STINGER-C1 PRINTER CONTROLLER
(Machine Code: B305)

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1. OVERALL MACHINE INFORMATION

1.1 SPECIFICATIONS

1.1.1 GENERAL SPECIFICATIONS

Print Speed (Max.)	18 ppm (600 dpi, A4 sideways)
Printer Languages	PCL 6 and PCL 5e PostScript Level 3 (optional) Note: PostScript Level 3 is referred to as "PS3" in this manual.
Print Resolution	PCL 6 – 600 dpi PCL 5e – 300/600 dpi PS3 (optional) – 300/600 dpi
Memory (SDRAM)	16 MB (standard) 80 MB (maximum) Note: There is 1 slot for a 32 or 64 MB SDRAM DIMM.
Memory (Hard Disk)	1.6 GB (optional) Note: The HDD is used for print data spooling, proof print, font storage, and macro (form) storage.
Resident Fonts	PCL: 45 outline fonts and 1 bitmap font PS3 (optional): 136 fonts (24 Type 2 fonts and 112 Type 14 fonts)
Host Interfaces	IEEE1284/ECP parallel interface x 1 (standard) Ethernet 10BaseT/100BaseTX network interface x 1 (optional) Note: Refer to the NIB service manual for details.
Other Interfaces	ROM DIMM interface x 1 (for optional PS3) SDRAM DIMM interface x 1 (for optional memory) PC Card interface x 1 (for upgrading firmware)

Overall
Information

1.1.2 SUPPORTED PAPER SIZES

Paper	Size (W x L)	Tray 1			Tray 2/3			By-pass
		NA	EU	Asia	NA	EU	Asia	
Ledger	11 x 17"	Y	Y$^\#$	Y$^\#$	Y	Y	Y	Y$^\#$
Legal	8.5 x 14"	Y	Y$^\#$	Y$^\#$	Y	Y	Y	Y$^\#$
Letter SEF	8.5 x 11"	Y	Y	Y	Y	Y	Y	Y$^\#$
Letter LEF	11 x 8.5"	Y	Y	Y	Y	Y	Y	Y$^\#$
Half Letter SEF	5.5 x 8.5"	N	N	N	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$
Half Letter LEF	8.5 x 5.5"	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$
Executive SEF	7.25 x 10.5"	N	N	N	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$
Executive LEF	10.5 x 7.25"	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$
A3	297 x 420 mm	Y$^\#$	Y	Y	Y	Y	Y	Y$^\#$
B4	257 x 364 mm	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$
A4 SEF	210 x 297 mm	Y$^\#$	Y	Y	Y	Y	Y	Y$^\#$
A4 LEF	297 x 210 mm	Y	Y	Y	Y	Y	Y	Y$^\#$
B5 SEF	182 x 257 mm	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$
B5 LEF	257 x 182 mm	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$
A5 SEF	148 x 210 mm	N	N	N	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$
A5 LEF	210 x 148 mm	Y$^\#$	Y	Y	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$
A6 SEF	105 x 148 mm	N	N	N	N	N	N	Y$^\#$
A6 LEF	148 x 105 mm	N	N	N	N	N	N	N
Folio	8.25 x 13"	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$
Foolscap	8.5 x 13"	Y	Y	Y	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$
F	8 x 13"	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$
Com10 Env	4.125 x 9.5"	N	N	N	N	N	N	Y$^\#$
Monarch Env	3.875 x 7.5"	N	N	N	N	N	N	Y$^\#$
C6 Env	114 x 162 mm	N	N	N	N	N	N	Y$^\#$
C5 Env	162 x 229 mm	N	N	N	N	N	N	Y$^\#$
DL Env	110 x 220 mm	N	N	N	N	N	N	Y$^\#$
8K	267 x 390 mm	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$
16K SEF	195 x 267 mm	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$
16K LEF	267 x 195 mm	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$	Y$^\#$
Custom	[Minimum] 90 x 148 mm [Maximum] 297 x 432 mm	N	N	N	N	N	N	Y^C

Keys:

Y	Supported. The paper size sensor detects this paper size.
Y$^\#$	Supported. The user has to select the correct paper size for the tray.
Y^C	Supported. The user has to enter the width and length of the paper.
N	Not supported.

NA: North America version, EU: Europe version

1.2 SOFTWARE ACCESSORIES

The printer drivers and utility software are provided on one CD-ROM. An auto-run installer allows you to select which components to install. The service tools are not provided on the CD-ROM.

1.2.1 PRINTER DRIVERS

Printer Language	Windows 3.1x	Windows 95/98	Windows NT4.0	Macintosh
PCL 6	Yes	Yes	Yes	No
PCL 5e	Yes	Yes	Yes	No
PS3	Yes	Yes	Yes	Yes

NOTE: 1) The printer drivers for Windows NT 4.0 are only for the Intel x86 platform. There is no Windows NT 4.0 printer driver for PowerPC, Alpha, or MIPS platforms.
   2) The PS3 drivers are all genuine AdobePS drivers. A PPD file for each operating system is provided with the driver.
   3) The PS3 drivers for Macintosh support Mac OS 7.1 or later versions.
   4) The PS3 drivers for Windows 3.1x and Windows NT4.0 do not support the "Proof Print" function.

1.2.2 UTILITY SOFTWARE

Software	Description
Afga Font Manager (Win3.1x, 95/98, NT4)	A font management utility with screen fonts for the printer.
Aficio Manager for Admin (Win 95/98, NT4)	A printer management utility for network administrators. NIB setup utilities are also available.
Aficio Manager for Client (Win95/98, NT4)	A printer management utility for client users.
Multi-Direct Print (Win95/98, NT4)	A utility for peer-to-peer printing over a NetBEUI or TCP/IP network.

1.2.3 SERVICE TOOLS

Software	Description
NBTFTP	NIB firmware update utility for use on a NetBEUI network. This utility is not on the Driver and Utilities CD-ROM; it is issued separately as a service tool

1.3 **MACHINE OVERVIEW**
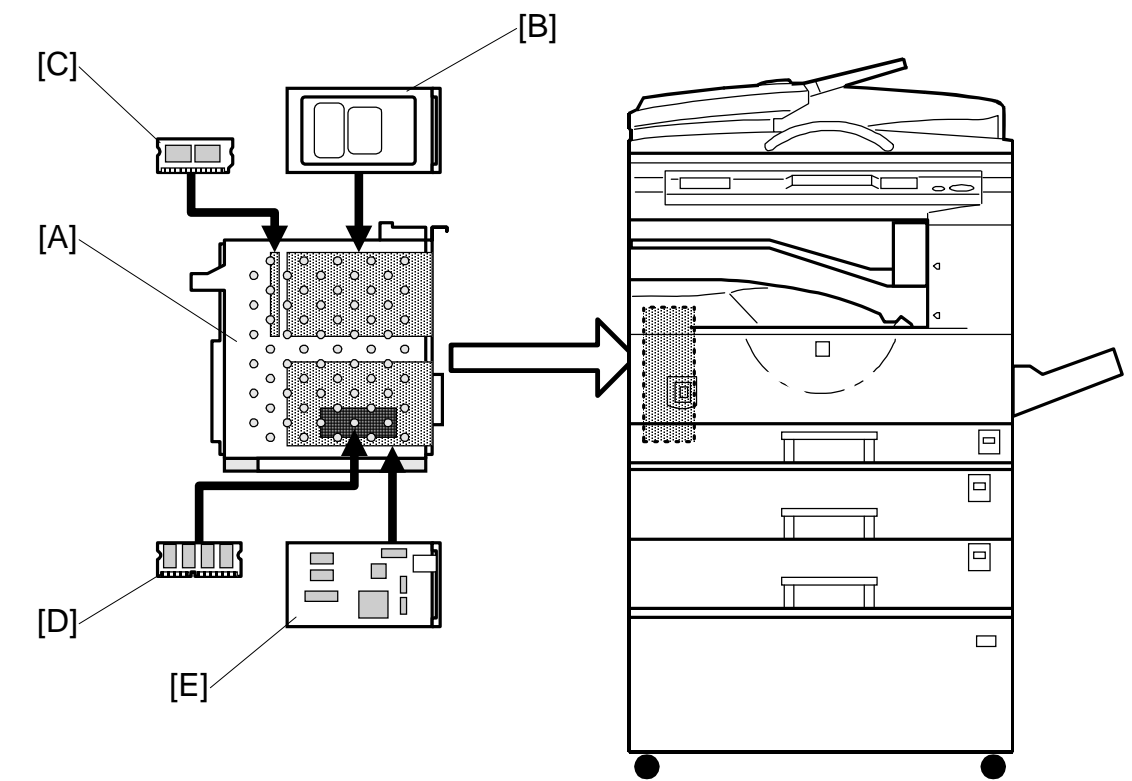
B305V501.WMF

Ref.	Component	Machine Code
A	Printer Controller	B305
B	Hard Disk (option)	G690
C	PS3 Module (option)	B308
D	SDRAM Module (option)	G688
E	Network Interface Board (option)	B307

1.4 BLOCK DIAGRAM
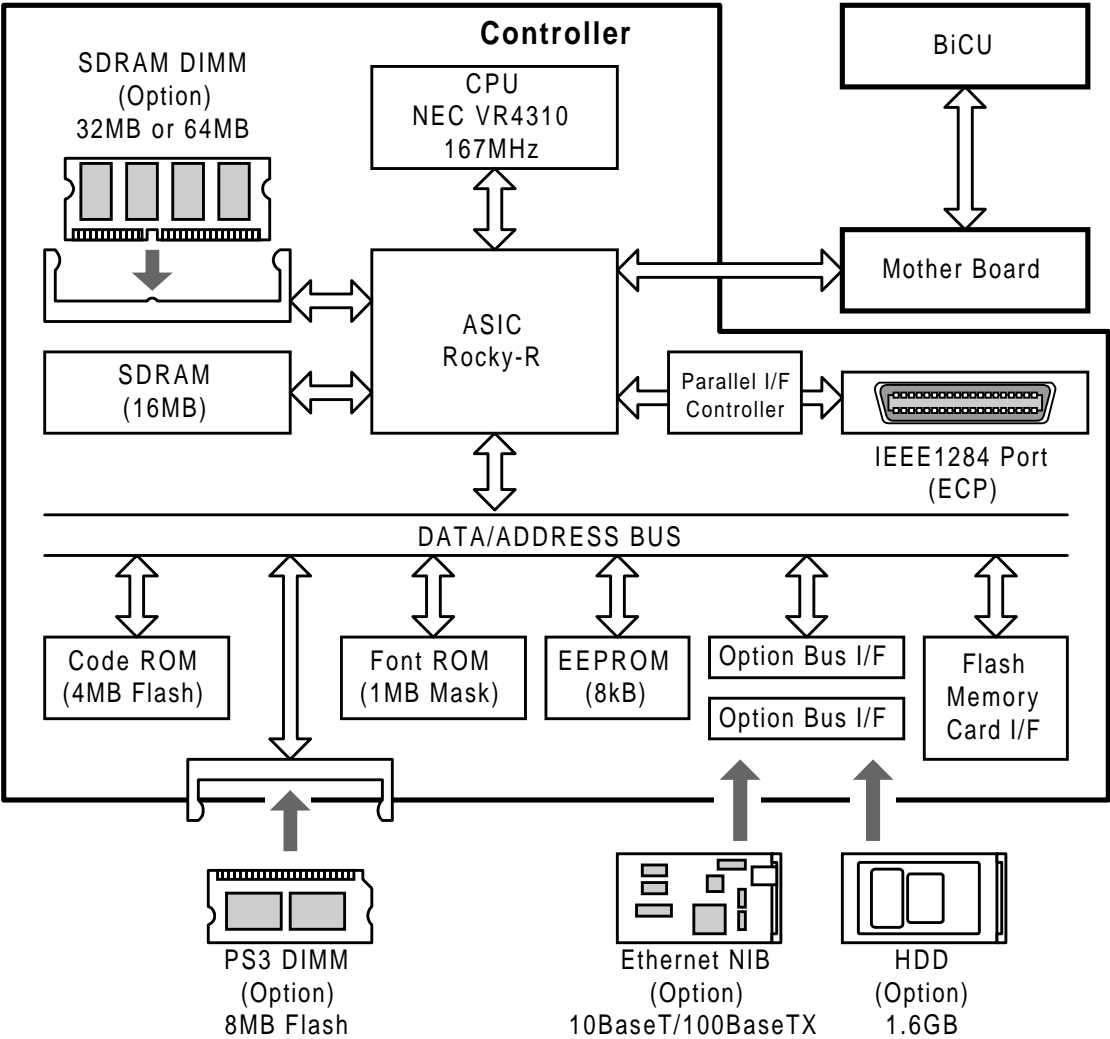
B305V502.WMF

The controller board contains a CPU (NEC VR4310) and an ASIC (Rocky-R). The ASIC controls the main memory (SDRAM), engine interface, ROM interface, IEEE1284 parallel interface, two option bus interfaces for the NIB and HDD, and an IC card interface for upgrading firmware.

There is one optional memory socket that can have either a 32MB or a 64MB SDRAM DIMM module to increase RAM capacity and enable RAM collation. With the 64MB SDRAM module, the RAM capacity is increased to 80MB. There is another memory socket for the optional PS3 DIMM.

The two option bus interfaces allow the user to install an Ethernet NIB and a hard disk drive (allows the Proof Print, Disk Collation, and font and form download features).

The flash memory card interface allows the firmware for the controller, PostScript, and NIB to be updated.

2.   DETAILED SECTIONS DESCRIPTIONS

2.1   ENGINE FUNCTIONS

2.1.1 IMAGE DATA PROCESSING

The controller uses the engine's FCI (Fine Character Image) function for smoothing and toner saving mode, but these two functions do not work at the same time. When toner saving mode is enabled, edge smoothing is automatically disabled. The memory circuit in the engine (MSU) is not used for printing from the controller.

Detailed Descriptions

2.1.2 PRINT PRIORITY AND INTERLEAVING

[User Tools] – [System Settings] – [Print Priority] defines how the copy, fax and printer applications share a single print engine.

NOTE: "[User Tools] – [System Settings] – [Print Priority]" indicates that you press the System Tools key, select System from the menu, then select "Print Priority" from the next menu.

Display Priority

A print request from the application (copy, fax, or printer) now displayed on the LCD has the highest priority. For example, the machine is in the middle of a large copy run, and a user wants to print a document from a computer immediately. In this case, pressing the Printer key to switch the LCD display to Printer mode will interrupt the copy run and print the document from the computer, and the copy run will resume after the document has been printed. If the LCD display stays in Copy mode, the user will have to wait until the copy run finishes.

Note that the Interrupt key on the operation panel does not work like the Printer key in the above example. The Interrupt key is for interrupting a copy run to do another copy operation.

Copier, Fax or Printer

The selected application has the highest priority, regardless of which mode the LCD is in. If there are multiple print requests to the print engine, the selected application will print first. Other applications have to wait until the selected application finishes printing.

Interleave

All the applications have the same priority. An application can print even while another application is using the printer engine. If there are multiple print requests to the print engine, the engine will adjust its print priorities and the sequence of printed pages.

For example, if a received fax message and a copy job are waiting for printing, the machine prints 5 pages of the fax, then 5 pages of the copy job, then the next 5 pages of the fax, and so on.

Copier SP mode 5-951 determines the number of pages that are printed from one job before switching over to the next. The default is 5 pages.

NOTE: Using the Interleave function is not recommended if the machine does not have multiple output trays. This is because the printouts from copy, fax, and printer applications may be mixed up in a single output tray if the Interleave function is enabled.

2.2 CONTROLLER FUNCTIONS

2.2.1 PAPER SIZE DETECTION AND SELECTION

The controller uses the paper sizes detected by the print engine for trays 1, 2 and 3. For the by-pass tray, the user has to specify a paper size using the Job Control menu in the Printer User Tools. Refer to section 1.1.2 for details on supported paper sizes.

When the printer controller receives a print job, the controller uses the paper size specified in the PJL, PCL, or PS commands for printing.

Detailed Descriptions

2.2.2 PAPER SOURCE SELECTION

Auto Tray Select
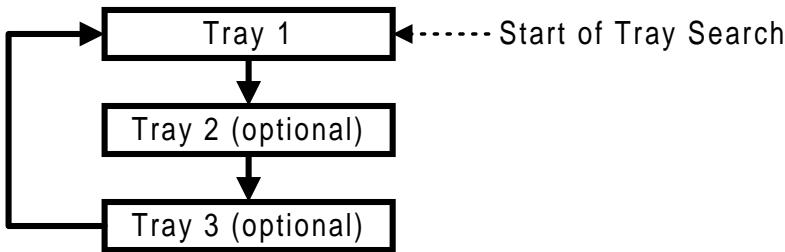
B305D501.WMF

The controller searches for the specified paper size, starting from Tray 1, and uses the first tray that has the specified paper size. If the selected tray is pulled out or paper runs out during printing, the controller searches for another tray with the specific paper size and if found, automatically switches to it. If the controller cannot find another paper tray with the specified paper size, printing stops and the LCD displays the message "Add Paper to Tray 1".

Manual Tray Select
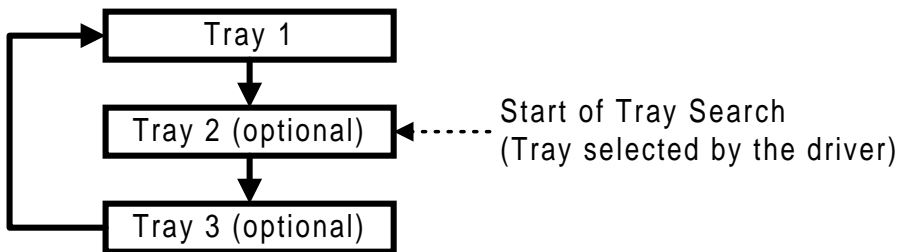
B305D502.WMF

When the printer driver specifies a tray, the selected tray becomes the first tray checked at the start of the tray search. If the selected tray does not have the size of paper specified by the driver, the controller searches the other trays for the same paper size.

NOTE: Tray Priority in the Job Control menu does not specify the start of the tray search, but specifies the paper size in the selected tray as the default paper size.

Tray Lock

If Tray Lock is enabled for a tray, the controller does not use the "locked" tray in the tray search process. If a tray has, for example, coloured A4 size paper for fax prints, enable tray lock for that tray so that the controller does not select the tray for printing.

If the printer driver selects a "locked" tray, the controller uses the tray for printing only when the specified paper size matches the actual paper size in the tray.

By-pass Tray

The by-pass tray is not part of the automatic tray search. To print from the by-pass tray, the user has to select the by-pass tray. Even if the by-pass tray is empty, the controller will not switch to another tray; the message on the LCD asks the user to add paper to the by-pass tray.

NOTE: Collation is disabled when the by-pass tray is selected.

Paper Size Mismatch

When the controller could not find the specified paper size in any of the trays, the machine displays an error message, e.g., "Load 8 ½ x 11".

Then the user can either load the requested paper size in a tray or select another tray, e.g., a tray that contains A4 size paper, by pressing the "Form Feed" key.

The controller will print the job if the specified paper size is detected in a tray, or if the user presses the Enter key after selecting a tray.

2.2.3 OUTPUT TRAY SELECTION

Output Tray Priority in the System User Tools specifies the default paper output tray for each application. If a print job does not specify an output tray or the driver specifies the Default Tray, the default tray is used.

If the driver specifies an output tray, this overrides the default tray setting in the user tools.

If the option one-bin tray is selected but it has an error, the standard output tray is used.

2.2.4 COLLATION (SORT)

When the controller has either an optional SDRAM DIMM or an optional HDD installed, collation is enabled.

If the memory or HDD becomes full while storing a job that uses collation, the controller prints the pages that have been stored for collation, empties the memory or HDD, then continues printing the rest of the pages with collation.

Memory Capacity	Collation	Maximum Pages	Note
16MB (standard)	Not possible		
48MB (with 32MB)	Possible	30 pages	Note 1)
80MB (with 64MB)	Possible	50 pages	Note 1)
With HDD	Possible	1500 pages	Note 2)

NOTE: 1) The number of pages is calculated using a sample MS-Word document that contains 5,000 characters of plain text. The sample document takes 409.6kB of memory space per page.
If the document is more complex, the memory can hold fewer pages. If the document is simpler, e.g., 1,000 characters per page, the memory can hold more pages.

2) This is the maximum number of pages that the controller can handle.
If the document is more complex, the HDD can hold fewer pages. Even if the document is simpler, e.g., 1,000 characters per page, the HDD cannot hold more than 1,500 pages.
To calculate the pages using the same document as specified in Note 1, the HDD can hold up to 1,250 pages.
About 500 MB of disk space is used for collation.

2.2.5 PROOF PRINT
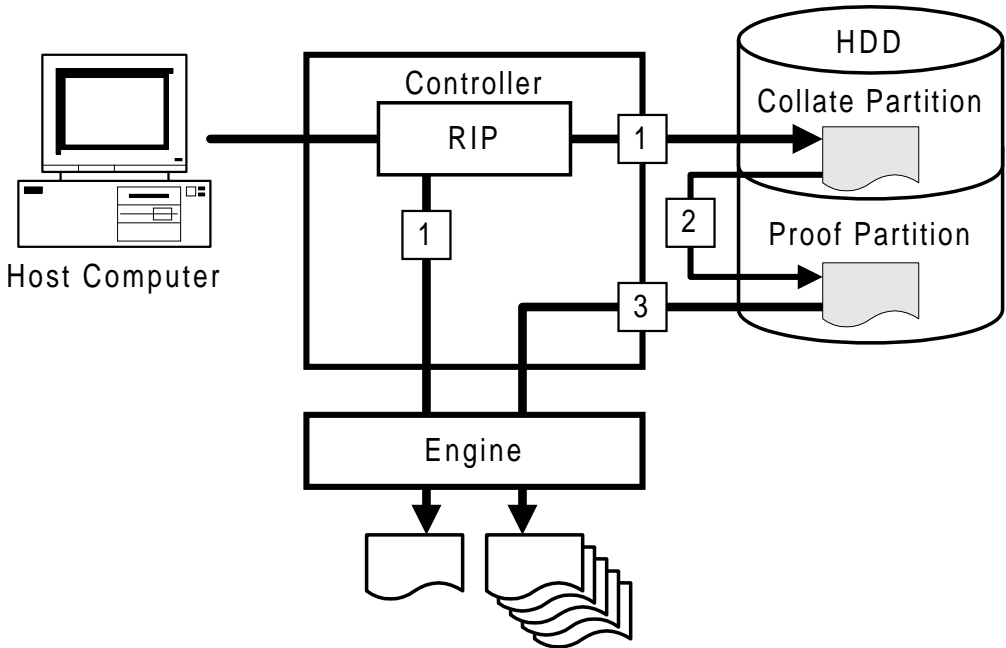
B305D503.WMF

The Proof Print function gives users a chance to check the print results before starting a multiple-set print run.

When printing from a host computer, a print job is sent to the controller with a user ID and the current time. Then the controller executes raster image processing (RIP), stores the image data onto the collation partition of the hard disk, and prints one set of the document (step [1] in the above diagram). Then the controller moves the raster image file to the proof print partition of the hard disk (step [2] in the above diagram).

After the user checks that the print result is OK, the user selects the file using the machine's operation panel, and print the rest of the sets (step [3] in the above diagram). After all sets have been printed, the controller deletes the file automatically.

If the proof print result is not OK, the user must delete the file manually.

If there is no available space for a new file in the proof print partition, the controller deletes the file from the collation partition after printing the first set, even though it cannot copy the file to the proof print partition..

NOTE: 1) Proof print requires the installation of an optional hard disk.
2) The proof print partition size is about 600 MB. It can hold up to 30 files or 2,000 pages. The maximum number of pages depends on how complex the pages are.
3) Proof print is available with the PCL drivers, the Windows 95/98 PostScript driver, and the Macintosh PostScript driver (with the Proof Print plug-in). The PostScript drivers for Windows 3.x and Windows NT4.0 do not support the proof print function.

2.2.6 **RESET OPERATIONS**

Job Reset

This resets the job being processed and ignores all incoming data until a data end is received.

If a collate job or a proof print job is being printed, the controller stops printing and deletes the file from the RAM or HDD.
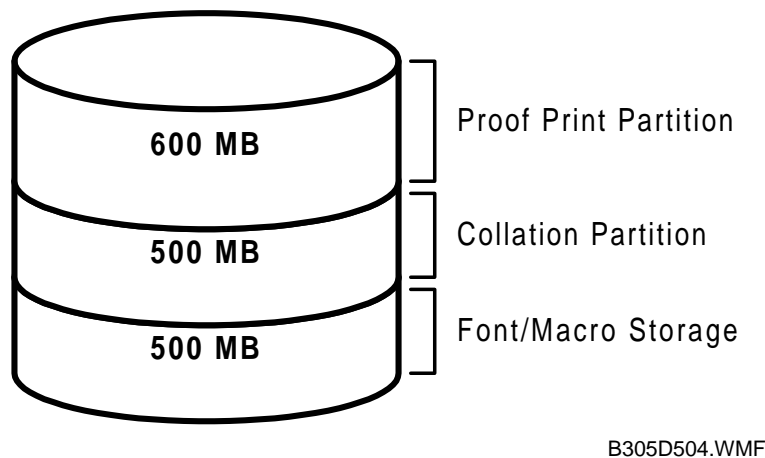
System Reset

This initializes the collation data, proof print data, fonts and macros downloaded to the RAM. The menu settings, NIB settings, system log data, and error codes remain unchanged.

NOTE: Do not use this when the controller is receiving a print job.

Menu Reset

This resets all the menu settings to their default values, including the NIB settings.

2.2.7 **HDD (OPTIONAL)**


```
┌──────────────────────┐
│                      │┐
│      600 MB          │├─ Proof Print Partition
│                      │┘
├──────────────────────┤
│      500 MB          │├─ Collation Partition
│                      │┘
├──────────────────────┤
│      500 MB          │├─ Font/Macro Storage
│                      │┘
└──────────────────────┘
```

B305D504.WMF

The optional 1.6 GB HDD has three partitions.

- The Proof Print partition uses 600 MB for Proof Print file storage.
- The Collation partition uses 500 MB for collation data storage.
- The last partition uses 500 MB for font and macro storage.

3. INSTALLATION PROCEDURES

3.1 PRECAUTIONS

| ⚠**CAUTION** |
| --- |
| **Before installing this option, do the following:** |
| 1. **Ensure that an appropriate Plug&Play name has been programmed for the machine using SP5-907.** |
| 2. **If the data-in lamp on the operation panel is blinking or lit, wait until a document or report is printed, then turn off the machine.** |
| 3. **If there is a fax unit in the machine, print out all messages stored in the memory, the lists of user-programmed items, and the system parameter list.** |
| 4. **Turn off the main switch and disconnect the power cord, the telephone cable(s), and the Ethernet cable.** |
| 5. **If a fax unit, PC fax expander, or ISDN G4 kit is installed, remove them before installing the printer controller.** |

Installation

3.2 PRINTER CONTROLLER

NOTE: If there are any optional components for installation, install them on the controller before installing the controller.
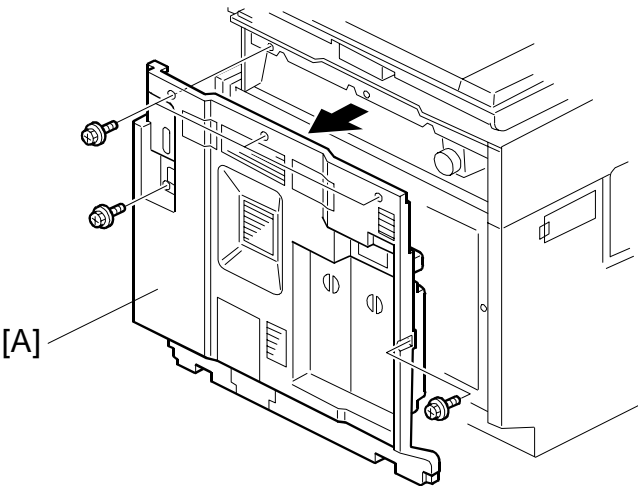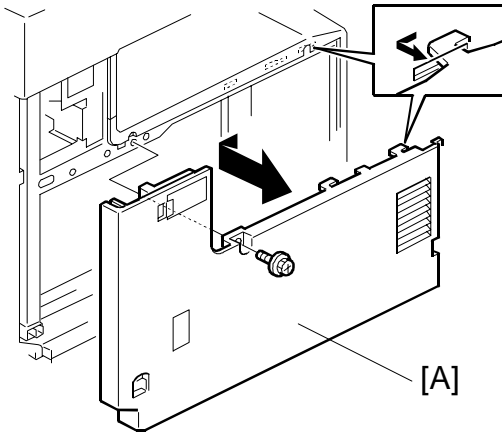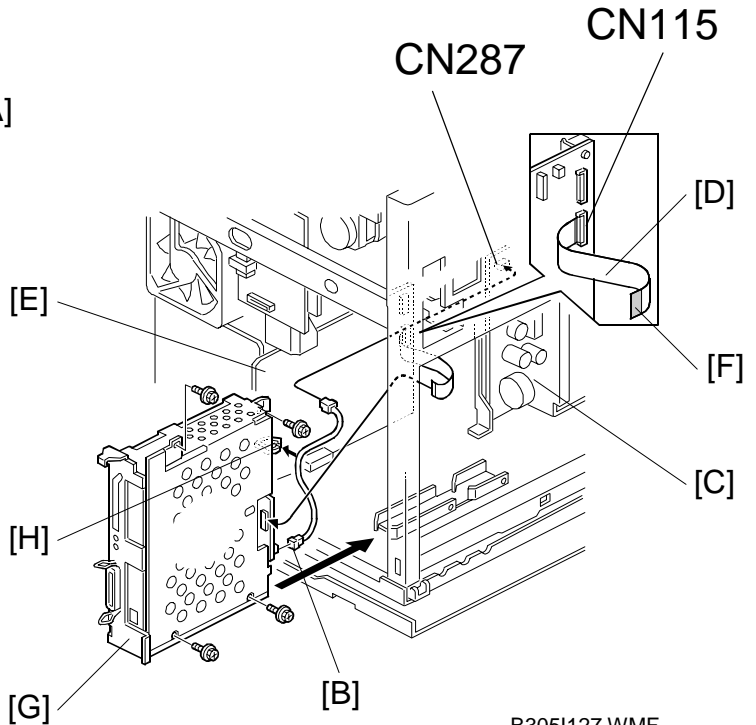

B305I175.WMF
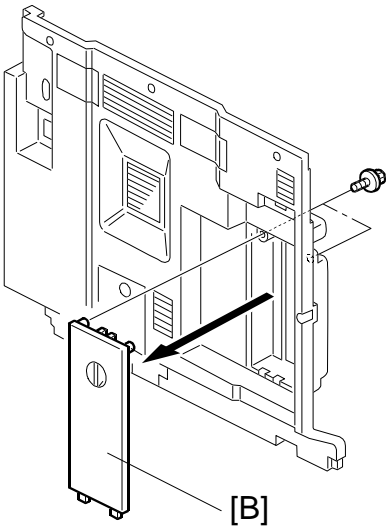
B305I115.WMF

1. Remove the rear cover [A] (5 screws).

2. Remove the interface cover [B] (2 screws).

B305I176.WMF

CN115

CN287

[D]

[E]

[F]

[H]

[C]

[G]   [B]

B305I127.WMF

3. Remove the left cover [A], as shown (1 screw).

4. Connect the power supply cable [B] to CN287 on the power supply unit [C].

5. Connect the flat cable [D] to CN115 on the BICU [E].
   When connecting the flat cable, make sure that the blue edge [F] of the flat cable faces the left side of the machine (away from the BICU board).

6. Install the printer controller [G] (4 screws).
   When installing the printer controller, make sure not to pinch the power supply cable.

7. Connect the power supply cable and the flat cable to the printer controller.

8. Secure the power supply cable to the clamp [H].

9. Re-install the rear and left covers.
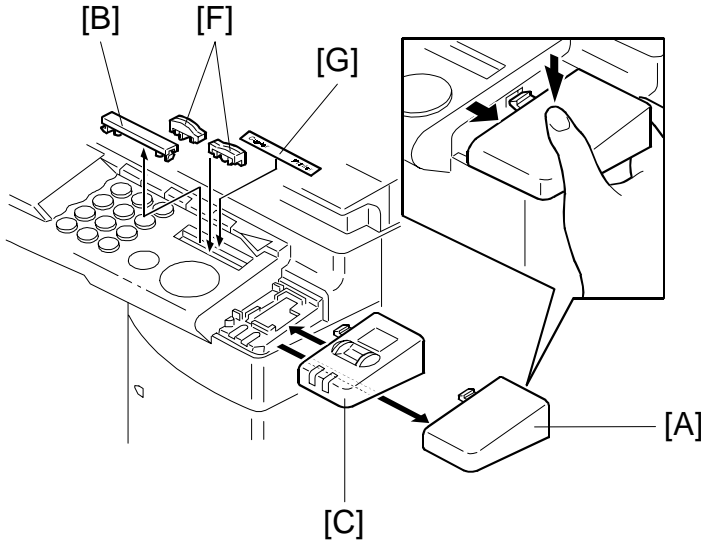
Installation

B305I138.WMF
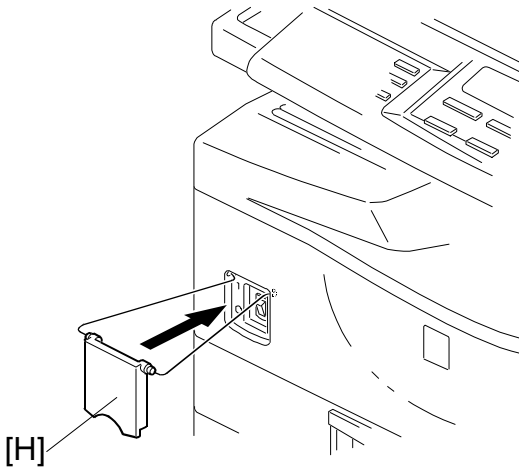
B305I177.WMF
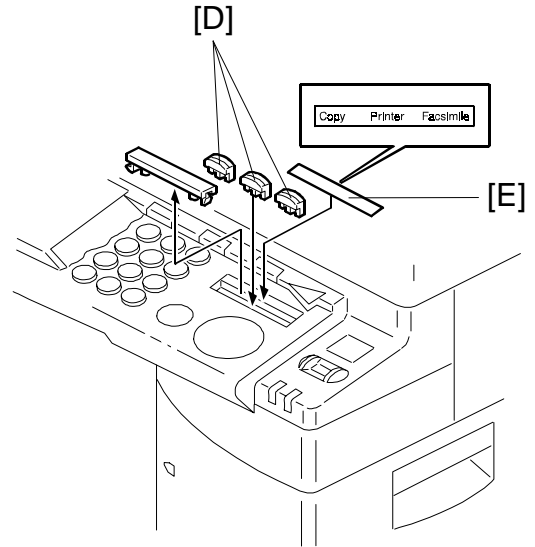
B305I139.WMF

10. Remove the covers [A] and [B] from the operation panel.

11. Install the switch cover [C] on the operation panel.

12. If the machine has the fax unit option, install the keys [D] and the decal (instead of the basic decal) [E] as shown. The decal [E] has "Copy", "Printer", and "Facsimile" on it.
    If the machine does not have the fax unit option, install the keys [F] and the decal [G] as shown. The decal [G] has "Copy" and "Printer" on it.

13. Install the main switch cover [H].

14. Turn on the machine and print the Printer Configuration Page ([User Tools] – [Printer] – [List Print]).
    Ensure that the all the installed options are listed on the Configuration Page.

3.3 HARD DISK (HDD)

1. Remove the rear cover (5 screws).

2. Remove the left cover (1 screw).

[B]

[A]

G690I128.WMF

[C]
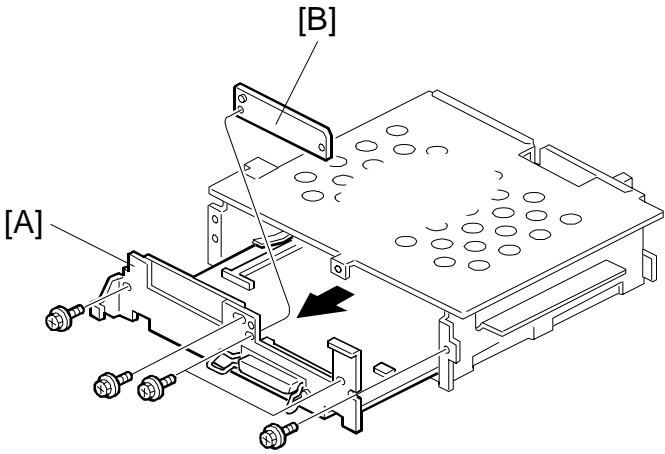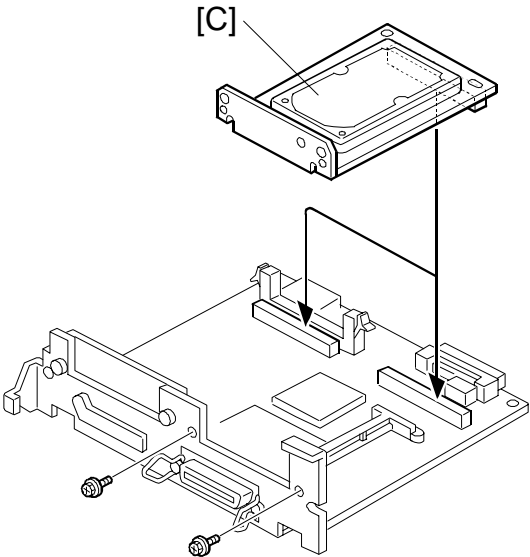
G690I180.WMF

3. Remove the printer controller [A] (3 screws) and cover bracket [B] (2 screws).

4. Attach the hard disk drive [C] to either CN506 or CN507 on the controller, as shown (2 screws removed in step 4, and 1 connector).
    NOTE: The controller can have only one optional HDD.

5. Re-install the printer controller.

6. Turn on the machine and print the Printer Configuration Page ([User Tools] – [Printer] – [List Print]). Verify that "Printer Hard Disk Drive" is listed.

3.4   NETWORK INTERFACE BOARD (NIB)

1. Remove the rear cover (5 screws).

2. Remove the left cover (1 screw).
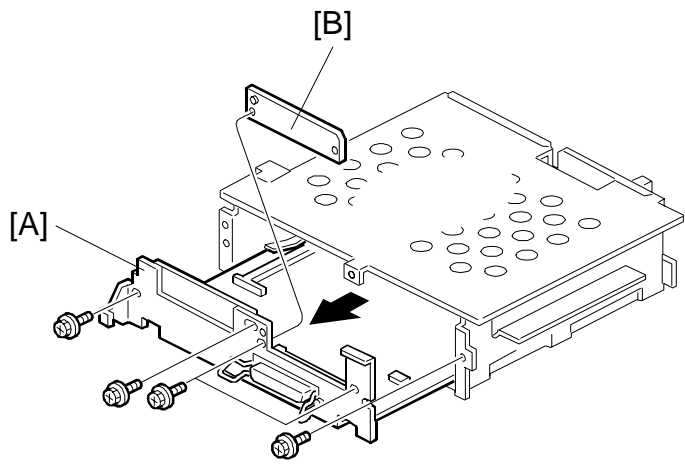
[B]

[A]

B308I128.WMF
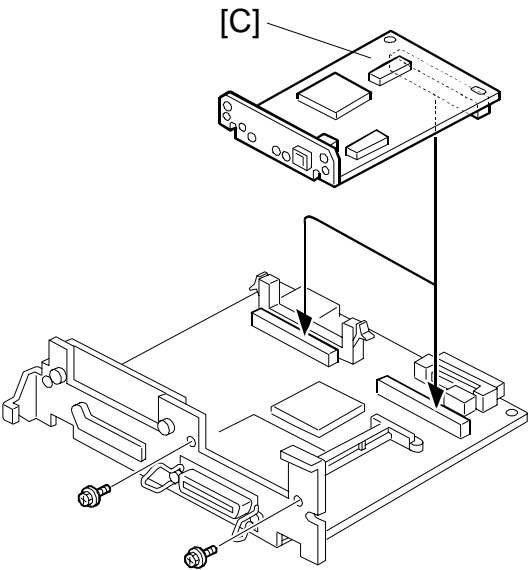
[C]

B307I179.WMF

Installation

3. Remove the printer controller [A] (3 screws) and cover bracket [B] (2 screws).

4. Attach the network interface board [C] to either CN506 or CN507 on the controller, as shown (2 screws removed in step 4, and 1 connector).
    NOTE: The controller can have only one optional NIB.

5. Re-install the printer controller.

[A]
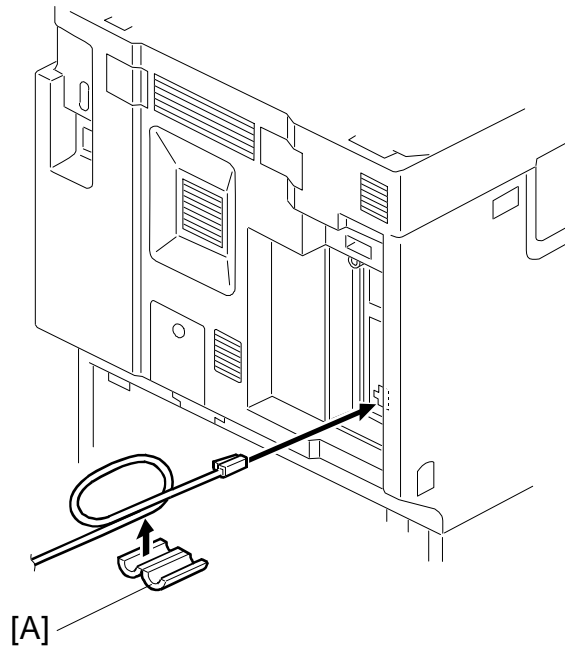
B307I187.WMF

6. Attach the core [A] to the Ethernet cable, as shown. Then connect it to the NIB.

NOTE: 1) An Ethernet cable is not supplied with the NIB option.
2) A STP (Shielded Twisted Pair) cable, category 5 or better, must be used to meet electromagnetic radiation standards.
3) If the ISDN G4 option is installed, make sure not to connect the Ethernet cable to the ISDN port by mistake.

7. Turn on the machine and ensure that the first and the third LEDs from the top are both lit.

8. Print the Printer Configuration Page ([User Tools] – [Printer] – [List Print]) and confirm that "Network Interface Board" is on the list.

9. Print the NIB configuration sheet by pressing the black button on the NIB for 2 seconds.
For more information about NIB setup, refer to the NIB service manual and the operating instructions.

3.5 POSTSCRIPT DIMM

1. Remove the rear cover (5 screws).

2. Remove the left cover (1 screw).

[A]

B308I129.WMF

[B]

B308I178.WMF

Installation
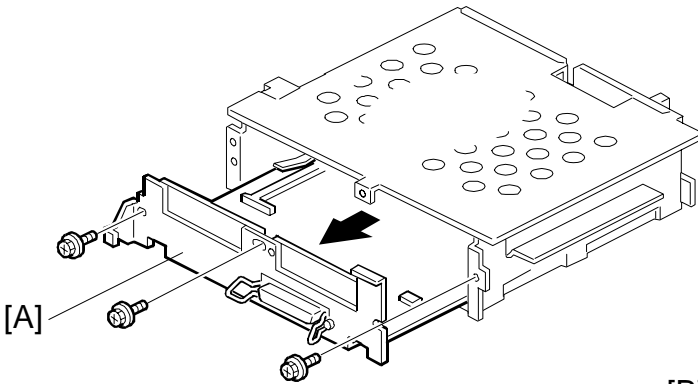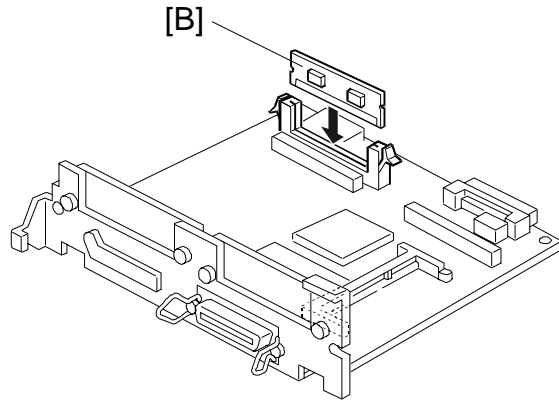
3. Remove the printer controller [A] (3 screws).

4. Attach the PostScript kit [B] to the printer controller.

5. Re-install the printer controller.

[A]
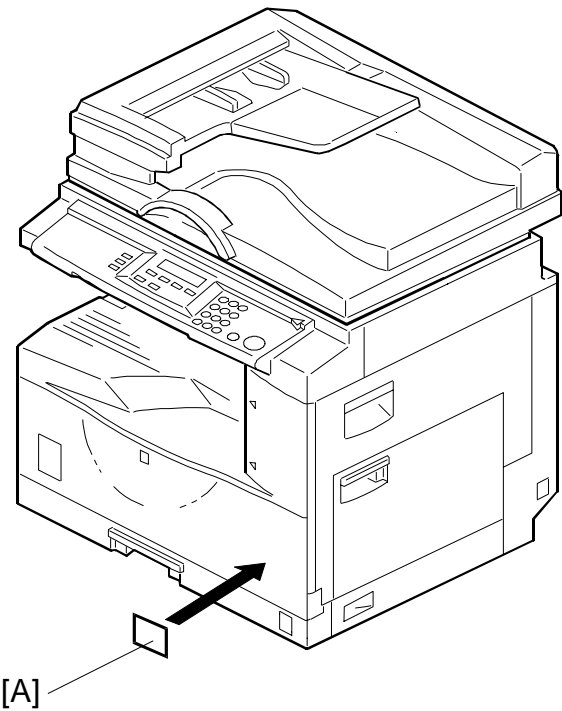
B308I130.WMF

6. Attach the PostScript decal [A] to the front cover, as shown.

7. Turn on the machine and print the Printer Configuration Page ([User Tools] – [Printer] – [List Print]). Verify that "Adobe PostScript 3" is on the list.

3.6 MEMORY (SDRAM DIMM)

1. Remove the rear cover (5 screws).

2. Remove the left cover (1 screw).
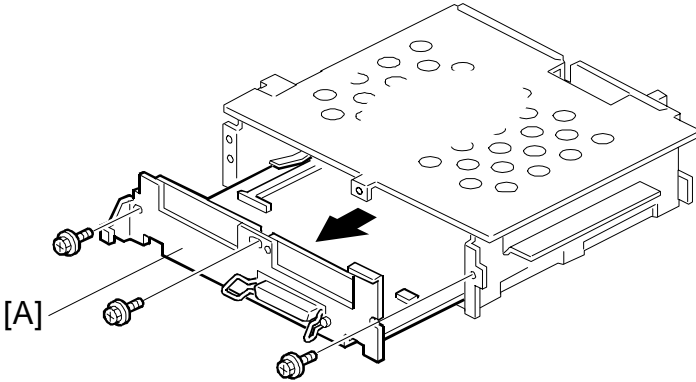
G688I129.WMF
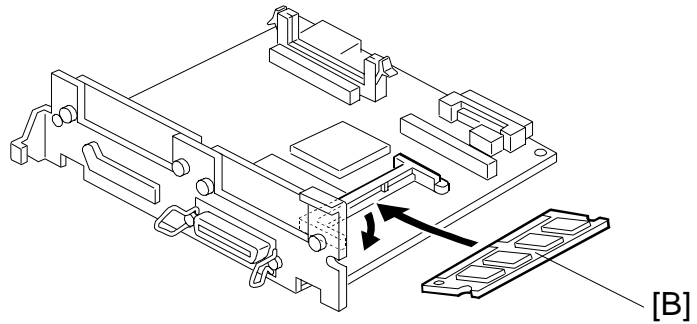
G688I178.WMF

3. Remove the printer controller [A] (3 screws).

4. Attach the printer memory [B] to the printer controller, as shown.

5. Re-install the printer controller.

6. Turn on the machine and print the Printer Configuration Page ([User Tools] – [Printer] – [List Print]). Verify that the total memory has increased.

4. SERVICE TABLES

4.1 PRECAUTION

Do not turn off the machine, or switch the controller off-line, while the data-in LED is blinking or lit. Some data that the controller has received for raster image processing may be lost.

Check with the customer before maintenance to avoid such data loss.

4.2 SERVICE PROGRAM MODE OVERVIEW

4.2.1 HOW TO ENTER THE SP MODE

Entering and exiting SP mode is the same as for copier and fax, as follows.

**NOTE:** Before using any of the SP modes, disconnect the parallel and Ethernet cables.

Entering Printer SP mode

⊛/⊘ → ⎀1⎀ → ⎀0⎀ → ⎀7⎀ → C/⊘ (Hold for more than 3 seconds.)

Select "4. Printer". The Printer SP mode main menu appears.

Exiting SP mode

Select "3. End" from the Printer SP mode main menu, then exit the SP mode main menu.

4.2.2 SP MODE TABLE

SERVICE MENU

		Title	Description
A	BitSw#1 Set		Adjusts bit switch settings.
B	BitSw#2 Set		Refer to section 4.3.1 for details.
C	BitSw#3 Set		
D	BitSw#4 Set		**Note:** The bit switches are not used at the moment.
E	NVRAM Clear 1		Initializes the controller NVRAM except bit switches, NIB settings, and log data.
F	NVRAM Clear 2		Initializes the NVRAM on the controller.
G	NVRAM Clear 3		Initializes the NVRAM on the NIB.
H	Counter Clear		Initializes all counters to zero.
I	Diag. Error		Displays diagnostics error codes on the LCD.
K	Service Print		Prints the service summary sheet.

Service Tables

SERVICE TOOLS

	Title	Description
H	HDD Test	Verifies the FAT and directory entries on the HDD.
I	HDD Format	Partitions and formats the HDD.
L	NIB Read/Write	Backs up the NIB NVRAM and restores it.

4.3 SERVICE MENU

4.3.1 BIT SWITCH PROGRAMMING

1. Enter the Printer SP mode, and select "1. Service Menu".

2. Select A, B, C, or D for the desired bit switch, then press [Enter].

3. Press [Enter] in the "Bit Switch Set" menu.

4. Adjust the bit switch using the following keys.
    - ⬅ ➡ : Change the switch setting.
    - [UP] [DOWN]: Move to the next bit.
    - [CANCEL]: Exit without saving changes.
    - [ENTER]: Exit and save changes.

5. Press [Enter] to save changes and exit.

BIT SWITCHES

Note: The bit switches are not used at the moment.

4.3.2 NVRAM RESET

⚠**CAUTION**

Print the service summary report, controller configuration page, and NIB configuration page before resetting the NVRAM(s).

DIAG. ERROR LOG AND PAPER TRAY SETTINGS RESET

This initializes the following settings in the controller NVRAM.
- Controller diagnostics error log
- Paper type settings for trays
- Paper size setting for the by-pass tray

1. Enter the Printer SP mode, and select "1. Service Menu".

2. Select "E. NVRAM Clear 1", then press [Enter].

3. Ensure that you have printed the service summary report, then press [Enter].

4. Press [Enter] to execute. Or press [Cancel] to exit.

CONTROLLER NVRAM RESET

This initializes all the data in the controller NVRAM, except the NIB settings.

1. Enter the Printer SP mode, and select "1. Service Menu".

2. Select "F. NVRAM Clear 2", then press [Enter].

3. Ensure that you have printed the service summary report and controller configuration page, then press [Enter].

4. Press [Enter] to execute. Or press [Cancel] to exit.

NIB NVRAM RESET

This initializes all the data in the NIB NVRAM.

1. Enter the Printer SP mode, and select "1. Service Menu".

2. Select "G. NVRAM Clear 3", then press [Enter].

3. Ensure that you have printed the NIB configuration page, then press [Enter].

4. Press [Enter] to execute. Or press [Cancel] to exit.

COUNTER RESET

This initializes all the print counters in the controller NVRAM. Refer to the service summary report for the counters in the controller NVRAM.

1. Enter the Printer SP mode, and select "1. Service Menu".

2. Select "H. Counter Clear", then press [Enter].

3. Press [Enter] to reset all the print counters.

4. Press [Enter] to execute. Or press [Cancel] to exit.

Service Tables

4.3.3 POWER-ON DIAGNOSTICS ERROR DISPLAY

This displays the latest 10 error codes that were found during the power-on self-test. Refer to chapter 6 (Troubleshooting) for details of the error codes.

1. Enter the Printer SP mode, and select "1. Service Menu".

2. Select "I. Diag. Error", then press [Enter].

3. Check the error codes on the LCD.
    - [UP] [DOWN]: Move to the previous/next page.

4. Press [Cancel] to exit.

4.3.4 SERVICE SUMMARY

This prints a summary of all the controller settings.

1. Enter the Printer SP mode, and select "1. Service Menu".

2. Select "K. Service Print", then press [Enter].

3. Press [Enter] again to print the report.

Model Number / System Version / Unit Number
Lists the machine's Plug&Play name, controller firmware version, and the controller part number.

Program List
Lists the firmware module version.

Bit Switch
List the current bit switch settings.
Note: The bit switches are not actually used at the moment.

Counter
List all the counters in the controller.
NOTE: Some counters listed in the report are not actually used.
          For example, "Duplex Page Count" is listed, but not available.

Exception Information
Lists CPU exception error information. Designer use only.

System Logging / System Logging 2
Lists internal log data. Designer use only.

Option
Lists all the installed optional components.

4.4 SERVICE TOOLS

4.4.1 HDD TEST

This verifies the file and directory entries on the hard disk drive.

1. Enter the Printer SP mode, and select "2. Service Tool".

2. Select "HDD Test", then press [Enter].

3. Specify the number of tests, then press [Enter].
    - If "000" is specified, the test will continue until it is manually cancelled.
    - [UP] [DOWN]: Increment/decrement the digit at the cursor.
    - ⬅ ➡ : Move the cursor.
    - [Cancel]: Exit without executing the test. Cancels the test even while it is being executed.
    - [Enter]: Execute the test.

4. Check the result of the test, then do the following:
    - If the result is OK, press [Enter] to display the available free space on the HDD. Then press [Enter] again to exit.
    - If the result is NG, press [Enter] to do the test again. Or, press [Cancel] to exit.

Service Tables

Error Display Details	
Number at the top right corner	Indicates that the error was found in the n'th test.
Error Message	"Clstr error" A damaged cluster was found. The damaged cluster was marked as "bad" to avoid future use.

4.4.2 HDD FORMAT

This creates partitions on the HDD and formats them.

1. Enter the Printer SP mode, and select "2. Service Tool".

2. Select "HDD Format", then press [Enter].

3. Check the HDD capacity, then press [Enter].

4. Press [Enter] again to start formatting. Or, press [Cancel] to exit.
    Note: Once the format has started, it cannot be cancelled.

5. Check the result of the test, then do the following:
    *   If the result is OK, press [Enter] to exit.
    *   If the result is NG, check the error message, then press [Enter] to exit.

Error Display Details	
Error Messages	"HDD Ident Fail"
	The controller could not retrieve information from the HDD.
	"NG Logic Format"
	Logical format failed.
	"No Support HDD"
	Unsupported HDD is detected.

4.4.3 NIB NVRAM BACKUP AND RESTORE

This backs up the NIB NVRAM to the controller, and restores the data to the NIB NVRAM. Use this procedure when replacing a NIB. The following procedure shows how to use this when copying data from one NIB to another.

1. Ensure that the source NIB is installed in the controller.

2. Enter the Printer SP mode, and select "2. Service Tool".

3. Select "NIB read/write", then press [Enter].

4. Select the data copy direction "NIB -> CTL", then press [Enter].
    *   [UP] [DOWN]: Select a data copy direction.
    *   [Cancel]: Exit.
    *   [Enter]: Copy the NIB NVRAM to the controller.
        Note: Once data copying has started, it cannot be cancelled.

5. Check the result, then do the following:
    *   If the result is OK, press [Enter] to exit. Go on to the next step.
    *   If the result is NG, check the error message, then press [Enter] to exit.

Error Display Details	
Error Message	"NG copying"
	NIB data copying failed. Try again.

6. Turn off the machine and replace the NIB.

7. Turn on the machine, and ensure that the target NIB is correctly installed.

8. Enter the Printer SP mode, and select "2. Service Tool".

9. Select "NIB read/write", then press [Enter].

10. Select the data copy direction "CTL -> NIB", then press [Enter].
    - [UP] [DOWN]: Select a data copy direction.
    - [Cancel]: Exit.
    - [Enter]: Copy the NIB NVRAM to the controller.
      Note: Once data copying has started, it cannot be cancelled.

11. Check the result, then do the following:
    - If the result is OK, press [Enter] to exit.
    - If the result is NG, check the error message, then press [Enter] to exit.

Error Display Details	
Error Message	"NG copying"
	NIB data copying failed. Try again.

4.5 FIRMWARE UPDATE

4.5.1 FIRMWARE DOWNLOAD (CONTROLLER, NIB AND PS3)

This procedure is for upgrading the firmware for the controller, the network
interface board, and the PS3 DIMM module.
To update the PS3 firmware, the target DIMM module must already contain a
version of the PS3 firmware.

⚠**CAUTION**
Do not turn off the machine while downloading the firmware.
---

1. Prepare an IC card that contains the required firmware.

2. Turn off the machine and install the card in the IC card slot on the controller.
    Note: When you see the machine from the back, the "A" side of the card must
    face the right side.

3. Turn on the machine and switch the display to "Printer" (use the "Printer" key
    on the operation panel).

4. Check the firmware version as follows:
    1) Controller and NIB Firmware
       • CARD: Firmware version on the card
       • ROM: Current controller or NIB firmware version
    2) PS3 DIMM
       • DIMM: Current PS3 firmware version
       • CARD: Firmware version on the card

5. Start downloading the new firmware.
    1) Controller and NIB Firmware
       • Press [Install] to download the new firmware.
         Note: Do not press [Backup]. [Backup] will copy the firmware from the
         controller to the card.
       • Press [Cancel] to exit.
    2) PS3 DIMM
       • Press [Start] to download.
       • Turn off the machine to cancel.

6. After the firmware download has finished, turn off the machine, and remove the
    card.

7. Turn on the machine, and print the service summary report to confirm that the
    new firmware version has been installed.

Error Messages

Message	Description	Controller	NIB	PS3
Erasing Failed ADRS: xxxxxx	Test the on-board flash ROM and retry the download.	Yes	Yes	Yes
Writing Failed ADRS: xxxxxx		Yes	Yes	Yes
Memory Insufficient	Reset the controller and try again.	Yes	Yes	Yes
Melting Failed	The firmware file used to program the card may be damaged. Get a new firmware file and store it on the card.	Yes	Yes	No
DIMM – installable program cannot find	Wrong type of firmware on the card.	No	No	Yes
CRC error: Please retry install	The firmware file used to program the card may be damaged. Get a new firmware file and store it on the card.	No	No	Yes
NIB board is not equipped	Install a NIB on the controller, then try again.	No	Yes	No
Initialization failed	Retry the download.	No	Yes	No
Download mode is disabled	Retry the download.	No	Yes	No

Service Tables

4.5.2 FIRMWARE UPLOAD (CONTROLLER ONLY)

This creates a backup copy of the controller firmware on an IC card.
Note: The target IC card must already contain a version of the controller firmware.

1. Prepare an IC card with a version of controller firmware programmed.

2. Turn off the machine and install the card in the IC card slot on the controller.
    Note: When you see the machine from the back, the "A" side of the card must face the right side.

3. Turn on the machine and switch the display to "Printer" (use the "Printer" key on the operation panel).

4. Check the firmware version as follows:
    • CARD: Firmware version on the card
    • ROM: Current controller or NIB firmware version

5. Press [Backup] to upload the firmware to the card.
    Note: Do not press [Install]. [Install] will copy the firmware from the card to the controller.

6. After the firmware upload has finished, turn off the machine, and remove the card.

7. Turn on the machine.

Error Messages

Message	Description
Compressing failed	Retry the upload.
Card capacity insufficient	Use the correct IC card.
Card error	Use the correct IC card. The card may be damaged.

4.5.3 ERROR RECOVERY

CONTROLLER

If the controller does not start up after a failed firmware download, use the following procedure. This procedure will force the controller to boot from the IC card.

1. Prepare an IC card with the required controller firmware version on it.

2. Turn off the machine and remove the controller.

3. Change the DIP switch 1 – No. 1 setting to "ON".

4. Put back the controller and install the card in the IC card slot on the controller.
   Note: When you see the machine from the back, the "A" side of the card must face the right side.

5. Turn on the machine.

6. Wait until the LEDs between the IC card slot and the parallel interface are both lit (this may take 1 to 2 minutes.).

7. Turn off the machine, remove the card, and reset the DIP switch 1 – No.1 setting to "OFF". Then, put back the controller.
   Note: The default settings of the DIP switches are all 'OFF'.

8. Turn on the machine, and print the service summary report.

Service Tables

PS3 DIMM / NIB

If a download attempt failed, try downloading the new firmware again.

4.6 POWER-ON SELF TEST

4.6.1 PARALLEL LOOP-BACK TEST

This tests the standard IEEE1284 parallel interface using a loop-back connector. The loop-back connector (P/#: G0219350) is required for this test.

NOTE: Do not use the loop-back connector (P/#: G0109350). This loop-back connector causes the "Timeout error".

1. Turn off the machine and attach the loop-back connector to the Centronics parallel interface.
2. Turn on the machine.
    *   Regardless of the test result, the controller starts up as normal.
3. Enter the SP mode and check the "Diag. Error" for the error codes 1101 or 1102.
    *   Refer to the section 4.3.3 for how to check the error codes.
    *   Refer to the section 6.2 for the details of error codes.

4.6.2 OTHER TESTS

The controller tests the following devises at power-on. If an error is detected, an error code is stored in the NVRAM. Refer to the section 4.3.3 for how to check the error codes, and the section 6.2 for the details of error codes.

*   Flash ROM (Firmware)
*   CPU, Clock and ASIC
*   Resident and optional SDRAM
*   Centronics interface (if a loop-back connector is present)
*   NVRAM
*   Font ROM
*   Optional HDD

5. REMOVAL AND REPLACEMENT

5.1 PRECAUTIONS

⚠CAUTION
Before removing any of the printer components, do the following:
1. **If the data-in lamp on the operation panel is blinking or lit, wait until a document or report is printed, then turn off the machine.**
2. **If there is a fax unit in the machine, print out all messages stored in the memory, as well as the user-programmed items and the system parameter lists.**
3. **Turn off the main switch and disconnect the power cord, the telephone cable(s), and the Ethernet cable.**
4. **If a fax unit, PC fax expander, or ISDN G4 is installed, remove them before removing the printer controller.**

5.2 CONTROLLER

NOTE: 1) When replacing the controller board, remove the NVRAM (IC26) from the defective board, then install the NVRAM on the new board.

2) If the controller does not start up after a firmware update, try to boot from the IC card and download the firmware. If that does not work, you may need to replace the controller board. Refer to section 4.5.3 (Error Recovery) for details.

Removal Replacement

1. Remove the covers.

2. Remove the controller (3 screws).

3. Remove the optional component(s) and the NVRAM from the controller, then install them on the new controller.

4. Install the new controller.

5. Turn on the machine and print the Printer Configuration Page ([User Tools] – [Printer] – [List Print]).
Ensure that all the controller settings are restored.

5.3 NIB

NOTE: 1) Before replacing the NIB, back up the NIB NVRAM to the controller using the "NIB read/write" service tool. Then, replace the NIB. Then restore the NIB NVRAM using the "NIB read/write" service tool. Refer to section 4.4.3 for details.
 2) If the NIB does not start up after a firmware update using the NBTFTP utility, try downloading the firmware from an IC card.

1. Back up the NIB NVRAM to the controller using [Service Tool] – [NIB read/write].

2. Remove the covers.

3. Remove the controller (3 screws).

4. Replace the NIB (2 screws).

5. Put back the controller.

6. Turn on the machine and restore the NIB NVRAM using the [Service Tool] – [NIB read/write].

7. Turn off the machine and turn it back on. Then, print the Printer Configuration Page ([User Tools] – [Printer] – [List Print]).
   Ensure that all the controller settings are restored.

6. TROUBLESHOOTING

6.1 SC CODES

SC No.	Description	Required Action
2001	Power-on Self-Diagnostics Error	Check the error code using [Service Menu] – [Diag. Error].
2002	FGATE error	Check any SC errors for the engine.

6.2 ERROR CODES

| Code	Description	Required Action
0201	On-board SDRAM read/verify failed.	Replace the controller if this error is frequent.
0301	SDRAM DIMM (option) read/verify failed.	Replace the SDRAM DIMM if this error is frequent.
0Fxx	Controller – BiCU interface error.	Check the connectors and cable connections. Replace the motherboard, cable, and/or BiCU.
1101	Data transmission did not finish within the specified time.	An incompatible loop-back connector is connected to the parallel port, or the loop-back connector is not connected. Use the correct loop-back connector (P/#: G0219350) before the test.
1102	Data looped back to the controller is not the same as the data transmitted.	The loop-back connector may be defective. Try using another one.
11xx	Centronics parallel interface error.	Replace the controller if this error is frequent.
1401	The controller NVRAM has a problem.	Replace the NVRAM if this error is frequent.
1402	NVRAM checksum error or the battery has run out.	
1403	NVRAM write error	
1404	NVRAM read error	
1501	RTC error	Replace the controller board if this error is frequent.
1601	Font ROM error	Replace the controller if this error is frequent.
1602	The data in the Font ROM is damaged.	Replace the controller if this error is frequent.
1Bxx	Option bus A (CN506) error	Check the connection to the optional component at CN506. Try replacing the optional NIB or HDD.
1Cxx	Option bus B (CN507) error	Check the connection to the optional component at CN507. Try replacing the optional NIB or HDD.

Trouble-
shooting

Code	Description	Required Action
2100	NIB self test failed.	Turn off the machine and turn it back on. Replace the NIB if this error is frequent.
21xx	NIB error	
2501	The data in the PS DIMM is damaged.	Replace the PS DIMM if this error is frequent.
2508	The data in the IC card is damaged.	Reprogram the IC card and try again.
3002	A damaged cluster was found on the HDD.	The damaged cluster is automatically marked as "bad". If this error is frequent, format the HDD.
47xx	Controller ASIC error.	Replace the controller.

6.3 LED DISPLAY

6.3.1 LOCATION

The controller uses two LEDs to display error status even while the LCD message is not active.
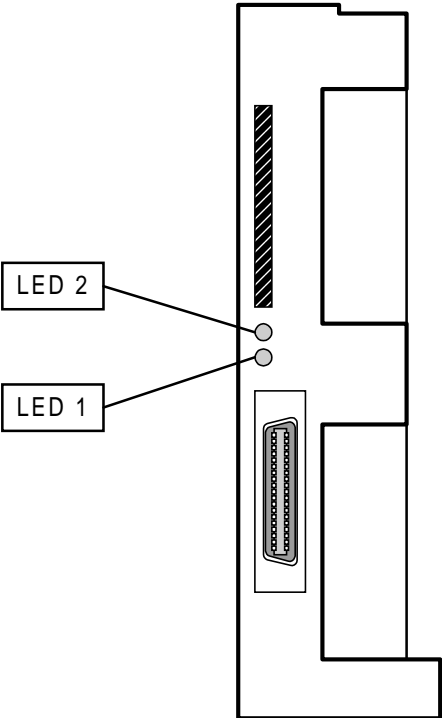
B305T501.WMF

6.3.2 FATAL ERROR

If the controller detected a fatal error during the power-on self-test, it uses two LEDs to notify the cause of the error.

If one of the following fatal errors happens, the LED status changes as shown (read from the left of the diagram to the right).

Flash ROM Error

LED2 (Upper)	● ○ ● ○ ● ○ ●
LED1 (Lower)	● ○ ● ○ ● ○ ●

○ ON
● OFF

B305T502.WMF

Turn off the machine and turn it back on. If the controller detects the same error, download new firmware from a IC card (refer to section 4.5.3). If the problem still remains, replace the controller.
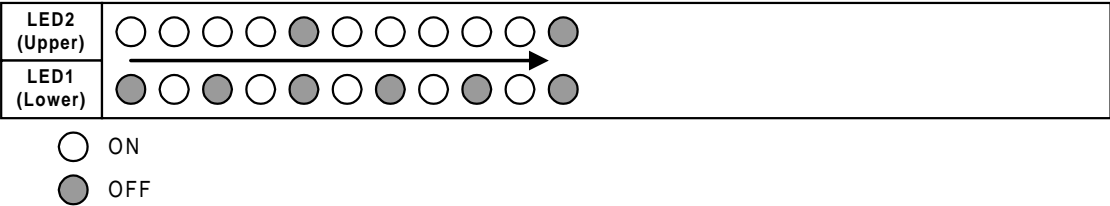
SDRAM Error

LED2 (Upper)	○ ○ ● ○ ○ ○ ●
LED1 (Lower)	● ○ ● ○ ● ○ ●

○ ON
● OFF

B305T503.WMF

Turn off the machine and turn it back on. If the controller detects the same error, replace the controller.

CPU Error

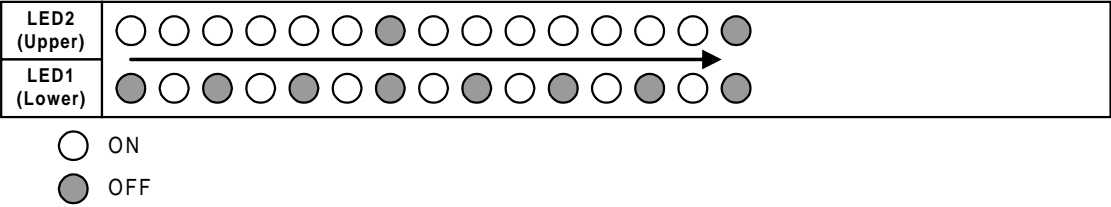| LED2 (Upper)	○ ○ ○ ○ ● ○ ○ ○ ○ ○ ●
LED1 (Lower)	● ○ ● ○ ● ○ ● ○ ● ○ ●

○ ON
● OFF

B305T504.WMF

Turn off the machine and turn it back on. If the controller detects the same error, replace the controller.
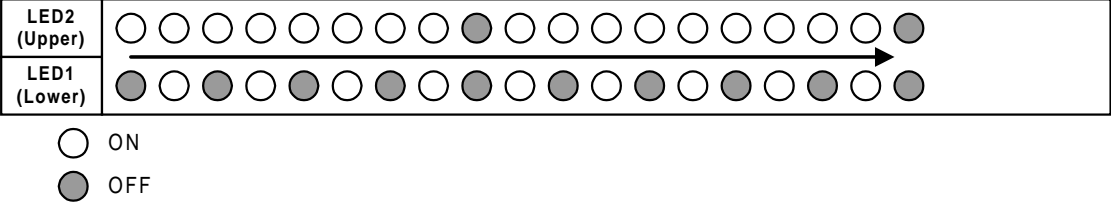
Trouble-shooting

ASIC Error

| LED2 (Upper) | ○ ○ ○ ○ ○ ○ ● ○ ○ ○ ○ ○ ○ ● |
| LED1 (Lower) | ● ○ ● ○ ● ○ ● ○ ● ○ ● ○ ● ○ ● |

○ ON
● OFF

B305T505.WMF

Turn off the machine and turn it back on. If the controller detects the same error, replace the controller.

Other Diagnostic Error

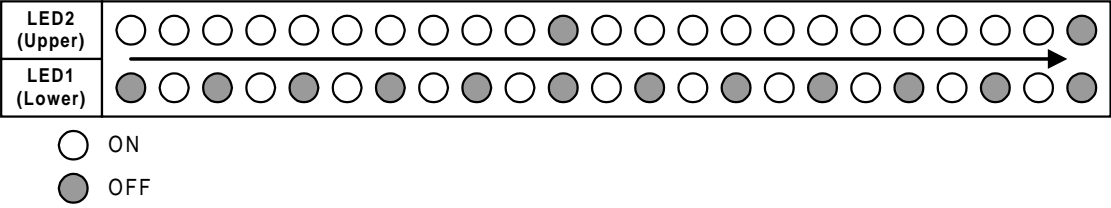| LED2 (Upper) | ○ ○ ○ ○ ○ ○ ○ ○ ● ○ ○ ○ ○ ○ ○ ○ ○ ● |
| LED1 (Lower) | ● ○ ● ○ ● ○ ● ● ○ ● ○ ● ○ ● ○ ● ○ ● ○ ● |

○ ON
● OFF

B305T506.WMF

Turn off the machine, check the connection to the optional components, and turn on the machine. If the controller detects the same error, replace the controller or optional HDD/NIB.

APIP Error

| LED2 (Upper) | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ● ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ● |
| LED1 (Lower) | ● ○ ● ○ ● ○ ● ○ ● ○ ● ○ ● ○ ● ○ ● ○ ● ○ ● ○ ● |

○ ON
● OFF

B305T507.WMF

Turn off the machine, check the connection to the BiCU, then turn on the machine. If the controller detects the same error, replace the motherboard, controller, or BiCU.