

# **PRINTER CONTROLLER**

**(Machine Code: B335, B336, B337)**

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# 1. OVERALL MACHINE INFORMATION

## 1.1 INTRODUCTION

The base engine (Machine Code: A292/A293 and A294/A295) contains an interface for the multi-function controller. The multi-function controller adds printer functions. The printer functions can operate independently and simultaneously with other functions in the background, and their output can be interleaved with the copy mode output.

The printer supports PCL6 and PostScript 3. The PostScript language is an optional function.

Print data from the host is transmitted through the standard parallel port or an optional Network Interface Board (NIB). The parallel port supports bi-directional Command and Status feed back communication with the base engine.

An optional IDE hard disk drive provides font download and macro download.

An additional SDRAM can be installed to boost the printer performance.

Print data is rasterized at 600 dpi in the controller.

The A294 and A295 engines can print 85 and 105 pages per minute respectively at 600 dpi. The A292 and A293 engines can print 55 and 70 pages per minute respectively at 600 dpi.

1.2 SPECIFICATIONS

|                     |  |
|---------------------|--|
| Resolution:         | 600 x 600 dpi  |
| Gray Scale:         | 256 levels   |
| Printing Speed:     | 85 ppm (A294), 105 ppm (A295)<br>55 ppm (A292), 70 ppm (A293)  |
| Printing Emulation: | Main Controller Board: PCL6 (5e + XL)<br>Optional PS Board: PostScript 3   |
| Printer Fonts:      | 45 scaleable typefaces in 14 typeface families<br>(35 Intellifont and 10 TrueType format fonts)<br><br>6 bitmapped typefaces in the Line Printer typeface family |
| Printer Interface:  | IEEE1284/ECP Bi-directional Parallel x 1 (Standard)<br><br>Network Interface x 1 (Option)<br><br>Ethernet (100 base-TX/10 base-T for TCP/IP, IPX/SPX, EtherTalk) |
| DRAM Capacity:      | 32 MB (Standard)<br><br>An optional SDRAM slot (up to 128 MB)<br><br>Total: Up to 160 MB   |

1.3 SOFTWARE

1.3.1 PRINTER DRIVERS

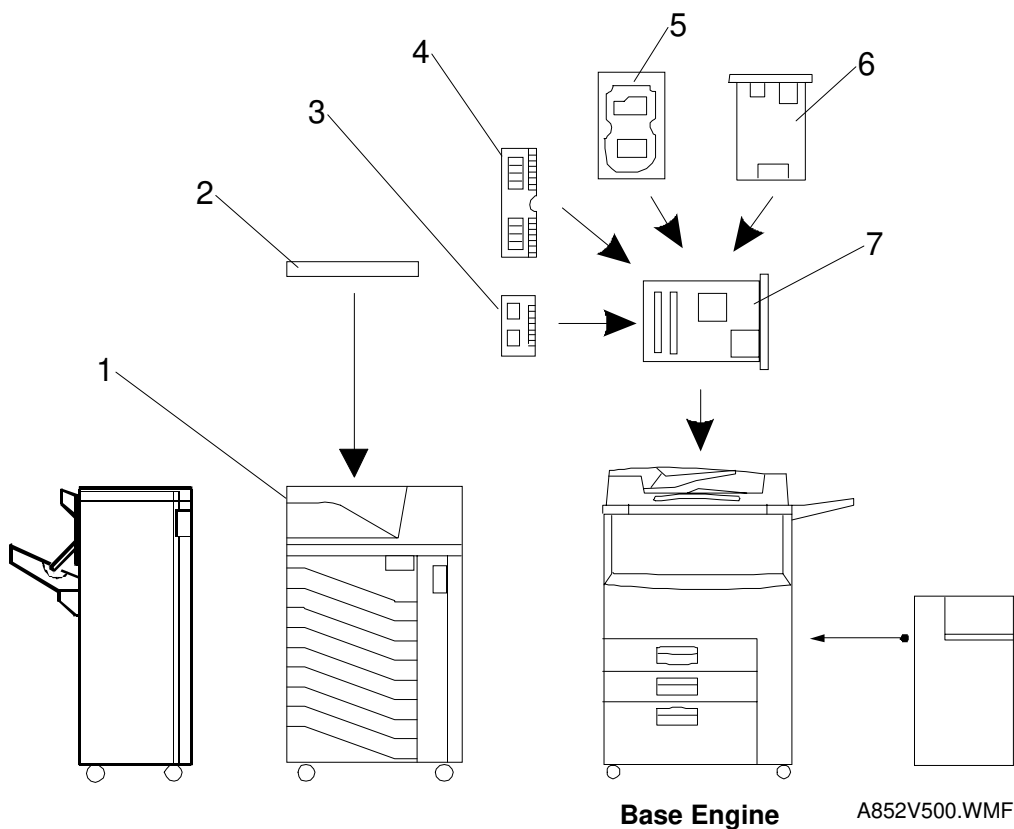
The following printer drivers are enclosed in the printer manual/driver kit:

- PCL5e Printer Driver for Windows 95/98/NT4.0
- PCL6 Printer Driver for Windows 95/98/NT4.0
- PS3 Printer Driver for Windows 95/98/NT4.0 and Macintosh

1.3.2 NETWORK UTILITIES

The network utilities are enclosed with the Network Interface Board (NIB) option. Refer to the NIB manual for details.

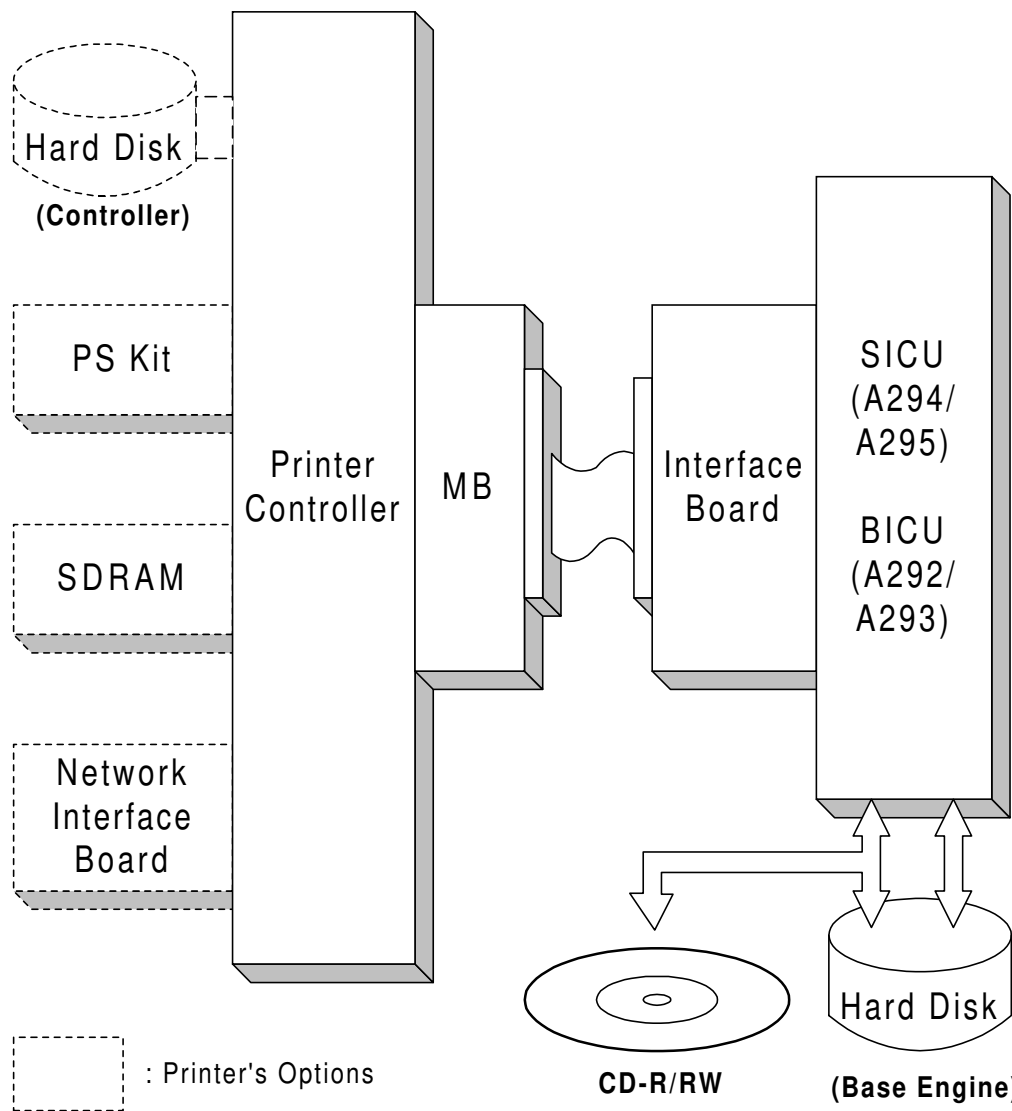
1.4 MACHINE CONFIGURATION



| Item                      | Machine Code                                   | No. |
|---------------------------|--|-----|
| Mailbox                   | G909 (A292/A293 only)                          | 1   |
| Mailbox Bridge Unit       | G912 (A292/A293 only)                          | 2   |
| PostScript Kit            | B338   | 3   |
| SDRAM                     | ---  | 4   |
| Hard Disk                 | B349   | 5   |
| Network Interface Board   | A855   | 6   |
| Printer Controller        | B335 (A295)<br>B336 (A294)<br>B337 (A292/A293) | 7   |
|                           |  |     |
| Printer Manual/Driver Kit | ---  | --- |

1.5 STRUCTURE

1.5.1 BLOCK DIAGRAM



B335V501.WMF



## 1.5.2 DESCRIPTIONS

### 1. Printer Controller

The printer controller handles the following functions:

- Printer host interface
- Printing functions
- Interface and control of controller options (Hard disk, PostScript kit, Network interface board and SDRAM)

### 2. Hard Disk (option)

This stores additional soft fonts and macros (both PCL and PostScript fonts).

### 3. PostScript Kit (option)

This is to add the PostScript 3 feature.

### 4. Network Interface Board (option)

The network interface board is an additional printer interface to allow the printer to be used on a network.

### 5. SDRAM (option)

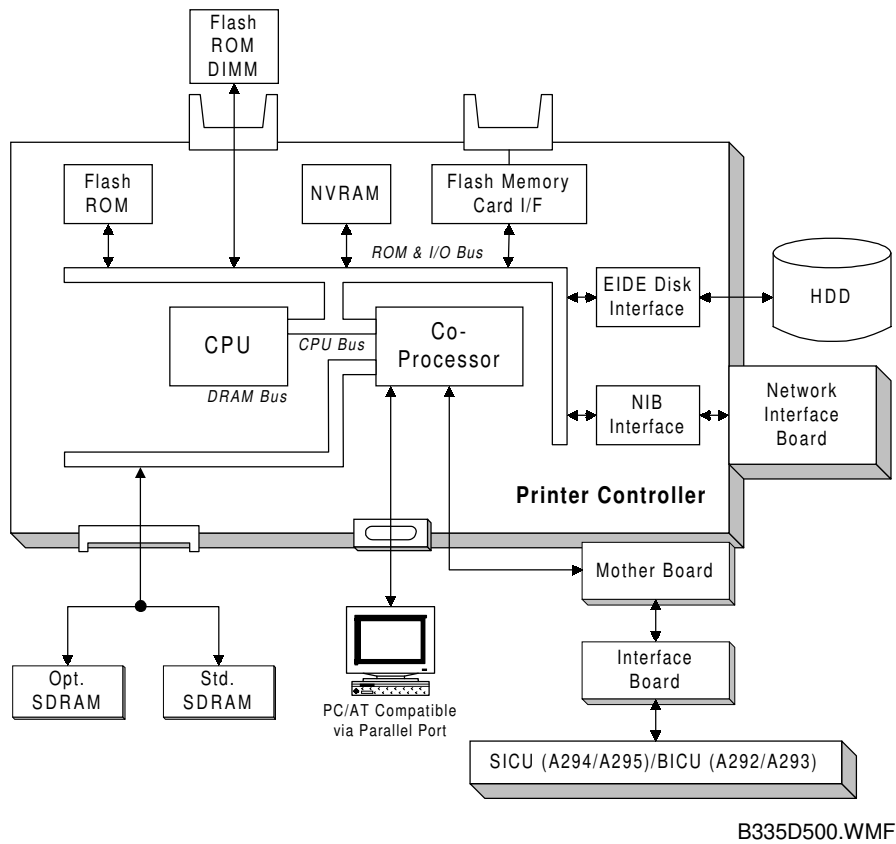
There are two SDRAM slots. One slot is for the standard 32 MB SDRAM module. The other is used for additional printer processing memory, and a 32, 64, or 128 MB SDRAM module (168 pin PC100) can be installed here. As a result, up to 160 MB of RAM are installable (32 MB plus 128 MB).

### 6. Mother Board (MB)

This connects the controller to the SICU (A294/A295)/BICU (A292/A293) board in the printer controller box.

## 2. DETAILED SECTION DESCRIPTIONS

### 2.1 HARDWARE OVERVIEW



The above block diagram shows the major components of the printer controller. The main features of the controller are as follows.

#### 1. CPU

A Motorola Power PC 740 processor is used. A 66-MHz oscillator is used as the clock source for both this CPU and the coprocessor. The processor has a bus clock of 66 MHz and an internal clock of 266 MHz.

#### 2. Co-processor (Peerless QP1910)

This performs the following functions:

- ROM control
- I/O control
- DRAM control
- Printer video interface
- Printer communication interface
- IEEE 1284 compliant bi-directional parallel port interface
- Interrupt control

**3. ROM memory****1) Flash ROM (4 MB)**

This flash ROM includes boot code, operation system code, PCL5e codes, PCL6 code, and font data for PCL languages (resident fonts).

**2) Flash ROM DIMM (4 MB for the PostScript option)**

This ROM DIMM includes the PostScript code and PostScript font data.

**3) SDRAM DIMM (32 MB and an option slot)**

This SDRAM DIMM provides page memory and work area.

**4. NVRAM (8 KB)**

The NVRAM contains the system parameters, printer settings, job record data, and error record data.

**5. Network Interface Board Interface**

This controls the optional network interface board provided to support the network operations.

**6. Hard Disk Drive Interface (Enhanced IDE: 6 GB)**

The HDD interface is provided to support storage of fonts and macros downloaded from a PC.

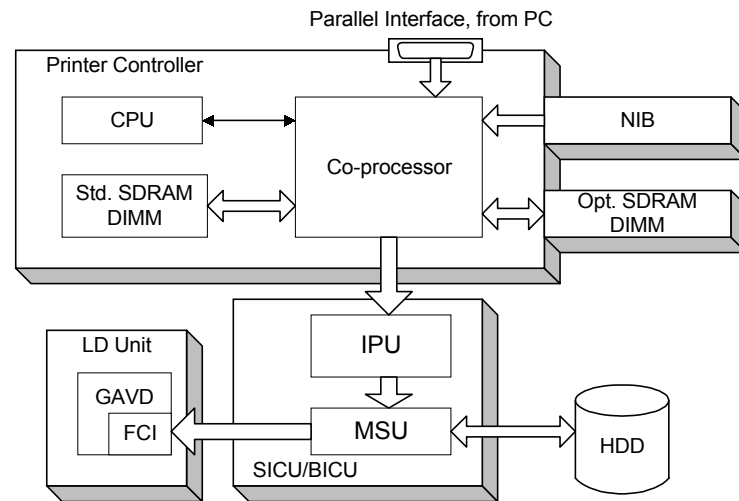
**7. Flash Memory Card Interface (PCMCIA Card Slot)**

The flash memory card for updating the controller and PostScript firmware is connected to the flash memory card slot.

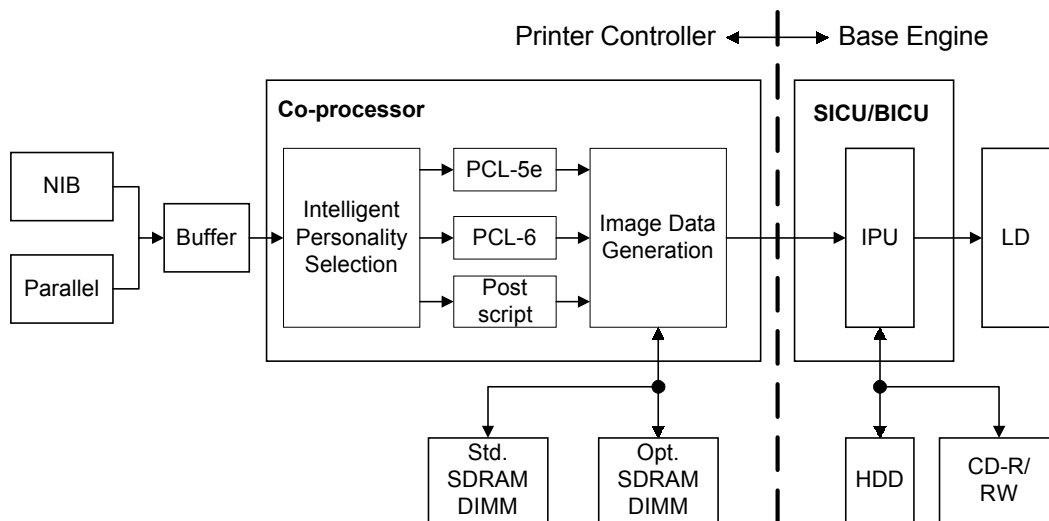
**8. Power-on Self Diagnostics**

When the main power switch is turned on, the controller performs a self-diagnostic test.

## 2.2 IMAGE PRINTING



B335D502.WMF



B335D503.WMF

The printer controller receives print data from a PC through the parallel or network interface port. The co-processor handles the print data but it only makes raster image. All image processing, such as edge smoothing and toner saving, are done in the base engine.

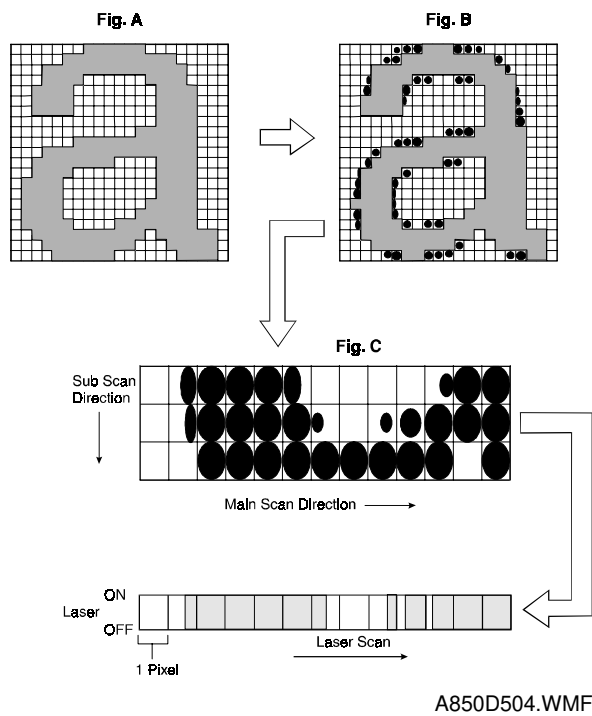
The print data from the PC goes to the buffer in the SDRAM DIMM and then goes to the co-processor. The co-processor automatically selects the appropriate printer language and creates the print data to match the selected printer language. Then, the co-processor sends the print data to the LD unit through the IPU on the SICU or BICU board. At the same time, the data is also sent to the hard disk for multiple printing, as well as for backup in case of a paper jam.

## 2.3 IMAGE DATA PROCESSING

The FCI in the LD unit is responsible for edge smoothing and toner saving functions.

The edge smoothing and toner saving modes can be switched on or off using the printer user tools or the printer driver.

### 2.3.1 EDGE SMOOTHING



Usually, binary picture processing generates jagged edge on characters (Fig. A). The FCI reduces the edges of characters using edge smoothing.

Whether a pixel undergoes smoothing depends on the surrounding image data. Changing the laser pulse position for certain pixels does the smoothing.

### 2.3.2 TONER SAVING MODE

Toner saving is done by reducing the number of black dots printed, not by varying the development bias. In toner saving mode, the image data is filtered through a matrix.

As a result of passing through the filter, less toner is used to create the latent image on the drum and black areas are printed as gray.

## 2.4 FEATURES

### 2.4.1 SORT

If “Collate” is turned on when a multi-set job is printed, the first set of the job is directly printed. At the same time, the print data for the copy job is stored in the hard disk of the base engine. The remaining sets are printed using the data in the engine hard disk.

If the finisher is not installed, the rotate sort feature can be used. The SICU or BICU rotates the image in the same way as the copy mode.

### 2.4.2 DUPLEX

Duplex printing is available with all output options such as finisher or mailbox but not with all paper sizes (refer to the specifications section of the base engine manual). If the selected paper size is not usable in the duplex mode, the job is printed simplex.

Two types of duplex binding can be selected. Those are short-edge binding and long-edge binding.

In short-edge binding, the image may be rotated when printing on the second side of a sheet of paper. The co-processor in the printer controller does the rotation.

The co-processor corrects the page order for duplex printing as follows:

- Larger than A4 lengthwise/8 1/2”x11” (in the case of 8 pages)  
1st page – 3rd page – 2nd page – 5th page – 4th page – 7th page – 6th page – 8th page
- A4 lengthwise/8 1/2”x11” or smaller (in the case of 14 pages)  
1st page – 3rd page – 5th page – 2nd page – 7th page – 4th page – 9th page – 6th page – 11th page – 8th page – 13th page – 10th page – 12th page – 14th page

### **2.4.3 STAPLE**

The staple function is only available when a finisher is installed.

The finisher has the following stapling positions:

- 1) Top left slant
- 2) Top left horizontal
- 3) Top left vertical
- 4) Top two staples
- 5) Left two staples

Depending on the paper orientation, the image may have to be rotated. The co-processor in the printer controller does this image rotation.

There is a limit for the number of sheets that can be stapled by the finisher. If the number of sheets for stapling is more than the limit, the set is not stapled.

### **2.4.4 PUNCH**

The punch function is only available when a punch unit is installed on the finisher. There are several types of punch unit, each having different numbers of holes. The punching position in relation to the printed image depends on the paper feeding orientation and imaging. The punching positions are as follows:

- 1) Left
- 2) Top

## 2.4.5 JAM RECOVERY

If the jam recovery feature is on and a paper jam occurs, the controller reprints all the pages that have not been fed out. In usual cases, all image data from the controller is sent to the hard disk in the base engine. When a jam occurs, the recovery data is sent from this hard disk.

## 2.4.6 AUTO TRAY SELECT

When “Auto Select” is selected with the printer driver, the printer searches for a tray that contains a suitable size and paper type. The search starts from the LCT as below.

LCT – 1st tray – 2nd tray – 3rd tray

The default setting for the tray priority is LCT. If the LCT is not installed, the default is the 1st tray.

## 2.4.7 POWER ON SELF-DIAGNOSTICS

When the main power switch is turned on, the printer controller performs a self-diagnostic test. If an error is detected, an error message is displayed on the LCD of the operation panel.

### ***Test Items***

Devices always tested

- Co-processor
- Flash ROM
- SDRAM DIMM
- NVRAM
- Engine I/F

Devices tested when they are installed

- PS DIMM I/F
- HDD I/F
- Network interface board I/F

The LEDs on the controller board show how the diagnostic is progressing (see Troubleshooting).



## **2.5 HARD DISK**

Two types of hard disk are used for the printer functions. One type is connected to the printer controller (Printer HDD). The other is in the base engine (Engine HDD).

### **2.5.1 PRINTER HDD**

After installing the printer HDD, it must be formatted. When the main power switch is turned on and the printer mode key is pressed, the hard disk can be formatted.

When the Continue button is pressed, the hard disk is formatted and two partitions are made. One partition is for PCL and the other is for PostScript (fonts and macros only).

If the Cancel button is pressed, it is judged that the printer HDD is not installed. If the Cancel button is pressed by mistake, the printer HDD can be formatted by turning the main power switch off and on or entering the Service Program (SP) mode.

### **2.5.2 ENGINE HDD AND CD-R/RW**

The hard disk in the base engine is used for the copy, printer, and document server modes. Therefore, the hard disk has three partitions for each mode. (Refer to HDD Control in the base engine manual.)

Print data can be saved on the HDD (document server) and on the CD-R/RW via the document server.

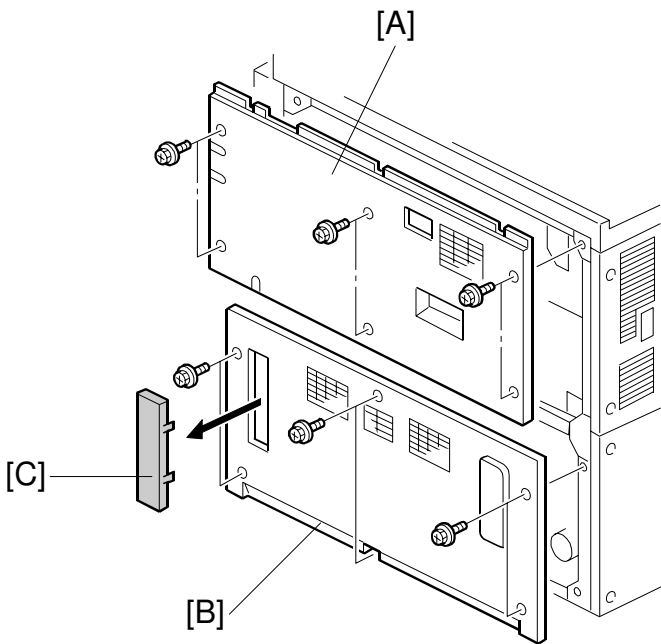
### 3. INSTALLATION PROCEDURE

#### 3.1 PRINTER CONTROLLER (B335/B336)

##### 3.1.1 ACCESSORY CHECK

| No. | Description               | Q'ty | No. | Description     | Q'ty |
|-----|---------------------------|------|-----|-----------------|------|
| 1   | Controller Box            | 1    | 6   | Screw           | 8    |
| 2   | Interface Board           | 1    | 7   | Cover Bracket   | 1    |
| 3   | Bracket – Interface Board | 1    | 8   | Ferrite Core    | 1    |
| 4   | Interface Cable           | 1    | 9   | Printer Key Top | 1    |
| 5   | Cable Clamp               | 2    |     |                 |      |

##### 3.1.2 INSTALLATION PROCEDURE



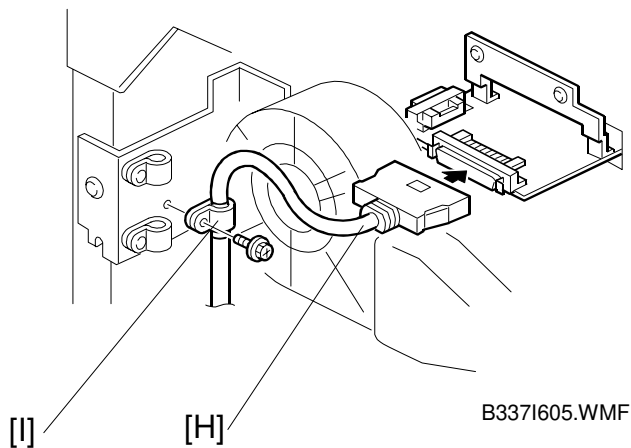
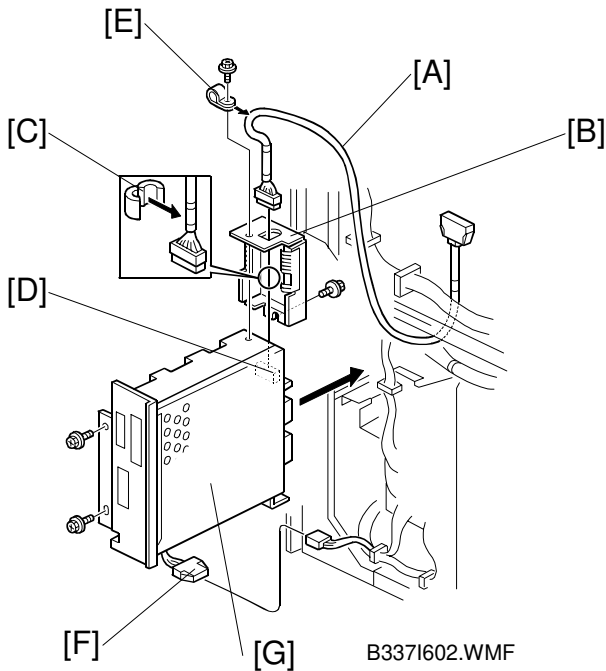
B316I601.WMF



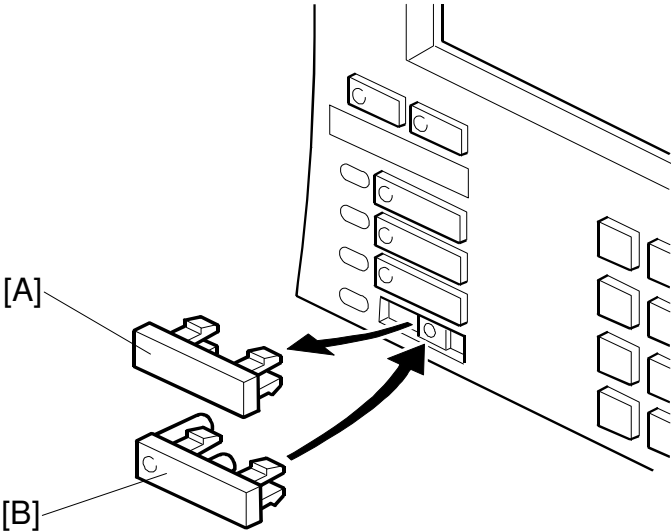
**CAUTION**

**Unplug the copier power cord before starting the following procedure.**

1. Disconnect the ADF connector.
2. Remove the upper rear cover [A] (6 screws).
3. Remove the lower rear cover [B] (6 screws).
4. Remove the printer cover [C].



5. Pass the interface cable [A] through the cover bracket [B].
6. Attach the ferrite core [C] to the cable.
7. Connect the interface cable to the printer controller [D].
8. Attach the cover bracket (1 clamp [E], 2 screws).
9. Connect the power supply cable [F].
10. Install the controller box [G] (2 screws).
11. Connect the interface cable [H] and attach the metal clamp [I] (1 screw).
12. Reinstall the upper and lower rear covers.



B337I606.WMF

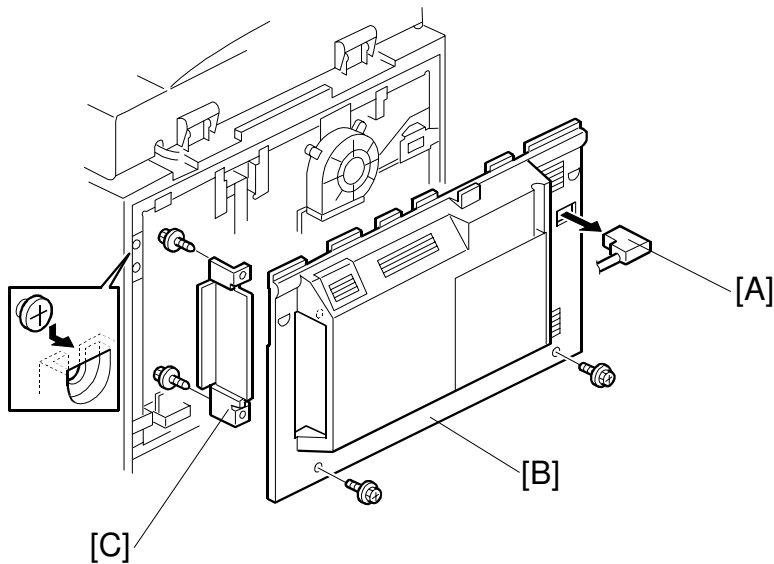
- 13. Remove the key top cover [A].
- 14. Attach the printer key top [B].

3.2 PRINTER CONTROLLER (B337)

3.2.1 ACCESSORY CHECK

| No. | Description               | Q'ty | No. | Description           | Q'ty |
|-----|---------------------------|------|-----|-----------------------|------|
| 1   | Controller Box            | 1    | 7   | Ferrite Core          | 1    |
| 2   | Interface Board           | 1    | 8   | Cover Bracket         | 1    |
| 3   | Bracket – Interface Board | 1    | 9   | Upper Ground Plate    | 1    |
| 4   | Interface Cable           | 1    | 10  | Lower Ground Plate    | 1    |
| 5   | Cable Clamp               | 1    | 11  | Printer Key Top       | 1    |
| 6   | Screw                     | 6    | 12  | Printer Key Top Cover | 1    |

3.2.2 INSTALLATION PROCEDURE



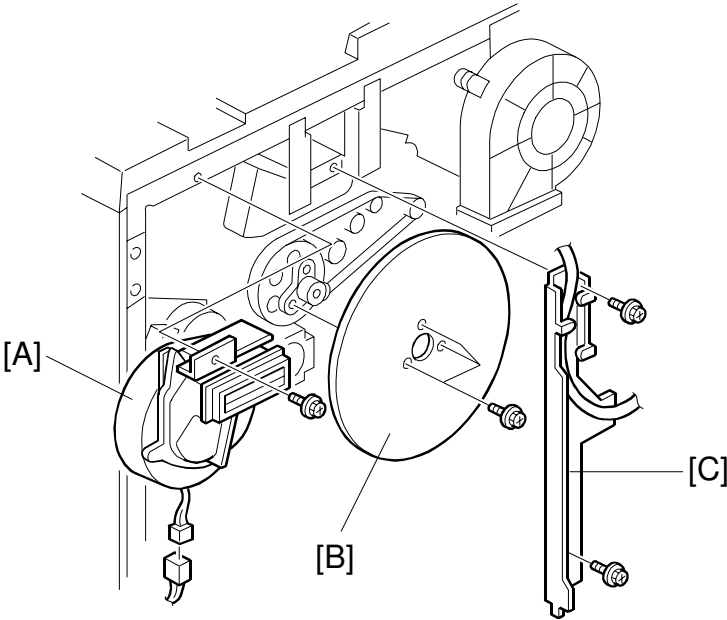
B337I101.WMF



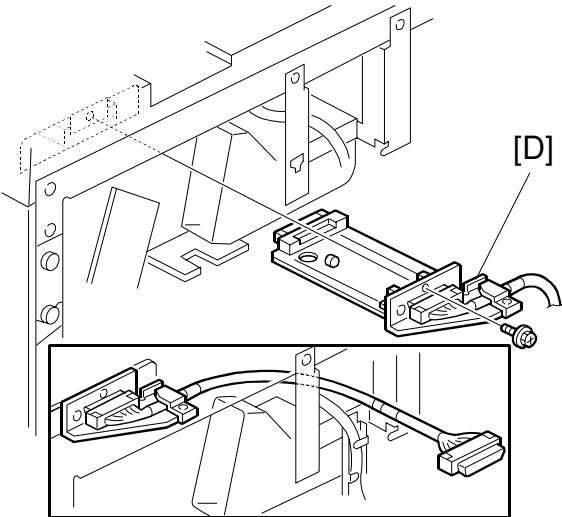
**CAUTION**

Unplug the copier power cord before starting the following procedure.

1. Disconnect the ADF connector [A].
2. Remove the upper rear cover [B] (2 screws).
3. Remove the printer cover [C] (2 screws).



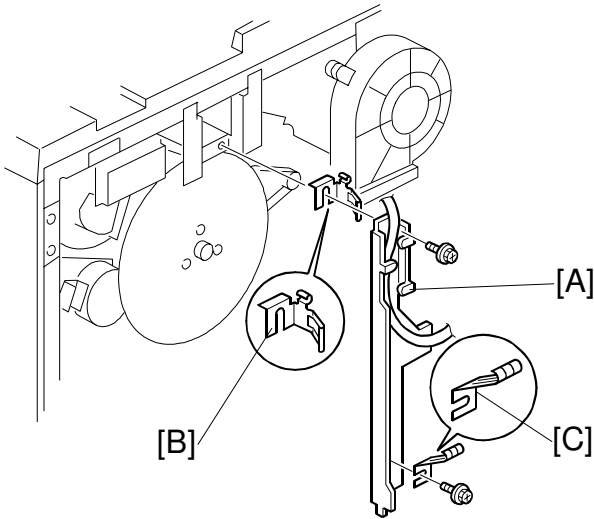
B3371102.WMF



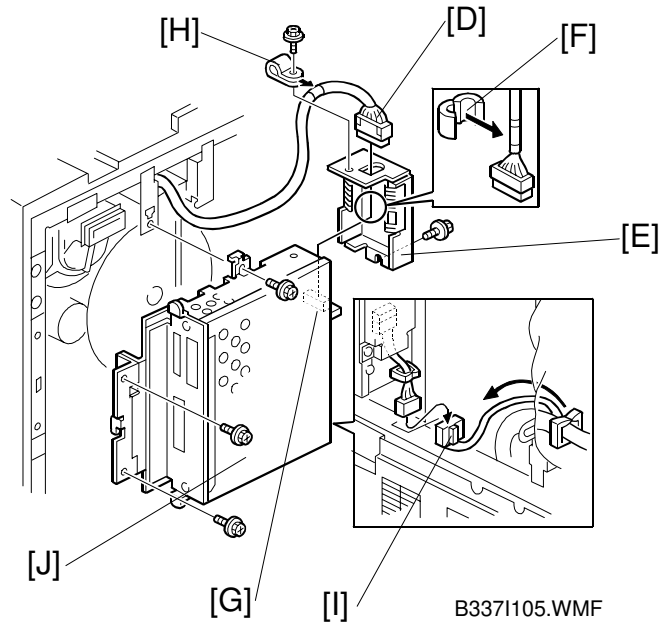
B3371104.WMF

- 4. Remove the duct [A] (1 screw, 1 connector).
- 5. Remove the flywheel [B] (3 screws).
- 6. Remove the bracket [C] (2 screws).
- 7. Install the interface board [D] (1 screw).



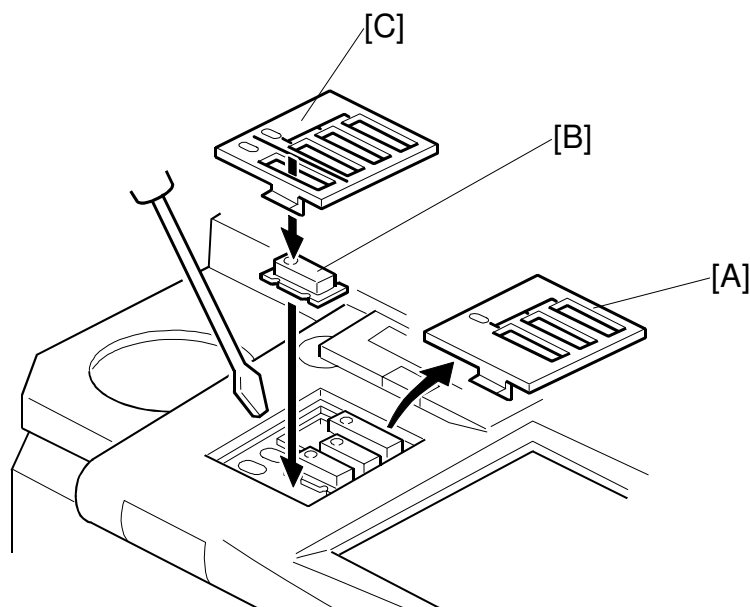


B337I103.WMF



B337I105.WMF

8. Reinstall the duct and flywheel.
9. Reinstall the bracket [A] with upper ground plate [B] and lower ground plate [C] (2 screws).
10. Pass the interface cable [D] through the cover bracket [E].
11. Attach the ferrite core [F].
12. Connect the interface cable to the printer controller [G].
13. Install the cover bracket [E] (1 clamp [H], 2 screws).
14. Connect the power supply cable [I].
15. Install the printer controller box [J] (3 screws).
16. Reinstall the upper rear cover.



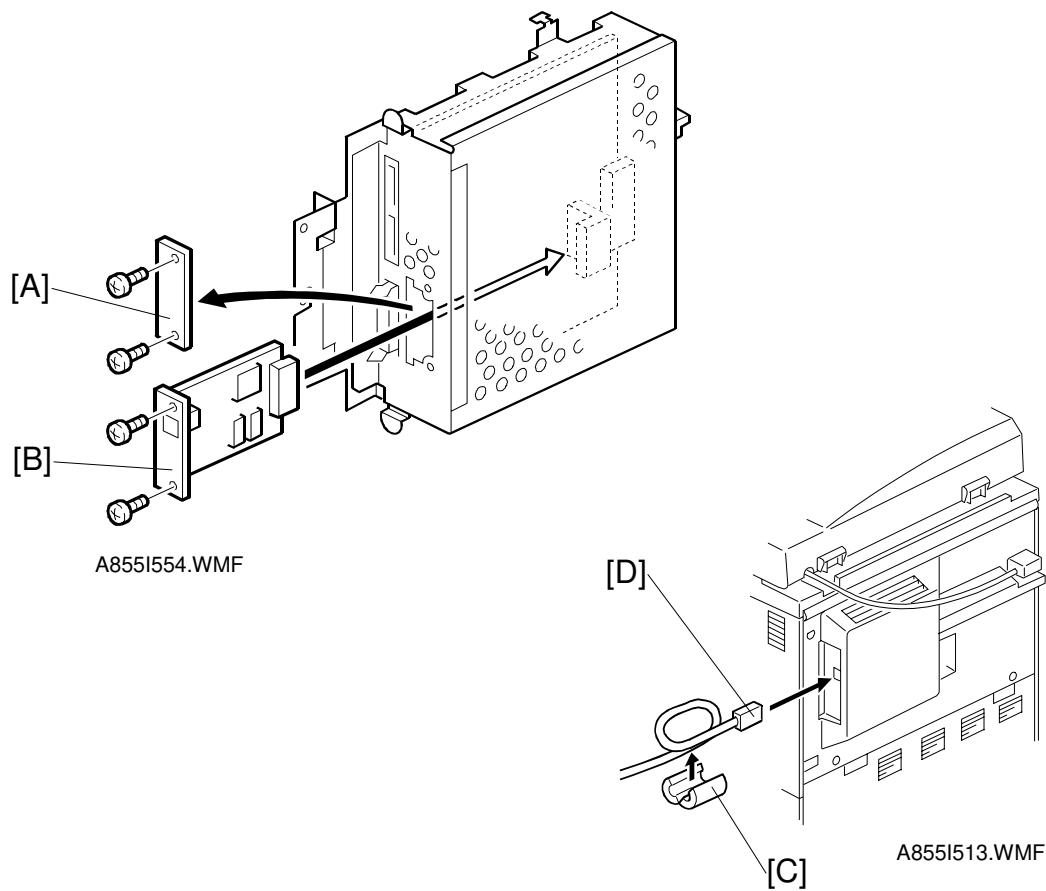
B337I106.WMF

- 17. Remove the key top cover [A].
- 18. Install the printer key top [B].
- 19. Install the printer key top cover [C].



### 3.3 NETWORK INTERFACE BOARD (A855)

#### 3.3.1 INSTALLATION PROCEDURE

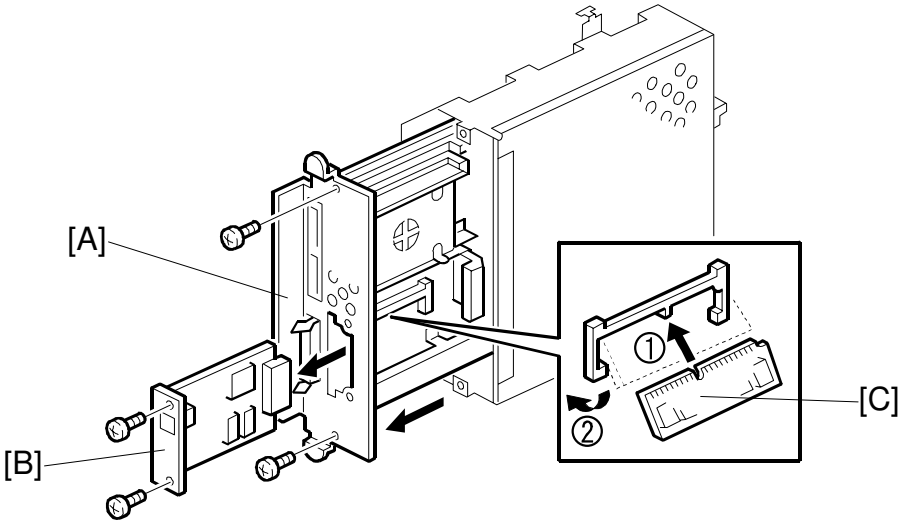


**⚠ CAUTION**  
**Unplug the copier power cord before starting the following procedure.**

1. Remove the cover bracket [A] (2 screws).
2. Install the network interface board [B] (2 screws that were removed in step 1).
3. Attach the ferrite core [C] to the network cable [D].

### 3.4 POSTSCRIPT KIT (B338)

#### 3.4.1 INSTALLATION PROCEDURE



B338I500.WMF

Installation



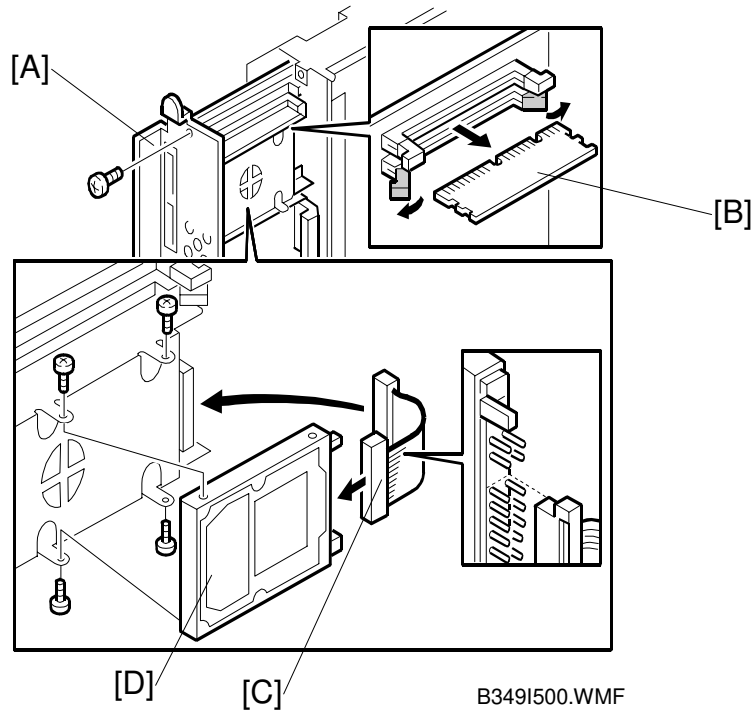
**CAUTION**

**Unplug the copier power cord before starting the following procedure.**

- 1. Remove the printer controller [A] (2 screws).
- 2. Remove the NIB [B] (2 screws).
- 3. Install the PostScript Kit [C].  
**NOTE:** Make sure that the PostScript Kit is properly set.

## 3.5 HARD DISK (B349)

### 3.5.1 INSTALLATION PROCEDURE



#### **⚠ CAUTION**

**Unplug the copier power cord before starting the following procedure.**

1. Remove the rear cover of the base engine.
2. Remove the printer controller [A] (2 screws).
3. Remove the memory (SDRAM DIMM) [B].
4. Connect the cable [C] to the printer controller.
5. Attach the hard disk [D] to the printer controller (4 screws).
6. Connect the cable to the hard disk.
7. Reinstall the rear cover of the base engine.
8. After turning on the main switch and pressing the printer mode key, formatting the hard disk is necessary. (See Service Tables – Service Program Mode – Hard Disk Format.)

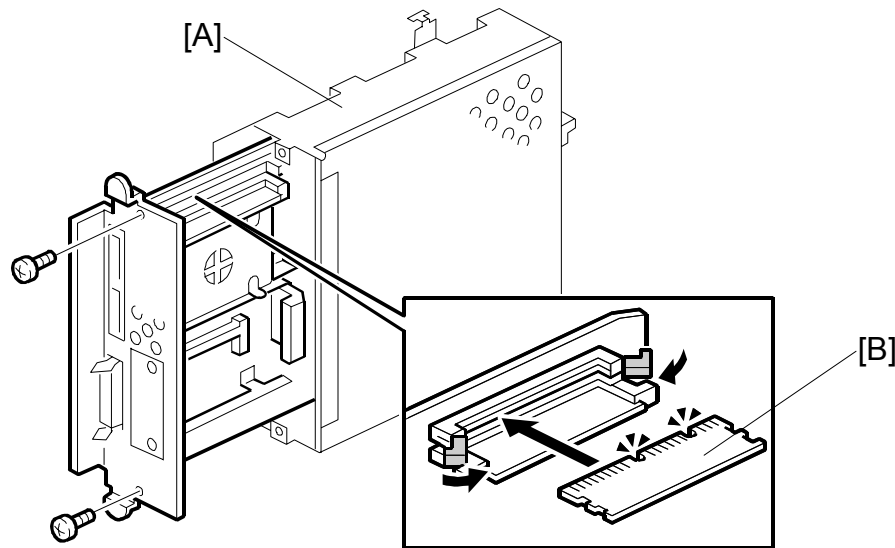
## 3.6 SDRAM DIMM

### 3.6.1 REQUIRED SPECIFICATION CHECK

Before installing the SDRAM DIMM, ensure that it satisfies the following requirements.

| Type           | PC Compatible     |
|----------------|-------------------|
| Number of pins | 168 pins PC100    |
| Capacity       | 32, 64, or 128 MB |

### 3.6.2 INSTALLATION PROCEDURE



B335I108.WMF

#### **⚠ CAUTION**

**Unplug the copier power cord before starting the following procedure.**

1. Remove the printer controller [A] (2 screws).

2. Install the SDRAM DIMM [B].

**NOTE:** Make sure that SDRAM DIMM is properly installed.

## 3.7 CONNECTING THE INTERFACE CABLES

### 3.7.1 PARALLEL INTERFACE

An IEEE1284 compatible printer cable is required to connect the printer controller to a host PC parallel port.

### 3.7.2 NETWORK INTERFACE

A Shielded Twisted Pair (STP) cable with RJ45 connectors is required to connect the Network Interface Board to a computer network. (The cable should be Category/Type 5 or better.) After all the hardware is installed, the network setup should be done by the user. The setup procedure is described in the NIB manual.

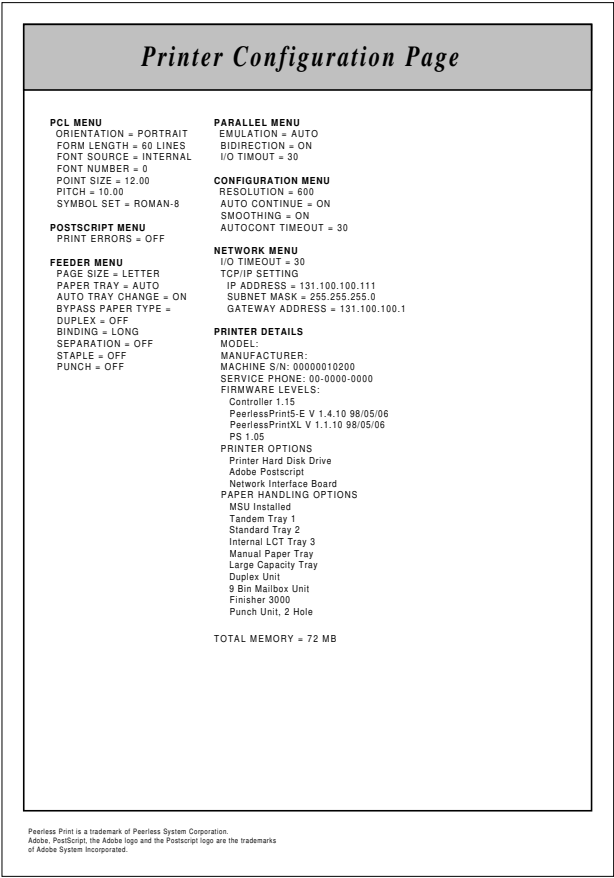
## 3.8 CHECKING THE CONNECTION

### 3.8.1 CONNECTION BETWEEN BASE ENGINE AND PRINTER CONTROLLER (and related options; PostScript ROM, SDRAM DIMM, Hard Disk Drive, NIB)

1. Plug in the power cord and turn on the main power switch.
2. Enter the printer user mode.
  - 1) Press the User Tool key.
  - 2) Press the Printer Features button.
3. Print out the printer configuration page.
  - 1) Select the List Print tab.
  - 2) Press the Configuration Page button to print the configuration page. The machine prints the printer configuration page automatically.

**NOTE:** For further details about the operation panel settings, refer to the operating instructions.

The printer configuration page is similar to that shown on the next page.



A852I509.WMF

**CONFIGURATION MENU**  
 RESOLUTION = 600  
 AUTO CONTINUE = ON  
 SMOOTHING = ON  
 AUTOCONT TIMEOUT = 30

**NETWORK MENU**  
 I/O TIMEOUT = 30  
 TCP/IP SETTING:  
 IP ADDRESS = 131.100.100.111  
 SUBNETMASK = 255.255.255.0  
 GATEWAY ADDRESS = 131.100.100.1

**PRINTER DETAILS**  
 MODEL:  
 MANUFACTURER:  
 MACHINE S/N: 00000010200  
 SERVICE PHONE: 00-0000-0000  
 FIRMWARE LEVELS:  
 Controller 1.15  
 PeerlessPrint5-E V 1.4.10 98/05/06  
 PeerlessPrintXL V 1.1.10 98/05/06  
 PS 1.05  
 PRINTER OPTIONS:  
 Printer Hard Disk Drive  
 Adobe Postscript  
 Network Interface Board  
 PAPER HANDLING OPTIONS:  
 MSU Installed  
 Tandem Tray 1  
 Standard Tray 2  
 Internal LCT Tray 3  
 Manual Paper Tray  
 Large Capacity Tray  
 Duplex Unit  
 9 Bin Mailbox Unit  
 Finisher 3000  
 Punch Unit, 2 Hole

TOTAL MEMORY = 72 MB

[C]

[D]

[A]

[B]

Installation

A852I510.WMF

Check the following:

- For the printer controller board, confirm that the machine prints the printer configuration page.
- For the hard disk drive and PS kit, confirm that the configuration page includes them in the “Printer Options” section [A].
- For DRAM SIMM, confirm that “Total Memory” [B] printed on the configuration page shows the correct amount of memory in the machine (Std. plus Opt. SDRAM DIMM).
- For the NIB, confirm that the configuration page includes the “Network Menu” section [C] and includes the network interface board in the “Printer Options” section [A].
- For the firmware version, check “Firmware Levels” [D].

If any problem occurs with the above checks, reinstall the printer controller and other options. Then set up the machine again and redo the test.

### **3.8.2 CONNECTION BETWEEN PRINTER CONTROLLER BOARD AND NETWORK INTERFACE BOARD**

There are the following two ways to check the connection between the printer controller board and the network interface board.

1. To see “Network Menu” on the configuration page.
2. To see the Network Interface Board Status Sheet with the network information that is automatically printed after power on.

#### ***How to Print the Network Interface Board Status Sheet***

Whenever the main power switch is turned on, the network interface board status sheet is automatically printed.

**NOTE:** If the status sheet is not printed, check the Network menu in the printer user tools.

If any problem is found during the check, try to reinstall the printer controller and optional equipment. Then, check again.

## 4. SERVICE TABLES

### 4.1 GENERAL CAUTION






Do not turn off the main power switch or change the controller to off-line while the data LED blinks or is lit. Otherwise, the data that has been stored in the controller will be lost. If it is necessary to do this, ask the customer for consent.

### 4.2 SERVICE PROGRAM MODE

#### 4.2.1 SERVICE PROGRAM ACCESS PROCEDURE

The service program (SP mode) access procedure is the same procedure as for the copy mode.

##### Entering SP mode

 →  →  →  →  (Hold it for more than 3 seconds.)

##### Exiting SP mode

Press the Exit key until the standby mode display appears.

#### 4.2.2 SERVICE PROGRAM MODE TABLES

|                 | No. | Description                       | Function   |
|-----------------|-----|-----------------------------------|--|
| 1. Flash        | 01  | Flash System From Parallel        | Downloads the printer controller firmware from a PC through the parallel port      |
|                 | 02  | Flash System From PCMCIA          | Downloads the printer controller firmware using an IC card through the PCMCIA port |
|                 | 03  | Flash Postscript From Parallel    | Downloads the PostScript firmware from a PC through the parallel port              |
|                 | 04  | Flash Postscript From PCMCIA      | Downloads the PostScript firmware using an IC card through the PCMCIA port         |
|                 | 05  | Copy Flash ROM                    | Copies the printer controller firmware between ROM DIMM and printer controller     |
|                 | 06  | Format Disk                       | Formats the hard disk drive  |
| 2. Log          | 11  | Parallel Loop Back Test           | Performs the parallel loop back test   |
|                 | 01  | Print Job Log Data                | Prints the print/job count log page  |
|                 | 02  | Print Error Log Data              | Prints the printer error log page  |
|                 | 03  | Clear Job Log Counter             | Clears the print/job counter   |
|                 | 04  | Print User Code Job Attribute Log | Clears the error log counter   |
| 3. Reset Select | 05  | Print User Code Job Pages Count   | Prints the gateway address page  |
|                 | 01  | System Reset                      | Reset the printer system   |

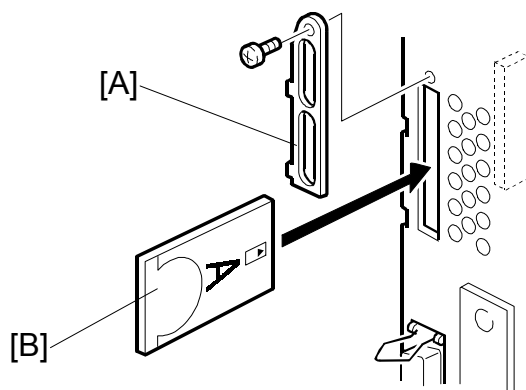


## 4.3 FIRMWARE DOWNLOAD

Firmware for the printer controller and PostScript can be downloaded using a flash memory card through the PCMCIA port or using a PC through a parallel cable.

### 4.3.1 FIRMWARE UPDATE USING A FLASH MEMORY CARD (SP02 AND 04)

1. Prepare a flash memory card programmed with the latest firmware.  
**NOTE:** When programming a firmware file in a flash memory card, set the following parameters:
  - Start Address: 000000h
  - Length: 3FFFFh
2. Turn off the main power switch, remove the cover [A] and insert the flash memory card [B] into the slot. The “A” side of the card must face the front of the base engine.




B335M502.WMF

3. Turn on the main power switch and enter the printer SP mode.
4. Select the Flash tab.
5. Press the “Flash System from PCMCIA” button (to download system firmware) or the “Flash PostScript from PCMCIA” button (to download PostScript firmware).
6. Press “Yes” in reply to the confirmation message. The download takes several minutes. The LEDs on the controller board show how the download is progressing (see Troubleshooting).
7. When the download is successfully finished, turn off the main power switch, pull the card out from the slot and turn on the main switch again.
8. Print the “Printer Configuration Page” to check the new firmware version ([User Tools] – [Printer Features] – [List Print tab] – [Configuration Page]). The firmware version number is in the “Printer Details” section of this page.
9. System Firmware Downloads: If the controller does not start up after the download, the download has failed. See “Copy Flash ROM” for how to recover.

4.3.2 FIRMWARE UPDATE USING PARALLEL PORT

- 1. Prepare the latest firmware file and Fcopy.exe on a PC.
- 2. Turn off the main power switch, then connect the PC using a parallel cable.
- 3. Turn on the main switch and enter the printer SP mode.
- 4. Select the Flash tab.
- 5. Press the “Flash System from Parallel” button or the “Flash Postscript from Parallel” button depending on the firmware type.
- 6. Press “Yes” in reply to the confirmation message. The LEDs on the controller board show how the download is progressing (see Troubleshooting).
- 7. On the PC, access the MS-DOS Prompt and type the following command:

```
Either
  C:\> FCOPY path\filename
or
  C:\> COPY /b path\filename port
```

 **CAUTION**

**Do not turn off the main power switch while “Downloading New System Software” is displayed on the LCD, even if the MS-DOS Prompt mentions that FCOPY has finished.**

Service  
Tables

- 8. When the downloaded is successfully finished, turn off the main power switch, disconnect the parallel cable if necessary and turn on the main switch again.
- 9. Print the “Printer Configuration Page” to check the new firmware version ([User Tools] – [Printer] – [List Print] – [Configuration Page]).  
The firmware version number is listed in the “Printer Details” section of the configuration page.
- 10. If the printer controller does not start up after downloading system firmware, this means that the download failed; see “Copy Flash ROM” for how to recover.

4.3.3 HARD DISK FORMAT

This function is used to format the printer hard disk. If the hard disk is formatted, the stored data (downloaded fonts and macros) is erased. So, when performing this function, ask the customer for consent. After this operation, advise the customer to restore the erased data if necessary.

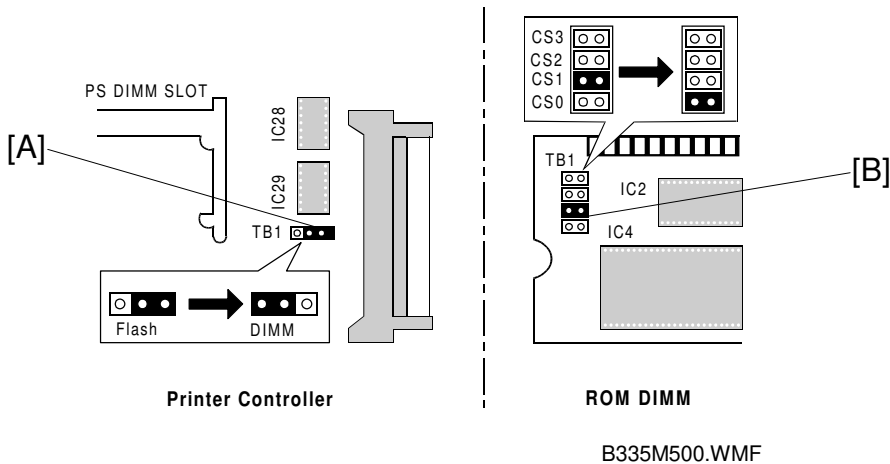
- 1. Enter the printer SP mode.
- 2. Select the Flash tab.
- 3. Press the “Format Disk” button.
- 4. Press “Yes” in reply to the confirmation message. The format takes several minutes.
- 5. When the format is successfully finished, turn off the main power switch and turn it on again.

### 4.3.4 COPY FLASH ROM

There are two functions. One copies the printer controller firmware from the ROM DIMM to the printer controller and the other copies the opposite way.

#### ***Download from ROM DIMM to printer controller***

When downloading the printer controller firmware from either the flash memory card or a PC is not successfully finished and the printer controller does not start up, the controller firmware cannot be downloaded again using the flash memory card or a PC to recover. However, the firmware can be downloaded from a ROM DIMM by following the procedure below.



1. Turn off the main power switch and remove the printer controller.
2. Change the position of the TB1 jumper [A] on the controller from CS0 to CS1.
3. Change the position of the TB1 jumper [B] on the ROM DIMM from CS1 to CS0.
4. Install the ROM DIMM in the PostScript DIMM slot on the controller.

#### **⚠ CAUTION**

**Make sure to install the correct type of ROM DIMM in the PostScript SIMM.**

5. Install the printer controller and turn on the main power switch.
6. Enter the printer SP mode, select the Flash tab and Press the “Copy Flash ROM” button.
7. Press “Yes” in reply to the confirmation message.
8. When the download is successfully finished, turn off the main power switch, remove the printer controller and remove the ROM DIMM.
9. Reposition the jumpers on the printer controller and ROM DIMM.
10. Reinstall the printer controller and turn on the main power switch.
11. Check that the printer controller starts up.

Download from the controller to ROM DIMM

⚠

CAUTION

Never perform this function if the PostScript ROM SIMM is installed on the controller. Otherwise, the controller firmware will be copied to the PostScript kit. Take out the PostScript ROM SIMM and install a blank one.

1. Remove the printer controller.

2. Make sure that the TB1 jumper on the controller is at CS0.

3. Make sure that the TB1 jumper on the ROM DIMM is at CS1.

4. Install the ROM DIMM on the controller.

5. Install the printer controller and turn on the main power switch.

6. Enter the printer SP mode, select the Flash tab and Press the “Copy Flash ROM” button.

7. Press “Yes” in reply to the confirmation message.

8. When the download is successfully finished, turn off the main power switch, remove the printer controller and remove the ROM DIMM.

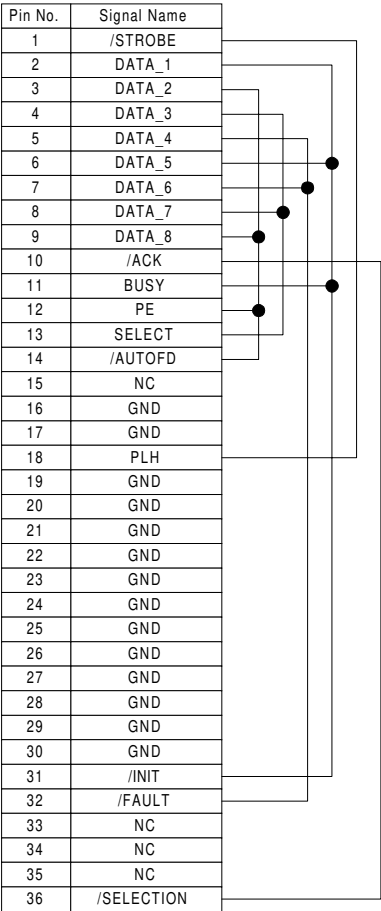
9. Reinstall the printer controller and turn on the machine.

4.3.5 PARALLEL LOOP BACK TEST (SP11)

1. Plug the loop back connector into the parallel port of the printer.

2. Enter the printer SP mode, select the Flash tab and Press the “Parallel Loop Back Test” button.

3. Press “Yes” in reply to the confirmation message. The result of the test will be displayed on the LCD.



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4.4 USER PROGRAM MODE

A user program (UP) mode is available for the printer mode as well as for the copy mode. Press the User Tool button to access it.

4.4.1 UP MODE TABLE (PRINTER FEATURES)

**NOTE:** The function of each UP mode is explained in the Printer Reference section of the operating instructions.

|                  |                                       |
|------------------|---------------------------------------|
| 1. PCL           | 1. Orientation                        |
|                  | 2. Form Length                        |
|                  | 3. Font Source                        |
|                  | 4. Font Number                        |
|                  | 5. Point Size                         |
|                  | 6. Font Pitch                         |
|                  | 7. Symbol Set                         |
| 2. Postscript    | 1. Print Errors                       |
| 3. Paper Feed    | 1. Page Size                          |
|                  | 2. Tray Priority                      |
|                  | 3. Auto Tray Switching                |
|                  | 4. Bypass Paper Type (A292/A293 only) |
|                  | 1. Duplex                             |
|                  | 2. Sort                               |
|                  | 3. Staple                             |
| 4. Parallel      | 4. Punch                              |
|                  | 1. Printer Language                   |
|                  | 2. Bi-direction                       |
|                  | 3. I/O Timeout                        |
| 5. Network       | 1. I/O Timeout                        |
|                  | 2. IP Address                         |
|                  | 3. Subnet Mask                        |
|                  | 4. Gateway Address                    |
|                  | 5. Network Menu Protect               |
| 6. Configuration | 1. Resolution                         |
|                  | 2. Auto Continue                      |
|                  | 3. Edge Smoothing                     |
|                  | 4. Auto Continue Timeout              |
| 7. List Print    | 1. PS Font List                       |
|                  | 2. PCL Font List                      |
|                  | 3. PS Demo Page                       |
|                  | 4. PCL Demo Page                      |
|                  | 5. Configuration Page                 |
|                  | 6. Disk Directory List                |
|                  | 7. Minor Error Log                    |
| 8. Reset Select  | 1. Job Reset                          |
|                  | 2. Menu Reset                         |
|                  | 3. Printer Restart                    |
|                  | 4. User Code Log Clear                |

## 4.5 DIP SWITCHES/JUMPER PINS/LEDS

### 4.5.1 DIP SWITCHES

SW5:

| No.     | Function                             | On                                       | OFF                  |
|---------|--------------------------------------|--|----------------------|
| 1       | Operation mode                       | Normal operation                         | Programming firmware |
| 2, 3    | Not used                             | Do not change this setting. Keep at OFF. |                      |
| 4       | Cache setting                        | Use cache memory                         | Not use cache memory |
| 5       | Destination for firmware downloading | To flash ROM                             | To ROM DIMM          |
| 6, 7, 8 | Not used                             | Do not change this setting. Keep at OFF. |                      |

**NOTE:** The functions of DIP switches no. 4 and 5 are enabled when changing the setting of no. 1 to the off position. However, **do not change the default settings** (keep them all on). The firmware download should be done using the SP mode.

### 4.5.2 JUMPER PINS

TB1:

| Function              | CS0                      | CS1                |
|-----------------------|--------------------------|--------------------|
| Boot device selection | Boot from resident flash | Boot from ROM DIMM |

### 4.5.3 LEDS

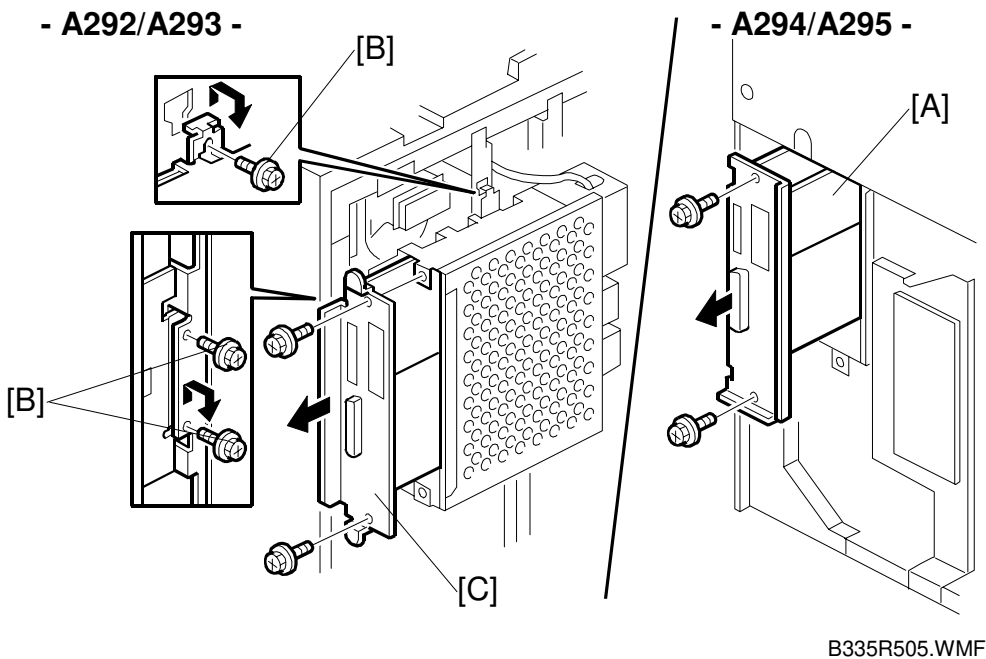
| Symbol | Function   |
|--------|--|
| PWR    | This LED turns on when +5 V is supplied to the printer controller. |
| LED2   | Refer to section 6.2 (LEDs) for further details.                   |
| LED3   |  |
| LED4   |  |
| LED5   |  |

# 5. REPLACEMENT AND ADJUSTMENT



**CAUTION**  
Turn off the main power switch and unplug the power cord before attempting any of the procedures in this section.

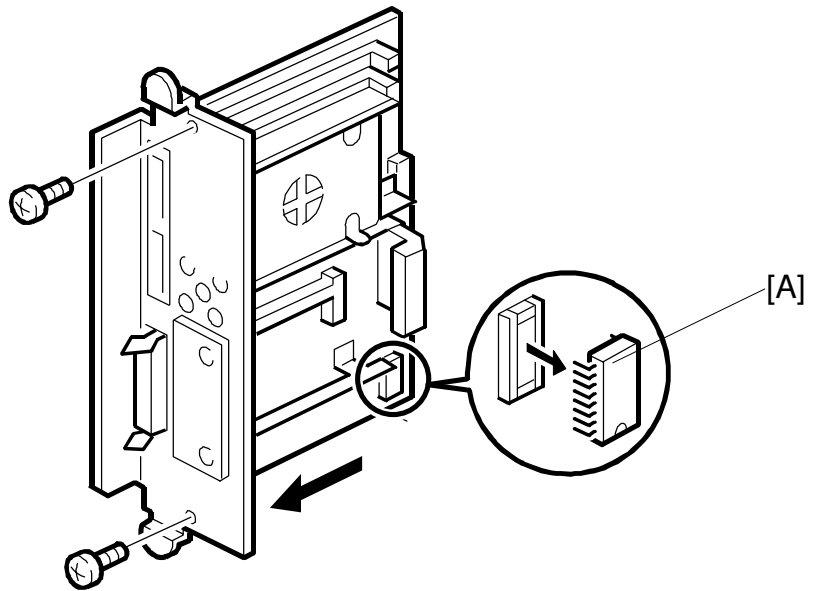
## 5.1 PRINTER CONTROLLER BOARD



B335R505.WMF

1. Disconnect the network and Bi-Centronics cables.
2. Remove the cover. (Refer to the installation procedures.)  
A294/A295: Lower rear cover (2 screws).  
A292/A293: Upper rear cover (2 screws).
3. A294/A295: Remove the controller board [A] (2 screws).  
A292/A293: Remove the 3 screws [B] and remove the controller board [C] (2 screws).

Replacement  
Adjustment

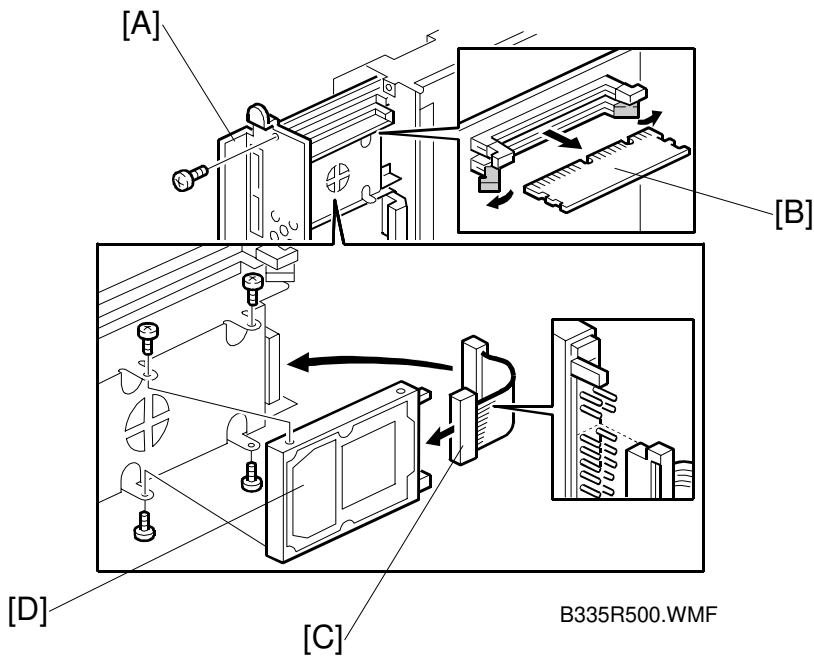


B335R504.WMF

4. Remove the hard disk, network interface board, PS DIMM, and SDRAM DIMM if they are installed (see their replacement procedures).
5. Remove the NVRAM [A] from the old printer controller and install it on a new printer controller.
6. Install the removed options on the new printer controller.
7. Reinstall the rear cover.



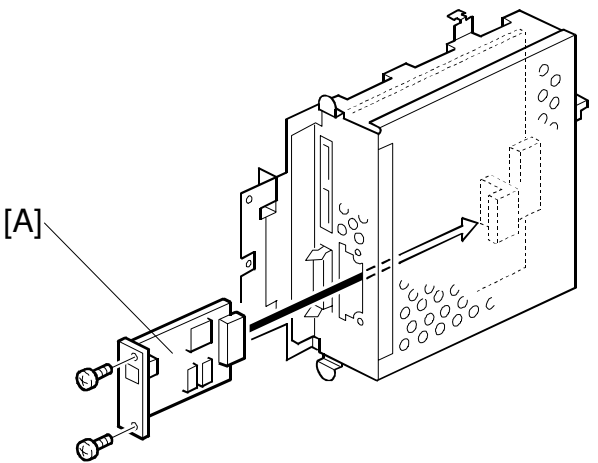
5.2 HARD DISK



- 1. Remove the printer controller [A] (2 screws).
- 2. Remove the SDRAM DIMMs [B].
- 3. Disconnect the IDE cable [C].
- 4. Remove the hard disk [D] (4 screws).
- 5. Install a new hard disk and put back the SDRAM DIMMs.
- 6. Reinstall the controller.
- 7. After turning on the main power switch, format the hard disk.

Replacement  
Adjustment

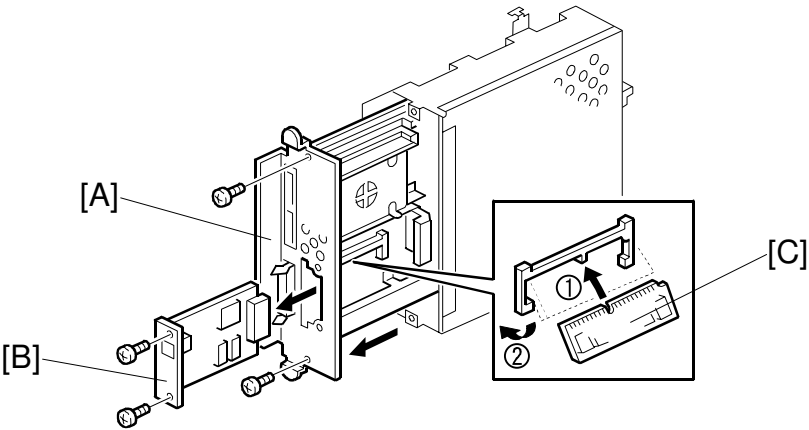
5.3 NETWORK INTERFACE BOARD



B335R501.WMF

- 1. Disconnect the network cable.
- 2. Remove the network interface board [A] (2 screws).

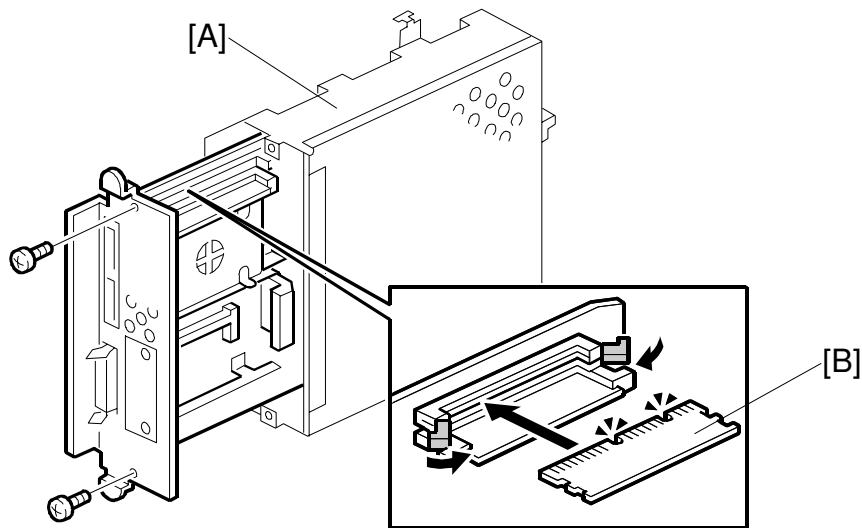
5.4 POSTSCRIPT DIMM



B335R502.WMF

- 1. Remove the printer controller [A] (2 screws).
- 2. Remove the network interface board [B] (2 screws).
- 3. Remove the PS DIMM [C].

5.5 SDRAM DIMM



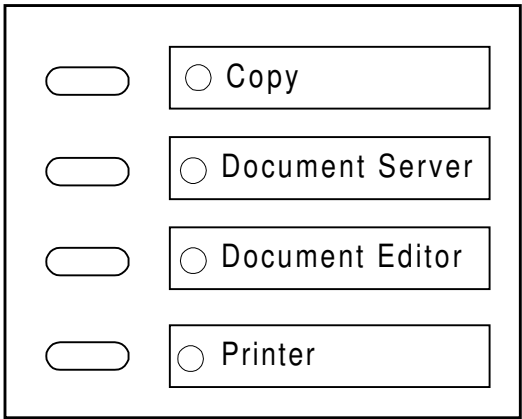
B335R503.WMF

- 1. Remove the printer controller [A] (2 screws).
- 2. Remove the SDRAM DIMM [B].

## 6. TROUBLESHOOTING

### 6.1 ERROR MESSAGES

If an error occurs, the LED for the printer key turns red and an error message is displayed on the LCD.



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#### Service call (SC) codes

| SC No. | Description / Definition   | Possible Cause                         |
|--------|--|--|
| SC2000 | Functional problems (Self diagnostic error)  | Printer controller board defective.    |
|        | <i>A diagnostic error occurred at power on. The controller has a hardware problem.</i>             |  |
| SC2001 | Functional problems (Debug trap error)   | The controller software has a problem. |
|        | <i>An error has occurred in the controller. The controller has a software problem.</i>             |  |
| SC2002 | Functional problems (Exception error)  | Printer controller board defective.    |
|        | <i>An error has occurred in the controller. The controller has a software or hardware problem.</i> |  |

Trouble-  
shooting

**Other messages**

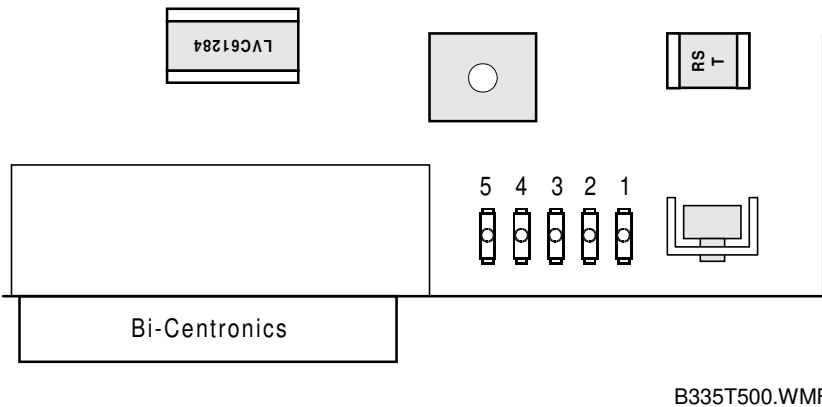
The following errors might need assistance from service.

| Error Message  | Condition  | Possible Cause   |
|--|--|--|
| Printer HDD Error.<br>Press Reset to cancel current job.   | A hard disk error was detected during macro or font download.  | <ul style="list-style-type: none"><li>• Printer HDD defective</li><li>• Printer controller defective</li></ul>   |
| Parallel Communication Error.<br>Please set up communication parameters in parallel menu. Press Reset to cancel current job. | Parallel communication error occurred during a print job via the parallel port.  | <ul style="list-style-type: none"><li>• An item in the parallel menu was set incorrectly</li><li>• Parallel cable defective</li><li>• Printer controller defective</li></ul>               |
| Print overrun.<br>Press Reset to cancel current job, or press Continue to print.   | This error occurred when a file was being printed in banding mode. A complex page may not have enough time to image a band while the engine is printing the previous page. | <ul style="list-style-type: none"><li>• Insufficient memory</li><li>• A complex page is printed</li><li>• The DRAM SIMM board is defective</li><li>• The controller is defective</li></ul> |
| Memory overflow.<br>Press Reset to cancel current job.   | This error occurred during printing.<br>The language has sent a file that is too complex to interpret in the available memory.   | <ul style="list-style-type: none"><li>• Insufficient memory</li><li>• A complex page is printed</li><li>• The DRAM SIMM is board defective</li><li>• The controller is defective</li></ul> |

## 6.2 LEDS

### 6.2.1 LOCATION

Five LEDs (LED1 to LED5) are located next to the Bi-Centronics port on the printer controller. They indicate the progress of the self test, and errors and status conditions.

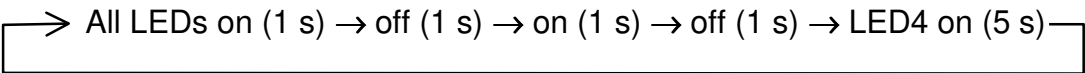


### 6.2.2 LED CODE TABLE

#### Self-diagnostics

The following LED table shows the self-diagnostic function. When an error occurs during the self-diagnostic test, first all four LEDs blink, then they light as shown in the following table to indicate the error.

E.g.) RAM error:



1 = LED is on,    0 = LED is off

| LEDs |      |      |      | Description                         |
|------|------|------|------|-------------------------------------|
| LED2 | LED3 | LED4 | LED5 |                                     |
| 0    | 0    | 0    | 1    | ROM error                           |
| 0    | 0    | 1    | 0    | RAM (resident, SIMM) error: note 1) |
| 0    | 0    | 1    | 1    | NVRAM error: note 1)                |
| 0    | 1    | 0    | 1    | Fatal error                         |
| 0    | 1    | 1    | 0    | Debug trap error: note 2)           |

**NOTE:** 1) SC2000 is also displayed.  
2) SC2002 is also displayed.

**Controller Firmware Copy/Download**

While copying or downloading the controller firmware, the following LED status is indicated.

1 = LED is on,    0 = LED is off,    1/0 = LED is blinking

| LEDS |      |      |      | Description                        |
|------|------|------|------|------------------------------------|
| LED2 | LED3 | LED4 | LED5 |                                    |
| 1    | 0    | 0    | 0    | Data downloading                   |
| 0    | 1/0  | 0    | 0    | Erasing                            |
| 1/0  | 1/0  | 1    | 0    | Programming                        |
| 0    | 0    | 0    | 1    | Verifying                          |
| 1    | 0    | 0    | 1    | Insufficient RAM error             |
| 1    | 0    | 1    | 0    | Verify failure                     |
| 1    | 0    | 1    | 1    | Download failure (check sum error) |
| 1    | 1    | 0    | 0    | Erase failure                      |
| 1    | 1    | 0    | 1    | Download failure (other error)     |
| 1    | 1    | 1    | 1    | Copy/download success              |