Service Manual

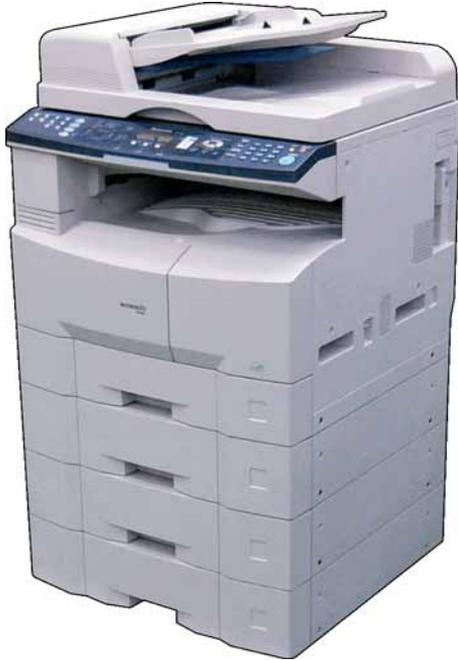**Digital Imaging Systems**

DP-8020E/8020P/8016P

[Version 1.1]

⚠ **WARNING**

This service information is designed for experienced repair technicians only and is not intended for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt within this service information by anyone else could result in serious injury or death.

IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are marked by ⚠ in the Schematic Diagrams, Circuit Board Diagrams, Exploded Views and Replacement Parts List. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire or other hazards. Do not modify the original design without permission of manufacturer.

Panasonic®

General Annotations

1. Panasonic Digital Document Company and other Panasonic Sales Companies reserve
   the right to change any information enclosed herein without prior notification.
   (This includes, but is not limited to, parts pricing, availability, and text)

2. Electrical parts supplied may include previously used components.

3. ⚠ **Important Safety Notice**
   Components identified by a ⚠ mark, have special characteristics important for safety.
   When replacing any of these components, use only manufacturer's specified parts.

4. In New Parts column, "N" indicates part is used only in DP-8020E/8020P*/8016P models,
   "C" indicates part is used in previous models.

5. In Remarks column, "PM" indicates "Preventive Maintenance Part".

6. In Remarks column, "RTL" indicates that the Retention Time is limited for this item. After
   the discontinuation of this assembly in production, the item will continue to be available for
   a specific period of time. The retention period of availability is dependant on the type of
   assembly, and in accordance with the laws governing part and product retention.
   After the end of this period, the assembly will no longer be available.

7. This "Unit" which includes other itemized parts is provided as "Limited Availability" for your
   convenience, and will only be offered for up to 3 years after the production of the unit
   ceases. However, the individual contents of the assembly will be available for the standard
   period.

8. **This Product Uses Lead (Pb) Free Solder Printed Circuit Boards (PCBs).**
   Information regarding Lead-Free (PbF) solder;

   Distinction of PbF PCB:
   PCBs (manufactured) using lead free solder will have a **PbF** mark following
   the PCB part numbers in a label on the PCB.
   Caution:
   • Pb free solder has a higher melting point than standard solder; typically the melting
     point is 86-104°F (30-40 °C) higher. Please use a soldering iron with temperature
     control and adjust it to 698±20°F (370±10°C). Exercise care while using higher
     temperature soldering irons, do not heat the PCB for too long to prevent solder splash
     or damage to the PCB.
   • Pb free solder will tend to splash when heated too high (about 1112°F/600°C).
   • ECO SOLDER M705 (available from Senju Metal Industry Co., Ltd.;
     URL: http://www.senju-m.co.jp) is recommended when repairing PbF PCBs.

   * DP-8020P is not available for USA and Canada.

General Annotations

9. **Important Notice**
   (Especially in those countries belonging to the European Union):

   This product is fully compliant with the national laws transposed from the EU Directive on the restriction of the use of certain hazardous substances (RoHS) in electrical and electronic equipment, effective 1st July 2006 in the EU countries.

   In order for the product to comply with the RoHS Directive, the six particular substances (lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls, and polybrominated diphenyl ethers) have been either totally eliminated or limited to the concentration level below maximum allowed. Consequently spare parts have been changed to RoHS-compliant parts where applicable.

   To ensure compliance with the spare parts application of the RoHS legislation, please make sure to follow the details provided in this manual when ordering spare parts and carrying out repairs.

The contents of this Service Manual, and the Specifications are subject to change without notice. Panasonic Communications Co., Ltd. reserves the right to make improvements in the product design without reservation and without notice. Published in Japan.

Important Notice

Please read these Instructions completely **BEFORE** installing any optional accessories. Installing the additional board, or connector with the power ON (only the power switch OFF) could damage the SPC, and/or SC board.

If the Hard Disk Drive Unit is installed, to prevent a Disk Scan Function from being performed (similar to when the power is abruptly interrupted to the PC), it is important to follow the step sequence below when turning OFF the Power Switch on the machine.

How to turn OFF the Power:

<Example : DP-8020>

1. If the machine is in the "ENERGY SAVER (Shutdown Mode)", you may turn the Power Switch on the machine to the OFF position. If it is not in the "ENERGY SAVER (Shutdown Mode)", continue to step 2 below.
2. Press "FUNCTION" and "ENERGY SAVER" keys simultaneously first.
3. Wait approximately 10 seconds while the machine writes the closing status onto the Hard Disk Drive Unit, and advances into "ENERGY SAVER MODE".
4. Turn the Power Switch on the machine to the OFF position.
5. Disconnect the Telephone Line Cable, if the Fax Option is installed.
6. Unplug the AC Power Cord.
    (When the Fax option is installed, there is a remote possibility of electrocution when servicing the unit during a Lightning Storm. As a precaution, disconnect the Telephone Line Cable first, before unplugging the AC Power Cord.

Location of Main Power Switch

POWER

Note:
Main Power Switch
Ⅰ = Power ON
O = Power OFF

⚠ WARNING

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Wichtiger Hinweis

Diese Vorschriften bitte ganz durchlesen, **BEVOR** die Maschine repariert oder optionales Zubehör installiert wird. Der Einbau einer zusätzlichen Leiterplatte oder eines Steckers, wenn die Netzspannung angeschaltet ist (bei ausgeschaltetem vorderen Betriebsschalter), kann die SPC- und/oder SC-Leiterplatte beschädigen.

Um eine Ausführung der Disk-Scanfunktion bei einer eingebauten Festplatte zu unterbinden (wenn z.B. die Stromzufuhr des PCs plötzlich unterbrochen wird), muss beim Ausschalten des Geräts unbedingt die folgende Schrittreihenfolge eingehalten werden.

Ausschalten der Maschine:

<Beispiel : DP-8020>

1. Wenn sich das Gerät im "ENERGIESPARMODUS (Schließmodus)" befindet, können Sie den Geräteschalter auf OFF (AUS) stellen. Falls sich das Gerät nicht im "ENERGIESPARMODUS (Schließmodus)" befindet, setzen Sie mit den nachfolgenden Schritt 2 fort.
2. Betätigen Sie die Tasten "FUNKTION" und "ENERGIESPARMODUS" gleichzeitig.
3. Warten Sie ca. 10 Sekunden, bis das Gerät den Abschließstatus auf die Festplatte schreibt und in den "ENERGIESPARMODUS" umschaltet.
4. Bringen Sie den Geräteschalter in die Stellung AUS.
5. Falls die Fax-Option installiert ist, ist das Telefonkabel abzuziehen.
6. Das Netzkabel abziehen.
   (Wenn die Fax-Option installiert ist, besteht die Möglichkeit eines Stromschlags, wenn während eines Gewitters eine Wartung ausgeführt wird. Als Vorsichtsmaßnahme empfehlen wir, zuerst das Telefonkabel und dann das Netzkabel abzuziehen.)

Position des Geräteschalters

POWER
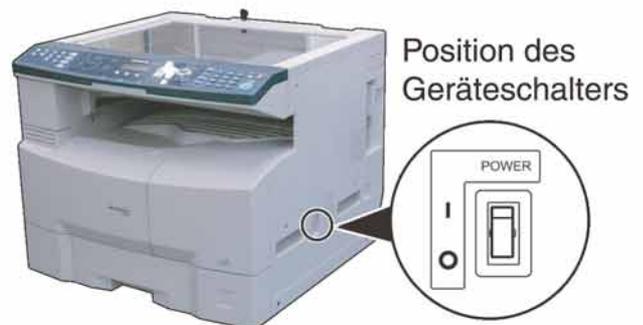
Hinweis:
Hauptnetzschalter
I = eingeschaltet
O = ausgeschaltet

⚠ WARNUNG

Diese Wartungsinformation ist ausschließlich für erfahrenes Wartungspersonal und nicht für allgemeine Wartung durch den Laien bestimmt. Die Information enthält keine Warn- und Vorsichtshinweise hinsichtlich potentieller Gefahren für nicht professionelle Benutzer. Elektrisch betriebene Geräte dürfen nur durch erfahrenes technisches Personal gewartet oder repariert werden. Jegliche Wartung oder Reparatur durch unerfahrene Personen kann zu ernsthaften Verletzungen bzw. zu einem tödlichen Stromschlag führen.

* Technishche Änderungen jederzeit vorbehalten. Panasonic Communications Co., Ltd. behält sich das Recht vor, jederzeit und ohne Mitteilung Verbesserungen des Produkt-Design durchzuführen.

Caution:

Depending on your machine's model, it may weight approximately 93.26 - 98.33 lb (42.3 - 44.6 kg) without any options.

To prevent injuries, use the appropriate number of personnel to **lift, or move the machine as illustrated**.

Do not lift the machine by the Paper Tray as it may cause damage and/or bodily injury.

Note:

Refer to the Installation Instructions when installing the machine.

Precautions

For Your Safety

To prevent severe injury and loss of life, read this section carefully before servicing the Panasonic machine to ensure proper, and safe operation of your machine.
Please ensure that the machine is installed near a wall outlet, and is easily accessible.

- This section explains the Warnings and Cautions used in the machine and/or this manual.

> ⚠ **WARNING:** Denotes a potential hazard that could result in serious injury or death.
>
> ⚠ **CAUTION:** Denotes hazards that could result in minor injury or damage to the machine.

- This section also explains the Warnings and Cautions used in the machine and/or this manual.

> 🚫 🚫 🚫 These symbols are used to alert operators to a specific operating procedure that must not be performed.
>
> ❗ 🔌 These symbols are used to alert operators to a specific operating procedure that must be emphasized in order to operate the machine safely.

⚠ WARNING

Power and Ground Connection Cautions

❗ Ensure that the plug connection is free of dust. In a damp environment, a contaminated connector can draw a significant amount of current that can generate heat and eventually cause fire if left unattended over an extended period of time.

❗ Always use the power cord provided with your machine. When an extension power cord is required, always use a properly rated cord.
- 120 V/15 A or AC 220 - 240V/10 A
If you use a cord with an unspecified current rating, it may be underrated, and the machine, or plug may emit smoke, orbecome hot to the touch.

🚫 Do not attempt to repair, pull, bend, chafe or otherwise damage the power cord. Do not place a heavy object on the cord. A damaged cord can cause fire or electric shocks.

🚫 Never touch a power cord with wet hands. Danger of electric shock exists.

❗ If the power cord is damaged, or insulated wires are exposed, contact the authorized Panasonic dealer for a replacement. Using a damaged cord can cause fire or electric shocks.

🔌 Stop operation immediately if your machine emits smoke, excessive heat, unusual noise, or abnormal smell, or if water is spilt onto the machine. These conditions can cause fire. Immediately switch Off and unplug the machine, and contact the authorized Panasonic dealer.

🚫 Do not disconnect or reconnect the machine while the power switch is in the On position. Disconnecting a live connector can cause arcing, consequently deforming the plug and cause fire.

❗ When disconnecting the machine, grasp the plug instead of the cord. Pulling on a cord forcibly can damage it, and cause fire, or an electric shock.

❗ When the machine is not used over an extended period of time, switch it Off and unplug it. If an unused machine is left connected to a power source for a long period, degraded insulation can cause electric shocks, current leakage or fire.

❗ Be sure to switch Off, and unplug the machine before accessing the interior of the machine for cleaning, maintenance or fault clearance. Access to a live machine's interior can cause an electric shock.

Once a month, unplug the machine and check the power cord for the following. If you notice any unusual condition, contact your authorized Panasonic dealer
- The power cord is plugged firmly into the receptacle.
- The plug is not excessively heated, rusted, or bent.
- The plug and receptacle are free of dust.
- The cord is not cracked or frayed.

Operating Safeguards

Do not touch areas where these caution labels are attached to, the surface may be very hot and may cause severe burns.

Do not place any liquid container such as a vase, or coffee cup on the machine. Spilt water can cause fire or shock hazard.

Do not place any metal parts such as staples or clips on the machine. If metal and flammable parts get into the machine, they can short-circuit internal components, and cause fire or electric shocks.

If debris (metal or liquid) gets into the machine, switch Off and unplug the machine immediately.
Operating a debris-contaminated machine can cause fire or electric shock.

Do not try to alter the machine configuration or modify any parts. An unauthorized modification can cause smoke or fire.

Consumable Safeguards

Never dispose of toner, toner cartridge, or a waste toner container into an open flame. Toner remaining in the cartridge/bottle can cause an explosion, burns and/or injuries.

Keep button batteries/stamp out of the reach of children to prevent chocking or poisoning. If a button battery/verification stamp is swallowed accidentally, get medical treatment immediately.

Notice: California only:

This product contains a CR Coin Cell Lithium Battery which contains Perchlorate Material - special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate

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⚠ CAUTION

Installation and Relocation Cautions

Do not place the machine near heaters or volatile, flammable, or combustible materials such as curtains that may catch fire.

Do not place the machine in a hot, humid, dusty, or poorly ventilated environment. Prolonged exposure to these adverse conditions can cause fire or electric shocks.

Place the machine on a level and sturdy surface that can withstand the weight of the machine.
Refer to the Specifications section for the weight of the machine.
If tilted, the machine may tip-over and cause injuries.

When relocating the machine, remove the toner and/or developer, and pack the machine with proper packing materials for shipping.

When moving the machine, be sure to unplug the power cord from the outlet. If the machine is moved with the power cord attached, it can cause damage to the cord which could result in fire or electric shock.

⚠ CAUTION

Operating Safeguards

Do not place a magnet near the safety switch of the machine. A magnet can activate the machine accidentally, resulting in injuries.

Do not use a highly flammable spray, or solvent near the machine. It can cause fire.

When copying a thick document, do not use excessive force to press it against the scanning glass. The glass may break and cause injuries.

Never touch a labelled area found on, or near the heat roller You can get burnt. If a sheet of paper is wrapped around the heat roller, do not try to remove it yourself to avoid injuries or burns. Switch Off the machine immediately, and wait until it cools down.

Do not use conductive paper, e.g. folding paper, carbon paper and coated paper. When a paper jam occurs, they can cause a short circuit and fire.

Do not place any heavy object on the machine. An off-balance machine can tip-over, or the heavy object can fall, causing damage and/or injuries.

Keep the room ventilated when using the machine for an extended period of time to minimize the ozone density in the air.

When copying with the document cover open, do not look directly at the exposure lamp. Direct eye exposure can cause eye fatigue or eye injury.

Pull the paper trays out slowly to prevent injuries.

When removing jammed paper, make sure that no pieces of torn paper are left in the machine. A piece of paper remaining in the machine can cause fire. If a sheet of paper is wrapped around the heat roller, or when clearing a jammed paper that is difficult or impossible to see, do not try to remove it by yourself. Doing so can cause injuries or burns. Switch Off the machine immediately, and wait until it cools down.

Consumable Safeguards

Never heat the drum cartridge, or scratch its surface. A heated, or scratched drum can be hazardous to your health.

Do not mix new and old batteries together, as they can burst or leak, causing a fire or injuries. Be sure to use the specified type of batteries only.

Ensure that batteries are installed with correct polarity. Incorrectly installed batteries can burst or leak, resulting in spillage or injuries.

Others

- When clearing a paper jam or other fault, follow the appropriate procedure given in this manual.
- The machine has a built-in circuit for protection against lightning-induced surge current. If lightning strikes in your neighborhood, maintain an ample distance from the machine, and do not touch it until the lightning stops.
- If you notice flickering, distorted images, or noises on your audio-visual units, your machine may be causing radio interference. Switch it Off, and if the interference disappears, the machine is the cause of the radio interference. Perform the following procedure until the interference is corrected.
  - Move the machine, and the TV and/or radio away from each other.
  - Reposition or reorient the machine, and the TV and/or radio.
  - Unplug the machine, TV and/or radio, and replug them into outlets operating on different circuits.
  - Reorient the TV and/or radio antennas, and cables until the interference stops. For an outdoor antenna, ask your local electrician for support.
  - Use a coaxial cable antenna.

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Für Ihre Sicherheit

Um schwere Verletzungen, möglicherweise mit Todesfolge, zu vermeiden, lesen Sie diesen Abschnitt sorgfältig durch, bevor Sie den Panasonic verwenden, um richtige und sichere Verwendung Ihrer Maschine sicherzustellen.

■ Dieser Abschnitt erklärt die Warnungen und Vorsichtsmaßregeln, die in dieser Bedienungsanleitung verwendet werden.

⚠	**WARNUNG**	Weist auf eine potenzielle Gefahr hin, die zu schweren Verletzungen oder Tod führen kann.
⚠	**Achtung**	beschreibt Gefahren, die zu leichten Verletzungen oder Schäden an der Maschine führen können.

■ Dieser Abschnitt erklärt auch die grafischen Symbole, die in dieser Bedienungsanleitung verwendet werden.

🚫 🖐 🔧	Diese Symbole werden verwendet, um Bediener auf spezifische Bedienverfahren hinzuweisen, die vermieden werden müssen.
❗ 🔌	Diese Symbole werden verwendet, um Bediener auf spezifische Bedienverfahren hinzuweisen, die genutzt werden müssen, um die Maschine sicher zu betreiben.
🔥	Dieses Symbol dient dazu, die Bediener darauf aufmerksam zu machen, dass eine heiße Oberfläche vorhanden ist, die Verbrennungen verursachen kann.

⚠ WARNUNG

Vorsichtsmaßregeln zu Strom- und Erdungsverbindungen

❗ Stellen Sie sicher, dass die Steckerverbindung staubfrei ist. In einer feuchten Umgebung kann ein verschmutzter Secker eine beträchtliche Menge Strom aufnehmen, die Hitze erzeugen und nach längerer Zeit in diesem Zustand zu Bränden führen kann.

❗ Verwenden Sie immer das mit dem Gerät mitgelieferte Netzkabel. Wenn ein Verlängerungskabel erforderlich ist, verwenden Sie immer ein Kabel mit geeigneter Stärke.
● 120-240V/6.5A
Wenn Sie ein Kabel mit einer nichtspezifizierten Stromstärke verwenden, kann die Maschine Rauch abgeheben oder sich außen stark erhitzen.

🚫 Versuchen Sie nicht, das Netzkabel zu modifizieren und vermeiden Sie Ziehen, Biegen, Scheuern oder anderweitige Beschädigung. Stellen Sie keine schweren Gegenstände auf das Netzkabel. Ein beschädigtes Netzkabel kann zu Bränden oder elektrischen Schlägen führen.

🚫 Niemals ein Netzkabel mit nassen Händen berühren. Dabei besteht die Gefahr elektrischer Schläge.

❗ Wenn das Netzkabel beschädigt ist oder isolierte Drähte freiliegen, wenden Sie sich wegen Ersatz an Ihren Panasonic-Fachhändler. Verwendung eines beschädigten Netzkabels kann zu Bränden oder elektrischen Schlägen führen.

🔌 Sofort den Betrieb stoppen, wenn Ihre Maschine Rauch, starke Hitze, ungewöhnliche Geräusche oder Geruch abgibt, oder wenn Wasser auf die Maschine geschüttet wurde. Durch diese Bedingungen können Brände verursacht werden. Schalten Sie die Maschine sofort aus, ziehen Sie den Stecker ab, und wenden Sie sich an Ihren Panasonic-Fachhändler.

🚫 Versuchen Sie nicht, die Maschine abzutrennen oder neu anzuschließen, während der Netzschalter auf Ein steht. Durch Abziehen eines stromführenden Steckers kann ein Lichtbogen entstehen, durch den Verformungen und Brände verursacht werden.

❗ Beim Abtrennen des Netzsteckers immer am Stecker und nicht am Kabel ziehen. Wenn ein Stecker gewaltsam abgezogen wird, kann er beschädigt werden und Brände oder elektrische Schläge verursachen.

❗ Wenn die Maschine längere Zeit über nicht verwendet wird, schalten Sie sie aus und ziehen den Netzstecker ab. Wenn eine nichtverwendete Maschine längere Zeit an einer Stromquelle angeschlossen bleibt, kann beeinträchtigte Isolierung zu elektrischen Schlägen, Stromlecks oder Feuer führen.

❗ Schalten Sie die Maschine immer aus und ziehen Sie den Stecker ab, bevor Sie auf das Innere der Maschine zugreifen, um Reinigung, Wartung oder Fehlerbehebung auszuführen. Zugriff zu Teilen im Maschineninneren kann zu elektrischen Schlägen führen.

Einmal im Monat die Maschine vom Netz trennen und das Netzkabel auf Folgendes prüfen. Wenn ein ungewöhnlicher Zustand vorgefunden wird, wenden Sie sich an Ihren Panasonic-Fachhändler.
● Das Netzkabel ist fest in die Steckdose eingesteckt.
● Der Stecker ist nicht stark erhitzt, verrostet oder verbogen.
● Stecker und Steckdose sind frei von Staub.
● Das Kabel ist nicht gerissen oder aufgefasert.

Bedienungs-Schutzmaßnahmen

Berühren Sie nicht Bereiche, wo diese Vorsichtsaufkleber an der Oberfläche angebracht sind, da diese sehr heiß sein können und zu schweren Verbrennungen führen können.

Stellen Sie keine Flüssigkeitsbehälter wie eine Vase oder Kaffeekanne auf die Maschine. Verschüttetes Wasser kann zu Bränden oder elektrischen Schlägen führen.

Legen Sie keine Metallgegenstände wie Heft- oder Büroklammern auf die Maschine. Falls Metall- oder brennbare Teile in die Maschine geraten, können sie zu Kurzschlüssen an internen Bauteilen führen und Brände oder elektrische Schläge verursachen.

Falls Fremdkörper (Metall oder Flüssigkeiten) in die Maschine geraten, sofort ausschalten und den Stecker abziehen. Den Panasonic-Fachhändler anrufen. Bedienung einer durch Fremdkörper verschmutzten Maschine kann zu Bränden oder elektrischen Schlägen führen.

Niemals die Maschinenabdeckungen öffnen, die mit Schrauben festgeschraubt sind, wenn nicht spezifisch in der "Bedienungsanleitung" angegeben. Ein Hochspannungsbauteil kann zu elektrischen Schlägen führen.

Versuchen Sie nicht, die Maschinenkonfiguration zu ändern oder Teile zu modifizieren. Eine unbefugte Modifikation kann zu Rauch oder Bränden führen.

VerbrauchsmaterialienSchutzmaßnahmen

Niemals Toner, Tonerkassette oder Tonerabfallbehälter in offenes Feuer werfen. In der Kassette verbleibender Toner kann eine Explosion verursachen und zu Verbrennungen und/oder Verletzungen führen.

Halten Sie Knopfbatterie/Stempel außer Reichweite von Kindern. Wenn eine Knopfbatterie/Stempel versehentlich verschluckt wird, sofort ärztliche Hilfe aufsuchen.

⚠ ACHTUNG

Vorsichtsmaßregeln zu Aufstellung und Transport

Platzieren Sie die Maschine nicht in der Nähe von Heizkörpern oder flüchtigen, entflammbaren oder brenbaren Materialien wie Vorhänge, die Feuer fangen können.

Stellen Sie die Maschine nicht in einer heißen, feuchten, staubigen oder schlecht belüfteten Umgebung auf. Längerer Betrieb unter diesen Bedingungen kann zu Bränden oder elektrischen Schlägen führen.

Die Maschine auf eine ebene und feste Oberfläche stellen

Wenn sie geneigt wird, kann die Maschine umkippen und Verletzungen verursachen.

Beim Aufstellungsänderung des Geräts wenden Sie sich an Ihren Panasonic-Fachhändler.

Beim Transport der Maschine ziehen Sie den Netzstecker von der Steckdose ab. Wenn die Maschine bei eingestecktem Netzkabel und -stecker bewegt wird, kann das Netzkabel beschädigt werden, was zu Bränden oder elektrischen Schlägen führen kann.

Bedienungs-Schutzmaßnahmen

Bringen Sie keinen Magneten in die Nähe des Sicherheitsschalters der Maschine. Ein Magnet kann die Maschine versehentlich aktivieren, was zu Verletzungen führen kann.

Verwenden Sie keine leicht entflammbaren Sprays oder Lösungsmittel in der Nähe der Maschine. Dadurch können Brände verursacht werden.

Beim Kopieren eines dicken Originals nicht starke Kraft verwenden, um es gegen das Originalauflageglas zu drücken. Das Glas kann brechen und Verletzungen verursachen.

Niemals den markierten Bereich in der Nähe der Heizwalze berühren. Dabei besteht die Gefahr von Verbrennungen. Wenn ein Blatt Papier um die Heizwalze gewickelt ist, versuchen Sie nicht, es selber zu entfernen, um Verletzungen oder Verbrennungen zu vermeiden. Schalten Sie das Gerät sofort aus und wenden Sie sich an Ihren Panasonic-Fachhändler.

Verwenden Sie kein leitendes Papier, wie z.b. Faltpapier, Karbonpapier oder beschichtetes Papier. Wenn ein Fehleinzug auftritt, kann dies zu Kurzschlüssen und Bränden führen.

Stellen Sie keine schweren Gegenstände auf die Maschine. Eine unbalancierte Maschine kann umkippen, oder schwere Gegenstände können herunterfallen, was zu Schäden und/oder Verletzungen führen kann.

Halten Sie den Raum gut gelüftet, wenn Sie die Maschine längere Zeit über verwenden, um die Ozondichte in der Luft zu minimieren.

Beim Kopieren mit offener Originalauflage-Abdeckung nicht direkt in die Belichtungslampe blicken. Direkte Bestrahlung des Auges kann zu Augenermüdung oder sogar zu Augenschäden führen.

Die Papierfächer langsam ziehen, um Verletzungen zu vermeiden.

Beim Entfernen von fehleingezogenem Papier stellen Sie sicher, dass keine abgerissenen Papierreste in der Maschine verbleiben. Ein in der Maschine verbleibendes Stück Papier kann Feuer fangen. Wenn ein Blatt Papier um die Heizwalze gewickelt ist oder wenn ein besonders schwieriger Papierfehleinzug behoben werden muss, versuchen Sie nicht, es selber zu entfernen. Dabei besteht die Gefahr von Verletzungen oder Vebrennungen. Schalten Sie das Gerät sofort aus und wenden Sie sich an Ihren Panasonic-Fachhändler.

Beim Zugriff auf Innenteile des Geräts zum Beheben von Papierfehleinzug usw. immer darauf achten, nicht heiße Stellen zu berühren; sonst besteht die Gefahr von Verbrennungen.

Sonstiges

■ Beim Beheben eines Papierstaus oder einer anderen Störung das geeignete Verfahren entsprechend der Bedienungsanleitung befolgen.

Für Ihre Sicherheit

⚠ ACHTUNG

VerbrauchsmaterialienSchutzmaßnahmen

Verwenden Sie immer nur Batterien des vorgeschriebenen Typs.

Stellen Sie sicher, dass die Batterien mit richtiger Polung eingelegt sind. Falsch eingelegte Batterien können bersten oder leck werden, was zu Bränden oder Verletzungen führen kann.

Sonstiges

■ Die Maschine hat eine eingebaute Schaltung zum Schutz gegen Stromspitzen durch Blitzschlag. Falls in der Nähe ein Gewitter mit Blitzschlägen auftritt, sorgen Sie für ausreichenden Abstand vom Gerät und berühren Sie das Gerät nicht, bevor das Gewitter beendet ist.
■ Wenn Sie Flackern oder verzerrte Bilder oder Rauschen in Audio/Video-Geräten in der Nähe feststellen, kann es sein, dass die Maschine elektromagnetische Störungen erzeugt. Schalten Sie sie aus, und wenn die Störungen verschwinden ist die Maschine die Ursache der Störungen. Führen Sie das folgende Verfahren aus, bis die Störungen beseitigt sind.
 ● Die Maschine und das Fernsehgerät und/oder Radio weiter voneinander entfernt aufstellen.
 ● Die Maschine und das Fernsehgerät und/oder Radio anders aufstellen oder ausrichten.
 ● Ziehen Sie den Netzstecker der Maschine, von Fernsehgerät und/oder Radio ab und stecken sie in Steckdosen ein, die zu getrennten Stromkreisen gehören.
 ● Die Fernseh- und/oder Rundfunkantennen und -kabel anders ausrichten, bis die Störungen aufhören. Bei einer Außenantenne den örtlichen Elektriker um Unterstützung bitten.
 ● Verwenden Sie eine Koaxkabelantenne.

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1 Specifications

1.1. Control Panel

DP-8020 Series for PU (USA/Canada, etc.)

DP-8020E

DP-8020P

DP-8016P

OPTIONS (DP-8020E/8020P only)

Keyboard Option

Note1:
1. DP-8020P is not available for USA and Canada.
2. Model availability may differ as per destination. Please ask your sales company for details.

Note2:
LCD Display Brightness Adjustment
To adjust the brightness of the LCD display, press and while holding down the "**CLEAR**" key, keep pressing the "**ORIGINAL SIZE**", or the "**COPY SIZE**" key until the desired brightness is achieved.
ORIGINAL SIZE : Dimmer
COPY SIZE   : Brighter

DP-8020 Series for Other Destinations

DP-8020E

DP-8020P

DP-8016P

OPTIONS (DP-8020E/8020P only)

Keyboard Option

Note:
Model availability may differ as per destination. Please ask your sales company for details.

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1.2. Specifications Table

1.2.1. Copy Function

Items	Description			Remarks
	DP-8020E	DP-8020P	DP-8016P	
Basic Specifications				
1 Type	Desktop			
2 Platen	Fixed			
3 Original Position				
Platen	Left / Rear			
ADF / i-ADF	Left / Center			
4 Recording Paper Path	Center			
5 Face Up / Face Down	Face Down			
6 Drum	Organic Photo Conductor (OPC)			
7 Copy Process	Dry Electrostatic System			
8 Developing Process	Dry Dual Components			
9 Toner Recycle	No			
10 Fusing System	Heat & Pressure			
11 Max Original Size	Ledger (11 x 17 in) / A3 (297 x 420 mm)			
12	Paper Size			
Paper Tray	LDR, LGL, LTR, LTR-R, INV-R			For USA and Canada
	A3, A4, A4-R, A5, A5-R, B4, FLS			For EU FLS = 8 x 13 in, 8.5 x 13 in
	A3, A4, A4-R, B4, B5, B5-R			For Other Destinations
Bypass Tray	LDR, LGL, LTR, LTR-R, INV-R			For USA and Canada
	A3, A4, A4-R, A5-R, B4, FLS			For EU FLS = 8 x 13 in, 8.5 x 13 in
	A3, A4, A4-R, B4, B5, B5-R			For Other Destinations
Bypass Tray (Envelope)	#10 (4.1 x 9.5 in)			For USA and Canada
	DL (4.3 x 8.7 in)			For EU
13 Paper Weight				
Paper Tray	16-24 lb (60 - 90 g/m2)			
Bypass Tray	15-34 lb (55 - 133 g/m2)			
ADU	17-24 lb (64 - 90 g/m2)			For DP-8020E
14 Warm-up Time	Less than 30 sec			68 °F (20 °C)
15 First Copy Time	Less than 6.9 sec			From Platen, Letter/ A4 Portrait,1st Paper Tray. Period between Start Key is pressed and Paper ejected to the Exit Tray. When LSU is ready.
16 Copy Speed				
Ledger	11 cpm		9 cpm	From Platen, 1st Paper Tray, and Paper ejected to the Exit Tray, LSU is ready, and Continuous Copy.
A3	11 cpm		10 cpm	
Legal / B4 / FLS	13 cpm		11 cpm	
Letter-R / A4-R	16 cpm / 15 cpm		13 cpm	
Letter / A4	20 cpm		16 cpm	
Invoice-R / A5-R	20 cpm		16 cpm	

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Items			Description			Remarks
			DP-8020E	DP-8020P	DP-8016P	
17	Zoom					
	Enlargement		Selected Original size / Copy size			
	Reduction		Selected Original size / Copy size			
	Zoom		50 - 200%			1% Step
18	Paper Feed		Front Loading Universal Paper Tray			
	Paper Tray					
		Capacity	550 sheets x 1			LTR / A4 : 20 lb (75 g/m2)
		Auto Size Setting	No			Control Panel Selectable
		Low Level Warning	Empty Only			
	Bypass Paper Tray					
		Capacity	50 sheets			LTR / A4 : 20 lb (75 g/m2)
		Auto Size Setting	Yes			
	Paper Capacity (Std. Configuration)		600 sheets			Paper Tray 1 (Std) + Bypass Paper Tray
19	Multi Copy Range		999 sheets			
20	Gradation					
	Text		Bi-Level			
	Text / Photo		256 steps			Halftone by Error Diffusion
	Photo		256 steps			
21	Resolution		600 dpi			Scanning and Printing.
22	Standard Sorting Memory Size		16 MB			
23	Standard Page Memory Size		32 MB			
24	Exit Tray Capacity		Standard: 250 sheets			
25	Color		No			
26	Dimensions					
	(W x D x H)		22.0 x 21.9 x 18.1 in (558 x 557 x 460 mm)			H: To Platen Glass.
			33.2 x 24.6 x 24.5 in (844 x 624 x 623 mm)			Includes ADF / Bypass Paper Tray.
27	Operating Space					
	(W x D)		33.2 x 22.2 in (844 x 565 mm)			Includes Bypass Paper Tray.
	Weight	DP-8020E	95.46 lb (43.3 Kg)			For PU (USA/Canada, etc.) *DP-8020P is not available for USA and Canada
		DP-8020P*/ 8016P/	93.26 lb (42.3 Kg)			
		DP-8020E	98.33 lb (44.6 Kg)			For EU and Other Destinations
		DP-8020P/ 8016P	96.12 lb (43.6 Kg)			

Items	Description			Remarks
	DP-8020E	DP-8020P	DP-8016P	
Options				
1 Paper Feed System				LTR / A4 : 20 lb (75 g/m2)
550 sheets 2nd Paper Tray	Yes			
Paper Size Detection	Manual			Control Panel Selectable
Low Level Paper Warning	Empty Only			
550 sheets 3rd Paper Tray	Yes		No	
Paper Size Detection	Manual			Control Panel Selectable
Low Level Paper Warning	Empty Only			
550 sheets 4th Paper Tray	Yes		No	
Paper Size Detection	Manual			Control Panel Selectable
Low Level Paper Warning	Empty Only			
Max. Paper Capacity	2, 250 sheets		1, 150 sheets	
2 Stand				
Stand for 4*-Paper Tray Configuration	Option			Low Stand with Casters DA1D18C :For USA and Canada Only DA-DA191-PE :For Other Destinations
Stand for 3*-Paper Tray Configuration	Option			Low Stand with Casters DA1D18C :For USA and Canada Only DA-DA190-PE :For Other Destinations
Stand for 2-Paper Tray Configuration	Option			Mid Stand with Casters DA1D18B :For USA and Canada Only DA-DA189-PE :For Other Destinations
Stand for 1-Paper Tray Configuration	Option			High Stand with Casters DA1D18A :For USA and Canada Only DA-DA188-PE :For Other Destinations
Note: The same Stand (DA1D18C) is used for either 3 or 4 Paper Tray Configuration for USA and Canada.				
3 Platen Cover	Option			For USA and Canada
	Standard			For EU and Other Destinations
Free Stop	Yes			From 30 to 70 degrees.

Items	Description			Remarks
	DP-8020E	**DP-8020P**	**DP-8016P**	
4 ADF				
Single Side Type	Option			
Original Set	Face Up			
Scanning Method	Sheet Through			
Capacity (Originals)	50 sheets			LTR / A4 : 20 lb (75 g/m2)
SADF Mode	Yes			
Free Stop	Yes			From 30 to 70 degrees.
5 Inverting ADF (i-ADF)				
Duplex Type	Option	No		
Original Set	Face Up			
Scanning Method	Sheet Through			
Capacity (Originals)	50 sheets			LTR / A4 : 20 lb (75 g/m2)
SADF Mode	Yes			Available for single side scanning only.
Free Stop	Yes			From 30 to 70 degrees.
6 Exit Tray (Inner)				
Tray Position	Inner			
Number of Bins	1			
Face Up / Face Down	Face Down			
Bin Capacity	250 sheets			
Multi Tray Function	No			
Shift Tray Function	No			
7 Finisher	No			
8 Exit Tray (Outer)	No			
9 Automatic Duplex Unit	Standard : DP-8020E			
10 Counter				
Key Counter Capability	Option			The Harness Kit contains only Harnesses, Bracket and a Screw.
11 Dehumidifier	Option			Supplied as a Service Part.
12 Sorting Image Memory				
Optional Image Memory 1 (16MB)	Yes			Unit comes standard with 16 MB. 1-Slot available for an Optional Image Memory module.
Optional Image Memory 2 (64MB)	Yes			
Optional Image Memory 3 (128MB)	Yes			
13 Hard Disk Drive	Option			Additional Optional Sorting Image Memory (Minimum 16 MB) is required for the Hard Disk Drive to function. (For Tandem, Remote Copy, etc.)

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Items	Description			Remarks
	DP-8020E	**DP-8020P**	**DP-8016P**	
Features				
1 Automatic Features				
Auto Magnification Selection	Yes			Using ADF only
Auto Paper Selection	Yes			
Auto Paper Tray Selection	Yes			
Auto Start	Yes			Reservation while Power On Initializing.
Remote Diagnostic	Yes			Requires the Fax Communication Board (DA-FG180) option or the Internet Fax / E-MAIL Module (DA-NF180) option.
Machine Stops when Out of Toner	Yes			PPC Function
2 Additional Features				
Low Level Paper Warning	Empty Only			
Photo Mode	Yes			256 steps
Original Detection Release	No			Manually overridden when using the Original Size keys.
Edit / Effects				
Book Mode	Yes			
Edge Mode	Yes			
Margin Mode	Yes			
X-Y Zoom	No			
Stamping / Page Numbering	No			
Inverse Mode (Negative / Positive)	No			
Centering Mode	Yes			With Digital Sky Shot
Image Repeat	Yes			
Mirror Mode	No			
Others (Inverting ADF & ADU)				
2-Page Copy Mode	Yes			LDR $\rightarrow$ LTR x 2 (A3 $\rightarrow$ A4 x 2, B4 $\rightarrow$ B5 x 2)
2 in 1	Yes			
4 in 1	Yes			
6 in 1	No			
8 in 1	No			
Booklet Mode	No			Copy from four 1-Sided pages to 1 Booklet Mode sheet.

Items		Description			Remarks
		DP-8020E	DP-8020P	DP-8016P	
	Duplex Copy				
		1→2	Yes	No	
		2→1	Yes		Scanning twice by turning the original.
		2→2	Yes	No	
		Book→2	Yes	No	
			1st Page BLANK	No		1 → 2 / 2 → 1 / 2 → 2
			1st Page IMAGE	No		Book → 2
	Image Rotation (90 or 270 °)	Yes			
	Electronic Sorting	Yes			
	Rotation Sorting	Yes			
	Insertion Job				
		Cover Mode	No		
		Page Insertion Mode	No		
		OHP Interleave Mode	No		
		Presentation Mode	No		
	Department Counter	Yes			300 Departments
	ADF				
		Multi Size Feed	No		
		JOB Build and SADF Mode	Yes		
		Original Counter	No		
	Job Memory	Yes			2 Jobs in Memory
	Job Time Display	Yes			
	Concurrent Copy	Yes			12 Concurrent Copy Jobs
	Tandem Copy Mode	No			
	Remote Copy Mode	No			
	Scan Once Print Many Mode	Yes			
	Job Complete Notice	Yes		No	
	Trial Copy Mode	No			
	Weekly Timer	No			
	Function Mode	Yes			
	Interrupt	Yes			
	Electronic Counter	Yes			
	Digital Sky Shot Mode	Yes			
	Double Exposure	Yes			
3	Control Panel				
	Display	LCD			20 digits x 2 lines
	Status Lamp	Yes			GREEN: Scanning / Printing RED: Alarm / Warning

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Items		Description		Remarks
		DP-8020E	DP-8020P	DP-8016P	
Key				
	Original Size	Yes		
	Copy Size	Yes		
	Keypad	Yes		
	Clear	Yes		
	Stop	Yes		
	Start	Yes		
	Energy Saver	Yes		
	Multi Size Feed	No		
	Sort	Yes		
	Function Mode	Yes		
	Original Detection Release	No		
	Interrupt	Yes		
	Reset	Yes		
	One-Touch key	Yes		With Keyboard Option
	Mode Change	Yes		Copier / Printer / NW Scanner / Fax and Internet Fax Mode
LCD Main Indication				
	Message Language (Default)	English (American)		For USA and Canada
		Specified Language		For EU and Other Destinations
	Original Size / Image Indication	Yes (without Image)		
	Paper Size / Image Indication	Yes (without Image)		
	Paper Tray Selection	Yes		
	Selected Paper Tray / Tray Status	Yes		
	Original Mode Selection	Yes		Text / Text-Photo / Photo
	Copy Density Selection	Yes		
	Setting Confirmation	Yes		
	Function Classification	Yes		
	Zoom Magnification	Yes		
	Number of Copies	Yes		
	JOB Build and SADF / Multi Size Feed Mode	Yes		
	Error Code	Yes		
	Finishing	No		
	Warning Indicators	Yes		
	Add Toner	Yes		
	Toner Waste Container Full	Yes		
	Add Paper (No Paper)	Yes		
	Add Paper (Under 50 sheets)	No		

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Items			Description			Remarks
			DP-8020E	DP-8020P	DP-8016P	
		Paper Jam Indication	Yes			
		Paper Jam Location	Yes			
		Service Alert Call	Yes			
		User Error	Yes			
		Machine Error	Yes			
		History of Jam Errors	Yes			
4	Main Unit					
	Total Counter					
		Electronic	Yes			
		Mechanical	Yes			Standard for EU. Available as a Service Part for Other Destinations.
	Max. Weight of Documents on the Platen Glass		11.02 lb (5 kg)			
	ADF with Document Guide		Yes			
	Clip Pocket		Yes			
	Operating Instructions Pocket		No			
	Warning / Caution Label		Specified Language			
5	Optical System					
	Original Detection Method		Reflective Photo Sensor Type			
	Scanning Method		600 dpi CCD			
	Dehumidifier		Yes			Supplied as a Service Part
	Mechanical Multi Copy Mode		No			
6	Process System					
	Type		Separate OPC Unit and Developer Unit Type			
	Toner		10 K			User replacement
	Toner Waste Container		10 K			
	Drum Life		60 K			
	Developer Life		60 K			
	Dehumidifier		Yes			Supplied as a Service Part
	Manual Add Toner		Yes			Manually adds toner to the developer (up to TDC threshold)

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Items	Description			Remarks
	DP-8020E	DP-8020P	DP-8016P	
PM Cycle				
1 PM Cycle				
Major PM	120 K			
Minor PM (Cleaning)	60 K			
Packing Configuration				
1 Packing Dimension	28.5 x 29.7 x 28.6 in (725 x 755 x 726 mm)			For USA, Canada
	29.5 x 31.3 x 29.7 in (750 x 796 x 755 mm)			For China
	28.7 x 29.3 x 25.8 in (730 x 745 x 655 mm)			For EU and Other Destinations
2 Packing Weight	127.77 lb (58 kg)	125.56 lb (57 kg)		For USA and Canada
	143.187 lb (65 kg)	140.98 lb (64 kg)		For China
	112.35 lb (51 kg)	110.14 lb (50 kg)		For EU and Other Destinations
3 Accessories				
Process Unit	Yes			
Developer	No			
Toner	No			
Toner Waste Container	No			
Operating Instructions	Yes			
Power Supply				
1 Power Requirement	99 - 132 VAC 47 - 63 Hz Single phase			120 VAC
	180 - 264 VAC 47 - 63 Hz Single phase			220 - 240 VAC
2 Power Consumption				
Max.Power Consumption				
100 VAC PS	Less than 1.3 KW			
220 VAC PS	Less than 1.3 KW			
Standby				
100 VAC PS	120 W			Turns On the Heater Power.
220 VAC PS	120 W			
Energy Saver				Automatically enters the Sleep or Shutdown Mode after 10 minutes from the Standby or Energy Saver Mode. Manually enters the Energy Saver Mode by pressing the Energy Saver key. Sleep or Shutdown mode is controlled by the General Functions setting.
Power Saver Mode				
100 VAC PS	19.0 W			
220 VAC PS	19.5 W			
Sleep Mode				
100 VAC PS	8.5 W			
220 VAC PS	9.5 W			
Shutdown Mode				
100 VAC PS	1.4 W			Network Function not available
220 VAC PS	1.6 W			

Items	Description			Remarks
	DP-8020E	**DP-8020P**	**DP-8016P**	
Ambient Conditions				
1 Temperature	50 - 80 °F / 10 - 30 °C			
2 Relative Humidity	30 - 80% RH			
3 Safety	UL60950-1 / CSA C22.2 No.60950-1			For USA and Canada
	EN60950-1 / IEC60950-1			For EU and Other Destinations
4 Energy Saver	Energy Star Compliant			
5 EMI	Class A computing device in FCC Rules Part 15			For USA and Canada
	Class B EN55022, EN55024, EN61000-3-2, EN61000-3-3, CISPR22			For EU and Other Destinations
6 Lead Free Solder (PbF)	This Product uses Lead Free (PbF) PCBs			Refer to the Parts Manual for details

1.3. Fax, Printer and Internet Fax Functions

1.3.1. Fax Function

Items	Description		Remarks
	DP-8020E	DP-8020P	
Main Specifications			
1 Compatibility	G3		ITU-T Std & Non-Std
2 PSTN Line Port	Yes		1-Line Only
3 Leased Line Port	No		
4 V.24 Line Port	No		
5 Modem Speed	33.6 - 2.4 kbps		T.30/V.34/V.17/V.29/V.27ter
6 Coding Scheme	JBIG/MMR/MR/MH		
7 ECM	Yes		Conforms to ITU-T Rec. T.30 ECM
8 Short Protocol	Yes (B, D)		
9 Transmission Speed	Approx. 2.9 sec		ITU-T Image No. 1 (A4, Std Resolution)
10 Communication Resolution dpi x lpi (pels/mm x lines/mm)	**Transmission** **Std.** : 203 x 98 (8 x 3.85) **Fine** : 203 x 196 (8 x 7.7) **S-Fine** : 203 x 391 (8 x 15.4) 406 x 391 (16 x 15.4) **600dpi** : 600 x 600 dpi **Reception** **Std.** : 203 x 98 (8 x 3.85) **Fine** : 203 x 196 (8 x 7.7) **S-Fine** : 203 x 391 (8 x 15.4) 406 x 391 (16 x 15.4) **600dpi** : 600 x 600 dpi		600 dpi communication is only possible between T.30 Compliant Panafax, WORKiO, and other T.30 compliant machines.
Scanner Mechanism			
1 Scanning Device	CCD (ADF / Platen)		
2 Scanning Speed (ADF)			
Resolution	Vertical Horizontal		
Std: 203 x 98 (8 x 3.85) dpi x lpi (pels/mm x lines/mm)	0.9 / 1.0 sec 0.7 sec		LTR / A4, Scanned in Vertical or Horizontal Direction. Excluding Initializing Time and ADF slipping factor.
Fine: 203 x 196 (8 x 7.7) dpi x lpi (pels/mm x lines/mm)			
S-Fine: 406 x 391 (16 x 15.4) dpi x lpi (pels/mm x lines/mm)	1.8 / 2.0 sec 1.4 sec		
600dpi: 600 x 600	2.8 sec 2.1 sec		
3 Scanning Speed (Platen)			
Resolution	Vertical Horizontal		
600dpi: 600 x 600	2.8 sec 2.1 sec		
4 Scanning Resolution dpi x lpi (pel/mm x lines/mm)	**Std.** : 203 x 98 (8 x 3.85) **Fine** : 203 x 196 (8 x 7.7) **S-Fine** : 203 x 391 (8 x 15.4) 406 x 391 (16 x 15.4) **600dpi** : 600 x 600 dpi		

Items	Description		Remarks
	DP-8020E	DP-8020P	
5 Document Size (Max.)	ADF: LDR / A3		
6 Effective Scanning Width	LDR (11.5 in) / A3 (292 mm)		
7 A3 size TX/RX	Yes		Conforms to ITU-T A3
8 Reduction XMT	Yes		LDR to LTR / A3 to B4 / A3 to A4 / B4 to A4
9 ADF Capacity	50 sheets		Face-Up, feed from top page LTR / A4 (20 lb / 75 g/m^2)
10 Collation Stack	Yes		Face Down
Printer Mechanism			
1 Recording Method	LP		
2 Recording Speed	23 / 30 ppm (A4 Horizontal)		Recording Speed attained after the 1st copy.
3 Recording Resolution Fax	600 x 600 dpi		
4 Recording Paper Size	Ledger / Legal / Letter / A3 / B4 / A4 / A5		Invoice : Not supported. Ledger size is transmitted as A3 size for N. American models. If A3 is received, approx. 1" of image on both edges are not printed on Ledger size paper.
5 Effective Printing Width	11.4 in (289 mm)		Conforms to ITU-T A3
6 Recording Paper Capacity	600 sheets		Optional max. 2250 sheets LTR / A4 : 20 lb (75 g/m^2)
7 Collation Stack	Yes		Face Down
8 Consumable	Toner Bottle, Developer, OPC Drum		
Fax Memory			
1 Standard Memory	2 MB (120 pages)		Flash ROM, ITU-T Image No.1 (A4, Std Resolution)
2 Optional Memory	4 MB 8 MB		Expansion Flash Memory Card, using ITU-T Image No.1 (A4, Std Resolution)
Dual Operation			
1 Multi Task Operation	Yes		
2 Direct XMT Reserve	Yes		
3 Memory XMT Reserve	Yes		
4 Number of Memory Job Files	Yes		Max. 50 files

Items	Description		Remarks
	DP-8020E	DP-8020P	
Dialing/Telephone Features			
1 One-Touch Keys	28		Requires Optional Keyboard.
2 One-Touch / Program Keys	4		
3 One-Touch Auto Dialers	32		
4 Abbr. Auto Dialers	200		
5 Total Auto Dialers	232		Plus an additional 800 stations available to select from, when the optional Hard Disk Drive (DA-HD18) is installed.
6 Directory Search Dialing	Yes		
7 Max. Tel Number Digits	36		
8 Max. Station Name Characters	15		
9 Full Number Dialing (Buffered Dialing)	Yes		Max. 50 stations
10 Direct Dialing (Monitor Dialing)	Yes		Voice mode
11 Automatic Redialing	Yes		Up to 15 times at 0 to 15 min. intervals
12 Manual Redialing	Yes		Pressing the REDIAL/PAUSE button
13 Line Monitor Speaker	Yes		
14 Chain Dialing (Hybrid Dial)	Yes		In Monitor Dialing mode only
15 Pulse / Tone Dialing	Yes		10 pps / DTMF
16 Pulse to Tone Change	No		
17 Flash Key	Yes		
18 Handset	No		

Items	Description		Remarks
	DP-8020E	DP-8020P	
Transmission Features			
1 Direct Transmission	Yes		
2 Memory Transmission	Yes		Page Retransmission
3 Quick Memory Transmission	Yes		
4 Multi-Station Transmission (Sequential Broadcasting)	Yes		Max. 250 stations
5 Direct Deferred Transmission	No		ADF Deferred Transmission
6 Deferred Transmission	Yes		Max. 50 timers
7 Deferred Multi-Station Transmission	Yes		
8 Priority Direct Transmission	Yes		Priority ADF Transmission
9 Priority Memory Transmission	No		
10 Batch Transmission	Yes		Real Time (up to 5 Files)
11 90 Degree Rotation Transmission	Yes		
12 Cover Sheet	Yes		
13 Confidential Mail Box	No		
14 Multi-Copy Transmission	No		
15 Memory Back-Up	Yes		**FAX** : Back-up with Flash Memory. **Copy / Printer** : No Back-up with D-RAM
16 Duplex Scanning	Yes		With Inverting ADF (i-ADF)
Reception Features			
1 Substitute Reception	Yes		
2 Fixed Reduction	Yes		LTR/A4/LGL: 70 - 100% (in 1% Steps), Top & Left Alignment
3 Auto Reduction	Yes		LTR/A4/LGL: 70 - 100% (in 1% Steps), Top & Left Alignment
4 Overlap Printing	Yes		Page End Approx. 0.51 in (13 mm)
5 Receive to Memory	Yes		
6 Distinctive Ring Detector (DRD)	No		
7 90 Degree Rotation Reception	Yes		
8 Duplex Printing	Yes		

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Items	Description		Remarks
	DP-8020E	DP-8020P	
Polling			
1 Polling	Yes		
2 Turnaround Polling	No		
3 Multi-Station Polling	Yes		Max. 250 stations
4 Deferred Polling	Yes		Max. 50 timers
5 Deferred Multi-Station Polling	Yes		Max. 50 timers / 250 stations
6 Direct Polling Tx	No		
7 Memory Polling Tx	Yes		1 File
8 Preset Polling Password	Yes		
9 Temporary Polling Password	Yes		
10 Continuous Polling	Yes		
Convenience			
1 Panel Display	LCD		
2 Voice Contact	No		
3 Edit File Mode	Yes		With View Mode
4 Incomplete File Save	Yes		With View Mode
5 Automatic Cover Sheet	Yes		
Certainty			
1 Verification Stamp	Yes		
2 Header / Total Page Print	Yes		
3 Transaction Journal	Yes		200 Transactions / with View Mode
4 Comm. Journal	Yes		With Image Data
5 Last Ind. XMT Journal	Yes		
List Printouts			
1 One-Touch List	-		
2 ABBR. No. List	-		
3 Program List	Yes		
4 Address Book Search List	Yes		Auto Dialer List
5 Fax Parameter List	Yes		
6 File List	Yes		With View Mode
7 Ind. XMT Journal	Yes		
8 Directory Sheet	No		

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Items	Description		Remarks
	DP-8020E	DP-8020P	
Identifications			
1 Logo	Yes		25 Characters
2 Multiple Logo	No		
3 Character ID	Yes		16 Characters
4 Numeric ID	Yes		20 Digits
Special Communications			
1 Password XMT / RCV	No		
2 Selective Reception	No		TSI Check
3 Relay XMT Request	No		
4 Relay XMT Center	No		
5 Confidential XMT / Polling	No		
6 Confidential Center	No		
7 Mailbox XMT / Polling	No		
8 Mailbox Center	No		
9 File XMT	No		
10 Fax Forward	Yes		Received File Transfer (Only with Internet Fax Option)
11 Sub-Address XMT	Yes		T. Routing
12 Sub-address RCV	No		
13 OMR-XMT	No		
Others			
1 Fax Access Code	Yes		
2 PIN Code Access	Yes		For USA and Canada only
3 Intelligent Redial (AI)	Yes		5 Files
4 Department Code	Yes		300 Departmental Codes
5 Power Saver Mode	Yes		
6 Self Diagnostic Function	Yes		
7 Remote Diagnostic Function	Yes		
8 Check & Call Function	Yes		
9 V.24 / Encryption Interface	No		

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1.3.2. Printer Function

Items	Description		Remarks
	DP-8020E/P	DP-8016P	
Interface			
1 Centronics Parallel I/F	No		
2 LAN (Network)	Ethernet 10Base-T/ 100Base-TX		
3 USB Port	Yes		USB
4 IEEE-1394	No		
Printer Function			
1 Printing Size (Paper Tray)	Letter / Legal / Ledger / A3 / A4 / A5 / B4 / B5 / FLS1 / FLS2 / Invoice / 8K / 16K		8K / 16K = China only
2 Printing Size (Multi-Purpose Tray)	Additionally; Envelope #10 / Envelope DL / Custom Size (PCL / PS only)		8K / 16K = Tray1 only
3 Stapling	No		
4 Printing Resolution (dpi)	300 x 300 600 x 600 1200 (Equivalent) x 600 (PCL / PS only)		
5 Interface	USB / Ethernet		
6 OS	Win 98 / Me / Win NT 4.0 / Win 2000 / XP / Windows Server 2003 / MAC 8.6-10.4		MAC 8.6-10.4 is PS only.
7 Printer Work Memory Size	20 MB		Not expandable
8 GDI	Yes		
9 PDL (PCL6)	Yes		Requires Optional PCL6 Emulation Kit.
10 PDL (PS3)	Yes	No	Requires Optional PS / PCL6 Emulation Kit
11 Duplex Printing	Yes	No	DP-8020E only. Custom Size/Post Card Size is not available.
12 Collation Stack	Yes		
13 Status Monitor			
Network	Yes		
USB	No		
14 Network Printing	Yes		
15 Smoothing	Yes		
16 Applicable PC	IBM PC, AT or Compatible, MAC		MAC is PS only.
17 Multi-Task Operation			
Printing while Fax-XMT from Memory	Yes		
Printing while Fax-RCV into Memory	Yes		
Fax-XMT from Memory while Printing	Yes		
Fax-RCV into Memory while Printing	Yes		

Items	Description		Remarks
	DP-8020E/P	DP-8016P	
18 Output to separate tray for Printing, Fax, Copy	No		
19 Font	Yes		Requires Optional PCL6 or PS / PCL6 Emulation Kit
20 Mailbox	Yes		Requires Optional HDD Unit. Max. 100 Users. Max. 20 mailboxes for each User ID
21 Secure Mailbox	Yes		Requires Optional HDD Unit. Max. 100 Users. Max. 20 mailboxes for each User ID

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1.3.3. Network Scanner Function

Items	Description		Remarks
	DP-8020E	DP-8020P	
Interface			
1 Centronics Parallel I/F	No		
2 LAN (Network)	Ethernet 10Base-T/ 100Base-TX		
3 USB Port	No		
4 IEEE-1394	No		
Network Scanning Function			
1 Scanning Device	CCD (i-ADF / ADF / Platen)		
2 Scanning Speed (ADF / I-ADF)	600 x 600 : 2.1 sec 300 x 300 : 1.1 sec 150 x 150 : 1.1 sec		Letter / A4
3 Halftone	256 Halftone shades		With Error Diffusion
4 Max. Document Size	Ledger, A3		
5 Scanning Resolution (dpi)	600 x 600 300 x 300 150 x 150		Selectable, 600 dpi Optical Scanner
6 OS	Win 98 / Me / Win NT 4.0 / Win 2000 / XP / Windows Server 2003		
7 2-Sided Scanning	Yes		With i-ADF.
8 File Format	Mult-page TIFF / PDF		TIFF can also be converted to PDF with the PDMS Software
9 Completion Notice	Yes		Auto Pop-up on the PC Screen (requires Network Status Monitor - installed with PDMS Software)
10 Protocol	TCP/IP, Non-Std		
Network Address Features			
1 One Touch Address Keys	32		Requires Optional Keyboard. Shared with Fax/Internet Fax One Touch Address, 32 in Total
2 Abbr. Address Numbers	60		Independent for Network Scanner

1.3.4. Internet Fax Function

Items	Description		Remarks
	DP-8020E	DP-8020P	
Main Specifications			
1 Communication Protocols	SMTP / POP3 / MIME		
2 Max. Modem Speed	NA		
3 Coding Scheme	JBIG/MMR/MR/MH		
4 File Format	TIFF / PDF		Selectable PDF file is only available if sending to PC (Network Scanner).
5 Line Interface	RJ-45		Ethernet LAN
Scanner Mechanism			
1 Max. Document Size	Ledger, A3		
2 Effective Scanning Width	11.4 in (289 mm)		

3 Scanning Resolution
dpi x lpi (pel/mm x lines/mm)
	Std. : 203 x 98 (8 x 3.85)
	Fine : 203 x 196 (8 x 7.7)
	S-Fine : 203 x 391 (8 x 15.4)
	            406 x 391 (16 x 15.4)
	600dpi : 600 x 600 dpi
			LAN: 600 dpi, 16 x 15.4
			    Scanning Resolution is available with Parameter setting

Printer Mechanism			
1 Printing Resolution	600 dpi		
2 Effective Recording Width	11.4 in (289 mm)		
Transmission Features			
1 Multi-Task Operation	Yes		Simultaneous operation of G3 Fax and LAN is available.
2 Memory Transmission	Yes		
3 Sequential Multi-Station Transmission	Yes		
4 Simultaneous Multi-Station Transmission	Yes		Max. 250 stations (200 Address Book + 50 Full Number Dialing)
5 Sender Selection	Yes		
6 G3 / Email Mixed Broadcasting	Yes		
7 Deferred Transmission	Yes		
8 Fax Forward	Yes		Received File Transfer, only with Internet Fax Option
9 Sub-address RCV	Yes		Inbound Routing, only with Internet Fax Option
10 Mail Header			
Email Header Print Selection	Yes		All or From / To / Subject only
Subject Line	Random Entry		

Items	Description		Remarks
	DP-8020E	DP-8020P	
LAN Features			
1 Internet Fax Communication	Yes		A3 Communication is available with Parameter setting.
2 Internet Mail Reception	Yes		
3 Internet Fax Server Features			
Internet Fax Relay XMT	Yes		Internet Fax $\rightarrow$ Internet Fax $\rightarrow$ G3FAX
Email Relay MXT	Yes		PC $\rightarrow$ Internet Fax $\rightarrow$ G3FAX
Received Fax / Email Forward	Yes		Local print available
PC to FAX Transmission	No		
Inbound Routing	Yes		Using Sub-Address. Local print available
Phone Book Registration from PC	Yes		Via Email
4 Internet Fax Parameters Registration via Email	Yes		
5 Internet Delivery Confirmation	Yes		With MDN
6 Network Scanning	Yes		600 dpi
7 Network Printing			
LPR / LPD	Yes		600 dpi
GDI	Yes		600 dpi
PDL	Yes		Requires Optional PCL6 or PS Emulation Kit
8 DHCP Client	Yes		
9 LDAP	Yes		Lightweight Directory Access Protocol
10 TIFF Viewer	Yes		Selectable, PDMS / TIFF Viewer
Certainty			
1 Comm. Journal (w / Image)	Yes		
ID			
1 Email Address	Yes		

1.4. System Combination

ADF

Inverting ADF (DP-8020E only)

ADF PC Board

Scanner Unit
(SPC PC Board)

Document Sensor
Motor

Panel
(PNL PC Board)

Main PC Board
(SC PC Board)

PCL6
Emulation Option

Fax Communication
Option (FXB/MJR)

PS/PCL6
Emulation Option

Printer

Network
Scanner Option

USB
Interface

Key Counter
Harness Option

Automatic
Duplex Unit
(DP-8020E only)

Internet Fax/
E-Mail Option

10/100 Ethernet
Interface

Dehumidifier
Heater Kit

Electronic Sorting Memory

Expansion Flash
Memory Card
4 or 8M

Image Memory
16, 64, 128MB
Either Option

Hard Disk
Drive Option

SPC PC Board

2nd Paper Tray (CST2 PC Board)

3rd Paper Tray (CST3 PC Board)

4th Paper Tray (CST2 PC Board)

Standard Configuration

Option

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1.5. Options List

■ Options

Option Name	Option Number	Remarks
Printer Controller Module (PCL)	DA-PC820	Printer Controller for PCL6*
Multi Page Description Language Controller Module (PCL/PostScript)	DA-MC820	Printer Controller for PCL6/PS3* For DP-8020E/8020P* only
Fax Communication Board	DA-FG180	G3 Fax Communication
Keyboard Option	DA-KB180	
Hard Disk Drive Unit	DA-HD18	Additional Optional Sorting Image Memory (Minimum 16 MB) is required for the Hard Disk Drive to function. (For additional 800 address book, etc.)
Expansion Board	DA-EM600	F-ROM Board (8 MB)
Expansion Flash Memory Card, 4 MB	UE-410047	Additional Memory for Fax / Internet Fax
Expansion Flash Memory Card, 8MB	UE-410048	
Image Memory (16MB)	DA-SM16B	For Electronic Sorting
Image Memory (64 MB)	DA-SM64B	
Image Memory (128MB)	DA-SM28B	
Accounting Software	DA-WA10	For Accounting Function
Platen Cover	DA-UC200	Available in Specified Destinations
Automatic Document Feeder	DA-AS181	
Inverting Automatic Document Feeder	DA-AR202	For DP-8020E
2nd / 4rd Paper Tray	DA-DS184	4th Paper Tray is for DP-8020E only.
3rd Paper Tray	DA-DS185	3rd Paper Tray is for DP-8020E only.
Deluxe Stand (High)	DA1D18A	For USA and Canada
Deluxe Stand (Mid)	DA1D18B	**Note:** The same Deluxe Stand (DA1D18C) is used for either 3 or 4 Paper Tray Configuration.
Deluxe Stand (Low)	DA1D18C	
Stand (1-Paper Tray Configuration)	DA-DA188-PE	Available in Specified Destinations
Stand (2-Paper Tray Configuration)	DA-DA189-PE	
Stand (3-Paper Tray Configuration)	DA-DA190-PE	
Stand (4-Paper Tray Configuration)	DA-DA191-PE	
Key Counter Harness Kit	DA-KH180	

Note:
1. PCL6 is a Page Description Language of the Hewlett-Packard Company.
2. PS3 is a Page Description Language of the Adobe Systems Company.
3. Availability may differ as per destination. Please ask your sales company for details.

■ Supplies

Part Name	Part Number	Remarks
Toner	DQ-TUJ10K-PU	For PU (USA/Canada, etc.), 10K
	DQ-TUJ10K-PK	For China, 10K
	DQ-TU10J-PB	For EU and Other Destinations, 10K
OPC Drum	DQ-H60J	60K
Developer	DQ-Z60J	60K

Note:
Availability may differ as per destination. Please ask your sales company for details.

1.6. External View

1. Standard Configuration

Top View

(For USA Only)

Complies with FDA radiation performance standards, 21 CFR Subchapter J
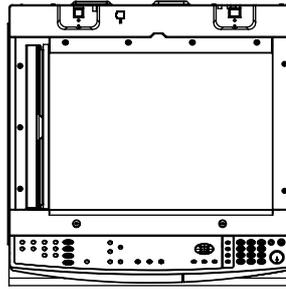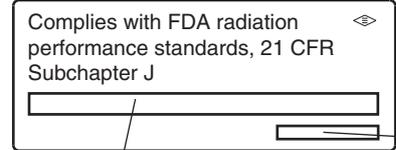
Factory ID

Manufacturer's Name and Address

18.19 in (462 mm)

21.97 in (558 mm)

21.54 in (547 mm)
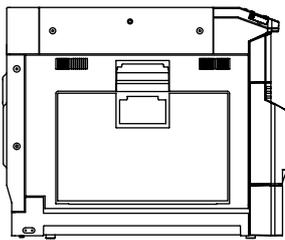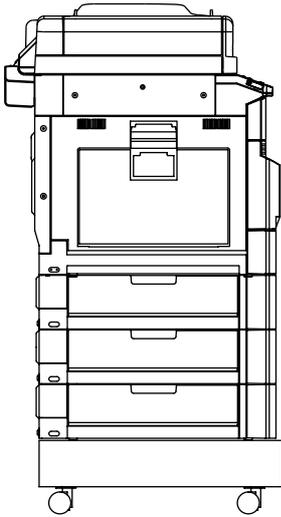
Left View
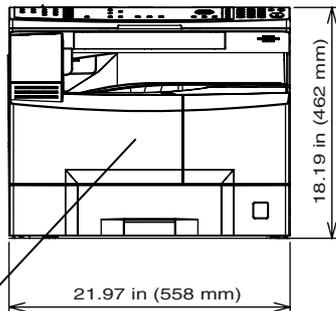
Front View
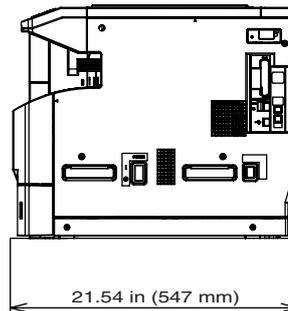
Right View
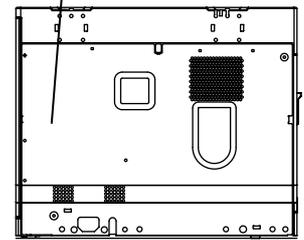
Rear View

For USA, Canada and Europe

CAUTION: CLASS 3B INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCKS DEFEATED.
　　　　 AVOID EXPOSURE TO THE BEAM.
ATTENTION: Rayonnement laser classe 3B invisible en cas d'ouverture et de défaut
　　　　 de sécurité.
　　　　 EXPOSITION DANGEREUSE AU FAISCEAU.
Vorsicht: Um bei geöffneten Deckel den Austritt von Klasse 3B unsichtbare Laserstrahlung
　　　　 zu verhindern, muss die Stromversorgung des Lasers unterbrochen werden.
PRECAUCIÓN: RADIACIÓN LÁSER DE CLASE 3B INVISIBLE CUANDO SE ABRE LA PUERTA CON
　　　　 EL BLOQUEO INVALIDADO.
　　　　 EVITE LA EXPOSICIÓN A LOS RAYOS.
VAROITUS: LUOKKA 3 B NÄKYMÄTÖNTÄ JA VAARALLISTA LASERSÄTEILYÄ, JOS LAITTEEN
　　　　 KANSI AVATAAN KESKEN SKANNAUKSEN JA SUOJALUKITUS OHITETAAN.
　　　　 VÄLTÄ SUORAA ALTISTUMISTA SÄTEELLE.
ADVARSEL: KLASSE 3B USYNLIG LASERSTRÅLING NÅR ÅBEN OG SIKKERHEDSLÅS BRYDES.
　　　　 UNDGÅ EKSPONERING FOR STRÅLEN.
ADVARSEL: KLASSE 3B USYNLIG LASERSTRÅLING NÅR MASKINEN ER ÅPEN OG
　　　　 SIKKERHETSLÅS BRYTES.
　　　　 UNNGÅ EKSPONERING FOR STRÅLEN.
VARNING: CLASS 3B OSYNLIG LASER ÖPPEN OCH NÄR SÄKERHETSSPÄRRAR ÄR URKOPPLADE.
　　　　 UNDVIK EXPONERING AV LASER

FDB8902PU

For Other Destinations

CAUTION: CLASS 3B INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCKS DEFEATED.
　　　　 AVOID EXPOSURE TO THE BEAM.
ATTENTION: Rayonnement laser classe 3B invisible en cas d'ouverture et de défaut
　　　　 de sécurité.
　　　　 EXPOSITION DANGEREUSE AU FAISCEAU.
Vorsicht: Um bei geöffneten Deckel den Austritt von Klasse 3B unsichtbare Laserstrahlung
　　　　 zu verhindern, muss die Stromversorgung des Lasers unterbrochen werden.

注意：當打開本機及連鎖裝置失效時，爲防止CLASS 3B不可見雷射光照射，
　　　請勿暴露在光線下。
注意：当打开本机及连锁装置失效时，为防止CLASS 3B不可见激光照射，
　　　请勿暴露在光柱下。
주의：커버(덮개)가 열려 있거나 인터록이 파손된 경우 눈에 보이지 않는
　　　클래스3B의 레이저 광선이 유출 될 수 있습니다.
　　　레이저 광선에 노출되지 않도록 주의 하십시오.
注意：ここを開き、セーフティインターロックを解除すると、クラス3B不可視
　　　レーザ光が出る。
　　　ビームに身をさらさないこと。

FDB8902PK

2. With Optional System Console Configuration
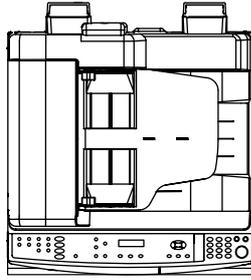
Top View

| Left View | Front View | Right View | Rear View |

6.61 in (168 mm)

39.57 in (1005 mm)

45.91 in (1166 mm)

21.97 in (558 mm)

24.76 in (629 mm)

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3. Space Requirements With Options

Main Unit

3.94 in (100 mm)

10.83 in (275 mm)

21.97 in (558 mm)

3.94 in (100 mm)

21.93 in (557 mm)

3.94 in (100 mm)

45.67 in (1160 mm)

16.14 in (410 mm)

3.94 in (100 mm)

40.67 in (1033 mm)

Main Unit + ADF

3.94 in (100 mm)

10.83 in (275 mm)

21.97 in (558 mm)

3.94 in (100 mm)

23.54 in (598 mm)

3.94 in (100 mm)

47.28 in (1201 mm)

16.14 in (410 mm)

3.94 in (100 mm)

40.67 in (1033 mm)

Main Unit + i-ADF

3.94 in (100 mm)

10.83 in (275 mm)

21.97 in (558 mm)

3.94 in (100 mm)

24.57 in (624 mm)

3.94 in (100 mm)

48.31 in (1227 mm)

16.14 in (410 mm)

3.94 in (100 mm)

40.67 in (1033 mm)

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1.6.1. Serial Number Contents

The contents of the 11-digit Serial Number is as follows:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |

Sequential Production Number
5-Digit Sequential Production Number

00001 ~ 99999 = 1 ~ 99,999 units
A0001 ~ Y9999 = 100,000 ~ 329,976 units
(Letters I and O are skipped)

Model Number and Destination Code (Main Unit)
3-Digit number or alphanumeric representation
(Except Letters I and O)

For Example:

 52B = DP-8020E-PU   527 = DP-8020E-PB
 525 = DP-8020P-PU   521 = DP-8020P-PB
 51Z = DP-8016P-PU   51V = DP-8016P-PB

Production Facility

Production Year
Starting with Year 2001, the last 2-digits of the year is
represented as: A ~ T

A : 01 (2001)		K : 11 (2011)
B : 02		L : 12
C : 03		M : 13
D : 04		N : 14
E : 05		O : 15
F : 06		P : 16
G : 07		Q : 17
H : 08		R : 18
I : 09		S : 19
J : 10 (2010)		T : 20 (2020)

Production Month

A : January	G : July
B : February	H : August
C : March	I : September
D : April	J : October
E : May	K : November
F : June	L : December

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1.7. Sensors

ADF Sensor 1 (131)
ADF Sensor 2 (131)
ADF Original Length Sensor 1 (131)
ADF Original Length Sensor 2 (131)
ADF Sensor 3 (131)
Home Position Sensor (131)
Sheet Bypass Sensor 1 (131)
Sheet Bypass Sensor 2 (131)
Sheet Bypass Sensor 3 (131)
Sheet Bypass NP Sensor (131)
1st Paper Tray Detection Sensor (131)
2nd Paper Tray Detection Sensor (131)
2nd Paper Tray Jam Cover Open Sensor (131)
2nd Paper Tray Paper Path Sensor (131)

ADF Cover Open Sensor (131)
Fuser Unit Sensor (131)
Registration Sensor (131)
Mechanical Counter (821)
1st Paper Tray NP Sensor (131)
1st Paper Tray Upper Limit Sensor (131)
Toner Waste Container Sensor (2806)
2nd Paper Tray NP Sensor (131)
2nd Paper Tray Upper Limit Sensor (131)

1.8. Fans and Motors

ADF Motor (i-ADF: 2601) (ADF: 1905)
Scanning Motor (316)
Rear Fan (815)
Drive Motor (1511)
Lift DC Motor (3132)
PS Fan (816)
Toner Motor (1503)

Note:
Numbers in parenthesis "(xxxx)" represent the Part Reference Number(s) found in the Parts Manual for your quick reference.

1.9. Clutches and Switches

ADF Roller Clutch (2324)

Intermediate Clutch (2632)

Feed 2 Roller Clutch (2325)

Interlock Switch (227)

Registration Roller Clutch (694)

Paper Feed Roller Clutch (695)

Intermediate Roller Clutch (694)

Paper Feed Roller Clutch (695)

Heater Switch (814)

Power Switch (818)

1.10. PC Boards

SNS PCB (2832)

CCD Unit (427)

ADF PCB
(i-ADF: 2847)
(ADF: 2846)

PNL1 PCB (2904)

PNL3 PCB (2906)

PNL2 PCB (2905)

PNL4 PCB (2907)

Sort Memory Board

MJR PCB (2902)

SPC PCB (2802)

Hardware Key (3505)

F-ROM Board (2805)

RLB PCB (2804)

SSN PCB (2910)

DC PCB (2803)

PCL PCB (2807)

HDD (804)

WTS PCB (2806)

FXB PCB (2903)

PS PCB (2901)

SC PCB (2801)

CST2 PCB (2908)

Note:
Numbers in parenthesis "(xxxx)" represent the Part Reference Number(s) found in the Parts Manual for your quick reference.

2 Disassembling, Cleaning and Replacement

2.1. General Disassembly

Pertinent Disassembly Instruction sections are shown below.

i-ADF	Scanner Unit
2.2.1.	2.2.4.

ADF	Control Panel Unit
2.2.2.	2.2.3.

Fuser Unit
2.2.6.

Left Cover	Process Unit
2.2.8.	2.2.5.

Bypass Paper Tray
2.2.9.

Paper Feed Module
2.2.10.

Drive Unit	PC Boards	LSU	Filter
2.2.7.	2.2.11.	2.2.12.	2.2.13.

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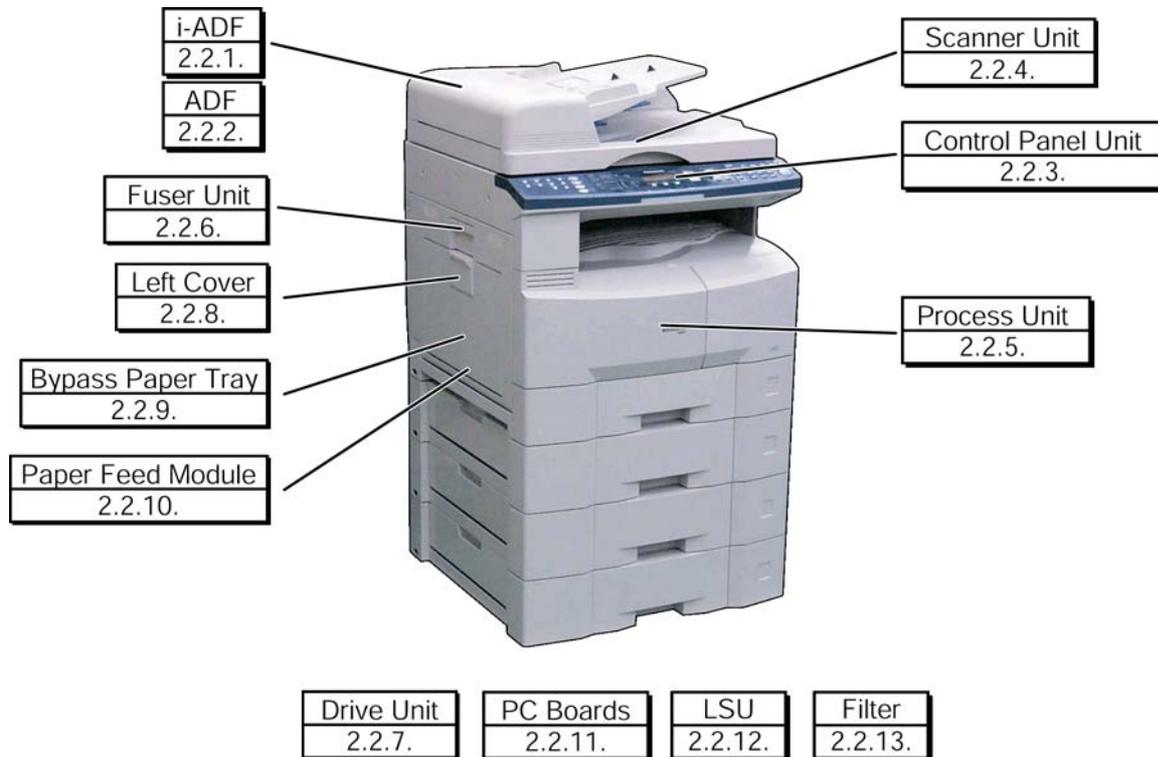
2.2. Disassembly Instructions

2.2.1. Inverting-Automatic Document Feeder (i-ADF) Unit
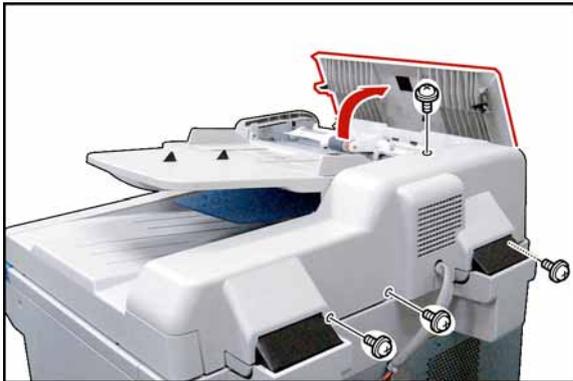
(1) Open the **ADF Cover** (2126).
(2) Remove 4 **Silver Screws** (B1).
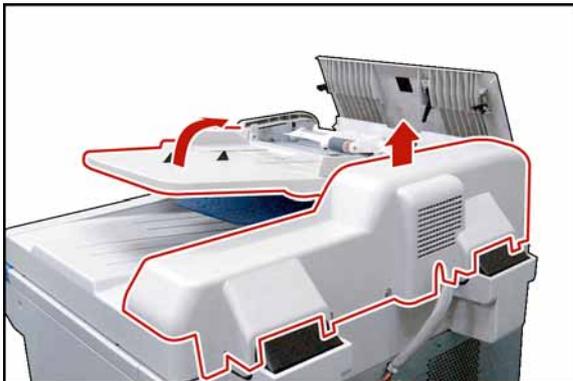
(3) Lift the **ADF Input Tray** (2201).
(4) Slightly pull the right edge of the ADF Rear Cover upward.
(5) Release the **Latch Hooks**.
(6) Remove the **ADF Rear Cover** (2101).
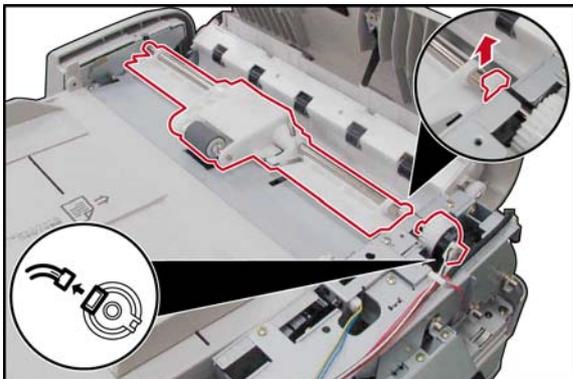
(7) Lower the ADF Input Tray back in place.
(8) Disconnect the **ADF Motor**, and **Clutch Harness** (2853) from the Clutch.
(9) Remove the **Snap Ring** (S9).
(10) Remove the **ADF Roller** (2314) Assembly.
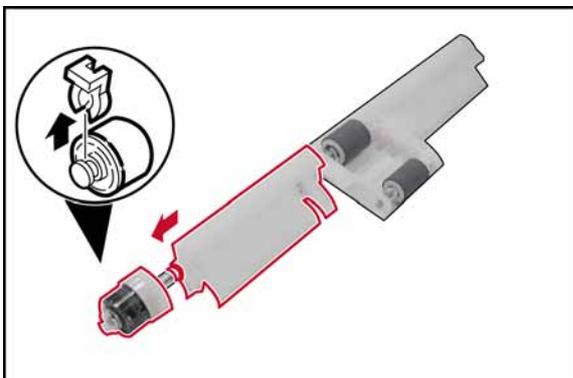
(11) Remove the **Snap Ring** (S9).
(12) Remove the **Clutch** (2324).
(13) Remove the **Bushing** (2321).
(14) Remove the **Rear ADF Guide** (2311).

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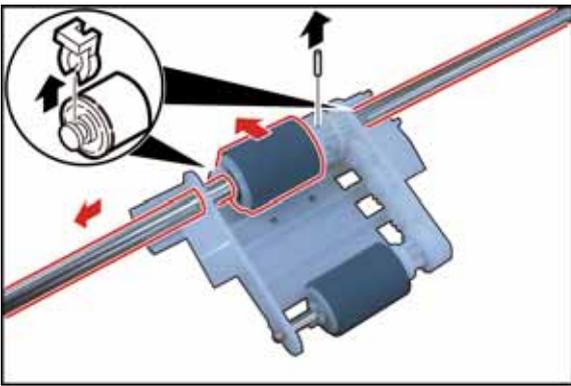
(15) Remove the **Snap Ring** (S9).
(16) Remove the **Pin** (2327).
(17) Remove the **ADF Shaft** (2310).
(18) Remove the **ADF Roller** (2314).
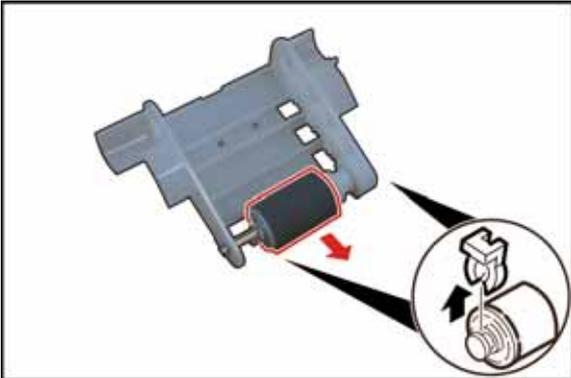
(19) Remove the **Snap Ring** (S9).
(20) Remove the **Pre Feed Roller Shaft** (2316).
(21) Remove the **Pre Feed Roller** (2018).
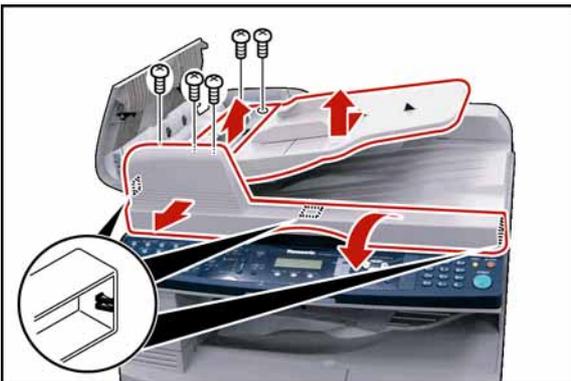
(22) Remove 1 **Silver Screw** (B1).
(23) Remove the **ADF Front Cover** (2210).
Note:
  Release 3 Latch Hooks in the direction as shown
  by each arrow.

(24) Remove 4 **Screws** (X6).
(25) Remove the **Upper ADF Guide** (2502).

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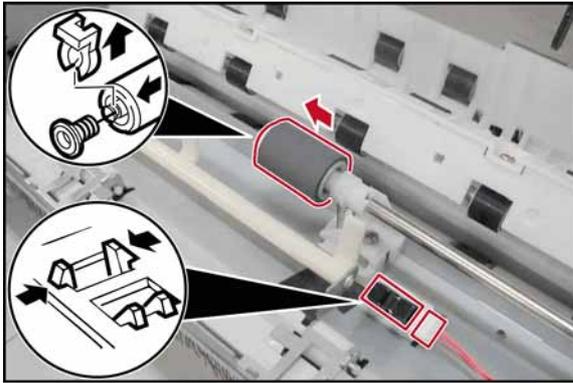
(26) Remove the **Snap Ring** (S9).

(27) Remove the **Torque Limiter Bushing** (2510), and **Torque Limiter Spring** (2511).

Note:

When reinstalling the Torque Limiter Assembly, ensure that the Torque Limiter Spring is placed into the deeper slot of the Separation Roller.

<Cleaning Torque Limiter Bushing, and Torque Limiter Spring>

Clean the Torque Limiter Bushing, and Torque Limiter Spring with a soft cloth, saturated with Water.

(28) Remove the **Separation Roller** (2509).

<Cleaning Separation Roller>

Clean the Separation Roller with a soft cloth, saturated with Water.

(29) Disconnect the **Read Point Sensor Harness** (2858), and remove **Sensor** (131) (Original Detection Sensor).

(30) Disconnect all **Harnesses** on the ADF PC Board.

(31) Remove 2 **Screws** (X6).

(32) Remove the **i-ADF PC Board** (2847).
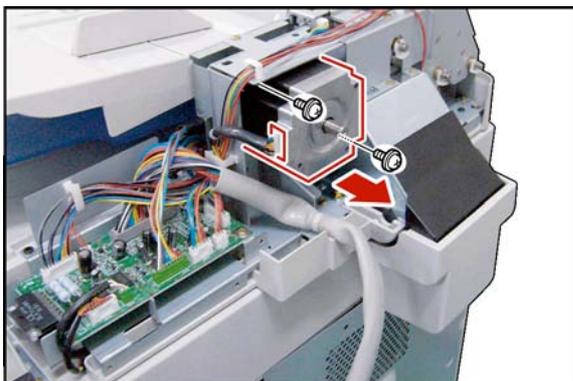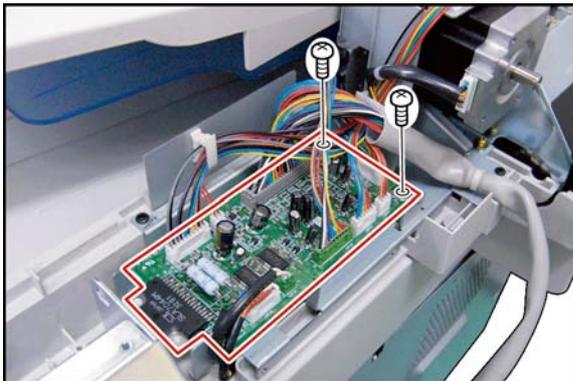
(33) Remove 2 **Screws** (Y9).

(34) Remove the **ADF Motor** (2601).

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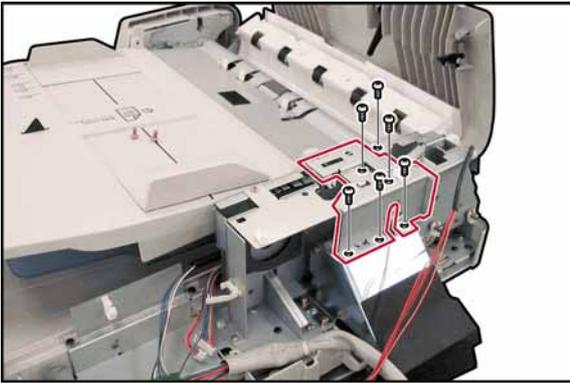
(35) Remove 6 **Screws** (X6).

(36) Remove the **Sensor Bracket** (2120).
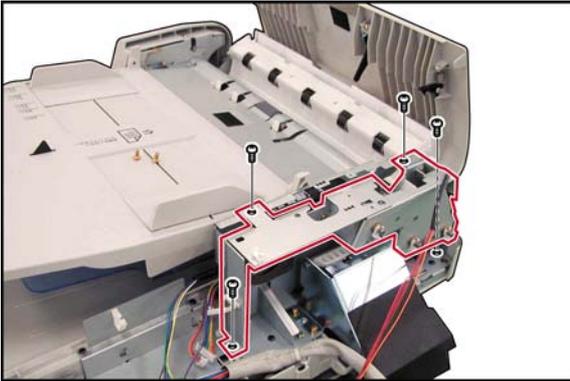
(37) Remove 4 **Screws** (X6).

(38) Remove the **Motor Bracket** (2610), and **Gear Bracket** (2602) Assemblies.

Note:
   Apply Molykote EM-50L Grease to all Gears, and Shafts except to the following: E26S35 Drive Gear (2604), ADF Motor (2601), and the shafts of Drive Shaft 2 (2615), and Exit 3 Roller (2515).
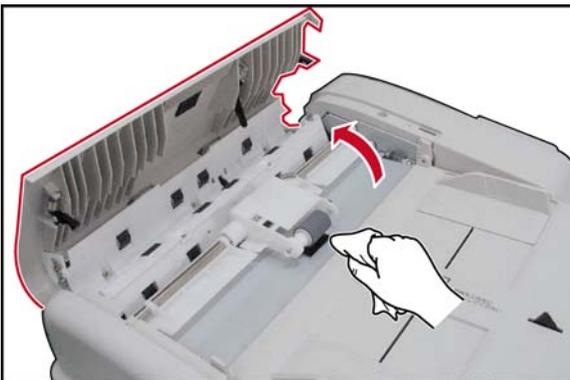
< Cleaning ADF Roller, Pre-Feed Roller, Drive Roller, and Feed 2 Roller>

(1) Open the **ADF Cover** (2126).

(2) Clean the **ADF Roller** (2314), **Pre Feed Roller** (2018), **Drive Roller** (2706), and the **Feed 2 Roller** (2517) with a soft cloth, saturated with Water.
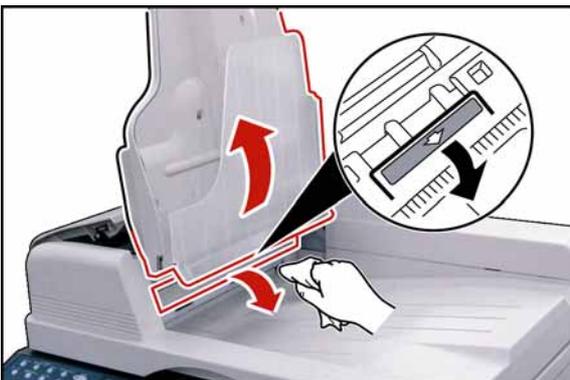
< Cleaning Exit Roller, and Inverting Feed Roller>

(3) Lift the **ADF Input Tray** (2201).

(4) Open the **ADF Exit Cover** (2429).

(5) Clean the **Exit 3 Roller** (2515), and the **Inverting Feed Roller** (2428) with a soft cloth, saturated with Water.

2.2.2. ADF Unit
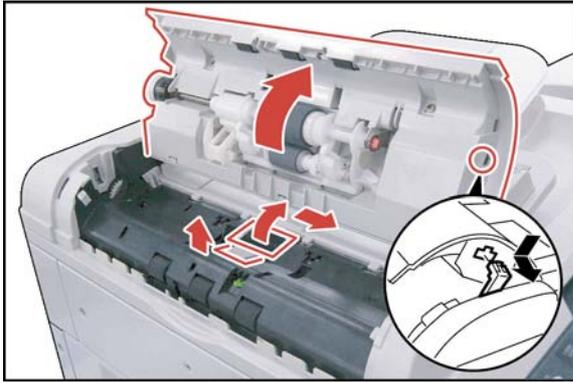
(1) Open the **ADF Cover** (1902), and release the **ADF Cover Stopper** (2013).
(2) Remove the **Pad Cover** (2023).
(3) Remove the **Separation Rubber** (2024).
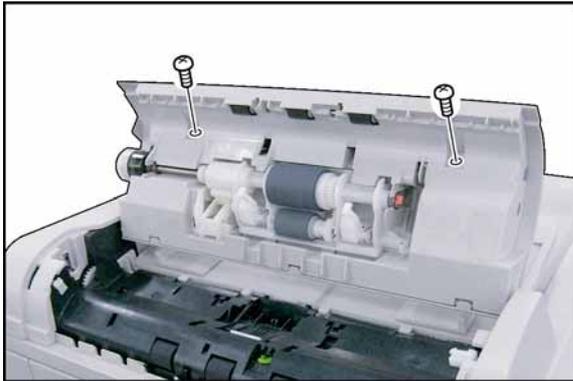
(4) Remove 2 **Screws** (X6).
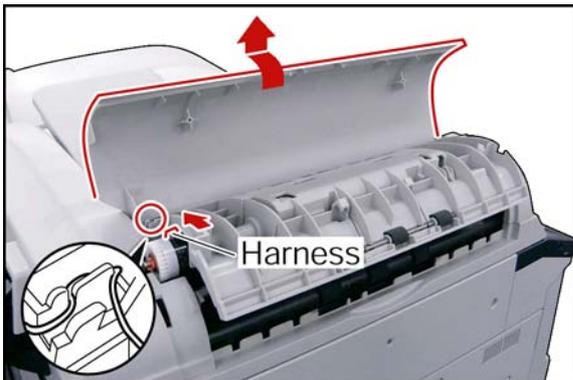
(5) Remove the **ADF Cover** (1902).
(6) Disconnect the **ADF Motor Harness** (2848).

Harness
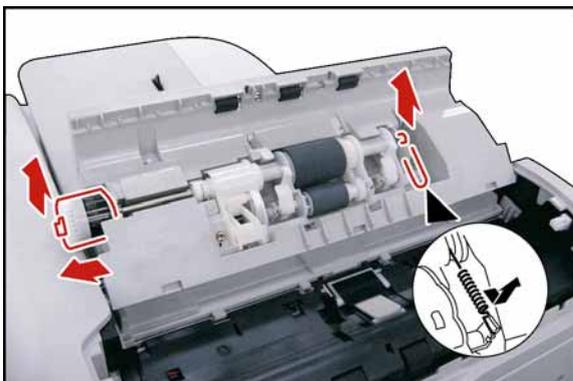
(7) Remove the **Pick Up Spring** (2022).
(8) Remove 2 **Snap Rings** (G3).
(9) Remove the **Clutch** (2324).

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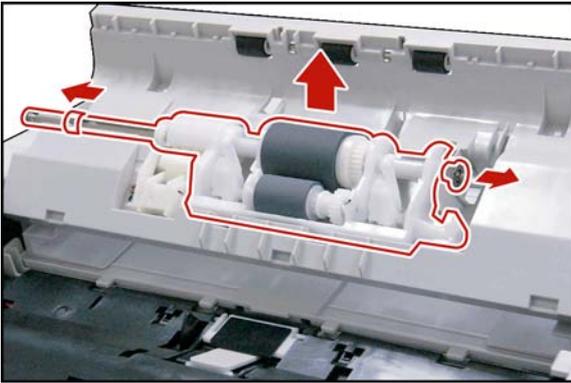
(10) Remove 2 **Bushings** (698).
(11) Remove **Roller Holder** (2026) Assembly.
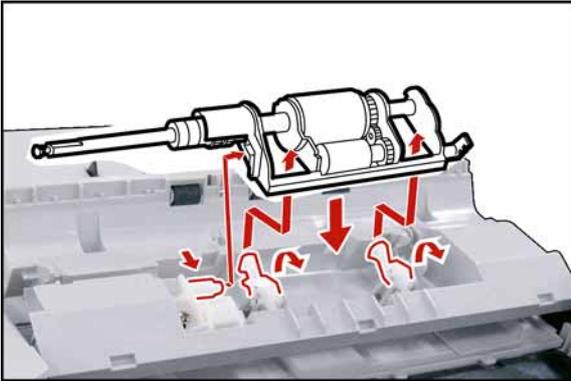
Note:
When reinstalling, make sure that the **Roller Holder** (2026) Assembly is properly placed on the ADF Unit.
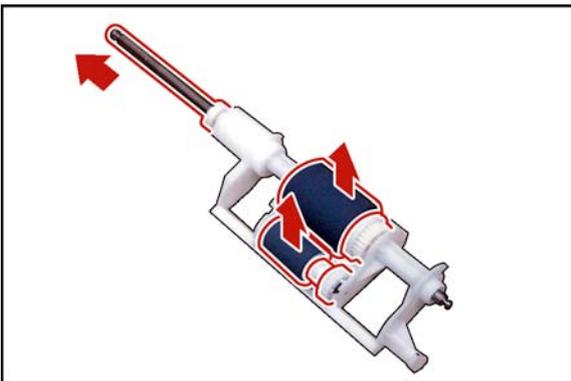
(12) Remove the **Paper Feed Shaft Assembly** (2029).
(13) Remove **Paper Feed Roller** (2001), and **D26 D Gear** (2025).
(14) Remove the **Pre Feed Roller** (2018), **Pre Feed Shaft** (2019), and **Pre Feed Gear 1**, and **2** (2020, and 2021).
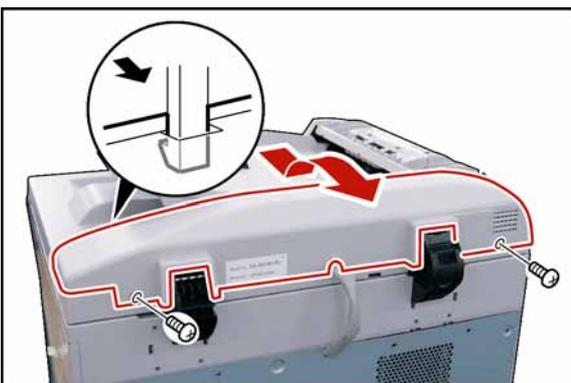
(15) Remove 2 **Silver Screws** (B1).
(16) Lift cover, and release the **Latch Hook** then remove the **ADF Rear Cover** (1701).

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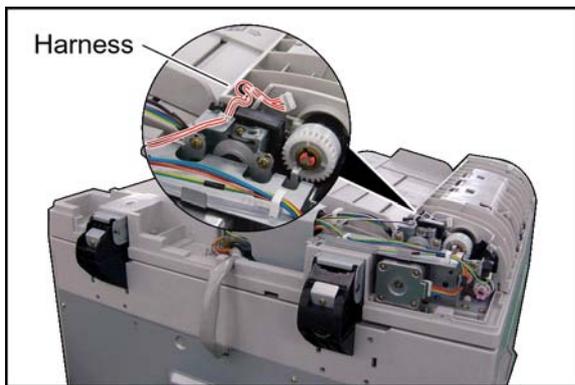
Note:
When reinstalling the **ADF Rear Cover** (1701), make sure to properly route the **ADF Harness** as illustrated.
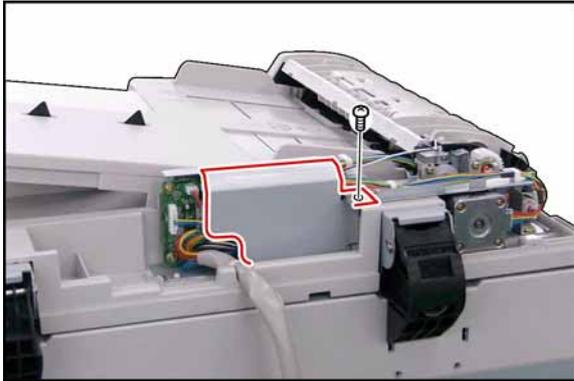
(17) Remove 1 **Screw** (X6).
(18) Remove the **ADF PC Board Cover** (1916).
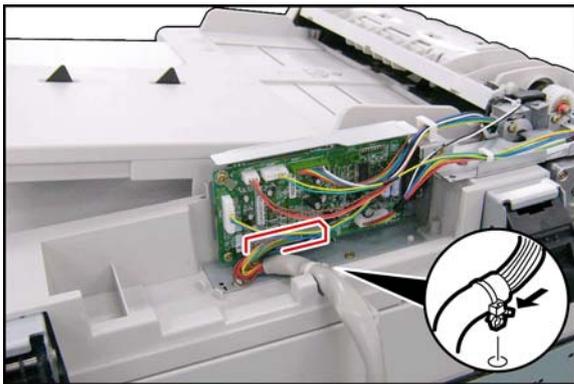
(19) Release the **Clamp** from ADF Unit.
Note:
Do not cut the Tie-Wrap. Push the release clip on the side of the clamp to remove it.

(20) Disconnect the **ADF Harness** (2827) on the ADF PC Board (CN21).
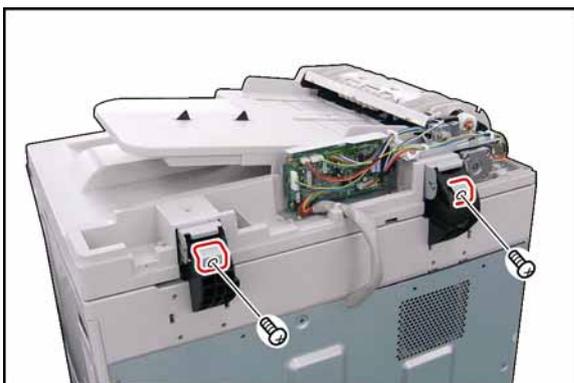
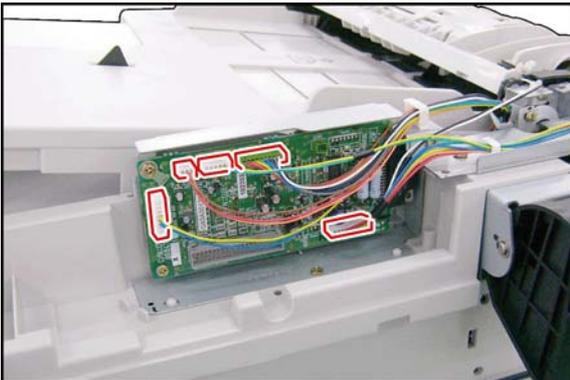(21) Remove 2 **Silver Screws** (B1).
(22) Remove 2 **Angle Plate** (1801).
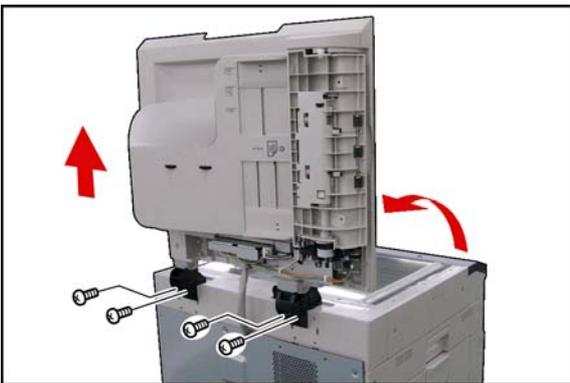
(23) Open the **ADF Unit**.

(24) Remove 4 **Screws** (6A).

Caution:
   Don't close the ADF Unit subsequent to this step.

(25) Remove the **ADF Unit**.

(26) Disconnect 5 **Harnesses** (2848, 2849, 2850, 2851) on the ADF PC Board. (5 connectors)

(27) Remove 2 **Screws** (X6).
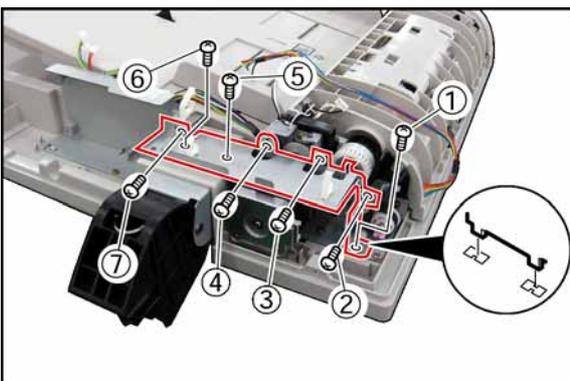
(28) Remove the **ADF PC Board** (2846).
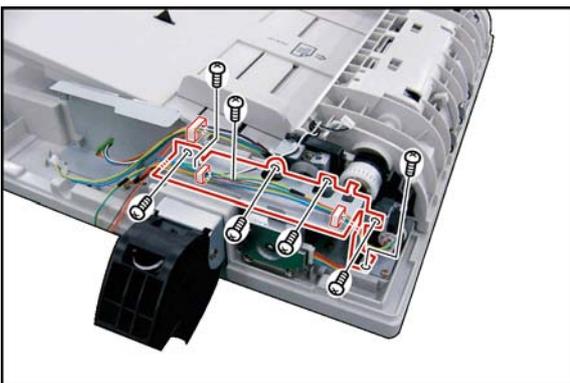
(29) Release the **Harness** from the Clamp.
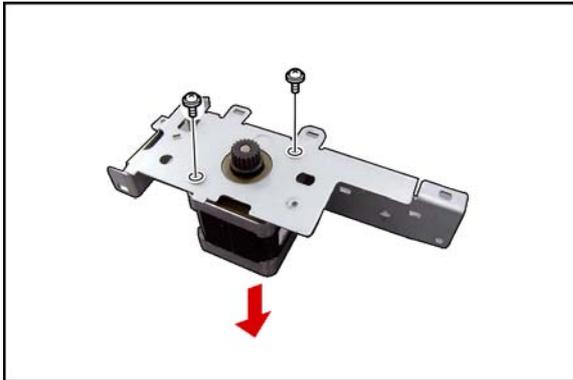
(30) Disconnect 2 **Harnesses** (2848, 2850).

(31) Remove 7 **Screws** (X6).

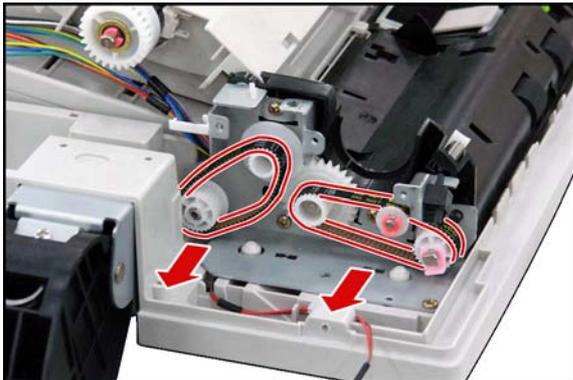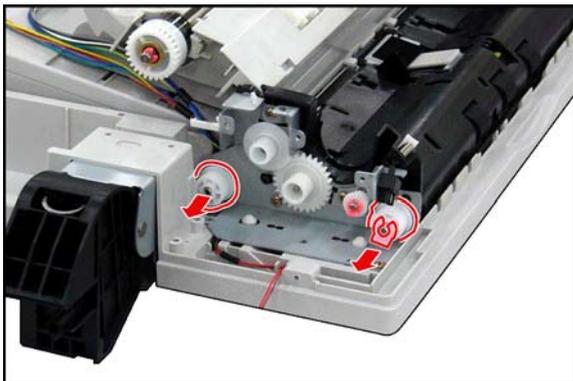(32) Remove the **Motor Bracket** (1906) Assembly.

Note:
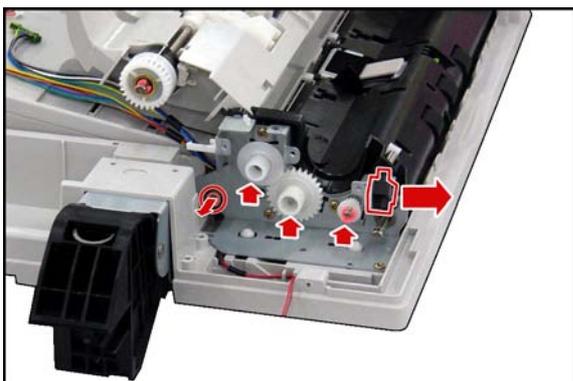   When reassembling the **Motor Bracket** (1906) Assembly, follow the step sequence as illustrated.

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(33) Remove 2 **Screws** (18).
(34) Remove the **ADF Motor** (1905).
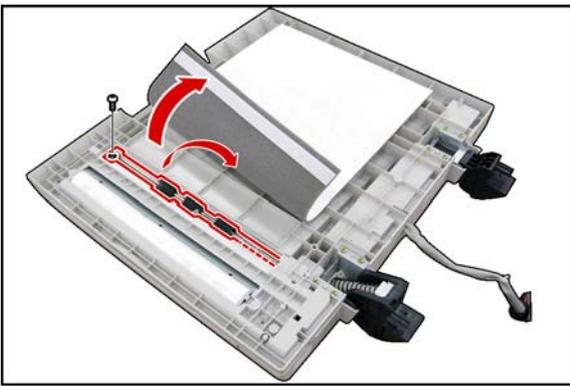
(35) Remove 2 **Drive Belts** (1911, 1912).

(36) Remove the **S27 Pulley** (1910).
(37) Remove the **Snap Ring** (B9).
(38) Remove the **S27 Pulley** (1910).

(39) Release the clips, and remove the **Switch** (1918).
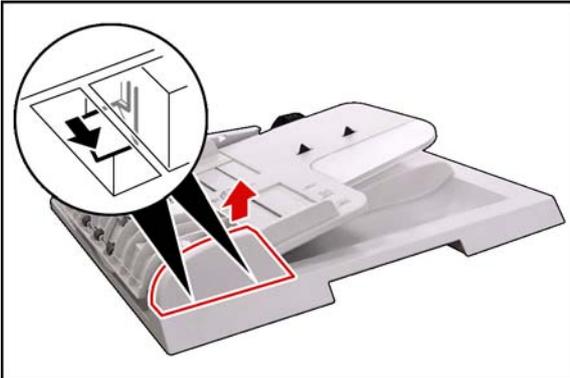(40) Remove the **Bushing** (698).
Note:
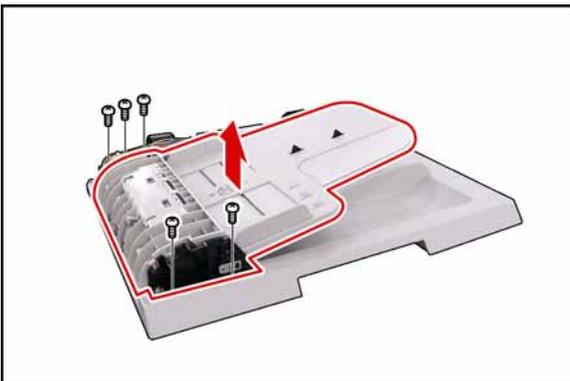   Apply Molykote EM-50L Grease to 3 shafts on the Right Bracket (1914).

<Turn the ADF upside down>

(41) Detach the Hook, and Loop Fastener on the left side of the **Scanning Pad** (1822).
(42) Remove 1 **Screw** (X6).
(43) Remove the **Exit 1 Roller** (1812), and **P6L8 Bushing** (1813).

<Return the ADF to its upright position>
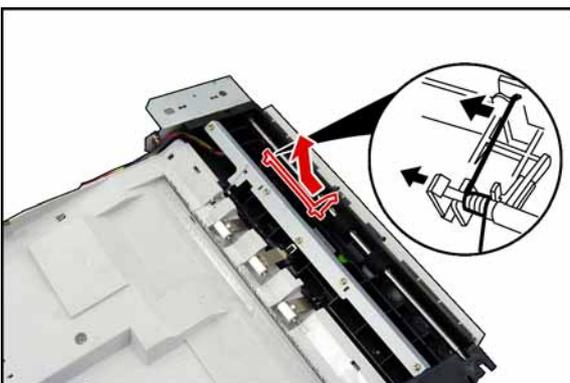
(44) Release 2 **Latch Hooks**.
(45) Remove the **ADF Front Cover** (1702).

(46) Release the **Harnesses** (2849, 2851) from the Clamp.
(47) Remove 5 **Screws** (X6).
(48) Remove the **Original Tray**.

(49) Remove the **Timing Actuator** (2004).

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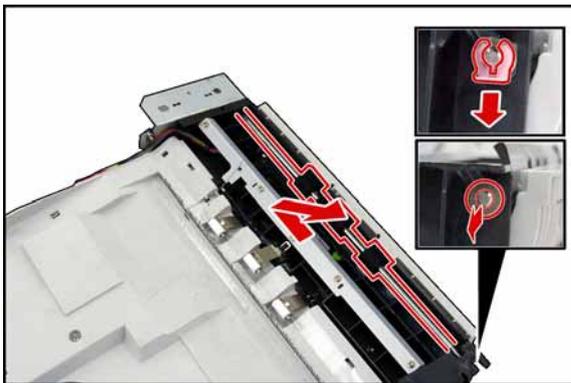
(50) Remove the **Snap Ring** (B9).
(51) Remove the **Bushing** (698).
(52) Remove the **Feed Roller** (2010).

<Cleaning the Rollers, and Rubber>
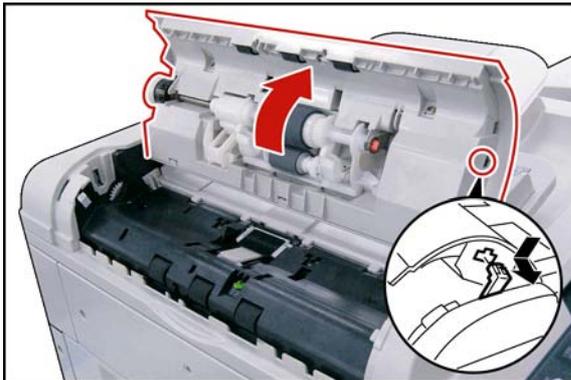
(1) Open the **ADF Cover**.
(2) Release the **Stopper**.
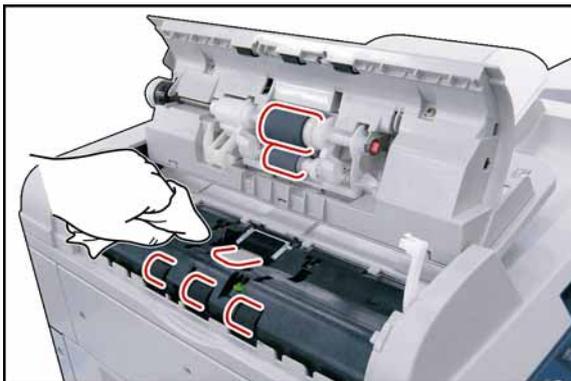
(3) Clean the **Separation Rubber**, **Feed Roller**, **Pre Feed Roller**, and **Paper Feed Roller** with a soft cloth, saturated with Water.

<Cleaning the Exit Roller>

(1) Lift the **Original Tray**.
(2) Clean the **Exit Roller** with a soft cloth, saturated with Water.

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<Cleaning the Scanner>
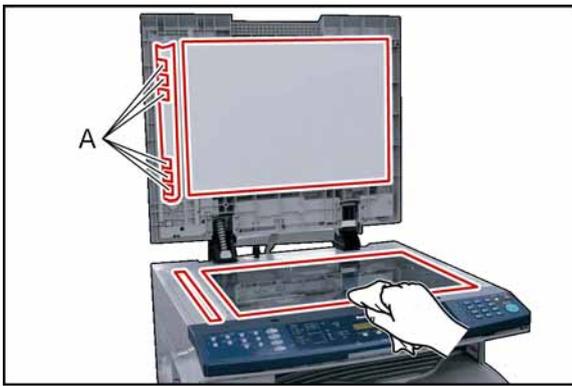
(1) Open the **ADF Unit**.
(2) Clean the **White Guide**, **Scanning Pad**, **Scanning (S) Glass**, and **Platen (L) Glass** with a soft cloth.

Note:
  Ensure that the Clear Film as illustrated by A is not damaged.

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2.2.3. Control Panel Unit, Battery

<Replace the Battery>

(1) Remove 1 **Screw** (Q8).
(2) Remove the **Battery Holder** (503).
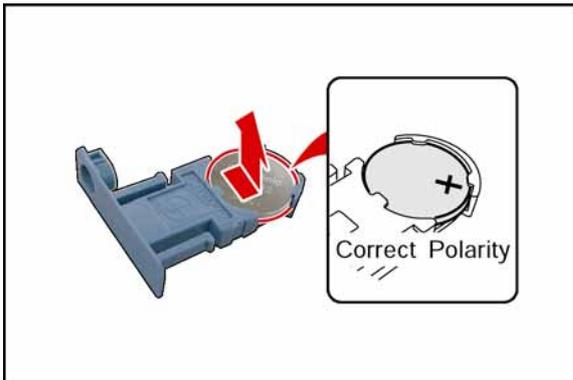
(3) Replace the **Battery** (504*).

Note:
Ensure that the battery is installed with correct polarity.

(4) Reinstall the **Battery Holder** (503), and the **Screw** (Q8).

⚠ **CAUTION**

Denotes hazards that could result in minor injury or damage to the machine.

* THIS PRODUCT CONTAINS A LITHIUM BATTERY. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE. IMPROPER USE OR REPLACEMENT MAY CAUSE OVERHEATING, RUPTURE OR EXPLOSION RESULTING IN INJURY OR FIRE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS OF YOUR LOCAL SOLID WASTE OFFICIALS AND LOCAL REGULATIONS.

Note: The service life of the Battery is approximately 1 year under normal use.

⚠ **Avertissement**

CE PRODUIT CONTIENT UNE PILE AU LITHIUM. REMPLACEZ UNIQUEMENT AVEC LE MÊME TYPE DE PILE OU UN TYPE ÉQUIVALENT. UNE UTILISATION OU UN REMPLACEMENT IMPROPRE POURRAIT CAUSER UNE SURCHARGE, UNE RUPTURE OU UNE EXPLOSION RÉSULTANT EN DES BLESSURES OU UN INCENDIE. DÉBARASSEZ-VOUS DES PILES USÉES EN RESPECTANT LA RÉGLEMENTATION LOCALE SUR LA MISE AU REBUT DES DÉCHETS SOLIDES.

⚠ **VORSICHT**

● DIESES PRODUKT IST MIT EINER LITHIUM-BATTERIE BESTÜCKT. ERSETZEN SIE DIE BATTERIE DURCH EINE IDENTISCHE ODER GLEICHWERTIGE. EINE NICHT BESTIMMUNGSGEMÄSSE VERWENDUNG ODER DIE VERWENDUNG EINES ANDEREN BATTERIETYPS KANN ZU ÜBERHITZUNG, BRUCH ODER EXPLOSION FÜHREN UND VERLETZUNGEN ODER EINEN BRAND VERURSACHEN. ENTSORGEN SIE VERBRAUCHTE BATTERIEN GEMÄSS DEN ANWEISUNGEN DER ZUSTÄNDIGEN STELLEN SOWIE DEN ÖRTLICHEN UMWELTSCHUTZBESTIMMUNGEN.
● Verwenden Sie ausschließlich den angegebenen Batterietyp.
● Setzen Sie die Batterie korrekt ein (beachten Sie die Polarität).

* Notice: California only:
This product contains a CR Coin Cell Lithium Battery which contains Perchlorate Material - special handling may apply.

See www.dtsc.ca.gov/hazardouswaste/perchlorate

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<Control Panel>
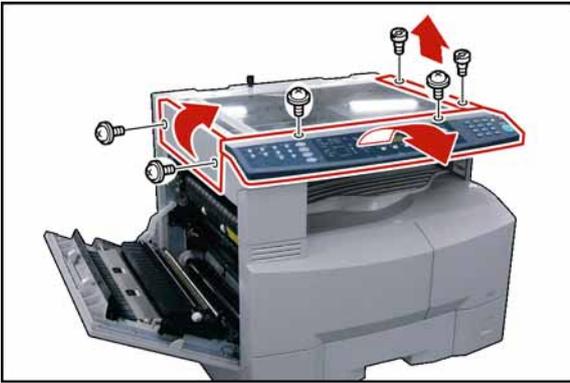
(5) Open the **Left Cover**.
(6) Remove 2 **Silver Screws** (S6).
(7) Remove the **Left Scanner Cover** (101).
(8) Remove 2 **Shoulder Silver Screws** (X2).
(9) Remove the **Right Scanner Cover** (132).
(10) Remove 2 **Silver Screws** (1027).
(11) Slightly lift the **Control Panel Assembly** (538).
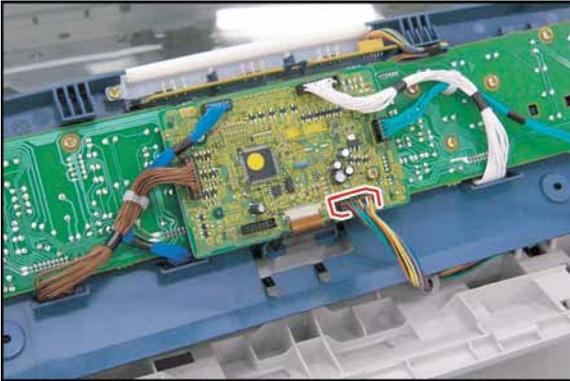
(12) Disconnect the **Harness** on the PNL1 PC Board (CN220).
(13) Remove the **Control Panel Assembly**.
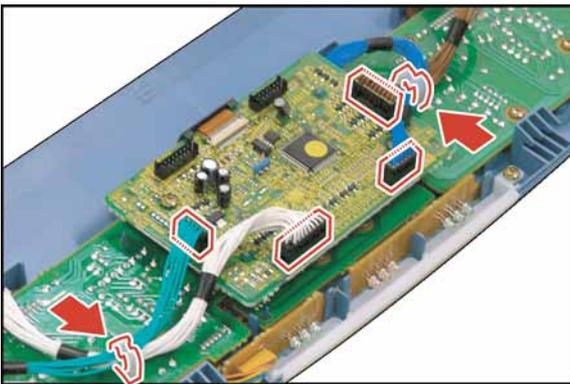
(14) Disconnect all the **Harnesses** on PNL1 PC Board.
(15) Release the **Harnesses** from 2 Harness Clamps.
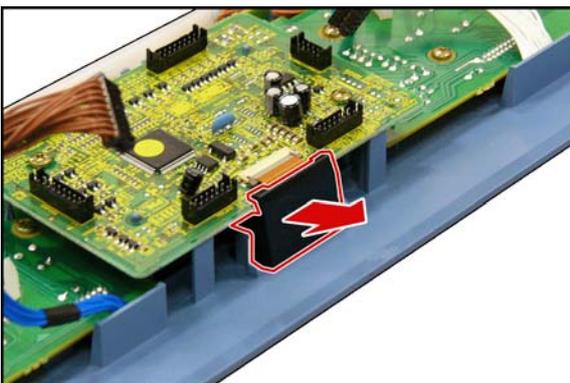
(16) Remove the **Harness Protection Cover** (518).

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(17) Disconnect the **Harness** on PNL1 PC Board as illustrated.
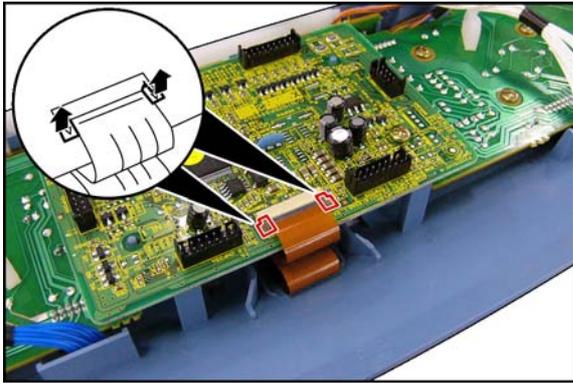
(18) Remove 2 **Screws** (X8).
(19) Remove the **PNL1 PC Board** (2904).
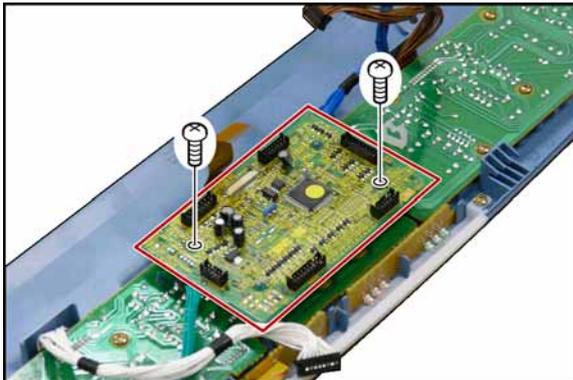
(20) Remove 8 **Screws** (X8).
(21) Remove the **PNL 2 PC Board** (2905) as illustrated.
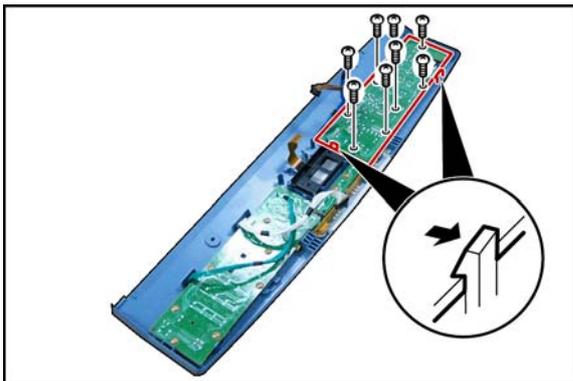
(22) Remove 10 **Screws** (X8).
(23) Remove the **PNL 3 PC Board** (2906) as illustrated.

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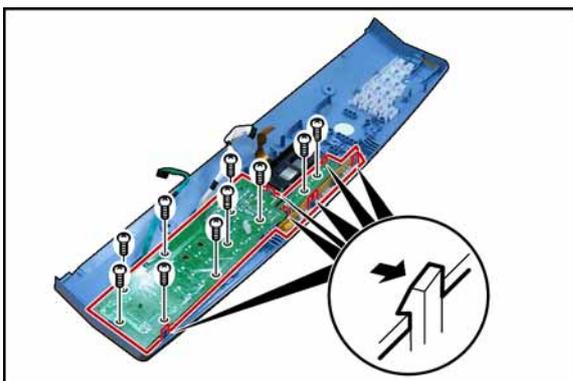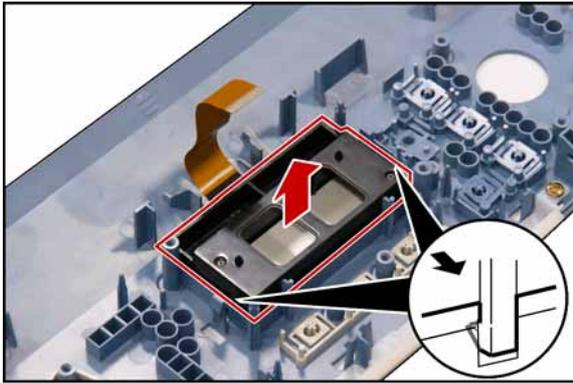
(24) Remove the **LCD Holder** (520).
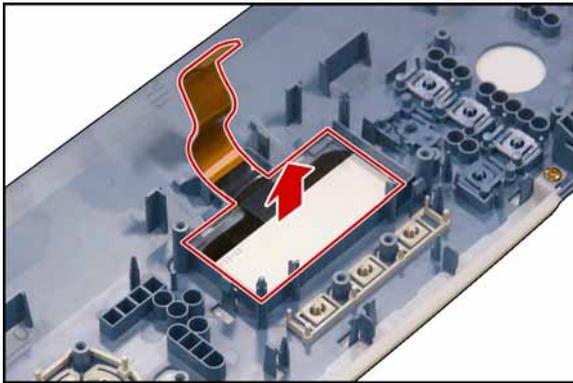
(25) Remove the **LCD Module** (519).

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2.2.4. Scanner Unit
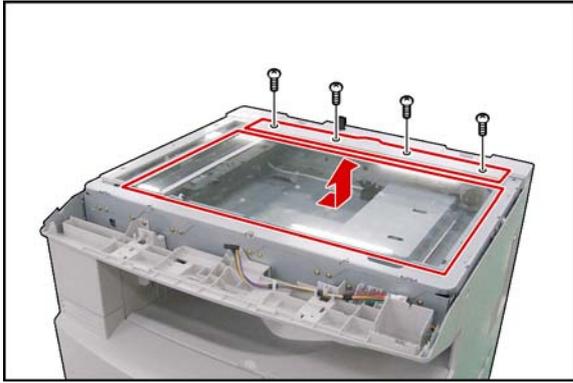
(1) Remove the **Control Panel Assembly**.
(Refer to 2.2.3.)
(2) Remove 4 **Shoulder Silver Screws** (X2).
(3) Remove the **Rear Document Plate** (107).
(4) Remove the **Platen (L) Glass** (106).
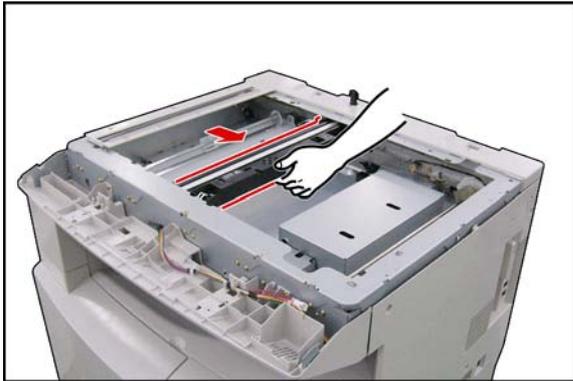
(5) Holding by the center, slowly move the **Lamp Base Assembly** to the center of the Scanner Base Frame in the direction shown by the arrow.
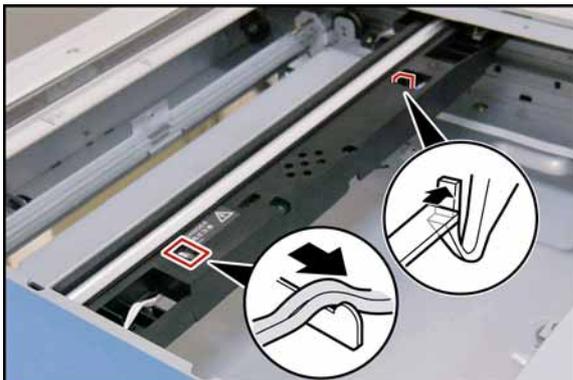
(6) Release the **Harness**.
(7) Release the **Latch Hook**.
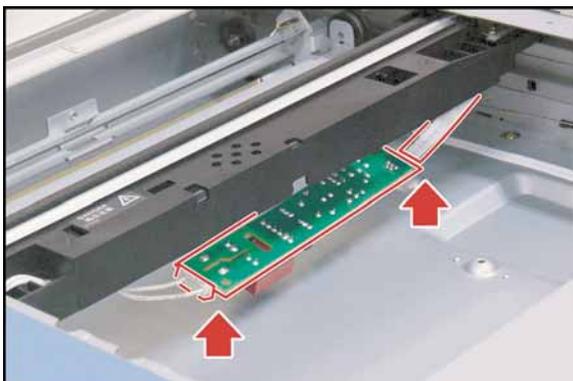
(8) Disconnect 2 **Harnesses** on the Inverter PC Board (CN1, and CN2).
(9) Remove the **Inverter PC Board** (416).

Ver. 1.1
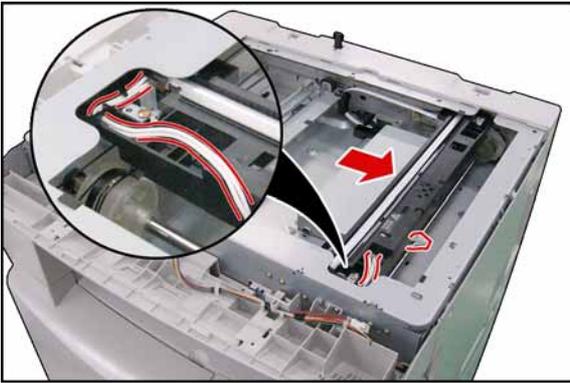
(10) Slide the **Lamp Base Assembly** to the right side as illustrated.

(11) Release the **Harness**.

Note:
   When reinstalling the Harness, confirm that the Harness is installed as illustrated.
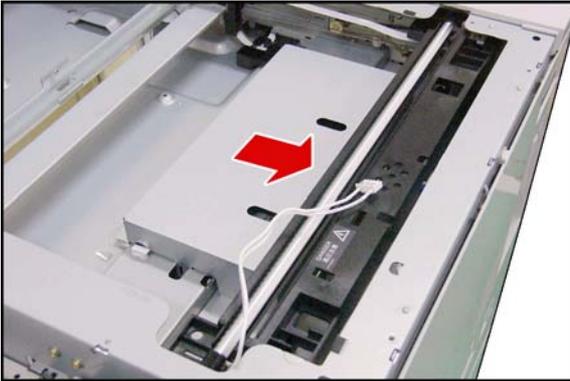
(12) Slide the **Lamp Base Assembly** to the right side as illustrated.
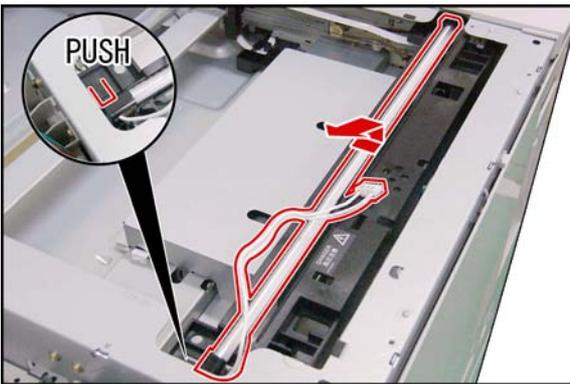
(13) Remove the **Scanning Lamp** (410) as illustrated.
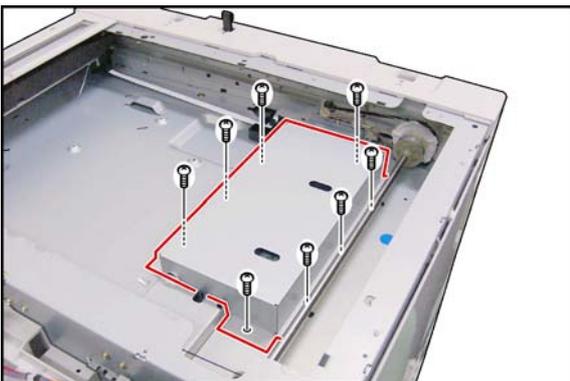
(14) Remove 8 **Screws** (Y2).
(15) Remove the **CCD Cover** (406).

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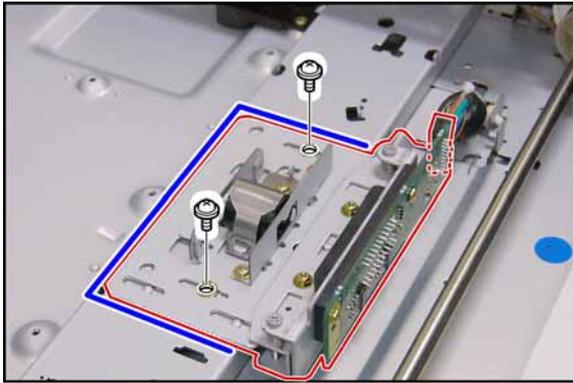
(16) Remove 2 **Screws** (X3).

(17) Remove the **CCD Assembly** (427).

Note:

    Before proceeding, mark the position of the CCD Assembly as illustrated.

    If the CCD Assembly is not reinstalled at the same position, it will affect the copy quality.
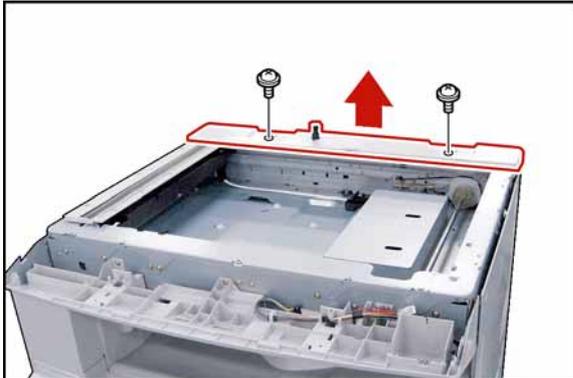
(18) Remove 2 **Shoulder Silver Screws** (X2).

(19) Remove the **Rear Scanner Cover** (102).
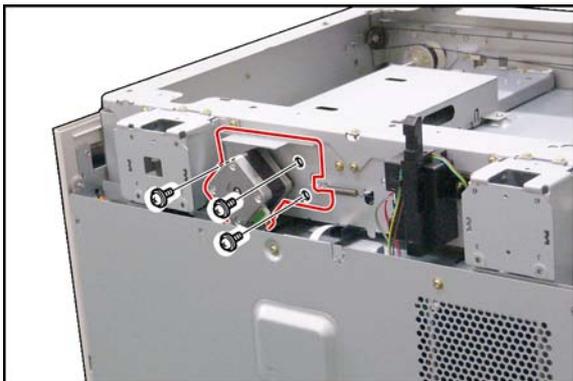
(20) Remove 3 **Screws** (Y3).
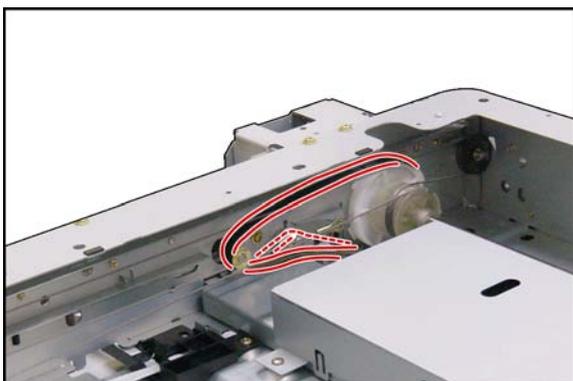
(21) Remove the **Synchro Belt** (318).
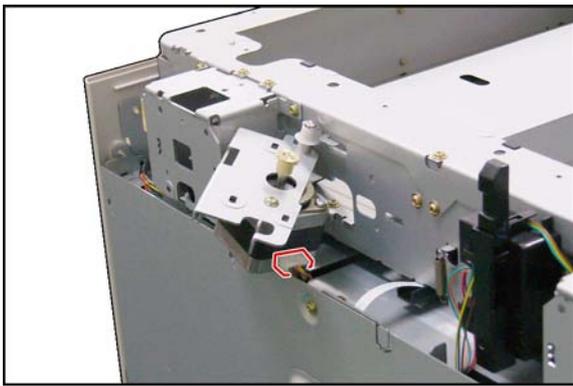
(22) Disconnect the **Harness**.
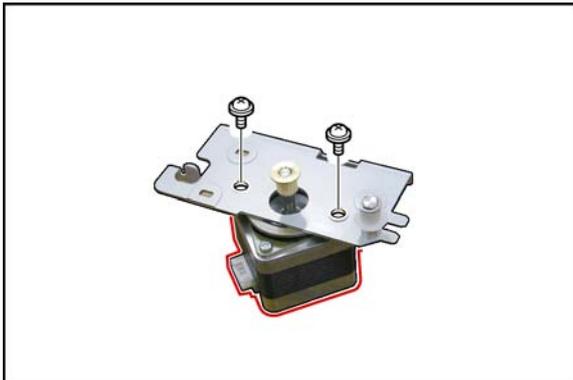
(23) Remove 2 **Screws** (Y3).
(24) Remove the **Scanning Motor** (316).
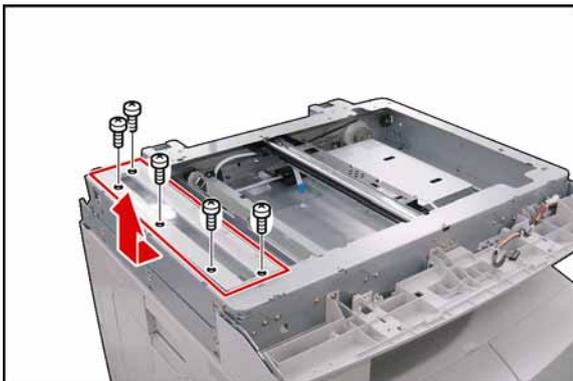
(25) Remove 5 **Shoulder Silver Screws** (X2).
(26) Remove the **Left Document Plate** (109).
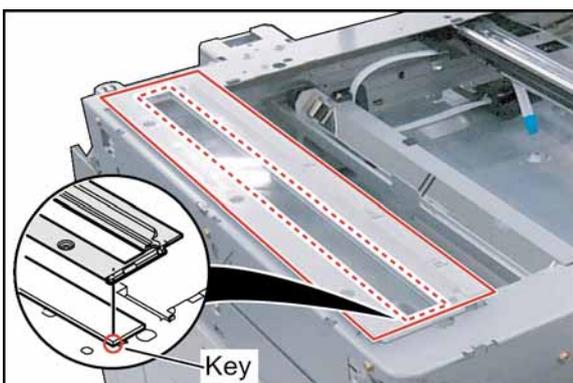
Note:
  When reinstalling the Left Document Plate, ensure
  the Scanning (S) Glass is in its original position
  against the key as illustrated.

Key

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(27) Clean the White Reference Sheet with a soft cloth, saturated with Water.
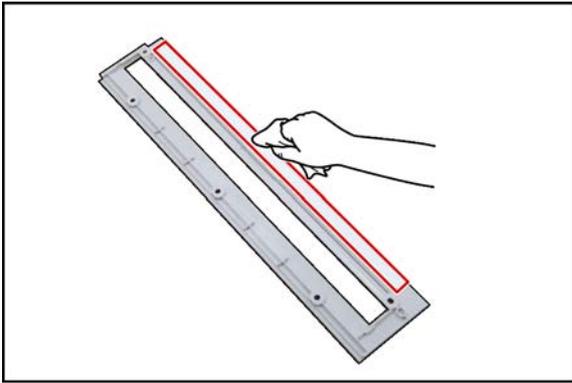
(28) Clean both **Mirror 2** (421) with a soft cloth.
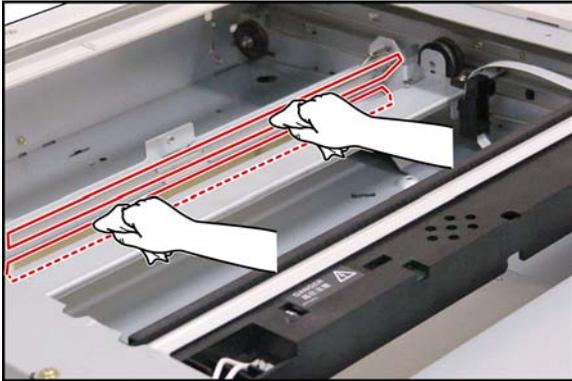
(29) Clean the **Mirror 1** (415) with a soft cloth.
Note:
  1. Clean any dirt or fingerprints with a Dry Cotton Swab.
  2. Do not use Isopropyl Alcohol or any other Alcohol.

67
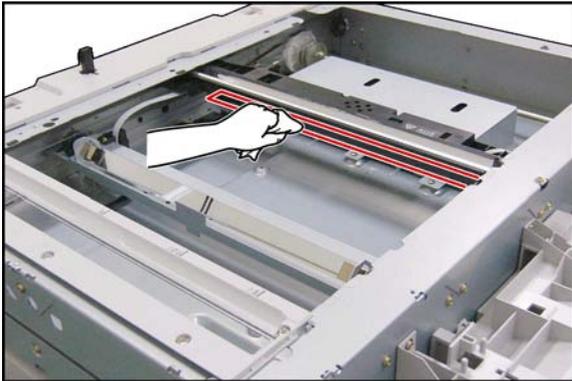
2.2.5.   Process Unit

Note:

To avoid Toner spill in the machine, follow the steps below before removing the Process Unit.

1. Press "**FUNCTION**", and "**1 SIDED COPY**" keys simultaneously.
2. The LCD shows "**Please wait...**" for approx. 5 sec. Then it will be ready.

(1) Open the **Left Cover**.
(2) Open the **Front Cover**.
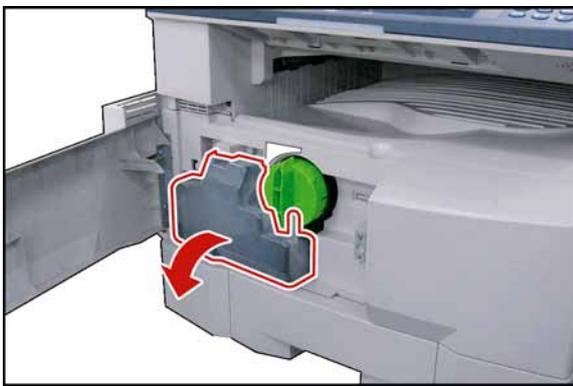
(3) Remove the **Toner Waste Container** (1201).
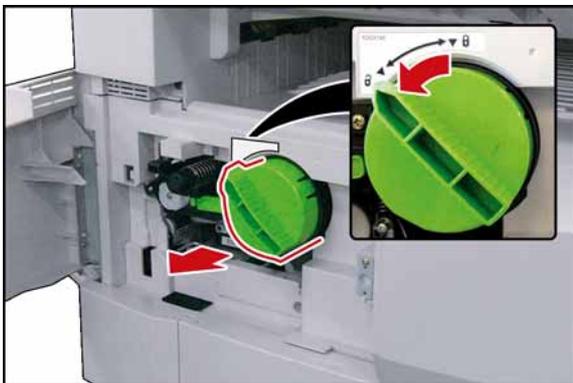
(4) Remove the **Toner Bottle**.

Caution:

Do Not install the Toner Bottle before installing the Process Unit first. If the Toner Bottle is installed, and turned to the "Locked" position without the Process Unit installed, the Toner will spill inside the machine.

<Cleaning Charge Wire>
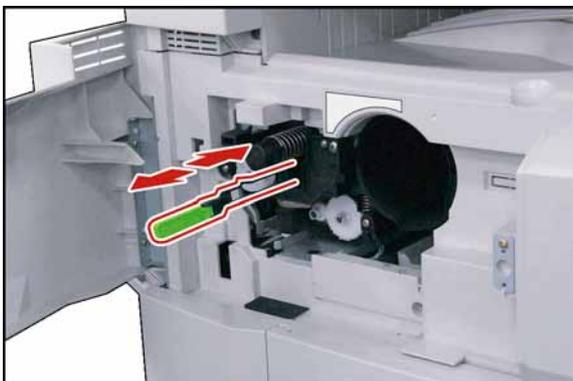
Slide the Corona Cleaner in, and out 3, or 4 times slowly, then return the Cleaning Lever Handle to original position.

68
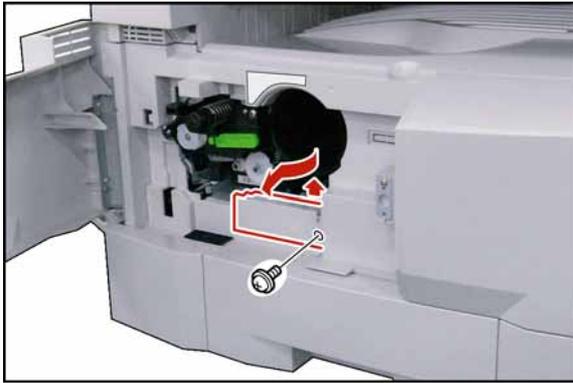
(5) Remove 1 **Screw** (Y3).
(6) Remove the **Connector Cover** (203).

(7) Loosen 1 **Screw**.
(8) Disconnect the **Harness**.
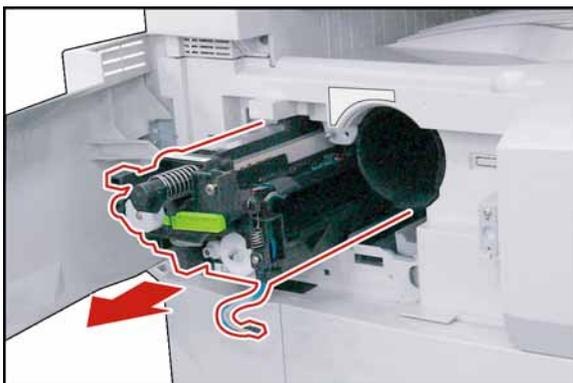
(9) Remove the **Process Unit**.
Caution:
To prevent damage to the Process Unit, ensure that the Left Cover is still open before removing the Process Unit out of the machine.
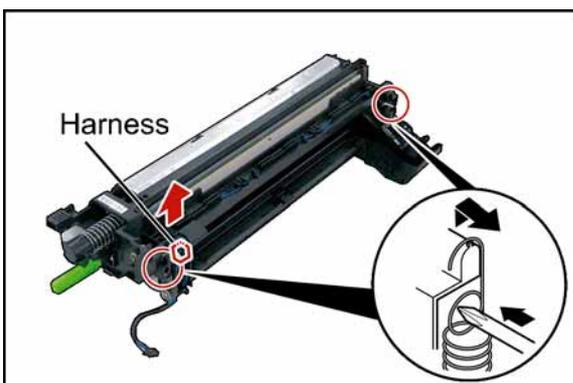
(10) Unhook 2 **Springs** as illustrated.
(11) Disconnect the **Harness**.
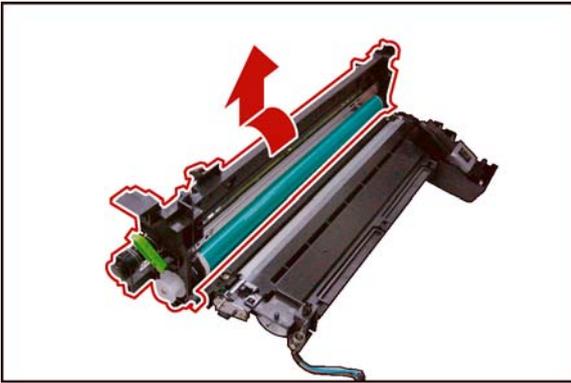
Harness

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(12) Turn the **OPC Drum Assembly** in the direction of the arrow, and remove.

Caution:
Exercise caution not to scratch the surface of the **OPC Drum** (Green), and not to touch it with bare hands.

Caution:
The OPC Drum is sensitive to light. To prevent optical exposure problems, do not expose the OPC Drum to direct sunlight, or bright light.

Even if it is a fluorescent lamp, approx.1000 lm/m^2 (1000 lx).
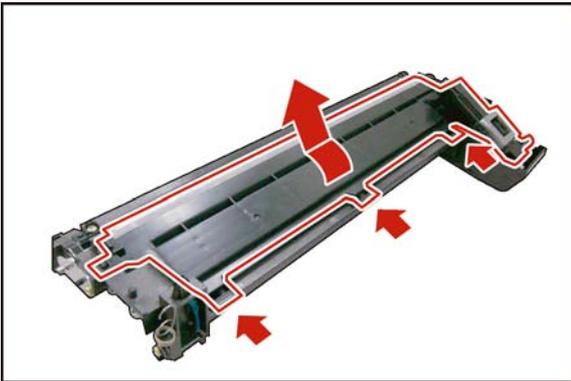
(13) Release 3 **Latch Hooks**, and remove the **Developer Cover**.

(14) Remove the **Support Pipe** (1338).

<Removing the Old Developer, and Toner>

(15) Hold the Developer Unit as illustrated over a suitable container, and dump the used Developer, and Toner by rotating the Gear.
(16) Clean the **Developer Unit** with a soft dry cloth.

70
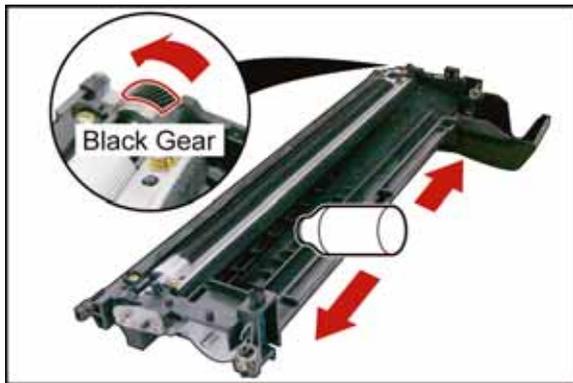
(17) Shake the **Developer Bottle** thoroughly (approx. 30 seconds).
(18) Pour the developer evenly into the developer unit by turning the Black Gear as illustrated. Make sure to empty the bottle.

<Removing the Old OPC Drum>

(19) Remove the **OPC Drum Shaft Holder** Assembly.
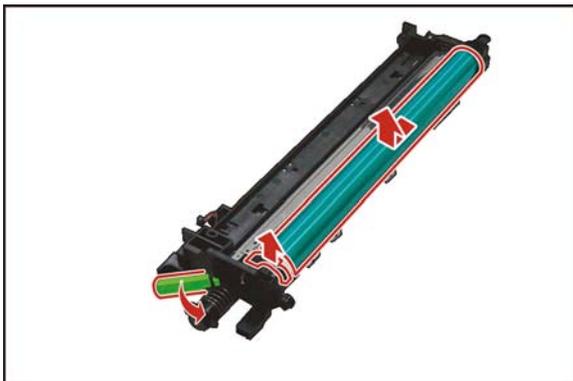
(20) Remove the **Roller Spacer** (1409).
(21) Lift the **OPC Drum**, holding the left side where the OPC Drum Shaft Holder Assembly was installed.
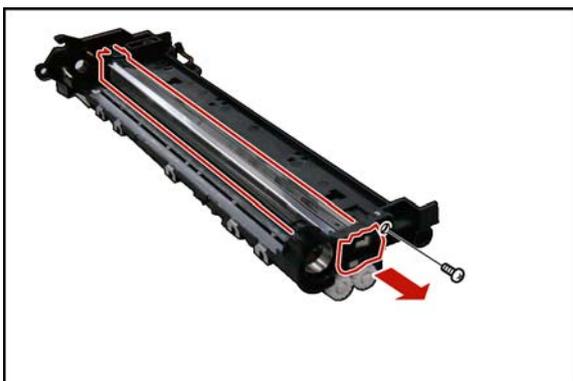
(22) Remove 1 **Screw** (X9).
(23) Remove the **Charge Corona** Assembly.

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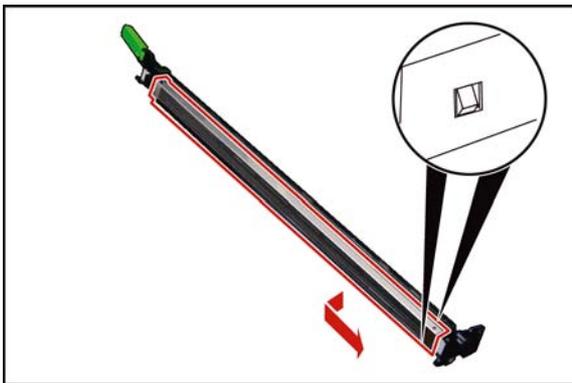
(24) Remove the **Charge Grid** (1433).

(25) Remove 2 **Charge Covers** (1432, and 1438).
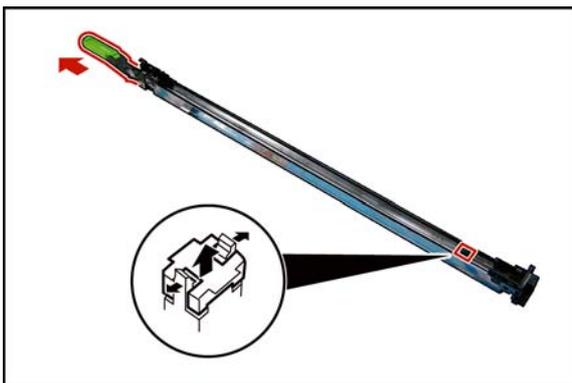
(26) Draw out the **Cleaning Lever Handle** (Green) (1427).
(27) Remove the **Charge Cleaning Base** (1439).
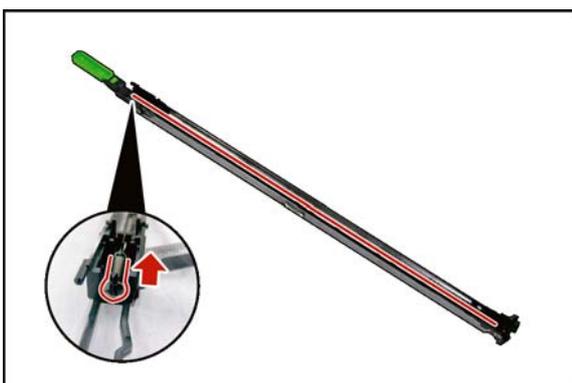
(28) Remove the **Charge Wire** Assembly.

(29) Remove the **Pad Base** (1441).
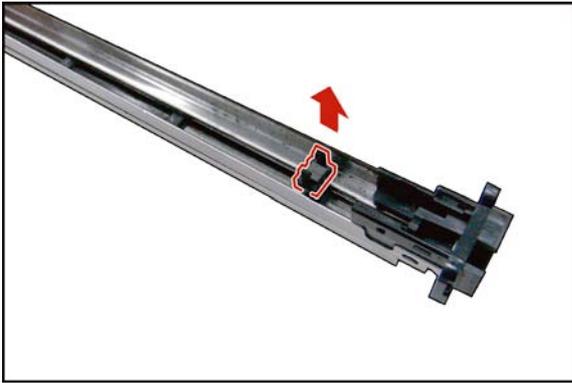
(30) Remove 2 **Screws** (X3).
(31) Remove the **Cleaning Blade** (1408).
(32) Remove the **Front Cleaning Felt** (1410), **Rear Cleaning Felt** (1411), and 2 **Cleaning Sponges** (1412).
(33) Remove the **Splash Prevention Sheet** (1415).

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2.2.6. Fuser Unit

CAUTION:
To prevent from getting burned, do not install, remove, clean, or make adjustments when the Fuser Unit is hot.
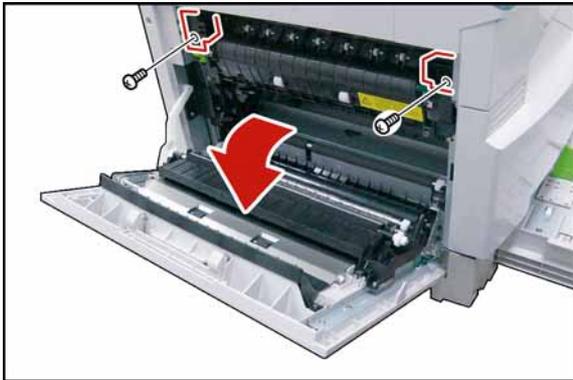
(1) Open the **Left Cover**.
(2) Remove 2 **Screws** (X8).
(3) Remove the **Rear Fuser Cover** (1006), and the **Front Fuser Cover** (1007).
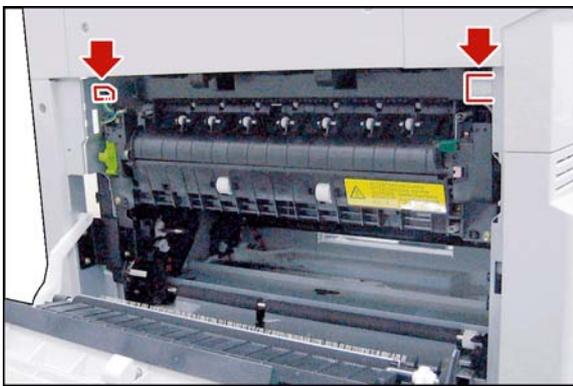
(4) Disconnect 2 **Harnesses**.
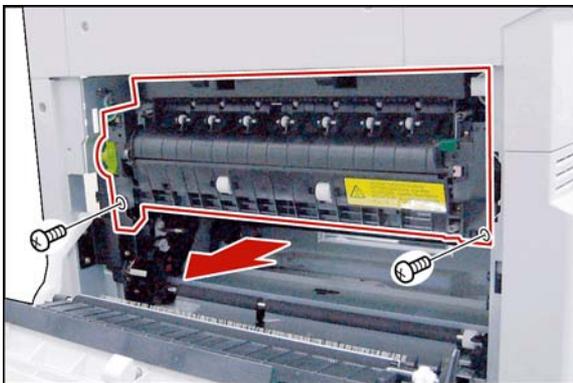
(5) Remove 2 **Screws** (Y5).
(6) Remove the **Fuser Unit**.
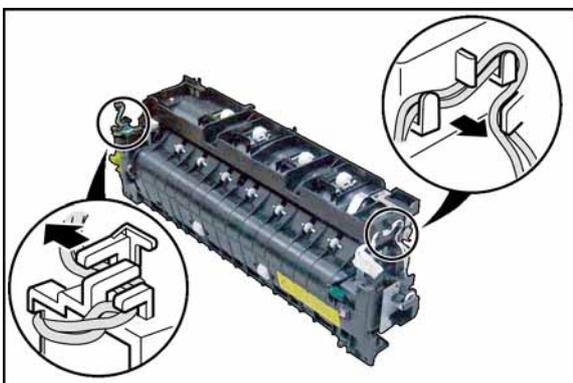
(7) Release 2 **Harnesses** from Latch Hooks.

Ver. 1.1

(8) Disconnect the **Harness**.
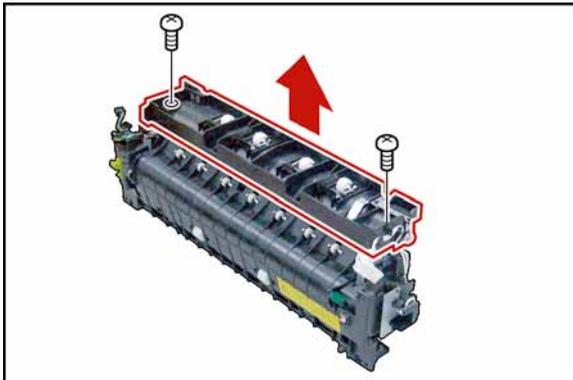
(9) Remove 2 **Screws** (X8).
(10) Remove the **Upper Fuser Cover Assembly**.

<Cleaning Exit 2 Roller>
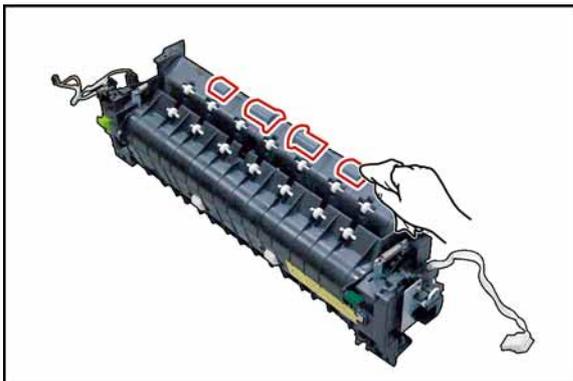
Clean the Exit 2 Roller with a soft cloth, saturated with Water.
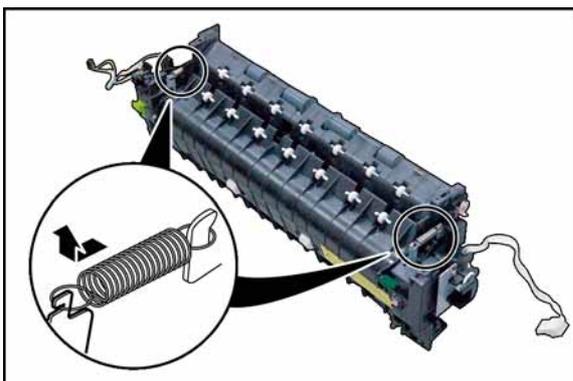
(11) Unhook 2 **Springs**.

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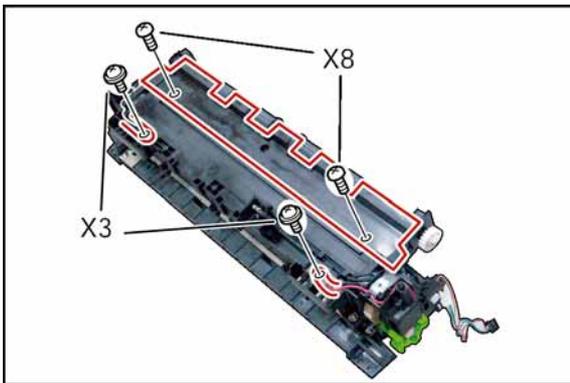
(12) Remove 2 **Screws** (X3).
(13) Release 2 **Harnesses**.
(14) Remove 2 **Screws** (X8).
(15) Remove the **Exit Roller Cover** (1101).
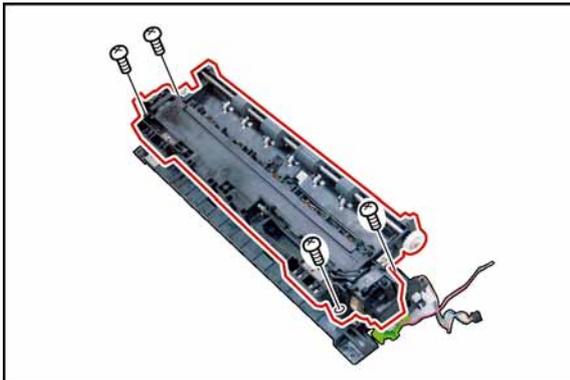
(16) Remove 4 **Screws** (X7).
(17) Remove the **Fuser Roller** (1115) Assembly.
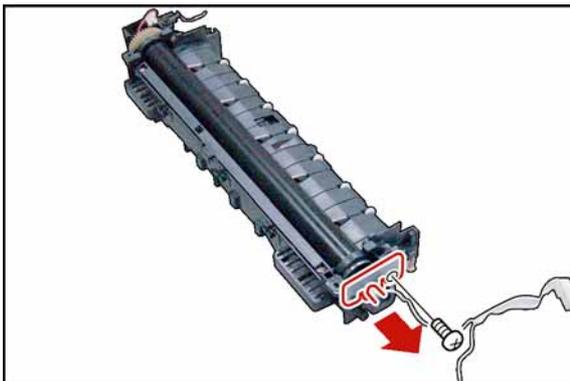
(18) Remove 1 **Screw** (X8).
(19) Remove the **Front Lamp Holder** (1123).
(20) Remove the **Fuser Lamp** (1116).
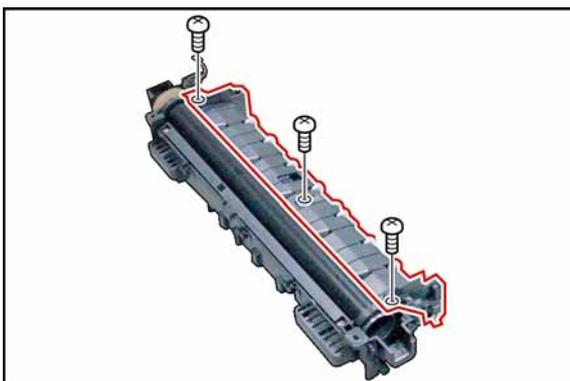
(21) Remove 3 **Screws** (X8).
(22) Remove the **Exit Roller Assembly**.

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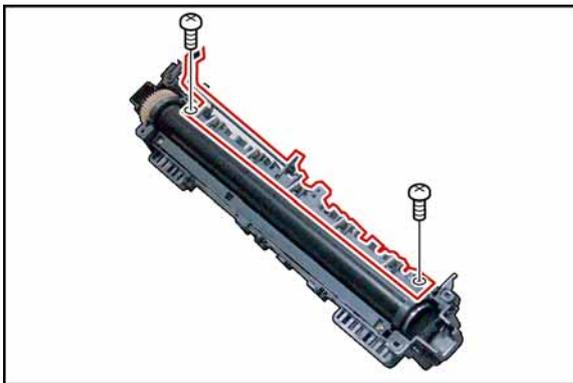
(23) Remove 2 **Screws** (X8).
(24) Remove the **Finger Base** (1108) Assembly.
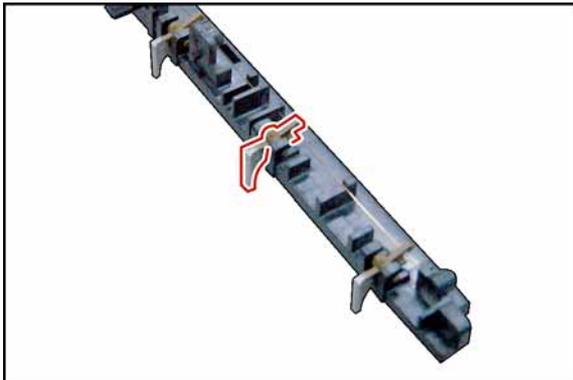
(25) Remove 5 **Separators** (1109).

<Cleaning Separators>

Clean the Separators with a Dry soft cloth.

(26) Remove the **Fuser Roller** (1115) Assembly.

(27) Remove the 2 **C-Rings** (1113).
(28) Remove the **E39 Heat Roller Gear** (1112).
(29) Remove the 2 **Fuser Roller Bushings** (1114).
Note:
Exercise care not scratch the surface of the Fuser Roller when removing, or reinstalling it.

<Cleaning Fuser Roller>

Clean the surface of the Fuser Roller with a soft cloth, saturated with Water.
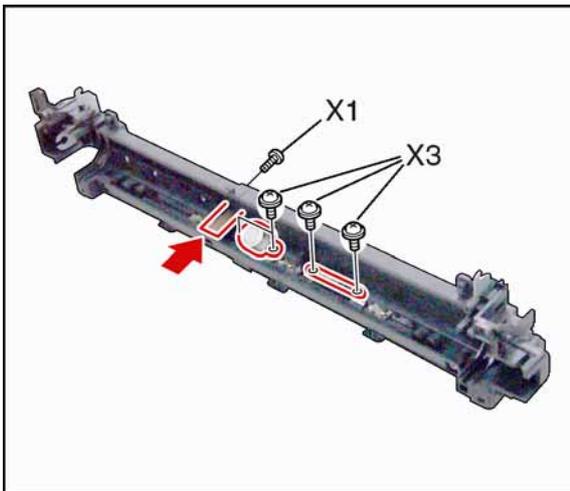
(30) Remove 2 **Screws** (X3).
(31) Remove the **Thermostat** (1120).
(32) Remove 2 **Screws** (X3).
(33) Remove the **Thermal Fuse** (1118).
(34) Remove 1 **Screw** (X1).
(35) Remove the **Thermistor Assembly** (1125).

<Cleaning Thermostat>

Clean the surface of the Thermostat only with a Dry soft cloth.

<Cleaning Thermistor Assembly>

Clean the surface of the Thermistor Assembly only with a Dry soft cloth.
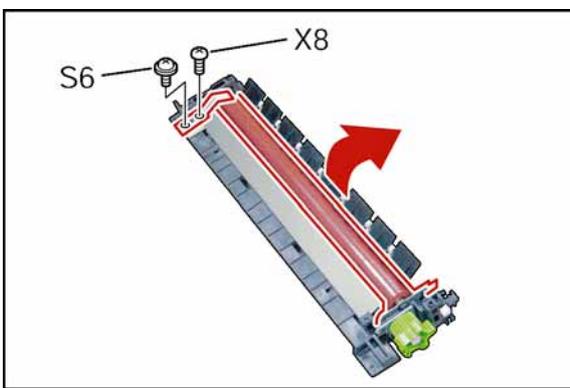
(36) Remove 2 **Screws** (S6, X8).
(37) Remove the **Ground Plate 2** (1024).
(38) Remove the **Pressure Roller** (1021) Assembly.
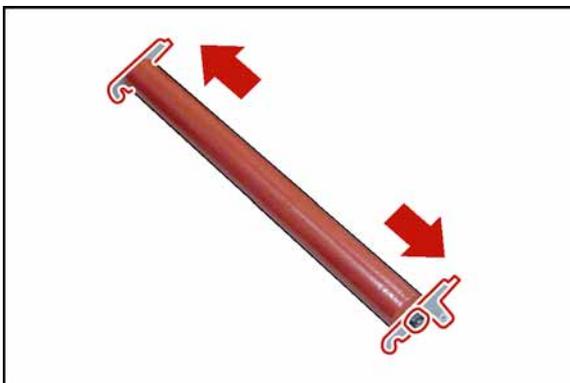
(39) Remove the **Front Pressure Plate** (1019), and the **Rear Pressure Plate** (1018).
(40) Remove 2 **Pressure Roller Bushings** (1020).
Note:
Do not scratch the surface of the Pressure Roller when removing, or reinstalling it.

<Cleaning Pressure Roller>

Clean the surface of the Pressure Roller with a soft cloth, saturated with Water.

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2.2.7. Drive Unit

2.2.7.1. Drive Motor, and Toner Bottle Motor
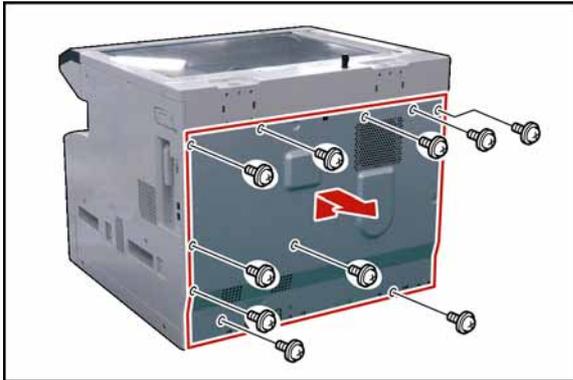
(1) Remove 10 **Screws** (Y3).
(2) Remove the **Rear Cover** (220).
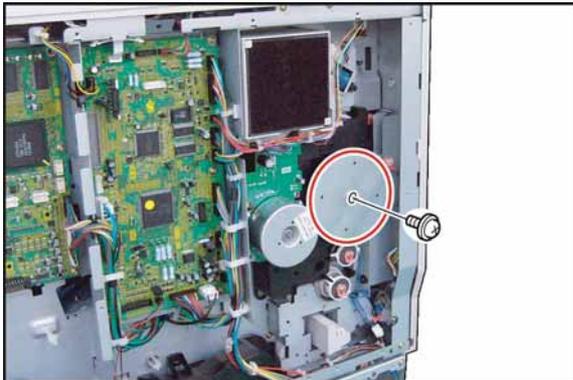
(3) Remove 1 **Screw** (Y9).
(4) Remove the **Fly Wheels** (1555).

Note:
  When the Ground Spring Kit (1556) is attached, it is removed.
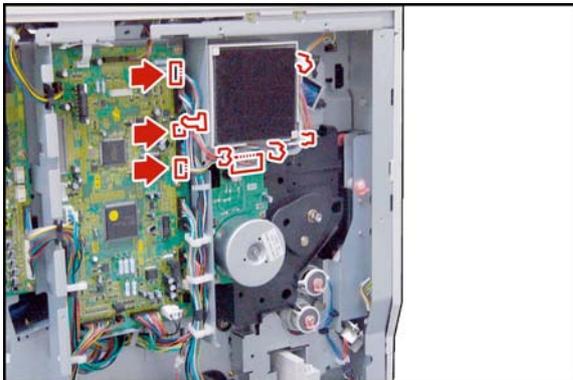
(5) Disconnect the **Harnesses** on the SPC PC Board (CN719, CN721, and CN723), and Main Motor.
(6) Release the **Harnesses** from 5 Harness Clamps.
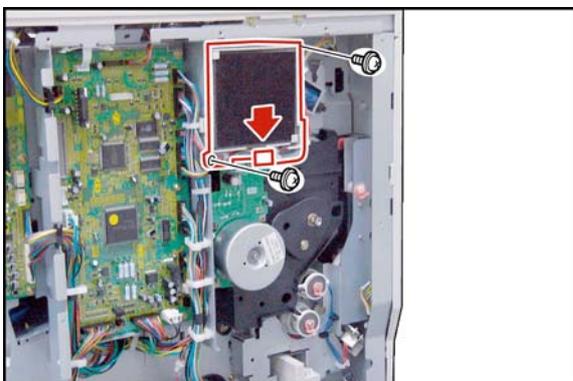
(7) Disconnect the **Harness**.
(8) Remove 2 **Screws** (Y4).
(9) Remove the **Fan** (815) Assembly.

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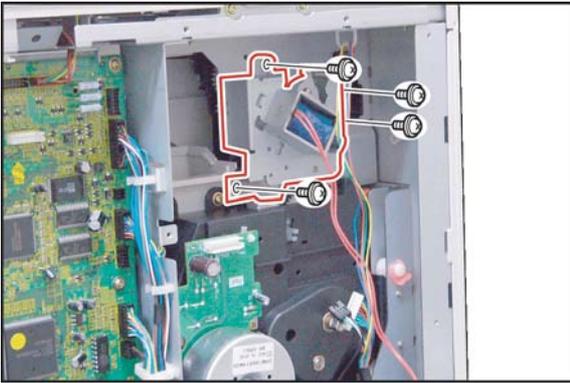
(10) Remove 4 **Screws** (Y3).
(11) Remove the **Main Drive Frame B**.
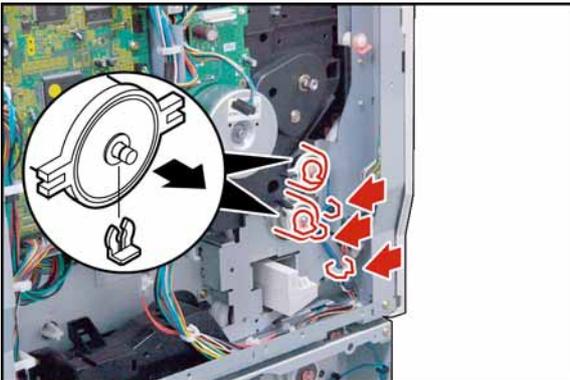
(12) Remove 2 **Snap Rings** (S9).
(13) Release the **Harnesses** from 3 Harness Clamps.
(14) Remove 2 **Clutches** (694, and 695).
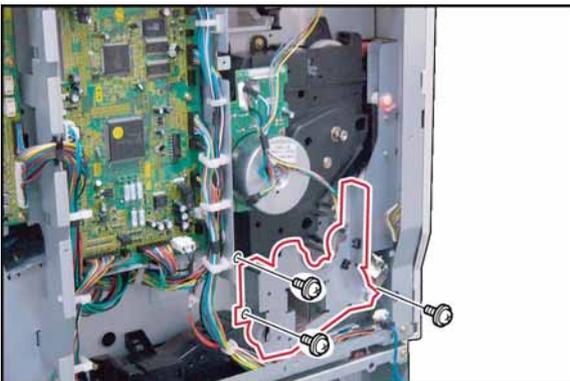
(15) Slide the **1st Paper Tray** out of the unit.
(16) Remove 3 **Screws** (Y3).
(17) Remove the **Feed Drive Assembly** (1541).
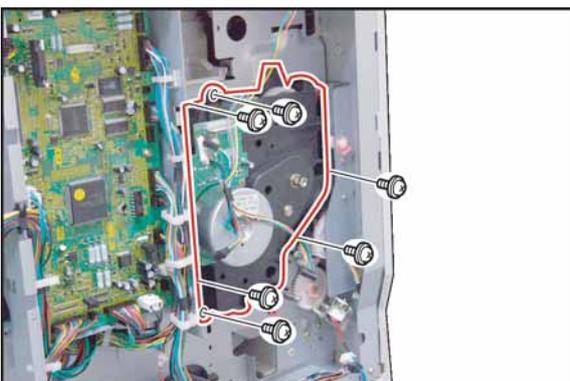
(18) Remove 6 **Screws** (X8).
(19) Remove the **Main Drive Assembly** (1540).

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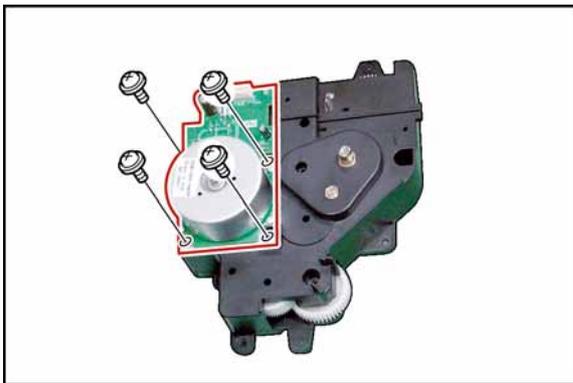
(20) Remove 4 **Screws** (X8).
(21) Remove the **Drive Motor** (1511).
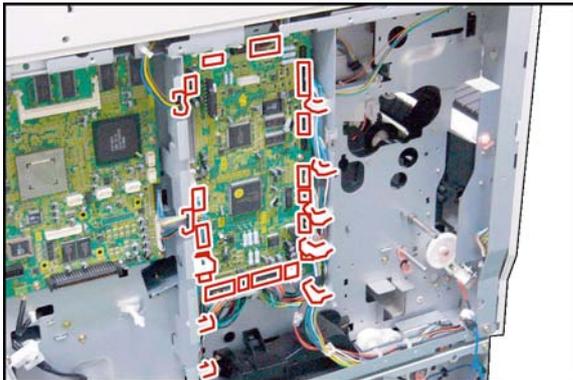
(22) Disconnect all the **Harnesses** on the SPC PC Board.
(23) Release the **Harnesses** from Harness Clamps.
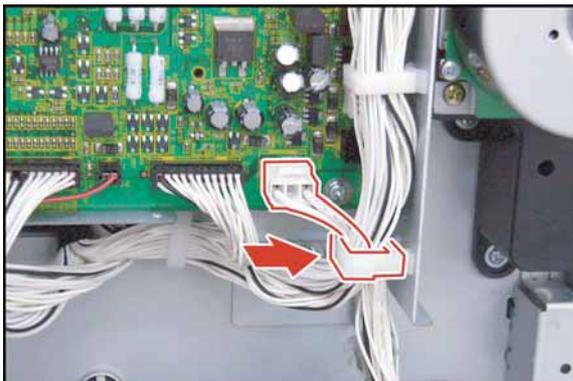
Note:
When reinstalling the ILS Harness (SPC PC Board CN708), ensure that it is secured by the Harness Clamp as illustrated.
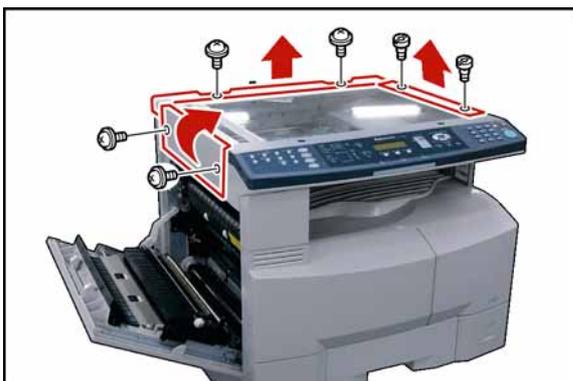
(24) Open the **Left Cover**.
(25) Remove 2 **Silver Screws** (S6).
(26) Remove the **Left Scanner Cover** (101).
(27) Remove 2 **Shoulder Silver Screws** (X2).
(28) Remove the **Right Scanner Cover** (132).
(29) Remove 2 **Silver Screws** (1027).
(30) Remove the **Rear Scanner Cover** (102).
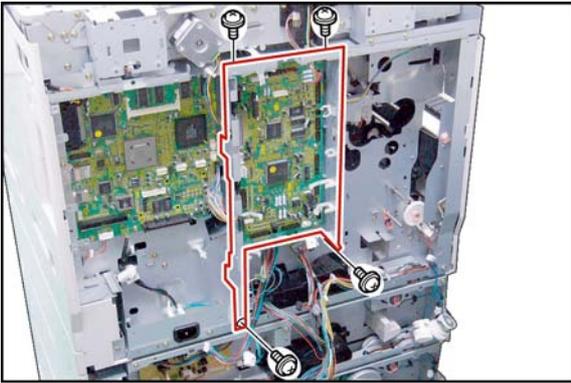
(31) Remove 4 **Screws** (Y3).
(32) Remove the **SPC Bracket** (926).
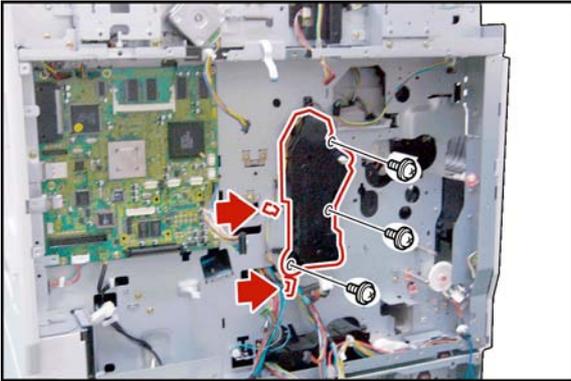
(33) Release the **Harnesses** from Harness Clamps.
(34) Remove 3 **Screws** (Y3).
(35) Remove the **Toner Bottle Motor Unit**.
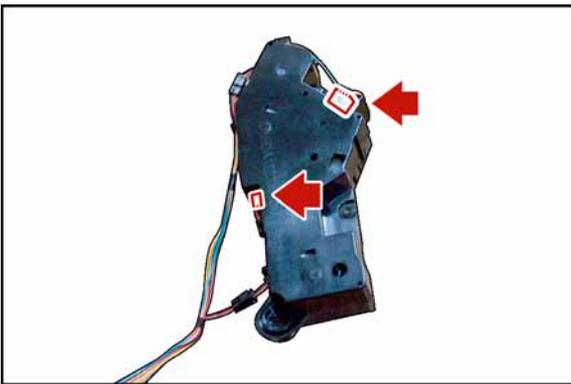
(36) Disconnect the **Harness**.

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2.2.7.2. Lift Up Motor, and 3rd Main Motor
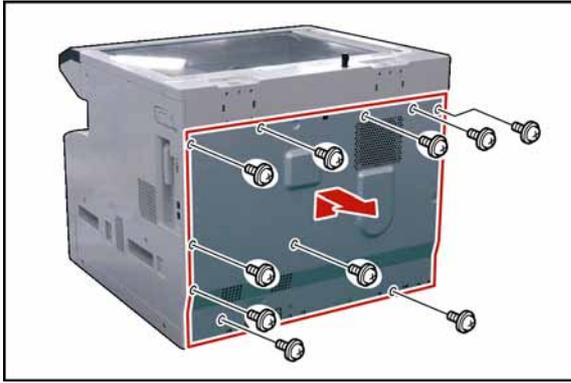
(1) Remove 10 **Screws** (Y3).
(2) Remove the **Rear Cover** (220).
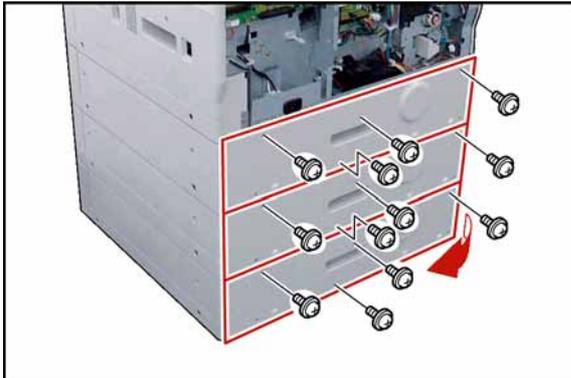
(3) Remove 4 **Silver Screws** (1027).
(4) Remove the **Rear Paper Tray Cover** (3004).
(5) Remove 4 **Silver Screws** (1027).
(6) Remove the **Rear Paper Tray Cover** (3004).
(7) Remove 4 **Silver Screws** (1027).
(8) Remove the **Rear Paper Tray Cover** (3004).
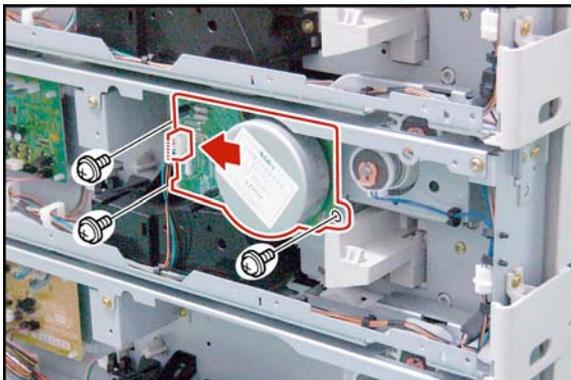
 (9) Disconnect the **Harness**.
(10) Remove 3 **Screws** (Y3).
(11) Remove the **3rd Main Motor** (3134).
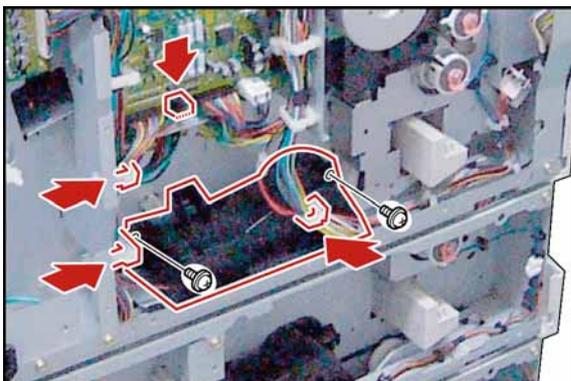
(12) Release the **Harnesses** from 3 Harness Clamps.
(13) Disconnect the **Harness** on the SPC PC Board (CN706).
(14) Remove 2 **Screws** (Y3).
(15) Remove the **Lift Up Motor** (3132).

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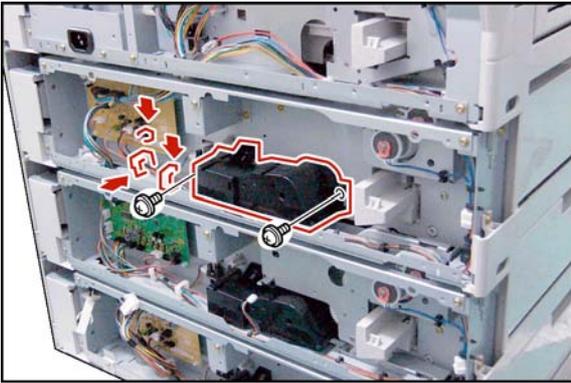
(16) Release the **Harnesses** from 2 Harness Clamps.
(17) Disconnect the **Harness** on the CST2 PC Board (CN774).
(18) Remove 2 **Screws** (Y3).
(19) Remove the **Lift Up Motor** (3132).
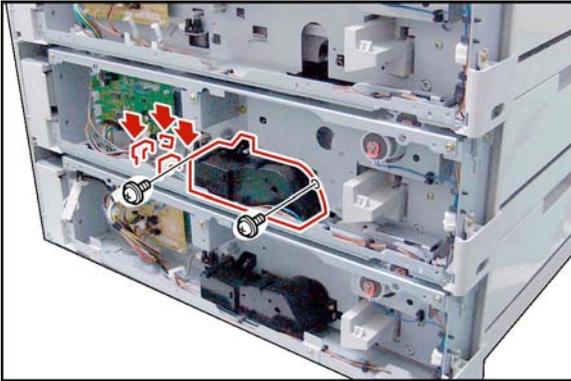
(20) Release the **Harnesses** from 2 Harness Clamps.
(21) Disconnect the **Harness** on the CST2 PC Board (CN774).
(22) Remove 2 **Screws** (Y3).
(23) Remove the **Lift Up Motor** (3132).

84
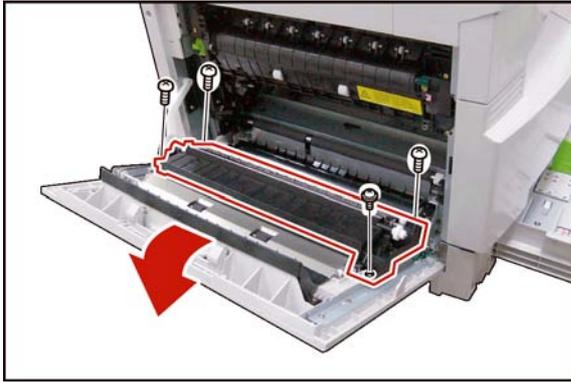
2.2.8.   Left Cover

(1) Open the **Left Cover**.
(2) Remove 4 **Screws** (Y3).
(3) Remove the **ADU**.
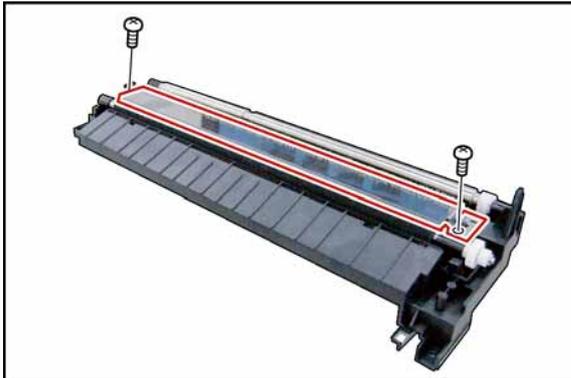
(4) Remove 2 **Screws** (X8).
(5) Remove the **Bias Transfer Guide** (701).
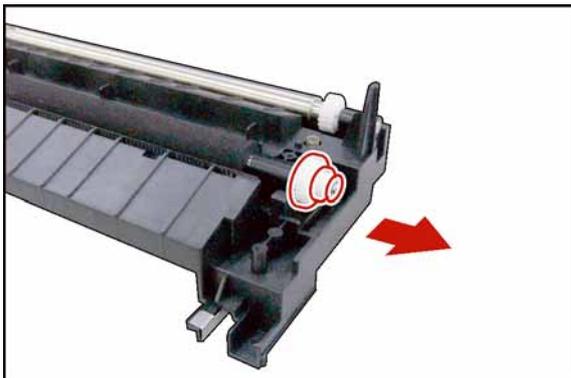
(6) Remove the **E-Ring** (J6).
(7) Remove the **BTR Ring Spacer** (705).
(8) Remove the **BTR 27 Gear** (706).
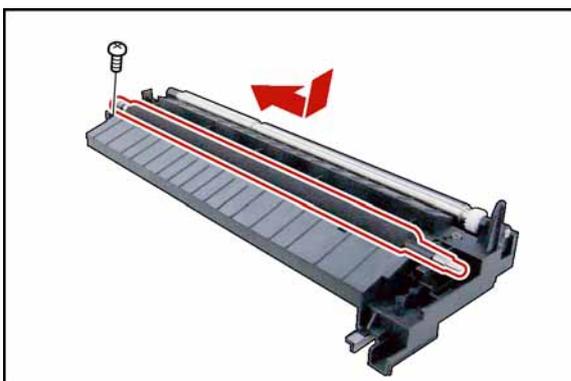
(9) Remove 1 **Screw** (X8).
(10) Remove the **Bias Transfer Roller** (711) Assembly.

85
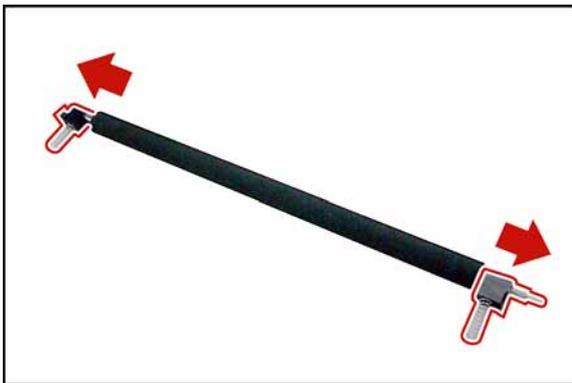
(11) Remove 2 **Bias Transfer Roller Bushings** (709).

<Cleaning Bias Transfer Roller>

Clean the surface of the Bias Transfer Roller only with a soft dry cloth.

<Cleaning Duplex Feed Rollers>
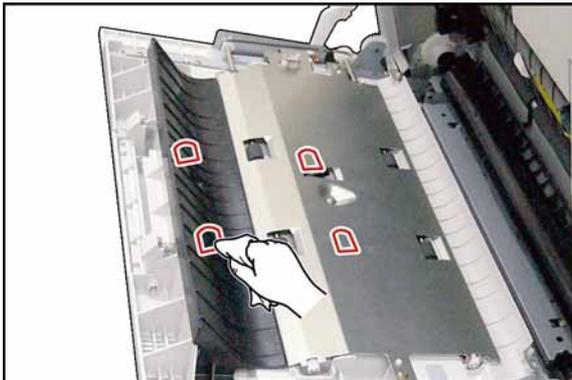
Clean the surface of the Duplex Feed Roller with a soft cloth, saturated with Water.

86

2.2.9. Bypass Paper Tray
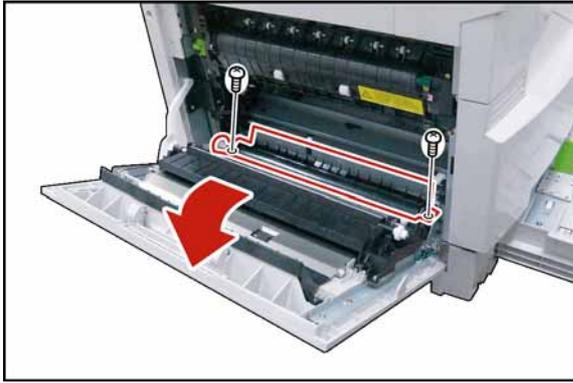
(1) Open the **Left Cover**.
(2) Remove 2 **Screws** (X1).
(3) Remove the **Duplex Guide** (638) Assembly.
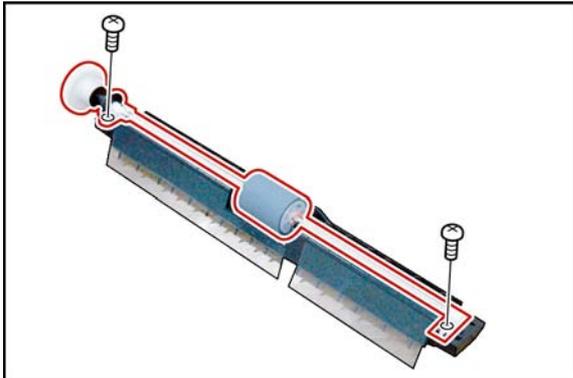
(4) Remove 2 **Screws** (X8).
(5) Remove the **Feed Roller** (689) Assembly.
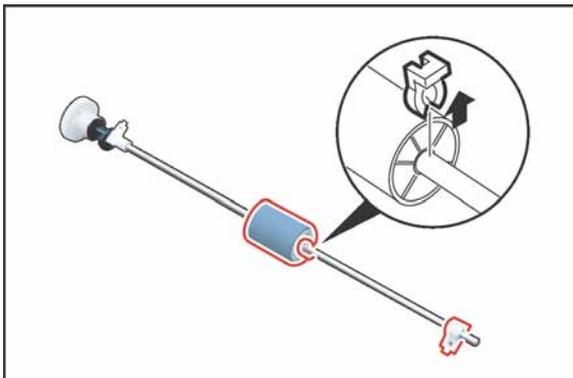
(6) Remove the **Snap Ring** (S9).
(7) Remove the **Bushing** (642).
(8) Remove the **Feed Roller** (689).

<Cleaning Feed Roller>

Clean the surface of the Feed Roller with a soft cloth, saturated with Water.
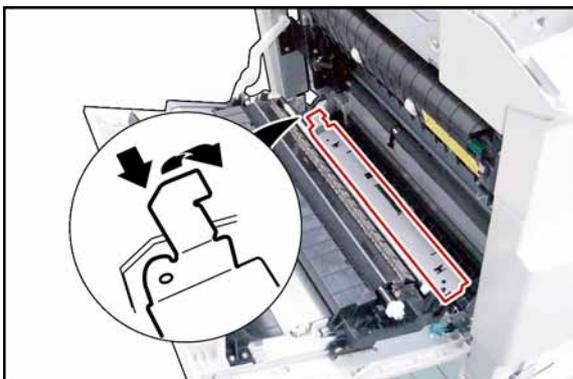
(9) Remove the **Pressure Plate** (649).

87
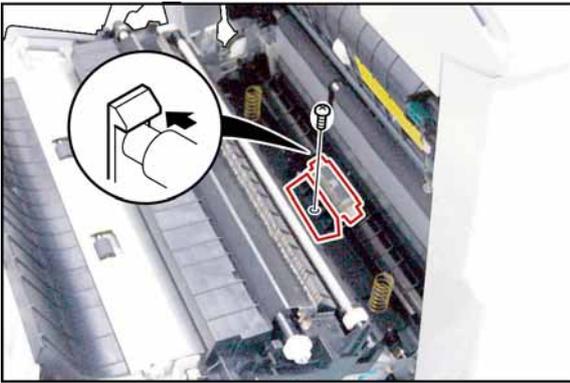
(10) Remove 1 **Screw** (X8).
(11) Remove the **Guide** (659).
(12) Remove the **Separation Roller** (658) Assembly.

(13) Remove the **Bushing** (651).
(14) Remove the **Torque Limiter 2** (691).
(15) Remove the **Separation Roller** (658).

<Cleaning Separation Roller>

Clean the surface of the Separation Roller with a soft cloth, saturated with Water.

88

2.2.10. Paper Feed Module

(1) Slide the **1st Paper Tray** out of the unit.
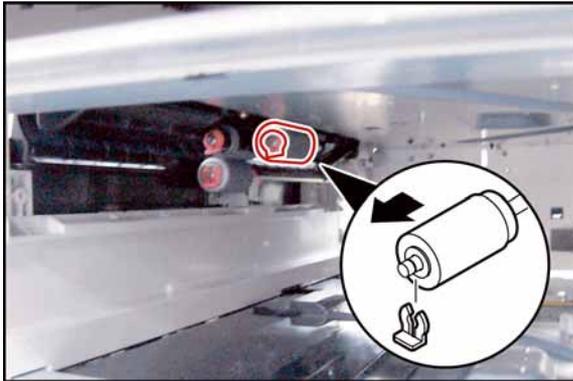
(2) Remove the **Snap Ring** (H6).
(3) Remove the **Pickup Roller** (619).

<Cleaning Pickup Roller>

Clean the surface of the Pickup Roller with a soft cloth, saturated with Water.
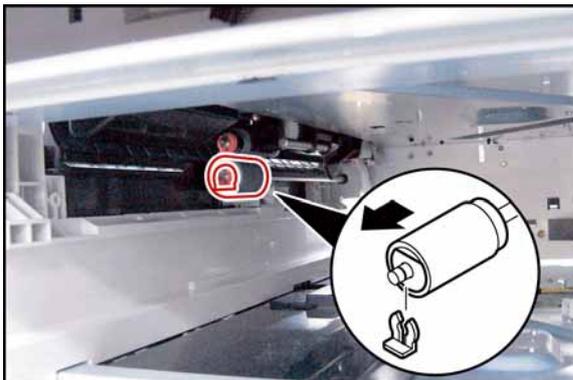
(4) Remove the **Snap Ring** (H6).
(5) Remove the **Separation Roller** (629) Assembly.
(6) Remove the **Torque Limiter 1** (690).

<Cleaning Separation Roller>

Clean the surface of the Separation Roller with a soft cloth, saturated with Water.
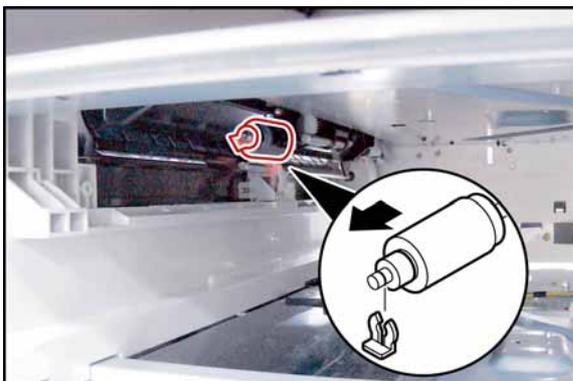
(7) Remove the **Snap Ring** (H6).
(8) Remove the **One-way Clutch** (622).
(9) Remove the **Feed Roller** (623).

<Cleaning Feed Roller>

Clean the surface of the Feed Roller with a soft cloth, saturated with Water.

(10) Slide the **2nd Paper Tray** out of the unit.
(11) Open the **Jam Access Cover** (3015).

(12) Remove 3 **Screws** (Y3, X8).
(13) Remove the **Paper Guide** (3022).
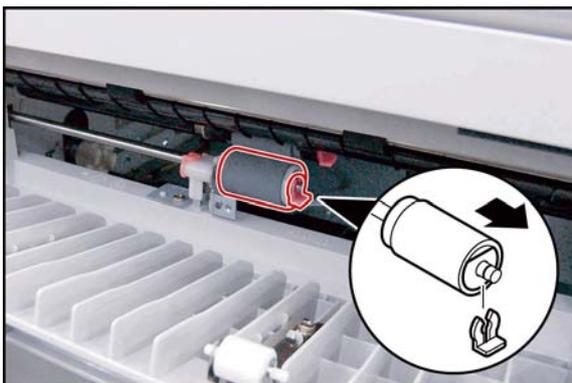
(14) Remove the **Snap Ring** (H6).
(15) Remove the **Separation Roller** (629) Assembly.
(16) Remove the **Torque Limiter 1** (690).

<Cleaning Separation Roller>

Clean the surface of the Separation Roller with a soft cloth, saturated with Water.
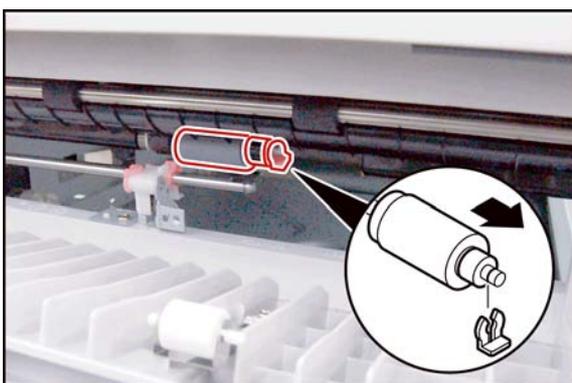
(17) Remove the **Snap Ring** (H6).
(18) Remove the **One-way Clutch** (622).
(19) Remove the **Feed Roller** (623).

<Cleaning Feed Roller>

Clean the surface of the Feed Roller with a soft cloth, saturated with Water.

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(20) Remove the **Snap Ring** (H6).

(21) Remove the **Pickup Roller** (619).

<Cleaning Pickup Roller>
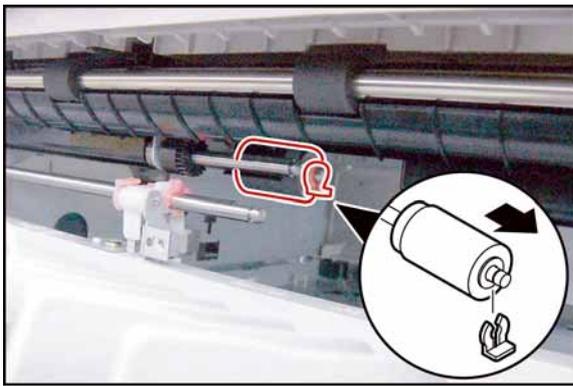
Clean the surface of the Pickup Roller with a soft cloth, saturated with Water.

<Cleaning Intermediate Roller>
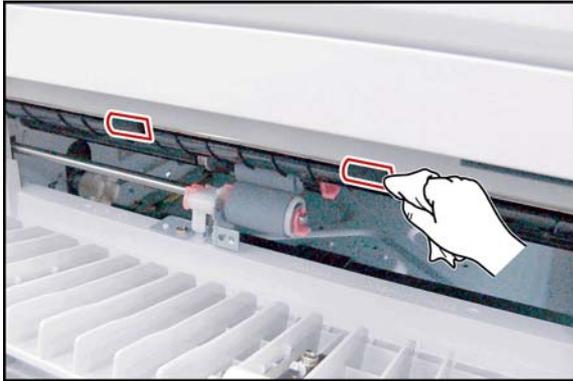
Clean the surface of the Intermediate Roller with a soft cloth, saturated with Water.

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2.2.11. PC Boards, and Power Supply PC Boards

<SC PC Board>
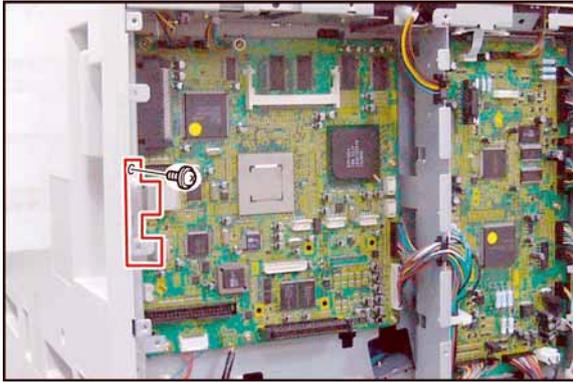
(1) Remove the **Rear Cover**, and **Lower Rear Cover** (Refer to 2.2.7.2.).
(2) Remove 1 **Screw** (Y3).
(3) Remove the **LAN Spring** (812).
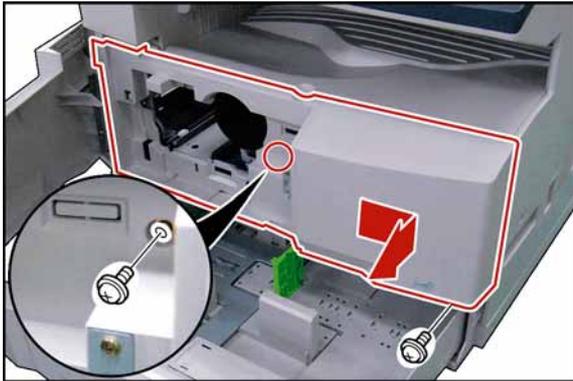
(4) Remove the **Process Unit** (Refer to 2.2.5.).
(5) Slide the **1st Paper Tray** out of the unit.
(6) Remove 2 **Screws** (Y3).
(7) Remove the **Front Cover 1** (211).
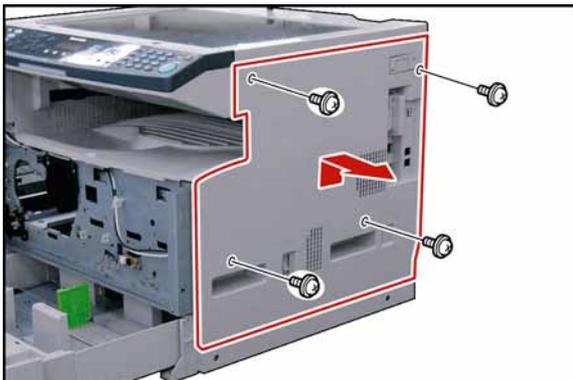
(8) Remove 4 **Silver Screws** (1027).
(9) Remove the **Right Cover** (216).
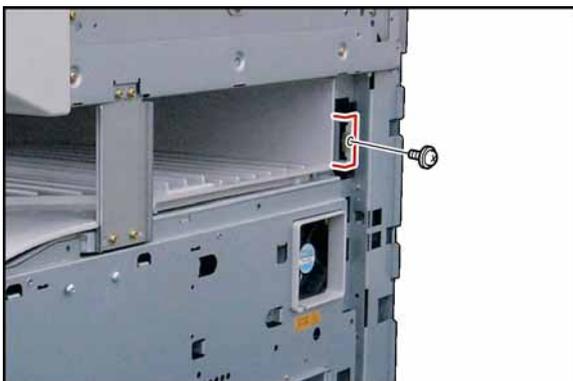
(10) Remove 1 **Screw** (Y3).
(11) Remove the **Ground Plate** (947).
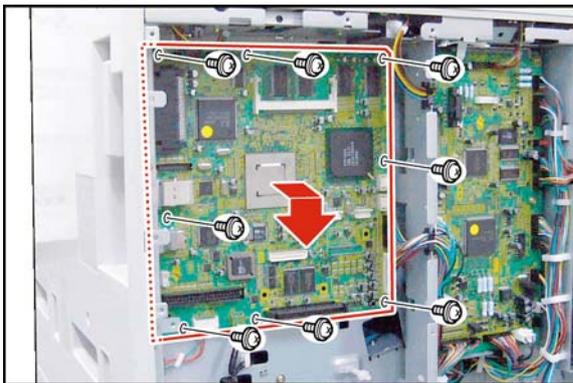
(12) Disconnect all the **Harnesses** on the SC PC Board.
(13) Remove 8 **Screws** (Y3).
(14) Remove the **SC PC Board** (2801).

<SPC PC Board>
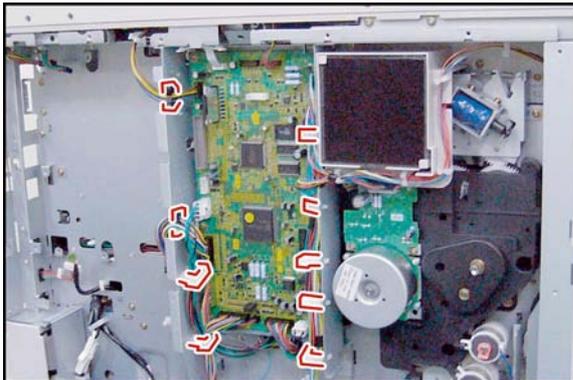
(15) Disconnect all the **Harnesses** on the SPC PC Board.
(16) Release the **Harnesses** from Harness Clamps.
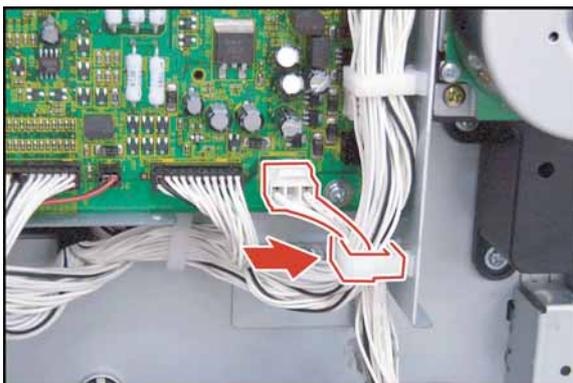
Note:
When reinstalling the ILS Harness (SPC PC Board CN708), ensure that it is secured by the Harness Clamp as illustrated.
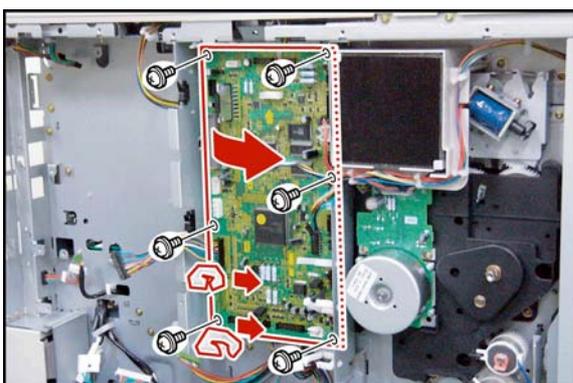
(17) Remove 2 **Harness Clamps** (3805).
(18) Remove 6 **Screws** (Y3).
(19) Remove the **SPC PC Board** (2802).

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<Power Supply PC Boards>
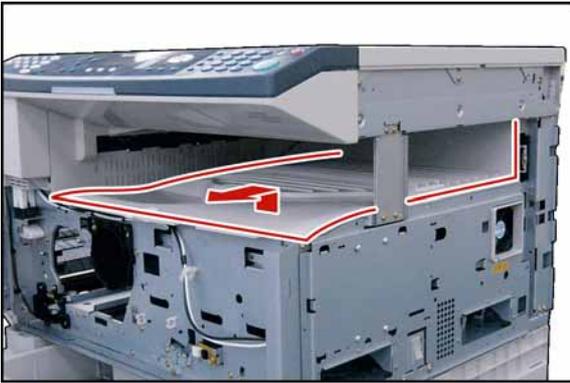
(20) Remove the **Inner Cover** (219).
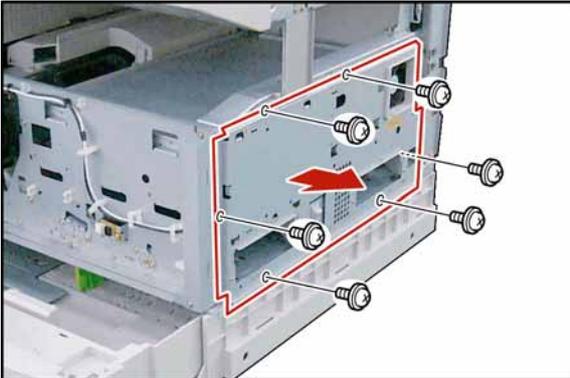
(21) Remove 6 **Screws** (Y3).
(22) Remove the **Right Bracket** (803).
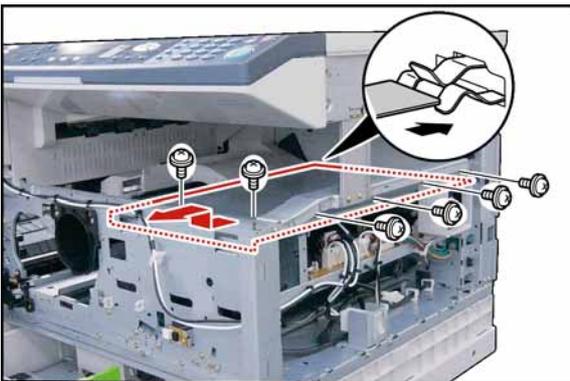
(23) Remove 6 **Screws** (X3).
(24) Remove the **PS Cover** (801).
Note:
 When reinstalling the PS Cover, ensure that the PS Cover is installed into the Ground Plate as illustrated.
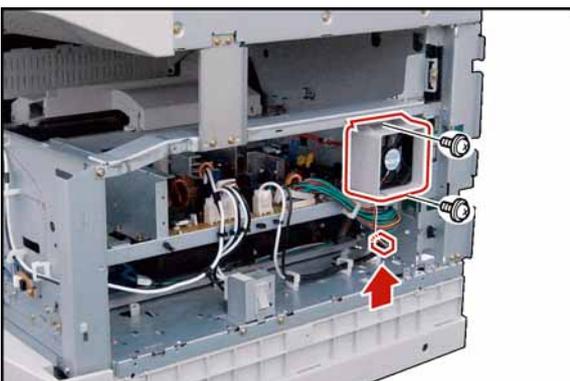
(25) Disconnect the **Fan Harness**.
(26) Remove 2 **Screws** (X3).
(27) Remove the **Fan** (816) Assembly.

94
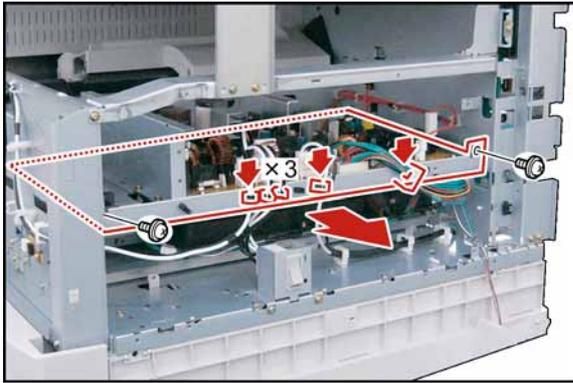
(28) Disconnect all the **Harnesses** on the PS PC Board.

(29) Release the **Harnesses** from Harness Clamps.

(30) Remove 2 **Screws** (X3).

(31) Remove the **PS PC Board** Assembly.
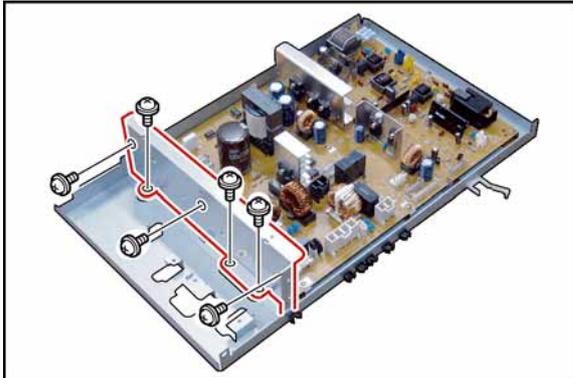
(32) Remove 3 **Screws** (Y3), and 3 **Screws** (X3).

(33) Remove the **PS Bracket** (802).
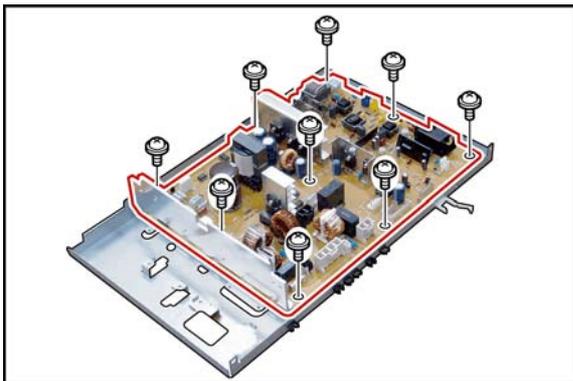
(34) Remove 9 **Screws** (Y3).

(35) Remove the **PS PC Board** (2901).

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2.2.12. LSU Unit
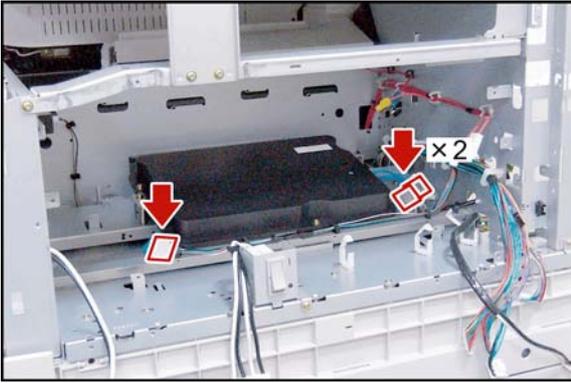
(1) Remove the **PS PC Board** Assembly.
   (Refer to 2.2.11.)
(2) Disconnect 3 **Harnesses**.
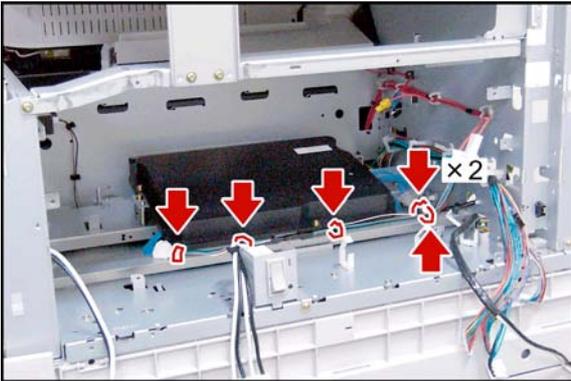
(3) Release the **Harnesses** from Harness Clamps.
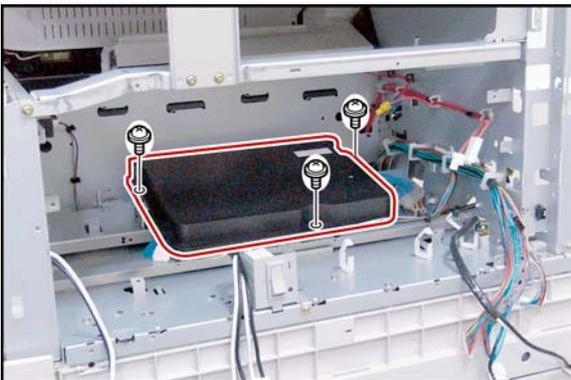
(4) Remove 3 **Screws** (X3).
(5) Remove the **LSU Unit** (829).

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2.2.13. Filter
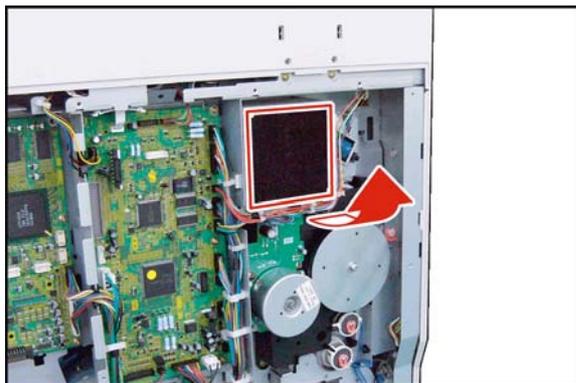
(1) Remove the **Rear Cover** (Refer to 2.2.7.).
(2) Remove the **Ozone Filter** (825).

(3) Remove the **Filter Holder** (824).

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2.3. Hardware Identification Template

Ref. No.	Part No.	Figure	Remark
18	XYN3+F6FJ		Screw
62	XTB3+6JFJ		Screw
1N	XTB4+8JFJ		Screw
3F	XYN3+F5FJ		Screw
5M	XYN3+F4FJ		Screw
5Z	XUC6VM		E-Ring
6A	XTB3+12GFJ		Screw
B1	DZPB000007		Silver Screw
B4	XTB3+8JFI		Blue Screw
C2	DZPB000020		Screw
E8	XTW3+10SFJ		Screw
F7	XSN4+W10FN		Silver Screw
G6	FFPFJ0039B		Snap Ring
H7	FFPFJ0041B		Snap Ring
J6	XUC3VM		E-Ring
J7	XUC4VM		E-Ring

Ref. No.	Part No.	Figure	Remark
J8	XUC7VM		E-Ring
K5	XUC5VM		E-Ring
K9	FFPFJ0043B		Snap Ring
M2	DZPA000064		Thumb Screw
Q8	XTB3+8GFN		Screw
S6	DZPA000086		Screw
S9	FFPFJ0033B		Snap Ring
W9	XTB3+12JFJ		Screw
X1	XTB3+10GFJ		Screw
X2	DZPA000089		Screw
X3	XYN3+F8FJ		Screw
X4	XTB3+20GFJ		Screw
X6	XTB3+8JFJ		Screw
X7	XYN3+F14FJ		Screw
X8	XTB3+8GFJ		Screw
X9	XTB3+8FFJ		Screw
Y1	XTW3+8PFJ		Screw
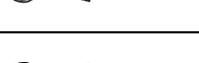
Ver. 1.1

Ref. No.	Part No.	Figure	Remark
Y2	XTB3+6FFJ-RP		Screw
Y3	XTW3+6LFJ		Screw
Y4	XTB3+32GFJ		Screw
Y5	XSN3+W10FJ		Screw
Y6	XTW3+6LFJR		Screw
Y7	XNC3FJ		Nut
Y8	XTN3+10GFJ		Screw
Y9	XYN4+F8FJ		Screw
Y10	XYN4+F6FJ		Screw
Y11	XSB4+10FN		Screw
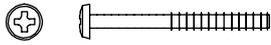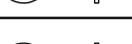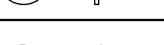
3   Maintenance, Adjustments and Check Points

3.1.   Preventive Maintenance

Preventive maintenance is performed at specific intervals, and consists of machine cleaning, and parts replacement.

It is essential to perform these service activities properly, and at the specified intervals for customer satisfaction.

The purpose of this service is to maintain machine performance, and image quality.

- You should prepare the replacement parts, and cleaning tools beforehand.
- After completing the preventive maintenance, discard the used parts, and packaging in accordance with local regulations, and clean the surrounding area.
- Before servicing the equipment, turn the power switches Off, and disconnect the power cord from the wall outlet.
- Before using solvents such as IPA (Isopropyl alcohol), put on rubber gloves, and wear eye protection.

1   Timing
- Perform the preventive maintenance in accordance with the Preventive Maintenance Check List (refer to 3.4) in the service manual.

2   Cleaning the Rollers
- Rollers should be cleaned with water, and a soft cloth.
- Use the IPA (Isopropyl Alcohol) sparingly.

3   Disassembly and Adjustment Precautions
CAUTION!
Turn the Power Switch on the Right Side of the machine to the OFF position, and then unplug the AC Power Cord from the wall outlet before disassembling the machine. (During a Lightning Storm, to prevent electrocution disconnect the Telephone Line Cable first before unplugging the AC Power Cord.)
- After taking the unit apart, do not attempt to operate the machine.
- When operating the machine with covers removed, be careful, and avoid clothing from being caught by moving components.
- While the electricity is applied to the unit, do not connect nor disconnect the connectors on any PC Board.
- When handling the drum, follow the precautions listed in section 3.3.
- Ensure to use correct screws.
- Use toothed lock washers for the installation of ground wires to ensure electrical continuity.
- To reassemble, reverse the sequence of disassembly, unless otherwise specified.
- Blown fuses should only be replaced with fuses of the same specified rating.

4   Laser Handling Precautions

The optical laser system employed by this photocopier is completely sealed by a protective housing, and an external cover. Therefore, the laser beam will not stray or leak during photocopying operation.

However, when servicing the photocopier, take the following precautions:

1. Do not insert any screwdrivers, or other tools that have high reflective properties into the laser's path.

2. Before servicing the machine, remove watches, rings, or other metallic objects that you may be wearing. (This is to avoid the danger of the laser striking the eye by reflecting off the metallic objects being worn.)
   Since the laser beam cannot be seen with the naked eye, for maximum safety, please follow the above precautions.

3.2. Required Tools

No.	Tools	No.	Tools
1	Soft Cloth	7	Pliers
2	Isopropyl Alcohol	8	Cotton Swab
3	Phillips Screwdriver (#2)	9	Brush
4	Stubby Phillips Screwdriver (#2)	10	KS-660 - Conductive Grease (Available from Shin-Etsu Silicones of America, Inc. URL: http://www.shinetsusilicones.com)
5	Slotted Screwdriver (3/32 in)	11	Molykote EM-50L Grease (Available from Dow Corning, URL: http://www.dowcorning.com)
6	Tweezer		

3.2.1. Preventive Maintenance Method

No.	Part Description	Important Action	Comments
1	Memory Data	Check	1. Print the RAM DATA for reference, and as a precaution. 2. After completing the task(s), print, and compare the RAM DATA with the previously printed one.
2	Auto Document Feeder (ADF)	Check & Clean	1. Clean the Rollers, and Separation Rubber with a Wet soft cloth (Water). **Note:** For stubborn toner accumulation, wipe with a soft cloth saturated with Isopropyl Alcohol first, then follow up with a soft cloth saturated with water.
3	Scanner Unit	Check & Clean	1. Clean the Scanning Glass, or White Reference Sheet with Isopropyl Alcohol when required.
4	Transmitter Unit	Check & Clean	1. Remove any foreign obstacles. 2. Clean the Rollers with a Wet soft cloth (Water).
5	Mirrors	Check & Clean	1. Do not touch the surface of the Mirrors with your hands. 2. Clean any dirt, or fingerprints with a Dry Cotton Swab. **Note:** Do not use any type of Alcohol.
6	Inspection Items	Check	1. Check the Harnesses. 2. Check the Connectors. 3. Check the Screws. If required, replace consumable parts.
7	Gears, Rollers Shafts	Check & Grease	1. Check, and grease the required Gears, and Shafts.
8	Timing Belts	Check & Clean	1. Check for belt looseness, or abrasion. 2. Adjust the Idle Pulley.

3.3. Preventive Maintenance Points

i-ADF

ADF

DETAIL A

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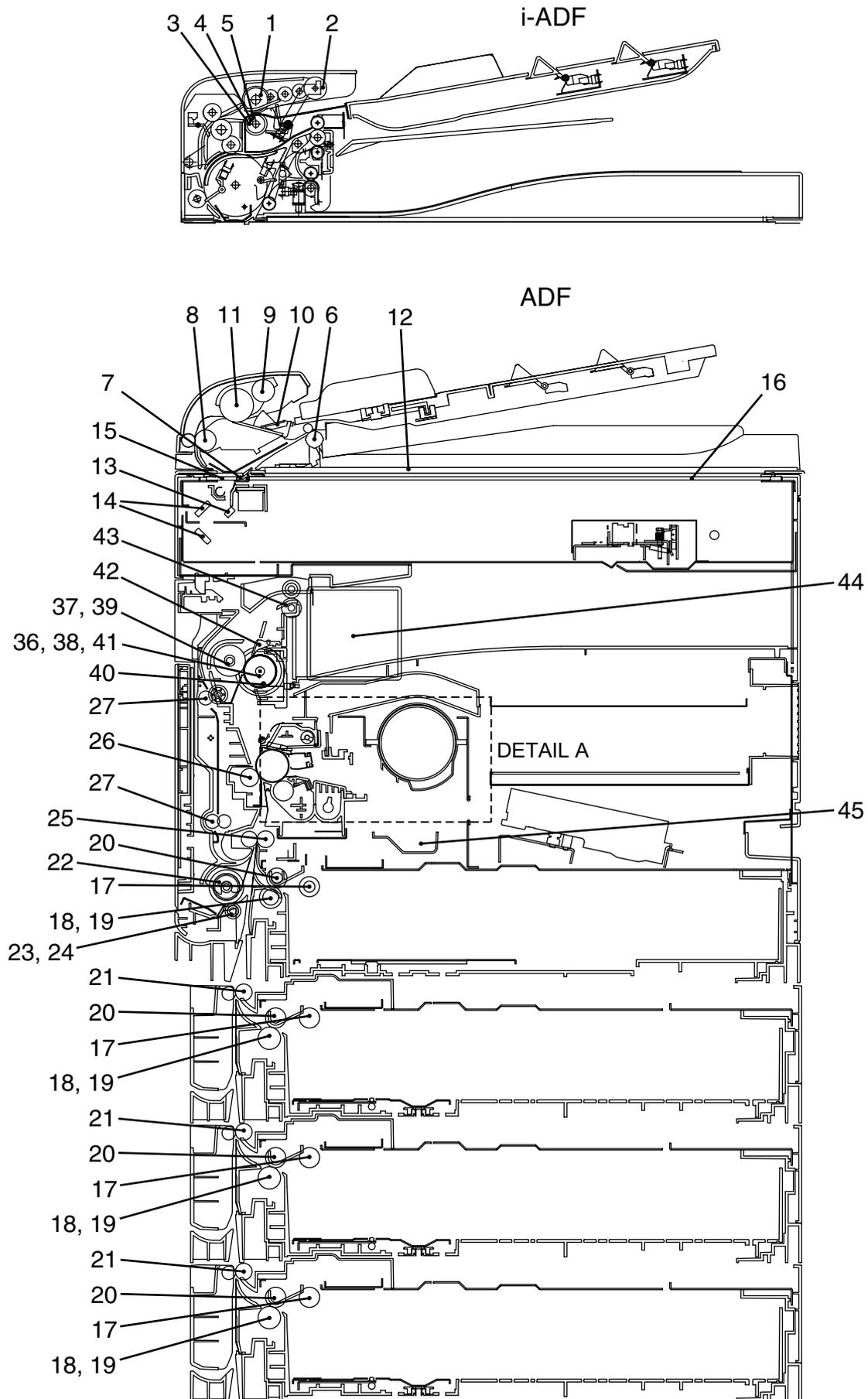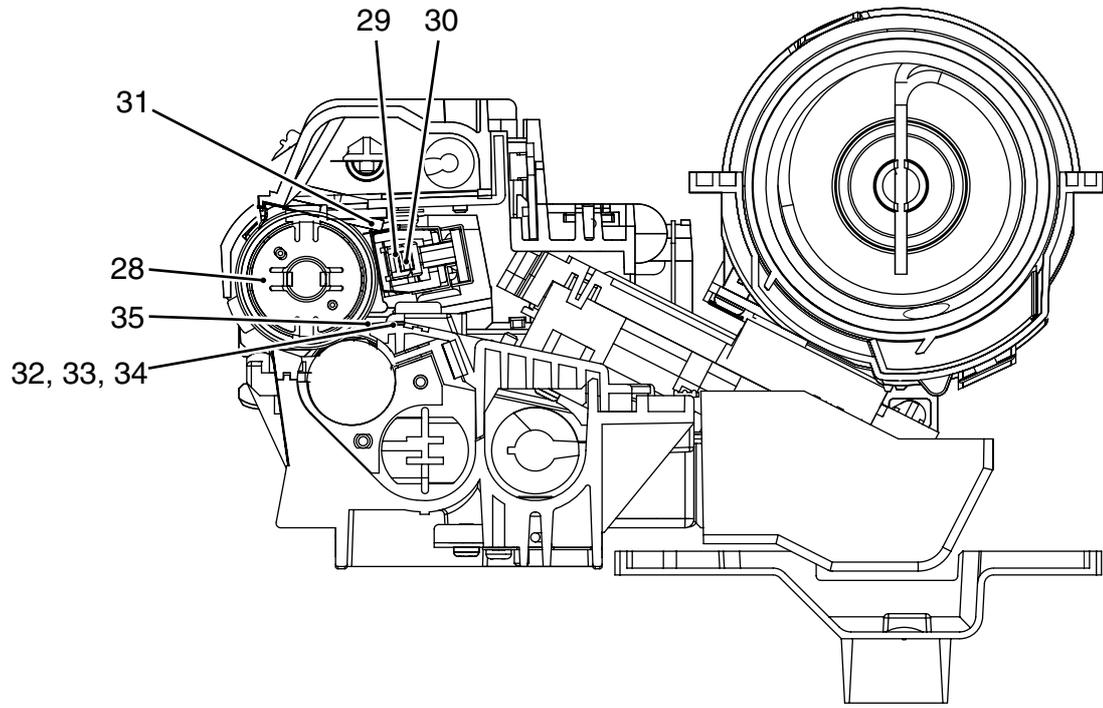
DETAIL A

3.4. Preventive Maintenance Check List

The chart outlined below is a general guideline for maintenance.

No.	Mechanical Parts	Ref. No.	Cleaning		Replacement/Adjustment		Ref. Counter
			Cycle (Sheet)	Method	Cycle (Sheet)	Procedure	
	i-ADF Unit						
1	ADF Roller	2314	60K	Water [1]	120K	Refer to 2.2.1.	F7-08
2	Pre Feed Roller	2018	60K	Water [1]	120K		
3	Separation Roller	2509	60K	Water [1]	120K		
4	Torque Limiter Bushing	2510	60K	Water [1]	120K		
5	Torque Limiter Spring	2511	60K	Water [1]	120K		
	ADF Unit						
6	Exit 1 Roller	1812	60K	Water [1]	-	Refer to 2.2.2.	F7-08
7	White Sheet	1814	60K	Water [1]	-		
8	Feed Roller	2010	60K	Water [1]	-		
9	Pre Feed Roller	2018	60K	Water [1]	120K		
10	Separation Rubber	2024	-	-	60K		
11	Paper Feed Roller	2001	60K	Water [1]	120K		
12	Scanning Pad	1822	60K	Dry soft cloth	-		
	Scanner Unit						
13	Mirror 1	415	60K	-	-	Refer to 2.2.4.	F7-04
14	Mirror 2	421	60K	-	-		
15	Platen (L) Glass	106	60K	-	-		
16	Scanning (S) Glass	110	60K	-	-		
	2nd, 3rd & 4th Paper Trays						
17	Pickup Roller	619	60K	Water [1]	120K	Refer to 2.2.10.	F7-12/-13/-14/-15
18	Separation Roller	629	60K	Water [1]	120K		
19	Torque Limiter 1	690	-	-	120K		
20	Feed Roller	623	60K	Water [1]	120K		
21	Intermediate Roller	3104	60K	Water [1]	-		
	Sheet Bypass						
22	Feed Roller	689	60K	Water [1]	120K	Refer to 2.2.9.	F7-11
23	Separation Roller	658	60K	Water [1]	120K		
24	Torque Limiter 2	691	-	-	120K		
25	Registration Roller	601	60K	-	-		
	Bias Transfer Unit						
26	Bias Transfer Roller (BTR)	711	60K	Dry soft cloth	120K	Refer to 2.2.8.	F7-02
27	Duplex Feed Roller	735	60K	Water [1]	-		
	Process Unit						
-	Developer	-	-	-	60K	Refer to 2.2.5.	F7-10
28	OPC Drum	1403	-	-	60K		F7-06

No.	Mechanical Parts	Ref. No.	Cleaning		Replacement/Adjustment		Ref. Counter
			Cycle (Sheet)	Method	Cycle (Sheet)	Procedure	
29	Charge Corona Case	1444	60K	-	-	Refer to 2.2.5.	F7-07
30	Charge Wire	1443	10K By Customer	-	60K		
31	Cleaning Blade	1408	-	-	60K		
32	Front Cleaning Felt	1410	-	-	60K		
33	Rear Cleaning Felt	1411	-	-	60K		
34	Cleaning Sponge	1412	-	-	60K		
35	Splash Prevention Sheet	1415	-	-	60K		
	Fuser Unit						
36	Fuser Roller	1115	60K	Water [1]	120K	Refer to 2.2.6.	F7-02
37	Pressure Roller	1021	60K	Water [1]	240K		
38	Fuser Roller Bushing	1114	-	-	120K		
39	Pressure Roller Bushing	1020	-	-	240K		
40	Thermistor Assembly	1125	60K	Dry soft cloth	120K		
41	Fuser Lamp	1116	-	-	240K		
42	Separator	1109	60K	Dry soft cloth	120K		
43	Exit 2 Roller	1104	60K	Water [1]	-		
	Main Unit						
44	Ozone Filter	825	-	-	240K	Refer to 2.2.13.	F7-02
45	Toner Spill Tray	1202	60K	-	-		

Note:
1. Wet Cloth represents a soft cloth saturated with water.
   For stubborn toner accumulation, wipe with a soft cloth saturated with Isopropyl Alcohol first, then follow up with a soft cloth saturated with water.
2. The Maintenance Cycle is based on the Counter Information for each individual module.
   To verify the counter information, print the Total Counter List using the Service Mode: F7 - Electronic Counter - 00 (List Print).
3. Cleaning, Replacement, and Adjustment Cycle (Sheet) are based on using Panasonic's recommended standard paper, and supplies. These cycles may vary with the kind of paper used, Paper size, orientation, print duty, continuous/interval print, and/or ambient conditions.

• **Total Counter View Mode on the LCD**
   The Total Counter can be displayed on the Panel Display by pressing "**COPY SIZE**", and "**PAPER TRAY**" keys simultaneously in Standby mode for quick reference.

```
TOTAL COUNTER

            1234
```

• **LCD Display Brightness Adjustment**
   To adjust the brightness of the LCD display, press and while holding down the "**CLEAR**" key, keep pressing the "**ORIGINAL SIZE**", or the "**COPY SIZE**" key until the desired brightness is achieved.
      ORIGINAL SIZE : Dimmer
      COPY SIZE   : Brighter

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3.5.   Resetting the P/M (Preventive Maintenance) Counter

When the machine reaches the preset P/M Cycle, it will show "Call for P/M", or "Replace The Toner Waste Container" on the LCD Display. The PM Counter can be reset by following the procedures below.

3.5.1.   "Call for P/M" (Default: 120K)

1. Perform the P/M (Preventive Maintenance). Refer to Section 3.3, and 3.4.
2. Press "**FUNCTION**", "**ORIGINAL SIZE**", and "**3**" keys sequentially to enter the Service Mode.
3. Enter the Copy Service Mode F5-70 (PM Cycle), and change to the desired value.
4. Press "**FUNCTION**", and "**CLEAR**" keys simultaneously to exit the Service Mode.

3.5.2.   "Call for P/M ADF" (Default: Not Set)

1. Perform the P/M (Preventive Maintenance). Refer to Section 3.3, and 3.4.
2. Press "**FUNCTION**", "**ORIGINAL SIZE**", and "**3**" keys sequentially to enter the Service Mode.
3. Enter the Copy Service Mode F5-87 (ADF PM Cycle), and change to the desired value.
4. Press "**FUNCTION**", and "**CLEAR**" keys simultaneously to exit the Service Mode.

3.5.3.   U14 "Replace The Toner Waste Container"

A. Blinking Maintenance, and Toner Waste Container Indicators
   Upon detecting that the Toner Waste Container is full, the machine will complete the current job, and stop operating.
   A blinking Maintenance, and Toner Waste Container Indicators will appear on the display.
   To continue using the machine temporarily while waiting for the Service Technician, press any key (up to 100 additional copies can be made).

B. Steady Maintenance, and Toner Waste Container Indicators
   Upon reaching the 100 copies, the machine stops, and will not allow further operation until the Toner Waste Container is replaced.
   Replace the Toner Waste Container. (Refer to Section 2.2.5.)

3.6. Lubrication Point List

This information is used for routine Preventive Maintenance (PM) calls to ensure the highest degree of reliability. Inspect the following areas, and lubricate as required. The inspection interval is usually 120K copies, or more, however the interval may be reduced due to environmental conditions.

Mechanical Parts	Ref. No.	Grease	Lubrication Point
Automatic Duplex Unit			
Pinch Timing Roller	712	KS-660	
Bias Transfer Bushing	709		
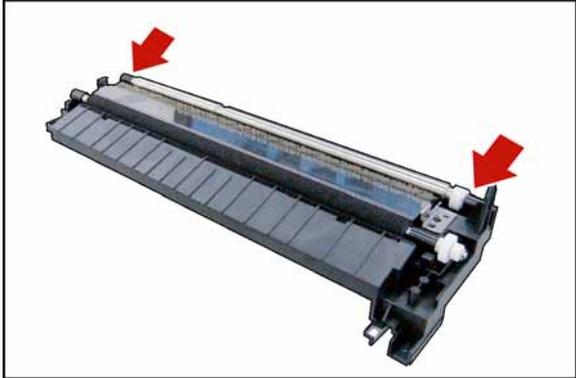
3.7. Updating the Firmware

The Quickest, and Most Easiest Method of Updating the Firmware is to use the Network Firmware Tool (FUP) using Ethernet LAN Port, and a Crossover Cable.

The Network FUP Tool version must be 3.XX, or higher, and it can be found on the Panasonic Document Management System CD-ROM included with the main unit, or on the CD-ROM included with the PCL, or PS/PCL options.

Refer to the Firmware Update Operation Instructions, Service Notes (8.1.) for additional details.

3.7.1. Firmware Configuration

A. Hardware Configuration

This machine is controlled by two (2) CPUs which are located on the System Control (SC) PC Board, and the Scanner Printer Control (SPC) PC Board.
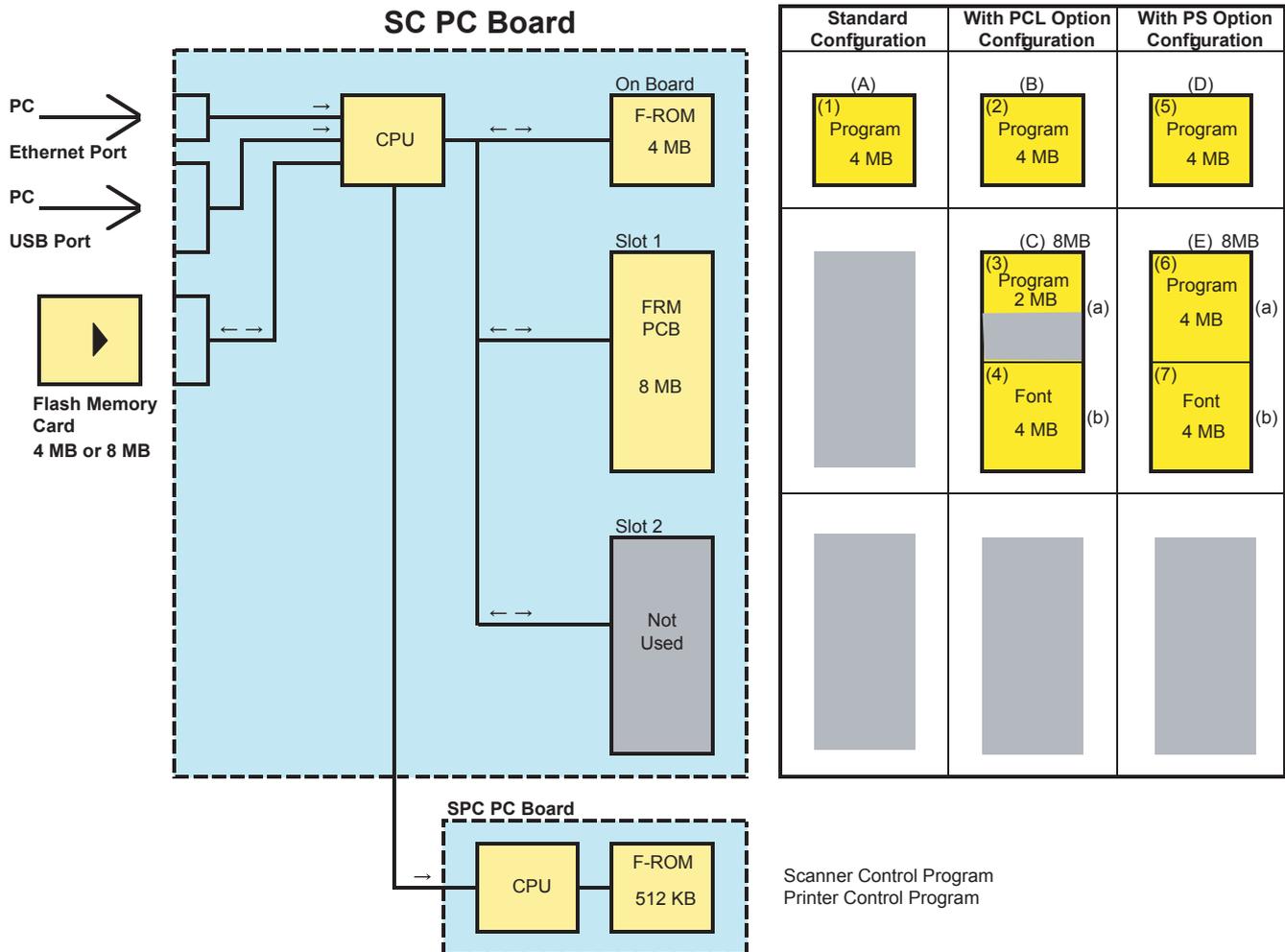
B. SC PC Board Firmware

The 4 MB Program Memory (F-ROM) is integrated on the SC PCB. An Optional Expansion 8 MB Program Memory (FRM8 PCB) can be installed into SLOT 1.

The Firmware to be written into the 4 MB onboard, and the 8 MB of SLOT 1 depends upon the configuration of the Standard, PCL, or PS Options.

(1) **Standard**

The Standard Program (1) is only written into the 4 MB onboard, which is assigned as ROM Code (A).

(2) **For PCL Option**

The PCL Control Program (2) must be written into the 4 MB onboard, which is assigned as ROM Code (B). The PCL Control Program (3), and PCL Font data (4) are written into the 8 MB in the SLOT 1. The Firmware (3), and (4) are assigned as ROM Code (C).

When using 8 MB Flash Memory Card, the 8 MB Program (C) can be written onto one card.

When using 4 MB Flash Memory Card, the 8 MB program (C) must be divided onto 2 cards, one 4 MB card for the PCL Control Program (3), and one 4 MB card for the PCL Font data (4).

(3) **For PS Option**

The PS Control Program must be written into the 4 MB onboard, which is assigned as ROM Code (D). The PS Control Program (6), and (7) are written into the 8 MB in the SLOT 1.

Both Firmwares (6), and (7) are assigned as ROM Code (E).

When using 4 MB Flash Memory Card, the 8 MB program (E) must be divided onto 2 cards, one 4 MB card for the PS Control Program (6), and one 4 MB card for the PS Control Program (7).

C. SPC PC Board Firmware

The 512 KB Program Memory (F-ROM) is integrated on the SPC PCB. The Programs for Scanner Control, and Printer Control are saved on the Board. The Firmware is transferred as Serial Data from the SC PCB.

D. Firmware Updating Ports

Three (3) types of Ports are available for updating the firmware.

(1) Ethernet LAN Port (The Quickest, and Most Easiest Method)

The machine's Firmware can be updated from a PC via Local Area Network (LAN). Refer to the Firmware Update Operation Instructions, Service Notes (8.1.) for additional details.

(2) USB Port (Alternate)

The machine's Firmware can be updated from a PC via USB Port. The Master Firmware Card can also be created from a PC using the USB Port. Refer to the Firmware Update Operation Instructions, Service Notes (8.1.) for additional details.

(3) Flash Memory Card (Alternate)

The machine's Firmware can be updated using the Master Firmware Card. The Master Firmware Card can be created by copying the Firmware from an existing machine's SC PCB using a 4 MB, or 8 MB Flash Memory Card.

To update the SC, SPC, and PNL PCB, 3 Flash Memory Cards are required for the Standard configuration, or 5 Flash Memory Cards for the PCL, or PS/PCL configuration.

3.7.2. Updating through a LAN Port (The Quickest, and Most Easiest Method)

The firmware code can be easily updated when the main unit is connected to a LAN.

The Network Firmware Update Tool can also be used by connecting to the machine using a **crossover cable**, if the unit is not connected to a LAN.

1) **Install the Network Firmware Update Tool to your PC**

The option CD-ROM includes the Network Firmware Update Tool, and the Main Unit Firmware Code. Please refer to the following Operating Instructions to install the Network Firmware Update Tool. The installation password is "**workio**".

Operating Instructions:

\xFirmware\Tools\NwFirmup\NwFirmup OI.pdf (Refer to the NW Firmware Update Tool OI on the CD)

Setup:

\xFirmware\Tools\NwFirmup\Setup\Setup.exe

2) **Preparing the Firmware Code**

Double click the appropriate Destination Shortcut Batch File, and copy the Firmware Code File on the CD-ROM to the Firmware Data Folder in your PC. Note that the files in the Archive will be extracted automatically into the designated folder when the Archived file (.exe) is Double-clicked.

Example:
From:
Destination Shortcut Batch File: D:(CD-ROM Drive) \ xFirmware \ USA.bat
Firmware Code File: DP-8016_8020_PU_xxxxxx.exe
To:
Firmware Data Folder: C:\ Panasonic \ Panasonic-FUP \ Data

3) **Preparing the Main Unit for the Firmware Upgrade**
  Make sure the unit's Key Operator Password is the same as the tool's password.
  Make sure the unit is in an idle state (e.g. not making copies, not printing, etc.).

4) **Upgrading the Main Unit's Firmware Code**
  Start the Network Firmware Update Tool, and select the following **Firmware Code Folders** in the
  C:\Panasonic\Panasonic-FUP\Data folder, and then follow the display instructions to upgrade the
  Main Unit's Firmware Codes.

Parent Firmware File Folder	Sub Firmware File Folder	Transferring Order
\ DP-8016_8020_PU_xxxxxx	\ **SC_STD** \ DP-LL80**A**xVxxxxx_xx	1
	\ **SC_PCL** \ DP-LL80**B**xVxxxxx_xx	1
	\ **SC_PS** \ DP-LL80**D**xVxxxxx_xx	1
	\ **SPC** \ LL80-SPCAxVxxxxxx	2

When you select the Parent Folder, the following Firmware Type window appears. Proper Sub File Folders are selected automatically by selecting the Firmware Type.
The transferring order is set up automatically.

Note:
  1. Manual mode must be used, when updating the designated version of the firmware, or changing
     the type of the firmware.
     Please refer to the Section 2.2, "**Setting up the Network Firmware Update Tool, File Selection
     Tab**" of the Operating Instructions.
  2. While updating the firmware code, the display may become garbled, however, it will return to
     normal upon completion of the firmware update.
  3. If the firmware update fails, and the unit does not boot up, the Network Firmware Update Tool will
     not be able to transfer the firmware code. If this occurs, please refer to the next section "**Updating
     through the USB Port**", and use the Local Firmware Update Tool to recover the unit.
  4. The suffix **"_xx"** for the Folder Name, or File Name may not exist depending on the destination
     location.

3.7.3.   Updating through the USB Port (Alternate Method)
If the device is not connected to the LAN, upgrade the firmware code using the USB Port.

1) **Install the Local Firmware Update Tool to your PC**
  The option CD-ROM includes the Local Firmware Update Tool, and the Main Unit Firmware Code.
  Please refer to the following Operating Instructions to install the Local Firmware Update Tool.
  Operating Instructions:
  \xFirmware\Tools\Firmup\FIRMUP OI.pdf (Refer to the Local Firmware Update Tool OI on the CD)
  Setup:
  \xFirmware\Tools\Firmup\Setup\Setup.exe

2) **Preparing the Firmware Code**
   Double click the appropriate Destination Shortcut Batch File, and copy the Firmware Code File on the CD-ROM to the Firmware Data Folder in your PC. Note that the files in the Archive will be extracted automatically into the designated folder when the Archived file (.exe) is Double-clicked.
   Example:
   From:
   Destination Shortcut Batch File: D:(CD-ROM Drive) \ xFirmware \ USA.bat
   Firmware Code File: DP-8016_8020_PU_xxxxxx.exe
   To:
   Firmware Data Folder: C:\ Panasonic \ Panasonic-FUP \ Data

3) **Preparing the Main Unit for the Firmware Upgrade**
   Important: DO NOT connect the USB Cable yet.
   Enter into Test Mode F9-07-01 to enable the unit to accept the programming code from the USB Port.

   Now connect the USB Cable between the Unit, and PC.
4) **Upgrading the Main Unit's Firmware Code**
   Start the Local Firmware Update Tool, and select the following **Firmware Code Parent File Folder** in the **C:\Panasonic\Panasonic-FUP\Data** folder, and select the Firmware Code Type then follow the display instructions to upgrade the Main Unit's Firmware Codes.
   You must process each firmware file separately in this manner, and sequence.

Parent Firmware File Folder	Sub Firmware File Folder	Firmware File	Transferring Order
\ DP-8016_8020_PU_xxxxxx	\ **SC_STD** \ DP-LL80**A**xVxxxxx_xx	DP-LL80AxVxxxxx_xx.bin	1
	\ **SC_PCL** \ DP-LL80**B**xVxxxxx_xx	DP-LL80BxVxxxxx_xx.bin DP-LL80CxVxxxxxa_xx.bin DP-LL80CxVxxxxxb.bin	1-1 1-2 1-3
	\ **SC_PS** \ DP-LL80**D**xVxxxxx_xx	DP-LL80DxVxxxxx_xx.bin DP-LL80ExVxxxxxa_xx.bin DP-LL80ExVxxxxxb.bin	1-1 1-2 1-3
	\ **SPC** \ LL80-SPCAxVxxxxxx	LL80-SPCAxVxxxxxx.bin	2

When you select the Parent Folder, the following Firmware Type window appears. Proper Firmware Files are selected automatically by selecting the Firmware Type.
The transferring order is set up automatically.

Note:
   1. While updating the firmware code, the display may become garbled, however, it will return to normal upon completion of the firmware update.
   2. Please refer to the service manual for additional details.
   3. The suffix **"_xx"** for the Folder Name, or File Name may not exist depending on the destination location.

3.7.4. Updating the Firmware using the Master Firmware Card (Alternate method)

1. Before starting, print the F5/F6 Parameters List **(Copy Service Mode F9-03-00)**.
2. Turn the Power Switch on the Right side of the machine to the OFF position. (During a Lightning Storm, to prevent electrocution disconnect the Telephone Line Cable first before unplugging the AC Power Cord, if the Fax Option is installed.)
3. Install the appropriate Master Firmware Card into the machine.
4. Turn the Power Switch on the Right Side of the machine to the ON position.
5. Press "**FUNCTION**", "**ORIGINAL SIZE**" keys, and then Key "**3**" on the keypad sequentially.
6. Perform the Copy Service Mode F9-07-00 **(Update From Master Card)**.
7. The firmware is copied into the machine.
8. After the update is completed, the machine reboots itself, and returns to standby.
9. Turn the Power Switch on the Right side of the machine to the OFF position.
10. Remove the Master Firmware Card from the machine.
11. Turn the Power Switch on the Right Side of the machine to the ON position.
12. Reprogram the F5 & F6 Parameters according to the lists printed in Step 1 above if the settings are other than factory default.

Note:

After the update is completed, the machine reboots itself, and returns to standby mode.
Repeat the above steps if there are additional firmware code files to be updated.
Confirm that the update was successfully completed by checking the Firmware Version with F9 Parameters F9-02-xx.

Caution:

If the unit does not boot up properly in step 8, refer to Service Manual 3.7.8. **(Firmware Emergency Recovery)**

3.7.4.1. Creating a Master Firmware Card
A. Utilizing the Firmware Update Kit

1) **Install the Local Firmware Update Tool to your PC**
   The option CD-ROM includes the Local Firmware Update Tool, and the Main Unit Firmware Code. Please refer to the following Operating Instructions to install the Local Firmware Update Tool.
   Operating Instructions:
   \xFirmware\Tools\Firmup\FIRMUP OI.pdf (Refer to the Local Firmware Update Tool OI on the CD)
   Setup:
   \xFirmware\Tools\Firmup\Setup\Setup.exe

2) **Preparing the Firmware Code**
   Double click the appropriate Destination Shortcut Batch File, and copy the Firmware Code File on the CD-ROM to the Firmware Data Folder in your PC. Note that the files in the Archive will be extracted automatically into the designated folder when the Archived file (.exe) is Double-clicked.
   Example:
   From:
   Destination Shortcut Batch File: D:(CD-ROM Drive) \ xFirmware \ USA.bat
   Firmware Code File: DP-8016_8020_PU_xxxxxx.exe
   To:
   Firmware Data Folder: C:\ Panasonic \ Panasonic-FUP \ Data

3) **Preparing the Main Unit for the Programming Master Firmware Card**
   Important: DO NOT connect the USB Cable yet.
   1. Turn the Power Switch on the Right side of the machine to the OFF position. (During a Lightning Storm, to prevent electrocution disconnect the Telephone Line Cable first before unplugging the AC Power Cord, if the Fax Option is installed.)
   2. Insert/Remove the Flash Memory Card (4 MB, or 8 MB) into/from the machine.

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3. Turn the Power Switch on the Right Side of the machine to the ON position.

4. Press "**FUNCTION**", "**ORIGINAL SIZE**" keys, and then Key "**3**" on the keypad sequentially.

5. Perform the Update Program Card Mode F9-09 **(Update Program Card)**.

The unit is now ready to accept the firmware code from the USB Port.
Now connect the USB Cable between the Unit, and PC.
(Refer to the Local Firmware Update Tool OI on the CD)

Repeat the above steps if there are additional master firmware cards to be programmed.

B. Copying the Firmware from an Existing Machine using a Flash Memory Card (4 MB, or 8 MB)

1. Turn the Power Switch on the Right side of the machine to the OFF position. (During a Lightning Storm, to prevent electrocution disconnect the Telephone Line Cable first before unplugging the AC Power Cord, if the Fax Option is installed.)

2. Install a Flash Memory Card (4 MB, or 8 MB) into the machine.

3. Turn the Power Switch on the Right Side of the machine to the ON position.

4. Press "**FUNCTION**", "**ORIGINAL SIZE**" keys, and then Key "**3**" on the keypad sequentially.

5. Perform the Copy Service Mode F9-08 **(Program Backup)**.

6. The firmware is copied into the Flash Memory Card.

7. After the backup is completed, press "**STOP**" first, and then press "**FUNCTION**" + "**CLEAR**" keys simultaneously to return to standby.

8. Turn the Power Switch on the Right side of the machine to the OFF position.

9. Remove the Master Firmware Card that you just created from the machine.

10. Turn the Power Switch on the Right Side of the machine to the ON position.

11. Use this Master Firmware Card to update the firmware on other machines.

3.7.4.2. Erasing the Master Firmware Card

1. Turn the Power Switch on the Right side of the machine to the OFF position. (During a Lightning Storm, to prevent electrocution disconnect the Telephone Line Cable first before unplugging the AC Power Cord, if the Fax Option is installed.)

2. Install the Master Firmware Card into the machine.

3. Turn the Power Switch on the Right Side of the machine to the ON position.

4. Press "**FUNCTION**", "**ORIGINAL SIZE**" keys, and then Key "**3**" on the keypad sequentially.

5. Perform the Service Mode F9-09 **(Update Program Card)**.

6. After the Flash Memory Card is erased, machine prompts "**READY TO PROGRAM PRESS SET TO START**". Press "**STOP**".

7. Press "**STOP**" first, and then press "**FUNCTION**" + "**CLEAR**" keys simultaneously to return to standby.

8. Turn the Power Switch on the Right side of the machine to the OFF position.

9. Remove the blank Flash Memory Card from the machine.

10. Repeat from Step 2 above if you are erasing another Master Firmware Card.

3.7.5. <u>User Authentication Function Confirmation (Specified Destinations only)</u>

If your customer requires User Authentication, and/or Via Fax Server, setup the feature(s) by referring to the Operating Instructions (For User Authentication).

3.7.6. Notice after installing the HDD option

After the Hard Disk Drive Unit is installed, to prevent a Scan Disk Function from being performed (similar to Windows OS when the power is abruptly interrupted), it is important to follow the step sequence below when turning OFF the Power Switch on the machine.

1. If the machine is in the "ENERGY SAVER (Shutdown Mode)", you may turn the Power Switch on the Right Side of the machine to the OFF position. If it is not in the "ENERGY SAVER (Shutdown Mode)", continue to step 2 below.
2. Press "FUNCTION", and "ENERGY SAVER" keys simultaneously first.
3. Wait approximately 10 seconds while the machine writes the closing status onto the Hard Disk Drive Unit, and advances into "ENERGY SAVER MODE".
4. Turn the Power Switch on the Right side of the machine to the OFF position.
5. Unplug the AC Power Cord. (During a Lightning Storm, to prevent electrocution disconnect the Telephone Line Cable first before unplugging the AC Power Cord, if the Fax option installed.)
6. After finishing the installation of the Hard Disk Drive, please go over the above Power Down procedure with the customer to avoid the Scan Disk Function from being performed (indicated by SCANNING HARD DISK message on the display), and customer inquiries related to abrupt Power Off.
7. Reconnect the Telephone Line Cable if it was disconnected.

3.7.7. Firmware Emergency Recovery

The easiest method to recover the firmware in an Emergency Recovery routine is to either use the Local Firmware Update Tool software by selecting the Independent File method, or using the Master Firmware Flash Card method (2 Flash Cards required).

Whichever method you select, it is easier to restore the machine's firmware to the Standard (AAV) Type first as it only requires 2 files to bring the machine to initial working condition. (Install the files in this order: SC, and SPC).

After recovering, if optional PCL, or PS/PCL firmware is required, use the Network Firmware Update Tool, or the Local Firmware Update Tool to update the firmware to the required level.

If the unit does not boot up properly, follow the steps below:

1. Turn the power Off (use the power switch on the right side of the unit).
   - Before proceeding to the next step, you must prepare either the Local Firmware Update Tool, or create the Master Firmware Flash Cards (read the appropriate sections first).
   - If using the Master Firmware Card, insert the Master Firmware Flash Cards in the unit.
2. Turn the power On while holding the "ENERGY SAVER" key.
3. When the green lamp on the front panel turns On, release the "ENERGY SAVER" key.
   - If using the Master Firmware Card, the unit will start updating the Firmware code files automatically.

The unit is now ready to accept the firmware code from the USB Port, or Master Firmware Card.
Repeat the above steps if there are additional firmware code files to be updated.

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3.7.8. Firmware Version

SC : DP-LL80 A A Vxxxxx (a) PU (AU)

Destination Code (Fax)
AU : USA/Canada
AB : UK

Destination Code (Copier)
PU : USA/Canada
PB : UK

Division Soft
(When it is divided into (a) and (b))

Firmware Version (V1xxxx)

Language Code
A : A-English, C-French & Spanish
c : French, German, Italian, Dutch,
Portuguese, Spanish, English & Greek
d : French, German, Swedish, Norwegian,
Danish, Finnish, Turkish & English
e : French, German, English, Polish,
Hungarian, Czech & Russian
j : English & Korean
k : English & Taiwanese
n : English & Chinese

Firmware Type
A : Standard
B, C, D, E : Optional

Model Number

SPC : LL80- SPC A A Vxxxxx

Firmware Version (V1xxxx)

AA: Fixed

SPC

Model Number

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3.8. Copy Quality Adjustment Procedure (Order)

When the following items are replaced or cleaned, perform adjustments in the correct order.

No.	Work	Part Item	Optics Clean	Process Unit Clean	Toner Spill Tray Clean	TDC Adj. F8-09	OPC Counter Reset F8-14	LSU PWM Pattern Print F8-18	PWM Adj. F6-39 (Note 3)	LSU Adj. (Note 4)	Print F5/F6 (Note 1)	Image Density Adj. F6-49/50/51 (Note 2)	Remark
1	Installation	Main				1	2				3	4	
2	Cleaning	Optics	1								2	3	
3		Process Unit		1							2	3	
4		Toner Spill Tray			1						2		
5	Replace	Scanning Lamp	1								2	3	
6		Platen Glass									1	2	
7		OPC Drum		1	2		3				4	5	
8		Developer				1					2	3	
9		OPC Drum & Developer		1	2	3	4				5	6	
10		Corona Wire		1	2						3	4	
11		Process Unit			1	2	3				4	5	
12		Toner Density Sensor				1					2	3	Replace Developer
13		LSU						1	2	3	4	5	
14		SC PC Board									1	2	Input F5/F6 Parameter

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Note:
1. Print F5/F6

    1) Press "**FUNCTION**", "**ORIGINAL SIZE**", and "**3**" keys sequentially to enter the Service Mode.

    2) Press the "**9**" key to enter the F9 Mode (Unit Maintenance).

    3) Press the "**START**" key.

    4) Press "**3**", and "**SET**" keys.

    5) Press "V", or "/\" arrow keys to select "**00 F5/F6 PARAMETERS**", and press "**SET**" key.

    6) Prints the memory contents of the F5, and F6 modes.

2. Contrast Adjusting

    1) Press "**FUNCTION**", "**ORIGINAL SIZE**", and "**3**" keys sequentially to enter the Service Mode.

    2) Press the "**2**", and the "**START**" keys to enter the F2 Mode (Single Copy Test).

    3) Set the exposure to the center position.

    4) Set the machine to TEXT / PHOTO Mode.

    5) Make a copy of Test Chart 53/54 with gray scale (P/N: FQ-SJ1011), and compare the density to the chart shown below. If it is within specification, skip to step (14).

      a. Gray scale "A" should not be visible.

      b. Gray scale "2" should be clearly visible.

A	← Not visible
1	← (Not visible, or hardly visible)
2	← Clearly visible
3	

    6) Press the "**STOP**" key to exit the F2 Mode (Single Copy Test).

    7) Press the "**6**", and the "**START**" keys to enter the F6 Mode (Adjust Parameters).

    8) Enter F6-50 Mode (T/P Mode Image Density).

    9) Press the "**SET**" key to highlight the current value.

  10) Enter a new value (up to 3-digits).

    Note:
    The "RESET" key is used to change to a Negative, or Positive (+/-) value.

        (+) : Lighter

        (-) : Darker

  11) Press the "**SET**", and "**STOP**" keys.

  12) Enter F2 Mode (Single Copy Test).

  13) Make a copy to confirm the adjustment.

    Note:
    Repeat Steps (3) to (10) until desired density is attained.

        F6-49 : T Mode Image Density (Text)

        F6-51 : P Mode Image Density (Photo)

  14) Press "**FUNCTION**", and "**CLEAR**" keys simultaneously to exit the Service Mode.

3. PWM Adjustment

1) Ensure that Ledger / A3 Size Paper is loaded in one of the Trays, and pull out the remaining trays (including the bypass tray) to disable them.

2) Press "**FUNCTION**", "**ORIGINAL SIZE**", and "**3**" keys sequentially to enter the Service Mode.

3) Press the "**8**" key to enter the F8 Mode (Service Adjustment).

4) Press the "**START**" key.

5) Press the "**1**", "**8**", and "**SET**" keys sequentially to enter the F8-18 "**C18 PRT PWM ADJ. PTN.**".

6) Press the "**START**" key to begin the LSU PWM Pattern Printing.

    Sample:
       4 gray patches are visible in the illustration, the value of the uppermost patch position is "+2" in our example.
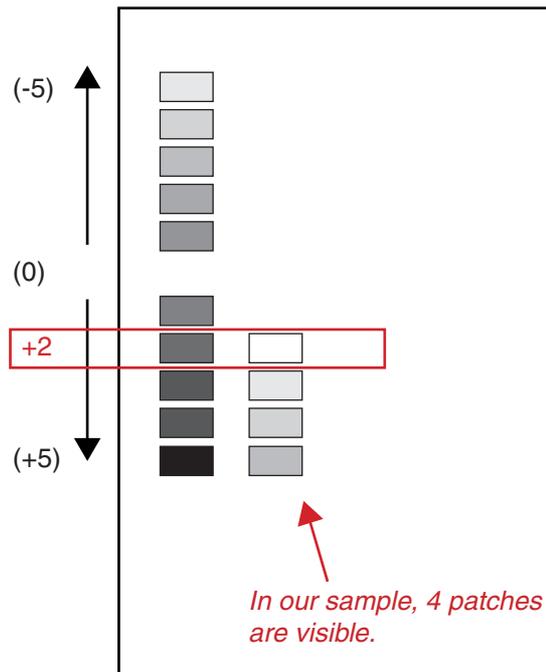
Test Pattern

7) Press the "**STOP**" key.

8) Press the "**6**", and the "**START**" keys to enter the F6 Mode (Adjust Parameters).

9) Select "**39 LSU Unit PWM ADJUST**".

10) Press "**SET**" button, and enter the value of the gray patch, as established in Step (6).

4. **LSU Adjustment**

    Refer to 3.9.

3.9. Adjusting the Printer Registration, LSU Image Side to Side

When installing the Paper Tray option, the following LSU Image Side to Side adjustment must be performed.

The Printer registration is adjusted at the factory.

If copy image is abnormal, specially in the Rotation Copy mode, adjust it by the following procedure.

3.9.1. Printer Registration

1. Insert Ledger, or A3 size paper into the 1st tray, and change the tray setting to the appropriate paper size. Empty, or pull out all the remaining trays (including the bypass tray) to disable them.
2. Press "**FUNCTION**", "**ORIGINAL SIZE**" keys, and then Key "**3**" on the keypad sequentially.
3. Perform the Service Mode F1-03 (Print Test Pattern 1).
4. Check the gap of the print pattern from the paper edge, refer to the Figure below.
5. Perform the Service Mode F6-04 (Printer Registration) to adjust the gap to be 5 mm.
6. If the gap is less than 5 mm, input a (-) value. If more than 5 mm, input a (+) value.
7. Press "**STOP**" first, and then press "**FUNCTION**" + "**CLEAR**" keys simultaneously to return to standby.

<Figure>

Two lines are printed on the top (Lead edge).
For Ledger or A3, place as Portrait.
For Letter or A4, place as Landscape.

5 mm

Top (Lead edge)

Two lines are printed

5 mm   5 mm

Two lines are printed
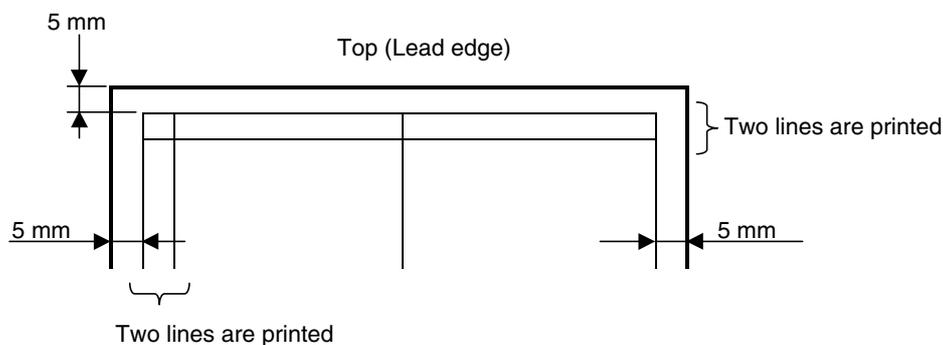
3.9.2. LSU Image Side to Side Adjustment for the Tray

1. Insert paper into the 1st tray, and change the tray setting to the appropriate paper size. Empty, or pull out all the remaining trays (including the bypass tray) to disable them.
2. Press "**FUNCTION**", "**ORIGINAL SIZE**" keys, and then Key "**3**" on the keypad sequentially.
3. Perform the Service Mode F1-03 (Print Test Pattern 1).
4. Check the gap of the print pattern from the paper edge, refer to the Figure above.
5. Perform the Service Mode F6-10 to F6-14, to adjust the gap to be 5 mm.
6. If the gap is less than 5 mm, input a (+) value. If more than 5 mm, input a (-) value.
7. Proceed the above steps for other Tray.
8. Press "**STOP**" first, and then press "**FUNCTION**" + "**CLEAR**" keys simultaneously to return to standby.

3.9.3. LSU Image Side to Side Adjustment for the ADU

1. Insert paper into the 1st tray, and change the tray setting to the appropriate paper size. Empty, or pull out all the remaining trays (including the bypass tray) to disable them.
2. Press "**FUNCTION**", "**ORIGINAL SIZE**" keys, and then Key "**3**" on the keypad sequentially.
3. Perform the Service Mode F1-06 (Print Test Pattern 4).
4. Check the gap of the print pattern from the paper edge, refer to the Figure above.
5. Perform the Service Mode F6-16 (ADU Side Adjust), to adjust the gap to be 5 mm.
6. If the gap is less than 5 mm, input a (+) value. If more than 5 mm, input a (-) value.
7. Press "**STOP**" first, and then press "**FUNCTION**" + "**CLEAR**" keys simultaneously to return to standby.

3.9.4. 100% Read Adjustment

1. Place the Original Document on the Platen Scanner.
2. Insert Ledger, or A3 size paper into the 1st tray, and change the tray setting to the appropriate paper size. Empty, or pull out all the remaining trays (including the bypass tray) to disable them.
3. Press "**FUNCTION**", "**ORIGINAL SIZE**" keys, and then Key "**3**" on the keypad sequentially.
4. Perform the Service Mode F2 (Single Copy Test).
5. Check the Image size of the Copy, and the Original as Portrait.
6. Perform the Service Mode F6-00 (Adj 100% Side-Side Read), to adjust for an identical vertical (side-to-side) size ratio.
7. If the image is smaller than the Original, input a (+) value. If bigger than the Original, input a (-) value.
8. Perform the Service Mode F6-01 (Adj 100% Lead-Tail Read), to adjust for an identical horizontal (top-to-bottom) size ratio.
9. If the image is smaller than the Original, input a (+) value. If bigger than the Original, input a (-) value.
10. Press "**STOP**" first, and then press "**FUNCTION**" + "**CLEAR**" keys simultaneously to return to standby.

   Note:
   This is the size adjustment, and do not worry about the positioning.

3.9.5. Original Registration & CCD Read Adjustments

1. Place the Original Document on the Platen Scanner.
2. Insert Ledger, or A3 size paper into the 1st tray, and change the tray setting to the appropriate paper size. Empty, or pull out all the remaining trays (including the bypass tray) to disable them.
3. Press "**FUNCTION**", "**ORIGINAL SIZE**" keys, and then Key "**3**" on the keypad sequentially.
4. Perform the Service Mode F2 (Single Copy Test).
5. Check the Image size of the Copy, and the Original as Portrait.
6. Perform the Service Mode F6-03 (Original Registration), to adjust the platen original registration detection timing.
7. If the gap is smaller than the Original, input a (-) value. If bigger than the Original, input a (+) value.
8. Perform the Service Mode F6-53 (CCD Read Position Adj), to adjust the CCD Read side position.
9. If the gap is smaller than the Original, input a (+) value. If bigger than the Original, input a (-) value.
10. Press "**STOP**" first, and then press "**FUNCTION**" + "**CLEAR**" keys simultaneously to return to standby.

3.9.6. ADF 100% Image 1-Sided Adjustment

1. Place the Original Document on the ADF.
2. Insert Ledger, or A3 size paper into the 1st tray, and change the tray setting to the appropriate paper size. Empty, or pull out all the remaining trays (including the bypass tray) to disable them.
3. Press "**FUNCTION**", "**ORIGINAL SIZE**" keys, and then Key "**3**" on the keypad sequentially.
4. Perform the Service Mode F2 (Single Copy Test).
5. Check the Image size of the Copy, and the Original as Portrait.
6. Perform the Service Mode F6-93 (ADF 100% Image 1-Sided), to adjust for an identical vertical (side-to-side) magnification for 1-sided scan.
7. If the image is smaller than the Original, input a (+) value. If bigger than the Original, input a (-) value.
8. Press "**STOP**" first, and then press "**FUNCTION**" + "**CLEAR**" keys simultaneously to return to standby.

Note:
This is the size adjustment, and do not worry about the positioning.

3.9.7. ADF Original Read Edge & ADF Main Scan Adjustments

1. Place the Original Document on the ADF.
2. Insert Ledger, or A3 size paper into the 1st tray, and change the tray setting to the appropriate paper size. Empty, or pull out all the remaining trays (including the bypass tray) to disable them.
3. Press "**FUNCTION**", "**ORIGINAL SIZE**" keys, and then Key "**3**" on the keypad sequentially.
4. Perform the Service Mode F2 (Single Copy Test).
5. Check the Image size of the Copy, and the Original as Portrait.
6. Perform the Service Mode F6-91 (Original Read Edge ADF), to adjust for the ADF Original Read Edge detection timing.
7. If the gap is less than the Original, input a (+) value. If bigger than the Original, input a (-) value.
8. Perform the Service Mode F6-90 (ADF Read Main Scan Pos.), to adjust for the ADF horizontal image read start position.
9. If the gap is less than the Original, input a (+) value. If bigger than the Original, input a (-) value.
10. Press "**STOP**" first, and then press "**FUNCTION**" + "**CLEAR**" keys simultaneously to return to standby.

3.9.8.   Double Exposure Lead, and Side Edge Adjustments

Caution:
Confirm that the Scanning Pad is installed, and aligned correctly on the ADF/i-ADF prior to making any adjustments. (Refer to the ADF/i-ADF Installation Instructions in Sect. 8.11., or 8.12.)

1. Place a Business Card, Driver's License, Insurance Card, etc. (Invoice size, or smaller) on the Platen Glass as illustrated.

```
        ┌──────────────────────────┐
        │ ┌──────┐                  │
        │ │Driver's│                │
        │ │License │    Platen      │
        │ └──────┘                  │
        │                          │
        │                          │
        └──────────────────────────┘
```

2. Insert Letter, or A4 size paper into the 1st Paper Tray, or onto the Sheet Bypass, and change the tray settings to the appropriate paper size.
3. Make a copy using the Double Exposure Copy Mode.
4. Check the Copy Image.
   a. For a Horizontal Black Line in the Center, adjust the Service Mode F6-63 (Lead Edge Read Timing) by following the steps below.
   b. For a Vertical Black Line at the Leading Edge, adjust the Service Mode F6-64 (Side Edge Read Adjust) by following the steps below.

Output of Letter (A4) Paper (not LTR-R)

```
  ┌──────────────┐      ┌──────────────┐
  │ ┌────────┐   │      │ ┌────────┐   │
  │ │Driver's│   │      │ │Driver's│   │
  │ │License │   │      │ │License │   │
  │ └────────┘   │      │ └────────┘   │
  │   Adjust with│      │              │
  │   F6-63      │      │              │
  │ ──────────── │      │ ┌────────┐   │
  │              │      │ │Driver's│   │
  │ ┌────────┐   │      │ │License │   │
  │ │Driver's│   │      │ └────────┘   │
  │ │License │   │      │              │
  │ └────────┘   │      │  Adjust with │
  │              │      │  F6-64       │
  └──────────────┘      └──────────────┘
```

5. Press "**FUNCTION**", "**ORIGINAL SIZE**" keys, and then Key "**3**" on the keypad sequentially.
6. Perform the Service Mode F6-63 (Lead Edge Read Timing), and F6-64 (Side Edge Read Adjust).
   Note:
   It is not recommended setting the value higher than "4" as it will increase the Void Area.
7. Press "**STOP**" first, and then press "**FUNCTION**" + "**CLEAR**" keys simultaneously to return to standby.
8. Repeat the above steps 3 to 7 until the Black Line(s) disappear.

3.10. Signal Waveform

3.10.1. Glossary of Electrical Abbreviations

Glossary of Electrical Abbreviations	
Signal Name	**Function**
+12V	+12 VDC Power Supply
+24V	+24 VDC Power Supply
+24VD1	+24 VDC Power Supply
+24VFL	+20 / +24 VDC Power Supply
+24VM	+24 VDC Power Supply
+24VOPC	+24 VDC Power Supply
+24VOPF	+24 VDC Power Supply
+3.3V	+3.3 VDC Power Supply
+5v	+5 VDC Power Supply
+5VD	+5 VDC Power Supply
+5VP	+5 VDC Power Supply
+ACT	ACTIVE Lamp LED Power Supply
+ALM	ALARM Lamp LED Power Supply
+DAT	DATA Lamp LED Power Supply
+SLP	Energy Saver Lamp LED Power Supply
AC(L)	AC Power Supply
AC(N)	AC Power Supply
ACSW	Fuser Relay
ADF2	2nd Paper Tray Feed Roller Drive Signal
ADF3	3rd Paper Tray Feed Roller Drive Signal
ADF4	4th Paper Tray Feed Roller Drive Signal
AGND	Ground
BAT+	Lithium Battery
BMCNT	Toner Bottle Motor Control Signal
BTHP	Toner Bottle Position Sensor Signal
BZ-	Buzzer Signal
BZ+	Buzzer Signal (+)
C1-	Capacitor 1 Negative Connection Pin for Converter
C1+	Capacitor 1 Positive Connection Pin for Converter
C2-	Capacitor 2 Negative Connection Pin for Converter
C2+	Capacitor 2 Positive Connection Pin for Converter
C3+	Capacitor 3 Positive Connection Pin for Converter
C4+	Capacitor 4 Positive Connection Pin for Converter
CASET	Paper Tray Detection Signal (1st Feeder)
CCRMT	Charge Leak Detection Signal
CPWM	Charge Control DC ON/OFF PWM
CSB1	Chip Select Signal
CST2	2nd Paper Tray Detection Signal
CST3	3rd Paper Tray Detection Signal
CST4	4th Paper Tray Detection Signal
CSTOP	2nd Paper Feed Module Detection Signal
CSTOP4	4th Paper Feed Module Detection Signal

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Glossary of Electrical Abbreviations	
Signal Name	**Function**
DAA1	ADF Motor Current Control Signal
DB0	Data Signal
DB1	Data Signal
DB2	Data Signal
DB3	Data Signal
DB4	Data Signal
DB5	Data Signal
DB6	Data Signal
DB7	Data Signal
DDCPWM	Development Control DC ON/OFF PWM
E_RDB	Read/Write Execution Control Signal
ELPCNT	Discharge Lamp
F/R	Direction of Rotation Signal
FDPCHK2	2nd Paper Tray Paper Registration Detection Signal
FDPCHK3	3rd Paper Tray Paper Registration Detection Signal
FDPCHK4	4th Paper Tray Paper Registration Detection Signal
FSH	Transfer Gate Clock
GND	Ground
GPWM	Grid Control ON/OFF PWM
HFSOL	Temp Humidity Sensor Signal
HPMB	LCD driver Power Control Signal
HSYNC	Horizontal Synchronous Signal
HUMISN	Temp Humidity Sensor Signal
HVAC1	INV PC Board/Lamp Signal
HVAC2	INV PC Board/Lamp Signal
IICSCL	IIC Transmission Clock
IICSDA	IIC Transmission Signal
IOUTA	Motor Control Signal
IOUTB	Motor Control Signal
JAMDOR2	2nd Paper Tray Jam Access Cover Open Detection Signal
JAMDOR3	3rd Paper Tray Jam Access Cover Open Detection Signal
JAMDOR4	4th Paper Tray Jam Access Cover Open Detection Signal
KCDET	Key Counter Option Detection
KCNT	Key Counter Option
KIN0	PNL Key Signal (Key Line)
KIN1	PNL Key Signal (Key Line)
KIN2	PNL Key Signal (Key Line)
KIN3	PNL Key Signal (Key Line)
KIN4	PNL Key Signal (Key Line)
KIN5	PNL Key Signal (Key Line)
KIN6	PNL Key Signal (Key Line)
KIN7	PNL Key Signal (Key Line)
L1	Line Signal
L2	Line Signal
L5V	Laser Circuit +5VDC Power Supply
LD	Motor Lock Detection Signal

Glossary of Electrical Abbreviations	
Signal Name	**Function**
LDBTHP	Toner Bottle HP Sensor Signal
LDCST2	Photo Sensor DC Drive Voltage
LDCST3	Photo Sensor DC Drive Voltage
LDCSTSEN	Photo Sensor DC Drive Voltage
LDDUX	Photo Sensor DC Drive Voltage
LDEN	Laser Control
LDFPCHK2	Photo Sensor DC Drive Voltage
LDFPCHK3	Photo Sensor DC Drive Voltage
LDFPCHK4	Photo Sensor DC Drive Voltage
LDHEX	Photo Sensor DC Drive Voltage
LDHFPE	Photo Sensor DC Drive Voltage
LDI-	Laser Diode Control -
LDI+	Laser Diode Control +
LDJAM2	Photo Sensor DC Drive Voltage
LDJAM3	Photo Sensor DC Drive Voltage
LDJAM4	Photo Sensor DC Drive Voltage
LDORI	Photo Sensor DC Drive Voltage
LDPED	Photo Sensor DC Drive Voltage
LDPHK2	Photo Sensor DC Drive Voltage
LDPHK3	Photo Sensor DC Drive Voltage
LDPHK4	Photo Sensor DC Drive Voltage
LDPSEN	Photo Sensor DC Drive Voltage
LDRRSEN	Photo Sensor DC Drive Voltage
LDSSN	Photo Sensor DC Drive Voltage
LDTF	Photo Sensor DC Drive Voltage
LDUPL2	Photo Sensor DC Drive Voltage
LDUPL3	Photo Sensor DC Drive Voltage
LDUPL4	Photo Sensor DC Drive Voltage
LDUPLSEN	Photo Sensor DC Drive Voltage
LDWTB	Photo Sensor DC Drive Voltage
LED0	PNL LED Control Signal
LED1	PNL LED Control Signal
LED2	PNL LED Control Signal
LED3	PNL LED Control Signal
LED4	PNL LED Control Signal
LED5	PNL LED Control Signal
LED6	PNL LED Control Signal
LED7	PNL LED Control Signal
LED8	PNL LED Control Signal
LED9	PNL LED Control Signal
LEDCT0	PNL LED Control Signal
LEDCT1	PNL LED Control Signal
LEDCT2	PNL LED Control Signal
LEDCT3	PNL LED Control Signal
LEDCT4	PNL LED Control Signal
LIFT1	1st Paper Tray Lift Motor Signal

Glossary of Electrical Abbreviations	
Signal Name	**Function**
LIFT2	2nd Paper Tray Lift Motor Signal
LIFT4	4th Paper Tray Lift Motor Signal
LIFTM2	2nd Paper Tray Lift Motor Drive Signal
LIFTM4	4th Paper Tray Lift Motor Drive Signal
MGND	Ground
MRCLH2	2nd Paper Tray Intermediate Roller Clutch Drive Signal
MRCLH3	3rd Paper Tray Intermediate Roller Clutch Drive Signal
MRCLH4	4th Paper Tray Intermediate Roller Clutch Drive Signal
N.C.	No Connection
nA3SEN	Sheet Bypass Paper Size Detection Signal
nA5SEN	Sheet Bypass Paper Size Detection Signal
nAA3S	Original Width Detection Signal
nAA3SN	Original Width Detection Signal
nAADL1	Original Length Detection Signal
nAADL2	Original Length Detection Signal
nAAPNT	Original Detection Signal
nAB1SN	Read Point Detection Signal
nAB2SN	Duplex Eject Detection Signal
nAB4S	Original Width Detection Signal
nAB4SN	Original Width Detection Signal
nACLH1	Feed 2 Roller Clutch Control Signal
nACLH2	Paper Feed Roller Clutch Control Signal
nACLH3	Inverting Roller Clutch Control Signal
nACLOCKAD1	ADF Motor Control Clock Signal
nAEJC	Original Eject Detection Signal
nAKEEP1	Reversing 1 Guide Solenoid Control Signal
nAKEEP2	Reversing 1 Guide Solenoid Control Signal
nANG	Platen Cover Angle
nAOAC	ADF Cover Open Detection Signal
nAPACHG	Release Lever Plate Solenoid Control Signal
nAPICR	Release Lever Plate Solenoid Control Signal
nAREV	ADF Exit Cover Open Detection Signal
nASTAMP	Stamp Control Signal
nASTROAD1	ADF Motor Control Strobe Signal
nATT	Attention Signal
nB4SEN	Sheet Bypass B4 Paper Detection Signal
nBDOOR	Platen Cover Open Detection Signal
nCCLH1	Feed 2 Roller Clutch Control Signal
nCCLH2	ADF Roller Clutch Control Signal
nCCLH3	Inverting Roller Clutch Control Signal
nCST2	2nd Paper Tray Detection Signal
nCTCNT	Counter Drive Signal
nCTON	Ring Detection Signal
nDADFON	ADF Option Detection Signal
nDUPACK	Duplex Print Acknowledge Signal
nDUPSEN	ADU Sensor Signal

Glossary of Electrical Abbreviations	
Signal Name	**Function**
nDUREQ	Duplex Print Request
nDUXSOL	ADU Solenoid Control Signal
nFLON	Inverter Ground
nFNRDT	Fan Ready Signal
nFNRDTP	PS Fan Ready Signal
nHEXSEN	Paper Exit Sensor Signal
nHFPESEN	Bypass Feed Sensor Signal
nHKOF	External Phone Off-Hook Detection Signal
nLEDACT	ACTIVE Lamp LED Control Signal
nLEDALM	ALARM Lamp LED Control Signal
nLEDDAT	DATA Lamp LED Control Signal
nLEDSLP	Energy Saver Lamp LED Control Signal
nLIFTM3	3rd Paper Tray Lift Motor Drive Signal
nLPOW1	Power Control
nLPOW2	Power Control
nMMCK	Main Motor Clock
nMMON	Main Motor Rotation Control Signal
nMMRDY	Main Motor Ready Signal
nOPDUP	Duplex Unit Detection Signal
nOPT	PNL4 Detection
nORI	Home Position Detection Signal
nOUTA	Motor Control Signal
nOUTB	Motor Control Signal
nPACK	Printer ACK Signal
nPCHK4	4th Paper Tray Paper Detection Signal
nPEDSEN	Sheet Bypass Paper Detection Signal
nPHY1	CCD CLOCK
nPHY2	CCD CLOCK
nPHYCP	CCD CLOCK
nPHYR	CCD CLOCK
nPNLRST	Panel Reset Signal
nPRDY	Printer Ready Signal
nPRGDWN	F-ROM Rewrite
nPVSYNC	Print Registration
nSACK	Scan ACK Signal
nSADFON	ADF Detection Signal
nSCNWUP	Energy Saver Signal
nSLPKY	Energy Saver Key Signal
nSREQ	Scanner Request Signal
nSTAMP	Stamp Control Signal
nTFSEN	Toner Waste Sensor
nVCNT	+24 VDC Power Supply Control Signal
nVRDY	VSYNC Reset Signal
nWAKE	FAX Wake Up Signal
nWTBSEN	Toner Waste Container Detection Sensor Signal
OP3CLK	3rd Paper Tray Motor Clock

Glossary of Electrical Abbreviations	
Signal Name	**Function**
OP3ENB	Option Feed FIFO Enable
OP3FCK	Option Feed FIFO Clock
OP3FDIN	Option Feed FIFO Input
OP3FLD	Option Feed FIFO Load
OP3FLT	Option Feed FIFO Latch
OP3FOT	Option Feed FIFO Output
OP3RST	Option Feed FIFO Reset
OUTA	Motor Control Signal
OUTB	Motor Control Signal
P/S	Motor Start/Stop
pADATA1A	ADF Motor Control Signal
pADATA1B	ADF Motor Control Signal
pBDA	Print BDA Signal
PCHK1	1st Paper Tray Paper Detection Signal
PCHK2	2nd Paper Tray Paper Detection Signal
PCHK3	3rd Paper Tray Paper Detection Signal
PCHK4	4th Paper Tray Paper Detection Signal
pCMLD	Line Switching Relay Drive Signal
PFCLCNT	Paper Feed Clutch Drive Signal
PMCK	Polygon Motor Clock
PMON	Polygon Motor Rotation Signal
PMRDY	Polygon Motor Ready Signal
PNLRXD	PNL Reception Data Signal
PNLTXD	PNL Transmission Data Signal
POWCNTV	Laser Power Control Signal
pPHY1	CCD CLOCK
pPHY2	CCD CLOCK
pPHYCP	CCD CLOCK
pPHYR	CCD CLOCK
PS	Parallel / Serial Data Input Select Signal
pSENTIM	Scanner LSYNC Signal
pSPCRST	SPC Reset Signal
pSPKOT	Line Dial Tone Signal
pVREQ	Print ACK Request Signal
RESETB	LCD Driver Reset Signal
RETRACE	Laser Control
RRCLCNT	Registration Roller Drive Signal
RS	Register Selection Control Signal
RSEN	Registration Sensor Signal
RW_WRB	LCD Control Signal
S/H	Sample Hold Signal
SCN0	PNL Key Signal (Scan Line)
SCN1	PNL Key Signal (Scan Line)
SCN10	PNL Key Signal (Scan Line)
SCN11	PNL Key Signal (Scan Line)
SCN2	PNL Key Signal (Scan Line)

Glossary of Electrical Abbreviations	
Signal Name	**Function**
SCN3	PNL Key Signal (Scan Line)
SCN4	PNL Key Signal (Scan Line)
SCN5	PNL Key Signal (Scan Line)
SCN6	PNL Key Signal (Scan Line)
SCN8	PNL Key Signal (Scan Line)
SCN9	PNL Key Signal (Scan Line)
SMCNT	Toner Motor Control Signal
SPCRXD	SPC Reception Data Signal
SPCTXD	SPC Transmission Data Signal
SSR	Heater Control Signal
TC	Transfer Control Cleaning Output
TDREF	Toner Density Reference Sensor
TDSEN	Toner Density Sensor Signal
TEMPSN	Temp Humidity Sensor Signal
THERM1	Thermistor Output Signal
THERM2	Ground
TPWM	Transfer Control Transfer Output
UPLIMIT	1st Paper Tray Paper Level Signal
UPLIMIT2	2nd Paper Tray Paper Level Signal
UPLIMIT3	3rd Paper Tray Paper Level Signal
UPLIMIT4	4th Paper Tray Paper Level Signal
UPLMT2	2nd Paper Tray Paper Level Signal
UPLMT4	4th Paper Tray Paper Level Signal
V0	LCD Driver Supply Voltages
V1	LCD Driver Supply Voltages
V2	LCD Driver Supply Voltages
V3	LCD Driver Supply Voltages
V4	LCD Driver Supply Voltages
VCL	LCD Power Supply
VDD	+3.3 VDC Power Supply
VOUT	Voltage Converter Input / Output
VOUT1	Graphic Data Output
VOUT2	Graphic Data Output
VSS	Ground
ZCRS	Heater Control Signal

3.10.2. SC PC Board

CN51

SC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN51-1	+24V	PS PCB CN11-1	+24V	+24 VDC Power Supply
CN51-2	GND	PS PCB CN11-2	0V	Ground
CN51-3	+5VP	PS PCB CN11-3	+5V	+5 VDC Power Supply
CN51-4	+5VD	PS PCB CN11-4	+5V	+5 VDC Power Supply
CN51-5	+5v	PS PCB CN11-5	+5V	+5 VDC Power Supply
CN51-6	GND	PS PCB CN11-6	0V	Ground
CN51-7	GND	PS PCB CN11-7	0V	Ground
CN51-8	GND	PS PCB CN11-8	0V	Ground
CN51-9	GND	PS PCB CN11-9	0V	Ground
CN51-10	GND	PS PCB CN11-10	0V	Ground
CN51-11	+3.3V	PS PCB CN11-11	+3.3V	+3.3 VDC Power Supply
CN51-12	+3.3V	PS PCB CN11-12	+3.3V	+3.3 VDC Power Supply

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SC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN51-13	nLPOW1	PS PCB CN11-13	+24V ⌐‾‾‾‾⌐___ 0V	Power Control
CN51-14	nLPOW2	PS PCB CN11-14	+3.3V ⌐‾‾‾‾⌐___ 0V	Power Control
CN51-15	nVCNT	PS PCB CN11-15	+24V ___⌐‾‾‾⌐___ 0V	+24 VDC Power Supply Control Signal
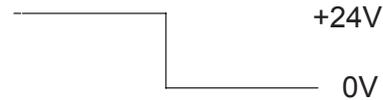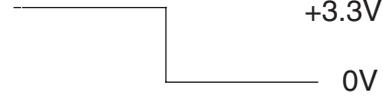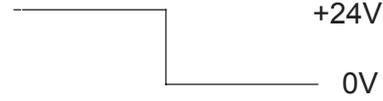
CN52

SC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN52-1	+24V	PNL1 PCB CN220-1	+24V ‾‾‾‾‾‾‾‾	+24 VDC Power Supply
CN52-2	GND	PNL1 PCB CN220-2	0V _____	Ground
CN52-3	GND	PNL1 PCB CN220-3	0V _____	Ground
CN52-4	GND	PNL1 PCB CN220-4	0V _____	Ground
CN52-5	+5VP	PNL1 PCB CN220-5	+5V ‾‾‾‾‾‾‾‾	+5 VDC Power Supply
CN52-6	+5v	PNL1 PCB CN220-6	+5V ‾‾‾‾‾‾‾‾	+5 VDC Power Supply
CN52-7	PNLRXD	PNL1 PCB CN220-7	+5V ⊓⊓⊓⊓ 0V	PNL Reception Data Signal
CN52-8	PNLTXD	PNL1 PCB CN220-8	+5V ⊓⊓⊓⊓ 0V	PNL Transmission Data Signal
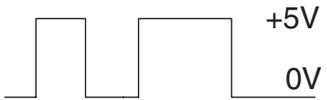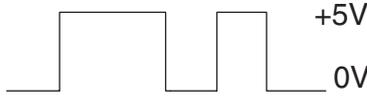
SC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN52-9	nPNLRST	PNL1 PCB CN220-9	+3.3V RESET 0V	Panel Reset Signal
CN52-10	nLPOW2	PNL1 PCB CN220-10	+3.3V 0V	Power Control
CN52-11	nLPOW1	PNL1 PCB CN220-11	+24V 0V	Power Control
CN52-12	nSLPKY	PNL1 PCB CN220-12	+3.3V PRESSED 0V	Energy Saver Key Signal
CN52-13	nWAKE	PNL1 PCB CN220-13	+3.3V 0V	FAX Wake Up Signal
CN52-16	nVCNT	PNL1 PCB CN220-16	+24V 0V	+24 VDC Power Supply Control Signal
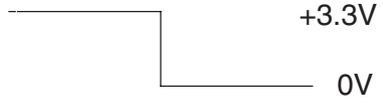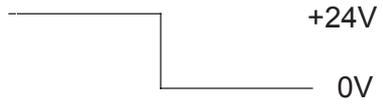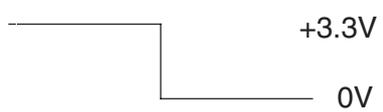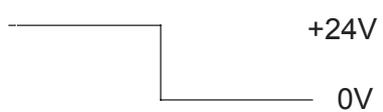
CN53

SC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN53-1	nPRDY	SPC PCB CN717-1	+5V READY 0V	Printer Ready Signal
CN53-2	nVRDY	SPC PCB CN717-2	+5V 0V	VSYNC Reset Signal
CN53-3	nPACK	SPC PCB CN717-3	+5V 0V	Printer ACK Signal
CN53-4	nATT	SPC PCB CN717-4	+5V 0V	Attention Signal
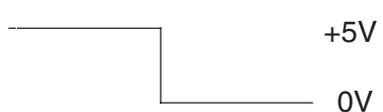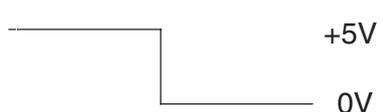
134

SC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN53-5	nDUPACK	SPC PCB CN717-5	+5V / 0V	Duplex Print Acknowledge Signal
CN53-6	pBDA	SPC PCB CN717-6	+3.3V / 0V	Print BDA Signal
CN53-7	pVREQ	SPC PCB CN717-7	+5V / 0V	Print ACK Request Signal
CN53-8	nSACK	SPC PCB CN717-8	+5V / 0V	Scan ACK Signal
CN53-9	nPVSYNC	SPC PCB CN717-9	+5V / 0V	Print Registration
CN53-10	nDUREQ	SPC PCB CN717-10	+5V / 0V	Duplex Print Request
CN53-11	pSENTIM	SPC PCB CN717-11	+5V / 0V	Scanner LSYNC Signal
CN53-12	nSREQ	SPC PCB CN717-12	+5V / 0V	Scanner Request Signal
CN53-13	pSPCRST	SPC PCB CN717-13	+5V / 0V	SPC Reset Signal
CN53-14	nPRGDWN	SPC PCB CN717-14	+5V / 0V	F-ROM Rewrite
CN53-15	GND	SPC PCB CN717-15	0V	Ground
CN53-16	GND	SPC PCB CN717-16	0V	Ground
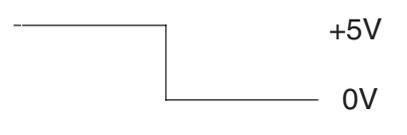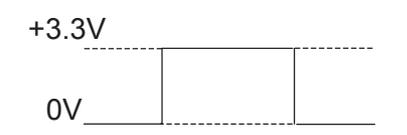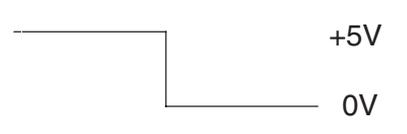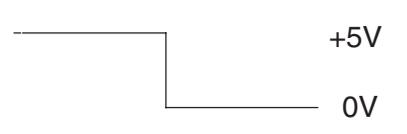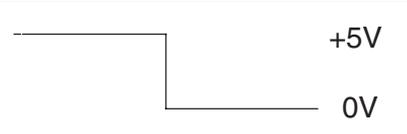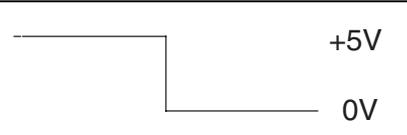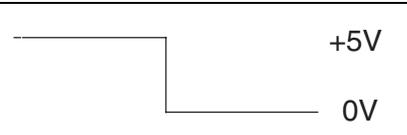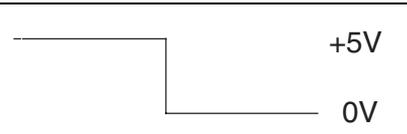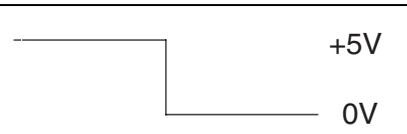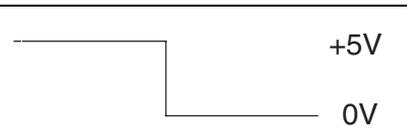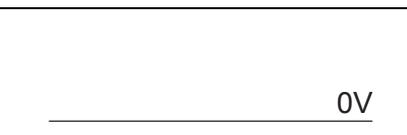
135

SC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN53-17	IICSCL	SPC PCB CN717-17	+5V / 0V	IIC Transmission Clock
CN53-18	IICSDA	SPC PCB CN717-18	+5V / 0V	IIC Transmission Signal
CN53-19	GND	SPC PCB CN717-19	0V	Ground
CN53-20	nSCNWUP	SPC PCB CN717-20	+5V / 0V	Energy Saver Signal
CN53-21	SPCRXD	SPC PCB CN717-21	+5V / 0V	SPC Reception Data Signal
CN53-22	SPCTXD	SPC PCB CN717-22	+5V / 0V	SPC Transmission Data Signal
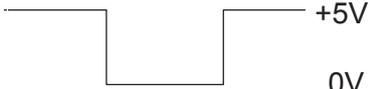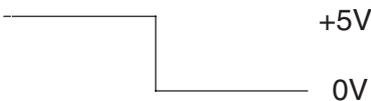
CN55

SC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN55-1	VOUT2	CCD CN850-1	4~6V / 1V / 0V	Graphic Data Output
CN55-2	AGND	CCD CN850-2	0V	Ground
CN55-3	VOUT1	CCD CN850-3	4~6V / 1V / 0V	Graphic Data Output
CN55-4	AGND	CCD CN850-4	0V	Ground
CN55-5	AGND	CCD CN850-5	0V	Ground
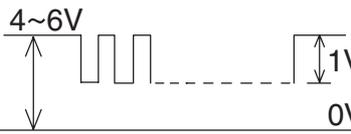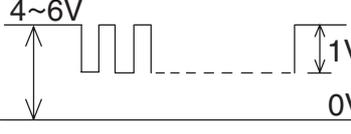
SC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN55-6	AGND	CCD CN850-6	0V	Ground
CN55-7	+12V	CCD CN850-7	+12V	+12 VDC Power Supply
CN55-8	AGND	CCD CN850-8	0V	Ground
CN55-9	GND	CCD CN850-9	0V	Ground
CN55-10	GND	CCD CN850-10	0V	Ground
CN55-11	pPHYCP	CCD CN850-11	+3.3V 0V	CCD CLOCK
CN55-12	nPHYCP	CCD CN850-12	+3.3V 0V	CCD CLOCK
CN55-13	pPHYR	CCD CN850-13	+3.3V 0V	CCD CLOCK
CN55-14	nPHYR	CCD CN850-14	+3.3V 0V	CCD CLOCK
CN55-15	pPHY2	CCD CN850-15	+3.3V 0V	CCD CLOCK
CN55-16	nPHY2	CCD CN850-16	+3.3V 0V	CCD CLOCK
CN55-17	pPHY1	CCD CN850-17	+3.3V 0V	CCD CLOCK
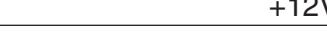
137

SC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN55-18	nPHY1	CCD CN850-18	+3.3V / 0V	CCD CLOCK
CN55-19	FSH	CCD CN850-19	+3.3V / 0V	Transfer Gate Clock
CN55-20	+5v	CCD CN850-20	+5V	+5 VDC Power Supply

CN57

SC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN57-1	+3.3V	LSU CN2-1	+3.3V	+3.3 VDC Power Supply
CN57-2	GND	LSU CN2-2	0V	Ground
CN57-3	LDI+	LSU CN2-3	+3.3V / 0V	Laser Diode Control +
CN57-4	LDI-	LSU CN2-4	+3.3V / 0V	Laser Diode Control -
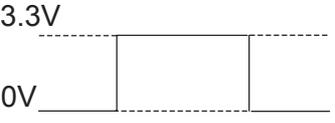
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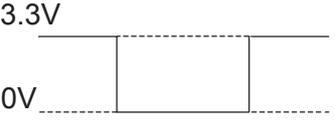
3.10.3. SPC PC Board

CN650

SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN650-1	+5VP	ADF PCB CN21-1	+5V	+5 VDC Power Supply
CN650-2	MGND	ADF PCB CN21-2	0V	Ground
CN650-3	GND	ADF PCB CN21-3	0V	Ground
CN650-4	+24V	ADF PCB CN21-4	+24V	+24 VDC Power Supply
CN650-5	nAAPNT	ADF PCB CN21-5	+5V DETECT 0V	Original Detection Signal
CN650-6	N.C.	ADF PCB CN21-6		No Connection
CN650-7	nAB4SN	ADF PCB CN21-7	+5V 0V	Original Width Detection Signal
CN650-8	nAA3SN	ADF PCB CN21-8	+5V 0V	Original Width Detection Signal
CN650-9	nAADL1	ADF PCB CN21-9	+5V 0V	Original Length Detection Signal
CN650-10	nAADL2	ADF PCB CN21-10	+5V 0V	Original Length Detection Signal
CN650-11	nAB2SN	ADF PCB CN21-11	+5V 0V	Duplex Eject Detection Signal

SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN650-12	nAB1SN	ADF PCB CN21-12	+5V / 0V	Read Point Detection Signal
CN650-13	nAEJC	ADF PCB CN21-13	+5V / 0V	Original Eject Detection Signal
CN650-14	nAREV	ADF PCB CN21-14	+5V / OPEN / 0V	ADF Exit Cover Open Detection Signal
CN650-15	nAOAC	ADF PCB CN21-15	+5V / OPEN / 0V	ADF Cover Open Detection Signal
CN650-16	nAKEEP1	ADF PCB CN21-16	+5V / 0V	Reversing 1 Guide Solenoid Control Signal
CN650-17	nAKEEP2	ADF PCB CN21-17	+5V / 0V	Reversing 1 Guide Solenoid Control Signal
CN650-18	nAPACHG	ADF PCB CN21-18	+5V / 0V	Release Lever Plate Solenoid Control Signal
CN650-19	nAPICR	ADF PCB CN21-19	+5V / 0V	Release Lever Plate Solenoid Control Signal
CN650-20	nSTAMP	ADF PCB CN21-20	+5V / 0V	Stamp Control Signal
CN650-21	nACLH1	ADF PCB CN21-21	+5V / 0V	Feed 2 Roller Clutch Control Signal
CN650-22	nACLH2	ADF PCB CN21-22	+5V / 0V	Paper Feed Roller Clutch Control Signal
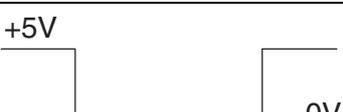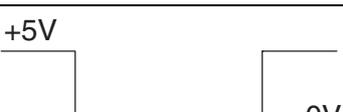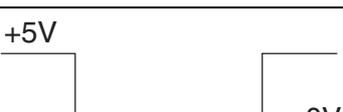
140

SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN650-23	nACLH3	ADF PCB CN21-23	+5V ‾‾___‾‾ 0V	Inverting Roller Clutch Control Signal
CN650-24	nACLOCKA D1	ADF PCB CN21-24	+5V ‾_‾_‾_‾ 0V	ADF Motor Control Clock Signal
CN650-25	nASTROAD1	ADF PCB CN21-25	+5V ‾‾___‾‾ 0V	ADF Motor Control Strobe Signal
CN650-26	pADATA1A	ADF PCB CN21-26	+5V __‾__ 0V	ADF Motor Control Signal
CN650-27	pADATA1B	ADF PCB CN21-27	+5V __‾__ 0V	ADF Motor Control Signal
CN650-28	+24V	ADF PCB CN21-28	+24V ‾‾‾‾‾	+24 VDC Power Supply
CN650-29	GND	ADF PCB CN21-29	0V ‾‾‾‾‾	Ground
CN650-30	+24V	ADF PCB CN21-30	+24V ‾‾‾‾‾	+24 VDC Power Supply
CN650-31	GND	ADF PCB CN21-31	0V ‾‾‾‾‾	Ground
CN650-32	DAA1	ADF PCB CN21-32	+5V __‾‾ 0V	ADF Motor Current Control Signal
CN650-33	MGND	ADF PCB CN21-33	0V ‾‾‾‾‾	Ground
CN650-34	MGND	ADF PCB CN21-34	0V ‾‾‾‾‾	Ground
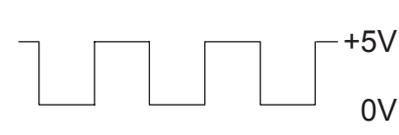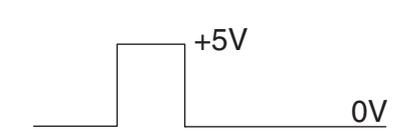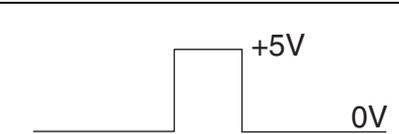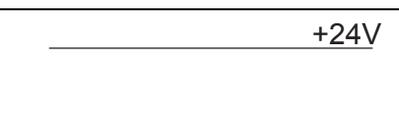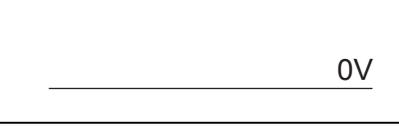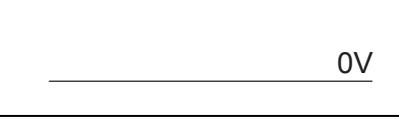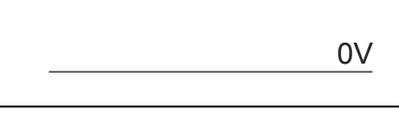
SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN650-35	nSADFON	ADF PCB CN21-35	+5V (For i-ADF) +0V (For ADF)	ADF Detection Signal
CN650-36	nDADFON	ADF PCB CN21-36	+5V 0V	ADF Option Detection Signal
CN650-37	+24V	ADF PCB CN21-37	+24V	+24 VDC Power Supply
CN650-38	MGND	ADF PCB CN21-38	0V	Ground
CN650-39	+5v	ADF PCB CN21-39	+5V	+5 VDC Power Supply
CN650-40	+5v	ADF PCB CN21-40	+5V	+5 VDC Power Supply
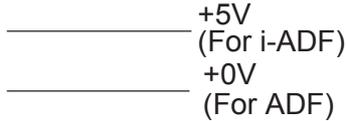
CN655

SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN655-1	OUTA	Scanning Motor -1	+18V 0V	Motor Control Signal
CN655-3	nOUTA	Scanning Motor -2	+18V 0V	Motor Control Signal
CN655-2	+24V	Scanning Motor -3	+24V	+24 VDC Power Supply
CN655-4	OUTB	Scanning Motor -4	+18V 0V	Motor Control Signal
CN655-5	+24V	Scanning Motor -5	+24V	+24 VDC Power Supply
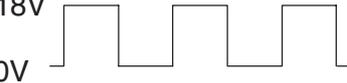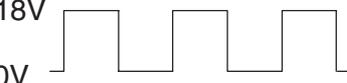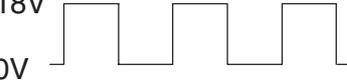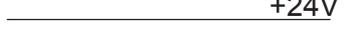
SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN655-6	nOUTB	Scanning Motor -6	+18V ⎍⎍⎍ 0V	Motor Control Signal

CN656

SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN656-1	+24V	INV PCB CN1-1	+24V	+24 VDC Power Supply
CN656-2	+24V	INV PCB CN1-2	+24V	+24 VDC Power Supply
CN656-3	nFLON	INV PCB CN1-3	+24V ⎍ 0V	Inverter Ground
CN656-4	MGND	INV PCB CN1-4	0V	Ground
CN656-5	MGND	INV PCB CN1-5	0V	Ground

CN657

SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN657-1	+5VP	SNS PCB -1	+5V	+5 VDC Power Supply
CN657-2	nANG	SNS PCB -2	+5V ⎍ ON 0V	Platen Cover Angle
CN657-3	GND	SNS PCB -3	0V	Ground
CN657-4	nBDOOR	SNS PCB -4	+5V ⎍ ON 0V	Platen Cover Open Detection Signal

SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN657-5	nORI	Home Position Sensor -1	+5V ⊓ HOME ⊔ 0V	Home Position Detection Signal
CN657-6	GND	Home Position Sensor -2	0V	Ground
CN657-7	LDORI	Home Position Sensor -3	+1.2V	Photo Sensor DC Drive Voltage

CN701

SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN701-1	L5V	LSU CN1-1	+5V	Laser Circuit +5VDC Power Supply
CN701-2	GND	LSU CN1-2	0V	Ground
CN701-3	S/H	LSU CN1-3	+5V(H) 0V(L)	Sample Hold Signal
CN701-4	HSYNC	LSU CN1-4	+5V 0V	Horizontal Synchronous Signal
CN701-5	LDEN	LSU CN1-5	+5V(H) 0V(L)	Laser Control
CN701-6	RETRACE	LSU CN1-6	+5V 0V	Laser Control
CN701-7	GND	LSU CN1-7	0V	Ground
CN701-8	POWCNTV	LSU CN1-8	+1.1V	Laser Power Control Signal
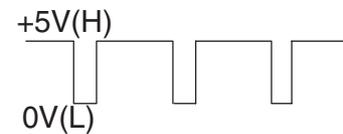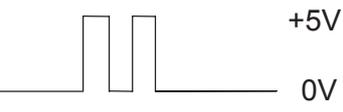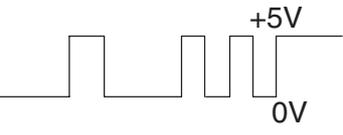
SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN701-9	PMCK	LSU CN3-1	+5V(H) / 0V(L)	Polygon Motor Clock
CN701-10	PMRDY	LSU CN3-2	+5V / Ready / 0V	Polygon Motor Ready Signal
CN701-11	PMON	LSU CN3-3	+5V / ON / 0V	Polygon Motor Rotation Signal
CN701-12	MGND	LSU CN3-4	0V	Ground
CN701-13	+24VM	LSU CN3-5	+24V	+24 VDC Power Supply

CN702

SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN702-1	+24VM	PS PCB CN500-1	+24V	+24 VDC Power Supply
CN702-2	CPWM	PS PCB CN500-2	+5V / 0V	Charge Control DC ON/OFF PWM
CN702-3	GPWM	PS PCB CN500-3	+5V / 0V	Grid Control ON/OFF PWM
CN702-4	N.C.	PS PCB CN500-4		No Connection
CN702-5	DDCPWM	PS PCB CN500-5	+5V / 0V	Development Control DC ON/OFF PWM
CN702-6	TPWM	PS PCB CN500-6	+5V / 0V	Transfer Control Transfer Output

SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN702-7	TC	PS PCB CN500-7	+5V / 0V	Transfer Control Cleaning Output
CN702-8	CCRMT	PS PCB CN500-8	+5V / 0V	Charge Leak Detection Signal
CN702-9	MGND	PS PCB CN500-9	0V	Ground
CN702-10	+24V	PS/LSU Fan -1	+24V	+24 VDC Power Supply
CN702-11	nFNRDTP	PS/LSU Fan -2	+5V / 0V	PS Fan Ready Signal
CN702-12	MGND	PS/LSU Fan -3	0V	Ground
CN702-13	+5VP	PS PCB CN12-1	+5V	+5 VDC Power Supply
CN702-14	+5v	PS PCB CN12-2	+5V	+5 VDC Power Supply
CN702-15	+5v	PS PCB CN12-3	+5V	+5 VDC Power Supply
CN702-16	GND	PS PCB CN12-4	0V	Ground
CN702-17	GND	PS PCB CN12-5	0V	Ground
CN702-18	GND	PS PCB CN12-6	0V	Ground
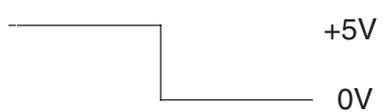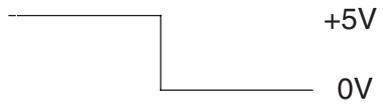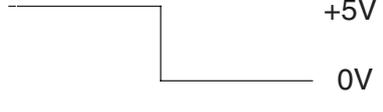
Ver. 1.1

SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN702-19	ZCRS	PS PCB CN12-7	+5V / 0V	Heater Control Signal
CN702-20	SSR	PS PCB CN12-8	+5V(H) / 0V(L)	Heater Control Signal
CN702-21	ACSW	PS PCB CN12-9	+24V / ON / 0V	Fuser Relay
CN702-22	+24VD1	PS PCB CN12-10	+24V	+24 VDC Power Supply
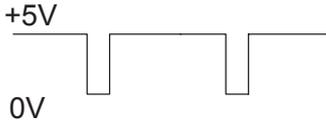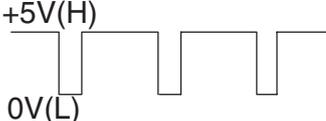
CN703

SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN703-1	MGND	PS PCB CN10-1	0V	Ground
CN703-2	MGND	PS PCB CN10-2	0V	Ground
CN703-3	+24V	PS PCB CN10-3	+24V	+24 VDC Power Supply
CN703-4	+24V	PS PCB CN10-4	+24V	+24 VDC Power Supply
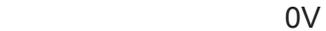
CN706

SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN706-1	+24VM	1st Tray Lift Motor	+24V	+24 VDC Power Supply
CN706-2	LIFT1	1st Tray Lift Motor	+24V / ON / 0V	1st Paper Tray Lift Motor Signal

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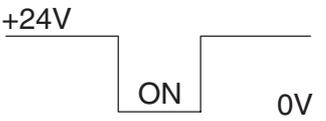
CN707

SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN707-1	+24VM	CST2 PCB CN770-3	+24V	+24 VDC Power Supply
CN707-2	MGND	CST2 PCB CN770-4	0V	Ground
CN707-3	+5v	CST2 PCB CN770-5	+5V	+5 VDC Power Supply
CN707-4	GND	CST2 PCB CN770-6	0V	Ground
CN707-5	OP3FLT	CST2 PCB CN770-7	+5V 0V	Option Feed FIFO Latch
CN707-6	OP3RST	CST2 PCB CN770-8	+5V Reset 0V	Option Feed FIFO Reset
CN707-7	OP3FOT	CST2 PCB CN770-9	+5V 0V	Option Feed FIFO Output
CN707-8	OP3FCK	CST2 PCB CN770-10	+5V 0V	Option Feed FIFO Clock
CN707-9	OP3FLD	CST2 PCB CN770-11	+5V 0V	Option Feed FIFO Load
CN707-10	OP3ENB	CST2 PCB CN770-12	+5V (H) 0V (L)	Option Feed FIFO Enable
CN707-11	OP3CLK	CST2 PCB CN770-13	+5V 0V	3rd Paper Tray Motor Clock
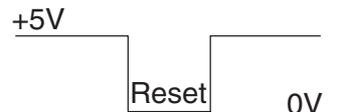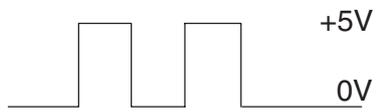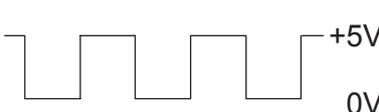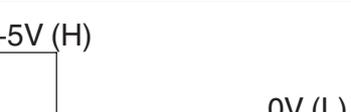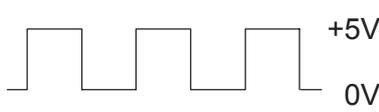
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SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN707-12	OP3FDIN	CST2 PCB CN770-14	+5V / 0V	Option Feed FIFO Input
CN707-13	ADF2	CST2 PCB CN771-1	+5V ON 0V	2nd Paper Tray Feed Roller Drive Signal
CN707-14	MRCLH2	CST2 PCB CN771-2	+5V ON 0V	2nd Paper Tray Intermediate Roller Clutch Drive Signal
CN707-15	LIFT2	CST2 PCB CN771-3	+5V ON 0V	2nd Paper Tray Lift Motor Signal
CN707-16	PCHK2	CST2 PCB CN771-4	+5V / 0V	2nd Paper Tray Paper Detection Signal
CN707-17	CST2	CST2 PCB CN771-5	+5V / 0V	2nd Paper Tray Detection Signal
CN707-18	UPLIMIT2	CST2 PCB CN771-6	+5V / 0V	2nd Paper Tray Paper Level Signal
CN707-19	FDPCHK2	CST2 PCB CN771-7	+5V(H) / 0V(L)	2nd Paper Tray Paper Registration Detection Signal
CN707-20	JAMDOR2	CST2 PCB CN771-8	+5V / 0V	2nd Paper Tray Jam Access Cover Open Detection Signal
CN707-21	CSTOP	CST2 PCB CN771-9	0V	2nd Paper Feed Module Detection Signal
CN707-23	+24VM	CST2 PCB CN771-11	+24V	+24 VDC Power Supply
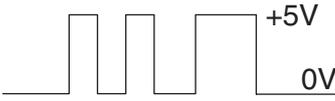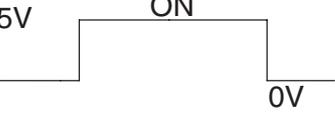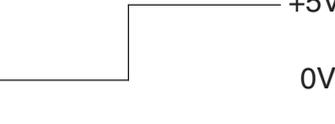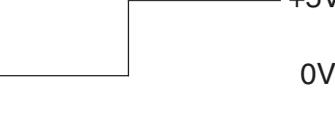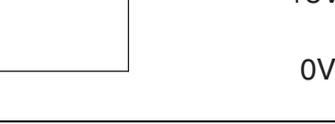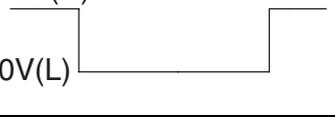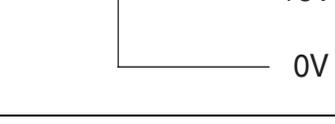
SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN707-24	MGND	CST2 PCB CN771-12	0V	Ground
CN707-25	+24VM	CST2 PCB CN770-15	+24V	+24 VDC Power Supply
CN707-26	MGND	CST2 PCB CN770-16	0V	Ground

CN709

SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN709-1	PCHK1	No Paper Sensor -1	+5V / 0V	1st Paper Tray Paper Detection Signal
CN709-2	GND	No Paper Sensor -2	0V	Ground
CN709-3	LDPSEN	No Paper Sensor -3	+1.2V	Photo Sensor DC Drive Voltage
CN709-4	UPLIMIT	Upper Limit Sensor -1	+5V / 0V	1st Paper Tray Paper Level Signal
CN709-5	GND	Upper Limit Sensor -2	0V	Ground
CN709-6	LDUPLSEN	Upper Limit Sensor -3	+1.2V	Photo Sensor DC Drive Voltage
CN709-7	CASET	1st Tray Detection Sensor -1	+5V / 0V	Paper Tray Detection Signal (1st Feeder)
CN709-8	GND	1st Tray Detection Sensor -2	0V	Ground
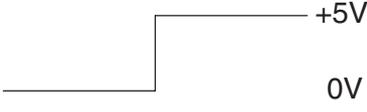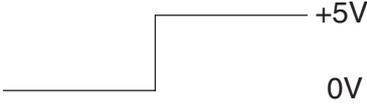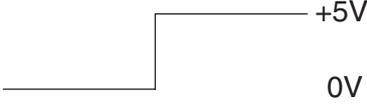
SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN709-9	LDCSTSEN	1st Tray Detection Sensor -3	+1.2V	Photo Sensor DC Drive Voltage
CN709-10	RSEN	Registration Roller Sensor -1	+5V / 0V	Registration Sensor Signal
CN709-11	GND	Registration Roller Sensor -2	0V	Ground
CN709-12	LDRRSEN	Registration Roller Sensor -3	+1.2V	Photo Sensor DC Drive Voltage
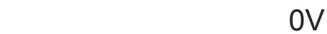
CN712

SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN712-1	LDSSN	SSN PCB CN42-1	+1.2V	Photo Sensor DC Drive Voltage
CN712-2	nA3SEN	SSN PCB CN42-2	+5V / 0V	Sheet Bypass Paper Size Detection Signal
CN712-3	GND	SSN PCB CN42-3	0V	Ground
CN712-4	nB4SEN	SSN PCB CN42-4	+5V / 0V	Sheet Bypass B4 Paper Detection Signal
CN712-5	nA5SEN	SSN PCB CN42-5	+5V / 0V	Sheet Bypass Paper Size Detection Signal
CN712-6	nPEDSEN	Bypass Feed No Paper Sensor -1	+5V / 0V	Sheet Bypass Paper Detection Signal
CN712-7	GND	Bypass Feed No Paper Sensor -2	0V	Ground
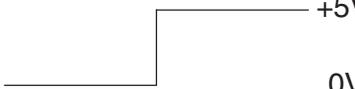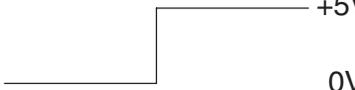
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SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN712-8	LDPED	Bypass Feed No Paper Sensor -3	+1.2V	Photo Sensor DC Drive Voltage
CN712-9	nDUPSEN	Duplex Sensor -1	+5V 0V	ADU Sensor Signal
CN712-10	GND	Duplex Sensor -2	0V	Ground
CN712-11	LDDUX	Duplex Sensor -3	+1.2V	Photo Sensor DC Drive Voltage
CN712-14	nHFPESEN	Bypass Feed Sensor -1	+5V 0V	Bypass Feed Sensor Signal
CN712-15	GND	Bypass Feed Sensor -2	0V	Ground
CN712-16	LDHFPE	Bypass Feed Sensor -3	+1.2V	Photo Sensor DC Drive Voltage
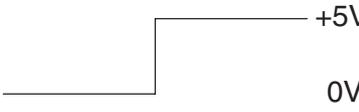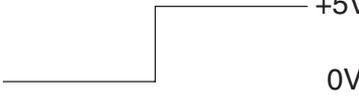
CN715

SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN715-1	+24VM	Registration Roller Clutch -1	+24V	+24 VDC Power Supply
CN715-2	RRCLCNT	Registration Roller Clutch -2	+24V ON 0V	Registration Roller Drive Signal
CN715-3	+24VM	Paper Feed Clutch -1	+24V	+24 VDC Power Supply
CN715-4	PFCLCNT	Paper Feed Clutch -2	+24V ON 0V	Paper Feed Clutch Drive Signal
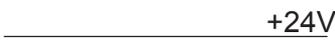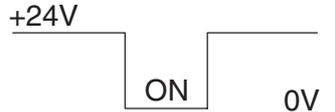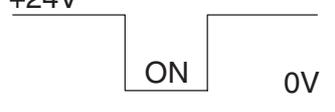
SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN715-5	+24VM	Bypass Feed Solenoid -1	+24V	+24 VDC Power Supply
CN715-6	HFSOL	Bypass Feed Solenoid -2	+24V ON 0V	Temp Humidity Sensor Signal
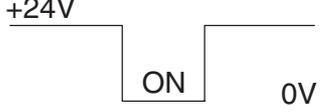
CN717
Refer to SC PC Board .

CN719

SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN719-1	+24VM	Duplex Solenoid	+24V	+24 VDC Power Supply
CN719-2	nDUXSOL	Duplex Solenoid	+24V ON 0V	ADU Solenoid Control Signal
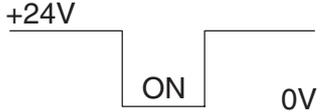
CN720

SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN720-3	+24VM	PCL PCB -1	+24V	+24 VDC Power Supply
CN720-4	ELPCNT	PCL PCB -2	+24V ON 0V	Discharge Lamp
CN720-5	+24VM	Toner Density Sensor -2	+24V	+24 VDC Power Supply
CN720-6	TDREF	Toner Density Sensor -1	9V 4V	Toner Density Reference Sensor
CN720-7	TDSEN	Toner Density Sensor -3	5V 0V	Toner Density Sensor Signal
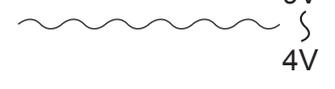
153

SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN720-8	GND	Toner Density Sensor -4	0V	Ground
CN720-12	GND	Waste Toner Sensor -1	0V	Ground
CN720-13	nWTBSEN	Waste Toner Sensor -2	+5V 0V	Toner Waste Container Detection Sensor Signal
CN720-14	nTFSEN	Waste Toner Sensor -3	+5V 0V	Toner Waste Sensor
CN720-15	LDWTB	Waste Toner Sensor -4	+1.2V	Photo Sensor DC Drive Voltage
CN720-16	LDTF	Waste Toner Sensor -5	+1.5V 0V	Photo Sensor DC Drive Voltage
CN720-17	+5v	Humidity Sensor -1	+5V	+5 VDC Power Supply
CN720-18	HUMISN	Humidity Sensor -2	5V 0V	Temp Humidity Sensor Signal
CN720-19	GND	Humidity Sensor -3	0V	Ground
CN720-20	TEMPSN	Humidity Sensor -4	5V 0V	Temp Humidity Sensor Signal
CN720-21	+24VM	Total Counter -1	+24V	+24 VDC Power Supply
CN720-22	nCTCNT	Total Counter -2	+24V 0V	Counter Drive Signal
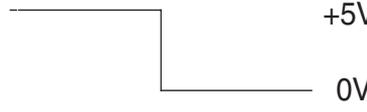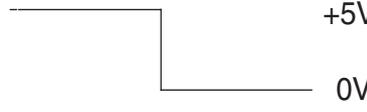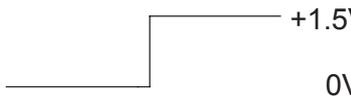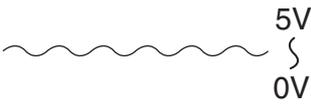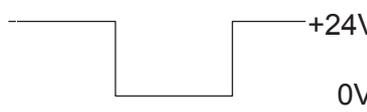
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CN721

SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN721-1	THERM1	Thermistor -1	5V ⌇ 0V	Thermistor Output Signal
CN721-2	THERM2	Thermistor -2	0V	Ground
CN721-3	nHEXSEN	Paper Exit Sensor -1	+5V 0V	Paper Exit Sensor Signal
CN721-4	GND	Paper Exit Sensor -2	0V	Ground
CN721-5	LDHEX	Paper Exit Sensor -3	+1.2V	Photo Sensor DC Drive Voltage
CN721-10	+24VFL	Exit Fan -1	+24V	+20 / +24 VDC Power Supply
CN721-11	nFNRDT	Exit Fan -2	+5V 0V	Fan Ready Signal
CN721-12	MGND	Exit Fan -3	0V	Ground
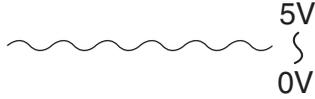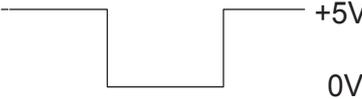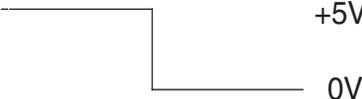
CN722

SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN722-1	+24VM	Toner Bottle Motor -1	+24V	+24 VDC Power Supply
CN722-2	BMCNT	Toner Bottle Motor -2	+24V ON 0V	Toner Bottle Motor Control Signal
CN722-3	+24VM	Toner Motor -1	+24V	+24 VDC Power Supply

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SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN722-4	SMCNT	Toner Motor -2	+24V / ON / 0V	Toner Motor Control Signal
CN722-5	BTHP	Toner Bottle Home Position Sensor -1	+5V / 0V	Toner Bottle Position Sensor Signal
CN722-6	GND	Toner Bottle Home Position Sensor -2	0V	Ground
CN722-7	LDBTHP	Toner Bottle Home Position Sensor -3	+5V / 0V	Toner Bottle HP Sensor Signal
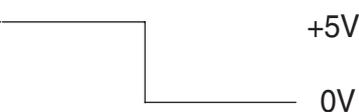
CN723

SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN723-1	+24VM	Main Motor -1	+24V	+24 VDC Power Supply
CN723-2	+24VM	Main Motor -2	+24V	+24 VDC Power Supply
CN723-3	MGND	Main Motor -3	0V	Ground
CN723-4	MGND	Main Motor -4	0V	Ground
CN723-5	GND	Main Motor -5	0V	Ground
CN723-6	+5v	Main Motor -6	+5V	+5 VDC Power Supply
CN723-7	nMMON	Main Motor -7	+6.5V / 0V	Main Motor Rotation Control Signal
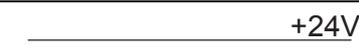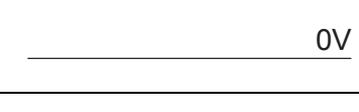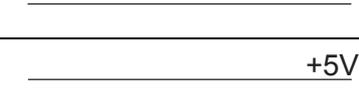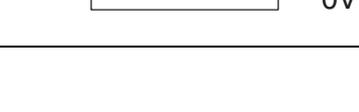
SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN723-8	nMMCK	Main Motor -8	+6.5V ⎍⎍⎍⎍ 0V	Main Motor Clock
CN723-9	F/R	Main Motor -9	0V	Direction of Rotation Signal
CN723-10	nMMRDY	Main Motor -10	+5V ⊔ 0V	Main Motor Ready Signal
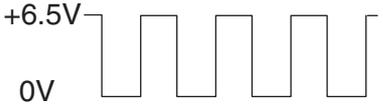
CN726

SPC PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN726-1	+24VM	Key Counter	+24V	+24 VDC Power Supply
CN726-2	KCNT	Key Counter	+24V ⊔ 0V	Key Counter Option
CN726-3	GND	Key Counter	0V	Ground
CN726-4	KCDET	Key Counter	+5V DETECT 0V	Key Counter Option Detection
CN726-5	N.C.			No Connection
CN726-6	N.C.			No Connection
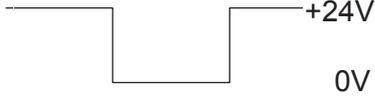
157

3.10.4. PNL1 PC Board

CN220
Refer to SC PC Board .

CN223

PNL1 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN223-1	CSB1	LCD	+3.3V ⎍ 0V	Chip Select Signal
CN223-2	RESETB	LCD	+3.3V RESET 0V	LCD Driver Reset Signal
CN223-3	RS	LCD	+3.3V 0V	Register Selection Control Signal
CN223-4	RW_WRB	LCD	+3.3V ⎍ 0V	LCD Control Signal
CN223-5	E_RDB	LCD	+3.3V ⎍ 0V	Read/Write Execution Control Signal
CN223-6	DB0	LCD	+3.3V 0V	Data Signal
CN223-7	DB1	LCD	+3.3V 0V	Data Signal
CN223-8	DB2	LCD	+3.3V 0V	Data Signal
CN223-9	DB3	LCD	+3.3V 0V	Data Signal
CN223-10	DB4	LCD	+3.3V 0V	Data Signal
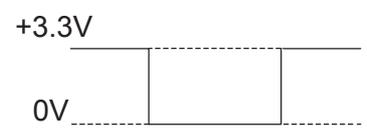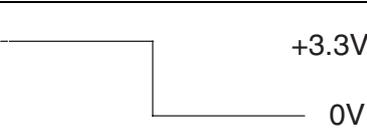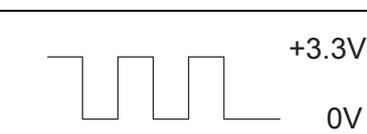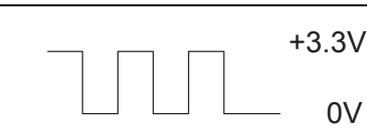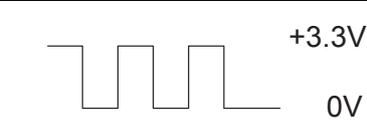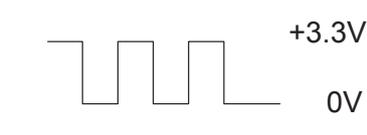
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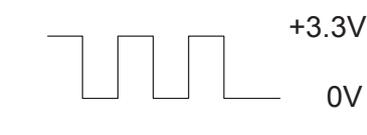
PNL1 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN223-11	DB5	LCD	+3.3V / 0V	Data Signal
CN223-12	DB6	LCD	+3.3V / 0V	Data Signal
CN223-13	DB7	LCD	+3.3V / 0V	Data Signal
CN223-14	VDD	LCD	+3.3V	+3.3 VDC Power Supply
CN223-15	VCL	LCD	+3.3V	LCD Power Supply
CN223-16	VSS	LCD	0V	Ground
CN223-17	VOUT	LCD	+12.5V	Voltage Converter Input / Output
CN223-18	C4+	LCD	+12.5V	Capacitor 4 Positive Connection Pin for Converter
CN223-19	C3+	LCD	+12.5V / +9.5V	Capacitor 3 Positive Connection Pin for Converter
CN223-20	C1-	LCD	+3.3V / 0V	Capacitor 1 Negative Connection Pin for Converter
CN223-21	C1+	LCD	+6.3V / +3.3V	Capacitor 1 Positive Connection Pin for Converter
CN223-22	C2+	LCD	+9.5V / +6.3V	Capacitor 2 Positive Connection Pin for Converter
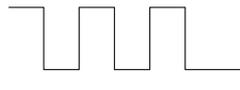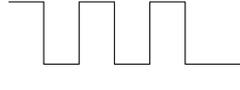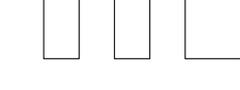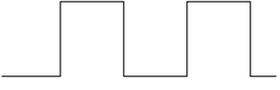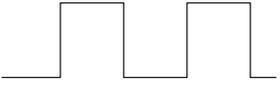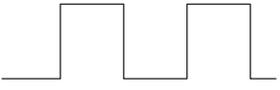
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PNL1 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN223-23	C2-	LCD	+3.3V / 0V	Capacitor 2 Negative Connection Pin for Converter
CN223-24	V1	LCD	+6.7V	LCD Driver Supply Voltages
CN223-25	V2	LCD	+5.3V	LCD Driver Supply Voltages
CN223-26	V3	LCD	+2.6V	LCD Driver Supply Voltages
CN223-27	V4	LCD	+1.4V	LCD Driver Supply Voltages
CN223-28	V0	LCD	+8V	LCD Driver Supply Voltages
CN223-29	PS	LCD	+3.3V	Parallel / Serial Data Input Select Signal
CN223-30	HPMB	LCD	+3.3V	LCD driver Power Control Signal
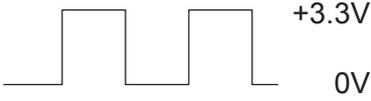
CN230

PNL1 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN230-1	LED0	PNL2 PCB CN250-1	0V	PNL LED Control Signal
CN230-2	KIN7	PNL2 PCB CN250-2	+3.3V Key Pressed 0V	PNL Key Signal (Key Line)
CN230-3	LED1	PNL2 PCB CN250-3	0V	PNL LED Control Signal

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PNL1 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN230-4	KIN6	PNL2 PCB CN250-4	Key Pressed +3.3V 0V	PNL Key Signal (Key Line)
CN230-5	LED2	PNL2 PCB CN250-5	0V	PNL LED Control Signal
CN230-6	SCN0	PNL2 PCB CN250-6	Key Scan +3.3V 0V	PNL Key Signal (Scan Line)
CN230-7	LED3	PNL2 PCB CN250-7	0V	PNL LED Control Signal
CN230-8	SCN1	PNL2 PCB CN250-8	Key Scan +3.3V 0V	PNL Key Signal (Scan Line)
CN230-9	LED4	PNL2 PCB CN250-9	0V	PNL LED Control Signal
CN230-10	KIN5	PNL2 PCB CN250-10	Key Pressed +3.3V 0V	PNL Key Signal (Key Line)
CN230-11	LED5	PNL2 PCB CN250-11	0V	PNL LED Control Signal
CN230-12	KIN4	PNL2 PCB CN250-12	Key Pressed +3.3V 0V	PNL Key Signal (Key Line)
CN230-13	LEDCT2	PNL2 PCB CN250-13	+5V LED ON 0V	PNL LED Control Signal
CN230-14	KIN3	PNL2 PCB CN250-14	Key Pressed +3.3V 0V	PNL Key Signal (Key Line)
CN230-15	LEDCT3	PNL2 PCB CN250-15	+5V LED ON 0V	PNL LED Control Signal

PNL1 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN230-16	KIN2	PNL2 PCB CN250-16	Key Pressed +3.3V / 0V	PNL Key Signal (Key Line)
CN230-17	LEDCT4	PNL2 PCB CN250-17	+5V / 0V LED ON	PNL LED Control Signal
CN230-18	BAT+	PNL2 PCB CN250-18	+3V	Lithium Battery
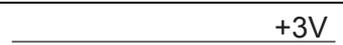
CN231

PNL1 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN231-1	+SLP	PNL2 PCB CN251-1	+5VP	Energy Saver Lamp LED Power Supply
CN231-2	nLEDSLP	PNL2 PCB CN251-2	+5VP / 0V	Energy Saver Lamp LED Control Signal
CN231-3	nSLPKY	PNL2 PCB CN251-3	+3.3V PUSH 0V	Energy Saver Key Signal
CN231-4	GND	PNL2 PCB CN251-4	0V	Ground
CN231-5	LEDCT0	PNL2 PCB CN251-5	+5V / 0V LED ON	PNL LED Control Signal
CN231-6	BZ+	PNL2 PCB CN251-6	+12V (+24V)	Buzzer Signal (+) +24V: Loud
CN231-7	LEDCT1	PNL2 PCB CN251-7	+5V / 0V LED ON	PNL LED Control Signal
CN231-8	BZ-	PNL2 PCB CN251-8	+12V (+24V) / 0V	Buzzer Signal +24V: Loud
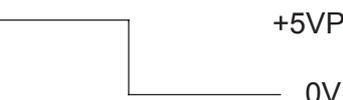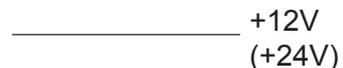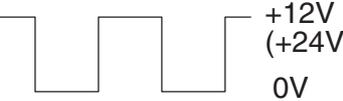
PNL1 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN231-9	LED6	PNL2 PCB CN251-9	0V	PNL LED Control Signal
CN231-10	SCN2	PNL2 PCB CN251-10	Key Scan +3.3V 0V	PNL Key Signal (Scan Line)
CN231-11	KIN0	PNL2 PCB CN251-11	Key Pressed +3.3V 0V	PNL Key Signal (Key Line)
CN231-12	KIN1	PNL2 PCB CN251-12	Key Pressed +3.3V 0V	PNL Key Signal (Key Line)
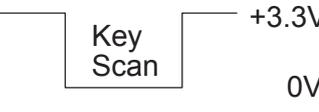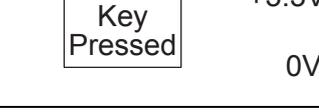
CN232

PNL1 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN232-1	SCN4	PNL3 PCB CN252-1	Key Scan +3.3V 0V	PNL Key Signal (Scan Line)
CN232-2	SCN5	PNL3 PCB CN252-2	Key Scan +3.3V 0V	PNL Key Signal (Scan Line)
CN232-3	SCN3	PNL3 PCB CN252-3	Key Scan +3.3V 0V	PNL Key Signal (Scan Line)
CN232-4	SCN6	PNL3 PCB CN252-4	Key Scan +3.3V 0V	PNL Key Signal (Scan Line)
CN232-5	KIN3	PNL3 PCB CN252-5	Key Pressed +3.3V 0V	PNL Key Signal (Key Line)
CN232-6	N.C.	PNL3 PCB CN252-6		No Connection
CN232-7	KIN2	PNL3 PCB CN252-7	Key Pressed +3.3V 0V	PNL Key Signal (Key Line)
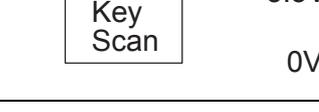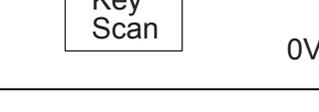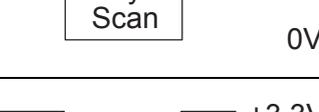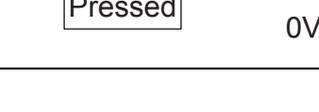
PNL1 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN232-8	KIN7	PNL3 PCB CN252-8	Key Pressed +3.3V 0V	PNL Key Signal (Key Line)
CN232-9	KIN1	PNL3 PCB CN252-9	Key Pressed +3.3V 0V	PNL Key Signal (Key Line)
CN232-10	KIN0	PNL3 PCB CN252-10	Key Pressed +3.3V 0V	PNL Key Signal (Key Line)

CN233

PNL1 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN233-1	+DAT	PNL3 PCB CN253-1	+24V 0V	DATA Lamp LED Power Supply
CN233-2	N.C.	PNL3 PCB CN253-2		No Connection
CN233-3	+ALM	PNL3 PCB CN253-3	+24V 0V	ALARM Lamp LED Power Supply
CN233-4	KIN4	PNL3 PCB CN253-4	Key Pressed +3.3V 0V	PNL Key Signal (Key Line)
CN233-5	+ACT	PNL3 PCB CN253-5	+24V 0V	ACTIVE Lamp LED Power Supply
CN233-6	KIN5	PNL3 PCB CN253-6	Key Pressed +3.3V 0V	PNL Key Signal (Key Line)
CN233-7	nLEDACT	PNL3 PCB CN253-7	+3.3V 0V	ACTIVE Lamp LED Control Signal
CN233-8	KIN6	PNL3 PCB CN253-8	Key Pressed +3.3V 0V	PNL Key Signal (Key Line)
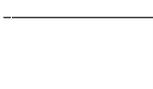
PNL1 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN233-9	nLEDALM	PNL3 PCB CN253-9	+3.3V / 0V	ALARM Lamp LED Control Signal
CN233-10	LEDCT0	PNL3 PCB CN253-10	+5V / 0V LED ON	PNL LED Control Signal
CN233-11	nLEDDAT	PNL3 PCB CN253-11	+3.3V / 0V	DATA Lamp LED Control Signal
CN233-12	LED9	PNL3 PCB CN253-12	0V	PNL LED Control Signal
CN233-13	LEDCT4	PNL3 PCB CN253-13	+5V / 0V LED ON	PNL LED Control Signal
CN233-14	LED8	PNL3 PCB CN253-14	0V	PNL LED Control Signal
CN233-15	LEDCT3	PNL3 PCB CN253-15	+5V / 0V LED ON	PNL LED Control Signal
CN233-16	LED7	PNL3 PCB CN253-16	0V	PNL LED Control Signal
CN233-17	LEDCT2	PNL3 PCB CN253-17	+5V / 0V LED ON	PNL LED Control Signal
CN233-18	LEDCT1	PNL3 PCB CN253-18	+5V / 0V LED ON	PNL LED Control Signal
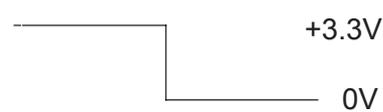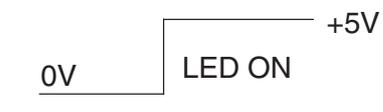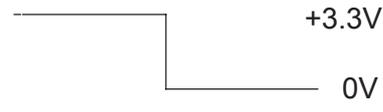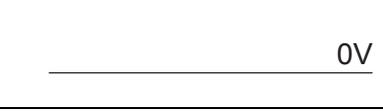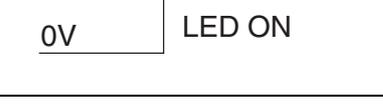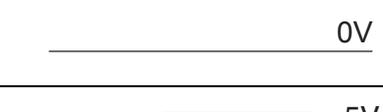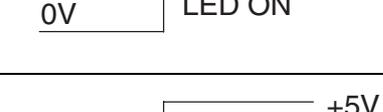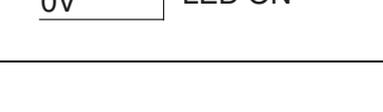
CN234

PNL1 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN234-1	KIN4	PNL4 PCB CN280-1	+3.3V / Key Pressed / 0V	PNL Key Signal (Key Line)
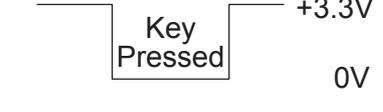
PNL1 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN234-2	KIN5	PNL4 PCB CN280-2	Key Pressed +3.3V 0V	PNL Key Signal (Key Line)
CN234-3	KIN3	PNL4 PCB CN280-3	Key Pressed +3.3V 0V	PNL Key Signal (Key Line)
CN234-4	KIN6	PNL4 PCB CN280-4	Key Pressed +3.3V 0V	PNL Key Signal (Key Line)
CN234-5	KIN2	PNL4 PCB CN280-5	Key Pressed +3.3V 0V	PNL Key Signal (Key Line)
CN234-6	KIN7	PNL4 PCB CN280-6	Key Pressed +3.3V 0V	PNL Key Signal (Key Line)
CN234-7	KIN1	PNL4 PCB CN280-7	Key Pressed +3.3V 0V	PNL Key Signal (Key Line)
CN234-8	SCN11	PNL4 PCB CN280-8	Key Scan +3.3V 0V	PNL Key Signal (Scan Line)
CN234-9	KIN0	PNL4 PCB CN280-9	Key Pressed +3.3V 0V	PNL Key Signal (Key Line)
CN234-10	SCN10	PNL4 PCB CN280-10	Key Scan +3.3V 0V	PNL Key Signal (Scan Line)
CN234-11	SCN8	PNL4 PCB CN280-11	Key Scan +3.3V 0V	PNL Key Signal (Scan Line)
CN234-12	SCN9	PNL4 PCB CN280-12	Key Scan +3.3V 0V	PNL Key Signal (Scan Line)
CN234-13	nOPT	PNL4 PCB CN280-13	+3.3V 0V	PNL4 Detection 0V: Detection
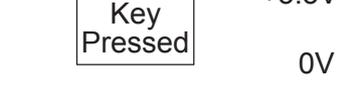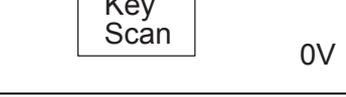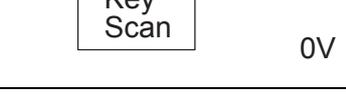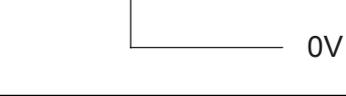
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PNL1 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN234-14	GND	PNL4 PCB CN280-14	0V	Ground

3.10.5. PS PC Board

CN10
  Refer to SPC PC Board .

CN11
  Refer to SC PC Board .

CN12
  Refer to SPC PC Board .

CN500
  Refer to SPC PC Board .

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3.10.6. ADF PC Board

CN21
Refer to SPC PC Board .

CN22

ADF PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN22-1	OUTA	ADF Motor -1	+24V ⊓_⊓_⊓_ 0V	Motor Control Signal
CN22-2	+24V	ADF Motor -2	——— +24V	+24 VDC Power Supply
CN22-3	IOUTA	ADF Motor -3	+24V ⊓_⊓_⊓_ 0V	Motor Control Signal
CN22-4	OUTB	ADF Motor -4	+24V ⊓_⊓_⊓_ 0V	Motor Control Signal
CN22-5	+24V	ADF Motor -5	——— +24V	+24 VDC Power Supply
CN22-6	IOUTB	ADF Motor -6	+24V ⊓_⊓_⊓_ 0V	Motor Control Signal
CN22-7	+24VOPF	ADF Roller Clutch -1	——— +24V	+24 VDC Power Supply
CN22-8	nCCLH2	ADF Roller Clutch -4	+24V ⎺⎺� ON 0V	ADF Roller Clutch Control Signal
CN22-9	+24VOPF	Feed 2 Roller Clutch -1	——— +24V	+24 VDC Power Supply
CN22-10	nCCLH1	Feed 2 Roller Clutch -4	+24V ⎺⎺ ON 0V	Feed 2 Roller Clutch Control Signal
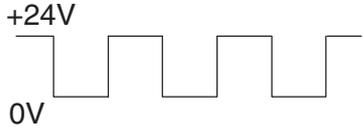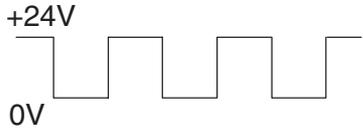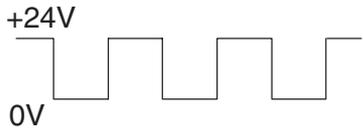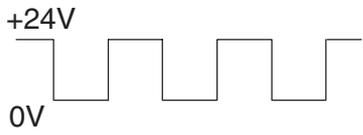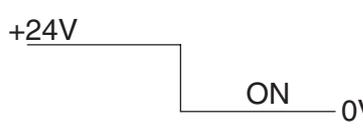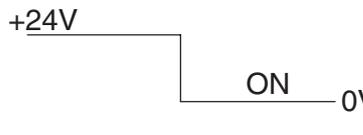
CN24

ADF PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN24-1	+24VOPF	Inverting Roller Clutch -1	+24V	+24 VDC Power Supply
CN24-2	nCCLH3	Inverting Roller Clutch -4	+24V ON 0V	Inverting Roller Clutch Control Signal
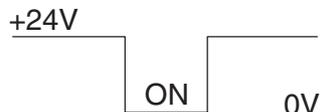
CN25

ADF PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN25-1	+24VOPF	Stamp Solenoid	+24V	+24 VDC Power Supply
CN25-2	nASTAMP	Stamp Solenoid	+24V ON 0V	Stamp Control Signal

CN26

ADF PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN26-1	+24VOPC	Release Lever Plate Solenoid -1	+24V	+24 VDC Power Supply
CN26-2	nAPACHG	Release Lever Plate Solenoid -2	+24V ON 0V	Release Lever Plate Solenoid Control Signal
CN26-3	nAKEEP1	Reversing Guide 1 Solenoid -1	+24V ON 0V	Reversing 1 Guide Solenoid Control Signal
CN26-4	+24VOPC	Reversing Guide 1 Solenoid -2	+24V	+24 VDC Power Supply
CN26-5	nAKEEP2	Reversing Guide 1 Solenoid -3	+24V ON 0V	Reversing 1 Guide Solenoid Control Signal
CN26-6	+24VOPF	Duplex 2 Guide Solenoid -1	+24V	+24 VDC Power Supply
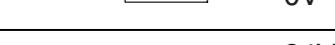
170

ADF PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN26-7	nAPICR	Duplex 2 Guide Solenoid -2	+24V ⎍ ON 0V	Release Lever Plate Solenoid Control Signal

CN27

ADF PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN27-1	nAAPNT	Original Detection Sensor -1	+5V ⎍ ON 0V	Original Detection Signal
CN27-2	GND	Original Detection Sensor -2	0V	Ground
CN27-3	+5v	Original Detection Sensor -3	+5V	+5 VDC Power Supply

CN28

ADF PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN28-1	nAADL1	Original Lengh Sensor 1 -1	+5V ⎍ ON 0V	Original Length Detection Signal
CN28-2	GND	Original Lengh Sensor 1 -2	0V	Ground
CN28-3	+5v	Original Lengh Sensor 1 -3	+5V	+5 VDC Power Supply
CN28-4	nAADL2	Original Lengh Sensor 2 -1	+5V ⎍ ON 0V	Original Length Detection Signal
CN28-5	GND	Original Lengh Sensor 2 -2	0V	Ground
CN28-6	+5v	Original Lengh Sensor 2 -3	+5V	+5 VDC Power Supply

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ADF PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN28-7	nAB4S	SNS PCB CN41-4	+5V(H) ‾‾⎍‾‾ 0V	Original Width Detection Signal
CN28-8	nAA3S	SNS PCB CN41-2	+5V ‾‾⎍‾‾ 0V	Original Width Detection Signal
CN28-9	GND	SNS PCB CN41-3	0V	Ground
CN28-10	+5v	SNS PCB CN41-1	+5V	+5 VDC Power Supply
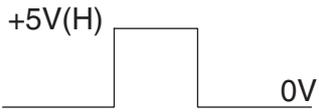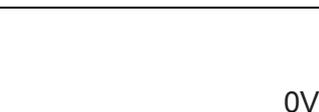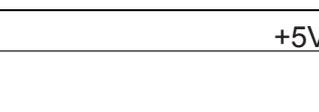
CN29

ADF PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN29-1	nAB1SN	Read Point Sensor -1	+5V ‾‾‾� ON 0V	Read Point Detection Signal
CN29-2	GND	Read Point Sensor -2	0V	Ground
CN29-3	+5v	Read Point Sensor -3	+5V	+5 VDC Power Supply
CN29-4	nAOAC	ADF Cover Open Detection Sensor -1	+5V OPEN 0V	ADF Cover Open Detection Signal
CN29-5	GND	ADF Cover Open Detection Sensor -2	0V	Ground
CN29-6	+5v	ADF Cover Open Detection Sensor -3	+5V	+5 VDC Power Supply
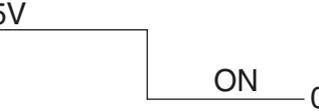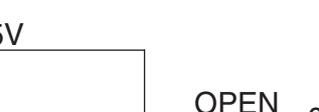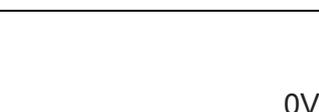
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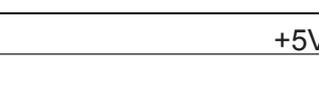
CN30

ADF PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN30-1	nAEJC	Eject Sensor -1	+5V / 0V ON	Original Eject Detection Signal
CN30-2	GND	Eject Sensor -2	0V	Ground
CN30-3	+5v	Eject Sensor -3	+5V	+5 VDC Power Supply
CN30-4	nAB2SN	Duplex Eject Sensor -1	+5V / 0V ON	Duplex Eject Detection Signal
CN30-5	GND	Duplex Eject Sensor -2	0V	Ground
CN30-6	+5v	Duplex Eject Sensor -3	+5V	+5 VDC Power Supply
CN30-7	nAREV	ADF Exit Cover Sensor -1	+5V / 0V OPEN	ADF Exit Cover Open Detection Signal
CN30-8	GND	ADF Exit Cover Sensor -2	0V	Ground
CN30-9	+5v	ADF Exit Cover Sensor -3	+5V	+5 VDC Power Supply
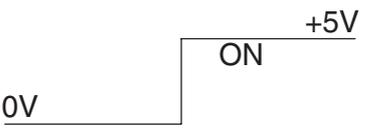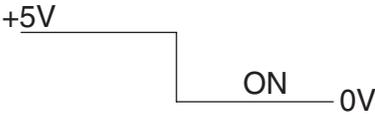
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3.10.7. CST2 PC Board

CN770
Refer to SPC PC Board .

CN771
Refer to SPC PC Board .

CN772

CST2 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN772-1	+24VM	CST3 PCB CN807-1	+24V	+24 VDC Power Supply
CN772-2	MGND	CST3 PCB CN807-2	0V	Ground
CN772-3	+5v	CST3 PCB CN807-3	+5V	+5 VDC Power Supply
CN772-4	GND	CST3 PCB CN807-4	0V	Ground
CN772-5	OP3RST	CST3 PCB CN807-5	+5V Reset 0V	Option Feed FIFO Reset
CN772-6	OP3FLT	CST3 PCB CN807-6	+5V 0V	Option Feed FIFO Latch
CN772-7	OP3FCK	CST3 PCB CN807-7	+5V Reset 0V	Option Feed FIFO Clock
CN772-8	OP3FOT	CST3 PCB CN807-8	+5V 0V	Option Feed FIFO Output
CN772-9	OP3ENB	CST3 PCB CN807-9	+5V (H) 0V (L)	Option Feed FIFO Enable
CN772-10	OP3FLD	CST3 PCB CN807-10	+5V 0V	Option Feed FIFO Load
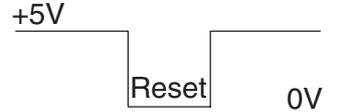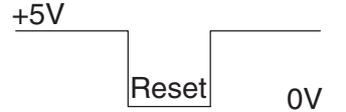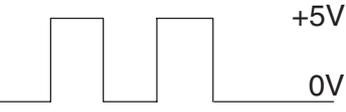
CST2 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN772-11	OP3FDIN	CST3 PCB CN807-11	+5V / 0V	Option Feed FIFO Input
CN772-14	+24VM	CST3 PCB CN807-13	+24V	+24 VDC Power Supply
CN772-13	GND	CST3 PCB CN807-14	0V	Ground
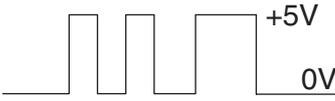
CN773

CST2 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN773-1	+24VM	Paper Feed Clutch -1	+24V	+24 VDC Power Supply
CN773-2	ADF2	Paper Feed Clutch -2	+24V ON 0V	2nd Paper Tray Feed Roller Drive Signal
CN773-3	+24VM	Intermediate Roller Clutch -1	+24V	+24 VDC Power Supply
CN773-4	MRCLH2	Intermediate Roller Clutch -2	+24V ON 0V	2nd Paper Tray Intermediate Roller Clutch Drive Signal

CN774

CST2 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN774-1	+24VM	2nd Tray Lift Motor	+24V	+24 VDC Power Supply
CN774-2	LIFTM2	2nd Tray Lift Motor	+24V ON 0V	2nd Paper Tray Lift Motor Drive Signal

CN775

CST2 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN775-1	PCHK2	No Paper Sensor -1	+5V / 0V	2nd Paper Tray Paper Detection Signal
CN775-2	GND	No Paper Sensor -2	0V	Ground
CN775-3	LDPHK2	No Paper Sensor -3	+1.2V	Photo Sensor DC Drive Voltage
CN775-4	UPLMT2	Upper Limit Sensor -1	+5V / 0V	2nd Paper Tray Paper Level Signal
CN775-5	GND	Upper Limit Sensor -2	0V	Ground
CN775-6	LDUPL2	Upper Limit Sensor -3	+1.2V	Photo Sensor DC Drive Voltage
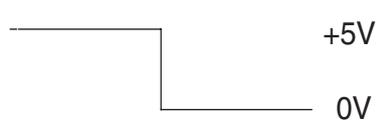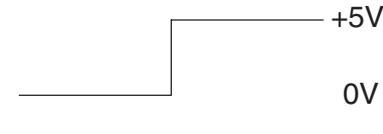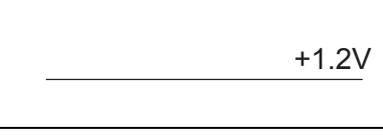
CN776

CST2 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN776-1	FDPCHK2	Registration Sensor -1	+5V / 0V	2nd Paper Tray Paper Registration Detection Signal
CN776-2	GND	Registration Sensor -2	0V	Ground
CN776-3	LDFPCHK2	Registration Sensor -3	+1.2V	Photo Sensor DC Drive Voltage
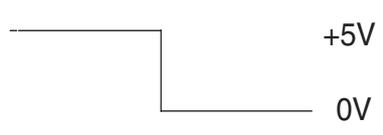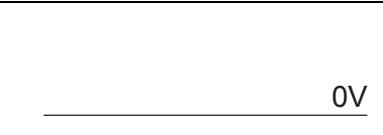
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CN777

CST2 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN777-1	nCST2	2nd Tray Detection Sensor -1	+5V ___ 0V	2nd Paper Tray Detection Signal
CN777-2	GND	2nd Tray Detection Sensor -2	0V	Ground
CN777-3	LDCST2	2nd Tray Detection Sensor -3	+1.2V	Photo Sensor DC Drive Voltage
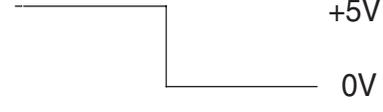
CN778

CST2 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN778-1	JAMDOR2	Jam Cover Open Sensor -1	+5V ___ OPEN 0V	2nd Paper Tray Jam Access Cover Open Detection Signal
CN778-2	GND	Jam Cover Open Sensor -2	0V	Ground
CN778-3	LDJAM2	Jam Cover Open Sensor -3	+1.2V	Photo Sensor DC Drive Voltage

3.10.8. CST3 PC Board

CN800

CST3 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN800-1	PCHK3	No Paper Sensor -1	+5V / 0V	3rd Paper Tray Paper Detection Signal
CN800-2	GND	No Paper Sensor -2	0V	Ground
CN800-3	LDPHK3	No Paper Sensor -3	+1.2V	Photo Sensor DC Drive Voltage
CN800-4	UPLIMIT3	Upper Limit Sensor -1	+5V / 0V	3rd Paper Tray Paper Level Signal
CN800-5	GND	Upper Limit Sensor -2	0V	Ground
CN800-6	LDUPL3	Upper Limit Sensor -3	+1.2V	Photo Sensor DC Drive Voltage
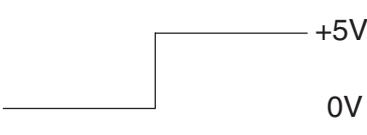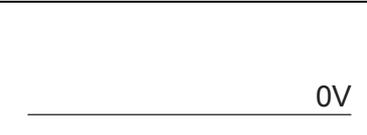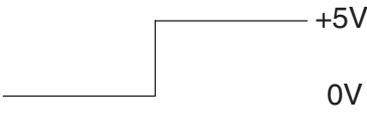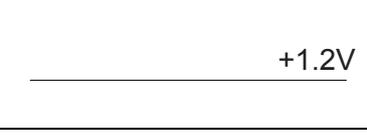
CN801

CST3 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN801-1	CST3	3rd Tray Detection Sensor -1	+5V / 0V	3rd Paper Tray Detection Signal
CN801-2	GND	3rd Tray Detection Sensor -2	0V	Ground
CN801-3	LDCST3	3rd Tray Detection Sensor -3	+1.2V	Photo Sensor DC Drive Voltage
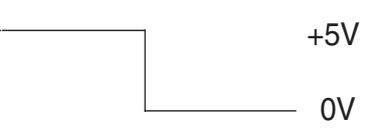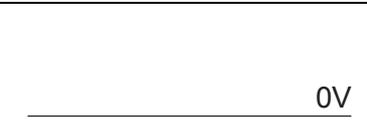
CN802

CST3 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN802-1	JAMDOR3	Jam Cover Open Sensor -1	+5V 0V	3rd Paper Tray Jam Access Cover Open Detection Signal
CN802-2	GND	Jam Cover Open Sensor -2	0V	Ground
CN802-3	LDJAM3	Jam Cover Open Sensor -3	+1.2V	Photo Sensor DC Drive Voltage
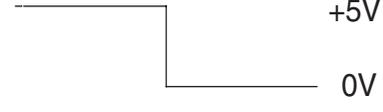
CN803

CST3 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN803-1	FDPCHK3	Registration Sensor -1	+5V 0V	3rd Paper Tray Paper Registration Detection Signal
CN803-2	GND	Registration Sensor -2	0V	Ground
CN803-3	LDFPCHK3	Registration Sensor -3	+1.5V	Photo Sensor DC Drive Voltage

CN804

CST3 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN804-1	+24VM	3rd Tray Lift Motor	+24V	+24 VDC Power Supply
CN804-2	nLIFTM3	3rd Tray Lift Motor	+24V 0V	3rd Paper Tray Lift Motor Drive Signal
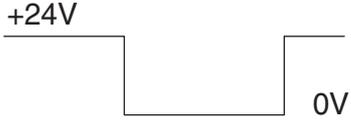
CN805

CST3 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN805-1	+24VM	3rd Tray Drive Motor -1	+24V	+24 VDC Power Supply

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CST3 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN805-2	MGND	3rd Tray Drive Motor -2	0V	Ground
CN805-3	N.C.	3rd Tray Drive Motor -3		No Connection
CN805-4	P/S	3rd Tray Drive Motor -4	+5V / 0V	Motor Start/Stop
CN805-5	LD	3rd Tray Drive Motor -5	+5V / 0V	Motor Lock Detection Signal
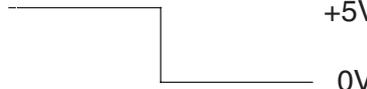
CN806

CST3 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN806-1	+24VM	Paper Feed Clutch -1	+24V	+24 VDC Power Supply
CN806-2	ADF3	Paper Feed Clutch -2	+24V / 0V	3rd Paper Tray Feed Roller Drive Signal
CN806-3	+24VM	Intermediate Roller Clutch -1	+24V	+24 VDC Power Supply
CN806-4	MRCLH3	Intermediate Roller Clutch -2	+24V / 0V	3rd Paper Tray Intermediate Roller Clutch Drive Signal
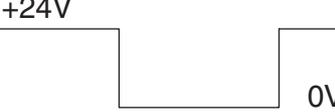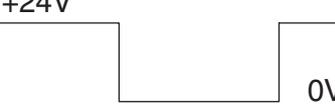
CN808

CST3 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN808-1	+24VM	CST2 PCB CN770-3	+24V	+24 VDC Power Supply
CN808-2	MGND	CST2 PCB CN770-4	0V	Ground

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CST3 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN808-3	+5v	CST2 PCB CN770-5	+5V	+5 VDC Power Supply
CN808-4	GND	CST2 PCB CN770-6	0V	Ground
CN808-5	N.C.	CST2 PCB CN770-7		No Connection
CN808-6	N.C.	CST2 PCB CN770-8		No Connection
CN808-7	N.C.	CST2 PCB CN770-9		No Connection
CN808-8	N.C.	CST2 PCB CN770-10		No Connection
CN808-9	N.C.	CST2 PCB CN770-11		No Connection
CN808-10	N.C.	CST2 PCB CN770-12		No Connection
CN808-12	N.C.	CST2 PCB CN770-14		No Connection
CN808-13	ADF4	CST2 PCB CN771-1	+24V ON 0V	4th Paper Tray Feed Roller Drive Signal
CN808-14	MRCLH4	CST2 PCB CN771-2	+24V ON 0V	4th Paper Tray Intermediate Roller Clutch Drive Signal
CN808-15	LIFT4	CST2 PCB CN771-3	+5V 0V	4th Paper Tray Lift Motor Signal

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CST3 PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN808-16	PCHK4	CST2 PCB CN771-4	+5V / 0V	4th Paper Tray Paper Detection Signal
CN808-17	CST4	CST2 PCB CN771-5	+5V / 0V	4th Paper Tray Detection Signal
CN808-18	UPLIMIT4	CST2 PCB CN771-6	+5V / 0V	4th Paper Tray Paper Level Signal
CN808-19	FDPCHK4	CST2 PCB CN771-7	+5V / 0V	4th Paper Tray Paper Registration Detection Signal
CN808-20	JAMDOR4	CST2 PCB CN771-8	+5V / 0V	4th Paper Tray Jam Access Cover Open Detection Signal
CN808-21	CSTOP4	CST2 PCB CN771-9	0V	4th Paper Feed Module Detection Signal
CN808-23	+24VM	CST2 PCB CN771-11	+24V	+24 VDC Power Supply
CN808-24	MGND	CST2 PCB CN771-12	0V	Ground
CN808-25	N.C.	CST2 PCB CN770-15		No Connection
CN808-26	N.C.	CST2 PCB CN770-16		No Connection
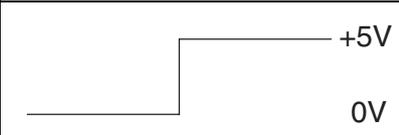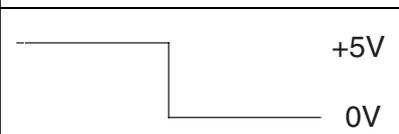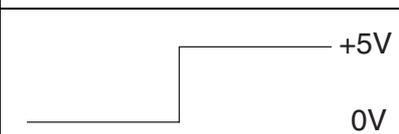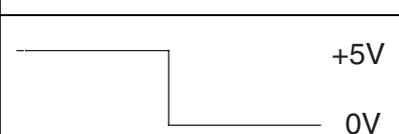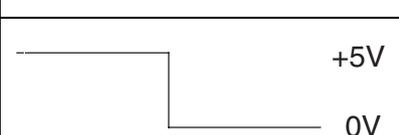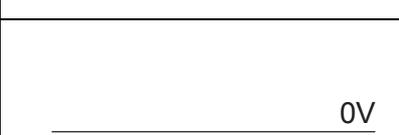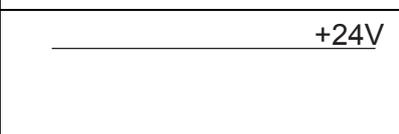
182

3.10.9. FXB PC Board

CN391

FXB PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN391-1	+5VP	MJR PC Board CN25-1	+5V	+5 VDC Power Supply
CN391-2	GND	MJR PC Board CN25-2	0V	Ground
CN391-3	+24V	MJR PC Board CN25-3	+24V	+24 VDC Power Supply
CN391-4	pCMLD	MJR PC Board CN25-4	+5V(H) ON / OFF 0V(L)	Line Switching Relay Drive Signal H : CML On L : CML Off
CN391-5	nHKOF	MJR PC Board CN25-5	+5V(H) 0V(L)	External Phone Off-Hook Detection Signal H : On Hook L : Off Hook
CN391-6	nCTON	MJR PC Board CN25-6	H: Standby Mode L: Ringing	Ring Detection Signal
CN391-7	AGND	MJR PC Board CN25-7	0V	Ground
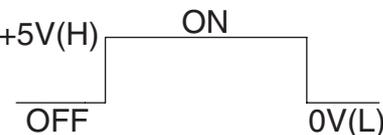
CN392

FXB PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN392-1	L2	MJR PC Board CN22-1		Line Signal
CN392-3	L1	MJR PC Board CN22-2		Line Signal

CN393

FXB PCB Pin No.	Signal Name	Destination	Signal Waveform	Function
CN393-1	pSPKOT	Speaker -1	+1V (Max) -1V (Min)	Line Dial Tone Signal
CN393-2	GND	Speaker -2	0V	Ground
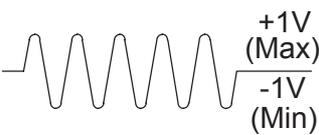
184

3.10.10. MJR PC Board

CN22
Refer to FXB PC Board .

CN25
Refer to FXB PC Board .

185

4 Troubleshooting

4.1. Initial Troubleshooting Flowchart

START

Plug the Power Cord in, and turn the Power Switche ON.

Does the unit power up normally? — No

Yes

Does the LCD display the function correctly? — No

Yes

Troubleshoot Improper LCD Display

Troubleshoot any 3-digit CODE displayed

Does the unit produce normal copies? — No

Yes

Does the original document feed through correctly? — No

Yes

Troubleshoot the Document Feeder

Does the recording paper exit the unit? — No

Yes

Check for recording paper path problems.

Troubleshoot communication problems (transmission, reception, dialing, polling, information codes, or diagnostic codes.)

Troubleshoot printed copy quality problems

186

4.2. Improper LCD Display

```
                  ( START )
                      │
                      ▼
      ┌─────────────────────────────┐
      │ Check connectors: CN52 (SC  │
      │ PCB), and CN220 (PNL1 PCB). │
      └─────────────────────────────┘
                      │
                      ▼                    Yes
      ┌─────────────────────────┐  ──────────────►  ┌──────────────────────────────┐
      │ Is LED/LCD displayed?   │                    │ Does the display appear      │
      └─────────────────────────┘                    │ normal?                      │
                      │ No                            └──────────────────────────────┘
                      ▼                                  Yes │        │ No
      ┌─────────────────────────┐  Yes                      │        │
      │ Does CN52, pin 6 on the │ ──────────────────────►   │        │
      │ SC PCB measure +5 VDC?  │                           │        ▼
      └─────────────────────────┘                           │   ┌─────────────────┐
                      │ No                                   │   │ Replace the LCD │
                      ▼                                      │   │ Module.         │
      ┌─────────────────────────┐                           │   └─────────────────┘
      │ Replace the SC PCB.     │                           │        │
      └─────────────────────────┘                           │        │
                      │                                      └────────┤
                      ▼         No     ┌──────────────┐               │
      ┌─────────────────┐  ─────────►  │ Replace the  │               │
      │ Is the trouble  │              │ Power Supply │               │
      │ resolved?       │              │ Unit.        │               │
      └─────────────────┘              └──────────────┘               │
                      │ Yes                                            ▼
                      ▼                                            ( END )
                  ( END )
```

Note:
LCD Display Brightness Adjustment
To adjust the brightness of the LCD display, press, and while holding down the "**CLEAR**" key, keep pressing the "**ORIGINAL SIZE**", or the "**COPY SIZE**" key until the desired brightness is achieved.
ORIGINAL SIZE: Dimmer
COPY SIZE   : Brighter

4.3. Printed Copy Quality Problems

4.3.1. Black Copy

Paper Travel ↑

```
                    START

        Is the Test Pattern printout in    No
        Copier F1 Mode, or Fax    ──────────→    Check the Scanner mechanism.
        Service Mode 3 normal?
                    Yes

        Is the OPC Drum/Developer    No
        Unit operational?    ──────────→    Replace the OPC Drum/Developer Unit.
                    Yes

        Is the PS normal?    No    ──────────→    1. Check all connectors, and voltages
                    Yes                              on the PS.
                                               2. Check the contacts between
                                                  PS, and Developer Unit.
                                               3. Replace the PS.

        Is the SPC PCB normal?    No    ──────────→    1. Check all connectors, and voltages
                    Yes                                    on the SPC PCB.
                                                     2. Replace the SPC PCB.

                    END
```

188

4.3.2. Blank Copy

Paper Travel ↑

START

Is the Test Pattern printout in Copier F1 Mode, or Fax Service Mode 3 normal? — No → Check the Scanner mechanism.

Yes

Is the OPC Drum/Developer Unit operational? — No → Replace the OPC Drum/Developer Unit.

Yes

Are there any foreign particles, or stains in the Charge Unit? — Yes →
1. Clean the Charge Wire with a soft, dry cloth.
2. Replace the Charge Unit.

No

Is the PS normal? — No →
1. Check all connectors, and voltages on the PS.
2. Check the Spring Connector, and voltage on the PS.
3. Replace the PS.

Yes

Are there any foreign particles, or stains blocking the Laser Beam path? — Yes →
1. Remove the particles from the laser beam path, or clean the stains.
2. Replace the LSU.

No

Is the SPC PCB normal? — No →
1. Check all connectors, and voltages on the SPC PCB.
2. Replace the SPC PCB.

Yes

END

4.3.3. Vertical White Lines

Paper Travel

START

Is the Test Pattern printout in Copier F1 Mode normal? — No → Check the Scanner mechanism.

Yes

Is the recording paper damp? — Yes → Replace the recording paper.

No

Is the Drum/Developer Unit operational? — No → Replace the Drum/Developer Unit.

Yes

Are there any foreign particles, or stains blocking the Laser Beam path? — Yes →
1. Remove the particles from the laser beam path, or clean the stains.
2. Replace the LSU.

No

Are the Fuser, and Pressure Roller surfaces clean? — No → Clean, or replace the Rollers.

Yes

END

4.3.4. Ghost Images

A

A

Paper Travel ↑

A A A

```
        ( START )
            │
            ▼
┌─────────────────────────────┐   No
│ Is the Test Pattern printout│────────────────┐
│ in Copier F1 Mode, or Fax   │                ▼
│ Service Mode 3 normal?      │      ┌──────────────────────────────┐
└─────────────────────────────┘      │ Check the Scanner mechanism. │
            │ Yes                     └──────────────────────────────┘
            ▼
┌─────────────────────────────┐   Yes
│ Is the recording paper damp?│────────────────┐
└─────────────────────────────┘                ▼
            │ No                      ┌──────────────────────────────┐
            │                         │ Replace the recording paper. │
            ▼                         └──────────────────────────────┘
┌─────────────────────────────┐   No
│ Is the OPC Drum/Developer   │────────────────┐
│ Unit operational?           │                ▼
└─────────────────────────────┘      ┌──────────────────────────────────┐
            │ Yes                     │ Replace the OPC Drum/Developer   │
            │                         │ Unit.                            │
            ▼                         └──────────────────────────────────┘
┌─────────────────────────────┐   No
│ Are the Fuser and Pressure  │────────────────┐
│ Roller surfaces clean?      │                ▼
└─────────────────────────────┘      ┌──────────────────────────────┐
            │ Yes                     │ Clean, or replace the rollers.│
            ▼                         └──────────────────────────────┘
         ( END )
```

191

4.3.5. Vertical Dark Lines

Paper Travel ↑

P P

START

```
Is the Test Pattern printout in        No
Copier F1 Mode, or Fax          ─────────────────►   Check the Scanner mechanism.
Service Mode 3 normal?
              Yes

Is the OPC Drum/Developer      No
Unit operational?               ─────────────────►   Replace the OPC Drum/Developer Unit.
              Yes

Is the LSU normal?              No
                                ─────────────────►   Replace the LSU.
              Yes

Are the Fuser, and Pressure    No
Roller surfaces clean?          ─────────────────►   Clean, or replace the rollers.
              Yes
```

END

192

4.3.6. Horizontal Dark Lines

P
Paper Travel

START

Is the Test Pattern printout in Copier F1 Mode, or Fax Service Mode 3 normal? — No → Check the Scanner mechanism.
Yes

Is the OPC Drum/Developer Unit operational? — No → Replace the OPC Drum/Developer Unit.
Yes

Is the LSU normal? — → Replace the LSU.
Yes

Is the PS normal? — No →
1. Check all connectors, and voltages on the PS.
2. Check the Spring Connector, and voltage on the PS.
3. Replace the PS.
Yes

Are the Fuser, and Pressure Roller surfaces clean? — No → Clean, or replace the rollers.
Yes

END

4.3.7. Dark Background

P

Paper Travel →

START

Is the Test Pattern printout in Copier F1 Mode, or Fax Service Mode 3 normal?

No → Check the Scanner mechanism.

Yes

Is the recording paper damp?

Yes → Replace the recording paper.

No

Is the OPC Drum/Developer Unit operational?

No → Replace the OPC Drum/Developer Unit.

Yes

Is the LSU normal?

No → Replace the LSU.

Yes

Is the PS normal?

No →
1. Check all connectors, and voltages on the PS.
2. Check the Spring Connector, and voltages on the PS.
3. Replace the PS.

Yes

Are the Fuser, and Pressure Roller surfaces clean?

No → Clean, or replace the rollers.

Yes

END

194

4.3.8. Light Print

```
                                                          P  ↑
                                                             Paper Travel
```

START

Is the Test Pattern printout in Copier F1 Mode, or Fax Service Mode 3 normal? — Yes → Check the Scanner mechanism.

No ↓

Is the recording paper damp? — Yes → Replace the paper.

No ↓

Is the OPC Drum/Developer Unit operational? — No → Replace the OPC Drum/Developer Unit.

Yes ↓

Are there any foreign particles, or stains blocking the Laser Unit path? — Yes →
1. Remove the particles from the laser beam path, or clean the stains.
2. Replace the LSU.

No ↓

Is the PS normal? — No →
1. Check all connectors, and voltages on the PS.
2. Replace the PS.

Yes ↓

Are the Fuser, and Pressure Roller surfaces clean? — No → Clean, or replace the rollers.

Yes ↓

END

4.3.9. Horizontal White Lines

P

Paper Travel ↑

START

Is the Test Pattern printout in Copier F1 Mode, or Fax Service Mode 3 normal? — No → Check the Scanner mechanism.

Yes

Is the recording paper damp? — Yes → Replace the recording paper.

No

Is the OPC Drum/Developer Unit operational? — No → Replace the OPC Drum/Developer Unit.

Yes

Are there any foreign particles, or stains in the Charge Unit? — Yes → 1. Clean the Charge Wire with a soft, dry cloth.
2. Replace the Charge Unit.

No

Is the PS normal? — No → 1. Check all connectors, and voltages on the PS.
2. Replace the PS.

Yes

Are the Fuser, and Pressure Roller surfaces clean? — No → Clean, or replace the rollers.

Yes

END

196

4.3.10. Improper Fusing (Printed image does not bond to the paper)


```
                    ┌─────────────┐
                    │    START    │
                    └──────┬──────┘
                           │
          ┌────────────────────────────┐      Yes
          │ Is the recording paper damp?│──────────────────┐
          └────────────────────────────┘                   │
                     │ No                                   ▼
                     │                    ┌─────────────────────────────┐
                     │                    │ Replace the recording paper.│
                     │◄───────────────────┴─────────────────────────────┘
                     ▼
          ┌────────────────────────────┐      No
          │ Is the Fuser Unit normal?  │──────────────────┐
          └────────────────────────────┘                   │
                     │ Yes                                  ▼
                     │                    ┌─────────────────────────────────┐
                     │                    │ Replace the Fuser Unit. (See Note)│
                     │◄───────────────────┴─────────────────────────────────┘
                     ▼
              ┌─────────────┐
              │     END     │
              └─────────────┘
```

Note:
Replace the entire Fuser Unit when the Thermostat, and/or the Thermistor fail (open-circuit).

4.3.11. Voids in Solid Areas

Paper Travel ↑

```
              START
                │
                ▼
  Is the recording paper damp? ──Yes──┐
                │                       ▼
                No            ┌─────────────────────────────┐
                │            │ Replace the recording paper. │
                │            └─────────────────────────────┘
                ▼
  Is the OPC Drum/Developer ──No──┐
  Unit operational?                ▼
                │       ┌──────────────────────────────────┐
               Yes      │ Replace the OPC Drum/Developer Unit. │
                │       └──────────────────────────────────┘
                ▼
  Are the Fuser, and Pressure ──No──┐
  Roller surfaces clean?              ▼
                │          ┌─────────────────────────────┐
               Yes         │ Clean, or replace the rollers. │
                │          └─────────────────────────────┘
                ▼
               END
```

4.3.12. Black Dots

Paper Travel ↑

```
              START
                │
                ▼
  Is the OPC Drum/Developer ──No──┐
  Unit operational?                ▼
                │       ┌──────────────────────────────────┐
               Yes      │ Replace the OPC Drum/Developer Unit. │
                │       └──────────────────────────────────┘
                ▼
  Are the Fuser, and Pressure ──No──┐
  Roller surfaces clean?              ▼
                │          ┌─────────────────────────────┐
               Yes         │ Clean, or replace the rollers. │
                │          └─────────────────────────────┘
                ▼
               END
```

198

4.3.13. Recording Paper Creases

Paper Travel

```
        START
          │
          ▼
┌──────────────────────┐   Yes   ┌──────────────────────────────┐
│ Is the recording     │────────▶│ Replace the recording paper. │
│ paper damp?          │         └──────────────────────────────┘
└──────────────────────┘
          │ No
          ▼
┌──────────────────────┐   Yes   ┌──────────────────────────────┐
│ Are there any foreign│────────▶│ Remove any obstructions and /│
│ particles, or stains │         │ or clean the paper path.     │
│ in the paper path?   │         └──────────────────────────────┘
└──────────────────────┘
          │ No
          ▼
┌──────────────────────┐   Yes   ┌──────────────────────────────┐
│ Is the recording     │────────▶│ Ensure the paper is set      │
│ paper skewing?       │         │ correctly in the Paper Tray, │
└──────────────────────┘         │ and that the Paper Guides    │
          │ No                   │ are properly adjusted.       │
          │                      └──────────────────────────────┘
          ▼
┌──────────────────────┐   Yes   ┌──────────────────────────────┐
│ Are the Fuser, and   │────────▶│ 1. Remove any foreign        │
│ Pressure Roller      │         │    particles and / or clean  │
│ surfaces soiled, or  │         │    the stains.               │
│ are there any foreign│         │ 2. Clean, or replace the     │
│ particles, or stains │         │    rollers.                  │
│ in the Fuser Unit?   │         │ 3. Replace the Fuser Unit.   │
└──────────────────────┘         └──────────────────────────────┘
          │ No
          ▼
         END
```

4.3.14. Poor Printed Copy Quality

```
                          ( START )
                              │
                              ▼
              ┌────────────────────────────┐      No
              │ Is the Test Pattern printout ├──────────────────────┐
              │ in Copier F1 Mode, or Fax    │                      ▼
              │ Service Mode 3 normal?       │      ┌──────────────────────────────┐
              └────────────────────────────┘      │ 1. Replace the SPC PCB.        │
                           Yes                     │ 2. Replace the LSU.            │
                            │                      │ 3. Replace the PS.             │
                            │                      │ 4. Replace the Developer Unit. │
                            │◄──────────────────── └──────────────────────────────┘
                            ▼
              ┌────────────────────────────┐
              │ Make a local copy.          │
              └────────────────────────────┘
                            │
                            ▼
              ┌────────────────────────────┐      No
              │ Is the printed copy correct? ├──────────────────────┐
              └────────────────────────────┘                      ▼
                           Yes                     ┌──────────────────────────────┐
                            │                      │ Check the connections of      │
                            │                      │ CN850 on the CCD PCB,         │
                            │                      │ CN 55 on the SC PCB,          │
                            │                      │ the Scanning Lamp.            │
                            │◄──────────────────── └──────────────────────────────┘
                            ▼
              ┌────────────────────────────┐
              │ Perform a receiving test    │
              │ with the reference fax unit. │
              └────────────────────────────┘
                            │
                            ▼
              ┌────────────────────────────┐      No
              │ Is the received copy correct?├──────────────────────┐
              └────────────────────────────┘                      ▼
                           Yes                     ┌──────────────────────────────┐
                            │                      │ 1. Check CN390 on the FXB PCB. │
                            │                      │ 2. Check CN22/25 on MJR PCB.   │
                            │                      │ 3. Check the Telephone Line Cord.│
                            │                      │ 4. Replace the FXB PCB.        │
                            │◄──────────────────── └──────────────────────────────┘
                            ▼
              ┌────────────────────────────┐      No
              │ Is a poor copy printed only  ├──────────────────────┐
              │ when receiving from a        │                      ▼
              │ specific transmitter?        │      ┌──────────────────────────────┐
              └────────────────────────────┘      │ Telephone line quality is poor. │
                           Yes                     └──────────────────────────────┘
                            │
                            ▼
              ┌────────────────────────────┐
              │ The transmitting machine     │
              │ may be defective.            │
              └────────────────────────────┘
                            │
                            ▼
                         ( END )
```

4.3.15. Document Skewing

START

Is the Test Pattern printout in Copier F1 Mode normal? — No → Check the Scanner or ADF/iADF mechanism.

Yes

Is the LSU normal? — No → Check or replace LSU.

Yes

END

Copy Mode Sample

201

4.3.15.1. LSU Skew Adjustment

(1) Open the Front Cover, and the Left Cover.
(2) Slide the Process Unit out. (Refer to 2.2.5.)

Caution:
Exercise caution not to scratch the surface of the **OPC Drum** (Green), and not to touch it with bare hands.

(3) Remove the Front Cover 1. (Refer to 2.2.11.)
(4) Loosen 3 Screws.
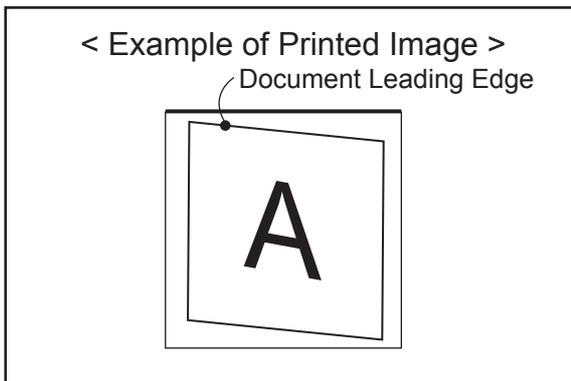
Adjust the Lever Plate downwards, and recheck the Document Skewing. Readjust as needed.

One scale adjusts the skewed image by approximately 0.15 mm.
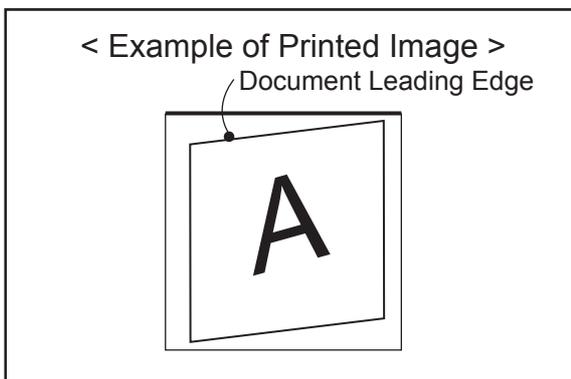
Adjust the Lever Plate upwards, and recheck the Document Skewing. Readjust as needed.

202

4.3.16. Abnormal Printing

```
                    ┌─────────────┐
                    │    START    │
                    └─────────────┘
                           │
                           ▼
        ┌──────────────────────────────┐  No
        │ Is the recording paper loaded ├──────────────┐
        │ in the Paper Tray properly?   │              │
        └──────────────────────────────┘              ▼
                    │ Yes              ┌────────────────────────────────┐
                    │                  │ 1. Adjust the Paper Width Guide.│
                    │                  │ 2. Adjust the Paper Length Guide.│
                    │                  └────────────────────────────────┘
                    ◄──────────────────────────┘
                    ▼
        ┌──────────────────────────────┐  No
        │ Is the recording paper size, and├────────────┐
        │ thickness within specification?│             │
        └──────────────────────────────┘              ▼
                    │ Yes              ┌────────────────────────────────┐
                    │                  │   Replace with correct paper.  │
                    │                  └────────────────────────────────┘
                    ◄──────────────────────────┘
                    ▼
        ┌──────────────────────────────┐  No
        │ Is Panasonic Toner being used?├──────────────┐
        └──────────────────────────────┘              ▼
                    │ Yes              ┌────────────────────────────────┐
                    │                  │ Replace with the Panasonic Toner.│
                    │                  └────────────────────────────────┘
                    ◄──────────────────────────┘
                    ▼
        ┌──────────────────────────────┐  No
        │ Are all switches, and sensors ├──────────────┐
        │ operating properly?           │              │
        └──────────────────────────────┘              ▼
                    │ Yes              ┌────────────────────────────────┐
                    │                  │    Adjust, clean, or replace.  │
                    │                  └────────────────────────────────┘
                    ◄──────────────────────────┘
                    ▼
        ┌──────────────────────────────┐  Yes
        │ Are there any foreign particles,├────────────┐
        │ or paper pieces in the receiver│             │
        │ unit?                         │              ▼
        └──────────────────────────────┘   ┌────────────────────────────────┐
                    │ No               │ Remove the foreign particles, or paper pieces│
                    │                  │ from the receiver unit.        │
                    │                  └────────────────────────────────┘
                    ◄──────────────────────────┘
                    ▼
        ┌──────────────────────────────┐  No
        │ Do the rollers rotate properly?├─────────────┐
        └──────────────────────────────┘              ▼
                    │ Yes              ┌────────────────────────────────┐
                    │                  │ 1. Check all rollers, gears, drive clutches, and│
                    │                  │    springs.                    │
                    │                  │ 2. Adjust, or replace any defective parts.│
                    │                  └────────────────────────────────┘
                    ◄──────────────────────────┘
                    ▼
        ┌──────────────────────────────┐  No
        │ Is the receiving mechanism    ├──────────────┐
        │ operating correctly?          │              │
        └──────────────────────────────┘              ▼
                    │ Yes              ┌────────────────────────────────┐
                    │                  │ Adjust, or replace any defective parts.│
                    │                  └────────────────────────────────┘
                    ◄──────────────────────────┘
                    ▼
                    ┌─────────────┐
                    │     END     │
                    └─────────────┘
```

4.3.17. Scanned Copy Quality Problems

```
                        ┌─────────┐
                        │  START  │
                        └─────────┘
                             │
                             ▼
        ┌──────────────────────┐  Yes
        │ Is the Scanning Lamp │ ────────────┐
        │ abnormal?            │             │
        └──────────────────────┘             │
                    │ No                      ▼
                    │           ┌─────────────────────────────┐
                    │           │ Replace the Scanning Lamp.  │
                    │           └─────────────────────────────┘
                    │◄──────────────────────────┘
                    ▼
        ┌──────────────────────────┐  Yes
        │ Are there any foreign    │ ────────────┐
        │ particles, or paper      │             │
        │ pieces in the scanning   │             │
        │ area?                    │             ▼
        └──────────────────────────┘   ┌──────────────────────────────────┐
                    │ No               │ Remove the foreign particles, or │
                    │                  │ paper pieces from the scanning   │
                    │                  │ area.                            │
                    │                  └──────────────────────────────────┘
                    │◄──────────────────────────┘
                    ▼
        ┌──────────────────────────┐  Yes
        │ Is the scanning area     │ ────────────┐
        │ dirty?                   │             │
        └──────────────────────────┘             ▼
                    │ No               ┌──────────────────────────────────┐
                    │                  │ 1. Clean the Scanning Glass.     │
                    │                  │ 2. Clean Mirrors 1, and 2.       │
                    │                  └──────────────────────────────────┘
                    │◄──────────────────────────┘
                    ▼
        ┌──────────────────────────┐  Yes
        │ Are the Transmitting     │ ────────────┐
        │ Rollers dirty?           │             │
        └──────────────────────────┘             ▼
                    │ No               ┌──────────────────────────────────┐
                    │                  │ Clean the rollers.               │
                    │                  └──────────────────────────────────┘
                    │◄──────────────────────────┘
                    ▼
        ┌──────────────────────────┐  Yes
        │ Is the Scanner Block     │ ────────────┐
        │ abnormal?                │             │
        └──────────────────────────┘             ▼
                    │ No               ┌──────────────────────────────────┐
                    │                  │ 1. Check CN (SC PCB).            │
                    │                  │ 2. Check CN (CCD PCB).           │
                    │                  │ 3. Replace the CCD Assembly.     │
                    │                  │ 4. Replace the SC PCB.           │
                    │                  └──────────────────────────────────┘
                    ▼
               ┌─────────┐
               │   END   │
               └─────────┘
```

4.3.18. Print Skew Adjustment for Platen Glass Scanning

Follow the procedures below to adjust for the skewing when scanning original(s) from the Platen Glass.

Remove the **Platen (L) Glass**. (Refer to 2.2.4.)

<Adjustment 1>

When the printed image is skewed as illustrated.

< Example of Printed Image >
Document Leading Edge

A
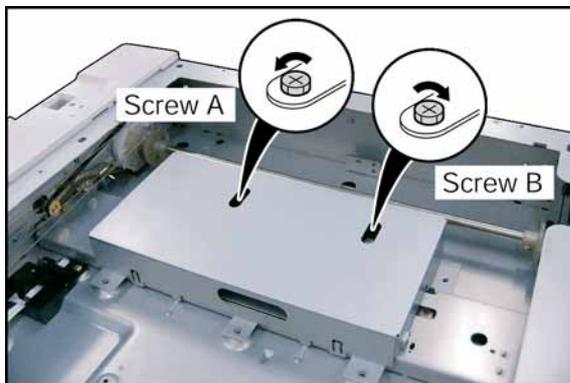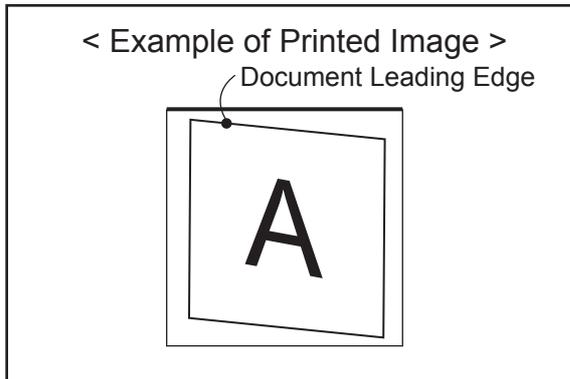
Screw A
Screw B

(1) Mark the original positions of the Screw A, and B before making any adjustments.
(2) Rotate the Screw A counter-clockwise, and Screw B clockwise by the **same amount**.
(Half rotation of the screw, adjusts the skewed image by approximately 0.9 mm.)

Caution:
Do not rotate the screw by more than half a rotation.

(3) Make a copy to confirm the correction.

When the printed image is skewed as illustrated.

< Example of Printed Image >
Document Leading Edge

A
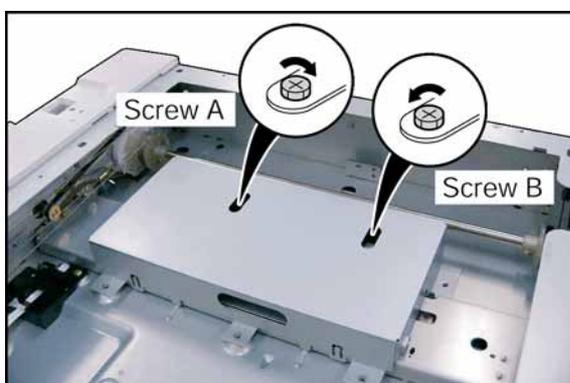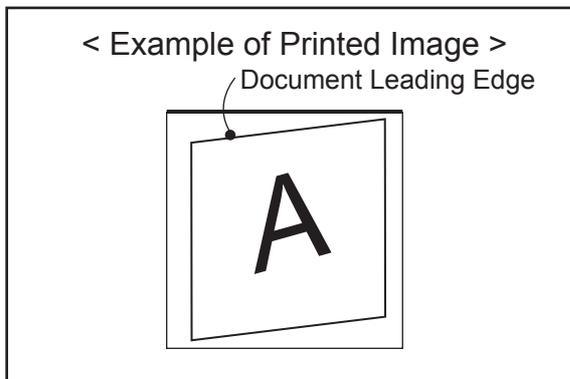
Screw A
Screw B

(4) Rotate the Screw A clockwise, and Screw B counter-clockwise by the **same amount**.
(Half rotation of the screw, adjusts the skewed image by approximately 0.9 mm.)

Caution:
Do not rotate the screw by more than half a rotation.

(5) Make a copy to confirm the correction.

<Adjustment 2: Alternate method>

   It is delicate method as a factory adjustment.
   Only when it can not be fixed by the adjustment 1.

When the printed image is skewed as illustrated.

< Example of Printed Image >
Document Leading Edge

A
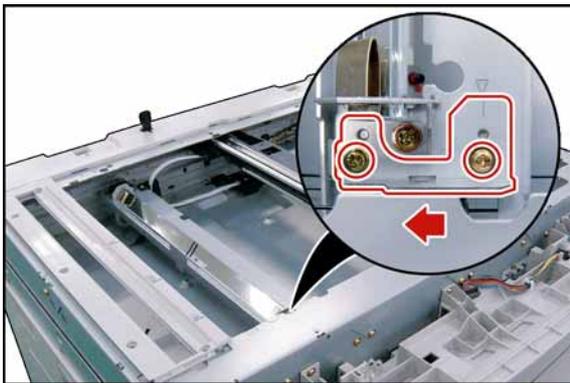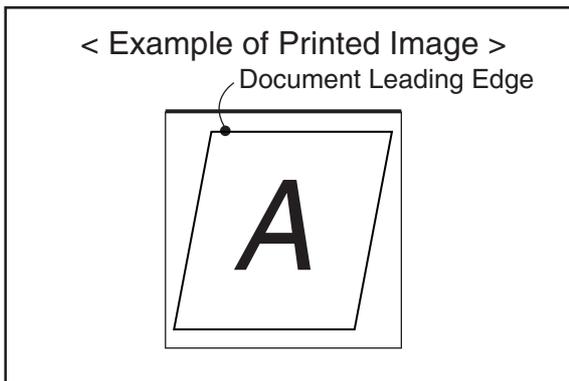
(1) Mark the original position of the Plate before making any adjustments.
(2) Loosen 2 Screws.
(3) Adjust the Plate to left, and recheck the Document Skewing. Readjust as needed.

When the printed image is skewed as illustrated.

< Example of Printed Image >
Document Leading Edge

A

(4) Loosen 2 Screws.
(5) Adjust the Plate to right, and recheck the Document Skewing. Readjust as needed.

(6) Perform the Service Mode F6-03 to adjust the Top field, if necessary.

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4.4. Document Feeder (ADF)

4.4.1. No Document Feed

```
                    ┌─────────┐
                    │  START  │
                    └─────────┘
                         │
                         ▼
        ┌──────────────────────┐   No    ┌──────────────────┐
        │ Is the Document set  ├────────▶│ Set the Document │
        │ properly?            │         │ properly.        │
        └──────────────────────┘         └──────────────────┘
                  │ Yes
                  ▼
        ┌──────────────────────┐   No    ┌──────────────────┐
        │ Is the Document      ├────────▶│ Set the Document │
        │ thickness, or size   │         │ on the Platen    │
        │ within specifications?│        │ Glass.           │
        └──────────────────────┘         └──────────────────┘
                  │ Yes
                  ▼
        ┌──────────────────────┐   No   ┌──────────────────┐  No   ┌──────────────────┐
        │ Does the LCD activate├───────▶│ Does the NP Sensor├─────▶│ Adjust, or replace│
        │ when a Doument is set?│       │ Actuator move    │       │ the Actuator.    │
        └──────────────────────┘       │ smoothly?        │       └──────────────────┘
                  │ Yes                 └──────────────────┘
                  ▼                            │ Yes
        ┌──────────────────────┐               ▼
        │ Check the Harness of │       ┌──────────────────┐  No   ┌──────────────────┐
        │ the ADF Motor.       │◀──────│ Does CN27, pin 3 on├─────▶│ Check the         │
        └──────────────────────┘       │ the ADF PCB      │       │ connections of    │
                  │                     │ measure +5 VDC?  │       │ CN21 on the ADF   │
                  │                     └──────────────────┘       │ PCB, and CN605    │
                  │                            │ Yes               │ on the SC PCB.    │
                  │                                                └──────────────────┘
                  │                                                       │
                  │                                                       ▼
                  │                                           ┌──────────────────┐  No
                  │                                           │ Is the trouble   ├────┐
                  │                                           │ resolved?        │    │
                  │                                           └──────────────────┘    │
                  │                                                  │ Yes            │
                  │                                                  ▼                │
                  │                                             ┌─────────┐           │
                  │                                             │  END    │           │
                  │                                             └─────────┘           ▼
                  ▼                                                         ┌──────────────────┐
        ┌──────────────────────┐  No   ┌──────────────────┐                │ Replace the ADF  │
        │ Does the ADF Roller  ├──────▶│ Replace the Clutch│               │ PCB, or the SC   │
        │ rotate?              │       │ or the ADF Motor. │               │ PCB.             │
        └──────────────────────┘       └──────────────────┘                └──────────────────┘
                  │ Yes                        │
                  │                            ▼
                  │                   ┌──────────────────┐  No   ┌──────────────────┐
                  │                   │ Is the trouble   ├──────▶│ Replace the ADF  │
                  │                   │ resolved?        │       │ PCB.             │
                  │                   └──────────────────┘       └──────────────────┘
                  │                          │ Yes
                  │                          ▼
                  │                     ┌─────────┐
                  │                     │  END    │
                  │                     └─────────┘
                  ▼
        ┌──────────────────────┐  No   ┌──────────────────┐
        │ Is the Feed Roller   ├──────▶│ Check, and adjust │
        │ surface dirty?       │       │ the separator     │
        └──────────────────────┘       │ pressure.        │
                  │ Yes                 └──────────────────┘
                  ▼                            │
        ┌──────────────────────┐               ▼
        │ Clean the Feed Roller│       ┌──────────────────┐  No   ┌──────────────────┐
        │ surface.             │       │ Is the trouble   ├──────▶│ Replace the Pre- │
        └──────────────────────┘◀──────│ resolved?        │       │ Feed and / or the│
                  │                     └──────────────────┘       │ ADF Roller.      │
                  │                            │ Yes               └──────────────────┘
                  ▼
             ┌─────────┐
             │  END    │
             └─────────┘
```

4.4.2. Document Jam

```
                        ( START )
                            │
                            ▼
        ┌──────────────────────────┐ Yes  ┌──────────────────────────┐
        │ Are there any obstacles in├─────▶│ Remove any obstacles     │
        │ the document path?       │      │ blocking the path.       │
        └──────────────────────────┘      └──────────────────────────┘
                         │ No
                         ▼
        ┌──────────────────────────┐ No   ┌──────────────────────────┐
        │ Does the ADF Roller      ├─────▶│ Check the ADF Motor      │
        │ rotate?                  │      │ connector.               │
        └──────────────────────────┘      └──────────────────────────┘
                    │ Yes                               │
                    │                                   ▼
                    │             ┌──────────────────────────┐ Yes
                    │             │ Is the trouble resolved? ├──────┐
                    │             └──────────────────────────┘      │
                    │                          │ No                 │
                    │                          ▼                    │
                    │             ┌──────────────────────────┐      │
                    │             │ Replace the ADF Motor, or│      │
                    │             │ the ADF PCB.             │      │
                    │             └──────────────────────────┘      │
                    ▼                                               │
        ┌──────────────────────────┐ No   ┌──────────────────────┐ │
        │ Does the document feed   ├─────▶│ Check the Gear, and  │ │
        │ normally?                │      │ the Roller.          │ │
        └──────────────────────────┘      └──────────────────────┘ │
                    │ Yes                                           │
                    ▼                                               │
        ┌──────────────────────────┐ No   ┌──────────────────────────┐
        │ Does CN27, pin 3 on the  ├─────▶│ Check the connections of │
        │ ADF PCB measure          │      │ CN21 on the ADF PCB and  │
        │ +5 VDC?                  │      │ CN605 on the SC PCB.     │
        └──────────────────────────┘      └──────────────────────────┘
                    │ Yes                               │
                    │               Yes                 ▼
                    │◀─────────────┌──────────────────────────┐
                    │              │ Is the trouble resolved? │
                    │              └──────────────────────────┘
                    │                          │ No
                    │                          ▼
                    │              ┌──────────────────────────┐
                    │              │ Replace the ADF PCB, or  │
                    │              │ SC PCB.                  │
                    │              └──────────────────────────┘
                    ▼                                               │
                ( END )◀────────────────────────────────────────────┘
```

4.4.3. Document Skew

START

Are there any obstacles in the document path? — Yes → Remove any obstacles from the document path.

No ↓

Are the Pre-Feed, and ADF Rollers operational? — No → Replace the Pre-Feed, and / or ADF Roller.

Yes ↓

Are the components of the Feeder Unit operational? — No → Replace any worn out / defective component.

Yes ↓

Does the NP Sensor Actuator move smoothly? — No → Adjust, or replace the Actuator.

Yes ↓

Front Page skew? — Yes → Adjust Feed Skew Adjustment "A". (See Sect. 4.4.3.1.)

No ↓

Back Page skew? — Yes → Adjust Feed Skew Adjustment "B". (See Sect. 4.4.3.1.)

No ↓

END

4.4.3.1. ADF Feed Skew Adjustment

Using a lined Original (about 20 lb (75 g/m^2) weight pager), make a copy from the ADF to check for feeding alignment.

(1) Copy an Original using the ADF.
(2) Open the **ADF Cover**, and release the **Stopper**.
(3) Remove the **ADF Front Cover**.
Note:
   Release the 2 Latch Hooks from back by opening the ADF.
(4) Remove 1 **Screw**, and turn the **Adjusting Bracket** counter-clockwise.

<Example of Printed Image>
Copy Image Leading Edge
Skewed to the right
Right
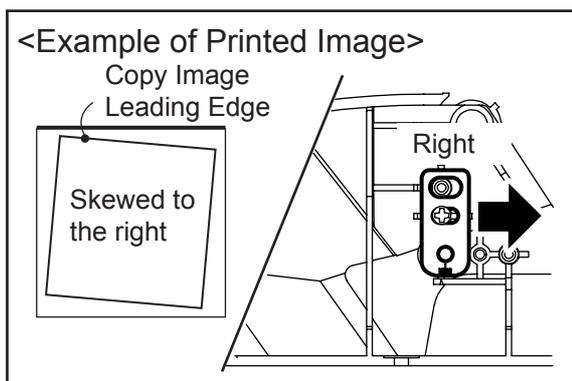
(A) If the Document is Skewed to the right, set the Adjusting Bracket to the right, and secure with 1 Screw.

<Example of Printed Image>
Copy Image Leading Edge
Skewed to the left
Left
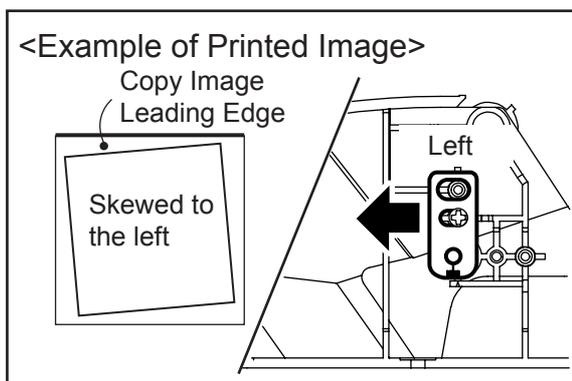
(B) If the Document is Skewed to the left, set the Adjusting Bracket to the left, and secure with 1 Screw.

4.4.3.2. i-ADF Feed Skew Adjustment

Pinch Roller (1838)
(Feed Skew Adjustment "A")
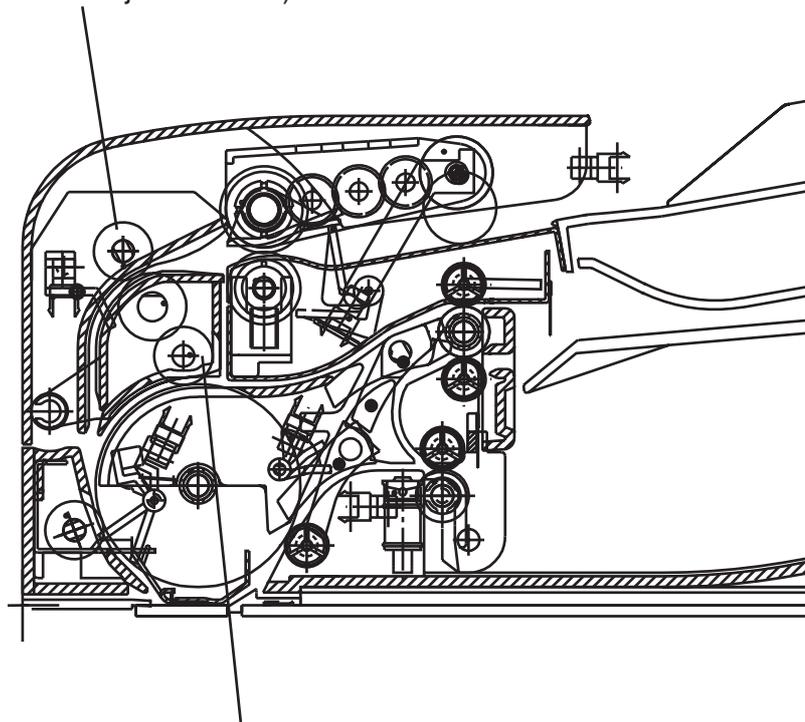
Pinch Roller (1838)
(Reverse Registration, or Feed Skew Adjustment "B")

1. Front Page Skew Adjustment

Using a lined original (about 20 lb (80 g/m^2) weight pager), make a copy from the ADF / i-ADF to check for feeding alignment.

< Example of Printed Image >
Document Leading Edge

A
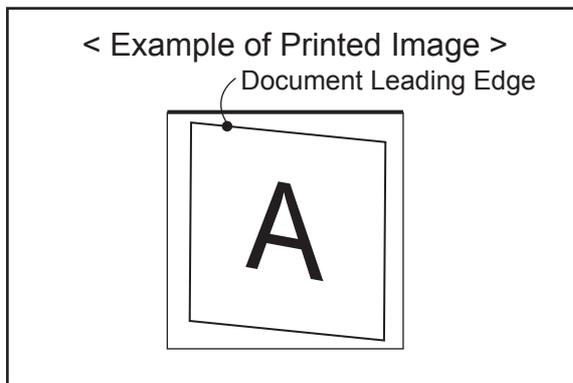
Adjust the Feed Skew Adjustment "A" downwards, and recheck the feeding alignment. Readjust as needed.

< Example of Printed Image >
Document Leading Edge

A
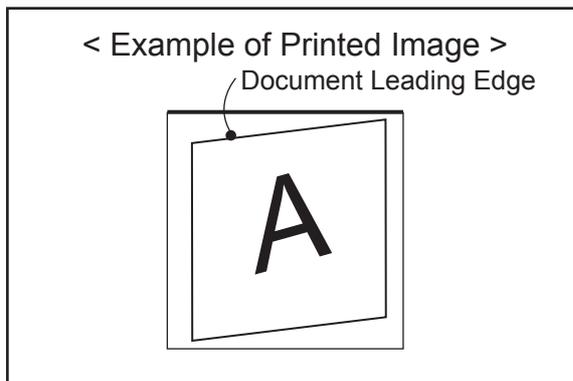
Adjust the Feed Skew Adjustment "A" upwards, and recheck the feeding alignment. Readjust as needed.

2. Back Page Skew Adjustment (i-ADF Only)

Using a lined original (about 20 lb (80 g/m^2) weight pager), make a copy from the i-ADF to check for feeding alignment.

< Example of Printed Image >
Document Leading Edge

B
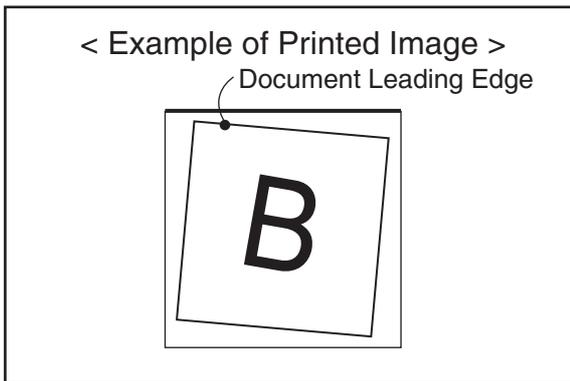
Adjust the Feed Skew Adjustment "B" downwards, and recheck the feeding alignment. Readjust as needed.

< Example of Printed Image >
Document Leading Edge

B
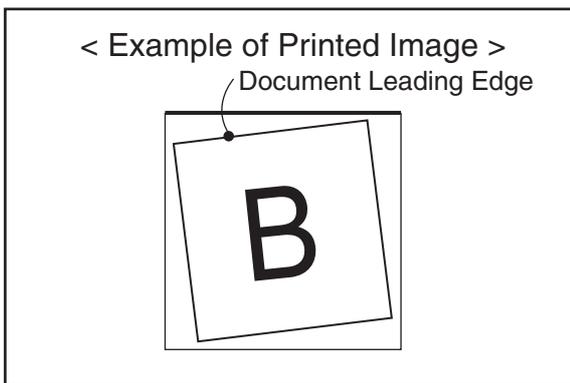
Adjust the Feed Skew Adjustment "B" upwards, and recheck the feeding alignment. Readjust as needed.

4.4.4.   i-ADF Free Stop Adjustment
Follow the procedure below to adjust the Free Stop function, if necessary.
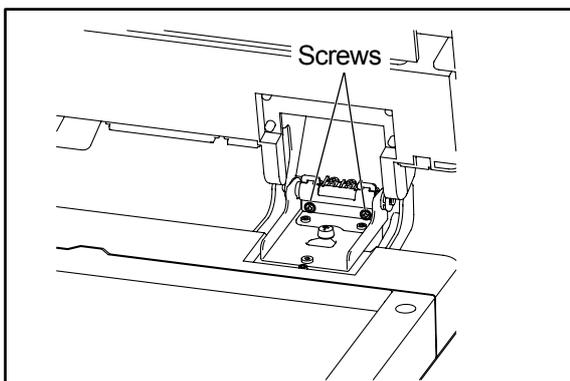
Screws

Fasten 2 Adjusting Screws on the Right Hinge.
The Adjustment should be performed by 1/4 turn while checking the Free Stop.
Make sure that the rotation values of both Adjusting Screws are the same.

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4.5. Troubleshooting the LAN Interface

4.5.1. Checking Network Configuration

```
                        ┌──────────┐
                        │  START   │
                        └────┬─────┘
                             │
    ┌────────────────────────┴──────────────────┐
    │ Print the current Internet Parameters List │
    └────────────────────────┬──────────────────┘
                             │
```

Ask the customer for the Pre-Installation Information form filled out by the Network Administrator.
Verify this information with the Internet Parameters List that you just printed.
Are the Internet Parameters entered correctly into the unit?

——No——→ Re-enter the Internet Parameters correctly.

Yes

Locate a PC connected to the same Subnet Mask as the unit

From the DOS Prompt, enter the following command-line utility: ipconfig /all

Does the displayed Network configuration, match the following settings of the unit Internet Parameters ?
Default Gateway IP Address:
DNS Server IP Address:
Subnet Mask:

——No——→ Ask the Network Administrator to verify the proper information.

Yes

From the DOS Prompt, enter the following command-line utility: "route print"

Does the current routing table for the Gateway match ?

——No——→ Ask the Network Administrator to correct the routing table on that Gateway.

Yes

Does the Default Gateway respond to the "ping IP" command ?

——No——→ Check the power switch, cables , and the current settings of unit.

Yes

Does the DNS Server respond to the "ping IP" command ?

——No——→ Ask the Network Administrator to check the Default Gateway, and system status.

Yes

Does the unit respond to the "ping host name" command ?

——No——→ Ask the Network Administrator to check the Default Gateway, and system status.

Yes

Does the unit respond to the "telnet" command ?

——No——→ Replace the SC PCB

Yes

Ask the Network Administrator to verify the POP/SMTP account, and system status.

4.5.2. Testing the TCP / IP Network

It is beyond the scope of this Service Manual to cover Networking in detail, there are many excellent manuals on this subject, but we hope the information in this section will aid with your troubleshooting efforts. In most cases, the Network Administrator will be able to provide you with needed information, or assistance.

When encountering Network problems during an onsite service call, or during the installation stage, try to isolate the steps that are not being completed so that you can quickly locate the components that don't work. It is best to organize your troubleshooting efforts by understanding what should be happening, then you can trace the path, and see where the problem is occurring.

In our case, we use TCP/IP for transportation of data from one system to another, which involves a whole series of events occurring throughout a number of different layers.
As with all networking, TCP/IP works better when its plugged in, therefore, start your troubleshooting by checking the Physical Connectivity first, the cable(s).

In our examples, we'll use several simple tools readily available in the DOS command-line utility for troubleshooting. There are many other utilities available for checking more detailed information, some are Free of charge, others are available for a nominal fee.

1. **System Diagram Model**
   Ask the customer to provide you with the Pre-Installation Information form, that was filled out by the Network Administrator.
   A description, or system diagram for the unit, including its physical address, email server, and DNS server is required.

Network Configuration
Domain Name: labo.mgcs.com

Network D

PC Client
[210.232.71.18]
js2.labo.mgcs.com

WAN

SMTP/POP   DNS
Server   Server

sv2.labo.mgcs.com
[192.168.1.2]

sv1.labo.mgcs.com
[192.168.1.1]

Network A
[192.168.3.0]

[192.168.3.254]

Router (R1)

[192.168.1.253]

Network B
[192.168.1.0]

PC Client
[192.168.1.4]
ec5.labo.mgcs.com

"ping"

Hub

PC Client
[192.168.3.4]
ec4.labo.mgcs.com

Panasonic Device
[192.168.3.5]
ef1.labo.mgcs.com

Network C
[192.168.4.0]

PC Client
[192.168.4.1]
fmrt7.labo.mgcs.com

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2. **Checking Current Configuration**

Print the current unit Internet Parameters configuration.

Locate a PC connected to the same Subnet Mask as the unit, then from the DOS Prompt, type the following command-line utility: **"ipconfig /all"** for Windows 98/Me/2000/NT/XP.

Verify that the displayed Network configuration on the PC, matches the following Internet Parameter settings of the unit:

Default Gateway IP Address:
DNS Server IP Address:
Subnet Mask: (whether it is valid)

For Windows 98 / Me / 2000 / NT / XP / Windows Server 2003
The following example shows the output after you type "ipconfig /all" at a command prompt:

```
C:\>ipconfig /all
Windows NT IP Configuration
        Host Name -------------------- : ec4.labo.pcc.com
        DNS Servers-------------------- : 192.168.1.1
        Node Type --------------------- : Hybrid
        NetBIOS Scope ID-------------- :
        IP Routing Enabled. ------------ : No
        WINS Proxy Enabled ----------- : No
        NetBIOS Resolution Uses DNS--- : No

        Ethernet adapter IBMFE1-------- :
        Description-------------------- : IBM 100/10 EtherJet PCI Adapter

        Physical Address -------------- : 00-04-AC-EE-9C-E8
        DHCP Enabled---------------- : No
        IP Address -------------------- : 192.168.3.4
        Subnet Mask ------------------ : 255.255.255.0
        Default Gateway --------------- : 192.168.3.254
        Primary WINS Server----------- : 192.168.3.18
```

From the above examples, you know the Network configuration for the specified Subnet Mask is as follows: IP Address: 192.168.3.4; Subnet Mask: 255.255.255.0; Default Gateway (Default Router IP Address): 192.168.3.254; DNS Server: 192.168.1.1, and the Domain Name: labo.pcc.com (obtained from the Host Name).

3. **Using "PING" to Test Physical Connectivity**

The Packet Internet Groper (PING) is a command-line tool included with every Microsoft TCP/IP client (any DOS, or Windows client with the TCP/IP protocol installed). PING is a simple utility that is used to send a test packet to a specified IP Address, or Hostname, then, if everything is working properly, the packet is echoed back (returned).

Sample command-line PINGing, and parameters are shown below. There are several available options that can be specified with the PING command. However, for our examples, we will use two options (-n, and -w) which are commonly used when the response from the destination location is too long.

-n count   :   The number of echo requests that the command should send. The default is four.
-w *timeout* :   Specifies the period PING will wait for the reply before deciding that the host is not responding.

PINGing the Unit

```
C:\WINDOWS>ping ef1.labo.pcc.com

Pinging ef1.labo.pcc.com [192.168.3.5] with 32 bytes of data:

Reply from 192.168.3.5: bytes=32 time=5ms TTL=253
Reply from 192.168.3.5: bytes=32 time=4ms TTL=253
Reply from 192.168.3.5: bytes=32 time=4ms TTL=253
Reply from 192.168.3.5: bytes=32 time=4ms TTL=253
```

PINGing the Default Gateway (Default Router IP Address)

```
C:\WINDOWS>ping 192.168.3.254

Pinging 192.168.3.254 with 32 bytes of data:

Reply from 192.168.3.254: bytes=32 time=5ms TTL=253
Reply from 192.168.3.254: bytes=32 time=4ms TTL=253
Reply from 192.168.3.254: bytes=32 time=4ms TTL=253
Reply from 192.168.3.254: bytes=32 time=4ms TTL=253
```

PINGing the SMTP/POP Server

```
C:\WINDOWS>ping sv2.labo.pcc.com

Pinging sv2.labo.pcc.com [192.168.1.2] with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time=5ms TTL=253
Reply from 192.168.1.2: bytes=32 time=5ms TTL=253
Reply from 192.168.1.2: bytes=32 time=5ms TTL=253
Reply from 192.168.1.2: bytes=32 time=5ms TTL=253
```

If for some reason, the physical connection is missing, the echo reply will not be received from the destination, and the following output is displayed:

```
C:\WINDOWS>ping fmrt7.labo.pcc.com

Pinging fmrt7.labo.pcc.com [192.168.4.1] with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.4.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum =  0ms, Average =  0ms
```

If the physical destination is far, and it's connected by WAN (Wide Area Network), the PING option command default value must be changed to compensate for the expected delayed response.
e.g.

-n 10   : The number of echo requests that the command should send.

-w 2000   : Specifies the period PING will wait for the reply before deciding that the host is not responding.

```
C:\WINDOWS>ping js2.labo.pcc.com -n 10 -w 2000

Pinging js2.labo.pcc.com [210.232.71.18] with 32 bytes of data:

Reply from 210.232.71.18: bytes=32 time=633ms TTL=252
Reply from 210.232.71.18: bytes=32 time=645ms TTL=252
Reply from 210.232.71.18: bytes=32 time=810ms TTL=252
Reply from 210.232.71.18: bytes=32 time=455ms TTL=252
Reply from 210.232.71.18: bytes=32 time=645ms TTL=252
Reply from 210.232.71.18: bytes=32 time=633ms TTL=252
Reply from 210.232.71.18: bytes=32 time=677ms TTL=252
Reply from 210.232.71.18: bytes=32 time=703ms TTL=252
Reply from 210.232.71.18: bytes=32 time=633ms TTL=252
Reply from 210.232.71.18: bytes=32 time=633ms TTL=252
```

4. **Tracing a Packet Route**

Another useful command-line utility is TRACERT, which is used to verify the route a packet takes to reach its destination. The result shows each router crossed, and how long it took to get through each particular router to reach the specified destination.

The time it takes to get through a particular router is calculated three times, and displayed for each router hop along with the IP Address of each router crossed.   If a FQDN (Fully Qualified Domain Name) is available, it will be displayed as well.

This utility is useful for two diagnostic purposes:

a. To detect whether a particular router is malfunctioning along a known path.   For example, if you know that packets on a network always go through London to get from New York to Berlin, but the communication is failing.   A TRACERT to the Berlin address shows all the hops up to the point where the router in London should respond.   If it does not respond, the time values are shown with an asterisk (*), indicating the packet timed out.

b. To determine whether a router is slow, and needs to be upgraded, or additional routers should be installed on the network. You can determine this by simply comparing the time it takes for a packet to get through a particular router.   If its return time is significantly higher than the other routers, it should be upgraded.

To use this utility, from the DOS command-line, type: tracert <IP Address, or Hostname>

Tracing the Route to SMTP/POP Server

```
C:\WINDOWS>tracert sv2.labo.pcc.com
Tracing route to sv2.labo.pcc.com [192.168.1.2]
over a maximum of 30 hops:

  1    4 ms    2 ms    2 ms  192.168.3.254
  2    4 ms    5 ms    5 ms  sv2.labo.pcc.com [192.168.1.2]

Trace complete.
```

5. **Managing Network Route Tables**

In the simplest case a router connects two network segments. In this model, the system used to join the two segments needs to know only about these segments.

The routing table for router R1 in this case is simple; the following table shows its key routes:

Network Address	Netmask	Gateway	Interface
192.168.3.0	255.255.255.0	192.168.3.254	192.168.3.254
192.168.1.0	255.255.255.0	192.168.1.253	192.168.1.253

When the Unit at 192.168.3.5 attempts to communicate with the Unit at 192.168.1.x, IP performs the ANDing process to find two things: The local network ID is 192.168.3.0, and the destination network ID is not. This means, that the destination host is not on the local network.

IP, is responsible to find a route to the remote network, and therefore, it consults the routing table. Here, the local host normally determines that the next step in the route is the Default Gateway, and sends the packet to router R1.

The router R1, receives the packet. After determining that the packet is for another host, and not the router itself, it checks the routing table. It finds the route to 192.168.1.0, and sends the packet through the interface to the Unit at 192.168.1.x, which receives the packet. This is a simple route that took only a single hop.

When another network is added as the number of hosts grows, it gets complicated, and the systems on the most distant networks cannot communicate. When the router receives a packet in this case, it cannot find a route to the remote network. It then discards the packet, and a message indicating "destination host unreachable" is sent to the originator.

Here, is where the ROUTE command-line utility is useful when dealing with more than two networks, and is used by Administrators to statically manage a route table by adding, deleting, changing, and clearing the route table. It has a number of options that are used to manipulate the routing tables, some are shown below:

• MASK
  If this switch is present, the next parameter is interpreted as the netmask parameter.
• Netmask
  If included, specifies a sub-net mask value to be associated with this route entry. If not specified, it defaults to 255.255.255.255.
• Gateway
  Specifies the gateway.
• METRIC
  Specifies the metric / cost for the destination.

All symbolic names used for the destination are looked up in the network database file NETWORKS. The symbolic names for the gateway are looked up the host name database file HOSTS.

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When the packet does not reach the specified destination even when the physical connection is properly made, check the registered persistent routes on the same subnet as the Unit by typing "route print" in the DOS command-line. The output display is shown below:

```
C:\WINDOWS>route print
Active Routes:

 Network Address      Netmask              Gateway Address      Interface         Metric
 0.0.0.0              0.0.0.0              192.168.3.254        192.168.3.2        1
 127.0.0.0            255.0.0.0            127.0.0.1            127.0.0.1          1
 192.168.3.0          255.255.255.0        192.168.3.2          192.168.3.2        1
 192.168.3.2          255.255.255.255      127.0.0.1            127.0.0.1          1
 192.168.3.255        255.255.255.255      192.168.3.2          192.168.3.2        1
 224.0.0.0            224.0.0.0            192.168.3.2          192.168.3.2        1
 255.255.255.255      255.255.255.255      192.168.3.2          192.168.3.2        1
```

6. **Host Name Query on DNS Server**

Windows NT 4.0 also has a tool that enables you to test DNS to verify that it is working properly. This utility is not available on Windows 98/Me.

From the DOS command-line, type "NSLOOKUP" to display the following output:

```
C:\>nslookup
Default Server:  sv1.labo.pcc.com
Address:  192.168.1.1
```

NS(Name Server) Record in Domain

From the DOS command-line, type "ls -t NS <Domain Name>" to display the following output:

```
> ls -t NS labo.pcc.com.
[sv1.labo.pcc.com.]
 labo.pcc.com.           NS   server = sv1.labo.pcc.com
```

MX(Mail Exchange) Record in Domain

From the DOS command-line, type "ls -t MX <Domain Name>" to display the following output:

```
> ls -t MX labo.pcc.com
[sv1.labo.pcc.com]
 labo.pcc.com.           MX    10   sv2.labo.pcc.com
```

A (Address) Record in Domain

From the DOS command-line, type "ls -t A <Domain Name>" to display the following output:

```
> ls -t A labo.pcc.com
[sv1.labo.pcc.com]
 labo.pcc.com.        NS   server = sv1.labo.pcc.com
 sv1                  A    192.168.1.1
 sv2                  A    192.168.1.2
 ec5                  A    192.168.1.4
 ec4                  A    192.168.3.4
 ef1                  A    192.168.3.5
```

(To leave from this menu, type "exit" on the command-line.)

7. **Testing Unit Using the TELNET Command**

TELNET is a terminal emulation protocol. TELNET enables PCs, and workstations to function as dumb terminals in sessions with hosts on internet works.

From Windows 98/Me/2000/NT/XP, use the TELNET to test the communication of TCP/IP, and SMTP Protocol manually to the Unit. This method eliminates the SMTP Server.

For better understanding, type "telnet" in the DOS Command-line to bring up the Telnet screen. Then, click on the Terminal menu, and on Preferences, check the "Local Echo", and "Block Cursor" radio dials, and click on the OK button.

Click on the Connect menu, then click on Remote System.

Enter "25" in the "Port:" field, and click on Connect button.

For example,

```
C:\WINDOWS>telnet


Open 192.168.3.5 25

220 DP80xx

helo
250 Hello

mail from:test
250 Sender OK

rcpt to:fax@labo.pcc.com
250 Receipient OK

data
354 Email, end with "CRLF . CR LF"


[Press the Enter Key]
Panasonic Internet Fax
test
test
[Press the Enter Key]
[Press the  .  Key]
[Press the Enter Key]
250 OK, Mail accept

quit
221 Closing connection
```

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4.6. Error Codes (For Copier)

The self-diagnostic functions detect troubles in the important components of the copier.
When any trouble occurs, the copier stops.

4.6.1. User Error Codes (U Code)
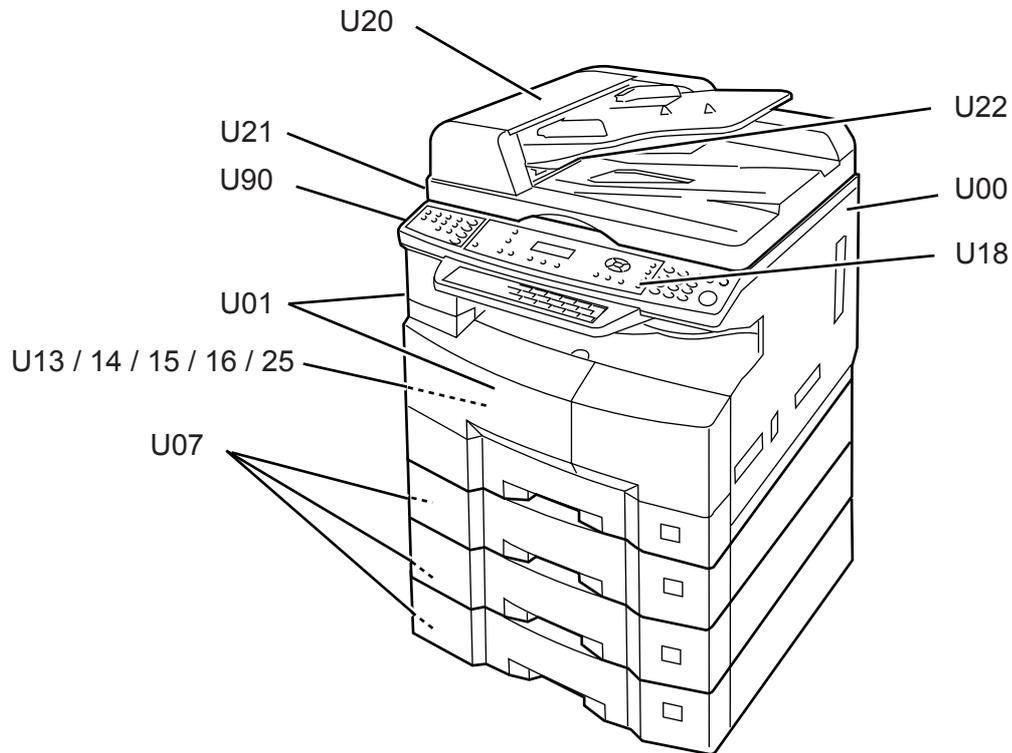
Note:
Uxx, and a message will appear on the Panel Display.

User Error Codes (U Code) Table		
Code	**Item**	**Possible Cause(s)**
U00	Key Counter	1. Card Key not installed. 2. Key Counter Harness disconnected. 3. Department Code not assigned.
U01	Close Front Cover	1. Front Cover / Side Cover open. 2. Front Cover / Side Cover Sensor disconnected. 3. Front Cover / Side Cover Sensor defective 4. PS connector disconnected. 5. PS defective. 6. SPC PCB connector disconnected. 7. SPC PCB defective.
U07	Close Tray Cover	1. Tray Cover open. 2. Tray Unit incorrectly installed. 3. Tray Unit connector disconnected. 4. Tray Unit Sensor disconnected. 5. Tray Unit Sensor defective. 6. PS connector disconnected. 7. PS defective. 8. CST2/CST3 PCB connector disconnected. 9. CST2/CST3 PCB defective.

User Error Codes (U Code) Table		
Code	**Item**	**Possible Cause(s)**
U13	Add Toner	1. Toner Bottle incorrectly installed. 2. Low Toner. 3. Toner Sensor disconnected. 4. Toner Sensor defective. 5. SPC PCB connector disconnected. 6. SPC PCB defective.
U14	Replace Toner Waste Container	1. Toner Waste Container full. (See Sect. 3.5.3.)
U15	No Toner Waste Container	1. Toner Waste Container not installed. 2. Toner Waste Container Sensor disconnected. 3. Toner Waste Container Sensor defective.
U16	No Developer Unit	1. Developer Unit not installed.
U18	Total Copy Limit Over	1. Department Copy Counter full.
U20	Close ADF Cover	1. ADF Cover open. 2. ADF not installed correctly. 3. ADF Cover Sensor disconnected. 4. ADF Cover Sensor defective. 5. PS connector disconnected. 6. PS defective.
U21	Close ADF	1. ADF, and ADF Cover open. 2. ADF Sensor disconnected. 3. ADF Sensor defective.
U22	Close ADF Exit Cover	1. ADF Exit Cover open. 2. ADF not installed correctly. 3. ADF Exit Cover Sensor disconnected. 4. ADF Exit Cover Sensor defective. 5. PS connector disconnected. 6. PS defective.
U25	Shake Toner Bottle	1. Toner blocked in the Toner Bottle.
U90	Replace Battery	1. Internal battery requires replacement.

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4.6.2. Jam Error Codes (J Code)
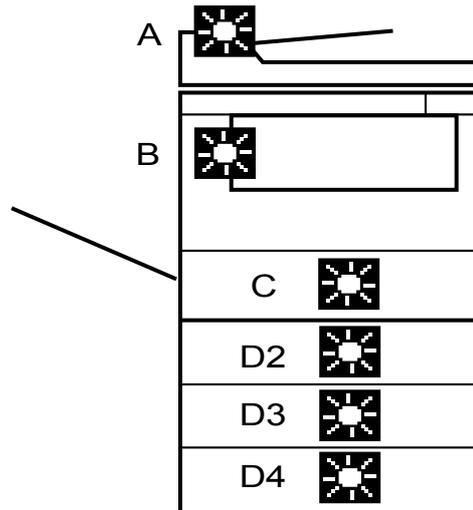
Section	Jam Location
A	ADF / i-ADF / Scanner
B	Paper Transport / Exit Area
C	Paper Entry Area
D2	2nd Paper Tray
D3	3rd Paper Tray
D4	4th Paper Tray

• **Jam Sensor Location of i-ADF**

• **Jam Sensor Location of ADF**

Read Point, and Eject Sensor

Original Detection Sensor

Original Length Sensor
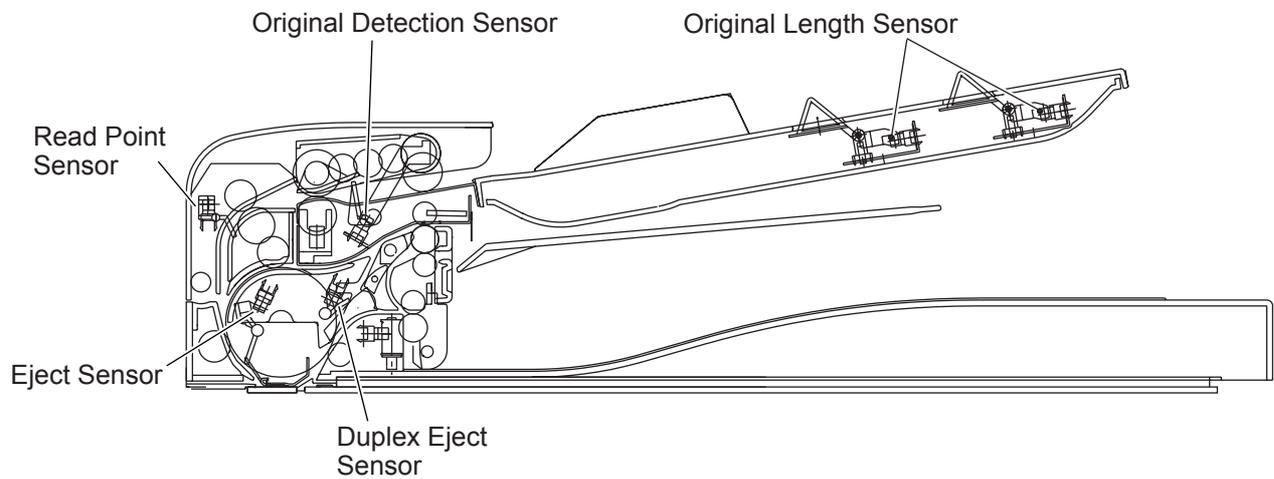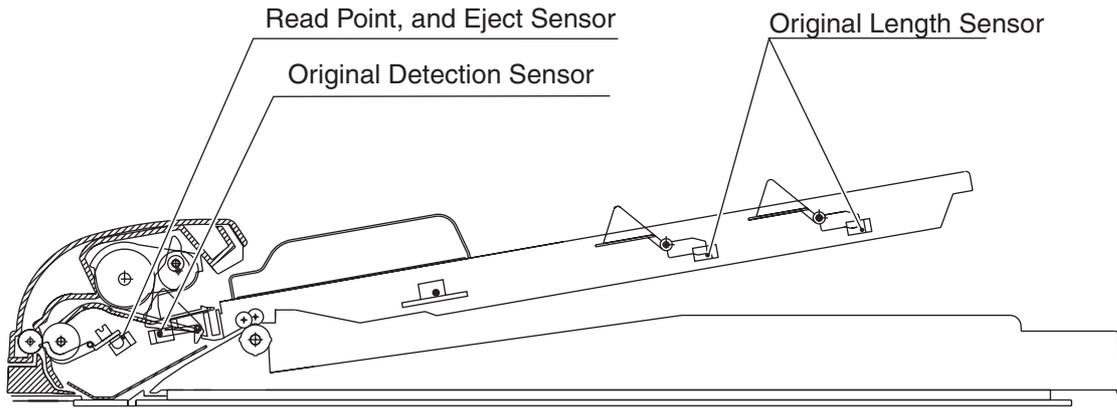
• **Jam Sensor Location of Printer**

Paper Exit Sensor

ADU Sensor

Registration Sensor

2nd Paper Tray Path Sensor

3rd Paper Tray Path Sensor

4th Paper Tray Path Sensor

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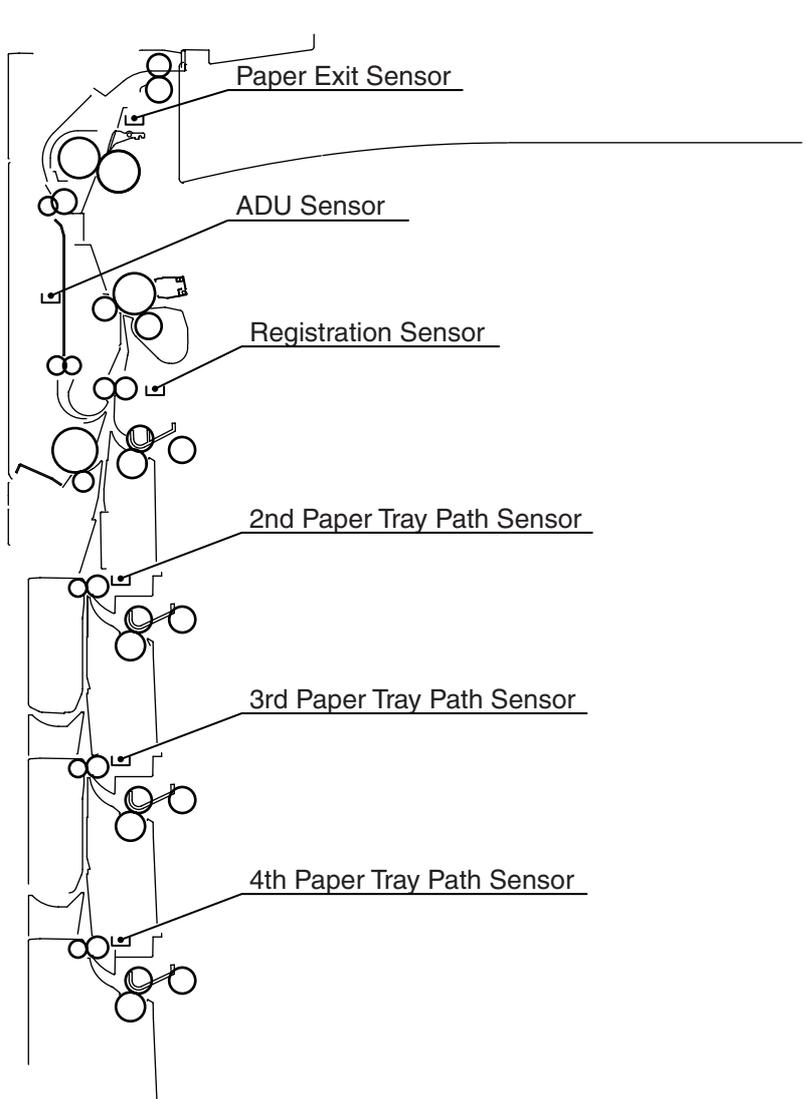
• **Paper Transport / Exit / Entry / Feed Unit Area**

Jam Error Codes (J Code) Table		
Code	**Contents**	**Section**
J00	The Registration Sensor does not detect paper within a predetermined time after the paper starts feeding. (Sheet Bypass)	B
J01	The Registration Sensor does not detect paper within a predetermined time after the Paper Feed Roller starts rotating. (1st Paper Tray)	
J02	The 2nd Paper Tray Path Sensor does not detect paper within a predetermined time after the Paper Feed Roller starts rotating. (2nd Paper Tray)	D2
J03	The 3rd Paper Tray Path Sensor does not detect paper within a predetermined time after the Paper Feed Roller starts rotating. (3rd Paper Tray)	D3
J04	The 4th Paper Tray Path Sensor does not detect paper within a predetermined time after the Paper Feed Roller starts rotating. (4th Paper Tray)	D4
J07	The Registration Sensor does not detect paper within a predetermined time after the 2nd Paper Tray Path Sensor is activated. (2nd Paper Tray)	B, D2
J08	The Registration Sensor did not detect paper within a predetermined time after the 3rd Paper Tray Path Sensor is activated. (3rd Paper Tray)	D3
J09	The Registration Sensor did not detect paper within a predetermined time after the 4th Paper Tray Path Sensor is activated. (4th Paper Tray)	D4
J12	The 2nd Paper Tray Path Sensor does not go off within a predetermined time after the Paper Tray Path Sensor is activated.	B, D2
J13	The 3rd Paper Tray Path Sensor does not go off within a predetermined time after the Paper Tray Path Sensor is activated.	D3
J14	The 4th Paper Tray Path Sensor does not go off within a predetermined time after the Paper Tray Path Sensor is activated.	D4
J19	The Registration Sensor does not detect within a predetermined time after the ADU Sensor is activated.	B
J22	The 2nd Paper Tray Path Sensor detect paper at the time of the initials.	B, D2
J23	The 3rd Paper Tray Path Sensor detect paper at the time of the initials.	D2, D3
J24	The 4th Paper Tray Path Sensor detect paper at the time of the initials.	D3, D4
J30	The Registration Sensor does not go off within a predetermined time after the Sensor is activated. (Sheet Bypass)	B
J31	The Registration Sensor does not go off within a predetermined time after the Sensor is activated. (Except Sheet Bypass)	
J32	The Registration Sensor does not go off within a predetermined time after the ADU Sensor is activated. (DP-8020E)	
J33	The Registration Sensor detects paper during non-printing mode.	
J45	The Paper Exit Sensor keeps detecting paper after a predetermined time, during non-printing mode.	
J46	The Paper Exit Sensor does not go off within a predetermined time after the Sensor is activated.	
J48	The Paper Exit Sensor does not detect paper within a predetermined time after the Registration Sensor is activated.	
J82	The ADU Sensor does not detect paper within a predetermined time after the Duplex Feed Roller starts rotating.	
J85	The ADU Sensor does not go off within a predetermined time after the Sensor is activated.	
J87	The ADU Sensor detects paper during non-printing mode.	
J90	Abnormal Paper Jam: During printing the Front Door was opened, etc.	B, C, D
J91	A Paper Tray was pulled out while feeding paper.	C

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Jam Error Codes (J Code) Table		
Code	**Contents**	**Section**
J95	The paper size of a Tray differs from the Machine setting size.	B
J97	After passing the Registration Sensor (Roller), the Paper does not clear the sensor within a predetermined time period.	
J98	No VRDY Signal after a predetermined time has lapsed.	
J99	No VSYNC Signal within a predetermined time after VRDY Signal is activated.	

• **i-ADF / ADF Area**

Jam Error Codes (J Code) Table		
Code	**Contents**	**Section**
J70	The Read Point Sensor does not detect paper within a predetermined time after the original starts feeding.	A
J71	The Read Point Sensor keeps detecting paper within a predetermined time after scanning starts.	
J72	The Eject Sensor does not detect paper within a predetermined time after the Read Point Sensor is activated.	A (i-ADF only)
J73	1. The Eject Sensor keeps detecting paper within a predetermined time after scanning starts. 2. The Eject Sensor keeps detecting paper within a predetermined time after the Read Point Sensor is deactivated.	
J76	The Duplex Eject Sensor does not detect paper within a predetermined time after scanning starts.	
J78	The Duplex Eject Sensor keeps detecting paper within a predetermined time after 2-Sided Scanning.	
J79	The Read Point Sensor keeps detecting paper in the ADF.	A
J92	The Read Point Sensor does not detect paper in the ADF.	
J93	The paper remained in the ADF.	
J94	The ADF does not go off after the predetermined time. Unexpected Jam timing (i.e. Original is too short, Ledger / A3 size original is fed without being recognized that the length is abnormal for a Fax Transmission, etc.)	

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4.6.3. Mechanical Error Codes (E Code)

E1: Optical Unit Error		
Code	**Function**	**Possible Cause(s)**
E1- 01	Abnormal Platen Glass Scanning	1. Home Position Sensor connector disconnected. 2. Home Position Sensor defective. 3. Scanner Motor connector disconnected. 4. Scanner Motor defective. 5. Scanning Mechanism defective. 6. SPC PCB connector disconnected. 7. SPC PCB defective. 8. PS defective.
E1- 20	Laser Unit Horizontal Synchronization	1. LSU connector disconnected. 2. LSU defective. 3. SPC PCB connector disconnected. 4. SPC PCB defective.
E1- 22	Polygon Motor Synchronization	1. Polygon Motor connector disconnected. 2. SPC PCB connector disconnected. 3. LSU connector disconnected. 4. Polygon Motor defective. 5. PS defective. 6. SPC PCB defective.
E1- 31	Scanning Lamp (Does not turn On)	1. INV PCB connector disconnected. 2. INV PCB defective. 3. Scanning Lamp defective. 4. SPC PCB connector disconnected. 5. PS defective.

E2: Lift DC Motor Error		
Code	**Function**	**Possible Cause(s)**
E2- 01	Lift Motor Rotation (1st Paper Tray)	1. Level Sensor connector disconnected. 2. Level Sensor defective. 3. Lift Mechanism defective. 4. Lift Motor connector disconnected. 5. Lift Motor defective. 6. SPC PCB connector disconnected. 7. SPC PCB defective. 8. PS defective.
E2- 02	Lift Motor Rotation (2nd Paper Tray)	1. Level Sensor connector disconnected. 2. Level Sensor defective. 3. Lift Mechanism defective. 4. Lift Motor connector disconnected. 5. Lift Motor defective. 6. SPC PCB connector disconnected. 7. SPC PCB defective. 8. CST2 PCB connector disconnected. 9. CST2 PCB defective. 10. CST3 PCB connector disconnected. 11. CST3 PCB defective. 12. PS defective.
E2- 03	Lift Motor Rotation (3rd Paper Tray)	
E2- 04	Lift Motor Rotation (4th Paper Tray)	

E2: Lift DC Motor Error		
Code	**Function**	**Possible Cause(s)**
E2- 10	System Console Drive Motor Rotation	1. Drive Mechanism defective. 2. Drive Motor connector disconnected. 3. Drive Motor defective. 4. CST2 PCB connector disconnected. 5. CST3 PCB connector disconnected. 6. CST3 PCB defective. 7. PS connector disconnected. 8. PS defective. 9. SPC PCB connector disconnected. 10. SPC PCB defective.

E3: Development System Error		
Code	**Function**	**Possible Cause(s)**
E3- 01	Toner Bottle Motor Rotation	1. Toner Bottle Motor connector disconnected. 2. Toner Bottle Motor defective. 3. Toner Bottle Motor Drive Mechanism defective. 4. Toner Bottle installed incorrectly. 5. SPC PCB connector disconnected. 6. SPC PCB defective. 7. Toner Bottle Home Position Sensor connector disconnected. 8. Toner Bottle Home Position Sensor defective.
E3- 02	Toner Screw Motor Over Current	1. Toner Screw Motor defective. 2. Toner Screw Motor Drive Mechanism defective. 3. SPC PCB defective.
E3- 03	Toner Density Sensor Gain	1. Sensor connector disconnected. 2. Sensor defective. 3. SPC PCB connector disconnected. 4. SPC PCB defective.
E3- 10	High Voltage Power Supply leak (1) - Grid Charge Voltage	1. PS connector disconnected. 2. PS defective. 3. SPC PCB connector disconnected. 4. SPC PCB defective. 5. Corona Wire is abnormal. (Check for: contamination with foreign particles, broken, not installed in the proper position, or loose tension)
E3- 20	Main Motor Rotation	1. Drive Mechanism defective. 2. Main Motor connector disconnected. 3. Main Motor defective. 4. SPC PCB connector disconnected. 5. SPC PCB defective. 6. PS defective.

E4: Fuser Unit Error		
Code	Function	Possible Cause(s)
E4- 01	Fuser Warm-up Temperature	1. Fuser Thermistor dirty. 2. Thermistor position incorrect. 3. Thermistor defective. 4. Thermistor connector disconnected. 5. Fuser Lamp connector disconnected. 6. Fuser Lamp defective. 7. Fuser Thermostat defective. 8. Thermal Fuse defective. 9. SPC PCB connector disconnected. 10. SPC PCB defective. 11. Fuser temperature low. (Adjust F6-31) 12. Incorrect SC PCB is installed. 13. Incorrect SPC PCB is installed.
E4- 02	Fuser Paper Jam	1. Paper Jam in Fuser Unit. 2. Paper Exit Sensor disconnected. 3. Paper Exit Sensor defective. 4. SPC PCB connector disconnected. 5. SPC PCB defective.
E4- 10	Fuser Fan Motor Rotation	1. Fuser Fan connector disconnected. 2. Fuser Fan defective. 3. SPC PCB connector disconnected. 4. SPC PCB defective. 5. PS defective.

E5: System Error		
Code	Function	Possible Cause(s)
E5- 11	Printer Engine Communication Abnormal	1. SPC PCB connector disconnected. 2. SPC PCB defective. 3. SC PCB connector disconnected. 4. SC PCB defective.
E5- 17	Scanner Synchronization	
E5- 19	Scanner Line Synchronization	
E5- 40	Sort Memory Abnormal	1. Sort Memory defective. 2. SC PCB connector disconnected. 3. SC PCB defective.
E5- 42	Total Counter Connection	1. Total Counter connector disconnected. 2. Total Counter defective. 3. SPC PCB connector disconnected. 4. SPC PCB defective.
E5- 60	Power Supply Cooling Fan Motor Rotation	1. Cooling Fan connector disconnected. 2. Cooling Fan defective. 3. SPC PCB connector disconnected. 4. SPC PCB defective. 5. PS defective.

E7: Optional Unit Error		
Code	Function	Check Points
E7- 90	Hardware Key Abnormal	1. Incorrect Hardware Key installed. 2. Hardware Key defective.

E13: Out of Toner		
Code	**Function**	**Possible Cause(s)**
E13	No Toner Detection	1. Out of Toner. 2. Toner Bottle not installed. 3. Toner Bottle not installed correctly. 4. Toner Sensor disconnected. 5. Toner Sensor defective. 6. SPC PCB connector disconnected. 7. SPC PCB defective.

4.6.4. Technician Warning

The following message will be displayed in the event.

LCD Message	**Possible Cause(s)**
HDD OPTION REQURIES ADDITIONAL SORT MEM	1. Additional Sort memory is not installed. • DA-SM16 (16 MB) • DA-SM64 (64 MB) • DA-SM28 (128 MB) 2. Make sure the SDRM PC Board was installed properly.
MACHINE ID ERROR	1. Incorrect SC PCB is installed. • SC PCB for DP-8020E • SC PCB for DP-8020P • SC PCB for DP-8016P 2. SPC PCB defective.

4.7. Information Codes Table (For Facsimile)

Fax Information Codes				
Code	Mode	Phase	Description of Problem	Possible Cause(s)
012	RCV	C, D	The length of the received document is over 2 m.	
030	XMT	B	Read Point Sensor does not activate within 10 seconds after the document starts feeding.	Document not set properly. Defective Read Point Sensor.
031	XMT COPY	C	Transmitting document was longer than 2,000 mm (78.7 in). (Super Fine: 1,000 mm (39.4 in), 600 dpi: 430 mm (16.2 in))	Document may be jammed. Defective Read Point Sensor.
061	-	A	ADF Door is open.	Cover not firmly closed. Connectors not firmly connected.
200	RCV	C	Decoding process did not complete at the end of phase C.	Defective FXB PCB.
212	XMT RCV	A-E	Interface error occurred between the CPU, and modem.	Modem defective. (FXB PCB) Software problem occurred. (SC PCB)
301	XMT RCV		System fault.	Software problem occurred. (SC PCB)
331	XMT	C	8-minutes timer error. (Germany only)	
400	XMT	B	T1 timer (35±5 sec) elapsed without detecting 300 bps signal.	Wrong number dialed, and the START button was pushed. Telephone line disconnected while dialing. FXB PCB (Modem), or MJR PCB defective. Receiver defective. (It may only be transmitting CED)
401	XMT	B	DCN was returned from receiver while transmitter is waiting for CFR, or FTT.	Your machine's ID Number is not programmed. Possible incompatibility, or incorrect Password (Password Reception, Selective Receive). Mailbox full.
402	XMT	B	DCN was returned from receiver while transmitter is waiting for NSF/DIS.	Receiver working in non-CCITT mode only. (Possible incompatibility)
403	RCV (Polling)	B	Transmitter had no polling function.	"POLLED=ON" (polling XMT ready) not set at the transmitter. Document to be transmitted not placed at the transmitter.
404	XMT	B	Transmitter sent NSS (or DCS) followed by TCF three times, but the receiver did not respond. (CFR, or FTT is usually returned)	Receiver defective. (Modem, MJR PCB, etc.) FXB PCB, or MJR PCB defective. Receiver disconnects line during first NSS (or DCS) transmitted.

Fax Information Codes				
Code	Mode	Phase	Description of Problem	Possible Cause(s)
405	XMT	B	Transmitter received FTT after it transmitted TCF at 2400 bps. Received RTN after communicating at 2400 bps.	Line quality poor. (TCF is damaged due to line noise) Receiver defective. (Modem, MJR PCB, etc.) FXB PCB, or MJR PCB defective.
406	RCV (Password Comm.)	B	XMT-Password mismatched. RCV-Password mismatched. Selective RCV incomplete.	XMT, RCV password does not match. Last 4 digits of TSI does not match with the last 4 digits of Auto Dial telephone number.
407	XMT	D	Transmitter received no response after it transmitted post message, such as EOP, MPS, EOM, etc...or received DCN.	Receiver defective. (No paper, paper jamming, etc.) Receiver ceased receiving because of excessive errors. (Line quality poor) FXB PCB (Modem), or MJR PCB defective.
408	XMT	D	Transmitter received RTN after it transmitted EOP, MPS, or EOM.	Receiver receives data with errors. (Line quality poor) Receiver defective. (Modem, MJR PCB, etc.) FXB PCB, or MJR PCB defective.
409	XMT	D	Transmitter receives PIN after it transmitted a post message, such as EOP, MPS, EOM, etc.	Receiver receives data with error due to poor line quality, and receiving operator requests voice contact. Receiver defective. (Modem, MJR PCB, etc.) FXB PCB, or MJR PCB defective.
410	RCV	D	Received DCN while waiting for post command. (EOP, MPS, EOM, etc.)	Interface, or line faulty. Transmitter defective.
411	RCV (Polling)	B	Received DCN after transmitting NSC.	Transmitter not ready for polling communication. Password does not match between transmitter, and receiver.
412	G3 RX	B, D	No response within 12 seconds in NSS/DCS/MPS wait state. (After transmitting FTT)	Transmitter defective. FXB PCB defective.
414	RCV (Polling)	B	No response received after transmitting 3rd NSC.	Password does not match between transmitter, and receiver. Transmitter defective. (No original, document jam, etc.)
415	XMT (Polling)	B	Remote side attempted to receive message from your machine in polling communication.	Inform the remote side that your machine does not have the polling transmission feature.
416	RCV	D	Receiver did not detect post command, such as EOP, MPS, EOM, etc.	Transmitter defective. Line quality poor. (RTC signal distorted due to line noise) FXB PCB, or MJR PCB defective.
417	RCV	C	Receiver returned RTN in response to post message.	Line quality poor. (There are excessive errors in received data) FXB PCB, or MJR PCB defective.

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			Fax Information Codes	
Code	**Mode**	**Phase**	**Description of Problem**	**Possible Cause(s)**
418	RCV	C	Receiver transmitted PIN in response to PRI-Q from transmitter. (Transmitting operator requests voice contact)	Line quality poor. (There are excessive errors in received data) FXB PCB, or MJR PCB defective.
420	RCV	B	T1 timer (35 sec.) elapsed without detecting 300 bps signal.	Wrong number dialed. (Non-facsimile communication) Transmitter defective. FXB PCB, or MJR PCB defective.
421	RCV	B	Busy Tone was detected after sending NSF Signal.	Remote station disconnected the line. Wrong number was dialed.
422	XMT	B	Content of NSF (or DIS), or NSC (or DTC) was invalid.	Incompatible content
427	G3 RCV	B	DCN received to NSF/CSI/DIS transmitted.	Interface is incompatible.
433	XMT RCV	B, D	T.30 Protocol abnormal.	Defective remote station.
434	XMT, or RCV	B	CD (response from Modem) did not turn OFF within 180 sec. after receiver detected FLAG signal.	Remote unit defective. FXB PCB, or MJR PCB defective.
436	G3 RX	C	DCN received after transmitting FTT.	Transmitter defective, or incompatible. Line quality poor.
456	RCV	B	Received relay transfer request, or confidential document to distribute to an end receiving station, or all confidential mailboxes are used.	
457	RELAY XMT CONF. XMT/ POLL	B	Remote unit does not have Relayed XMT, or Confidential Comm. capability.	
459	RCV	C	Failed training in Phase C.	Line quality poor. (Training signal distorted due to line noise) FXB PCB, or MJR PCB defective.
490	RCV	C	Sum of error lines exceeded the limit (Function Parameter No. 70) of 64 lines.	Line quality poor. FXB PCB, or MJR PCB defective.
494	RCV	C	Interval between two EOLs was more than 10 sec. when receiver received message data.	Transmitter defective. Line quality poor. (EOL damaged due to line noise) FXB PCB, or MJR PCB defective.
495	XMT RCV	C	During reception, CD turned OFF, or continued ON for long time. During communication, lost loop - current.	Line disconnected. Transmitter defective. FXB PCB, or MJR PCB defective.
496	XMT	C	CS of modem is not able to turn ON.	FXB PCB defective.
501	XMT/ RCV(V.34)	B	Incompatible Modem on the Remote unit.	
502	XMT/ RCV(V.34)	B, C, D	During reception, CD turned OFF, or continued ON for long time. During communication, lost loop - current.	Line disconnected. Transmitter defective. FXB PCB, or MJR PCB defective.

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Fax Information Codes				
Code	Mode	Phase	Description of Problem	Possible Cause(s)
503	XMT/ RCV(V.34)	B, C, D	CS of modem is not able to turn ON during training.	FXB PCB defective. Line disconnected.
504	RCV/V.34 (Polling)	B	Polling is rejected from the remote station.	No polling original set.
505	XMT/V.34 (Polling)	B	Polling XMT is rejected.	No polling original set.
540	XMT ECM	B	No response after transmitting 3rd CTC, or DCN received.	Incompatible interface.
541	XMT ECM	D	No response after transmitting 3rd EOR, or received DCN.	Faulty line. MJR PCB abnormal.
542	XMT ECM	D	No response to the 3rd RR transmitted, or received DCN.	Remote unit abnormal.
543	XMT ECM	D	T5 timer (60 sec.) elapsed without MCF.	Remote unit abnormal.
544	XMT ECM	D	Stopped Transmission after EOR Transmission.	Faulty line. MJR PCB abnormal.
550	RCV ECM	C	Timer between frames in phase C has elapsed.	Defective remote station.
554	RCV ECM	D	Transmitted ERR after receiving EOR.	Faulty line.
555	RCV ECM	D	Transmitted PIN after receiving EOR.	Faulty line, and Operator Call requested by RX side.
570	RCV	B	Password, or machine code did not match during remote diagnostic communication.	
571	XMT	B	Remote unit did not have the remote diagnostic function.	
580	XMT	B	Sub-address transmission to a unit that has their DIS bit 49 (NSF bit 155) OFF.	Sub-address transmission to a unit that has no Sub-address function.
581	XMT	B	Sub-address Password transmission to a unit that has their DIS bit 50 (NSF bit 156) OFF.	Sub-address transmission to a unit that has no Sub-address function.
582	XMT	B	Sub-address SEP (for Polling) transmission to a unit that has their DIS bit 47 (NSF bit 130) OFF.	Sub-address transmission to a unit that has no Sub-address function.
601	XMT		ADF Door was opened during ADF transmission.	
623	XMT	A	No original was in the ADF. (Built-in dialer engaged)	Operator removed the original from the ADF after dialing was completed. Original was not set properly in the ADF.
630	XMT, or RCV (Polling)	B	Redial count over.	No dial tone detected. Sensor did not detect dial tone. (Country dependent) Busy tone is detected. (Country dependent) T1 timer (35±5 sec) elapsed without a signal from the receiver.
631	XMT	A	"STOP" key was pressed during Auto Dialing.	

Fax Information Codes				
Code	Mode	Phase	Description of Problem	Possible Cause(s)
634	XMT	PSTN	Redial count over with no response, or busy tone was not detected. **Note:** U.S.A., and Canadian models will redial only once if a busy tone is not detected.	
638	XMT	PSTN LAN	Power turned Off with applicable data in memory, or during communication.	Power switched Off. Power failure occurred.
700	XMT RCV	PSTN LAN	Communication terminated by Operator pressing the "STOP" key.	
712	XMT	LAN	Unknown email address replied from the Mail Server.	Mail Server received an incorrect email address. (Dependent on Server's Mail application)
714	XMT RCV	LAN	LAN Interface error. Cannot logon to the LAN.	The 10Base-T/100Base-TX cable not connected. An unexpected LAN problem occurred.
715	XMT	LAN	TCP/IP connection timed out.	Incorrect IP Address set. Verify the IP Address, Default Router IP Address, SMTP Server IP Address.
716	XMT	LAN	Cannot logon to the LAN.	Incorrect SMTP Server IP Address set. No email application activated on the Mail Server.
717	XMT	LAN	Incomplete SMTP Protocol transmission.	Mail Server's hard disk may be full. Mail Server defective.
718	XMT	LAN	Page Memory Overflow occurred while receiving printing data. The paper size selected within your application to print is larger than the paper size loaded in the paper tray(s).	Check the document size, and resolution. Ask originator to resend in a supported size, and resolution.

719	RCV	LAN	Received data via LAN is in a format that is not supported.	Ask the originator to resend with a supported file attachment:
				  * In a TIFF-F format.
				  * Image data conforming to A4/Letter size.

720	POP	LAN	Unable to connect to the POP Server.	Incorrect POP Server address set. POP Server is down.
721	POP	LAN	Unable to login to the POP Server.	Incorrect User Name, or Password set.
722	RCV	LAN	Failed to obtain the Network Parameters (such as: IP Address, Subnet Mask, Default Gateway IP Address, etc.) from the DHCP server.	DHCP not available. (Contact the Network Administrator.)
725	XMT POP	LAN	DNS Server connection timed out.	Incorrect DNS Server address set. DNS Server is down.
726	XMT POP	LAN	Received an error response from the DNS Server.	Incorrect POP Server address set. Incorrect SMTP Server address set.

Fax Information Codes				
Code	Mode	Phase	Description of Problem	Possible Cause(s)
727	XMT	LAN	Received an Error, or No Response from the Remote Internet Fax. (SMTP Direct XMT)	Remote Internet Fax Errors: Busy, or Job Number Overflow for Relay XMT. (Retry is possible)
728	XMT	LAN		Remote Internet Fax Errors: Memory Overflow, or No Power. (Retry is not possible)
729	XMT	LAN	Failed to authenticate (SMTP AUTHENTICATION) when connecting with the SMTP server.	SMTP AUTHENTICATION, User Name, and/or Password are incorrect. (Contact the Network Administrator.)
730	RCV	LAN	Unable to program the Internet parameters, or the autodialer via Email from a PC.	Verify that the Fax Parameter #158 is set to Valid.
731	RCV	LAN	Dialer full while Relayed Transmission Request was received.	Dial buffer for manual number dialing (70 stations) is being used.
741	XMT, Polling	PSTN	Unable to dial	Deleted the registered station name before dialing with Timer Controlled Communications, etc.
800	Relay Comm.	PSTN	The machine was requested to relay a document but has no Relay Hub capability.	
814	Conf. XMT Conf. Polling Relay Comm.	PSTN	The remote station does not have Relay XMT nor Confidential Communication capability.	
815	Conf. RCV	PSTN	Mailbox full.	
816	Conf. Polled	PSTN	The received Polling Password did not match.	
825	Conf. RCV Conf. Polled	PSTN	Parameter settings of the remote station are not properly set.	
870	MEM XMT Multi-Copy	PSTN LAN	Memory overflow occurred while storing documents into memory.	
879	Memory RCV	PSTN	Memory overflow occurred during substitute memory reception.	Memory overflow on the Fax side.
		LAN	Memory overflow. Mail Server sent a reset command while downloading the data to the machine.	Memory overflow on the Fax side. Mail server aborted the download (Busy with other higher priority jobs).
880	-	-	File Access Error.	
884	-	-	File Access Error.	
961	RCV	LAN	Memory file access error.	SC PCB defective.
962	XMT	PSTN	Memory file access error.	SC PCB defective.
		LAN	Memory file access error.	SC PCB defective.

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4.8. Diagnostic Codes (For Facsimile)

The 13-digit Diagnostic Code is provided for the service engineer to analyze how the communication was performed. The code is recorded on the Journal.

Journal Example

```
************* -JOURNAL- ************************ DATE MMM-dd-yyyy ***** TIME 09:39********

NO. COMM. PAGES  FILE DURATION X/R  IDENTIFICATION  DATE    TIME   DIAGNOSTIC

01  OK    001    129  00:00'42  XMT  123 456 789     MMM-dd  01:55  C8649003C0000
                                                                     ↑          ↑
                                                                   1st digit  13th digit


- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

                                                    - PANASONIC MACHINE

***************************** - PANASONIC MACHINE- ***** -12345678901234567890- *******
```

1st Digit: Manufacturer Code
-: Not used/defined

Fax Diagnostic Codes				
Data	**Definition**			
	Manufacturer Code			
0	-			
1	Casio			
2	Canon			
3	Sanyo			
4	Sharp			
5	Tamura			
6	Toshiba			
7	NEC			
8	Oki			
9	Hitachi			
A	Xerox			
B	Fujitsu			
C	Matsushita			
D	Mitsubishi			
E	Murata			
F	Ricoh			

2nd Digit
  -: Not used/defined

Fax Diagnostic Codes				
Data	Definition			
	ID (TSI, CSI, CIG)	RTN	DCN	STOP Button
0	-	-	-	-
1	Received	-	-	-
2	-	Received	-	-
3	Received	Received	-	-
4	-	-	Received	-
5	Received	-	Received	-
6	-	Received	Received	-
7	Received	Received	Received	-
8	-	-	-	Pressed
9	Received	-	-	Pressed
A	-	Received	-	Pressed
B	Received	Received	-	Pressed
C	-	-	Received	Pressed
D	Received	-	Received	Pressed
E	-	Received	Received	Pressed
F	Received	Received	Received	Pressed

3rd Digit
  -: Not used/defined

Fax Diagnostic Codes			
Data	Definition		
	Resolution (dpi)	Paper Width	
0	-	A4	
1	S-Fine	A4	
2	400 x 400	A4	
3	300 x 300	A4	
4	-	B4	
5	S-Fine	B4	
6	400 x 400	B4	
7	300 x 300	B4	
8	600 x 600	A4	
9	600 x 600	B4	
A	-	-	
B	600 x 600	A3	
C	-	A3	
D	S-Fine	A3	
E	400 x 400	A3	
F	300 x 300	A3	

4th Digit
  -: Not used/defined

Fax Diagnostic Codes				
Data	**Definition**			
	Scanning Rate	**Resolution**		
0	20 ms/line	Std		
1	5 ms/line	Std		
2	10 ms/line	Std		
3	-	Std		
4	40 ms/line	Std		
5	-	Std		
6	-	Std		
7	0 ms/line	Std		
8	20 ms/line	Fine		
9	5 ms/line	Fine		
A	10 ms/line	Fine		
B	-	Fine		
C	40 ms/line	Fine		
D	-	Fine		
E	-	Fine		
F	0 ms/line	Fine		

5th Digit
  -: Not used/defined

Fax Diagnostic Codes				
Data	**Definition**			
	Deferred Comm.	**Dialing/RCV**	**Memory/ Non-Memory**	
0	-	Manual Communication	Non-Memory	
1	Used	Manual Communication	Non-Memory	
2	-	Auto Dialing	Non-Memory	
3	Used	Auto Dialing	Non-Memory	
4	-	Auto RCV	Non-Memory	
5	Used	Auto RCV	Non-Memory	
6	-	Remote RCV	Non-Memory	
7	Used	Remote RCV	Non-Memory	
8	-	Manual Communication	Memory	
9	Used	Manual Communication	Memory	
A	-	Auto Dialing	Memory	
B	Used	Auto Dialing	Memory	
C	-	Auto RCV	Memory	
D	Used	Auto RCV	Memory	
E	-	Remote RCV	Memory	
F	Used	Remote RCV	Memory	

6th Digit
 -: Not used/defined

Fax Diagnostic Codes				
	Definition			
Data	Polling	XMT/RCV	Selective Comm.	Password Comm.
0	-	RCV	Off	Off
1	Yes	RCV	Off	Off
2	-	XMT	Off	Off
3	Yes	XMT	Off	Off
4	-	RCV	On	Off
5	Yes	RCV	On	Off
6	-	XMT	On	Off
7	Yes	XMT	On	Off
8	-	RCV	Off	On
9	Yes	RCV	Off	On
A	-	XMT	Off	On
B	Yes	XMT	Off	On
C	-	RCV	On	On
D	Yes	RCV	On	On
E	-	XMT	On	On
F	Yes	XMT	On	On

7th Digit
 -: Not used/defined

Fax Diagnostic Codes				
	Definition			
Data	Sub-Address Comm.	Confidential Comm.	Relayed Comm.	Turnaround Polling
0	-	-	-	-
1	Yes	-	-	-
2	-	Yes	-	-
3	Yes	Yes	-	-
4	-	-	Yes	-
5	Yes	-	Yes	-
6	-	Yes	Yes	-
7	Yes	Yes	Yes	-
8	-	-	-	Yes
9	Yes	-	-	Yes
A	-	Yes	-	Yes
B	Yes	Yes	-	Yes
C	-	-	Yes	Yes
D	Yes	-	Yes	Yes
E	-	Yes	Yes	Yes
F	Yes	Yes	Yes	Yes

8th Digit
-: Not used/defined

Fax Diagnostic Codes				
	Definition			
Data	Advanced Comm.	Cover Sheet XMT		
0	-	-		
1	Report XMT	-		
2	Check & Call	-		
3	-	-		
4	Memory Transfer	-		
5	-	-		
6	-	-		
7	-	-		
8	-	Yes		
9	Report XMT	Yes		
A	Check & Call	Yes		
B	-	Yes		
C	Memory Transfer	Yes		
D	-	Yes		
E	-	Yes		
F	-	Yes		

9th Digit
-: Not used/defined

Fax Diagnostic Codes				
	Definition			
Data	Short Protocol	Standard/ Non-Standard		
0	-	Standard		
1	-	Standard		
2	-	Standard		
3	-	Standard		
4	-	Standard		
5	-	Standard		
6	-	Standard		
7	-	Standard		
8	-	Non-Standard		
9	B	Non-Standard		
A	-	Non-Standard		
B	D	Non-Standard		
C	-	Non-Standard		
D	B	Non-Standard		
E	-	Non-Standard		
F	D	Non-Standard		

10th Digit
-: Not used/defined

Fax Diagnostic Codes				
Data	**Definition**			
	Coding	**ECM**		
0	MH	-		
1	MR	-		
2	MMR	-		
3	JBIG	-		
4	-	-		
5	-	-		
6	-	-		
7	-	-		
8	MH	Yes		
9	MR	Yes		
A	MMR	Yes		
B	JBIG	Yes		
C	-	Yes		
D	-	Yes		
E	-	Yes		
F	-	Yes		

11th Digit
-: Not used/defined

Fax Diagnostic Codes				
Data	**Definition**			
	Symbol Rate (V.34)	**V.34**		
0	-	-		
1	-	-		
2	-	-		
3	-	-		
4	-	-		
5	-	-		
6	-	-		
7	-	-		
8	2400 sr	Yes		
9	-	Yes		
A	2800 sr	Yes		
B	3000 sr	Yes		
C	3200 sr	Yes		
D	3429 sr	Yes		
E	-	Yes		
F	-	Yes		

12th Digit
-: Not used/defined

Fax Diagnostic Codes				
	Definition			
Data	Modem Speed	Modem Speed (V.34)		
0	2400 bps	-		
1	4800 bps	2400 bps		
2	7200 bps	4800 bps		
3	9600 bps	7200 bps		
4	TC 7200 bps	9600 bps		
5	TC 9600 bps	12000 bps		
6	12000 bps	14400 bps		
7	14400 bps	16800 bps		
8	-	19200 bps		
9	-	21600 bps		
A	-	24000 bps		
B	-	26400 bps		
C	-	28800 bps		
D	-	31200 bps		
E	-	33600 bps		
F	-	-		

13th Digit
-: Not used/defined

Fax Diagnostic Codes				
	Definition			
Data				
0				
1				
2				
3				
4				
5				
6				
7				
8				
9				
A				
B				
C				
D				
E				
F				

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4.9. Troubleshooting (For Printer)

4.9.1. Checking the Basics

This section explains how to solve problems including error messages, or unexpected printing results.

If the Printing System is not printing or working as expected, and if you are not sure what to do, start your troubleshooting by checking the basics below:

- Ensure that the Ethernet LAN (10Base-T / 100Base-TX) Cable is connected properly
- Ensure that the Internet Parameters are correct
- Ensure that the Unit is turned On
- Ensure that the Paper is set properly in the Unit
- No error message is displayed on the Unit
- Try printing a test page from the printer driver properties dialog box

4.9.2. Document Does Not Print Properly

Problem	Possible Solution(s)
Character is not printing in the correct positions, or the characters near the edges of the page are missing.	• Check, and specify the paper size and orientation settings in the printer driver to coincide with the application. • Check if the specified paper is loaded in the Panasonic Device. • Increase the Page Margins in the application. The Panasonic Device requires minimum margins of ¼ inches (5 mm) on all sides.
The font type is incorrect	• Check if the selected font is installed in the PC. • Check if the selected font is being replaced with a proper printer font in the Font Substitution Table of the Printer Driver Properties dialog box. • Select "**Always use True Type fonts**" from the **Font** tab of the Printer Driver Properties dialog box.
The character is not smooth.	• Select an outline font instead of a bit map font.
Fine line print cannot be obtained.	• Select 600 dpi resolution.
Poor photograph print quality.	• Select 600 dpi resolution.
Different character, or symbol from the document is printed.	• Check if the Panasonic Printing System (PCL) printer driver is selected.
The printer does not print anything, or prints irregular images from the middle of the 1st page.	• Insufficient Printer Page Memory in the Panasonic Device, install an Expansion D-RAM Card, or change the resolution to 300 dpi in the **Quality** tab of the Printer Driver Properties dialog box.
Printing is exceedingly slow.	• Select the Spool settings "**Start printing after first page is spooled** " from the **Details** tab of the Printer Driver Properties dialog box. • Select 300 dpi resolution.

4.9.3. Error Message Appears on the PC

Error Message	Possible Solution(s)
Network Print DLL Error.	• Check if the Panasonic Device is turned "On", and the 10Base-T/ 100Base-TX cable is properly connected. • Printer Properties may be incorrectly configured. (i.e. Printer Port)
Network Port is Busy.	• The Panasonic Device may be processing a different print job, please wait, and try again later. • The Panasonic Device is either Transmitting, or Receiving an email.
Cannot print because an error is found in the current printer setting.	• Verify, and specify the paper size, or orientation to coincide with the application, and the printer driver settings.

4.9.4. Error Message Appears on the Unit

Error Message	
Cannot complete print job; Image memory overflow	• There may not be enough Sort Memory available in the Panasonic Device to complete the print job. Either install an optional Sort Memory, or change the resolution to 300 dpi in the Printer Driver Properties dialog box.
Cannot complete print job; Confirm print condition	• The print settings may not be matched for the system. Change the printing settings in the Printer Driver Properties dialog box. **Ex:** Multi-sized printing.
Cannot print; System error	• Change the resolution to 300 dpi in the Printer Driver properties dialog box.

4.9.5. System Error (CD Drive Related Error During Installation)

Problem	Possible Solution(s)
Cannot read the drive.	• Insert the CD into the drive, and click "Retry".

5 Service Modes

5.1. Service Modes (For Copier)

These Service Modes are provided to assist the technician in checking for abnormalities in the copier, and a means of making adjustments to the Input/Output of major components.

5.1.1. Service Mode Procedure

1. To select the Service Mode
   The service mode is selected when "**FUNCTION**", "**ORIGINAL SIZE**", and "**3**" keys are sequentially pressed, then F1 will appear in the display.

2. To exit the Service Mode
   The service mode is reset when the "**FUNCTION**", and "**CLEAR**" keys are pressed simultaneously.

5.1.2. Copier Service Mode Functions

<table>
<tr><th colspan="4">Service Modes (For Copier)</th></tr>
<tr><th>Service Mode</th><th colspan="2">Item</th><th>Function</th></tr>
<tr><td rowspan="7">F1</td><td rowspan="7">Self Test</td><td>00 CCD Test</td><td>This test is used for checking the CCD.</td></tr>
<tr><td>01 LCD/LED Test</td><td>This test is used for checking the LCD, and LEDs.</td></tr>
<tr><td>02 Page Memory Test</td><td>This test is used for checking the Page Memory.</td></tr>
<tr><td>03 Print Test Pattern 1</td><td>Prints the pattern for setting the Paper position alignment.</td></tr>
<tr><td>04 Print Test Pattern 2</td><td>Prints the Slant pattern for setting the Paper position alignment.</td></tr>
<tr><td>05 Print Test Pattern 3</td><td>Prints the Grid pattern for setting the Paper position alignment.</td></tr>
<tr><td>06 Print Test Pattern 4</td><td>Prints the pattern for setting the Duplex Paper position alignment.</td></tr>
<tr><td>F2</td><td colspan="2">Single Copy Test</td><td>One sheet is copied when the Start key is pressed.</td></tr>
<tr><td>F3</td><td colspan="2">Continuous Copy Test</td><td>Multi copies are made when the Start key is pressed.</td></tr>
<tr><td>F4</td><td colspan="2">Input / Output Status Test</td><td>The functioning of Input / Output items (selected item numbers) is checked.</td></tr>
<tr><td>F5</td><td colspan="2">Function Parameters</td><td>Various function settings (selected by code numbers) can be changed.</td></tr>
<tr><td>F6</td><td colspan="2">Adjust Parameters</td><td>Various function settings (selected by code numbers) can be adjusted.</td></tr>
<tr><td>F7</td><td colspan="2">Electronic Counter</td><td>Electronic Counters for Maintenance</td></tr>
<tr><td>F8</td><td colspan="2">Service Adjustment</td><td>Perform pseudo-operation of an item (selected by code numbers)</td></tr>
<tr><td>F9</td><td colspan="2">Unit Maintenance</td><td>Fax Service Mode
Service Alert Tel #

Firmware Version
Print Device Info.</td></tr>
</table>

F5 / F6 Information List (Sample)

```
**********-F5/F6 INFORMATION LIST-****** DATE MMM-dd-yyyy *** TIME12:01 *** P.01


F5-00 . . . . .                            F5-50 Auto contrast adj.         Yes
F5-01 Frequency desired      60Hz          F5-51 Dept. Counter (COPY)       Yes
F5-02 . . . . .                            F5-52 Dept. Counter (FAX)        No
F5-03 LSU startup speed      Full          F5-53 2-sided auto shift         No
F5-04 LSU off timer          15 Sec.       F5-54 Margin reduction           No
F5-05 . . . . .                            F5-55 Margin value default       10mm
F5-06 . . . . .                            F5-56 Edge value default         5mm
F5-07 . . . . .                            F5-57 Book value default         20mm
F5-08 . . . . .                            F5-58 U14 Clear                  Any Keys
F5-09 Fuser lamp control     Auto          F5-59 Oper.add toner alarm       Stop

F5-10 EXIT TRAY LIMITATION   None          F5-60 Auto Tray selection        Yes
F5-11 REPLACE DRUM UNIT      Off           F5-61 TDC Adj.(Dev Cond.)        Yes
F5-12 Printer fan extension  5 min         F5-62 TDC Adj.(Dev Life)         Yes
F5-13 PAPER OUT INDICATOR    On            F5-63 U13 clear                  Any keys
F5-14 Paper size (tray1)     LETTER        F5-64 Dept. Counter (SCAN)       Yes
F5-15 Paper size (tray2)     LEDGER        F5-65 Dept. Counter (PRINT)      Yes
F5-16 Paper size (tray3)     LEDGER        F5-66 . . . . .
F5-17 Paper size (tray4)     LEDGER        F5-67 . . . . .
F5-18 . . . . .                            F5-68 . . . . .
F5-19 T Corona Current Adj   No            F5-69 Reduce N in 1 space        No

F5-20 ADF                    Auto          F5-70 PM cycle                   120k
```

```
**********-F5/F6 INFORMATION LIST-****** DATE MMM-dd-yyyy *** TIME12:01 *** P.02

F6-00 Adj 100% Read (S/S)     0            F6-50 T/P Mode Image Density     0
F6-01 Adj 100% Read (L/T)     0            F6-51 Photo Image Density        0
F6-02 100% Selection          0            F6-52 . . . . .
F6-03 Orig. Registration      0            F6-53 CCD Read Position          0
F6-04 Printer Registration    0            F6-54 Text Mode Contrast         0
F6-05 Main Motor Speed        0            F6-55 T/P Mode Contrast          0
F6-06 Polygon Motor Speed     0            F6-56 Photo Mode Contrast        0
F6-07 Registration Void       6            F6-57 . . . . .
F6-08 Trail Edge Read Tim.    0            F6-58 Corona Charger Curr.       0
F6-09 Trail Edge Prt Tim.    -6            F6-59 Trail Edge(Trays)          0

F6-10 Side Adjust (Bypass)    0            F6-60 Trail Edge(Bypass)         0
F6-11 Side Adjust (Tray 1)    0            F6-61 Trail Edge(2-Side)         0
F6-12 Side Adjust (Tray 2)    0            F6-62 TDC Gain Voltage Adj       0
F6-13 Side Adjust (Tray 3)    0            F6-63 Lead Edge Read Tim.        0
F6-14 Side Adjust (Tray 4)    0            F6-64 Side Edge Read Adj.        0
F6-15 . . . . .                            F6-65 Trans Side1(S-Wide)        0
F6-16 Side Adjust (ADU)       0            F6-66 Trans Side2(S-Wide)        0
F6-17 Std Grid Voltage        0            F6-67 ADF Image Density          0
F6-18 Standard Laser Power    0            F6-68 . . . . .
F6-19 Bias Std Voltage        0            F6-69 Stamp Position Adj.        0

F6-20 . . . . .                            F6-70 . . . . .
F6-21 TDC Gain Voltage        0            F6-71 ADF Read Scan Pos.         0
F6-22 . . . . .                            F6-72 Original Lead ADF:S        0
```

Machine Setup Information List (Sample)

```
**********-MACHINE SETUP INFORMATION-****** DATE MMM-dd-yyyy *** TIME12:01 *** P.01

   1.MACHINE INFORMATION
         MACHINE NAME              : DP-8020E
         MAC ADDRESS               : 080023006FA1
         SERIAL NUMBER             :

   2.FIRMWARE VERSION
         SC                        : AAV10xxxPU
         SC BOOT                   : LLN4
         PNL                       : VO2000x
         SPC                       : 20E V10xxx
         FAX MODEM                 :
         PDL FONT1                 :
         SC2                       :

   3.MEMORY CAPACITY
         PAGE MEMORY               : 32 MB
         SORT MEMORY               : 16 MB
         FAX MEMORY                : 2 MB

   4.OPTION
         DOCUMENT FEEDER (ADF)      : ADF
         2nd PAPER TRAY            : Yes
         3rd PAPER TRAY            : Yes
         4th PAPER TRAY            : Yes
         FAX BOARD                 : Yes
         NETWORK SCANNER           : Yes
         PCL PRINTER               : No
         PS PRINTER                : No
         EMAIL                     : Yes
         HDD                       : No
         KEYBOARD                  : Yes

   5.ERROR LOG
         TOTAL PRINT COUNT         : 2082

   NO. DATE & TIME      ERROR CODE ERROR COUNT   NO. DATE & TIME     ERROR CODE ERROR COUNT
   -------------------------------------------------------------------------------
   01  MMM-dd-yyyy 11:11 J27        XX-00000008
   02  MMM-dd-yyyy 11:31 J41        XX-00000140
                                    (See Remarks)
   -------------------------------------------------------------------------------




                                              -PANASONIC        -

**************************** -PANASONIC        - ***** -    0001- ********
```

```
   Remarks:
      XX-00000140

         │    │
         │    │
              │
              Page Count
         │

      00 : Printer Error
      02 : Scanner Error
```

F7 Total Counter List (Sample)

```
**********-F7 TOTAL COUNTER LIST-****** DATE MMM-dd-yyyy *** TIME12:01 *** P.01


F7-01  Key Operator ID Code      :   000

F7-02  Total Count               :   295
F7-03  PM Count                  :   295
F7-04  Scanner PM Count          :    61
F7-05  . . . . .                 :
F7-06  OPC Drum Count            :   295
F7-07  Process Unit Count        :   295
F7-08  ADF/i-ADF PM Count        :    50
F7-09  . . . . .                 :
F7-10  Developer Count           :   295

F7-11  Sheet Bypass Count        :   147
F7-12  1st Paper Tray Count      :    90
F7-13  2nd Paper Tray Count      :     0
F7-14  3rd Paper Tray Count      :     0
F7-15  4th Paper Tray Count      :     0
F7-16  2-Sided Count             :    28
F7-29  A4/LETTER Count           :   284
F7-30  A4-R/LETTER-R Count       :    73
F7-31  A3/LEDGER Count           :    19
F7-32  B4/LEGAL Count            :     0

F7-17  ADF/i-ADF Count           :    26
F7-18  ADF/i-ADF Read Count      :    26
F7-19  Scanner Count             :    61
F7-20  Scanner Read Count        :    18

F7-21  COPY PRINT COUNT          :    42
F7-22  COPY SCAN COUNT           :    29

F7-23  PC PRINT COUNT            :     0
F7-24  PC SCAN COUNT             :     0

F7-25  FAX TRANSMIT COUNT        :     0
F7-26  FAX RECEIVE COUNT         :     0
F7-27  FAX PRINT COUNT           :     0
```

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5.1.3.   F4 Mode: Input/Output Status Test

Set the machine to service mode, and press "**4**" key on the Keypad.
↓
Press the "**START**" key.
↓
Enter the number to activate the test then press "**START**" key.
↓
Press "**STOP**" key to cancel the test.
↓
When the "**CLEAR**" key is pressed, the selected code input will not be accepted.
↓
Press "**FUNCTION**", and "**CLEAR**" keys simultaneously to exit the service mode.

1. Check Input

No.	Function	Condition	7	6	5	4	3	2	1	0	Remarks
			Message Display								
000	Toner Screw Motor Over Current	Over Current is detected.		1							
	Power Supply Fan Signal	Normal.			0						
003	Paper Tray Unit Option Detection Sensor (2nd Paper Tray)	Unit is installed.	0								
	Paper Tray Detection Sensor (2nd Paper Tray)	Paper Tray is opened.		0							
	Paper Tray Detection Sensor (1st Paper Tray)	Paper Tray is opened.			0						
	NP Sensor (Sheet Bypass)	Paper is not detected.					1				
	Paper Length Sensor (Sheet Bypass)	Sensor is activated.						1			
	Size Sensor (PC1) (Sheet Bypass)	Sensor is activated.							1		
	Size Sensor (PC2) (Sheet Bypass)	Sensor is activated.								1	

No.	Function	Condition	Message Display								Remarks
			7	6	5	4	3	2	1	0	
004	Size Sensor (PC3) (Sheet Bypass)	Paper is not detected.		0							
	ADU Detection Sensor	Unit is connected.			0						
	JAM Access Cover Open Detection Sensor (2nd Paper Tray)	Cover is open.				0					
	Upper Limit Sensor (2nd Paper Tray)	Upper Limit is detected.					1				
	Upper Limit Sensor (1st Paper Tray)	Upper Limit is detected.						1			
	NP Sensor (2nd Paper Tray)	Paper is not detected.							0		
	NP Sensor (1st Paper Tray)	Paper is not detected.								0	
005	Total Counter Detection Sensor	Counter is not detected.		1							
	Polygon Motor Lock Signal	Normal.			0						
	Main Motor Lock Signal	Normal.				0					
	Fuser Fan Lock Signal	Normal.					0				
	Toner Waste Container Detection Sensor	Toner Waste Container is detected.						0			
	Toner Waste Container Full Detection Sensor	Toner Waste Container is full.							1		
	Toner Bottle Motor Rotation Detection Sensor	Lock								0	
006	ADU Paper Sensor	Paper is detected.					0				
	Fuser Exit Sensor	Paper is detected.						0			
	Registration Sensor (2nd Paper Tray)	Paper is detected.							0		
	Registration Sensor	Paper is detected.								0	
008	Front / Left Cover Open Sensor 1	See Remarks.							*		Front / Left Cover is closed. Signal 1 = 0 Signal 2 = 0 Right Cover is open. Signal 1 = 1 Signal 2 = 1
	Developer Unit Detecting Sensor	Unit is connected.								1	

F4 Mode (Check Input)

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No.	Function	Condition	Message Display								Remarks
			7	6	5	4	3	2	1	0	
009	JAM Access Cover Open Detection Sensor (4th Paper Tray)	Cover is open.	0								
	Paper Tray Detection Sensor (4th Paper Tray)	Paper Tray is not connected.		0							
	Upper Limit Sensor (4th Paper Tray)	Upper Limit is detected.			0						
	Paper Tray Detection Sensor (4th Paper Tray)	Unit is connected.				0					
	Feed Motor Lock Signal (3rd Paper Tray)	Normal.					0				
	Paper Tray Detection Sensor 2 (3rd Paper Tray)	See Remarks.						*			Unit is connected. Signal 1 = 1 Signal 2 = 0 A different signal pattern, indicates that the unit is not connected, or CST 3 PCB is defective.
	Paper Tray Detection Sensor 1 (3rd Paper Tray)	See Remarks.							*		
010	Registration Sensor (3rd Paper Tray)	Paper is detected.			0						
	JAM Access Cover Open Detection Sensor (3rd Paper Tray)	Cover is open.				0					
	Paper Tray Detection Sensor (3rd Paper Tray)	Paper Tray is connected.				1					
	Upper Limit Sensor (3rd Paper Tray)	Upper Limit is detected.					0				
	NP Sensor (3rd Paper Tray)	Paper is not detected.						0			
	Registration Sensor (4th Paper Tray)	Paper is detected.							0		
	NP Sensor (4th Paper Tray)	Paper is not detected.								0	
011	Corona Leak Detection	Leak				0					

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No.	Function	Condition	7	6	5	4	3	2	1	0	Remarks
			Message Display								**Remarks**
020	Size Sensor C (Not Used)	Original detected on the C position.								1	Z / Y Platen / X C B A Front Side
	Size Sensor B (Not Used)	Original detected on the B position.							-		
	Size Sensor A (Not Used)	Original detected on the A position.						1			
	Size Sensor Z (Not Used)	Original detected on the Z position.					1				
	Size Sensor Y (Not Used)	Original detected on the Y position.				1					
	Size Sensor X (Not Used)	Original detected on the X position.			1						
021	Home Position Sensor	Home position is detected.								1	
	ADF/Platen Cover Open Sensor	ADF/Platen Cover is open.						1			
	ADF/Platen Cover Angle Sensor	ADF/Platen Cover is open more than 30° angle.					1				
	Fuser Lamp Disconnect Detection Sensor	No Lighting				-					
	+24V Line Error Detecting Signal	+24V Line is ON.			-						
030	ADF B1 Sensor	Original is detected.								1	
	ADF B2 Sensor	Original is detected.							1		
	ADF Paper Exit Detection Sensor	Original is detected.						1			
	ADF Inverting Cover Open Detection Sensor	Cover is open.					1				
	ADF Cover Open Detection Sensor	Cover is open.				1					
	ADF Detection Sensor 1	See Remarks.			*						iADF Signal 1 = 1 Signal 2 = 1 ADF Signal 1 = 1 Signal 2 = 0 A different signal pattern, indicates that the unit is not connected.
	ADF Detection Sensor 2	See Remarks.		*							
031	ADF Original Sensor	Original is detected.								1	
	ADF Original Width Sensor	Original is detected.						1			
	ADF Original Width Sensor	Original is detected.					1				
	ADF Original Length Sensor 2	Original is detected.				1					
	ADF Original Length Sensor 1	Original is detected.			1						

2. Check Output

Press the "**START**" key to start, and press the "**STOP**" key to reset.

No.	Item	Function	Remark
		F4 Mode (Output Check)	
040	Total Counter	When SPC PCB CN715-8 signal level changes to 0V from +24V, count up the Total Counter.	
041-049	Not Used		
050	Main Motor	When SPC PCB CN723-2 signal level changes to 0V from +5V, the Main Motor activates.	
051	Toner Bottle Motor Rotation In Forward Direction	When SPC PCB CN720-16 signal level changes to 0V from +24V, the Motor rotates in the forward direction.	
052	Toner Screw Motor	When SPC PCB CN720-18 signal level changes to 0V from +24V, the Clutch activates.	
053	Power Supply Fan	When SPC PCB CN704-9,10, CN709-16 are 24V, Power Supply Fan rotates high-speed.	
054-055	Not Used		
056	Fuser Fan	When SPC PCB CN709-13 is 24V, Fuser Fan rotates.	
057-060	Not Used		
061	Registration Clutch	When SPC PCB CN715-2 signal level changes to 0V from +24V, clutch operates.	1 minute
062	Not Used		
063	Paper Feed Roller Clutch (1st Paper Tray)	When SPC PCB CN715-4 signal level changes to 0V from +24V, clutch operates.	1 minute
064	Lift Motor (1st Paper Tray)	When SPC PCB CN706-2 signal level changes to 0V from +24V, motor rotates in the ascending direction.	
065	ADU Solenoid	When SPC PCB CN728-2 signal level changes to 0V from +24V, solenoid operates.	1 minute
066-069	Not Used		
070	Paper Feed Roller Clutch (2nd Paper Tray)	When CST2 PCB CN773-2 signal level changes to 0V from +24V, clutch operates.	1 minute
071	Lift Motor (2nd Paper Tray)	When CST2 PCB CN774-2 signal level changes to 0V from +24V, motor rotates in the ascending direction.	

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F4 Mode (Output Check)			
No.	Item	Function	Remark
072	Intermediate Roller Clutch (2nd Paper Tray)	When CST2 PCB CN773-4 signal level changes to 0V from +24V, clutch operates.	1 minute
073-074	Not Used		
075	Paper Feed Motor (3rd Paper Tray)	When CST3 PCB CN805-4 signal level changes to 0V from +5V, activate the Motor.	
076	Paper Feed Roller Clutch (3rd Paper Tray)	When CST3 PCB CN806-2 signal level changes to 0V from +24V, clutch operates.	1 minute
077	Lift Motor (3rd Paper Tray)	When CST3 PCB CN804-2 signal level changes to 0V from +24V, motor rotates in the ascending direction.	
078	Intermediate Roller Clutch (3rd Paper Tray)	When CST3 PCB CN806-4 signal level changes to 0V from +24V, clutch operates.	1 minute
079	Not Used		
080	Paper Feed Roller Clutch (4th Paper Tray)	When CST2 PCB CN773-2 signal level changes to 0V from +24V, clutch operates.	1 minute
081	Lift Motor (4th Paper Tray)	When CST2 PCB CN774-2 signal level changes to 0V from +24V, motor rotates in the ascending direction.	
082	Intermediate Roller Clutch (4th Paper Tray)	When CST2 PCB CN773-4 signal level changes to 0V from +24V, clutch operates.	1 minute
083-084	Not Used		
085	Paper Feed Roller Solenoid (Sheet Bypass)	When SPC PCB CN715-6 signal level changes to 0V from +24V, solenoid operates.	1 minute
086-119	Not Used		
120	Lamp	When SPC PCB CN656-3 signal level changes to +5V from 0V, Lamp operates.	
121-159	Not Used		
160	ADF Paper Feed Motor Rotating (35% speed rotating)	ADF paper feed motor rotates at 35% speed.	
161	ADF Paper Feed Motor Rotating (100% speed rotating)	ADF paper feed motor rotates at 100% speed.	
162	ADF Paper Feed Motor Rotating (200% speed rotating)	ADF paper feed motor rotates at 200% speed.	
163	ADF Paper Feed Motor Reverse Rotating (35% speed rotating)	ADF paper feed motor rotates in reverse at 35% speed.	

F4 Mode (Output Check)			
No.	Item	Function	Remark
164	ADF Paper Feed Motor Reverse Rotating (100% speed rotating)	ADF paper feed motor rotates in reverse at 100% speed.	
165	ADF Paper Feed Motor Reverse Rotating (200% speed rotating)	ADF paper feed motor rotates in reverse at 200% speed.	
166	ADF Paper Feed Roller Clutch 1	When ADF PCB CN22-10 signal level changes to 0V from +24V, clutch operates for 3 seconds.	
167	ADF Paper Feed Roller Clutch 2	When ADF PCB CN22-8 signal level changes to 0V from +24V, clutch operates for 3 seconds.	
168	ADF Paper Feed Roller Clutch 3	When ADF PCB CN24-2 signal level changes to 0V from +24V, clutch operates for 3 seconds.	
169	ADF Paper Exit Solenoid	When ADF PCB CN26-2 signal level changes to 0V from +24V, Solenoid operates for 3 second.	
170-171	Not Used		
172	ADF Solenoid	When ADF PCB CN26-5 signal level changes to 0V from +24V, Solenoid operates for 1 second.	
173	ADF Inverting Solenoid	When ADF PCB CN26-3 signal level changes to 0V from +24V, Solenoid operates for 1 second.	
174	ADF Pinch Roller Solenoid	When ADF PCB CN26-7 signal level changes to 0V from +24V, Solenoid operates for 1 second.	
175	ADF Stamp Solenoid	When ADF PCB CN25-2 signal level changes to 0V from +24V, Solenoid operates for 1 second.	

5.1.4.   F5 Mode: Function Parameters (For Copier)

Set the machine to Service Mode, and press "**5**" key on the Keypad.
↓
Press the "**START**" key.
↓
Enter the desired code number, or press "**V**", "**Λ**" arrow keys.
↓
If you wish to select another code number, scroll the menu with the arrow keys.
↓
Press the "**SET**" key.
↓
Enter the desired function code number, and press "**SET**" key.
↓
When the "**CLEAR**" key is pressed, the selected code input will not be accepted.
↓
Press "**STOP**" key, then press "**FUNCTION**", and "**CLEAR**" keys simultaneously to exit the service mode.
↓
Reboot the machine after setting the parameter(s) to activate the setting(s).

No.	Item	Function	Default Setting
F5 Mode			
00	Not Used		
01	Frequency Desired	0 : Auto 1 : 50 Hz 2 : 60Hz	2 (for USA / Canada) 1 (for Europe)
02	Not Used		
03	LSU Startup Speed	0 : Low 1 : Full	1
04	LSU Off Timer	1 : 5 sec. 2 : 10 sec. 3 : 15 sec. 4 : 20 sec. 6 : 30 sec. 8 : 40 sec. 10 : 50 sec. 12 : 60 sec.	3
05	Not Used		
06	Job Tracking Server	0 : No 1 : Yes	0
07-08	Not Used		
09	Fuser Lamp Control	0 : Off 1 : Auto	0 (for USA / Canada) 1 (for Europe)
10	Exit Tray Limitation (Up to 250 Sheets)	0 : None 1 : Accumulate 2 : Job	0 (Effective from August 2004 Production)

F5 Mode			
No.	**Item**	**Function**	**Default Setting**
11	Replace Drum	0 : Off 1 : On	0 (Effective from August 2004 Production)
	Replace Drum (Except USA / Canada)	0 : Off 1 : User (Displays Replace Drum) 2 : Service (Enables Check & Call function)	0 (Effective from Oct. 2004 Production)
12	Printer Fan Extension	5 : 5 min 2 : 2 min 0 : Non	5
13	Paper Out Red Indicator	0 : On 1 : Off	0
14	Paper Size Tray 1	0 : None 1 : A3 2 : B4 3 : A4 4 : A4-R 5 : B5 6 : B5-R 7 : A5 8 : A5-R 9 : 8 x 13 10 : 8.5 x 13 11 : LEDGER 12 : LEGAL 13 : LETTER 14 : LETTER-R 15 : INVOICE	11 (for USA / Canada) 1 (for Europe)
15	Paper Size Tray 2	Same as F5-14	
16	Paper Size Tray 3	Same as F5-14	(for DP-8020P/8020E)
17	Paper Size Tray 4	Same as F5-14	(for DP-8020P/8020E)
18	Not Used		
19	T Corona Current Auto Adj.	0 : No 1 : Yes	1
20	ADF	0 : No 1 : Auto	1
21	Not Used		
22	System Console	0 : No 1 : Auto	1 (for DP-8020P/8020E)
23-25	Not Used		
26	2-Sided Unit	0 : No 1 : Auto	1
27-30	Not Used		
31	ADF Duplex Scanning	0 : No 1 : Auto	1
32	Job Build, and SADF Mode	0 : No 1 : Yes	0
33	TH Sensor (Laser duty)	0 : No 1 : Mid 2 : Large	1
34-37	Not Used		

No.	Item	Function	Default Setting
	F5 Mode		
38	2-Sided Mode Default	0 : No 1 : 1 to 2 2 : 2 to 2 3 : B to 2	0
39	Not Used		
40	Double Count	0 : No 1 : LDR 2 : LDR, LGL 3 : A3 4 : A3, B4	1 (for USA / Canada) 3 (for Europe)
41	Count Up Timing	0 : At feed 1 : At exit	1
42	KEY/DEPT. Counter	0 : No 1 : Key Cntr 2 : DEPT. 3 : Card	0
43	Key Counter Timing	Same as F5-41	0
44	Not Used		
45	Dept Code Reentry Again	0 : Yes 1 : No	0
46	Not Used		
47	TH Sensor (T corona current)	0 : No 1 : Mid 2 : Large	1
48	TH Sensor (DEV)	0 : No 1 : Mid 2 : Large	1
49	Not Used		
50	Auto Contrast Adjust	0 : No 1 : Yes	1
51	Dept. Counter (COPY)	0 : No 1 : Yes	1
52	Dept. Counter (FAX)	0 : No 1 : Yes	0
53	2-Sided Auto Shift	0 : No 1 : Auto sft	0
54	Margin Reduction	0 : No 1 : Yes	0
55	Margin Value Default	0 : 5 mm 1 : 10 mm 2 : 15 mm 3 : 20 mm	1
56	Edge Value Default	0 : 5 mm 1 : 10 mm 2 : 15 mm 3 : 20 mm	0
57	Book Value Default	0 : 15 mm 1 : 20 mm 2 : 25 mm 3 : 30 mm	1

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No.	Item	Function	Default Setting
F5 Mode			
58	U14 Clear	0 : Continue 1 : Any Keys	1
59	Oper. Add Toner Alarm	0 : Stop 1 : Continue	0
60	Auto Tray Selection	0 : No 1 : Yes	1
61	TDC Auto Adj. (DEV Conditions)	0 : No 1 : Yes	1
62	TDC Auto Adj.(DEV life)	0 : No 1 : Yes	0
63	U13 Clear	0 : Any keys 1 : Func + 1	0
64	Dept. Counter (SCANNER)	0 : No 1 : Yes	1
65	Dept. Counter (PRINTER)	0 : No 1 : Yes	1
66-68	Not Used		
69	Reduce N in 1 Space	0 : No 1 : Yes	0
70	PM Cycle	0 : No 1 : 1.5 K 2 : 2.5 K 3 : 5 K 4 : 10 K 5 : 15 K 6 : 20 K 7 : 30 K 8 : 40 K 9 : 60 K 10 : 80 K 11 : 90 K 12 : 120 K 13 : 150 K 14 : 200 K 15 : 240 K	12
71	Add Toner Time Limit	0 : Unlimited 1 : 1/3 Limited 2 : 2/3 Limited	0
72-75	Not Used		
76	TH Sensor (Corona, Grid)	0 : No 1 : Yes	1
77	TH Sensor (Bias DC)	0 : No 1 : Yes	1
78	A4/LTR Size Select	0 : No 1 : Yes	0
79	Not Used		

F5 Mode			
No.	**Item**	**Function**	**Default Setting**
80	Paper Size Priority	1 : A3 2 : B4 3 : A4 4 : A4-R 5 : B5 6 : B5-R 7 : A5 8 : A5-R 9 : 8 x 13 10 : 8.5 x 13 11 : LEDGER 12 : LEGAL 13 : LETTER 14 : LETTER-R 15 : INVOICE	13 (for USA / Canada) 3 (for Europe)
81	B4/FLS Size Selection	0 : B4 1 : 8 x 13 2 : 8.5 x 13	0
82	Manual Skyshot Mode	0 : Off 1 : M1, On 2 : M2, On 3 : M1, M2, On	0
83	Digital Skyshot Mode	0 : No 1 : Normal 2 : Quality	1
84	Paper Tray Priority	0 : S > C > B 1 : C > S > B	1
85	Side Void Setting (ADF)	0 : None 1 : Yes	0
86	PM Cycle (Optics)	0 : No 1 : 40 K 2 : 60 K 3 : 120 K 4 : 240 K 5 : 360 K 6 : 480 K 7 : 600 K	0
87	PM Cycle (ADF)	0 : No 1 : 40 K 2 : 60 K 3 : 120 K 4 : 240 K 5 : 360 K 6 : 480 K 7 : 600 K	0
88	USB Port Function	0 : Off 1 : Once 2 : ON	0

F5 Mode			
No.	**Item**	**Function**	**Default Setting**
89	LAN Speed/Duplex	0 : Auto 1 : 10 Half 2 : 10 Full 3 : 100 Half 4 : 100 Full	0
90	TCH Panel Beep Sound	0 : Off 1 : Soft 2 : Loud	1
91	M1, Size Y	Set the default size for Manual Skyshot Mode, M1, and M2.	160
92	M1, Size X		70
93	M2, Size Y		220
94	M2, Size X		95
95	Paper Size (FA) **(Factory use only)**	0 : Japan 1 : USA/CAN 2 : Europe 3 : Other	1 (for USA / Canada) 2 (for Europe)
96	Bypass Detection **(Factory use only)**	0 : Japan 1 : USA/CAN 2 : Europe 3 : Other	1 (for USA / Canada) 2 (for Europe)
97	BP Tray B4/FLS/LGL (FA) **(Factory use only)**	0 : B4 1 : 8 x 13 2 : 8.5 x 13 3 : LEGAL	3 (for USA / Canada) 0 (for Europe)
98	TH Sensor (Laser Power)	0 : No 1 : Mid 2 : Large	1
99	Not Used		

5.1.5. F6 Mode: Adjust Parameters (For Copier)

Set the machine to Service Mode, and press "**6**" key on the Keypad.
↓
Press the "**START**" key.
↓
Enter the desired code number, or press "**V**", "**Λ**" arrow keys.
↓
If you wish to select another code number, scroll the menu with the arrow keys.
↓
Press the "**SET**" key.
↓
Enter the desired function code number, and press "**SET**" key.
↓
When the "**CLEAR**" key is pressed, the selected code input will not be accepted.
↓
Press "**STOP**" key, then press "**FUNCTION**", and "**CLEAR**" keys simultaneously to exit the service mode.
↓
Reboot the machine after setting the parameter(s) to activate the setting(s).

Note:
The Factory Setting is different in each model.

F6 Mode			
No.	**Item**	**Remarks**	**Setting Range**
00	Adj 100% Side-Side Read	Adjustment for identical vertical (side-to-side) size ratio.	-9 - +9 0.1%
01	Adj 100% Lead-Tail Read	Adjustment for identical horizontal (top-to-bottom) size ratio.	-9 - +9 0.1%
02	100% Selection	Adjustment from 99.1% to 100.9%	-9 - +9 0.1%
03	Original Registration	Adjustment of platen original registration detection timing.	-30 - +30 0.2mm
04	Printer Registration	Delay time is adjusted from registration roller clutch ON.	-50 - +50 0.5mm
05	Main Motor Speed	Adjustment of Main Motor speed.	-10 - +10 0.1%
06	Polygon Motor Speed	Adjustment Polygon Motor speed.	-5 - +5 0.1%
07	Registration Void	Registration void should be adjusted.	0 - +99 0.5mm
08	Trail Edge Read Timing	Adjustment of trail edge void.	-9 - 0 0.5mm
09	Trail Edge Print Timing	Adjustment of trail edge void.	-9 - +15 0.5mm
10	Side Adjust (Bypass)	Adjustment of LSU side-side (Sheet Bypass).	-8 - +7 0.5mm
11	Side Adjust (Tray 1)	Adjustment of LSU side-side (1st Tray).	-8 - +7 0.5mm
12	Side Adjust (Tray 2)	Adjustment of LSU side-side (2nd Tray).	-8 - +7 0.5mm
13	Side Adjust (Tray 3)	Adjustment of LSU side-side (3rd Tray).	-8 - +7 0.5mm

No.	Item	Remarks	Setting Range
	F6 Mode		
14	Side Adjust (Tray 4)	Adjustment of LSU side-side (4th Tray).	-8 - +7 0.5mm
15	Not Used		
16	Side Adjust (ADU)	Adjustment of LSU side-side (ADU).	-8 - +7 0.5mm
17	Standard Grid Voltage	Charge voltage compensation adjustment.	-128 - +19 2.0V
18	Standard Laser Power	Laser power compensation adjustment.	-19 - +38 0.05mW
19	Std Bias DC Voltage	Adjustment of bias standard voltage.	-128- +48 2.6V
20	Not Used		
21	TDC Gain Voltage	Adjustment of toner density sensor gain voltage.	-70 - +57 0.033V
22	DC Bias ON timing **(Factory use only)**	Adjustment of DC Bias ON timing.	-10 - +10 0.01Sec.
23	DC Bias OFF timing **(Factory use only)**	Adjustment of DC Bias OFF timing.	-10 - +10 0.01Sec.
24-25	Not Used		
26	TDC Judgment Level	Adjustment of toner supply starting judgement voltage level.	-26 - +26 0.02V
27-29	Not Used		
30	Light Halftone Adj.	Halftone duty ratio adjustment	-127 - +127
31	Fuser Temperature	Adjustment of fuser temperature.	-15 - +15 0.833°C
32	Fuser Edge Temperature	Temperature compensation for edges	-15 - +15 0.833°C
33	TDC Max. Read Only	Set by F8-20 TDC Check Operation	-99 - +99 (Read only)
34	TDC Min. Read Only	Set by F8-20 TDC Check Operation	-99 - +99 (Read only)
35	TDC Avg. Read Only	Set by F8-20 TDC Check Operation	-99 - +99 (Read only)
36	Paper Loop (Tray 1)	Individual Fine Adjustment for Tray 1	-99 - +99
37	Not Used		
38	F8-09 (TDC) Adjustment time **(Factory use only)**	Adjustment of TDC Adjustment timing.	-1 - +5 60Sec.
39	LSU Unit PWM Adjust	Adjustment of PWM value of LSU.	-32 - +32
40	Transfer Current Side 1	Adjustment of Transfer Current.	-62 - +110 0.15uA
41	Paper Loop (Bypass)	Individual Fine Adjustment for Sheet Bypass	-99 - +99
42	Paper Loop (Tray 2)	Individual Fine Adjustment for Tray 2	-99 - +99
43	Paper Loop (2-Sided)	Adjustment for the length of the loop formed before the copier timing roller.	-99 - +99
44	FAX Laser Duty Adj	Printer Density Adjustment for FAX. (-) : Darker. (+) : Lighter.	-99 - +99
45	Not Used		

F6 Mode			
No.	**Item**	**Remarks**	**Setting Range**
46	PRINTER Laser Duty Adj	Printer Density Adjustment for Printer. (-) : Darker. (+) : Lighter.	-99 - +99
47	Transfer Current Side 2	Adjustment of Transfer Current.	-62 - +110 0.15uA
48	Transfer Current Envelope	Adjustment of Transfer Current.	-62 - +110 0.15uA
49	T Mode Image Density	Image density adjustment for Text mode. (-) : Darker. (+) : Lighter.	-99 - +99
50	T/P Mode Image Density	Image density adjustment for Text/ Photo mode. (-) : Darker. (+) : Lighter.	-99 - +99
51	P Mode Image Density	Image density adjustment for Photo mode. (-) : Darker. (+) : Lighter.	-99 - +99
52	Not Used		
53	CCD Read Position Adj	Adjustment of CCD read position.	-42 - +44 0.2mm
54	T Mode Contrast	Adjustment of Contrast for Text Mode.	-128 - +127
55	T/P Mode Contrast	Adjustment of Contrast for Text/Photo Mode.	-128 - +127
56	P Mode Contrast	Adjustment of Contrast for Photo Mode.	-128 - +127
57	Not Used		
58	Corona Charger Current	Adjustment of Corona Charge Current.	-77 - +76 1.3uA
59	Trail Edge Trans (Trays)	Trail Edge Transfer Image High Voltage Timing Adjustment for Trays 1-4 feeding.	-30 - +30 0.5mm
60	Trail Edge Trans (Bypass)	Trail Edge Transfer Image High Voltage Timing Adjustment for Bypass Tray feeding.	-30 - +30 0.5mm
61	Trail Edge Trans (2Sided)	Trail Edge Transfer Image High Voltage Timing Adjustment for the 2nd side of 2-Sided printing.	-30 - +30 0.5mm
62	TDC Gain Voltage Adjust	Adjustment of Toner Density sensor gain voltage.	-10 - +10 0.033V
63	Lead Edge Read Timing (Adjustment for Double Exposure Copy Mode, for details, and adjustment procedure, refer to Sect. 3.9.8.)	Adjustment of Lead Edge Read Point.	0 - +9 0.5mm
64	Side Edge Read Adjust (Adjustment for Double Exposure Copy Mode, for details, and adjustment procedure, refer to Sect. 3.9.8.)	Adjustment of Side Edge Read Point.	0 - +9 0.5mm
65	Transfer Current Side 1 (Small Width) **(Factory use only)**	Adjustment of Transfer Current.	-20 - +20 0.15uA

F6 Mode			
No.	**Item**	**Remarks**	**Setting Range**
66	Transfer Current Side 2 (Small Width)	Transfer Current (Not Use)	-20 - +20 0.15uA
67	ADF Image Density	Compensation of ADF image density.	-99 - +99
68	Paper Loop (Tray 3)	Individual Fine Adjustment for Tray 3	-99 - +99
69	Stamp Position Adjust	Adjustment of verification stamp position.	-50 - +50 0.3mm
70	Not Used		
71	ADF Read Main Scan Pos. (Reverse Side)	Adjustment of ADF horizontal image read start position.	-99 - +99 0.05mm
72	Original Lead Edge ADF (Reverse Side)	Adjustment of ADF Original Lead Edge	-99 - +99 0.3mm
73	Original Trail Edge ADF (Reverse Side)	Adjustment of ADF Original Trail Edge	-127 - +127 0.3mm
74	Stamp Position Adjust (Reverse Side)	Adjustment of Stamp Position	-50 - +50 0.3mm
75-76	Not Used		
77	Add Toner Level	Adjustment of Toner supply (Not Use)	-1 - +1 1
78	Paper Loop (Tray 4)	Individual Fine Adjustment for Tray 4	-99 - +99
79	MTF Adjust	Adjustment of Scanning Sharpness by digital image processing for Text /Photo Copy Mode.	-2 - +2 1
80	Laser Power Control **(Factory use only)**	Value of Gamma Table for Photo Mode.	-99 - +99 (Read Only)
81	Grid voltage Control **(Factory use only)**	Value of Laser duty of Check pattern.	-99 - +99 (Read Only)
82	Bias DC Voltage Control **(Factory use only)**	Value of Laser duty of Black pattern.	-99 - +99 (Read Only)
83	Temperature Sensor Value	Value of Temperature sensor.	0 - 255 (Read Only)
84	Humidity Sensor Value	Value of Humidity sensor.	0 - 255 (Read Only)
85	Not Used		
86	ADF Reverse Stop Posi.	Adjustment of ADF reverse stop position.	-99 - +99 0.3mm
87	ADF Exhaust Stop Posi.	Adjustment of ADF exit stop position	-99 - +99 0.3mm
88-89	Not Used		
90	ADF Image Read Start	Adjustment of ADF horizontal image read start position.	-99 - +99 0.05mm
91	Original Lead Edge ADF	Adjustment of original detection timing.	-99 - +99 0.3mm
92	Original Trail Edge ADF	Adjustment of trail edge detection timing.	-127 - 127 0.3mm
93	ADF 100% Image 1-Sided	Adjustment of magnification for 1-sided.	-9 - +9 0.1%
94	ADF 100% Image 2-Sided	Adjustment of magnification for 2-sided.	-9 - +9 0.1%
95-96	Not Used		

F6 Mode			
No.	**Item**	**Remarks**	**Setting Range**
97	**(Factory use only)**	Adjustment of Timer	-5 - +99 10Sec
98	Not Used		
99	F5/F6 Initialization	Initialize F5/F6 parameter settings.	

5.1.6.   F7 Mode: Electronic Counter

Set the machine to Service Mode, and press "**7**" key on the Keypad.
↓
Press the "**START**" key.
↓
Enter the desired code number, or press "**V**", "**Λ**" arrow keys.
↓
If you wish to select another code number, scroll the menu with the arrow keys.
↓
Press the "**SET**" key.
↓
Enter the desired function code number, and press "**SET**" key.
↓
When the "**CLEAR**" key is pressed, the selected code input will not be accepted.
↓
Press "**STOP**" key, then press "**FUNCTION**", and "**CLEAR**" keys simultaneously to exit the service mode.
↓
Reboot the machine after setting the parameter(s) to activate the setting(s).

F7 Mode		
No.	Item	Remarks
01	Key Operator ID Code	Key Operator's identification code for access to the counter mode.
02	Total Count	Total count for all copies / prints.
03	PM Count	Preventive Maintenance count.
04	Scanner PM Count	PM count for scanner readings.
05	Not Used	
06	OPC Drum Count	PM count of recording paper fed through the OPC Drum.
07	Process Unit Count	PM count of recording paper fed through the Process Unit.
08	ADF PM Count	PM count of originals fed through the ADF.
09	Not Used	
10	Developer Count	PM count of recording paper fed through the Developer.
11	Sheet Bypass Count	Total count of paper fed from the sheet bypass.
12	1st Paper Tray Count	Total count of paper fed from the 1st paper tray.
13	2nd Paper Tray Count	Total count of paper fed from the 2nd paper tray.
14	3rd Paper Tray Count	Total count of paper fed from the 3rd paper tray.
15	4th Paper Tray Count	Total count of paper fed from the 4th paper tray.
16	2-sided Count	Total count of 2-sided Print.
17	ADF Count	Total count of originals fed through the ADF.
18	ADF Read Count	Total count of originals scanned through the ADF.
19	Scanner Count	Total count of scanning operations.
20	Scanner Read Count	Total count of scanner readings.
21	Copy Print Count	Total count of copies printed.
22	Copy Scan Count	Total count of copies scanned.
23	PC Print Count	Total count printed from PC.
24	PC Scan Count	Total count scanned to PC.

F7 Mode		
No.	Item	Remarks
25	Fax Transmit Count	Total count of Fax transmitted.
26	Fax Receive Count	Total count of Fax received.
27	Fax Print Count	Total count of Fax printed.
28	Total OPC Rotation Time	Total Time of OPC Rotation.
29	A4/LT Count	Total count of A4 / Letter Print.
30	A4R / LETTER R Count	Total count of A4-R / Letter-R Print.
31	A3 / Ledger Count	Total count of A3 / Ledger Print.
32	B4 / LEGAL Count	Total count of B4 / Legal Print.
99	All Counter Clear	All counters are cleared.

5.1.7.　F8 Mode: Service Adjustment

Set the machine to Service Mode, and press "**8**" key on the Keypad.

↓

Press the "**START**" key.

↓

Enter the desired code number, or press "**V**", "**/**" arrow keys.

↓

If you wish to select another code number, scroll the menu with the arrow keys.

↓

Press the "**SET**" key.

↓

Enter the desired function code number, and press "**SET**" key.

↓

When the "**CLEAR**" key is pressed, the selected code input will not be accepted.

↓

Press "**STOP**" key, then press "**FUNCTION**", and "**CLEAR**" keys simultaneously to exit the service mode.

↓

Reboot the machine after setting the parameter(s) to activate the setting(s).

No.	Item	Remarks
	F8 Mode	
00	Exp. Lamp Replacement	When replacing the exposure lamp. Procedure: a) Press the Start key to move the exposure lamp to the position (approx. 250 mm from the optics home position) where it can be replaced. b) To return the optical system to the home position, press the CLEAR key.*
01-05	Not Used	
06	Error Log Print/View	a) Each time the arrow key is pressed, the machine errors, or paper jam codes stored in memory are displayed, beginning with the oldest code. **Note:** Only the 30 most recent codes are displayed.
07	Error Log Clear	a) Press the Reset key. A Message "Error code can be cleared with the Start key" is displayed on the LCD.* b) Press the Start key.
08	**(Factory use only)**	Lock operation for Scanner Unit.
09	Toner Density Adjustment	Adjustment operation of Toner Density.
10	Drum Charge Adjustment	Adjustment operation of Drum Charge.
11	Not Used	
12	Org.size Sensor Adj. (Not Used)	Adjust the slice level for the original size detection sensors automatically. Execute this mode by closing the platen cover.
13	Black Density Reference (Not Used)	Adjustment operation of Black Density sensor.
14	OPC Counter Reset	Proceed when OPC is replaced.
15-17	Not Used	
18	LSU PWM Pattern	Print out the Test Pattern. Proceed when the LSU is replaced.

F8 Mode		
No.	**Item**	**Remarks**
19	Move Mirror To Lock	a) Press the Start key to move the mirror unit to the locked position for transporting the copier. b) When the mirror unit is locked, the machine will not accept any numerical key input. **Note:** The locking operation is automatically reset when the Power switch is turned ON again.
20	TDC Check Operation	Adjustment of TDC sensor.
21-46	Not Used	
47	ADF Continuous Test	Press START key to begin.
48	Platen Continuous Test	Press START key to begin.

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5.1.8.   F9 Mode: Unit Maintenance

Set the machine to Service Mode, and press "**9**" key on the Keypad.
↓
Press the "**START**" key.
↓
Enter the desired code number, or press "**V**", "**/**" arrow keys.
↓
If you wish to select another code number, scroll the menu with the arrow keys.
↓
Press the "**SET**" key.
↓
Enter the desired function code number, and press "**SET**" key.
↓
When the "**CLEAR**" key is pressed, the selected code input will not be accepted.
↓
Press "**STOP**" key, then press "**FUNCTION**", and "**CLEAR**" keys simultaneously to exit the service mode.
↓
Reboot the machine after setting the parameter(s) to activate the setting(s).

F9 Mode					
Service Mode	**Item**				**Remarks**
F9	Unit Maintenance	00	Fax Service Mode		
		01	Service Alert Tel #		Displays the contact number when a machine malfunction occurs.
		02	Firmware Version	00	SC	Displays the firmware version for SC.
				01	SC Boot	Displays the firmware version for SC Boot.
				02	PNL	Displays the firmware version for PNL.
				03	SPC	Displays the firmware version for SPC.
				04	Not Used	
				05	FAX Modem	Displays the firmware version for FAX option 1.
				06	Not Used	
				07	SC2	Displays the firmware version for Slot 1.
		03	Print Device Info.	00	F5/F6 Parameters	Prints the memory contents of the F5, and F6 modes.
				01	Machine Information	Prints the machine setup information list.
				02	Counter Information	Prints the Counter information list.
				03	System Address Info.	Prints the system memory setting.
				04	RAM Address Information	Prints the RAM data dump list.
		04	RAM Edit Mode	0	Relative Address	Setting of Relative address.
				1	Absolute Address	Setting of Real address.
		05	Serial Number		Registration of Serial Number for Maintenance. Clears by Shipment Set.

F9 Mode					
Service Mode	**Item**				**Remarks**
F9	Unit Maintenance	06	RAM Initialize	00 Parameter Initialize	Resets the Fax, and Function parameters to default values. **Note:** Turn the Power Switch to the **OFF**, and back to the **ON** position to enable the parameter settings.
				01 All Job Clear	Clears all Jobs stored in Flash Memory.
				02 LBP Error Log Clear	Clears LBP Error log
				03 Shipment Set	Clears All Jobs, All Preset Data, Parameter Initialize & Resets the Counters (Fax).
				04 LBP Fuser Reset	Clears the LBP fuser error.
				05 Dept. Counter Clear	Resets the Counter
				06 Flash Memory Clear	Clears the Flash Memory Data
		07	Firmware Update	00 Update FROM Card	Updates the firmware in the machine with the Master Firmware Card.
				01 Update from USB	Updates the firmware in the machine with the USB.
		08	Program Backup (Refer to Sect. 3.7.)	00 Main	Onboard F-ROM 4MB
				01 Option 1 all	Slot 1 FRM8 PCB 8MB
				02 Option 1 a	Slot 1 FRM8 PCB 4MB (a)
				03 Option 1 b	Slot 1 FRM8 PCB 4MB (b)
				04 Not Used	Slot 2 FRM8 PCB 8MB
				05 Not Used	Slot 2 FRM8 PCB 4MB (a)
				06 Not Used	Slot 2 FRM8 PCB 4MB (b)
		09	Update Program Card		Creates a Master Firmware Card using the Firmware Update Kit. A 4MB, or 8MB Flash Memory Card will be required depending upon the model.
		10	Program Copy	00 From card to slot 1	Configuration for Program copy.
				01 Not Used	
				02 From slot 1 to card	
				03 Not Used	
				04 Not Used	
				05 Not Used	
		11	Parameter Backup		Backup the Parameter.
		12	Parameter Restore		Restore the Parameter.
		13	Page Memory Size		Displays the page memory size (MB).
		14	Sort Memory Size		Displays the sort memory size (MB).

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5.2. Service Modes (For Facsimile)

5.2.1. Fax Service Mode Procedure

1. To enter the Fax Service Mode
   a. Press "**FAX/EMAIL**" key.
   b. Press "**FUNCTION**", and then "**7**" keys.
   c. Press "**MONITOR**" four times, then press "*****".
   d. Enter the desired code number, or press the "**V**", "**∧**" arrow keys.

2. To exit the Fax Service Mode
   Press "**STOP**" key.

Note:
The following buttons provide these functions in the Service Mode:

"START":	:	The new setting value is stored in the machine.
"V"	:	Scroll the function parameter number down.
"∧ "	:	Scroll the function parameter number up.

5.2.2. FAX Service Mode Table

The following service modes are provided to assist you in setting operational functions of the unit, and determining the condition of the unit.

Service Modes (For Facsimile)		
No.	Service Mode	Description
00	Not Used	
01	Function Parameter Setting	Allows changes to the function parameters (the home position, etc.).
02	RAM Edit Mode	**Factory use only.**
03	Print Parameter List / Report	Prints the Function Parameter List, Page Memory Test, Printer Report, All Document File, Protocol Trace, and Toner Order Form.
04	Modem Tests	Generates various binary, tonal, and DTMF signals, by the modem.
05	Not Used	
06	RAM Initialize	Initialize RAM, and restore the default value of the function parameters. **Note:** Turn the Power Switch to the **OFF**, and back to the **ON** position to enable the parameter settings.
07	Not Used	
08	Check & Call	Allows input of information for Service Alert Report, Maintenance Alert Report, and Toner Order Form.
09	System Maintenance	Used for Firmware Update, Firmware Backup, Parameter Restore, Parameter Backup, Transferring Firmware from the PC to the Flash Card, and Sending a Received File during a fatal printer error.

5.2.3. Fax Service Mode 1 (Function Parameter Setting)

Use the following procedure to change the function parameters.

Enter the desired code number, and press "**START**" key.

↓

If you wish to select another code number, scroll the menu with the "**V**", "**/**" arrow keys.

↓

Select the desired function code, and press the "**START**" key.

↓

When the "**CLEAR**" key is pressed, the selected code input will not be accepted.

↓

Press "**STOP**" key twice to exit the service mode.

	Function Parameter Table		
No.	Parameter	Selections	Function
000	Monitor/Tel Dial	1 = Monitor 2 = Tel/Dial	Selects whether the machine starts to TX automatically during On-Hook dialing. **Monitor** : Start to TX after pressing START **TEL/DIAL** : Start to TX automatically
001	Alarm Status	1 = Off 2 = Timer 3 = Constant	Selects the No Paper, or No Toner alarm status. **OFF** : Alarm is disabled. **Timer** : Alarm will shut off after 6 seconds. **Constant** : Alarm will not stop until "STOP" is pressed, or the error is cleared/corrected.
002	Stop Comm. JRNL	1 = Off 2 = On	Selects whether the machine prompts to print the COMM. Journal when the printout condition is set to INC, and STOP is pressed during communication.
003	Continuous Poll	1 = Off 2 = Stn (Tx only) 3 = Hub (Rx only)	Selects whether the Continuous Polling feature is enabled. **Stn** : Place the document(s) on the ADF, or Platen, then press the assigned Program Key to store, or add the documents into a polled file. (See Note 1) **Hub** : When the polling command is initiated, the machine will continuously poll originals from the remote stations until it is interrupted by pressing "STOP".
004	Numeric ID Set	1 = Off (will not accept) 2 = On (accepts)	Selects whether the machine accepts, and allows to set, or change the Numeric ID.

Function Parameter Table

No.	Parameter	Selections	Function
005	Destination Code	000 : Austria 001 : U.K. 002 : Canada 003 : Denmark 004 : Taiwan 005 : Finland 006 : Germany 007 : Netherlands 008 : Italy 009 : Spanish 010 : Hong Kong 011 : Australia 012 : Switzerland 013 : Norway 015 : Portuguese 016 : Ireland 017 : Belgium 018 : Sweden 019 : Turkey 020 : U.S.A. 021 : France 022 : New Zealand 025 : Japan 029 : Poland 030 : Czech 031 : Russia 032 : Greece 033 : Hungary 034 : Indonesia 035 : South Korea 038 : Malaysia 039 : China 045 : Thailand 048 : South Africa 049 : Singapore 050 : Universal 051 : East Euro	Specified destinations only.
006	ID Display	1 = Number (Numeric ID) 2 = Chara (Character ID)	Selects the priority of displaying the ID.
007	JRNL Column	1 = Station 2 = RCV'D ID	Selects the contents of the ID to display on the Journal.
008	Monitor	1 = Off 2 = On	Selects whether the Monitor is ON/OFF for monitoring fax signals. **(FOR SERVICE USE ONLY)**
009	DC Loop	1 = Off (Normal) 2 = On (Off Hook)	Selects a false Off Hook state for back to back communication test.
010	TX Level	00 = 0 dBm ~ 15 = -15 dBm	Selects the TX signal output level, 0 to -15 dBm in 1 dBm steps. (Refer to Chapter 4.3.)
011	RX Level	1 = -43 dBm 2 = -38 dBm 3 = -33 dBm 4 = -48 dBm	Selects the receiving sensitivity of -33/-38/-43/-48 dBm.

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Function Parameter Table			
No.	Parameter	Selections	Function
012	DTMF Level	00 = 0 dBm ~ 15 = -15 dBm	Selects the DTMF output level, 0 to -15 dBm in 1 dBm steps.
013	G3 RX EQL	1 = 0dB 2 = 4dB 3 = 8dB 4 = 12dB	Selects the cable equalizer for G3 reception mode, 0dB, 4dB, 8dB, or 12dB.
014	G3 TX EQL	1 = 0dB 2 = 4dB 3 = 8dB 4 = 12dB	Selects the cable equalizer for G3 transmission mode, 0dB, 4dB, 8dB, or 12dB.
015 ~ 016	Not Used		

017	TX Start	2400 bps
		4800 bps
		7200 bps
		9600 bps
		TC7200
		TC9600
		12000 bps
		14400 bps
			Selects the transmission modem start speed, 14400/12000/TC9600/TC7200/9600/7200/4800/2400 bps.
			    Press "V", or "∧ " to select the symbol rate.
			Note:
			    This parameter is applicable only when communicating with regular G3 machines. When communicating with Super G3 (V.34) machines, use Parameter No. 32.

018	RX Start	2400 bps
		4800 bps
		7200 bps
		9600 bps
		TC7200
		TC9600
		12000 bps
		14400 bps
			Selects the reception modem start speed, 14400/12000/TC9600/TC7200/9600/7200/4800/2400 bps.
			    Press "V", or "∧ " to select the symbol rate.
			Note:
			    This parameter is applicable only when communicating with regular G3 machines. When communicating with Super G3 (V.34) machines, use Parameter No. 33.

019	ITU-T V.34	1 = Off 2 = On 3 = Select	Selects whether the ITU-T V.34 is Off, On, or Select. **Select**: Select whether the ITU-T V.34 is Off, or On, when entering Phone Book Dialing Numbers, or Manual Number Dialing.
020	ITU-T ECM	1 = Off (Invalid) 2 = On (Valid)	Select the ECM mode.
021	EP Tone	1 = Off (without EP Tone) 2 = On (with EP Tone)	Selects whether to add the echo protect tone on V.29 mode. (Used when Echo Suppression is disabled.) **On** : Add **Off** : Do not add
022	Signal Interval	1 = 100 ms 2 = 200 ms 3 = 500 ms	Selects the time interval between the receiving signal, and the transmitting signal.
023	TCF Check	1 = Normal (Short) 2 = Long	Selects the TCF check interval Long/Short
024	CED Frequency	1 = 1080 Hz (non ITU-T) 2 = 2100 Hz	Selects the CED frequency 2100/1080 Hz
025	COMM. Start-Up	1 = First 2 = Second	Selects the communication start-up condition (XMT, and Polling). (Used when Echo Suppression is disabled.)

Function Parameter Table

No.	Parameter	Selections	Function
026	Non-Standard	1 = Off (Invalid) 2 = On (Valid)	Selects own mode (Panafax mode).
027	Short Protocol B	1 = Off (Invalid) 2 = On (Valid)	Selects the short protocol mode.
028	Short Protocol D	1 = Off (Invalid) 2 = On (Valid)	Selects the short protocol mode. When activated, it allows the machine to automatically store the modem speed for each Auto Dial Number.
029	Remote Diagnostics	1 = Off (will not accept) 2 = On (accepts)	Selects whether the machine accepts Remote Diagnostics from the service station.
030	CED & 300 bps	1 = 75 ms 2 = 1 sec	Selects the pause interval between the CED, and the 300 bps signal. (Used when Echo Suppression is disabled.)
031	RTC = EOL x 12	1 = Off (EOLx6) 2 = On (EOLx12)	Selects the RTC signal, EOLx6, or EOLx12.
032	V34 TX Start	2400-33600bps	Selects the transmission modem start speed for V.34 communication, 33600-2400 bps. Press "V", or "/\ " to select the symbol rate.
033	V34 RX Start	2400-33600bps	Selects the receiving modem start speed for V.34 communication, 33600-2400 bps. Press "V", or "/\ " to select the symbol rate.
034	V34 TX SR	2400-3429sr	Selects the transmission symbol rate for V.34, 3429/3200/3000/2800/2400 sr. Press "V", or "/\ " to select the symbol rate.
035	V34 RX SR	2400-3429sr	Selects receiving symbol rate for V.34, 3429/3200/3000/2800/2400 sr. Press "V", or "/\ " to select the symbol rate.
036	Not Used		
037	Protocol Display	1 = Off (not displayed) 2 = On (displayed)	Selects whether to display the modem speed during communication. (Press the Job Status Key to display)
038	Not Used		
039	Flash Time	5 = 50 ms ~ 100 = 1000 ms	Selects the pause interval before activating the Flash key.
040	Flash Time (PSTN)	5 = 50 ms ~ 100 = 1000 ms	Selects the pause interval before activating the Flash key. (For Germany, Austria, and Czech)
041	Pause Time	1 = 1 sec. ~ 10 = 10 sec.	Selects the pause interval from 1 sec. ~ 10 sec. for dialing through a switchboard, or for international calls.
042	Not Used		
043	Redial Interval	0 = no waiting ~ 15 = 15 minutes	Selects the redial interval from 0 to 15 minutes in 1 minute steps.
044	Redial Count	0 = no redial ~ 15 = 15 times 0 ~ 9 (For Australia Only)	Selects the redial count from 0 to 15 times in 1 step intervals. **Note:** In order to comply with the requirements TBR21 in the EC countries, do not select 15 times.

Function Parameter Table

No.	Parameter	Selections	Function
045	Ring Detect Count	1 = 1 ring ~ 9 = 9 rings	Selects the ring detection count from 1 to 9 rings in 1 ring step intervals.
046	On-Hook Time	0 = 0 sec. ~ 90 = 90 sec.	Selects the on-hook time between sequential communication calls in 1 second step intervals.
047	Response Wait Interval	1 = 1 sec. ~ 90 = 90 sec. 20 ~ 150 sec. (For France Only)	Selects the waiting interval for the response after completing the dialing.
048~ 049	Not Used		
050	Ring Detect Mode	1 = Normal 2 = Rough	Selects the quality of ringer detection. Use if the line signal is out of regulation, set to "Rough" so that the unit may detect the ringing signals.
051	Not Used		
052	Pulse Rate	1 = 10 pps 2 = 20 pps	Selects the dial pulse rate 10/20 pps.
053~ 054	Not Used		
055	Busy Tone Check	1 = Off 2 = On	Selects whether to detect the Busy Tone.
056	Dial Tone Check	1 = Off 2 = On	Selects whether to detect Dial Tone before dialing the telephone number.
057	DC Loop Check (Except for USA, and Canada)	1 = Off 2 = On	Selects whether the unit checks the DC Loop during communication.
058	Comm. JRNL + Image	1 = Off (without image) 2 = On (with image)	Selects whether the machine prints the COMM. Journal with image.
059	Confidential RCV Report	1 = Off (does not print out) 2 = On (prints out)	Selects whether the machine prints the Confidential RCV Report.
060	Version	Indicates the Host software version.	
061	TX/RX/PRT/CPY	TX:****** PRT:****** RX:****** CPY:******	Displays the transmitted, received, total printed, and copied document count.
062	Print Counter	1 = Off 2 = On	Selects whether to print in the Fax Parameter List, the counter information that is displayed in the Function Parameter No. 61.
063~ 067	Not Used		
068	NYSE Fax Forward (USA, and Canada Only)	1 = Off 2 = On	Selects whether the machine will forward the incoming, and outgoing faxes to a specified station. **Note:** Once this parameter is activated, Fax Forwarding via Fax Parameter No. 054 is automatically disabled, an Access Code of "0000" is automatically assigned, and Fax Parameter No. 038 has a new setting added called "NYSE".

No.	Parameter	Selections	Function
069	NYSE Local Print (USA, and Canada Only)	1 = Inc 2 = On (Always)	Selects the printing condition for the incoming faxes after FAX Forwarding. **INC.** : Prints only if FAX Forwarding fails. **ON** : Always prints.

070	Line Error	128 lines
		256 lines
		512 lines
		1024 line
		2048 lines
		Off
		(will not disconnect line)
			1. Selects the line disconnect condition during reception. If the number of line errors exceed this setting, the unit will disconnect the line.
			    Press "V", or "Λ " to select the symbol rate.
			2. Selects the transmit condition of RTP/PIP, or RTN/PIN.
			    (Available if No. 73 Error Detect is set to "LINES") (See Note 1)

071	Total Error	1 = 5% 2 = 10% 3 = 15% 4 = 20%	Selects the transmit condition of RTP/PIP, or RTN/PIN. (Available if No. 73 Error Detect is set to "RATE".) (See Note 2)
072	Continuous Error	1 = Off (unlimited) 2 = 3 lines/STD 3 = 6 lines/STD 4 = 12 lines/STD	Selects the continuous total error criteria of Off/3/6, or 12 lines in Standard mode. If continuous total error exceeds this setting, the unit will transmit RTN/PIN. (Available if No. 73 Error Detect is set to "RATE".)
073	Error Detect	1 = Lines 2 = Rate	Selects the error detect condition Lines/Rate.
074	RTN Receive	1 = Disconnect 2 = Continue	Selects whether to disconnect the phone line, or continue when "RTN" is received.
075	Coding	1 = MH (MH only) 2 = MR (MH, or MR) 3 = MMR (MH, or MR, or MMR) 4 = JBIG	Selects the coding scheme.
076	Batch TX	1 = Off 2 = On	Selects whether the batch transmission is available.
077	RX JAM Length	1 = Off (unlimited) 2 = 2 m	Selects the maximum length of a received document that can be printed.
078~ 079	Not Used		
080	Doc Top Feed	-99 ~ +99	Adjusts the distance between the scanning sensor ON position, and the scanning start position.
081	Doc End Feed	-90 ~ +127	Adjusts the distance between the scanning sensor OFF position, and the scanning end position.
082	JAM Length	1 = 1 m 2 = 2 m	Selects the maximum length of the original that can be scanned.
083	Not Used		
084	Line As No Paper	1 = Ring (ring) 2 = Busy (keep line busy)	Selects whether to ring, or send a busy tone to the remote station when the recording paper runs out, or the unit cannot receive because of any trouble.
085	Not Used		
086	Reduction Fine	1 = Off 2 = On	Selects whether to fix with Fine Mode, or not for the Reduction transmission.

Function Parameter Table

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\		Function Parameter Table	
No.	**Parameter**	**Selections**	**Function**
087	Darker Level	0 = Lightest Contrast	Selects the contrast level.
088	Normal Level	~	0← →15
089	Lighter Level	15 = Darkest Contrast	Lightest← →Darkest
090 ~ 091	Not Used		
092	Smoothing	1 = Off 2 = On	Selects whether the smoothing function is available.
093 ~ 094	Not Used		
095	Reduction Ratio	(70-100)	Selects Print Reduction Ratio (%).
096~ 101	Not Used		
102	Original Registration	-30 ~ +30	Adjustment of original registration detection timing.
103	Trail Edge Read Timing	-9 ~ 0	Adjustment of trail edge void.
104~ 109	Not Used		
110	MAC Address		Indicates the MAC Address.
111	Not Used		
112	Insert EMAIL TXT	1 = Off 2 = On	Selects whether the Text Template (email message) is programmable, and added on all email sent in the message body above the top line of text. (Up to 40 characters Programmed in the User Parameters.) **Note:** After enabling this feature, aside from entering the text in the User Parameters, it also has to be activated in each Auto Dial Number before it will take effect. It does not work for Direct Dialed Numbers.
113~ 114	Not Used		
115	Time Zone	1 = Scroll 2 = Direct	Selects the setting method for Time Zone. **Scroll** : Allows using "Scroll Keys" to scroll through the Time Zone Table. **Direct** : Allows you to input the Time Zone directly, (*) key to be used as a switch between +/-.
116	Overwrite Warning	1 = Yes 2 = No	Selects whether the Overwrite Warning is included on the Internet FAX Result Receipt when programming the Auto Dialer via email.
117~ 121	Not Used		
122	LDAP	1 = Off 2 = On	When LDAP is used, specialized characters may be displayed as different characters.
123	One Ring Sound (USA, and Canada Only)	1 = Off 2 = On (Effective from Oct. 2004 Production)	When Function Parameter No. 45 "Ring Detect Count" is set to 1 Ring, and this parameter is enabled (On), the machine will only ring once out loud, answering on the second ring count.

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Function Parameter Table			
No.	**Parameter**	**Selections**	**Function**
124 ~ 199	Not Used		

Note 1: Continuous Polling (Station Mode)
This feature allows you to store, or add documents into a polled file in memory.

To enable the Continuous Polling feature set Function Parameter No. 003 to "2:Station".
The last Program Key will be assigned with the "Store 4 Poll" Key name automatically
and cannot be changed.

To prepare the document(s) to be polled, simply place the document(s) on the ADF, or Platen
and then press the Program Key to store, or add the document(s) into a polled file.

(**Note:** If a regular polled file is stored in memory, the Program Key for Continuous Polling will
not be accepted.)

Note 2: Function Parameter No. 070 (Line Error)-Transmit condition of RTP/PIP, or RTN/PIN

Signal	Setting					
	1:128	**2:256**	**3:512**	**4:1024**	**5:2048**	**6:Off**
MCF/PIP	0-31	0-63	0-127	0-255	0-511	Always
RTP/PIP	32-63	64-127	128-255	256-511	512-1023	-
RTN/PIN	64-127	128-255	256-511	512-1023	1024-2047	-

Note 3: Function Parameter No. 071 (Total Error)-Transmit condition of RTP/PIP, or RTN/PIN

Signal	Setting			
	1:5%	**2:10%**	**3:15%**	**4:20%**
MCF/PIP	0-2	0-4	0-7	0-9
RTP/PIP	3-4	5-9	8-14	10-19
RTN/PIN	5-	10-	15-	20-

Note 4: The default setting of parameters depends on the country's specifications, or regulations. Print the
Function Parameter List to confirm the default settings.

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5.2.4. Fax Service Mode 3 (Printout of Lists, Reports, and Test Results)

From this Service Mode you can print the Function Parameter List, Page Memory Test, Printer Report, All Document File, Protocol Trace, and the Toner Order Form.

5.2.4.1. Function Parameter List

A list of all Function Parameters can be printed by the following procedure.

Press the "**V**", "**/**" arrow keys to select the "**3: Print Report/List**" on the display.

↓

Press the "**SET**" key to select the "**1: Function Parameter List**".

↓

Press the "**SET**" key.

↓

Press the "**STOP**" key twice to exit the service mode.

Function Parameter List (Sample)

```
************** -FUNCTION PARAMETER- ************* DATE MMM-dd-yyyy ***** TIME 12:07 ***P.01

000 Mon/Tel Dial          Monitor        050 Ring Det Mode             Normal
001 Alarm Status          Timer          051 ----------
002 Stop Comm. JRNL       On             052 Pulse Rate               10pps
003 Continuous Poll       Off            053 ----------
004 Numeric ID Set        On             054 ----------
005 Destination Code      999            055 Busy Tone Check          On
006 ID Display            Chara          056 Dial Tone Check          Off
007 JRNL Column           Station        057 DC Loop Check            Off
008 Monitor               Off            058 Comm. JRNL + Image       On
009 DC Loop               Off            059 Conf. RCV Report         On

010 TX Level              -9dBm          060 Version ..... AcV........
011 RX Level              -43dBm         061 TX/RX/PRT/CPY 000080/000168/000003/000000
012 DTMF Level            -5dBm          062 Print Counter            Off
013 G3 RX EQL             0dB            063 ----------
014 G3 TX EQL             0dB            064 ----------
015 ---------                            065 ----------
016 ---------                            066 ----------
017 TX Start              14400bps       067 ----------
018 RX Start              14400bps       068 ----------
019 ITU-T V.34            On             069 ----------

020 ITU-T ECM             On             070 Line Error               128
021 EP Tone               Off            071 Total Error              10
022 Sig. Interval         500ms          072 Conti. Error             Off
023 TCF Check             Normal         073 Error Detect             Rate
024 CED Freq.             2100Hz         074 RTN Receive              Discon
025 Comm. Start-Up        First          075 Coding                   JBIG
026 Non-Standard          On             076 BATCH TX:[On]            On
027 Short Protocol B      On             077 RX JAM Length            2 m
028 Short Protocol D      On             078 ----------
029 Remote Diag.          On             079 ----------

030 CED & 300bps          75ms           080 Doc Top Feed             0
031 RTC = EQL x 12        Off            081 Doc End Feed             0
032 V34 TX Start          33600bps       082 JAM Length               2 m
033 V34 RX Start          33600bps       083 ----------
034 V34 TX SR             3429sr         084 Line As NoPaper          Ring
035 V34 RX SR             3429sr         085 ----------
036 ---------                            086 Reduction Fine           On
037 Protocol Display      Off            087 Darker Level             2
038 ---------                            088 Normal Level             8
039 Flash Time            500ms          089 Lighter Level            4

040 ---------                            090 ----------
041 Pause Time            3sec           091 ----------
042 ---------                            092 Smoothing                On
043 Redial Interval       3min           093 ----------
044 Redial Count          5              094 ----------
045 Ring Det. Count       2              095 Reducton Ratio           100%
046 On-Hook Time          5sec           096 ----------
047 Response Wait         55sec          097 ----------
048 ---------                            098 ----------
049 ---------                            099 ----------




                                              -PANASONIC        -

 *****      ****************** -PANASONIC    - ****** -12345678901234567890- *********
```

Note:
   1. The contents of the Function Parameter List may vary depending on the country's regulations.
   2. " * " mark will be shown on the left side of number when setting was changed from default.

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5.2.4.2. Page Memory Test

A test pattern prints out for checking the page memory, and printer mechanism using the following procedure.

Press the "**V**", "**/**" arrow keys to select the "**3: Print Report/List**" on the display.

↓

Press the "**SET**" key to select the "**1: Function Parameter List**".

↓

Press the "**V**", "**/**" arrow keys to select the "**3: Page Memory Test**".

↓

Press the "**SET**" key.

↓

Press the "**STOP**" key twice to exit the service mode.

```
************* TEST PATTERN PRINT *************** DATE MMM-dd-yyyy ***** TIME 12:07 ***P.01
```

[checkerboard test pattern]

```
        SC           :              TX/RX/PRT/CPY   : 000123/000456/000789/000666
        SC BOOT      :              MEMORY SIZE     : (2 MB)
        PNL          :              MAC ADDRESS     : 08002300E078
        SPC          :              SHIPMENT SET
        FAX MODEM    :
        SC2          :


                                                -PANASONIC          -

     *****        ***************** -PANASONIC        - ****** -12345678901234567890- ***********
```
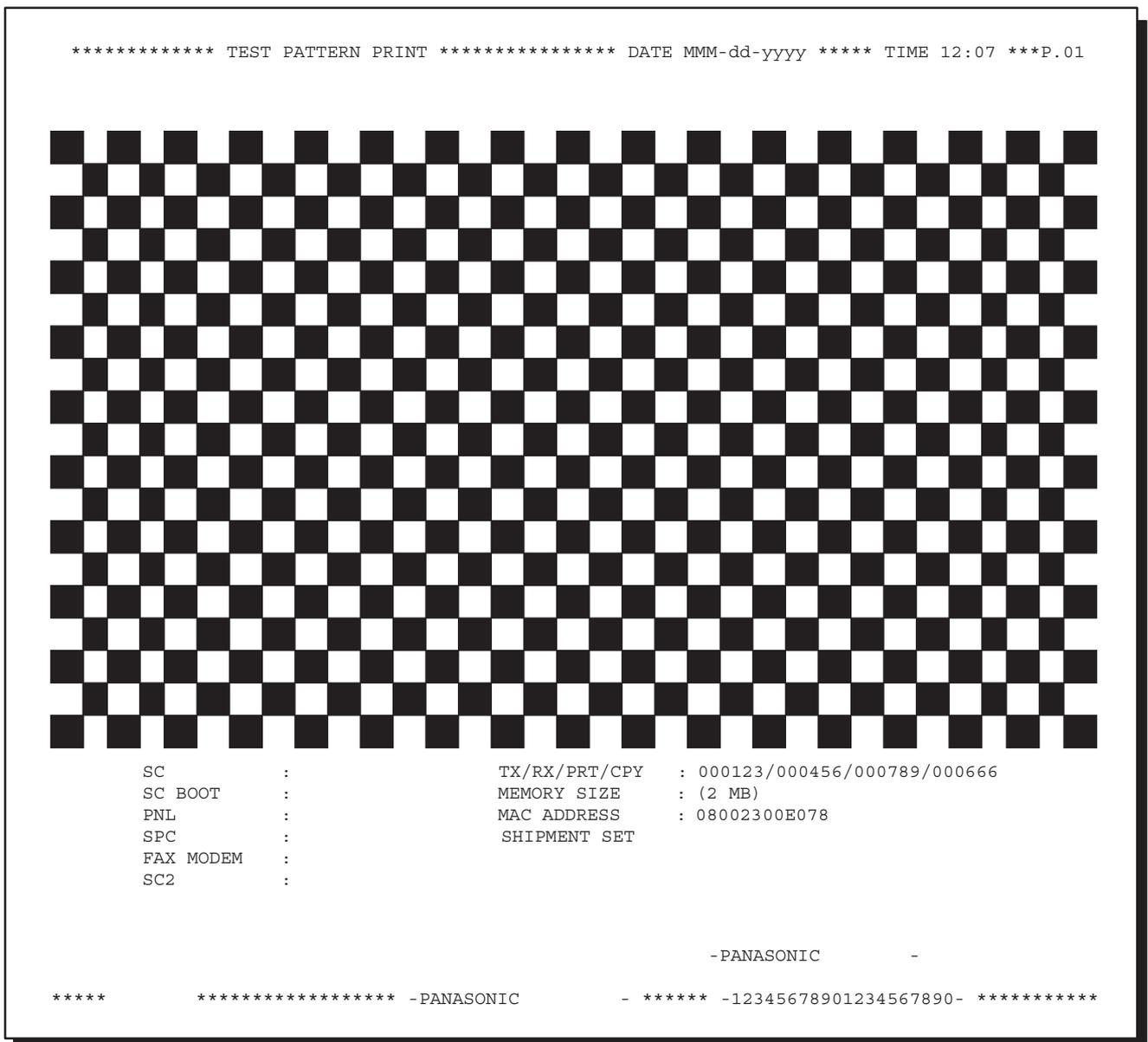
5.2.4.3.   Printer Report

All printer errors are logged on the Printer Report which can be printed by the following procedure.

Press the "**V**", "**Λ**" arrow keys to select the "**3: Print Report/List**" on the display.
        ↓
Press the "**SET**" key to select the "**1: Function Parameter List**".
        ↓
Press the "**V**", "**Λ**" arrow keys to select the "**4: Printer Report**".
        ↓
Press the "**SET**" key.
        ↓
Press the "**STOP**" key twice to exit the service mode.

```
 **************-PRINTER REPORT-******************** DATE MMM-dd-yyyy ***** TIME 19:02********

             LAST PRINT ERROR      : MMM-dd-yyyy 15:38 J00        00-00000016

             SERIAL NUMBER         :
             CUSTOMER ID           : 1234567890123456

             FIRMWARE VERSION
              SC                   :
              PNL                  :
              SPC                  :

             TRANSMIT COUNTER      : 000475
             RECEIVE COUNTER       : 000398
             COPY COUNTER          : 000083
             PRINT COUNTER         : 000016

   NO.DATE & TIME       ERROR CODE RRROR COUNT  |  NO.DATE & TIME       ERROR CODE RRROR COUNT
   --------------------------------------------------------------------------------------------
   01.MMM-dd-yyyy 15:38 J00        00-00000016  |
   02.MMM-dd-yyyy 10:48 J02        00-00000016  |

   --------------------------------------------------------------------------------------------
                                                      -PANASONIC        -
   *****        *******************-PANASONIC     -*******-12345678901234567890-**************
```

5.2.4.4.   All Document Files

Print the document files from the Flash Memory.

Press the "**V**", "**/**" arrow keys to select the "**3: Print Report/List**" on the display.
         ↓
Press the "**SET**" key to select the "**1: Function Parameter List**".
         ↓
Press the "**V**", "**/**" arrow keys to select the "**5: All Document Files**".
         ↓
Press the "**SET**" key.
         ↓
Press the "**STOP**" key twice to exit the service mode.

5.2.4.5. Protocol Trace

Print a Protocol Trace Report for the previous communication.

Press the "**V**", "Λ" arrow keys to select the "**3: Print Report/List**" on the display.

↓

Press the "**SET**" key to select the "**1: Function Parameter List**".

↓

Press the "**V**", "Λ" arrow keys select the "**6: Protocol Trace**".

↓

Press the "**SET**" key.

↓

Press the "**STOP**" key twice to exit the service mode.

```
*************** PROTOCOL LOG. REPORT ****************** DATE MMM-dd-yyyy ***** TIME 16:56 *******


            STATUS        : OK
            MODE          : ECM-TX  (STANDARD)
            SPEED         : 9600bps  0MS/L
            REMOTE CAPA.  : DIS 00 CE B9 C4 80 12
            LOCAL CAPA.   : TSI 2B 20 20 20 38 37 2B 2B 2B 2B
                                39 38 36 36 35 34 37 38 38 30
                            DCS 00 C6 F8 44

            COMMAND LOG.
            REMOTE        : NSF   CSI   DIS              CFR
            LOCAL         :                  TSI   DCS        PIX   PPS-EOP
            ----------------------------------------------------------------
            REMOTE        : MCF
            LOCAL         :       DCN
                                                    -PANASONIC      -

*****************************-PANASONIC      -*************-12345678901234567890-***************
```

5.2.4.6. Toner Order Form

The Toner Order Form can be printed out manually by the following procedure.

Press the "**V**", "**/**" arrow keys to select the "**3: Print Report/List**" on the display.

↓

Press the "**SET**" key to select the "**1: Function Parameter List**".

↓

Press the "**V**", "**/**" arrow keys to select the "**7: Toner Order Form**".

↓

Press the "**SET**" key.

↓

Press the "**STOP**" key twice to exit the service mode.

```
*************************************
>    TONER BOTTLE ORDER FORM     <
*************************************


**** The toner supply in your machine is running low **** (1)
To order a replacement Bottle from your Authorized Dealer


        by Phone:  1 201 111 5555 (2)
        by Fax:    1 201 111 4444 (3)


        Thank you for your order.


        Customer Name and Address
        =========================
```

Ship to:_____ Bill to:_____

_____ _____

_____ _____

Attention:_____ Attention:_____

Phone No.:_____ Phone No.:_____

Customer ID: ABC COMPANY (4) P.O. No.(if required):_____

Toner Cartridge: (5) Serial No.:_____

Quantity Required:

Print your name and title   Signature & Date

Explanation of Contents

(1) Low Toner Message (Fixed)   "The toner supply in your machine is running low"
(2) Toner Order Tel #   Up to 36 digits
(3) Toner Order Fax #   Up to 36 digits
(4) Customer ID   Up to 16 characters (User Identification Code)
(5) Toner Cartridge   DQ-TU10J (For DP-8020E/8020P/8016P Except for USA, Canada, and China)
                                   DQ-TUJ10K (For DP-8020E/8020P/8016P for USA, Canada, and China)

5.2.5. Fax Service Mode 4 (Modem Test)

5.2.5.1. Binary Signal

This Service Mode is used to check the binary signal output. Signals can be output to the line using the following procedure.

Press the "**V**", "**/**" arrow keys to select the "**4: MODEM Test**" on the display.
   ↓
Press the "**SET**" key to select the "**1: Signal Test**".
   ↓
Press the "**SET**" key.
   ↓
Press the desired number.
   ↓
Press the "**SET**" key.
   ↓
Press the "**STOP**" key twice to exit the service mode.

Binary Signal Table

Number	Signals
1	V21 300bps
2	V27ter 2400bps
3	V27ter 4800bps
4	V29 7200bps
5	V29 9600bps
6	V17 TC7200bps
7	V17 TC9600bps
8	V17 12000bps
9	V17 14400bps

5.2.5.2. Tonal Signal

This Service Mode is used to check the tonal signal output. Signals can be output to the line using the following procedure.

Press the "**V**", "**∧**" arrow keys to select the "**4: MODEM Test**" on the display.
     ↓
Press the "**SET**" key to select the "**2: Tonal Test**".
     ↓
Press the "**SET**" key.
     ↓
Press the desired number, and press the "**START**" key.
     ↓
Press the "**STOP**" key twice to exit the service mode.

Tonal Signal Table

Number	Signals
1	462 Hz
2	1080 Hz
3	1100 Hz
4	1300 Hz
5	1650 Hz
6	1850 Hz
7	2100 Hz

5.2.5.3. DTMF Signal

This Service Mode is used to check the DTMF (Dual Tone Multi Frequency) signal output.
The DTMF signal can be generated using the following procedure.

• DTMF Single Tone

Press the "**V**", "**∧**" arrow keys to select the "**4: MODEM Test**" on the display.
↓
Press the "**SET**" key to select the "**3: DTMF Test**".
↓
Press the "**SET**" key.
↓
Press the "**V**", "**∧**" arrow keys to select the "**1. Single**".
↓
Press the desired number, and press the "**START**" key.
↓
Press the "**STOP**" key twice to exit the service mode.

• DTMF Dual Tone

Press the "**V**", "**∧**" arrow keys to select the "**4: MODEM Test**" on the display.
↓
Press the "**SET**" key to select the "**3: DTMF Test**".
↓
Press the "**SET**" key.
↓
Press the "**V**", "**∧**" arrow keys to select the "**2. Dual**".
↓
Press the desired number, and press the "**START**" key.
↓
Press the "**STOP**" key twice to exit the service mode.

<table>
<tr><th colspan="2">DTMF Single Tone Table</th></tr>
<tr><th>Number</th><th>DTMF Signal Tones</th></tr>
<tr><td>1</td><td>697 Hz</td></tr>
<tr><td>2</td><td>770 Hz</td></tr>
<tr><td>3</td><td>852 Hz</td></tr>
<tr><td>4</td><td>941 Hz</td></tr>
<tr><td>5</td><td>1209 Hz</td></tr>
<tr><td>6</td><td>1336 Hz</td></tr>
<tr><td>7</td><td>1477 Hz</td></tr>
<tr><td>8</td><td>1633 Hz</td></tr>
</table>

<table>
<tr><th colspan="2">DTMF Dual Tone Table</th></tr>
<tr><th>Number</th><th>DTMF Dual Tones</th></tr>
<tr><td>0</td><td>941 Hz + 1336 Hz</td></tr>
<tr><td>1</td><td>697 Hz + 1209 Hz</td></tr>
<tr><td>2</td><td>697 Hz + 1336 Hz</td></tr>
<tr><td>3</td><td>697 Hz + 1477 Hz</td></tr>
<tr><td>4</td><td>770 Hz + 1209 Hz</td></tr>
<tr><td>5</td><td>770 Hz + 1336 Hz</td></tr>
<tr><td>6</td><td>770 Hz + 1477 Hz</td></tr>
<tr><td>7</td><td>852 Hz + 1209 Hz</td></tr>
<tr><td>8</td><td>852 Hz + 1336 Hz</td></tr>
<tr><td>9</td><td>852 Hz + 1477 Hz</td></tr>
<tr><td>*</td><td>941 Hz + 1209 Hz</td></tr>
<tr><td>#</td><td>941 Hz + 1477 Hz</td></tr>
</table>

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5.2.5.4.   Binary Signal (V.34)

This Service Mode is used to check the binary signal output. Signals can be output to the line using the following procedure. (V.34)

Press the "**V**", "**/**" arrow keys to select the "**4: MODEM Test**" on the display.
↓
Press the "**SET**" key to select the "**4: V34 MODEM**".
↓
Press the "**SET**" key.
↓
Press the desired number, and press the "**START**" key.
↓
Press the "**STOP**" key twice to exit the service mode.

Binary Signal Table

Number	Signals	Number	Signals	Number	Signals
01	V34 2400 sr 2400 bps	22	V34 3000 sr 9600 bps	43	V34 3429 sr 4800 bps
02	V34 2400 sr 4800 bps	23	V34 3000 sr 12000 bps	44	V34 3429 sr 7200 bps
03	V34 2400 sr 7200 bps	24	V34 3000 sr 14400 bps	45	V34 3429 sr 9600 bps
04	V34 2400 sr 9600 bps	25	V34 3000 sr 16800 bps	46	V34 3429 sr 12000 bps
05	V34 2400 sr 12000 bps	26	V34 3000 sr 19200 bps	47	V34 3000 sr 19200 bps
06	V34 2400 sr 14400 bps	27	V34 3000 sr 21600 bps	48	V34 3429 sr 16800 bps
07	V34 2400 sr 16800 bps	28	V34 3000 sr 24000 bps	49	V34 3429 sr 19200 bps
08	V34 2400 sr 19200 bps	29	V34 3000 sr 26400 bps	50	V34 3429 sr 21600 bps
09	V34 2400 sr 21600 bps	30	V34 3000 sr 28800 bps	51	V34 3429 sr 24000 bps
10	V34 2800 sr 4800 bps	31	V34 3200 sr 4800 bps	52	V34 3429 sr 26400 bps
11	V34 2800 sr 7200 bps	32	V34 3200 sr 7200 bps	53	V34 3429 sr 28800 bps
12	V34 2800 sr 9600 bps	33	V34 3200 sr 9600 bps	54	V34 3429 sr 31200 bps
13	V34 2800 sr 12000 bps	34	V34 3200 sr 12000 bps	55	V34 3429 sr 33600 bps
14	V34 2800 sr 14400 bps	35	V34 3200 sr 14400 bps	56	ANSam
15	V34 2800 sr 16800 bps	36	V34 3200 sr 16800 bps	57	CM
16	V34 2800 sr 19200 bps	37	V34 3200 sr 19200 bps	58	JM
17	V34 2800 sr 21600 bps	38	V34 3200 sr 21600 bps	59	INFO0c & TONEB
18	V34 2800 sr 24000 bps	39	V34 3200 sr 24000 bps	60	INFO0c & TONEA
19	V34 2800 sr 26400 bps	40	V34 3200 sr 26400 bps	61	PPh & AC & ALT
20	V34 3000 sr 4800 bps	41	V34 3200 sr 28800 bps		
21	V34 3000 sr 7200 bps	42	V34 3200 sr 31200 bps		

5.2.6. Fax Service Mode 6 (RAM Initialization)

Initializes RAM, and restores the Function Parameters to their default values.

Note:
This operation should be performed when the unit is first installed.

Press the "**V**", "**/**" arrow keys to select the "**6: RAM initialize**" on the display.
↓
Press the "**SET**" key to select the desired Mode number.
↓
Press the "**SET**" key to initialize RAM.
↓
Press the "**STOP**" key twice to exit the service mode.

RAM Initialization Table

No.	Initialize Mode	Description
01	PARAMETER INITIALIZE	Restores the Fax, and Function Parameters to default values. **Note:** Turn the Power Switch to the **OFF**, and back to the **ON** position to enable the parameter settings.
02	JOURNAL CLEAR	Clears the Journal contents.
03	AUTO DIAL CLEAR	Clears the One-touch, ABBR Numbers, and Phone Books.
04	PROGRAM DIAL CLEAR	Clears the Program keys.
05	LOGO/ID/PSWD CLEAR	Clears the Logo, ID, Polling Password.
06	LBP ERROR LOG CLEAR	Clears the Printer Error Log.
07	SHIPMENT SET	Deletes all setting information, except parameter number 80, and 81, then set default values.
08	FLASH MEMORY CLEAR	Deletes all information in the Flash Memory.
09	ALL JOB CLEAR	Clears all Jobs stored in Flash Memory.

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5.2.7.   FAX Service Mode 8 (Check & Call)

5.2.7.1.   Overview

This feature enables the Authorized Servicing Dealers to manage, and improve the machine maintenance to their customers by alerting them of equipment problems. It also can be used as a Supply Sales Tool by alerting the Dealer that the unit is running Low on Toner. The function overview is as follows:

1. The machine's printer error information is stored in the Printer Report.
2. The printer report can be manually printed when required.
3. When printer errors occurs, the unit can automatically transmit the Service Alert Report to the pre-registered telephone number, or email address.
4. When the unit detects Low Toner, or PM counter reached the maintenance timing, it can automatically transmit the Maintenance Alert Report to the pre-registered telephone number, or email address.

Press the "**V**", "**/**" arrow keys to select the "**8: Check & Call**" on the display.

↓

Press the "**SET**" key to select the desired code number.
(i.e. 01 Service Alert Fax #, input the telephone No., or for an email address, press the "**FAX/EMAIL**" Mode key, and input the email address.)

↓

Press the "**SET**" key.

↓

Press the "**STOP**" key twice to exit the service mode.

5.2.7.2.   Printer Reports

• **Conditions under which a report can be printed, or transmitted**

1. Manual print
   The Printer Report can be printed by Service Mode 3. (See Sect. 5.2.4.3.)
2. Automatic transmission/printout
   a. Service Alert Report
      When the unit detects an Emergency Printer Error, the unit will immediately transmit the Service Alert Report to the pre-registered telephone number, or email address. However, the unit will not transmit the Service Alert Report if it finds the same error within the same date in the error log.
   b. Maintenance Alert Report
      When the unit detects Low Toner, the unit can automatically transmit the Maintenance Alert Report to the pre-registered telephone number, or email address. Refer to the Error Code Table.
   c. Toner Order Form
      When the unit detects Low Toner, the unit can automatically print the Toner Order Form with the pre-registered order information.
   d. Call Counter Report
      When the printer counter reaches the pre-set number, the unit can automatically transmit the Call Counter Report to the pre-registered telephone number, or email address.

Note:
The Service, and Maintenance Alert Reports are managed in the same manner as the normal memory transmission (Retry, Incomplete, File List, Display while it is transmitting, Journal).

Error Code	Log	Tx Report	Remarks
Ex-xx	O	S	Refer to the Mechanical Error Code (E Code) Table. (Sect. 4.6.3.)
E13			Out of Toner.
Jxx			Refer to the Jam Error Code (J Code) Table. (Sect. 4.6.2.)
Uxx			Refer to the User Error Code (U Code) Table. (Sect. 4.6.1.)
U13		M	Low Toner.

Note:
    TX (Transmission) Report: S = Service Alert Report, M = Maintenance Alert Report

5.2.7.3. SERVICE ALERT REPORT FORMAT

```
*************************************************** DATE MMM-dd-yyyy ***** TIME 03:47 ********

                              ****************************
                              >   SERVISE ALERT REPORT   <
                              ****************************
               LAST PRINT ERROR   : MMM-dd-yyyy 20:07 E04-01      00-00000013

               SERIAL NUMBER      :
      (1)      CUSTOMER ID        : ABC COMPANY
      (2)      FIRMWARE VERSION
                     SC           :
                     PNL          :
                     SPC          :

 (3)  COUNTER INFORMATION:
                                    CURRENT          PM CYCLE
      F7-02 Total Count          :      13          (------)
      F7-03 PM COUNT             :      13          120000
      F7-04 Scanner PM Count            9           (------)
      F7-05  . . . . .           :
      F7-06 OPC Drum Count       :      13          (------)
      F7-07 Process Unit Count   :      13          (------)
      F7-08 ADF PM Count         :       1
      F7-10 Developer Count      :      13
      F7-11 Sheet Bypass Count   :       0      F7-23 PC Print Count        :          0
      F7-12 1st Paper Tray Count :       3      F7-24 PC Scan Count         :          6
      F7-13 2st Paper Tray Count :       0      F7-25 FAX Transmit Count    :          0
      F7-14 3st Paper Tray Count :       0      F7-26 FAX Receive Count     :          0
      F7-15 4st Paper Tray Count :       0      F7-27 FAX Print Count       :          0
      F7-16 2-Sided Count        :       0      F7-28 OPC Drum Rotate       :          0
      F7-17 ADF/iADF Count       :       0      F7-29 A4/LT Count           :          0
      F7-18 ADF/iADF Read Count  :       0      F7-30 A4R/LTR Count         :          0
      F7-19 Scanner Count        :       0      F7-31 A3/LD Count           :          0
      F7-20 Scanner Read Count   :       0      F7-32 B4/LG Count           :          0
      F7-21 Copy Print Count     :       0
      F7-21 Copy Scan Count      :       0


 Call Counter Pri-set Value    :  999999


 (4)  PRINT ERROR:

      NO. DATE & TIME         ERROR CODE ERROR COUNT | NO. DATE & TIME        ERROR CODE ERROR COUNT
      -----------------------------------------------------------------------------------------------
      01  MMM-dd-yyyy 20:07 E04-01      00-00000013 |
      02  MMM-dd-yyyy 20:04 E04-01      00-00000013 |
                                                    |
                                                    |
                                                    |
                                                    |
      -----------------------------------------------------------------------------------------------



                                         -LOGO PANASONIC         -
 *****        ********************** -CHARACTER ID   - ***** -31415926535897932384-*********
```

Explanation of Contents

(1) Customer ID

(2) Firmware Version

(3) Counter Information

(4) Print Error   Last 30 records (Latest on top)

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5.2.7.4. MAINTENANCE ALERT REPORT FORMAT

```
**************************************************** DATE MMM-dd-yyyy ***** TIME 12:00 ********

                              ****************************
                              > MAINTENANCE ALERT REPORT <
                              ****************************


             LAST PRINT ERROR : MACHINE IS RUNNING OUT OF TONER (1)

             SERIAL NUMBER    :
             CUSTOMER ID      : ABC COMPANY (2)

             FIRMWARE VERSION   (3)
                SC            :
                PNL           :
                SPC           :

             TRANSMIT COUNTER : 000244   (4)
             RECEIVE COUNTER  : 000082
             COPY COUNTER     : 000000
             PRINT COUNTER    : 000000


   NO.DATE & TIME     ERROR CODE  ERROR COUNT     NO.DATE & TIME      ERROR CODE  ERROR COUNT
   -----------------------------------------------------------------------------------------

   -----------------------------------------------------------------------------------------















                                           -LOGO PANASONIC           -
   *********************************** -CHARACTER ID   - ***** -31415926535897932384-***********
```

Explanation of Contents

(1) Low Toner Message (Fixed)   "MACHINE IS RUNNING OUT OF TONER"

(2) Customer ID   Up to 16 characters (User Identification Code)

(3) Firmware Version

(4) Transmission / Reception / Copy / Print Counters

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5.2.7.5. Toner Order Form

```
*************************************
>     TONER BOTTLE ORDER FORM      <
*************************************


**** The toner supply in your machine is running low ****  (1)
To order a replacement Bottle from your Authorized Dealer


by Phone:  1 201 111 5555  (2)
by Fax:    1 201 111 4444  (3)


Thank you for your order.


Customer Name and Address
=========================


Ship to:_____      Bill to:_____

        _____              _____

        _____              _____

Attention:_____      Attention:_____

Phone No.:_____      Phone No.:_____

Customer ID: ABC COMPANY  (4)          P.O. No.(if required):_____

Toner Cartridge:           (5)         Serial No.:_____

                    Quantity Required:

                    ┌─────────┐
                    │         │
                    └─────────┘




_____      _____   /   /  ____
Print your name and title             Signature & Date
```

Explanation of Contents

(1) Low Toner Message (Fixed)   "The toner supply in your machine is running low"

(2) Toner Order Tel #   Up to 36 digits

(3) Toner Order Fax #   Up to 36 digits

(4) Customer ID   Up to 16 characters (User Identification Code)

(5) Toner Cartridge   DQ-TU10J (For DP-8020E/8020P/8016P
                                              Except for USA, Canada, and China)

                                       DQ-TUJ10K (For DP-8020E/8020P/8016P
                                              for USA, Canada, and China)

5.2.7.6.   CALL COUNTER REPORT

```
************************************************** DATE MMM-dd-yyyy ***** TIME 03:47 ********

            ******************************************************************
            >   SCHEDULED REPORT - CALL COUNTER HAS REACHED PRE-SET VALUE   <
            ******************************************************************
            LAST PRINT ERROR   : MMM-dd-yyyy 20:07 E04-01     00-00000013

            SERIAL NUMBER      :
       (1)  CUSTOMER ID        : ABC COMPANY
       (2)  FIRMWARE VERSION
            SC                 :
            PNL                :
            SPC                :
  (3)  COUNTER INFORMATION:
                                   CURRENT      PM CYCLE
     F7-02 Total Count         :      13       (------)
     F7-03 PM COUNT            :      13       120000
     F7-04 Scanner PM Count    :       9       (------)
     F7-05 . . . . .           :
     F7-06 OPC Drum Count      :      13       (------)
     F7-07 Process Unit Count  :      13       (------)
     F7-08 ADF PM Count        :       1
     F7-10 Developer Count     :      13
     F7-11 Sheet Bypass Count  :       0      F7-23 PC Print Count      :       0
     F7-12 1st Paper Tray Count :      3      F7-24 PC Scan Count       :       6
     F7-13 2nd Paper Tray Count :      0      F7-25 FAX Transmit Count  :       0
     F7-14 3rd Paper Tray Count :      0      F7-26 FAX Receive Count   :       0
     F7-15 4th Paper Tray Count :      0      F7-27 FAX Print Count     :       0
     F7-16 2-Sided Count       :       0      F7-28 OPC Drum Rotate     :       0
     F7-17 ADF/iADF Count      :       0      F7-29 A4/LT Count         :       0
     F7-18 ADF/iADF Read Count :       0      F7-30 A4R/LTR Count       :       0
     F7-19 Scanner Count       :       0      F7-31 A3/LD Count         :       0
     F7-20 Scanner Read Count  :       0      F7-32 B4/LG Count         :       0
     F7-21 Copy Print Count    :       0
     F7-21 Copy Scan Count     :       0


 Call Counter Pri-set Value       :       1

  (4)  PRINT ERROR:

     NO. DATE & TIME        ERROR CODE ERROR COUNT | NO. DATE & TIME       ERROR CODE ERROR COUNT
     ------------------------------------------------------------------------------------------
     01  MMM-dd-yyyy 20:07 E04-01    00-00000013 |
     02  MMM-dd-yyyy 20:04 E04-01    00-00000013 |
                                                 |
                                                 |
                                                 |
                                                 |
                                                 |
                                                 |
         ----------------------------------------------------------------------------------


                                          -LOGO PANASONIC        -
   *****          ********************** -CHARACTER ID   - ***** -31415926535897932384-********
```

Explanation of Contents

  (1) Customer ID

  (2) Firmware Version

  (3) Counter Information

  (4) Call Counter Pre-Set Value

5.2.8.   Service Mode 9 (System Maintenance)

5.2.8.1.   Overview

This Service Mode is used to maintain the machine. Use the following procedure for System Maintenance.

Press the "**V**", "**Λ**" arrow keys to select the "**9: System Maintenance**" on the display.
↓
Press the "**SET**" key to select the "**1: Send RCV'D File**". The display changes to the Fax Mode.
↓
Select the desired Fax number.
↓
Press "**START**" to send the Fax.
After the transmission, the machine returns to the Stand-by Mode.

Note:
If there is NO File in the machine, this operation will not function.
Press the "STOP" key twice to exit the service mode.

System Maintenance Table

No.	Maintenance Mode	Description
01	Send RCV'D File	Transfers documents from memory to another fax machine during a fatal printer error.

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6 System Description

6.1. Mechanical Operation

6.1.1. Scanning Mechanism (Flatbed)

1. Scanning Mechanism

The Scanning Mechanism consisting of Lens, CCD PCB Assembly, Mirrors, Scanner Lamp, Lamp Base Bracket and Mirror 2 Bracket, is used to scan originals.

• The Mirror 1 and Mirrors 2 reflect image information, in the form of light, through the Lens.
• The Lens focuses the image information and passes it to the CCD.
• The CCD, mounted on the CCD PC Board, converts the image information into an electrical signal.
• The Timing Belt driven by the Stepping Motor, move the Scanner Assembly.
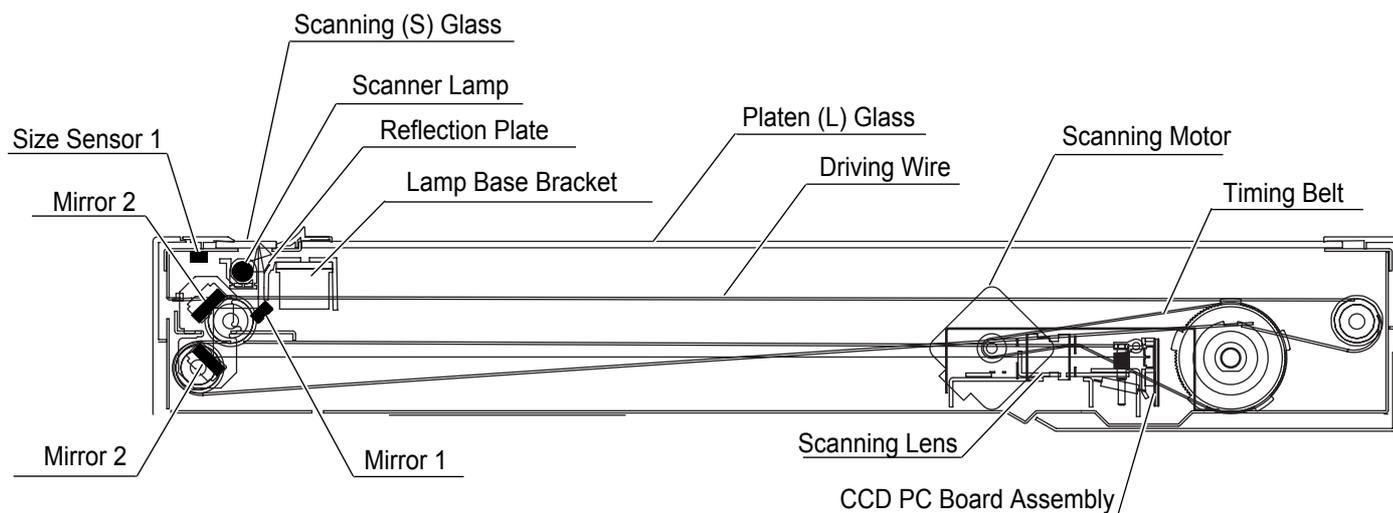
2. Transmit Mechanism

a. When ADF is used, originals are scanned on the Scanning (S) Glass. The Platen (L) Glass is used when scanning on the Platen.
b. The Scanning point is established by the setting on the Panel.
c. Document size is manually set when the Platen is used.
d. The Transmit Mechanism starts feeding and scanning originals based on the above Document Size Setting.
e. When scanning is completed, the Stepping Motor stops rotating and the Lamp Base and Mirror 2 Brackets return to the standby position.

During scanning, the Lamp Base Bracket and Mirror 2 Bracket move in the direction of the Black arrow and while returning to standby position, it moves in the direction of the White arrow as shown in the illustration. The location of these two brackets and the scanning length are established by the setting on the Panel. The following illustration shows the Drive system.

When scanning originals

When returning to Standby position

Scanning Motor

Drive Shaft Assembly

Lamp Base Bracket

Mirror 2 Bracket

Ver. 1.1
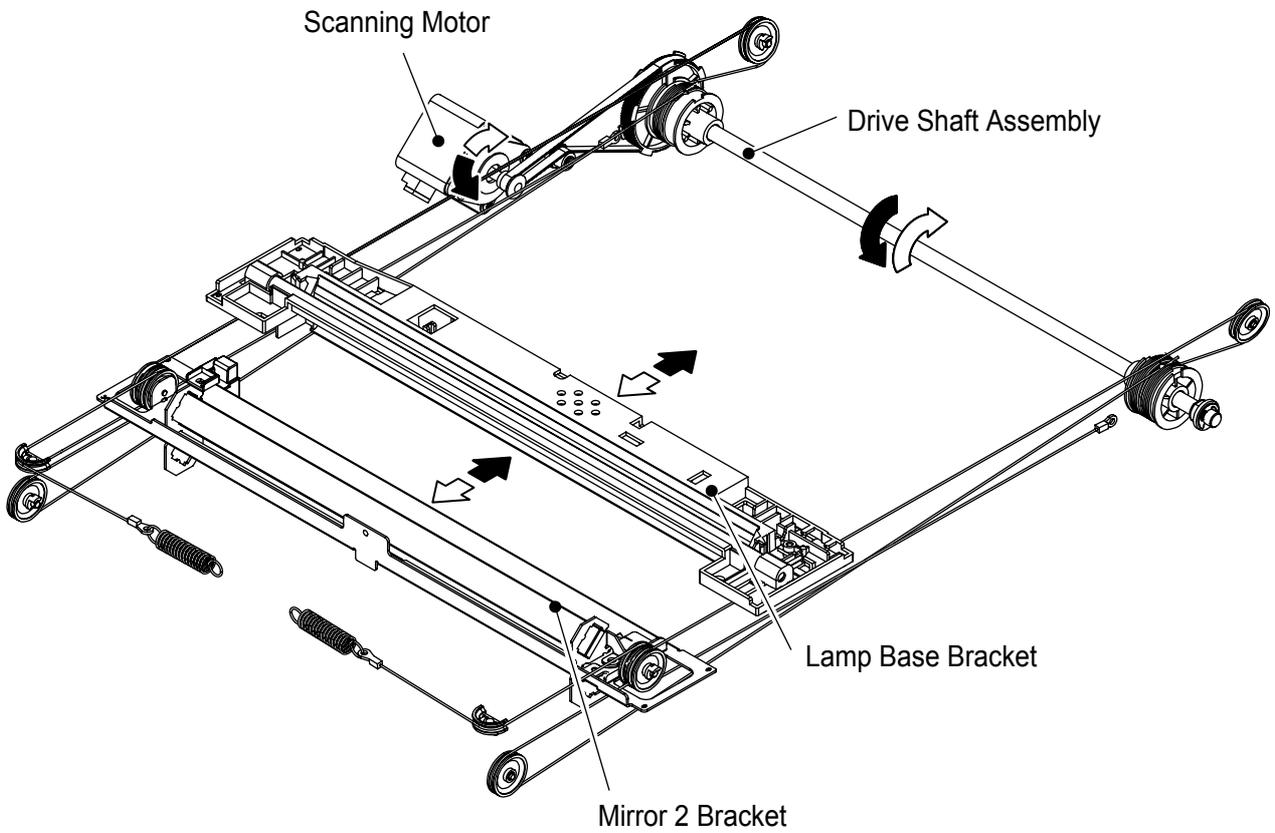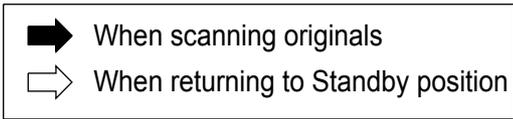
6.2. Automatic Document Feeder

The ADF (Automatic Document Feeder) automatically feeds paper into the unit, one original at a time.
Its main features are:
1. Place originals Face-Up
2. Correct Order Stacking (Collation Mode)
3. Paper Feed Mechanism with Pre Feed Roller

The following is the ADF Mechanical operation description.

6.2.1. Automatic Document Feeder

1. Initialization

The ADF begins its operation with the Eject phase in order to feed and eject any originals stuck inside the ADF. The ADF Motor starts rotating Feed Roller (2010), Exit 1 Roller (1812) and Ejecting the Original, after a few seconds the Clutch (2324) reverses the rotation direction raising the Original Stopper to its standby position.

2. Original Setting and Size Sensors

Place the original(s) face up on the ADF until the leading edge stops against the Original Stopper. Adjust the Original Front and Rear Guides (1711 & 1714) to center the original on the ADF. The Original Stopper prevents originals from skewing and multiple feeding. The Photo Sensor (131) for Original Detection detects the presence of Originals on the ADF when the original(s) actuate NP Actuator (2008) on the Lower Paper Feed Guide (2002). The two Sensors mounted on the SNS PC Board (2832) which is installed in the Original Upper and Lower Trays (1712, 1706) are actuated by the Original Front/Rear Guides, their position determines the original's width and 2 Photo Sensors (131) for Original Length detect the length of the original.

3. Feeding and Separation

When the Start button is pressed, the Clutch (2324) starts to rotate and uppers the Original Stopper, causing the Pre Feed Roller (2018) to apply a downwards pressure against the originals. After a few seconds, the Clutch (2324) reverses the direction of rotation and the Pre Feed Roller is raised upwards along with the Original Stopper. The upper original is fed to the Paper Feed Roller (2001), and the Separation Rubber (2024) prevents multiple feeding.

4. Transmission and Ejection

The original is fed into the Feed Roller (2010) and when the original actuates the Photo Sensor (131) for Read Point and Eject, the Paper Feed Roller (2001) stops rotating. The Photo Sensor (131) for Read Point and Eject detects the scanning position and the Feed Roller (2010) transports the original while scanning. The Exit 1 Roller (1812) feeds and ejects the original out of the ADF. If there are additional originals on the ADF, the next one is fed into the feeder.

5. Final Operation

After ejecting the last original on the ADF, the Clutch reverses the direction of rotation raising the Original Stopper to its standby position.

Automatic Document Feeder

Photo Sensor (131) for Original Length

Original Upper and Lower Trays (1706, 1712)

Paper Feed Roller (2001)

Pre Feed Roller (2018)

Original Front and Rear Guide (1711, 1714)

Lower Paper Feed Guide (2002)

Feed Roller (2010)

SNS PC Board (2832)

Exit 1 Roller (1812)

NP Actuator (2008)

Original Stopper (2016)

Photo Sensor (131) for Original Detection

Separation Rubber (2024)

Photo Sensor (131) for Read Point and Eject

6.3. Inverting Automatic Document Feeder

The i-ADF automatically inverts two-sided original(s) for faxing or copying of the second side. This feature enables machines with a duplexer mounted to perform duplex copying.

An i-ADF (Inverting Automatic Document Feeder) functions in a similar manner as the ADF (Automatic Document Feeder), with the main exception being the document eject path after scanning. The following is the description of the main differences.

For DP-8020E only.

1. Switching from the ADF Mode to the i-ADF Mode

After passing through the Read Point Sensor (131), the path of the original is switched over by the Duplex 2 Guide (2431), to the Exit Roller or to the Inverting Feed Roller (2428).For single-side scanning, the Duplex 2 Guide is rotated clockwise by the Solenoid guiding the original to the Exit Roller. For double-side scanning, the Duplex 2 Guide is rotated counter-clockwise by the Solenoid guiding the original to the Inverting Feed Roller (2428).The Duplex 2 Guide moves only once, in the direction according to whether a single or double-side scanning is selected (Copier or Fax) before the Start button is pressed. It will remain in this position until a different operation is performed (i.e. if the last operation was 2-sided scanning, a single-side scanning is performed).

2. Scanning the Front and the Back Side of an Original

The scanning of the Front and Back side of a 2-sided original is accomplished by means of the Duplex 2 Guide (2431) and Inverting 1 Guide (2432).

After the Front side of the original is scanned, the original is transported through the Duplex 2 Guide, through the Inverting 1 Guide (2432) that was rotated counter-clockwise by the Solenoid and is carried beyond the Inverting Feed Roller (2428) and upper Pinch Roller 1 (2130) into the Sub Tray (2209). The original is carried for a specified period of time after the trailing edge of the original triggers the Duplex Eject Sensor (131) and stops within 10 to 20 mm from exiting the rollers.

Then, the Inverting 1 Guide is rotated clockwise by the Solenoid and the reverse rotation of the ADF Motor pulls the original back around the Feed 2 Roller (2517) and proceeds to scan the Back side of the original.

After the Back side is scanned, the original is transported through the Duplex 2 Guide, through the Inverting 1 Guide and is carried beyond the Inverting Feed Roller and lower Pinch Roller 1 (2130) this time, into the Sub Tray, again stopping 10 to 20 mm from exiting the rollers.

3. Eject by Reverse Rotation

For the originals to stack properly, the above process repeats one more time. The Inverting 1 Guide is rotated clockwise by the Solenoid and the reverse rotation of the ADF Motor pulls the original back around the Feed 2 Roller, however, this time the original is routed to the Exit 3 Roller (2515) and exits into the ADF Base.

4. Sub Tray

The Inverting ADF system includes a Sub Tray (2209), which supports the originals during the ejection mode of the double-side scanning operation.

The Release Lever Plate grasps the originals and prevents them from being ejected into the Sub Tray.

Inverting Automatic Document Feeder

Separation Roller (2509)

Pinch Roller 2 (2624) (Feed Skew Adjustment)

Drive Roller (2706)

Read Point Sensor (131)

Eject Sensor (131)

Duplex Eject Sensor (131)

Feed 2 Roller (2517)

Pinch Roller 2 (2624) (Registration Adjustment)

ADF Roller (2314)

Original Stopper (2506)

Pre Feed Roller (2018)

Original Detection Sensor (131)

Pinch Roller 1 (2130)

Release Lever Plate (2504)

Read Point

Pinch Roller 2 (2624) (Reverse Registration or Feed Skew Adjustment)

Reversing 1 Guide (2516)

Stamp Head (1827)

Exit 3 Roller (2515)

Duplex 2 Guide (2431)

Inverting 1 Guide (2432)

Pinch Roller 1 (2130)

Inverting Feed Roller (2428)

Sub Tray (2209)

210 (A5)
215.9 (INVOICE)

257 (B5-R)

297 (A4-R)

330.2 (FLS1.2)

364 (B4)

420 (A3)
431.8 (Ledger)

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6.4. Receive Mechanism

6.4.1. Paper Tray
1. Paper Tray (1st / 2nd / 3rd / 4th)
< NP Sensor Operation >
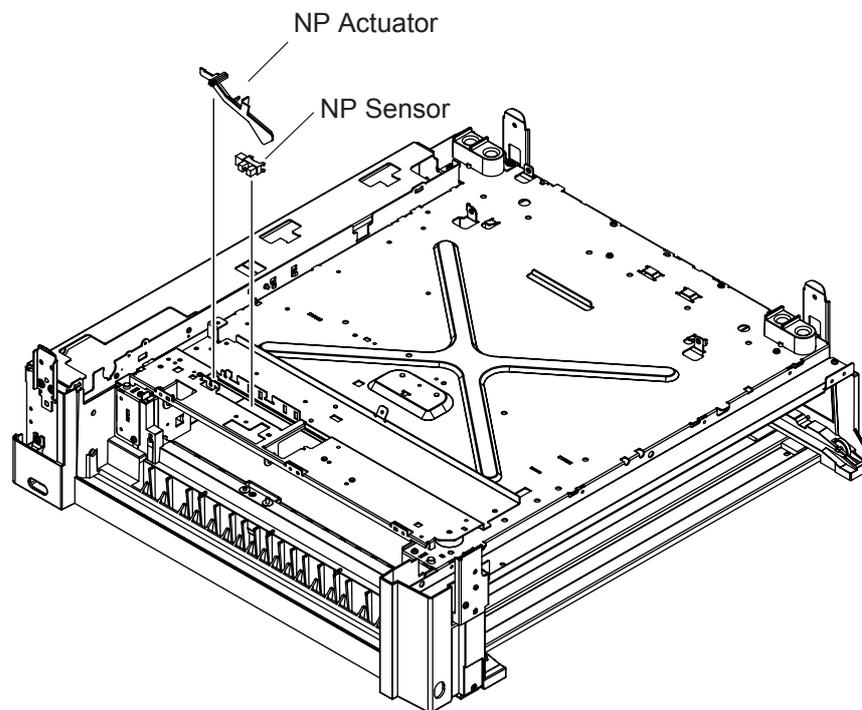
a. The NP Actuators attached to the Paper Feed Blocks No.1, 2, 3 and 4 determine if there is paper in the paper tray.

b. The paper in the paper tray lifts up the NP Actuator, allowing the light from the LED to actuate the NP Sensor.

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< Paper Tray Operation >
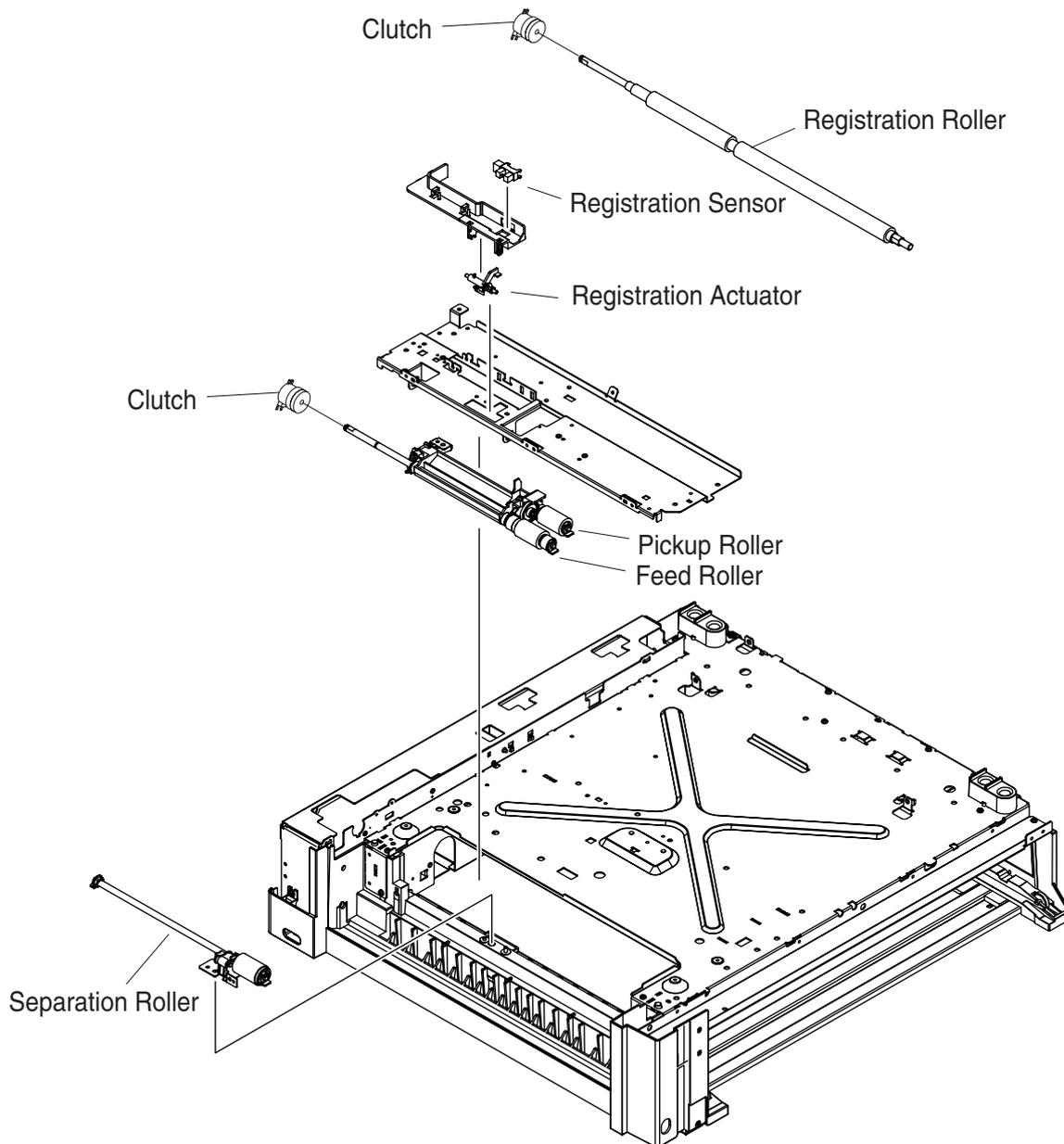
a. When the printing operation begins, the Main Motor starts driving the Gears.

b. The Clutch is energized for a specified period of time and turns ON. This activates the Feed Roller. The paper is separated into individual sheets by the Separation Roller and is transported.

c. The paper is transported to the Registration Roller, activating the Registration Sensor. After a specified period of time, the Clutch is turned ON and the Registration Roller and the Registration Pinch Roller start rotating. The paper is transported to the OPC drum area.

d. The paper passes through the Read Point Sensor and after a specified period of time, the Clutch is turned OFF. The Registration Roller and the Registration Pinch Roller stop rotating.

< Paper Tray (Optional) Operation >
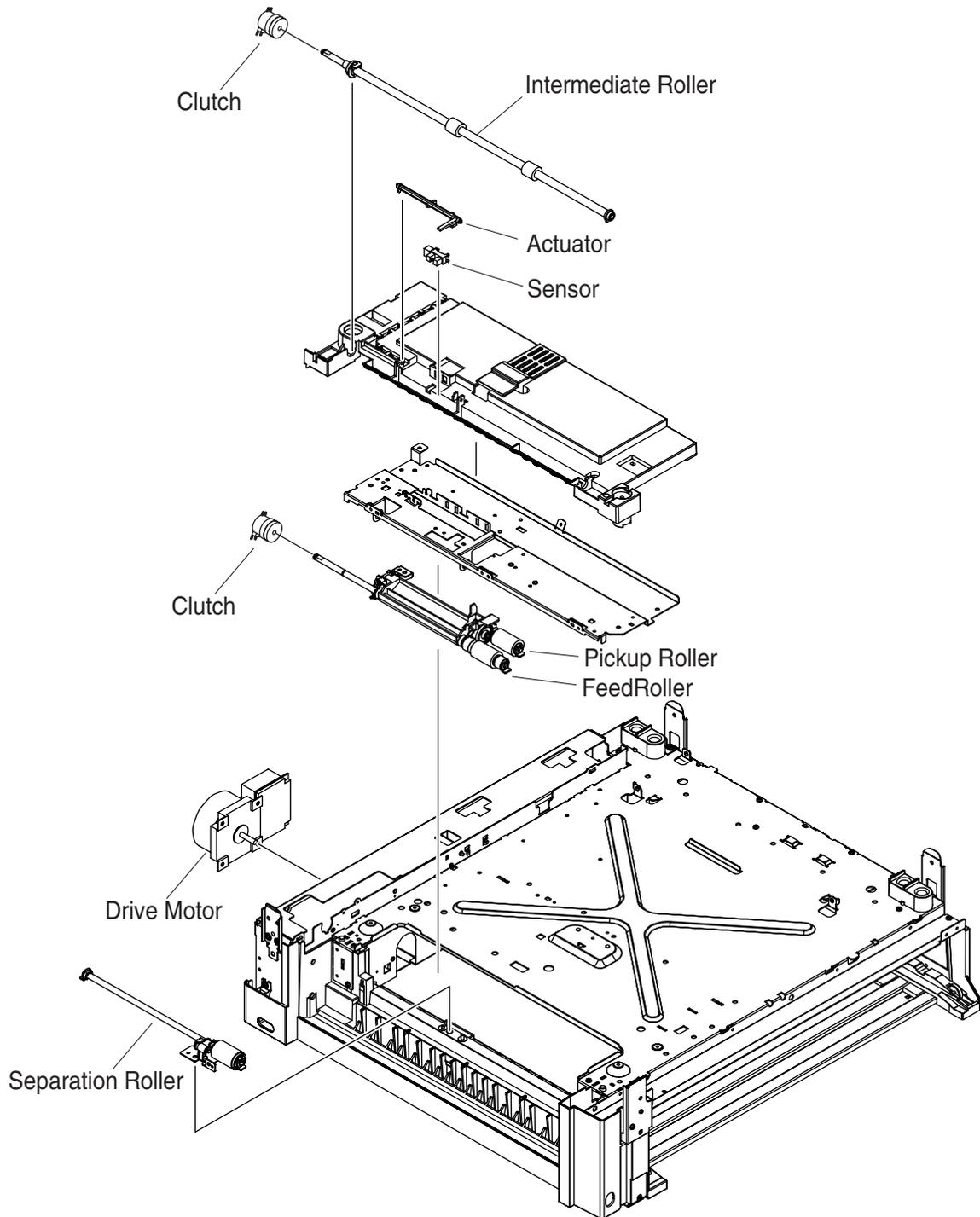
a. When the printing operation begins, the Main Motor and the Drive Motor start driving the Gears.
b. The Clutch is energized for a specified period of time and turns ON. This activates the Feed Roller. The paper is separated into individual sheets by the Separation Roller and transported by the Intermediate Roller.
c. The paper is transported to the Registration Roller, activating the Registration Sensor. After a specified period of time, the Clutch is turned ON and the Registration Roller starts rotating. The paper is transported to the OPC drum area.
d. The paper passes through the Read Point Sensor and after a specified period of time, the Clutch is turned OFF. The Registration Roller and the Registration Pinch Roller stop rotating.

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< Paper Tray Lift up Mechanism >

Pickup Roller

Upper Limit Sensor

Lift DC Motor

Feed Roller

Coupling

Lift Plate
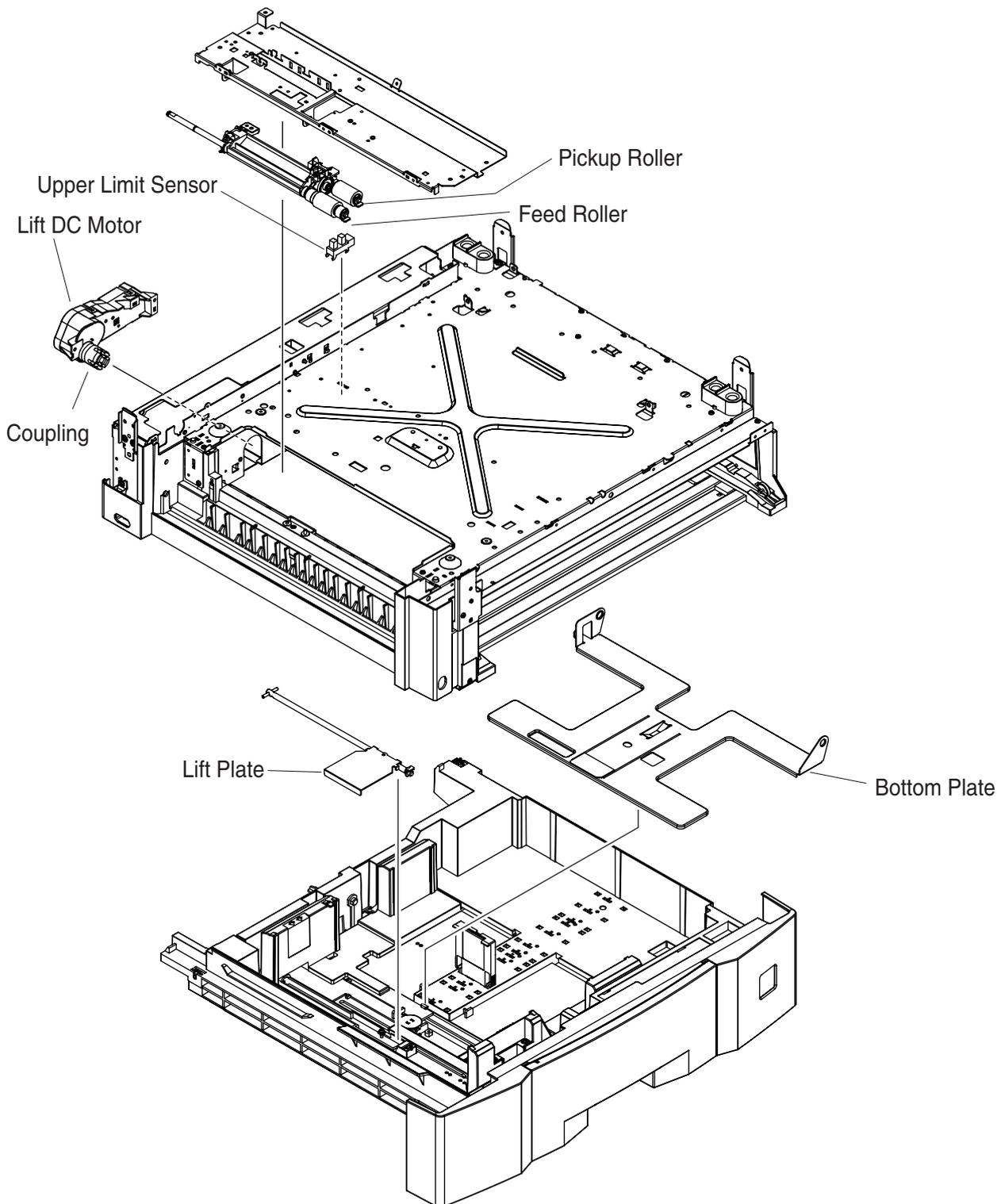
Bottom Plate

a. When inserting the Paper Tray into the machine, the NP Sensor activates. At the same time, the Lift Plate is combined with the coupling which drives the Lift Plate of the machine. The Lift Plate rotates, lifting the Bottom Plate and the Recording Paper.

b. Once the Bottom Plate and the Recording Paper are raised, the Upper Limit Sensor is turned ON. The Lift DC Motor stops rotating, maintaining the recording paper at the certain level.

< Paper Tray Recording Paper Size Setting >

a. The Recording Paper size in the Paper Feed Module is set on the Touch Panel.

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2. Sheet Bypass
< NP Sensor Operation >

a. The NP Actuator attached to the Paper Feed Unit determines if there is paper in the paper tray.
b. The paper in the paper tray lowers the NP Actuator and the NP Sensor actuates.

< Sheet Bypass Operation >

Feed Roller

Pressure Plate

Sparate Roller

NP Actuator

NP Sensor
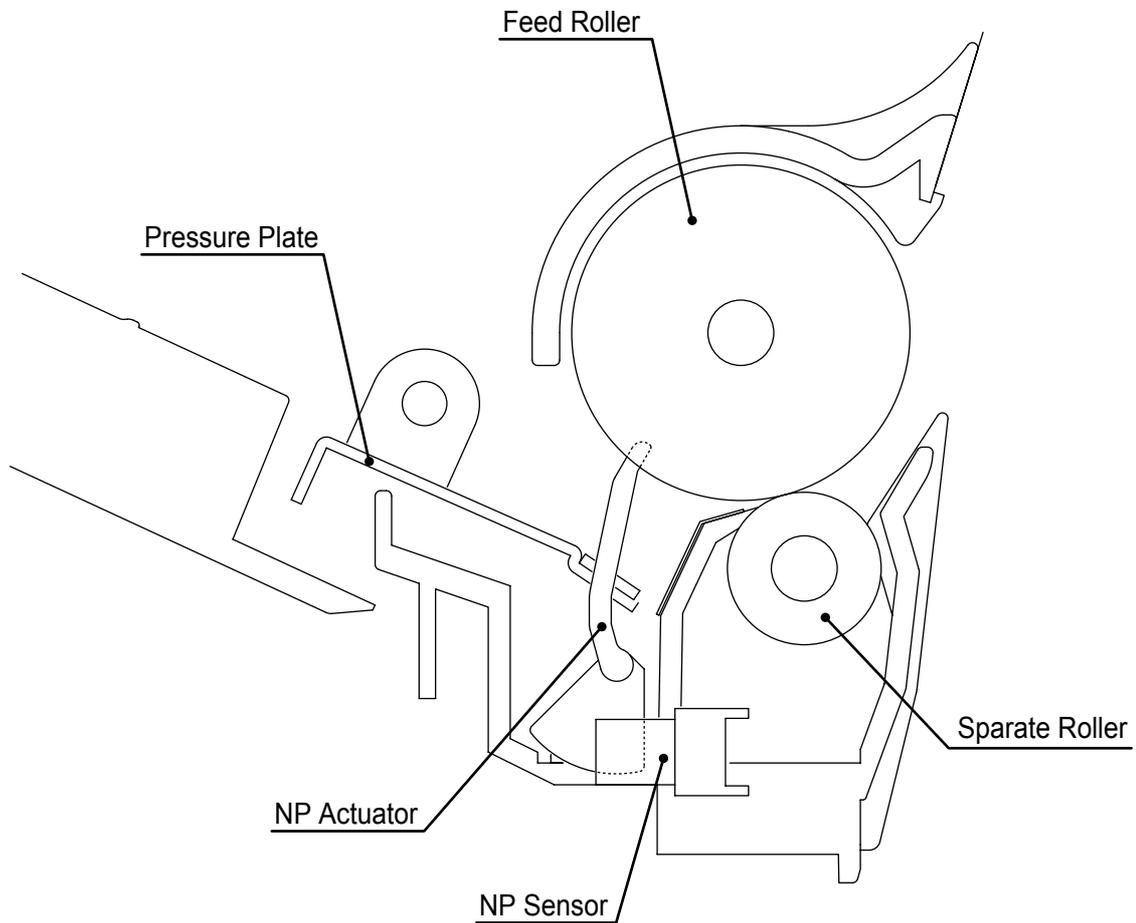
a. When the printing operation begins, the PRINT (Print Request Signal) turns On and the Main Motor starts driving the Gears.
b. The Clutch is energized for a specified period of time and turns ON. This activates the Paper Feed Roller. The paper is raised by the Pressure Plate and transported to the Separate Roller. The paper is separated into individual sheets by the Separate Roller.
c. The paper is transported to the Registration Roller, activating the Registration Sensor.
d. After a specified period of time, the Clutch is turned ON and the Registration Roller and the Registration Pinch Roller start rotating. The paper is transported to the OPC drum area.
   After lowering the Pressure Plate during the specified period of time, the Clutch is turned OFF and the Paper Feed Roller stops rotating.
e. After the trailing edge of the paper passes the Registration Sensor and after a specified period of time, the Clutch is turned OFF. The Registration Roller and the Registration Pinch Roller stop rotating.

6.4.2. Laser Unit
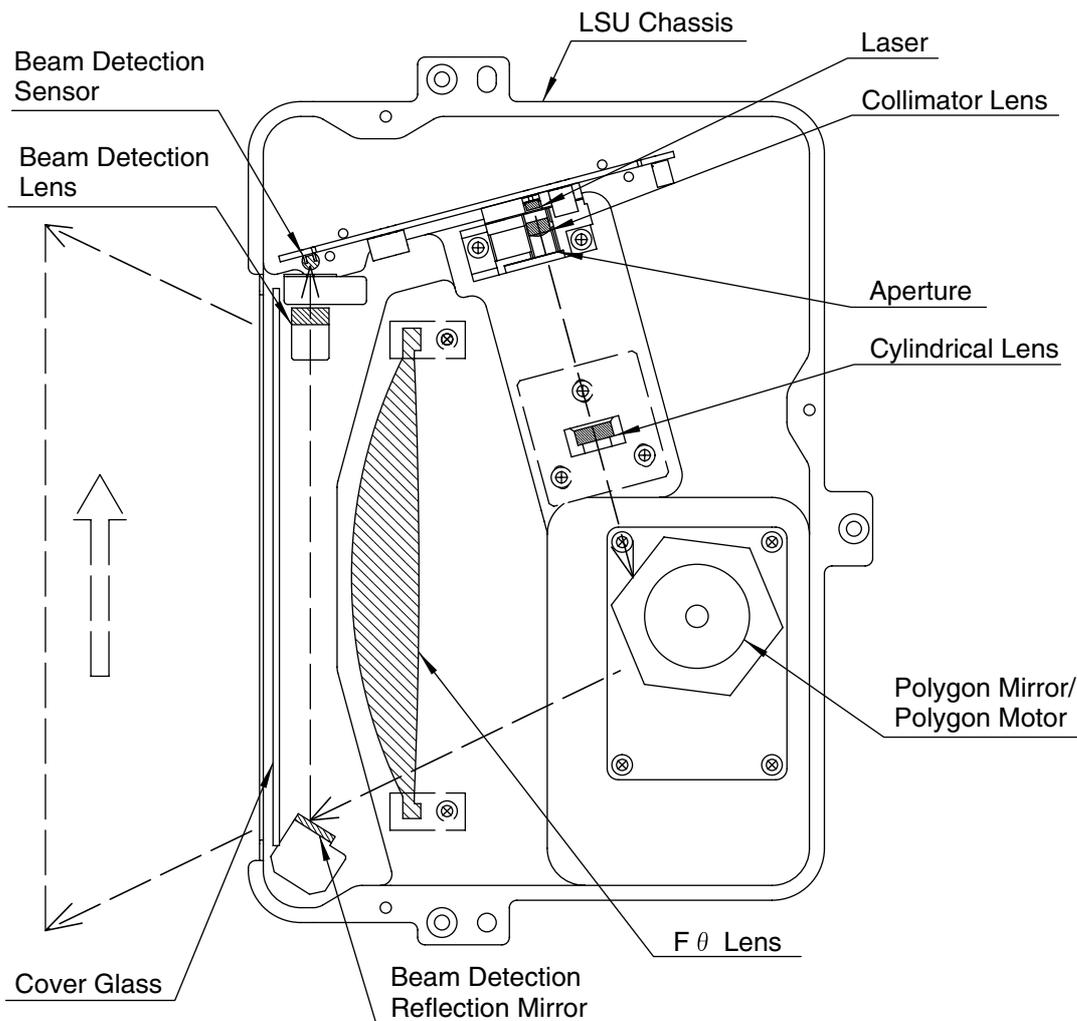
1. **Laser**
   This Laser uses the semiconductor laser. The beam power on the drum surface is approximately 0.4 mW.
2. **Collimator Lens and Cylindrical Lens**
   These lenses converge and focuse the laser beam, converting it to parallel light.
3. **Aperture**
   This controls the size of the laser beam.
4. **Polygon Mirror and Polygon Motor**
   The polygon scanner consists of a 6-sided mirror, directly driven by a DC motor, revolving at 42,000 rpm. The laser beam is reflected against these mirrors and swept over the recorded width in the scanning direction.
5. **Beam Detection (BD) Lens and Beam Detection (BD) Sensor**
   The BD Lens receives the reflected light from the Polygon Mirror and redirects it into the BD Sensor, which converts the laser beam into electrical signals and sets the start timing for the scanning line.
6. **F-θ Lens**
   This amorphous plastic, molded lens is designed to provide parallel laser light across the surface of the drum, providing a constant scanning speed.
7. **Cover Glass**
   This prevents a particle of dust invading into the LSU.

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6.4.3. Fuser Operation

The paper passes through the Fuser Roller and is subjected to heat and pressure in the Fuser Unit.
Pressure between the Fuser Roller and Pressure Roller fuses or bonds the toner into the paper.
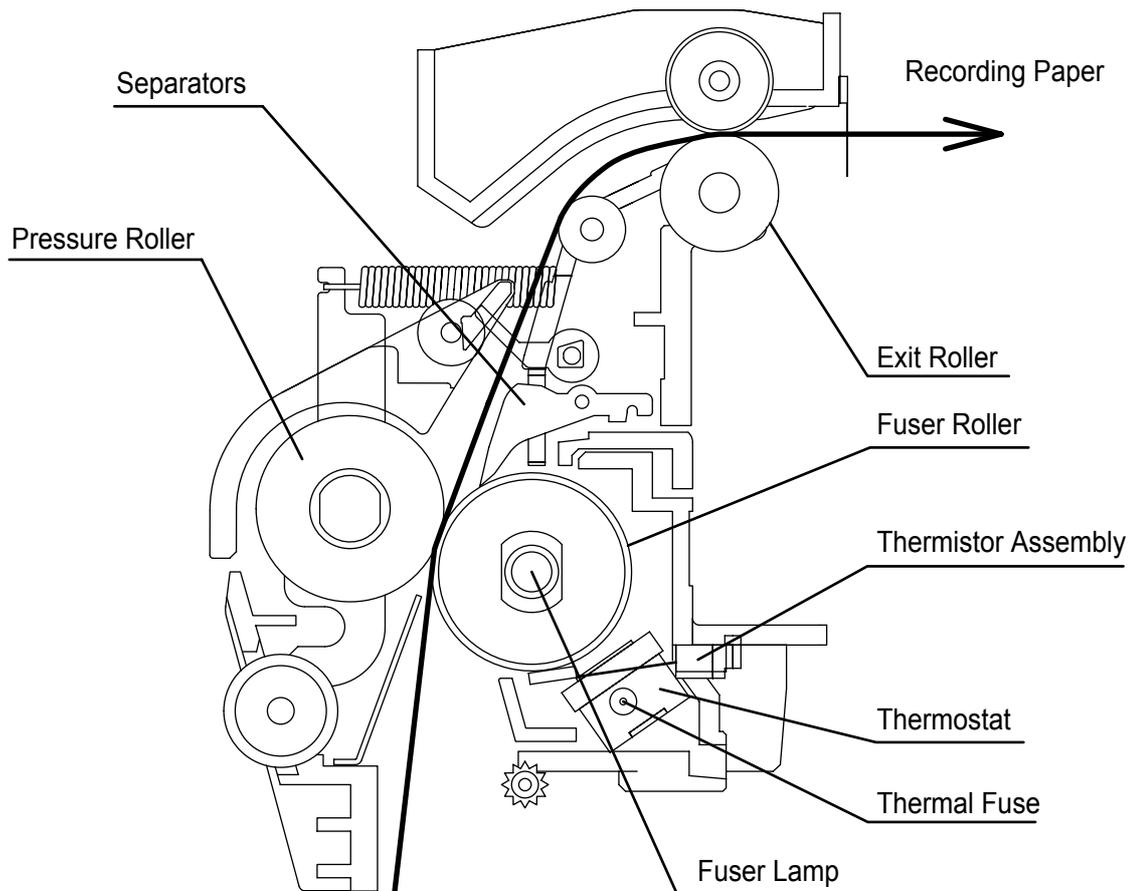
Fuser Roller

A Teflon coated roller supplies heat for bonding the toner to the paper. The temperature of the surface is kept constant at approximately 180°C (± 10°C) or 356°F. (Approximately 190°C (± 10°C) or 374°F for DP-8020 only.)

Fuser Lamp

Located in the Fuser Roller is the Fuser Lamp that serve as the heat source for the Fuser Roller.

Thermistor Assembly

A heat sensitive resistor, in contact with the Fuser Roller, monitors the surface temperature and keeps the temperature at the specified level by controlling the Fuser .

Thermostat and Thermal Fuse

The Thermostat and the Thermal Fuse are installed in the Fuser Roller, providing an extra overheat protection.

Printer Motor

The Main Motor provides the driving force to the Fuser Roller through the Fuser Roller Gears.

Pressure Roller

This converted PFA tube Silicon Sponge Roller applies pressure to the Fuser Roller, assisting in bonding the toner to the paper.

When the Fuser Unit does not reach the specified temperature within a certain period of time, an Error code is shown on the display, stopping the operation.
When the Thermistor Assembly is disconnected or the surface temperature of the Fuser Roller is out of limit, an Error code is shown on the display, stopping the operation.

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6.4.4. Printing Process Operation

The Process Unit consists of Developer Unit, OPC Drum unit and Toner Bottle with Toner supplied. Toner is supplied to the Process Unit.

The Process Unit includes the Toner Paddle and Mag Roller that supplies Toner to the OPC Drum.

The Cleaning Blade is attached to the OPC Unit. The Cleaning Blade scrapes the OPC Drum surface to remove the excess toner on the surface of the OPC Drum into the Toner Waste Chamber. The removed toner is moved into the Toner Waste Container by means of Toner Waste Paddle and Toner Waste Screw.

Process Unit
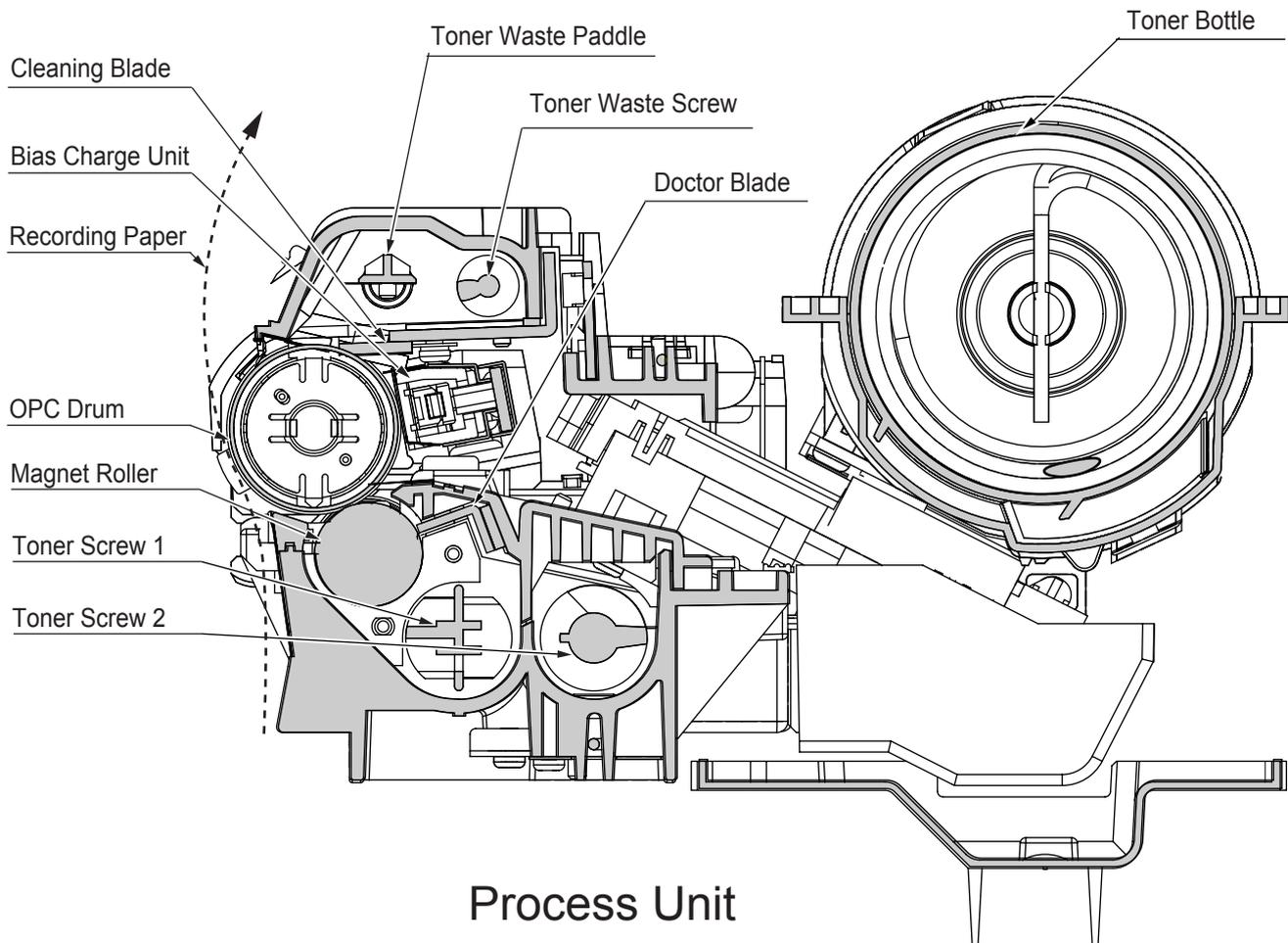
Developer Unit

1. Construction of the Developer
   a. The developer unit consists of the Magnet Roller, Sleeve and Toner Screws.
   b. The developer is mixed and charged by the Toner Screws where it is transferred to the developer sleeve. The developer on the sleeve forms a brush by the magnetic force of the Magnetic Roller, and makes contact with the electrostatic latent image on the drum. Toner is attracted to the areas of the drum which have been discharged by the laser.
   c. The Doctor Blade regulates the height of the magnetic brush which is formed by the developer which is attracted to the sleeve of the Magnetic Roller.
   d. The TDC sensor is an inductance type sensor used to measure the ratio of toner to developer.
   e. A dust collector vacuum duct is provided over the developer unit to prevent toner dusting. The dust collector is duct connected to the dust collector fan mounted on the machine frame which vacuums the scattered toner to prevent toner dusting over the developer unit.

2. Developing
   a. The developer mixing unit contains developer which is a mixture of fine powder (non-magnetic toner) and fine ferrite carrier.

b. The developer is mixed by the Toner Screws. The toner becomes negatively charged (ñ) and the carrier becomes positively charged (+). The developer is magnetically attracted to the aluminum sleeve of the Magnetic Roller, and the magnetic brush is formed.

c. The Magnetic Roller sleeve rotates in a counterclockwise direction. The height of magnetic brush is controlled by the gap between the doctor blade and the sleeve surface.

d. The drum, with an electrostatic latent image, is rotated clockwise and makes contact with the magnetic brush.

e. The negatively charged toner is attracted to the electrostatic latent image on the drum.

f. Charge (developer bias) is applied to the Magnetic Roller sleeve, which prevents toner from moving to the non-image area of the drum. The distance between the drum and the sleeve is controlled by the drum spacers.

7 Installation

7.1. Set Up Precautions

Before you begin the installation, read these entire instructions. You must locate an appropriate site (firm and leveled surface) for the installation. Reading this section assists you with the decision making process.

Machine performance, and copy quality is subject to, and dependant on environmental conditions.
To maintain good performance, quality, and safe operation, observe the following precautions:

1. For safe operation and to avoid trouble, do not install the system under the following conditions:

   • Extremely high or low temperature and humidity.
   Ambient conditions **Temperature** : 50 - 86 °F (10 - 30 °C)
   Relative humidity : 30 - 80 %
   • Sudden changes in temperature or humidity
   • Exposed to direct sunlight
   • Dusty environment
   • Poorly ventilated location
   • Exposed to chemical gases (such as ammonia gas)
   • Exposed to strong vibration
   • Exposed to direct air current (ex: Air conditioner vent)

2. The weight of the machine (options not included) is as follows:
   DP-8020E / 8020P / 8016P : Approx. 93.26 - 98.33 lb (42.3 - 44.6 kg)

   Options:
   DA-AS202 / DS181 (iADF / ADF)   : Approx. 20.5 lb (9.3 kg) / 11.0 lb (5.0 kg)
   DA-DS185 / DS184 (Paper Tray)   : Approx. 20.7 lb (9.4 kg) / 19.8 lb (9.0 kg)

3. The maximum power consumption is 1.3 kW. Depending on the product destination, the wall outlet must be rated for 120 VAC / 15 Amps, or 220-240 VAC / 10 Amps accordingly. If you have doubts regarding a power source, ensure that a qualified electrician checks the outlet. Do not connect any other devices to the wall outlet designated for this machine. (Do not use an extension cord)

4. Make sure the outlet is properly grounded. (Do not ground to gas, or water pipe)

5. The machine should be installed in a well-ventilated area to minimize the ozone density in the air.

6. This machine has ventilation openings on the side, and rear, which must remain unobstructed for safe operation. The machine should be located at least 3.94 inches (100 mm) from the wall. Obstructing the ventilation openings could present a fire hazard.

Using the space requirements shown on the following page, ensures that the machine has the ventilation it requires, and that you have the space needed for replacing the supplies.

Space Requirements

Main Unit
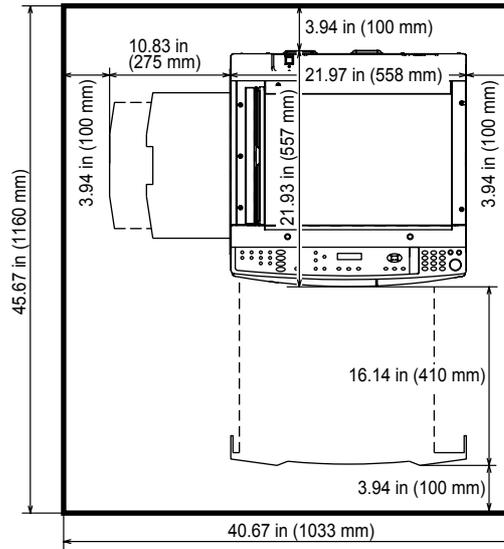
Main Unit + ADF

Main Unit + i-ADF

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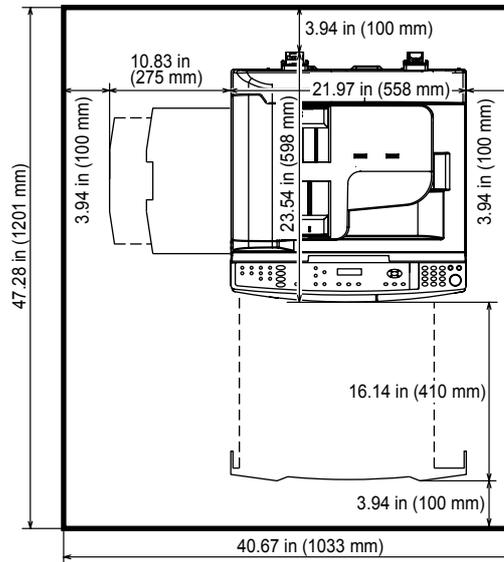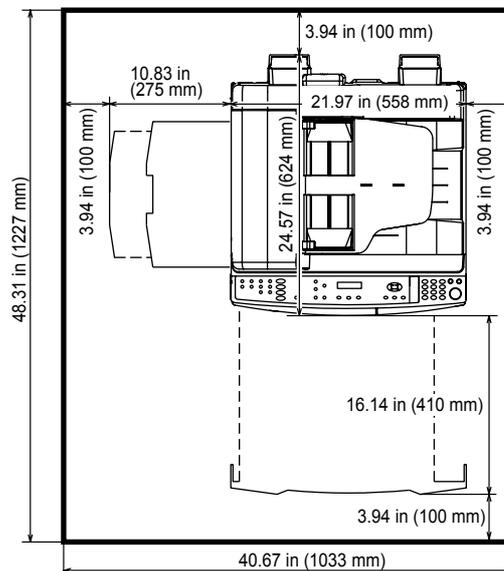
7.2. Unpacking

Visually check the condition, and contents of the box for completeness, or any shipping damage before installation.
Remove all tapes, and the packing materials used to secure the Unit during shipment.

Caution:

Depending on your machine's model, it may weight approximately 93.26 - 98.33 lb (42.3 - 44.6 ㎏) without any options. To prevent injuries, use the appropriate number of personnel, and the proper equipment to lift, or move the machine.

No.	Qty.	Description	Remarks
1	1	Main Unit	Platen Cover is Optional for USA / Canada, etc
2	1	Process Unit	
3	1	Paper Size Label	
4	1	AC Power Cord	
5	1	Quick Guide	For Copy & Network Scan Functions
6	1	Operating Instructions CD	
7	1	Panasonic-DMS and Print Driver CD	Includes Operating Instructions
8	1	Installation Instructions	This document

Note:

1. Supplies (Developer, Toner Bottle, and Toner Waste Container) are not included and are sold separately.
2. Refer to the Parts Manual for Part Number(s), Packing, and Accessories detail.
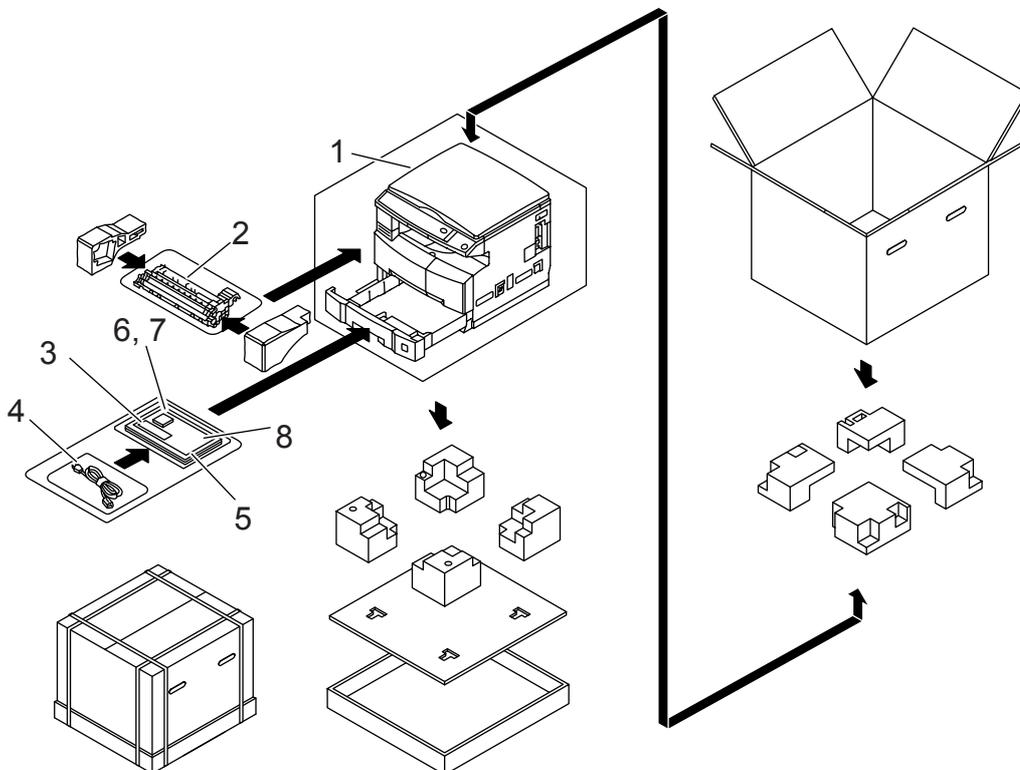
7.3. Installation Procedure

Note:
1. Refer to each individual Installation Instructions when installing other Options.
2. The following machine illustrations, depict a DP-8020E with a standard configuration.
3. The scanner is locked in place with a Shipping Screw (Blue) to prevent damage during transit.
   Do Not turn the Power Switch ON before unlocking the scanner.
4. The machine is shipped from the factory with the Pressure Roller locked in the opened position to avoid the possibility of damaging the Pressure Roller.
   Do Not turn the Power Switch ON before unlocking the Pressure Roller.

7.3.1. Installation Procedure

<Unlocking the Scanner>

(1) Remove the **Protective tape** from the Battery.
(2) Remove the **Tape**.
(3) Remove 1 **Blue Screw**.

(4) Store the **Blue Screw** into the space provided in the 1st Paper Tray.

<Unlocking the Pressure Roller>
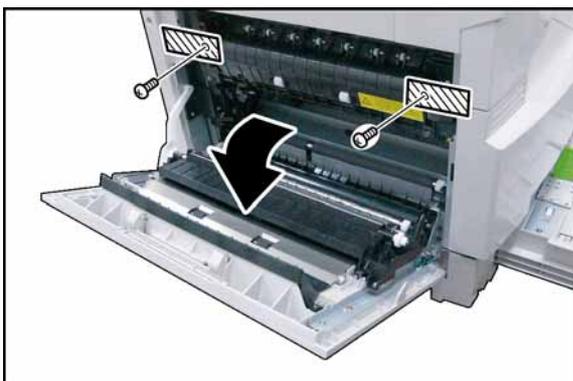
(5) Open the **Left Cover**.
(6) Remove 2 **Tapes**.
(7) Remove 2 **Blue Screws**.

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(8) Store the **Blue Screws** into the space provided in the 1st Paper Tray.

<Preparing the Process Unit>
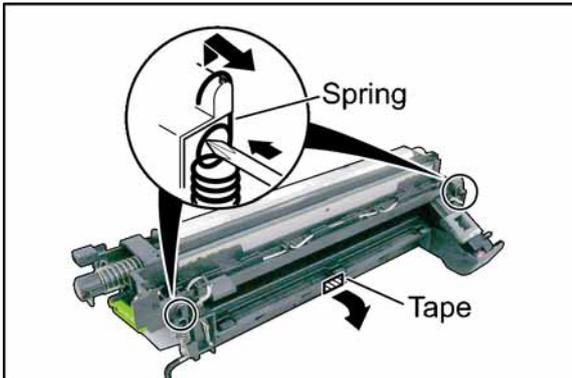
(9) Remove the **Tape**.

(10) Unhook 2 **Springs** as illustrated.

Note:
   <u>Do not remove</u> the **Protective Sheet** and **Tape** from the OPC Drum Assembly at this time.
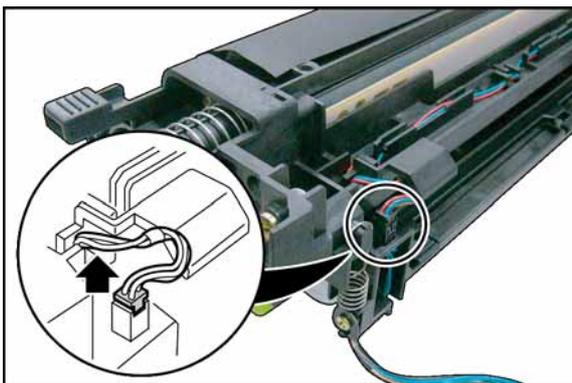
(11) Disconnect the **Harness**.
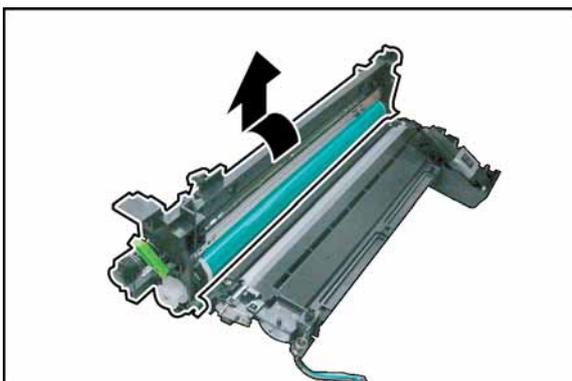
(12) Turn the **OPC Drum Assembly** in the direction of the arrow and remove.

Caution:
   Exercise caution not to scratch the surface of the **OPC Drum** (Green), and not to touch it with bare hands.

Caution:
   The OPC Drum is sensitive to light. To prevent optical exposure problems, do not expose the OPC Drum to direct sunlight or bright light.

   Even if it is a fluorescent lamp, approx.1000 lm/m^2 (1000 lx).

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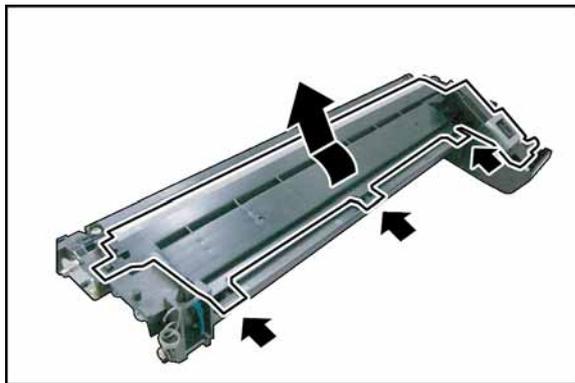
(13) Release 3 **Latch Hooks** and remove the **Developer Cover**.
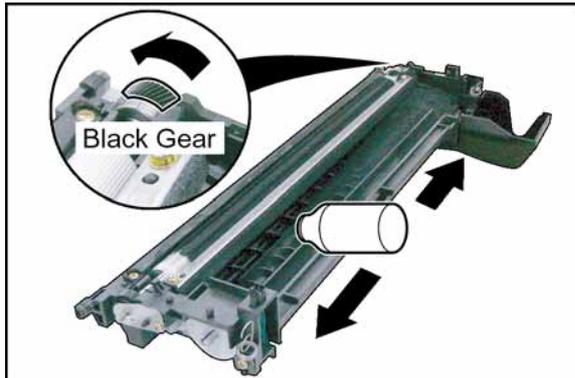
(14) Shake the **Developer Bottle** thoroughly (approx. 30 seconds).
(15) Pour the developer evenly into the developer unit by turning the Black Gear as illustrated. Make sure to empty the bottle.
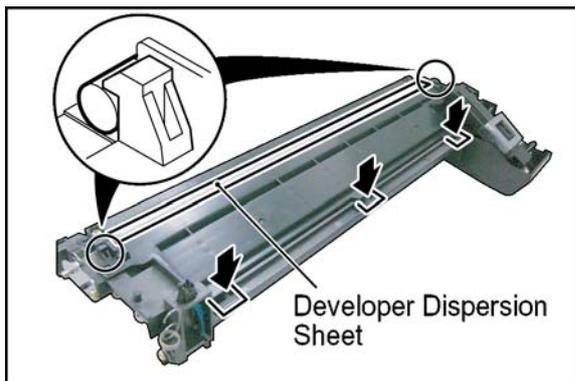
(16) Close the **Developer Cover**, and ensure that 5 Latch Hooks are hooked firmly.

Note:
When closing the Developer Cover, ensure that the Developer Dispersion Sheet is on the outside.
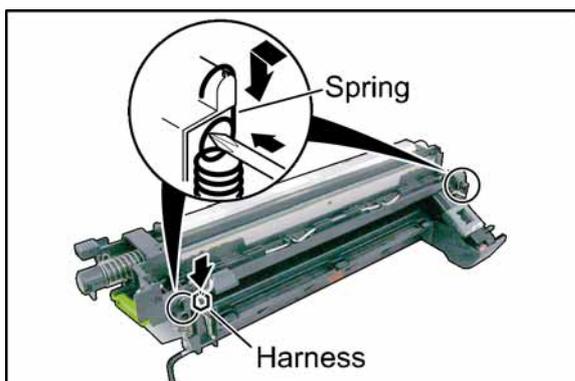
(17) Reinstall the **OPC Drum Assembly**.
(18) Reattach 2 **Springs**.
(19) Reconnect the **Harness**.
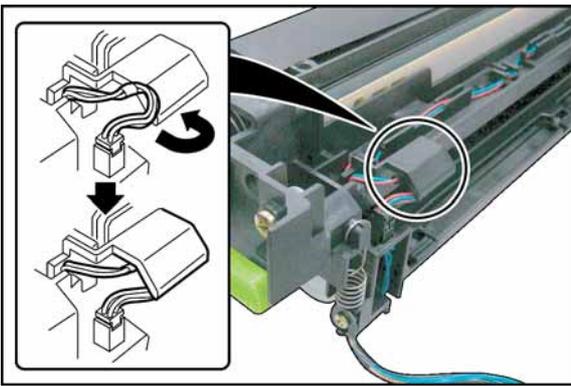
(20) Route the **Harness** under the Harness Shield as illustrated.

Note:
　To prevent damage to the Harness, ensure it is under the Harness Shield.

<Installing the Process Unit>

(21) Open the **Front Cover**.
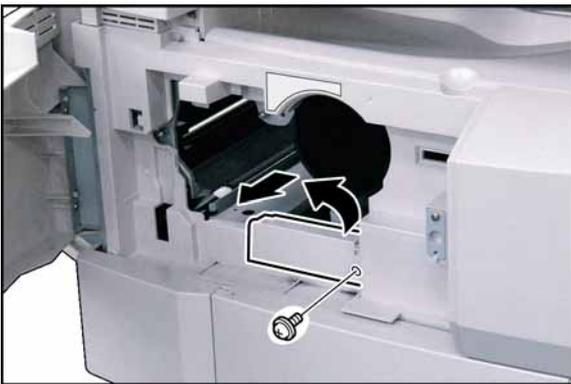
(22) Remove 1 **Screw**.
(23) Remove the **Connector Cover**.
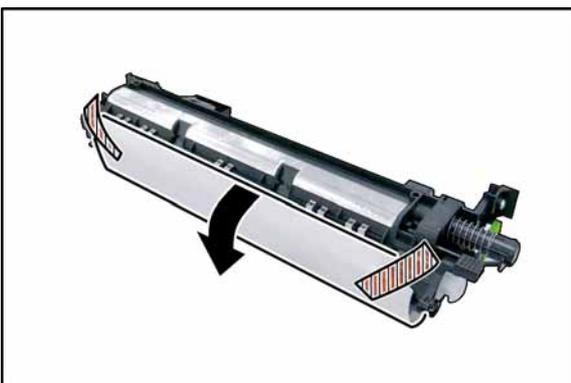
(24) Carefully remove the **Protective Sheet**, and **Tapes** from the OPC Drum Assembly.

Note:
　Do not tilt the Process Unit, or the Developer will spill.

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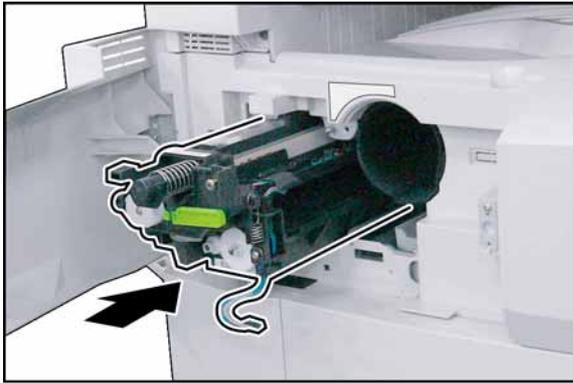
(25) Install the **Process Unit**.

Caution:
To prevent damage to the Process Unit, ensure that the Left Cover is still open before inserting the Process Unit into the machine.

Caution:
Exercise caution not to scratch the surface of the **OPC Drum** (Green), and not to touch it with bare hands.
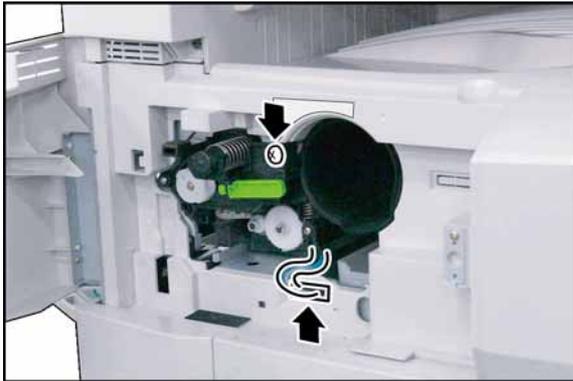
(26) Fasten the Process Unit with 1 **Screw**.
(27) Connect the Harness, and reinstall the Connector Cover, and Screw.
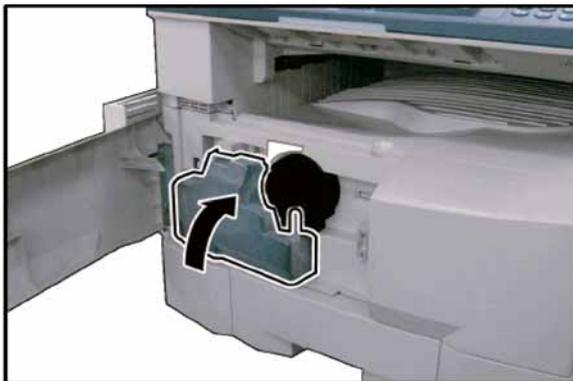
(28) Install the **Toner Waste Container**.
(29) Close the Front, and the Left Covers.
(30) Load paper into the Paper Tray.
Caution:
Ensure that all shipping tapes and packing materials are removed.
Caution:
Do Not install the Toner Bottle, and Do Not make any copies before performing the Toner Density Control (TDC) Adjustment first, or the TDC Adjustment will not be precise.
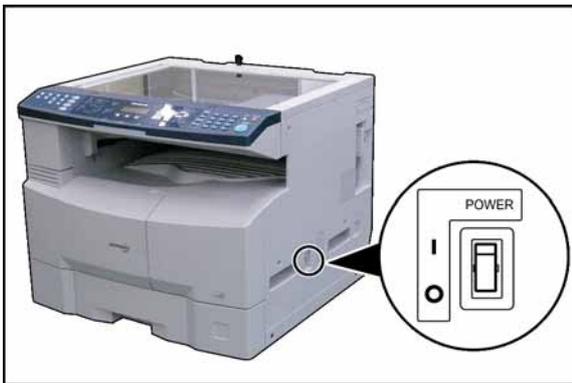
(31) Plug the **AC Power Cord**, and turn the Power Switch on the Right Side of the machine to the ON position.

Note:

Perform the following adjustments after the machine has warmed up, and displays:

<For USA / Canada etc> (Skip to Sect. 7.3.3.)

```
READY TO COPY
                COPIES:001
```

<For Europe and Other Destinations only>

```
DP-8020E (**)        ***

```

```
DESTINATION CODE :
PRESS V Λ TO SELECT
```

Note:

The contents in the (**) *** in the LCD display above may differ depending on the destination.

7.3.2. Setting the Default Destination (For Europe and Other Destinations only)

1. Press "**V**" or "**Λ**" arrow keys to select the desired destination.
2. Press the "**Set**" key.
3. Press the "**1**" key for YES.

After the machine has warmed up, it displays:

```
READY TO COPY
                COPIES:001
```

4. Turn the Power Switch on the Right side of the machine to the **OFF**, and back to the **ON** position.

7.3.3. Toner Density Control (TDC) Adjustment

Note:
    Ensure the Toner Bottle is not installed, or is removed before performing the TDC Adjustment,
    or adjustment will not be precise.

1. Press "**Function**", "**Original Size**", and "**3**" keys sequentially to enter the Service Mode.
2. Press the "**8**" key to enter the F8 Mode (Service Adjustment).
3. Press the "**Start**" key.
4. Press the "**0**", "**9**", and "**Start**" keys sequentially to begin the automatic TDC sensor gain adjustment.

Note:
    Do not touch any keys, or turn the Power Switch Off until the adjustment cycle is finished
    (approximately 3 minutes). Refer to the Sequence Chart below.

F8-09 (Performed after Developer Installation & Replacement)

```
┌────────────────────────────┐
│   TDC Adjust               │
└────────────────────────────┘
        3 min
```
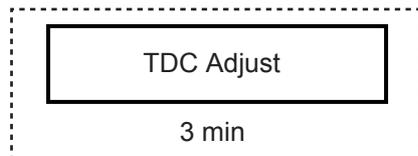
7.3.3.1. OPC Counter Reset

1. Press the "**Start**" key to enter the F8 Mode (Service Adjustment).
2. Press the "**1**", "**4**", and "**Start**" keys sequentially to proceed "**14**" (OPC Counter Reset).

F8-14 (Performed after OPC Installation & Replacement)

```
┌────────────────────────────┐
│   OPC Counter Reset        │
└────────────────────────────┘
       1-2 sec
```
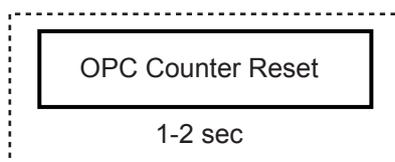
3. Press the "**6**", and the "**Start**" keys to enter the F6 Mode (Adjust Parameters).
4. Write down the contents of F6-21, and 26 onto the memory sheet (adhered to the inside the 1st Paper Tray).
    [For your convenience, record these values on this sheet first, then transcribe them onto the memory sheet.]

            F6-21 = TDC Gain Voltage
            F6-26 = TDC Judgement Level

5. Press the "**Stop**" key.
6. Press "**Function**", and "**Clear**" keys simultaneously to exit the Service Mode.

7.3.4. Installing the Toner Bottle

(1) Open the **Front Cover**.
(2) Remove the **Toner Waste Container**
(3) Shake the **Toner Bottle** 10 to 15 times to loosen the contents.
(4) Remove the **Tape** as illustrated, however, do not open the Shutter, or Toner will spill.

Caution:
    Do Not install the Toner Bottle, and Do Not make any copies before performing the Toner Density Control (TDC) Adjustment first, or the TDC Adjustment will not be precise.

(5) Insert the **Toner Bottle** into the Hopper Unit. Align the Toner Bottle Key with the Key Alignment Channel of the hopper unit. Insert the Bottle as far as it will go, and turn the Toner Bottle clockwise until it locks in place. (Bottle's Green Knob is lined up with the "Locked" symbol on the label)

Caution:
   Do Not install the Toner Bottle before installing the Process Unit first. If the Toner Bottle is installed, and turned to the "Locked" position without the Process Unit, the Toner will spill inside the machine.
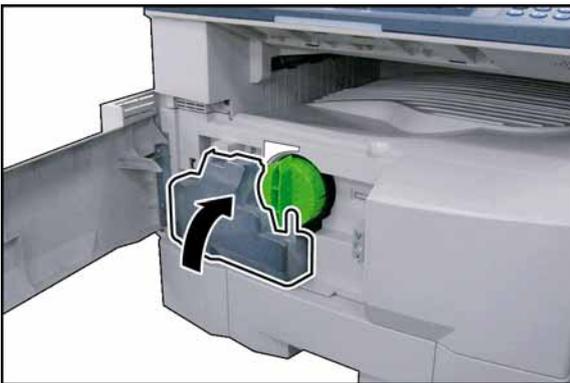
(6) Install the **Toner Waste Container**.

(7) Close the Front, and the Left Covers.

(8) Load paper into the Paper Tray.

Caution:
   Ensure that all shipping tapes, and packing materials are removed.

7.3.5. Paper Size setting (Paper Tray) for your customer

1. Press the "**Function**" key.
2. Select "**1: GENERAL SETTINGS**", and press the "**Set**" key.
3. Select "**09 KEY OPERATOR MODE**", input the 3 Digit Code (default is **000**) to enter the Key Operator Mode, and press the "**Set**" key.
4. Select the "**01 PAPER SIZE**", and press the "**Set**" key.
5. Press "**V**" or "**Λ**" arrow keys to select a New Paper Size, and press the "**Set**" key.
6. Press the "**Reset**" key, to exit the General Settings Mode.

7.3.5.1. Serial Number Setting for the Maintenance Report

1. Press "**Function**", "**Original Size**", and "**3**" keys sequentially to enter the Service Mode.
2. Press the "**9**" key to enter the F9 Mode (Unit Maintenance).
3. Press the "**Start**" key.
4. Press the "**5**", and the "**Set**" keys.
5. Input the Machine's Serial Number, and press the "**Set**" key.
6. Press the "**Stop**" key twice.
7. Press "**Function**", and "**Clear**" keys simultaneously to exit the Service Mode.

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7.3.6. Exposure (Standard Adjustment)

Caution:

Before making any adjustments, confirm that the following contents (F6-17, 18, and 19) are set to "**0**". DO NOT adjust these settings in the field.

F6-17 : Grid Voltage compensation

F6-18 : Standard Laser Power compensation

F6-19 : Std Bias DC Voltage compensation

Note:

If an exposure adjustment is required during a routine service call, ensure the developer unit is properly toned before making any adjustments.

1. Press "**Function**", "**Original Size**", and "**3**" keys sequentially to enter the Service Mode.
2. Press the "**2**", and the "**Start**" keys to enter the F2 Mode (Single Copy Test).
3. Set the exposure to the center position.
4. Set the machine to **TEXT / PHOTO** Mode.
5. Make a copy of **Test Chart 53/54** with gray scale (P/N: FQ-SJ1011), and compare the density to the chart shown below. If it is within specification, skip to step (14).
   a. Gray scale "A" should not be visible.
   b. Gray scale "2" should be clearly visible.

6. Press the "**Stop**" key to exit the F2 Mode (Single Copy Test).
7. Press the "**6**", and the "**Start**" keys to enter the F6 Mode (Adjust Parameters).
8. Enter F6-50 Mode (T/P Mode Image Density).
9. Press the "**Set**" key to highlight the current value.
10. Enter a new value (up to 3-digits).

Note:

The "**Reset**" key is used to change to a Negative, or Positive (+/-) value.

(+) : Lighter

(-) : Darker

11. Press the "**Set**", and "**Stop**" keys.
12. Enter F2 Mode (Single Copy Test).
13. Make a copy to confirm the adjustment.

Note:

Repeat Steps (3) to (10) until the desired density is attained.

F6-49 : T Mode Image Density (Text)

F6-51 : P Mode Image Density (Photo)

14. Press "**Function**", and "**Clear**" keys simultaneously to exit the Service Mode.

7.3.7. User Authentication, and/or Via Fax Server Function Confirmation (Specified Destinations only)

If your customer requires User Authentication, and/or Via Fax Server, setup the feature(s) by referring to the Operating Instructions (For User Authentication).

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8   Options and Supplies

8.1.   Service Notes "Firmware Update" for PCL or PS Option Installation for DP-8020/8016

To use **PCL (DA-PC820)**, or **PS (DA-MC820)** option individually, changing to **Type B**, or **Type D** SC firmware is required. The required firmware is on the CD included with the options.

Note:
   The 8 MB Expansion Board **(DA-EM600)** must be installed for the printer controllers above to function.
   The only time a DA-EM600 is needed is, if you are installing the PostScript (PS), or PCL option.

Before proceeding, it is important to determine the Final Configuration of your machine in order to correctly identify the required firmware from the table below. Carefully read, and follow the Installation Instructions for the appropriate option.

The firmware for SC, and SPC must be updated in this sequence as a set. Please update the firmware with the latest version as a set by referring to the following table.

Firmware Version Table

	Standard Firmware (SC = Type A)	PCL Firmware (SC = Type B)	PostScript Firmware (SC = Type D)
SC	DP-LL80**A**xVxxxxx_xx	DP-LL80**B**xVxxxxx_xx	DP-LL80**D**xVxxxxx_xx
SPC	LL80-SPCAxVxxxxx	←	←
Slot 1 FROM PCB	Not Required	Required	Required

Main Unit Firmware Code Updating Instructions

1. Updating through a LAN Port (The Quickest, and Most Easiest Method)
The firmware code can be easily updated when the main unit is connected to a LAN.
The Network Firmware Update Tool can also be used by connecting to the machine using a **crossover cable**, if the unit is not connected to a LAN.

1) **Install the Network Firmware Update Tool to your PC**
   The option CD-ROM includes the Network Firmware Update Tool, and the Main Unit Firmware Code.
   Please refer to the following Operating Instructions to install the Network Firmware Update Tool.
   The installation password is "**workio**".
   Operating Instructions:
   \xFirmware\Tools\NwFirmup\NwFirmup OI.pdf (Refer to the NW Firmware Update Tool OI on the CD)
   Setup:
   \xFirmware\Tools\NwFirmup\Setup\Setup.exe

2) **Preparing the Firmware Code**
   Double click the appropriate Destination Shortcut Batch File, and copy the Firmware Code File on the CD-ROM to the Firmware Data Folder in your PC. Note that the files in the Archive will be extracted automatically into the designated folder when the Archived file (.exe) is Double-clicked.

Example:
From:
Destination Shortcut Batch File: D:(CD-ROM Drive) \ xFirmware \ USA.bat
Firmware Code File: DP-8016_8020_PU_xxxxxx.exe
To:
Firmware Data Folder: C:\ Panasonic \ Panasonic-FUP \ Data

3) **Preparing the Main Unit for the Firmware Upgrade**
   Make sure the unit's Key Operator Password is the same as the tool's password.
   Make sure the unit is in an idle state (e.g. not making copies, not printing, etc.).

4) **Upgrading the Main Unit's Firmware Code**
   Start the Network Firmware Update Tool, and select the following **Firmware Code Folders** in the
   C:\Panasonic\Panasonic-FUP\Data folder, and then follow the display instructions to upgrade the
   Main Unit's Firmware Codes.

Parent Firmware File Folder	Sub Firmware File Folder	Transferring Order
\ DP-8016_8020_PU_xxxxxx	\ **SC_STD** \ DP-LL80**A**xVxxxxx_xx	1
	\ **SC_PCL** \ DP-LL80**B**xVxxxxx_xx	1
	\ **SC_PS** \ DP-LL80**D**xVxxxxx_xx	1
	\ **SPC** \ LL80-SPCAxVxxxxxx	2

When you select the Parent Folder, the following Firmware Type window appears. Proper Sub File Folders are selected automatically by selecting the Firmware Type.
The transferring order is set up automatically.

Note:
1. Manual mode must be used, when updating the designated version of the firmware, or changing the type of the firmware.
   Please refer to the Section 2.2, "**Setting up the Network Firmware Update Tool, File Selection Tab**" of the Operating Instructions.
2. While updating the firmware code, the display may become garbled, however, it will return to normal upon completion of the firmware update.
3. If the firmware update fails, and the unit does not boot up, the Network Firmware Update Tool will not be able to transfer the firmware code. If this occurs, please refer to the next section "**Updating through the USB Port**", and use the Local Firmware Update Tool to recover the unit.
4. The suffix **"_xx"** for the Folder Name, or File Name may not exist depending on the destination location.

2. Updating through the USB Port (Alternate Method)
If the device is not connected to the LAN, upgrade the firmware code using the USB Port.

1) **Install the Local Firmware Update Tool to your PC**
   The option CD-ROM includes the Local Firmware Update Tool, and the Main Unit Firmware Code.
   Please refer to the following Operating Instructions to install the Local Firmware Update Tool.
   Operating Instructions:
   \xFirmware\Tools\Firmup\FIRMUP OI.pdf (Refer to the Local Firmware Update Tool OI on the CD)
   Setup:
   \xFirmware\Tools\Firmup\Setup\Setup.exe

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2) **Preparing the Firmware Code**
   Double click the appropriate Destination Shortcut Batch File, and copy the Firmware Code File on the CD-ROM to the Firmware Data Folder in your PC. Note that the files in the Archive will be extracted automatically into the designated folder when the Archived file (.exe) is Double-clicked.
   Example:
   From:
   Destination Shortcut Batch File: D:(CD-ROM Drive) \ xFirmware \ USA.bat
   Firmware Code File: DP-8016_8020_PU_xxxxxx.exe
   To:
   Firmware Data Folder: C:\ Panasonic \ Panasonic-FUP \ Data

3) **Preparing the Main Unit for the Firmware Upgrade**
   Important: DO NOT connect the USB Cable yet.
   Enter into Test Mode F9-07-01 to enable the unit to accept the programming code from the USB Port.

   Now connect the USB Cable between the Unit, and PC.
4) **Upgrading the Main Unit's Firmware Code**
   Start the Local Firmware Update Tool, and select the following **Firmware Code Parent File Folder** in the **C:\Panasonic\Panasonic-FUP\Data** folder, and select the Firmware Code Type then follow the display instructions to upgrade the Main Unit's Firmware Codes.
   You must process each firmware file separately in this manner, and sequence.

Parent Firmware File Folder	Sub Firmware File Folder	Firmware File	Transferring Order
\ DP-8016_8020_PU_xxxxxx	\ **SC_STD** \ DP-LL80**A**xVxxxxx_xx	DP-LL80AxVxxxxx_xx.bin	1
	\ **SC_PCL** \ DP-LL80**B**xVxxxxx_xx	DP-LL80BxVxxxxx_xx.bin DP-LL80CxVxxxxxa_xx.bin DP-LL80CxVxxxxxb.bin	1-1 1-2 1-3
	\ **SC_PS** \ DP-LL80**D**xVxxxxx_xx	DP-LL80DxVxxxxx_xx.bin DP-LL80ExVxxxxxa_xx.bin DP-LL80ExVxxxxxb.bin	1-1 1-2 1-3
	\ **SPC** \ LL80-SPCAxVxxxxxx	LL80SPCAxVxxxxxx.bin	2

When you select the Parent Folder, the following Firmware Type window appears. Proper Firmware Files are selected automatically by selecting the Firmware Type.
The transferring order is set up automatically.

Note:
1. While updating the firmware code, the display may become garbled, however, it will return to normal upon completion of the firmware update.
2. Please refer to the service manual for additional details.
3. The suffix **"_xx"** for the Folder Name, or File Name may not exist depending on the destination location.

3. Updating the Firmware using the Master Firmware Card (Alternate method)

1. Before starting, print the F5/F6 Parameters List **(Copy Service Mode F9-03-00)**.
2. Turn the Power Switch on the Right side of the machine to the OFF position. (During a Lightning Storm, to prevent electrocution disconnect the Telephone Line Cable first before unplugging the AC Power Cord, if the Fax Option is installed.)
3. Install the appropriate Master Firmware Card into the machine.
4. Turn the Power Switch on the Right Side of the machine to the ON position.
5. Press "**FUNCTION**", "**ORIGINAL SIZE**" keys, and then Key "**3**" on the keypad sequentially.
6. Perform the Copy Service Mode F9-07-00 **(Update From Master Card)**.
7. The firmware is copied into the machine.
8. After the update is completed, the machine reboots itself, and returns to standby.
9. Turn the Power Switch on the Right side of the machine to the OFF position.
10. Remove the Master Firmware Card from the machine.
11. Turn the Power Switch on the Right Side of the machine to the ON position.
12. Reprogram the F5 & F6 Parameters according to the lists printed in Step 1 above if the settings are other than factory default.

Note:

After the update is completed, the machine reboots itself, and returns to standby mode.
Repeat the above steps if there are additional firmware code files to be updated.
Confirm that the update was successfully completed by checking the Firmware Version with F9 Parameters F9-02-xx.

Caution:

If the unit does not boot up properly in step 8, refer to Service Manual 3.7.8. **(Firmware Emergency Recovery)**

3.1. Creating a Master Firmware Card
A. Utilizing the Firmware Update Kit

1) **Install the Local Firmware Update Tool to your PC**
   The option CD-ROM includes the Local Firmware Update Tool, and the Main Unit Firmware Code. Please refer to the following Operating Instructions to install the Local Firmware Update Tool.
   Operating Instructions:
   \xFirmware\Tools\Firmup\FIRMUP OI.pdf (Refer to the Local Firmware Update Tool OI on the CD)
   Setup:
   \xFirmware\Tools\Firmup\Setup\Setup.exe

2) **Preparing the Firmware Code**
   Double click the appropriate Destination Shortcut Batch File, and copy the Firmware Code File on the CD-ROM to the Firmware Data Folder in your PC. Note that the files in the Archive will be extracted automatically into the designated folder when the Archived file (.exe) is Double-clicked.
   Example:
   From:
   Destination Shortcut Batch File: D:(CD-ROM Drive) \ xFirmware \ USA.bat
   Firmware Code File: DP-8016_8020_PU_xxxxxx.exe
   To:
   Firmware Data Folder: C:\ Panasonic \ Panasonic-FUP \ Data

3) **Preparing the Main Unit for the Programming Master Firmware Card**
   Important: DO NOT connect the USB Cable yet.
   1. Turn the Power Switch on the Right side of the machine to the OFF position. (During a Lightning Storm, to prevent electrocution disconnect the Telephone Line Cable first before unplugging the AC Power Cord, if the Fax Option is installed.)
   2. Insert/Remove the Flash Memory Card (4 MB, or 8 MB) into/from the machine.

3. Turn the Power Switch on the Right Side of the machine to the ON position.

4. Press "**FUNCTION**", "**ORIGINAL SIZE**" keys, and then Key "**3**" on the keypad sequentially.

5. Perform the Update Program Card Mode F9-09 **(Update Program Card)**.

The unit is now ready to accept the firmware code from the USB Port.

Now connect the USB Cable between the Unit, and PC.

(Refer to the Local Firmware Update Tool OI on the CD)

Repeat the above steps if there are additional master firmware cards to be programmed.

B. Copying the Firmware from an Existing Machine using a Flash Memory Card (4 MB, or 8 MB)

1. Turn the Power Switch on the Right side of the machine to the OFF position. (During a Lightning Storm, to prevent electrocution disconnect the Telephone Line Cable first before unplugging the AC Power Cord, if the Fax Option is installed.)

2. Install a Flash Memory Card (4 MB, or 8 MB) into the machine.

3. Turn the Power Switch on the Right Side of the machine to the ON position.

4. Press "**FUNCTION**", "**ORIGINAL SIZE**" keys, and then Key "**3**" on the keypad sequentially.

5. Perform the Copy Service Mode F9-08 **(Program Backup)**.

6. The firmware is copied into the Flash Memory Card.

7. After the backup is completed, press "**STOP**" first, and then press "**FUNCTION**" + "**CLEAR**" keys simultaneously to return to standby.

8. Turn the Power Switch on the Right side of the machine to the OFF position.

9. Remove the Master Firmware Card that you just created from the machine.

10. Turn the Power Switch on the Right Side of the machine to the ON position.

11. Use this Master Firmware Card to update the firmware on other machines.

3.2. Erasing the Master Firmware Card

1. Turn the Power Switch on the Right side of the machine to the OFF position. (During a Lightning Storm, to prevent electrocution disconnect the Telephone Line Cable first before unplugging the AC Power Cord, if the Fax Option is installed.)

2. Install the Master Firmware Card into the machine.

3. Turn the Power Switch on the Right Side of the machine to the ON position.

4. Press "**FUNCTION**", "**ORIGINAL SIZE**" keys, and then Key "**3**" on the keypad sequentially.

5. Perform the Service Mode F9-09 **(Update Program Card)**.

6. After the Flash Memory Card is erased, machine prompts "**READY TO PROGRAM PRESS SET TO START**". Press "**STOP**".

7. Press "**STOP**" first, and then press "**FUNCTION**" + "**CLEAR**" keys simultaneously to return to standby.

8. Turn the Power Switch on the Right side of the machine to the OFF position.

9. Remove the blank Flash Memory Card from the machine.

10. Repeat from Step 2 above if you are erasing another Master Firmware Card.

4. User Authentication, and/or Via Fax Server Function Confirmation (Specified Destinations only)

If your customer requires User Authentication, and/or Via Fax Server, setup the feature(s) by referring to the Operating Instructions (For User Authentication).

8.2. Installing the Printer Controller Module for PCL6 (DA-PC820)

8.2.1. Contents

No.	Qty.	Description	Remarks
1	1	Hardware Key	PDL KEY
2	1	Software CD	Includes Operating Instructions
3	1	Installation Instructions	This document
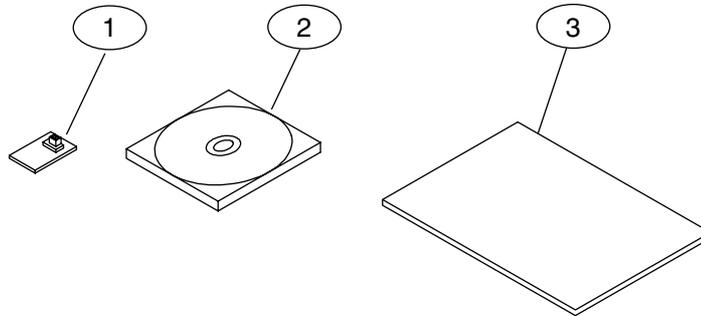
Note:
Refer to the Parts Manual for Part Number(s), Packing, and Accessories detail.
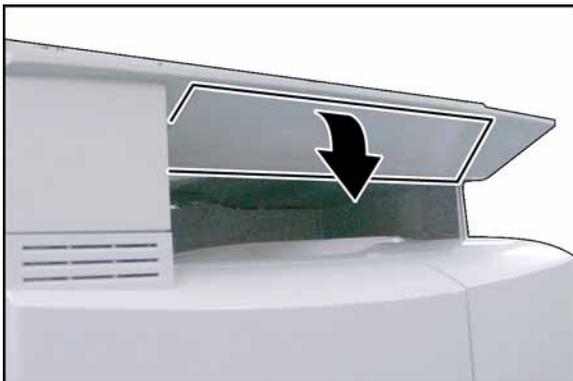
8.2.2. Installation

1. Before installing this option, make sure the Program Expansion Board (DA-EM600) is installed into Slot 1 on the SC PC Board first. Refer to the Installation Instructions of the Program Expansion Board (DA-EM600).
2. Install the Hardware Key by following the steps below.

CAUTION!
Turn the Power Switch on the Right Side of the machine to the OFF position, and then unplug the AC Power Cord before beginning installation. (During a Lightning Storm, to prevent electrocution disconnect the Telephone Line Cable first before unplugging the AC Power Cord, if the Fax Option is installed.)
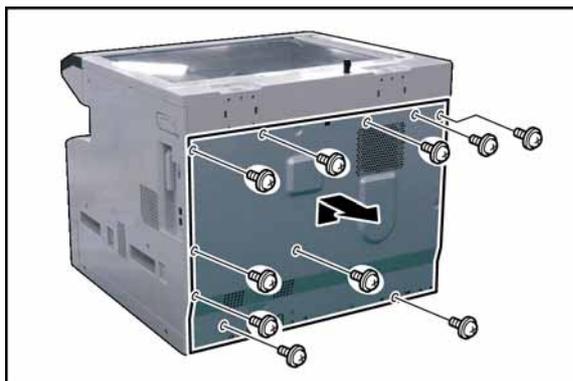
(1) Remove 10 **Screws**.
(2) Remove the **Rear Cover**.
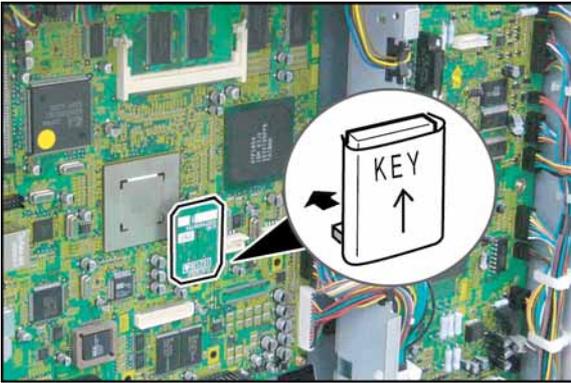
(3) Install the **Hardware Key** into the (CN67) connectors on the SC PC Board.

Note:

The connector is keyed, to prevent damage to the SC PC Board, install the Hardware Key as illustrated. Do not force the Hardware Key into the connector if facing the wrong way.

(4) Proceed with the installation of other options. If finished, reinstall all Harnesses, and Covers.

(5) Plug the **AC Power Cord**, and turn the Power Switch on the Right Side of the machine to the ON position.

(6) Reconnect the **Telephone Line Cable** if it was disconnected.

(7) Update the firmware of the unit to the PCL Option firmware. Refer to the attached "Service Notes".

(8) Install the PCL6 Software into the PC with the Operating Instructions by following the prompts of the Installation Wizard.

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8.3. Installing the Printer Controller Module for PS / PCL6 (DA-MC820)

8.3.1. Contents

| No.	Qty.	Description	Remarks
1	1	Hardware Key	PS KEY
2	1	Software CD	Includes Operating Instructions
3	1	Adobe PostScript 3 Label	
4	1	Installation Instructions	This document
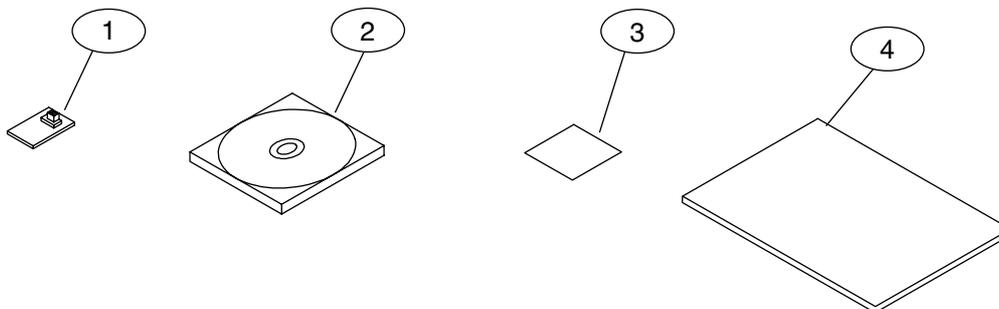
Note:
Refer to the Parts Manual for Part Number(s), Packing, and Accessories detail.

8.3.2. Installation

1. Before installing this option, make sure the Program Expansion Board (DA-EM600) is installed into Slot 1 on the SC PC Board first. Refer to the Installation Instructions of the Program Expansion Board (DA-EM600).
2. Install the Hardware Key by following the steps below.
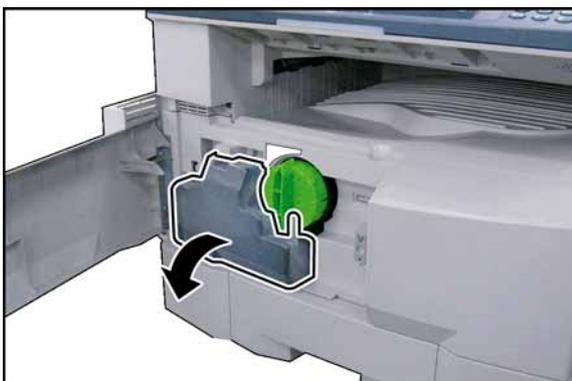
CAUTION!
Turn the Power Switch on the Right Side of the machine to the OFF position, and then unplug the AC Power Cord before beginning installation. (During a Lightning Storm, to prevent electrocution disconnect the Telephone Line Cable first before unplugging the AC Power Cord, if the Fax Option is installed.)
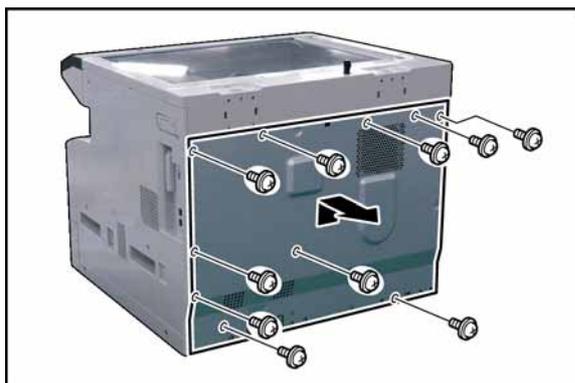

(1) Remove 10 **Screws**.
(2) Remove the **Rear Cover**.
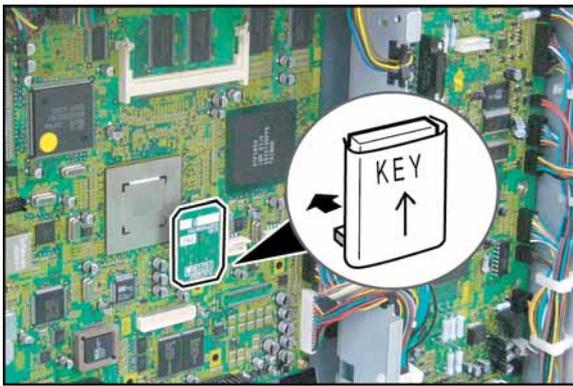
(3) Install the **Hardware Key** into one of the three available connectors (CN67) on the SC PC Board.

Note:
   The connector is keyed, to prevent damage to the SC PC Board, install the Hardware Key as illustrated. Do not force the Hardware Key into the connector if facing the wrong way.

(4) Proceed with the installation of other options. If finished, reinstall all Harnesses and Covers.

(5) Plug the **AC Power Cord** and turn the Power Switch on the Right Side of the machine to the ON position.

(6) Reconnect the **Telephone Line Cable** if it was disconnected.

(7) Update the firmware of the unit to the PS/PCL Option firmware. Refer to the attached "Service Notes".

(8) Install the PS/PCL6 Software into the PC with the Operating Instructions by following the prompts of the Installation Wizard.

(9) Attach the Adobe PostScript 3 Label to the Front Cover as illustrated.

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8.4. Installing the Fax Communication Board (DA-FG180)

8.4.1.Contents

No.	Qty.	Description	Remarks
1	1	FXB PC Board	
2	1	MJR PC Board Assembly	
3	1	MJR Harness	
4	1	Key Assembly	For DP-1820E/1820P/1520P only
5	1	Speaker	
6	1	Speaker Spring	
7	1	Telephone Line Cable	
8	1	TEL Label	
9	1	Line Label	
10	1	Type Approval Label	Specified Destination
11	1	Function Label	Specified Destination
12	1	Telepermit Label	For New Zealand only
13	1	Stamp Assembly	For USA/Canada only
			Other Destinations
14	1	Stamp Unit	For ADF
15	2	Clamp	
16	1	PCB Spacer	
17	4	Screw (M3 x 6)	
18	2	Screw (M3 x 8)	
19	1	Quick Guide	For Facsimile and Internet FAX/Email
20	1	Operating Instructions CD	
21	1	Installation Instructions	This document
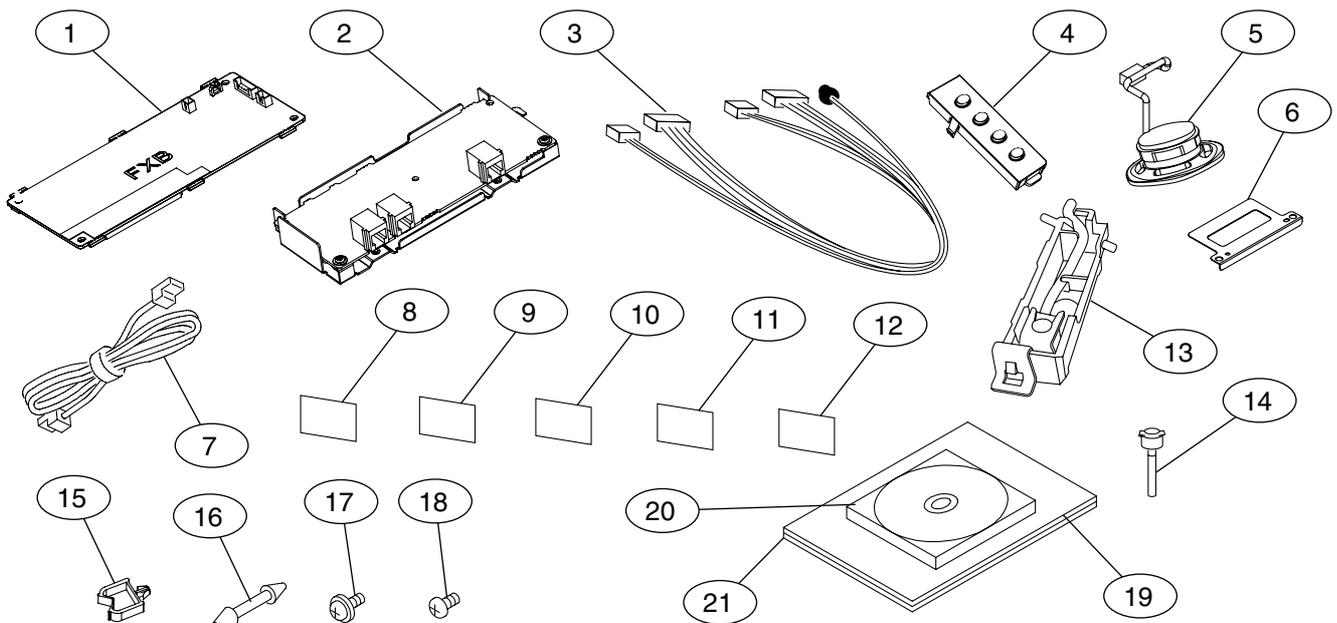
Note:
1. If also installing the Program Expansion Board (DA-EM600), it must be installed first.
2. Refer to the Parts Manual for Part Number(s), Packing, and Accessories detail.

8.4.2.Installation

Install the Hardware by following the steps below.

CAUTION!

Turn the Power Switch on the Right Side of the machine to the OFF position, and then unplug the AC Power Cord before beginning installation.
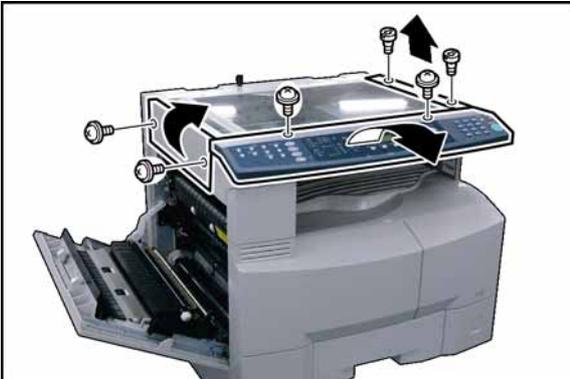
(1) Open the **Left Cover**.
(2) Remove 2 **Silver Screws**.
(3) Remove the **Left Scanner Cover**.
(4) Remove 2 **Shoulder Silver Screws**.
(5) Remove the **Right Scanner Cover**.
(6) Remove 2 **Silver Screws**.
(7) Slightly lift the **Control Panel Assembly**.
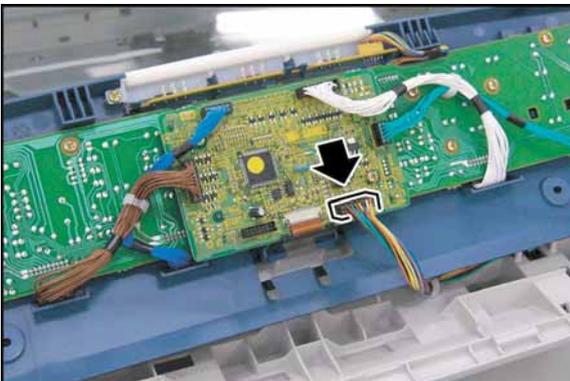
(8) Disconnect the **Harness** on the PNL1 PC Board (CN220).
(9) Remove the **Control Panel Assembly**.
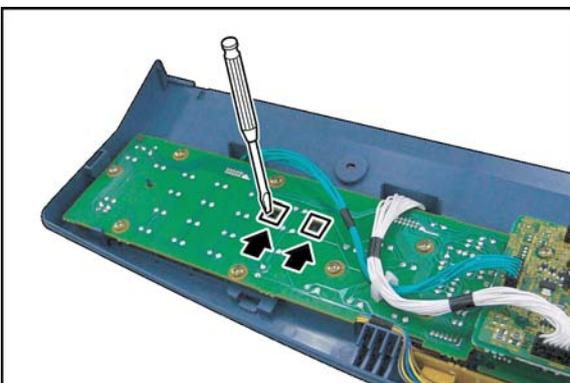
<For DP-1820E/1820P/1520P only>
Follow the steps (10) ~ (12) below.

(10) Release 2 **Latch Hooks**.

(11) Remove the **Panel Sub Cover**.

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(12) Install the **Key Assembly** into the Control Panel Assembly.

(13) Install the **Speaker** as illustrated.
(14) Connect the **Speaker Harness**.
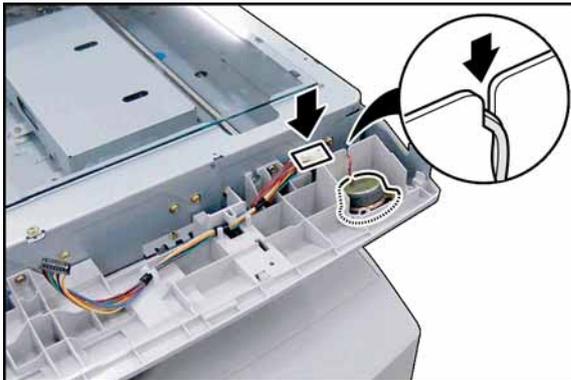
(15) Install the **Speaker Spring**.
(16) Secure the **Speaker Spring** with 2 Screws.
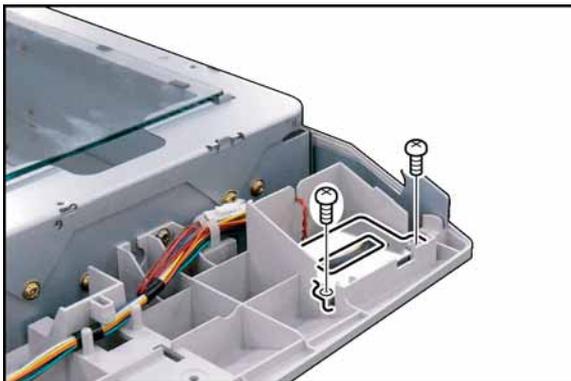
(17) Remove 10 **Screws**.
(18) Remove the **Rear Cover**.

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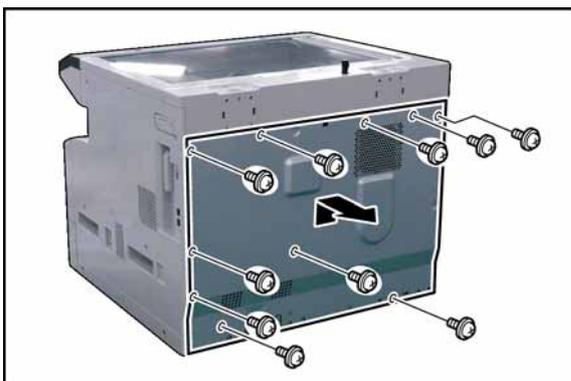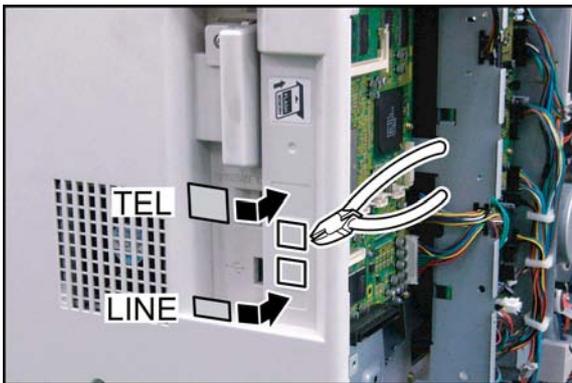
(19) Remove the **Lower Protective Tab** on the Right Cover for the LINE connection.
If installing an External Telephone, remove the upper protective tab as well.

(20) Attach the **Line Label** and **TEL Label** to the Right Cover as illustrated.
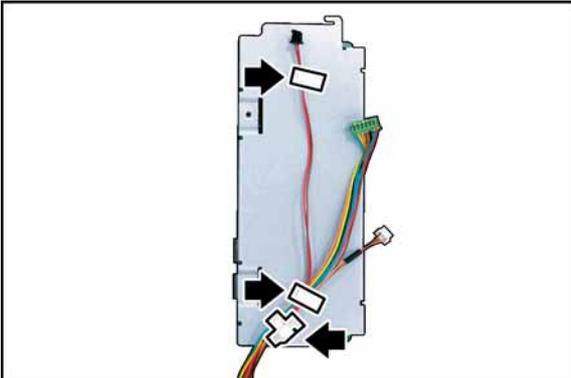
(21) Secure the **MJR Harness** with the Harness Clamps.
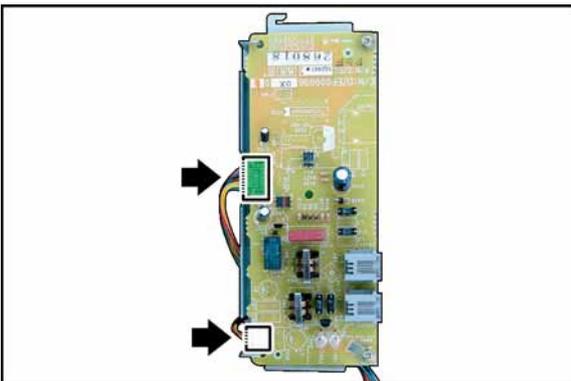
(22) Connect the **MJR Harness** to the MJR PC Board (CN22 and CN25).
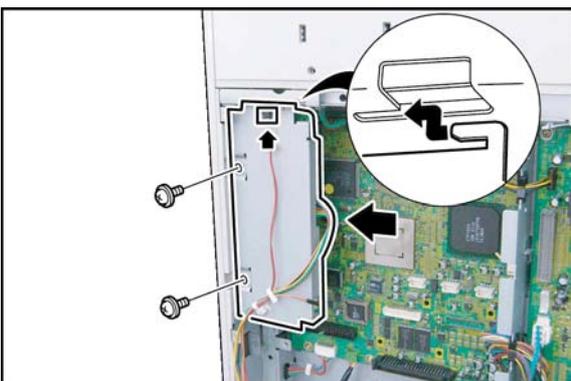
(23) Install the **MJR PC Board** Assembly from the rear of the machine by inserting the Hooks into the slots on the frame.

(24) Secure the **MJR PC Board Assembly** with 2 Screws (M3 x 6).

(25) Connect the **MJR Harness**.

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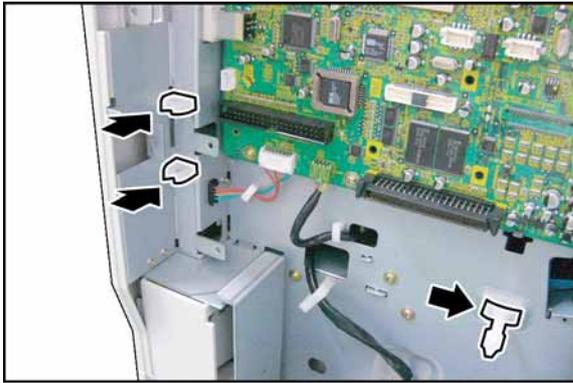
(26) Install 2 **Clamps**.
(27) Install the **PCB Spacer**.
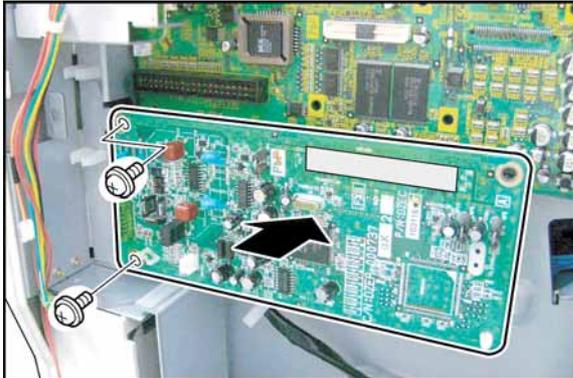
(28) Plug the **FXB PC Board** into the SC PC Board with on Board Connector (CN80).
(29) Secure the **FXB PC Board** with 2 Screws (M3 x 6).
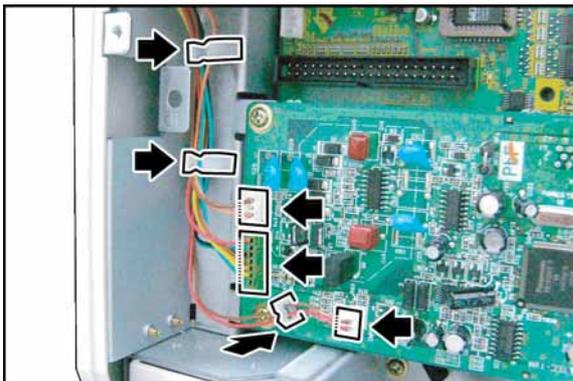
(30) Secure the **MJR Harness** with the Harness Clamps.
(31) Connect the **MJR Harnesses** to the FXB PC Board (CN391, CN392 and CN393).

Function
Label

(32) Attach the **Function Label** (specified destination) on the upper right corner as illustrated.
Note: (For ADF or Platen)
Attach the Function Label as the same position as i-ADF.

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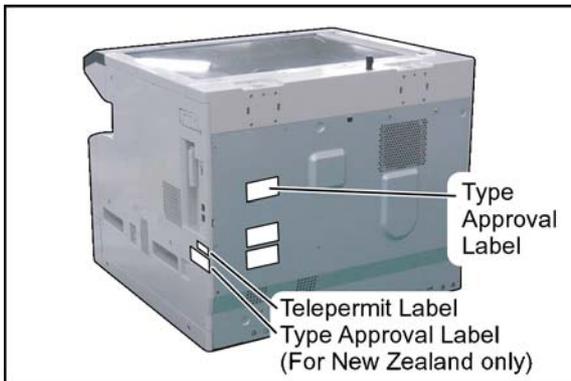
(33) Attach the **Type Approval Label** (specified destination) to the Rear Cover as illustrated.

Note: (For New Zealand only)
Attach the Type Approval Label and Telepermit Label to the Right Side Cover as illustrated.
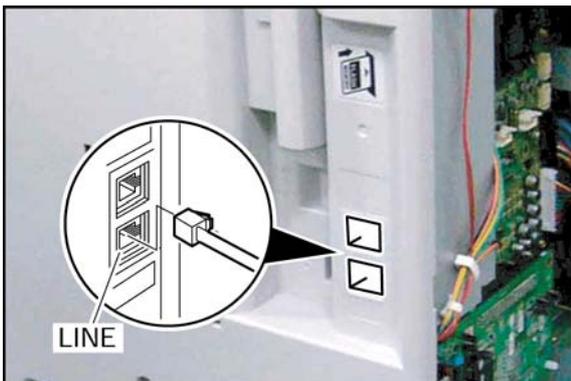
(34) Proceed with the installation of other options. If finished, reinstall all Harnesses and Covers.
(35) Plug the **AC Power Cord** and turn the Power Switch on the Right Side of the machine to the ON position.
(36) Connect one end of the **Telephone Line Cable** to the LINE Jack on the right side of the machine, and the other end to the Telephone Jack on the wall.

<Installing the Stamp Assembly for i-ADF>
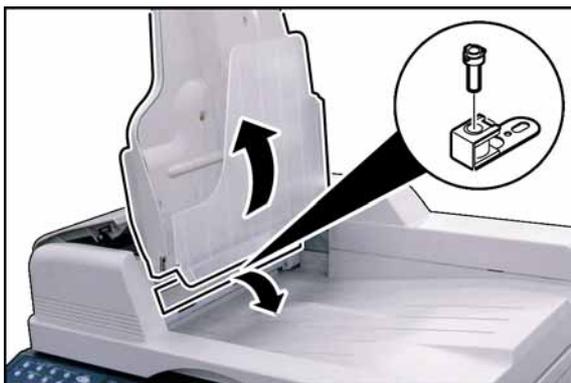
(37) Lift the **Original Tray Assembly**.
(38) Lower the **Inverting Guide 2 Assembly**.
(39) Install the **Stamp Assembly**.
(40) Perform Service Mode F6 (No. 69) to adjust the Stamp Position.

<Installing the Stamp Assembly for ADF>
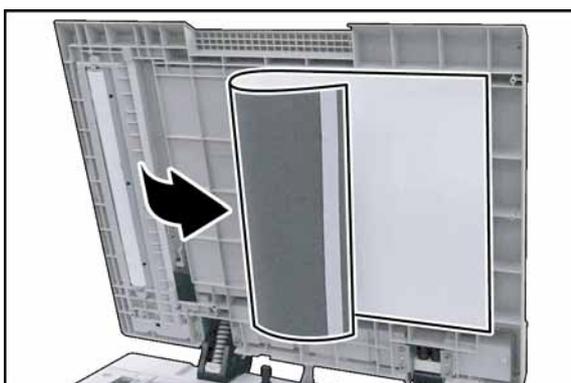
(41) Open the **ADF Unit**.
(42) Detach the Hook and Loop Fastener on the left side of the **Scanning Pad**.

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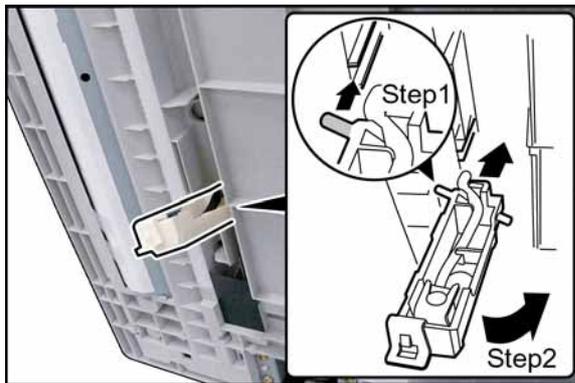
(43) Install the **Stamp Unit** as illustrated.
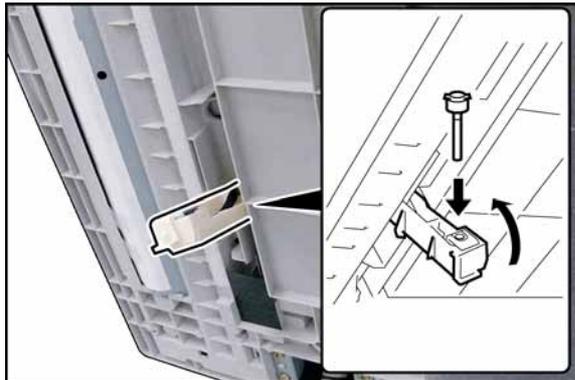
(44) Install the **Stamp Assembly**.
(45) Close the **Stamp Unit**.
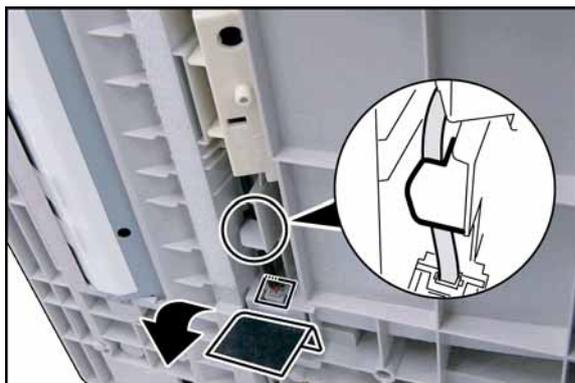
(46) Remove the edge of the **Protective Sheet**.
(47) Connect the **Harness** of Stamp Unit.
(48) Place the **Harness** into the Latch as illustrated.
(49) Reattach the Hook and Loop Fastener on the left side of the **Scanning Pad**.
(50) Close the **ADF Unit**.
(51) Perform Service Mode F6 (No. 69) to adjust the Stamp Position.

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(52) It is not necessary to set the parameter for the following suffix (Destinations). The Fax Firmware is automatically loaded with the Host Firmware.

    PB : UK
    PF : France
    PK : China
    PM: Germany
    PP : Poland
    PS : Sweden
    PT : Taiwan
    PU : USA

Note:
For other destinations, set the Function Parameter #005 (Destination Code).

    000 : Austria
    001 : U.K.
    002 : Canada
    003 : Denmark
    004 : Taiwan
    005 : Finland
    006 : Germany
    007 : Netherlands
    008 : Italy
    009 : Spain
    010 : Hong Kong
    011 : Australia
    012 : Switzerland
    013 : Norway
    015 : Portugal
    016 : Ireland
    017 : Belgium
    018 : Sweden
    019 : Turkey
    020 : U.S.A.
    021 : France
    022 : New Zealand
    025 : Japan
    029 : Poland
    030 : Czech
    031 : Russia
    032 : Greece
    033 : Hungary
    034 : Indonesia
    035 : South Korea
    038 : Malaysia
    039 : China
    045 : Thailand
    048 : South Africa
    049 : Singapore
    050 : Universal
    051 : East Euro

(53) Execute Parameter Initialize by following the steps below.

    a. Press "**FAX/EMAIL**" key.

    b. Press "**FUNCTION**" and then "**7**" keys.

    c. Press "**MONITOR**" four times, then press "∗ (TONE)" to enter the "**SERVICE MODE**".

    d. Press "**6**" key or "V", "Λ" arrow keys to enter "**6 RAM INITIALIZE**".

    e. Press "V", "Λ" arrow keys to enter "**PARAMETER INITIALIZE**".

    f. Press "**START**" key. Wait approximately 10-20 seconds, the unit displays "**COMPLETED**", then the unit will return to Service Mode.

    g. Turn the Power Switch on the Right side of the machine to the **OFF** and back to the **ON** position to enable the parameter settings.

(54) Verify the position of the ⊗ stamp on the document. If it is not within the desired location at the bottom of the document, you can adjust its position by following the steps below.

    a. Press "**FUNCTION**", "**ORIGINAL SIZE**", and "**3**" keys sequentially to enter the Service Mode.

    b. Press the "**6**" and "**START**" keys to enter the F6 Mode (Adjust Parameters).

    c. Press "**69**" to enter "**STAMP POSITION ADJ**".

    d. Press "**START**" and enter a number (-50 to 50).

    Note:

        A positive number moves the ⊗ stamp position closer to the trail edge of the document, conversely, a negative number moves it in the opposite direction.

        To change the current sign to either +/-, press the "**RESET**" key. (Default setting = 0; 0.3 mm/step)

    e. Press "**OK**" key twice.

    f. Press "**FUNCTION**" and "**CLEAR**" keys simultaneously to exit the Service Mode.

(55) Proceed the communication test to ensure the Fax Option works properly.

Perform the following steps if the Optional Hard Disk Drive Unit (DA-HD18), is also installed.
<Change from 200 to 1,000 Station Address Book>

An additional 800 Stations, 1,000 in total is available when the optional Hard Disk Drive (DA-HD18) is installed. When installing the HDD unit, the machine automatically changes the address book configuration from 200 to 1,000 Stations and the addresses that have been already registered will be copied into the HDD automatically.

Note:
　　1) As a precaution, before installing the HDD unit, it is recommended to printout the Address Book information, copy the data using the Network Address Book Editor in the Panasonic-DMS software or RDS as backup.
　　2) The address book data in the machine is initialized (erased) when the HDD is removed (except for the 200 addresses that were registered on F-ROM of the SC Board prior to HDD installation, they will be preserved).
　　3) When the HDD is removed, the registered address book data remains in the HDD. When reinstalling the HDD again, the registered address book data is still usable in the machine. However, the address book data will be initialized (erased) if the proper shut-down (Step sequence of turning OFF the Power Switch) procedure was not followed.

<Using Network Address Book Editor to Transfer the Address Book Data>
The registered data in the 200 Station Address Book can be easily copied and transferred (copy and paste) to the 1,000 Station Address Book by using the Network Address Book Editor (NAE).

Note:
　　The size and configuration of the transferred data, varies according to the 200 or 1,000 Fax Address Book.
　　When installing the Panasonic-DMS, 2 Address Book Editor modules are installed for the DP-8020/1820.
　　1) The "**DP-8020/1820**" is used for the standard 200 Fax Address Book.
　　2) The "**DP-8020/1820 (Fax1000)**" is used for the 1,000 Fax Address Book.

　　　　a) An appropriate Address Book Editor module is automatically selected depending on which style of Fax Address Book is activated on the DP-8020/1820.
　　　　b) Retrieve the 200 Station, Fax Address Book data from the unit as follows:
　　　　　　1. Click on **START\Programs\Panasonic\Panasonic Document Management System\Network MFP Utilities**.
　　　　　　2. Click on **Network Device Locator**.
　　　　　　3. In the Network Device Locator window, select your desired device.
　　　　　　4. In the menu bar, click on **Tools** and in the drop down menu on **Address Book Editor**.
　　　　　　5. The Network Address Book Editor "**DP-8020/1820**" window appears, under the Address Book Editor directory, click on **Fax Address Book**.
　　　　　　6. When the 200 Station Fax Address Book file is displayed, save the data file by clicking on **File\Save As...** and type the file name of your choice (i.e. 200 Station).
　　　　　　7. Then click the **OK** button.
　　　　c) Change the Address Book of the unit from 200 to 1,000 Stations, using the Service Mode described above.
　　　　d) Retrieve the 1,000 Fax Address Book (empty) data again from the unit using the same method as above. When the Address Book Editor appears this time, it will show "**DP-8020/1820 (Fax1000)**". Save the data file as above, except change to another name (i.e. 1,000 Station).
　　　　e) Open the 200 Fax data file of step b) and the 1,000 Fax data file of step d). Copy the 200 Fax data and paste it into the 1,000 Fax data file, add additional desired names to the file, then save it again. (Refer to Help.)
　　　　f) Transfer the edited 1,000 Fax data file to the unit, by clicking on Transfer and Write in the menu bar. Close the Network Address Book Editor application after the transfer is successfully completed.

8.5. Installing the Keyboard Option (DA-KB180)

8.5.1. Contents

No.	Qty.	Description	Remarks
1	1	Keyboard Unit	
2	1	Keyboard Sheet (English)	Preinstalled
3	1	Keyboard Sheet (French)	
4	1	Keyboard Sheet (German)	
5	4	Screw	
6	1	Installation Instructions	This document
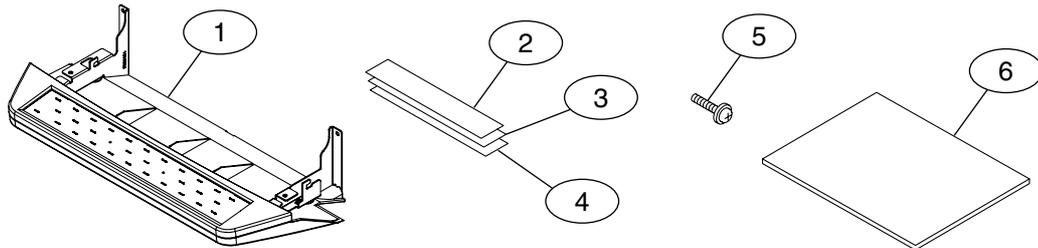
Note:

Refer to the Parts Manual for Part Number(s), Packing, and Accessories detail.

8.5.2. Installation

Install the Hardware by following the steps below.

CAUTION!

Turn the Power Switch on the Right Side of the machine to the OFF position, and then unplug the AC Power Cord before beginning installation. (During a Lightning Storm, to prevent electrocution disconnect the Telephone Line Cable first before unplugging the AC Power Cord, if the Fax Option is installed.)

(1) Open the **Left Cover**.
(2) Remove 2 **Silver Screws**.
(3) Remove the **Left Scanner Cover**.
(4) Remove 2 **Shoulder Silver Screws**.
(5) Remove the **Right Scanner Cover**.
(6) Remove 2 **Silver Screws**.
(7) Slightly lift the **Control Panel Assembly**.

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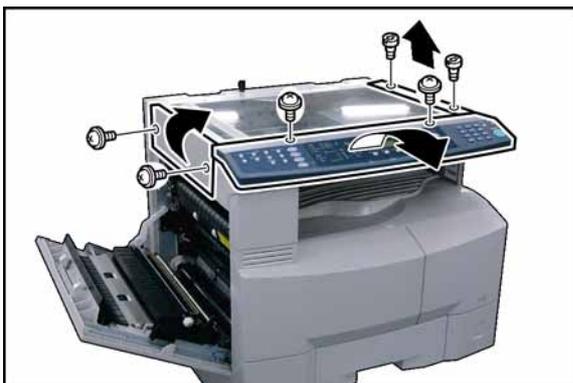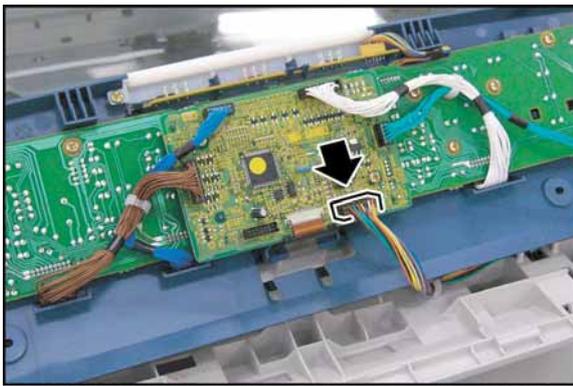
(8) Disconnect the **Harness** on the PNL1 PC Board (CN220).

(9) Remove the **Control Panel Assembly**.

(10) Release 2 **Latch Hooks**.

(11) Remove the **Control Panel Sub Base Cover**.

(12) Remove 2 **Screws**.

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(13) Replace the preinstalled **Keyboard Sheet** to the desired language.

Note:
Alphabet arrangement is dependent on the destination, and may differ.
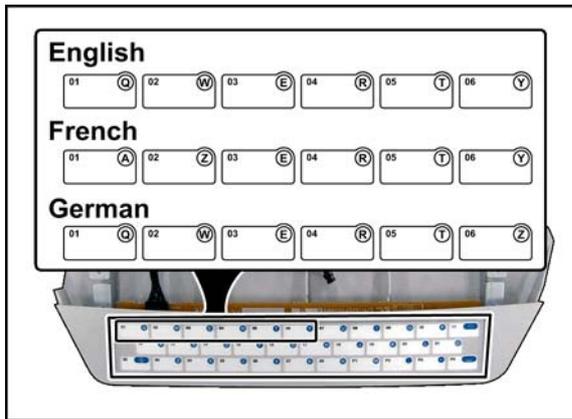
(14) Route the **Keyboard Harness** through the access hole on the machine.
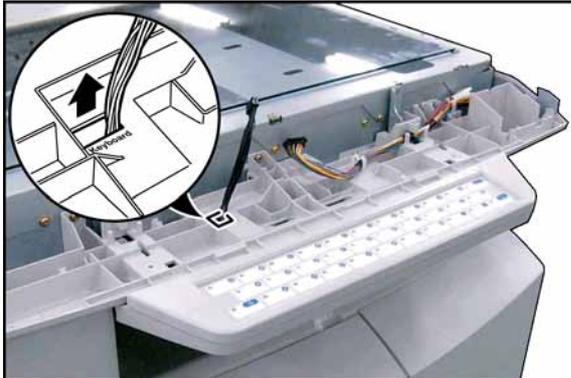
(15) Install the **Keyboard Unit** as illustrated.
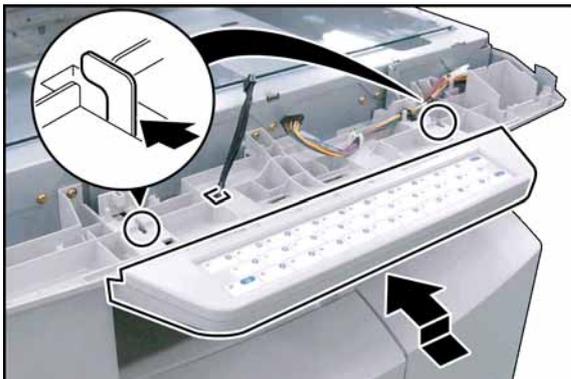
(16) Secure the Keyboard Unit with 4 **Screws**.

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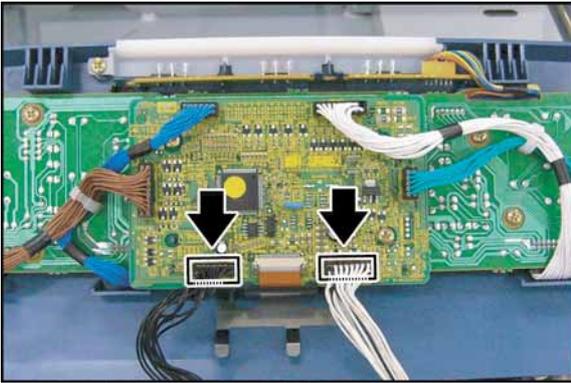
(17) Connect the **Keyboard Harness** to CN234 and **Panel Harness** to CN220 on the PNL1 PC Board.

(18) Proceed with the installation of other options. If finished, reinstall all Harnesses and Covers.

(19) Plug the **AC Power Cord** and turn the Power Switch on the Right Side of the machine to the ON position.

(20) Reconnect the **Telephone Line Cable** if it was disconnected.

(21) Set the parameter for the Keyboard Sheet by following the steps below.

Note:
   The parameter can be set whether SCANNER or FAX Mode depends on which Option is installed.

<SCANNER MODE>

a. Press"**SCAN/FILE**".

b. Press the "**FUNCTION**", "**1**" and "**SET**" keys to enter the SET Mode.

c. Press "**2**" and "**SET**" keys.

d. Press "**6**" key.

e. Press "**1**", "**2**" or "**3**" key to select desired Alphabet arrangement and press "**SET**" key.
   "1" : QWERTY (English)
   "2" : QWERTZ (German)
   "3" : AZERTY (French)

f. Press "**STOP**" key.

<FAX MODE>

a. Press "**FAX/EMAIL**".

b. Press the "**FUNCTION**" and "**7**" keys to enter the SET Mode.

c. Press "**4**" and "**SET**" keys.

d. Press "**64**" and "**SET**" keys.

e. Press "**1**", "**2**" or "**3**" key to select desired Alphabet arrangement and press "**SET**" key.
   "1" : QWERTY (English)
   "2" : QWERTZ (German)
   "3" : AZERTY (French)

f. Press "**STOP**" key.

8.6.   Installing the Hard Disk Drive Unit (DA-HD18)

8.6.1.   Contents

No.	Qty.	Description	Remarks
1	1	Hard Disk Drive (HDD)	
2	1	DC PCB	
3	1	HDD Cover	
4	1	HD Harness	
5	1	HDD2 Harness	
6	1	DC12 Harness	
7	2	Harness Clamp (Small)	Black
8	4	Harness Clamp (Medium)	White
9	4	Screw (6-32 x 3/8)	
10	6	Screw (M3 x 6)	
11	1	Installation Instructions	This document
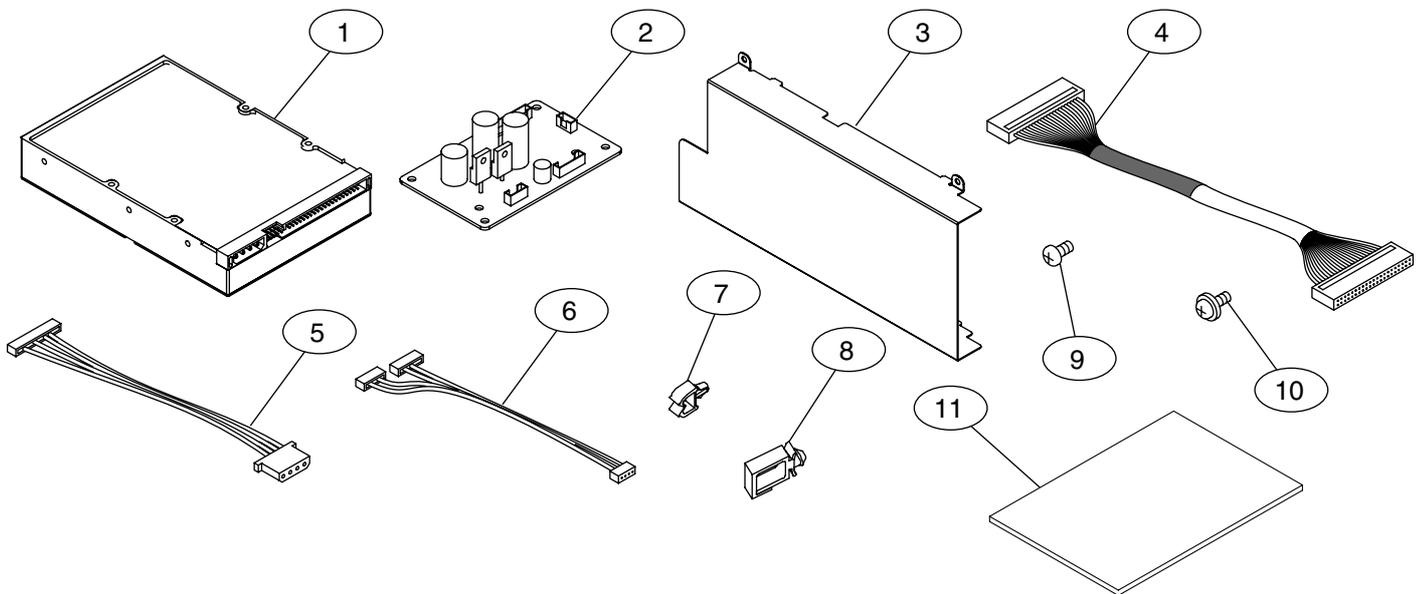
Note:
   Refer to the Parts Manual for Part Number(s), Packing, and Accessories detail.

8.6.2. Installation

1. Before installing the Hard Disk Drive Unit, make sure the optional Sorting Image Memory is installed in the memory socket on the SC PC Board first. **At least an additional 16 MB (DA-SM16B) of Sorting Image Memory is required.**
   Refer to the Installation Instruction of the Sorting Image Memory (DA-SM16B/64B/28B).
2. Install the Hard Disk Drive Unit by following the steps below.

CAUTION!

Turn the Power Switch on the Right Side of the machine to the OFF position, and then unplug the AC Power Cord before beginning installation. (During a Lightning Storm, to prevent electrocution disconnect the Telephone Line Cable first before unplugging the AC Power Cord, if the Fax Option is installed.)
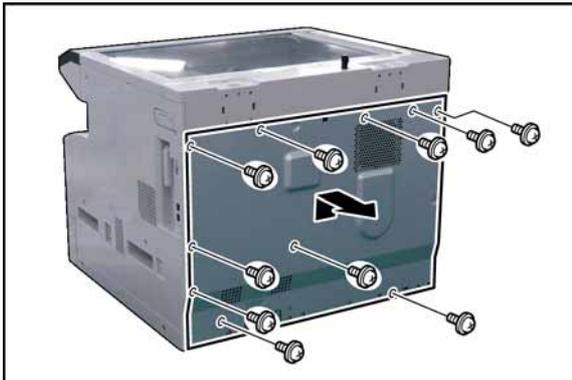
(1) Remove 10 **Screws**.
(2) Remove the **Rear Cover**.

(3) Open the **Left Cover**.
(4) Open the **Front Cover**.

(5) Remove the **Toner Waste Container**.

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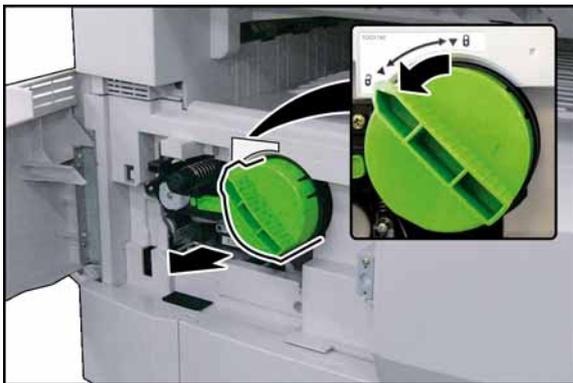
(6) Remove the **Toner Bottle**.

Caution:
Do Not install the Toner Bottle before installing the Process Unit first. If the Toner Bottle is installed and turned to the "Locked" position without the Process Unit, the Toner will spill inside the machine.

(7) Remove 1 **Screw**.
(8) Remove the **Connector Cover**.

(9) Loosen 1 Screw.
(10) Disconnect the **Harness**.
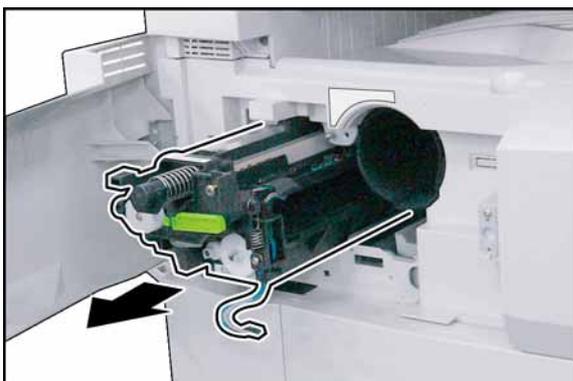
(11) Remove the **Process Unit**.

Caution:
To prevent damage to the Process Unit, ensure that the Left Cover is still open before removing the Process Unit out of the machine.

Caution:
Exercise caution not to scratch the surface of the **OPC Drum** (Green), and not to touch it with bare hands.

Caution:
The OPC Drum is sensitive to light. To prevent optical exposure problems, do not expose the OPC Drum to direct sunlight, or bright light.

Even if it is a fluorescent lamp, approx.1000 lm/m^2 (1000 lx).
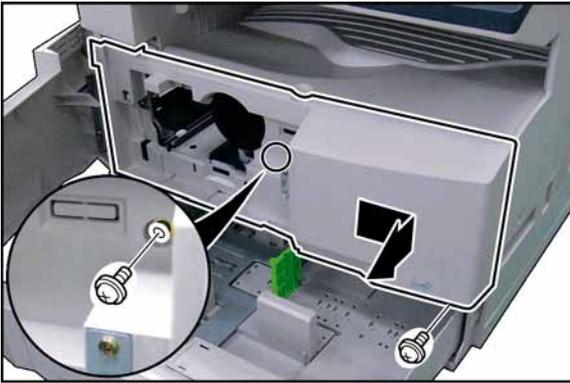
(12) Slide the **1st Paper Tray** out of the unit.
(13) Remove 2 **Screws**.
(14) Remove the **Front Cover 1**.
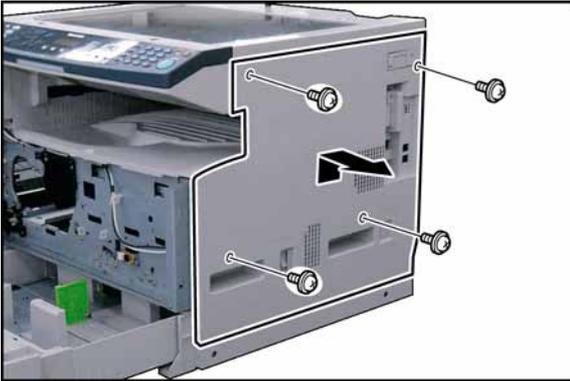
(15) Remove 4 **Silver Screws**.
(16) Remove the **Right Cover**.
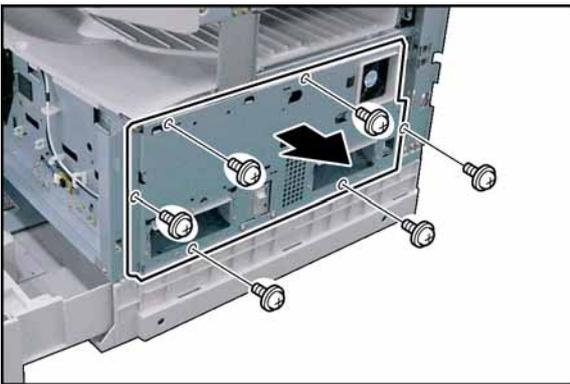
(17) Remove 6 **Screws**.
(18) Remove the **Right Bracket**.
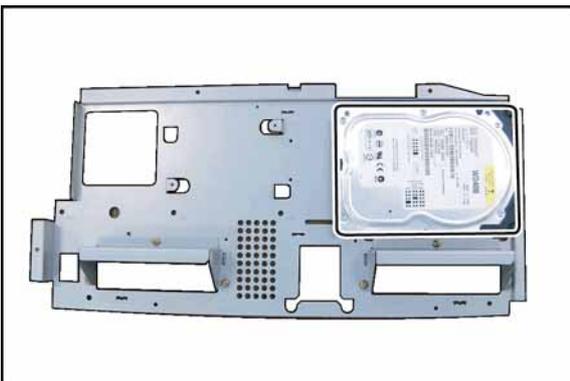
(19) Install the **HDD** into the Right Bracket as illustrated.

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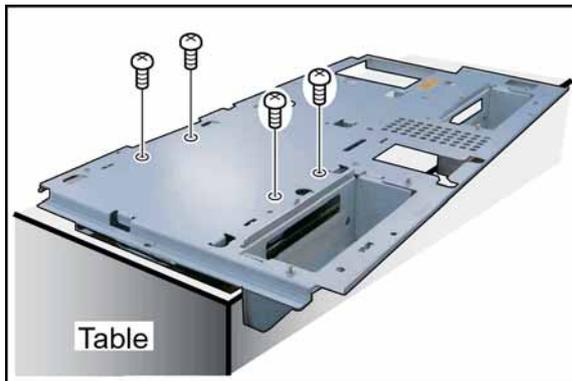
(20) Secure the HDD with 4 **Screws** (6-32x3/8).
Note:
  When securing the HDD, place it at the edge of a table as illustrated (cover the table to protect it from scratches).
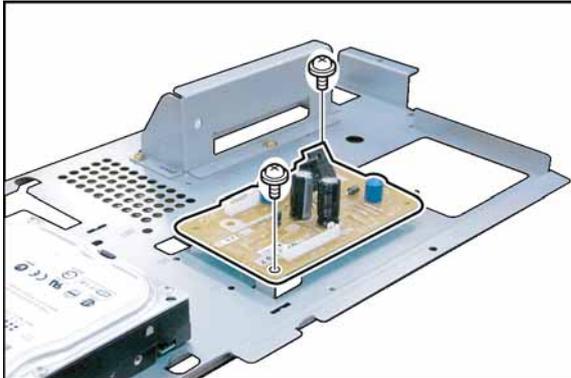
(21) Install the **DC PC Board**.
(22) Secure the **DC PC Board** with 2 Screws.
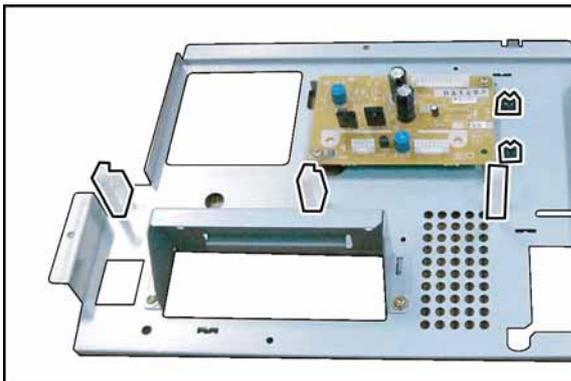
(23) Install 2 **Harness Clamps (Small)** and 3 **Harness Clamps (Medium)**.
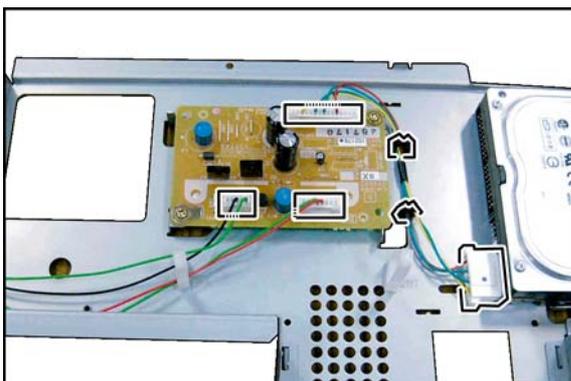
(24) Connect the **HDD2 Harness** to the HDD.
(25) Connect the **HDD2 Harness** to CN143, and **DC12 Harness** to CN141 & CN142.
(26) Secure the **HDD2 Harness** with the 2 Harness Clamps.

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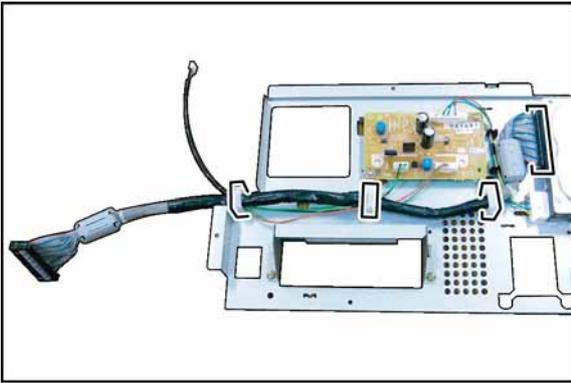
(27) Connect one end of the HD Harness to the HDD. See Note below.
(28) Secure the **HD Harness** and **DC12 Harness** with the Harness Clamps.

Correct	Incorrect
Key → HDD	Key → HDD
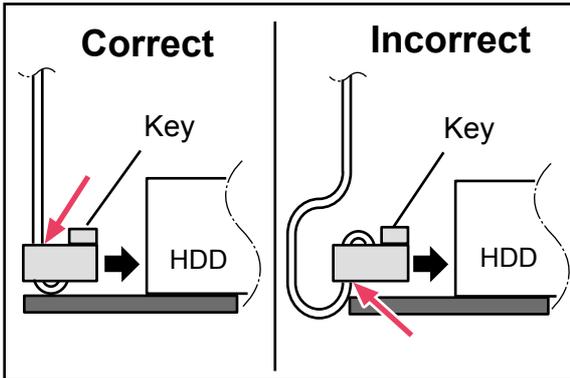
Note:
  Make sure that the HD Harness is connected to the HDD correctly as illustrated.
  1. The Key on the connector must be facing Upwards.
  2. Either connector of the HD Harness will fit into the HDD. However, the correct one is shown in the illustration (Harness comes out from the top of the connector).
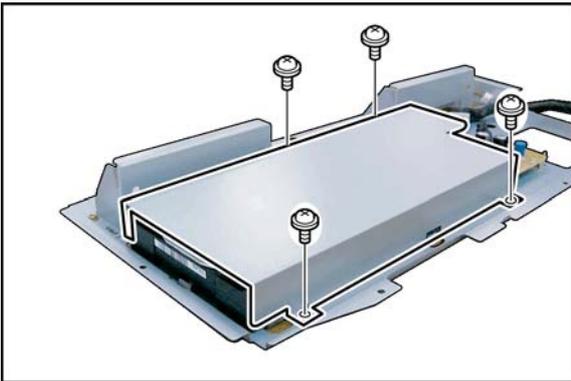
(29) Install the **HDD Cover**.
(30) Secure the **HDD Cover** with 4 Screws.
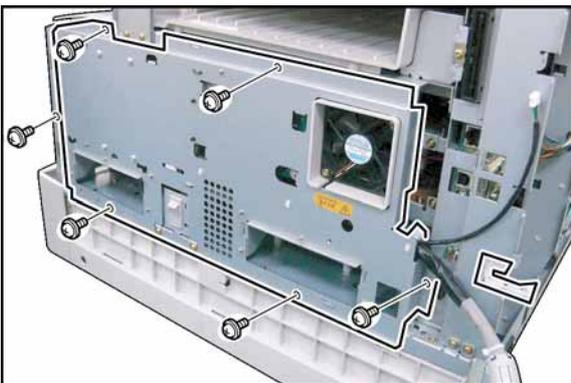
(31) Reinstall the **Right Bracket** Assembly.
(32) Install 1 **Harness Clamp (Medium)**.

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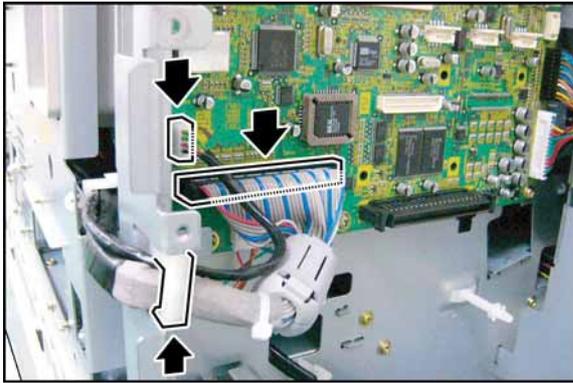
(33) Connect the **HD Harness** to CN59 and **DC12 Harness** to CN 145 on the SC PC Board.

(34) Secure the **HD Harness**, and **DC12 Harness** with the Harness Clamp.

(35) Proceed with the installation of other options. If finished, reinstall all Harnesses and Covers.

(36) Plug the **AC Power Cord**, and turn the Power Switch on the Right Side of the machine to the ON position.

(37) Reconnect the **Telephone Line Cable** if it was disconnected.

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CAUTION!

<Step sequence of turning OFF the Power Switch>
After the Hard Disk Drive Unit is installed, to prevent a Scan Disk Function from being performed (similar to Windows OS when the power is abruptly interrupted), it is important to follow the step sequence below when turning OFF the Power Switch on the machine.

    1. If the machine is in the "ENERGY SAVER (Shutdown Mode)", you may turn the Power Switch on the Right Side of the machine to the OFF position. If it is not in the "ENERGY SAVER (Shutdown Mode)", continue to step 2 below.

    2. Press "FUNCTION" and "ENERGY SAVER" keys simultaneously first.

    3. Wait approximately 10 seconds while the machine writes the closing status onto the Hard Disk Drive Unit and advances into "ENERGY SAVER MODE".

    4. Turn the Power Switch on the Right Side of the machine to the OFF position.

    5. Unplug the AC Power Cord. (During a Lightning Storm, to prevent electrocution disconnect the Telephone Line Cable first before unplugging the AC Power Cord, if the Fax option installed.)

    6. After finishing the installation of the Hard Disk Drive, please go over the above Power Down procedure with the customer to avoid the Scan Disk Function from being performed (indicated by SCANNING HARD DISK message on the display), and customer inquiries related to abrupt Power Off.

    7. Reconnect the Telephone Line Cable if it was disconnected.

<Change from 200 to 1,000 Station Address Book>
An additional 800 Stations, 1,000 in total is available when the optional Hard Disk Drive (DA-HD18) is installed. When installing the HDD unit, the machine automatically changes the address book configuration from 200 to 1,000 Stations and the addresses that have been already registered will be copied into the HDD automatically.

Note:
1) As a precaution, before installing the HDD unit, it is recommended to printout the Address Book information, copy the data using the Network Address Book Editor in the Panasonic-DMS software or RDS as backup.
2) The address book data in the machine is initialized (erased) when the HDD is removed (except for the 200 addresses that were registered on F-ROM of the SC Board prior to HDD installation, they will be preserved).
3) When the HDD is removed, the registered address book data remains in the HDD. When reinstalling the HDD again, the registered address book data is still usable in the machine. However, the address book data will be initialized (erased) if the proper shut-down (Step sequence of turning OFF the Power Switch) procedure was not followed.

<Using Network Address Book Editor to Transfer the Address Book Data>
The registered data in the 200 Station Address Book can be easily copied and transferred (using copy and paste) to the 1,000 Station Address Book by using the Network Address Book Editor (NAE).

Note:
The size and configuration of the transferred data, varies according to the 200 or 1,000 Fax Address Book.
When installing the Panasonic-DMS, 2 Address Book Editor modules are installed for the DP-8020/8016/ 1820.
1) The "**DP-8020/8016/1820**" is used for the standard 200 Fax Address Book.
2) The "**DP-8020/8016/1820 (Fax1000)**" is used for the 1,000 Fax Address Book.
    a) An appropriate Address Book Editor module is automatically selected depending on which style of Fax Address Book is activated on the DP-8020/8016/1820.

b) Retrieve the 200 Station, Fax Address Book data from the unit as follows:

1. Click on **START\Programs\Panasonic\Panasonic Document Management System\Network MFP Utilities**.

2. Click on **Network Device Locator**.

3. In the Network Device Locator window, select your desired device.

4. In the menu bar, click on **Tools** and in the drop down menu on **Address Book Editor**.

5. The Network Address Book Editor **"DP-8020/8016/1820"** window appears, under the Address Book Editor directory, click on **Fax Address Book**.

6. When the 200 Station Fax Address Book file is displayed, save the data file by clicking on **File\Save As...** and type the file name of your choice (i.e. 200 Station).

7. Then click the **OK** button.

c) Change the Address Book of the unit from 200 to 1,000 Stations, using the Service Mode described above.

d) Retrieve the 1,000 Fax Address Book (empty) data again from the unit using the same method as above. When the Address Book Editor appears this time, it will show **"DP-8020/8016/1820 (Fax1000)"**. Save the data file as above, except change to another name (i.e. 1,000 Station).

e) Open the 200 Fax data file of step b) and the 1,000 Fax data file of step d). Copy the 200 Fax data and paste it into the 1,000 Fax data file, add additional desired names to the file, then save it again. (Refer to Help.)

f) Transfer the edited 1,000 Fax data file to the unit, by clicking on Transfer and Write in the menu bar. Close the Network Address Book Editor application after the transfer is successfully completed.

8.7. Installing the Expansion F-ROM Board (DA-EM600)

8.7.1. Contents

No.	Qty.	Description	Remarks
1	1	Expansion F-ROM Board	
2	2	PC Board Support	
3	1	Installation Instructions	This document
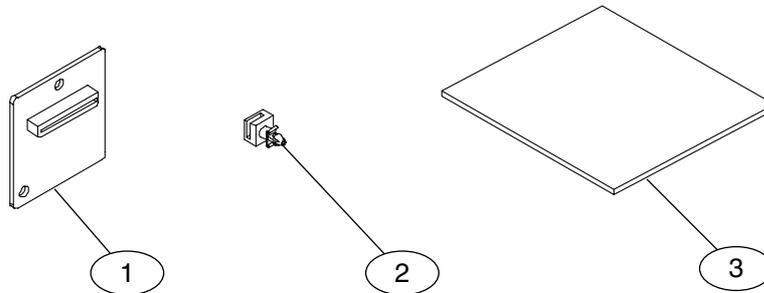
Note:
Refer to the Parts Manual for Part Number(s), Packing, and Accessories detail.

8.7.2. Installation

CAUTION!

Turn the Power Switch on the Right Side of the machine to the OFF position, and then unplug the AC Power Cord before beginning installation. (During a Lightning Storm, to prevent electrocution disconnect the Telephone Line Cable first before unplugging the AC Power Cord, if the Fax Option is installed.)
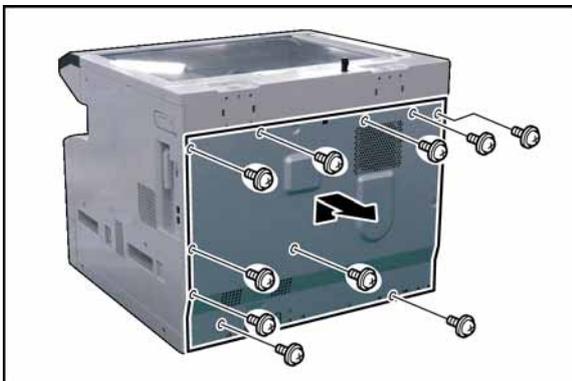
(1) Remove 10 **Screws**.
(2) Remove the **Rear Cover**.
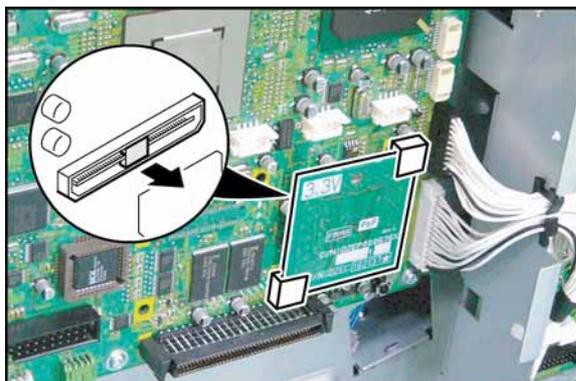
(3) Remove the **Black Pin Protector** from **Slot 1 (CN62)**, if it was pre-installed.

(4) Install 2 **PC Board Supporters** for the **Slot 1** on the SC PC Board.

(5) Install the **Program Expansion Board** into **Slot 1 (CN62)** on the SC PC Board and secure with the Supporters.

Note:
  The Program Extension F-ROM Board must always be installed into Slot 1 (CN62) for the PCL or PCL/PS Printer Option to function.

(6) Proceed with the installation of other options. If finished, reinstall all Harnesses and Covers.

(7) Plug the **AC Power Cord** and turn the Power Switch on the Right Side of the machine to the ON position.

(8) Reconnect the **Telephone Line Cable** if it was disconnected.

8.8. Installing the Sorting Image Memory 16 / 64 / 128 MB (DA-SM16B / 64B / 28B)

8.8.1. Contents

No.	Qty.	Description	Remarks
1	1	SDRM PC Board	16 MB
			64 MB
			128 MB
2	1	Installation Instructions	This document

Note:
Refer to the Parts Manual for Part Number(s), Packing, and Accessories detail.

8.8.2. Installation

CAUTION!

Turn the Power Switch on the Right Side of the machine to the OFF position, and then unplug the AC Power Cord before beginning installation. (During a Lightning Storm, to prevent electrocution disconnect the Telephone Line Cable first before unplugging the AC Power Cord, if the Fax Option is installed.)
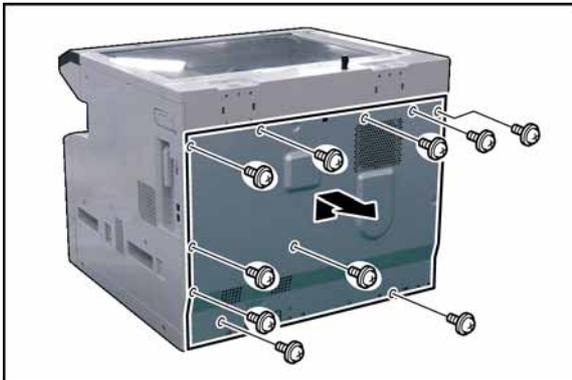
(1) Remove 10 **Screws**.
(2) Remove the **Rear Cover**.
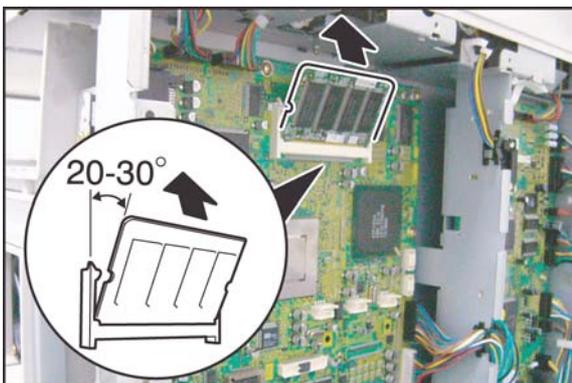
(3) Insert the **SDRM PC Board** into the Socket on the SC PC Board as illustrated.

Note:
Make sure to align the notch first and insert the SDRM PC Board at a 20 - 30° angle into the memory socket, and then lock it down.

(4) Proceed with the installation of other options. If finished, reinstall all Harnesses and Covers.
(5) Plug the **AC Power Cord**, and turn the Power Switch on the Right Side of the machine to the ON position.
(6) Reconnect the **Telephone Line Cable** if it was disconnected.

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8.9. Installing the Expansion Flash Memory Card 4/8 MB (UE-410047/410048)

8.9.1. Contents

Qty.	Description	Part No.		Remarks
1	Image Memory	UE-410047	4 MB	
		UE-410048	8 MB	

Note:
1. The part number(s) may differ depending on the Destination.
2. Refer to the Parts List in the Parts Manual.

8.9.2. Installation

CAUTION!

Turn the Power Switch on the Right Side of the machine to the OFF position, and then unplug the AC Power Cord before beginning installation. (During a Lightning Storm, to prevent electrocution disconnect the Telephone Line Cable first before unplugging the AC Power Cord, if the Fax Option is installed.)
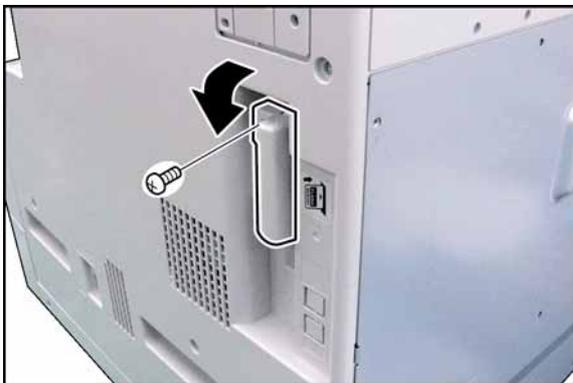
(1) Remove 1 **Silver Screw**.
(2) Remove the **Flash Memory Cover**.

(3) Gently insert the **Expansion Flash Memory Card** as illustrated.

Caution:
Forcing the card into the slot may cause damage to the card or machine.

(4) Reinstall the **Cover**.
(5) Plug the **AC Power Cord** and turn the Power Switch on the Left Side of the machine to the ON position.
(6) Reconnect the **Telephone Line Cable** if it was disconnected.

8.10. Installing the Accounting Software (DA-WA10)

8.10.1. Contents

Qty.	Description	Remarks
1	Accounting Software CD	Includes Operating Instructions
1	Installation Instructions	This document

8.10.2. Installation

1. Before installing this option, make sure the Hard Disk Drive Unit **(DA-HD18)** is installed into the machine first. Refer to the Installation Instructions for the Hard Disk Drive Unit (DA-HD18).
2. Install the Accounting Software into the PC with the Operating Instructions by following the prompts of the Installation Wizard.
3. Set the Key/Dept. Counter function by following the steps below.
    1) Press "**FUNCTION**", "**ORIGINAL SIZE**", and then "**3**" keys sequentially to enter the Service Mode.
    2) Press the "**5**" key to enter the F5 Service Mode (Function Parameters).
    3) Press the "**START**" key.
    4) Press the "**4**", "**2**", and then "**SET**" keys sequentially to enter the F5-42 "**KEY/DEPT. COUNTER**".
    5) Press the "**2**", and then "**SET**" keys to activate the Key/Dept. Counter function.
    6) Press the "**STOP**" key.

    Note:
    The factory default setting for the Key Operator ID Code is "**000**", to ensure security it is recommended to change this code.
    Follow the steps below to change the Key Operator ID Code:
    • While in the Service Mode, press "**7**" to enter the F7 Service Mode.
    • Press the "**START**" key to select "**01 KEY OPERATOR ID CODE**".
    • Press the "**SET**" key, and then input a new 3-digit ID Code.
    • Press the "**SET**" key, and then press "**STOP**" key to exit F7 Service Mode.

    7) Press "**FUNCTION**", and "**CLEAR**" keys simultaneously to exit the Service Mode.

4. Set the Key/Dept. Code by following the steps below.
    1) Press the "**FUNCTION**" key, and then select "**V**" or "**∧**" arrow buttons to select "**GENERAL SETTINGS**", and press "**SET**" key.
    2) Select "**V**" or "**∧**" arrow buttons to select "**09 KEY OPERATOR MODE**", and then input the 3-Digit Code, and press "**SET**" key to enter the Key Operator Mode.
    3) Select "**V**" or "**∧**" arrow buttons to select "**13 DEPT. COUNTER MODE**".
    4) Press "**2**", and then select "**SET**" keys.
    5) Select "**V**" or "**∧**" arrow buttons to set the Dept. Counter Codes (up to 300).
    6) Press the "**STOP**" key to return to the standby mode.

8.11. Installing the Inverting Automatic Document Feeder (DA-AR202)

8.11.1. Contents

No.	Qty.	Description	Remarks
1	1	Inverting Automatic Document Feeder (i-ADF)	
2	1	Scanning Pad	
3	2	Hinge Stopper	
4	2	Hinge Cover	
5	2	Hinge Cover 2	
6	2	ADF Mounting Bracket	
7	1	i-ADF OPS Actuator	
8	1	i-ADF Rear Support Bracket	for DP-2010E use only
9	9	Screw (M3 x 8)	4 Screws will not be used
10	8	Screw (M3 x 12)	
11	2	Silver Screw (M4 x 10)	
12	2	Thumb Screw (M4 x 10)	
13	1	Installation Instructions	This Document
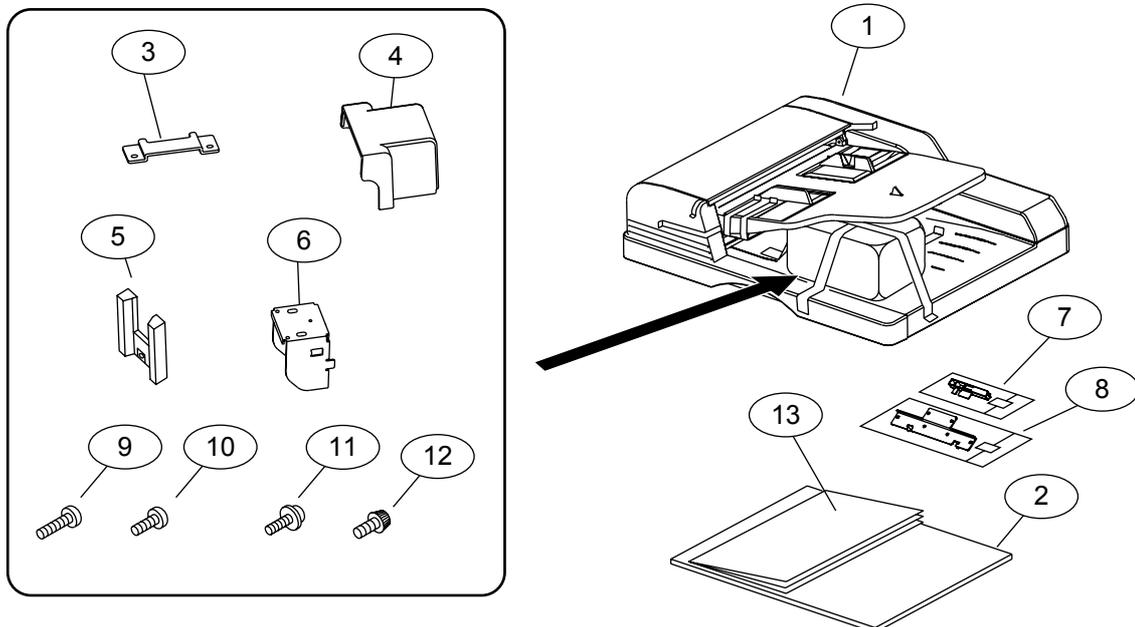
Note:
Refer to the Parts Manual for Part Number(s), Packing, and Accessories detail.

8.11.2. Installation

CAUTION!

Turn the Power Switch on the Right Side of the machine to the OFF position, and then unplug the AC Power Cord before beginning installation. (During a Lightning Storm, to prevent electrocution disconnect the Telephone Line Cable first before unplugging the AC Power Cord, if the Fax Option is installed.)
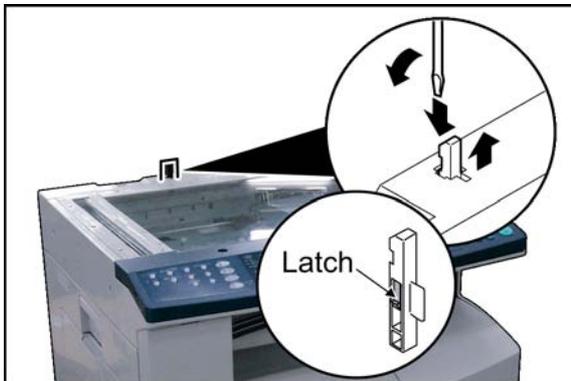
(1) Using a Slotted Blade Screwdriver, remove the **OPS Actuator** as illustrated.

Note:

Release the latch on the left side of the actuator with the Slotted Blade Screwdriver.
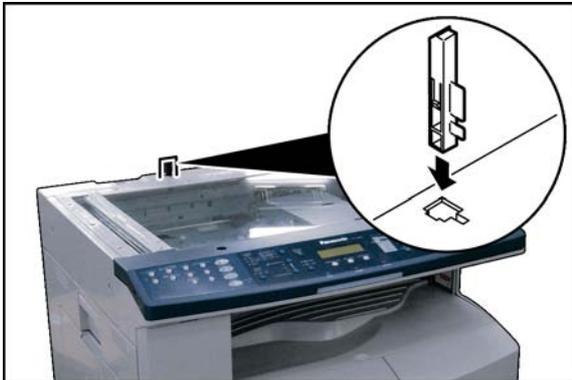
(2) Install the **i-ADF OPS Actuator**.
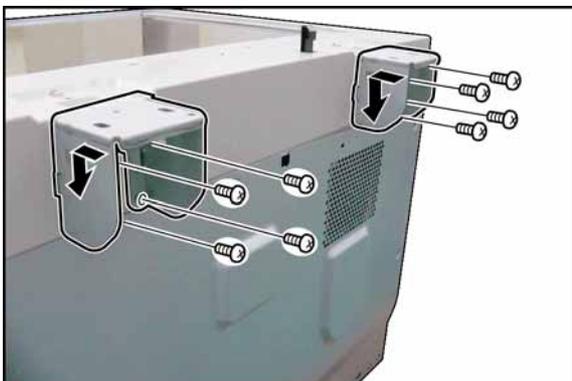
(3) Install 2 **ADF Mounting Brackets,** and push down as illustrated.
(4) Secure 2 ADF Mounting Brackets with 8 **Screws** (M4 x 12).
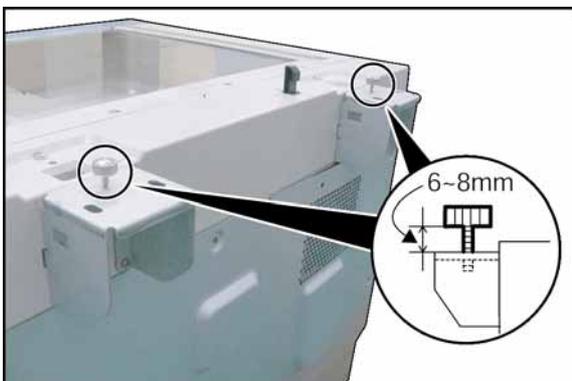
(5) Install 2 **Thumb Screws** (M4 x 10). (One for each ADF Mounting Bracket)

Note:

When installing the Thumb Screws, do NOT tighten them. Leave a clearance of approx. 6-8 mm, as illustrated.

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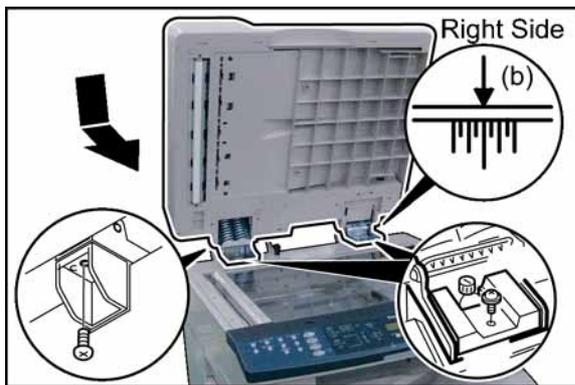
(6) Install the **i-ADF** onto the ADF Mounting Brackets.

Note:
   a. Set the i-ADF in the direction of the arrow.
   b. Align the hallmark on the Right Side of the Hinge Base, and the ADF Mounting Bracket as illustrated.

(7) Tighten 2 **Thumb Screws** (M4 x 10).
(8) Install 2 **Hinge Cover 2**.
(9) Secure the Automatic Document Feeder with 2 Silver Screws (M4 x 10).
(10) Install 1 **Screw** (M4 x 8) on the back of the left ADF Mounting Bracket from the bottom as illustrated.

(11) Remove 10 **Screws**.
(12) Remove the **Rear Cover**.
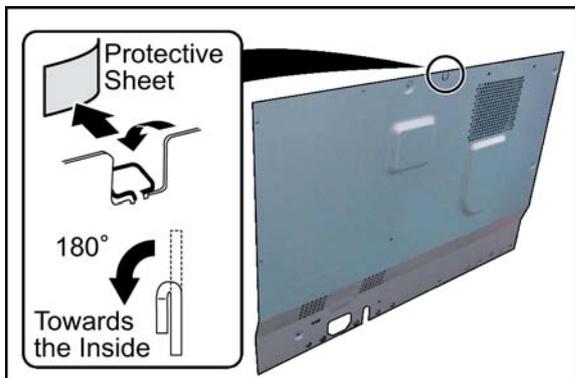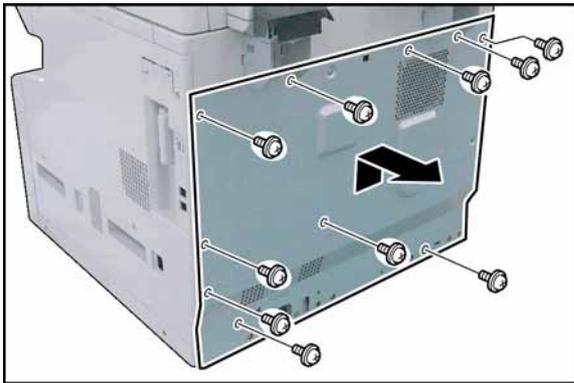
(13) Remove the **Protective Sheet**.
(14) Bend the **Protective Tab** on the Rear Cover approx. 180° towards the inside of the machine as illustrated.
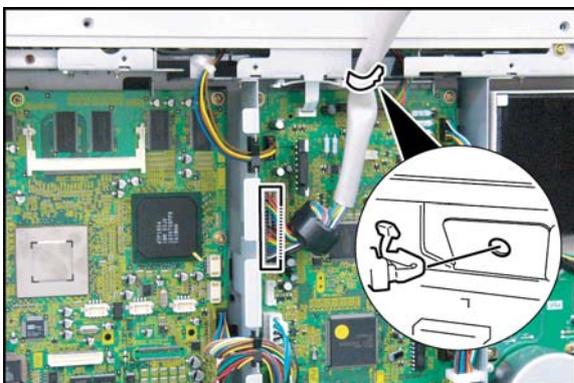
(15) Connect the **i-ADF Harness** to CN650 on the SPC PC Board.
(16) Insert the **Harness Clamp** into the pre-drilled hole in the frame (from underneath).

Note:
Do not cut the Harness Clamp (Tie-Wrap) when servicing. Push the release clip on the side of the clamp to remove it.

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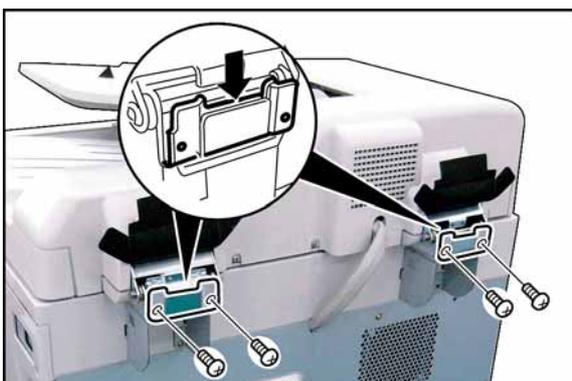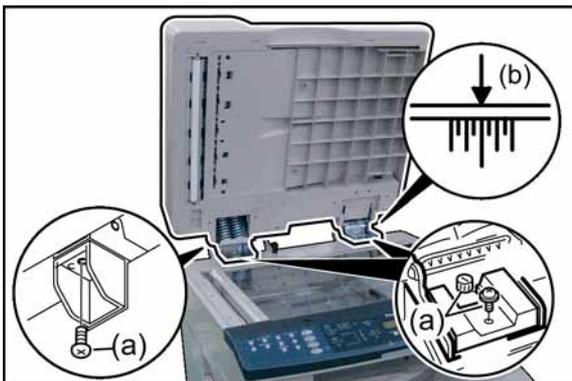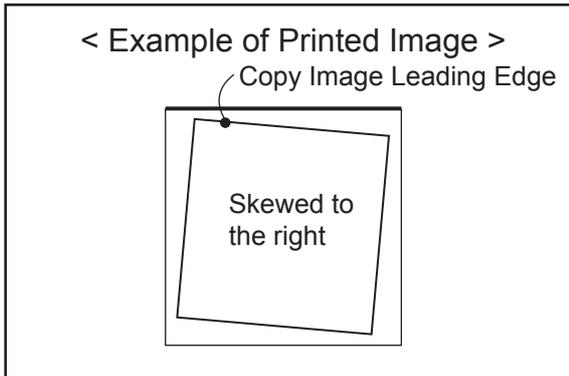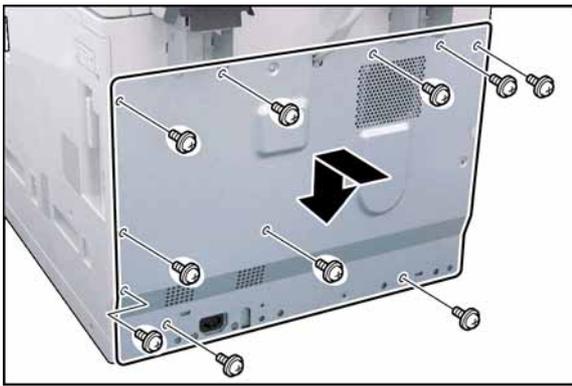
(17) Before proceeding, install the other options first. If finished, close the i-ADF.
(18) Reinstall the **Rear Cover**.
(19) Secure the Rear Cover with 10 **Screws**.
(20) Plug the **AC Power Cord** and turn the Power Switch on the Right Side of the machine to the ON position.
(21) Reconnect the **Telephone Line Cable** if it was disconnected.

< Example of Printed Image >

Copy Image Leading Edge

Skewed to the right

(22) Using a 20 lb (80 g/m^2) lined original, make a copy from the ADF to check the feed alignment.

(23) Check the alignment of the Copy Image. If the Copy Image is skewed either to the Right or Left, adjust the ADF's alignment as follows:
  a. Loosen 5 Screws securing the ADF.
  b. Using the Hallmark on the Right Hinge Base and the ADF Mounting Bracket as a guide, shift the ADF position by following the procedure below:
    • When the Copy Image is skewed to the right, shift the ADF slightly toward the front of the machine.
    • When the Copy Image is skewed to the left, shift the ADF slightly toward the rear of the machine.
  c. Tighten the 5 Screws loosened in step (a).
  d. Repeat step (22) to recheck the feed alignment and readjust the ADF position as needed.

(24) Install 2 **Hinge Stoppers**.
(25) Secure 2 Hinge Stoppers with 4 **Screws** (M4 x 8).

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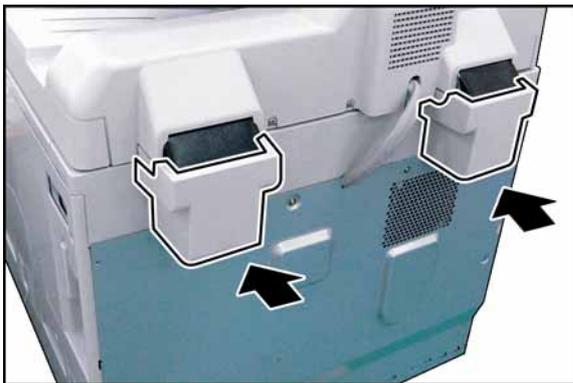
(26) Install 2 **Hinge Covers**.
Note:
When installing the Hinge Covers, make sure that a Hinge Film is placed inside of each Hinge Cover.
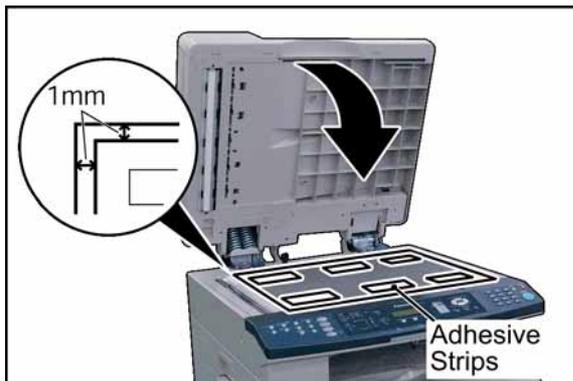
(27) Peel off 6 adhesive strip protectors from the Scanning Pad.
(28) Place the **Scanning Pad** on the glass aligning it on the upper left corner, keeping 1mm space as illustrated.
Note:
Failure to install the Scanning Pad correctly may cause a Black vertical, horizontal (or both) line(s) to appear on the copies in the Double Exposure Copy Mode. Upon completing the i-ADF installation, verify that the Double Exposure operation.

(29) Close the **i-ADF**.
Note:
Reopen the i-ADF Unit, and push the Scanning Pad gently to glue it properly.

(30) Perform Service Mode F6 (No. 71, 72, 73, 90, 91, 92, 93, and 94) to adjust the i-ADF Scanning Position.

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	Document	Printed Image	Adjustment	Adjustment Amount	Remarks
No. 90 / 71 1-Side / 2-Side ADF Detection Timing (ADF Image Read Start Position Adjustment)	Paper Travel A	A	+	0.05mm / 1 Point	Rebooting is not necessary to enable the Parameter Setting.
		A	−	0.05mm / 1 Point	
No. 91 / 72 1-Side / 2-Side ADF Original Leading Edge Registration (Original Lead Edge Detection Timing Adjustment)	Paper Travel ◀		−	0.3mm / 1 Point	
		Shadow of Document Leading Edge Void	+	0.3mm / 1 Point	
No. 92 / 73 1-Side / 2-Side ADF Original Trailing Edge Registration (Original Trail Edge Detection Timing Adjustment)	Paper Travel ▶		+	0.3mm / 1 Point	
		Shadow of Document Leading Edge Void	−	0.3mm / 1 Point	
No. 93 / 94 1-Side / 2-Side Magnification Ratio (Top Feed) (Ratio Adjustment when the scan is made)	Reduced		+	0.1% / 1 Point	
	Enlarged		−	0.1% / 1 Point	
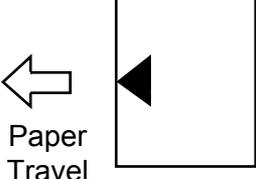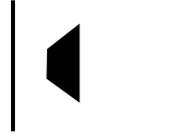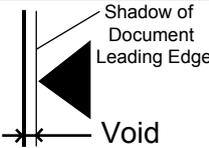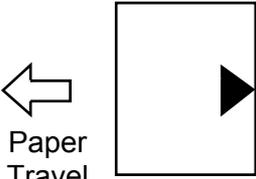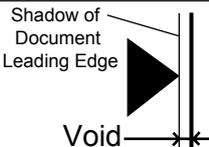
< When Adjusting the ADF Unit >

Adjust the ADF Unit to scan the lined part
(inside of the margin 1.5 - 2.5mm)
on the document as shown on the right.

1.5～2.5mm
1.5～2.5mm
1.5～2.5mm
1.5～2.5mm

Image Data

8.11.3. Double Exposure Lead and Side Edge Adjustments

Caution:
Confirm that the Scanning Pad is installed, and aligned correctly on the ADF/i-ADF prior to making any adjustments.

1. Place a Business Card, Driver's License, Insurance Card, etc. (Invoice size or smaller) on the Platen Glass as illustrated.

```
┌────────────────────────────────────┐
│  ┌──────┐                           │
│  │Driver's│                         │
│  │License │        Platen           │
│  └──────┘                           │
│                                     │
│                                     │
└────────────────────────────────────┘
```

2. Insert Letter or A4 size paper into the 1st Paper Tray, or onto the Sheet Bypass, and change the tray settings to the appropriate paper size.
3. Make a copy using the Double Exposure Copy Mode.
4. Check the Copy Image.
   a. For a Horizontal Black Line in the Center, adjust the Service Mode F6-63 (Lead Edge Read Timing) by following the steps below.
   b. For a Vertical Black Line at the Leading Edge, adjust the Service Mode F6-64 (Side Edge Read Adjust) by following the steps below.

Output of Letter (A4) Paper (not LTR-R)

```
┌──────────────────────┐    ┌──────────────────────┐
│  ┌────────┐          │    │  ┌────────┐          │
│  │Driver's│          │    │  │Driver's│          │
│  │License │          │    │  │License │          │
│  └────────┘          │    │  └────────┘          │
│       Adjust with F6-63   │                      │
│            /         │    │                      │
│  ─────────◄──────────│    │                      │
│  ┌────────┐          │    │  ┌────────┐          │
│  │Driver's│          │    │  │Driver's│          │
│  │License │          │    │  │License │          │
│  └────────┘          │    │  └────────┘          │
│                      │    │ ◄─ Adjust with F6-64 │
└──────────────────────┘    └──────────────────────┘
```

5. Press "**FUNCTION**", "**ORIGINAL SIZE**" keys, and then Key "**3**" on the keypad sequentially.
6. Perform the Service Mode F6-63 (Lead Edge Read Timing) and F6-64 (Side Edge Read Adjust).
   Note:
   It is not recommended setting the value higher than "4" as it will increase the Void Area.
7. Press "**STOP**" first, and then press "**FUNCTION**" + "**CLEAR**" keys simultaneously to return to standby.
8. Repeat the above steps 3 to 7 until the Black Line(s) disappear.

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8.12. Installing the Automatic Document Feeder (DA-AS181)

8.12.1. Contents

No.	Qty.	Description	Remarks
1	1	Automatic Document Feeder (ADF)	
2	2	Angle Plate	
3	1	Scanning Pad	
4	2	Screw (M3 x 8)	
5	4	Screw (M3 x 12)	
6	1	Installation Instructions	This Document
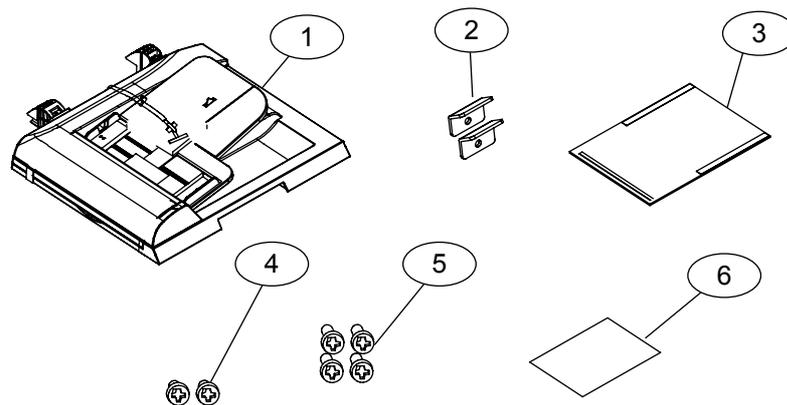
Note:

Refer to the Parts Manual for Part Number(s), Packing, and Accessories detail.

8.12.2. Installation

CAUTION!

Turn the Power Switch on the Right Side of the machine to the OFF position, and then unplug the AC Power Cord before beginning installation. (During a Lightning Storm, to prevent electrocution disconnect the Telephone Line Cable first before unplugging the AC Power Cord, if the Fax Option is installed.)
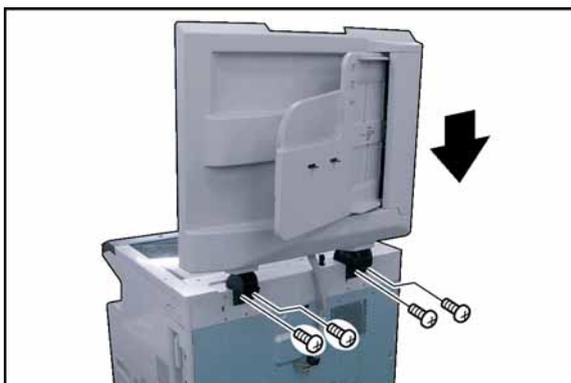
(1) Install the **Automatic Document Feeder** into the 2 Mounting Holes.

Note:

Before securing the ADF with 4 Screws, do not close the ADF, or the ADF may get damaged.

(2) Secure the ADF with 4 **Screws** (M3 x 12).

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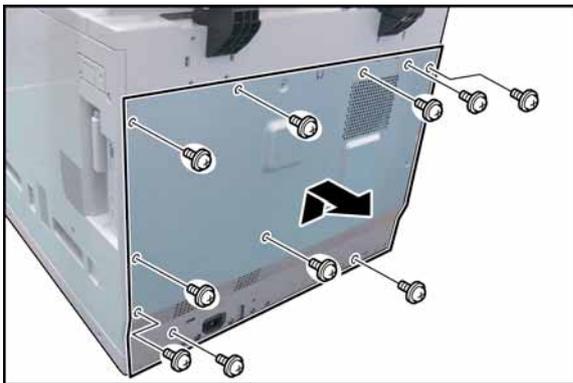
(3) Remove 10 **Screws**.

(4) Remove the **Rear Cover**.
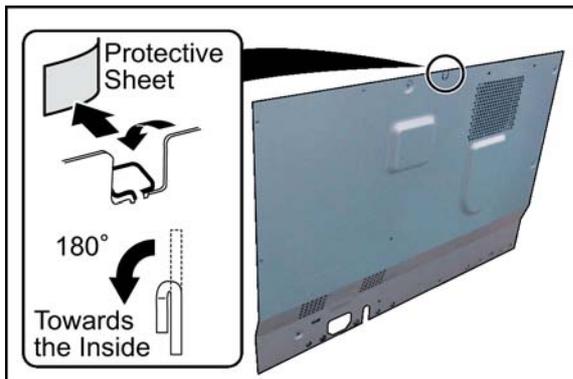
(5) Remove the **Protective Sheet**.

(6) Bend the **Protective Tab** on the Rear Cover approx. 180° towards the inside of the machine as illustrated.
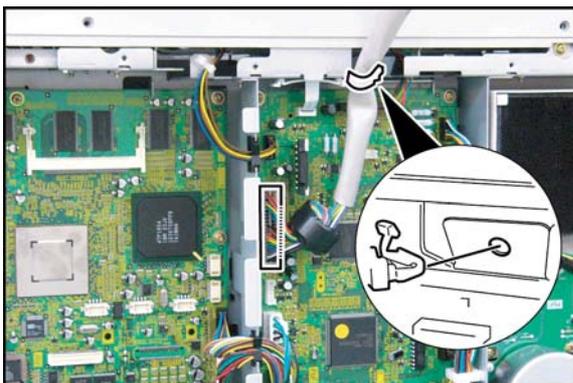
(7) Connect the **ADF Harness** to CN650 on the SPC PC Board.

(8) Insert the **Harness Clamp** into a pre-drilled hole in the frame (from underside).

Note:
Do not cut the Harness Clamp (Tie-Wrap) when servicing. Push the release clip on the side to remove it.
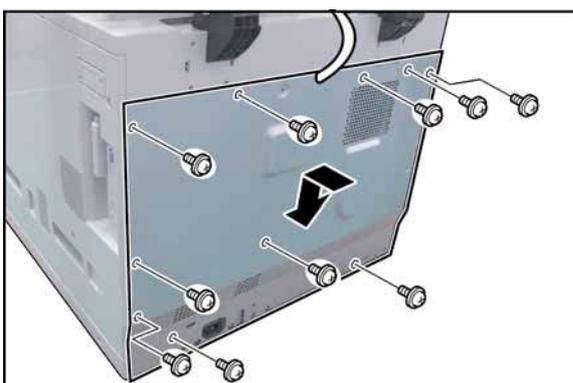
(9) Reinstall the **Rear Cover**.

(10) Secure the Rear Cover with 10 **Screws**.

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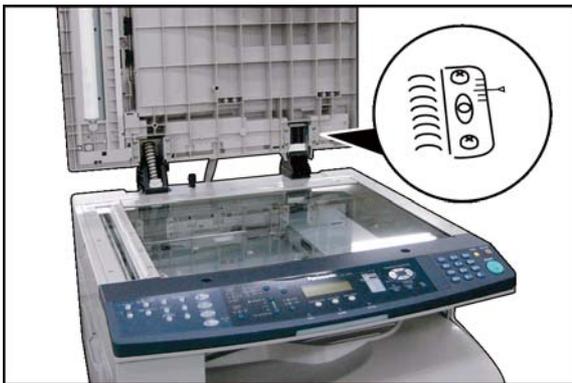
Note:
 Align the ADF if required by following the steps below.
 (A) Release 4 Screws.
 (B) Adjust the right side of the ADF, and the ADF Mounting Bracket as illustrated.
 (C) Secure the ADF with 4 Screws.
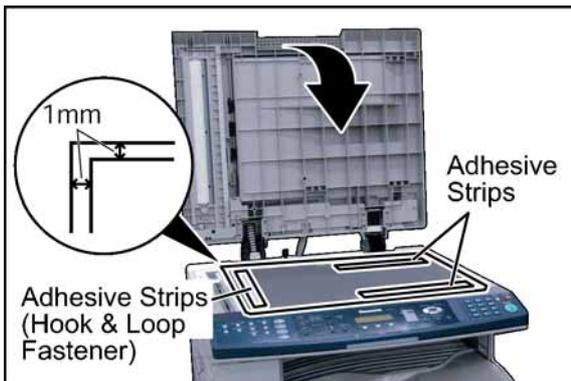
(11) Peel off 2 adhesive strip protectors from the Scanning Pad.
(12) Place the Scanning Pad on the glass, aligning with the upper left corner, keeping 1mm space as illustrated. (Hook and Loop Fastening Tape positioned to the Left Side of machine)

Note:
 Failure to install the Scanning Pad correctly may cause a Black vertical, horizontal (or both) line(s) to appear on the copies in the Double Exposure Copy Mode. Upon completing the ADF installation, verify that the Double Exposure operation.

(13) Close the ADF.

Note:
 Reopen the ADF Unit, and push the Scanning Pad gently to glue it properly.

(14) Install 2 **Angle Plates**.
(15) Secure 2 Angle Plates with 2 **Screws** (M3 x 8).
(16) Plug the **AC Power Cord**, and turn the Power Switch on the Right Side of the machine to the ON position.
(17) Reconnect the **Telephone Line Cable** if it was disconnected.

(18) Copy an Original using the ADF.

<Check the alignment of the Original's copy. If the Copy Image is skewed, adjust the ADF's alignment as follows>

(19) Open the **ADF Cover**, and release the **Stopper**.
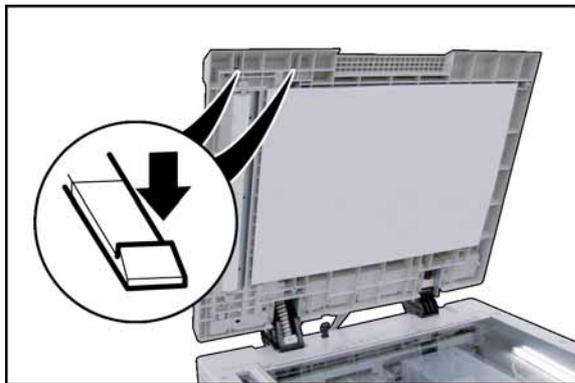
(20) Open the ADF, and release 2 Latch Hooks under the feeder.
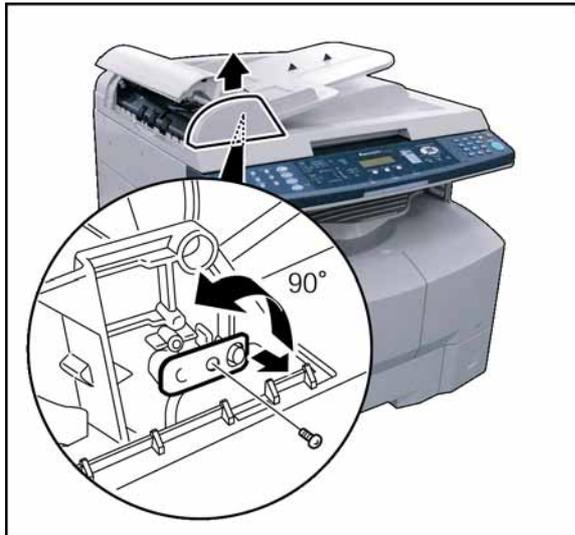
(21) Remove the **ADF Front Cover**.
(22) Remove 1 **Screw**, and turn the **Adjusting Bracket** counter-clockwise.

<Example of Printed Image>
Copy Image
Leading Edge
Right
Skewed to
the right
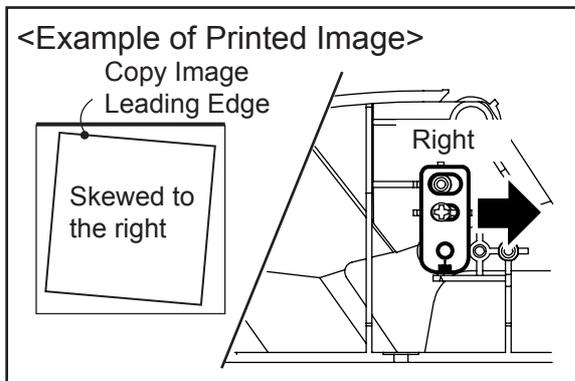
(23) If the Copy Image is Skewed to the right, set the Adjusting Bracket to the right and secure it with 1 Screw.

<Example of Printed Image>
Copy Image
Leading Edge
Left
Skewed to
the left
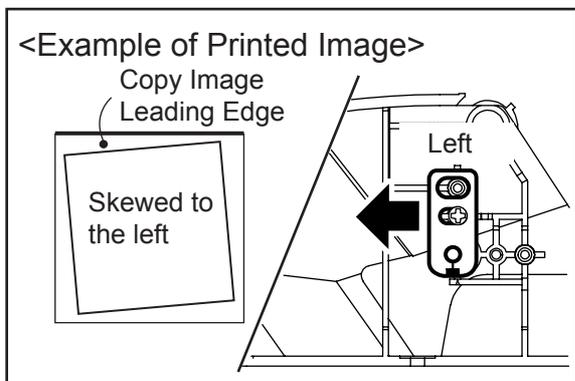
(24) If the Copy Image is Skewed to the left, set the Adjusting Bracket to the left and secure it with 1 Screw.
(25) Perform Service Mode F6 (No. 90, 91, 92, and 93) to adjust the ADF Scanning Position.

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	Document	Printed Image	Adjustment	Adjustment Amount	Remarks
No. 90 ADF Detection Timing (ADF Image Read Start Position Adjustment)	Paper Travel	A	+	0.05mm / 1 Point	
		A	—	0.05mm / 1 Point	
No. 91 ADF Original Leading Edge Registration (Original Lead Edge Detection Timing Adjustment)	Paper Travel		—	0.3mm / 1 Point	Rebooting is not necessary to enable the Parameter Setting.
		Shadow of Document Leading Edge / Void	+	0.3mm / 1 Point	
No. 92 ADF Original Trailing Edge Registration (Original Trail Edge Detection Timing Adjustment)	Paper Travel		+	0.3mm / 1 Point	
		Shadow of Document Leading Edge / Void	—	0.3mm / 1 Point	
No. 93 ADF Magnification Ratio (Top Feed) (Ratio Adjustment when the scan is made)	Reduced		+	0.1% / 1 Point	
	Enlarged		—	0.1% / 1 Point	
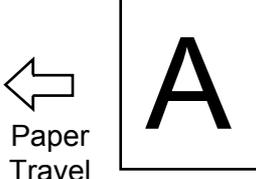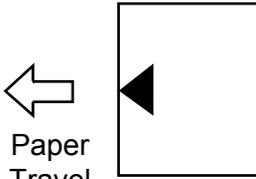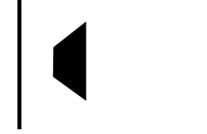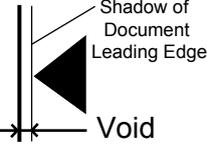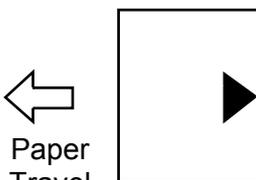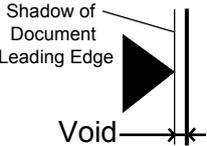
< When Adjusting the ADF Unit >

Adjust the ADF Unit to scan the lined part
(inside of the margin 1.5 - 2.5mm)
on the document as shown on the right.

1.5～2.5mm
1.5～2.5mm
1.5～2.5mm
1.5～2.5mm

Image Data

8.12.3. Double Exposure Lead and Side Edge Adjustments

Caution:
Confirm that the Scanning Pad is installed and aligned correctly on the ADF/i-ADF prior to making any adjustments.

1. Place a Business Card, Driver's License, Insurance Card, etc. (Invoice size or smaller) on the Platen Glass as illustrated.

2. Insert Letter or A4 size paper into the 1st Paper Tray, or onto the Sheet Bypass and change the tray settings to the appropriate paper size.
3. Make a copy using the Double Exposure Copy Mode.
4. Check the Copy Image.
   a. For a Horizontal Black Line in the Center, adjust the Service Mode F6-63 (Lead Edge Read Timing) by following the steps below.
   b. For a Vertical Black Line at the Leading Edge, adjust the Service Mode F6-64 (Side Edge Read Adjust) by following the steps below.

Output of Letter (A4) Paper (not LTR-R)

5. Press "**FUNCTION**", "**ORIGINAL SIZE**" keys, and then Key "**3**" on the keypad sequentially.
6. Perform the Service Mode F6-63 (Lead Edge Read Timing) and F6-64 (Side Edge Read Adjust).
   Note:
   It is not recommended setting the value higher than "4" as it will increase the Void Area.
7. Press "**STOP**" first, and then press "**FUNCTION**" + "**CLEAR**" keys simultaneously to return to standby.
8. Repeat the above steps 3 to 7 until the Black Line(s) disappear.

8.13. Installing the 2nd/4th Paper Tray (DA-DS184), 3rd Paper Tray (DA-DS185), and the Stand

8.13.1. Contents

<DA-DS184> 2nd/4th Paper Tray

No.	Qty.	Description	Remarks
1	1	2nd/4th Paper Tray Unit	
3	1	Paper Size Label	
6	3	Screw (M3 x 8)	
7	2	Screw (M3 x 6)	
8	1	Installation Instructions	This document

<DA-DS185> 3rd Paper Tray

No.	Qty.	Description	Remarks
1	1	3rd Paper Tray Unit	
3	1	Paper Size Label	
6	3	Screw (M3 x 8)	
7	2	Screw (M3 x 6)	
8	1	Installation Instructions	This document

<DA1D18A / DA1D18B / DA1D18C> Deluxe Stand for USA and Canada only

No.	Qty.	Description	Remarks
2	1	Deluxe Stand (DA1D18A)	For 1-Paper Tray Configuration
		Deluxe Stand (DA1D18B)	For 2-Paper Tray Configuration
		Deluxe Stand (DA1D18C)	For 3/4-Paper Tray Configuration
4	3	Joint Bracket A	
5	1	Joint Bracket B (Front Left)	
6	3	Screw (M3 x 8)	
7	6	Screw (M3 x 6)	
8	1	Installation Instructions	This document

<DA-DA188-PE / DA-DA189-PE / DA-DA190-PE / DA-DA191-PE >
Stand for Other Destinations

No.	Qty.	Description	Remarks
2	1	Stand (DA-DA188-PE)	For 1-Paper Tray Configuration
		Stand (DA-DA189-PE)	For 2-Paper Tray Configuration
		Stand (DA-DA190-PE)	For 3-Paper Tray Configuration
		Stand (DA-DA191-PE)	For 4-Paper Tray Configuration
4	3	Joint Bracket A	
5	1	Joint Bracket B (Front Left)	
6	3	Screw (M3 x 8)	
7	6	Screw (M3 x 6)	
8	1	Installation Instructions	This document
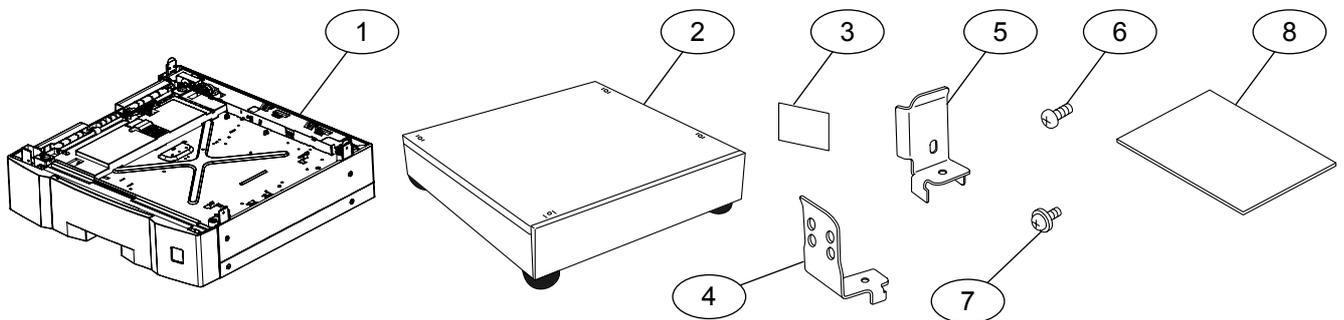
Note:
1. Refer to the Parts Manual for Part Number(s), Packing, and Accessories detail.
2. The following illustrations, and instructions are for the DP-8020E with a 4-Paper Tray configuration. For 2 or 3-Paper Tray configuration skip the indicated steps.

8.13.2. Installing the 2nd, 3rd and 4th Paper Trays

CAUTION!
Turn the Power Switch on the Right Side of the machine to the OFF position, and then unplug the AC Power Cord before beginning installation. (During a Lightning Storm, to prevent electrocution disconnect the Telephone Line Cable first before unplugging the AC Power Cord, if the Fax Option is installed.)
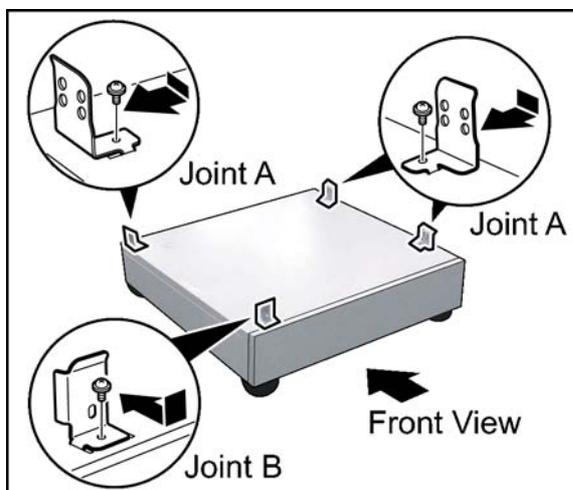
(1) Install 4 **Joint Brackets** as illustrated.
(2) Secure each **Joint Bracket** with 1 Screw (M3 x 6).

Ver. 1.1   SEP 2006
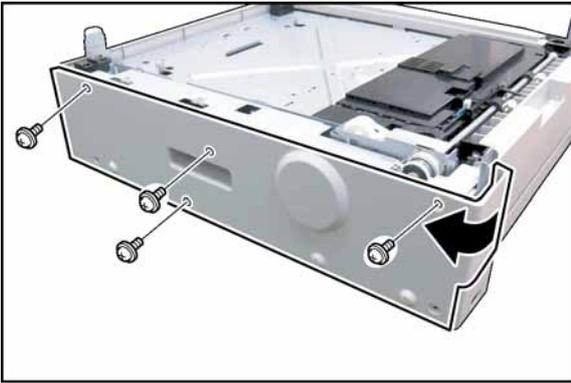
<Bottom Paper Tray Unit>
(3) Remove 4 **Silver Screws**.
(4) Remove the **Rear Paper Tray Cover**.
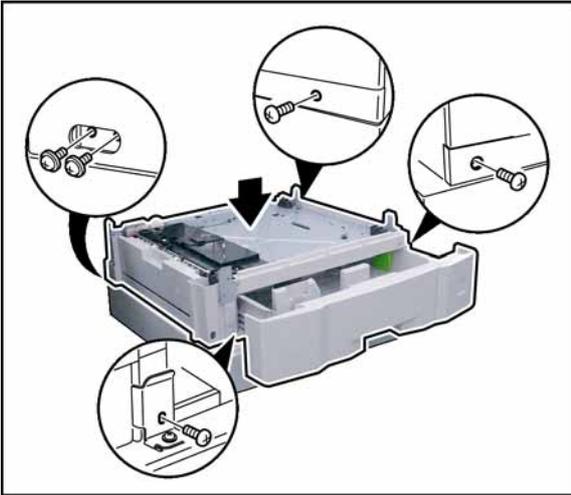
(5) Place the **Paper Tray Unit** onto the Stand.
(6) Slide the **Paper Tray** out of the unit.
(7) Secure the **Paper Tray Unit** with 5 Screws
    (M3 x 6, M3 x 8).

For a 3-Paper Tray Configuration, skip to Step (19).

For a 2-Paper Tray Configuration, skip to Step (30).
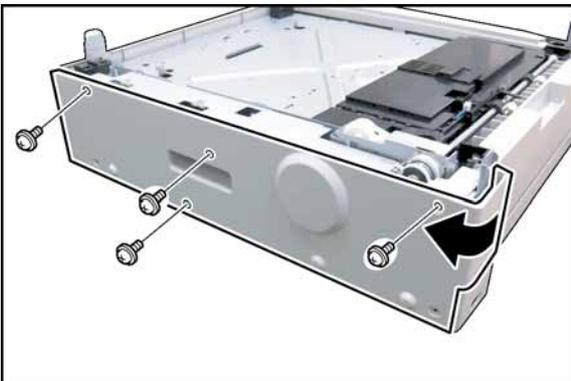
<3rd Paper Tray Unit>
(8) Remove 4 **Silver Screws**.
(9) Remove the **Rear Paper Tray Cover**.
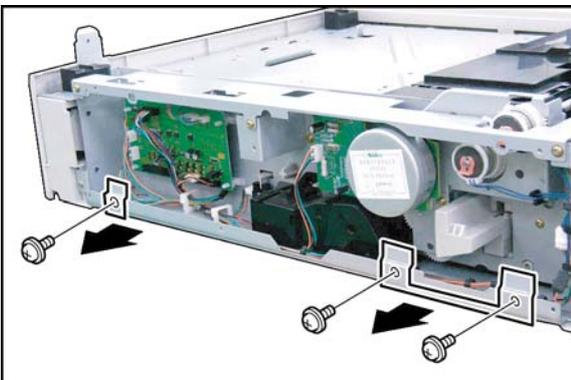
(10) Remove 3 **Screws**.
(11) Remove 2 **Brackets**.

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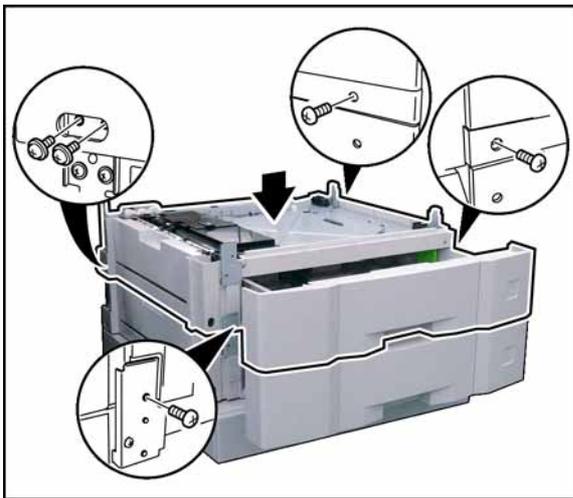
(12) Place the **3rd Paper Tray Unit** onto the 4th Paper Tray Unit.

(13) Slide the **3rd Paper Tray** out of the unit.

(14) Secure the **3rd Paper Tray Unit** with 5 Screws (M3 x 6, M3 x 8).
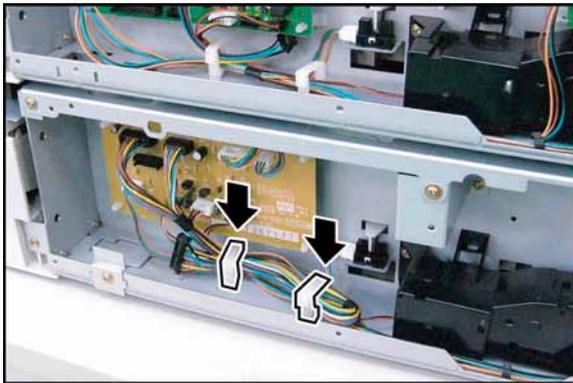
(15) Remove the **Harness** from Clamps of the 4th Paper Tray Unit.

Note:
Close the right clamp and leave the left clamp open.
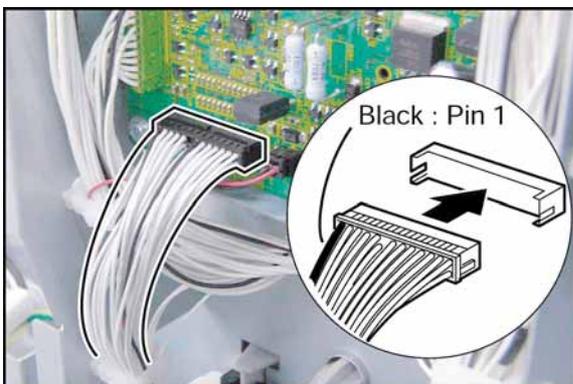
Black : Pin 1

Caution:
Ensure that the **Black Wire** is on the **Left Side**, and that it connects to **Pin 1** of the female connector as illustrated.
Inserting the connector upside-down, may damage the machine's SPC or CST PC Board.

Edge Saddle
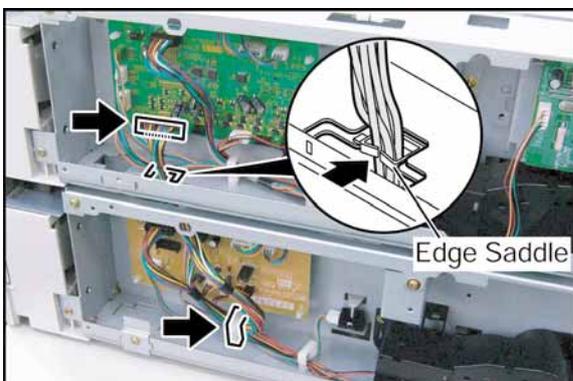
(16) Route the 4th Paper Tray Unit's Harness through the access hole at the bottom of the 3rd Paper Tray Unit as illustrated

(17) Connect the **Harness** of the 4th Paper Tray Unit to CN808 on the CST3 PC Board of the 3rd Paper Tray Unit.

(18) Secure the **Harness** with the Clamp and Edge Saddle while adjusting the harness length.

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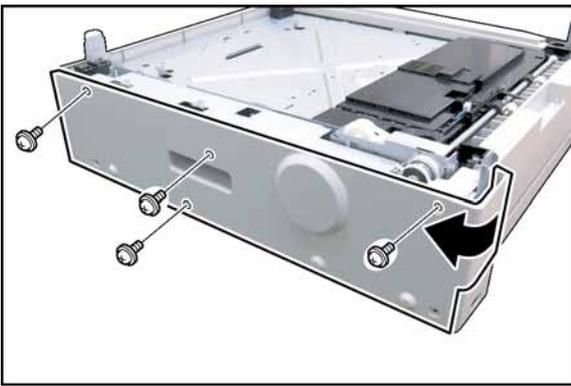
<2nd Paper Tray Unit>

(19) Remove 4 **Silver Screws**.
(20) Remove the **Rear Paper Tray Cover**.
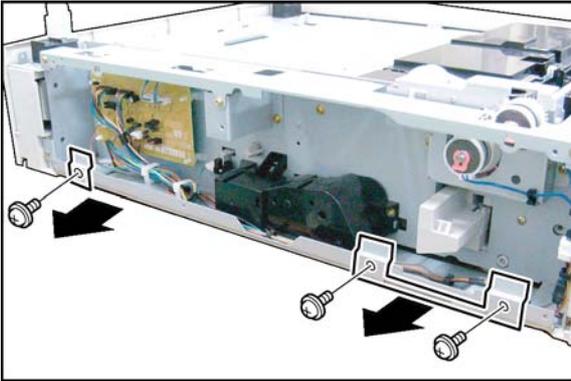
(21) Remove 3 **Screws**.
(22) Remove 2 **Brackets**.
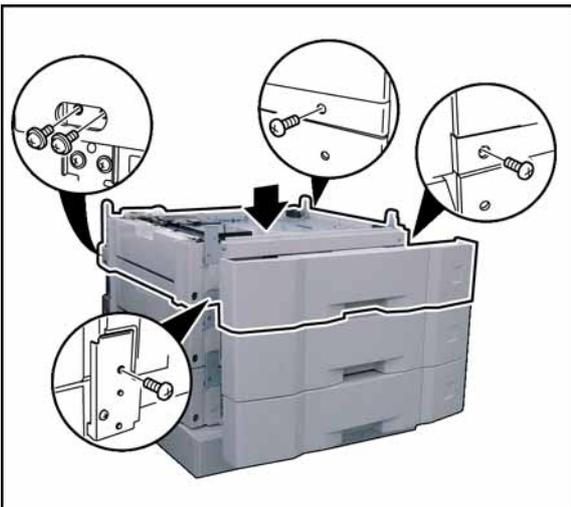
(23) Place the **2nd Paper Tray Unit** onto the 3rd
    Paper Tray Unit.
(24) Slide the **2nd Paper Tray** out of the unit.
(25) Secure the **2nd Paper Tray Unit** with 5 Screws
    (M3 x 6, M3 x 8).
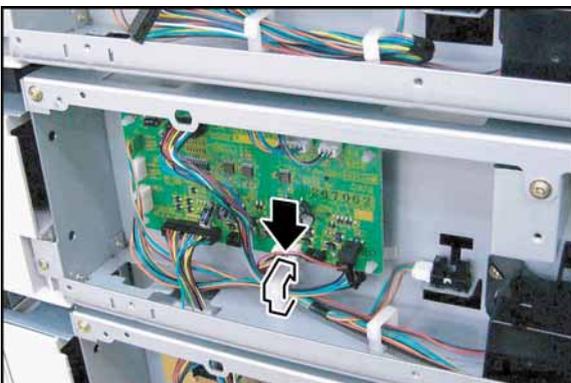
(26) Remove the **Harness** from Clamp of the 3rd
    Paper Tray Unit.

Note:
    Close the clamp.
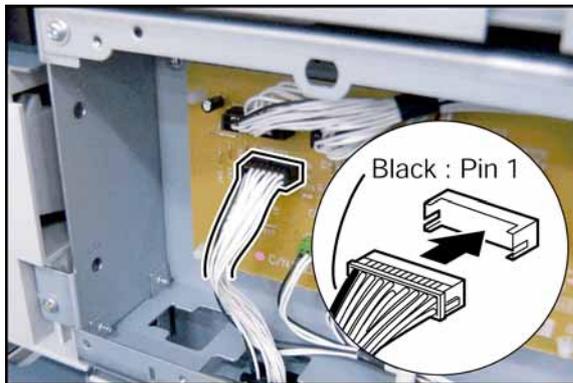
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Black : Pin 1

Caution:
Ensure that the **Black Wire** is on the **Left Side**, and that it connects to **Pin 1** of the female connector as illustrated.
Inserting the connector upside-down, may damage the machine's SPC or CST PC Board.
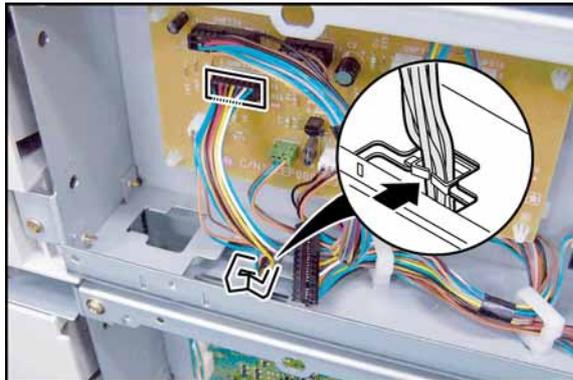
(27) Route the 3rd Paper Tray Unit's Harness through the access hole at the bottom of the 2nd Paper Tray Unit as illustrated
(28) Connect the **Harness** of the 3rd Paper Tray Unit to CN772 on the CST2 PC Board of the 2nd Paper Tray Unit.
(29) Secure the **Harness** with the Edge Saddle.
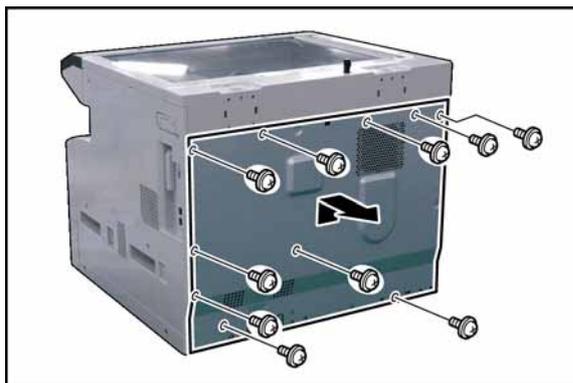
(30) Remove 10 **Screws**.
(31) Remove the **Rear Cover**.
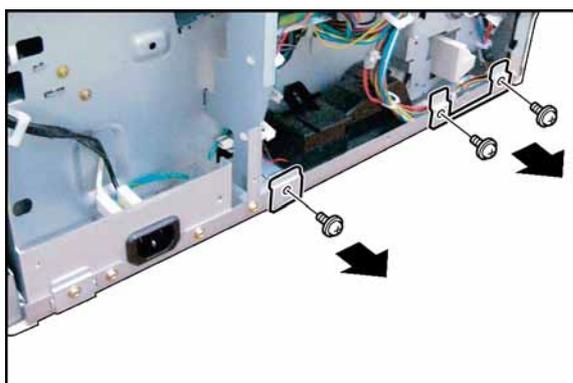
(32) Remove 3 **Screws**.
(33) Remove 2 **Brackets**.

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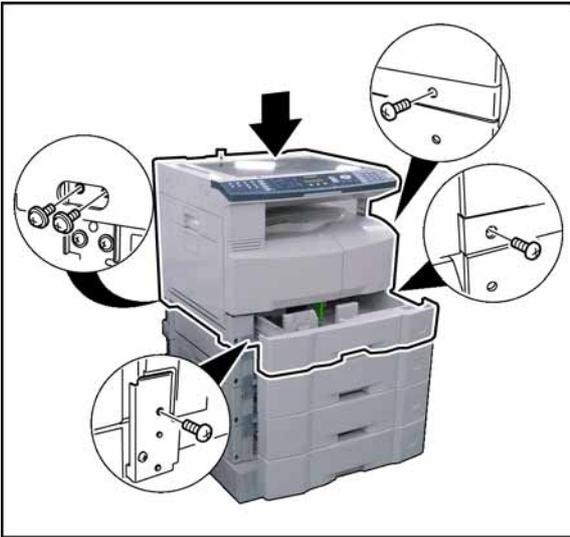
(34) Place the **machine** onto the 2nd Paper Tray
    Unit.

Caution:
    The machine weights approximately 93.26 - 98.33
    lb (42.3 - 44.6 kg). To prevent injuries, use the
    appropriate number of personnel, and the proper
    equipment to lift or move the machine.

(35) Slide the **1st Paper Tray** out of the unit.

(36) Secure the **machine** with 5 Screws
    (M3 x 6, M3 x 8).
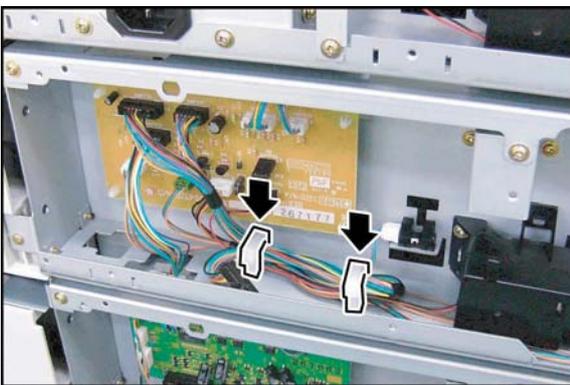
(37) Remove the **Harness** from Clamps of the 2nd
    Paper Tray Unit.

Note:
    Close the clamps.
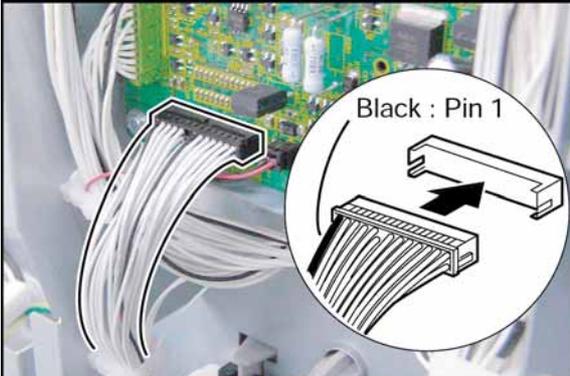
Black : Pin 1

Caution:
    Ensure that the **Black Wire** is on the **Left Side**,
    and that it connects to **Pin 1** of the female
    connector as illustrated.
    Inserting the connector upside-down, may damage
    the machine's SPC or CST PC Board.
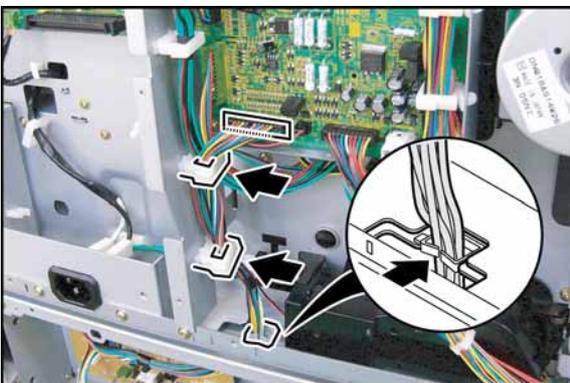
(38) Route the 2nd Paper Tray Unit's Harness
    through the access hole at the bottom of the
    machine Unit as illustrated

(39) Connect the **Harness** of the 2nd Paper Tray Unit
    to CN707 on the SPC PC Board.

(40) Secure the **Harness** with the Clamps and Edge
    Saddle.

(41) Proceed with the installation of other options.
    If finished, reinstall all Harnesses and Covers.

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(42) Attach the **Paper Size Label(s)** onto the 2nd/3rd/4th Paper Tray(s) as illustrated.

(43) Plug the **AC Power Cord**, and turn the Power Switch on the Right Side of the machine to the ON position.

(44) Reconnect the **Telephone Line Cable** if it was disconnected.

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8.14. Installing the Platen Cover (DA-UC200) for PU

8.14.1. Contents

Qty.	Description	Part No.	Remarks
1	Platen Cover	DZMA002394	
1	Scanning Pad	DZJM000428	
2	Platen Hinge	DZMH000013	
4	Screw	XTB3+12JFJ	
1	Installation Instructions	DZSM000303	This document

Note:
1. The part number(s) may differ depending on the Destination.
2. Refer to the Parts List in the Parts Manual.

8.14.2. Installation
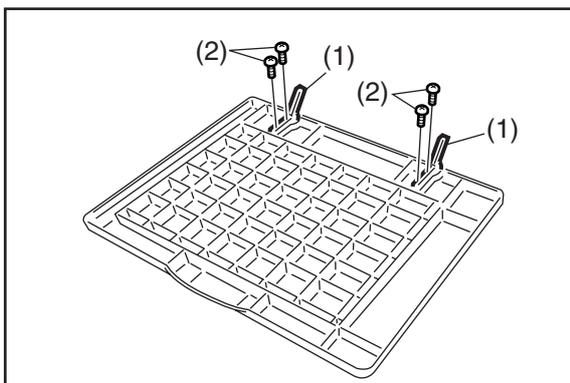
(1) Install 2 Platen Hinges.
(2) Secure the Platen Hinges with 2 Screws each.
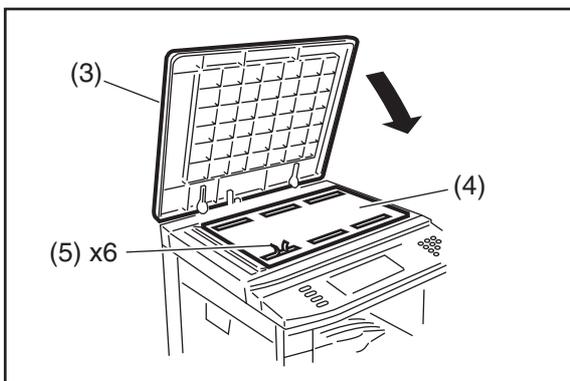
(3) Install the Platen Cover.
(4) Place the Scanning Pad on the glass aligning it with the upper left corner.
(5) Peel off 6 adhesive strip protectors from the Scanning Pad.
(6) Close the Platen Cover.
   Note:
   Reopen the Platen Cover and push the Scanning Pad gently to glue it properly.

8.15. Installing the Dehumidifier Heater Kit (DZTQ000074)

(Supplied as a Service Part)

8.15.1. Contents

No.	Qty.	Description	Part No.	Remarks
1	1	RLB PC Board Assembly	See Note	
2	1	PTC-AC Harness 1	DZFP001639	
3	1	PTC-AC Harness 2	DZFP001640	
4	1	PTC-AC Harness 3	DZFP001641	
5	1	RLB Harness	DZFP001653	
6	1	Heater	FFPCP0034	
7	2	Dehumidifier Heater	See Note	
8	1	Heater Bracket	FFPKD07791	
9	2	Dehumidifier Heater Bracket	DZJA001439	
10	1	Harness Bracket	DZJA001438	
11	1	Heater Switch Assembly	See Note	
12	1	Switch Label	DZNK005284	
13	1	Heater Main Label	DZNK005283	English
	1		PJGTC0053Z	Chinese
14	4	Clamp	DZJK000068	
15	1	Clamp	DZJK000046	
16	1	Clamp	DZJK000045	
17	14	Clamp	DZJK000023	
18	1	Clamp	DZJK000004	
19	1	Screw	B3X6TTS-RP	⊕ ▭
20	7	Screw	XTW3+6LFC	⊕ ▭
-	1	Installation Instructions	DZSM000818	

Note:
1. The part number(s) may differ depending on the Destination.
2. Refer to the Parts List in the Parts Manual.

8.15.2. Installation
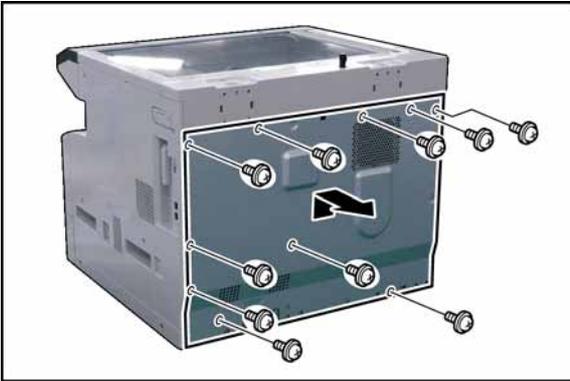
(1) Remove 10 **Screws**.

(2) Remove the **Rear Cover**.
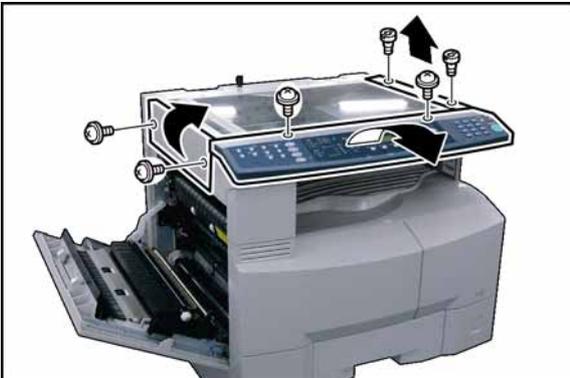
(3) Open the **Left Cover**.

(4) Remove 2 **Silver Screws**.

(5) Remove the **Left Scanner Cover**.

(6) Remove 2 **Shoulder Silver Screws**.

(7) Remove the **Right Scanner Cover**.

(8) Remove 2 **Silver Screws**.

(9) Slightly lift the **Control Panel Assembly**.
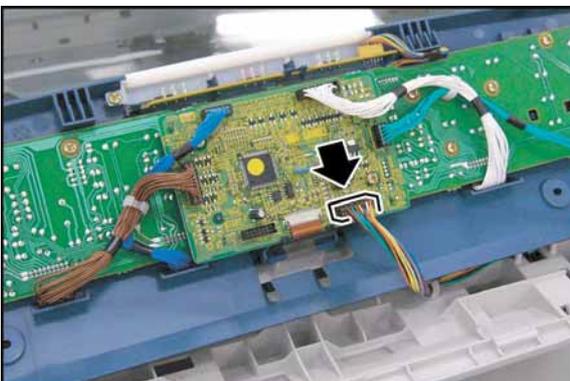
(10) Disconnect the **Harness** on the PNL1 PC Board (CN220).

(11) Remove the **Control Panel Assembly**.
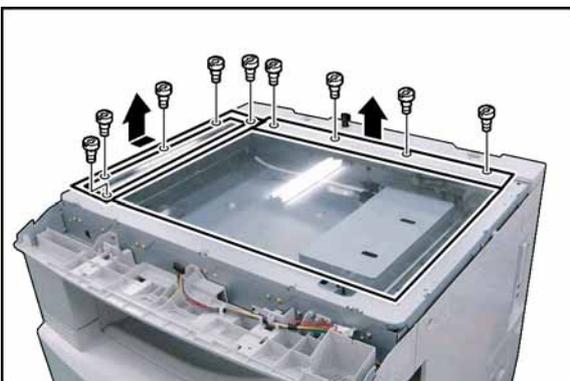
(12) Remove 9 **Screws**.

(13) Remove the **Rear Platen Cover** and **Left Platen Cover**.

(14) Remove the **Platen (L) Glass** and **Scanning (S) Glass**.

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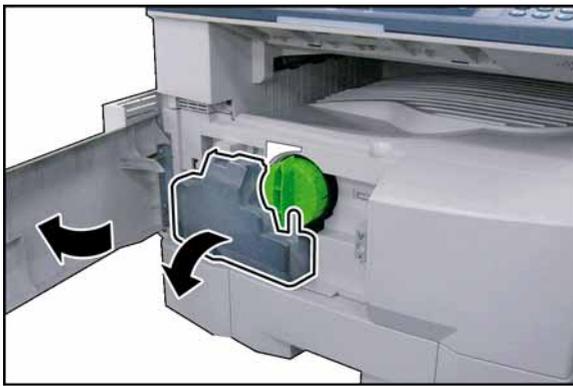
(15) Open the **Front Cover**.
(16) Remove the **Toner Waste Container**.
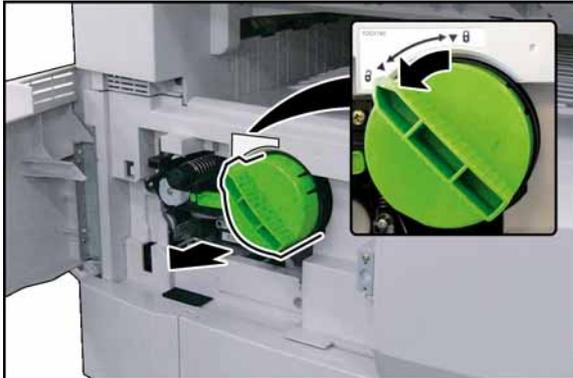
(17) Remove the **Toner Bottle**.
Caution:
    Do Not install the Toner Bottle before installing the Process Unit first. If the Toner Bottle is installed and turned to the "Locked" position without the Process Unit, the Toner will spill inside the machine.

(18) Remove 1 **Screw**.
(19) Remove the **Connector Cover**.

(20) Loosen 1 Screw.
(21) Disconnect the **Harness**.

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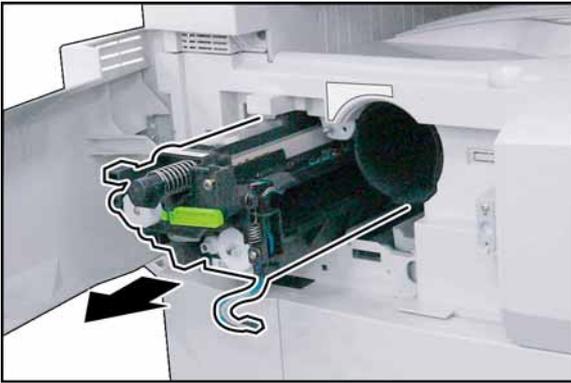
(22) Remove the **Process Unit**.

Caution:
   To prevent damage to the Process Unit, ensure that the Left Cover is still open before removing the Process Unit out of the machine.

Caution:
   Exercise caution not to scratch the surface of the **OPC Drum** (Green), and not to touch it with bare hands.

Caution:
   The OPC Drum is sensitive to light. To prevent optical exposure problems, do not expose the OPC Drum to direct sunlight or bright light.

   Even if it is a fluorescent lamp, approx.1000 lm/m^2 (1000 lx).
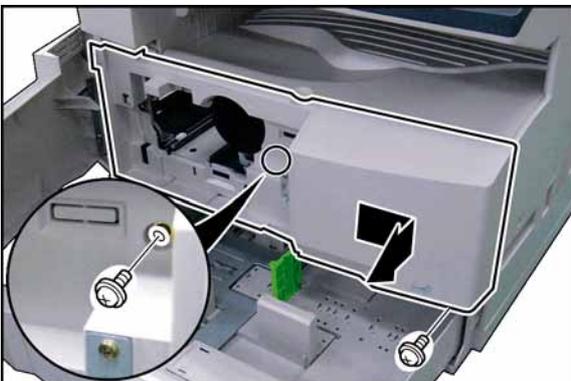
(23) Slide the **1st Paper Tray** out of the unit.
(24) Remove 2 **Screws**.
(25) Remove the **Front Cover 1**.
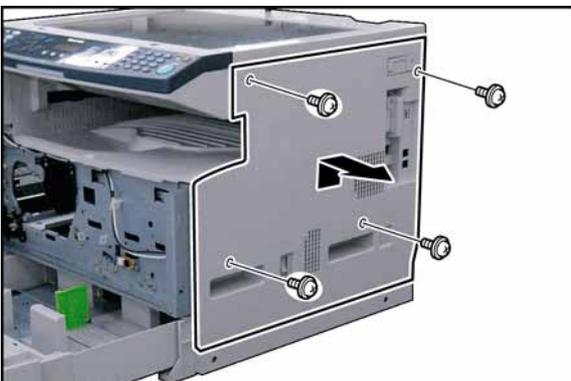
(26) Remove 4 **Silver Screws**.
(27) Remove the **Right Cover**.
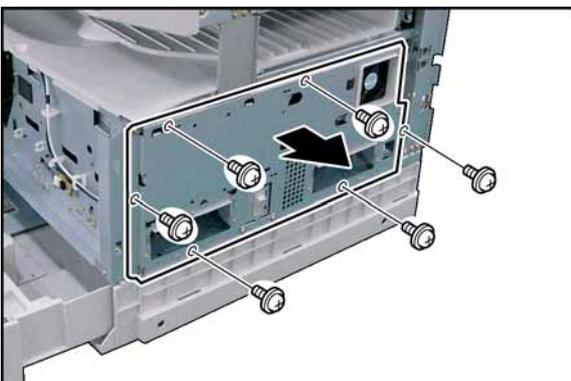
(28) Remove 6 **Screws**.
(29) Remove the **Right Bracket**.
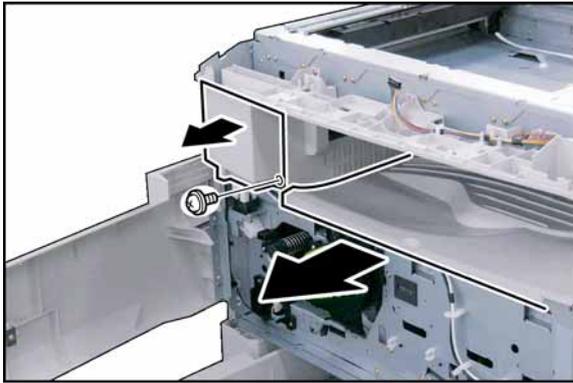
(30) Remove 1 **Screw**.
(31) Remove the **Front Left Cover**.
(32) Remove the **Inner Cover**.
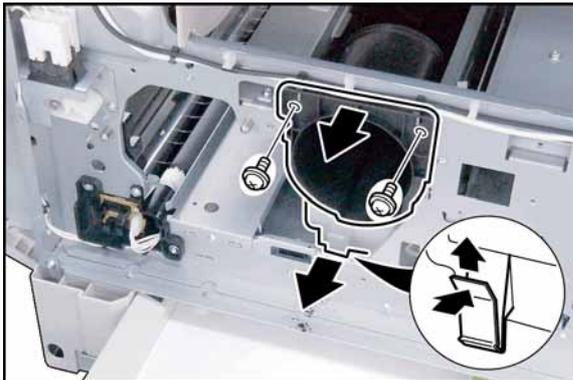
(33) Remove 2 **Screws**.
(34) Remove the **Bottle Holder**.
(35) Remove the **Toner Spill Tray** as illustrated.
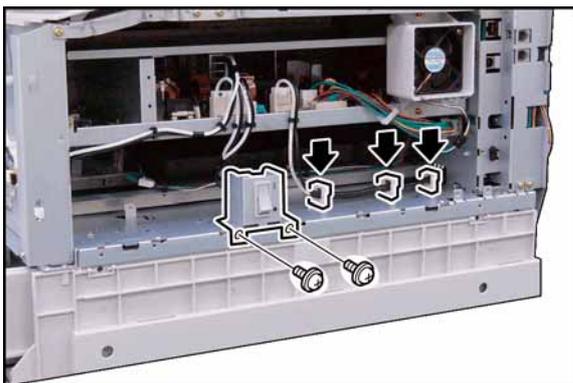
(36) Remove 2 **Screws**.
(37) Remove the **Main Switch**.
(38) Release the **Harness** from 3 Harness Clamps.
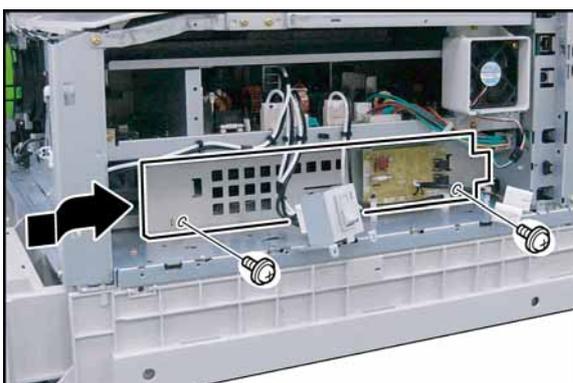
(39) Install the **RLB PC Board Assembly**.
(40) Secure the RLB PC Board Assembly with 2 Screws.

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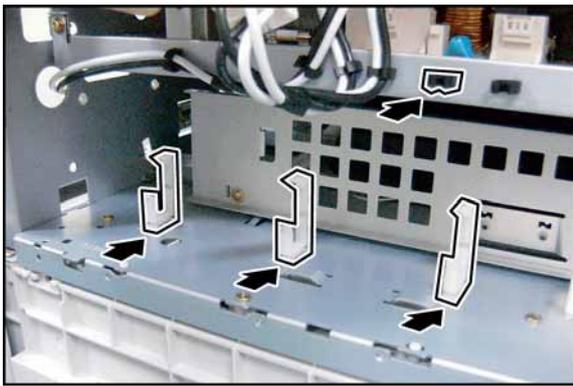
(41) Install 3 **Clamps** (DZJK000068) and 1 Black **Clamp**(DZJK000004).
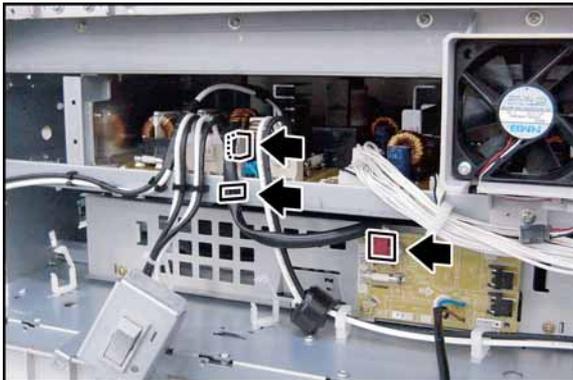
(42) Connect one end of the **RLB Harness** to CN171 on the RLB PC Board.
(43) Connect other end of the **RLB Harness** to CN2 on the PS PC Board.
(44) Secure the **RLB Harness** with the Harness Clamp.
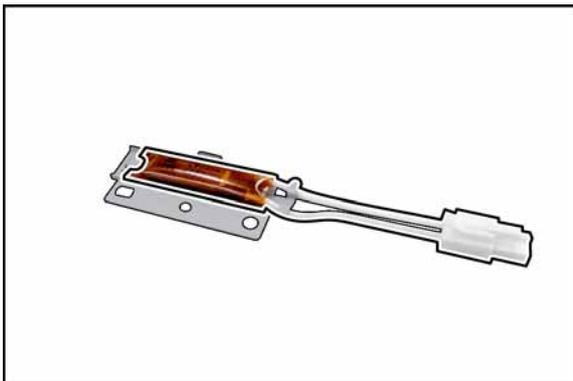
(45) Mount the **Heater** onto the Heater Bracket.
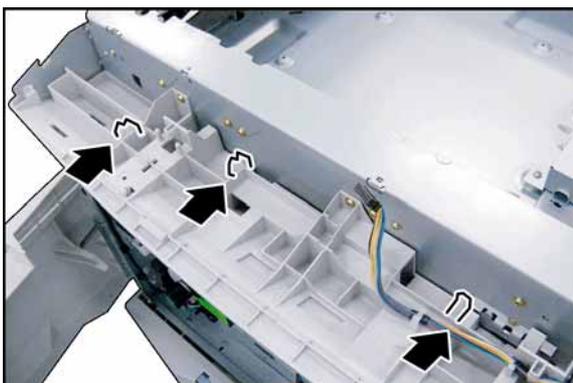
(46) Install 3 **Clamps** (DZJK000023).

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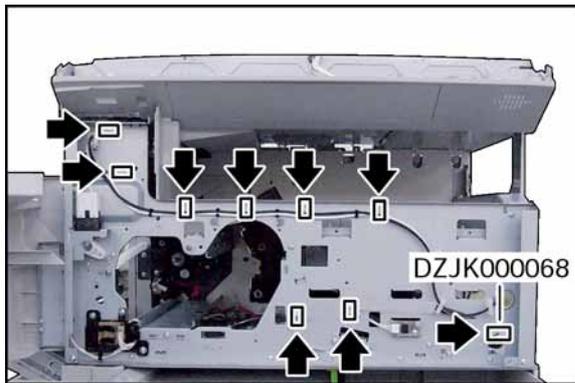
(47) Install 8 **Clamps** (DZJK000023) and 1 Clamp (DZJK000068).
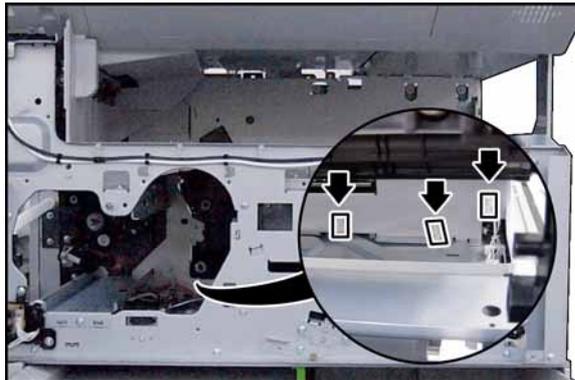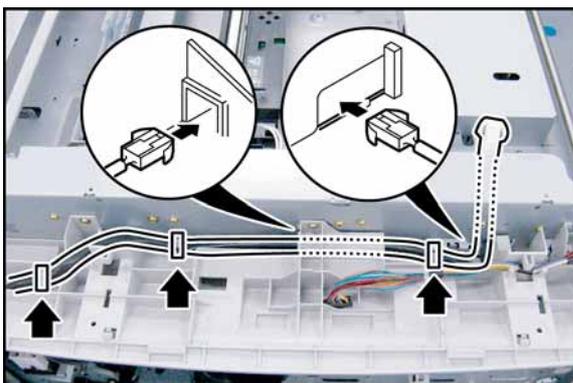
DZJK000068

(48) Install 3 **Clamps** (DZJK000023).
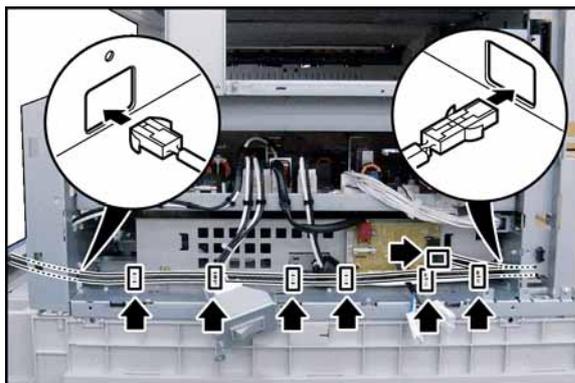
(49) Connect the **PTC-AC Harness 3** to CN173 on the RLB PC Board.
(50) Route the **PTC-AC Harness 3** through the holes in the frame as illustrated.
(51) Secure the **PTC-AC Harness 3** with 6 Harness Clamps.
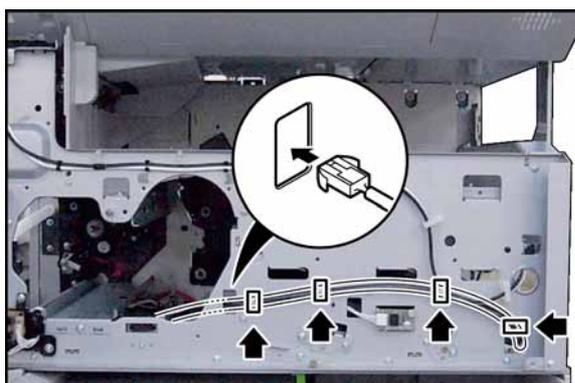
(52) Route the **PTC-AC Harness 3** through the hole in the frame as illustrated.
(53) Secure the **PTC-AC Harness 3** with 4 Harness Clamps.

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B3X6TTS-RP
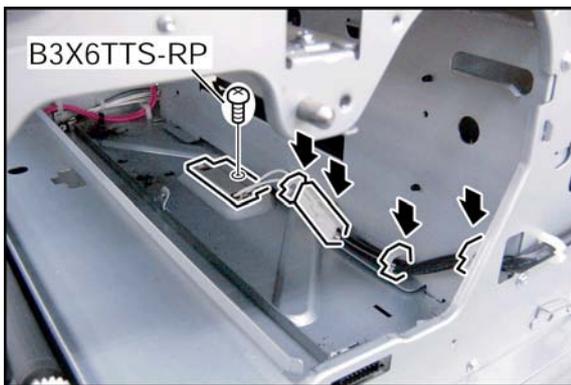
(54) Install the **Heater Assembly**.

(55) Secure the **Heater Assembly** with 1 Screw.

(56) Connect the **PTC-AC Harness 3** to the Heater Assembly.

(57) Secure the **PTC-AC Harness 3** with 3 Harness Clamps.

(58) Secure the **PTC-AC Harness 3** with the Harness Clamp.

Caution:
Do not remove the Dummy Plug, if the Dehumidifier Heater Kit is not installed in the Paper Tray.
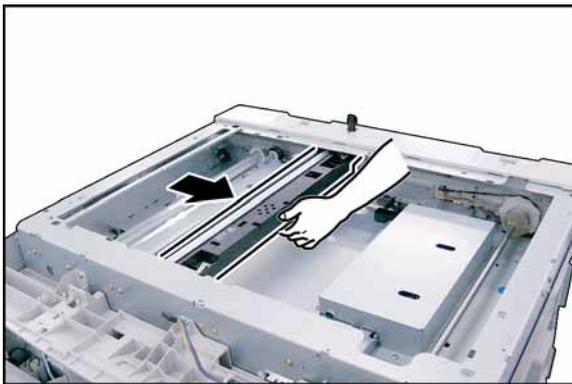
(59) Slide the **Scanner Unit**.
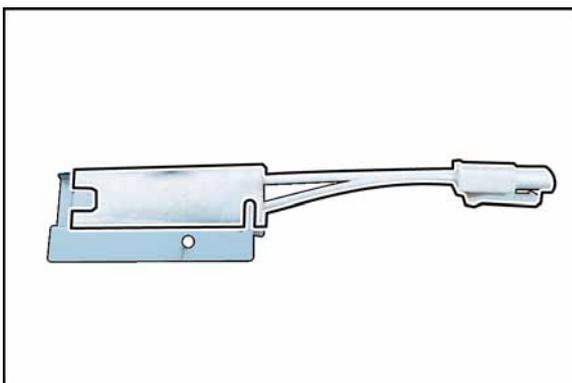
(60) Mount the **Dehumidifier Heater** onto the Dehumidifier Heater Bracket.
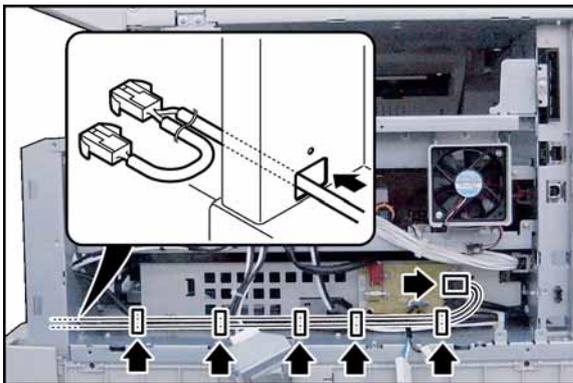
(61) Connect the **PTC-AC Harness 1** to CN172 on the RLB PC Board.
(62) Route the **PTC-AC Harness 1** through the hole in the frame as illustrated.
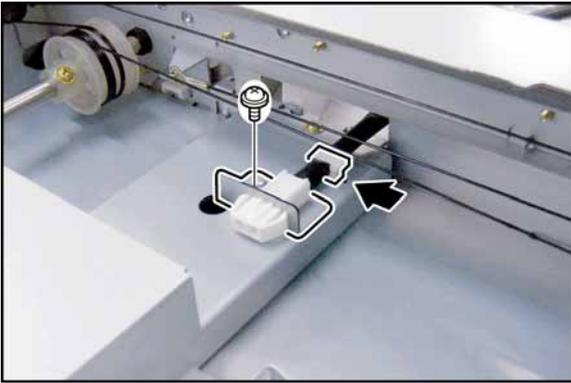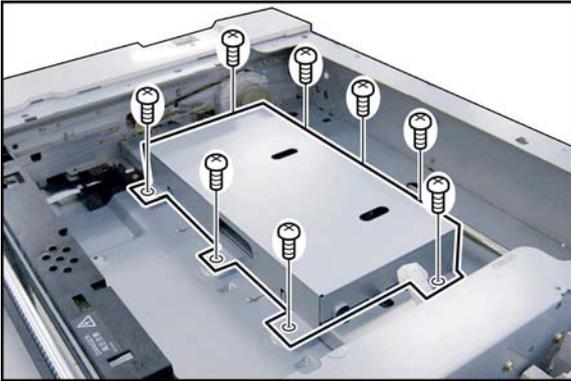(63) Secure the **PTC-AC Harness 1** with 5 Harness Clamps.
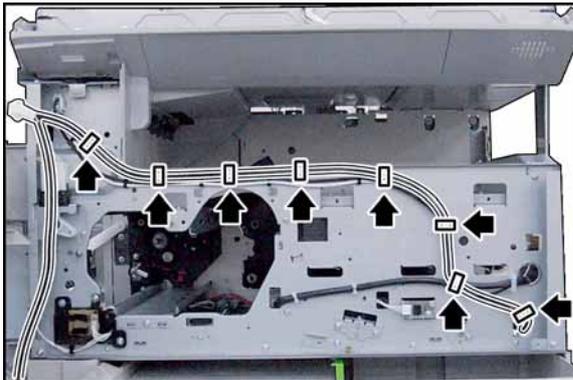
(64) Route the **PTC-AC Harness 1** as illustrated.
(65) Secure the **PTC-AC Harness 1** with 8 Harness Clamps.
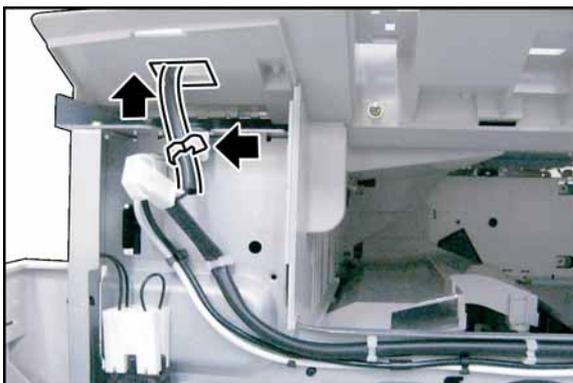
(66) Route the **PTC-AC Harness 1** through the hole in the frame as illustrated.
(67) Secure the **PTC-AC Harness 1** with the Harness Clamp.

(68) Route the **PTC-AC Harness 1** through the hole in the frame as illustrated.
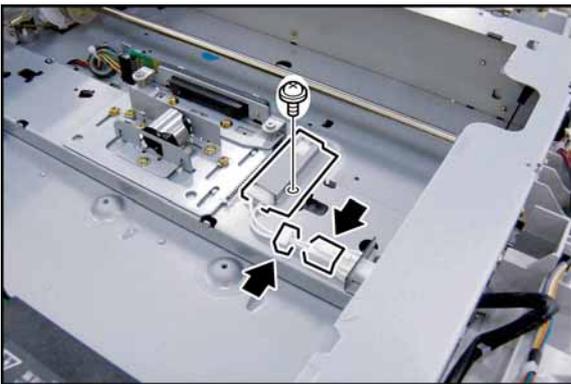(69) Secure the **PTC-AC Harness 1** with 3 Harness Clamps.

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(70) Install the **Clamp** (DZJK000046).
(71) Secure the **PTC-AC Harness 1** with the Harness Bracket and Harness Clamp.
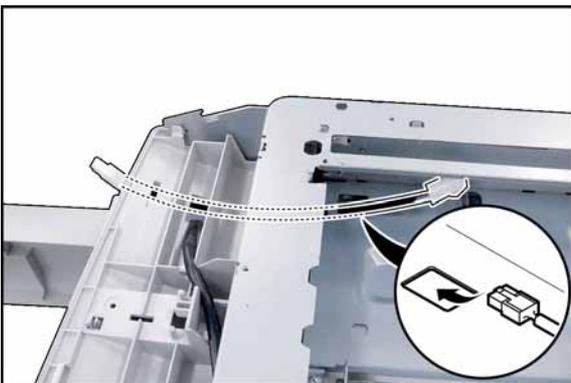(72) Secure the Harness Bracket with 1 Screw.
Caution:
Trim the excess length of the PTC-AC Harness 1 on the Panel Side.

(73) Remove 8 **Screws**.
(74) Remove the **CCD Cover**.

(75) Install the **Clamp** (DZJK000045).
(76) Install the **Dehumidifier Heater Assembly**.
(77) Secure the **Dehumidifier Heater Assembly** with 1 Screw.
(78) Secure the **Dehumidifier Heater Assembly** with the Harness Clamp.
(79) Connect the **PTC-AC Harness 1** to the Dehumidifier Heater Assembly.

(80) Route the **PTC-AC Harness 2** through the hole in the frame as illustrated.
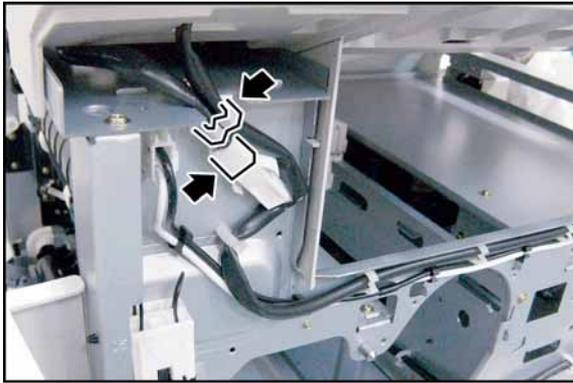
(81) Connect the **PTC-AC Harness 2** to PTC-AC Harness 1.
(82) Secure the **PTC-AC Harness 2** with the Harness Clamp.
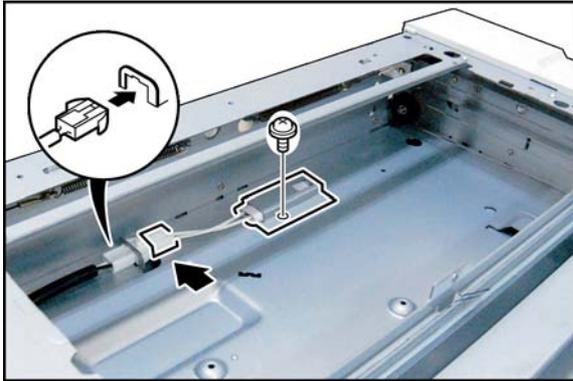
(83) Secure the **PTC-AC Harness 2** with the Harness Bracket.
(84) Install the **Dehumidifier Heater Assembly**.
(85) Secure the **Dehumidifier Heater Assembly** with 1 Screw.
(86) Connect the **PTC-AC Harness 2** to the Dehumidifier Heater Assembly.
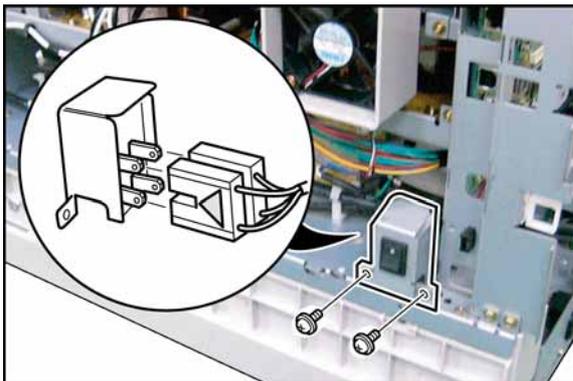
(87) Connect the Harness to Heater Switch Assembly as illustrated.
(88) Install the **Heater Switch Assembly**.
(89) Secure the Heater Switch Assembly with 2 Screw.
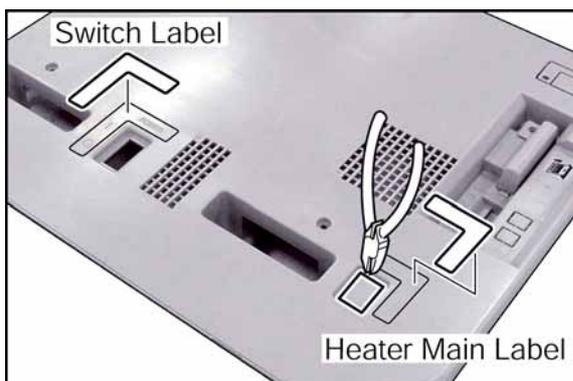
(90) Cut the **Protective Tab** on the Right Cover.
(91) Attach the **Heater Main Label** and **Switch Label** to the Right Cover as illustrated.
Note:
 Use the **Heater Main Label** to the desired language.

(92) Proceed with the installation of other options. If finished, reinstall all Harnesses and Covers.
(93) Plug the **AC Power Cord** and turn the Power Switch on the Right Side of the machine to the ON position.
(94) Reconnect the **Telephone Line Cable** if it was disconnected.

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8.16. Installing the Dehumidifier Heater Kit for Paper Tray (DZHP009959)

(Supplied as a Service Part)

8.16.1. Contents

No.	Qty.	Description	Part No.	Remarks
1	1	PTC-AC Harness 4	DZFP001642	
2	1	Heater	FFPCP0034	
3	1	Heater Bracket	DZJE001205	
4	1	Heater Cover	DZJE001206	
5	4	Clamp	DZJK000023	
6	2	Clamp	DZJK000067	
7	2	Edge Saddle	DZJK000017	
8	3	Screw	B3X6TTS-RP	⊕ ▭
-	1	Installation Instructions	DZSM000820	

Note:
1. The part number(s) may differ depending on the Destination.
2. Refer to the Parts List in the Parts Manual.
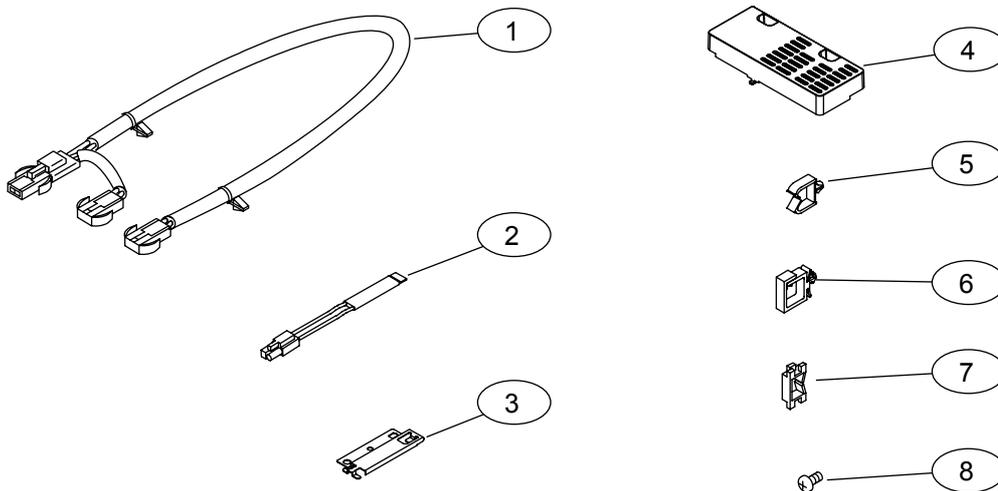
8.16.2. Installation

Before installing the Dehumidifier Heater Kit for Paper Tray (DZHP009959), make sure the Dehumidifier Heater Kit (DZTQ000074) is installed in the unit first.

CAUTION!
Turn the Power Switch on the Right Side of the machine to the OFF position, and then unplug the AC Power Cord before beginning installation. (During a Lightning Storm, to prevent electrocution disconnect the Telephone Line Cable first before unplugging the AC Power Cord, if the Fax Option is installed.)
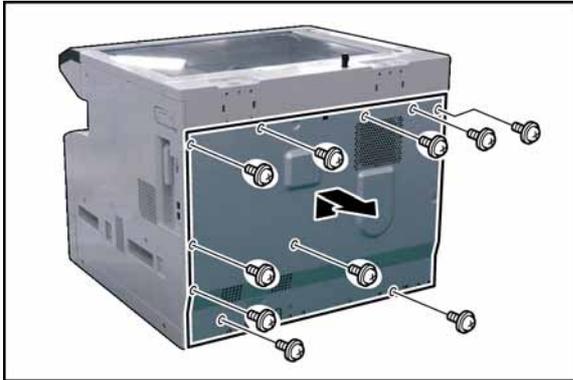
(1) Remove 10 **Screws**.
(2) Remove the **Rear Cover**.

(3) Remove 4 **Silver Screws**.
(4) Remove the **Rear Paper Tray Cover**.
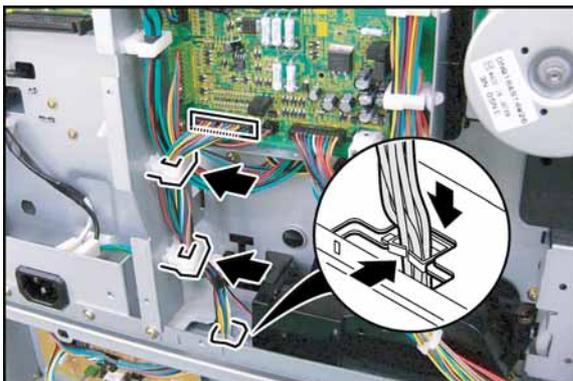
(5) Disconnect the **Harness** on the SPC PC Board (CN707).
(6) Release the **Harness** from 2 Harness Clamps and Edge Saddle.
(7) Route the **Harness** through a hole on the frame.

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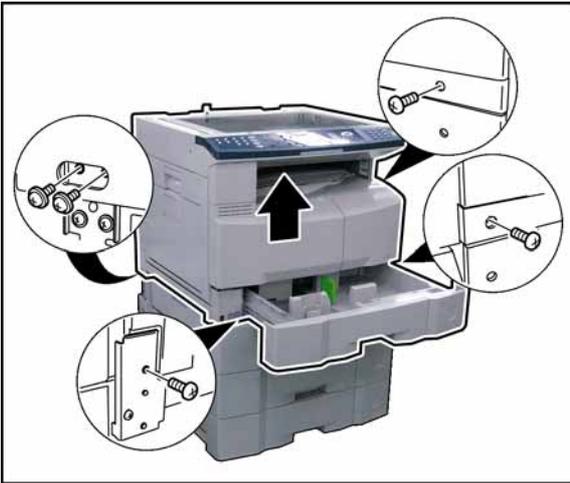
(8) Slide the **1st Paper Tray** out of the unit.

(9) Remove 5 **Screws**.

(10) Separate the **2nd Paper Tray** from the machine.

Caution:

The machine weights approximately 93.26 - 98.33 lb (42.3 - 44.6 kg). To prevent injuries, use the appropriate number of personnel and the proper equipment to lift or move the machine.
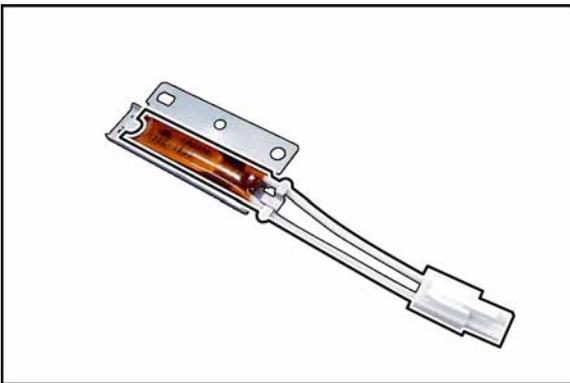
(11) Mount the **Heater** onto the Heater Bracket.
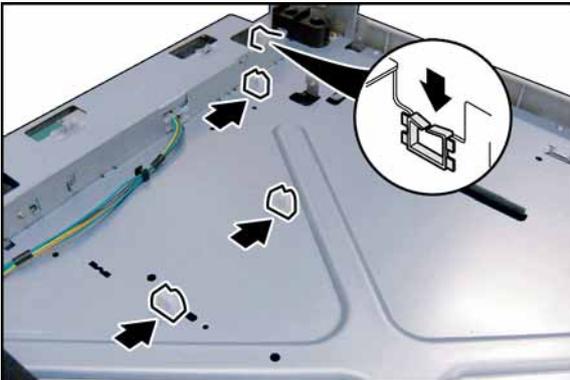
(12) Install 3 **Clamps** (DZJK000023) and 1 **Edge Saddle**.

(13) Secure the **Heater Assembly** with 1 Screw.

(14) Install the **Heater Assembly**.
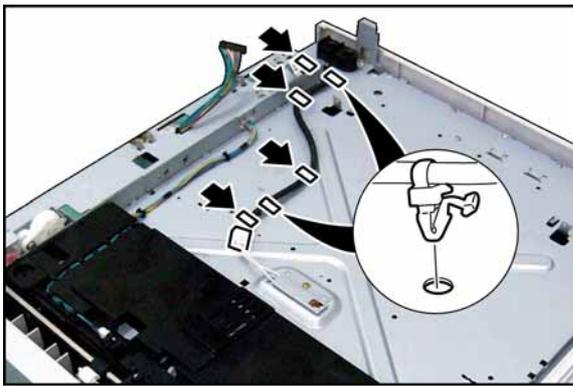
(15) Connect the **PTC-AC Harness 4** to the Heater Assembly.

(16) Insert 2 **Harness Clamp** of the PTC-AC Harness 4 into a pre-drilled hole in the frame.

(17) Secure the **PTC-AC Harness 4** with 3 Harness Clamps and **Edge Saddle**.
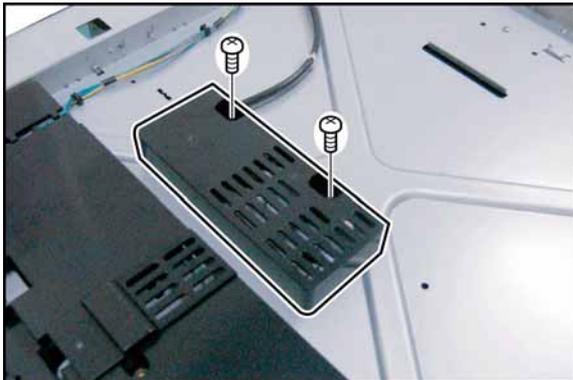
(18) Install the **Heater Cover**.

(19) Secure the **Heater Cover** with 2 Screws.
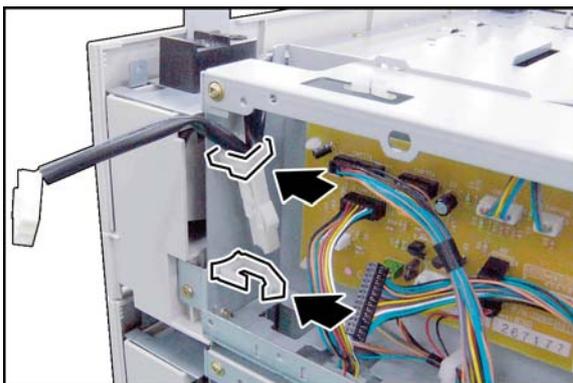
(20) Install 2 **Clamps** (DZJK000067).

(21) Secure the **PTC-AC Harness 4** with the Harness Clamp.

For a 2-Paper Tray Configuration, skip to Step (54).

(22) Remove 4 **Silver Screws**.

(23) Remove the **Rear Paper Tray Cover**.

403
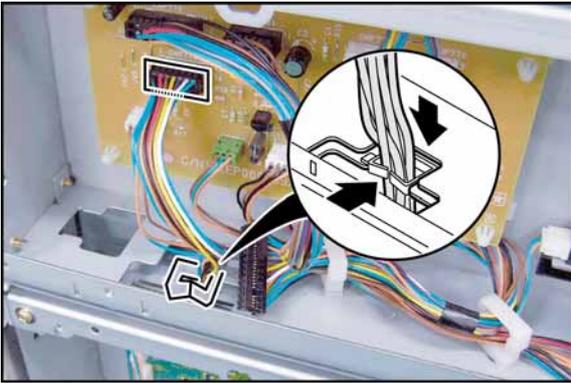
(24) Disconnect the **Harness** on the CST2 PC Board (CN772).
(25) Release the **Harness** from the Edge Saddle.
(26) Route the **Harness** through a hole on the frame.
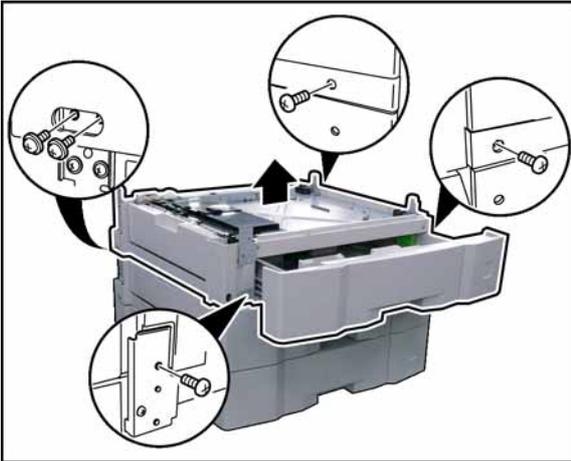
(27) Slide the **2nd Paper Tray** out of the unit.
(28) Remove 5 **Screws**.
(29) Separate the **3rd Paper Tray** from the 2nd Paper Tray.
(30) Install the **Heater**, refer to Steps (11) - (21).

For a 3-Paper Tray Configuration, skip to Step (47).
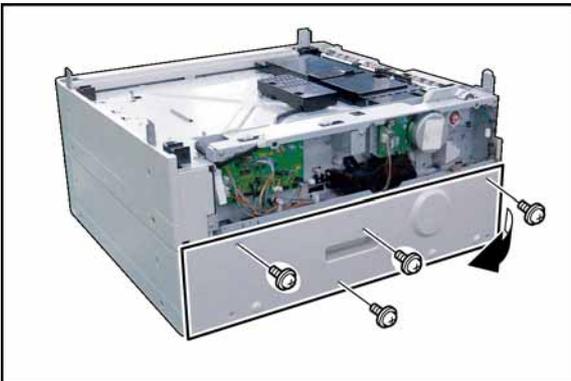
(31) Remove 4 **Silver Screws**.
(32) Remove the **Rear Paper Tray Cover**.
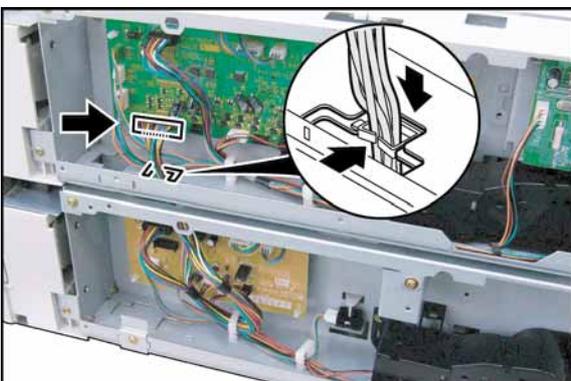
(33) Disconnect the **Harness** on the CST3 PC Board (CN808).
(34) Release the **Harness** from the Edge Saddle.
(35) Route the **Harness** through a hole on the frame.

404
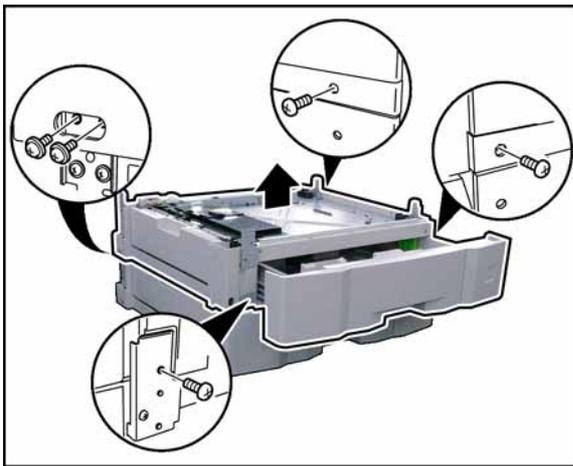
(36) Slide the **3rd Paper Tray** out of the unit.
(37) Remove 5 **Screws**.
(38) Separate the **4th Paper Tray** from the 3rd Paper Tray.
(39) Install the **Heater**, refer to Steps (11) - (21).
(40) Replace the **3rd Paper Tray Unit** onto the 4th Paper Tray Unit.
(41) Secure the **3rd Paper Tray Unit** with 5 Screws (XTW3+6LFJ, XTB3+8GFJ).
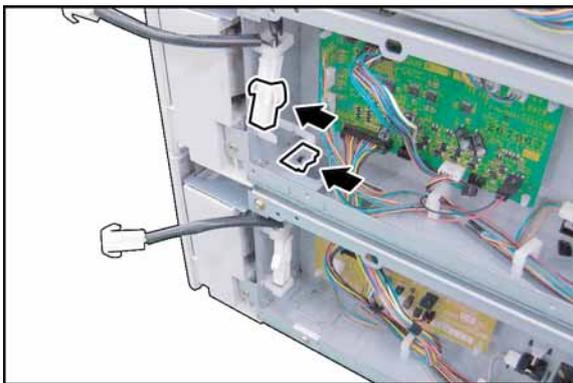
(42) Remove the **Dummy Plug**.
(43) Install 1 **Edge Saddle**.
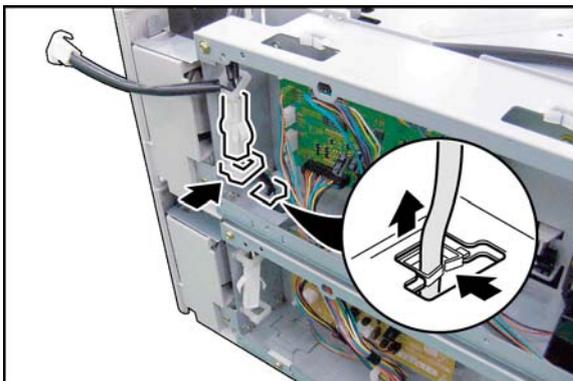
(44) Route the **PTC-AC Harness 4** through the hole in the frame as illustrated.
(45) Connect the **PTC-AC Harness 4**.
(46) Secure the **PTC-AC Harness 4** with the Harness Clamp and Edge Saddle.
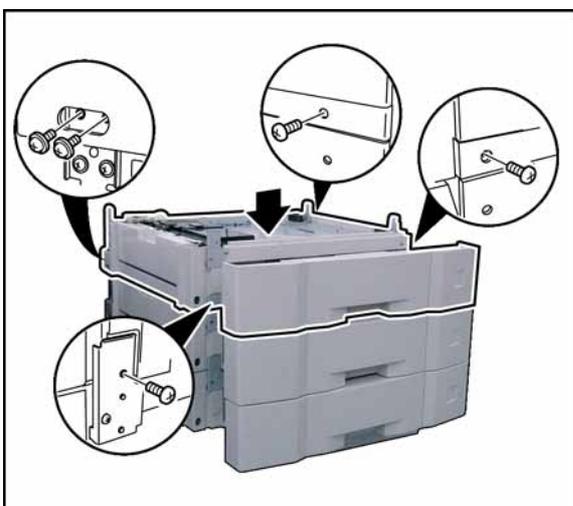
(47) Place the **2nd Paper Tray Unit** onto the 3rd Paper Tray Unit.
(48) Secure the **2nd Paper Tray Unit** with 5 Screws (XTW3+6LFJ, XTB3+8GFJ).

405
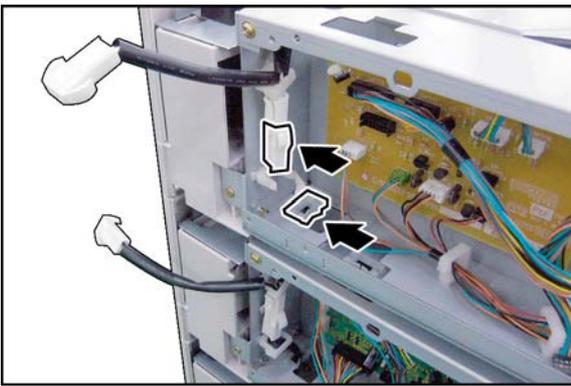
(49) Remove the **Dummy Plug**.

(50) Install 1 **Edge Saddle**.
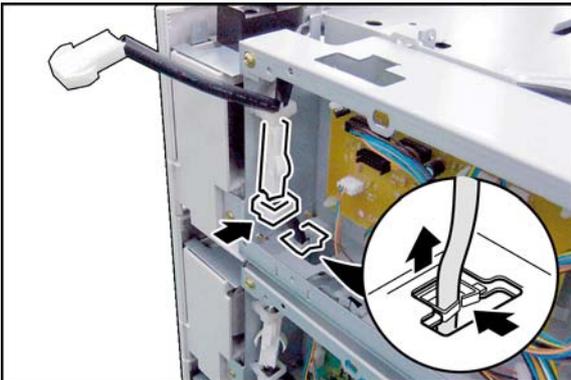
(51) Route the **PTC-AC Harness 4** through the hole in the frame as illustrated.

(52) Connect the **PTC-AC Harness 4**.

(53) Secure the **PTC-AC Harness 4** with the Harness Clamp and Edge Saddle.
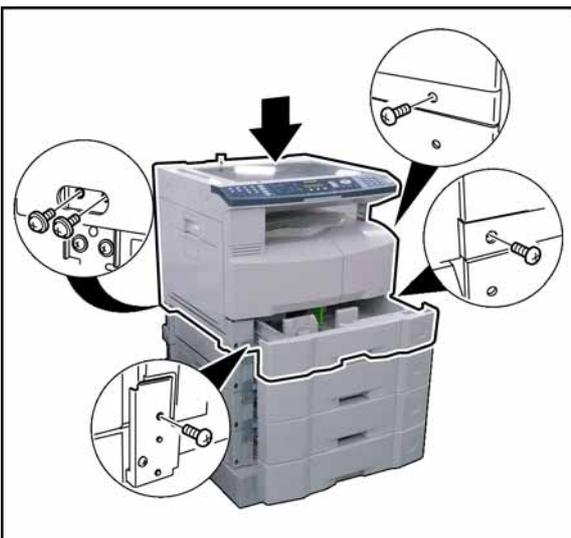
(54) Place the **machine** onto the 2nd Paper Tray Unit.

Caution:

The machine weights approximately 93.26 - 98.33 lb (42.3 - 44.6 kg). To prevent injuries, use the appropriate number of personnel and the proper equipment to lift or move the machine.

(55) Secure the **machine** with 5 Screws (XTW3+6LFJ, XTB3+8GFJ).
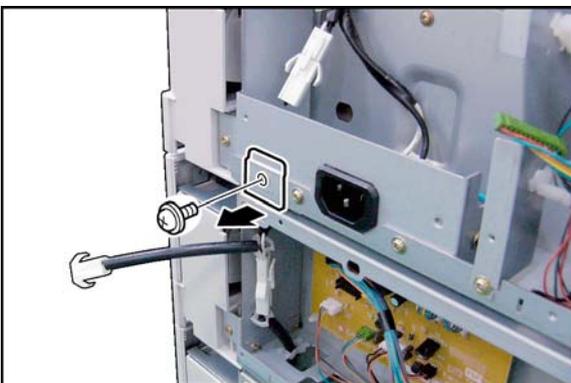
(56) Remove 1 **Screw**.

(57) Remove the **Bracket**.

406
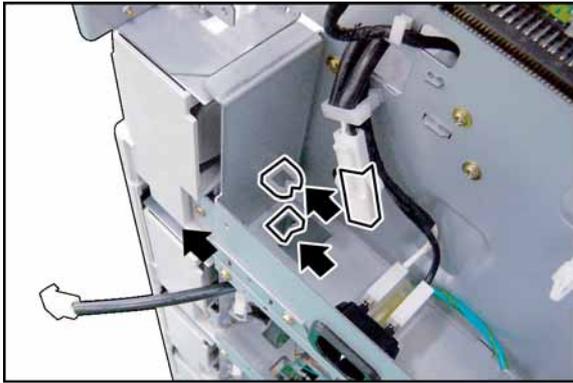
(58) Remove the **Dummy Plug**.

(59) Install 1 **Clamp** (DZJK000023) and 1 **Edge Saddle**.
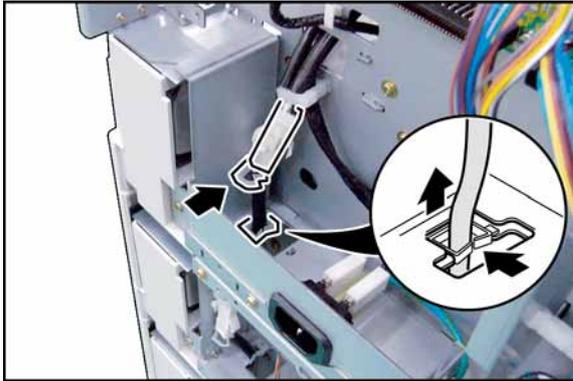
(60) Route the **PTC-AC Harness 4** through the hole in the frame as illustrated.

(61) Connect the **PTC-AC Harness 4**.

(62) Secure the **PTC-AC Harness 4** with the Harness Clamp and Edge Saddle.

(63) Proceed with the installation of other options. If finished, reinstall all Harnesses and Covers.

(64) Plug the **AC Power Cord** and turn the Power Switch on the Right Side of the machine to the ON position.

(65) Reconnect the **Telephone Line Cable** if it was disconnected.

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8.17. Installing the Mechanical Counter (DZTK000002)

(Supplied as a Service Part)

8.17.1. Contents

Qty.	Description	Remarks
1	Mechanical Counter	
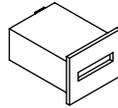
Note:
Refer to the Parts Manual for Part Number(s), Packing, and Accessories detail.

8.17.2. Installation

CAUTION!

Turn the Power Switch on the Right Side of the machine to the OFF position, and then unplug the AC Power Cord before beginning installation. (During a Lightning Storm, to prevent electrocution disconnect the Telephone Line Cable first before unplugging the AC Power Cord, if the Fax Option is installed.)

(1) Open the **Left Cover**.
(2) Open the **Front Cover**.

(3) Remove the **Toner Waste Container**.

408
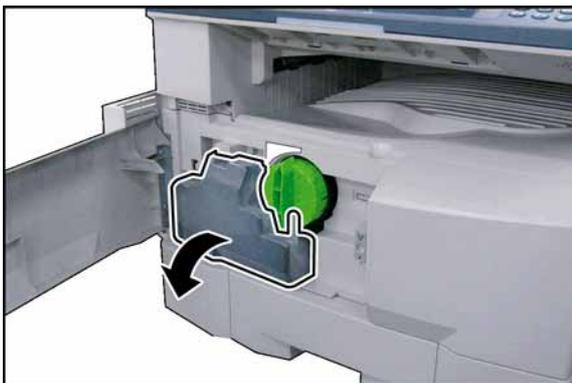
(4) Remove the **Toner Bottle**.

Caution:
 Do Not install the Toner Bottle before installing the Process Unit first. If the Toner Bottle is installed and turned to the "Locked" position without the Process Unit, the Toner will spill inside the machine.

(5) Remove 1 **Screw**.
(6) Remove the **Connector Cover**.

(7) Loosen 1 Screw.
(8) Disconnect the **Harness**.
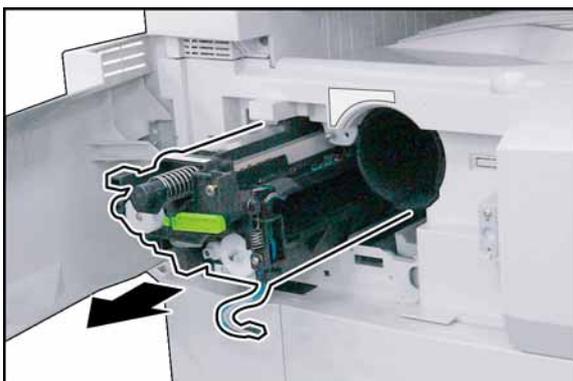
(9) Remove the **Process Unit**.

Caution:
 To prevent damage to the Process Unit, ensure that the Left Cover is still open before removing the Process Unit out of the machine.

Caution:
 Exercise caution not to scratch the surface of the **OPC Drum** (Green), and not to touch it with bare hands.

Caution:
 The OPC Drum is sensitive to light. To prevent optical exposure problems, do not expose the OPC Drum to direct sunlight or bright light.

 Even if it is a fluorescent lamp, approx.1000 lm/m^2 (1000 lx).
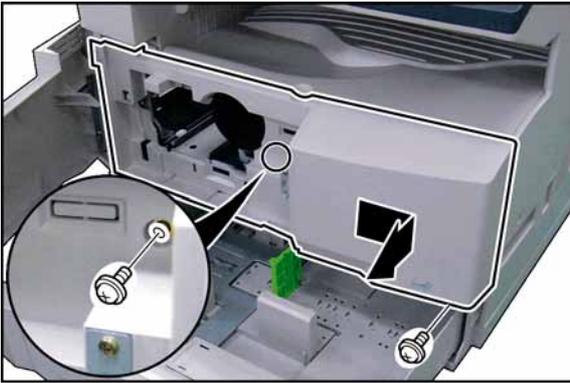
(10) Slide the **1st Paper Tray** out of the unit.

(11) Remove 2 **Screws**.

(12) Remove the **Front Cover 1**.

(13) Remove 4 **Silver Screws**.

(14) Remove the **Right Cover**.

(15) Remove the **Inner Cover**.
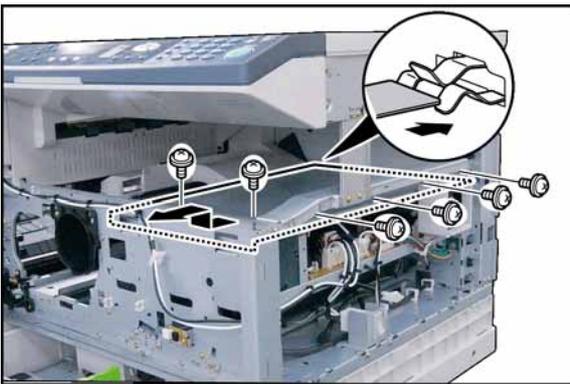
(16) Remove 6 **Screws**.

(17) Remove the **PS Cover**.

Note:

When reinstalling the PS Cover, ensure that the PS Cover is installed into the Ground Plate as illustrated.

(18) Install the **Mechanical Counter** to the machine.

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(19) Connect the **MC Harness** to the Mechanical Counter.
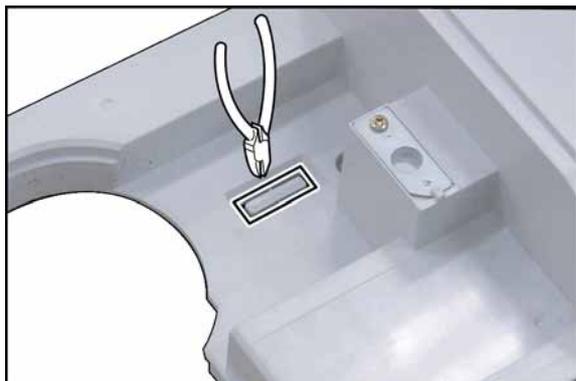
(20) Cut the **Protective Tab** on the Front Cover 1.
(21) Proceed with the installation of other options. If finished, reinstall all Harnesses and Covers.
(22) Plug the **AC Power Cord** and turn the Power Switch on the Right Side of the machine to the ON position.
(23) Reconnect the **Telephone Line Cable** if it was disconnected.

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8.18. Installing the Key Counter Harness Kit (DA-KH180)

8.18.1. Contents

Note:
The Key Counter is sold separately.

Qty.	Description	Part No.	Remarks
1	KEY Harness	DZFP001902	
1	Counter Guide	DZJB000463	
1	Key Counter Base	PJUIC0218Z	
1	Key Counter Cover	PJUIC0219Z	
1	Key Counter Front Cover	PJUIC0221Z	
3	Clamp	DZJK000070	
6	Screw	XTB3+6FFJ-RP	
2	Screw	XTW3+6LFJ	
2	Screw	XSB4+10FJ	
1	Installation Instructions	DZSM000825	This document

Note:
1. The part number(s) may differ depending on the Destination.
2. Refer to the Parts List in the Parts Manual.

8.18.2. Installation

CAUTION!

Turn the Power Switch on the Right Side of the machine to the OFF position, and then unplug the AC Power Cord before beginning installation. (During a Lightning Storm, to prevent electrocution disconnect the Telephone Line Cable first before unplugging the AC Power Cord, if the Fax Option is installed.)
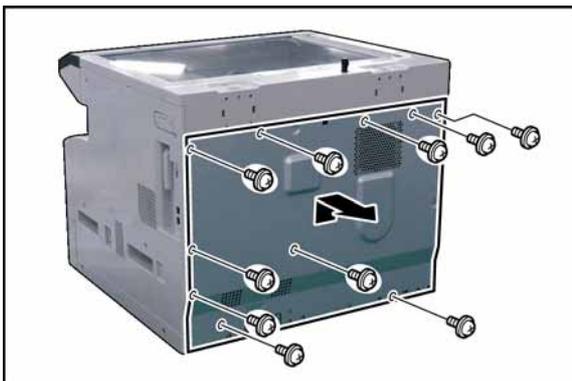
(1) Remove 10 **Screws**.
(2) Remove the **Rear Cover**.
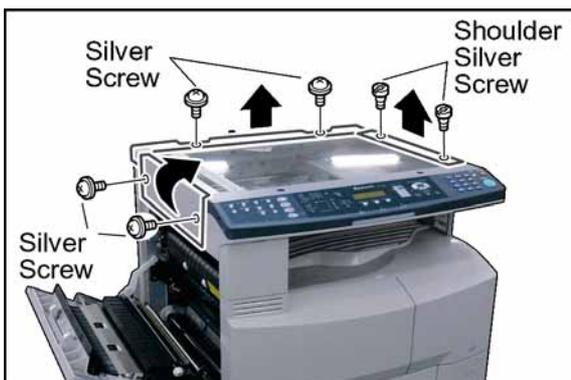
(3) Open the **Left Cover**.
(4) Remove 2 **Silver Screws**.
(5) Remove the **Left Scanner Cover**.
(6) Remove 2 **Shoulder Silver Screws**.
(7) Remove the **Right Scanner Cover**.
(8) Remove 2 **Silver Screws**.
(9) Remove the **Rear Scanner Cover**.

412
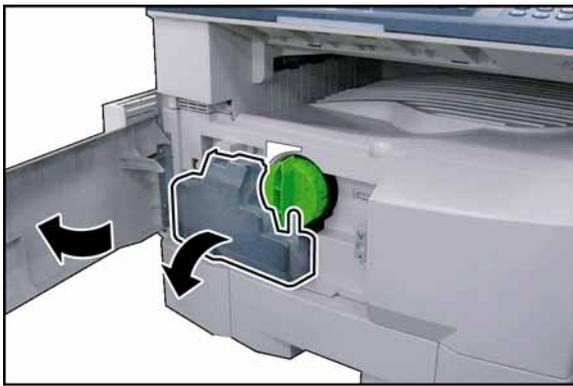
(10) Open the **Front Cover**.

(11) Remove the **Toner Waste Container**.
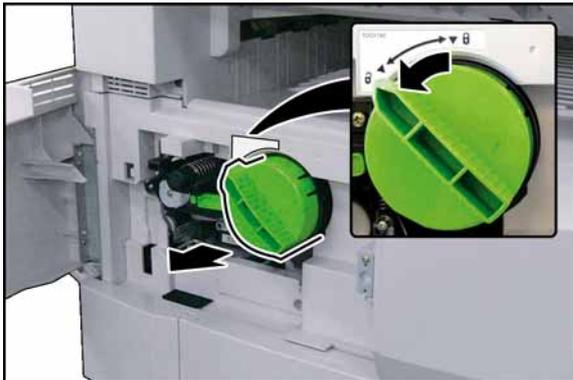
(12) Remove the **Toner Bottle**.

Caution:

Do Not install the Toner Bottle before installing the Process Unit first. If the Toner Bottle is installed and turned to the "Locked" position without the Process Unit, the Toner will spill inside the machine.

(13) Remove 1 **Screw**.

(14) Remove the **Connector Cover**.

(15) Loosen 1 Screw.

(16) Disconnect the **Harness**.

413
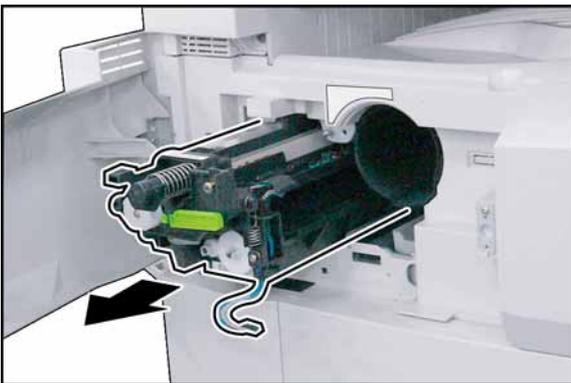
(17) Remove the **Process Unit**.

Caution:
    To prevent damage to the Process Unit, ensure that the Left Cover is still open before removing the Process Unit out of the machine.

Caution:
    Exercise caution not to scratch the surface of the **OPC Drum** (Green), and not to touch it with bare hands.

Caution:
    The OPC Drum is sensitive to light. To prevent optical exposure problems, do not expose the OPC Drum to direct sunlight or bright light.

    Even if it is a fluorescent lamp, approx.1000 lm/m^2 (1000 lx).
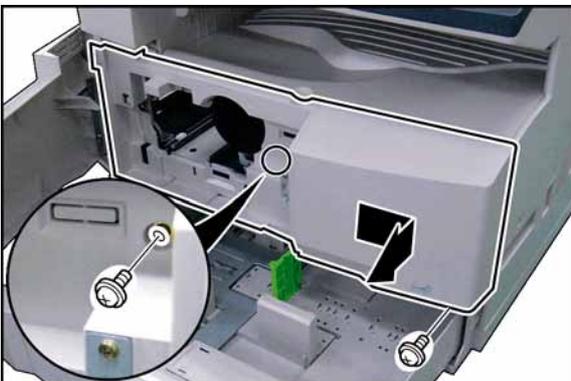
(18) Slide the **1st Paper Tray** out of the unit.
(19) Remove 2 **Screws**.
(20) Remove the **Front Cover 1**.
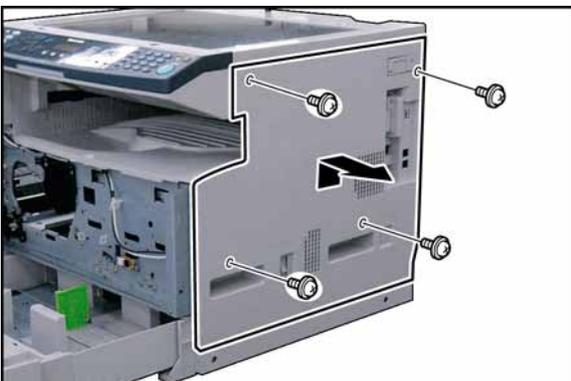
(21) Remove 4 **Silver Screws**.
(22) Remove the **Right Cover**.
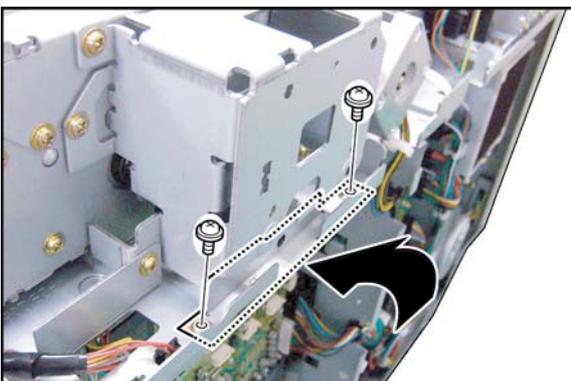
(23) Install the **Counter Guide**.
(24) Secure the **Counter Guide** with 2 Screws (XTW3+6LFJ).

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(25) Connect the **KEY Harness** to CN726 on the SPC PC Board.
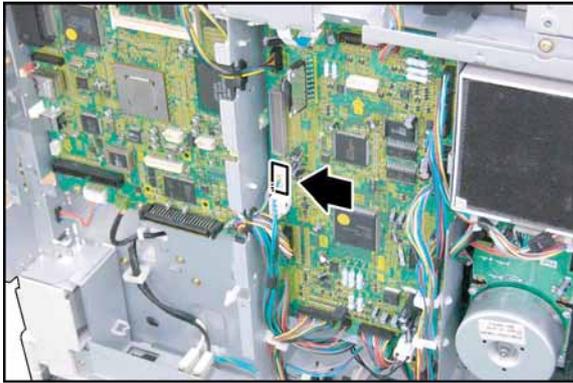
(26) Install 3 **Clamps**.
(27) Secure the **KEY Harness** with 4 Harness Clamps and 1 Edge Saddle.
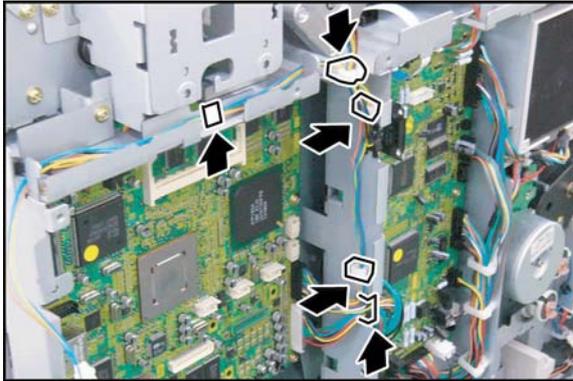
(28) Cut the **Protective Tab** on the Right Cover.
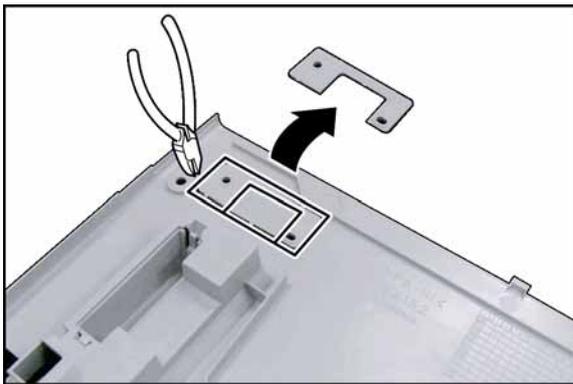
(29) Reinstall the **Right Cover**.
Caution:
  Route the **KEY Harness** through the hole on the Right Cover.

415
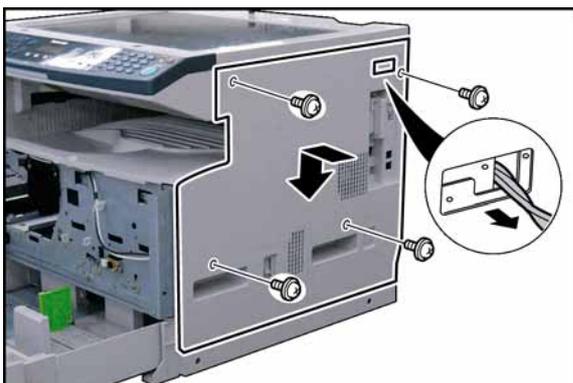
(30) Install the **Protective Tab** that was cut Step (28).
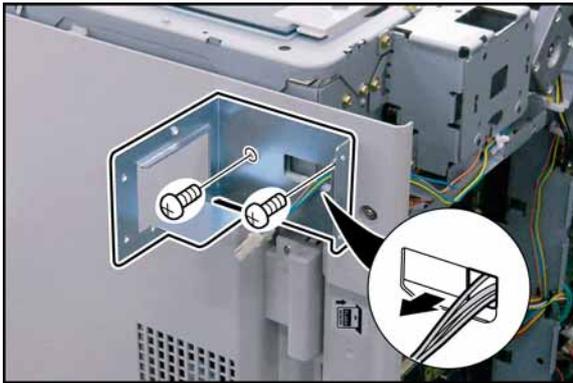
(31) Install the **Key Counter Base**.
Caution:
    Route the **KEY Harness** through the hole on the Key Counter Base.

(32) Secure the **KEy Counter Base** with 2 Screws (XSB4+10FJ).
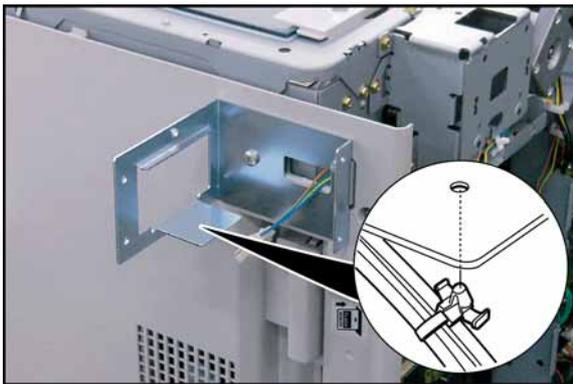
(33) Insert the **Harness Clamp** into the pre-drilled hole in the Key Counter Base (from underneath).
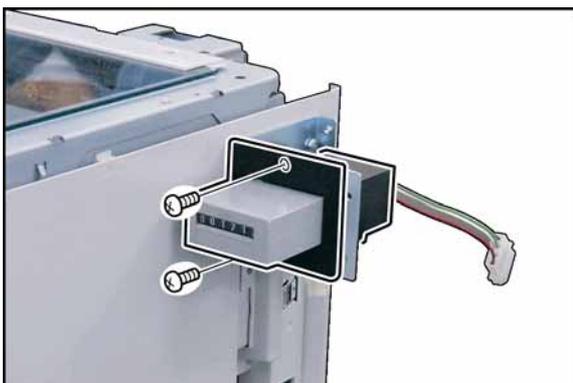
(34) Install the **Key Counter**.
(35) Secure the **Key Counter** with 2 Screws (XTB3+6FFJ-RP).

416
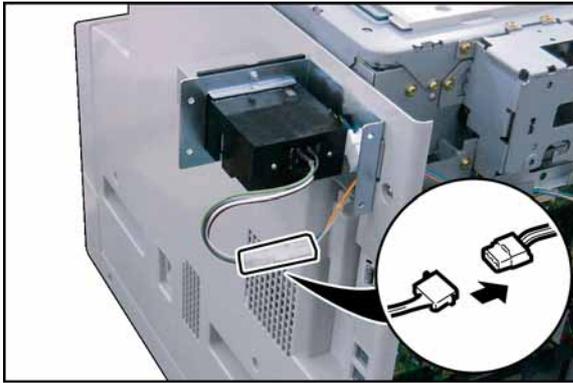
(36) Connect the **Key Counter Harness** to the KEY Harness.
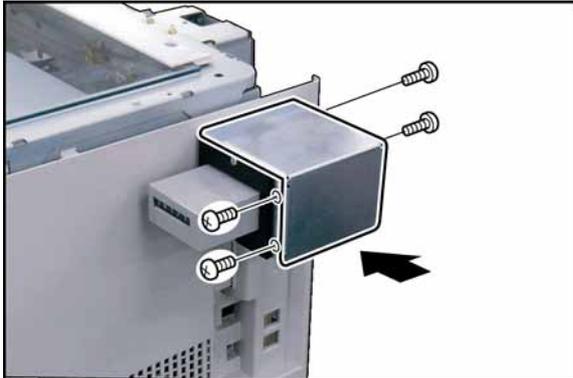
(37) Install the **Key Counter Cover**.
(38) Secure the **Key Counter Cover** with 4 Screws (XTB3+6FFJ-RP).
(39) Proceed with the installation of other options. If finished, reinstall all Harnesses and Covers.
(40) Plug the **AC Power Cord** and turn the Power Switch on the Right Side of the machine to the ON position.
(41) Reconnect the **Telephone Line Cable** if it was disconnected.
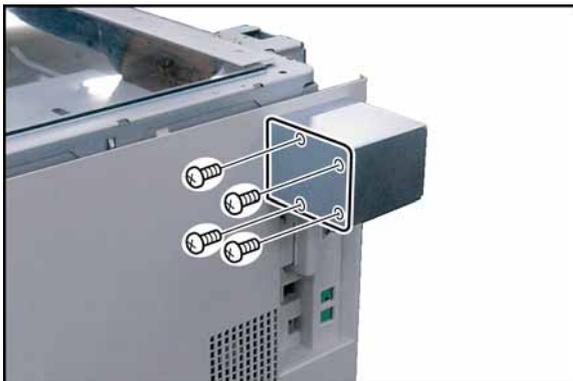
Note:

If you are not installing the Key Counter at this time, cover the opening with the **Key Counter Front Cover** and secure it with 4 Screws (XTB3+6FFJ-RP).

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8.19. Replacing the OPC Drum

Note:

To avoid Toner spill in the machine, follow the steps below before removing the Process Unit.

1. Press "**FUNCTION**" and "**1 SIDED COPY**" keys simultaneously.
2. The LCD shows "Please wait..." for approx. 5 sec. Then it will be ready.

(1) Open the **Left Cover**.
(2) Open the **Front Cover**.
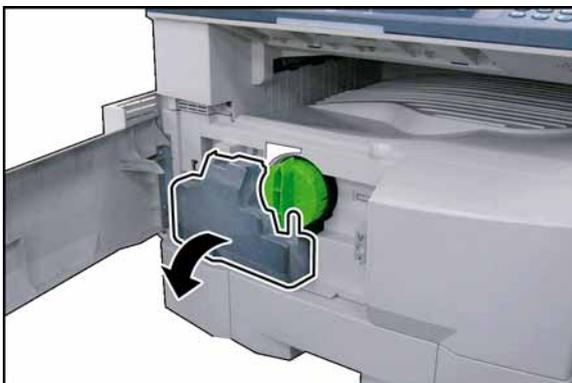
(3) Remove the **Toner Waste Container**.

(4) Remove the **Toner Bottle**.

Caution:

Do Not install the Toner Bottle before installing the Process Unit first. If the Toner Bottle is installed and turned to the "Locked" position without the Process Unit, the Toner will spill inside the machine.

(5) Remove 1 **Screw**.
(6) Remove the **Connector Cover**.

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(7) Loosen 1 Screw.

(8) Disconnect the **Harness**.

(9) Remove the **Process Unit**.

Caution:
   To prevent damage to the Process Unit, ensure that the Left Cover is still open before removing the Process Unit out of the machine.

(10) Unhook 2 **Springs**.

(11) Disconnect the **Harness**.
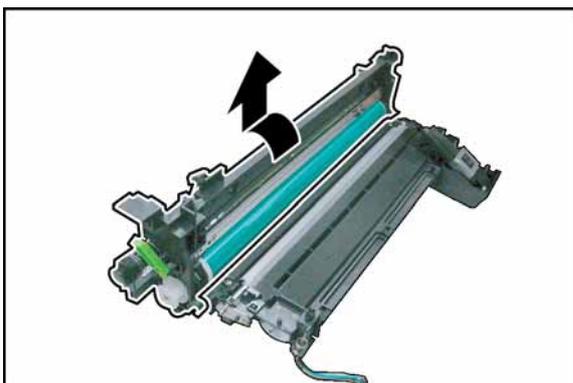
Harness

(12) Turn the **OPC Drum Assembly** in the direction of the arrow and remove.

Caution:
   Exercise caution not to scratch the surface of the **OPC Drum** (Green), and not to touch it with bare hands.

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(13) Remove the **OPC Drum Shaft Holder** Assembly.

(14) Remove the **Roller Spacer**.

(15) Lift the **OPC Drum**, holding the left side where the OPC Drum Shaft Holder Assembly was installed.

(16) Ensure that the OPC Drum is fully coated with the Drum Starting Powder. Apply additional Drum Starting Powder onto the surface of the OPC Drum if required.

Note:
Do not touch the surface of the OPC Drum with bare hands when removing or reinstalling it. Grease from fingerprints will affect copy quality.

Caution:
The OPC Drum is sensitive to light. To prevent optical exposure problems, do not expose the OPC Drum to direct sunlight or bright light.

Even if it is a fluorescent lamp, approx.1000 lm/m^2 (1000 lx).

(17) Install the new **OPC Drum** onto the OPC Drum Shaft Holder.

(18) Insert the OPC Drum Assembly into the Process Unit.

(19) Reinstall the Process Unit, Toner Bottle and the Toner Waste Container.

(20) Close the all Covers.

(21) Perform the Copy Service Mode F8-14 (OPC Counter Starting Point Adjustment) to clear the OPC Drum Counter.

9 General Network Information

9.1. Network Protocol

9.1.1. OSI Reference Mode

Having a model in mind helps you understand how the pieces of the network puzzle fit together. The most commonly used model is the Open System Interconnection (OSI) reference model. The OSI model, first released in 1984 by the International Standards Organization (ISO), provides a useful structure for defining and describing the various processes underlying networking communications.

The OSI model organizes communication protocols into seven layers. Layer 1, the Physical (Hardware) layer, consists of protocols that deal with how data is transferred across the transmission media. At the opposite end, Layer 7, the Application layer, interfaces the network services with the applications (software) in use on the computer. The five layers in between, Data Link, Network, Transport, Session and Presentation - perform intermediate communication tasks. In essence the OSI model is a framework that describes how a function from one computer is transmitted to another computer on the network.

Layer	Name	Function	Protocol
7	Application		SMB
6	Presentation		SMTP FTP DNS HTTP Telnet etc...
5	Session	NetBIOS, Windows, Sockets, etc...	
		TDI	
4	Transport	TCP, UDP	TCP/IP IPX/SPX Net BEUI Apple Talk etc...
3	Network	IP, IPX, etc... IP Address etc...	
		ODI Driver, NDIS Driver	
2	Datalink	PPP... Router MAC Address	Ethernet Token Ring FDDI
1	Physical	NIC SW Hub Repeater Hub RS-232C, X21...	ATM etc...
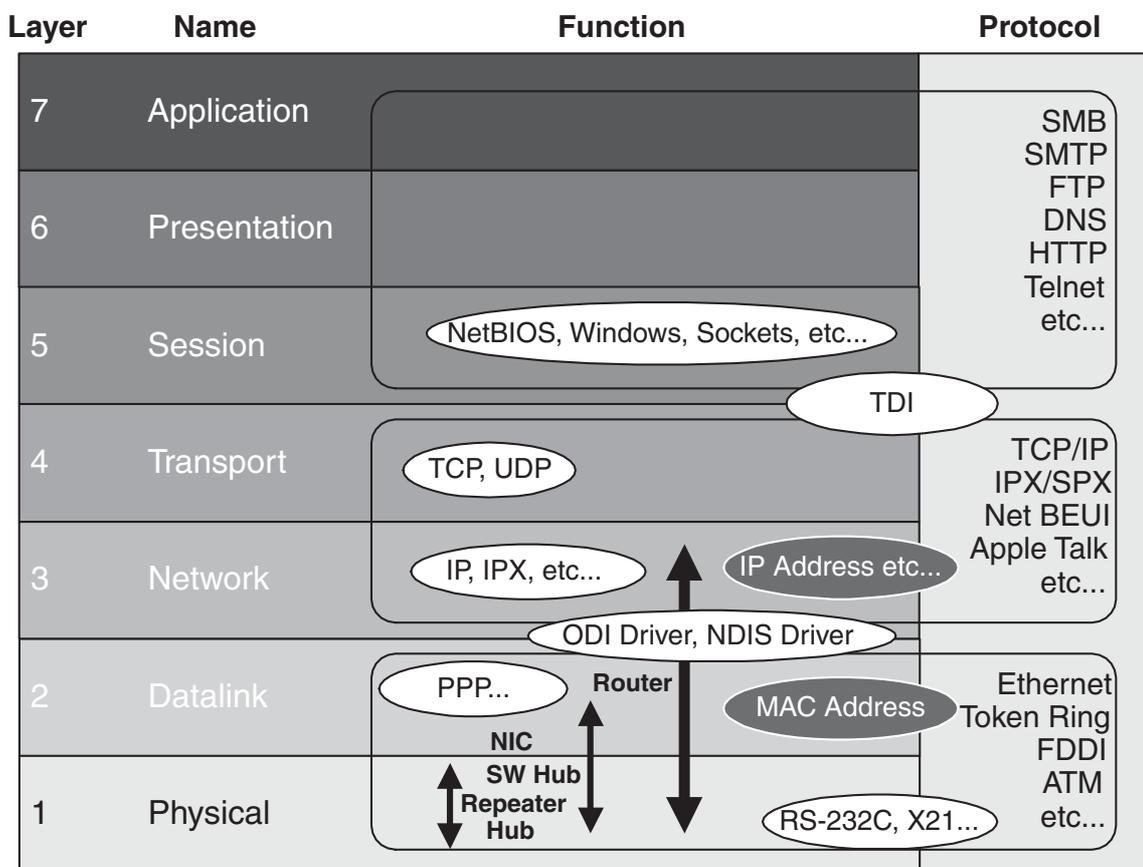
OSI Reference Model and Network Terms

9.1.2. Protocol

One reason for the popularity of TCP/IP is that no one vendor owns it, unlike the IPX/SPX, DNA, SNA or Apple Talk protocol suites, all of which are controlled by specific companies. TCP/IP evolved in response to input from a wide variety of industry sources. Consequently, it is the most open of the protocol suites and is supported by the widest variety of vendors. One huge advantage of using TCP/IP is that, it is required for communication over the Internet, thus the Internet can be used as a communication backbone.

TCP/IP was originally designed by ARPANET (Advanced Research Project Agency) in 1969 for the UNIX operating system. In early 1980, UNIX 4.2 BSD version was released. For more detailed information, an RFC (Request for Comment) document is available from the IETF (Internet Engineering Task Force) on the Internet at http://www.ietf.org/.

The Internet protocols do no map cleanly to the OSI reference model. The model for the Internet protocol suite has four layers. From the illustration below, you can see the approximate relationship of the layers.

Layer	OSI Reference Model	TCP/IP Base	Function
7	Application	Application	This layer embraces functions of the OSI Session, Presentation and Application layers. Protocols at this layer provide network services.
6	Presentation		
5	Session		
4	Transport	Transport	Compares to OSI Transport layer. Enables peer communication between hosts on the internetwork.
3	Network	Internet	Corresponds roughly to the OSI Network layer. Protocols move data between devices on networks.
2	Data Link	Network Interface	Corresponds to the bottom two layers of the OSI model. This correspondence enables the TCP/IP protocols to coexist with existing Data Link and Physical layer standards. This layer is concerned with all aspects of transmitting and receiving data on the network.
1	Physical		

Comparison of the TCP/IP layers to the OSI model

9.1.3. Cable

For the network transmission media at the Physical layer on the OSI reference model, there are several cable categories available. Category 5, 8 wire Unshielded Twisted Pair (UTP) cable is commonly used. Shielded Twisted Pair cables are also available. The Impedance for the STP / UTP Ethernet cable is 100 Ω. Category 3 is also used for the 10Base-T Ethernet.

Category	Purpose
1	Voice grade telephone line
2	ISDN
3	10Base-T Token Ring (4M)
4	Token Ring (16M)
5	100Base-TX, ATM (155M)

9.2. Layer Functions and Technology

9.2.1. MAC (Media Access Control)

The MAC address is burnt into each network card for establishing addresses for nodes on the network. These addresses are hexadecimal in nature and are unique for each card. The First three bytes from the left end identify the manufacturer's code that must be approved by IEEE (Institute of Electrical and Electronics Engineers). The Remaining three bytes on the right half should be kept in a unique manner. For Ethernet connections, multiple stations share the topology, therefore, the identification packet from each station should be unique.

XXXXXX XXXXXX

→ Unique value

→ Manufacturer ID
PCC : 080023

9.2.2. Network Control

CSMA/CD (Carrier Sense Multiple Access with Collision Detection) If a node is trying to make a link to the network, transmission from another station is prohibited and halted until the data transfer is completed and the link is off. CSMA/CD and Token Passing are typical techniques used to control the connection.
The General sequence is as follows:

Wait for the next available timing to send,
Send out a frame,
Perform collision sensing simultaneously,
Retry to send the same frame up to 16 times if necessary.
(Sequence goes by a binary exponential back-off algorithm to avoid periodical incident)

802.3 (Ethernet) Frame Format

← Most significant bit   Least significant bit →

Pre-amble 8 byte	Destination MAC address 6 byte	Source MAC address 6 byte	Data type 2 byte	Data 46~1500 byte	FCS 4 byte

Destination MAC address: 6 byte (uni-cast or broadcast)
If all "1" on 6 byte (FF-FF-FF-FF-FF-FF) means broadcast frame, it is detected by an applicable node, it must be passed to the upper layer.
Also, if the destination MAC address is not matched with that node, the frame is discarded at that node immediately.

Token Passing

Token passing utilizes a frame called a token, which circulates around the network. A computer that needs to transmit must wait until it receives the token, at which time the computer is permitted to transmit. When the computer is done transmitting, it passes the token frame to the next station on the network.

The first station that is powered up on a token-ring network automatically becomes the active monitor station. Its responsibility is to announce itself to the next active downstream station as the active monitor station and request that station to announce itself to its next active downstream station. After each station announces itself to its next active downstream neighbor, the announcing station becomes the nearest active upstream neighbor (NAUN) to the downstream station. After each station becomes aware of its NAUN, the beaconing process continues every seven seconds.

A computer in the ring captures the token, if it has data to transmit, it holds the token and transmits a data frame. This data frame is passed to each computer in the ring, which checks whether it is the intended recipient of the frame.

When the frame reaches the destination address, the destination PC copies the frame to a receive buffer, updates the frame status field of the data frame and puts the frame back on the ring. When the computer that originally sent the frame receives it back from the ring, it acknowledges a successful transmission, takes the frame off the ring, and places the token back on the ring.

Token Frame indicates that the network is available for transmission.
Data Frame indicates that the network is busy processing a transmission.

Token Frame Format

← Most significant bit　　　　　　　　　　　　Least significant bit →

| Start De-limiter (SFD) 1 byte | P | P | P | S | M | R | R | R | End De-limiter (ED) 1 byte |

　　P: priority
　　S: Status
　　　　0 = Token Frame
　　　　1 = Data Frame
　　R: Reserved

Data Frame Format

← Most significant bit　　　　　　　　　　　　　　Least significant bit →

| SFD 1 byte | Access Control 1 byte | Frame control 1 byte | Destination MAC 6 or 2 byte | Source MAC 6 or 2 byte | Data | FCS 4 byte | ED 1 byte | Frame Status 1 byte |

　　Data: Max 4429 byte (4M)
　　　　　Max 17779 (16M)

There are several different bit types assigned for Frame Status. For example, 1 and 5 bit indicates that the token has been read, 2 and 6 bit indicates that the frame has been copied by another station. Thus, we can confirm whether the Data Frame was delivered.

9.2.3. Ethernet

Ethernet is a very popular local area network architecture based on the CSMA/CD access method. The original ethernet specification was the basis for the IEEE 802.3 specifications. Typically, ethernet networks can use a bus physical topology, although, many varieties of ethernet such as 10Base-T uses a star physical topology and a bus logical topology. (Microsoft uses the term "star bus topology" to describe 10Base-T)

	Speed (bps)	Topology	Cable Type	Max Length
10Base-5	10M	Bus	Yellow cable	500 m (1640 ft)
10Base-T	10M	Star	Twisted Pair (Cat. 3, 4, 5)	100 m (328 ft)
100Base-TX	100M	Star	Twisted Pair (Cat. 5)	100 m (328 ft)

802.3 (CSMA/CD) Network Type
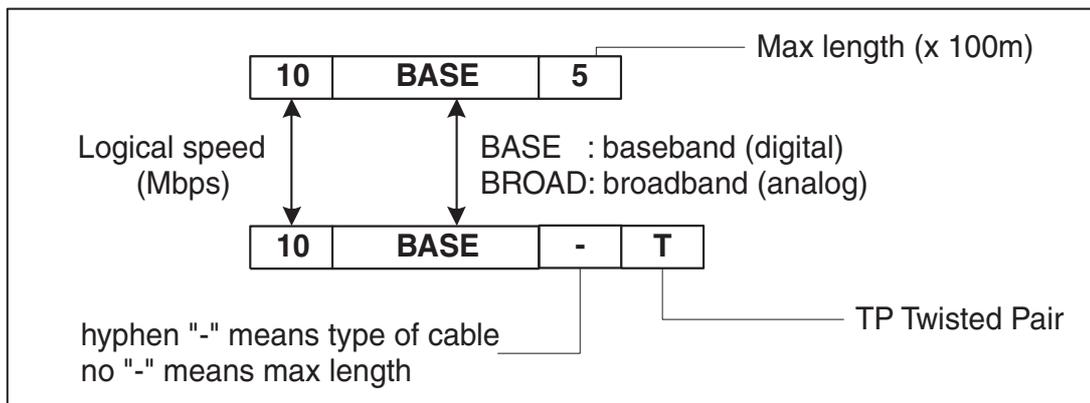
Ethernet Configuration

425
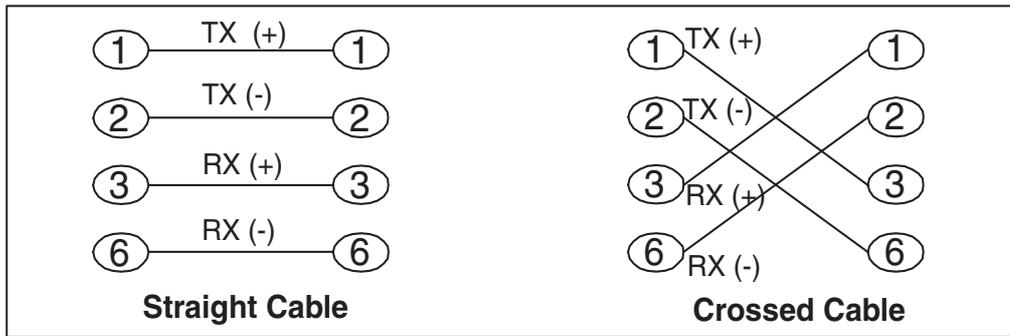
Ethernet Cable Pin Configuration

All eight pins on the Ethernet cable are normally wired in this configuration accordingly.
The Electrical level follows the Manchester code configuration.
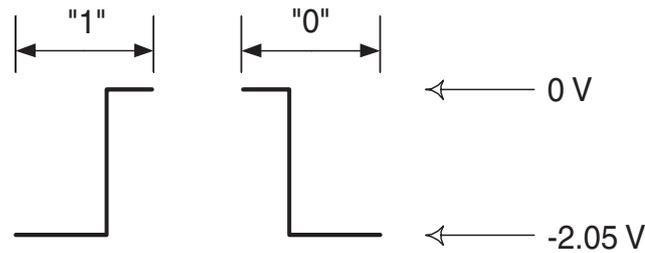
Out of balance in electrical levels indicates that a collision is occurring in a certain area. To avoid from further malfunctions, terminating the physical end is required for coaxial cables.

If a collision is detected, transmission is stopped and a maximum of 4.8 usec. of JAM packet is sent. The node that receives the JAM packet, discards the applicable received data. The maximum timing for collision detection is called slot time, normally set to 49.9 usec. The interval of 9.6 usec to 10 usec after the end of transmission frame is reserved for non-transmission period.

There are several merits to Ethernet wiring, the physical connection is easy and flexible for future expansion due to the star topology.

9.2.4.   Repeater
The main purpose of a repeater is to extend the maximum range for the network cabling. They operate at the OSI Physical layer, and do not filter or interpret the signal - they merely repeat (regenerate) the signal, passing all network traffic in all directions.

They perform signal amplitude, delete errors and reschedule the timing. Repeaters also follow the 5-4-3 rule, where no more than 5 network segments connected by 4 repeaters, with no more than 3 of the segments being populated.

Active Hubs function in part as repeaters (amplify and regenerate network signals), they occasionally are called multiport repeaters.

9.2.5.   NIC (Network Interface Card)
NIC is an acronym for Network Interface Card, which plugs into a computer and adapts the network interface to the appropriate standard. ISA, PCI, and PCMCIA cards are all examples of NICs.

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9.3.   Network Layer

9.3.1.   IP Address

An IP address is a set of four numbers, or octets, that can range in value between 0 and 255. Each octet is separated by a period (i.e. 192.168.31.1). All devices on a network that runs the TCP/IP protocol suite need a unique IP address. Most machines use a Domain Name, which are easier for people to remember.
The IP addresses are actually broken down into three distinct classes, knows as class A, class B and class C addresses.

Class A IP addresses contain a number between 1 and 127 before the first dot. In class A address, this first octet represents the network address, and the last three octets represent the node or host number.

Class B IP addresses can range in value from 128 to 191 for the first octet, but it is the first two octets that make up the network address, and the last two octets that make up the host ID.

Class C IP addresses can range in value from 192 to 223 for the first octet, and the first three octets make up the host ID.

There are class D and E addresses as well. For these addresses, the first octet is a number greater than 223. These addresses are not currently available to be used and are reserved for other purposes.

        Class A : First octet reserved for the network address
        Class B : First two octets reserved for the network address
        Class C : First three octets reserved for the network address
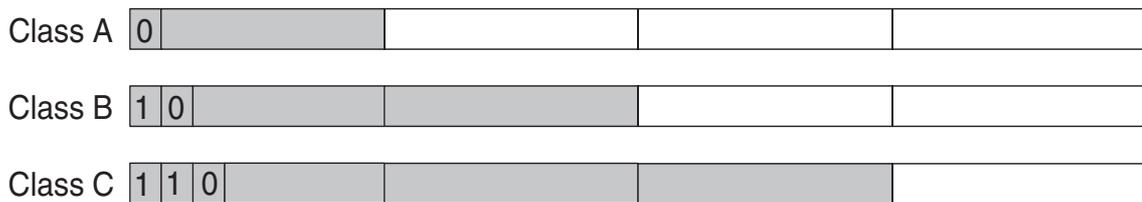
Private networks that do not connect to the Internet (operate internally) allow additional flexibility with IP addresses. Three classifications are available as shown below:

        Class A : 10.0.0.0 - 10.255.255.255
        Class B : 172.16.0.0 - 172.31.255.255
        Class C : 192.168.0.0 - 192.168.255.255

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9.3.2. Subnet Mask

A subnet mask defines how sub-segments of a network are treated.

IP
192.168.32.1

| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |

192   *168*   *32*   *1*

Subnet Mask
255.255.255.0

| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

255   *255*   *255*   *0*

IP
Subnet Mask

Network
Address
192.168.32.0

| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
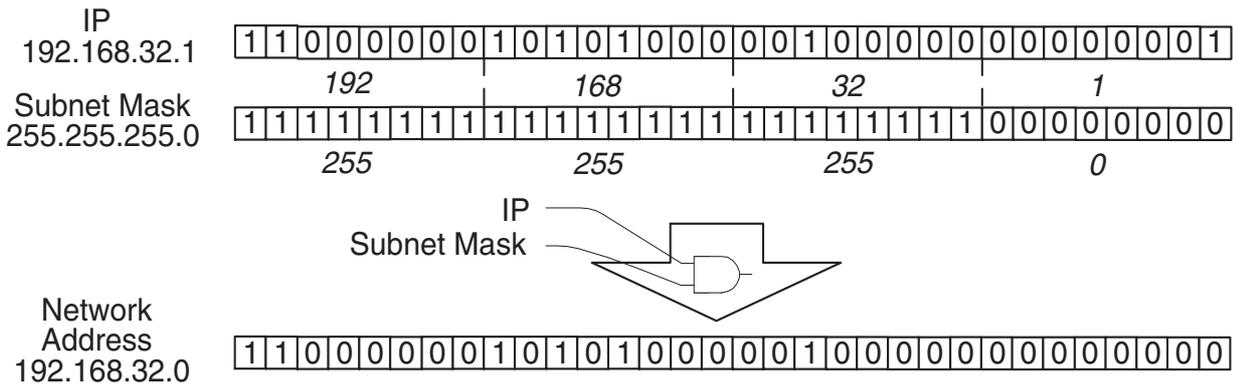
Network Address Configuration

Global IP
Address
190.0.0.0
255.255.0.0

Router

190.0.3.1
255.255.255.0   190.0.3.2
255.255.255.0   190.0.3.3
255.255.255.0   Third Floor

190.0.2.1
255.255.255.0   190.0.2.2
255.255.255.0   190.0.2.3
255.255.255.0   Second Floor

190.0.1.1
255.255.255.0   190.0.1.2
255.255.255.0   190.0.1.3
255.255.255.0   Ground Floor

Note
Upper: IP address
Lower: Subnet mask
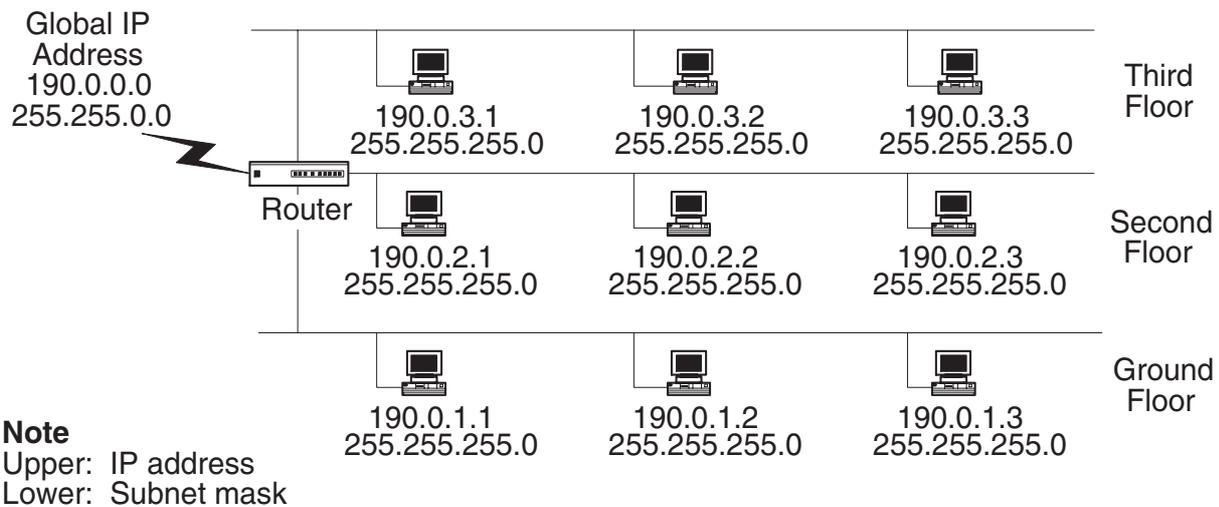
Class B Subnet Outline

For network management purposes, special IP addresses are assigned.

1. Host address is set to all "0"
2. Host address is set to all "1"
   Reserved for IP broadcasting to all subnet stations.
3. All 4 octets are set to all "1"
   IP broadcast of 255.255.255.255 can be passed over the router when the network address is specified.
   Normally, this is used for DHCP (Dynamic Host Configuration Protocol) network.
4. All 4 octets are set to all "0"
   Reserved for default route for non-destination address
5. Most significant bit starting with "127"
   Reserved for loop back address

9.3.3. Internet Protocol

The IP (Internet Protocol) operating at the OSI Network layer, is a connectionless protocol that provides datagram service, and IP packets are most commonly referred to as IP data grams.

It performs the following typical functions:
1. Identifies the IP address
2. Packet disassembly and reassembly of the IP datagram
3. Routing of the IP address

←——————————————————4 byte——————————————————→			
Version	Internet Header Length	Type Of Service	Total Length
ID		Flags	Fragment Offset
Time To Live		Protocol	Header Checksum
Source Address			
Destination Address			
Option + Padding (size varies)			
Data			
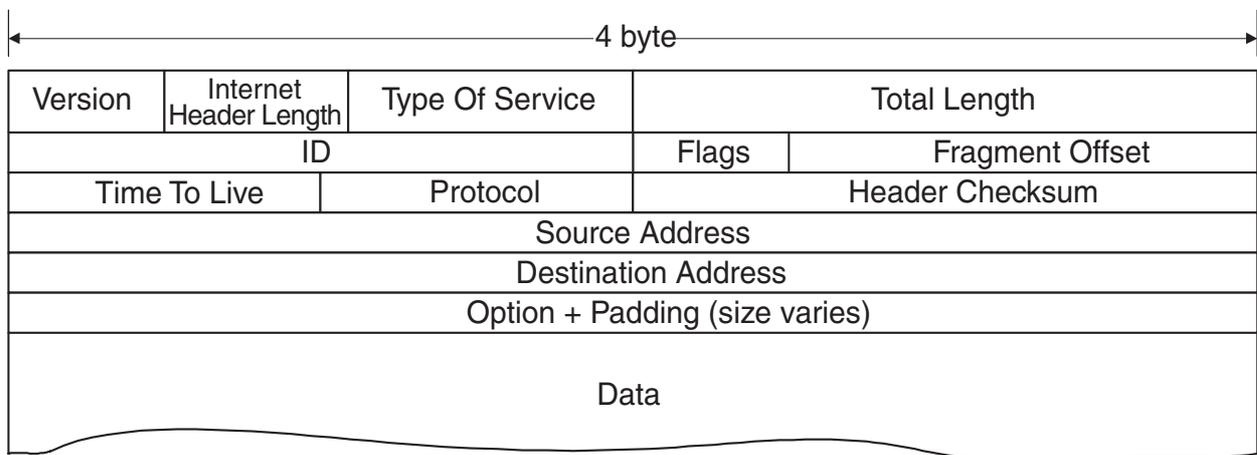
IP Datagram

Terms	Detail
Version	Currently version 4
Internet Header Length	IP Header field length
Type Of Service	Service priority requested by IP Datagram (3 bits are reserved for precedence)
ID	Identification frame number for upper layer communication
Flags	Packet disassembly information
Fragment Offset	Offset from most significant bit
Time To Live	Decrement the counter until 0 every time packet pass over the router
Protocol	Upper layer protocol identification number. ie TCP (06h), UDP (11h)
Header Checksum	Checksum is used for error checking on the header data
Source Address	Sender's IP Address
Destination Address	Destination's IP Address
Option	When implemented
Padding	Fill bit field to add up to 32 bit

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9.3.4. Router

Routers, operating at the OSI Network layer, organize the large network in terms of logical network segments. Each network segment is assigned an address so that every packet has both a destination network address and a destination device address.

Routers are more intelligent than bridges. Not only do routers build tables of network locations, but they also use algorithms to determine the most efficient path for sending a packet to any given network by identifying its header information.

These are the typical functions:

1. **Routing**
   This controls the traffic according to a specified routing table.

2. **Packet Filtering**
   This performs the access and security control for specified routing.

access-list permit tcp 192.168.32.0 0.0.0.255 192.168.33.1 0.0.0.0 eq 23

192.168.32/24   Router B   **192.168.33/24**

PC-A   PC-B   PC-C   PC-D
192.168.32.1/24   192.168.32.2/24   192.168.33.1/24   192.168.33.2/24

OK   OK

permission denied

permission denied
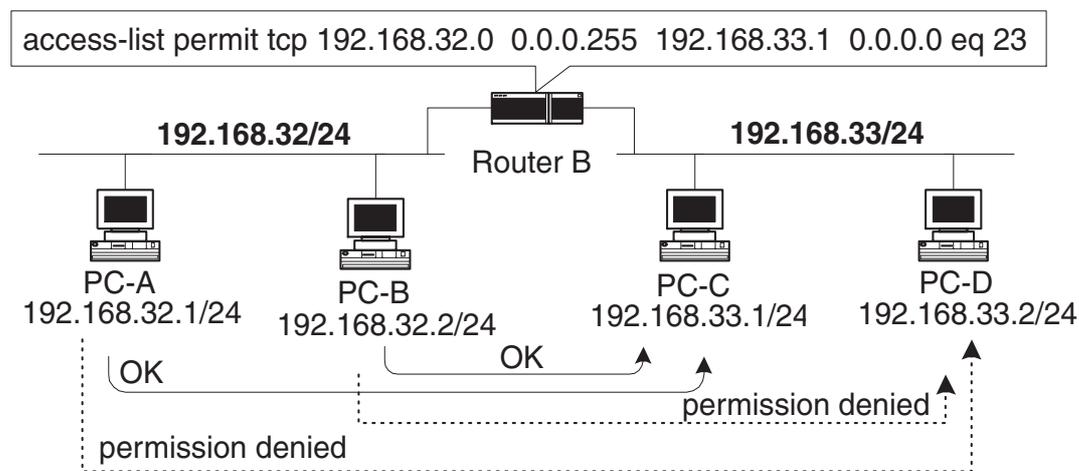
Packet Filtering Sample

3. **Address Conversion**
   NAT (Network Address Translator), This performs conversion of a single global IP Address from/to single private IP Address.

4. **IP Masquerade:**
   This performs a conversion of single global IP Address from/to multiple private IP Address.
   At the same time the port number is automatically assigned.
   Occasionally, the conversion creates a bottleneck in the network overhead. For a typical solution, PIX (Private address Internet address exchange) is available from Cisco, which is a well-known manufacturer.

5. **Designated Reply**
   These are reply that keep a connection alive by responding with a signal periodically.
   Watch Dog in IPX/SPX, TCP/IP in TCP, and Net BT (NetBIOS on TCP/IP) in Windows NT are all well known techniques to keep a live connection.

9.4. Transport Layer

9.4.1. TCP (Transmission Control Protocol)

The TCP (Transmission Control Protocol) is an internetwork connection-oriented protocol that corresponds to the OSI Transport layer. TCP provides full-duplex, end-to-end connections. When the end-to-end communication acknowledgement is not required, the UDP (User Datagram Protocol) can be substituted for the TCP at the Transport (host-to-host) level. TCP and UDP operate at the same layer.

The UDP is a connectionless oriented protocol.

IP Header (20 byte)	TCP Header (20 byte)	Application Data (vary)
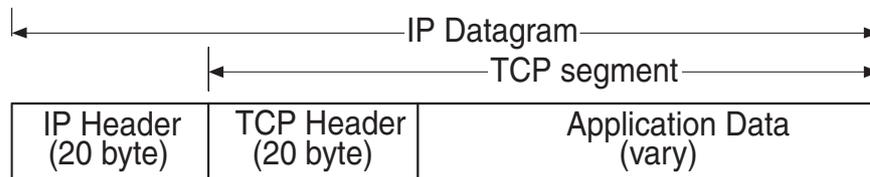
TCP Segment in IP Datagram

Source Port (2 byte)		Destination Port (2 byte)	
Sequence Number (4 byte)			
Acknowledgment Number (4 byte)			
Header Length (4 bit)	Reserved (6 bit)	Control Flag (6 bit)	Window (6 byte)
Checksum (2 byte)		Urgent Pointer (2 byte)	
Option			PAD
Data (Segment)			
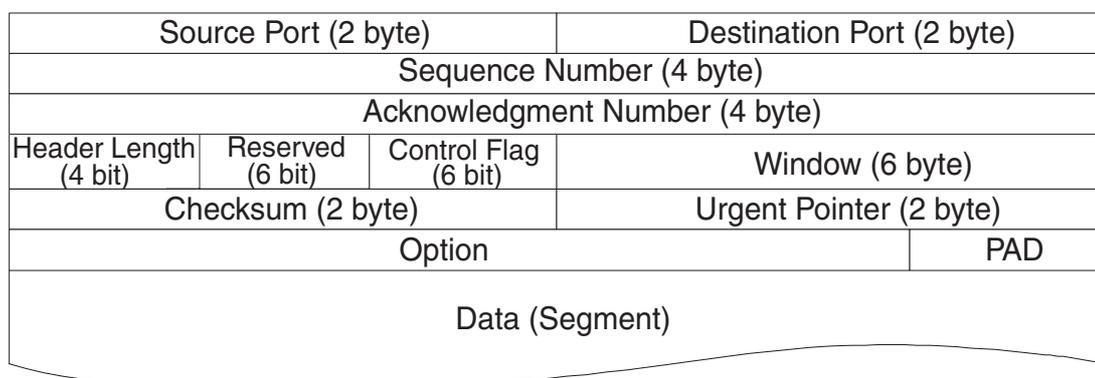
TCP Segment Outline

```
  1  Ok  [172.21.11.21]     [133.185.245.102]  TCP  D=110  S=23900  SYN  SEQ=4538970 LEN=0 WIN=2144 64
  2  Ok  [133.185.245.102]  [172.21.11.21]     TCP  D=23900 S=110   SYN  ACK=4538971 SEQ=1919424000 64
  3  Ok  [172.21.11.21]     [133.185.245.102]  TCP  D=110  S=23900       ACK=1919424001 WIN=2144      64

- TCP: ----- TCP header -----
    TCP:
    TCP: Source port            = 23900
    TCP: Destination port       = 110 (POP3)
    TCP: Initial sequence number = 4538970
    TCP: Data offset            = 24 bytes
    TCP: Flags                  = 02
    TCP:              ..0. .... = (No urgent pointer)
    TCP:              ...0 .... = (No acknowledgment)
    TCP:              .... 0... = (No push)
    TCP:              .... .0.. = (No reset)
    TCP:              .... ..1. = SYN
    TCP:              .... ...0 = (No FIN)
    TCP: Window                 = 2144
    TCP: Checksum               = COAE (correct)
    TCP:
    TCP: Options follow
    TCP: Maximum segment size = 536
    TCP:
```

TCP 3 way handshake

TCP Header Monitoring Sample
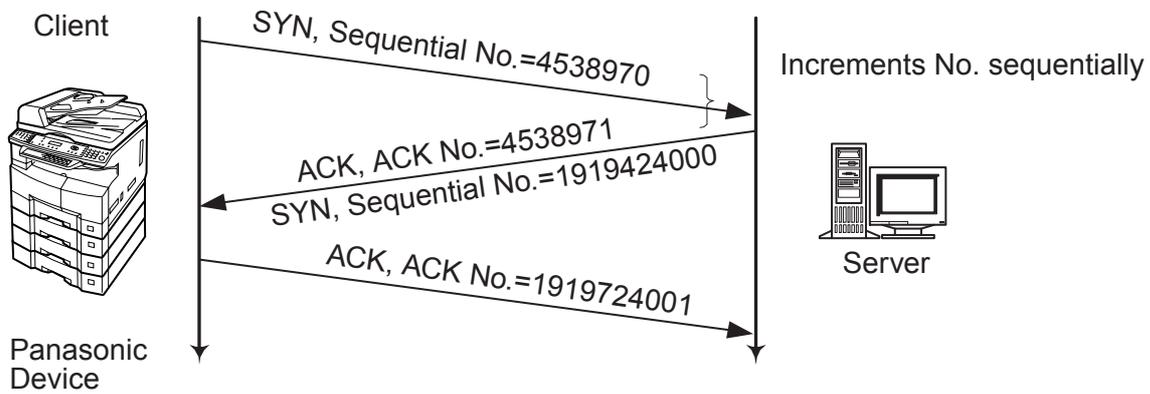
TCP 3 Handshake General Flowchart

The client generates random sequential numbers initially and sends them to the server. The initial sequential numbers are synchronized with the clock and increments the counter every 4 msec.

The Server responds with an acknowledgement that increments the initial sequential number by one. The ACK bit number is also changed to a "1" value. The "SYN" can have and identical "ACK" response for each packet, thus, the server and the client can establish a connection.

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9.5. Upper Layer

9.5.1. DNS (Domain Name System)

The DNS (Domain Name System) protocol provides host name and IP address resolution as a service to client applications. DNS servers enable humans to use logical node names, utilizing a fully qualified domain name structure, to access network resources.

Domain Names are comprised of 2 or more parts, separated by dots. The part on the left is the most specific, and the part on the right is the most general. A given device may have more than one Domain Name but a given Domain Name points to only one device. For example, the Domain Names below:

Panasonic.com
Mail.panasonic.com
ifax.panasonic.com

can all refer to the same device, but each domain name can refer to no more than one device.

Usually, all of the devices on a given network will have the same right-hand portion of their Domain Names (i.e. panasonic.com in the examples above). It is also possible for a Domain Name to exist but not be connected to an actual device.

This is often done so that a group or business can have an Internet email address without having to establish a real Internet site. In these cases, some real Internet machine must handle the email on behalf of the listed Domain Name.
Specification for this name system follows this basic guideline.

- The name must be separated by dots and must start with ASCII code.
- Only Alpha numeric and hyphen are available.
- Up to 63 characters maximum, separated by dots.
- Up to 255 characters maximum, including all dots.
- Capital letters and small letters are not identical. (Case Sensitive.)
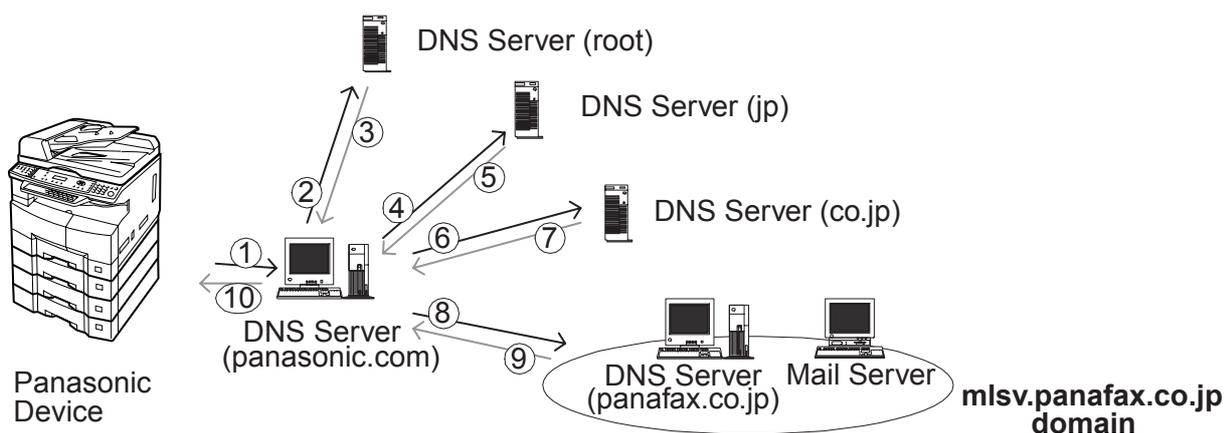
DNS Name Resolution Sample

The advantage of using a DNS server over a host lookup table, for host name resolution, is to avoid the need for a single centralized clearinghouse for all names. The authority for this information can be delegated to different organizations on the network responsible for it.
There are at least 10 Root DNS servers installed all over the world.

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The Name resolution flow is shown in the illustration above and follows the sequence below:

1. Query the local DNS Server.
2. Query the root DNS Server because the domain belongs to a destination outside of the company.
3. The "Com" root DNS Server sends the query to the "jp" root DNS Server.
4. The procedure repeats until a final name resolution is available.
5. The panafax.co.jp server responds with an IP address for the query name.
6. Finally, the name resolution is completed and the destination IP address is determined.

All DNS servers makes an effort to resolve the query name with an IP address, however, a response is not always sent out every time. Once a name resolution is completed, the information from the DNS Server IP address table is kept in cache memory at each DNS server in accordance with a minimum TTL (Time To Live) of SOA (Start Of Authority) record. There are two types of Name Servers, Primary and Secondary Name Server.

9.5.2. Primary Name Server

A primary server has the original copy of a zone file. Any changes made to the zone file are made to the copy on the primary server. When a primary server receives a query about a host name in its own zone, it retrieves the host resolution locally from its own zone files.

9.5.3. Secondary Name Server

A secondary server gets a copy of zone files from another server. This zone file is a read-only copy of the original file from the primary server. Any changes made to the zone file are made at the primary server, then the changes are copied down to the secondary server through a zone transfer. Multiple secondary servers in a domain improves performance.

9.5.4. SOA (Start of Authority) Record

Each database file starts with a Start of Authority (SOA) record for the file. This record specifies the zone's primary server, the server that maintains the read/write copy of the file. The syntax of this record is as follows:

IN SOA <source host><contact email><serial No.><refresh time><retry time><expiration time><TTL>

An example of the syntax is shown below:

```
;
;    File:       db.127.0.0 file
;    Purpose:   This file establishes the identity of this DNS.
;               SOA stands for 'start of authority' and sets the
;               default parameters for information this DNS is
;               authorized for:
;
@       IN SOA     nwr42.rdmg.pcc.co.jp. hostmaster.rdmg.pcc.co.jp. (
            951213      ; serial number
            43200       ; refresh every 12 hours
            7200        ; retry after 2 hours
            1209600     ; expire after 2 weeks
            172800)     ; default ttl is 2 days
;
        IN NS      nwr42.rdmg.pcc.co.jp.
1       IN PTR     localhost.rdmg.pcc.co.jp.
;
```

SOA Record (Bind 4.9.5 for NT) in "db.127.0.0" file

The "@" symbol in this example indicates the local server; "IN" indicates an Internet record. The FQDN for the name server NWR18 must end in a period. Note that the email address for the administrator must have a period instead of the "@" symbol. Also, if the SOA record is on more than one line, an open parenthesis must end the first line, and a close parenthesis must end the last line.

The following list explains the other parameters:

* Source host: The name of the host that has the read/write copy of the zone file.

* Contact email: The Internet email address of the person who maintains this file. This address must be expressed with a period instead of the "@" that is usually found in email addresses (i.e. hostmaster.rdmg.mgcs.mei.co.jp instead of hostmaster@rdmg.mgcs.mei.co.jp).

* Serial number: A version number for the zone file. This number should be changed each time the zone file changes, it changes automatically if you use DNS Manager to change the zone file.

* Refresh time: The time, in seconds, that a secondary server waits before checking the master server for changes to the database file. If the file has changed, the secondary server requests a zone transfer.

* Retry time: The time, in seconds, that a secondary server waits before trying again if a zone transfer fails.

* Expiration time: The time, in seconds, that a secondary server keeps trying to transfer a zone. After the expiration time passes, the old zone information is deleted.

* TTL: The time, in seconds, that a server can cache resource records from this database file. The TTL is sent as part of the response for any queries that are answered from this database file. An individual resource record can have a TT: that overrides this value.

9.5.5.   A (Address) Record

The A (Address) Record, lists the addresses for a given machine. The name field is the machine's name and the address is the network address. There should be one A record for each address on the machine.

```
; BIND version named 4.9.5-Rel+-Monday-dd-Month-yy
; BIND version GregSchueman-LarryKahn-VirajBais
; zone ' rdmg.pcc.co.jp'  last serial 720
; from  133.185.245.7  at Sun Mmm dd:11:35 yyyy
$ORIGIN pcc.co.jp.
rdmg            IN      SOA     nwmgr.pcc.co.jp. postmaster.rdmg.pcc.co.jp. (
                721 10800 3600 604800 86400 )
                IN      NS      nwmgr.pcc.co.jp.
                IN      MX      10 mlsv2.rdmg.pcc.co.jp.
$ORIGIN rdmg.pcc.co.jp.
ifax-gz03       IN      A       172.21.94.216
qmc-cco1        IN      A       133.185.254.212
ifaxos01        IN      A       172.21.97.26
ifpdyna         IN      A       202.244.202.29
```

A Record (Bind 4.9.5 for NT) in "db zone.info" file

9.5.6.   PTR (Pointer) Record

Pointer records are the reverse-lookup file entries that enable IP addresses to be resolved to host names. DNS is used to resolve host names to IP addresses, so the opposite process is called reverse lookup.

They specify the IP address in reverse order (like a DNS name, with the most specific information first) and then corresponding host name. The files are named according to the class of network, but with the octets in reverse order. The syntax for a PTR record is shown below:

<ip reverse domain name> IN PTR <host name>

```
        IN NS    nwr42.rdmg.pcc.co.jp.
1       IN PTR   localhost.rdmg.pcc.co.jp.
;
```

PTR record (Bind 4.9.5 for NT) in "db.127.0.0" file.

9.5.7.   CNAME (Canonical Name) Record

The CNAME (or canonical name) record is an alias (nickname), enabling you to specify more than one name for each IP address. The syntax of a CNAME is shown below:

<alias name> CNAME <host name>

Using CNAME records, you can combine an FTP and a Web server on the same host. Nicknames are useful when a well-known host changes its name. In this case, its usually a good idea to have a CNAME record so people still using the old name, will get to the right place.

9.5.8. NS (Name Server) Record

The Name Server record specifies the other name servers for a domain. The syntax for a name server record is shown below:

<domain> IN NS <nameserver host>

An example of a name server record follows below:

@ IN NS nwmgr.pcc.co.jp

The "@" symbol indicates the local domain. The server "nwmgr" in the domain "pcc.co.jp" is the name server.

9.5.9. MX (Mail Exchange) Record

The Mail Exchange (MX) record specifies the name of the host that processes mail for this domain. If you list multiple mail servers, you can set a preference number (value) that specifies the order in which the mail server should be used. Note that lower values indicate higher precedence, and that mailers are supposed to randomize same-value MX hosts so as to distribute the load evenly if values are equal. If the first preferred mail server does not respond, the second one is contacted, and so on.
If you want a host to receive its own mail, you should create an MX record for your host's name, pointing at your host's name. The syntax of this record is shown below:

<domain> IN MX <preference> <mailserver host>

For a more detail, please refer to RFC974 document at URL http://www.ietf.org/.

9.5.10. Reverse Lookup

This is a special domain for allowing address to name mapping. As Internet host addresses do not fall within domain boundaries, this special domain was formed to allow inverse mapping. The IN-ADDR.ARPA domain has four labels preceding it. These labels correspond to the 4 octets of an Internet address. All four octets must be specified even if an octet contains zero. The Internet address 128.32.0.4 is located in the domain 4.0.32.128.IN-ADDR.ARPA. This reversal of the address is awkward to read but allows for the natural grouping of hosts in a network.

9.5.11. Forwarding

A Slave Server is a server that always forwards queries it cannot satisfy from its cache, to a fixed list of forwarding servers instead of interacting with the name servers for the root and other domains. The queries to the forwarding servers are recursive queries. There may be one or more forwarding servers, and they are tried in turn until the list is exhausted. A Slave and forwarder configuration is typically used when you do not wish all the servers at a given site to interact with the rest of the Internet servers. A typical scenario would involve a number of workstations and a departmental timesharing machine with Internet access. The workstations might be administratively prohibited from having Internet access. To give the workstations the appearance of access to the Internet domain system, the workstations could be Slave servers to the timesharing machine, which would forward the queries and interact with other name servers to resolve the query before returning the answer. An added benefit of using the forwarding feature is that the central machine develops a much more complete cache of information that all the workstations can take advantage of. The use of Slave mode and forwarding is discussed further under the description of the named bootfile commands.
There is no prohibition against declaring a server to be a slave even though it has primary and/or secondary zones as well; the effect will still be that anything in the local server's cache or zones will be answered, and anything else will be forwarded using the forwarders list.
For more detail, please refer to published book (i.e. DNS and BIND etc) provided from O' Reilly & Associates, Inc.

9.6. SMTP (Simple Mail Transfer Protocol)

The objective of Simple Mail Transfer Protocol (SMTP) is to transfer mail reliably and efficiently. SMTP is independent of the particular transmission subsystem and requires only a reliable ordered data stream channel.

The SMTP design is based on the following model of communication: as the result of a user mail request, the sender-SMTP establishes a two-way transmission channel to a receiver-SMTP. The receiver-SMTP may be either the ultimate destination or an intermediate. SMTP commands are generated by the sender-SMTP and sent to the receiver-SMTP. SMTP replies are sent from the receiver-SMTP to the sender-SMTP in response to the commands. Once the transmission channel is established, the SMTP-sender sends a MAIL command indicating the sender of the mail. If the SMTP-receiver can accept mail it responds with an OK reply.

The SMTP-sender then sends a RCPT command identifying a recipient of the mail. If the SMTP-receiver can accept mail for that recipient it responds with an OK reply, if not, it responds with a reply rejecting that recipient (but not the whole mail transaction). The SMTP-sender and SMTP-receiver may negotiate several recipients. When the recipients have been negotiated the SMTP-sender sends the mail data, terminating with a special sequence. If the SMTP-receiver successfully processes the mail data it responds with an OK reply. The dialog is purposely lock-step, one-at-a-time. For more detail, please refer to the URL http://www.imc.org/rfc821
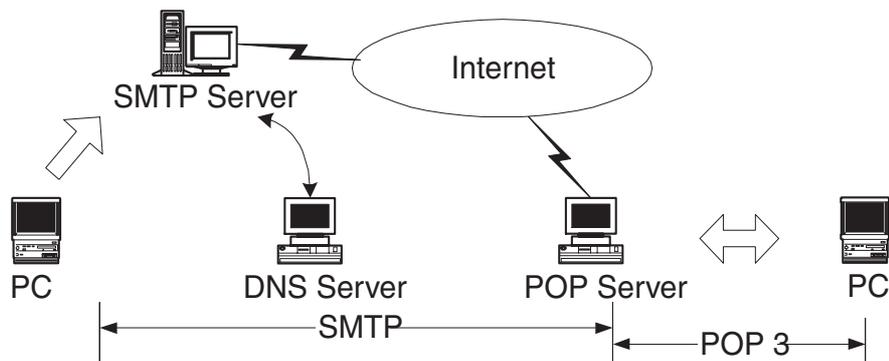
Internet Mail Sending and Receiving

9.6.1. Mail Header Sample

Received: from nwr35
    by labo.pcc.com (8.9.3/3.7W-RDMG) with SMTP id PAA09157
    for <freeport@labo.pcc.com>; Sun, dd Mmm yyyy 15:04:48 +0900 (JST)
	Delivery route

Date: Sun, dd Mmm yyyy 15:04:48 +0900 (JST)	
Message-Id: <199908200604.PAA09157@mlsv2.labo.pcc.com>	Message ID
Mime-Version: 1.0 X-Mailer: Internet FAX, Panasonic From: "Panasonic" <ifax98-us@labo.pcc.com> Subject: IMAGE from Internet FAX To: freeport@labo.pcc.com	
Content-Type: multipart/mixed; boundary="+-+-+-Panasonic-+-+-+"	Content-Type
X-UIDL: 8f32e4b1d691fdfc28daa812d913f572	

9.7. ITU T.37 and RFC2305

9.7.1. Mode of Operation

The Unit conforms to the ITU T.37 standards and RFC2305. This Internet store and forward facsimile uses approved IETF protocols for posting, relaying and delivery of documents. It requires no changes to Internet standards or to ITU Facsimile Recommendations.

Store and forward facsimiles may operate in one of two modes.
Communicating in the Simple Mode as defined below provides inter operability. All terminals conforming to this recommendation and capable of reception must be able to receive in Simple Mode. It is recommended that terminals conforming to this recommendation and capable of transmitting should, as a minimum, be capable of transmitting in Simple Mode.

Simple Mode supports the transfer of image data. Capability exchange and confirmation of receipt are not required for Simple Mode but may be provided using optional email functions outside the scope of this recommendation.

9.7.2. Implementation Requirements for T.37 Simple Mode Table

Sender

Required	Send data as a single MIME multi-page TIFF Profile S file
	Provide notice in case of local transmission problem
	Provide a return address of an Internet email receiver which is MIME compliant
Strongly Recommended	Include Message-ID
	Use Base 64 encoding for image data
Optional	Use other TIFF Profiles if it has prior knowledge that such profiles are supported by the receiver
	Provide notice on receipt of DSN or other notifications

Receiver

Required	Be MIME compliant except that it is not required to offer to place MIME attachment in a file and may print a received file rather than display
	Be capable of processing multiple MIME TIFF Profile S image files within a single message
	Provide notice in case of reception or processing problems
Optional	Use other TIFF Profiles

Offramp Gateway (when implemented)

Required	Be SMTP compliant
	Provide delivery failure notification
	Be able to process PSTN/FAX email address
	Comply with the relevant ITU Recommendations relating to facsimile transmission
	Attempt to relay authorized email to the corresponding G3 facsimile terminals
	Ensure DSN for delivery failure notification
Strongly Recommended	Use DSN for delivery failure notification
	Use an approved mailbox access protocol when serving multiple users
Optional	Translate image data into a format acceptable by the receiving G3 facsimile terminal
	Use a mailbox access protocol when serving a single mail recipient

9.7.3. Definitions and Abbreviations

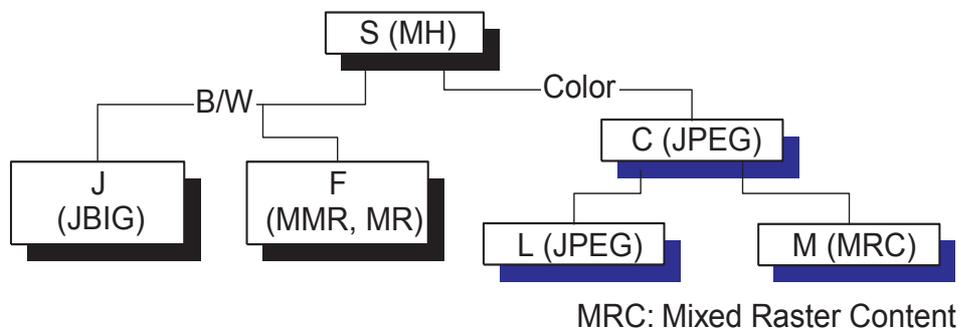|	
IETF	Internet Engineering Task Force
RFC	Request For Comment
MIME	Multipurpose Internet Mail Extensions
POP3	Post Office Protocol version 3
SMTP	Simple Mail Transfer Protocol
DSN	Delivery Status Notification
MDN	Message Disposition Notification
TIFF	Tagged Image File Format
IFD	TIFF Image File Directory
Offramp gateway	Equipment capable of receiving email and relaying to one or more G3/G4 facsimile terminals
Mailstore	Equipment capable of receiving email and storing it for retrievals by receiver
Notice	Provision of status information to the originator or recipient in a manner to be determined by the device

RFC reference http://www.imc.org/ietf-fax/

File Format for Internet Fax	RFC2301
Tag Image File Format (TIFF) Image/TIFF MIME Sub-type Registration	RFC2302
Minimal PSTN address format in Internet Mail	RFC2303
Minimal FAX address format in Internet Mail	RFC2304
A simple Mode of Facsimile Using Internet Mail	RFC2305
Tag Image File Format (TIFF)-F Profile for Facsimile	RFC2306

9.7.4. File Format for Internet Fax

Sending Internet Fax devices must be able to write minimum set TIFF files, according to the rules for creating minimum set TIFF files defined in TIFF for Facsimile (the S profile) [RFC2301], which is also compatible with the specification for the minimum subset of TIFF-F in [RFC2306]. Receiving Internet Fax devices MUST be able to read minimum set TIFF files.

The Following tree diagram shows the relationship among profiles and between profiles and coding methods.

```
                        ┌──────────┐
                        │  S (MH)  │
                        └──────────┘
          ┌────── B/W ──────┴──────── Color ──────┐
          │              │                  ┌──────────┐
          │              │                  │ C (JPEG) │
          │              │                  └──────────┘
     ┌─────────┐   ┌──────────┐        ┌─────┴──────┐
     │    J    │   │    F     │        │            │
     │ (JBIG)  │   │ (MMR, MR)│   ┌──────────┐  ┌──────────┐
     └─────────┘   └──────────┘   │ L (JPEG) │  │ M (MRC)  │
                                  └──────────┘  └──────────┘
```

MRC: Mixed Raster Content

A profile is based on a collection of ITU-T facsimile coding methods.

Class	Color	Coding Method	Remarks
S	B/W	MH	Internet Fax minimal set
F	B/W	MMR, MR	Internet Fax full mode
J	B/W	JBIG	Internet Fax mixed mode
C	Color	JPEG (lossy)	Color minimal set
L	Color	JPEG (lossless, grayscale)	One bit per color, palletized color image, continuous tone color and grayscale images
M	Color	Mixed Raster Content	Multiple coders and resolution within a page

9.7.5. Minimal Set

The minimum interchange set of TIFF fields that must be supported by all implementations in order to assure that some form of an image, albeit black-and-white, can be interchanged.

The table below summarizes the TIFF fields that comprise the minimal interchange set for black-and-white facsimile. The Baseline and Extenuation fields and fields values must be supported by all implementations.

Baseline Fields	Values
Bits Per Sample	1
Compression	3:1 dimension MH coding set T4 Options = 0 or 4
Fill Order	Least significant bit first
Image Width	1728 (A-4)
Image Length	N: total number of scan lines in image
New Sub File Type	2: Bit 1 identifies single page of a multi-page document
Page Number	N, m: page number n followed by total page count m
Photometric Interpretation	0: pixel value 1 means black
Resolution Unit	2: inch
Rows Per Strip	Number of scan lines per strip = Image length, with one strip
Samples Per Pixel	1
Strip Byte Counts	Number of byte in TIFF strip
Strip Offsets	Offsets from beginnings of file to single TIFF strip
X Resolution	204, 200 (pixels/inch)
Y Resolution	98, 196, 100, 200 (pixels/inch)
Extensions Fields	
T4 Options	0: MH coding, EOLs not byte aligned; 4: MH coding, EOLs byte aligned

9.7.6. Addressing

A simple method of encoding PSTN addresses in the local-part of Internet email addresses, along with an extension mechanism to allow encoding of additional standard attributes needed for email gateway to PSTN-based services.

(1) Offramp ⇨ **FAX= +12125551212@ panafax.com**
Global-phone — Service selector — Domain

(2) Sub address ⇨ **FAX= +3940 / T33S=183 @ faxworld.org**
Sub address — Domain — Selector — Global-phone — Service selector

(3) Others ⇨ **VOICE = +3940183@ panafax.com**
Global-phone — Domain — Service selector

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Note:
For RFC2305, a PSTN address in an email address should follow the above style. The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119. URL http://www.imc.org/rfc2119

1. **MUST**

This word, or the terms "REQUIRED" or "SHALL", means that the definition is an absolute requirement of the specification.

2. **MUST NOT**

This phrase, or the phrase "SHALL NOT", means that the definition is an absolute prohibition of the specification.

3. **SHOULD**

These words, or the adjective "RECOMMENDED", means that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.

4. **SHOULD NOT**

This phrase, or the phrase "NOT RECOMMENDED" means that there may exist valid reasons in particular circumstances when the particular behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.

9.7.7. Coding Example of a TIFF Header, IFD and Image Data

File Structure

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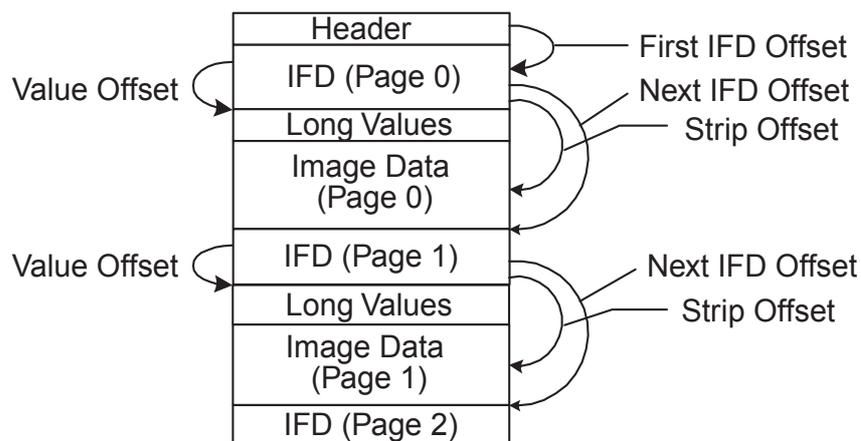
```
□14 |Ok |mlsv2.rdmg.mgcs.mei.co.jp |nwr35 (Internet FAX)       |SMTP |R PORT=25    250 <
□15 |Ok |nwr35 (Internet FAX)       |mlsv2.rdmg.mgcs.mei.co.jp |SMTP |C PORT=25    RCPT
□16 |Ok |mlsv2.rdmg.mgcs.mei.co.jp |nwr35 (Internet FAX)       |SMTP |R PORT=25    250 <
□17 |Ok |nwr35 (Internet FAX)       |mlsv2.rdmg.mgcs.mei.co.jp |TCP  |D=25 S=32424
□18 |Ok |nwr35 (Internet FAX)       |mlsv2.rdmg.mgcs.mei.co.jp |SMTP |C PORT=25    DATA
□19 |Ok |mlsv2.rdmg.mgcs.mei.co.jp |nwr35 (Internet FAX)       |SMTP |R PORT=25    354 E
■20 |Ok |nwr35 (Internet FAX)       |mlsv2.rdmg.mgcs.mei.co.jp |SMTP |C PORT=25    Text
□21 |Ok |mlsv2.rdmg.mgcs.mei.co.jp |nwr35 (Internet FAX)       |TCP  |D=32424 S=25
□22 |Ok |nwr35 (Internet FAX)       |mlsv2.rdmg.mgcs.mei.co.jp |SMTP |C PORT=25    Text
□23 |Ok |mlsv2.rdmg.mgcs.mei.co.jp |nwr35 (Internet FAX)       |TCP  |D=32424 S=25
```

```
        IP: Destination address = [133.185.245.7], mlsv2.rdmg.mgcs.mei.co.jp
        IP: No options
        IP:
  TCP: ----- TCP header -----
        TCP:
        TCP: Source port            = 32424
        TCP: Destination port       = 25 (SMTP)
        TCP: Sequence number        = 54954
        TCP: Acknowledgment number  = 3085635849
        TCP: Data offset            = 20 bytes
        TCP: Flags                  = 18
        TCP:             ..0. .... = (No urgent pointer)
        TCP:             ...1 .... = Acknowledgment
        TCP:             .... 1... = Push
        TCP:             .... .0.. = (No reset)
        TCP:             .... ..0. = (No SYN)
        TCP:             .... ...0 = (No FIN)
        TCP: Window                 = 2144
        TCP: Checksum               = 2BAA (correct)
        TCP: No TCP options
        TCP: [220 byte(s) of data]
        TCP:
  SMTP: ----- Simple Mail Transfer Protocol -----
        SMTP:
        SMTP: Line  1:  Mime-Version: 1.0
        SMTP: Line  2:  Content-Type: multipart/mixed; boundary="+-+-+-MGCS-+-+-+"
        SMTP: Line  3:  X-Mailer: Internet FAX, MGCS
        SMTP: Line  4:  From: "MGCS" <ifax98-us@rdmg.mgcs.mei.co.jp>
        SMTP: Line  5:  Subject: IMAGE from Internet FAX
        SMTP: Line  6:  To: freeport@mgcs.mei.co.jp
        SMTP: Line  7:
        SMTP:
```

Message Header Contents

9.7.8. Delivery Failure

In the event of relay failure, the sending relay must generate a failure message, which should be in the format of a DSN.

9.7.9. Image File Format

The Sending Internet Fax devices MUST be able to write minimum set TIFF files, according to the rules for creating minimum set TIFF files defined in TIFF for Facsimile (the S profile), which is also compatible with the specifications for the minimum subset of TIFF-F in F Profile for Facsimile, RFC 2306.

The Receiving Internet Fax devices must be able to read minimum set TIFF files.

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9.8. Communication Protocols

The set of conventions necessary to achieve facsimile-compatible service covers basic data transport, document data formats, message (document) addressing, delivery confirmation, and message security.

Protocol supported by the your Panasonic Device is as follows:

SMTP Command & Reply Procedure

```
┌─────────────────────────┐                    ┌─────────────────────────┐
│   your Panasonic Device  │                    │       SMTP Server       │
│    (ef1.labo.pcc.com)    │                    │    (sv2.labo.pcc.com)   │
└─────────────────────────┘                    └─────────────────────────┘
```

TCP 3 Way Handshake & Opening Session

Opening TCP Connection (TCP Port No. 25) →

[5 minutes] ← 220 sv2.labo.pcc.com Service ready

SMTP Command

HELO sv2.labo.pcc.com →

← 250 ef1.labo.pcc.com

MAIL FROM: <xxx@sv2.labo.pcc.com> →

[5 minutes] ← 250 OK

RCPT TO: <yyy@sv2.labo.pcc.com> →

[5 minutes] ← 250 OK

DATA →

[2 minutes] ← 250 Start mail out; end with <CR/LF> . <CR/LF>

DATA BLOCK

DATA BLOCK 1 →

[3 minutes] DATA BLOCK 2 →

[3 minutes] DATA BLOCK n →

CR/LF . CR/LF →

[10 minutes] ← 250 OK

Closing

QUIT →

← 221 sv2.labo.pcc.com Service closing transmission channel

Closing TCP Connection (TCP Port No. 25) →

According to RFC1123, there are two approaches for time-outs in the sender-SMTP:
  1. limit the time for each SMTP command separately, or
  2. limit the time for the entire SMTP dialogue for a single mail message.

A sender-SMTP SHOULD use option (a), per-command timeouts.Timeouts SHOULD be easily reconfigurable, preferably without recompiling the SMTP code.
The value of timer [ ] shown above are recommended by RFC1123.

9.8.1. Opening and Closing

At the time the transmission channel is opened there is an exchange of commands to ensure that the hosts are communicating with the hosts they think they are. The following two commands are used in the transmission channel for opening and closing:

HELO:<SP> <domain> <CRLF>
QUIT:<CRLF>

In the HELO command, the host sending the command identifies itself; the command may be interpreted as saying, "Hello, I am <domain>".

9.8.2. Mail (MAIL)

This command is used to initiate a mail transaction in which the mail data is delivered to one or more mailboxes.

9.8.3. RECIPIENT (RCPT)

This command is used to identify an individual recipient of the mail data; multiple recipients are specified by multiple uses of this command.

9.8.4. Data (DATA)

The receiver treats the lines following the command as mail data from the sender. This command causes the mail data from this command to be appended to the mail data buffer. The mail data may contain any of the 128 ASCII character codes. The mail data is terminated by a line containing only a period, that is the character sequence "<CRLF>.<CRLF>". This is the end of mail data indication.

9.8.5. Send

This command is used to initiate a mail transaction in which the mail data is delivered to one or more terminals. This command is successful if the message is delivered to a terminal.

9.8.6. Reset (RSET)

This command specifies that the current mail transaction is to be aborted. Any stored sender, recipients, and mail data must be discarded, and all buffers and state tables cleared. The receiver must send an OK reply.

9.8.7. Verify (VRFY)

This command asks the receiver to confirm that the argument identifies a user. If it is a user name, the full name of the user (if known) and the fully specified mailbox are returned.

9.8.8. Quit (QUIT)

This command specifies that the receiver must send an OK reply, and then close the transmission channel.

9.8.9. Reply Codes from SMTP Server

SMTP is independent of the particular transmission subsystem and requires only a reliable ordered data stream channel. The SMTP design is based on the following model of communication: as the result of a user mail request, the sender-SMTP establishes a two-way transmission channel to a receiver-SMTP. The receiver-SMTP may be either the ultimate destination or an intermediate. SMTP commands are generated by the sender-SMTP and sent to the receiver-SMTP. SMTP replies are sent from the receiver-SMTP to the sender-SMTP in response to the commands.

9.8.10. NUMERIC ORDER LIST OF REPLY CODES

211   System status or system help reply

220   <domain> Service ready

221   <domain> Service closing transmission channel

250   Requested mail action okay# completed

251   User not local; will forward to <forward-path>

354   Start mail input; end with <CRLF>.<CRLF>

421   <domain> Service not available: closing transmission channel

            [This may be a reply to any command if the service knows it must shut down]

450   Requested mail action not taken: mailbox unavailable

            [E.g.# mailbox busy]

451   Requested action aborted: local error in processing

452   Requested action not taken: insufficient system storage

500   Syntax error# command unrecognized

            [This may include errors such as command line too long]

501   Syntax error in parameters or arguments

502   Command not implemented

503   Bad sequence of commands

504   Command parameter not implemented

550   Requested action not taken: mailbox unavailable

            [E.g.# mailbox not found# no access]

551   User not local; please try <forward-path>

552   Requested mail action aborted: exceeded storage allocation

553   Requested action not taken: mailbox name not allowed

            [E.g.# mailbox syntax incorrect]

554   Transaction failed

9.9. POP (Post Office Protocol Version 3)

9.9.1. Introduction

On certain types of smaller nodes in the Internet it is often impractical to maintain a message transport system (MTS). For example, a workstation may not have sufficient resources (cycles, disk space) in order to permit a SMTP server and associated local mail delivery system to be kept resident and continuously running. Similarly, it may be expensive (or impossible) to keep a personal computer interconnected to an IP-style network for long amounts of time.

The Post Office Protocol - Version 3 (POP3) is intended to permit a workstation to dynamically access a mail drop on a server host in a useful fashion. Usually, this means that the POP3 protocol is used to allow a workstation to retrieve mail that the server is holding for it.

For more detail, please refer to URL of http:// www.imc.org/rfc1939

9.9.2. Basic Operation

Initially, the server host starts the POP3 service by listening on TCP Port No. 110. When a client host wishes to make use of the service, it establishes a TCP connection with the server host. When the connection is established, the POP3 server sends a greeting. The client and POP3 server then exchange commands and responses (respectively) until the connection is closed or aborted.

Commands in the POP3 consist of a case-insensitive keyword, possibly followed by one or more arguments. All commands are terminated by a CRLF pair. Keywords and arguments consist of printable ASCII characters. Keywords and arguments are each separated by a single SPACE character. Keywords are three or four characters long. Each argument may be up to 40 characters long.

Responses in the POP3 consist of a status indicator and a keyword possibly followed by additional information. All responses are terminated by a CRLF pair. Responses may be up to 512 characters long, including the terminating CRLF. There are currently two status indicators: positive ("+OK") and negative ("-ERR"). Servers MUST send the "+OK" and "-ERR" in upper case.

Responses to certain commands are multi-line. In these cases, which are clearly indicated below, after sending the first line of the response and a CRLF, any additional lines are sent, each terminated by a CRLF pair. When all lines of the response have been sent, a final line is sent, consisting of a termination octet (decimal code 046, ".") and a CRLF pair. If any line of the multi-line response begins with the termination octet, the line is "byte-stuffed" by pre-pending the termination octet to that line of the response.

Hence a multi-line response is terminated with the five octets "CRLF.CRLF". When examining a multi-line response, the client checks to see if the line begins with the termination octet. If so and if octets other than CRLF follow, the first octet of the line (the termination octet) is stripped away. If so and if CRLF immediately follows the termination character, then the response from the POP server is ended and the line containing ".CRLF" is not considered part of the multi-line response.

A POP3 session progresses through a number of states during its lifetime. Once the TCP connection has been opened and the POP3 @server has sent the greeting, the session enters the AUTHORIZATION state. In this state, the client must identify itself to the POP3 server. Once the client has successfully done this, the server @acquires resources associated with the client's mail drop, and the session enters the TRANSACTION state. In this state, the client requests actions on the part of the POP3 server. When the client has issued the QUIT command, the session enters the UPDATE state. In this state, the POP3 server releases any resources acquired during @the TRANSACTION state and says goodbye. The TCP connection is then closed.

A server MUST @respond to an unrecognized, unimplemented, or @syntactically invalid command by responding with a negative status @indicator. A server MUST respond to a command issued when the session is in an incorrect state by responding with a negative status indicator. There is no general method for a client to distinguish between a server which does not implement an optional command and a server which is unwilling or unable to process the command.

A POP3 server MAY have an inactivity auto logout timer. Such a timer MUST be of at least 10 minutes' duration. The receipt of any command from the client during that interval should suffice to reset the auto logout timer. When the timer expires, the session does NOT enter the UPDATE state--the server should close the TCP connection without removing any messages or sending any response to the client.

9.9.3.   POP3 Command Summary

Minimal POP3 Commands:

USER name	valid in AUTHORIZATION state
PASS string	
QUIT	

STAT	valid in the TRANSACTION state
LIST [msg]	
RETR msg	
DELE msg	
NOOP	
RSET	
QUIT	

Optional POP3 Commands:

APOP name digest	valid in AUTHORIZATION state

TOP msg n	valid in the TRANSACTION state
UIDL [msg]	

POP3 Replies:

+OK
-ERR

Note:
With the exception of the STAT, LIST, and UIDL commands, the reply given by the POP3 server to any command is significant only to "+OK" and "-ERR". The client may ignore any text occurring after this reply.

```
           From:            To:
□1  0k [172.21.11.19]   [133.185.245.20]   TCP  D=110 S=12270 SYN SEQ=14220350 LEN=0 WIN=2144
□2  0k [133.185.245.20] [172.21.11.19]     TCP  D=12270 S=110 SYN ACK=14220351 SEQ=1205248000 LEN=0 WIN=4
□3  0k [172.21.11.19]   [133.185.245.20]   TCP  D=110 S=12270     ACK=1205248001 WIN=2144
□4  0k [133.185.245.20] [172.21.11.19]     POP3 R PORT=12270   +OK UCB Pop server (version 1.831beta) at
□5  0k [172.21.11.19]   [133.185.245.20]   POP3 C PORT=110    USER p50019
□6  0k [133.185.245.20] [172.21.11.19]     POP3 R PORT=12270   +OK Password required for p50019.
□7  0k [172.21.11.19]   [133.185.245.20]   POP3 C PORT=110    PASS p50019
□8  0k [133.185.245.20] [172.21.11.19]     TCP  D=12270 S=110     ACK=14220377 WIN=4096
□9  0k [133.185.245.20] [172.21.11.19]     POP3 R PORT=12270   +OK p50019 has 1 message(s) (788 octets).
□10 0k [172.21.11.19]   [133.185.245.20]   POP3 C PORT=110    STAT
□11 0k [133.185.245.20] [172.21.11.19]     POP3 R PORT=12270   +OK 1  788
□12 0k [172.21.11.19]   [133.185.245.20]   POP3 C PORT=110    QUIT
□13 0k [133.185.245.20] [172.21.11.19]     TCP  D=12270 S=110     ACK=14220389 WIN=4096
□14 0k [133.185.245.20] [172.21.11.19]     POP3 R PORT=12270   +OK Pop server at popm1 signing off.
```

Sample of a POP3 Protocol Log

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POP 3 Command & Reply Procedure

your Panasonic Device (ef1.labo.pcc.com)	POP 3 Server (sv2.labo.pcc.com)

TCP 3 way handshake & Opening Session

Opening TCP Connection (TCP Port No. 110)

+OK POP Server ready
<1896.697170952@labo.pcc.com>

USER s50055

AUTHORIZATION

+OK Password required for s50055

PASS !xxxx

+OK s50055 has 2 messages (126040 octets).

STAT

TRANSACTION

+OK 2 126040

QUIT

+OK POP Server at sv2 signing off.

UPDATE

Closing TCP Connection (Port No. 110)

TCP 3 way handshake & Opening Session

Opening TCP Connection (TCP Port No. 110)

+OK POP Server ready
<1898.697170952@labo.pcc.com>

USER s50055

+OK Password required for s50055

AUTHORIZATION

PASS !xxxx

+OK s50055 has 2 messages (126040 octets).

TOP 1 1

+OK 69762 octets

Text DATA

Text DATA

PETR 1

+OK 69752 octets

Text DATA

Text DATA

Text DATA :end with .(period)

DELE 1

+OK Message 1 has been deleted.

TRANSACTION

TOP 2 1

+OK 1 56288 octets

Text DATA

Text DATA

PETR 2

+OK 1 56288 octets

Text DATA

Text DATA

Text DATA :end with .(period)

DELE 2

+OK Message 2 has been deleted.

QUIT

+OK POP Server at sv2 signing off.

UPDATE

Closing TCP Connection (Port No. 110)

9.10. Troubleshooting from a PC

Troubleshooting is an art of seeking out the cause of a problem and eliminating the problem by managing of eliminating the cause. No matter what the problem is on your network, the OSI Reference Model serves as an excellent reference tool to help you locate the area of trouble.

One of the simplest tools available, is the DOS command-line prompt from your Windows PC.
Listed below are the most often used command-line prompts that you can use at the customer's network PC. Some commands are available as an option for checking with more detail.

Command	Sample	Purpose
Ping	Ping 192.168.1.30	Checking for physical connection between your PC and the target destination (192.168.1.30)
Ipconfig /all	Ipconfig /all	Checking for current network configuration (Host Name, DNS server, IP address, Subnet Mask, Default Gateway, MAC address, WINS etc) For Windows 95/98/Me, please type "winipcfg" instead of Ipconfig/all
Tracert	Tracert 192.168.2.245	Checking for the datagram route between your PC and the target destination (192.168.2.245)
Netstat	Netstat Netstat -nr	Active connection list Active route for your subnet. All special assigned IP addresses are also shown
Net view	Net view	Checking for the current file sharing Host Name
Nslookup	Nslookup	Checking for the DNS server IP address. This command is available for Windows NT only.

Note:
   Before taking corrective action, you must check the physical connections or wiring first.

9.11. Verifying the Configuration and Mail Account Type (SMTP or POP)

START

Is the LAN connected to an ISP — Yes

No — No

Is this a Dialup connection ?

Yes

Not supported

Is static IP address available ?

No

DHCP Client?

Yes

Is G3 Gateway function being used ? — Yes

Is there a MX, and A Record entry for your Panasonic Device in the DNS table ? — No

Not supported

No

Yes

Is POP account available ?

Is POP account available ?

No

No

Yes

Is there a MX, and A Record entry for your Panasonic Device in the DNS table ? — No

Not supported

Yes

Yes

Set network parameters for POP receiving

Set network parameters for SMTP receiving

Set network parameters for POP receiving, and set G3 Gateway parameters for your Panasonic Device

If not ready

If not ready

If not ready

Ask the Network Administrator to setup a new POP account.

Check the host name by using the DOS command-line "ping" and "nslookup".

Ask the Network Administrator to setup a new POP account.

Check the host name by using the DOS command-line "ping" and "nslookup".

Important Notice:
Customers wishing to operate a G3 Gateway function for the Panasonic models, the total Network Security such as Anti Spam Mail protection must be aware of how the system performs sufficient security levels as designed. So you may ask the Security Policy Manager to allow relay of messages by changing the configuration of the Massage Transfer Agent like the Sendmail. Otherwise the system will deny any relay operation.

9.12. Dynamic Host Configuration Protocol (DHCP) - Extended Feature

DHCP is based on the Bootstrap Protocol (BOOTP), adding the capability of automatic allocation of reusable network addresses and additional configuration options.

The Dynamic Host Configuration Protocol (DHCP) provides configuration parameters to Internet hosts. The Bootstrap Protocol (BOOTP) is a UDP/IP-based protocol which allows a booting host to configure itself dynamically and without user supervision. BOOTP provides a means to notify a host of its assigned IP address, the IP address of a boot server host, and the name of a file to be loaded into memory and executed. Other configuration information such as the local subnet mask, the local time offset, the addresses of default routers, and the addresses of various Internet servers can also be communicated to a host using BOOTP.

DHCP consists of two components: a protocol for delivering host-specific configuration parameters from a DHCP server to a host and a mechanism for allocation of network addresses to hosts.

DHCP supports three mechanisms for IP address allocation.
In "automatic allocation", DHCP assigns a permanent IP address to a client.
In "dynamic allocation", DHCP assigns an IP address to a client for a limited period of time (or until the client explicitly relinquishes the address).
In "manual allocation", a client's IP address is assigned by the network administrator, and DHCP is used simply to convey the assigned address to the client. A particular network will use one or more of these mechanisms, depending on the policies of the network administrator.

"DHCP client"
A DHCP client is an Internet host using DHCP to obtain configuration parameters such as a network address.

"DHCP server"
A DHCP server is an Internet host that returns configuration parameters to DHCP clients.

Table 1 describes a DHCP message and its purpose of use.

Message	Comments
DHCPDISCOVER	Client broadcast to locate available servers.
DHCPOFFER	Server to client in response to DHCPDISCOVER with offer of configuration parameters.
DHCPREQUEST	Client message to servers either (a) requesting offered parameters from one server and implicitly declining offers from all others, (b) confirming correctness of previously allocated address after, e.g., system reboot, or (c) extending the lease on a particular network address.
DHCPACK	Server to client with configuration parameters, including committed network address.
DHCPNAK	Server to client indicating client's notion of network address is incorrect (e.g., client has moved to new subnet) or client's lease as expired
DHCPDECLINE	Client to server indicating network address and in use.
DHCPRELEASE	Client to server indicating network address and canceling remaining lease.
DHCPINFORM	Client to server, asking only for local configuration parameters; client already has externally configured network address.

Table 1: DHCP messages and purpose of use

Following figure shows the timeline diagram of messages exchanged between DHCP client and servers when allocating a new network address.

Server (not selected)	Client	Server (selected)
	Begins initialization	
Determines configuration	DHCPDISCOVER DHCPDISCOVER	Determines configuration
	DHCPOFFER DHCPOFFER	
	Collects replies Selects configuration	
	DHCPREQUEST DHCPREQUEST	Commits configuration
	DHCPACK	
	Initialization complete	
	Graceful shutdown	
	DHCPRELEASE	Discards lease
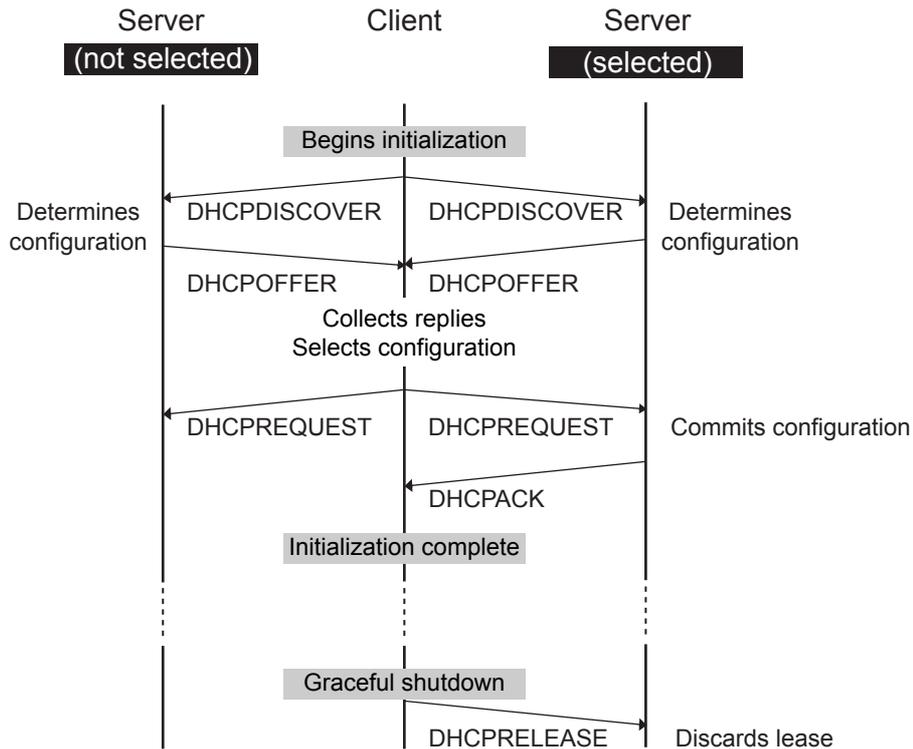
Timeline diagram of messages exchanged between DHCP client and servers when allocating a new network address

Following figure shows the timeline diagram of messages exchanged between DHCP client and servers when reusing a previously allocated network address.

Server	Client	Server
	Begins initialization	
Locates configuration	DHCPREQUEST DHCPREQUEST	Locates configuration
	DHCPACK DHCPACK	
	Initialization complete	
	Subsequent DHCPACKS ignored	

Timeline diagram of messages exchanged between DHCP client and servers when reusing a previously allocated network address

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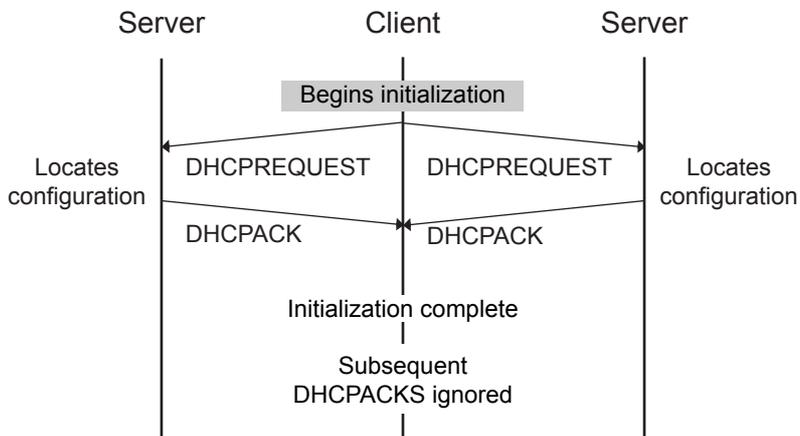
Several options have been defined so far. One particular option - the "DHCP message type" option - must be included in every DHCP message. This option defines the "type" of the DHCP message. Additional options may be allowed, required, or not allowed, depending on the DHCP message type.
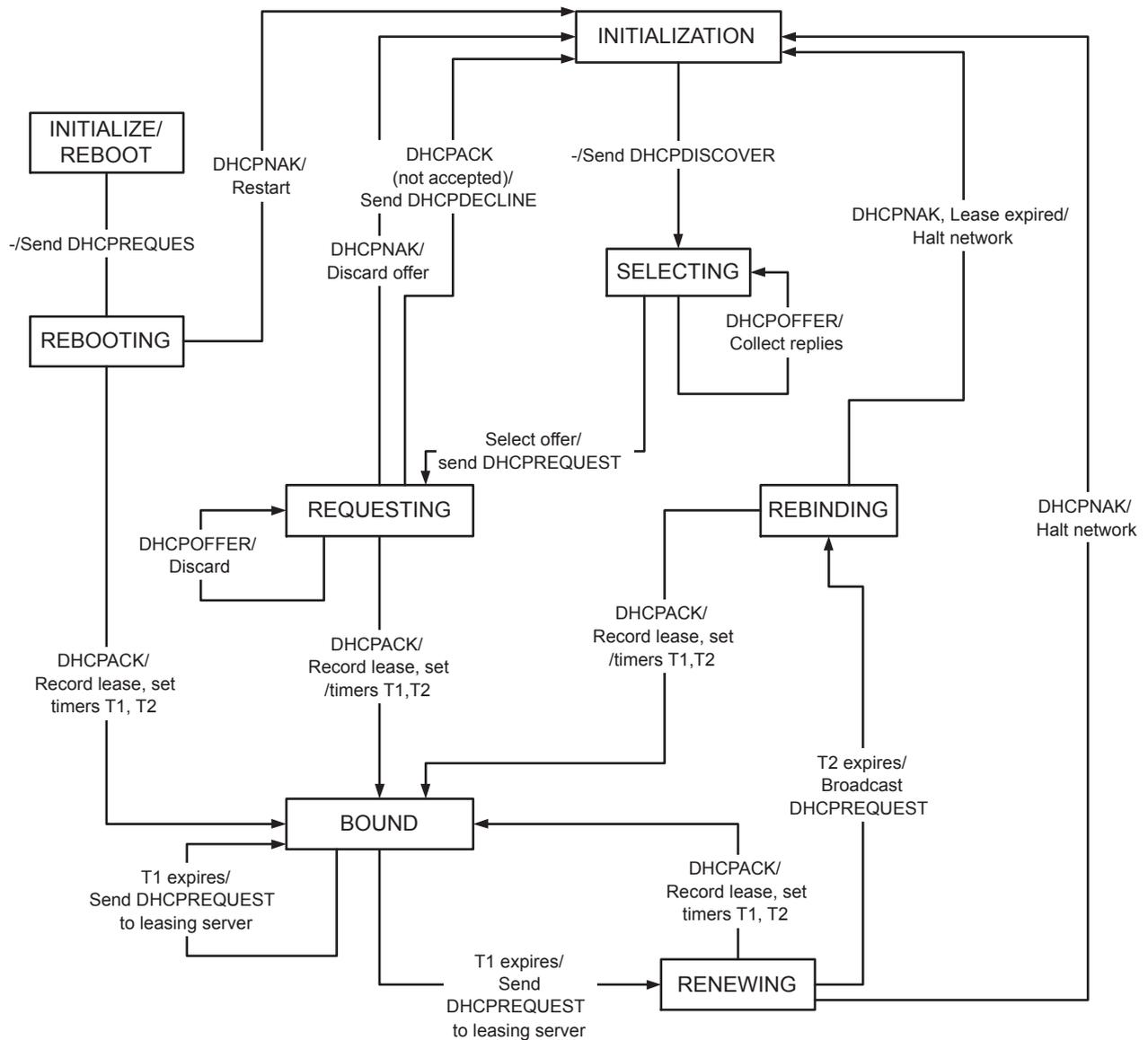
The client maintains two times, T1 and T2, that specify the times at which the client tries to extend its lease on its network address. T1 is the time at which the client enters the RENEWING state and attempts to contact the server that originally issued the client's network address. T2 is the time at which the client enters the REBINDING state and attempts to contact any server. T1 MUST be earlier than T2, which, in turn, MUST be earlier than the time at which the client's lease will expire.
To avoid the need for synchronized clocks, T1 and T2 are expressed in options as relative times.

State-transition diagram for DHCP clients

For more detailed information, please refer to RFC2131 document available from the following URL: http://www.ietf.org/rfc.html.

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9.13. Message Disposition Notifications (MDN) - Extended Feature

The confirmation of delivery and processing are extensions to "Simple Mode of Facsimile Using Internet Mail" [RFC2305]. These are designed to be interoperable with the existing base of mail transfer agents (MTAs) and mail user agents (MUAs), and take advantage of existing standards for advanced functionality such as positive delivery confirmation and disposition notification. The following two features are combined.

(1) Delivery confirmation (required)
(2) Additional document features (optional)

In Internet Mail, the operations of Delivery (to the mailbox) and Disposition (to paper or a screen) may be separated in time (due to store and forwarding of messages) and location (due to separation of delivery agent (MTA) and user agent (MUA)). The confirmations of these two operations are supplied by two different standards-track mechanisms: Delivery Status Notifications (DSN) [RFC1891, RFC1894] and Message Disposition Notifications (MDN) [RFC2298], respectively.
Your Panasonic device supports MDN.

Delivery Status Notification (DSN)

A DSN can be used to notify the sender of a message of any of several conditions: failed delivery, delayed delivery, successful delivery, or the gatewaying of a message into an environment that may not support DSNs. Panasonic Internet FAX does not request DSN while sending.
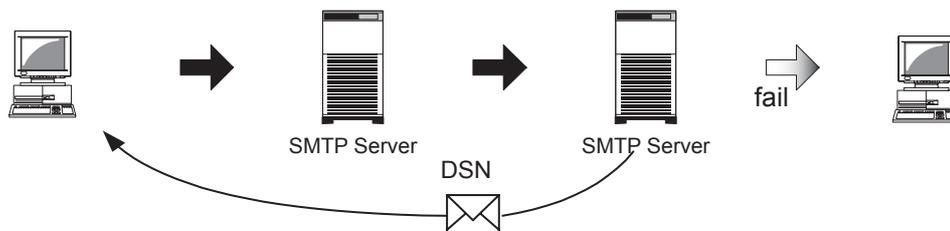
N returned to sender by Reporting MTAs (Message Transfer Agent) if fail of delivery is occurre

Message Disposition Notifications (MDN)

A MDN can be used to notify the sender of a message of any of several conditions that may occur after successful delivery, such as display of the message contents, printing of the message, deletion (without display) of the message, or the recipient's refusal to provide MDNs.
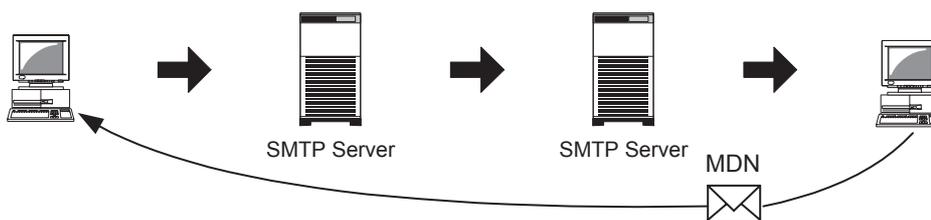
Recipient notifies that the message contents have been displayed

The MDNs are expected to serve several purposes such as allow mail user agents (Outlook Express) to keep track of the disposition of messages sent, by associating returned MDNs with earlier message transmissions.

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For example, you may configure the MDN parameter from the Options menu of Outlook Express.
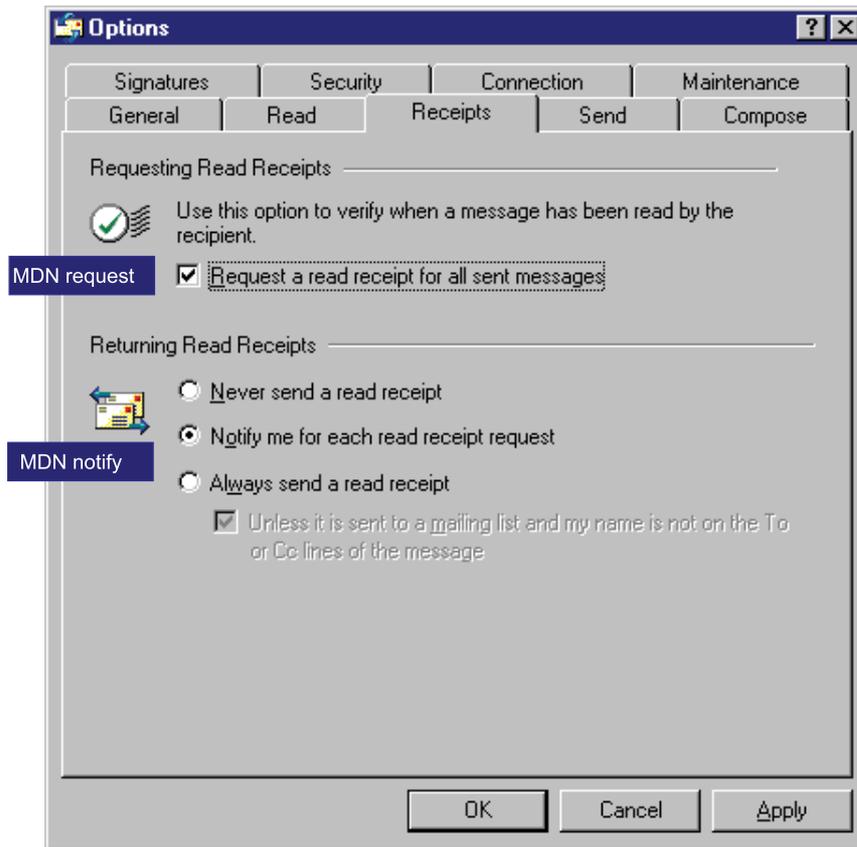
Additional Document Capabilities

Section 4 of "A Simple Mode of Facsimile Using Internet Mail" [RFC2305] allows sending only the minimum subset of TIFF for Facsimile "unless the sender has prior knowledge of other TIFF fields or values supported by the recipient." A recipient may support any or all (or any combination) of the TIFF profiles defined in RFC 2301, in addition to profile S. As a consequence, a sender may use those additional TIFF profiles when sending to a recipient with the corresponding capabilities.
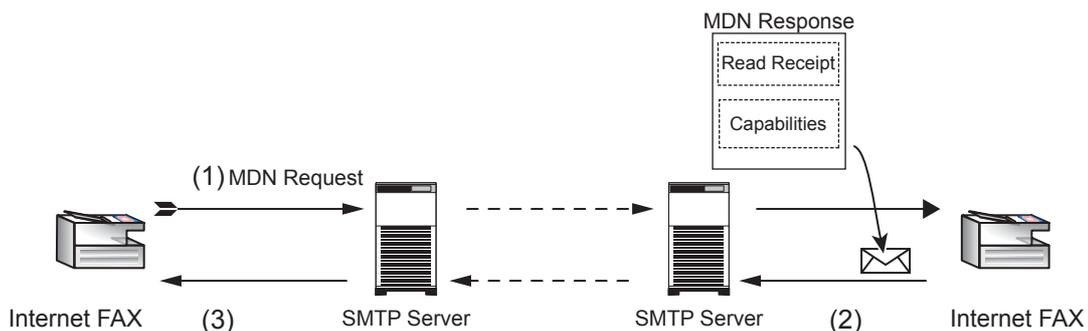
Additional Document Capabilities Exchanging

(1) **Request**

> If the sender (Internet FAX) desires processing confirmation, the sender must request Message Disposition Notification when sending the message itself.
> Sender provides the Disposition-Notification-To field on address using following formula.

MDN Request Sample

```
Mime-Version: 1.0
X-Mailer: Internet FAX, Panasonic
Content-Transfer-Encoding: 7bit
Date: Wed, dd Mmm yyyy 15:20:00 -0500
Message-Id: <200202060018.12345@core.mega.edu>
From: "Panasonic Internet FAX" <fax@core.mega.edu>
Subject: IMAGE from Internet FAX
To: fax@huge.com
Disposition-Notification-To:  <fax@core.mega.edu>
Content-Type: multipart/mixed; boundary="+-+-+-Panasonic-+-+-+"
```

(2) Recipient's MDN Response

Recipient (Internet FAX) starts printing process when the message is received properly. If the Disposition-Notification-To field is contained in message, recipient generates MDN capability response after successful delivery and sends to the address indicated on Disposition-Notification-To field as convey. However, the envelope-from (Return-Path: address) of original sender does not match with address indicated on Disposition-Notification-To field, and then no MDN response is sent.

MDN Response Sample

MESSAGE HEADER

```
Mime-Version: 1.0
X-Mailer: Internet FAX, Panasonic
Content-Transfer-Encoding: 7bit
Date: Wed, dd Mmm yyyy 15:42:00 -0500
Message-Id: <20020206154203470001.BE948.fax@huge.com>
From: <fax@huge.com>
Subject: Read Receipt:IMAGE from Internet FAX
To: fax@core.mega.edu
In-Reply-To: <5.0.2.5.2.20020206153721.00c44448@huge.com>
References: <5.0.2.5.2.20020206153721.00c44448@huge.com>
Content-Type: multipart/report; report-type=disposition-notification; boundary="+-+-+-Panasonic-+-+-+"
```

BODY TEXT

```
**********    Read Receipt    **********

 This message was opened by
 'fax@huge.com'
 dd Mmm yyyy 15:42


******************************************
```

ATTACHED FILE

```
Final-Recipient: rfc822;fax@huge.com
Original-Message-ID: <5.0.2.5.2.20020206153721.00c44448@huge.com>
Disposition: automatic-action/MDN-sent-automatically; dispatched
Media-Accept-Features:
 (& (type="image/tiff")
   (color=Binary)
   (image-file-structure=TIFF-minimal)
   (MRC-mode=0)
   (ua-media=stationery)
   (paper-size=[A4,B4,letter,legal])
   (image-coding=[MH,MR,MMR])
   (| (& (dpi=200) (dpi-xyratio=[200/100,1]) )
     (& (dpi=204) (dpi-xyratio=[204/98,204/196,204/391]) )
     (& (dpi=408) (dpi-xyratio=408/391) ) ) )
```

(3) **Processing Confirmation**

The processing confirmation provided by recipient is received and take specific services for expected several conditions respectively. This is unit independent issue.

For more detailed information, please refer to RFC2532 document.

9.14. Lightweight Directory Access Protocol (LDAP) - Extended Feature

The protocol is designed to provide access to directories supporting the X.500 models, while not incurring the resource requirements of the X.500 Directory Access Protocol (DAP).

This protocol is specifically targeted at management applications and browser applications that provide read/write interactive access to directories. When used with a directory supporting the X.500 protocols, it is intended to be a complement to the X.500 DAP.

X.500 is an overall model for Directory Services in the OSI world. The model encompasses the overall namespace and the protocol for querying and updating it. A major part of X.500 is that it defines a global directory structure.

It is essentially a directory web in much the same way that "http" & "html" are used to define & implement the global hypertext web. Anyone with an X.500 or LDAP client may peruse the global directory just as they can use a web browser to peruse the global Web.

From the "Start" menu of Windows client PC, you can search for people on the Internet, using of server at directory services.

9.15. Lightweight Challenge-response Mechanism POP (APOP)
- Extended Feature

The base POP3 specification (POP3) also contains a lightweight challenge-response mechanism called APOP. APOP is associated with most of the risks associated with such protocols: in particular, it requires that both the client and server machines have access to the shared secret in clear text form. Challenge-Response Authentication Mechanism (CRAM) offers a method for avoiding such clear text storage while retaining the algorithmic simplicity of APOP in using only MD5.

Normally, each POP3 session starts with a USER/PASS exchange. This results in a server/user-id specific password being sent in the clear on the network. For intermittent use of POP3, this may not introduce a sizable risk. However, many POP3 client implementations connect to the POP3 server on a regular basis to check for new mail. Further the interval of session initiation may be on the order of five minutes. Hence, the risk of password capture is greatly enhanced.

An alternate method of authentication is required which provides for both origin authentication and replay protection, but which does not involve sending a password in the clear over the network. The APOP command provides this functionality.

A POP3 server which implements the APOP command will include a timestamp in its banner greeting. For example, on a UNIX implementation in which a separate UNIX process is used for each instance of a POP3 server, the syntax of the timestamp might be:

        <process-ID.clock@hostname>

where "process-ID" is the decimal value of the process's PID, clock is the decimal value of the system clock, and hostname is the fully-qualified domain-name corresponding to the host where the POP3 server is running.

Client   Server

Establish TCP connection (TCP port No. 110)

Challenge Response
<1896.697170952@svr.pcc.co.jp>   +OK POP3 server ready <1896.697170952@svr.pcc.co.jp>

Digest parameter, Challenge + PASSWD
<1896.697170952@svr.pcc.co.jp>PASSWD   APOP USER c4c9334bac560ecc979e58001b3e22fb

Possible Responses:
  +OK
  -ERR permission denied

Produces a 16 octet digest value of
c4c9334bac560ecc979e58001b3e22fb

+OK maildrop has 1 message (369 octets)

STAT

+OK 1

Continue to follow the POP3 procedure

APOP overview

The POP3 client makes note of this timestamp, and then issues the APOP command. The "name" parameter has identical semantics to the "name" parameter of the USER command. The "digest" parameter is calculated by applying the MD5 algorithm to a string consisting of the timestamp (including angle-brackets) followed by a shared secret. This shared secret is a string known only to the POP3 client and server. Great care should be taken to prevent unauthorized disclosure of the secret, as knowledge of the secret will allow any entity to successfully masquerade as the named user. The "digest" parameter itself is a 16-octet value which is sent in hexadecimal format, using lower-case ASCII characters.

When the POP3 server receives the APOP command, it verifies the digest provided. If the digest is correct, the POP3 server issues a positive response, and the POP3 session enters the TRANSACTION state. Otherwise, a negative response is issued and the POP3 session remains in the AUTHORIZATION state.

Note that as the length of the shared secret increases, so does the difficulty of deriving it.

9.16. SMTP Service Extension for Authentication (SMTP Auth) - Extended Feature

SMTP is widely deployed and high-quality implementations have proven to be very robust. However, the Internet community now considers some services to be important that SMTP AUTH is an SMTP service extension (ESMTP) whereby an SMTP client may indicate an authentication mechanism to the server, perform an authentication protocol exchange, and optionally negotiate a security layer for subsequent protocol interactions. This extension is a profile of the Simple Authentication and Security Layer (SASL). To use SASL, a protocol includes a command for identifying and authenticating a user to a server and for optionally negotiating protection of subsequent protocol interactions.

```
        Client                                              Server

              Establish TCP connection (TCP port No. 25)
              ─────────────────────────────────────────────►
              220 smtp.example.com ESMTP server ready
              ◄─────────────────────────────────────────────
              EHLO jgm.example.com
              ─────────────────────────────────────────────►
              250-smtp.example.com
              ◄─────────────────────────────────────────────
              250 AUTH LOGIN DIGEST-MD5 CRAM-MD5
              ◄─────────────────────────────────────────────
              AUTH CRAM-MD5
              ─────────────────────────────────────────────►
              334
              PENCeUxFREJoU0NnbmhNWitOMjNGNndA
              ZWx3b29kLmlubm9zb2Z0LmNvbT4=
       ②     ◄─────────────────────────────────────────────  ①
              ZnJlZCA5ZTk1YWVlMDljNDBhZjJiODRhMGMyYjNiYmFlNzg2ZQ==
              ─────────────────────────────────────────────►
              235 Authentication successful
              ◄─────────────────────────────────────────────

                 Continue to follow the SMTP procedure
                                 ▼
```

SMTP AUTH overview

The AUTH command indicates an authentication mechanism to the server. If the server supports the requested authentication mechanism, it performs an authentication protocol exchange to authenticate and identify the user. Optionally, it also negotiates a security layer for subsequent protocol interactions. If the requested authentication mechanism is not supported, the server rejects the AUTH command with a 504 reply.

```
  ①  Challenge Response
      334   PENCeUxFREJoU0NnbmhNWitOMjNGNndAZWx3b29kLmlubm9zb2Z0LmNvbT4=

      Produces a Challenge                    BASE64 decoded string  ▼
         <CByLEDBhSCgnhMZ+N23F6w@elwood.innosoft>

  ②  Genrates Digest parameter
                            Challenge + PASSWD with HMAC (keyed-Hashing for Message
      USER                  Authentication Code), produces a 16 octet digest value of:
      Fred                     9e95aee09c40af2b84a0c2b3bbae786e

                  ▼  BASE64 encoded string
      ZnJlZCA5ZTk1YWVlMDljNDBhZjJiODRhMGMyYjNiYmFlNzg2ZQ==
```

The authentication protocol exchange consists of a series of server challenges and client answers that are specific to the authentication mechanism. A server challenge, otherwise known as a ready response, is a 334 reply with the text part containing a BASE64 encoded string. The client answer consists of a line

containing a BASE64 encoded string. If the client wishes to cancel an authentication exchange, it issues a line with a single "*". If the server receives such an answer, it must reject the AUTH command by sending a 501 reply.

If the server cannot BASE64 decode the argument, it rejects the AUTH command with a 501 reply. If the server rejects the authentication data, it should reject the AUTH command with a 535 reply unless a more specific error code, such as one listed in Error Codes below, is appropriate. Should the client successfully complete the authentication exchange, the SMTP server issues a 235 reply.

The service name specified by this protocol's profile of SASL is "smtp".

Error Codes
The following error codes may be used to indicate various conditions as described.

432: A password transition is needed

　　This response to the AUTH command indicates that the user needs to transition to the selected Authentication mechanism. This is typically done by authenticating once using the plain authentication mechanism.

538: Encryption required for requested authentication mechanism

　　This response to the AUTH command indicates that the selected authentication mechanism may only be used when the underlying SMTP connection is encrypted.

454: Temporary authentication failure

　　This response to the AUTH command indicates that the authentication failed due to a temporary server failure.

530: Authentication required

　　This response may be returned by any command other than AUTH, EHLO, HELO, NOOP, RSET, or QUIT. It indicates that server policy requires authentication in order to perform the requested action.

9.17. Direct SMTP Transfer - Extended Feature

Simple Mail Transfer Protocol (SMTP) is to transfer mail reliably and efficiently. An important feature of SMTP is its capability to transport mail across networks, usually referred to as SMTP mail relaying by employing SMTP server.

Direct SMTP transfer allows you to transmit documents to another Internet Fax directly employing no SMTP server. To enables this feature, you must configure its static IP address, subnetmask, default gateway and etc. accordingly. Domain Name System (DNS) must be required to run the system, so that hosts and some additional records must be properly existed in DNS entries.

Please note that the system runs under DHCP dynamic updates with DNS meets its requirement also.
In other words, DHCP runs non-Dynamic Updates in the Domain Name System cannot be applied for Internet Fax who whish to enables Direct SMTP transfer function.

Further more, in common cases only email and web service from the Internet are permitted into the corporate intranet, and corporate network administrators are extremely reticent to open the firewall for other, incoming services, since each opened path represents additional, potential security threats.

So the Direct SMTP transfer can be operating throughout the organization's Intranet.

Capability exchanges and content negotiations are also available to take advantageous communication between Internet Fax communications.

Several service extensions are newly assigned.
  (1) The EHLO keyword value associated with this extension is "CONNEG"
  (2) A parameter using the keyword "CONNEG" is added to the RCPT-TO command

Direct Internet Fax XMT Overview

10 Schematic Diagram

10.1. General Circuit Diagram

memo

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Network Firmware Update Tool
for Service Technicians

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1. General

The Network Firmware Update Tool allows a Panasonic Fax/Copy machine connected via LAN (TCP/IP) to program the Firmware Code Memory of the Unit directly. Using a PC, the firmware code is transferred to the Firmware Code Memory of the Unit through the LAN.

1.1 Supporting OS

This application software operation has been confirmed under the following OS

- Windows 98 / Me
- Windows NT 4.0
- Windows 2000
- Windows XP

1.2 Supporting Panasonic Fax/Copier Models

Please refer to the service manual of each model.

2. Installation

2.1 Installing the Network Firmware Update Tool

1. Start Microsoft Windows.

For Windows NT 4.0 / 2000 / XP, logon to the computer/network with an account that can add, or change configurations (i.e. Administrator).

2. Run \xFirmware\Tools\NwFirmup\Setup**Setup.exe** from the setup disk or folder.

3. Enter the installation password.
Please ask your Sales Company to obtain the password.

4. Follow the instruction on your screen to install the program.

5. The completion message is displayed when the installation is completed.
Check "Yes, I want to …" and click [Finish] to restart your PC.

2.2 Setting up the Network Firmware Update Tool

1. Click the **Start** button on the Taskbar, point to **Programs**, **Panasonic**, **Panasonic Network Firmware Update**, then click **Network Firmware Update Configuration.**

2. The **Configuration** dialog box appears.

General Tab

Please change the settings if necessary.
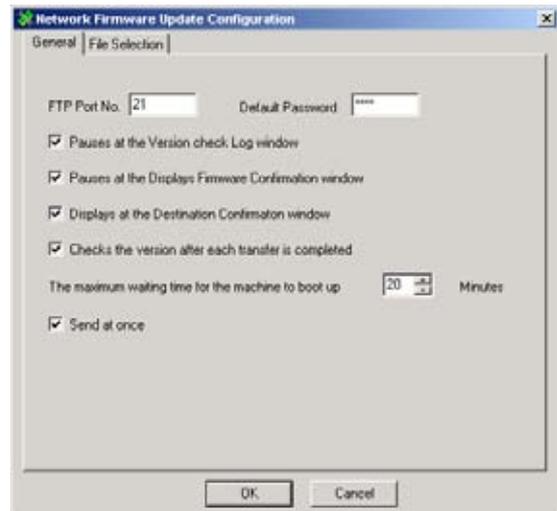
File Selection Tab

Auto-Select Update Mode
When you select this mode, the tool acquires the type of firmware and version from the device(s) of the specified address, and updates the device to the latest version from the "Local Firmware Folder".

However, this mode cannot change the type of firmware, so you must use the manual mode when changing from the standard firmware to the option firmware.
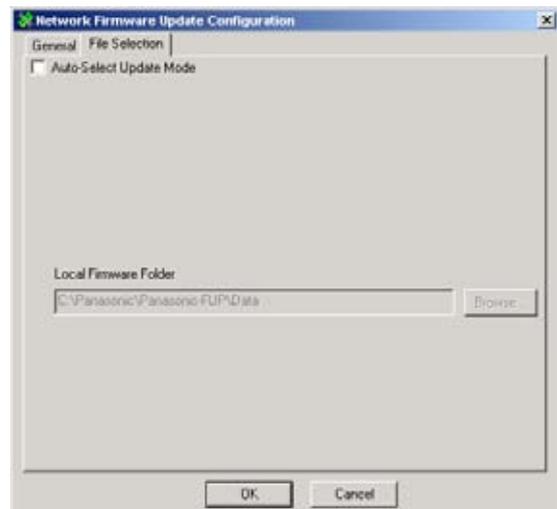
3. Click [**OK**] to finish the setup.

2.3 Uninstalling the Network Firmware Update Tool

The **Network Firmware Update Tool** can be uninstalled by using its uninstall program.

Note: Do not delete the installed program folder from Windows Explorer directly, due to possible registry setting problems.

1. Start Microsoft Windows.

For Windows NT 4.0 / 2000 / XP, logon to the computer/network with an account that can add, or change configurations (i.e. Administrator).

2. Click the **Start** button on the Taskbar, point to **Programs**, **Panasonic**, **Panasonic Firmware Update**, then click **Uninstall Network Firmware Update Tool**.

3. Follow the instructions on your screen to uninstall (Remove) the program.

4. The completion message is displayed when the uninstall is completed.

3. Preparing the Firmware Update

3.1 Preparing the Unit to Accept the Firmware Code

3.1.1 For DX-600 / DX-800 (v1.31 or higher)

1. If the device password is changed (Remote Password) from the default value (blank = 0000), it is not possible to program the firmware code. In this case, enter the password in advance to the Default Password in the Configuration dialog box, or enter the password at each communication.

2. Make sure the device is not in an operating condition (copying or printing etc...).
Note: It is recommended to update the firmware at night due to lower activity of the device.

3.1.2 For other models

1. If the device password (**Service Mode F7-01** = Key Operator ID Code, or Operation Password) is changed from the default value (0000 or 000), it is not possible to program the firmware code. In this case, enter the password in advance to the Default Password in the Configuration dialog box, or enter the password at each communication.

For the 3-digit Key Operator Password devices, only the first three digits "000" of the default value are singled out of the 4-digit "0000" value.

2. Make sure the device is not in an operating condition (copying or printing etc...).

Note:
It is recommended to update the firmware at night due to lower activity of the device.

3.2 Preparing the Firmware Code

Copy the firmware Code file(s) to the following folder.

C:\Panasonic\Panasonic-FUP\Data

Note: The Archive File extracts the Firmware Code Files automatically into the designated folder.
(ex. DP-2310_PU_030327.exe)

4. Using the Network Firmware Update Tool

1. Please close all applications that are currently running.

Note: When using the Network Firmware Update Tool on Windows 2000/XP OS, you must be logged on as an Administrator.

2. From the Windows Desktop, double-click on the **Network Firmware Update** shortcut icon to start the Network Firmware Update Tool.

Click [**Next>**].
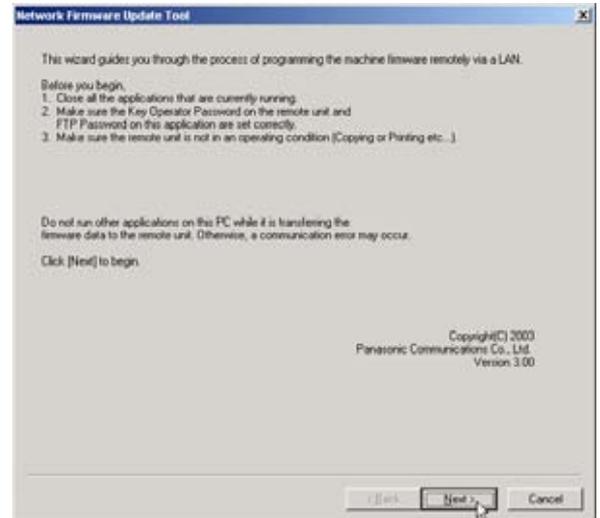
Note:
1) Make sure the device password (**Service Mode F7-01** = Key Operator ID Code, or Operation Password) on the remote unit and the password on this application are set correctly.
2) Make sure the remote unit is not in an operating condition (Copying or Printing etc...).
3) Do not run other applications on this PC while it is transferring the firmware data to the remote unit, or a communication error may occur.
4) Do not operate, or reset the power of the device while it is updating the firmware code, or the firmware update will fail, and the device will not boot up again.
5) If the Network Firmware Update fails, and the unit does not reboot automatically for more than 20 minutes, you may need to recover the firmware update again via a Parallel/USB port using the Local Firmware Update Tool, or with the FROM card.

3. Click [**Device Address List**].
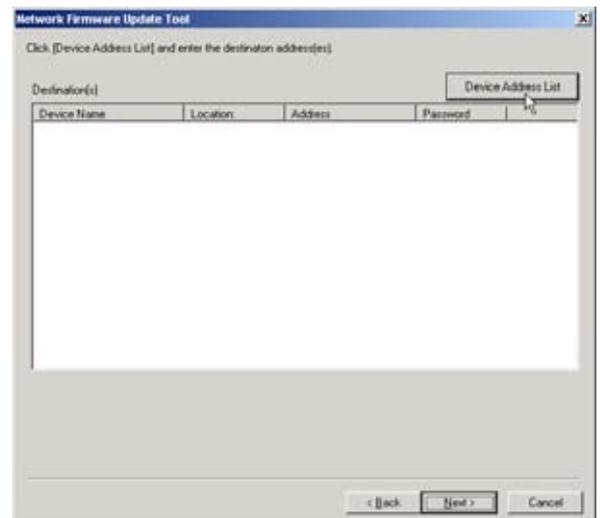
4. Enter the destination device(s) by using Manual Input, or Device Address List.

Click [**OK**].
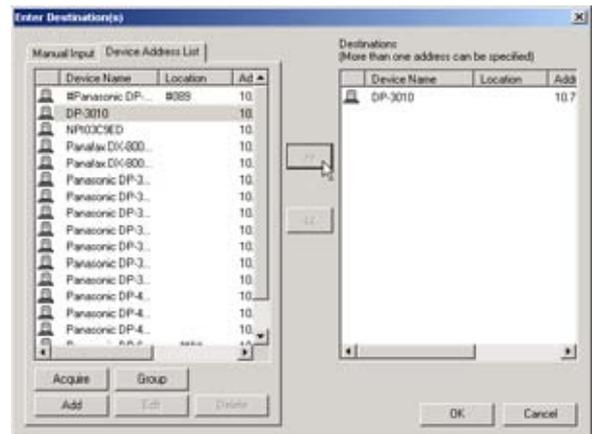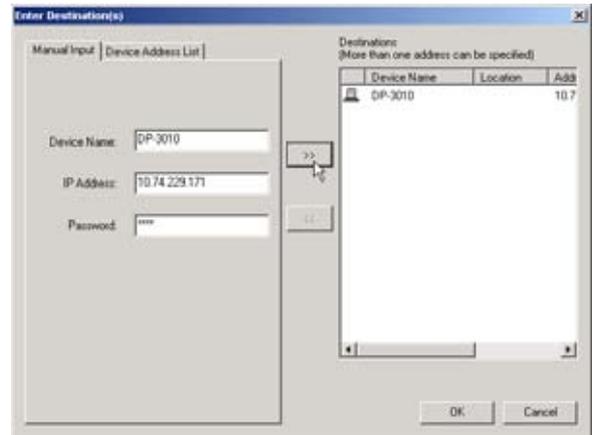
5. Confirm the destination device(s).

Click [**Next>**].
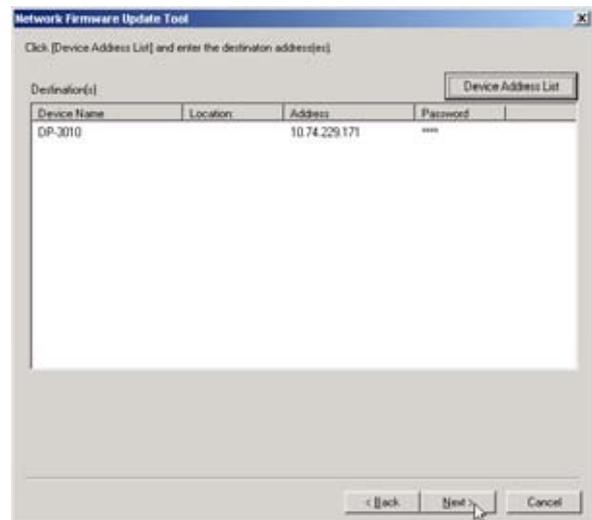
6. Specify the Firmware Code File using the following methods.

Select an Archive File (Complete Set)
--> Step 6a1
With this choice you can directly select the Firmware Code Archive File.
The selected archive file will be extracted into the local **\Data** folder automatically, and it is chosen as a set when the update of multiple firmware code files are necessary.

Select a Parent File Folder (Complete Set)
--> Step 6b1
If the archive file is already extracted into the local **\Data** folder, you can select the Parent File Folder directly from here.
It is chosen as a set when the update of multiple firmware code files are necessary.

Select Independent File Folders
--> Step 6c1
If the archive file is already extracted into the local **\Data** folder, you can select independent file folders from here.

Note: Files are chosen automatically in the automatic mode, so the screen of step 6 is not shown.

6a1 Select an Archive File (Complete Set)
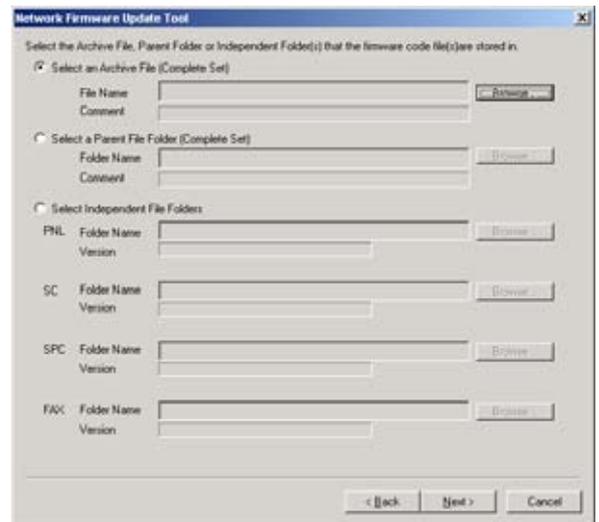
Select "Select an Archive File (Complete Set)" and click **[Browse...]** button.

6a2 Select the Firmware Archive file, and click **[Open]**.

Ex: DP-2310_3010_PU_030228.exe
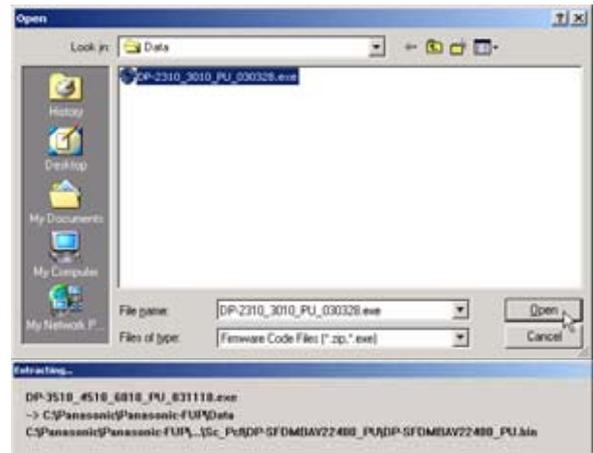
6a3 Extracting...

6a4 Select the Firmware Type window appears.
Select the Firmware Type, and click **[OK]**.
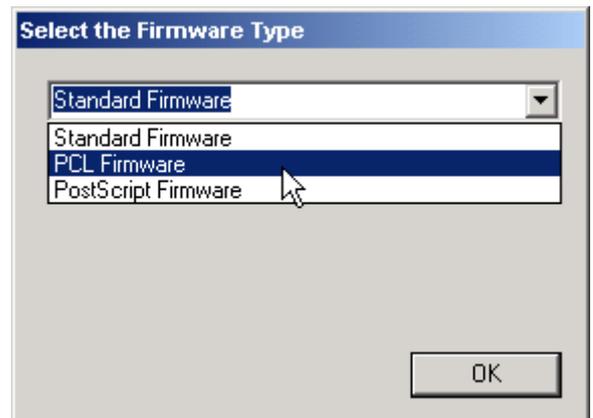
6a5 Firmware Code File selection is completed.
Click [**Next>**].

6b1 **Select a Parent File Folder (Complete Set)**

Select "Select a Parent File Folder (Complete Set)", and click **[Browse...]** button.
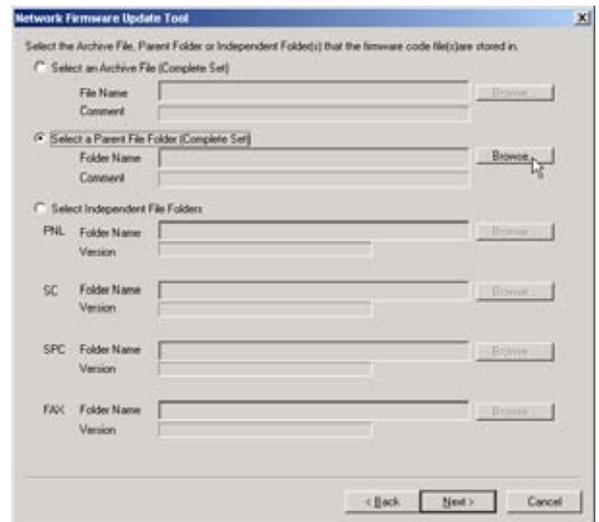
6b2 Select the Parent File Folder, and Click **[OK]**.

Ex: \DP-2310_3010_PU_030228
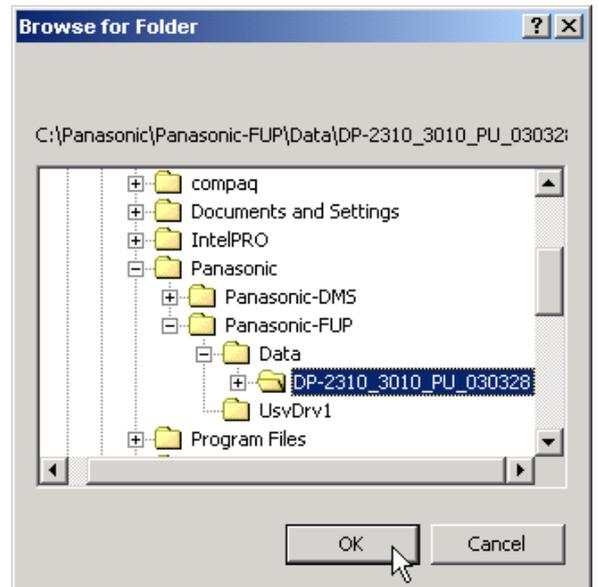
6b3 Select the Firmware Type, and click **[OK]**.
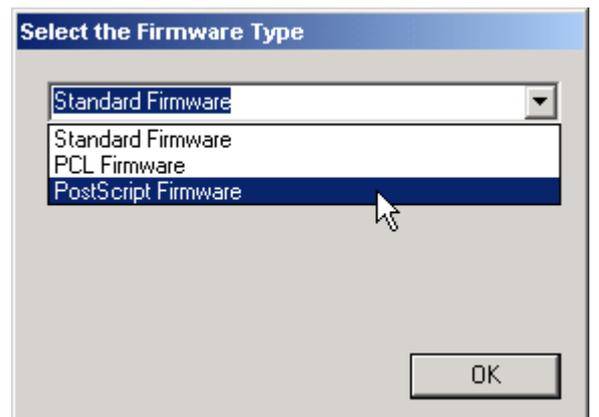
6b4 Firmware Code File selection is completed. Click [**Next>**].
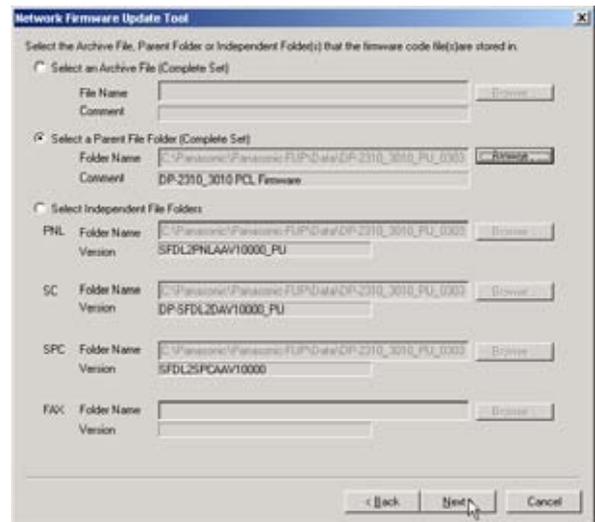
6c1 **Select Independent File Folders**

Select "Select Independent File Folders", and click **[Browse...]** button.
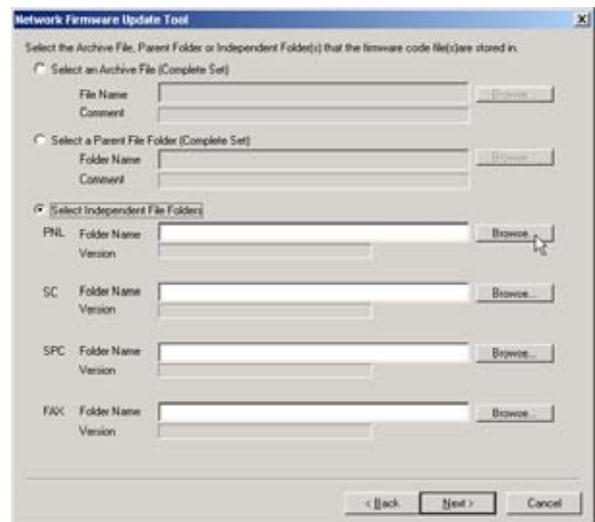
6c2 Select the Firmware Code File Folder, and click **[OK]**.

Ex: SFDL2PNLAAV100000_PU.BIN
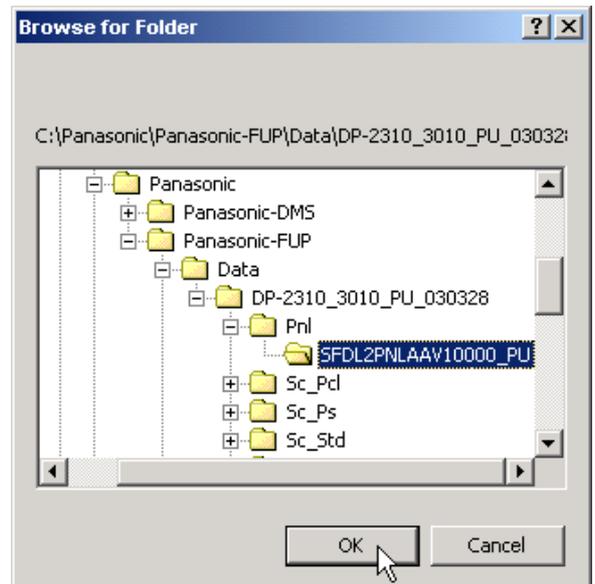
6c3 Select the other Firmware Code File Folder, and click **[OK]**.

6c4 Firmware Code File selection is completed.
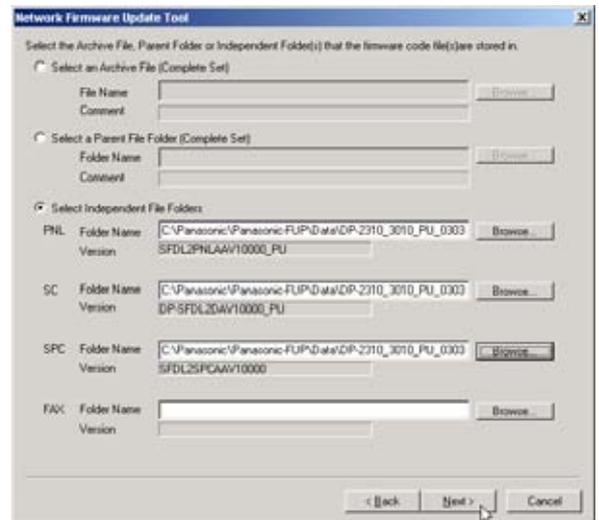
Click [**Next>**].

7. The version check for the specified devices starts.

Click [**Next>**].
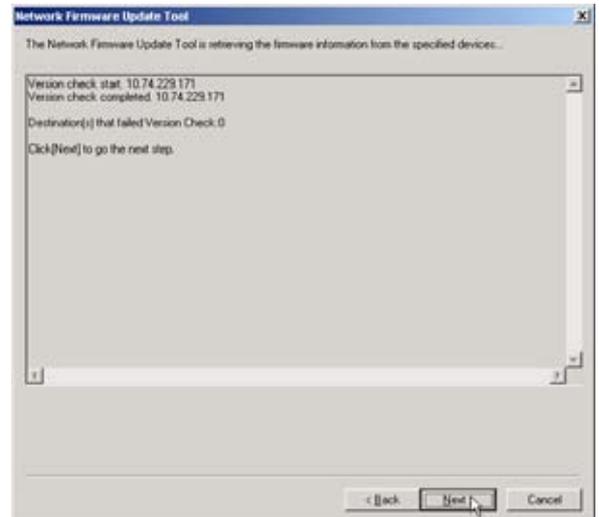
8. Verify that the information you want to update is correct.

Then click [**Next>**].

Note: If "Send at once" is checked, all firmware will be sent at once, and then erase, write and reboot.
If "Send at once" is checked out, each firmware (SC, PNL, SPC, etc...) are transmitted separately, and each time the unit erases, writes and reboots in the normal mode.
This "Send at once", function cannot be used if the model is DP-6010 / 4510 / 3510, firmware type is PCL or PS, and the unit SC version is V1.xxxx.

9. Confirm the destination device(s) again.

Set timer communication if necessary.

Then click [**Next>**].

10. Data is transferred to the Spooler, and the update is started.

The Spooler screen appears automatically showing the progress of the data transfer.

The spooler will take time to open depending on the number of addresses to update.
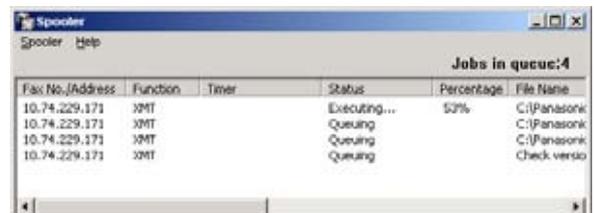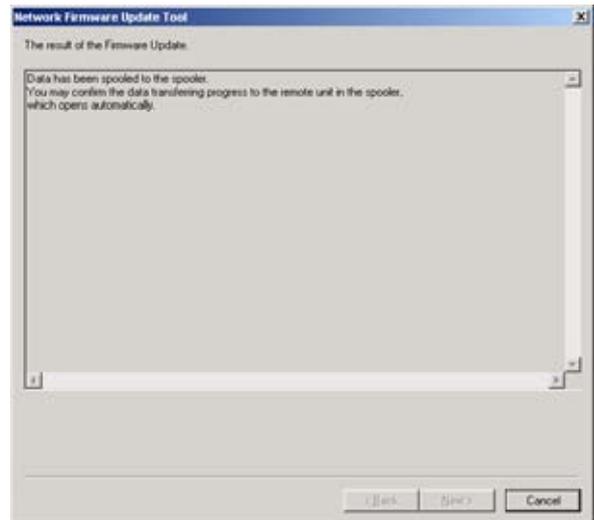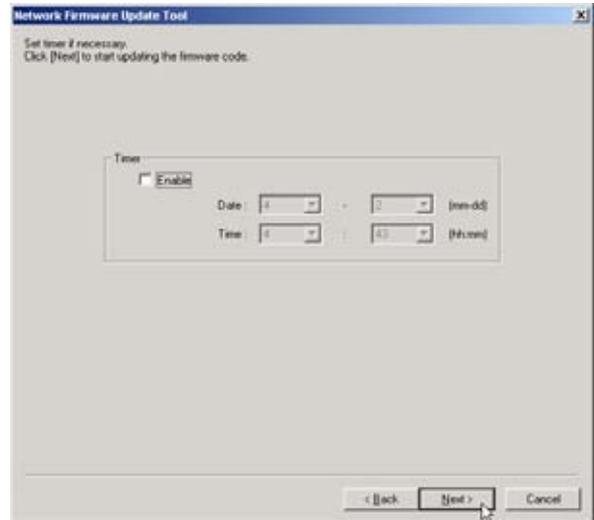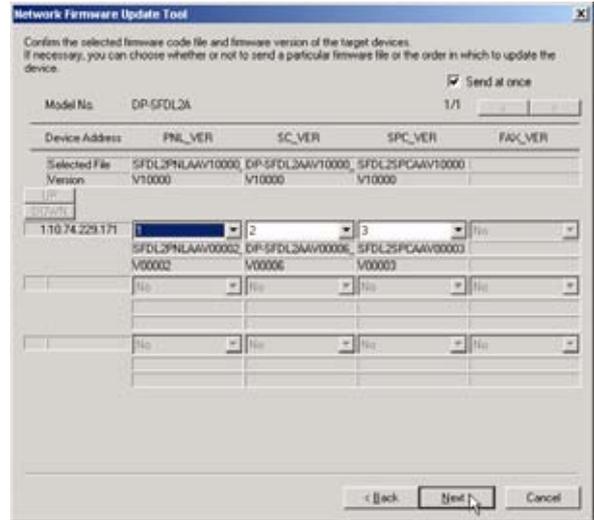
11. When the transfers are completed, all jobs in the spooler disappear, and the communication log is displayed.

Click **[Finish]** to close the tool.

After each firmware code is successfully programmed to the Firmware Flash Memory in the unit, the unit reboots and restarts again automatically.
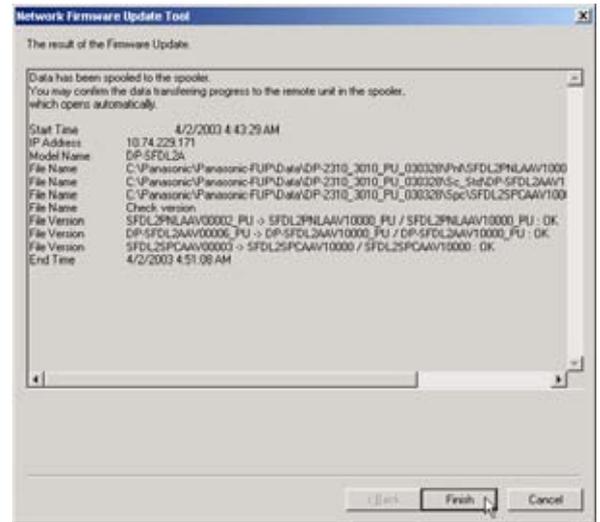
Panasonic®

Software

Operating Instructions

Local Firmware Update Tool
for Service Technicians

Version 3

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1. General

The Local Firmware Update Tool (Parallel/USB) allows a Panasonic Fax/Copy machine to emulate a Flash Memory Card Writer and create a Master Firmware Card, or to program the Firmware Code Memory of the Unit directly. Using a PC, the firmware code is transferred to the Flash Memory Card or the Firmware Code Memory of the Unit through the Parallel/USB Port on the Panasonic Fax/Copy machine. The installation and operation are very similar to the Printer Interface.

1.1 Supporting OS

This application software operation has been confirmed under the following OS

- Windows 98 / Me
- Windows NT 4.0 (Parallel Port only)
- Windows 2000 / XP

1.2 Supporting Panasonic Fax/Copier Models

Please refer to the service manual of each model.

2. Installation

2.1 Installing the Hardware on the Panasonic Fax/Copy Machine

1 Depending on the model, a Parallel Port or USB Port is installed.
Please install the Parallel Port/USB Port Assembly into one of the supporting Panasonic Fax/Copier models by following the appropriate option installation instructions for that model.

2 Prepare the Parallel cable or USB cable for connecting the Panasonic Fax/Copy machine and your PC.

Important: For the USB port models, do not connect the USB cable yet.

2.2 Installing the Local Firmware Update Tool

1 Start Microsoft Windows.

For Windows NT4.0 / 2000 / XP, log onto the computer/network with an account that can add or change printer configurations (i.e. Administrator).

Important: For the USB port models, do not connect the USB cable yet.

2 Run \xFirmware\Tools\Firmup\Setup**Setup.exe** from the install disk.

3 Installation Destination Folder
Click **[Next]** button.
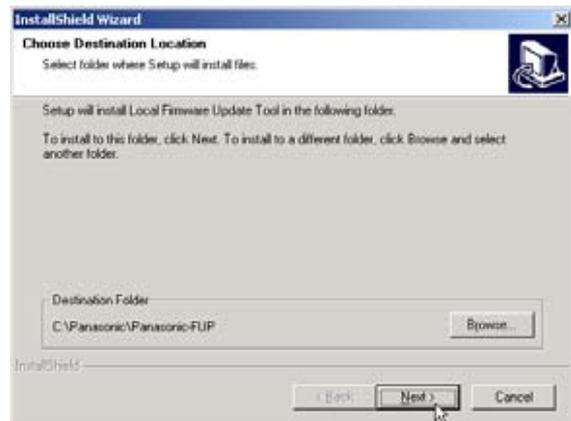
4 Program Folder
Click **[Next]** button.
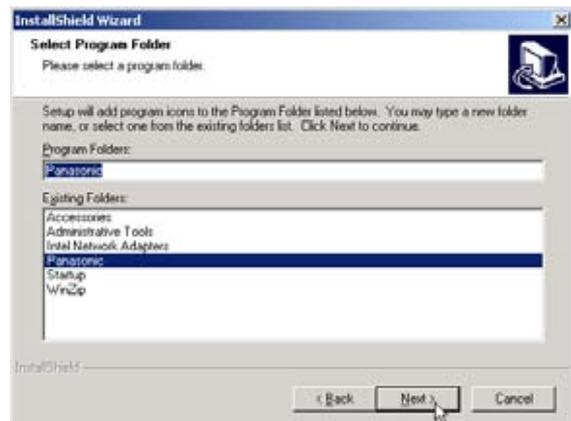
5 Copying...
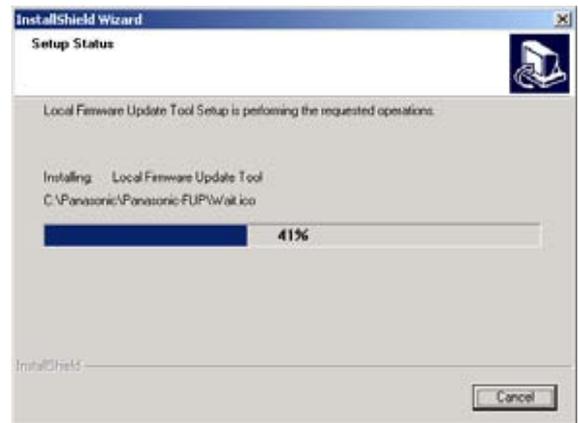
6 The installation is completed.

Check "Yes, I want to …" and click [Finish] to restart your PC.

2.3 Installing USB Firmware Update Driver (For the USB Port Model Only)

1 After installation of the Local Firmware Update Tool, if you need to install the USB Firmware Update Driver, please **set the unit to "Update from USB/* IN PROGRESS *" in the Service Mode** first, and then connect the USB Cable. The required Driver will then be installed automatically.

Note: For instructions of how to get into the Service Mode, refer to your machine's Service Manual.

2 Searching...

Installing driver...

3 When the install screen disappears, the installation of the Firmware Update (USB) Driver is completed.

Note:

1. The installation screens will vary, and are dependant on the OS.

2. For Windows 2000 or XP, through the "**Digital Signature Not Found**" or "**Software Installation**" window will be displayed during the installation and indicate "Unknown software package" or "not passed Windows Logo testing", please click **[YES]** or **[Continue Anyway]** button to continue the installation

3. If you are asked for the Inf file location, please specify the following folder.
    C:\Panasonic\Panasonic-FUP\UsbDrv1

4. After the USB Firmware Update Driver is installed, and you are not updating the machine's firmware at this time, turn the Power Switch OFF and ON again to return your machine to the Standby mode.

2.4   Uninstalling the Local Firmware Update Tool

The Local **Firmware Update Tool** can be uninstalled by using its uninstall program.

Note: Do not delete the installed program folder from Windows Explorer directly, due to possible registry setting problems.

1.   Start Microsoft Windows.

For Windows NT 4.0 / 2000 / XP, logon to the computer/network with an account that can add or change configurations (i.e. Administrator).

2.   Click the **Start** button on the Taskbar, point to **Programs**, **Panasonic**, **Panasonic Firmware Update** then click **Uninstall Local Firmware Update Tool**.

3.   Follow the instructions on your screen to uninstall (Remove) the program.

4.   The completion message is displayed when uninstall is completed.

Note: The Firmware Update Driver is not deleted by the Uninstaller. Please delete it from the Control Panel\Printers folder by manually. When you delete USB Firmware Update Driver, please delete it after you connect the PC to the unit with the USB cable and driver enabled, or it cannot be deleted properly.

3. Preparing the Firmware Update

3.1   Preparing the Unit to Accept the Firmware Code

Please refer to the Service Manual to set the unit to Firmware Update Mode (Service Mode).

3.2   Preparing the Firmware Code

Copy the firmware Code file(s) to the following folder.

C:\Panasonic\Panasonic-FUP\Data

Note: The Archive File extracts the Firmware Code Files automatically into the designated folder.
(ex. DP-2310_PU_030327.exe)

4. Using the Local Firmware Update Tool

1 Set the machine to the Firmware Update Mode and then connect the unit and PC with a Parallel cable or USB cable.

Note: **For the USB Port Models, the Plug & Play of the Printer mode is activated when the USB cable is connected without the unit set in the USB Firmware Update Mode. If this happens, please click the [Cancel] button for the Plug and Play Driver installation.**

2 Please close the all applications that are currently running.
Also ensure that the **Status Monitor** and/or **Port Controller** are **closed**. If they are running, right click on the icons in the system tray and select Exit/End.

Note: About Windows 2000/XP, using Network Firmware Update Tool, the authority more than a Power User is required.

3 From the Windows Desktop, double-click on the **Local Firmware Update Tool** shortcut icon to start the Panasonic Firmware Programming Wizard.

Click [**Next>**].

Note: Please close all applications that are currently running.
Also ensure that the Status Monitor and/or Port Controller are **closed**. If they are running, right click on the icons in the system tray and select Exit/End.

4 Select the Firmware Update Driver USB or Parallel.

Click [**Next>**].

Note: The "Firmware Update Driver (USB)" is only displayed if you installed it with the unit Plug and Play.
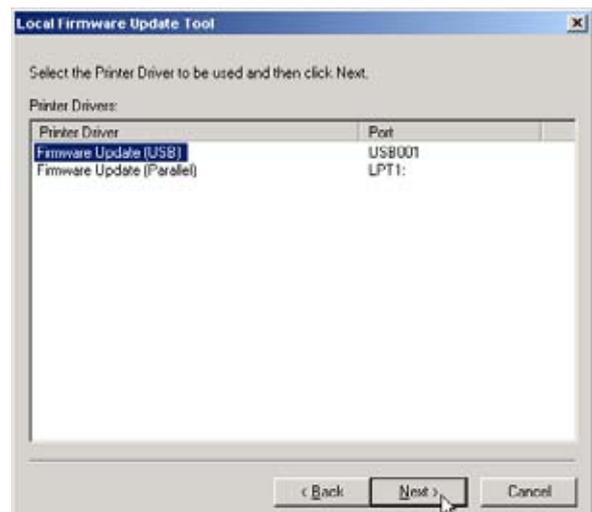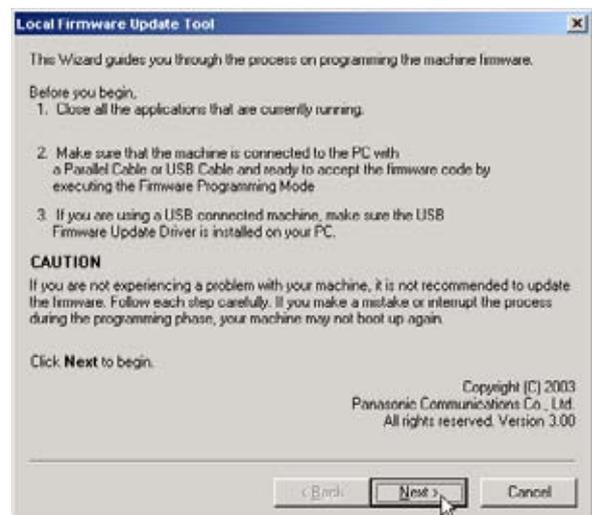
5 Specify the Firmware Code File by the following methods.

Select an Archive File (Complete Set)
> **--> Step 5a1**
> You can select the Firmware Code Archive File directly here.
> The selected archive file will be extracted into the local \Data folder automatically and it is chosen as a set when the update of multiple firmware code files are necessary.

Select a Parent File Folder (Complete Set)
> **--> Step 5b1**
> If the archive file is already extracted into the local \Data folder, you can select the Parent File Folder directly here.
> It is chosen as a set when the update of multiple firmware code files are necessary.

Select an Independent File
> **--> Step 5c1**
> If the archive file is already extracted into the local \Data folder, you can select an independent file here.
> When updating multiple firmware files, you must repeat the file selection operation.
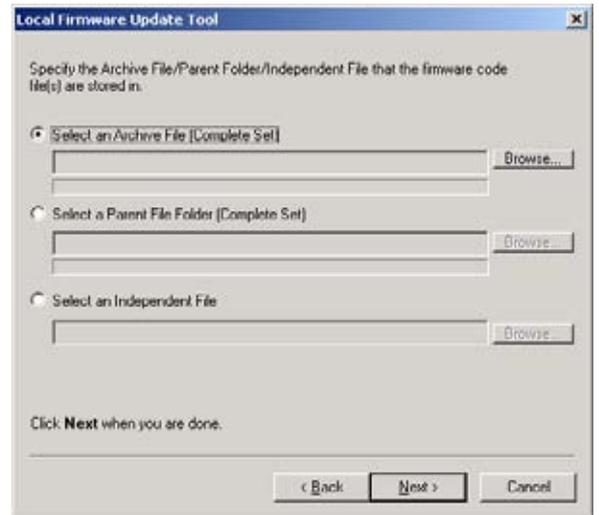
5a1 **Select an Archive File (Complete Set)**

Select "Select an Archive File (Complete Set)" and click **[Browse...]** button.
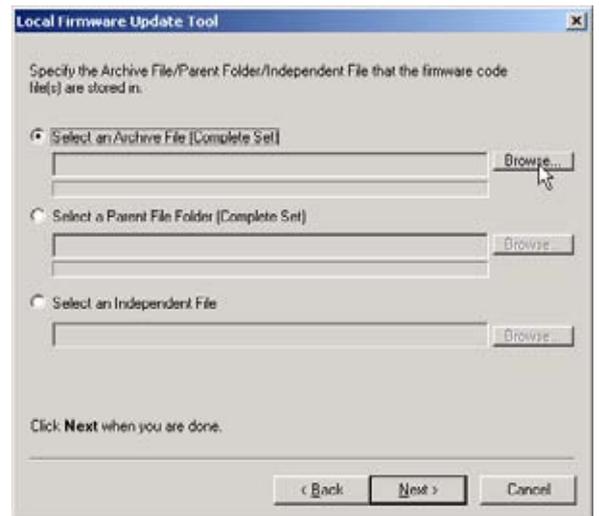
5a2 Select the Firmware Archive file and click **[Open]**.

ex. DP-2310_3010_PU_030227.exe
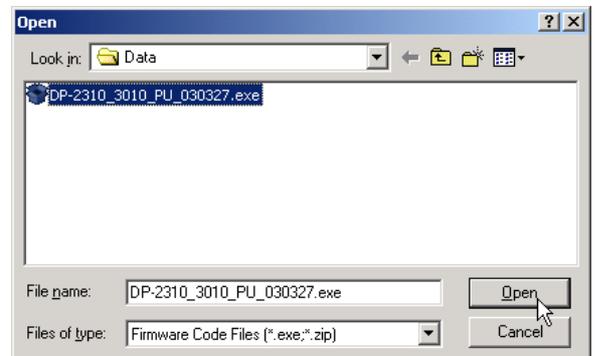
5a3 Extracting...

5a4   Select the Firmware Type window appears.
Select the Firmware Type and click **[OK]**.
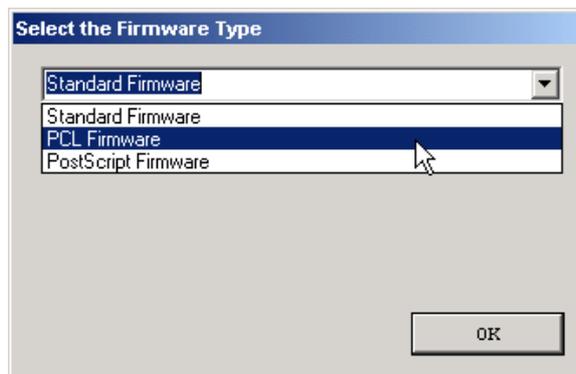
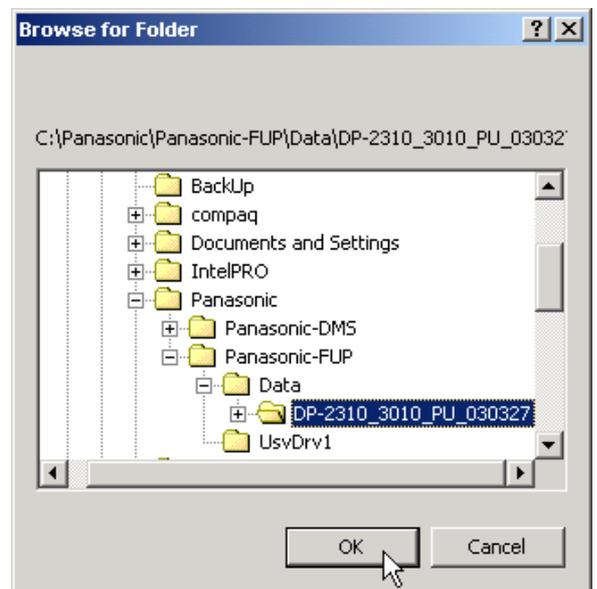**5a5**   Firmware Code File selection is completed.
Click [**Next>**].
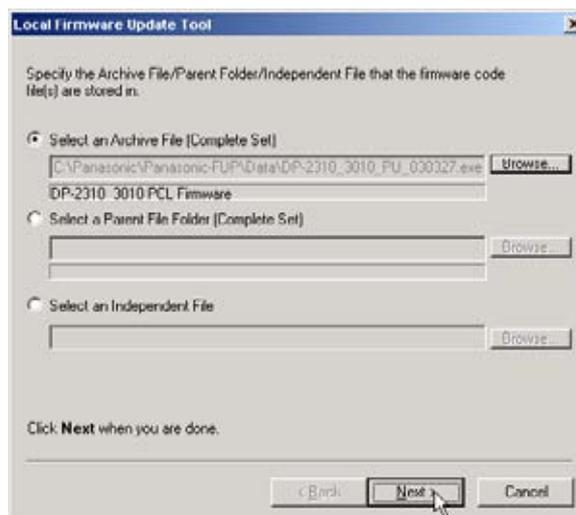
5b1 **Select a Parent File Folder (Complete Set)**

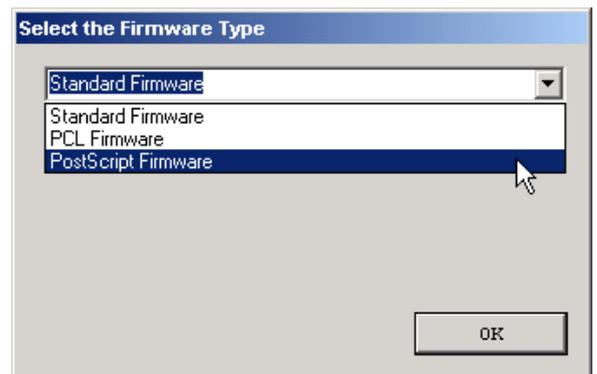Select "Select a Parent File Folder (Complete Set)" and click **[Browse...]** button.
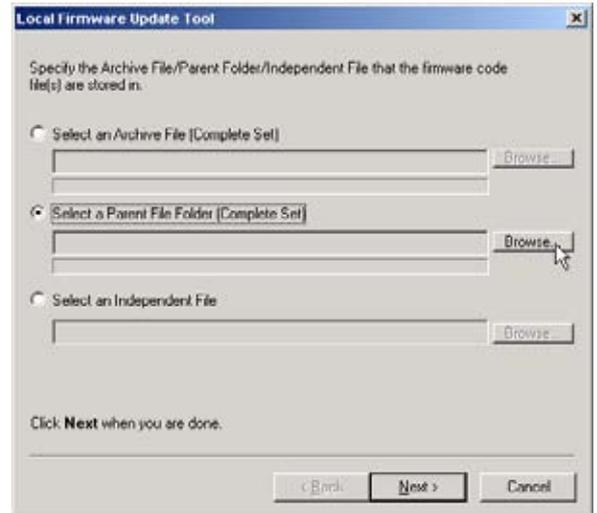
5b2 Select the Parent File Folder and Click **[OK]**.
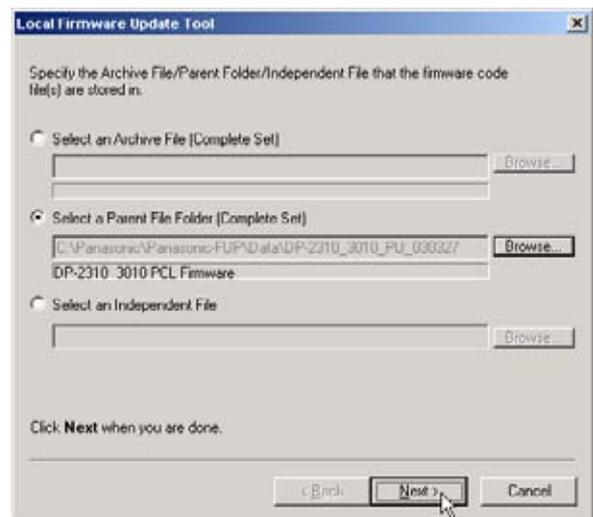
ex. \DP-2310_3010_PU_030327
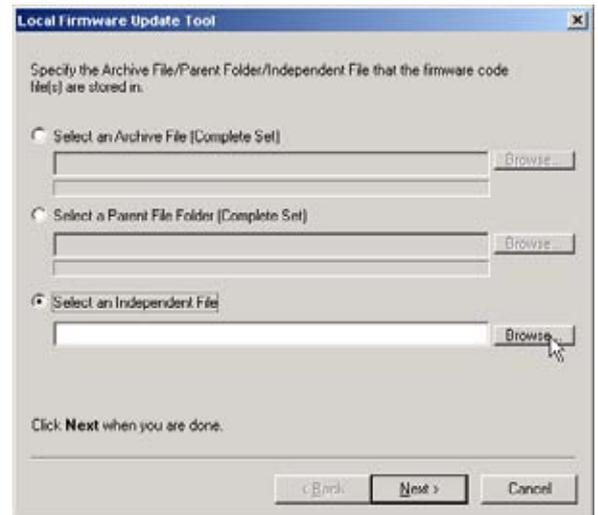
5b3 Select the Firmware Type and click **[OK]**.

5b4   Firmware Code File selection is completed.

Click [**Next>**].

5c1 **Select an Independent File**

Select "Select an Independent File" and click **[Browse...]** button.
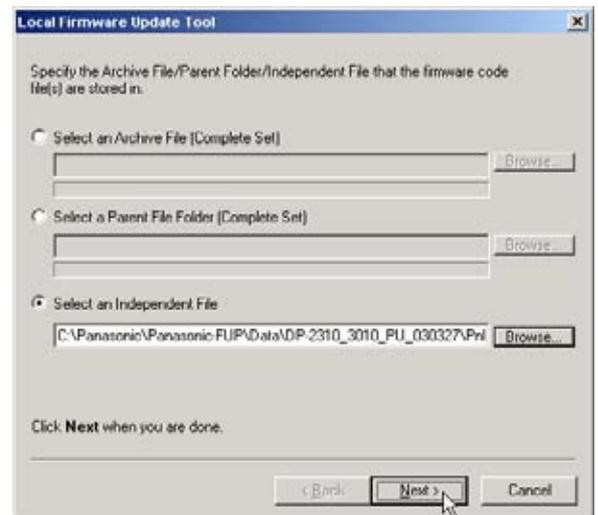
5c2 Select the Firmware Code File and click **[Open]**.

ex. SFDL2PNLAAV100000_PU.BIN
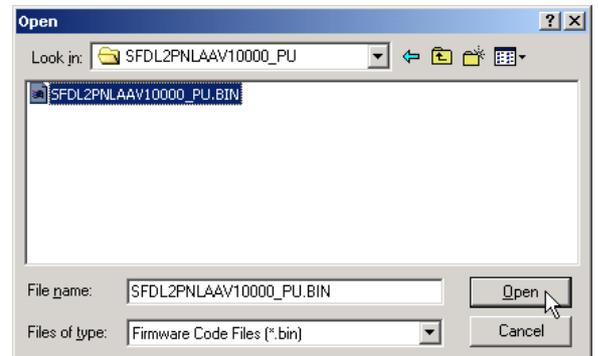
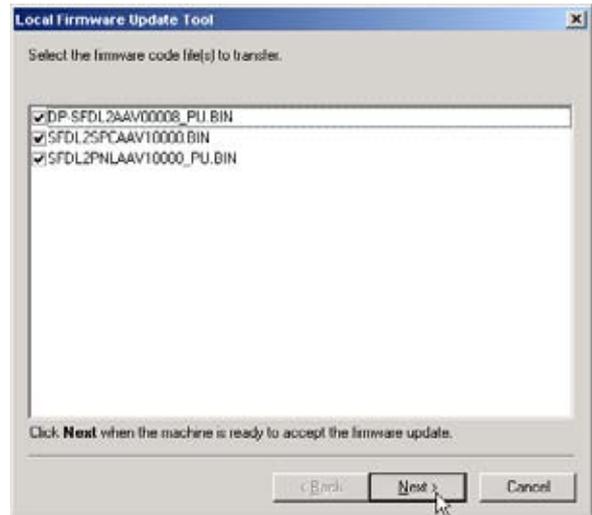**5c3** Firmware Code File selection is completed.

Click [**Next>**].

6 The selected Firmware Code File(s) are indicated. Uncheck the box if you do not need to transfer a file.

On the unit side:

Set the unit to the Firmware Update Mode.

Click [**Next>**].

7 The Firmware Code File starts transferring.

When there is more than one file to be updated, the operation will be the following;

For **USB connected** unit:
they are transferred in turn automatically if the unit is ready to receive the next firmware code file.

> **Note:** If you are updating the DP-2310/3010, the sending of sequential multiple files to the unit isn't done automatically. The "Waiting..." display on the PC will not advance to "Executing..." until you set the unit back to USB Firmware Update on the machine to start receiving the next file. See **Unit information of the Firmware Update Mode** on the next page.

For **Parallel connected** unit:
the confirmation screen is displayed when the current firmware code file transfer is finished and there are remaining firmware code files. Click **[OK]** when the machine is ready to receive the next file.
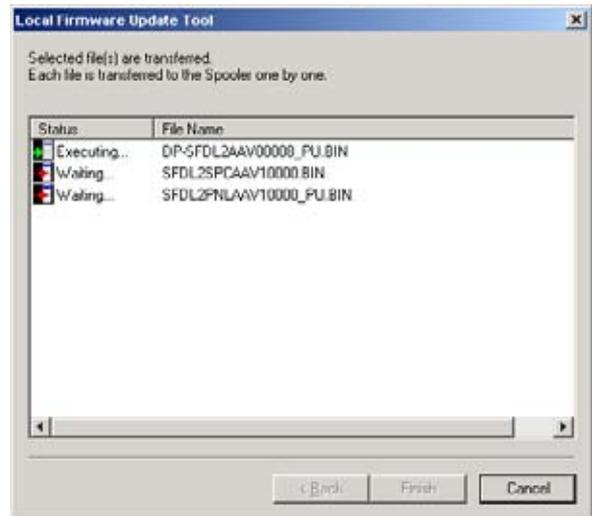
Unit information of the Firmware Update Mode:

For **USB Connected Unit (DP-2310/3010)**:
Every time the machine finishes receiving a firmware code file, **the unit does the delete and rewrite of the firmware code and will return to Service Mode again. Set the unit back to USB Firmware Update after the machine returns to Service Mode and continue the firmware update.**
When the last firmware code file (PNL) is received, the unit will re-boot automatically and return to standby. The unit doesn't re-boot automatically when you select an independent file and the PNL firmware wasn't transferred. Cycle the power Off-On and reset the unit if the firmware code file transfer is finished and the unit has returned to the Service Mode.

For **USB Connected Unit (Other models)**:
Every time the machine finishes receiving a firmware code file, **the unit does the delete and rewrite of the firmware code and will return to USB Firmware Update and continue the firmware update automatically.**
When the last firmware code file (AutoBoot) is received, the unit will re-boot automatically and return to standby. The unit doesn't boot automatically when you select an independent file. (The display returns to "Update in Progress") Cycle the power Off-On to reset the unit if the firmware code file transfer is finished and the display shows Completed.

For **Parallel Connected** Unit:
Every time the machine finishes receiving a firmware code file, the unit does the delete, rewrite of the firmware code and then boot. Set the unit back to Parallel Firmware Update in Service Mode after boot up, to continue the firmware update.

8 When the transfers of all the firmware files are finished, click **[Finish]** to close the tool.

Note: For USB Connected Unit only.
When the unit returns to standby, Plug and Play of the printer will popup.
Click **[Cancel]** to close the Printer Plug and Play window.