

BJ-W3000 BJ-W3050 SERVICE MANUAL

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Canon

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BJ-W3000

BJ-W3050

SERVICE

MANUAL

Canon

Target Readers

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This Service Manual describes fundamental field service for the BJ-W3000/BJ-W3050 large format printer.

This Manual is composed of the following chapters:

Chapter 1 General Description: Features, specifications and operating procedures

Chapter 2 Basic Operation: Operation of mechanical and electric functions

Chapter 3 Mechanical System: Mechanical setup and assembling/disassembling procedure

Chapter 4 Maintenance and Servicing: Periodic parts replacement, Standard service life of consumables, Periodical services, points of maintenance and inspections



Chapter 5 Troubleshooting: Service mode, adjusting and settings, operation trouble correction, image trouble correction

Chapter 6 Circuite diagrams

Appendix Menu guide

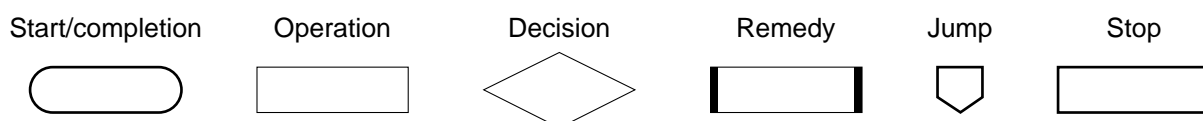
Descriptions in this manual are based on the following conventions.

1. In the Basic Operation section, the roles of each function, relationships between electrical and mechanical systems, and the timing for each part are summarized.

The mark  indicates mechanical drive transmission. The mark  accompanying a signal name indicates the flow of electrical signals.

Flow charts are also used in the summary of operation.

The symbols used in the flow charts are as follows:



2. In the descriptions of digital circuits, "1" or "H" indicates a high voltage level, and "0" or "L", a low voltage level. However, the actual voltage values vary depending on the circuit.
3. It is assumed that the Printed circuit board (PCB) will not be repaired by the user. Therefore, the descriptions of the circuits on the PCB are limited to block diagrams.
4. Troubleshooting is described using procedural tables.

The procedural table is a variation of a general flow chart.

An example is shown below.

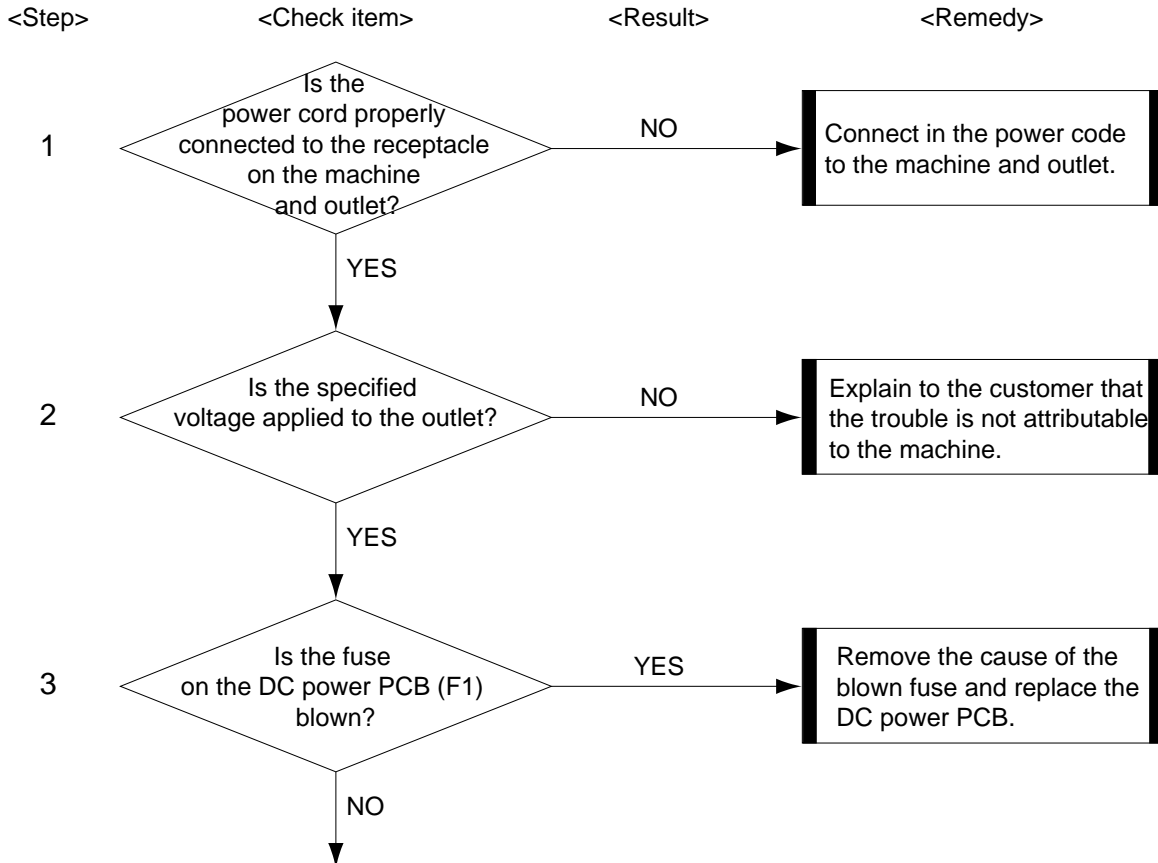
e.g. No power is supplied.

Cause	Step	Check item	Result	Remedy
Unplugged power source	1	Is the power cord properly connected to the receptacle on the machine and the outlet?	NO	Connect the power cord to the machine and outlet.
Power source failure	2	Is the specified voltage applied to the outlet?	NO	Explain to the customer that the trouble is not attributable to the machine.
Blown fuse	3	Is the fuse on the DC power PCB (F1) blown?	YES	Remove the cause of the blown fuse and replace the DC power PCB.

- If you want to know the possible causes of any specific problem (suspected parts), refer to the "Cause" column in the table.

In the event "No power is supplied" as shown in the above table, an unplugged power source, power source failure, blown fuse, and other causes can be considered.

- In order to remedy a problem, check the Steps in order. Answer the first "Check item" question. If your answer matches that given in the "Result", follow the corresponding procedure in the "Remedy" column. If your answer is not the same, go on to the next step and repeat the same procedure.



- When checking voltages using a tester is required, it will be specified in the check item. For instance; "measure the voltage between JI02-1 (+) and JI02-2 (-) on the engine controller PCB". In this case, apply the plus and minus leads of the tester to the (+) and (-) terminals indicated after the connector numbers:

e.g. JI02-1 (+): Plus lead

JI02-2 (-): Minus lead

- The signal address of the circuit diagram is shown by applicable pages of each controller (indicated at the upper right of the circuit diagram) and its location.

CAUTION

When checking voltages with a tester, touching the components or connector terminals on the PCB with the hands may cause an electric shock. It is advisable to wear rubber gloves or the like when power is supplied to the machine to protect yourself from electric shock.

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I. SPECIFICATIONS

1. Type

Type:	Bubble jet printer
Purge system:	Suction with tube pump
Paper feeding method:	Cut sheet media; Manually set to the front. Roll media; Automatic feeding (When manually set to the rear.)
Sheet feeder capacity:	Cut sheet media; 1 sheet Roll media; 1 unit (Outside dia.: 100mm or less, Media tube bore: 50.8mm (2"))
Media delivery system:	Face-up delivery in front
Max. delivery sheets:	5 sheets (Plain paper)
Fixing method:	Natural drying
Cutter:	Automatic cutter (replaceable)

2. Exterior

A0-size model:

External dimensions (main unit only);	1462 x 388 x 345 mm
External dimensions (including stand);	1462 x 700 x 1204 mm
Weight (Main unit only);	Approx. 31 kg
Weight (including stand);	Approx. 46 kg

A1-size model:

External dimensions (main unit only);	1182 x 388 x 345 mm
External dimensions (including stand);	1182 x 700 x 1204 mm
Weight (main unit only);	Approx. 26 kg
Weight (including stand);	Approx. 40 kg

3. Mechanism

Print mode/Resolution

(No.)	Mode	Pass * ¹	Resolution	Drive frequency	Dot size * ³
(1)	Monochrome draft	1 pass/Bi	180dpi x 360dpi	14.4kHz	M
(2)	Monochrome normal	1 pass/Uni	360dpi x 360dpi	7.2kHz	L
(3)	Monochrome enhanced	2 pass/Uni	360dpi x 360dpi	7.2kHz	L
(4)	Monochrome high enhanced	4 pass/Uni	360dpi x 360dpi	7.2kHz	L
(5)	Monochrome high resolution	4 pass/Uni	720dpi x 720dpi* ²	7.2kHz	S
(6)	Color draft	1 pass/Bi	360dpi x 360dpi	7.2kHz	Bk:M/Color:S
(7)	Color normal	1 pass/Uni	360dpi x 360dpi	7.2kHz	Bk:L/Color:S
(8)	Color enhanced	2 pass/Uni	360dpi x 360dpi	7.2kHz	Bk:L/Color:S
(9)	Color high enhanced	4 pass/Uni	360dpi x 360dpi	7.2kHz	Bk:L/Color:S

* ¹: Bi=bi-directional, Uni=uni-directional

* ²: Equivalent

* ³: S=small dot, M=middle dot, L=large dot

Table 1-101

Print modes according to media type <Corresponds to the Nos. of table 1-101.>

Media type	Monochrome				Color		
	Draft	Normal	Enhanced	High resolution	Draft	Normal	Enhanced
Plain paper	(1)	(2)	(3)	(5)	(6)	(7)	(8)
Coated paper	(1)	(2)	(3)	(5)	(7)	(8)	(9)
Tracing paper	(2)	(3)	(4)	(5)	(7)	(8)	(9)
Matte film	(2)	(3)	(4)	(5)	(7)	(8)	(9)

Table 1-102

Maximum printing speed (Plain paper mode)

Print mode		A0 size	A1 size
Monochrome mode	Draft mode	Approx. 2 minutes 15 seconds	Approx. 1 minute 30 seconds
	Enhanced mode	Approx. 13 minutes	Approx. 7 minutes
	High Resolution mode	Approx. 25 minutes	Approx. 13 minutes 15 seconds
Color mode	Draft mode	Approx. 5 minutes 15 seconds	Approx. 3 minutes
	Enhanced mode	Approx. 15 minutes	Approx. 8 minutes 30 seconds

Table 1-103

Cartridge construction	Head/Ink tank separation type 1 row of 160 nozzles (144 nozzles used) x 4 colors
Ink type	Black: Pigment, Cyan/Magenta/Yellow: dye
Ink tank capacity	Black: Approx. 23g, Cyan/Magenta/Yellow: Approx. 20g
BJ print head service life	A0 size: Approx. 400 sheets, A1 size: Approx. 500 sheets (continuous printing on plain paper, 1-pass uni-directional, at 20% duty (5% for each color))
Ink consumption	A0 size: Bk; 25 sheets, Cyan/Magenta/Yellow; 40 sheets A1 size: Bk; 50 sheets, Cyan/Magenta/Yellow; 80 sheets (continuous printing on plain paper, 1-pass uni-directional, at 20% duty (5% for each color))
Interface	Parallel interface Complies with IEEE1284 (Compatible mode/Nibble mode) Connector complying with IEEE1284-B Receptacle Serial interface Complies with RS-232C (DCE) D-Sub 9-pin female connector
Emulation	Complies with HP-GL, HP-GL/2, and HP-RTL
Kanji font	Kanji JIS first and second standard
Memory	Standard: 8MB (can be increased to 72 MB: 72-pin 60ns FPM type SIMMs) EDO memory can be used in FPM mode.
Cutter	Automatic cutter (replaceable)
Waste-ink tank	Provided
Maintenance jet	Provided
Capping system	Provided
Paper thickness adjustment	Provided
Automatic printing position adjustment	Provided
Self diagnostics	Provided
Skewed feed detection	Provided
Head detection	Provided
Head insertion error detection	Not provided

Ink tank detection	Provided
Remaining ink detection	Provided
Waste-ink full detection	Provided
Media out detection	Provided
Remaining roll media detection	Not provided
Roll media end detection	Provided
Media size detection	Cut sheet media: Automatic vertical/horizontal detection
	Roll media: Vertical; size or data designated Horizontal; automatic detection
Carriage position detection	Provided
Machine internal temperature detection	Provided

4. Media

Media types	Plain paper, coated paper, tracing paper, and matte film (75 ~ 100 μ m)
Paper thickness	75 ~ 165 μ m (excluding matte film) / 64 ~ 128g/m ²
Maximum paper width	A0 model: 914mm A1 model: 634mm
Minimum paper width/length	Width; 250mm Length; 150mm
Maximum printing length	Cut sheet media: 1250mm Roll media* : Windows95/98 driver; 4.6m WindowsNT4.0 driver; 4.6m ADI driver; 13m HDI driver; 18m

* : Printing length of roll media varies depending on the type of application, operating system, or driver used.

Printing margin	Cut sheet media: Leading edge; 5mm/15mm Trailing edge; 20mm Right/left edge; 5mm
	Roll media: Leading edge; 5mm/15mm Trailing edge; 5mm Right/left edge; 5mm
Maximum printing area	Excludes printing margins

Printable papers

Paper standard	mm	inch	A1 model		A0 model	
			Vertical	Horizontal	Vertical	Horizontal
ISO A						
A0	841.0 × 1189.0	33.1 × 46.8	NG	NG	OK	NG
A1	594.0 × 841.0	23.4 × 33.1	OK	NG	OK	OK
A2	420.0 × 594.0	16.5 × 23.4	OK	OK	OK	OK
A3	297.0 × 420.0	11.7 × 16.5	OK	OK	OK	OK
A4	210.0 × 297.0	8.3 × 11.7	NG	OK	NG	OK
JIS B						
B1	728.0 × 1030.0	28.7 × 40.6	NG	NG	OK	NG
B2	515.0 × 728.0	20.3 × 28.7	OK	NG	OK	OK
B3	364.0 × 515.0	14.3 × 20.3	OK	OK	OK	OK
B4	257.0 × 364.0	10.1 × 14.3	OK	OK	OK	OK
ISO B						
B1	707.0 × 1000.0	27.8 × 39.4	NG	NG	OK	NG
B2	500.0 × 707.0	19.7 × 27.8	OK	NG	OK	OK
B3	353.0 × 500.0	13.9 × 19.7	OK	OK	OK	OK
B4	250.0 × 353.0	9.8 × 13.9	OK	OK	OK	OK
ANSI						
E	863.6 × 1117.6	34.0 × 44.0	NG	NG	OK	NG
D	558.8 × 863.6	22.0 × 34.0	OK	NG	OK	OK
C	431.8 × 558.8	17.0 × 22.0	OK	OK	OK	OK
B	279.4 × 431.8	11.0 × 17.0	OK	OK	OK	OK
A	215.9 × 279.4	8.5 × 11.0	NG	OK	NG	OK
ANSI ARCH						
6	914.4 × 1219.2	36.0 × 48.0	NG	NG	OK	NG
5	762.0 × 1066.8	30.0 × 42.0	NG	NG	OK	NG
4	609.6 × 914.4	24.0 × 36.0	OK	NG	OK	OK
3	457.2 × 609.6	18.0 × 24.0	OK	OK	OK	OK
2	304.8 × 457.2	12.0 × 18.0	OK	OK	OK	OK
1	228.6 × 304.8	9.0 × 12.0	NG	OK	NG	OK
ISO Over						
A0	910.0 × 1245.0	35.8 × 49.0	NG	NG	OK	NG
A1	627.0 × 900.0	24.7 × 35.4	OK	NG	OK	OK
A1L	627.0 × 1250.0	24.7 × 49.2	OK	NG	OK	NG
A2	460.0 × 645.0	18.1 × 25.4	OK	NG	OK	OK
A3	340.0 × 465.0	13.4 × 18.3	OK	OK	OK	OK
EURO DIN						
A0	881.0 × 1229.0	34.7 × 48.4	NG	NG	OK	NG
A1	634.0 × 881.0	25.0 × 34.7	OK	NG	OK	OK
A2	460.0 × 634.0	18.1 × 25.0	OK	OK	OK	OK
A3	337.0 × 460.0	13.3 × 18.1	OK	OK	OK	OK
A4	250.0 × 337.0	9.8 × 13.3	OK	OK	OK	OK
KOREAN						
m	540.0 × 790.0	21.3 × 31.1	OK	NG	OK	OK
s	390.0 × 540.0	15.4 × 21.3	OK	OK	OK	OK

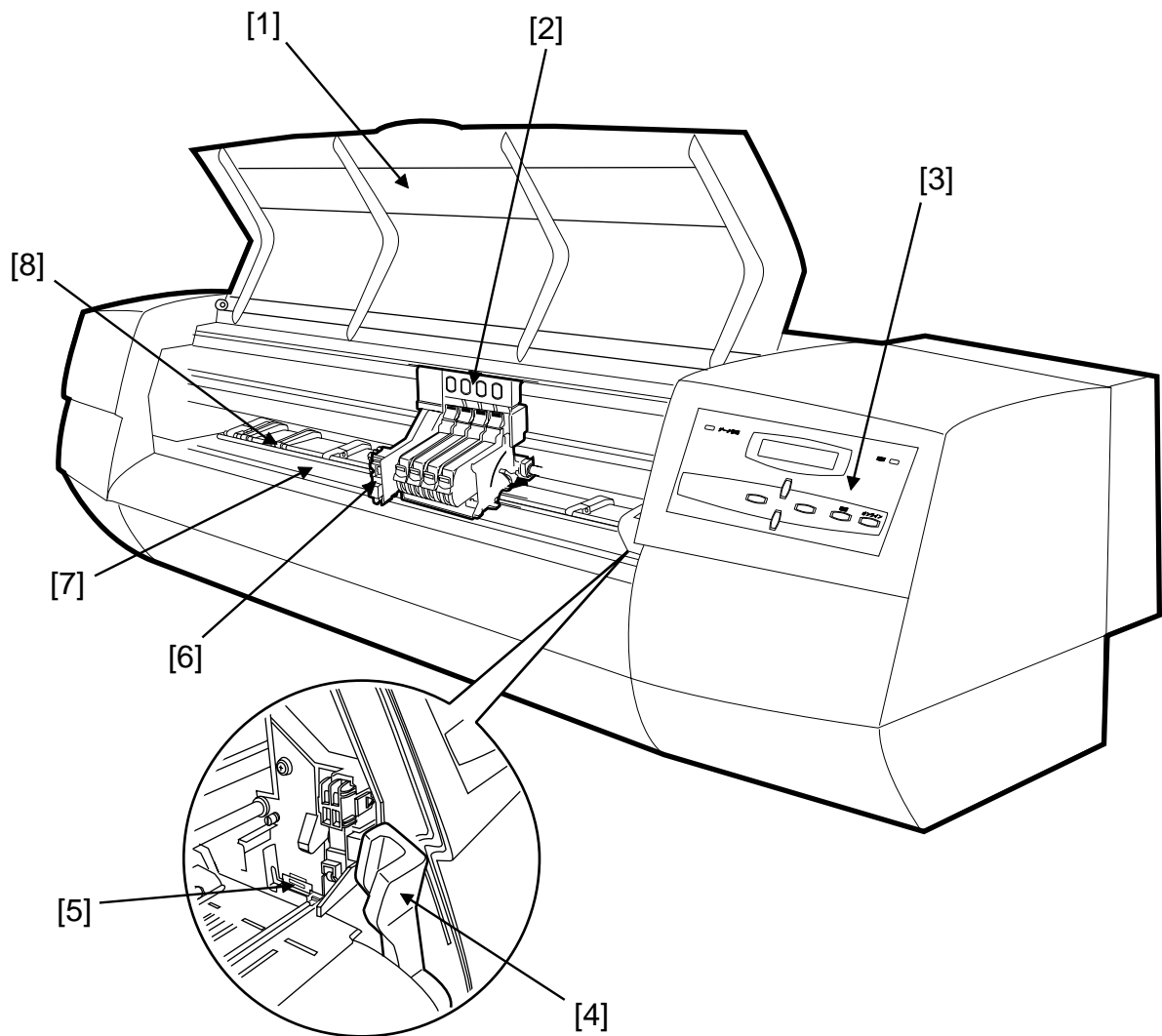
5. Others

Power source	AC: 100 ~ 240 V (-15%, +10%)
Frequency	50/60Hz
Power consumption	Max.: 120W or less At stand-by: 22W or less
Noise	Sound pressure level (Complies with ISO 9296.) When operating: Approx. 52dB (A) or less At stand-by: Approx. 20dB (A) or less
Operating environment	Temperature: 5 ~ 35°C (Printing quality assured: 15 ~ 30°C) Humidity: 10 ~ 90%RH (Printing quality assured: 20 ~ 80%RH) Atmospheric pressure: 1013 ~ 709hPa
Storage environment*	Temperature: 0 ~ 35°C Humidity: 5 ~ 95% (RH)

* : Should be free from condensation and rapid temperature variations.

II. NAMES OF COMPONENTS

A. External View



[1] Front cover

[2] Carriage

[3] Operation panel

[4] Paper release lever

[5] Wiper (Cleaner blade)

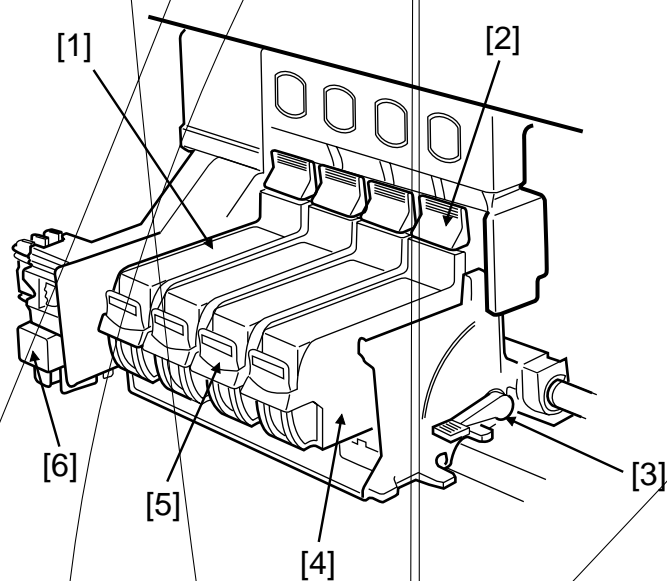
[6] Cutter unit

[7] Platen

[8] Pinch roller

Figure 1-201

B. Carriage



[1] Ink tank

[2] BJ print head release hook

[3] Paper thickness adjustment lever

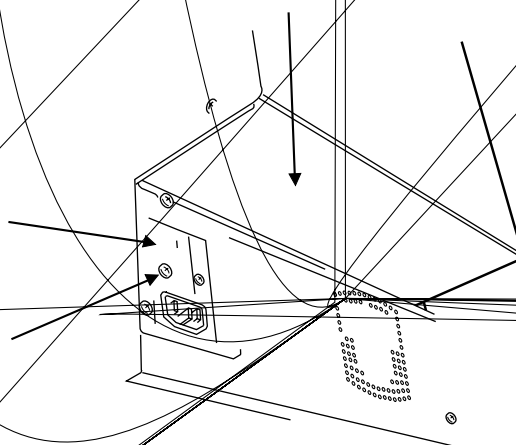
[4] BJ Cartridge

[5] Ink tank release hook

[6] Cutter unit

Figure 1-202

C. Cable Connections



[1] Parallel interface connector

[2] Serial interface connector

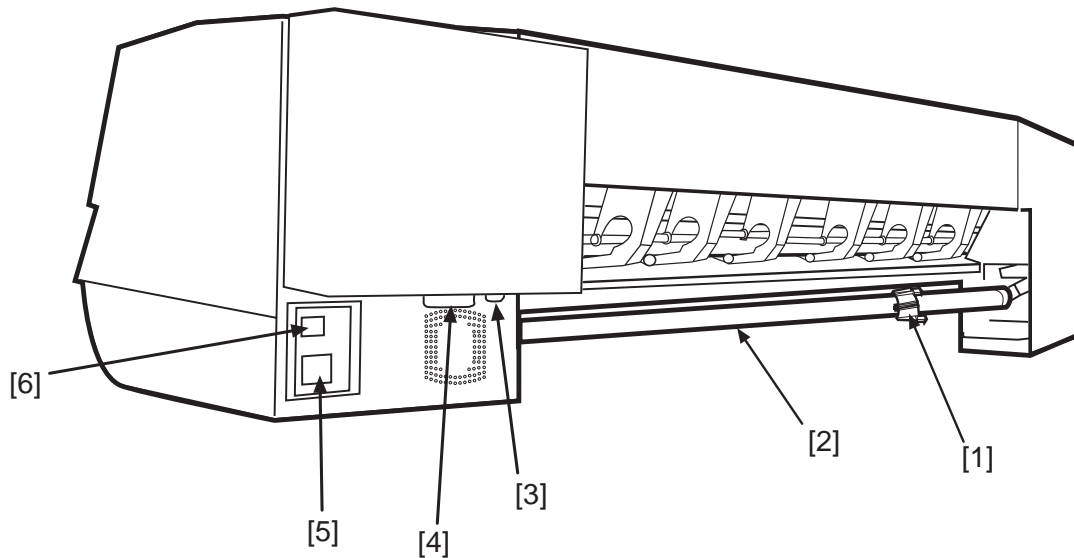
[3] AC inlet

[4] Earth wire terminal

[5] Power switch

Figure 1-203

D. Rear Side of Main Unit



- | | |
|--------------------------------|----------------------------------|
| [1] Roll media stopper | [4] Parallel interface connector |
| [2] Spindle | [5] AC inlet |
| [3] Serial interface connector | [6] Power switch |

Figure 1-204

E. Printing Direction

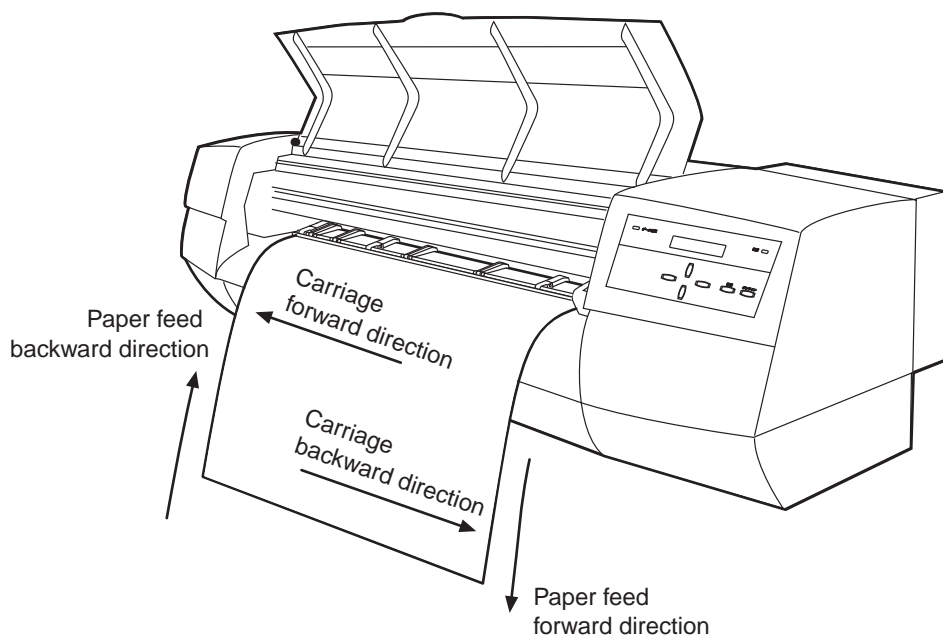


Figure 1-205

III. OPERATION

A. Operation Panel

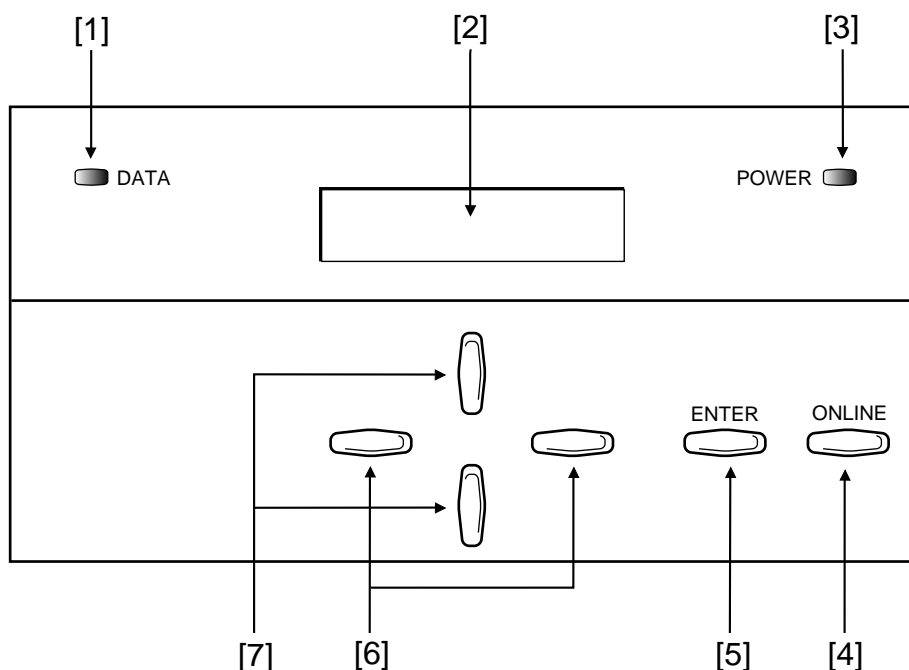


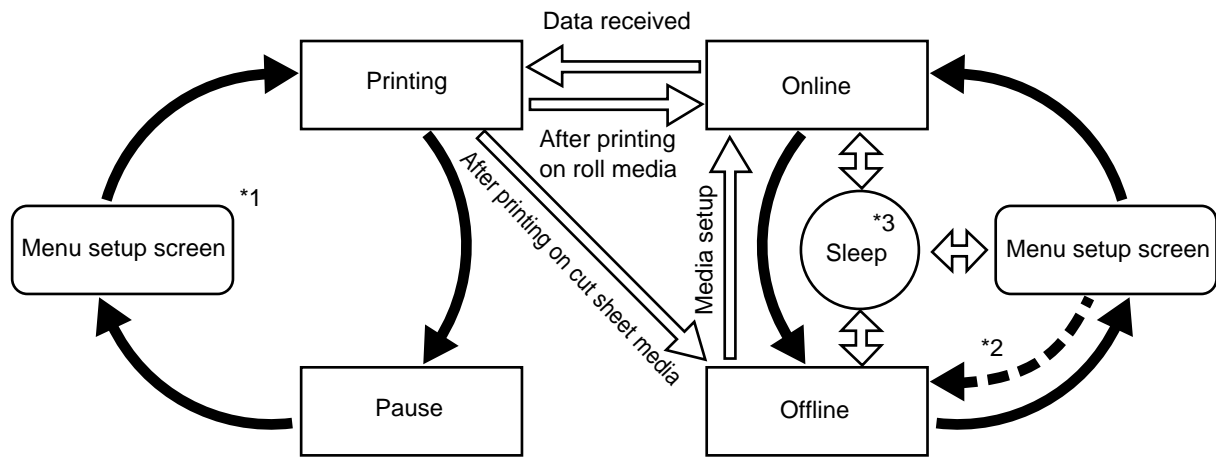
Figure 1-301

No.	Name	Function
[1]	Data reception lamp	Green when receiving data. Blinks if data is transmitted when the printer cannot receive it.
[2]	Message display	Menus, parameters, error messages and other conditions are displayed. Divided into upper and lower sections.
[3]	Power lamp	Green when power switch is turned on. Orange in the sleep state. Blinks orange if an error occurs.
[4]	Online key	Switches between the online, offline and menu states.
[5]	Enter key	Enters selected menu item.
[6]	Right/left arrow keys	Used when selecting parameters. Also used to move the carriage on the platen.
[7]	Up/down arrow keys	Used when selecting menus. Can move the paper back and forth when offline.

Table 1-301

B. Printer States

Printer states and key operation are shown below.



➡ (Black arrows) : Change of printer states when the Online key is pressed.

*1. Some menus cannot be setup during printing.

*2. When no media is loaded, the machine cannot be returned to the "Online" state by pressing the Online key.
It returns to "Offline".

*3. Pressing any key on the control panel, opening the front cover, or receiving data in "Sleep" state will wake the printer up.

Figure 1-302

State	Printer state
Online	<p>¥ This machine can receive, analyze and print data. When printing is started, "Printing" appears on the message display.</p> <p>¥ While online, only the online key is functional. To use the other keys, this machine should be offline or in the menu state.</p> <p>¥ If no data is received for 5 minutes in this state, the printer enters the sleep state.</p>
Offline	<p>¥ If data is transmitted from the host in the offline state, the printer will ignore it.</p> <p>¥ The roll media can be fed and the carriage can be moved.</p> <p>¥ If no data is received for 20 minutes, the printer enters the sleep state.</p>
Pause	<p>¥ Printing is paused. As long as, there is sufficient space in the buffer memory, data is received and analyzed continuously. When the reception buffer becomes almost full in the pause state, the mode is shifted to receive data at 1 byte/sec.</p> <p>¥ By pressing the online key in the pause state, the printer will enter the menu state.</p>
Menu	<p>¥ Menus and parameters can be set up. The menu items available when paused are more limited than those available when in offline state.</p>
Printing	<p>¥ The printer is printing.</p> <p>¥ The operation panel keys cannot be used in the printing state. To use the keys, the printer should be in the pause or menu state.</p>
Sleep	<p>¥ All lamps and the display (other than the power lamp) are off.</p> <p>¥ When paper is loaded and data is transmitted from the host, the printer automatically enters the online state and starts printing.</p>

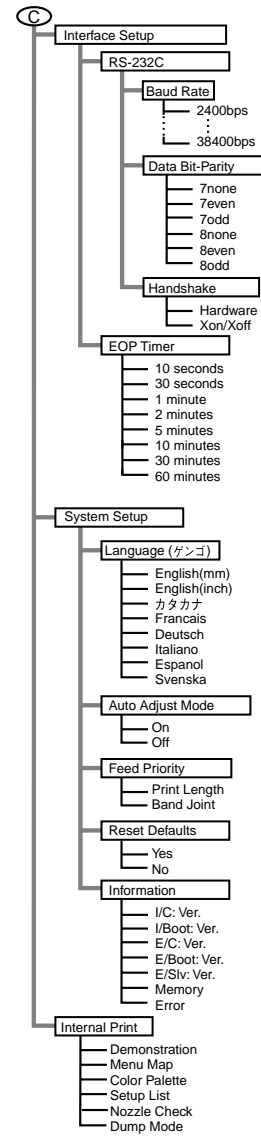
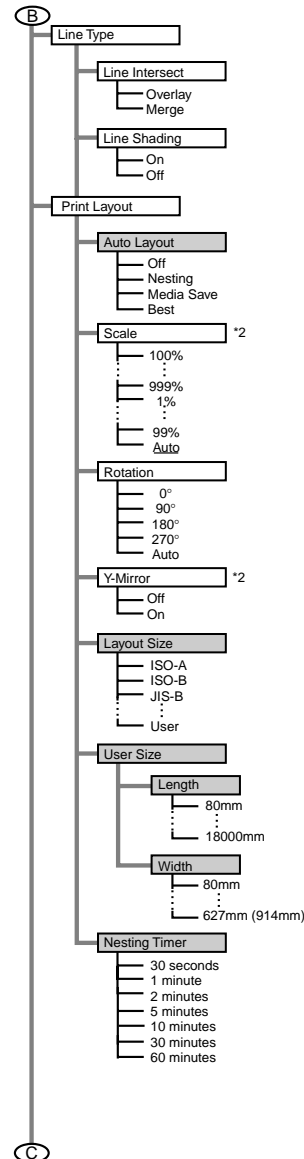
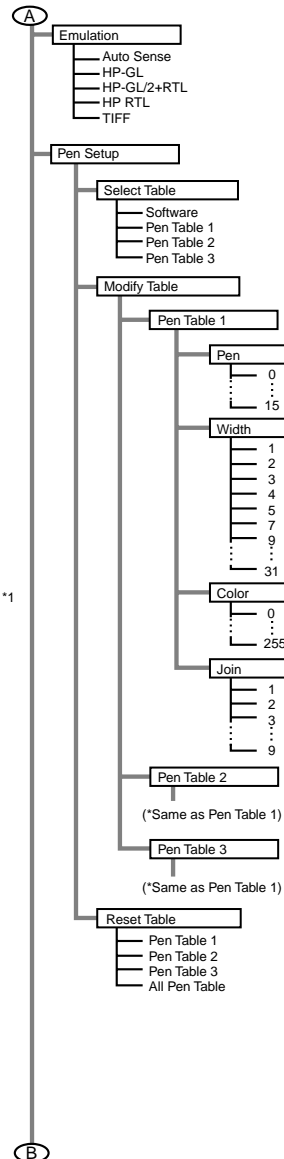
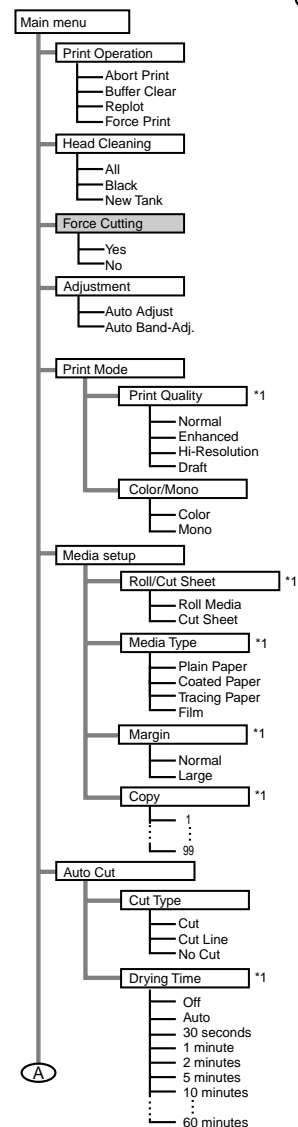
Table 1-302

C. User Mode Menu

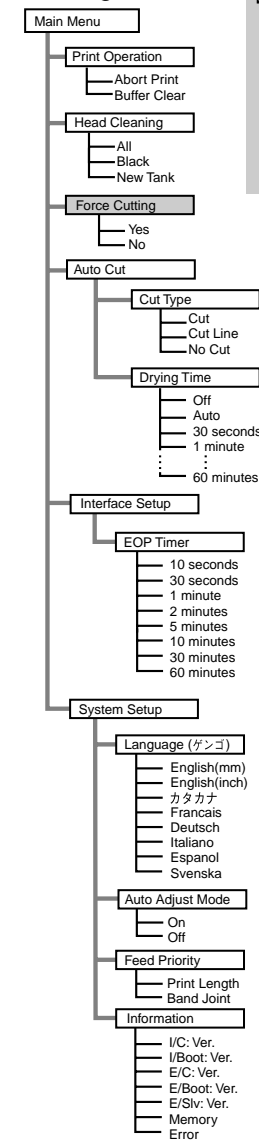
1. Menu guide

The following diagram shows the menu hierarchy of this printer.

Normal menu



Printing Menu



[Shaded Box] : Indicates the menu
 (Select the item using the up and down arrow keys.)
 (The shaded items are indicated only in the roll media mode.)
 *1: Can be set as a printer driver property. This takes priority over the operation panel setting when printing using the driver.
 *2: Can be set as a printer driver property, but both this setting and that of the operation panel will affect the printing.

xxx : Indicates set value.
 xxx : Press the right or left arrow key to accept the set value.
 xxx : Press the ENTER key to accept or execute the selection.
 (Underlined items are indicated only in the cut sheet media mode.)

2. Menu and parameter setup

Menus and parameters are selected as described below.

- 1) By pressing the online key in the offline or pause state, the printer enters the menu state.
- 2) Select a menu item by pressing the right and left arrow keys.
- 3) After selecting a menu, move to the parameter menu by pressing the down arrow key.

CAUTION

Menu display varies depending on the state. (offline or pause)

- 4) Select parameters by pressing the right and left arrow keys.
- 5) Accept the selected parameter by pressing the Enter key.

CAUTION

When "Head Cleaning", "Force Cutting" or other item for immediate execution is selected, the operation is started by pressing the Enter key. If the up arrow key is pressed instead, the operation will not start and the selected parameter is cancelled.

3. Details of user mode menus

The user mode menus are shown below.

[1] Print Operation

Used to change the current print operation.

- Abort Print

Printing is stopped in the pause state.

- Buffer Clear

All current operations are stopped from in the offline or pause state, and all printing data in the memory are cleared.

- Replot

The data printed last is printed again.

- Force Print

The EOP timer is started and the printer is forced to print from the printing stand-by state.

[2] Head Cleaning

Used to clean the cartridge heads.

- All
All heads are cleaned.
- Black
Only the black head is cleaned.
- New Tank
If the ink tank has been removed, use this menu to prevent non-discharge of ink.

[3] Force Cutting

Used to cut the set paper.

Paper is cut.

- Yes
Paper is cut.
- No
Paper is not cut.

[4] Adjustment

- Auto Adjust
Printing position is automatically adjusted.
- Auto Band-Adj.
Paper feed rate is automatically adjusted.

[5] Print Mode**a. Print Quality**

[Default: Normal]

The print quality can be selected for the type of data or paper.

- Draft
For higher-speed, lower-quality output.
- Normal
For printing line drawings, etc.
- Enhanced
For printing files including graphics or solid printing.
- High-Resolution (monochrome only)
For printing monochrome line drawings at an equivalent resolution to 720 dpi.

b. Color/Mono

[Default: Color]

Monochrome or color mode can be selected.

- Color
Color data will be printed in color.
- Mono
Color data will be printed in gray scale.

[6] Media Setup

Used to change paper settings.

a. Roll/Cut Sheet

[Default: Previous setting preserved]

Select roll media or cut sheet.

- **Roll Media**
Select this to use roll media. If a cut sheet is loaded, it will be ejected.
- **Cut Sheet**
Selected when cut paper is used. If roll media is loaded, it is reverse fed and withdrawn.

b. Media Type [Default: Plain paper]

The following media types can be selected:

- Plain Paper
- Coated Paper
- Tracing Paper
- Film

c. Margin [Default: Normal]

Margin size at the media leading edge can be selected.

- **Normal**
Leaves a margin of 5mm.
- **Large**
Leaves a margin of 15mm.

d. Copies [Default: 1]

Specify the number of copies to be printed.

1 - 99

[7] Auto Cut

a. Cut Type

[Default: Cut]

Select the type of cut for roll media after completion of printing.

- **Cut**
Cuts the roll media automatically after completion of printing.
- **Cut Line**
After completion of printing, a cutting line is printed.
- **No Cut**
After completion of printing, the roll media is not cut.

b. Drying Time (only for roll media)

[Default: Off]

Sets the time for drying the ink after completion of printing.

- **Off**
Paper is ejected as usual.
- **Auto**
Optimum drying time is automatically selected according to the media type and printing mode.
In the case of draft mode, the drying time is the same as for [Off].
- **30 sec., 1 min., 2 min., 5 min., 10 min., 20 min., 30 min., 40 min., 50 min., 60 min.**

CAUTION

In the draft mode, the ink may not dry, depending on the environment. Set the drying time as required.

REFERENCE

Drying time for each media type is as follows:

- Plain paper: 30 sec.
- Coated paper: none
- Tracing paper: 2 min.
- Film: 7 sec.

[8] Emulation

[Default: Auto Sense]

Emulation can be set to match the file type output from the computer.

- **Auto Sense**
HP-GL/2+RTL, HP RTL, HP-GL, and TIFF data is automatically detected and printed.
- **HP-GL/2+RTL**
Emulates HP-GL/2 and HP-RTL. Data is accumulated in the memory buffer and printing is started with the EOP command, or when the EOP timer times out.

- **HP RTL**

Should only be used when printing raster data. After the raster data is received and 1 band is analyzed, printing is started.

- **HP-GL (759x)**

Conforms to the HP-759X series format.

[9] Pen Setup

Composed of the pen setup selection menu, pen table changing menu, and pen table initialization menu.

a. **Select Table**

[Default: Software]

Specifies whether to use the setting designated by the software or the pen table setting.

- **Software**
Pen setup from the application is used. ([See Table 1-305.](#))
- **Pen Table (1 to 3)**
Pen setup (pen table) stored in the printer can be used. ([See Table 1-304.](#))

b. Modify Table

The pen setup (pen table) stored in the printer can be changed.

- Pen Table (1 to 3)
- Pen

Contents of the pen table can be changed. Settings can be changed for pen No. 0 to 15 (16 types).

- Width

Width of selected pen can be changed in units of dots (every dot from 1 to 5, every 2 dots from 5 to 31). (See Table 1-303.)

- Color

Pen color (256 values) can be set.

- Joint

Line joins and ends (9 types) can be set (See Figure 1-303).

c. Reset Table

Values in the selected pen table are returned to the defaults.

- All Pen Table

All pen table values are reset to the default values.

- Pen Table (1 - 3)

Values of the selected pen table are reset to the default values.

[10] Line Type

a. Line Intersect

[Default: Overlay]

Color processing method for overlapping lines or figures can be set.

- Overlay

Overlapping parts are printed in the color applied last.

- Merge

Overlapping parts are printed using mixed colors.

b. Line Shading

[Default: On]

When color data is printed in monochrome, a gray scale corresponding to the color is usually used. In order to improve the reproducibility of the line data, you can specify whether to print the line data using only black.

- On

Line data is drawn in gray scale.

- Off

Line data is drawn in black.

No. of dots	Approximate thickness (mm/inch)
1	0.07/0.003
2	0.14/0.005
3	0.21/0.008
4	0.28/0.011
5	0.35/0.014
7	0.49/0.019
9	0.63/0.025
11	0.78/0.031
13	0.92/0.036
15	1.06/0.042
17	1.20/0.047
19	1.34/0.052
21	1.48/0.058
23	1.62/0.063
25	1.76/0.069
27	1.90/0.074
29	2.04/0.080
31	2.19/0.086

Table 1-303

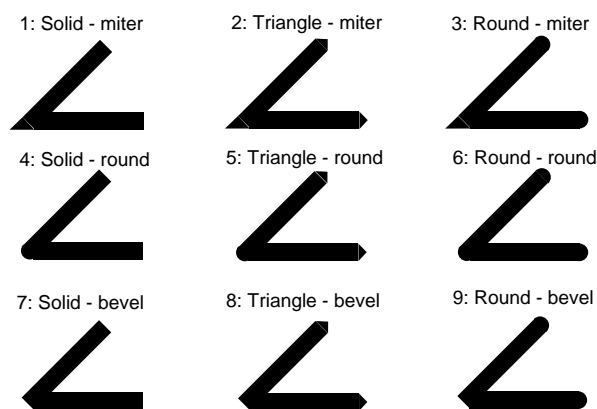


Figure 1-303

Default values of pen table 1 to 3 at the time of Factory settings.

Pen No.	Width(*1)	Color	Joint
0	3	0	6
1	1	1	6
2	2	2	6
3	3	3	6
4	4	4	6
5	5	5	6
6	7	6	6
7	9	7	6
8	11	8	6
9	13	9	6
10	15	10	6
11	17	11	6
12	19	12	6
13	21	13	6
14	23	14	6
15	25	15	6

*1. When the display language is other than katakana, the widths are all set to 3.

Table 1-304

Software pen table factory settings.

Pen No.	Width	Color	Joint(*2)
0	3	0	6
1	3	1	6
2	3	2	6
3	3	3	6
4	3	4	6
5	3	5	6
6	3	6	6
7	3	7	6

*2. When the emulation is HP-GL/2 or HP-RTL, the set value for the joint is 1.

Table 1-305

[11] Plot layout

Printed data layout can be set.

a. Auto Layout (roll media only)

[Default: Off]

Automatic layout can be set. The data size at this time should match the data size of "6. Image layout" (p.1-27).

- Off

Automatic layout does not take place. Data is printed in the layout designated by the received data. However, the settings designated by the scale, rotation, and Y-mirror menus will be used.

- Nesting

Nesting is automatically laid out. Continuous data is rotated clockwise so that the paper feeding rate is minimized. If the longitudinal direction of the later data enters in the width direction of the margin of the previous data, the data is printed on the margin. If the later data does not fit into the width of the margin of the previous data, the data is not printed on the margin but printed to the next printing position.

- Media Save

Automatic paper saving layout. Continuous data is rotated clockwise so that paper feeding rate is minimized. The image data is printed to the left end of the paper.

- Best

Automatic layout for selected standard size. Continuous data is rotated clockwise so that paper feeding is minimized. The image data is arranged at the center of the minimum standard size to allow the data to fit, and printed to the left end on the paper.

b. Scale

Magnification can be changed automatically, or can be specified.

[Default: 100%]

- Auto (cut sheet only)

The magnification changes to fit the cut sheet loaded.

- 1-999%

Printing can be expanded or contracted in steps of 1%.

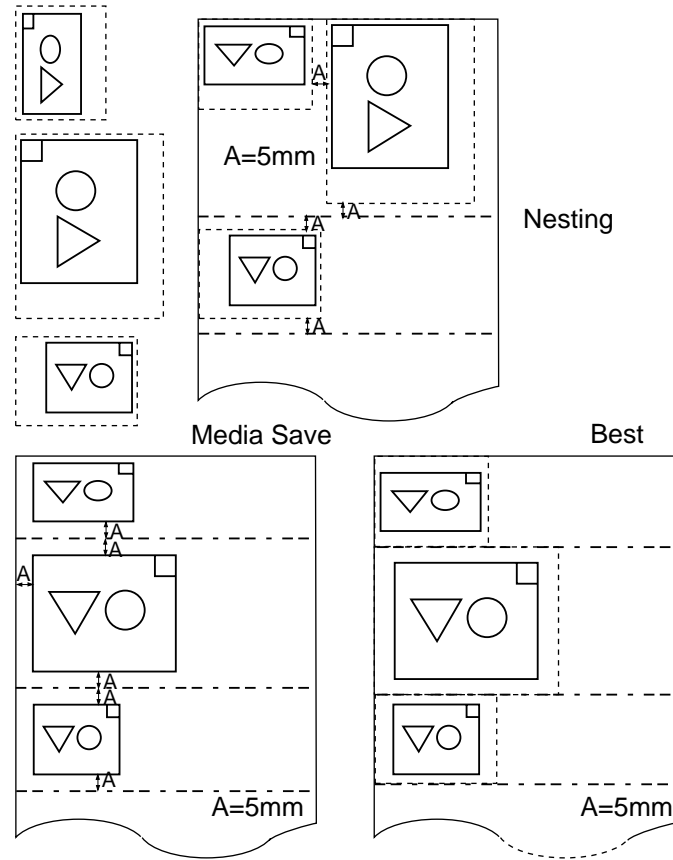


Figure 1-304

c. Rotation

[Default: 0°]

Data can be rotated on the paper when printed.

- Auto (cut paper only)
Rotated according to the loaded paper.
- 0°
Prints without rotating
- 90°
Rotated 90° counterclockwise.
- 180°
Rotated 180° counterclockwise.
- 270°
Rotated 270° counterclockwise.

d. Y-mirror

[Default: Off]

The data can be reversed in the paper feed direction when printing.

- Off
File is not reversed laterally.
- On
File is reversed laterally.

e. Layout Size (roll media only)

[Default: ISO A]

Paper size can be set.

- ISO A
- ISO B
- JIS B
- ANSI
- ANSI ARCH
- ISO Over
- EURO-DIN
- KOREAN
- Custom

f. User Size (roll media only)

Width and length of paper to be printed can be set.

[Default: A0 model: 84.1 x 118.9 cm
A1 model: 59.4 x 84.1 cm]

- Width
Width can be set from 8.0 to 62.7 (91.4)cm, in one mm units.
- Length
Length can be set from 8.0 to 1800cm, in one mm units.

g. Nesting Timer (roll media only)

[Default: 30 seconds]

Time until printing is started can be selected for the nesting layout operation.

- 30 sec., 1 min., 2 min., 5 min., 10 min., 30 min., 60 min.

[12] Interface Setup

a. RS-232C

Used to set up the RS-232C interface.

- **Baud Rate [default: 9600]**
Sets the data transfer speed.
2400bps, 4800bps, 9600bps,
19200pbs, 38400bps
- **Data Bit-Parity**
[Default: 8 none]
Sets combination of character bits and
parity bit.
7 none, 7 even, 7 odd
8 none, 8 even, 8 odd
- **Handshake**
[Default: Hardware]
Sets the data communication method
between the computer and printer.
Xon/Xoff, Hardware

b. EOP Timer

[Default: 30 sec.]

When a data completion command (terminator) is not contained in the file data, the time from completion of data transfer to start of printing will be as specified here.

- 10 sec., 30 sec., 1 min., 2 min., 5 min., 10 min., 30 min., 60 min.

[13] System Setup

Configuration of the system setting menu as follows:

a. Language

[Default: previos setting preserved]

Language to be indicated on the message display can be selected.

- **English (mm)**
Display in English (mm)
(Factory setting)
- **English (inch)**
Display in English (inch)
- **katakana**
Display in Japanese
- **Francais**
Display in French
- **Deutsch**
Display in German
- **Italiano**
Display in Italian
- **Espanol**
Display in Spanish
- **Svenska**
Display in Swedish

b. AutoAdjust mode

[Default: On]

Specifies whether or not to “Auto Adjust” when replacing the BJ Print head.

- **On**
Automatic adjustment is done when the BJ Print head is replaced.
- **Off**
Automatic adjustment is not done when the BJ Print head is replaced.

c. Feed Priority

[Default: Print Length]

Select between paper feeding accuracy over distance, or feeding with less band variation.

- **Print Length**
Feed with preference given to distance accuracy.
- **Band Joint**
Feed with less band variation.

d. Reset Defaults

All user menu settings can be reset to the default values.

- **Yes**
All user menu setting are reset to the default values.
- **No**
User menu settings are not reset.

e. Information

[Default: On]

Image controller PCB and engine controller PCB versions and memory capacity are displayed.

[14] Self-test Print

A self-test pattern can be printed to check the printer operation.

- **Demonstration**
A built-in demonstration pattern is printed.
- **Menu Map**
A list of menus is printed.
- **Color Pallet**
A color pallet of 0 to 255 is printed.
- **Setup List**
The printer settings are printed.
- **Nozzle Check**
A nozzle check pattern is printed.
- **Dump Mode**
All data input is printed by in hexadecimal and ASCII code.

4. Using the setup list

The setup list is used when the printer is not working correctly, to determine whether the problem is attributable to the printer or the computer.

The current menu settings, service mode values and a history of the last 4 errors which occurred are printed in the setup list, and can be filed for reference or faxed to the service department.

Figure 1-305 shows a sample of a setup list and Table 1-306 explains the information in the setup list.

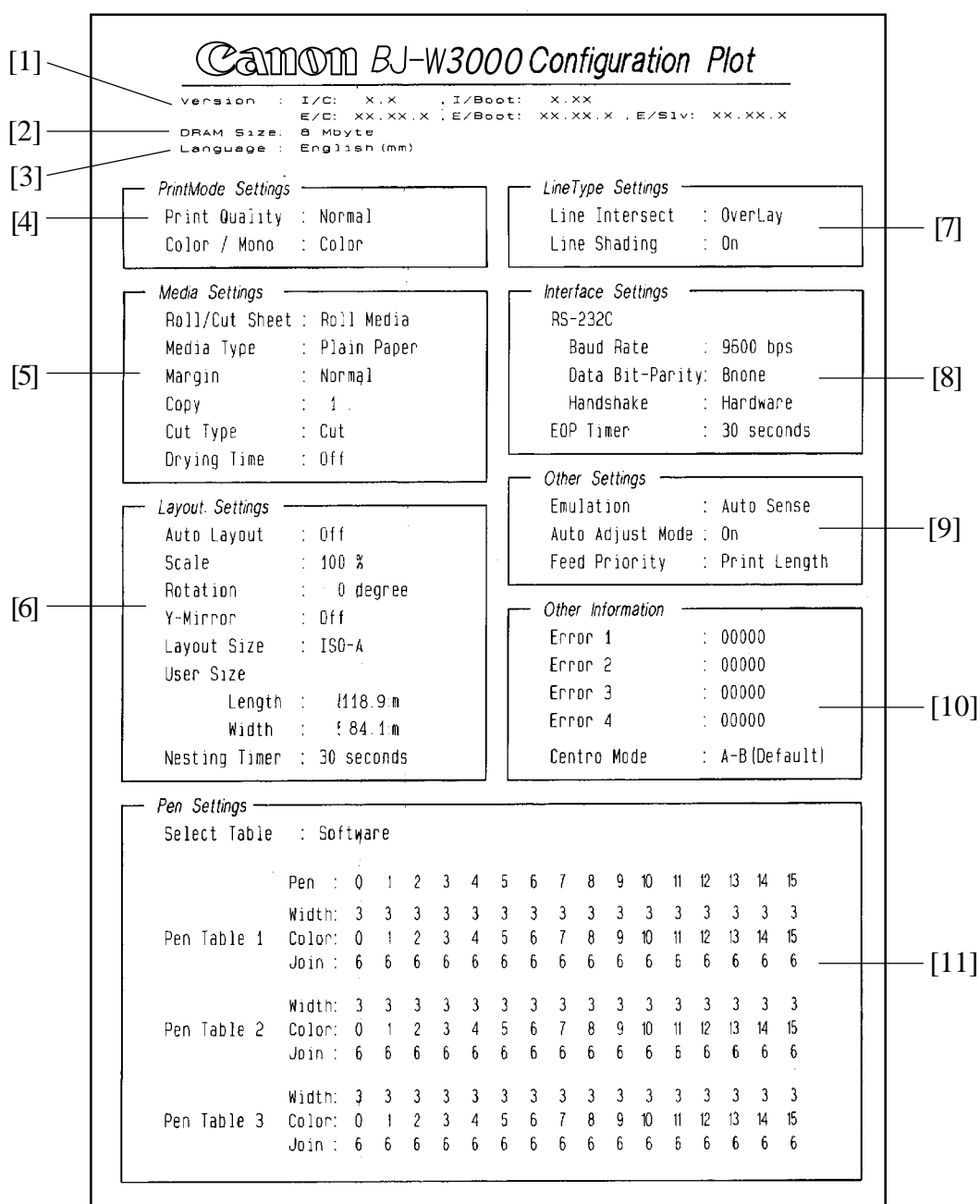


Figure 1-305

No.	Description	No.	Description
[1]	I/C: Image controller PCB version E/C: Engine controller PCB version I/Boot: Image controller PCB ROM version E/Boot: Engine controller PCB ROM version E/Slv: Engine controller PCB slave version		User-defined size setting Length setting Width setting Nesting timer setting
[2]	DRAM capacity	[7]	Line intersection setting Line shading setting
[3]	Language setting	[8]	Baud rate setting Data bit parity setting Hand shake setting EOP timer setting
[4]	Print mode setting Monochrome/color setting	[9]	Emulation setting Auto adjust mode setting Paper feeding priority setting
[5]	Media setting Media type setting Margin setting No. of copies to be printed Roll media auto cutting setting Drying time setting	[10]	Error display history Error 1 - most recent ⋮ Error 4 - least recent
[6]	Auto layout setting Zoom setting Rotation setting Y-mirror setting Layout size setting	[11]	Pen table setting pen table 1 pen table 2 pen table 3

Table 1-306

5. Dump mode

This machine is provided with a dump test function to print the input data in hexadecimal and ASCII code as an online test.

Select "Dump mode" on the system setting menu, and then set the printer online. When data is transferred from the computer in this state, the data is first printed normally. Then, for the data received since data reception started until the EOP timer was actuated, the initial 1k byte is dumped on one A4 sheet, and the last 1k byte is also dumped on an A4 sheet, in hexadecimal ASCII code.

The printer returns to the normal printing mode automatically after the dump output is completed. Therefore, to execute a dump again, reselect "Dump mode", and then transfer the file data.

CAUTION

If data is transferred continuously, the final portion cannot be correctly dumped. To prevent trouble, transfer only one file at a time in the dump mode.

6. Image layout

a. Data size recognition standard

This machine recognizes the size of data received as follows:

(1) PS (Plot size) recognition

Uses the size specified in the PS command contained in the data as the size of the data.

(2) Min./Max. size recognition (coordinates)

Detects the minimum and maximum positions in the range of vector coordinates actually drawn to determine the data size.

(3) Min./Max. size recognition (line width consideration)

Detects the minimum and maximum positions in the range of coordinate values, including the vector line width actually drawn.

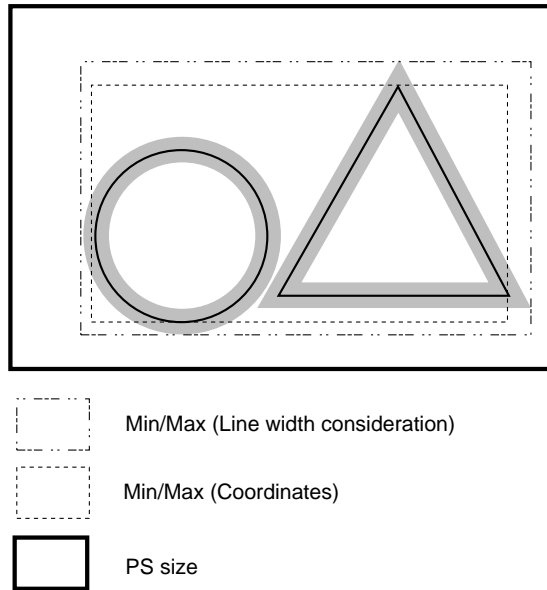


Figure 1-306

b. Relation between data size recognition and image processing

The printer recognizes the size of the data received and lays it out as listed below. When printing using the Canon printer driver, PS (Plot Size) commands are always provided.

		Data size recognition	Standard size judgment	Rotation	Layout size	Horizontal arrangement	Y-mirror scale	Panel rotation
PS provided	Nesting	PS size	Not done	Automatic rotation	PS size + each side of 5mm	Done	Done	Not done
	Best	Min./Max. coordinates	Done	Automatic rotation	Judged standard size	Not done	Done	Not done
	Media save	Min./Max. line width consideration	Not done	Automatic rotation	Min./Max. + each side of 5mm	Not done	Done	Not done
	Off	PS size	Not done	Follow the set value	PS size + each side of 5mm	Not done	Done	Done
No PS provided	Nesting	Min./max. coordinates	Done	Automatic rotation	Judged standard size	Done	Done	Not done
	Best	Min./max. coordinates	Done	Automatic rotation	Judged standard size	Not done	Done	Not done
	Media save	Min./Max. line width consideration	Not done	Automatic rotation	Min./max. + each side of 5mm	Not done	Done	Not done
	Off	Max	Not done	Follow the set value	Max. + each side of 5mm	Not done	Done	Done

Table 1-307

D. Basic Operation

1) Turn the power switch ON.

- The power lamp is lit and the initialization process begins.
- The initialization completes in about 20 seconds.

2) Make menu settings according to the computer and application software to be used.

- Press the online key to cause the menu selection screen to appear, select a menu with the right and left arrow keys, and go to the parameter menu with the down arrow key. Select parameters with the right and left arrow keys. Enter each selection with the Enter key.

3) Open the front cover.

4) Load paper into the printer.

a. In the case of cut sheets:

- [1] Lower the paper release lever.
- [2] With the printed surface of the paper upward, match the paper edge to the inside of the paper matching line, and raise the paper release lever.

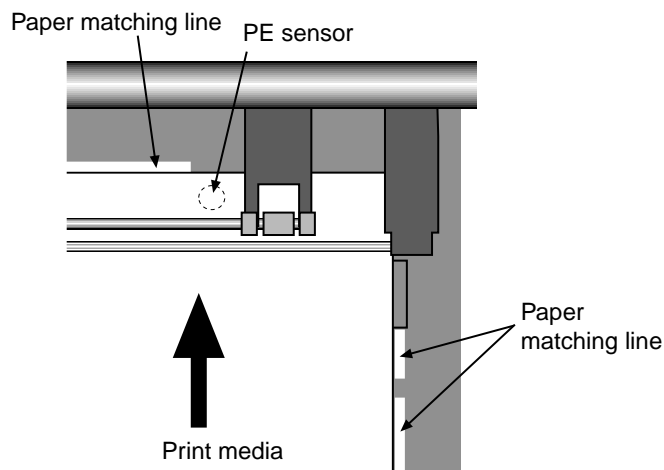


Figure 1-307

- When the paper inserted below the pinch roller unit is detected by the PE sensor, the suction fan runs and the paper is sucked to the platen.
- If the printer does not start within about 1 minute after the suction fan operates, the fan stops.

b. In the case of roll media:

- [1] Lower the paper release lever.
- [2] Keeping the roll media tight (no slack), pull it out straight onto the platen from the back side of the printer.
- [3] Raise the paper release lever so that the roll media is fed in parallel with the paper matching line.

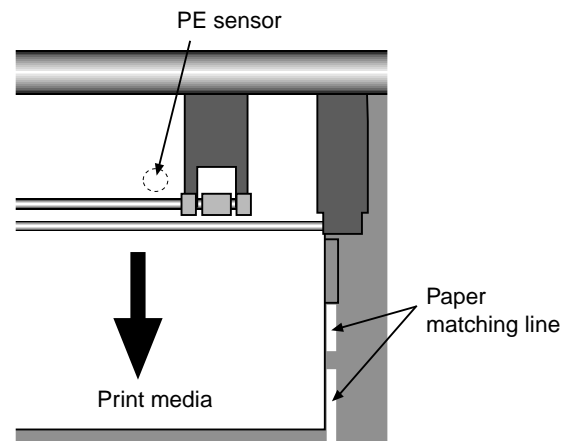


Figure 1-308

CAUTION

- If the roll media is forcibly aligned to the paper matching line on the platen, skewed feeding may result.
- Keeping the roll media in parallel to paper matching line, pull it out straight.
- When loading the paper, take care not to touch the printed area. Fingerprints can keep the print ink from soaking in to the paper, causing uneven print density.

CAUTION

After printing, take care not to touch the ink with wet hands.

When the printer is not to be used for a long time, raise the paper release lever to keep the pinch roller being pressed.

- 5) Close the front cover.
- 6) Press the up or down arrow key to load the paper.
 - The printer detects the paper size and feeds the paper to the printing start position.
 - After completion of loading, the printer enters the online state.

REFERENCE

If the paper loads crooked or jams, press any key on the operation panel to stop the loading process.

- 7) File data is transferred from the computer in the online state and printing is started.
 - To stop printing, press the online key to enter the pause state.
- 8) After completion of printing, remove the paper.

E. Paper Thickness Adjustment Lever

When printing, depending on the print media used or its thickness, the paper may become wavy, causing it to rub the head.

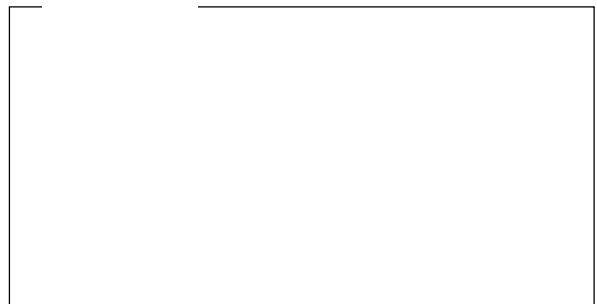
To prevent this, the distance between the head and platen can be adjusted in 3 stages using the paper thickness adjustment lever.

- 1) Press the left or right arrow key in the offline or pause state.
 - The carriage moves to the cartridge replacement position.
- 2) Open the front cover.
- 3) Move the paper thickness adjustment lever to adjust the head-to-platen distance.

: Standard position

: Set to this position when printing high-density graphics. (graphic position)

: Set to this position if the paper still rubs the head after being set to the graphic position.



IV. CARTRIDGE REPLACEMENT

The printer is provided with a mechanism to detect the ink remaining in the ink tank. When the tank becomes empty, the ink head state indication on the message display becomes “ - ” (hyphen). When no ink remains, replace the ink tank.

If no ink is discharged even though there is enough ink in the tank, check the BJ print head, referring to Chapter 5, V. “CORRECTION OF IMAGE DEFECT”.

If ink is still not discharged, replace the BJ print head.

A. Replacing the BJ Print head

CAUTION

- When handling the BJ print head, take care not to touch the head on electrodes.
- Replace the BJ print head only at the cartridge replacement position.

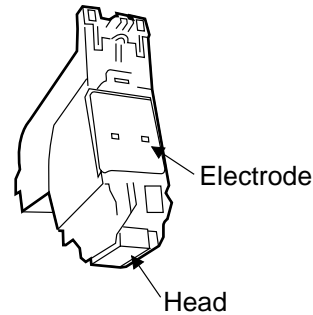


Figure 1-401

- 1) Press the right and left keys in the offline or pause state to move the carriage to the cartridge replacement position.
- 2) Open the front cover.
- 3) Remove the ink tank from the BJ print head to be replaced.
- 4) Push the release hook of the BJ print head to be replaced and remove the BJ print head.

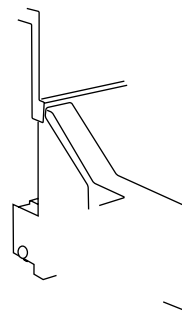


Figure 1-402

- 5) Unpack a new BJ print head.

- 6) Remove the protection cap and protection seal.

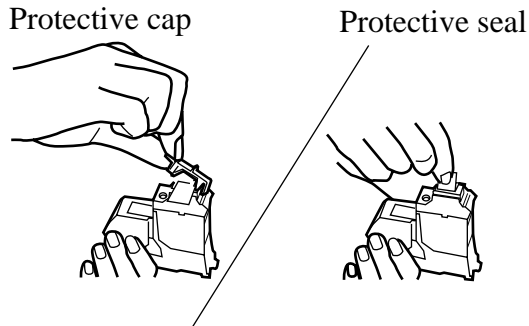


Figure 1-403

CAUTION

Take care not to touch the BJ print head and carriage electrodes.

Do not reuse the protective cap and protective seal.

Take care not to bump the head against the platen or carriage.

- 7) With the head facing down, insert the BJ print head into the carriage.

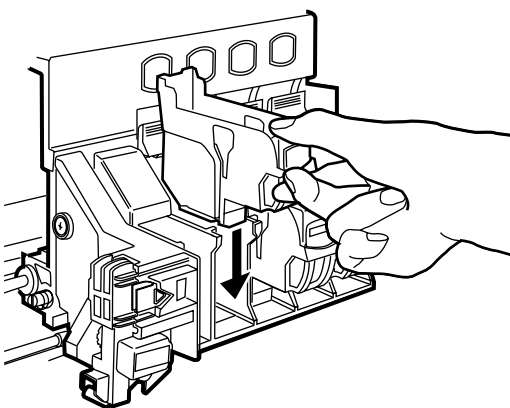


Figure 1-404

- 8) Pressing as shown in figure1-405, install the BJ print head in the carriage.

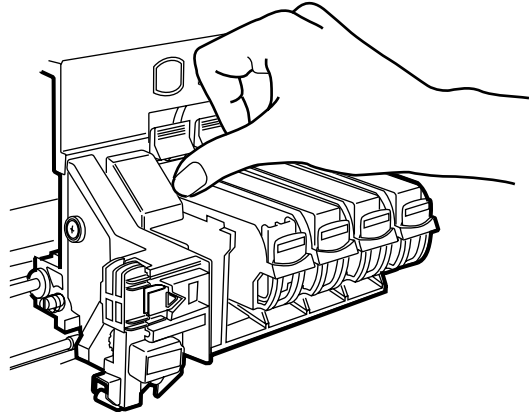


Figure 1-405

- 9) Remove the dummy ink tank.

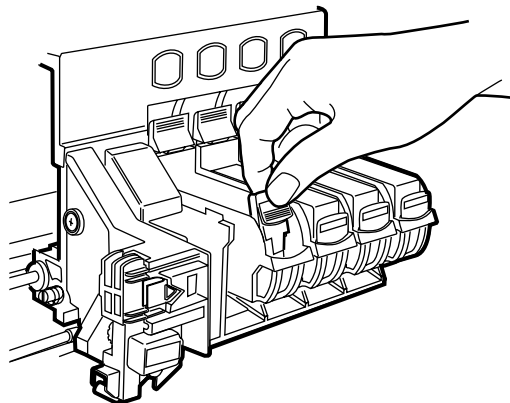


Figure 1-406

- 10) Install the real ink tank.
- 11) Close the front cover.
- The carriage returns to the home position and head cleaning is carried out.

B. Replacing the Ink Tank

CAUTION

Replace the ink tank only at the cartridge replacement position.

- 1) Press the right and left keys in the offline or pause state to move the carriage to the cartridge replacement position.
- 2) Open the front cover.
- 3) Press the ink tank release hook and remove the ink tank.

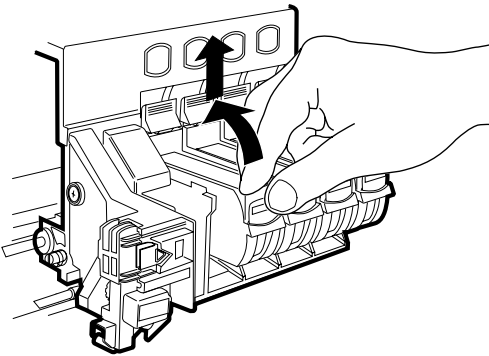


Figure 1-407

- 4) Unpack the new ink tank, and remove the protective seal from the ink tank.

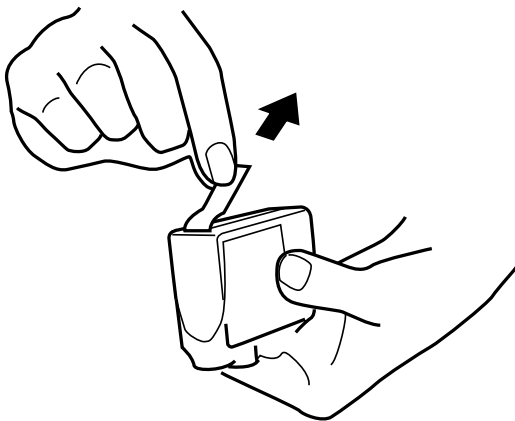


Figure 1-408

- 5) Twist the protective cap of the ink tank in the direction of the arrow mark and remove it.

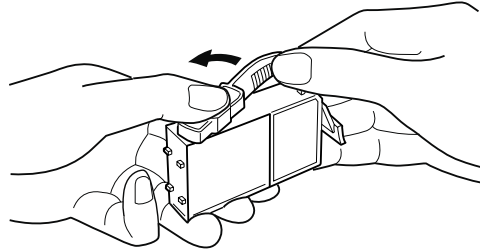


Figure 1-409

CAUTION

Do not touch the ink tank outlet.

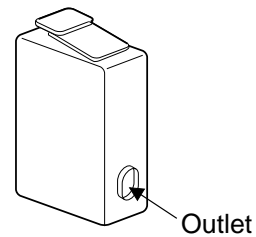


Figure 1-410

6) Install the ink tank.

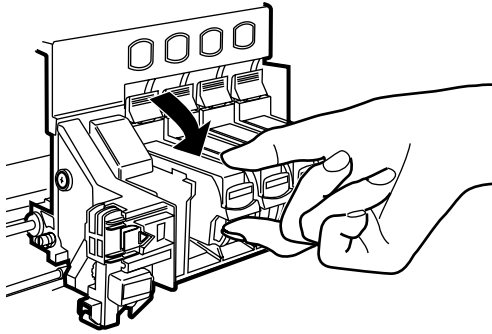


Figure 1-411

CAUTION

- Push the ink tank in until it clicks.

7) Close the front cover.

- The carriage returns to the home position and head cleaning is carried out.

V. SIMM

REPLACEMENT

A. About SIMM

The printer's memory can be increased. If the memory available is not sufficient for the print data, the memory capacity of the printer can be expanded by installing new (or large) SIMMs.

Proper installation of SIMMs can be confirmed by selecting "Information" of "System setting" of the main menu. The following message will be displayed:

Memory XX+8 MB

where, "XX" indicates the memory capacity of any installed SIMMs.

- SIMM type

Use SIMMs with the following specifications:

Capacity: 4, 8, 16, or 32 MB

No. of pins: 72

Access speed: 60ns or faster

FPM (high speed page mode) compatible

No parity

EDO memory can be also used but it is operated as FPM memory.

Two SIMMs can be added, so that the memory capacity can be increased by up to 72MB, with the standard memory.

CAUTION

- When handling SIMMs, be careful to avoid static electricity discharge.
- Before installing the SIMM, be sure to turn off the printer power.
- Install the SIMMs using the correct procedure.

B. SIMM Installation

- 1) Using the installation tools supplied with printer, remove the 4 screws [1], and remove the cover plate [2].

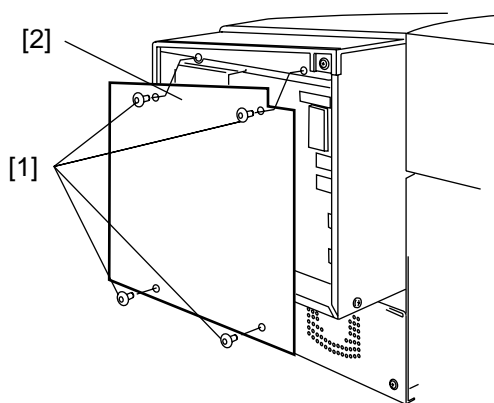


Figure 1-501

- 2) Holding both ends of the SIMM with it centered in the expansion slot, insert it from the right.

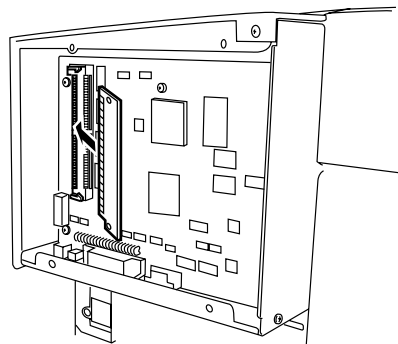


Figure 1-502

- 3) With the edge of the SIMM in the slot, roll the SIMM to the left until the hooks [3] at both ends of the slot click into the holes at both ends of the SIMM.

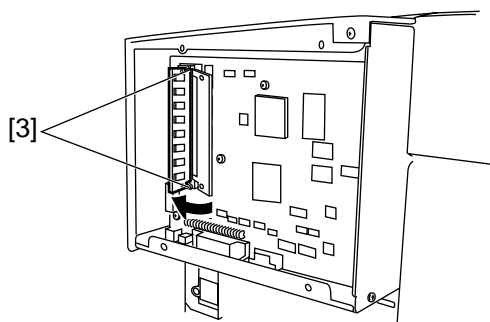


Figure 1-503

- 4) Attach the cover plate [2] and tighten the 4 screws [1].

REFERENCE

- When only one SIMM is used, it must be installed in the left slot (SIM601).
- When adding two SIMMs, it is easiest to install the first one into the left slot (SIM601).

C. SIMM Removal

- 1) Using the installation tools supplied with the printer, remove the 4 screws [1] and the cover plate [2].

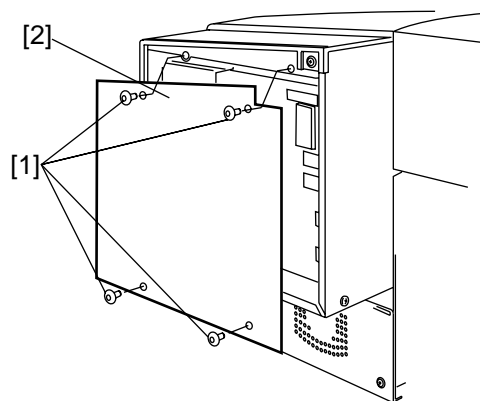


Figure 1-504

- 2) Gently pull back the two hooks [3] at each end of the SIMM. Roll the SIMM to the right and remove it.

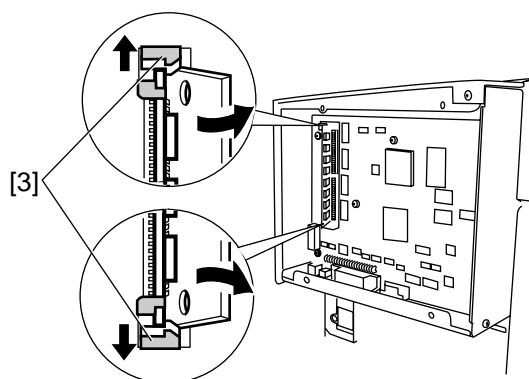


Figure 1-505

- 3) Attach the cover plate [2] and tighten the 4 screws [1].

VI. CAUTIONS ON HANDLING

When handling the printer, pay attention to the following points.

A. Cartridges

1. Cautions on handling the BJ print head

- Do not touch the head surface, or wipe with cloth or paper.
- Do not touch the electrodes.
- Do not bump the BJ print head.
- When removing the BJ print head, do not lay its face downward.
- Do not leave the BJ print head out of the printer for a long time.
- To avoid ink spillage, do not shake the BJ print head after removing the protective seal.
- Do not remove the BJ print head from this printer except when replacing it or disassembling the main unit.
- Only unpack a new BJ print head immediately before replacing an old one.
- Do not disassemble or modify the BJ print head.

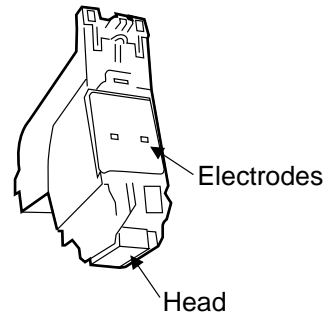


Figure 1-601

2. Cautions on handling ink tanks

- Do not touch the outlet.
- Do not remove the ink tank from the BJ print head except when replacing the ink tank.
- Only unpack a new ink tank immediately before replacement.
- After uncapping, install the ink tank immediately into the BJ Print head.
- Do not disassemble or modify the ink tank.

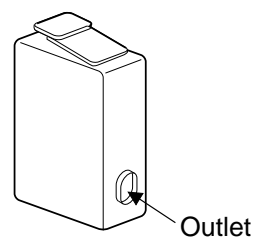


Figure 1-602

B. Paper Storage Environment

- Store the paper in wrapping paper, in a place free from high humidity and direct sun light.
- Store the paper horizontally to prevent it from being damaged.
- Store the paper under a relative humidity of 35 to 65%. If this requirement is not met in the environment where the printer is used, remove the paper from its package and keep it near the printer for a while to acclimatize it.

D. After Printing

- Since the ink may still be wet, do not touch it immediately after printing. If the ink is not completely dry, ink may be smudged, or if stored on top of another sheet, the backside of the paper may be stained, or attached to the another.
- As the ink is water-based, do not touch printed sheets with wet hands.

C. Paper

- Use paper that is not curled, folded or wrinkled.
- For handling the paper, be careful not to curl it or damage the printing side, hold the paper only at the ends, outside of the printed area, to prevent oil or moisture transferring from your hands to the paper, or wear cotton gloves.
- Take out each sheet from the wrapping paper immediately before using it.

VII. USER MAINTENANCE

A. Head Cleaning

The printer has a head cleaning function to maintain image quality.

With the BJ printing method, air bubbles may accumulate in the nozzles of the head, or, if the ink viscosity at the nozzle end increases, a nozzle may become plugged, resulting in white streaks on the image. In such a case, the user should execute the "Head cleaning" in the main menu to clean the head.

CAUTION

Repeated head cleaning will consume excessive ink. Explain to the user that head cleaning should only be performed when defective images occur.

B. Normal Cleaning

Instruct the user to clean the following places every month, or as needed.

CAUTION

Caution the user to take care not to allow the cleaning cloth or swab to touch the paper feed roller and pinch roller when cleaning.

1) Pinch roller/Paper feed roller

Load plain paper of the maximum width which can be printed by your printer (A1 size or A0 size) and feed the paper manually several times to remove any ink.

2) Platen

With a well-wrung damp cloth, wipe the platen, and then wipe it with a dry cloth.

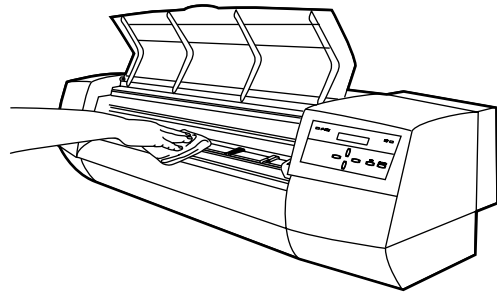


Figure 1-701

3) Paper stacker (stand)

With a well-wrung damp cloth, wipe the paper stacker and then wipe it with a dry cloth.

CAUTION

The seam-side of the paper stacker should face outward.

VIII. INSTALLATION ENVIRONMENT

Avoid the following when choosing a location for the printer.

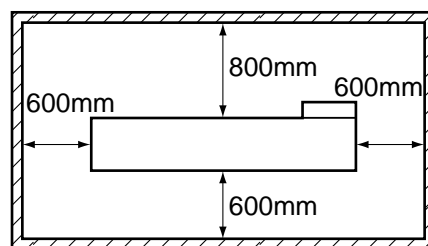
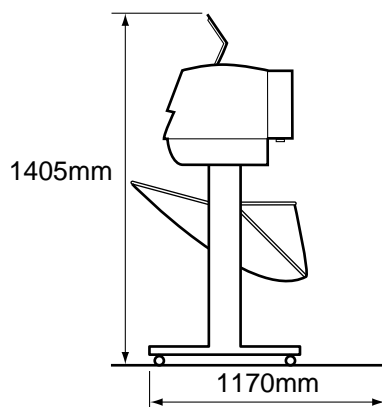
- Places with a large amount of dust
- Unstable location
- Uneven floor
- Non-horizontal surface
- Direct sun light (use curtains if placed nearby a window).
- Low temperature and humidity or high temperature and humidity (temperature should be in the range of 15 - 30°C and the humidity 20 - 80%. Particularly avoid locations near water taps, water heaters, humidifiers and refrigerators.)

- Locations where there might be alcohol, thinner, etc. nearby.
- Places where temperature or humidity fluctuates often.
- Air from an air conditioning system or electric fan directly blowing on the machine.

Be cautious about the following when installing the machine.

- Adjust the media so as not to touch the floor, to prevent it from picking up dust or dirt. Explain to the client that the floor near the printer should be cleaned carefully.
- The stand rollers should all sit flat on the floor.
- Provide a properly grounded electrical connection.

Secure sufficient space for maintenance and inspection, as illustrated below.



IX. PACKAGE CONFIGURATION

The package configuration of the printer when shipped from the factory is shown in the figure below.

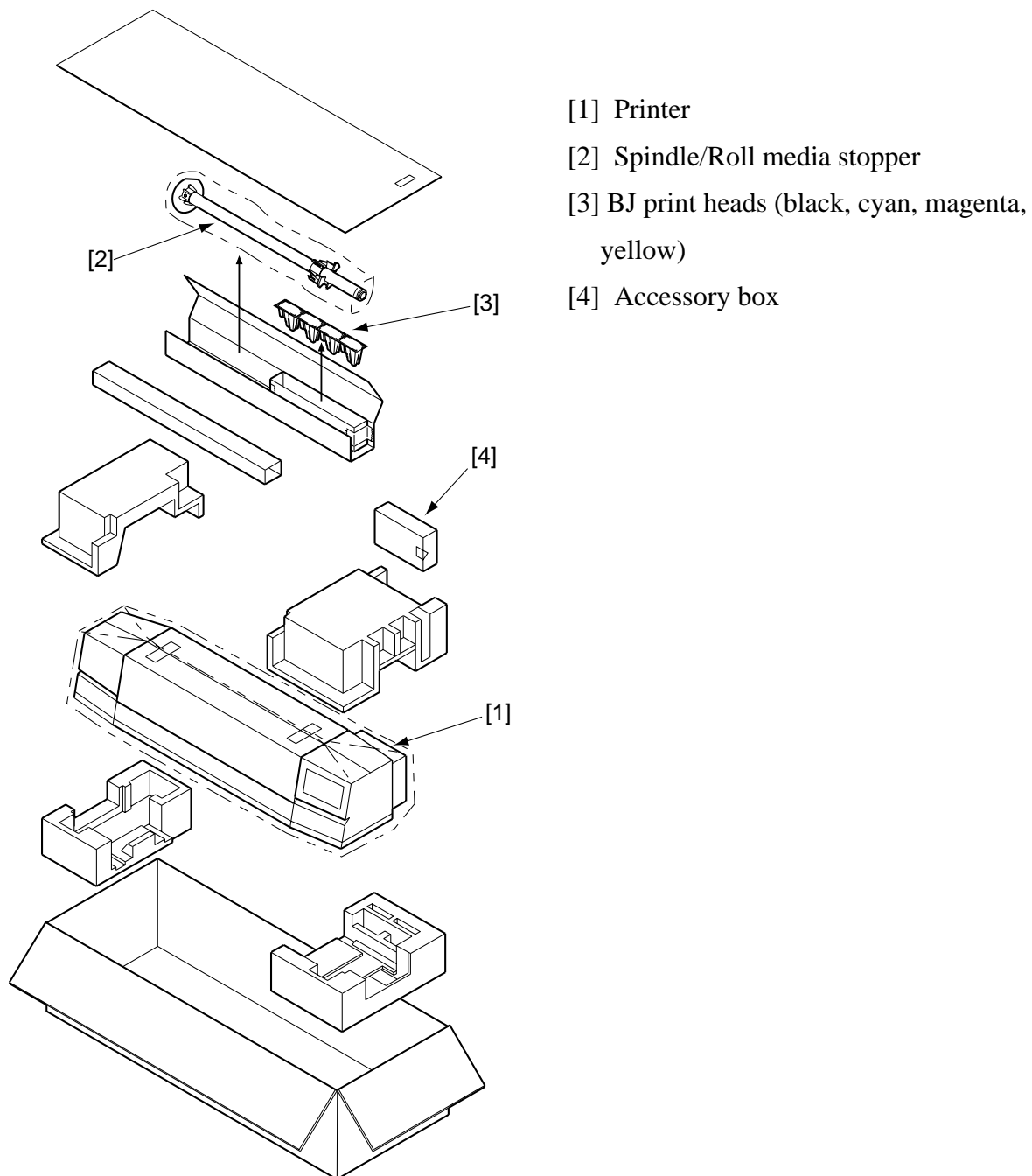


Figure 1-901

X. TRANSPORTING THE PRINTER

When transporting the printer by truck etc., or moving the printer, follow the procedures below.

CAUTION

- Pack the printer in the original box. If the original box is not available, pack the machine with sufficient shock absorbing material.
- Remove all cables.
- Do not remove the BJ cartridges.

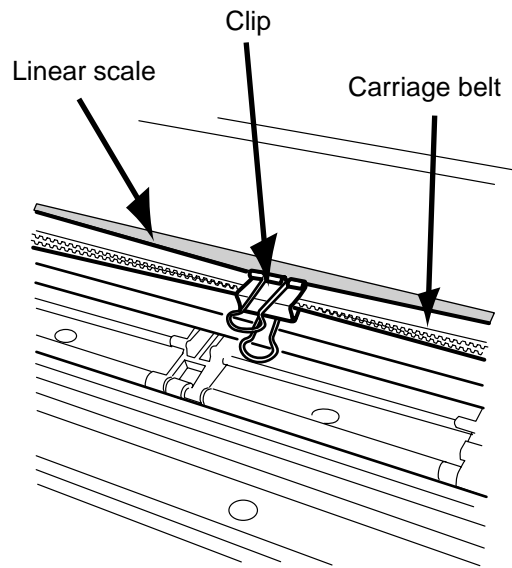


Figure 1-1001

- 1) Turn off the power switch and disconnect the power cord and interface cable.
- 2) Open the front cover and make sure the carriage is at the home position. If not, move it to the right end by hand.
- 3) Fold a sheet of A1-size paper or A0-size paper twice and insert it between the pinch rollers.
- 4) Fix the carriage belt at the center of the platen by holding it with a clip as shown in Figure 1-1001, so as not to allow the carriage to move.

CAUTION

Take care not to damage the carriage belt and linear scale.

- 5) Remove the roll media and spindle.
- 6) Fix the front cover closed with tape.
- 7) When the optional stand is used, remove the printer from the stand and disassemble the stand.
- 8) Pack the printer, stand, roll media and spindle carefully before transportation.

CAUTION

Be careful not to incline or turn the machine upside down when transporting it since waste ink may leak out.

CHAPTER 2

BASIC OPERATION

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I. Basic operation

A. Functional Configuration

The printer functional diagram is composed of 5 blocks; image processing/control system, carriage, BJ cartridge unit, purge unit and feeder unit.

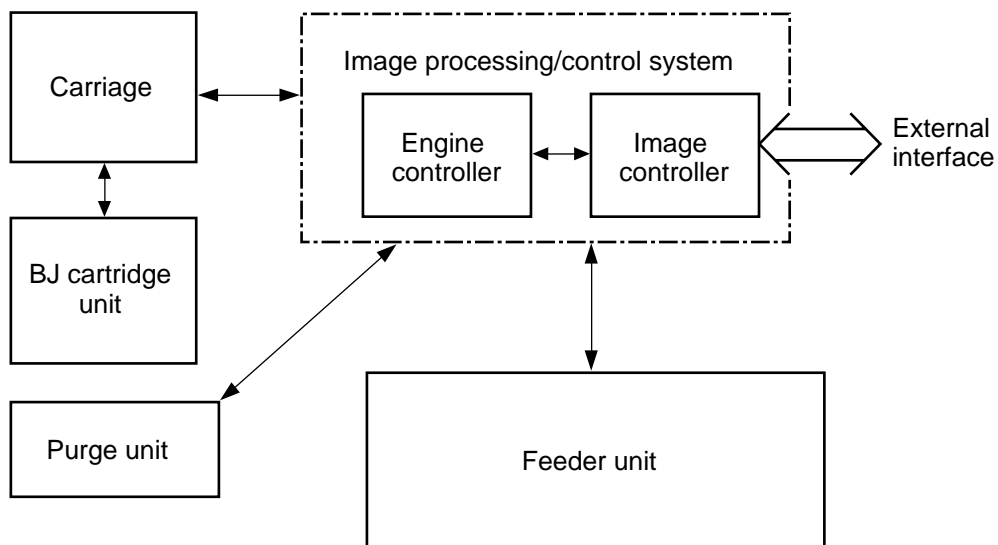


Figure 2-101

B. Interface Input/Output

1. Parallel interface

The parallel interface conforms to IEEE1284-B and is applicable to the compatible mode and nibble mode (2-way interface).

a. Input/output signal and pin assignment

Pin No.	Signal		Signal direction (PC to the printer)	Pin No.	Signal		Signal direction (PC to the printer)
	Compatible	Nibble			Compatible	Nibble	
1	$\overline{\text{Strobe}}$	HostClk	————→	19	GND		
2	Data 1		←————→	20	GND		
3	Data 2		←————→	21	GND		
4	Data 3		←————→	22	GND		
5	Data 4		←————→	23	GND		
6	Data 5		←————→	24	GND		
7	Data 6		←————→	25	GND		
8	Data 7		←————→	26	GND		
9	Data 8		←————→	27	GND		
10	$\overline{\text{Ack}}$	PtrClk	←————	28	GND		
11	Busy	PtrBusy	←————	29	GND		
12	Perror	AckDataReq	←————	30	GND		
13	Select	Xflag	←————	31	$\overline{\text{Init}}$		————→
14	$\overline{\text{AutoFd}}$	HostBusy	————→	32	$\overline{\text{Fault}}$	$\overline{\text{DataAvail}}$	←————
15	Not used			33	GND		
16	GND			34	Not used		
17	GND			35	Peripheral Logic High		←————
18	Peripheral Logic High		←————	36	$\overline{\text{Selectin}}$	IEEE1284active	————→

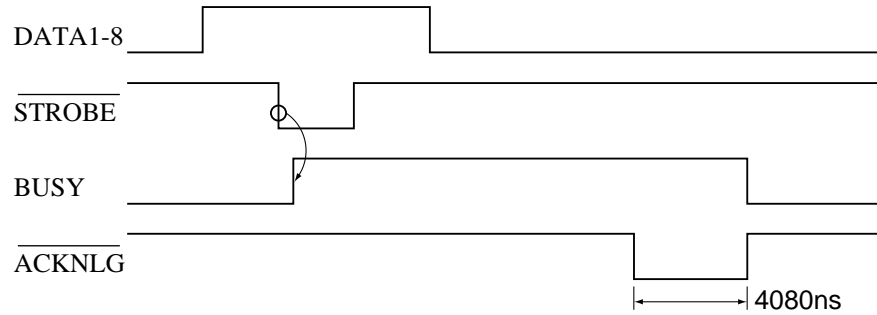
Table 2-101

b. Compatible mode

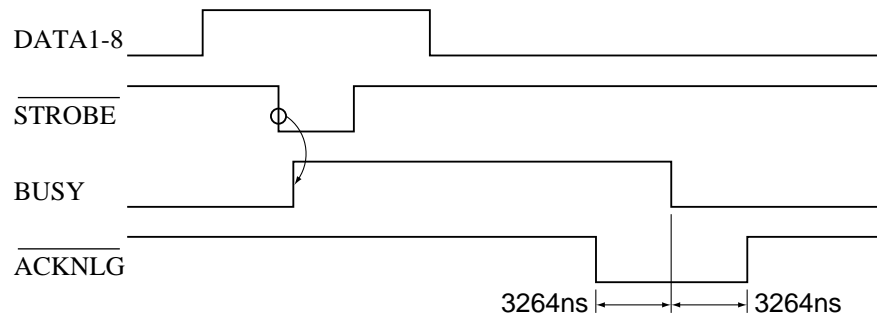
The compatible mode is applicable to cases as shown below.

The compatible mode can be switched by changing the BUSY and $\overline{\text{ACKNLG}}$ timing in the Centro timing setting mode.

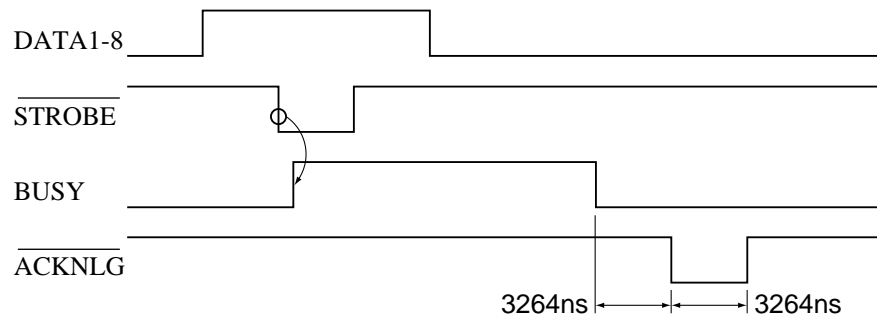
- A - B(Default) [Ack-in-Busy]



- A - B - A [Ack-while-Busy]



- B - A [Ack-after-Busy]



- A - B(Fast) [Ack-in-Busy(fast)]

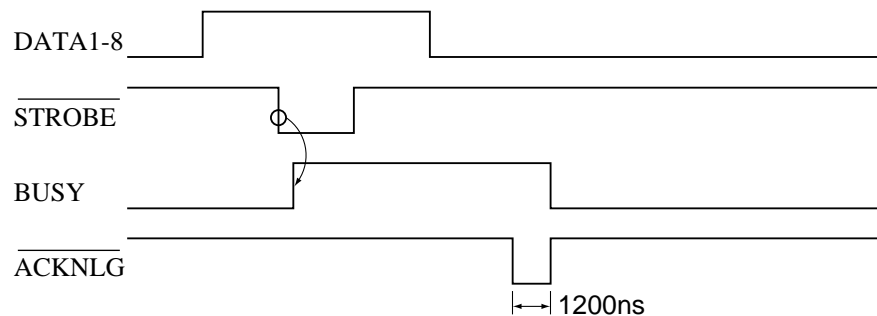


Figure 2-102

Data is transferred 8 bits at a time in the compatible mode. The data is transferred by handshaking the $\overline{\text{STROBE}}$, $\overline{\text{ACKNLG}}$, and BUSY signals.

The computer sets 8 bits of data and outputs the $\overline{\text{STROBE}}$ signal to the printer. The printer receives the data with the $\overline{\text{STROBE}}$ signal and responds by setting the BUSY signal to "H".

When data processing has been completed, the printer outputs the $\overline{\text{ACKNLG}}$ signal to notify the computer that the data has been accepted. When data reception is possible, it sets the BUSY signal to "L".

The Perror signal becomes "H" to indicate a warning or error in the printer.

The Select signal becomes "H" to indicate that the printer is in a printing mode (online, printing, warning ON, etc.) and "L" when in a non-printing mode (offline, in pause, error ON, etc.)

c. Nibble mode

In the nibble mode, 8-bit data is transmitted from the printer to the computer in two pieces, 4 bits at a time.

When data transmission is possible, the printer sets the $\overline{\text{DataAvail}}$ signal to "L" and the computer sets the HostBusy signal to "L" to indicate that data can be received.

The printer confirms the fall of the HostBusy signal, places the low-order 4 bits of data on the 4 control signal lines, and sets the PtrClk signal to "L". The computer accepts the data and changes the HostBusy signal to "H" indicating that the data has been received. The printer issues the PtrClk signal and the first handshaking is completed.

The printer confirms the second fall of the HostBusy signal and outputs the high-order 4 bits to the control signal lines. The computer accepts the data in the same way as before.

When the HostBusy signal goes active and there is no more data to be transmitted to the computer, the $\overline{\text{DataAvail}}$ signal is set to "H" and the next data transfer is awaited in the stand-by status.

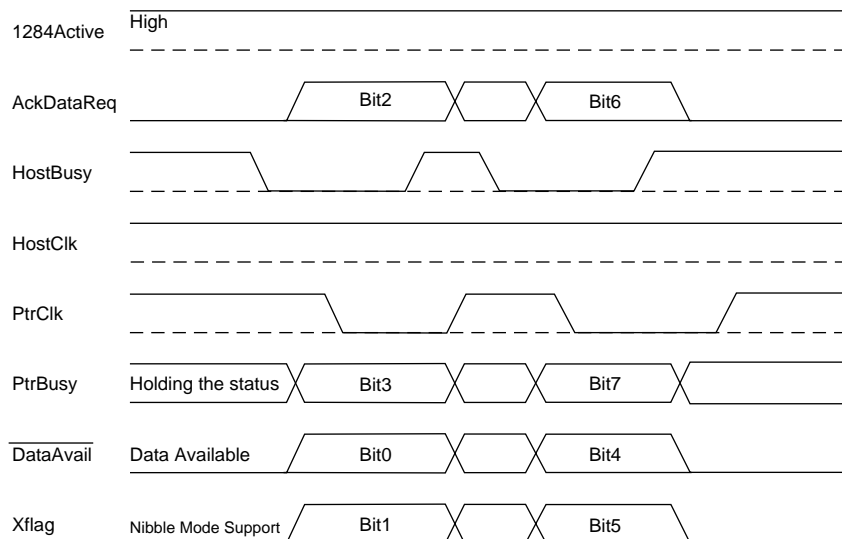


Figure 2-103

2. Serial interface

The serial interface conforms to RS-232C. The printer side is set up as the DCE (Data Circuit Terminating Equipment) and the computer side as DTE (Data Terminal Equipment). The serial interface connector is a D-Sub 9-pin female.

Table 2-102 shows the connector pin assignment and input/output signals.

Pin No.	Signal	Signal direction (PC (DTE) to the printer (DCE))
1	CD	←
2	RD	←
3	TD	→
4	DTR	→
5	SGND	
6	DSR	←
7	RTS	→
8	CTS	←
9	RI	←

Table 2-102

The computer turns ON the transmission request signal RTS and the printer turns ON the CTS signal if reception is possible. After confirming the CTS signal from the printer, the computer starts transmission of data (TD) to the printer.

The printer stores the data from the computer in its buffer and processes the data in succession. However, if the printer processing speed is slower than the computer's, the buffer soon becomes full so that no more data can be stored.

When the empty space in the buffer decreases below a specified value, the printer turns OFF the CTS signal. The computer knows that the printer can accept no more data and interrupts transmission. The printer continues processing the data in the buffer. When the empty space in the buffer reaches a specific value, the printer turns ON the CTS signal again to notify the computer that reception is possible.

In this way the RS-232C communication is controlled so as not to overflow the printer's buffer.

C. Image Controller

Figure 2-104 is a block diagram of the image controller.

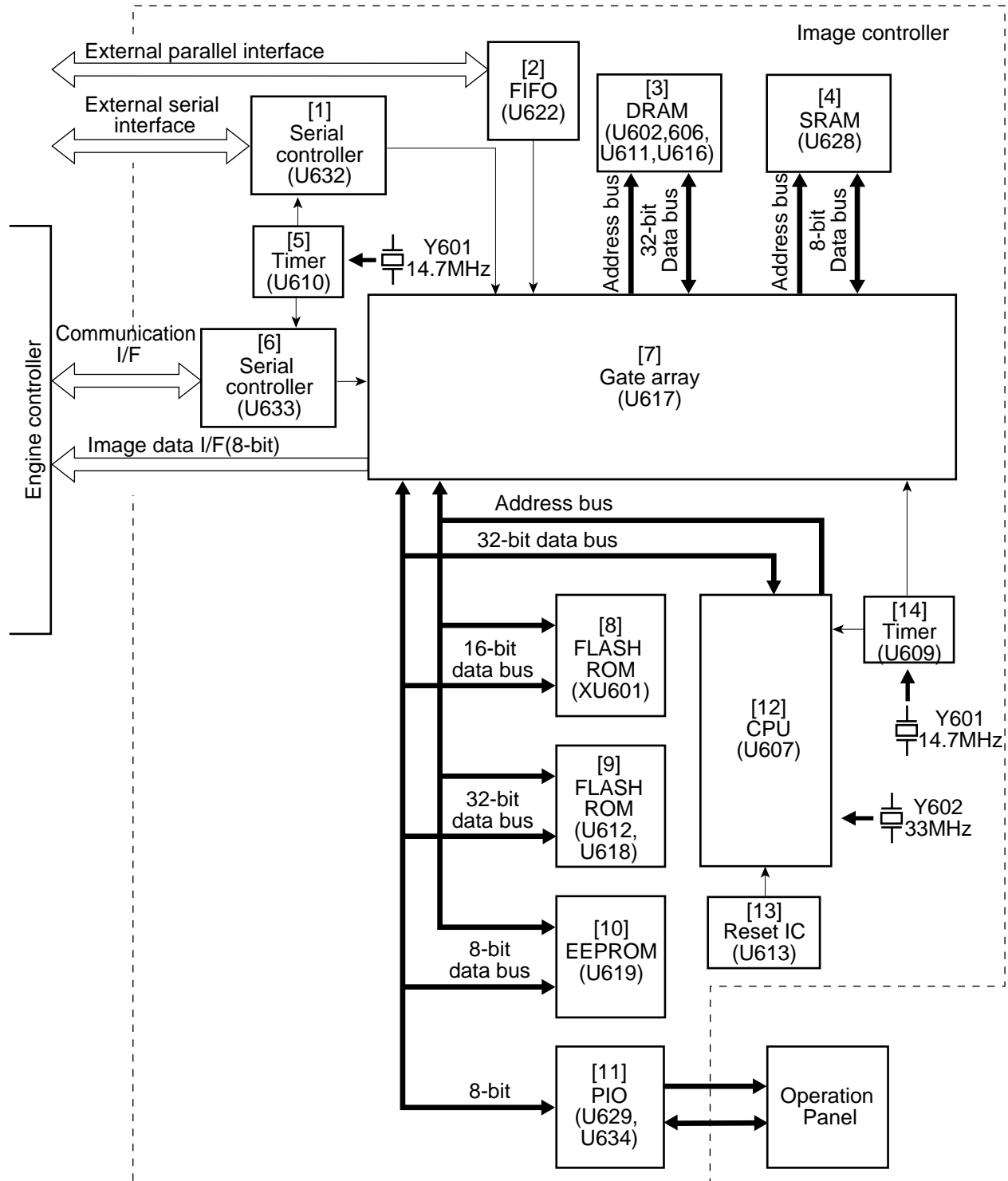


Figure 2-104

Major functions of the ICs on the image controller are as follows.

[1] Serial controller (U632)

Uses the external clock of 14.7MHz divided by 2.

Baud rates for receiving image data over the serial interface are 2400, 4800, 9600, 19200, and 38400bps.

[2] FIFO (U622)

This buffer stores the image data temporarily between the parallel interface and CPU (U607).

[3] DRAM (U602, U606, U611, U616)

4 RAM chips with a capacity of 2 Mbytes each, connected to the gate array using a 32-bit data bus, and used as follows.

- Storage area for the CMYK bitmap data created by the CPU (U607) for the banding process.
- CPU system processing work area.

[4] SRAM (U628)

32 Kbyte memory used to store the raster slice converted image data until a transmission request is received from the engine controller.

[5] Timer (U610)

Uses the by external clock of 14.7MHz divided by 2.

Functions as a baud rate clock for the serial controllers. (U632, U633)

[6] Serial controller (U633)

Uses the external clock of 14.7MHz divided by 2.

Intermediary between the gate array (U617) and engine controller.

[7] Gate array (U617)

Major functions are as follows.

- DRAM control
- Raster slice conversion of the image data in the DRAM after banding processing, to slice data to the width of the BJ cartridge
- Address decode
- 8-bit parallel output of image data to the engine controller
- Controls the compatible and nibble mode latch timing for image data transfer from the computer.

[8] FLASH ROM (XU601)

1 Mbyte boot ROM used to initialize the CPU at power ON. Stores the downloaded program.

[9] FLASH ROM (U612, U618)

1 Mbyte ROMs used to store the program for the image controller. The following functions are also provided.

- Interface analysis
- Operation panel control
- Generation of test pattern

[10] EEPROM (U619)

32Kbyte ROM used to store information on the printer and the values set using the operation panel.

[11] PIO (U634)

Intermediary between the CPU (U607) and operation panel input/output port.

[12] CPU (U607)

Uses the external 33 MHz clock.

Major functions are as follows.

- Controls the image controller
- Vector raster conversion
- Raster/raster conversion
- Controls communication with the engine controller

[13] Reset IC (U613)

Resets the CPU (U607) at power ON.

[14] Timer (U609)

Uses the external clock of 14.7MHz divided by 2.

Functions as a timer for :

- DRAM refresh timing
- Communication with the engine controller
- System operation of the image controller

D. Engine Controller

Figure 2-105 is a block diagram of the engine controller.

The printer is controlled mainly by the CPU (U221), which is run by the 16MHz external clock.

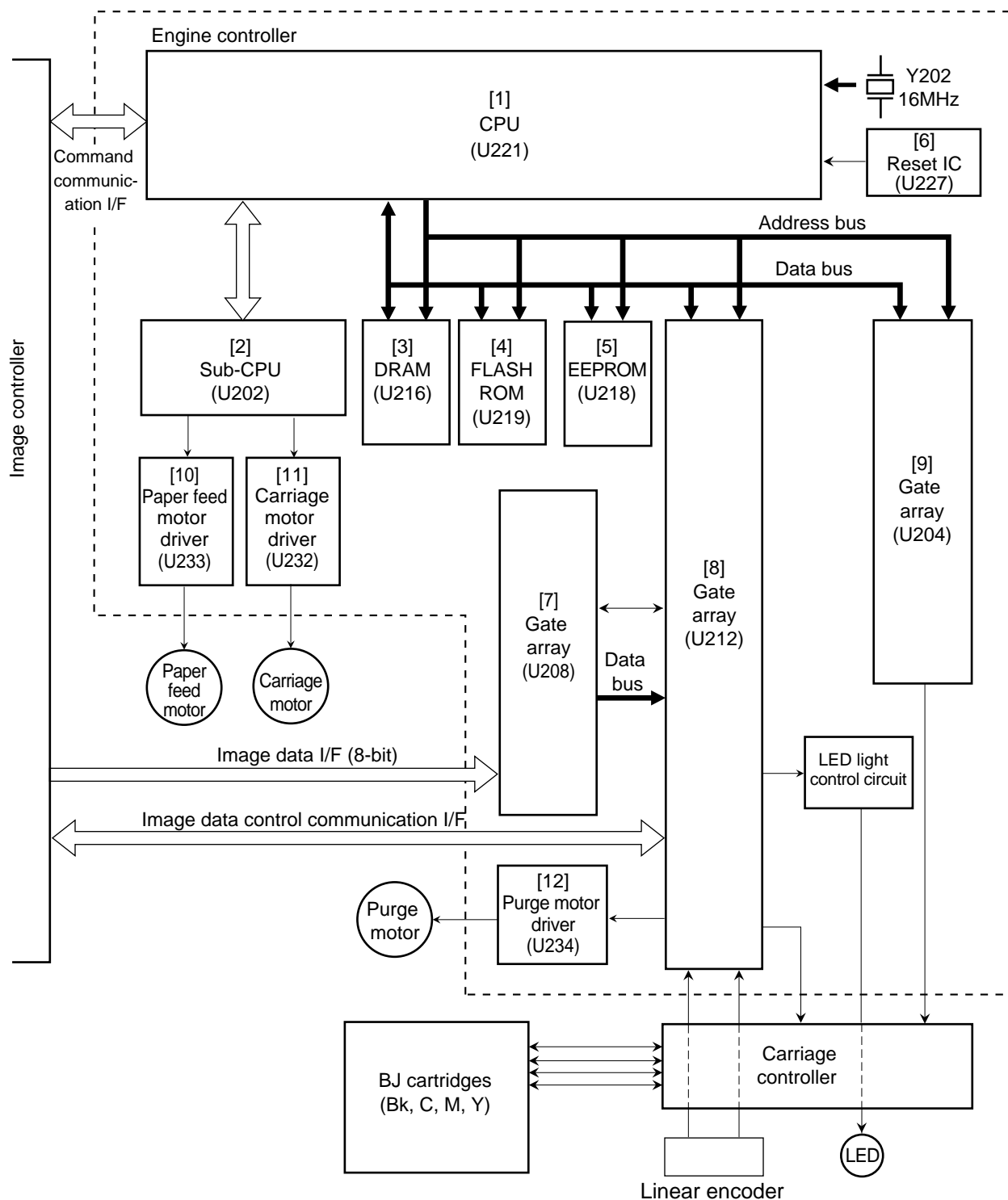


Figure 2-105

Major functions of the ICs on the engine controller are as follows.

[1] CPU (U221)

Connected to the DRAM (U216), FLASH ROM (U219), EEPROM (U218) and gate array (U204, U212) via the address bus and data bus.

Run by the 16MHz external clock.

Major functions are as follows.

- Command communication with the image controller
- Fan motor output port

[2] Sub-CPU (U202)

Connected to the CPU (U221). Major function is to control the paper feed motor and carriage motor.

[3] DRAM (U216)

2-Mbyte work area used to store temporary CPU data.

[4] FLASH ROM (U219)

500-Kbyte ROM containing the control program.

[5] EEPROM (U218)

8-Kbyte ROM used to store timer suction, dot count, waste ink count and other data.

[6] Reset IC (U227)

Detects the voltage supplied to the engine controller at power ON or power interruption, and resets the CPU (U221).

[7] Gate array (U208)

Provided with an 8-bit parallel input port for the image data from the image controller. Processes the image data before sending it to the gate array (U212). Also processes the internal print data.

[8] Gate array (U212)

- Image data transfer control for the image controller
- Conversion of image data
- Input ports for sensors, switches, etc.
- Carriage position control using the linear encoder
- Media sensor lamp signal output
- Solenoid output port
- Purge motor control

[9] Gate array (U204)

Operated by a clock from the CPU (U221). Generates head drive pulse signals.

[10] Paper feed motor driver (U233)

Generates paper feed motor drive signal.

[11] Carriage motor driver (U232)

Generates carriage motor drive signal.

[12] Purge motor driver (U234)

Generates purge motor drive signal.

E. Engine controller Input/Output

1. Engine controller input/output (1/3)

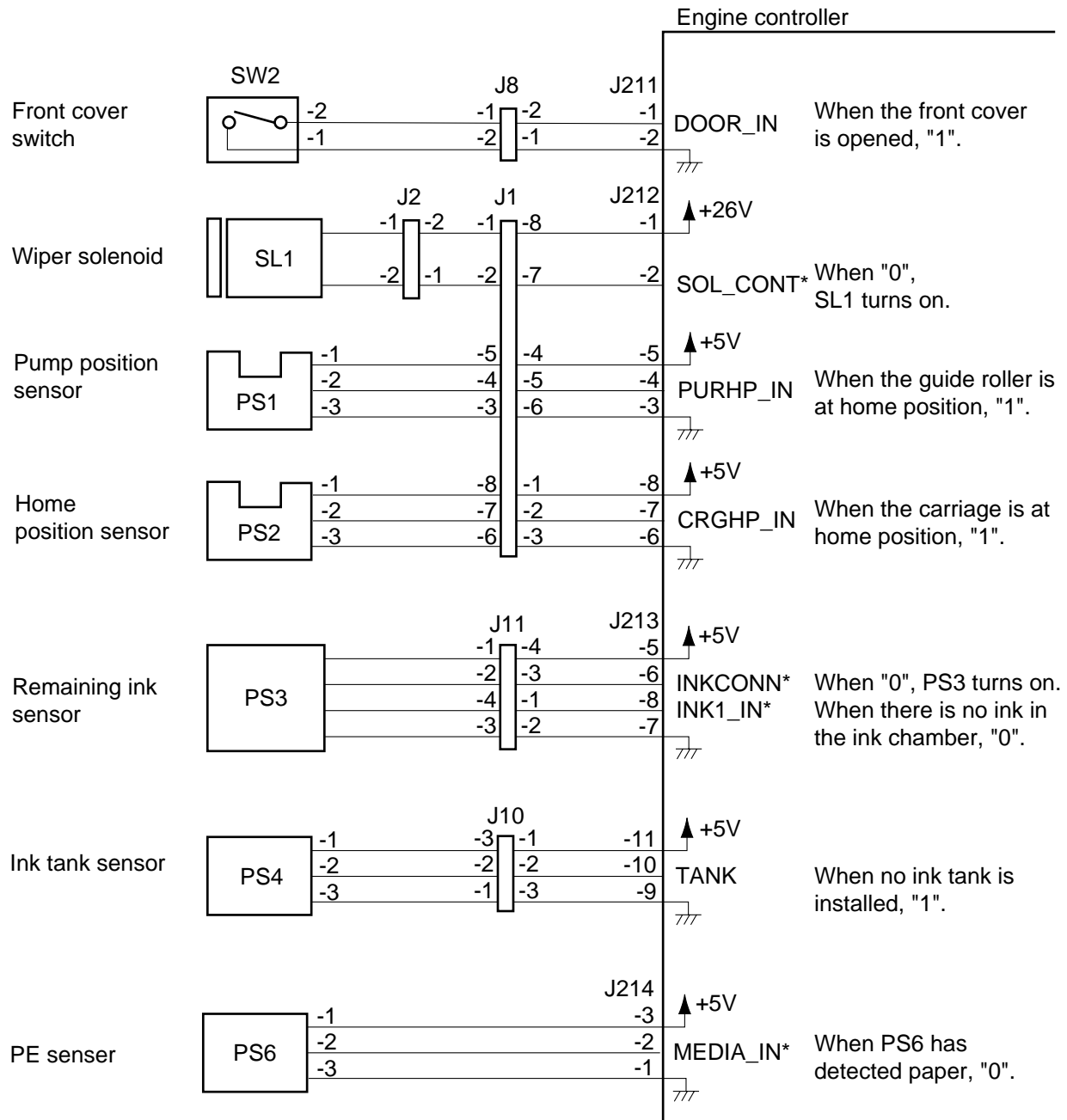


Figure 2-106

2. Engine controller input/output (2/3)

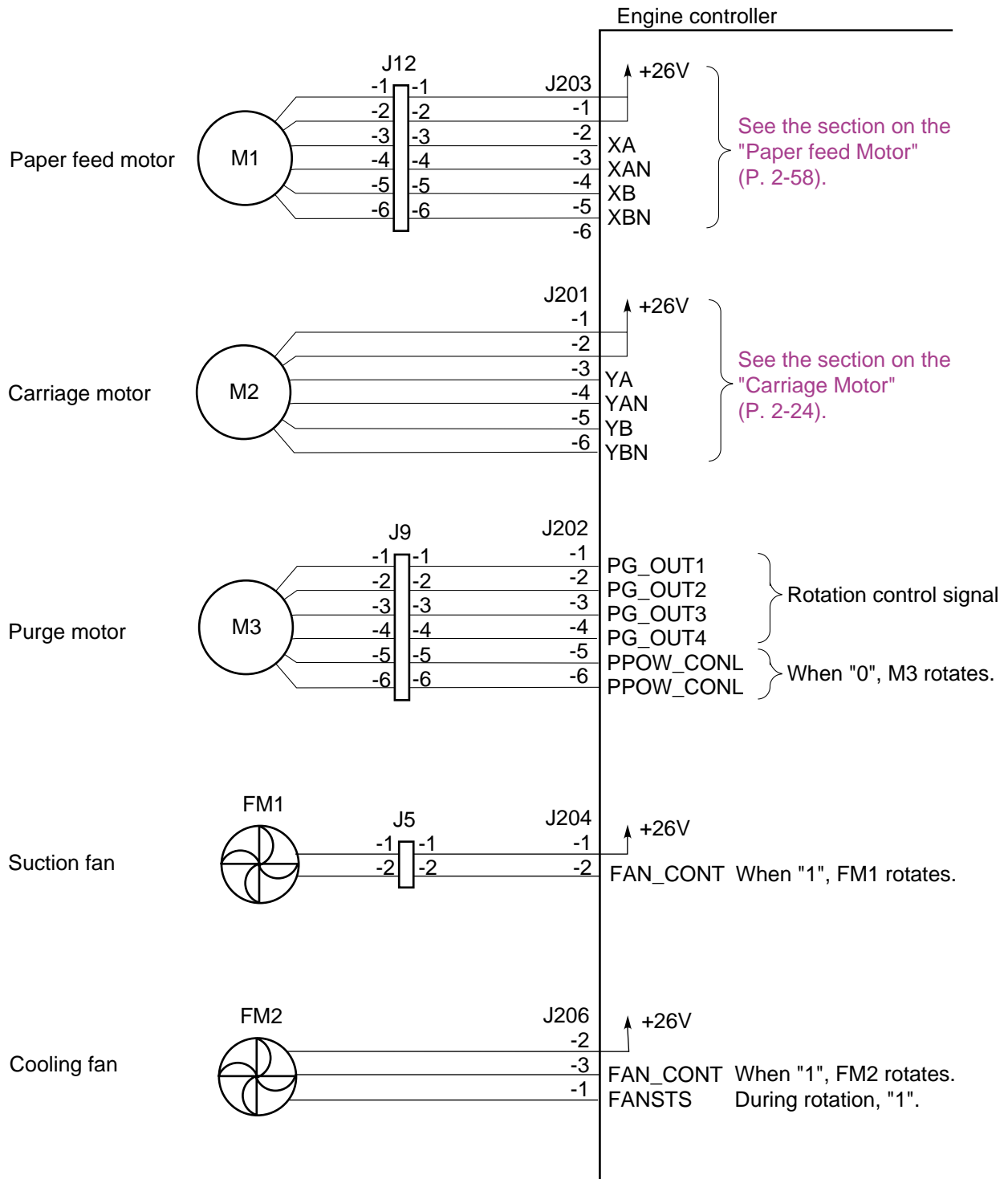


Figure 2-107

3. Engine controller input/output (3/3)

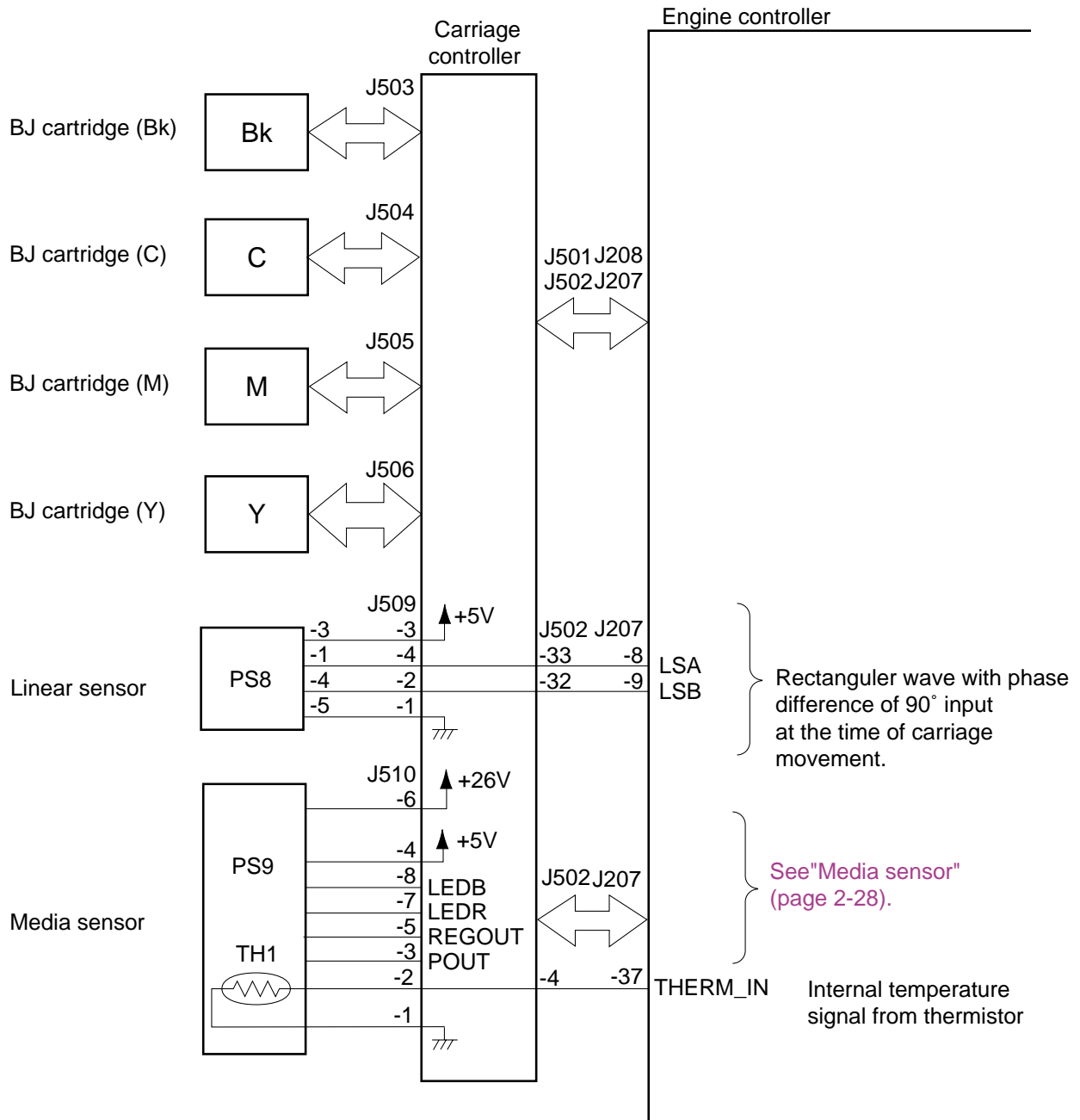
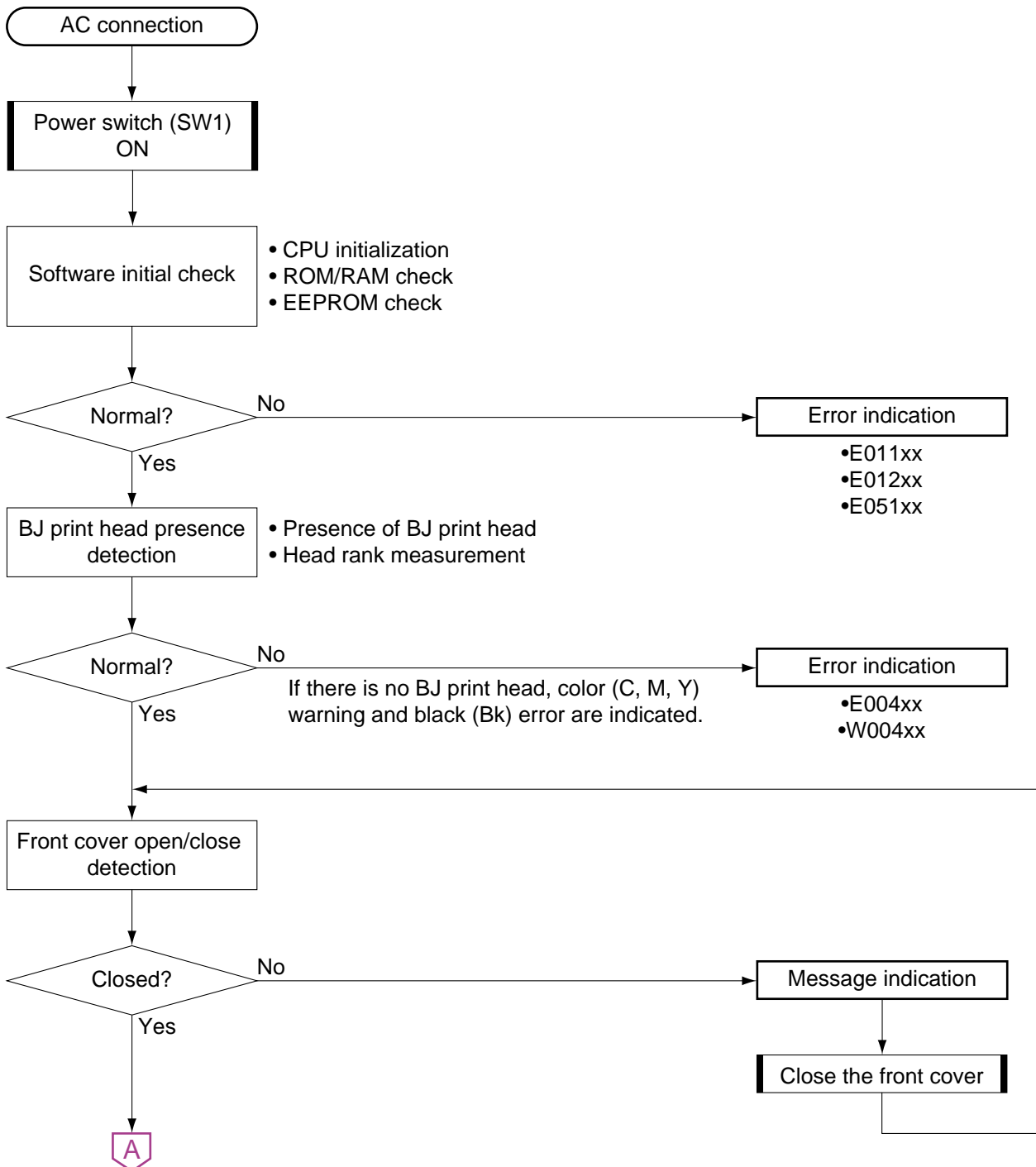
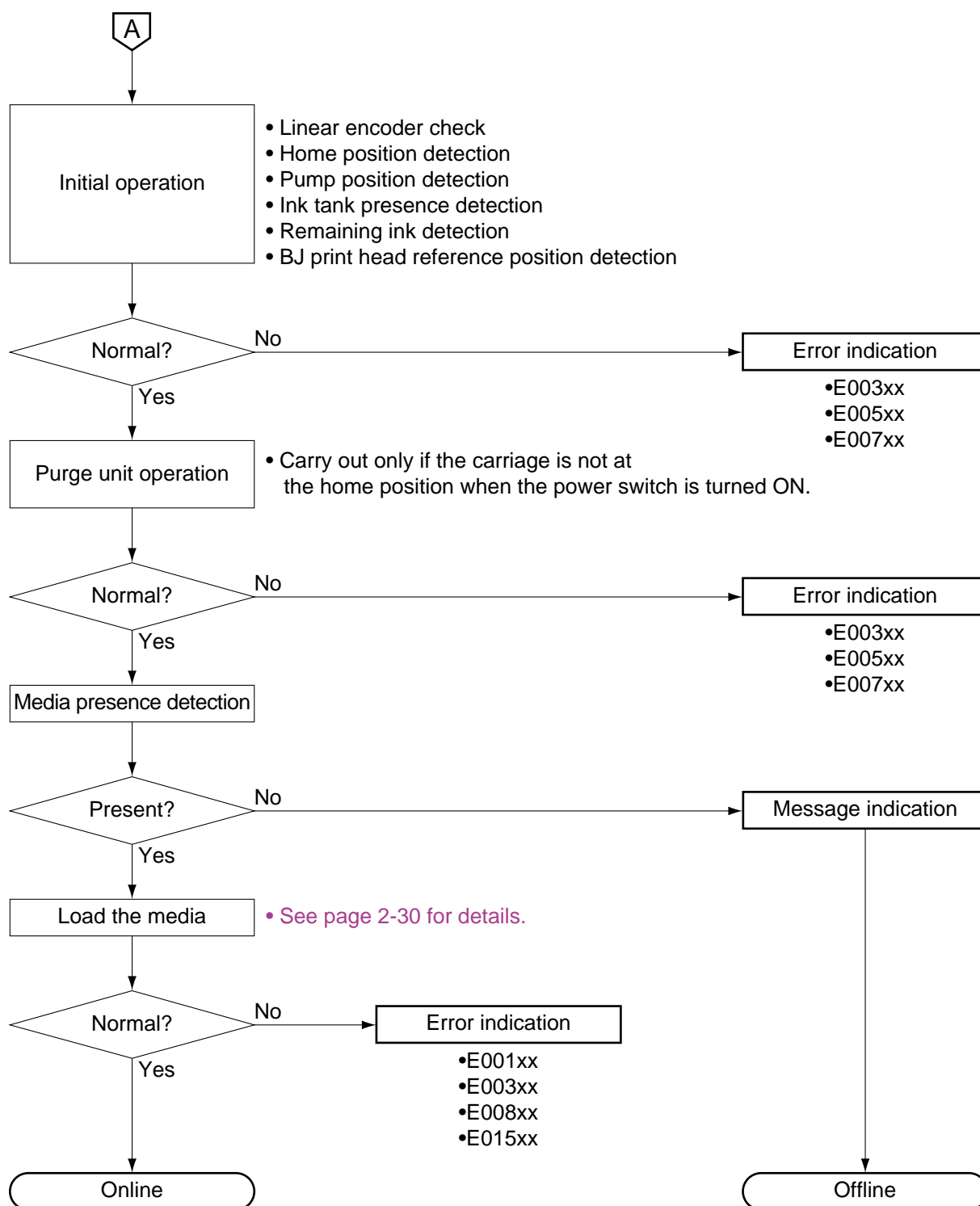


Figure 2-108

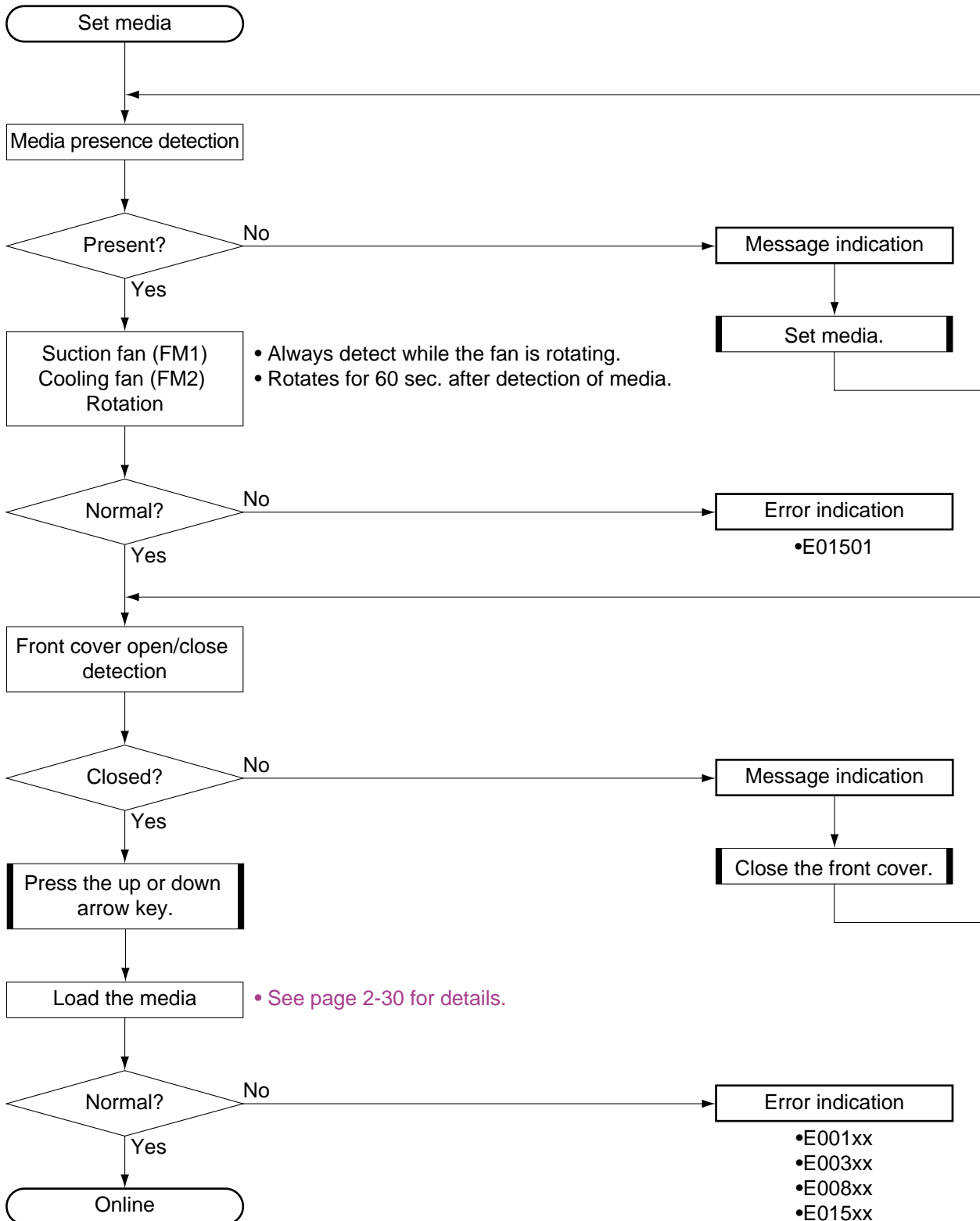
F. Summary of Operation

1. When the power switch is turned ON

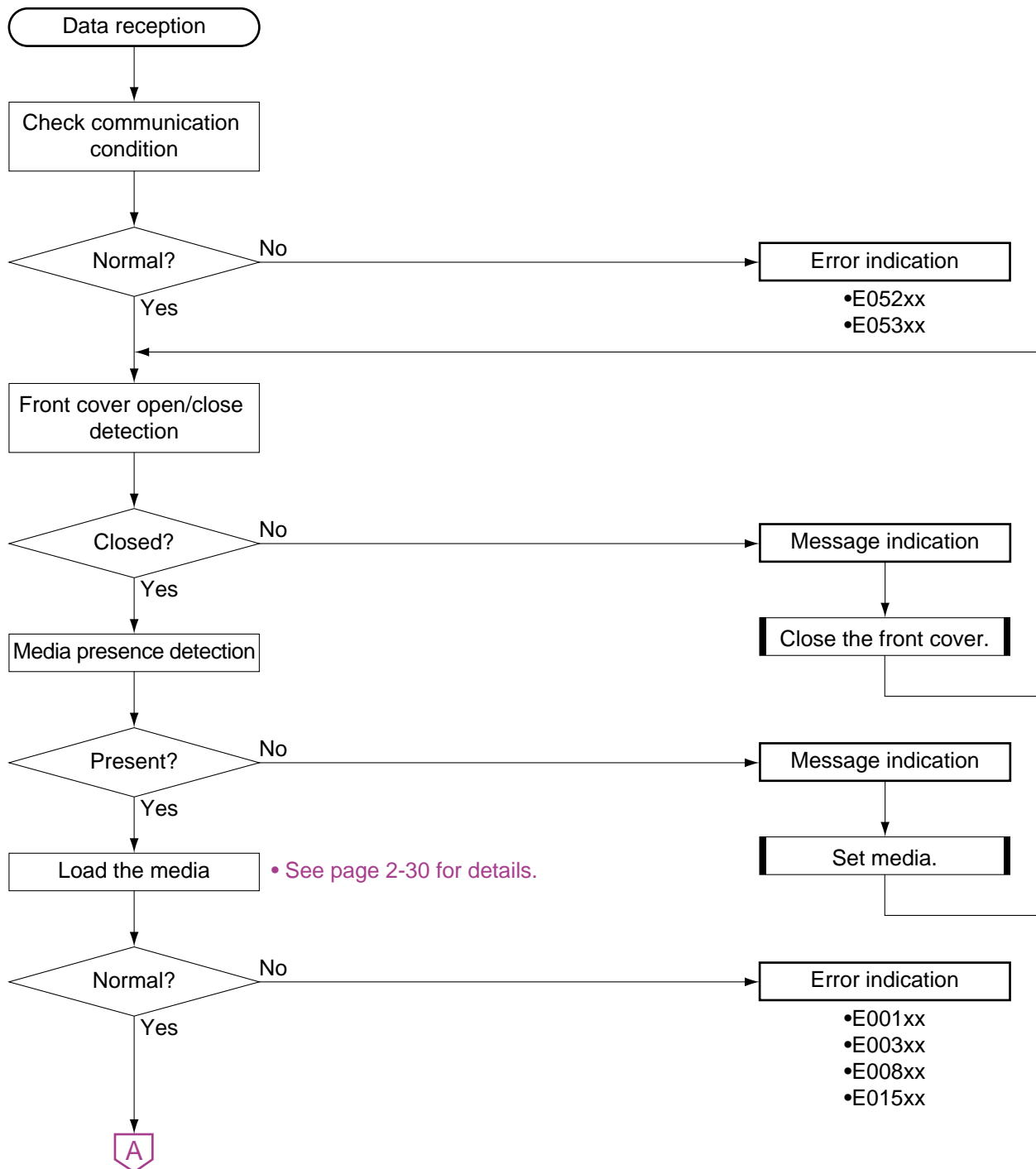


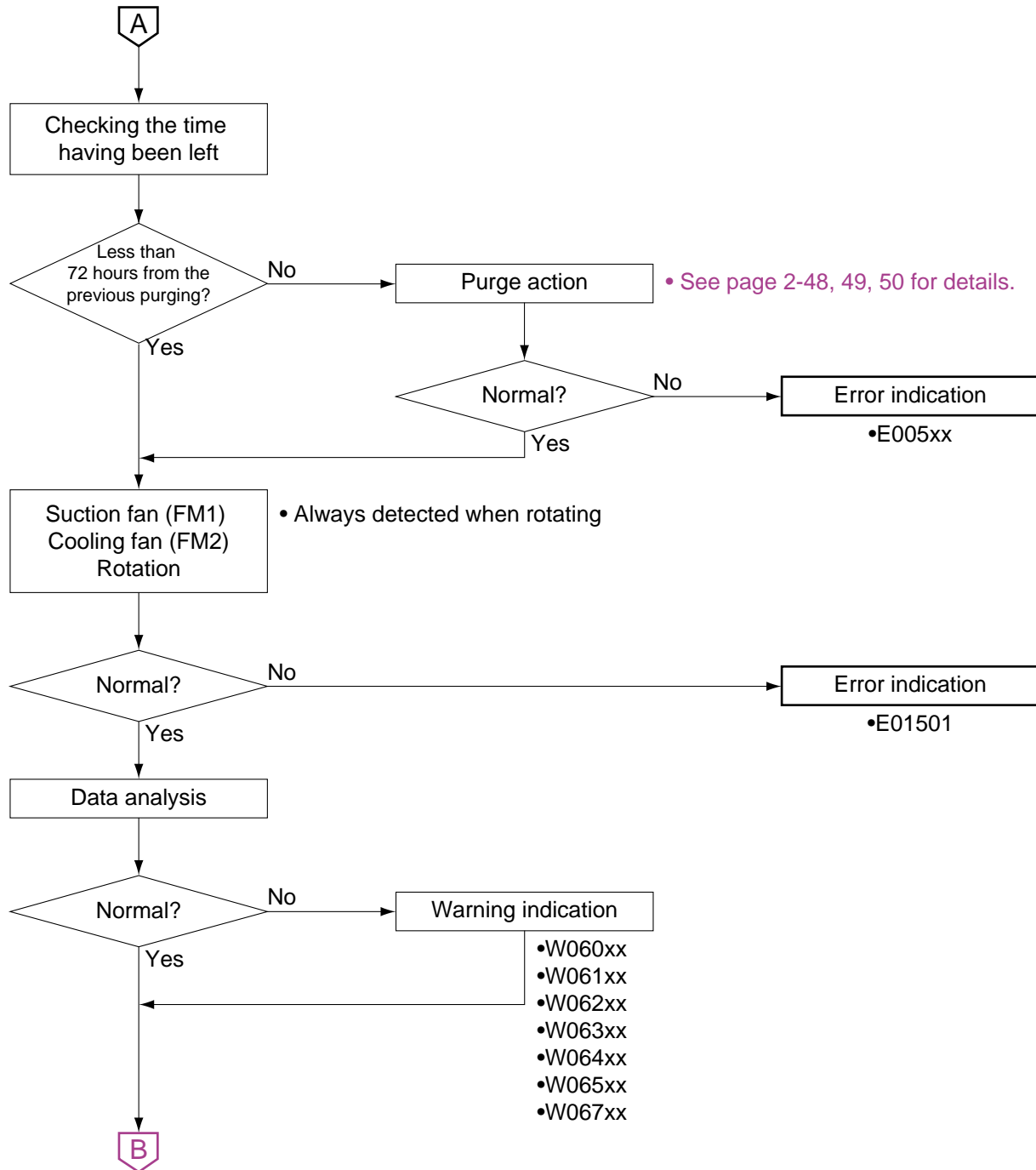


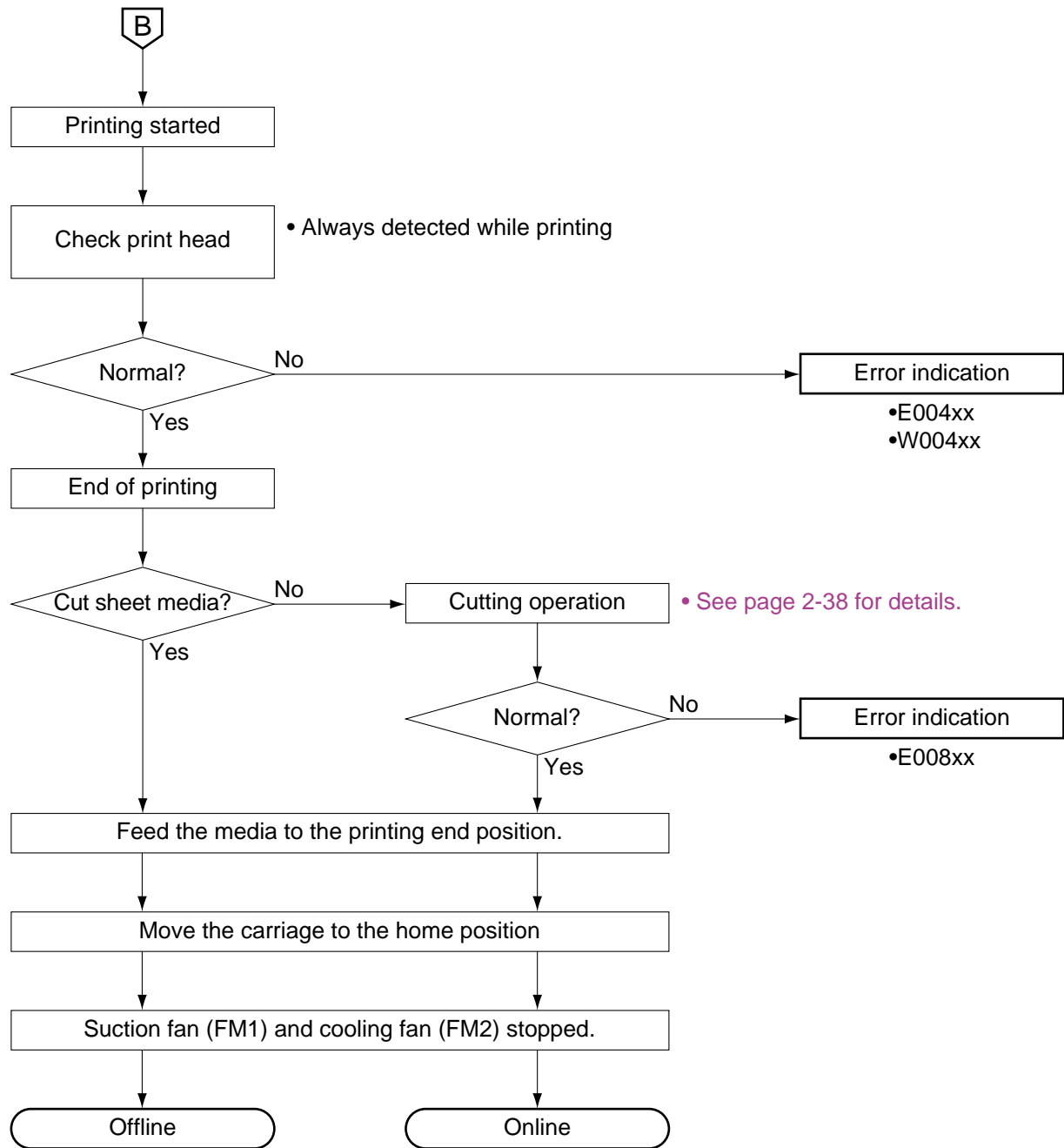
2. When media is loaded



3. Printing







II. CARRIAGE UNIT

A. Outline

Figure 2-201 shows the composition of the carriage and its driving components.

The driving force from the carriage motor (M2) is transmitted to the carriage through the carriage belt, causing the carriage to move back and forth over the paper. The distance it moves is controlled by counting the number of pulses of the signal transmitted from the engine controller to the carriage motor.

The print signal from the engine controller is transmitted to the BJ print head mounted to the carriage, via the carriage controller.

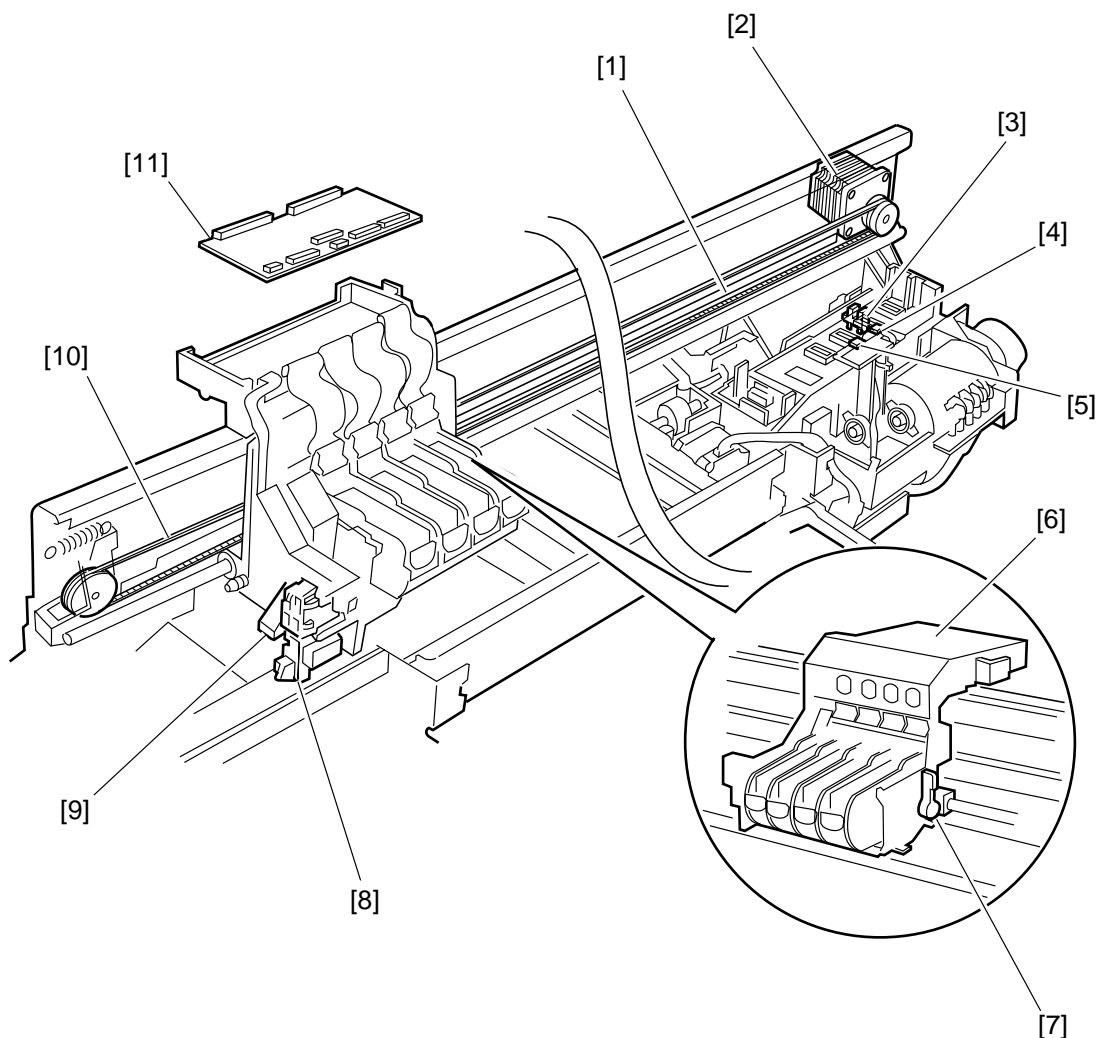


Figure 2-201

No.	Name	Function
[1]	Linear scale	Reference of printing position and print timing.
[2]	Carriage motor (M2)	Moves the carriage back and forth.
[3]	Home position sensor (PS2) *	Detects the home position.
[4]	Remaining ink sensor (PS3) *	Detects the ink level remaining in the ink tank.
[5]	Ink tank sensor (PS4) *	Detects presence of ink tank.
[6]	Carriage	Four BJ cartridges are mounted on the carriage and move back and forth by the driving force from the carriage motor (M2).
[7]	Paper thickness adjustment lever	Selects one of 3 distances between the head and platen.
[8]	Cutter	Rises and lowers according to the movement of the carriage, cutting the roll media.
[9]	Media sensor (PS9)	Detects ink dot position when adjusting the print position alignment. Also detects internal temperature with a built-in thermistor.
[10]	Carriage belt	Transmits the driving force of the carriage motor (M2) to the carriage.
[11]	Carriage controller	Relays the print signals issued from the engine controller to the BJ print head. Conducts serial communication with the engine controller using the 4-bit slave CPU, and sends the internal temperature, head temperature and head rank information to the engine controller.

* These sensors compose the purge unit.

Table 2-201

B. Carriage Motor Control

1. Outline

The carriage motor (M2) of this machine is a 2-phase stepping motor. It controls the back and forth movement of the carriage. The carriage motor (M2) is controlled by the engine controller, the main functions of which are shown below. Figure 2-202 is a block diagram of the carriage motor control circuit.

- [1] Carriage motor ON/OFF control
- [2] Carriage motor direction control
- [3] Carriage motor speed control
- [4] Carriage motor supply current control

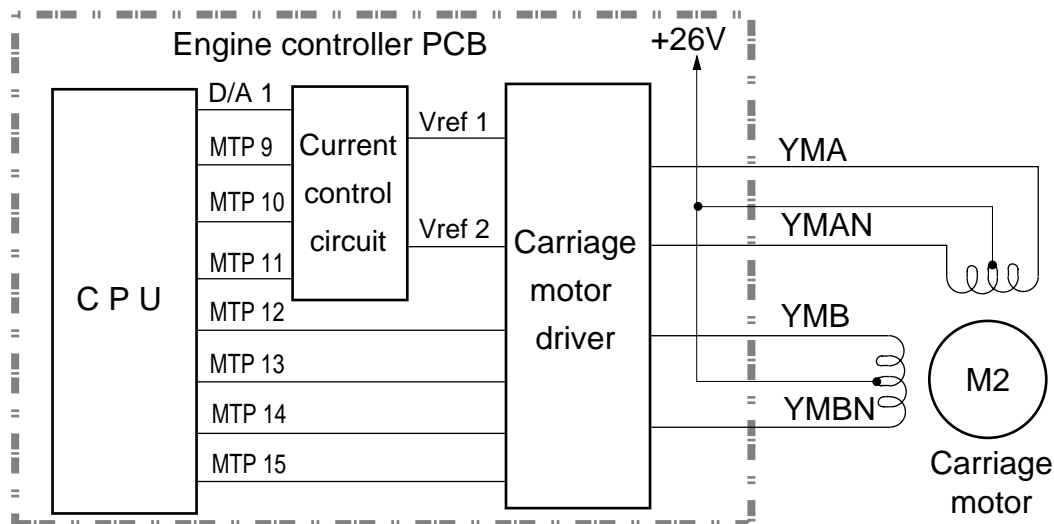


Figure 2-202

2. Operation

a. ON/OFF control

Carriage motor ON/OFF is controlled by the carriage motor driver control signal (MTP12-15) issued by the CPU to the carriage motor driver on the engine controller.

When MTP12 - 15 are "0", the carriage motor driver generates motor drive pulses (YMA, YMAN, YMB, YMBN) and the carriage motor (M2) is rotated by those pulses.

On the other hand, when MTP12-15 are "1", no motor drive pulses are generated and the carriage motor (M2) stops rotating.

b. Direction control

The output timing of the motor drive pulses (YMA, YMAN, YMB, YMBN) from the carriage motor driver is changed by the carriage motor driver control signals (MTP12-15) output from the CPU, to control the direction of the carriage motor (M2).

c. Speed control

The speed of the carriage motor (M2) is controlled by changing the frequency of the carriage motor current control signals (MTP9-11) and the carriage motor driver control signals (MTP12-15) issued by the CPU.

d. Supply current control

The 2 signals (Vref1, Vref2) output from the current control circuit are controlled by the carriage motor drive control signal (D/A1) output by the CPU, to control the current supplied to the carriage motor (M2) by the carriage motor driver for stopping, holding, low-speed operation and high-speed operation. By changing the carriage motor supply current according to the current condition of the carriage motor (M2), the carriage motor (M2) is smoothly controlled.

e. Detection of problems

If a heavy load is placed on the carriage for any reason, the pulse signal output from the linear encoder will not be detected within a specified time. The engine controller interprets this as a problem with the carriage motor and stops it.

3. Detection of front cover open/closed

As a safety precaution against the front cover being opened while the carriage is operating, a front cover switch (SW2) is provided.

When the front cover is opened, the front cover switch is turned OFF, the carriage motor (M2) drive voltage (+26V) is cut off after printing 1 band, and the carriage motor stops.

C. Linear Encoder

1. Outline

A linear encoder is installed on the printer to allow checking the carriage operation and adjusting the dot placement position on the paper. When the carriage is returning, after the home position sensor (PS2) turns ON and the carriage has travelled an additional 12mm, that position is considered the home position.

2. Structure

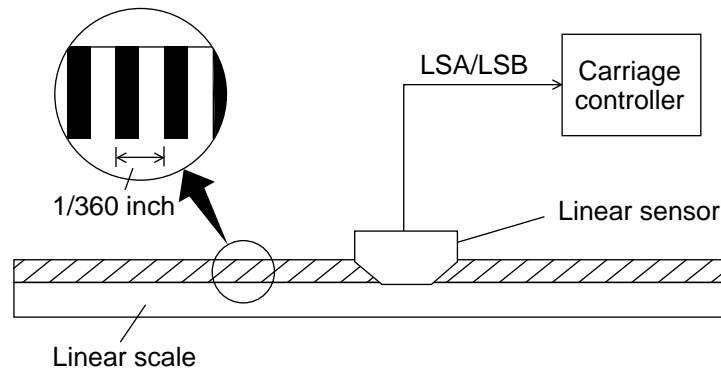


Figure 2-203

[1] Linear scale

Slits are printed at an interval of about 1/360 inch on a polyethylene telephthalate sheet.

[2] Linear sensor

Composed of a light emitting diode and photo diode, the sensor reads the slit pattern on the linear scale and outputs a 2-phase rectangular wave.

3. Output signal

When the linear sensor moves along the linear scale, the photo diode detects the light coming through the slit pattern and outputs 4 signals (A, \bar{A} , B, \bar{B}) to the signal processing circuit. Two comparators output rectangular waves (LSA, LSB) with a phase difference of 90°.

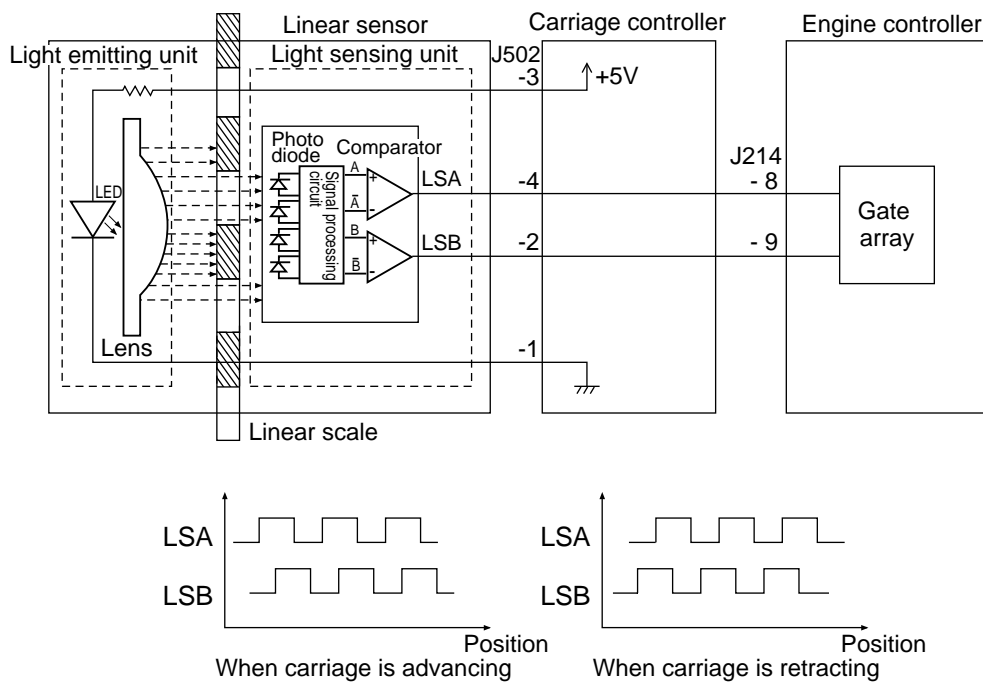


Figure 2-204

4. Control

The engine controller controls and checks as follows, based on the A and B-phase signals (LSA, LSB).

- Control of ink discharge timing
- Control of carriage operation
- Detection of carriage position

a. Ink discharge timing

The LTCLK signal is generated synchronously with the rising edge of the LSA pulse when the carriage advances, and with the falling edge of the LSA pulse when the carriage returns, so that the ink dot position is properly adjusted on the paper.

b. Carriage operation

The LSA signal has a phase difference of -90° to the LSB signal when the carriage is advancing and a phase difference of $+90^\circ$ when the carriage is returning, enabling the engine controller to control the carriage operation and direction.

c. Carriage position

The carriage position is detected by counting the LSA rising edges when the carriage is advancing and the LSA falling edges when the carriage is returning.

D. Media Sensor

1. Outline

The printer is provided with a media sensor to detect the width and skew of the paper, the internal temperature, and to enable automatic head adjustment. The media sensor is located on the carriage unit and composed of a red and a blue LED and one reflective photo sensor. When automatically adjusting the head, to detect the cyan line pattern, the red LED is lit, and to detect the black, magenta and yellow line patterns, the blue LED is lit.

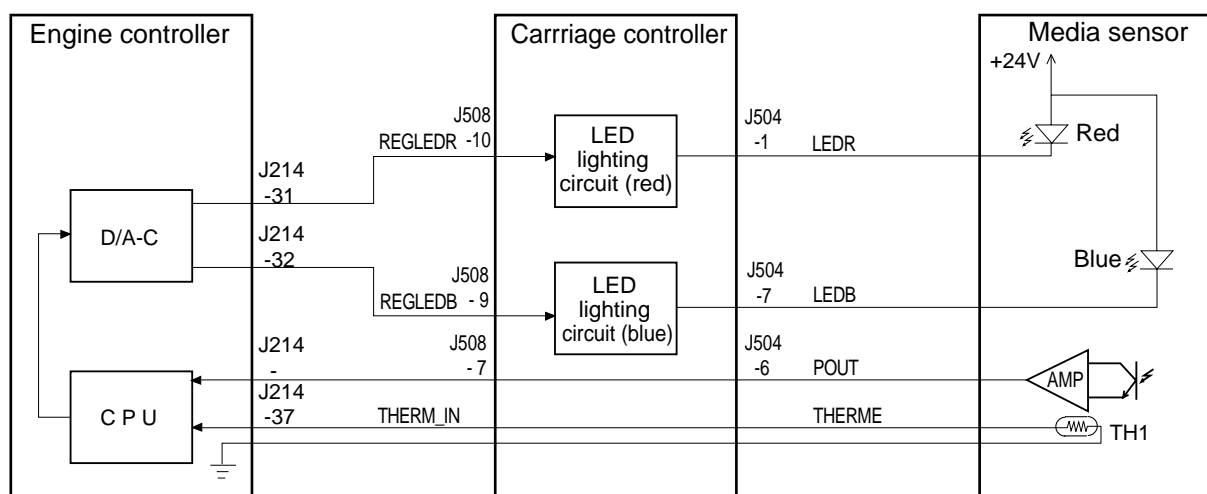


Figure 2-205

2. Paper width detection

When paper is picked up, the blue LED in the media sensor are switched on, and if the reflected light level is insufficient, the red LED also is switched on. The carriage is moved while lighting the proper LEDs (blue, red or both) and the right edge of the paper is detected when the carriage advances and the left edge when returning. The output pulses from the linear encoder are counted from when the carriage leaves the home position until the paper edges are detected, and the paper width is determined from the difference between the counted values at the time of advancing and returning.

When the paper width is less than 250.0mm, an error code is displayed on the operation panel.

If the right or left edge of the paper is detected as out of the reference position by more than 5mm, an error code (E00162) is indicated.

3. Skew detection

By comparing the detected right edge position of the paper after a certain volume of paper has been fed, with the position of the right edge detected during the paper width detection operation, paper skew can be detected.

[1] Roll media

After the paper width detection, the paper is fed for approximately 300mm to detect skew.

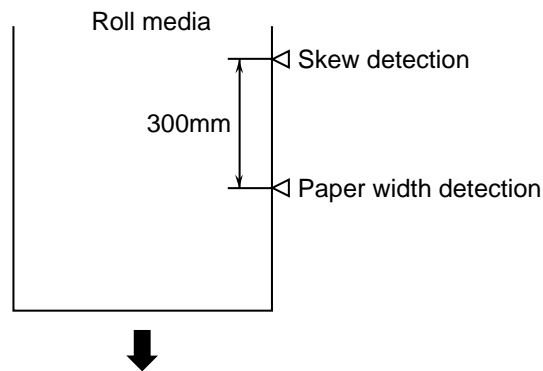


Figure 2-206

[2] Cut sheets

After the paper width detection, the paper is reverse fed for approx. 300mm for the first skew detection. The paper is then fed further back, and when the rear edge passes the media sensor, the paper is fed back for approx. 50mm from the leading edge and a second skew detection takes place.

However, if the leading edge passes by the media sensor before the paper is fed for approx. 300mm, the paper is returned approx. 50mm from that position, and skew detection is conducted.

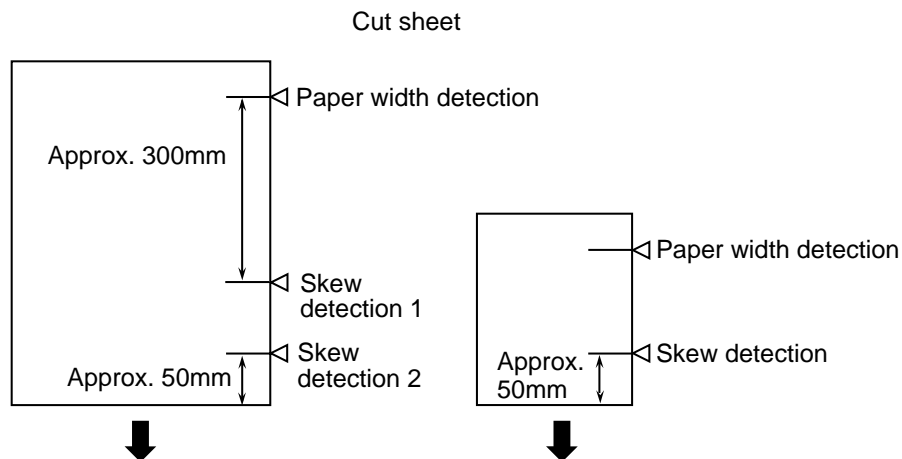
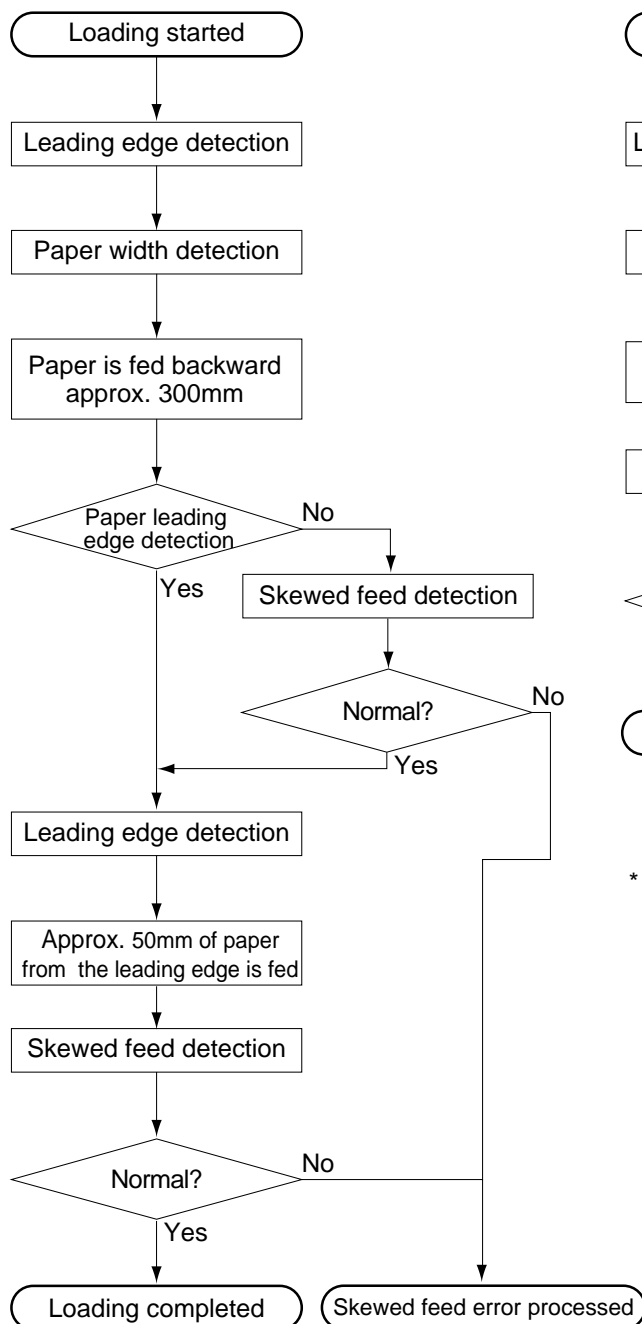


Figure 2-207

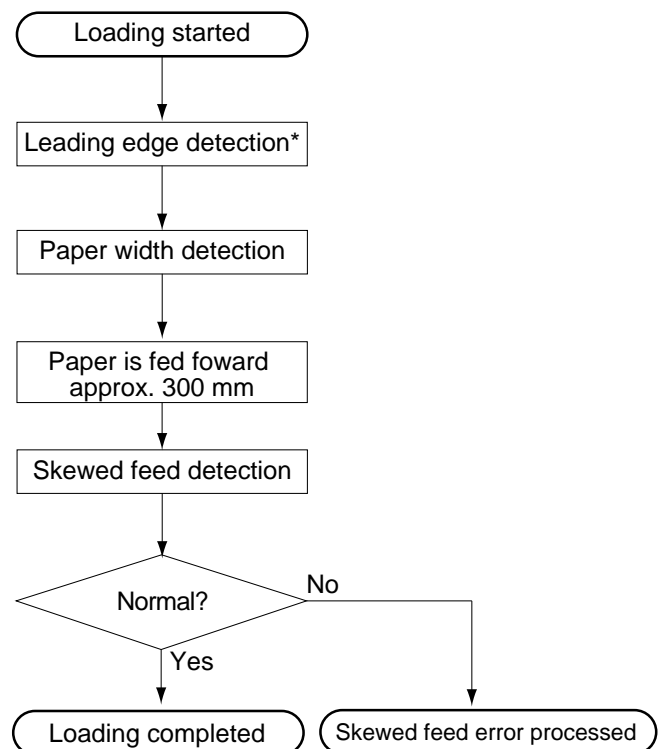
If the skew value is more than the specified amount, the paper is determined to be skewed. The skew value here is the divergence between the paper's right edge at the time of paper width detection and the right edge at the time of skew detection.

When paper skew is detected, the printer returns the carriage to the home position and stops operation.

Cut sheet loading sequence



Roll media loading sequence



* For continuous printing of roll paper, this process is performed only when "Cut" in "Auto Cut" is selected.

Figure 2-208

4. Light compensation

The media sensor brightness is automatically compensated for at the time of paper width detection and automatic print position adjustment. The carriage is advanced for approx. 200mm, the light quantity on the paper is compensated for in the order of blue and red, and then the light quantity on the platen is compensated for in the order of blue and red.

5. Auto band adjustment

Errors in band placement due to mechanical tolerances of the head nozzles and media feeding system can be automatically corrected.

a. Pattern

First, 2 ruled lines are printed using 10 nozzles from among 160 nozzles of the BJ print head, from the 4th one from both ends to the 14th one (pattern 1). The interval between the centers of these 2 rule lines corresponds to 144 nozzles. Then, the media is sent ahead for the distance corresponding to 144 nozzles and 3 ruled lines (pattern 2) are printed. The paper feed motor rotates twice for the above process (3200 steps).

Finally, the media is again advanced a distance corresponding to 144 nozzles, and one ruled line (pattern 3) is printed. This printing of patterns 1 to 3 is repeated 5 times.

b. Measurement and adjustment

The interval between ruled lines A and B of pattern 1 is measured, and then the interval between ruled line A of pattern 1 and ruled line A of pattern 2 is measured. The intervals are compared, and the feeding distance corresponding to 1 band of the paper feed motor is adjusted. Similarly, the interval between ruled lines B and C of pattern 2 and the interval between ruled line B of pattern 2 and ruled line A of the pattern 3 are measured. The intervals are compared and the feeding distance corresponding to 1 band of the paper feed motor is adjusted.

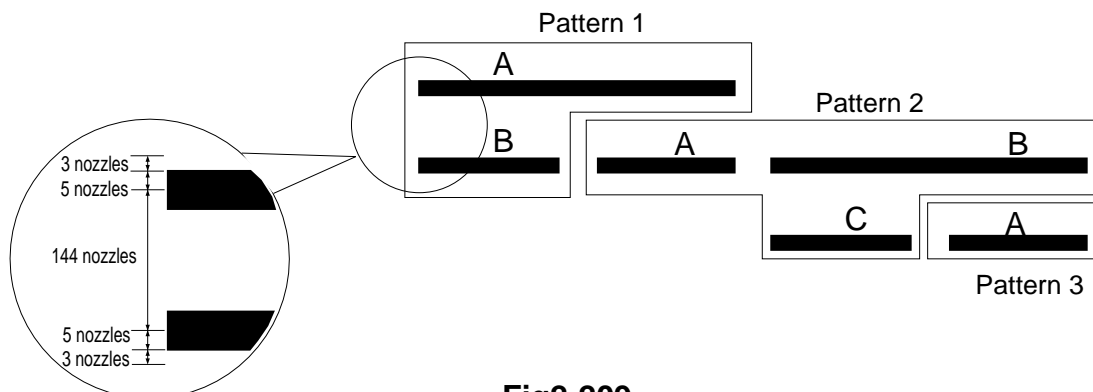


Fig2-209

6. Automatic print position adjustment

When cartridges are installed on the carriage, the nozzle positions of the cartridges may be displaced, causing displacement of dots of different colors on the paper. The automatic print position adjustment compensates for this displacement.

The head is automatically adjusted vertically (paper feeding) and horizontally (carriage movement) as follows.

a. Vertical adjustment (paper feed)

The line patterns for 1 band in the horizontal direction are printed in the order of black, cyan, magenta, and yellow as the carriage moves backward and forward. Then black lines for 1 band are printed as the carriage moves backward. This process is repeated 15 times.

The distance between the center of the second black line patterns and the center of the color pattern is measured for each of the 15 sets, the average value is calculated, and the calibration value is determined.

b. Horizontal adjustment (carriage movement)

As before, line patterns in the vertical direction are printed, and the distance between the center values of the black line patterns and color patterns are measured and divided into 29 intervals, the average value is calculated to determine the compensation value. Theoretically the horizontal adjustment is accurate to 1/270 dot. The adjustment covers 6 cases as follows.

- (1) The tolerances of the carriage drive components can cause the positions of ink dots on the media to shift. The printer detects the shifted value of the black line pattern with medium drops printed as the carriage moves forward with a drive frequency of 7.2kHz, and corrects the standard position where ink is placed.
- (2) When the carriage moves forward, the divergence between the black line pattern printed with small drops at a drive frequency of 7.2kHz and the color line pattern is adjusted.
- (3) When the carriage moves backward, the divergence between the black line pattern printed with small drops at a drive frequency of 7.2kHz and the color line pattern is adjusted.
- (4) When the carriage moves backward, the divergence between the black line pattern printed with large drops at a drive frequency of 7.2kHz and the color line pattern is adjusted.
- (5) The divergence between the black line pattern when the carriage moves forward and backward at a drive frequency of 7.2kHz and the line pattern is adjusted.
- (6) The divergence between the black line pattern when the carriage moves forward and backward at a drive frequency of 14.4kHz and the line pattern is adjusted.

CAUTION

Whenever a BJ print head is removed and reinstalled, or the head-to-paper gap is adjusted, the automatic print position adjustment must be conducted.

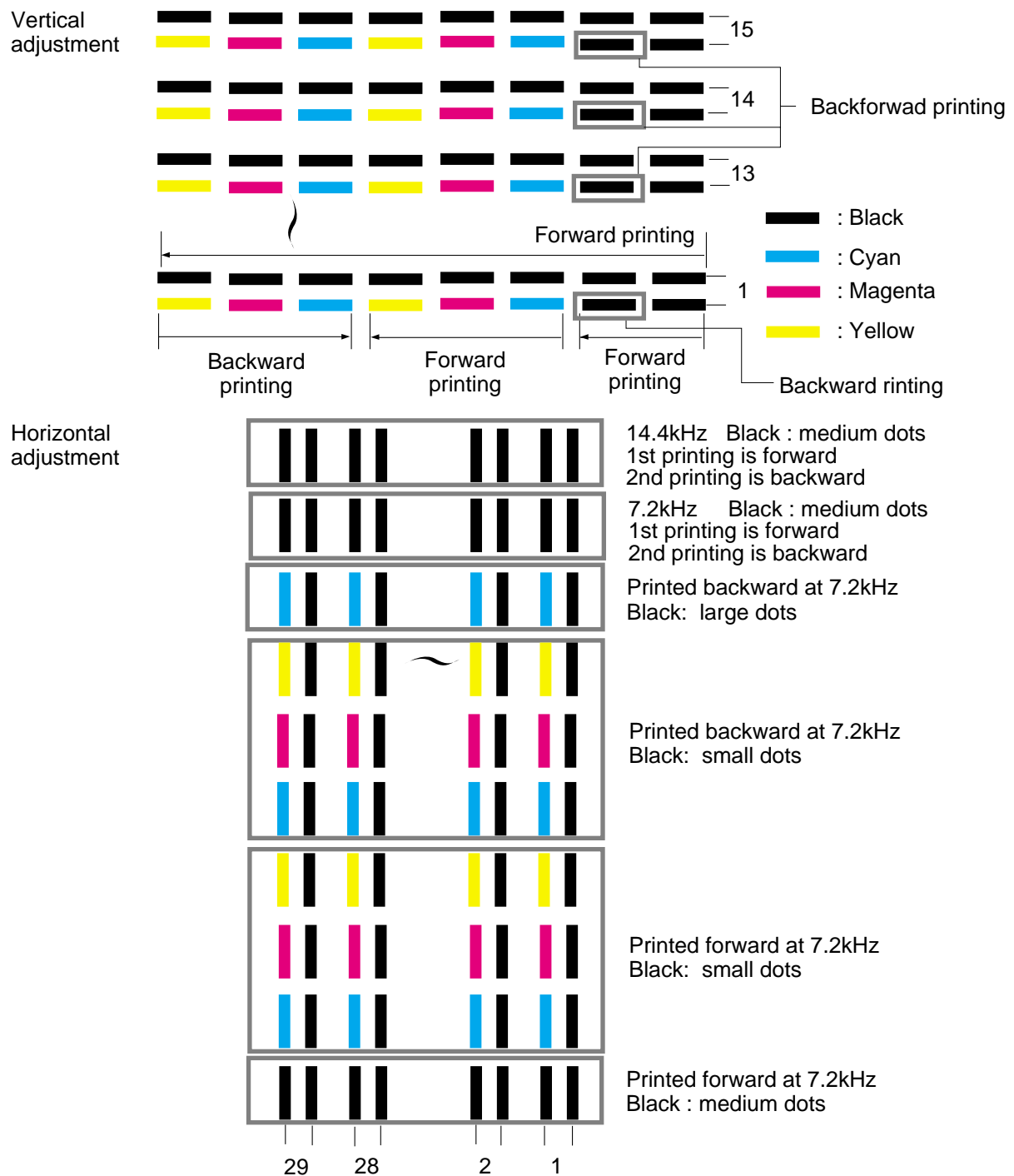


Figure 2-210

E. Detection of the Ink Tank

1. Outline

The printer has an ink tank detection function. When an ink tank is not installed, an error message appears on the message display and the ink and head condition is indicated by a blinking hyphen ("–").

2. Method of detecting the ink tank

The presence of the ink tank is detected by the ink tank detection sensor (PS4) installed on the purge unit when the carriage returns to the home position, in the order of yellow, magenta, cyan, and black. The ink tank detection sensor uses a reflective type photo sensor. The existence of the ink tank is detected by whether or not light is reflected from the bottom surface of the tank. When the ink tank is installed, light from the sensor is reflected from the bottom surface of the tank and returns to the light receiving unit, causing the ink tank detection signal (TANK) to be "0". When no ink tank is installed, light is not reflected back to the light receiving unit, and the ink tank detection signal (TANK) becomes "1".

Figure 2-213 is a flow chart of the ink tank detection and remaining ink detection process.

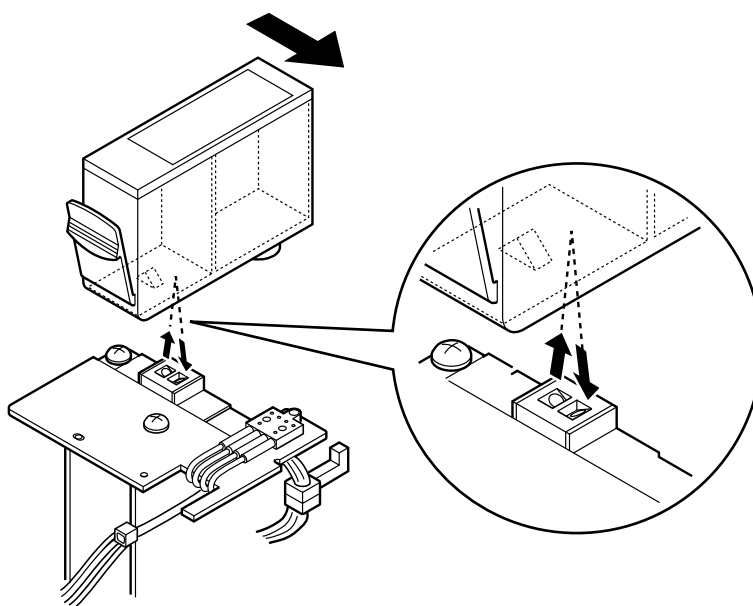


Figure 2-211

F. Remaining Ink Detection

1. Outline

The printer has a remaining ink detection function. The remaining ink is detected at 2 levels.

When the ink in the ink tank chamber is used up, the ink condition on the message display is shown in lower case letters.

If the ink in the tank's sponge is used up, when the printing of that page is completed, the ink condition on the message display is indicated by a hyphen ("–").

The ink condition indications are shown in Table 2-202.

Display	Condition
Capital letters	Ink is sufficient
Lower case letters	No ink in ink chamber
Hyphen ("–")	No ink in chamber and sponge
Blinking hyphen	No ink tank

Table 2-202

2. Method of detecting remaining ink

The ink remaining in the ink chamber is detected by the remaining ink sensor (PS3) installed on the purge unit, in the order of yellow, magenta, cyan, and black when the carriage returns to the home position. The remaining ink sensor (PS3) uses a reflective prism. The light from the sensor is reflected back by the prism in the bottom of the ink tank, and returns to the light receiving unit. When there is ink in the chamber, the light is absorbed by the ink and does not reflect back to the light receiving unit, and the remaining ink signal (INK1_IN) is "1". When there is no ink in the chamber, the light is reflected back by the prism to the light receiving unit, and the remaining ink signal (INK1_IN) changes from "1" to "0". When the ink tank is not installed, there is no prism, the light is not returned to the light receiving unit, and the remaining ink signal (INK1_IN) is "1".

When the ink in the chamber is exhausted, remaining ink is calculated by counting dots. The number of ink dots discharged from the head are counted by the gate array on the engine controller and the counted value is sent to the CPU for each band. The CPU adds the dot counts sent to it and the number of suction times (number of sucked dots) and the total is stored in the EEPROM. When the total number of ink dots reaches a specified value (the amount of ink held by the sponge), the indication of the ink status on the message display is changed.

Fig. 2-213 is a flow chart of the ink tank detection and remaining ink detection process.

Ink tank detection/remaining ink detection flow chart

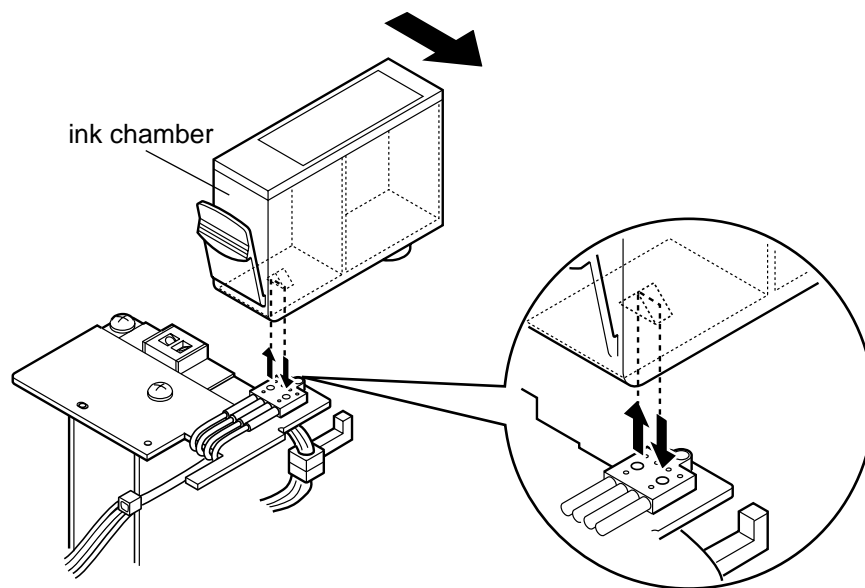


Figure 2-212

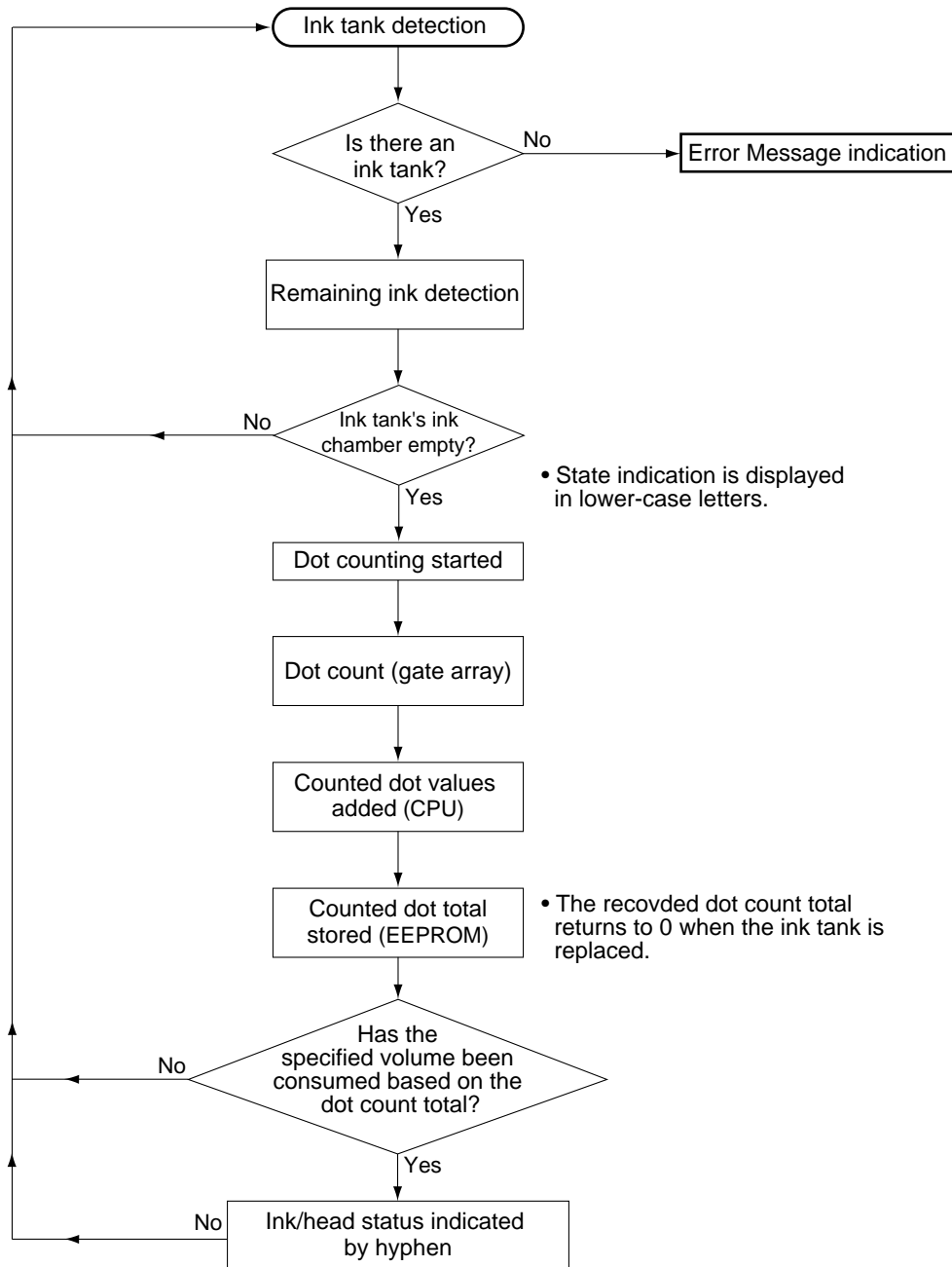


Figure 2-213

G. Cutter Unit

1. Outline

The Cutter unit is installed on the carriage. As the carriage moves, the cutter lowers, cutting the roll media. The Cutter unit is moved up and down along the slope of the platen to prevent cutting failure, and a paper retainer is provided to cut the paper while compensating its slackness or unevenness.

To maintain cutting quality, the blade position can be switched through 5 stages by turning a dial.

For safety, the Cutter unit is designed not to be removed from the carriage when the cutter blade is out.

REFERENCE

Roll media is cut as follows.

- After new roll media is picked up, 80mm is cut to straighten the front edge.
- After the roll media is printed, the rear edge is cut.
- When the FORCE CUT function is executed, the roll media is cut.

2. Cutting operation

When roll media is cut, the carriage advances to the left side of the platen and the cutter hook is released by the cutter guide at the left edge of the guide rail. The cutter is lowered by its spring.

The carriage cuts the roll media while returning, and the cutter rises along the cutter slope on the right side of the guide rail and is stored there.

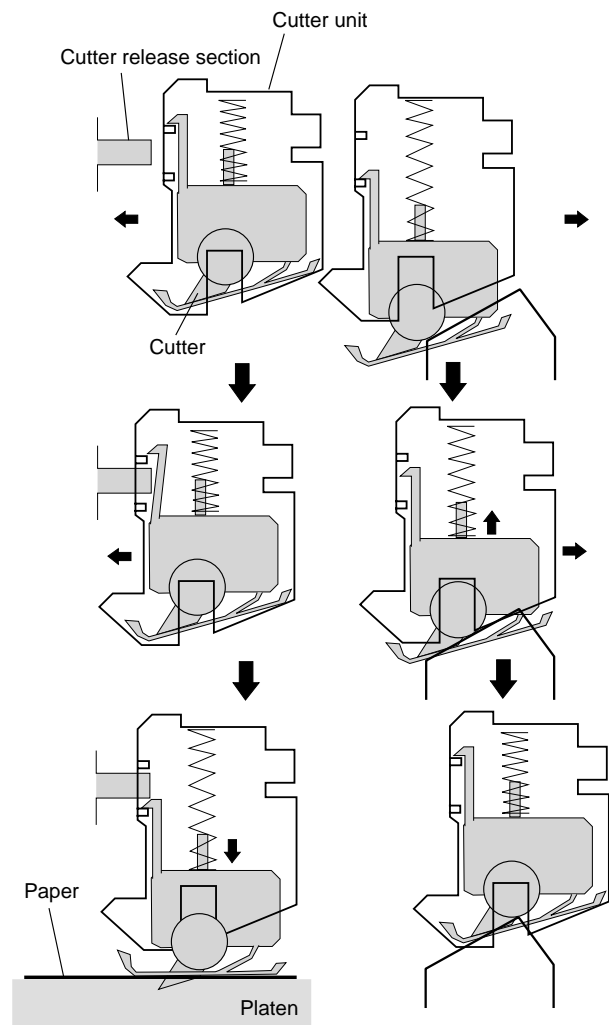


Figure 2-214

III. BJ CARTRIDGE

A. BJ Cartridge

1. Overview

Four colors of BJ cartridges are used in this printer: black (Bk), cyan (C), magenta (M), and yellow (Y). The BJ print head and ink tank are separable for each color.

2. Structure

Configuration of the BJ cartridge is shown below.

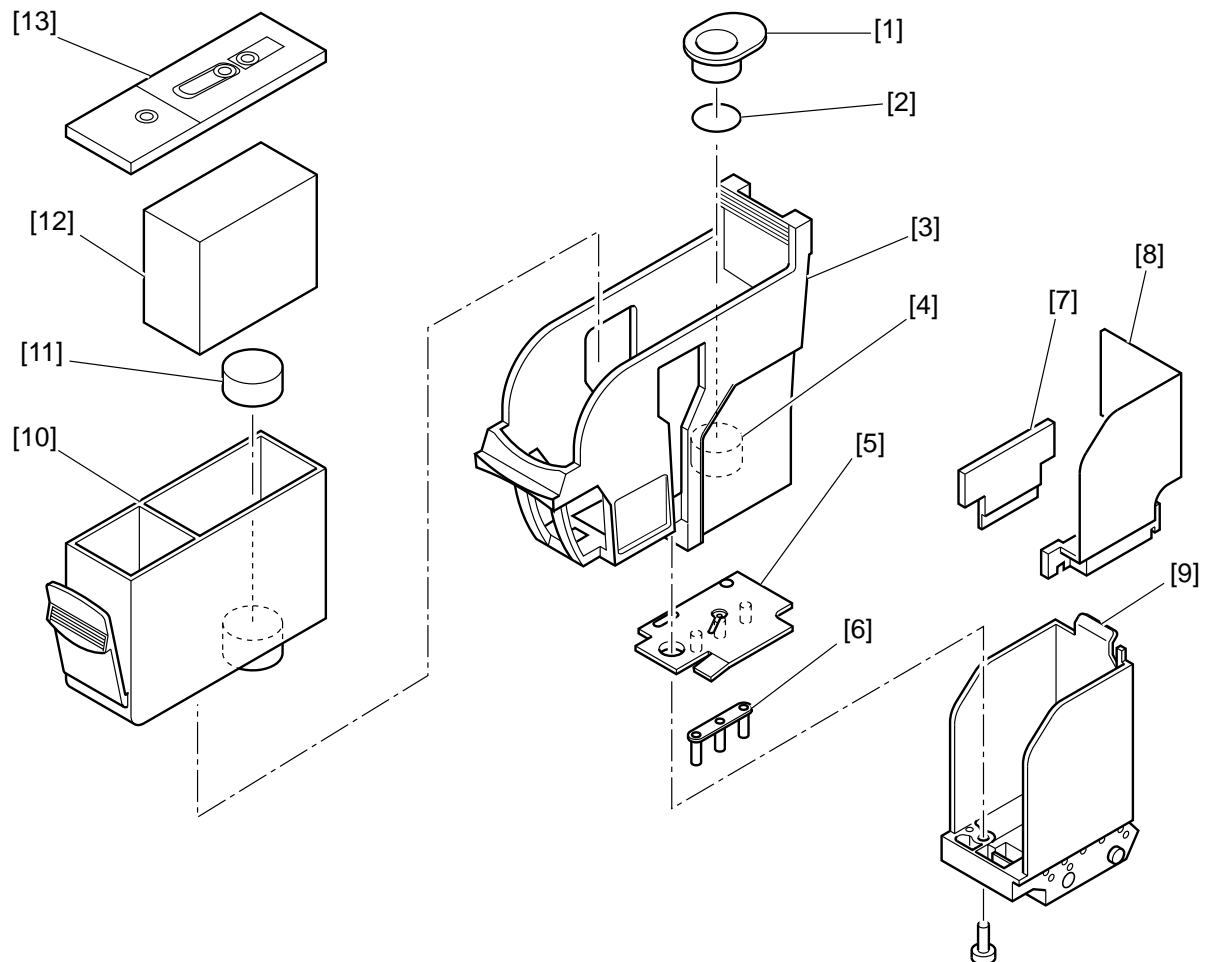


Figure 2-301

No.	Name	Function
[1]	Tank packing	Seals between the ink tank and ink pipe to prevent leakage.
[2]	Ink filter	Filters the ink to prevent foreign matter from entering the ink passage.
[3]	Cartridge body	A case accommodating and connecting the head unit and ink tank.
[4]	Ink pipe	Passage between ink tank and ink guide
[5]	Ink guide	Passage between the ink pipe and head unit
[6]	Head packing	Seals between the ink guide and BJ head unit to prevent ink from leaking.
[7]	Wiper cleaner	Wipes off ink attached to the wiper.
[8]	Head unit	Accepts ink from the ink guide and discharges ink by the print signal.
[9]	Head holder	A holder to mount the head unit through the ink guide.
[10]	Tank body	A case accommodating the ink sponge
[11]	Ink supplier	Feeds the ink from the ink sponge to the ink pipe under constant pressure
[12]	Ink sponge	Sponge soaked with ink
[13]	Atmospheric air passage plate	A hole and groove on the plate and label stuck to it compose an atmospheric air passage between the inside and outside of the ink tank. It prevents pressure variations in the cartridge, due to ink consumption or environmental conditions, for stable supply of ink to the head unit.

Table 2-301

3. BJ print head

Ink from the ink sponge is filtered through the mesh-like ink filter and fed to the head unit through the ink pipe of the cartridge body.

The ink is then sent to the nozzle through the joint pipe.

When head drive current flows to the heater plate in the nozzle, the ink boils in multiple bubbles, which soon become one bubble.

The head drive current is stopped before the ink drop leaves the nozzle, but bubbling continues from residual heat in the heater, and ink drops are ejected from the nozzle hole.

After the ink drops are ejected from the nozzle, the nozzle is filled with ink again from the ink sponge due to capillary action.

REFERENCE

The print head uses semiconductor technology, with the heaters and their circuits on a silicon plate.

The silicon plate, with these electrical circuits, is bonded to an aluminum plate, which is attached to the plastic cover housing the nozzles.

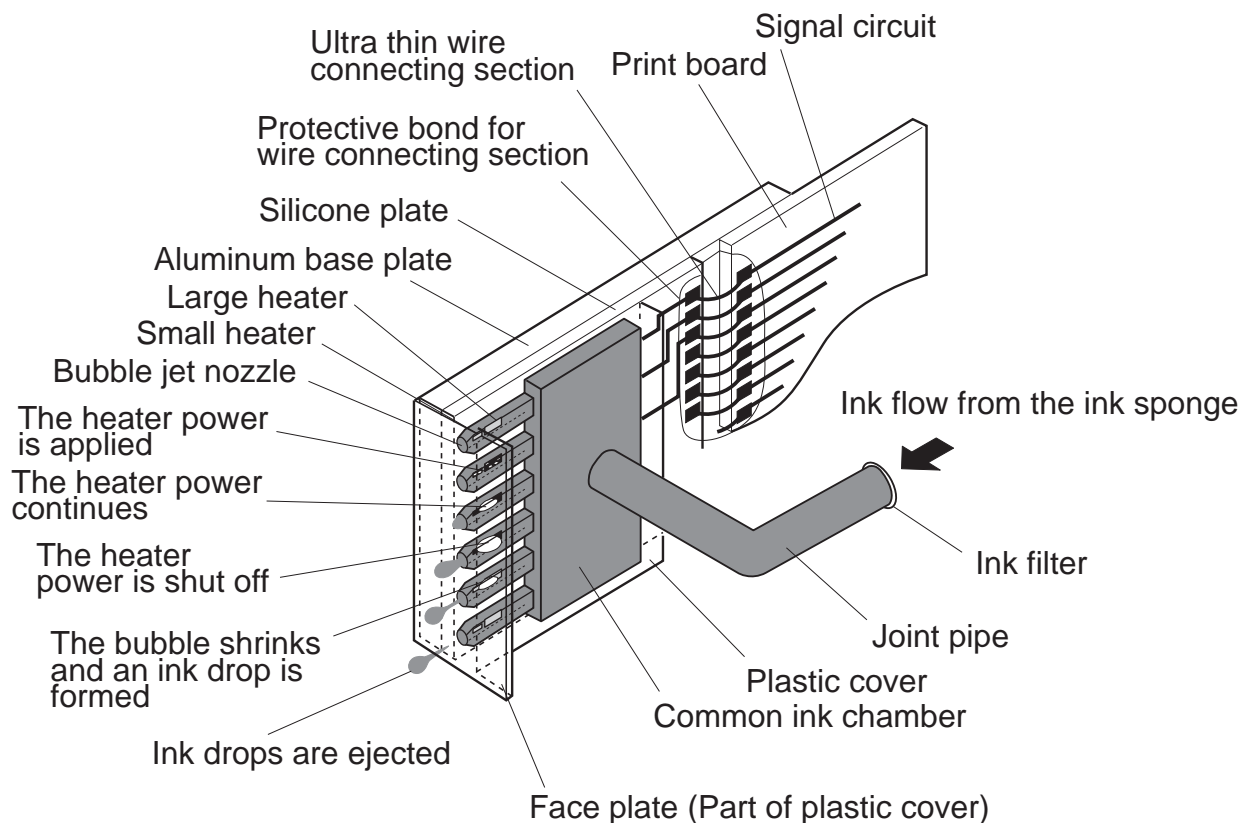


Figure 2-302

4. Nozzle arrangement

160 nozzles are arranged vertically in one line at a spacing of 1/360 in.

Nozzle arrangement on the BJ print head is shown below.

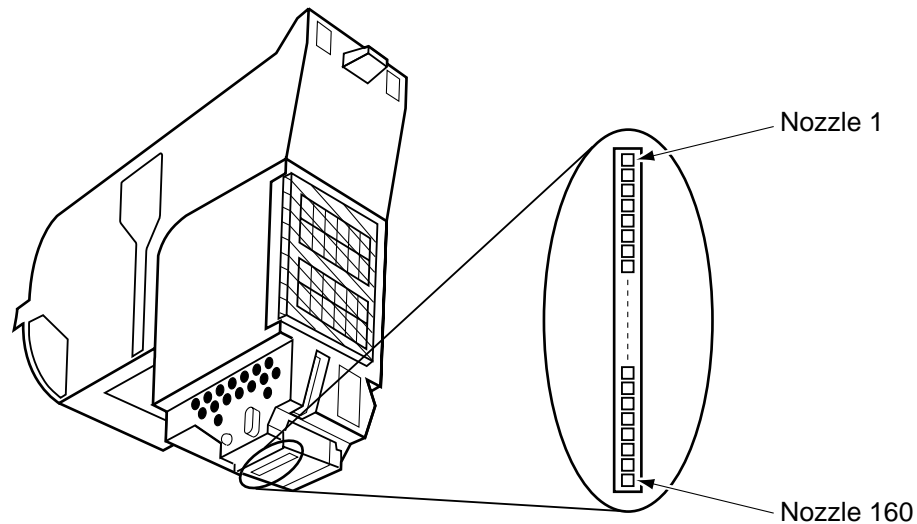


Figure 2-303

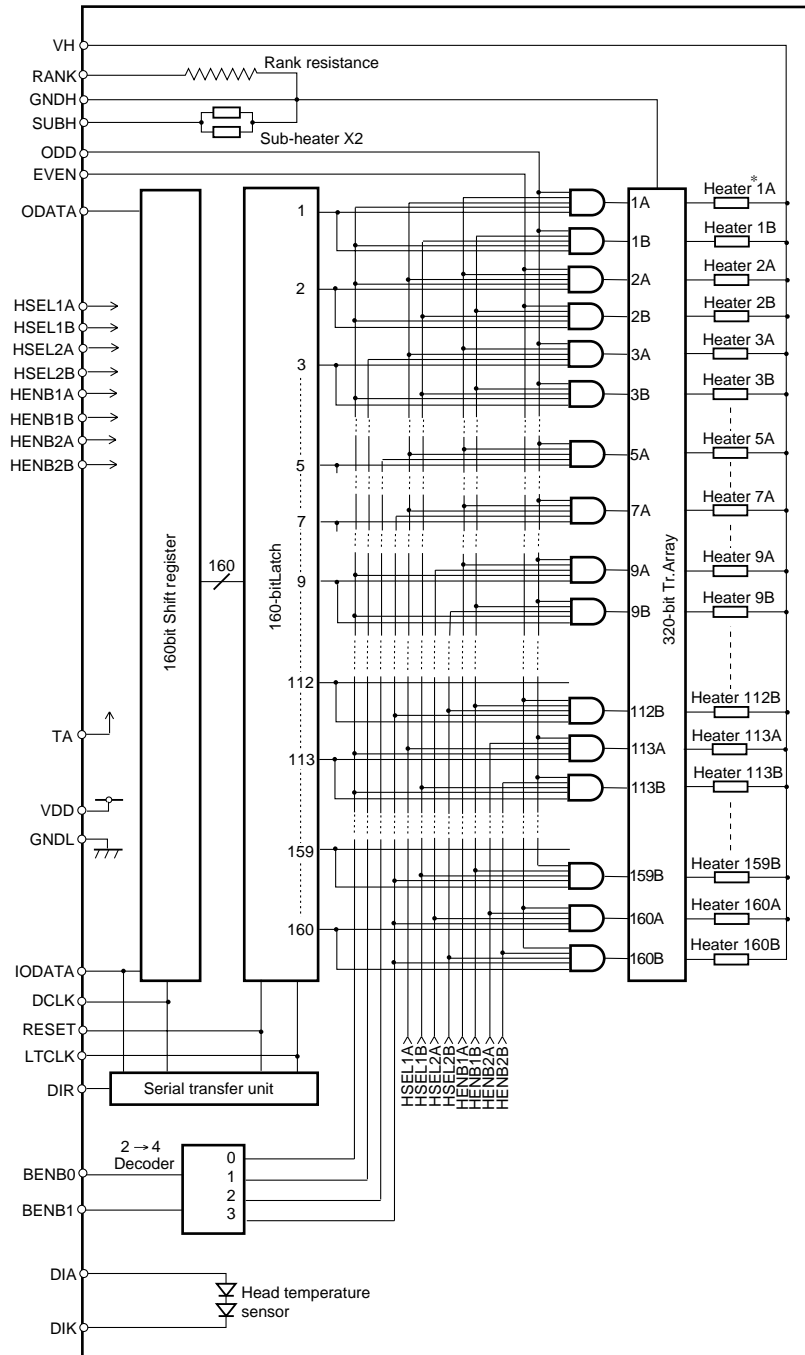
In the monochrome mode, 1 band is printed at a maximum width of 160 nozzles (approximately 11.3mm) .

However, in color mode, 4 BJ print heads are used, and the printer must compensate for variations in discharge due to each printhead installation tolerance and nozzle tolerance. For this reason, though the head is composed of 160 nozzles, one band has a width corresponding to 144 nozzles at the maximum (about 10.2mm), and the particular nozzles used on the printhead of each color are determined each time that “Auto Adjust” of the “Adjustment” menu is executed.

B. BJ Print head Drive

1. Construction of electric head unit

The figure below is a block diagram of the BJ print head drive control circuit.



* Heater A: Large heater
Heater B: Small heater

Figure 2-304

- 160-bit shift register

The serial ODATA signal from the engine controller is converted to parallel image data using the DCLK signal timing.

- 160-bit latch

Outputs image data transferred from the 160-bit shift register using the LTCLK signal timing.

- 2 → 4 decoder

BENB0 and BENBI signals are used to create 4 timing signals to heat all heaters.

- AND gates

These gates combine and output the parallel image data (IDATA), the timing signals generated from the 2→4 decoder, and the ODD, EVEN, HSEL and HENB signals.

- 320-bit transistor array

Supplies power to the heaters, as controlled by the outputs of the AND gates.

- Heater-boards 1A - 160B

The heaters inside the nozzles are heated when power is supplied.

Two types of heaters, large and small, are used in each nozzle. Ink discharge varies depending on the combination of the power supply to the 2 heaters.

- Sub-heater

Head temperature adjusting heater for stable ink ejection.

The engine controller drives the sub-heater according to the temperature detected by the head temperature sensor and internal temperature thermistor (TH1) in the media sensor (PS9), and the print mode.

- Rank resistance

Variation of heater characteristics of each head is classified into 24 ranks.

The engine controller reads the resistance values as voltage values at the A/D port of the CPU, in order to provide the best discharge control for each head.

- Head temperature sensor

Changes in temperature which occur due to the ink flow rate in the nozzles are detected with a diode.

The engine controller reads the head temperature sensor output voltage at the A/D port of the CPU and converts it to a digital temperature for discharge control and over heating protection.

- Serial transfer unit

Transmits data in both directions using the data input/output terminal (IODATA).

2. Print signal

The BJ print head is controlled as follows.

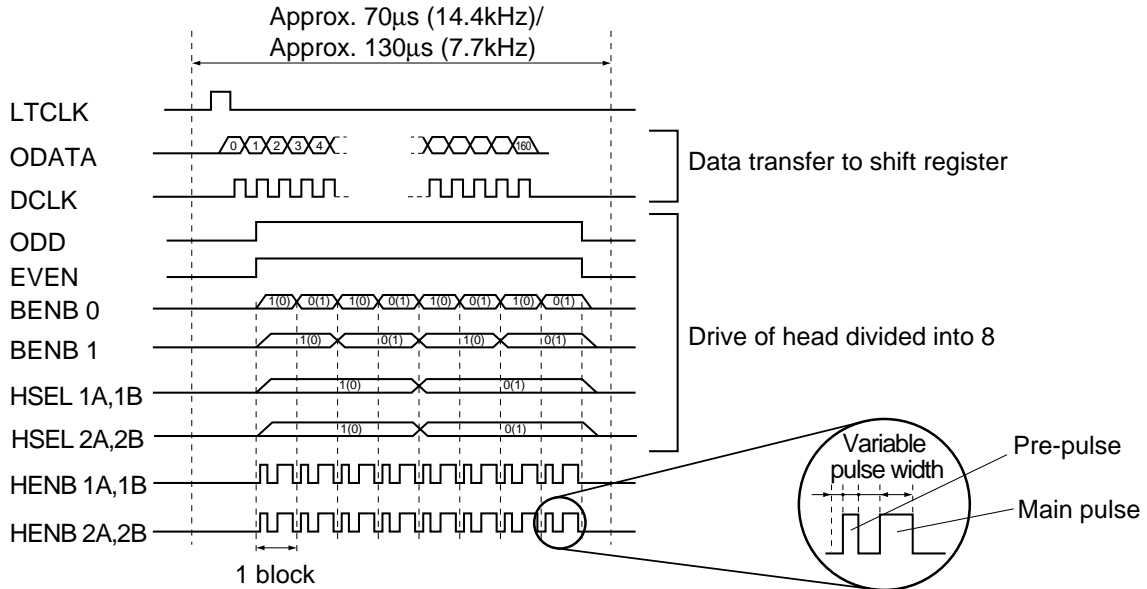


Figure 2-305

The image data (ODATA) transmitted to the shift register using the DCLK timing is transferred to the latch using the LTCLK timing by the signal from the linear encoder.

The BENB0 and BENBI signals are divided into 4 signals by the 2→4 decoder and the nozzles are controlled in 4 groups.

The HSEL1 and HSEL 2 signals also control the nozzles in 4 groups.

Finally, each block is further divided into 2 by the ODD and EVEN signals and the nozzles are divided into 8 groups. By dividing the head drive in this way, the power supply load is reduced and ink filling delays are prevented.

The HENB signals use a pre-pulse to increase the head temperature to a proper value before the main pulse discharges the ink. The pulse widths are varied according to the head rank and head temperature sensor for an even ink discharge rate.

These signals are input to the AND gates together with the image data (ODATA) and each heater is driven by the output.

The HSEL and HENB signals correspond to heaters large and small. By combining these signals in the various ways, the volume of ink discharged from the nozzles is controlled to form 3 drop sizes as follows:

- Large dot: Both large and small heaters are driven.
- Middle dot: Only large heater is driven.
- Small dot: Only small heater is driven.

IV. PURGE UNIT

A. Outline

The purge unit provides both a capping function to prevent the head from drying out, and to prevent dust and other foreign substances from attaching, as well as a head cleaning function to maintain the print head's condition.

These functions are controlled by the purge motor (M3) and the wiper solenoid (SL1).

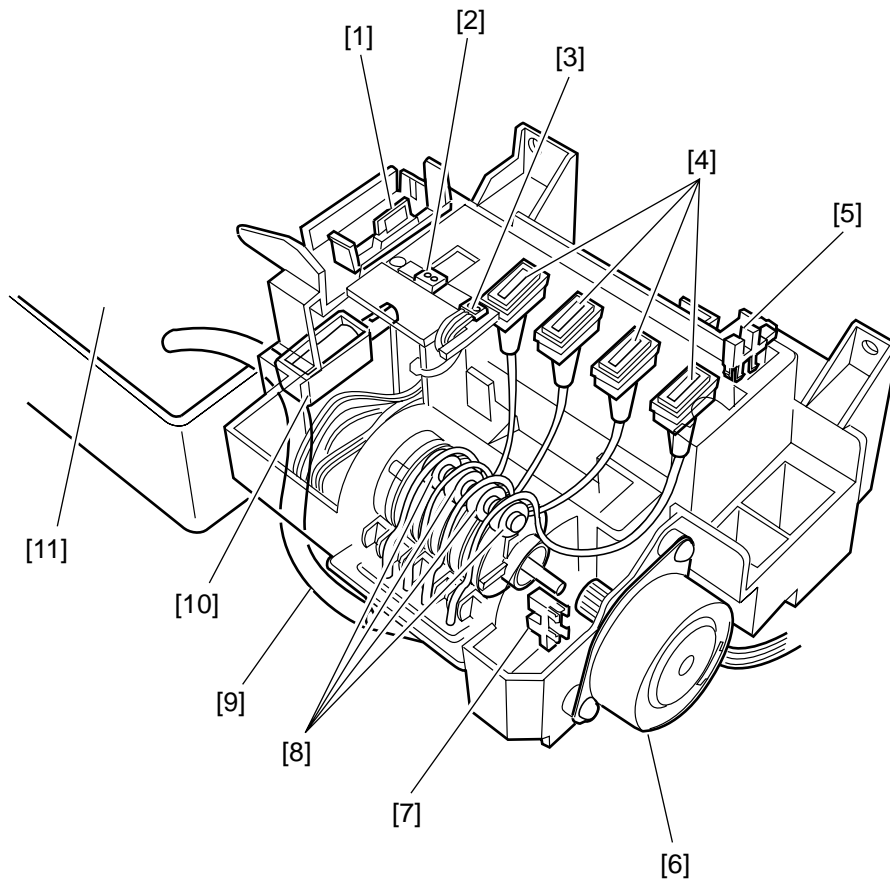


Figure 2-401

The purge unit is composed of the units below.

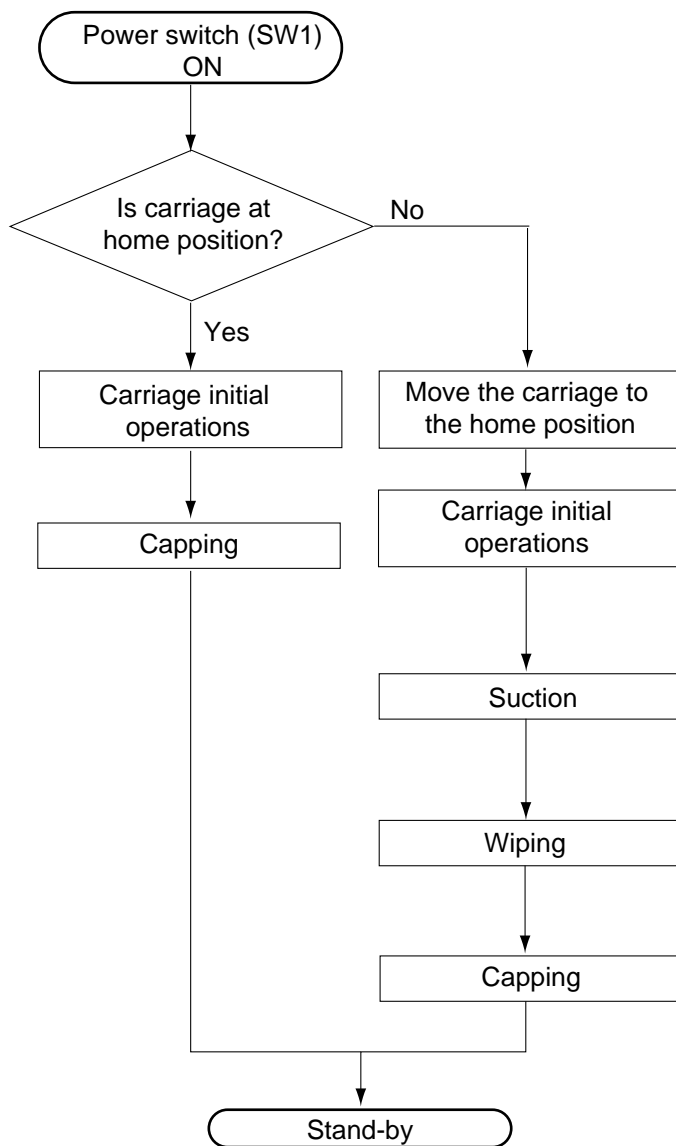
No.	Name	Function
[1]	Wiper	Lifts up when the carriage returns and wipes ink off the head surfaces (C, M, Y, Bk).
[2]	Remaining ink sensor (PS3)*	Detects ink remaining in the ink tank.
[3]	Ink tank sensor (PS4)*	Detects presence of ink tank.
[4]	Caps	Press against the heads when capping and purging. The caps are connected to the carriage tube to carry the purged waste ink into the tube.
[5]	Home position sensor (PS2)*	Detects the capping position of the carriage.
[6]	Purge motor (M3)	Rotates the pump roller.
[7]	Pump home position sensor (PS1)	Detects the pump roller capping position.
[8]	Pump roller	Generates suction by squeezing the ink carriage tube.
[9]	Waste ink carriage tube	Carries waste ink to the waste ink absorber unit.
[10]	Wiper solenoid (SL1)	Raises the wiper.
[11]	Waste ink absorber unit	Connected to the waste ink carriage tube. Accumulates waste ink.

* Refer to "II. Carriage unit" for details of these sensors.

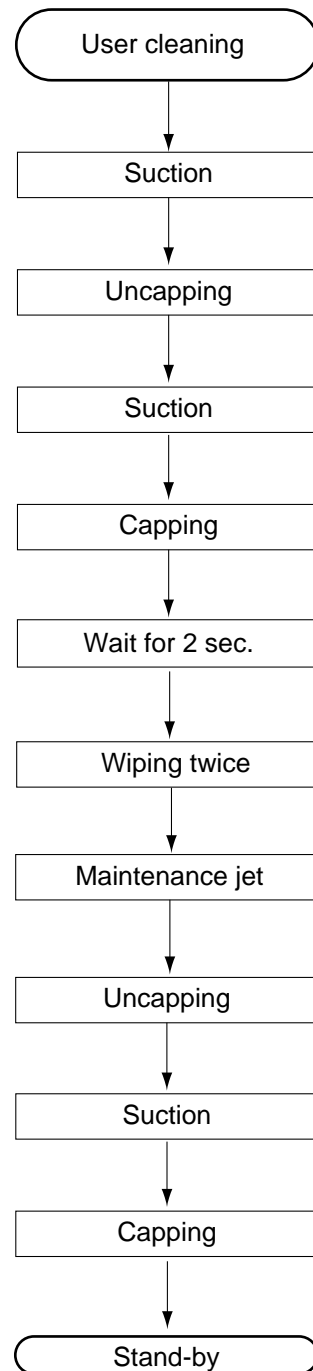
Table 2-401

Purge operation is carried out in the following steps.

- a. Purge sequence when powered ON
(Ink consumed: approx. 0.5g)

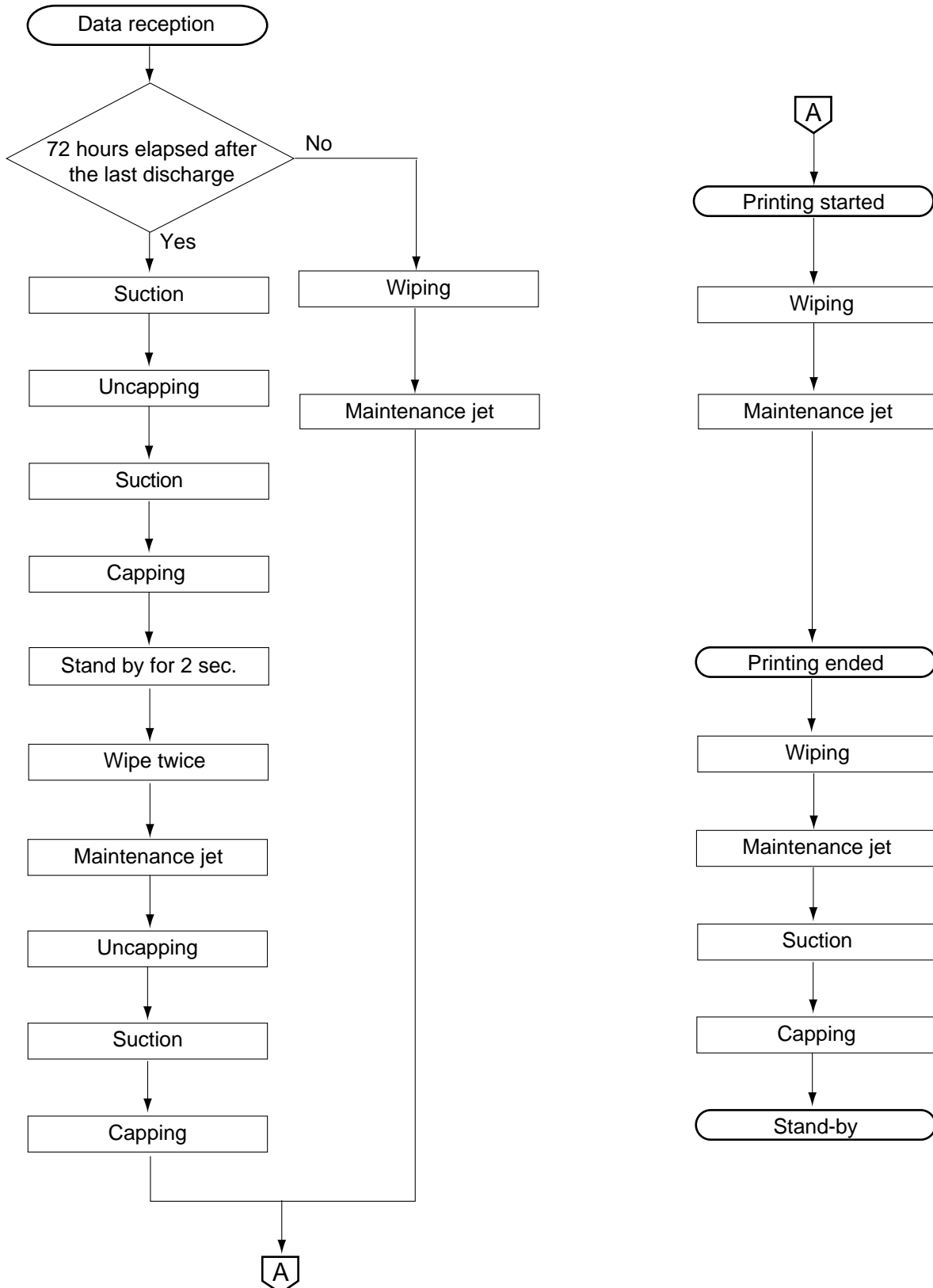


- b. Purge sequence when user cleaning is executed
(Ink consumed: approx. 0.16g)

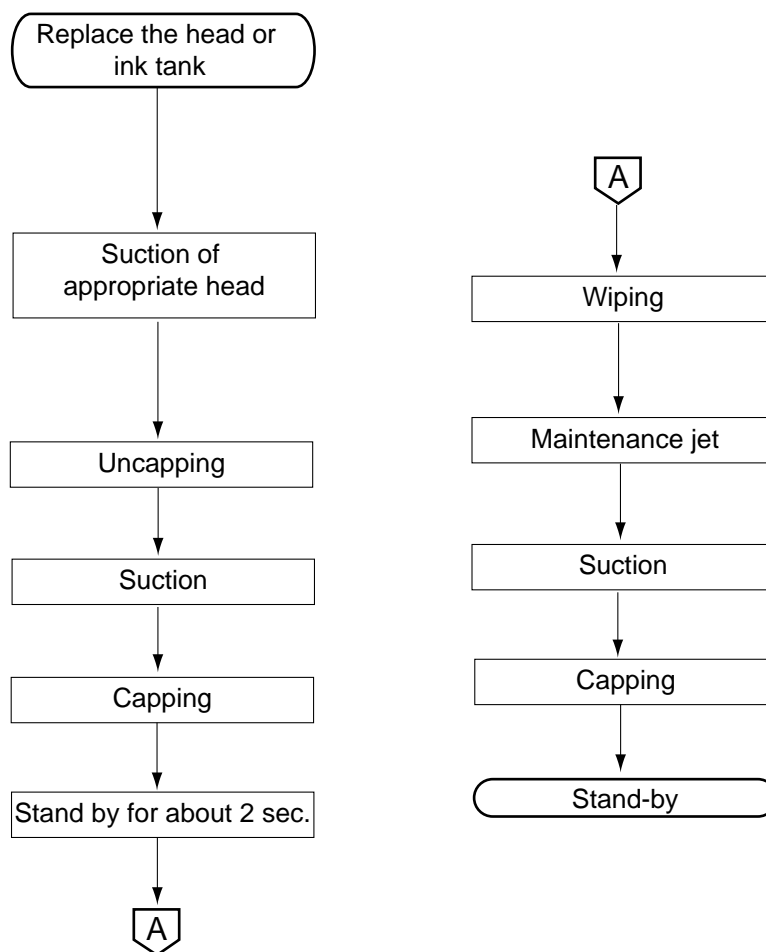


c. Purge sequence when printing

(Ink consumed: approx. 0.16g)



- d. Purge sequence at the time of head replacement/ink tank replacement
(Ink consumed : approx, 0.65g)



B. Capping Function

1. Outline

The carriage of this machine stands by at the home position. During this time, the caps of the purge unit are pressed against the BJ print heads to prevent the nozzles from drying out and to keep out dust.

2. Operation

When printing is completed, the carriage is returned to the home position and all the caps are lifted and pushed against the head face. The caps are lifted and lowered by the movement of the carriage.

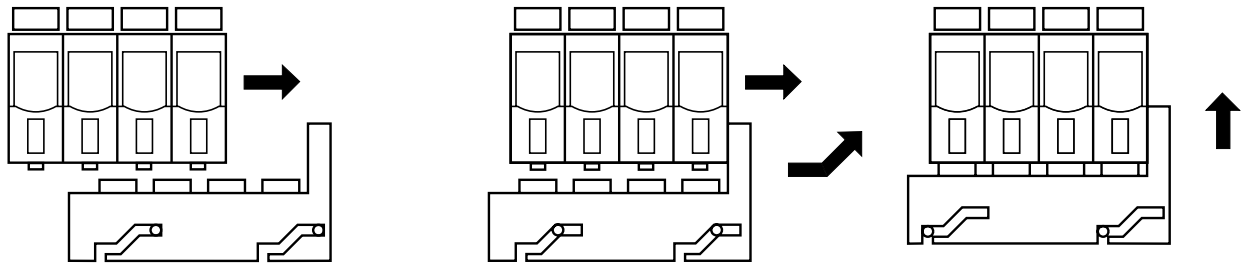


Figure 2-402

C. Head Cleaning

1. Outline

Head cleaning consists of wiping ink and dust from the head face plate, maintenance jet to adjust the head conditions, and sucking up the ink and air bubbles in the nozzles.

2. Wiping

a. Outline

When the carriage moves backward the wiper solenoid (SL1) is turned ON and lifts the wiper up and wipes the ink from the head surfaces. Ink attached to the wiper is absorbed by the wiper cleaner of the BJ print head.

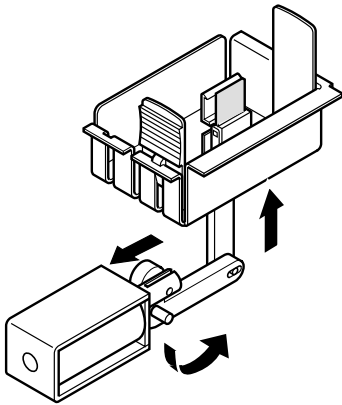


Figure 2-403

b. Operation

- 1) Before starting the printing process, the carriage is moved to the specified position on the left side of the wiper. The wiper solenoid (SL1) is turned ON and the wiper is lifted up.
- 2) The carriage is moved in reverse, and ink attached to the head (Y) surface is wiped off. The ink on the wiper is wiped off by the wiper cleaner installed in the BJ print head.

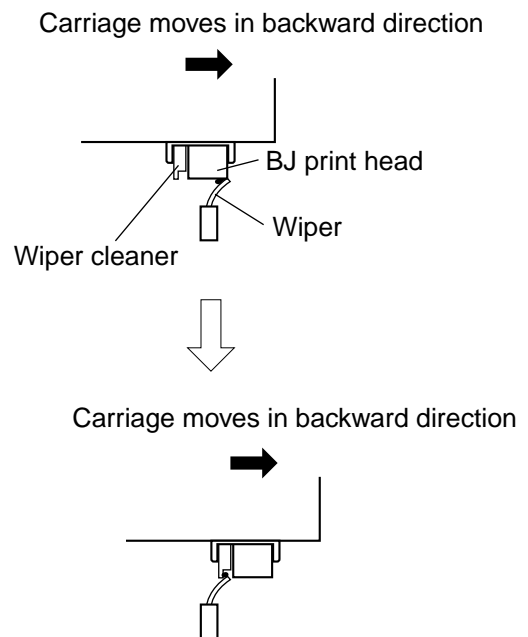


Figure 2-404

- 3) The carriage continues moving in backward direction, wiping the Y head, M head, C head and Bk head.
- 4) After wiping the Bk head, the wiper solenoid is turned OFF and the wiper is lowered.
- 5) The carriage is moved onto the purge unit and carries out the maintenance jet to the caps.

REFERENCE

When the drive frequency is 14.4kHz, only the Bk head is wiped.

c. Timing

Wiping is conducted under the following conditions.

[1] Before printing

Before the printing process is started, the wiping is carried out once.

[2] After the suction operations

After completion of suction, the caps are released and wiping is carried out once.

[3] Dot count wiping

The number of dots of ink discharged from each head since the start of printing is counted. When the count for a certain head exceeds the specified value, the head is wiped after the current printing of a band is completed. The count value is cleared to 0 when printing is started and after wiping.

3. Maintenance jet

a. Outline

Pre-discharge refers to discharging ink onto the cap for the purpose of removing ink which has dried and thickened in the nozzles, preventing the mixing of ink at the head after wiping, or adjusting the condition of the nozzles before starting to print. Maintenance jet uses large dots.

b. Timing

Ink is ejected into the caps in the order of the heads (Bk, C, M and Y) under the following conditions.

[1] When printing is to be started

Just before printing is started, maintenance jet is performed.

[2] During printing

The timing of the maintenance jet during printing is based on the internal temperature detected by the thermister in the media sensor.

The maintenance jet timer is reset after the maintenance jet is conducted.

[3] After wiping

After wiping, ink is pre-discharged into the caps. However, when the drive frequency is 14.4kHz, it is not conducted.

4. Suction**a. Outline**

The cap is pressed against the head and the thickened ink and air bubbles in the nozzles are removed by suction.

The cap is connected to the waste ink absorber unit by the waste ink carriage tube. Removed ink is carried to the waste ink absorber unit by vacuum. Each application of suction removes, about 0.2g of ink.

b. Operation

Suction operation is classified into all-color suction, color suction and black suction.

Suction is effected by rotating the guide roller, which is driven by the purge motor (M3) in the purge unit.

The guide roller position is detected by the pump home position sensor (PS1). The position where the guide roller has rotated 40 degrees from the pump home position is considered to be the guide roller standby position.

When the guide roller is rotated for capping, the cam starts to squeeze the waste ink carriage tube at a point 43 degrees from the pump home position.

After the guide roller has rotated 160 degrees, it is stopped for about 2 seconds. The waste ink carriage tube which was squeezed recovers during this period, and suction is generated, sucking ink from the color head nozzles. The guide roller then rotates 223 degrees, where the cam for the black head starts to squeeze the waste ink carriage tube. After the guide roller has rotated 340 degrees, it is stopped for about 3 seconds, while the waste ink carriage tube recovers, sucking ink from the black head nozzles.

The guide roller then, rotates to the home position.

When sucking only color ink, the black ink cap is released, so that no black suction occurs.

After printing is completed, the caps of all the heads are released, and the guide roller is rotated 4 times to move ink that has accumulated in the waste ink carriage tube to the waste ink absorber unit.

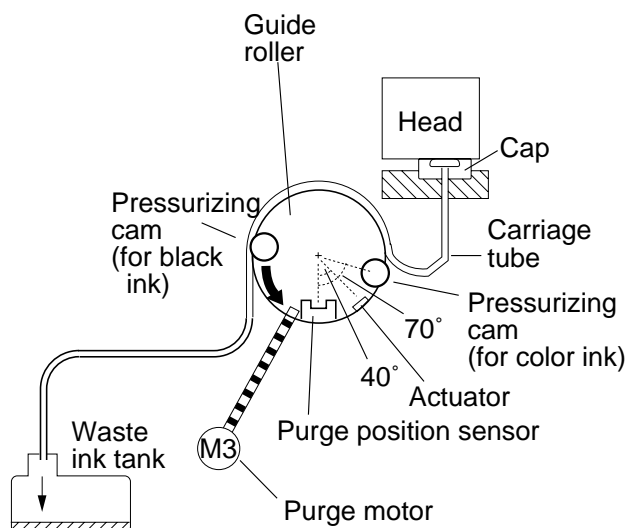


Figure 2-405

c. Timing

[1] User cleaning 1

The user can perform the cleaning operation for all heads.

- One suction operation occurs for all heads.

[2] User cleaning 2

The user can perform the cleaning operation for the Bk head.

- One suction operation occurs for the Bk head.

[3] User cleaning 3

When an ink tank is removed and then reinstalled, the user can perform the cleaning operation for at head.

- Three suction operations occur for the corresponding head.

[4] Suction for a replaced ink tank

When an ink tank is replaced, head cleaning is conducted.

- Three suction operations occur for all heads, color head, or the Bk head.

[5] Suction for replaced BJ print head

When a BJ print head is replaced, head cleaning is conducted.

- Four suction operations occur for all heads.

[6] Suction by timer

If 72 hours elapse with no suction operations, head cleaning will be carried out in the next standby mode.

- One suction operation occurs for the corresponding head.

[7] Suction by dot count

The number of dots of ink discharged since the last suction operation is counted and stored in the RAM on the engine controller. When this dot count exceeds the specified value, head cleaning operations are conducted after the completion of printing.

The dot count is cleared to 0 after each suction operation, and when the BJ print head is replaced.

- One suction operation occurs for the corresponding head.

D. Waste Ink Absorber Unit

1. Waste ink absorber unit

Waste ink is removed from the head nozzles by the suction operation, sent to the waste ink absorber unit through the waste ink carriage tube by vacuum, and absorbed by the waste ink absorber unit.

The waste ink level is measured by counting dots. When the specified count is exceeded, a warning message indicating a full waste ink absorber unit is shown on the message display, and the printer is stopped after completion of the current printing process.

CAUTION

- After the waste ink absorber unit is replaced, the dot count for the waste ink absorber unit should always be cleared in the service mode.
- When replacing the engine controller, [be sure to follow the procedures on page 5-12, to allow the count stored in the EEPROM to be renewed.](#)

V. FEEDER UNIT

A. Outline

The paper feed motor (M1) drives the paper feed roller to feed the paper. The existence of paper is detected by the PE sensor (PS6).

A diagram of the feeder unit is shown below.

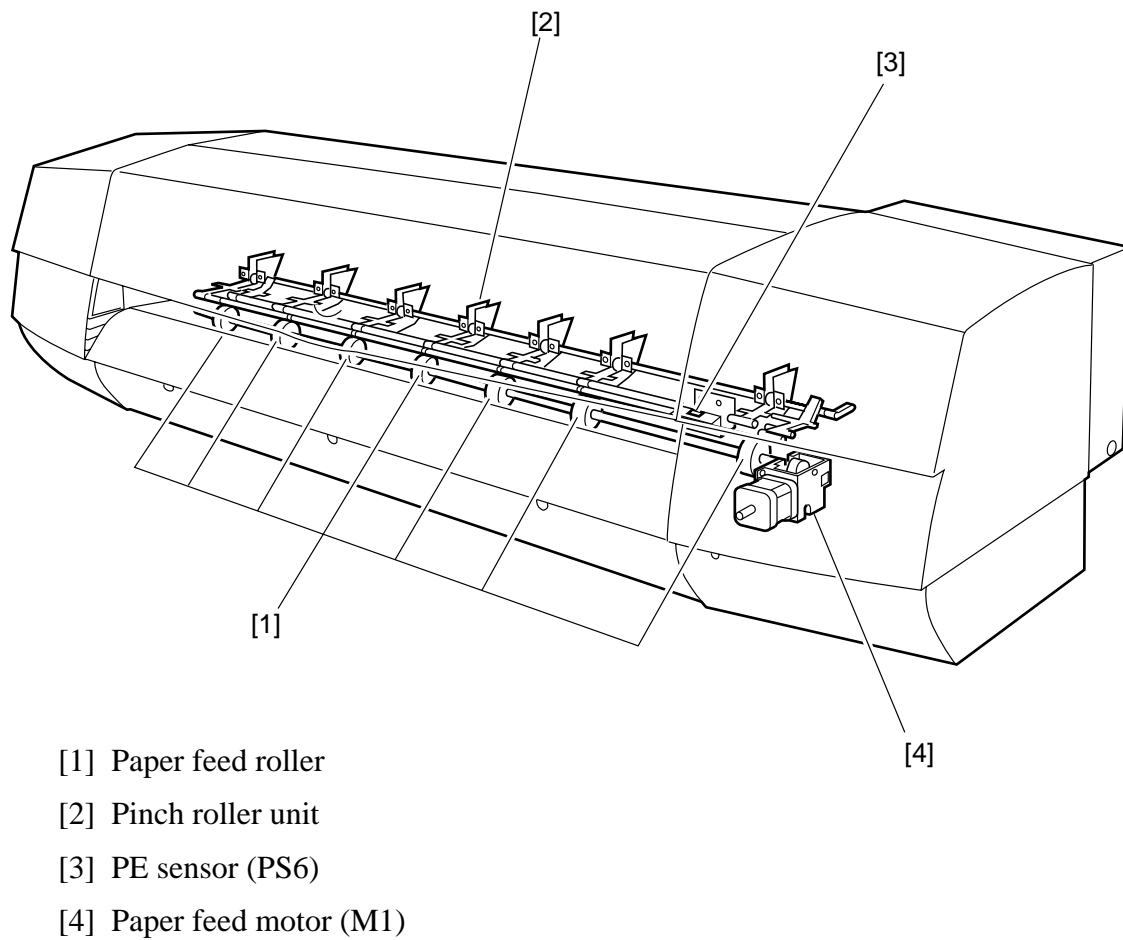


Figure 2-501

B. Paper Feed Motor Control

1. Outline

The paper feed motor (M1) is a 2-phase stepping motor. It controls the rotation of the paper feed roller. The paper feed motor is controlled by the engine controller. Its major functions are shown below. Figure 2-502 is a block diagram of the paper feed motor control circuit.

- [1] Paper feed motor ON/OFF control
- [2] Paper feed motor rotation direction control
- [3] Paper feed motor rotation speed control
- [4] Paper feed motor supply current control

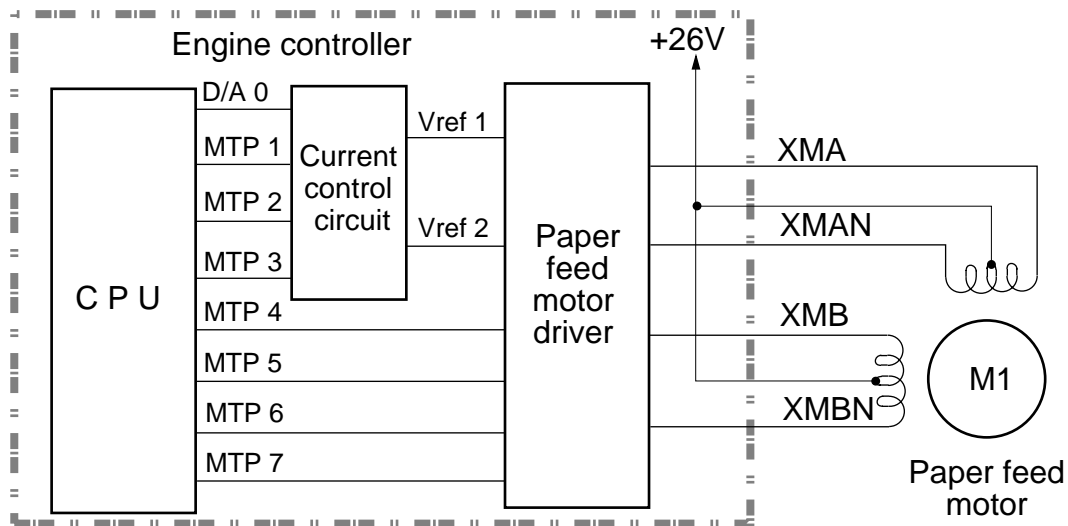


Figure 2-502

2. Operation

a. ON/OFF control

The feed motor is switched ON and OFF by the paper feed motor driver control signal (MTP 4 to 7) issued by the CPU to the paper feed motor driver on the engine controller.

When MTP 4 to 7 are "0", the paper feed motor (M1) rotates when the paper feed motor driver generates the motor drive pulses (XMA, XMAN, XMB, XMBN) from the paper feed motor drive control signal (MTP 4 to 7) input from the CPU.

When MTP 4 to 7 are "1", no motor drive pulses are generated and the paper feed motor (M1) stops rotating.

b. Control of rotation direction

The output timing of the motor drive pulses (XMA, XMAN, XMB, XMBN) from the paper feed motor driver is controlled by the paper feed motor driver control signals (MTP 4 to 7) output by the CPU to the paper feed motor driver, in order to control the rotation direction of the paper feed motor (M1).

c. Control of rotation speed

By changing the frequency of the paper feed motor current control signals (MTP 1 to 3) output by the CPU to the paper feed motor driver and the paper feed motor driver control signals (MTP 4 to 7), the rotation speed of the paper feed motor (M1) is controlled.

d. Supply current control

By changing the combination of 2 signals (Vref 1, Vref 2) output from the current control circuit by the paper feed motor drive control signal (D/A 0) output from the CPU, the current output from the paper feed motor driver to the paper feed motor is set up for stopping, holding, low speed rotation and high speed rotation. The paper feed motor supply current is changed according to the rotation condition of the paper feed motor for smooth rotation.

C. Feeding Operation

1. Outline

Paper feeding is classified into three modes as follows :

- Paper loading
- Paper feeding during printing
- Paper delivery

By setting paper at the pinch roller and pushing the up or down arrow key, the paper feed motor (M1) rotates and sets up the paper. When data is received and printing is started, the paper is fed forward 1 band width at a time.

2. Loading paper

a. Cut sheet

- 1) When paper is set at the pinch roller and the PE sensor (PS6) detects the paper, the suction fan turns on to suck the paper onto the platen, preventing the paper from lifting away from the platen during printing.
- 2) By pressing the up or down arrow key, the carriage advances about 200mm and adjusts the light of the media sensor (PS9). At the same time, the paper feed motor (M1) is rotated to feed the paper forward about 30mm and detects whether the paper is cut sheet or roll media using the PE sensor (PS6).

Thereafter paper is fed backward and the media trailing edge sensor (PS6) detects the rear edge of the paper.

- 3) The carriage is returned to the home position and the paper width is detected.
- 4) The carriage is advanced to a position about 200mm to the left of the home position, the paper is fed backward, and the media sensor (PS9) detects the skew of the paper.

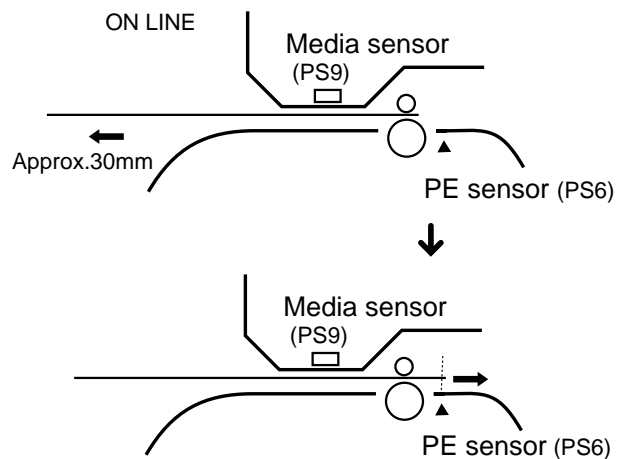


Figure 2-503

- 5) The paper is fed further backward. When the paper front end passes by the carriage's media sensor (PS9), the carriage stops after a switch-back operation. Before the media sensor detects the paper front edge, the paper length is determined by counting the clock pulses sent to the paper feed motor (M1).

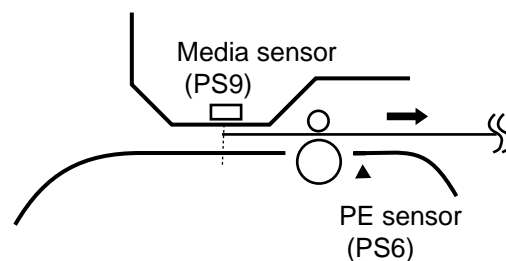


Figure 2-504

b. Roll media

- 1) When the paper is set and the media trailing edge sensor detects the paper, the suction fan operates to suck the paper on to the platen. This prevents the paper from lifting away from the platen during printing.
- 2) By pressing the upper or down arrow key, the carriage is advanced about 200mm to adjust the light of the media sensor (PS9). At the same time, the paper feed motor (M1) is rotated, feeding the paper forward about 30mm. Whether the paper is cut sheet or roll media is detected by the media trailing edge sensor.
- 3) The carriage is returned to the home position and the paper width is detected.
- 4) After the carriage is advanced to a position about 200mm to the left of the home position, paper is fed backward and the media sensor (PS9) detects the skew of the paper.

Thereafter paper is fed backward.

When the paper front edge passes through the media sensor (PS9), the paper feeding stops after switch-back operation.

REFERENCE

- Paper length detection is not conducted for roll media.
- After loading the paper, it can be fed back and forth by pressing the up and down arrow keys.
- After completion of printing on roll media, the carriage is moved to detect the top edge of the paper, to make sure the cutting operation was successful.

3. Paper feeding during printing

Paper is fed during printing, alternately with the carriage.

When print data is received, the paper is fed to the print start position and then the carriage moves to print 1 band. During the printing operation, the paper feed motor (M1) stops.

After printing 1 band, the paper feed motor rotates and feeds the paper forward for the next band. While the paper is being fed, the carriage motor (M2) stops. Then the next band is printed.

This feeding cycle of stop, rotation and stop of the paper feed motor (M1) is repeated until the final band is printed. When there is no data to be printed for the next band, the paper is fed to reach the next position for a band containing data.

4. Feeding operation

For cut sheets, the paper is fed until the paper rear edge reaches a position 3mm behind the pinch roller, after printing is completed.

When roll media is cut, the paper is fed to the position to be cut.

When roll media is not cut, the paper is fed to the position where the next printing will start.

5. PE sensor

Existence of paper is detected by the PE sensor (PS6) installed on the lower right side of the platen.

The sensor is a reflective-type photo interruptor. It detects the existence of paper and the rear edge of the paper by the existence of light reflected from the paper.

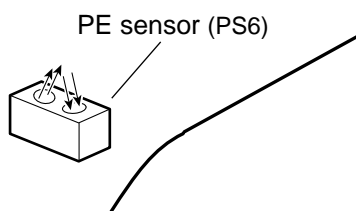


Figure 2-505

VI. FAN

The two fans shown in the figure below function as shown in Table 2-601.

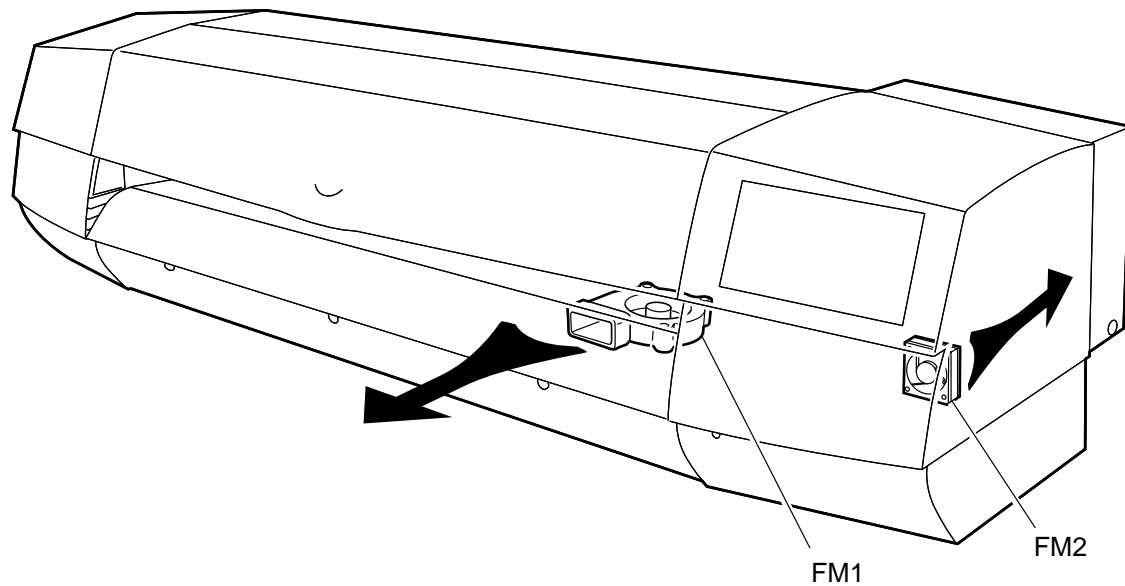


Figure 2-601

Symbol	Name	Fan direction	Function
FM1	Suction fan	Suction	Pulls the paper onto the platen to prevent it from floating up.
FM2	Cooling fan	Suction	Discharges the heat generated by the DC power supply unit.

Table 2-601

- Suction fan (FM1)

When the PE sensor detects the paper, the fan drive signal (FAN_CONT) changes to "1" and the suction fan (FM1) runs.

The suction fan continues to run constantly while the paper is being transported during the printing operation, to prevent the paper from floating away from the platen. However, if the platen does not carry the media even though the PE sensor detects the media, the suction fan stops after 60 seconds.

To carry the paper after the suction fan stops, the printer starts the suction fan again and starts the carriage operation.

- Cooling fan (FM2)

The cooling fan (FM2) runs at the same time as the suction fan (FM1), discharging the air heated by the DC power supply, to prevent the power supply from overheating. If the cooling fan rotation signal (FANSTS) is not detected while the cooling fan is running, error code "E01501" is indicated on the message display.

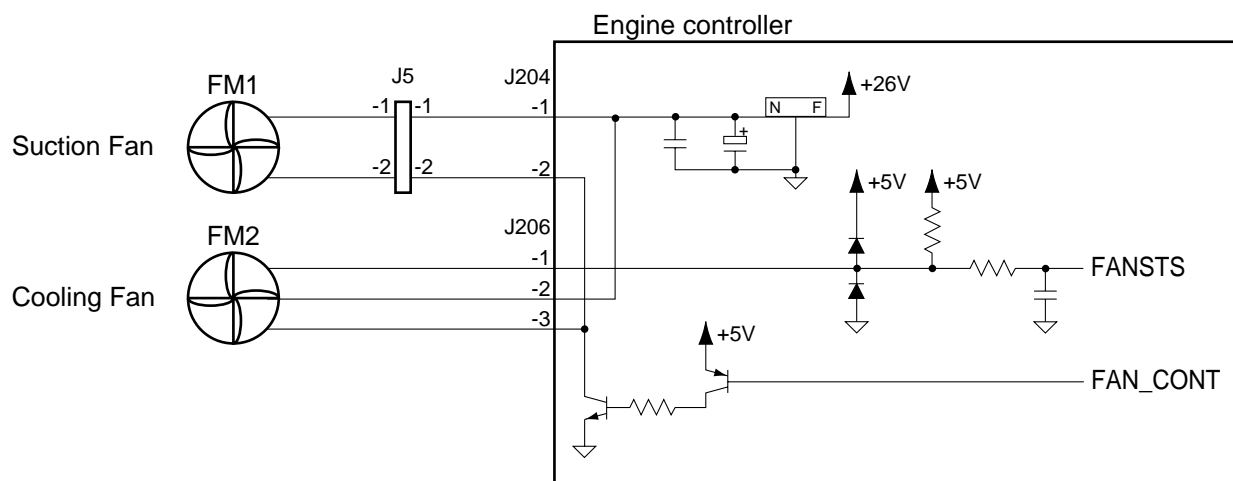


Figure 2-602

VII. POWER SUPPLY

A. Power Supply Outline

Figure 2-701 is a block diagram which shows the power supply system for the printer.

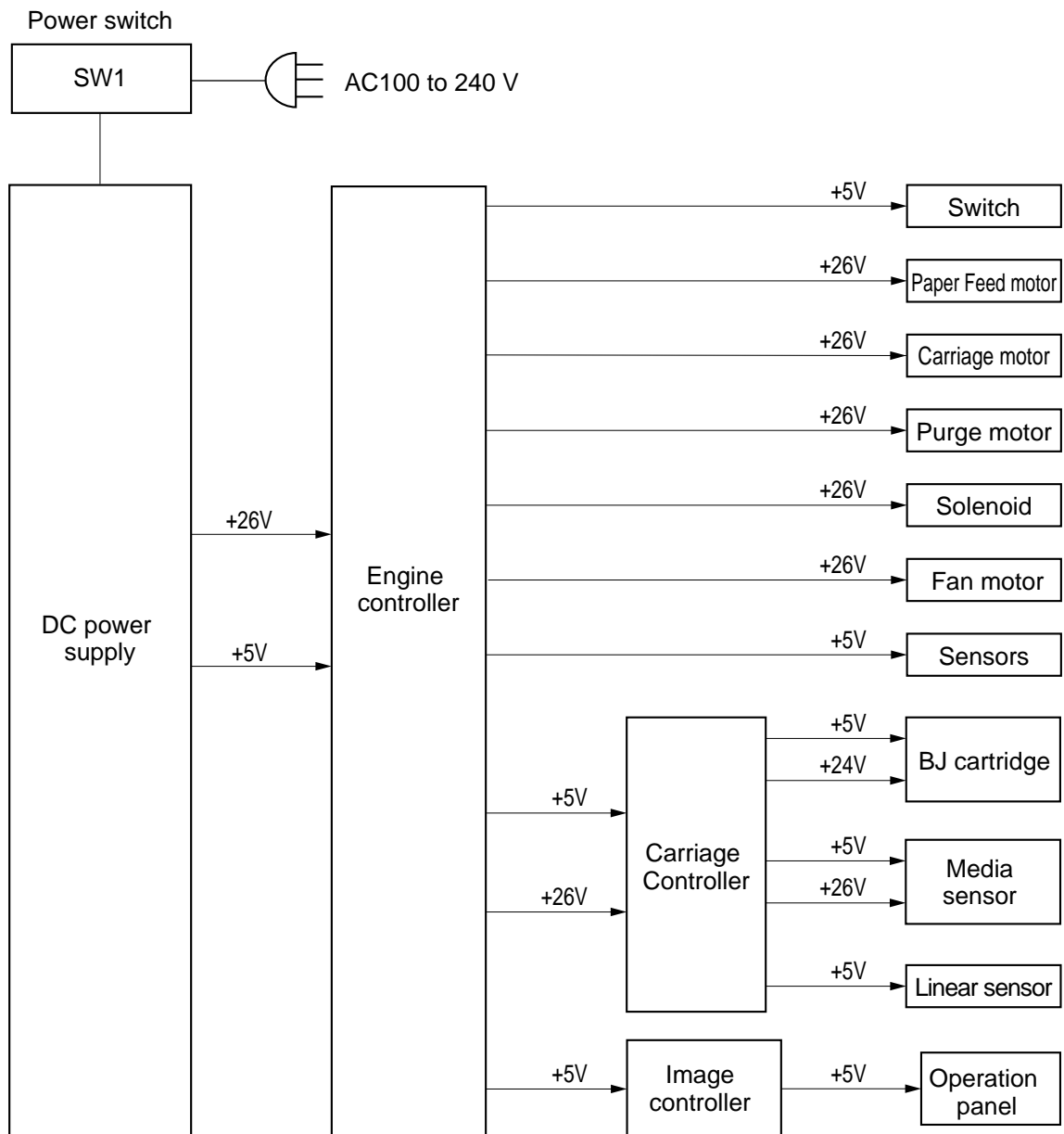


Figure 2-701

B. Power Circuit

1. AC power supply

By plugging in the power cord and turning the power switch (SW1) ON, AC power is supplied to the DC power supply PCB.

2. DC power supply

When the power cord is plugged in and the power switch (SW1) is turned ON, the DC power supply rectifies the supplied AC power, decreases the voltage, and smoothes and supplies $+26.5\text{V}\pm 5\%$ and $+5.1\text{V}\pm 5\%$ DC power.

The carriage controller decreases the voltage of the power supplied from the DC power supply from $+26\text{V}$ to $+24\text{V}$ and supplies power to the BJ cartridge.

DC power of $+24\text{V}$ for driving the head (VH), $+5\text{V}$ (HV5) for the HEAT signal, and $+5\text{V}$ (R5V) for the rank signal are supplied to the BJ cartridge. The output is controlled by the engine controller.

C. Power Circuit Protection

On the DC power supply, fuse F1 is provided on the primary side as a safety measure. On the secondary side, overcurrent protection and overvoltage protection circuits are provided.

If an overcurrent or overvoltage condition occurs due to a short circuit in the power line, etc., a protection circuit will actuate to stop all the outputs from the DC power supply.

By turning OFF the power switch, waiting for more than 1 minute, and then turning the power switch ON again, the protection circuit is reset and the output is recovered.

CAUTION

- Before recovering the output, be sure to remove the cause of the problem in the protective circuit.
- If the load is short-circuited often, or short circuit and recovery are repeated, the fuse incorporated in the DC power supply may blow.

CHAPTER 3

MECHANICAL SYSTEM

DISASSEMBLY AND ASSEMBLY	3-1	B. Operation Panel	3-9
1. List of Main Parts	3-2	C. Fan	3-10
2. Outline of disassembly and assembly of		II. CARRIAGE UNIT	3-13
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AND REASSEMBLY	3-5	V. DRIVING UNIT	3-28
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DISASSEMBLY AND ASSEMBLY

The disassembly and assembly list for the main parts and the related outlines are shown here. The outlines give the procedures for removing the main parts from the main unit. However, the directions for removing the connectors and the disassembly procedures for other parts are omitted.

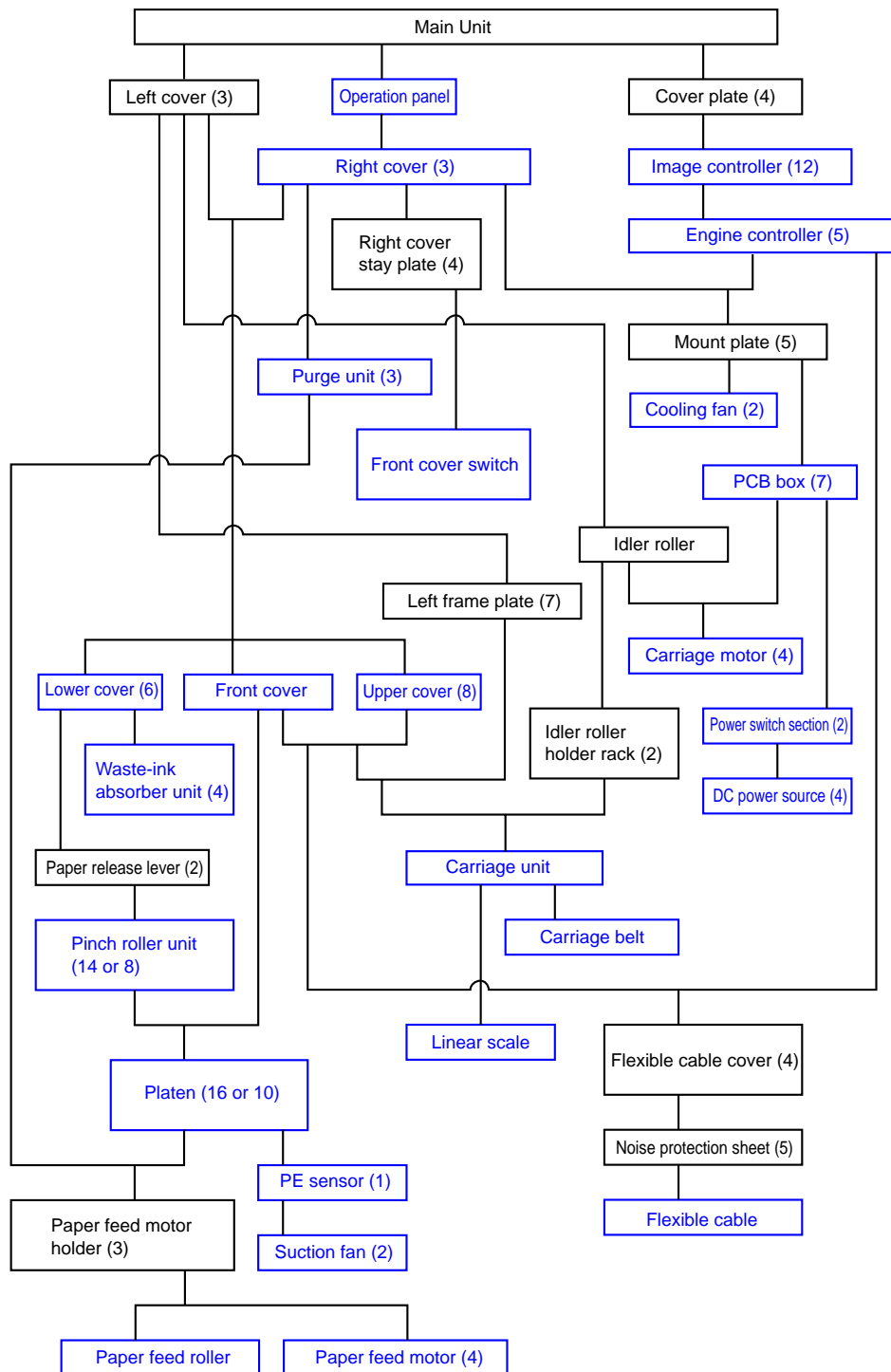
For the precautions on disassembly and assembly and detailed information on each procedure, [please refer to page 3-5](#).

1. List of Main Parts

Disassembly and assembly of :

- operation panel
- right cover
- lower cover
- upper cover
- front cover
- front cover switch
- purge unit
- waste-ink absorber unit
- pinch roller unit
- platen
- PE sensor
- suction fan
- paper feed roller
- paper feed motor
- carriage motor
- carriage unit
- carriage belt
- linear scale
- image controller
- engine controller
- PCB box
- cooling fan
- power switch
- DC power source
- flexible cable

2. Outline of disassembly and assembly of main parts



* : The figures written in () indicate the numbers of screws or E rings.

PRECAUTIONS FOR DISASSEMBLY AND REASSEMBLY

1. Do not loosen or remove screws which are not included in the disassembling procedures in this manual. In particular, never disassemble the points fixed with red screws as shown below. Readjustment is prohibited since they have been adjusted to the optimum position at the factory.

Number of red colored screws

A0 size model: 59

A1 size model: 45

Front side

Rear side

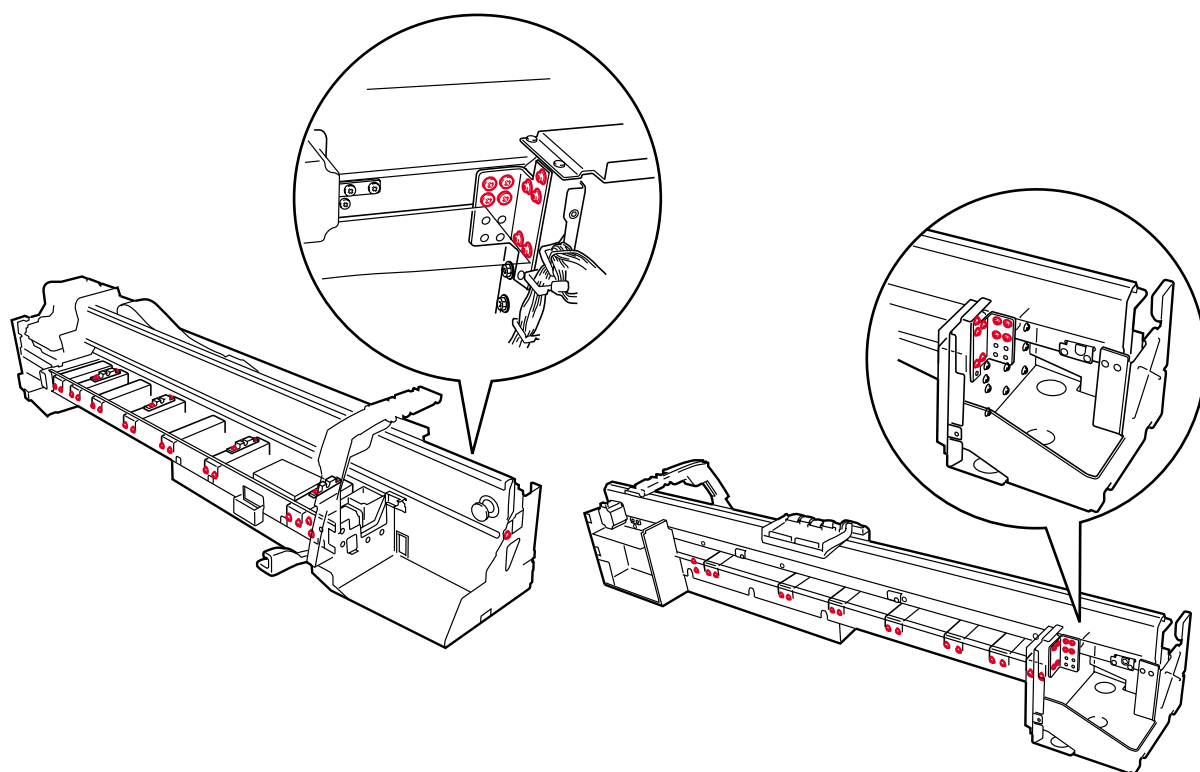


Figure 3-001

2. Handle the BJ cartridge with care ([See page 1-38](#)).
3. The head and electrode of the BJ Printhead should not be touched.

4. When lifting this machine, be sure that 2 people hold it as shown in Figure 3-003.

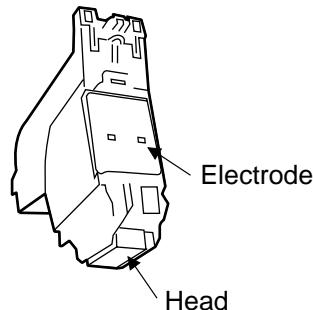


Figure 3-002

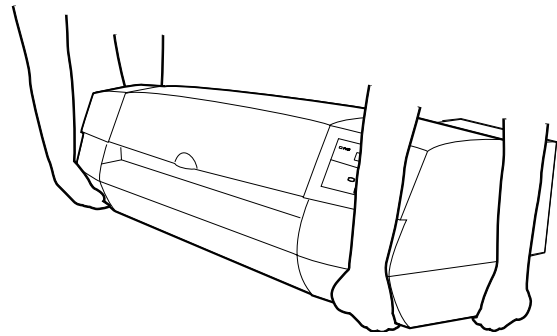


Figure 3-003

5. Before carrying out disassembly or reassembly, be sure to turn OFF the power switch and disconnect the power cord and interface cable.
6. You should not normally operate the printer with a component removed.
7. Unless a specific reassembly procedure is given, follow the disassembly procedure in reverse.
8. When reassembling, be careful about the types of screws (shape, length and diameter) and their positions.
9. When moving or disassembling the carriage, be sure to remove the cutter unit.
10. When handling a wiring harness tied with a band, cut off the band if necessary. When reassembling, be sure to tie the harness with a new band at the same position.
11. Ink mist generated during printing may become attached to the platen or purge unit. Be careful that your hands and clothes are not stained by the ink.
12. Ink used in this printer is not harmful, but contains organic solvent. Should it enter the eye, wash it away and consult a doctor.
13. The electronic circuits can be damaged by static electricity from your body. Before removing any circuit board, be sure to first touch a grounded metal part to remove any static charge. Do not touch the end of the short flexible cable.
14. Before replacing the image controller and the engine controller, [be sure to store the data following the procedure written in the “Chapter 5 II.C.3. Replacing the image controller and engine controller. \(See page 5-11.\)”](#)
15. After reassembly, be sure to carry out the “Auto Adjust”, “Auto Band-Adj.” of the main menu.

I. EXTERNALS

A. External Cover

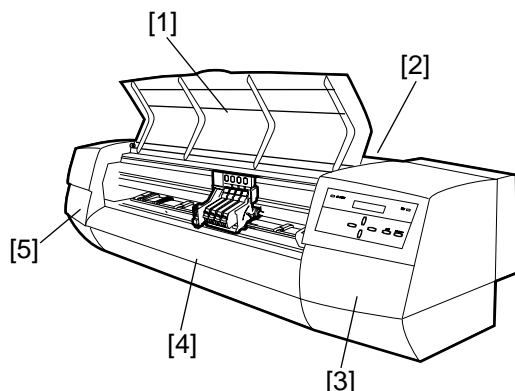


Figure 3-101

- [1] Front cover
- [2] Upper cover (8)
- [3] Right cover (3)
- [4] Lower cover (6)
- [5] Left cover (3)

Figures in () indicate the numbers of screws.

The removal procedures are omitted for those cover which can be removed simply by removing the screws.

1. Removing the right cover

- 1) Remove the operation panel (See page 3-9).
- 2) Remove 3 screws [1] and take off the right cover [2].

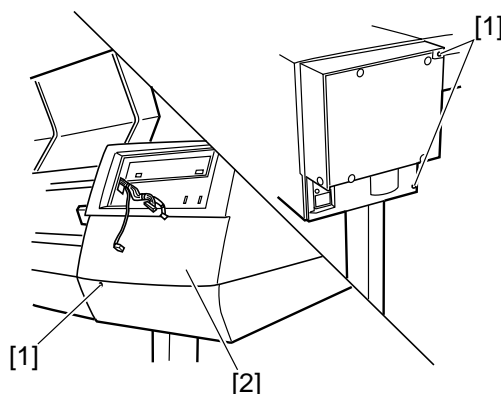


Figure 3-102

2. Removing the upper cover and front cover

- 1) Remove the right cover and left cover.
- 2) Remove 2 screws [1] and take off the front cover [2].

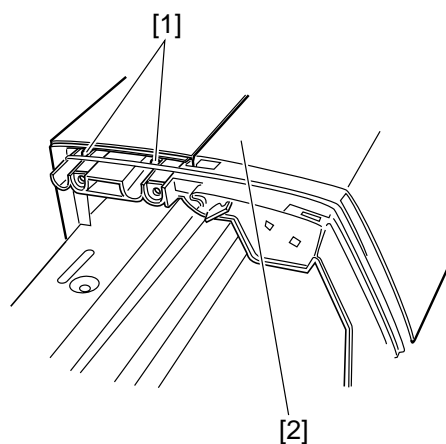


Figure 3-103

- 3) Remove 2 screws [3].

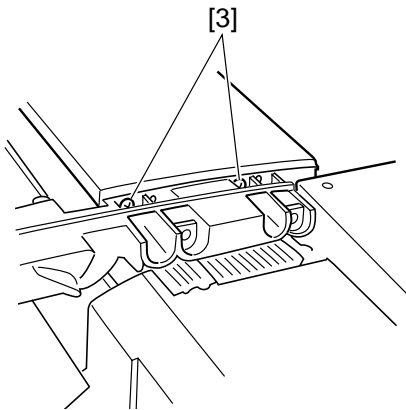


Figure 3-104

- 4) Remove 4 screws [4] and take off the upper cover [5].

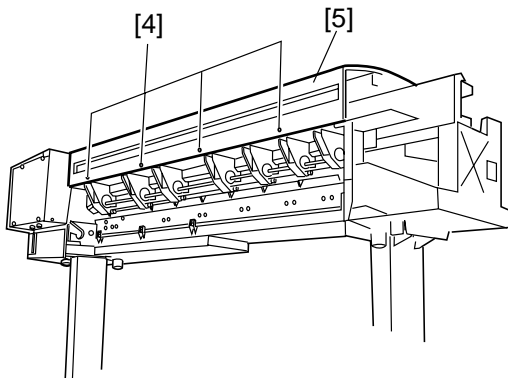


Figure 3-105

3. Removing the lower cover

- 1) Remove the right cover and left cover
(See page 3-7).
- 2) Open the front cover and lower the paper release lever.
- 3) Remove 6 set screws [1] and take off the lower cover [2].

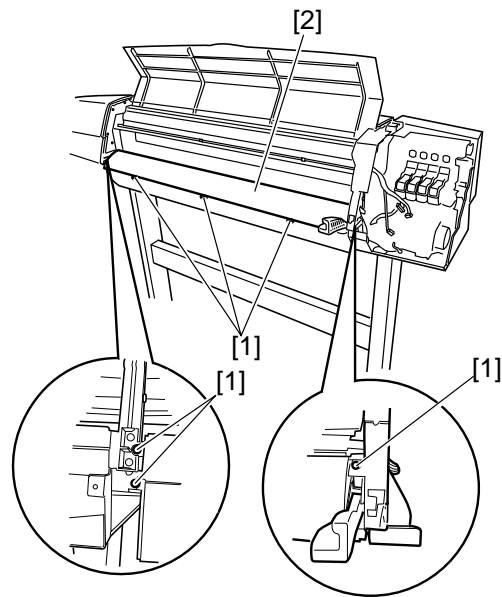


Figure 3-106

CAUTION

After completion of the work, close the front cover and raise the paper release lever.

4. Removing the front cover switch

- 1) Remove the right cover (See page 3-7).
- 2) Open the front cover.
- 3) Remove 4 screws [1] and take off the right cover stay plate [2].

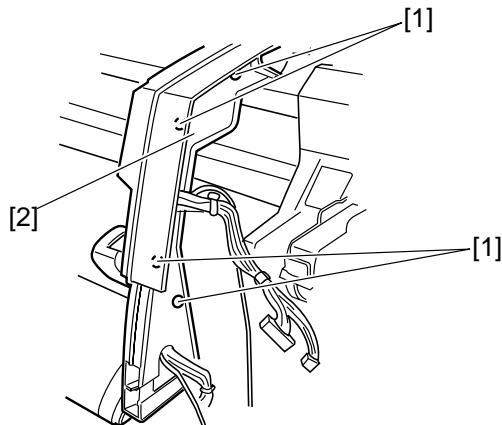


Figure 3-107

- 4) Disconnect connector [3], unlatch 2 hooks [4] and remove the front cover switch [5].

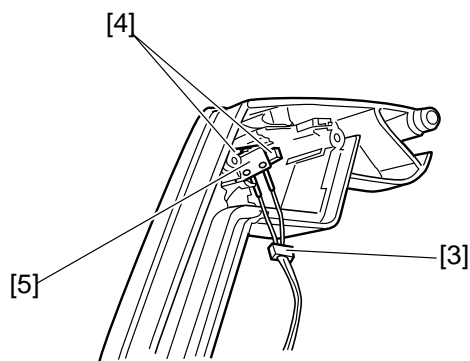


Figure 3-108

B. Operation Panel

1. Removing the operation panel

- 1) Open the front cover, and holding the green part, move the carriage to the center.
- 2) Unlatch the hooks [1] at 4 positions from the rear side of the right cover and remove the operation panel [2].

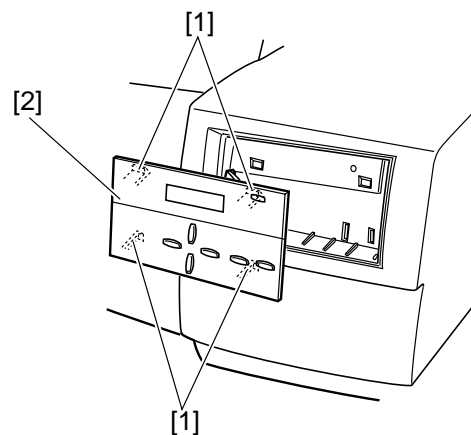


Figure 3-109

CAUTION

Three connectors [3] on the operation panel are connected. Be careful not to pull on the harnesses too hard.

- 3) Remove 3 connectors [3] (CN701, CN702, CN704) from the operation panel and take off the operation panel [2].

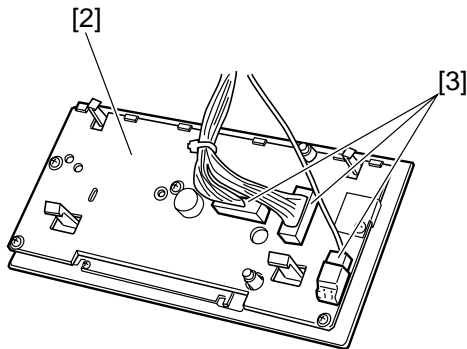


Figure 3-110

CAUTION

To prevent the heads from drying out, return the carriage promptly to the capping position upon completion of the work and close the front cover.

C. Fan

1. Removing the cooling fan

- 1) Remove the image controller (See page 3-32).
- 2) Remove the engine controller (See page 3-33).
- 3) Remove the right cover (See page 3-7).
- 4) Open the front cover, and holding the green part, move the carriage to the center.
- 5) Remove 1 screw [1] and peel off the noise protection sheet [2].

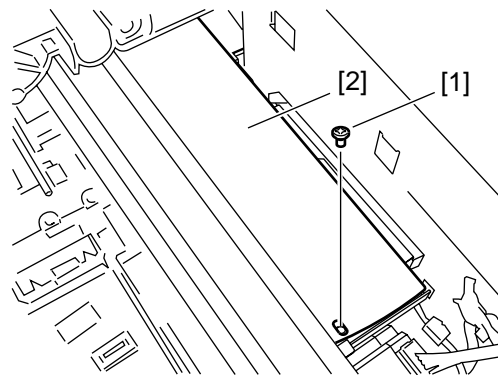


Figure 3-111

- 6) Remove 5 set screws [3] and take off the mount plate [4].

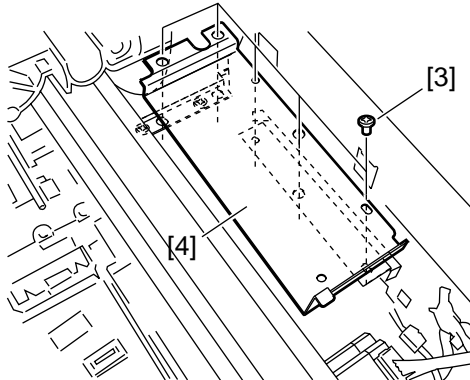


Figure 3-112

- 8) Remove 2 screws [6] and take off the cooling fan [7].

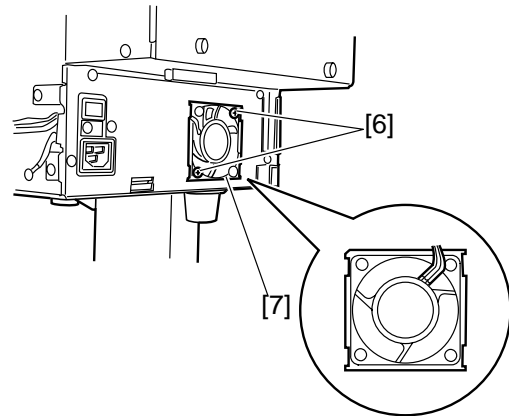


Figure 3-114

- 7) Disconnect the connector [5]

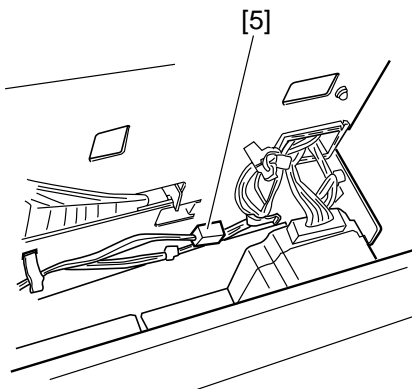


Figure 3-113

CAUTION

- To prevent the heads from drying out, return the carriage promptly to the capping position upon completion of the work and close the front cover.
- When reassembling the cooling fan, be sure to place the fan cord side in upper position to allow the cord to be reached to the connector.

2. Removing the suction fan

- 1) Remove the PE sensor ([See page 3-27](#)).
- 2) Remove 2 screws [1] and remove the suction fan cover [2].

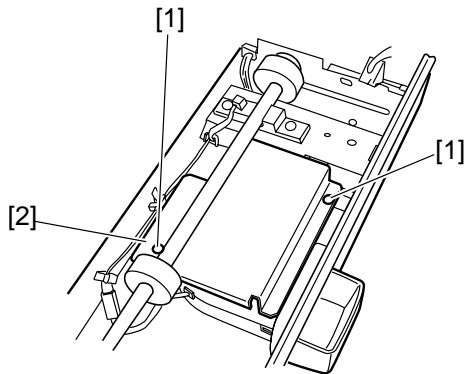


Figure 3-115

- 3) Disconnect the connector [3] and remove the suction fan [4].

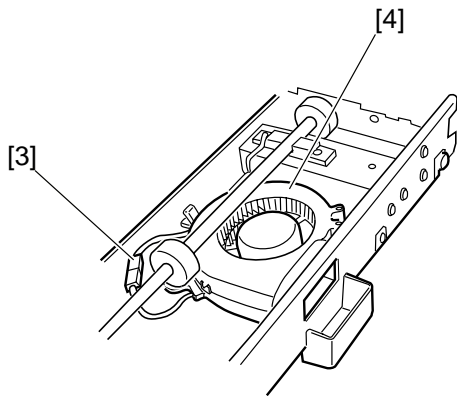


Figure 3-116

II. CARRIAGE UNIT

CAUTION

Before disassembling or reassembling the carriage unit, remove the BJ cartridge and cutter unit.

1. Removing the carriage unit

- 1) Remove the right cover and left cover
(See page 3-7).
- 2) Unlatch [1] front left hook, and then the remaining 3 hooks, and remove the carriage cover [2].

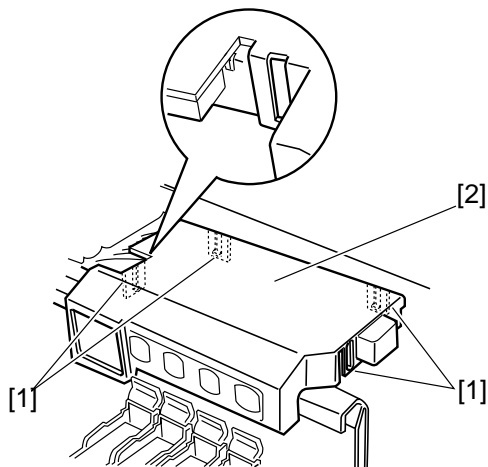


Figure 3-201

- 3) Remove the front cover and upper cover
(See page 3-7).
- 4) Holding the green part, move the carriage to the center, and remove the BJ cartridges.
- 5) Disconnect 2 connectors [3] (J501, J502) of the flexible cable on the carriage controller and set the cable to the left.

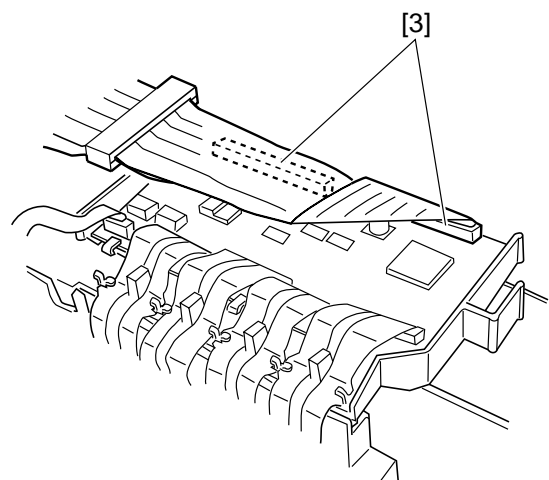


Figure 3-202

CAUTION

The flexible cables are fixed by a ferrite core. When removing the flexible cables, be careful not to damage them.

- 6) Remove the idler roller holder tension spring [4] and remove the idler roller [5] and idler roller holder [6].

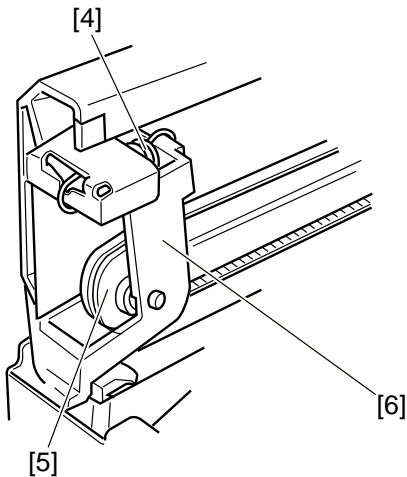


Figure 3-203

- 7) Remove 2 screws [7] and take off the idler roller holder rack [8].

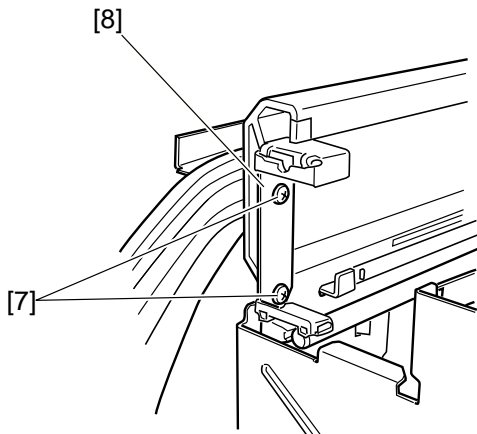


Figure 3-204

- 8) Remove 7 screws [9] and take off the left frame plate [10].

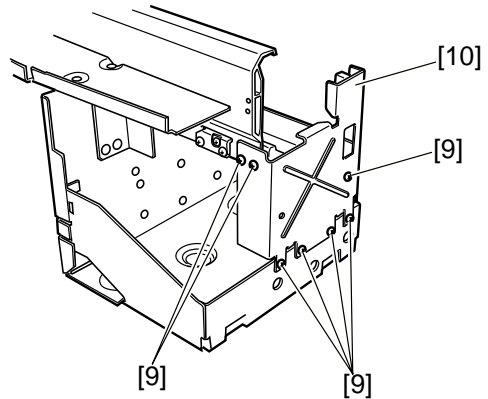


Figure 3-205

- 9) Remove the carriage unit [11] from the left side of the printer.

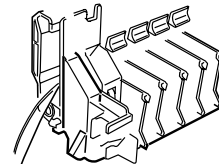


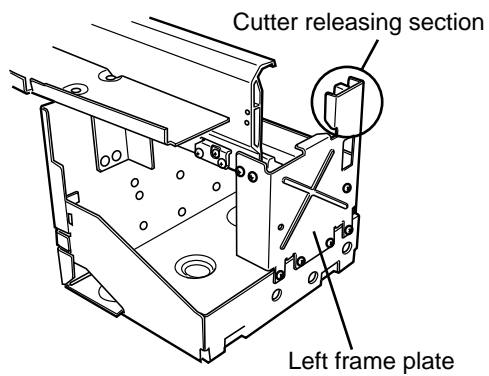
Figure 3-206

CAUTION

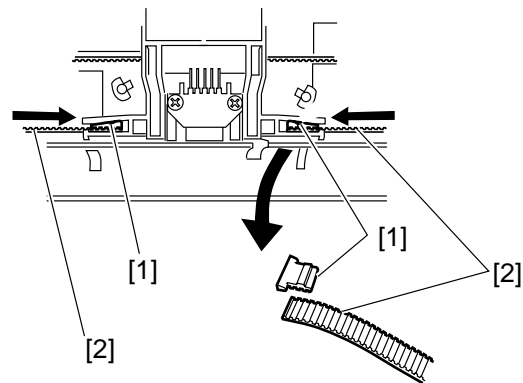
When removing the carriage unit, be careful not to damage or stain the carriage belt and linear scale.

CAUTION

When installing the carriage unit, check that the linear scale passes through the linear scale sensor. Attach the left frame plate so that the cutter release touches the cutter unit set in the carriage. Be careful not to get cut by the cutter edge moving down.

**2. Removing the carriage belt**

- 1) Remove the carriage unit ([See page 3-13](#)).
- 2) Remove 2 belt stoppers [1] at the back side of the carriage using a straight blade screw driver or the like and remove the carriage belt [2].

**Figure 3-207**

3. Installing the carriage belt

CAUTION

Install the carriage belt so that the belt stopper and the carriage belt joint surfaces are as shown in the figure below.

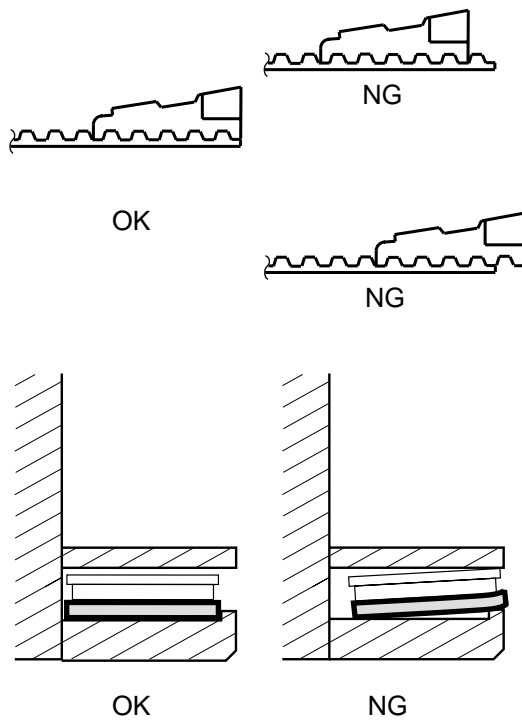


Figure 3-208

- 1) Matching the belt stopper [1] and carriage belt [2], insert the belt stopper into the hole at the back side of the carriage.
- 2) Pull the carriage belt in the direction shown in the figure below and check that the belt stopper has been correctly installed.

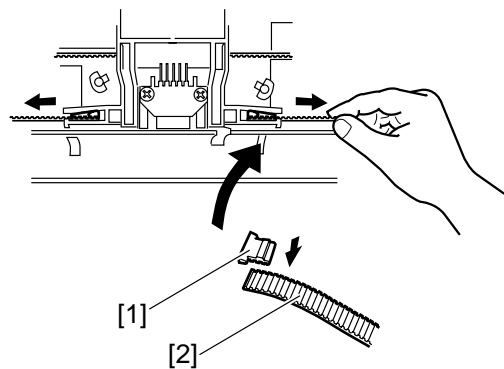


Figure 3-209

4. Removing the linear scale

- 1) Remove the carriage unit ([See page 3-13](#)).
- 2) Remove the tension spring [1] of the linear scale.
- 3) Unlatch the hook [2] and remove the linear scale [3].

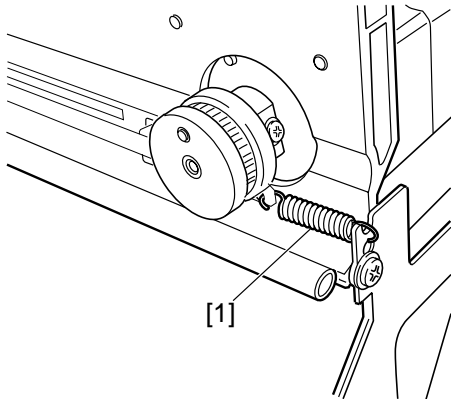


Figure 3-210

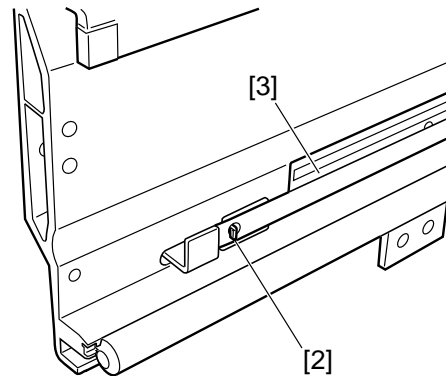


Figure 3-211

CAUTION

When removing the linear scale, be careful not to damage or stain it.

5. Replacing the flexible cable

- 1) Remove the image controller (See page 3-32).
- 2) Remove the engine controller (See page 3-33).
- 3) Remove the right cover and left cover (See page 3-7).
- 4) Remove the front cover and upper cover (See page 3-7).
- 5) Unlatch the 4 hooks [1] and remove the carriage cover [2].

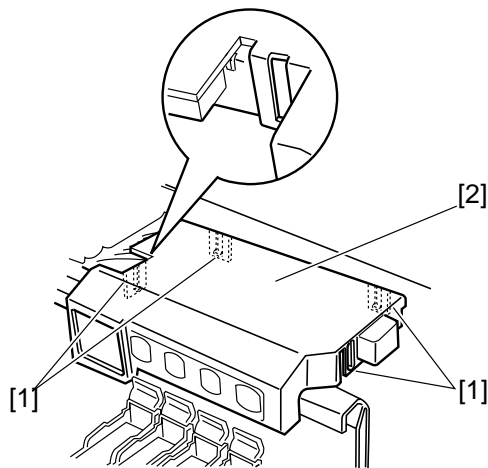


Figure 3-212

- 6) Holding the green part, move the carriage to the center and remove 2 connectors [3] (J501, J502) of the flexible cable on the carriage controller.

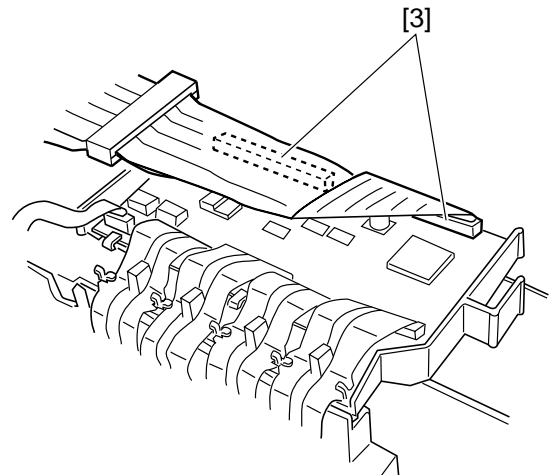


Figure 3-213

CAUTION

The flexible cables are fixed by a ferrite core. When removing the flexible cables, be careful not to damage them.

- 7) Peel off the fixing sheet [4] of the ferrite core and remove the ferrite core [5].

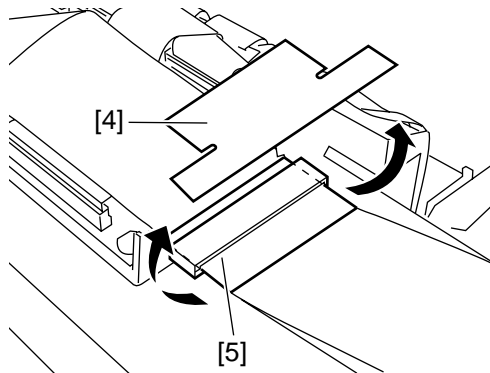


Figure 3-214

- 9) Remove 5 screws [9] from the noise protection sheet [8].

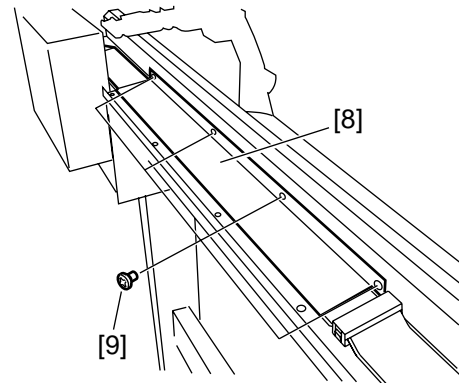


Figure 3-216

- 8) Remove 4 screws [6] and take off the flexible cable cover [7].

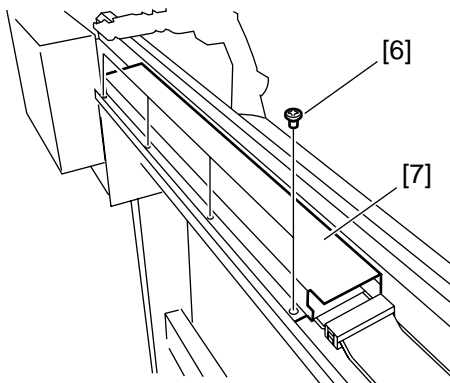


Figure 3-215

- 10) Peel off the flexible cable [10] from the flexible guide and remove the ferrite core [11].

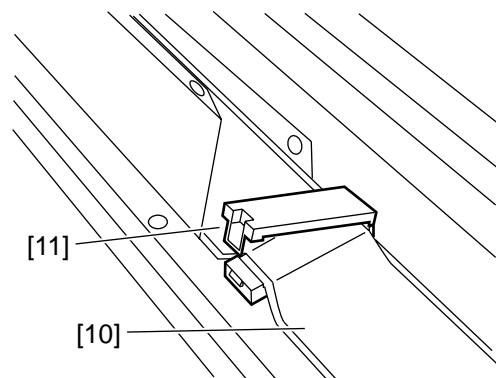


Figure 3-217

CAUTION

Remove the double-faced tape completely, leaving no residue on the flexible guide.

- 11) Fold the new flexible cable as shown in the figure below, and attach double-faced tape to positions [A].

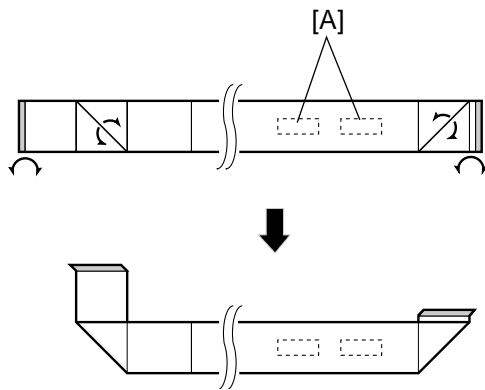


Figure 3-218

- 12) Stick double-faced tape over the flexible guide and attach the new flexible cable, aligning the mark [B] with the flexible guide edge [12].

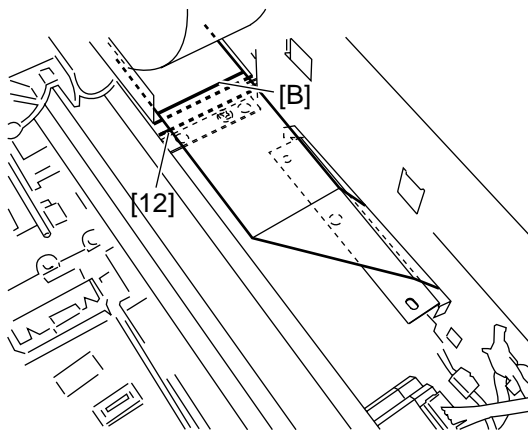


Figure 3-219

III. PURGE UNIT

CAUTION

- Do not touch the wiper or caps.
- Since waste ink accumulates on the bottom of the purge unit, hold the sides of the purge unit when removing it.
- Be careful not to spill the waste ink.

1. Removing the purge unit

- 1) Remove the right cover (See page 3-7).
- 2) Open the front cover, and holding the green part, move the carriage to the center.
- 3) Remove the tube clamp [1] and disconnect the waste ink tube from the pipe [2].

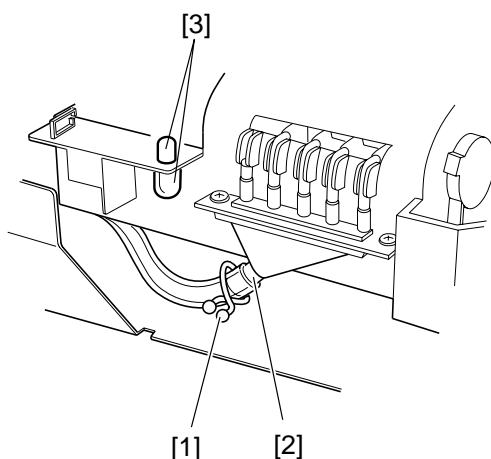


Figure 3-301

- 4) Cap the pipe [2] and the end of the waste ink tube [2] using the waste ink tube caps [3].

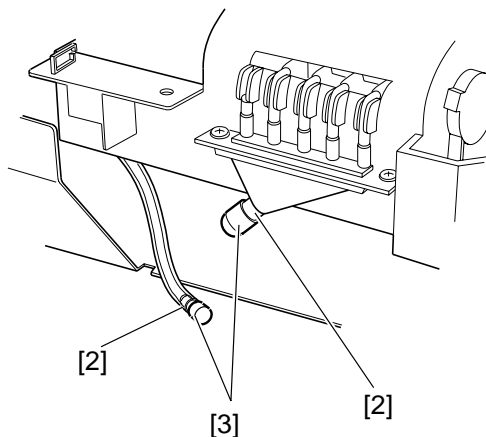


Figure 3-302

- 5) Disconnect 4 connectors [4] and remove the wiring harness from the wiring harness guide.

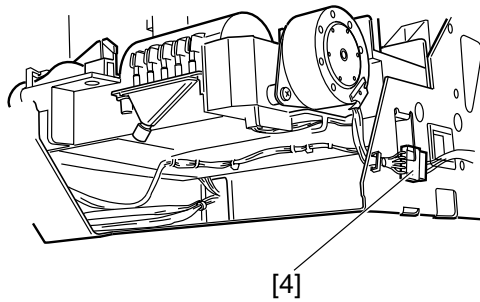
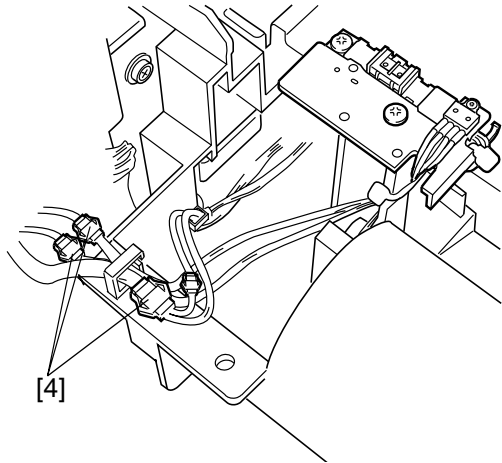


Figure 3-303

- 6) Remove 3 screws [5] and take off the purge unit [6].

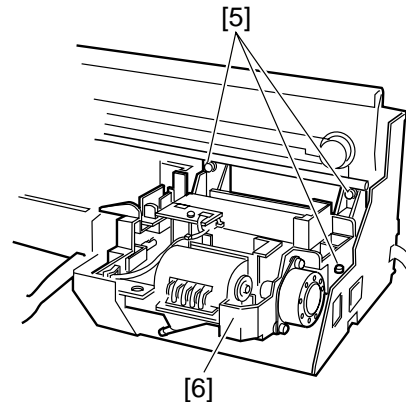


Figure 3-304

2. Removing the waste ink absorber unit

- 1) Remove the right cover (See page 3-7).
- 2) Remove the lower cover (See page 3-8).
- 3) Remove the tube clamp [1] and disconnect the waste ink tube from the pipe [2].

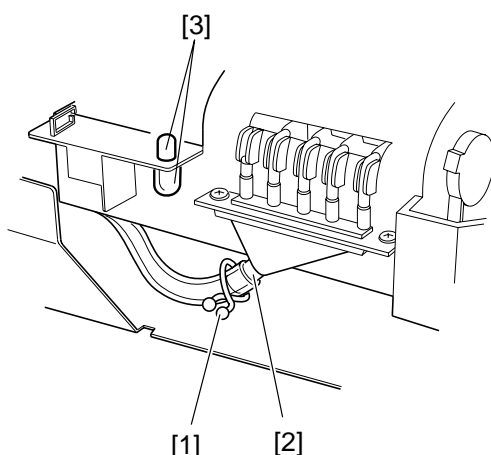


Figure 3-305

- 4) Cap the pipe [2] and the waste ink tube with the waste ink tube cap [3].

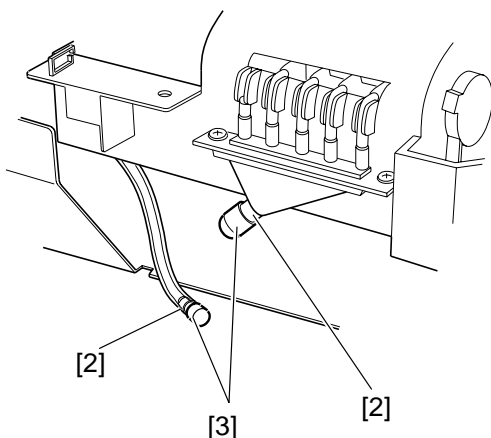


Figure 3-306

- 5) Remove 2 screws [4].

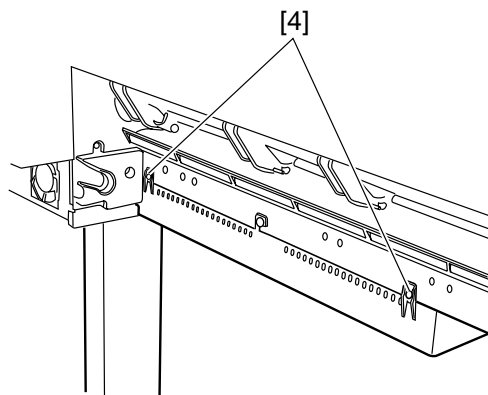


Figure 3-307

- 6) Remove 2 screws [5] and remove the waste ink absorber unit [6].

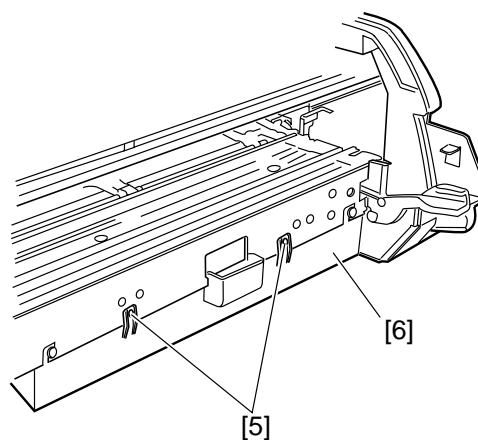


Figure 3-308

CAUTION

When replacing the waste-ink absorber unit, be sure to reset the waste-ink counter. (For details, see "Chapter 5 II.C.2 Waste ink counter reset" (P. 5-11).)

IV. FEEDER UNIT

1. Removing the pinch roller unit

- 1) Remove the lower cover (See page 3-8).
- 2) Raise the paper release lever [1], remove the E ring [2] and remove the paper release lever.

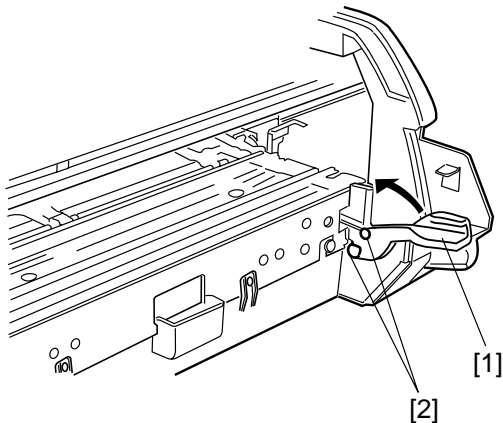


Figure 3-401

- 3) Remove screws [5] (A0 size model: 14, A1 size model: 8), and remove the pinch roller unit [6].

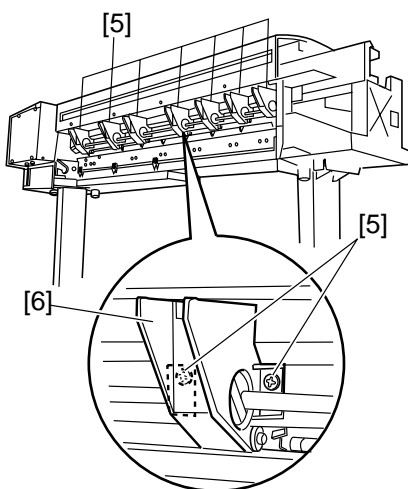


Figure 3-402

CAUTION

- When installing the pinch roller shaft, be careful about the position.
- Install the pinch roller unit with the screws [A] of the pinch roller facing upward (See Figure 3-403).
- When installing the pinch roller unit, tighten the screws in order from the left one at the back of the main unit (See Figure 3-404).

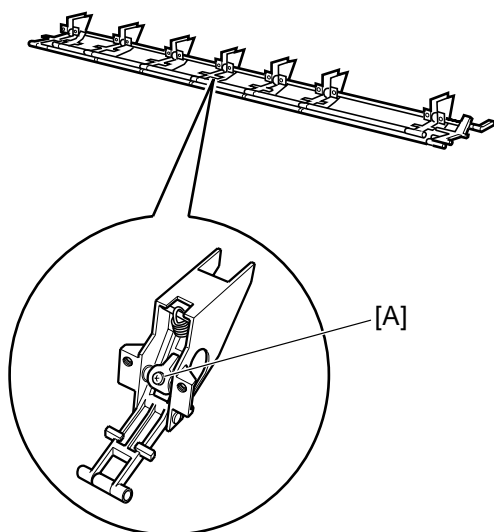


Figure 3-403

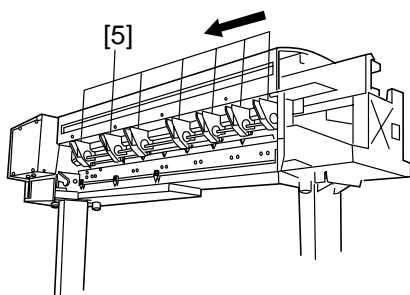


Figure 3-404

2. Removing the platen

- 1) Remove the pinch roller unit (See page 3-24).
- 2) Remove the front cover and upper cover (See page 3-7).
- 3) Remove 2 screw [1] and remove the left stay [2].

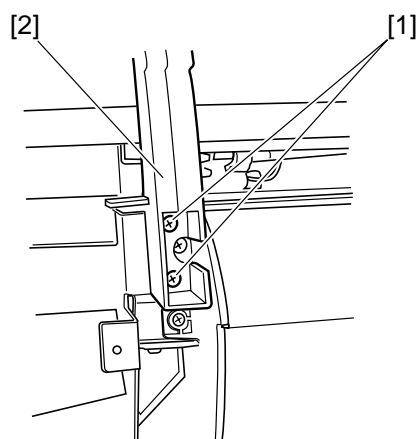


Figure 3-405

- 4) Remove screws [3] (A0 size model: 16, A1 size model: 10) and remove the platen [4].

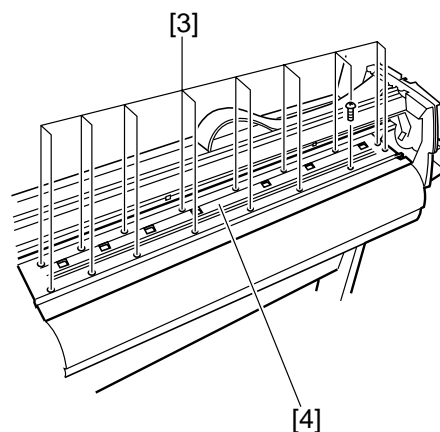


Figure 3-406

CAUTION

When removing the platen, be careful not to damage the carriage belt and linear scale.

3. Installing the platen

- 1) Tighten screw [11] ([7] on the A1 size model) temporarily.
- 2) Adjust the platen position so that the screw hole [1] is aligned with the platen hole and fix screw [1].
- 3) Fasten the screws from [2] to [14] ([2] to [8] on the A1 size model) firmly in order.
- 4) Loosen screws [1] and [2], and lift up the platen once while holding it at positions [A] and [B] (to eliminate warp).
- 5) Fix screw [1] .
- 6) Fix screw [2].
- 7) Fix screw [15] and [16] ([9] and [10] on the A1 size model).

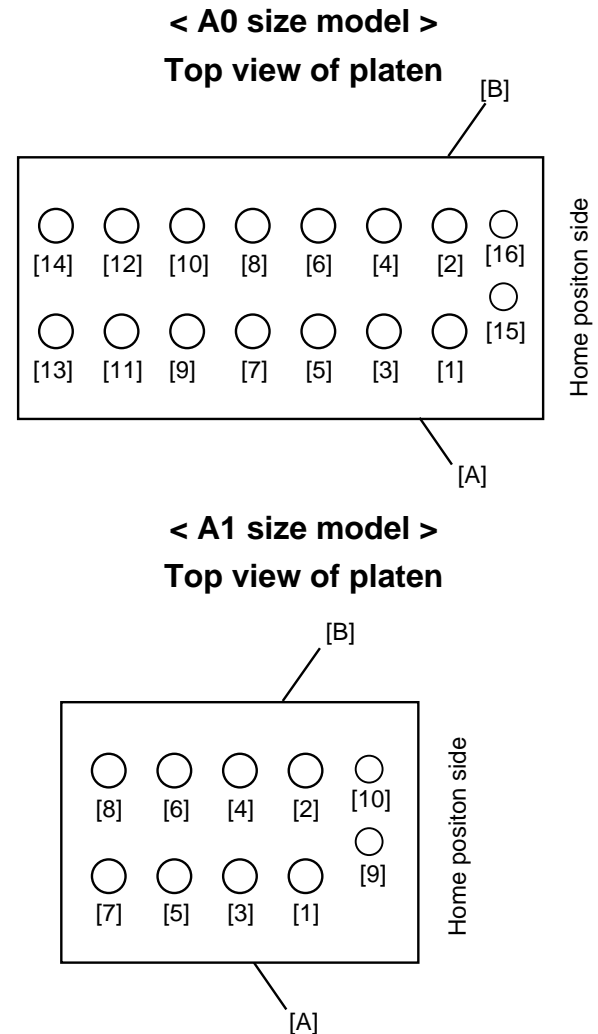


Figure 3-407

CAUTION

In order to keep the platen flat, be sure to install the platen using the sequence given above.

4. Removing the paper feed roller

- 1) Remove the platen (See page 3-25).
- 2) Remove the lower cover (See page 3-8).
- 3) Remove the paper feed motor (See page 3-29).
- 4) Remove the paper feed roller [1].

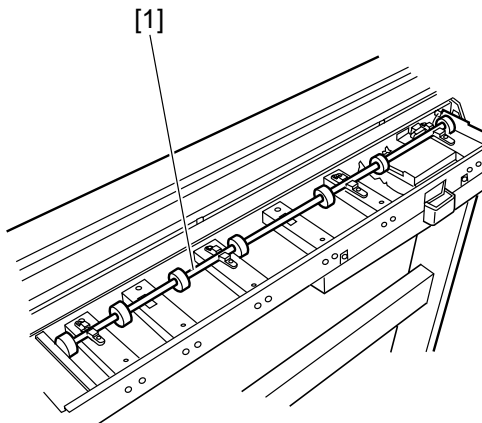


Figure 3-408

5. Removing the PE sensor

- 1) Remove the platen (See page 3-25).
- 2) Remove the screw [1] and disconnect the connector [2].
- 3) Remove the PE sensor [3].

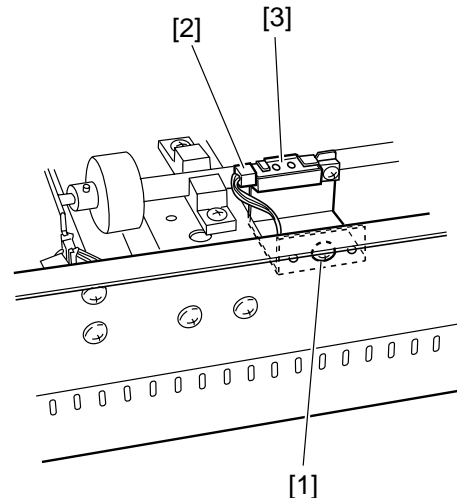


Figure 3-409

V. DRIVING UNIT

1. Removing the carriage motor

- 1) Remove the right cover and left cover
(See page 3-7).
- 2) Remove the idler roller holder tension spring [1], remove the the idler roller [2] and idler roller holder [3] and loosen the carriage belt.

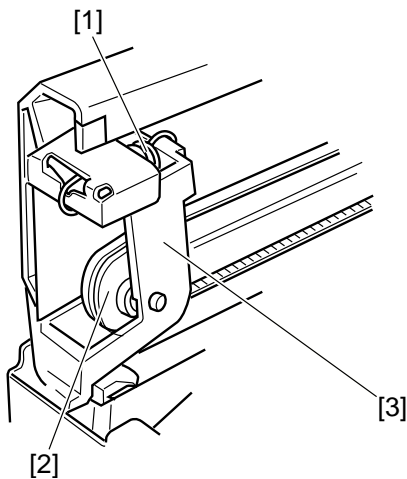


Figure 3-501

- 3) Remove the PCB box (See page 3-34).
- 4) Remove 4 screws [4] and remove the carriage motor [5].

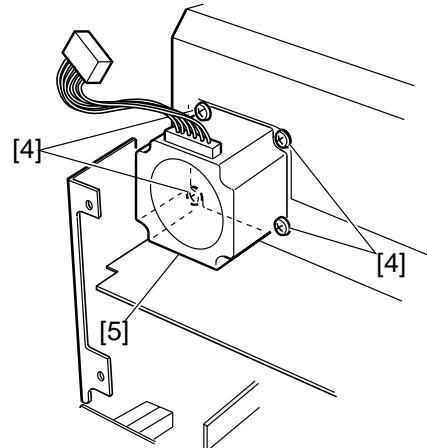


Figure 3-502

CAUTION

When reassembling, face the carriage motor connector upward.

2. Removing the paper feed motor

- 1) Remove the purge unit (See page 3-21).
- 2) Remove the platen (See page 3-25).
- 3) Remove the lower cover (See page 3-8).
- 4) Insert a straight blade screw driver into the hole on the front side of the cabinet, rotate the paper feed motor and loosen 3 set screws [1].

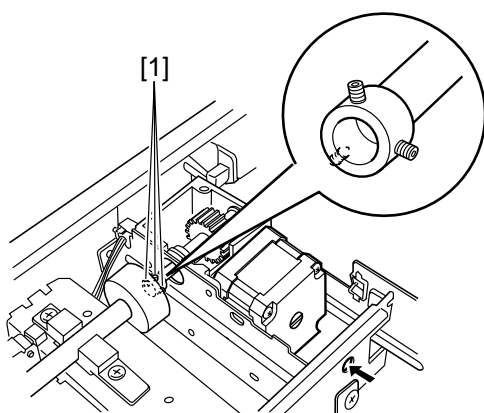


Figure 3-503

- 5) Remove 3 screws [2] and remove the motor holder [3] from the bearing.
- 6) Disconnect the connector [4], rotate the paper feed motor unit [5] and remove it.

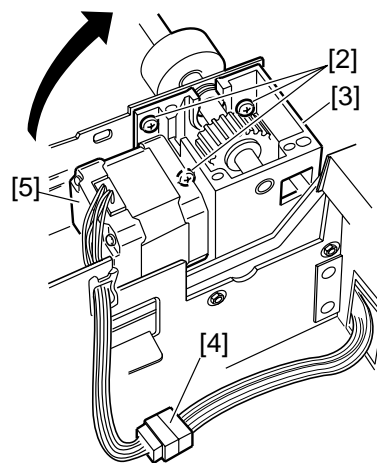


Figure 3-504

- 7) Remove 4 screws [6] and remove the paper feed motor [7].

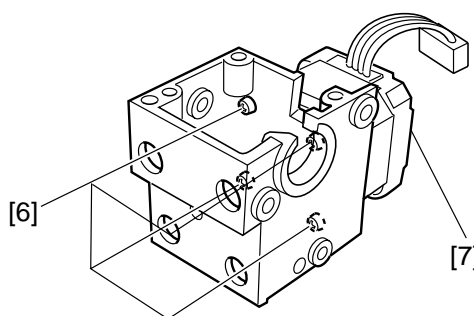


Figure 3-505

3. Installing the paper feed motor

- 1) Install the paper feed motor on the motor side board, pushing down the front of the paper feed motor in the direction shown in Figure 3-506, and tighten 3 screws [1].

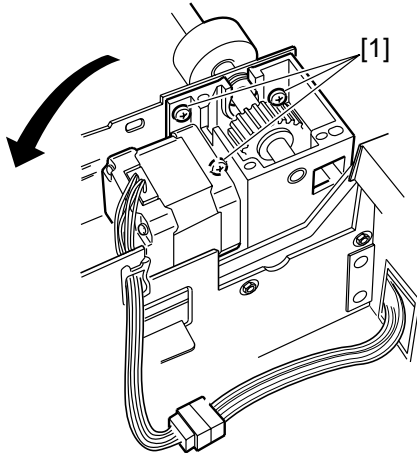


Figure 3-506

CAUTION

In order to keep the platen flat, be sure to install the paper feed motor as described above.

4. Fastening the paper feed roller set screws

- a. When the marks are aligned between the set screw positions
 - 1) Match the marks on the paper feed motor side and paper feed roller side.
 - 2) Tighten 2 set screws [1] and [2] close to the marks firmly.
 - 3) Tighten the remaining screw [3] firmly.

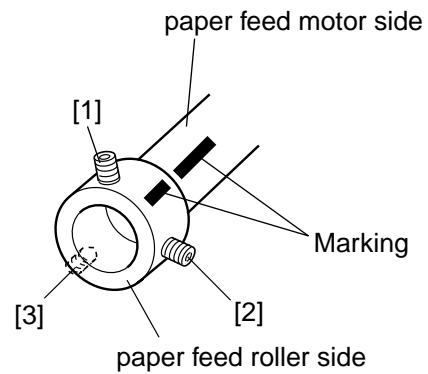


Figure 3-507

CAUTION

In order to assure paper feeding accuracy, be sure to follow the above sequence.

b. When the marks coincide with the set screw position

- 1) Match the marks on the paper feed motor side and paper feed roller side.
- 2) Tighten set screw [1] at the mark slightly.
- 3) Tighten set screws [2] and [3] slightly.
- 4) Loosen set screw [1].
- 5) Tighten set screws [2] and [3] firmly.
- 6) Tighten set screw [1] firmly.

Sectional view of set screw position

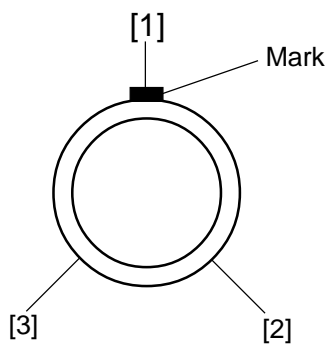


Figure 3-508

CAUTION

In order to assure the paper feeding accuracy, be sure to observe the above sequence.

VI. ELECTRICAL PART

1. Removing the image controller

CAUTION

When replacing the image controller, see "Chapter 5 II. C. 3. Replacing the image controller and engine controller" (P. 5-11).)

- 1) Remove 4 screws [1] and remove the cover plate [2].

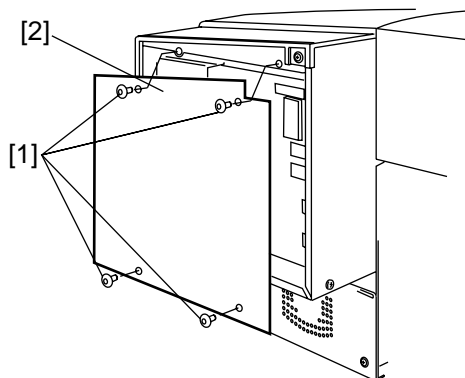


Figure 3-601

- 2) Remove the connector [3] (CN602) and remove 12 screws [4].
- 3) Remove the image controller [5].

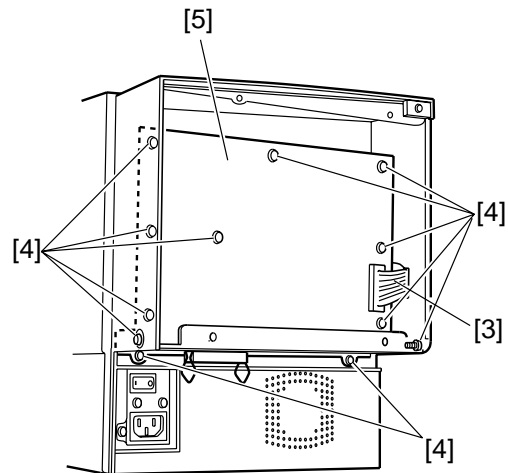


Figure 3-602

2. Removing the engine controller

CAUTION

When replacing the engine controller,
see "Chapter 5 II. C. 3. Replacing the
image controller and engine controller"
(P. 5-11).)

- 1) Remove the image controller (See page 3-32).
- 2) Remove 12 connectors [1] (J201, J202, J203, J204, J206, J207, J208, J210, J211, J212, J213, J214) and remove 3 screws [2].
- 3) Remove 2 stays [3] and 2 washers [4] and remove the engine controller [5].

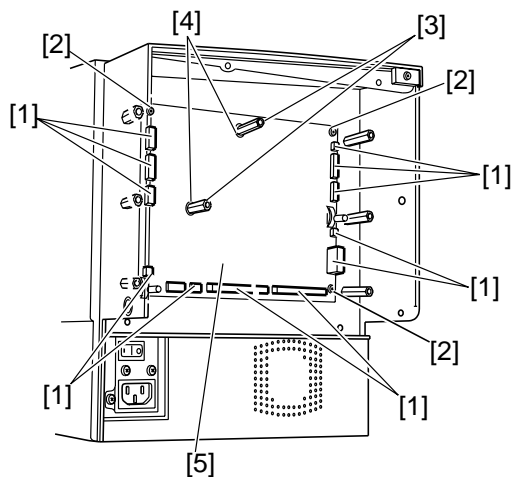


Figure 3-603

3. Removing the PCB box

- 1) Remove the right cover (See page 3-7).
- 2) Remove the engine controller (See page 3-33).
- 3) Remove the screw [1] and remove the noise protection sheet [2].

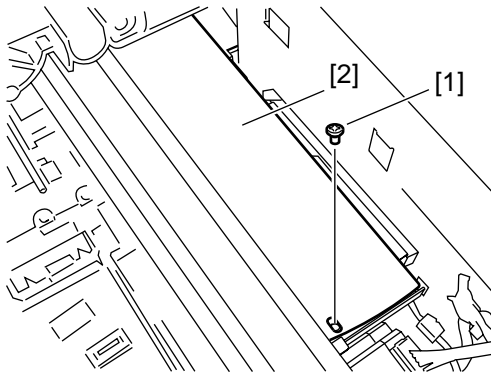


Figure 3-604

- 4) Remove 5 screws [3] and remove the mount plate [4].

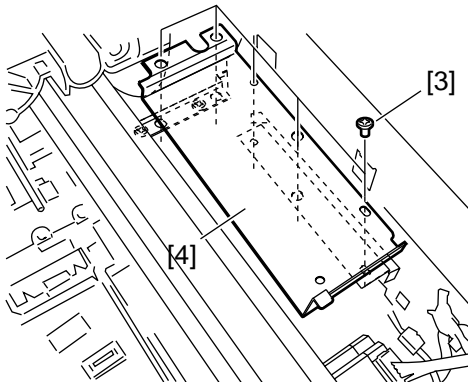


Figure 3-605

- 5) Remove 7 screws [5].

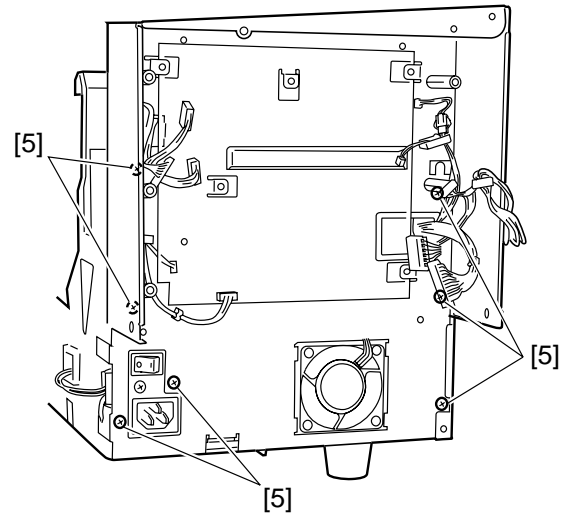


Figure 3-606

- 6) Remove the harness [6] and remove the PCB box [7].

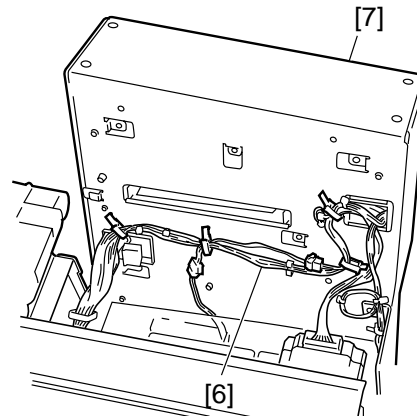


Figure 3-607

4. Removing the power switch

- 1) Remove the PCB box (See page 3-34).
- 2) Remove the screw with a crown washer [1] and the 2 screws [2].
- 3) Disconnect connector [3] and remove the power switch [4].

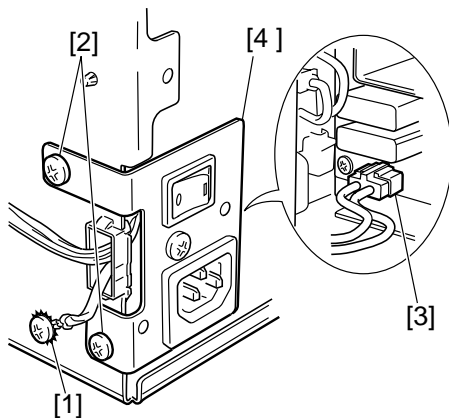


Figure 3-608

5. Removing the DC power supply

- 1) Remove the power switch.
- 2) Disconnect the connector and the DC power supply [3] after removing 4 screws [2].

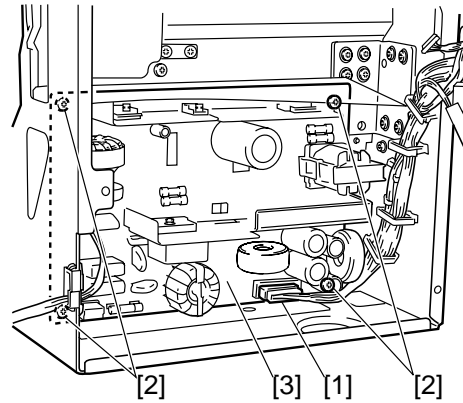


Figure 3-609

CHAPTER 4

MAINTENANCE AND SERVICING

I. PERIODIC PARTS REPLACEMENT	4-1
II. STANDARD SERVICE LIFE OF CONSUMABLES	4-1
III. PERIODIC SERVICE	4-1

IV. MAINTENANCE AND INSPECTION	4-2
A. Cleaning/Inspection Points	4-2
B. Lubrication Points	4-3

I. Periodic parts replacement

The printer contains no parts which require periodic replacement.

II. Standard service life of consumables

The printer contains no parts which require replacement.

III. Periodic service

The printer contains no parts which require periodic service.

IV. MAINTENANCE AND INSPECTION

A. Cleaning/Inspection Points

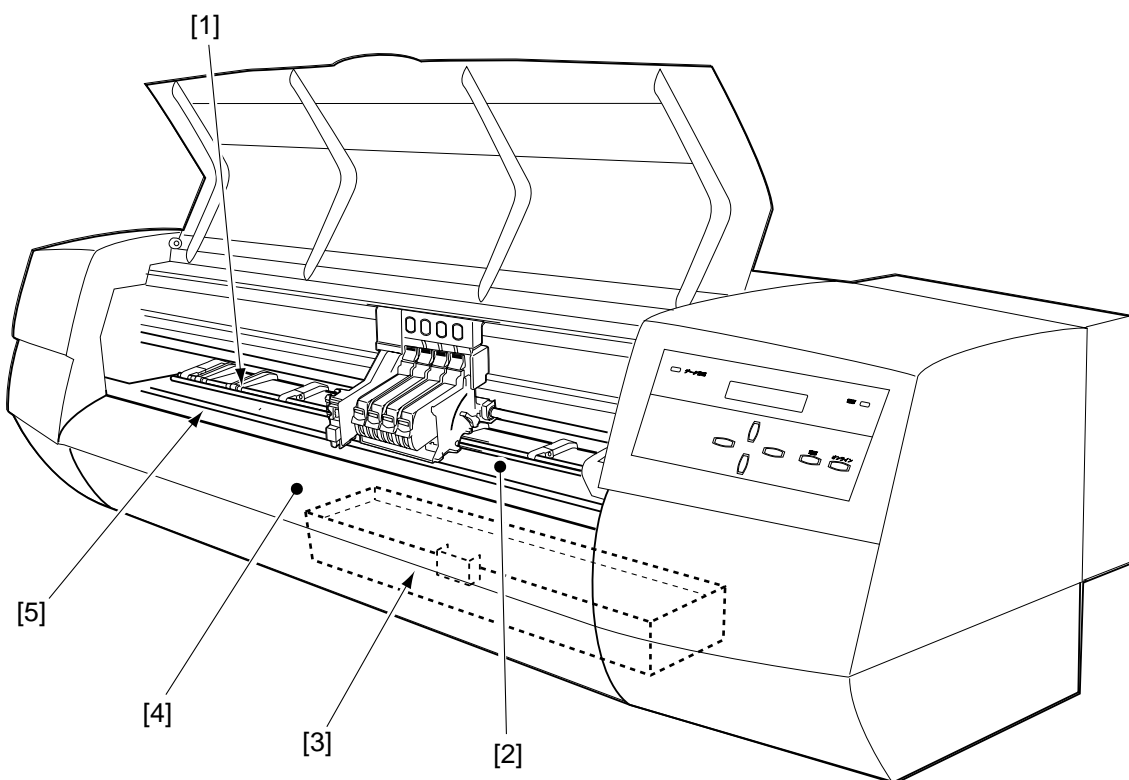


Figure 4-401

No.	Parts	Cleaning Tool	Service/caution
[1]	Pinch roller	Plain paper (A1 or A0)	Feed the paper until the stains are removed from it.
[2]	Platen	Moistened cloth	Clean
[3]	Waste ink absorber unit	—	Check or replace
[4]	Cover	Moistened cloth	Clean
[5]	Cut groove	Moistened swab	Remove paper chips and dust.

Table 4-401

B. Lubrication Points

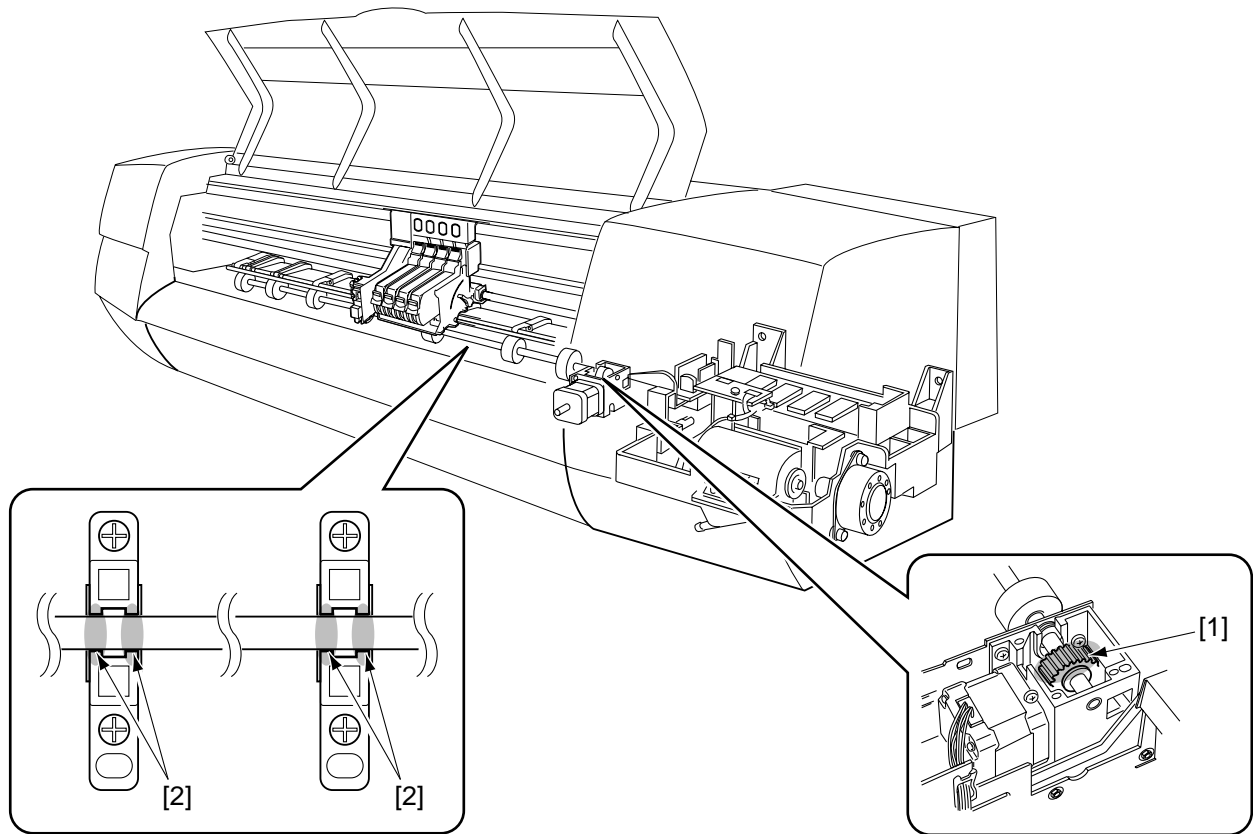


Figure 4-402

No.	Position	Lubricant	Remarks
[1]	Paper feed motor gear	Permalub G2	Apply approx. 500mg of grease uniformly to the tooth surfaces.
[2]	Grit roller bearing	Permalub G2	Apply approx. 40mg of grease to each bearing surface.

Table 4-402

CHAPTER 5

TROUBLESHOOTING

I. SERVICE MODE	5-1	IV. CORRECTION OF OPERATION DEFECTS ..	5-32
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B. List of Error and Warning Codes	5-18		

I. SERVICE MODE

A. Outline

For the purpose of adjustment in the field, 5 service modes are provided as shown below.

Mode	Description
DISPLAY	<ul style="list-style-type: none"> • Printing service mode settings • Display warning code history • Display error code history • Display machine model • Display machine internal temperature • Display compensated temperature of the head temperature sensor (Bk/C/M/Y). • Display the detected paper size. (Paper feed direction/carriage direction)
ADJUST	<ul style="list-style-type: none"> • Adjustment and printing of confirmation pattern • Adjustment in paper feed (Paper feed accuracy compensation value)
FUNCTION	<ul style="list-style-type: none"> • Operation panel LED/LCD lighting check • Operation panel key check
COUNTER	<ul style="list-style-type: none"> • Waste-ink counter display • Carriage drive time display
INITIALIZE	<ul style="list-style-type: none"> • Initialization of waste-ink counter • Initialization of carriage drive time • Initialization of warning history and error history • Transmitting EEPROM data on the engine controller to the image controller.

Table 5-101

B. Service Mode Operation

1. How to enter the service mode

- 1) While pressing the up and down arrow keys, turn ON the power switch.
- 2) Confirm the "Initializing" message is indicated on the message display, then release the key.
 - When you enter the service mode, the green and orange LEDs blink alternately.
- 3) Press the Online key to show "Main menu".
- 4) Press the left or right arrow key to show "SERVICE MODE", and press the down arrow key to select.
 - "SERVICE MODE" is between "System Setup" and "Internal Print" on the main menu.
- 5) Press the left or right arrow key to display the mode to be checked or adjusted (see Table 5-501), then select it with the down arrow key.
 - The name of the mode selected moves to the upper line of the message display.
- 6) Check or adjust.

2. Stopping the service mode

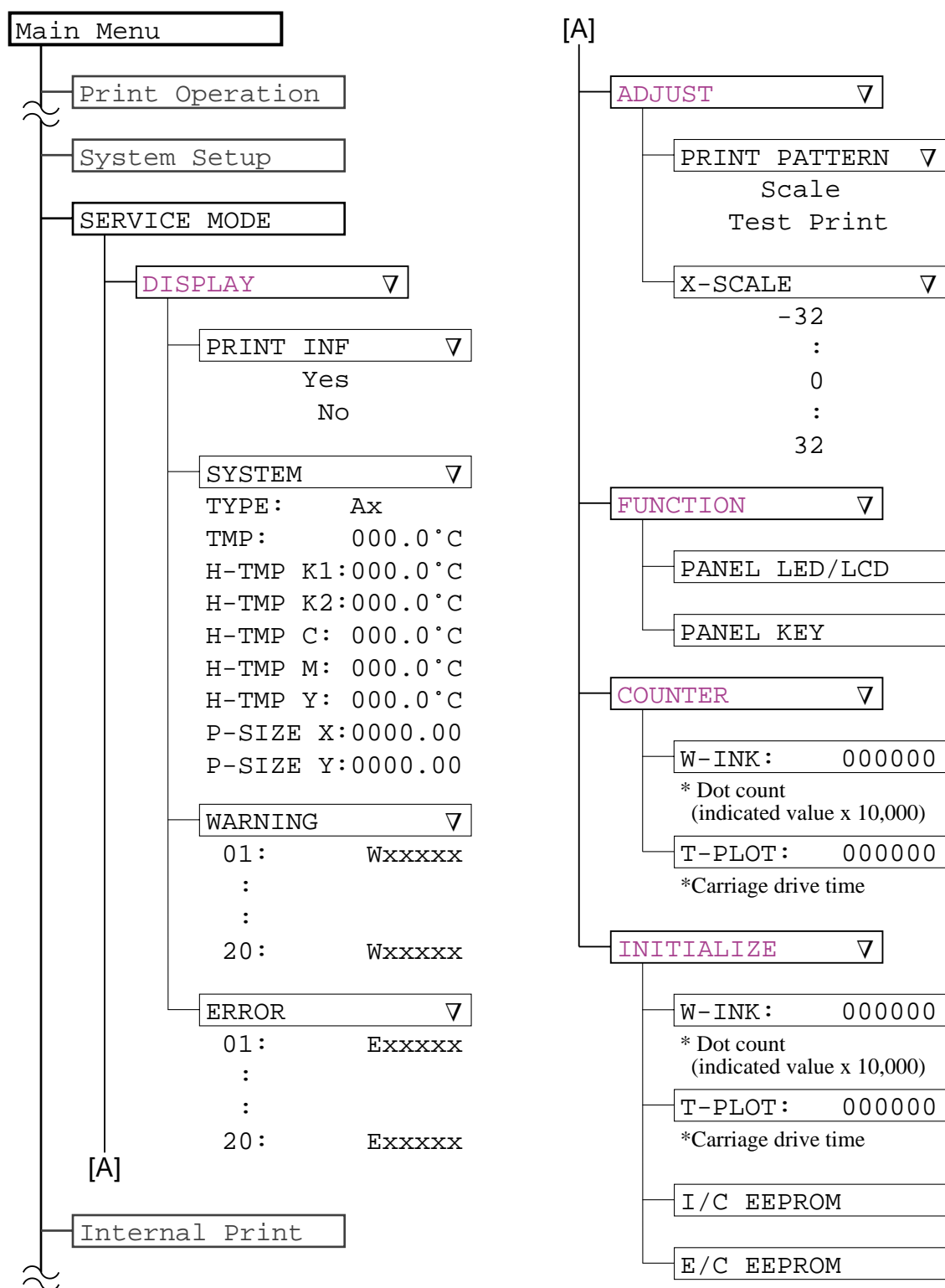
Turn OFF the power switch.

C. Service Mode Map

The hierarchy of service mode items is as shown below.

Refer to "D. Service Mode" for details on each item.

The service mode items are displayed in English regardless of which language is selected.



D. Service Mode

1. Control display mode

- Display items: Left or right arrow key
- Select an item: Down arrow key
- Execute an item: Enter key
- Reset the mode: Up arrow key

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	I	S	P	L	A	Y									
P	R	I	N	T		I	N	F							▽

Name of item	Contents	Remarks
PRINT INF	Printing of service-related data	The following are printed. <ul style="list-style-type: none"> • Warning history • Error history • Adjusting value • Counter value
SYSTEM	System display	See Table 5-502 (P.5-4).
WARNING	Warning code history display	The last 20 warning codes are displayed (smaller history numbers are newer.)
ERROR	Error code history display	The last 20 error codes are displayed (smaller history numbers are newer).

< "System" details >

Name of item	Contents	Remarks
TYPE	A0/A1 size model	Indicates the engine controller SW201 setting.
TMP	Internal temperature	Units: °C
H-TMP K1	Compensated temperature of the head temperature sensor (Bk)	Units: °C (Proper value: 0±80°C)
H-TMP K2	Unused	
H-TMP C	Compensated temperature of head temperature sensor (C)	
H-TMP M	Compensated temperature of head temperature sensor (M)	
H-TMP Y	Compensated temperature of head temperature sensor (Y)	
P-SIZE X	Detected size of set media (paper feed direction)	Units: mm
P-SIZE Y	Detected size of set media (carriage direction)	Units: mm

Table 5-102

2. Adjusting mode

- Display items and change values: Left or right arrow key
- Select an item: Down arrow key
- Registration of values and execution of actions: Enter key
- Reset mode or item: Up arrow key

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	D	J	U	S	T										
P	R	I	N	T		P	A	T	T	E	R	N			▽

Name of item	Contents	Value	Remarks
PRINT PATTERN	Adjustments and output of confirmation pattern	Scale*	Output of paper feed accuracy compensation value adjustment pattern
		Test Print	Output of test pattern
X-SCALE	Adjustment in paper feed direction (Paper feed accuracy compensation value adjustment pattern)	-32~32	The magnification in paper feed direction decreases by decreasing the value (units: 1 dot).

*: The paper feed accuracy compensation value adjustment pattern may not be adjustable, since the pattern cannot be printed in the paper feed direction if the Auto Layout/Rotation are set. Adjustment is also difficult if Scale/Y Mirror are set. Therefore, return the settings of "Auto Layout", "Scale", "Rotation", and "Y Mirror" to their default values. (See P. 5-13.)

3. Operation/inspection mode

- Display an item: Left or right arrow key
- Execute an item: Enter key
- Reset mode or item: Up arrow key

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
F	U	N	C	T	I	O	N								
P	A	N	E	L		L	E	D	/	L	C	D			

Name of item	Contents	Operation/Remarks
PANEL LED/ LCD	Check LED/LCD on the operation panel	Indicates as shown below for about 5 seconds. <ul style="list-style-type: none"> • LED blinks (2 colors of LED blink alternately). • LCD character cells blink alternately.
PANEL KEY	Key check on operation panel.	Make sure that "Key Check Mode" is indicated, then and press each key (excluding the up arrow key) on the operation panel. The symbols corresponding to the pressed keys (see Table 5-103) are indicated.

Key	Indication
Online	F1
Enter	F2
Down arrow	↓
Left arrow	←
Right arrow	→

Table 5-103

4. Counter mode

- Indication of items: Left or right arrow key
- Reset the mode: Up arrow key

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	O	U	N	T	E	R									
W	-	I	N	K	:					0	0	0	0	0	0

Name of item	Contents	Remarks
W-INK	Waste ink counter display	Counted dot value (x 10,000)
T-PLOT	Carriage drive time display	Units: hours

5. Initialization mode

- Display items: Left or right arrow key
- Initialization of counter: Down arrow key + Enter key
- Reset the mode: Up arrow key

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
I	N	I	T	I	A	L	I	Z	E						
W	-	I	N	K	:					0	0	0	0	0	0

Name of item	Contents	Remarks
W-INK	Initialization of waste ink counter	Set the counter value to 0. (Used when the waste ink absorber unit is replaced.)
T-PLOT	Initialization of carriage drive time	Set the carriage drive time value to 0.
I/C EEPROM	Initialization of warning history and error history	Clear the warning history and error history. During the initializing process (for about 0.5 seconds), "*" mark is indicated after the item name.
E/C EEPROM	Transmitting EEPROM data on the engine controller to the EEPROM on the image controller.	During the rewriting process (for about 0.5 seconds), "*" mark is indicated after the item name. (Used when replacing the engine controller. Refer to "Replacing the engine controller", P.5-12.)

II. ADJUSTMENTS AND SETTINGS

A. About Adjustments and Settings

The message display language (Factory setting: English) can be changed using the operation panel keys, corresponding to each sales territory.

There are no parts that require mechanical adjustment when assembling them as described in the service manual.

However, the settings, adjustments, and service described below are required.

1. If the paper thickness adjustment lever is changed, perform the automatic printing position adjustment.
2. When the parts that may affect printing accuracy (such as those in the carriage or paper feed section) are disassembled, perform the automatic printing position adjustment and automatic band adjustment.
3. When replacing the waste ink absorber unit, be sure to clear the waste ink counter.
4. Both the image controller and engine controller cannot be replaced at the same time, or the stored settings will be lost. Be sure to follow the proper procedures when replacing them.
5. The paper feed accuracy compensation value adjustment can be performed to achieve higher precision printing.
6. If the data reception lamp does not light when data is being transferred, check the parallel interface communication mode setting. If necessary, switch the setting.
7. The image controller and engine controller can be upgraded by downloading new firmware.

B. Items for Adjustment and Setting

1. [Automatic printing position adjustment and automatic band adjustment](#)
2. [Waste ink counter reset](#)
3. [Image controller and engine controller replacement procedures](#)
4. [Paper feed accuracy compensation value adjustment method](#)
5. [Parallel interface communication mode setting method](#)
6. [Image controller and engine controller upgrade procedures](#)

C. Adjustment and Setting Procedures

Some of the adjustments and settings must be carried out after the machine has been booted up in the specific methods described below.

Mode	Operating procedure
Service mode	Turn on the power while pressing both the Up arrow and Down arrow keys.
Firmware download mode	Turn on the power while pressing both the Right arrow and Left arrow keys.
Parallel interface communication select mode	Turn on the power while pressing both the ONLINE and ENTER keys.

1. Automatic printing position adjustment and automatic band adjustment (User-settable)

Select and execute the "Auto Adjust" or "Auto Band-adj." from the "Adjustment" menu within the Main menu. (See P. 1-15.)

2. Waste ink counter reset (for exclusive use in service mode)

Select and execute "W-INK" from the "INITIALIZE" menu of the service mode.

3. Replacing the image controller and engine controller

3.1 Cautions

- 1) The image controller and engine controller must not be replaced at the same time. The EEPROM on the engine controller stores data on waste ink amount, carriage driving time and others. Before replacing the engine controller, the data must be transferred into the EEPROM of the image controller, and then be automatically updated through internal communication. Therefore, the two controllers cannot be replaced simultaneously.
- 2) After replacing the image controller or engine controller, check the firmware version in the "Information" mode of the "System Setup" menu within the Main menu. If the version is outdated, it will be necessary to update the firmware to the newest version. (See P. 5-16.)

3.2 Replacing the image controller

When the image controller is replaced, the user settings set up using the operation panel are lost. Therefore, if the same settings need to be made after the replacement, execute the following procedure.

- 1) Before replacing the controller, print the "Setup List" of the "Internal Print" menu within the Main menu from the operating panel. (See pages 1-24 to 1-26.)
- 2) Replace the image controller. (See P. 3-32.)
- 3) Reset the values in the "Setup List".

3.3 Replacing the engine controller

Before replacing the engine controller, the data such as the waste ink amount, carriage driving time, and paper feed accuracy compensation value stored in the EEPROM of the engine controller must be copied into the EEPROM of the image controller, and then be automatically updated through internal communication.

The procedure is as follows.

- 1) Access the service mode, and select "INITIALIZE".
- 2) Display "E/C EEPROM" in the message display.
- 3) While holding the Down arrow key, press the ENTER key. The engine controller EEPROM data is copied into the EEPROM of the image controller.

While the data is being transferred, a "*" mark is displayed to the right of the "E/C EEPROM" display.

- 4) After the "*" mark has disappeared, turn off the power, and unplug the power cord.
- 5) Replace the engine controller. (See P. 3-33.)

At this time, be sure to check SW201 (model switch) on the new engine controller.

<Switching of the model>

On the engine controller, the model selection is determined by the jumper (SW201).

* A0 model: No jumper

* A1 model: Jumper installed

- 6) Run the "Auto Adjust" and "Auto Band Adj." of the "Adjustment" menu within the Main menu, and check whether the printing is correct.

CAUTION

If the precision of the printing becomes worse after replacing the engine controller, the replacement procedure may not have been followed correctly, or the EEPROM data may not have been successfully updated.

In this case, be sure to check that the paper feed accuracy compensation value ("X-SCALE" of the "ADJUST" menu within the service mode) matches the H/W X value written on the label attached to the left frame (remove the left cover to see the label).

If they don't match, set the printer to the value written on the label.

If they do match, perform the procedure described in ["10. Dimensional accuracy problems"](#) of ["V. Corrective Procedures for Image Defects"](#). (See P. 5-51.)

4. Paper feed accuracy compensation value adjustment

Media feed accuracy can be adjusted as follows.

- 1) Set up the service mode and select the "ADJUST" mode.
- 2) Load a cut sheet larger than A3.
- 3) Use the left or right arrow key to display "PRINT PATTERN" and then press the down arrow key.
- 4) Make sure that "Scale" is displayed, then press the ENTER key.
 - The scaling adjustment pattern will be printed.
 - While printing, the message is followed by a "*" mark.

```
PRINT PATTERN
Scale *
```

CAUTION

The paper feed accuracy compensation value adjustment pattern may not be adjustable, since the pattern cannot be printed in the paper feed direction if the Auto Layout/Rotation are set. Adjustment is also difficult if Scale/Y Mirror are set. Therefore, return the settings of "Auto Layout", "Scale", "Rotation", and "Y Mirror" to their default values.

- 5) Measure the length of the printed scale adjustment pattern in the paper feed direction.
 - Specified value: $380 \pm 0.5 \text{mm}$

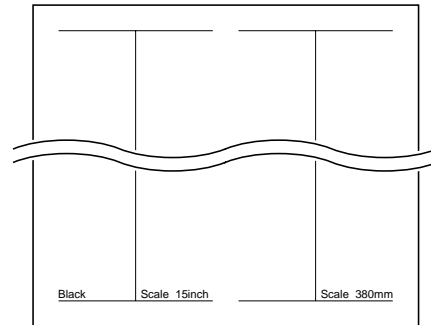


Figure 5-201

- 6) If the measured value does not satisfy the specified value, change the value of "X-SCALE" in the ADJUST mode.
 - Setting range: -32 to 32
 - To change the value: Left and right arrow keys.
 - Value registration: ENTER key

```
X - SCALE
```

```
OO *
```

REFERENCE:

- Changing the value by 1 changes the length of the adjustment in the X axis direction by 1 dot (about 0.07mm).
- When the value is increased, the line becomes longer, and by decreasing the value, the line becomes shorter.

- 7) Repeat steps 2) through 6) until the specified value is satisfied.
- 8) Turn OFF the power switch to leave the service mode.

CAUTION

When changing the paper feed accuracy compensation value ("X-SCALE" value), be sure to write the new value in the "H/W X" item on the label attached to the left frame (under the left cover). At the factory, each printer is adjusted and the value is written on this label.

Figure 5-202 shows the label on the left panel of the printer.

(In this printer, the "H/W Y" and "H/W B" adjustments are not used.)

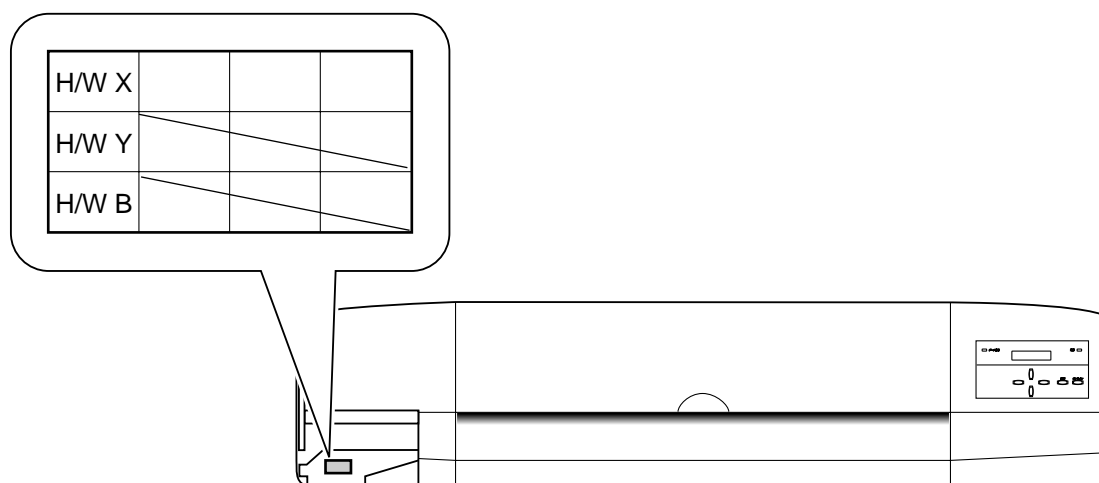


Figure 5-202

5. Changing the parallel interface communication mode

With some types of computers which communicate in the compatible mode, the timing of the Busy and $\overline{\text{Ack}}$ signals may need to be changed as the communication may not be done correctly.

In most computers, communication can be carried out normally using the "A-B (Default)" setting. However, if the data reception indicator on the printer does not light up when data is transferred, the communication mode should be switched by following the procedure below.

- 1) Turn OFF the power switch.
- 2) While pressing both the ONLINE and ENTER keys, turn ON the power switch to display the "Parallel Interface Communication select Mode."
- Confirm that "Busy-Ack" is displayed on the message display and release the keys.

```

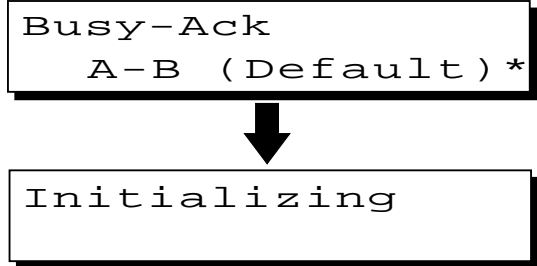
Busy-Ack
A-B (Default)

```

- 3) Press the left or right arrow key to display the desired communication mode.

- 4) Press the ENTER key to confirm the displayed mode.

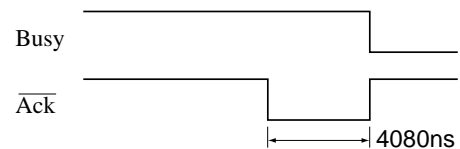
- When a "*" mark is displayed after the name of communication mode, execute the initial operation and return to the normal menu.



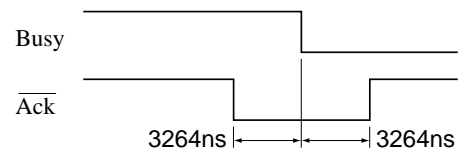
REFERENCE:

Relationship between the Busy and $\overline{\text{Ack}}$ signals in each communication mode :

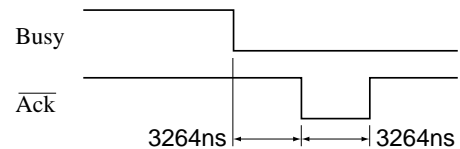
- A - B (Default) [Ack-in-Busy]



- A - B - A [Ack-while-Busy]



- B - A [Ack-after-Busy]



- A - B (Fast) [Ack-in-Busy(fast)]

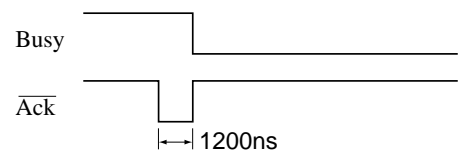


Figure 5-203

6. Image controller/engine controller upgrade procedure

Upgrade the image controller and/or engine controller by downloading the firmware following the procedure below.

- 1) Turn OFF the power switches of the printer and computer.
- 2) Connect the machine and computer using a parallel interface cable.
- 3) While pressing both the right and left arrow keys, turn ON the power switch of the printer.
 - Make sure that "Download Mode.." is displayed on the message display and release the keys.

```
Initializing
Download Mode..
```

- After initialization is finished, the following message is displayed and the download mode is selected.

```
Download Mode
[Send File to Pa
```

[Send File to Parallel Port]

- 4) Turn ON the power switch of the computer.
- 5) Insert the disk (containing the new firmware) into the disk drive.
- 6) Select the name of the drive in which the disk was inserted.

- 7) Type the following from the command prompt (when the computer output port LPT1 has been selected).

COPY/B file name LPT1:

- 8) Press the RETURN key.

- Data transmission from the computer to the printer starts.
- When data reception starts, the data reception light on the printer lights up. "Receiving.." is displayed on the message display.

```
Download Mode
Receiving..
```

- When the printer identifies the version of the data being transmitted, it displays the version as follows on the message display.
 - a) For both the image controller and engine controller :

```
I : XX.XX E : XX.XX
Receiving..
```

- b. For only the image controller :

```
I / C Ver.XX.XX
Receiving..
```

- c. For only the engine controller :

```
E / C Ver.XX.XX
Receiving..
```

- Upon completion of data reception, one of the following messages is displayed.
 - a: For both the image controller and engine controller :

```
I : XX.XX E : XX.XX
[ Press Online Ke
```

[Press Online Key to Write File on Flash]

- b: For only the image controller :

```
I / C XX.XX → XX.XX
[ Press Online Ke
```

[Press Online Key to Write File on Flash]

- c: For only the engine controller :

```
E / C XX.XX → XX XX
[ Press Online Ke
```

[Press Online Key to Write File on Flash]

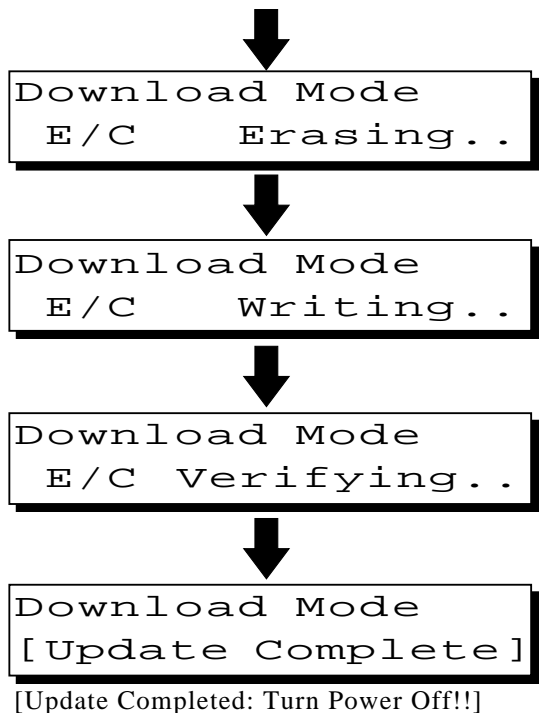
9) Press the ONLINE key

- Data in the flash memory is erased, written and verified. During this process, the following messages are displayed :

```
Download Mode
I / C Erasing..
```

```
Download Mode
I / C Writing..
```

```
Download Mode
I / C Verifying..
```



CAUTION

Do not turn OFF the power switch of the printer or computer during the download operation as there is a possibility that the firmware will not start up.

If the power is accidentally switched off at the wrong time, turn on the printer and the computer, and download the firmware again. If the printer cannot be started up, replace the PCB that you tried to download the firmware to.

10) Turn OFF the power switch of the printer.

11) Turn ON the power switch of the printer. Check the firmware version and whether the printer operates normally.

III. ERROR/WARNING CODES

A. Outline

This machine has a self-diagnostic function by means of the engine controller and image controller. Diagnosis is carried out as required.

If a problem is detected, a code or symbol and a message indicating the type of problem are indicated on the message display of the operation panel.

Problems with the printer are classified into errors and warnings as shown below.

Error:

A state in which the printer stops operating and cannot return to normal operation until the cause of the trouble is removed.

Warning:

A state in which the machine does not stop operating, and can continue without removing the cause of the problem. However, the printed image may be influenced.

B. List of Error and Warning Codes

- Error/warning code configuration

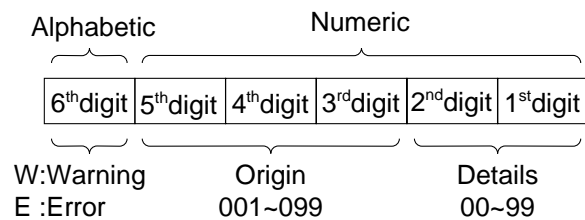


Figure 5-301

CAUTION

- For the code descriptions, since the codes enclosed with () are displayed as messages, the codes themselves are not displayed. However, in the "WARNING" and "ERROR" areas in the service mode, the last 20 codes, including the codes enclosed with (), are displayed.

- Errors and warning codes

The errors and warning codes are shown below.

Detailed information on the codes (meaning, detecting timing, major causes) are described in the following pages.

Codes *	Diagnostic part
001xx	Media/feeding system
003xx	Drive system
004xx	BJ Print head system
005xx	Ink tank system
007xx	Purge system
008xx	Cutter system
011xx	Engine controller internal error
012xx	Internal communication system
015xx	Power supply related
021xx	User-adjusted system
051xx	Image controller internal error
052xx	Serial interface communication system
053xx	Parallel interface communication system
060xx	Internal data processing system
061xx	GL command system
062xx	GL2 command system
063xx	RTL command system
064xx	ESC command system
065xx	PJL command system
067xx	TIFF command system
097xx	Direct error code from the image controller
098xx	Direct error code from the engine controller

* The codes above indicate the five right-most digits. In the actual displays, the code "E" (error) or "W" (warning) is added at the left.

1. 001xx (Media/feeding system)

Refer to "CORRECTION OF OPERATION DEFECTS" (P. 5-32) for remedies.

Code	Meaning	Detection timing	Major cause
(W00111)	<ul style="list-style-type: none"> PE sensor (PS6) detected the roll media trailing edge. 	<ul style="list-style-type: none"> While loading (roll media mode) While printing (roll media mode) 	<ul style="list-style-type: none"> No roll media Defective PE sensor (PS6) Defective engine controller
E00151	<ul style="list-style-type: none"> Media sensor (PS9) cannot detect the media leading edge. 	<ul style="list-style-type: none"> When detecting the media leading edge 	<ul style="list-style-type: none"> Media was removed during operation. Media jam Defective media Defective media sensor (PS9) Defective carriage controller Defective paper feed motor (M1) Defective engine controller
E00152	<ul style="list-style-type: none"> PE sensor (PS6) cannot detect the cut sheet trailing edge. 	<ul style="list-style-type: none"> When detecting media trailing edge 	<ul style="list-style-type: none"> Media jam Improper loading of media Defective media Defective PE sensor (PS6) Defective paper feed motor (M1) Defective engine controller
E00153	<ul style="list-style-type: none"> Media sensor (PS9) missed the media. 	<ul style="list-style-type: none"> At the time of media sensor compensation At the time of media leading edge detection At the time of media width measurement 	<ul style="list-style-type: none"> Media was removed during operation. Media jam Defective media Defective media sensor (PS9) Defective carriage controller Defective engine controller
E00154	<ul style="list-style-type: none"> Carriage cannot move. 	<ul style="list-style-type: none"> While loading While printing (except for auto cut operation) While the carriage is returning, except for above cases (except for cutting operation) 	<ul style="list-style-type: none"> Media jam Improper installation of carriage belt Defective carriage motor (M2) Defective linear encoder (PS8) Defective linear scale Defective carriage controller Defective engine controller
E00156	<ul style="list-style-type: none"> The PE sensor (PS6) detected the cut sheet trailing edge earlier than the size detected by the machine. 	<ul style="list-style-type: none"> While printing 	<ul style="list-style-type: none"> Media was removed during operation. Defective PE sensor (PS6) Defective paper feed motor (M1) Defective engine controller

Code	Meaning	Detection timing	Major cause
(W00161)	<ul style="list-style-type: none"> Media sensor (PS9) detected skewed feed of roll media exceeding the specified value. Media sensor (PS9) detected skewed feed of cut sheet media exceeding the specified value. 	<ul style="list-style-type: none"> When skewed feeding is detected. 	<ul style="list-style-type: none"> Improper loading of media Defective media Defective media sensor (PS9) Defective carriage controller Defective engine controller
E00162	<ul style="list-style-type: none"> Media sensor (PS9) cannot detect the right edge of the media. Media sensor (PS9) cannot detect the left edge of the media. 	<ul style="list-style-type: none"> At the time of media width measurement At the time of media skewed feed detection 	
E00164	<ul style="list-style-type: none"> Defective detection of media width. 	<ul style="list-style-type: none"> Media sensor (PS9) detected media width below 250mm. 	<ul style="list-style-type: none"> Defective media Defective media sensor (PS9) Defective linear encoder (PS8) Defective linear scale Defective carriage controller Defective engine controller
E00165	<ul style="list-style-type: none"> PE sensor (PS6) detected a media length less than 80mm. 	<ul style="list-style-type: none"> While loading in the cut sheet media mode 	<ul style="list-style-type: none"> Media was removed during operation. Defective media Defective PE sensor (PS6) Defective paper feed motor (M1) Defective engine controller
E00169	<ul style="list-style-type: none"> Media sensor (PS9) could not identify black. Media sensor (PS9) could not identify white. 	<ul style="list-style-type: none"> At the time of media sensor compensation 	<ul style="list-style-type: none"> Defective media Defective media sensor (PS9) Defective carriage controller Defective engine controller

2. 003xx (Drive system)

Code	Meaning	Detection timing	Major cause
E00311	<ul style="list-style-type: none"> Carriage does not operate. 	<ul style="list-style-type: none"> During initial operation During purging operation When the carriage is moving backward for a reason other than above (except for cutting operation) 	<ul style="list-style-type: none"> Improper installation of carriage belt Defective carriage home position sensor (PS2) Defective carriage motor (M2) Defective linear encoder (PS8) Defective linear scale Defective carriage controller Defective engine controller
E00312	<ul style="list-style-type: none"> Carriage does not stop at a normal position. 	<ul style="list-style-type: none"> When carriage cannot stop at a normal position. 	
E00313	<ul style="list-style-type: none"> Carriage stops abnormally. 	<ul style="list-style-type: none"> When front cover is open, carriage moves backward more than 20 mm from the stop position. 	<ul style="list-style-type: none"> Operation mistake Defective carriage motor (M2) Defective linear encoder (PS8) Defective carriage controller Defective engine controller

3. 004xx (BJ Print head system)

Code * ¹	Meaning	Detection timing	Major cause
(E00401) * ²	• No BJ print head	• During initial operation	• There is no BJ print head. • Improper installation of BJ print head • Defective BJ print head • Defective flexible cable inside the carriage unit • Defective carriage controller • Defective engine controller
(W00402) * ³			
(W00403) * ³			
(W00404) * ³			
(E00451) * ⁴	• Abnormal head rank • The front cover was closed while the BJ print head was removed.	• Constant detection • At the time of BJ print head replacement	
(E00452) * ⁴			
(E00453) * ⁴			
(E00454) * ⁴			
(E00461) * ⁴	• Abnormal head temperature control	• Too much time required for head temperature adjustment	• Defective BJ print head • Defective flexible cable inside the carriage unit • Defective media sensor (Internal temperature detection function) • Defective carriage controller • Defective engine controller
(E00462) * ⁴			
(E00463) * ⁴			
(E00464) * ⁴			
(E00471) * ⁴	• Abnormal head temperature compensation	• When head temperature compensation is abnormal.	
(E00472) * ⁴			
(E00473) * ⁴			
(E00474) * ⁴			
(E00481) * ⁴	• Abnormal head cooling control	• After abnormal BJ print head temperature is detected, the print head has not cooled to the temperature controllable even after operation has stopped for 40 seconds.	
(E00482) * ⁴			
(E00483) * ⁴			
(E00484) * ⁴			

*¹: Last digit of the code represents ink color. (1=BK, 2=C, 3=M, 4=Y)

*²: When an error occurs, an applicable print head is displayed as [_] (blinking) on the message display.

*³: When an error occurs, an applicable print head is displayed as [_] on the message display.

*⁴: When an error occurs, an applicable print head is displayed as [?] on the message display.

4. 005xx (Ink tank system)

Code *	Meaning	Detection timing	Major cause
(E00501)	<ul style="list-style-type: none"> The ink tank sensor (PS4) cannot detect the ink tank (no ink tank). 	<ul style="list-style-type: none"> At the time of the home position detection 	<ul style="list-style-type: none"> No ink tank Improper installation of ink tank Defective ink tank Defective ink tank detection sensor (PS4) Defective engine controller
(E00502)			
(E00503)			
(E00504)			
(E00511)	<ul style="list-style-type: none"> Remaining ink level count reached the specified value for no ink 	<ul style="list-style-type: none"> After suction After completion of printing 	<ul style="list-style-type: none"> No ink Defective remaining ink level sensor (PS3) Defective engine controller
(W00512)			
(W00513)			
(W00514)			
(W00521)	<ul style="list-style-type: none"> Remaining ink count detected no ink in the ink chamber. 	<ul style="list-style-type: none"> After suction After completion of printing operation 	<ul style="list-style-type: none"> No ink in the ink chamber Defective remaining ink level sensor (PS3) Defective engine controller
(W00522)			
(W00523)			
(W00524)			

* First digit of the code represents ink color. (1=BK, 2=C, 3=M, 4=Y)

5. 007xx (Purge system)

Code	Meaning	Detection timing	Major cause
E00701	<ul style="list-style-type: none"> Pump position cannot be detected. 	<ul style="list-style-type: none"> Purge unit does not return to the pump position even though the purge unit pump position detection operation was repeated 3 times. 	<ul style="list-style-type: none"> Defective pump position sensor (PS1) Defective purge motor (M3) Defective engine controller
E00711	<ul style="list-style-type: none"> Waste ink counter reached the specified value for full waste ink absorber unit. 	<ul style="list-style-type: none"> After suction 	<ul style="list-style-type: none"> Full waste ink absorber unit Waste ink counter was cleared in the service mode. Defective engine controller
(W00721)	<ul style="list-style-type: none"> Waste ink counter reached the specified value for approximately full. 		

6. 008xx (Cutter system)

Code	Meaning	Detection timing	Major cause
E00801	<ul style="list-style-type: none"> Media could not be cut. 	<ul style="list-style-type: none"> While detecting the media leading edge after being cut. 	<ul style="list-style-type: none"> No cutter Improper installation of cutter Defective cutter Improper media sensor (PS9) Defective carriage controller Defective engine controller
E00811	<ul style="list-style-type: none"> Carriage cannot operate. 	<ul style="list-style-type: none"> While cutting 	<ul style="list-style-type: none"> Cutter jam Defective cutter Defective carriage motor (M2) Defective linear sensor (PS8) Defective linear scale Defective carriage controller Defective engine controller
E00841	<ul style="list-style-type: none"> Carriage stops abnormally. 	<ul style="list-style-type: none"> When the front cover is open, carriage moved forward more than 20mm from the stop position unexpectedly. 	<ul style="list-style-type: none"> Operation mistake Defective carriage motor (M2) Defective linear encoder (PS8) Defective carriage controller Defective engine controller

7. 011xx (Engine controller)

Code	Meaning	Detection timing	Major cause
E01102	<ul style="list-style-type: none"> Failed initialization of EEPROM Failed reading from EEPROM Failed writing to EEPROM 	<ul style="list-style-type: none"> Constant 	<ul style="list-style-type: none"> Defective engine controller
E01135	<ul style="list-style-type: none"> EEPROM checksum error EEPROM data damage 		

8. 012xx (Internal communication system)

Code	Meaning	Detection timing	Major cause
E01219	<ul style="list-style-type: none"> Abnormal communication between engine controller and image controller 	<ul style="list-style-type: none"> Constant 	<ul style="list-style-type: none"> Defective engine controller Defective image controller

9. 015xx (Power supply related)

Code	Meaning	Detection timing	Major cause
E01501	<ul style="list-style-type: none"> Cooling fan (FM2) is not rotating. 	<ul style="list-style-type: none"> Fan rotation signal (FANSTS) cannot be detected while the cooling fan (FM2) is rotating 	<ul style="list-style-type: none"> Defective cooling fan (FM2) Defective engine controller

10. 021xx (User-adjusted system)

Code	Meaning	Detection timing	Major cause
E02101	<ul style="list-style-type: none"> Abnormal compensation value of media sensor (PS9) 	<ul style="list-style-type: none"> During media sensor compensation when adjustment menu is being executed 	<ul style="list-style-type: none"> Defective media sensor (PS9) Defective carriage controller Defective engine controller
E02102	<ul style="list-style-type: none"> Abnormal adjustment value 		
E02103	<ul style="list-style-type: none"> Media too small 	<ul style="list-style-type: none"> During loading while automatic adjustment is being executed 	<ul style="list-style-type: none"> Improper media size Defective PE sensor (PS6) Defective media sensor (PS9) Defective carriage controller Defective engine controller

11. 051xx (Image controller)

Code	Meaning	Detection timing	Major cause
E05102	<ul style="list-style-type: none"> No EEPROM Error writing to EEPROM 	<ul style="list-style-type: none"> Constant 	<ul style="list-style-type: none"> Defective DRAM Defective added memory Defective image controller
E05105	<ul style="list-style-type: none"> No on board DRAM Abnormal onboard DRAM 		
E05106	<ul style="list-style-type: none"> Abnormal added Memory 		

12. 052xx (Serial interface communication system)

Code	Meaning	Detection timing	Major cause
E05211	<ul style="list-style-type: none"> I/F buffer overflow 	<ul style="list-style-type: none"> While data is being received 	<ul style="list-style-type: none"> Improper communication setting with the computer Defective image controller
E05221	<ul style="list-style-type: none"> Overflow 		
E05222	<ul style="list-style-type: none"> Framing error 		
E05223	<ul style="list-style-type: none"> Parity error 		

13. 053xx (Parallel interface communication system)

Code	Meaning	Detection timing	Major cause
E05311	<ul style="list-style-type: none"> I/F buffer overflow 	<ul style="list-style-type: none"> While data is being received 	<ul style="list-style-type: none"> Improper communication setting with the computer Defective image controller

14. 060xx (Internal data processing system)

Code	Meaning	Detection timing	Major cause
W06011	• Data missing due to insufficient memory	• While data is being analyzed	<ul style="list-style-type: none"> • Insufficient memory • Defective setting of parallel interface communication mode • Defective image controller
W06012	• Missing data while analyzing TIFF data		
W06013	• Data missing due to insufficient memory (When being copied, second pages onwards)	• While data is being analyzed	• Insufficient memory
W06021	• Print data exceeds the printable area of the paper set up.	• While data is being analyzed	<ul style="list-style-type: none"> • Defective communication data from computer • Improper setting for parallel interface communication mode • Defective image controller
W06022			
W06023			
W06031	• Image data could not be rotated.	• While data is being analyzed	<ul style="list-style-type: none"> • Insufficient memory • Defective image controller
(W06041)	• Printing in monochrome mode since there are no color BJ print head/print heads (Y, M and C).	• Immediately before printing	<ul style="list-style-type: none"> • No color BJ print head/s (Y, M and C) • Improper installation of BJ print head • Defective BJ print head • Defective flexible cable inside the carriage unit • Defective carriage controller • Defective engine controller

15. 061xx (GL command system)

Code	Meaning	Detection timing	Major cause
W06100	• Unsupported command	• While data is being analyzed	<ul style="list-style-type: none"> • Incorrect data from computer • Defective image controller
W06111	• Incorrect number of parameters		
W06120	• Necessary parameters in the command are omitted.		
W06121	• Incorrect data range		

16. 062xx (GL2 command system)

Code	Meaning	Detection timing	Major cause
W06200	• Unsupported command	• While data is being analyzed	<ul style="list-style-type: none"> • Improper communication data from computer • Defective image controller
W06211	• Incorrect number of parameters		
W06220	• Necessary parameters in the command are omitted.		
W06221	• Incorrect data range		

17. 063xx (RTL command system)

Code	Meaning	Detection timing	Major cause
W06300	• Unsupported command	• While data is being analyzed	<ul style="list-style-type: none"> • Improper communication data from computer • Defective image controller
W06301	• Invalid data other than null or FF (HEX) continued for more than 20 bytes.		
W06311	• Incorrect number of parameters		
W06320	• Necessary parameters in the command are omitted.		
W06321	• Incorrect data range		

18. 064xx (ESC command system)

Code	Meaning	Detection timing	Major cause
W06400	• Unsupported command	• While data is being analyzed.	<ul style="list-style-type: none"> • Improper communication data from computer • Defective image controller
W06411	Incorrect number of parameters		
W06420	• Necessary parameters in the command are omitted.		
W06421	• Incorrect data range		

19. 065xx (PJM command system)

Code	Meaning	Detection timing	Major cause
W06500	• Unsupported command	• While data is being analyzed.	<ul style="list-style-type: none"> • Improper communication data from computer • Defective image controller
W06511	• Incorrect number of parameters		
W06520	• Necessary parameters in the command are omitted.		
W06521	• Incorrect data range		

20. 067xx (TIFF command system)

Code	Meaning	Detection timing	Major cause
W06700	• Unsupported command	• While data is being analyzed	<ul style="list-style-type: none"> • Improper communication data from computer • Defective image controller
W06721	• Improper parameter range		
W06760	• Unsupported parameter		
W06761	• Unsupported compression was designated.		
W06762	• Unsupported color was designated.		

21. 097xx (Direct error code from the image controller)

Code	Meaning	Detection timing	Major cause
E097xx*	<ul style="list-style-type: none"> Undefined error on image controller 	<ul style="list-style-type: none"> Constant 	<ul style="list-style-type: none"> Defective image controller

* The last 2 digits of the code are hexadecimal.

22. 098xx (Direct error code from the engine controller)

Code	Meaning	Detection timing	Major cause
E098xx*	<ul style="list-style-type: none"> Undefined error on engine controller 	<ul style="list-style-type: none"> Constant 	<ul style="list-style-type: none"> Defective engine controller

* The last 2 digits of the code are hexadecimal.

23. 099xx (Others)

Code	Meaning	Detection timing	Major cause
E09999	<ul style="list-style-type: none"> Unexpected error 	<ul style="list-style-type: none"> When error occurs 	<ul style="list-style-type: none"> Defective firmware

IV. CORRECTION OF OPERATION DEFECTS

1. 001xx (Media/feeding system)

Problem/Unit	Step	Check item	Result	Remedy
Media jam	1	Has media jam occurred?	YES	Remove media jam.
Incorrect media setting	2	Is the media loaded properly?	NO	Instruct the user to load the media correctly according to the specified media loading procedure.
Incorrect media	3	Are the type and size of the media proper?	NO	Instruct the user to use recommended media.
	4	Is "E00154" indicated on the message display?	YES	Refer to "Table 2. 003xx (Drive system)" (P.5-33).
	5	Is the media fed properly?	NO	Refer to "Media is not fed" (P.5-42).
	6	Does the major cause lie in the PE sensor (PS6)?	YES	Proceed to step 7.
			NO	Proceed to step 8.
PE sensor (PS6)	7	Is the trouble corrected by replacing the PE sensor?	YES	Completed.
Engine controller			NO	Check the wiring from the sensor to the engine controller. If correct, replace the engine controller.
Media sensor (PS9) Carriage controller	8	Is the trouble corrected by replacing the carriage unit?	YES	Completed.
Engine controller			NO	Check the wiring from the sensor to the carriage controller and from the carriage controller to the engine controller. If correct, replace the engine controller.

2. 003xx (Drive system)

Problem/Unit	Step	Check item	Result	Remedy																					
Foreign substance on rail	1	Can the carriage be moved smoothly by hand?	NO	Check for foreign substance, or some part in contact with the rail surface.																					
Carriage belt	2	Is the carriage belt correctly installed?	NO	Reinstall correctly.																					
Carriage home position sensor	3	Move the carriage onto the platen and turn ON the power switch. Does the carriage move to the home position?	YES	Check the wiring for the carriage home position sensor (PS2). If correct, replace the purge unit.																					
Carriage motor (M2)	4	Turn OFF the power switch and unplug the power cord from the outlet. Disconnect connector J201 on the engine controller. Set the tester range to x10 and connect the leads of the tester to the harness terminals on the motor side as shown in the table below. Are the resistance values correct? <table><tr><td>+</td><td>-</td><td>Resistance value</td></tr><tr><td>J201-3</td><td>J201-4</td><td>Approx. 4.8Ω</td></tr><tr><td>J201-5</td><td>J201-6</td><td>Approx. 4.8Ω</td></tr><tr><td>J201-1</td><td>J201-3</td><td>Approx. 2.4Ω</td></tr><tr><td>J201-1</td><td>J201-4</td><td>Approx. 2.4Ω</td></tr><tr><td>J201-2</td><td>J201-5</td><td>Approx. 2.4Ω</td></tr><tr><td>J201-2</td><td>J201-6</td><td>Approx. 2.4Ω</td></tr></table>	+	-	Resistance value	J201-3	J201-4	Approx. 4.8Ω	J201-5	J201-6	Approx. 4.8Ω	J201-1	J201-3	Approx. 2.4Ω	J201-1	J201-4	Approx. 2.4Ω	J201-2	J201-5	Approx. 2.4Ω	J201-2	J201-6	Approx. 2.4Ω	NO	Replace the motor.
+	-	Resistance value																							
J201-3	J201-4	Approx. 4.8Ω																							
J201-5	J201-6	Approx. 4.8Ω																							
J201-1	J201-3	Approx. 2.4Ω																							
J201-1	J201-4	Approx. 2.4Ω																							
J201-2	J201-5	Approx. 2.4Ω																							
J201-2	J201-6	Approx. 2.4Ω																							
Linear scale	5	Is the trouble corrected by replacing the linear scale?	YES	Completed.																					
Linear encoder (PS8)	6	Is the trouble corrected by replacing the carriage unit?	YES	Completed.																					
Carriage controller																									
Engine controller			NO	Check the wiring from the carriage controller to the engine controller. If correct, replace the engine controller.																					

3. 004xx (BJ Print head system)

Problem/Unit	Step	Check item	Result	Remedy
BJ print head instal- lation problem	1	Is the BJ print head properly installed?	NO	Install the BJ print head correctly.
BJ print head	2	Is the trouble corrected by replac- ing the BJ print head?	YES	Completed.
Flexible cable Thermistor (TH1) Carriage controller	3	Is the trouble corrected by replac- ing the carriage unit?	YES	Completed.
Engine controller			NO	Check the wiring from the carriage controller to the engine controller. If correct, replace the engine controller.

4. 005xx (Ink tank system)

Problem/Unit	Step	Check item	Result	Remedy
Ink tank installation problem	1	Is the ink tank installed correctly?	NO	Install the ink tank correctly.
Ink tank	2	Is the trouble corrected by replacing the ink tank?	YES	Completed.
Remaining ink sensor (PS3) Ink tank sensor (PS4)	3	Is the trouble corrected by replacing the purge unit?	YES	Completed.
Engine controller			NO	
			NO	Check the wiring from each sensor of the purge unit to the engine controller. If correct, replace the engine controller.

5. 007xx (Purge unit)

a. E00701

Problem/Unit	Step	Check item	Result	Remedy																					
Pump home position sensor (PS1)	1	Does the purge motor (M3) rotate when the power switch is turned ON?	NO	Check the wiring from the sensor to the engine controller and the wiring from the purge motor to the engine controller. If correct, replace the purge unit.																					
Purge motor (M3)		YES	Replace the engine controller.																						
Engine controller																									
		Turn OFF the power switch and unplug the power cord. Remove connector J202 on the engine controller. Set the tester range to x10 and connect the leads of the tester to the harness terminals on the motor side as shown in the table below. Are the resistance values correct?																							
		<table><tr><td>+</td><td>-</td><td>Resistance value</td></tr><tr><td>J202-1</td><td>J202-2</td><td>Approx. 44Ω</td></tr><tr><td>J202-3</td><td>J202-4</td><td>Approx. 44Ω</td></tr><tr><td>J202-1</td><td>J202-5</td><td>Approx. 22Ω</td></tr><tr><td>J202-2</td><td>J202-5</td><td>Approx. 22Ω</td></tr><tr><td>J202-3</td><td>J202-6</td><td>Approx. 22Ω</td></tr><tr><td>J202-4</td><td>J202-6</td><td>Approx. 22Ω</td></tr></table>	+	-	Resistance value	J202-1	J202-2	Approx. 44Ω	J202-3	J202-4	Approx. 44Ω	J202-1	J202-5	Approx. 22Ω	J202-2	J202-5	Approx. 22Ω	J202-3	J202-6	Approx. 22Ω	J202-4	J202-6	Approx. 22Ω		
+	-	Resistance value																							
J202-1	J202-2	Approx. 44Ω																							
J202-3	J202-4	Approx. 44Ω																							
J202-1	J202-5	Approx. 22Ω																							
J202-2	J202-5	Approx. 22Ω																							
J202-3	J202-6	Approx. 22Ω																							
J202-4	J202-6	Approx. 22Ω																							

b. E00711/W00721

Problem/Unit	Step	Check item	Result	Remedy
Full waste ink absorber unit	1	Is the waste ink absorber unit full? (Visual check)	YES	Replace the waste ink absorber unit.
Service mode	2	Was the waste ink counter cleared (Service mode "CLEAR") after replacing the waste ink absorber unit?	NO	Clear the waste ink absorber unit counter in the service mode "CLEAR".
Engine controller			YES	Replace the engine controller.

6. 008xx (Cutter system)

a. E00801

Problem/Unit	Step	Check item	Result	Remedy
	1	Is the code "001xx (Media/feeder system)" displayed when new media is loaded?	YES	Refer to step 7 onwards of Table 1. 001xx (Media/feeder system) (P.5-32).
Foreign substance in the cut groove	2	Are there any foreign substances in the cut groove?	YES	Clean the groove.
Cutter installation problem	3	Is the cutter properly installed?	YES	Install the cutter properly.
Defective cutter	4	Is the trouble corrected by replacing the cutter?	YES	Completed.
Engine controller			NO	Replace the engine controller.

b. E00811/E00841

Problem/Unit	Step	Check item	Result	Remedy
	1	Is the code "003xx (Drive system)" displayed when the power switch is turned ON?	YES	Refer to Table 2. 003xx (Drive system) (P.5-33).
Foreign substance in the cut groove	2	Are there any foreign substances in the cut groove?	YES	Clean the groove.
Defective cutter	3	Is the trouble corrected by replacing the cutter?	YES	Completed.
Engine controller			NO	Replace the engine controller.

7. 011xx (Engine controller)

Problem/Unit	Step	Check item	Result	Remedy
Malfunction	1	Is the trouble corrected by turning the power switch OFF and ON?	YES	Completed.
Engine controller			NO	Replace the engine controller.

8. 012xx (Internal communication system)

Problem/Unit	Step	Check item	Result	Remedy
Malfunction	1	Is the trouble corrected by turning the power switch OFF and ON?	YES	Completed.
Engine controller	2	Is the trouble corrected by replacing the engine controller?	YES	Completed.
Image controller			NO	Replace the image controller.

9. 015xx (Power supply related)

Problem/Unit	Step	Check item	Result	Remedy
Disconnected power connector	1	Is the power connector attached?	NO	Connect the connectors.
Defective cooling fan (FM2)	2	Is the trouble corrected by replacing the cooling fan?	YES	Completed.
Engine controller			NO	Check the wiring from the fan to the engine controller. If correct, replace the engine controller.

10. 021xx (User-adjusted system)

Problem/Unit	Step	Check item	Result	Remedy
Incorrect media	1	Are the media type and size correct?	NO	Instruct the user to use the recommended media.
Engine controller		When loading the cut sheet media (normal menu), is the code "001xx (Media/feeder system)" displayed?	YES	Refer to step 6 onwards of Table 1. 001xx (Media/feeder system) (P.5-32).
			NO	Replace the engine controller.

11. 051xx (Image controller)

Problem/Unit	Step	Check item	Result	Remedy
Malfunction	1	Is the trouble corrected by turning the power switch OFF and ON?	YES	Completed.
Image controller			NO	Replace the image controller.

12. 052xx (Serial interface communication system)

13. 053xx (Parallel interface communication system)

Problem/Unit	Step	Check item	Result	Remedy
Improper printer-computer communication setting	1	Is the printer-computer communication setting proper?	NO	Set the communication mode properly.
Image controller			YES	Replace the image controller.

14. 060xx (Internal data processing system)

a. W6041

Problem/Unit	Step	Check item	Result	Remedy
Missing color BJ print heads (Y, M and C)	1	Are all 3 color BJ print heads (Y, M and C) installed?	NO	Install each color BJ print head.
			YES	Refer to Table 3. 004xx (BJ print head system) (P.5-34).

b. Others

Problem/Unit	Step	Check item	Result	Remedy
Data transmission problem	1	Does the same phenomenon occur with other data transfers?	NO	Explain to the user that the trouble is in the data transfer.
Insufficient memory	2	Has the transmission data exceeded the memory capacity of the printer?	YES	Instruct the user to add memory.
Incorrect setting of parallel interface communication mode	3	Does the same phenomenon occur using the serial interface?	NO	Change the parallel interface communication mode.
Image controller			YES	Replace the image controller.

15. 061xx (GL command system)**16. 062xx (GL2 command system)****17. 063xx (RTL command system)****18. 064xx (ESC command system)****19. 065xx (PJI command system)****20. 067xx (TIFF command system)**

Problem/Unit	Step	Check item	Result	Remedy
Data transmission problem	1	Does the same phenomenon occur with other data transfers?	NO	Explain to the user that the trouble is in the data transfer.
Improper printer-computer communication setting	2	Is the printer-computer communication setting proper?	NO	Set the communication mode properly.
Image controller			YES	Replace the image controller.

21. 097xx (Direct error code from the image controller)

Problem/Unit	Step	Check item	Result	Remedy
Malfunction	1	Is the error corrected by turning the power switch OFF and ON?	YES	Completed.
Image controller			NO	Replace the image controller.

22. 098xx (Direct error code from the engine controller)

Problem/Unit	Step	Check item	Result	Remedy
Malfunction	1	Is the error corrected by turning the power switch OFF and ON?	YES	Completed.
Engine controller			NO	Replace the engine controller.

23. 099xx (Others)

Problem/Unit	Step	Check item	Remedy
Defective firmware	1	—	Turn the power switch OFF and ON.

24. No power

Problem/Unit	Step	Check item	Result	Remedy												
Unplugged power source	1	Is the power cord properly connected to the receptacle on the printer and the outlet?	NO	Connect the power cord correctly to the printer and outlet.												
Power source failure	2	Is the proper voltage available at the outlet?	NO	Explain to the customer that the trouble is not related to the printer.												
Operation panel	3	Does the carriage work when the power switch is turned ON?	YES	Check the wiring from the image controller to the operation panel. If correct, replace the operation panel.												
Disconnected connector	4	Are connectors J101 and J102 on the DC power unit correctly connected?	NO	Connect the connectors properly.												
Blown fuse	5	Is the fuse (F1) on the DC power unit blown?	YES	Remove the cause of the blown fuse and replace the DC power supply.												
Power switch (SW1)	6	Turn OFF the power switch and unplug the power cord. When applying the leads of the tester to the terminals 2 and 3, (then 5 and 6) of the power switch, and turning the power switch ON, is continuity indicated?	NO	Replace the power switch.												
DC power supply unit	7	<div>Remove connector J210 on the engine controller. Set the tester range to 30VDC. With the power switch ON and the tester leads on the harness terminals on the DC power supply side as shown in the table below, are the voltages normal?</div> <table><tr><td>+</td><td>-</td><td>Voltage</td></tr><tr><td>J210-1</td><td>J210-3</td><td>+26V</td></tr><tr><td>J210-2</td><td>J210-4</td><td>+26V</td></tr><tr><td>J210-5</td><td>J210-6</td><td>+5V</td></tr></table>	+	-	Voltage	J210-1	J210-3	+26V	J210-2	J210-4	+26V	J210-5	J210-6	+5V	NO	Check the wiring from the DC power supply to the engine controller. If correct, replace the DC power supply.
+	-	Voltage														
J210-1	J210-3	+26V														
J210-2	J210-4	+26V														
J210-5	J210-6	+5V														
Engine controller	8	Is the trouble corrected by replacing the engine controller?	YES	Completed.												
Image controller			NO	Replace the image controller.												

25. Nothing is indicated on the operation panel

Problem/Unit	Step	Check item	Result	Remedy
Disconnected connector	1	Are the connectors on the operation panel and image controller connected correctly?	NO	Connect the connectors properly.
Operation panel	2	Is the trouble corrected by replacing the operation panel?	YES	Completed.
Image controller			NO	Check the wiring from the operation panel to the image controller. If correct, replace the image controller.

26. Opening and closing of front cover is not detected

Problem/Unit	Step	Check item	Result	Remedy
Front cover switch (SW2)	1	Disconnect the relay connector (J8) of the front cover switch (SW2). Is there continuity when connecting the tester leads rod to the connectors on the switch side and closing the front cover?	NO	Replace the switch.
Engine controller			YES	Replace the engine controller.

27. Wiper solenoid does not working

Problem/Unit	Step	Check item	Result	Remedy
Wiper solenoid (SL1)	1	Is the trouble corrected by replacing the purge unit?	YES	Completed.
Engine controller			NO	Check the wiring from the solenoid to the engine controller. If correct, replace the engine controller.

28. Media is not fed

Problem/Unit	Step	Check item	Result	Remedy																					
Loose set screw	1	Are the set screws fixing the paper feed roller tightened firmly?	NO	Tighten the paper feed roller with set screws.																					
Paper feed motor (M1)	2	Turn OFF the power switch and unplug the power cord. Remove connector J203 on the engine controller. Set the tester range to x10. Are the resistance values normal when the tester leads are connected to the harness terminals on the motor side as shown in the table below? <table border="1"><thead><tr><th>+</th><th>-</th><th>Resistance value</th></tr></thead><tbody><tr><td>J203-3</td><td>J203-4</td><td>Approx. 6.8Ω</td></tr><tr><td>J203-5</td><td>J203-6</td><td>Approx. 6.8Ω</td></tr><tr><td>J203-1</td><td>J203-3</td><td>Approx. 3.4Ω</td></tr><tr><td>J203-1</td><td>J203-4</td><td>Approx. 3.4Ω</td></tr><tr><td>J203-2</td><td>J203-5</td><td>Approx. 3.4Ω</td></tr><tr><td>J203-2</td><td>J203-6</td><td>Approx. 3.4Ω</td></tr></tbody></table>	+	-	Resistance value	J203-3	J203-4	Approx. 6.8Ω	J203-5	J203-6	Approx. 6.8Ω	J203-1	J203-3	Approx. 3.4Ω	J203-1	J203-4	Approx. 3.4Ω	J203-2	J203-5	Approx. 3.4Ω	J203-2	J203-6	Approx. 3.4Ω	NO	Replace the paper feed motor.
+			-	Resistance value																					
J203-3	J203-4	Approx. 6.8Ω																							
J203-5	J203-6	Approx. 6.8Ω																							
J203-1	J203-3	Approx. 3.4Ω																							
J203-1	J203-4	Approx. 3.4Ω																							
J203-2	J203-5	Approx. 3.4Ω																							
J203-2	J203-6	Approx. 3.4Ω																							
Engine controller			YES	Check the wiring from the motor to the engine controller. If normal, replace the engine controller.																					

29. Suction fan does not rotate

Problem/Unit	Step	Check item	Result	Remedy
	1	Does the cooling fan (FM2) rotate when media is loaded?	YES	Go to step 3.
PE sensor (PS6)	2	Is the trouble corrected by replacing the PE sensor (PS6)?	YES	Completed.
Suction fan (FM1)	3	Is the trouble corrected by replacing the suction fan?	YES	Completed.
Engine controller			NO	Check the wiring from the fan to the engine controller. If correct, replace the engine controller.

V. CORRECTION OF IMAGE DEFECTS

A. Initial Inspection

The causes of poor images can be loosely classified into the following four cases :

- Installation environment
- Type or condition of media
- BJ cartridge
- Main unit problem

Check the installation environment, media and other conditions in the initial inspection.

1. Installation environment

Check that the installation environment standards are met.

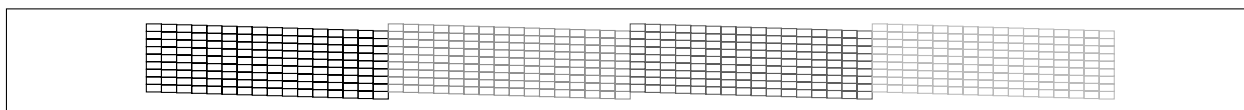
2. Media check

Be sure to check the media condition for the following items :

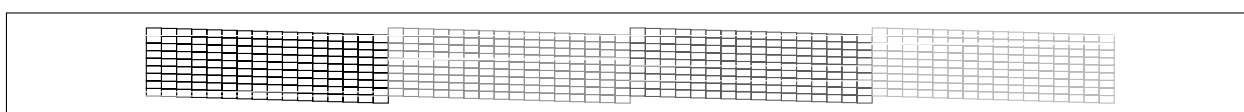
- Recommended media
- Proper media storage environment

B. Corrective Procedures for Image Defects

1. Non-ejection of ink



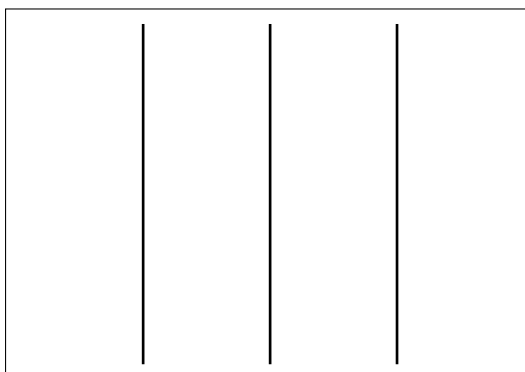
Normal



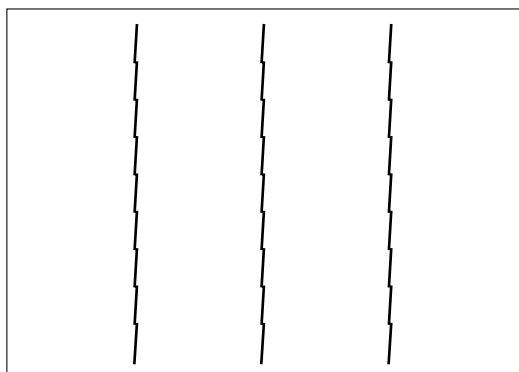
Abnormal

Problem/Unit	Step	Check item	Result	Remedy
No ink	1	Is there ink in the ink tank chamber of the applicable color?	NO	Replace the ink tank of that color. (When the ink becomes faint or no ink is ejected, an empty ink tank is usually the cause.)
Clogged nozzles Foreign substance stuck to the head	2	Carry out the [Head Cleaning] for the applicable color. Is the nozzle check pattern of that color normal when printing using the "Nozzle Check" in the [Internal Print] menu?	NO	If the problem persists after corrective steps have been attempted 3 times, check the following.
Defective head	3	Is the problem remedied by replacing the BJ print head of that color and executing the following process? • Load the recommended type of media larger than A3 (plain paper or coated paper) and execute the "Auto Adjust" in the [Adjustment] menu.	YES	Completed.
Foreign substance stuck to the wiper			NO	Replace the wiper (Cleaner blade).

2. Vertical misalignment 1



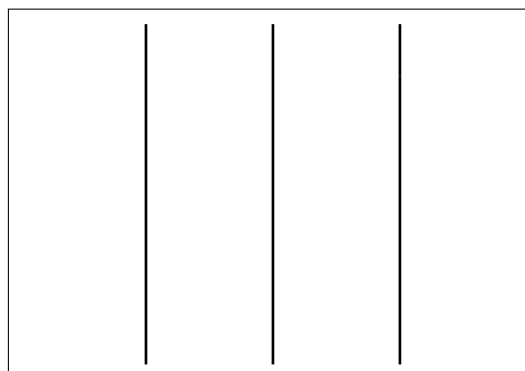
Normal



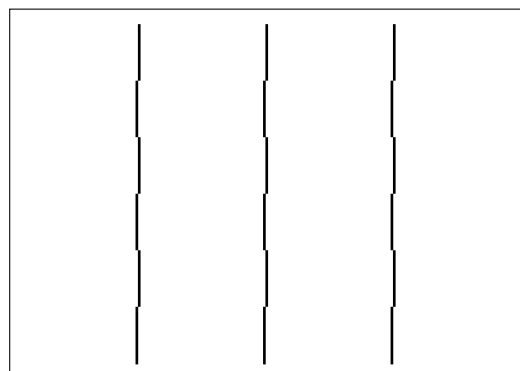
Abnormal

Problem/Unit	Step	Check item	Result	Remedy
BJ print head installation problem	1	Is it corrected by reinstalling the BJ print head of the applicable color and doing the following? <ul style="list-style-type: none"> • Load the recommended type of media (plain paper or coated paper) larger than A3 and execute the "Auto Adjust" in the [Adjustment] menu 	YES	Completed.
Defective head	2	Is it corrected by replacing the BJ print head of that color and doing the following? <ul style="list-style-type: none"> • Load the recommended type of media (plain paper or coated paper) larger than A3 and doing the "Auto Adjust" in the [Adjustment] menu. 	YES	Completed.

3. Vertical misalignment 2



Normal



Abnormal

Problem/Unit	Step	Check item	Result	Remedy
Printing position adjustment problem	1	Is it corrected by loading the recommended type of media (plain paper or coated paper) larger than A3 and executing the "Auto Adjust" in the [Adjustment] menu?	YES	Completed.
Paper thickness adjustment problem	2	Is the paper thickness adjustment lever in the proper position?	NO	Set the paper thickness adjustment lever position properly and carry out the following. <ul style="list-style-type: none"> • Load the recommended type of media (plain paper or coated paper) larger than A3 and execute the "Auto Adjust" in the [Adjustment] menu.
Print mode		Check the print mode. Is it in "Draft" mode?	YES	Set the [Print Mode] menu to other than "Draft".

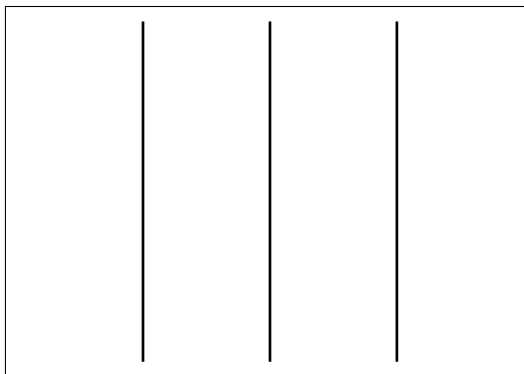
4. Low resolution

Problem/Unit	Step	Check item	Result	Remedy
Clogged nozzle, foreign substance stuck to the head	1	Execute the [Head Cleaning] for the applicable color. Is the nozzle check pattern of that color proper when printing the "Nozzle Check" in the [Internal Print] menu?	NO	If the problem persists after corrective steps have been attempted 3 times, check the next step.
Defective head	2	Is it corrected by replacing the BJ print head of that color and carrying out the following? • Load the recommended type of media (plain paper or coated paper) larger than A3 and execute the "Auto Adjust" in the [Adjustment] menu?	YES	Completed.

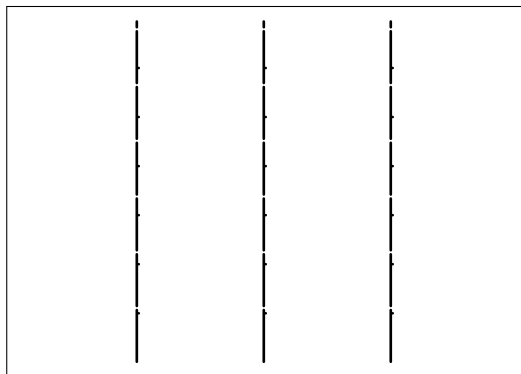
5. Dislocation of dots of different colors

Problem/Unit	Step	Check item	Result	Remedy
Foreign substance stuck to the head	1	Execute [Head Cleaning] for that color. Is the nozzle check pattern of that color proper when printing the "Nozzle Check" in the [Internal Print] menu?	NO	If the problem persists after corrective steps have been attempted 3 times, check the next step.
Printing position adjustment problem	2	Is it corrected by loading the recommended type of paper (plain paper or coated paper) larger than A3 and executing the "Auto Adjust" in the [Adjustment] menu?	YES	Completed.
Defective head	3	Is it corrected by replacing the BJ print head of that color and executing the following? • Load the recommended type of media (plain paper or coated paper) larger than A3 and execute the "Auto Adjust" in the [Adjustment] menu.	YES	Completed.
Defective media sensor (PS9) on the carriage unit			NO	Replace the carriage unit and do the following. • Load the recommended type of media (plain paper or coated paper) larger than A3 and execute "Auto Adjust" of [Adjustment] menu.

6. Dot misalignment



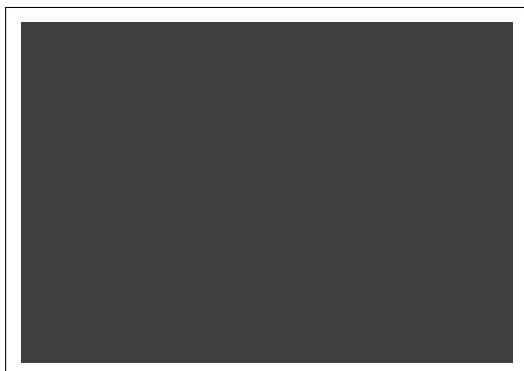
Normal



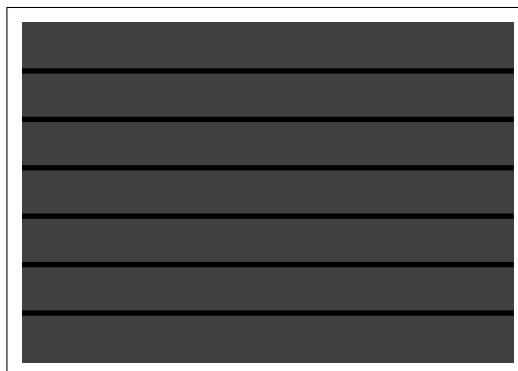
Abnormal

Problem/Unit	Step	Check item	Result	Remedy
Foreign substance stuck to the head	1	Execute [Head Cleaning] for that color. Is the nozzle check pattern of that color proper when the "Nozzle Check" in the [Internal Print] menu is printed?	NO	If the problem persists after corrective steps have been attempted 3 times, check the next step.
Defective head	2	Is it corrected by replacing the BJ print head of that color and executing the following? • Load the recommended type of media (plain paper or coat paper) larger than A3 and execute the "Auto Adjust" in the [Adjustment] menu.	YES	Completed.
Foreign substance stuck to wiper (cleaner blade)			NO	Replace the wiper (cleaner blade).

7. Lines (Carriage direction)



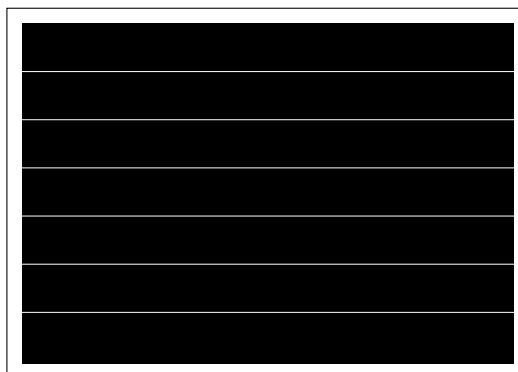
Normal



Abnormal



Normal



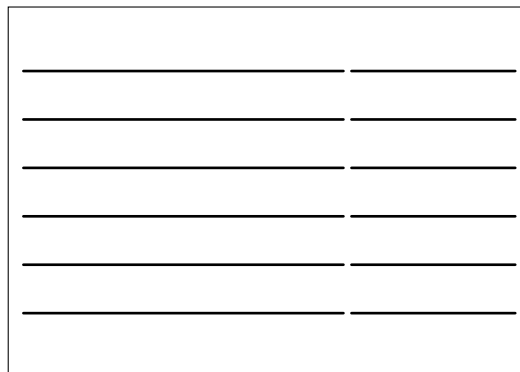
Abnormal

Problem/Unit	Step	Check item	Result	Remedy
Main menu settings	1	Is the "Band Joint" selected in "Feed Priority" in the [System Setup] menu?	NO	If the problem persists after setting "Band Joint", check the following.
Clogged nozzles Foreign substance stuck to the head	2	Carry out the [Head Cleaning] for the applicable color. Is the nozzle check pattern of that color normal when printing using the "Nozzle Check" in the [Internal Print] menu?	NO	If the problem persists after this step has been attempted 3 times, check the following.
Improper paper feed rate adjustment	3	Load the recommended type of media larger than A3 (plain paper or coated paper) and execute the "Auto Band-Adj" in the [Adjustment] menu.	YES	Completed.
Defective head	4	Is the problem remedied by replacing the BJ print head of that color and executing the following? • Load the recommended type of media larger than A3 (plain paper or coated paper) and execute the "Auto Band-Adj" in the [Adjustment] menu.	YES	Completed.

8. White lines (Paper feed direction)



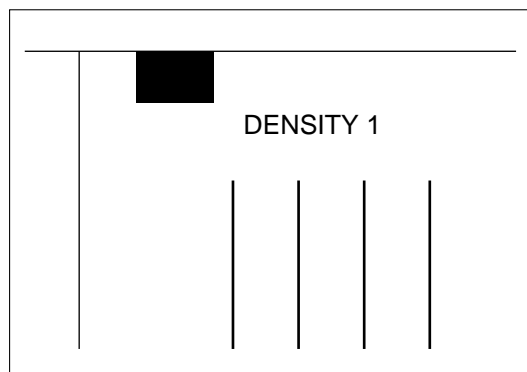
Normal



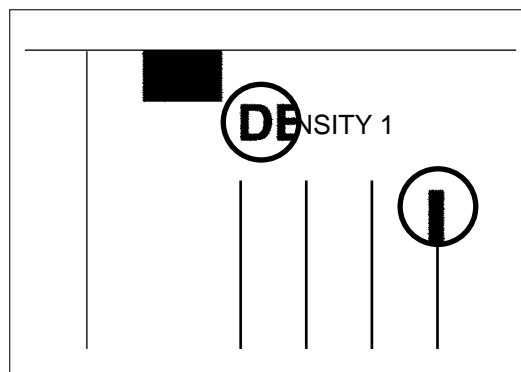
Abnormal

Problem/Unit	Step	Check item	Result	Remedy
Linear scale	1	Is it corrected by replacing the linear scale and executing the following? • Load the recommended type of media (plain paper or coated paper) larger than A3 and execute the "Auto Adjust" in the [Adjustment] menu.	YES	Completed.
Engine controller			NO	Replace the engine controller.

9. Bleeding



Normal



Abnormal

Problem/Unit	Step	Check item	Result	Remedy
Media smudges easily.	1	Is the recommended type of media being used?	NO	Use the recommended type of media (coated paper or other smudge resistant paper).
Printable side reversed.	2	Is the printable side of the media facing up?	NO	Explain to the user to use the media with the printable side facing up.
Print mode	3	Check the print mode. Is it in "Draft" mode?	YES	Set the [Print Mode] to other than "Draft".

10. Dimensional accuracy problems

Problem/Unit	Step	Check item	Result	Remedy
Expansion/contraction of media	1	Is it corrected by using the media after placing the media under the machine operating environment for some time?	YES	Explain to the user to use the media only after placing it under the machine operating environment for some time.
Paper feed accuracy compensation value	2	Confirm with the paper feed accuracy compensation value adjustment pattern.	NO	Adjust the paper feed accuracy compensation value. (See page 5-13).

11. Blotting boundary between filled images



Normal



Abnormal

Problem/Unit	Step	Check item	Result	Remedy
Poor moisture absor-bency of media	1	Is the recommended type of media being used?	NO	Explain to the user to use the recommended type of media (media with high absor-bency).
Printable side reversed	2	Is the printable side of the media facing up?	NO	Explain to the user to place the printable side of the media facing up.
Ink dries slowly.	3	Check the print mode. Is it in "Enhanced" or "Hi-Resolution" mode?	NO	Set the [Print Mode] menu to "Enhanced" or "Hi-Resolu-tion".

VI. ELECTRICAL COMPONENTS ARRANGEMENT/ FUNCTIONS

A. Sensors and Switches

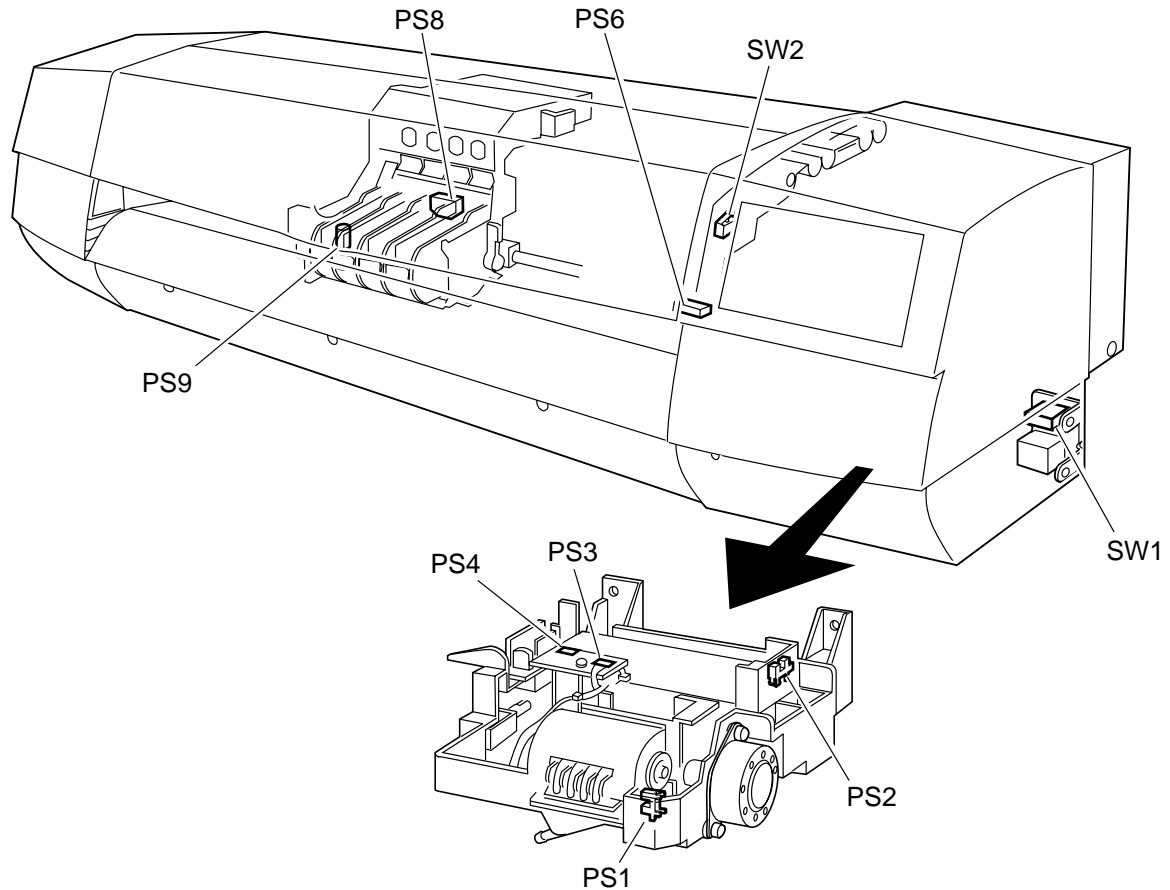


Figure 5-601

Name	Symbol	Function
Photo-interrupter	PS1	Pump position detection
	PS2	Home position detection
	PS3	Detection of remaining ink in the ink chamber
	PS4	Detection of the ink tank presence
	PS6	Media trailing edge detection
Sensor	PS8	Printing position detection
	PS9	Media leading edge detection, media width detection, internal temperature detection, printing position detection
Switch	SW1	AC power OFF/ON
	SW2	Front cover open/close detection

Table 5-601

B. Motors, Fans, and Solenoids

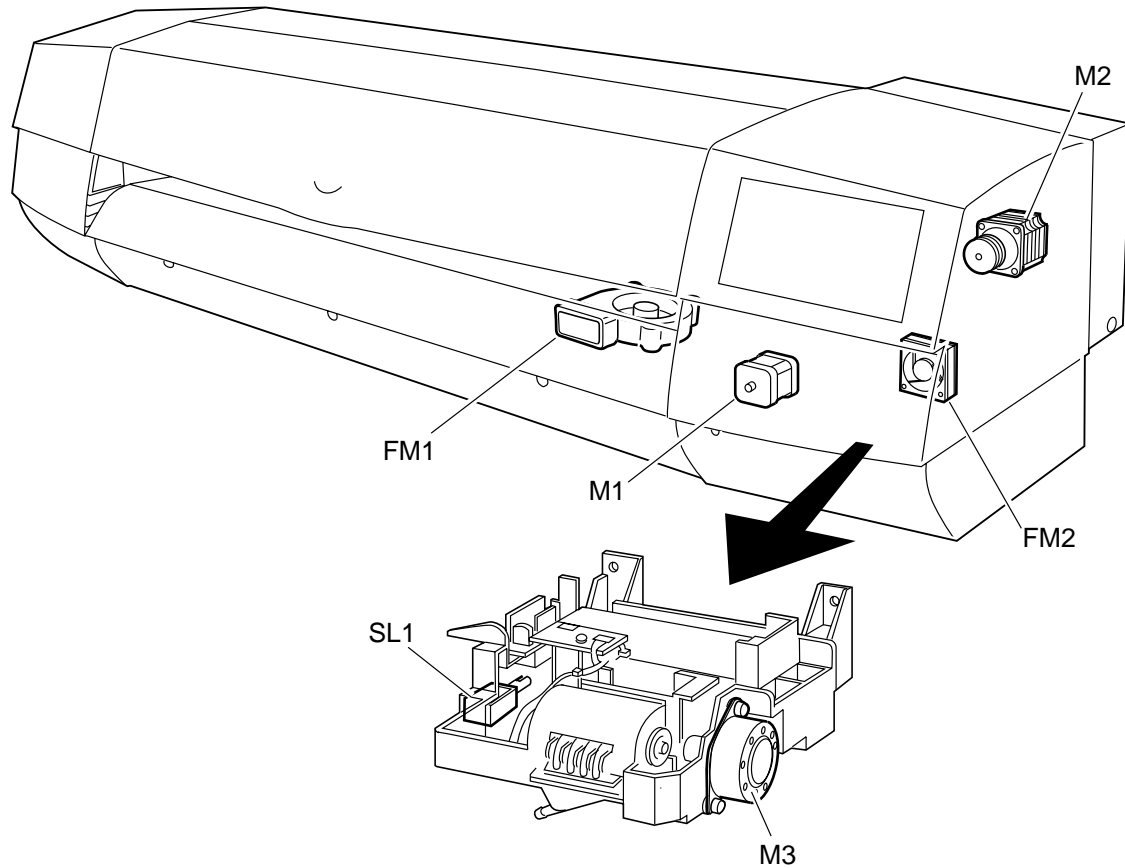


Figure 5-602

Name	Symbol	Function
Motor	M1	Paper feed drive
	M2	Carriage drive
	M3	Pump drive
Fan	FM1	Hold paper during printing
	FM2	Heat dispersion
Solenoid	SL1	Wiper (cleaner blade) lifting

Table 5-602

C. Logic boards

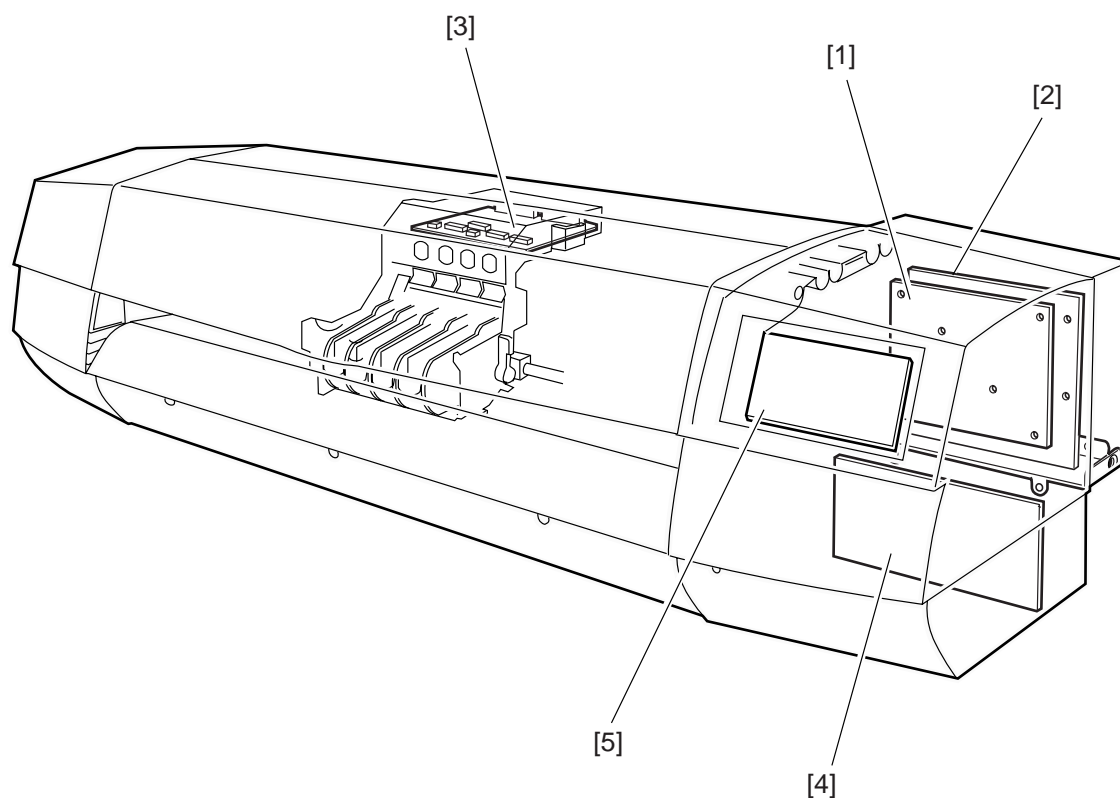


Figure 5-603

Name	Symbol	Function
Engine controller	[1]	Sequence control/motor control
Image controller	[2]	Data communication to host/raster conversion
Carriage controller	[3]	Head drive signal/sensor signal relay
DC power supply	[4]	DC power supply
Operation panel controller	[5]	Operation key, LED and message display control

Table 5-603

D. Engine Controller

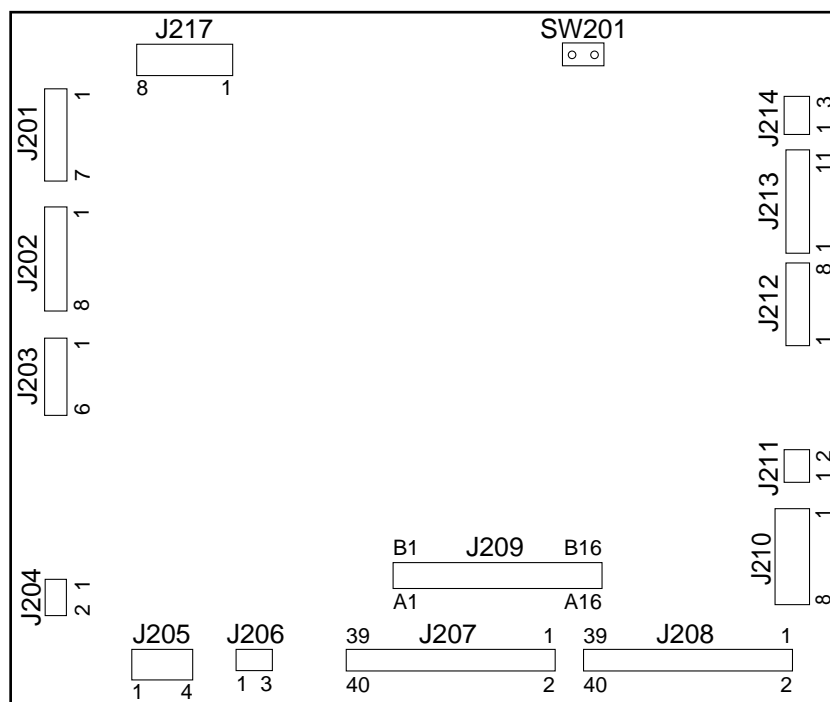


Figure 5-604

SW No.	Function	Remarks
SW201	Switching between A1 and A0 size models.	A0: No jumper
		A1: Jumper installed

Table 5-604

E. Image Controller

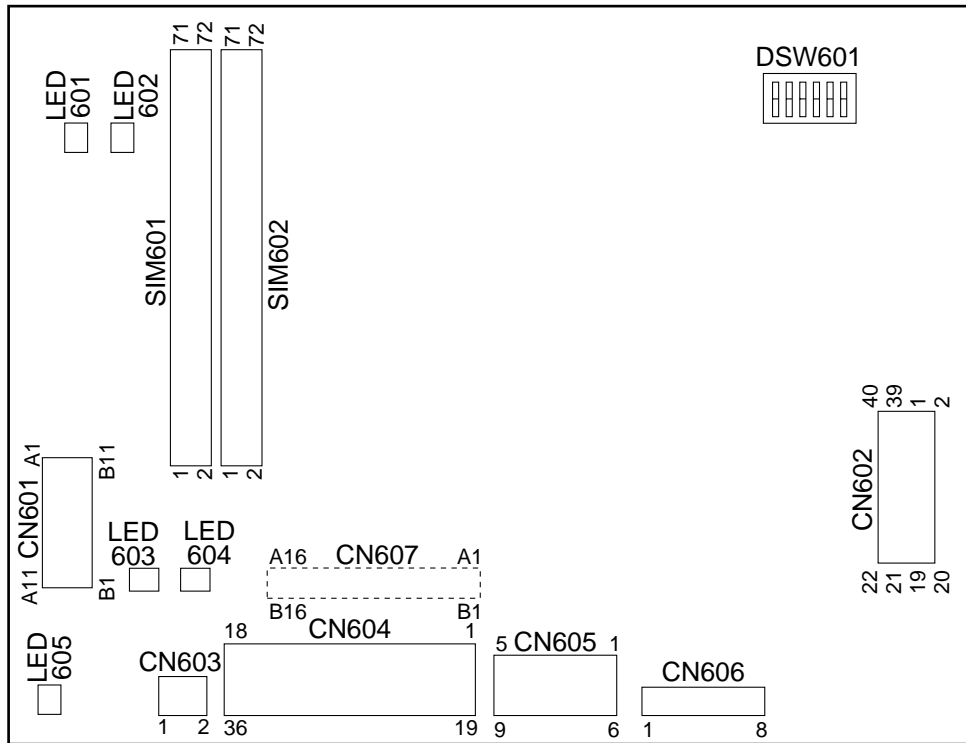


Figure 5-605

SW No.	Function	Remarks
DSW601-1	For factory adjustment	Set to OFF before shipment from factory
DSW601-2	For factory adjustment	Set to OFF before shipment from factory
DSW601-3	For factory adjustment	Set to OFF before shipment from factory
DSW601-4	For factory adjustment	Set to ON before shipment from factory
DSW601-5	For factory adjustment	Set to OFF before shipment from factory
DSW601-6	For factory adjustment	Set to OFF before shipment from factory
LED601	Unused	—
LED602	Unused	—
LED603	Lit in CPU operation (normal)	—
LED604	Lit at CPU stop (abnormal)	—
LED605	Lit when power is supplied	—

Table 5-605

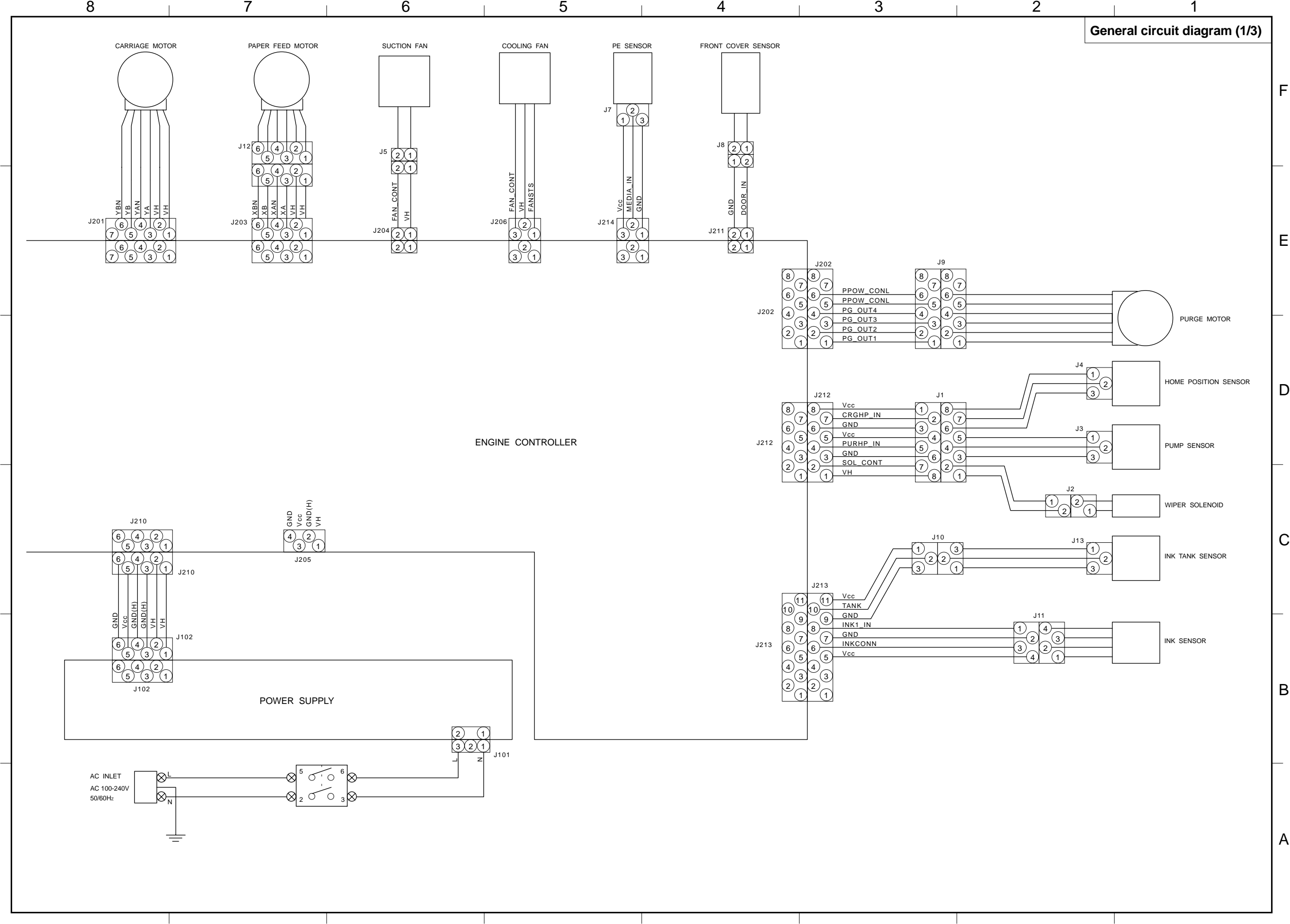
CHAPTER 6

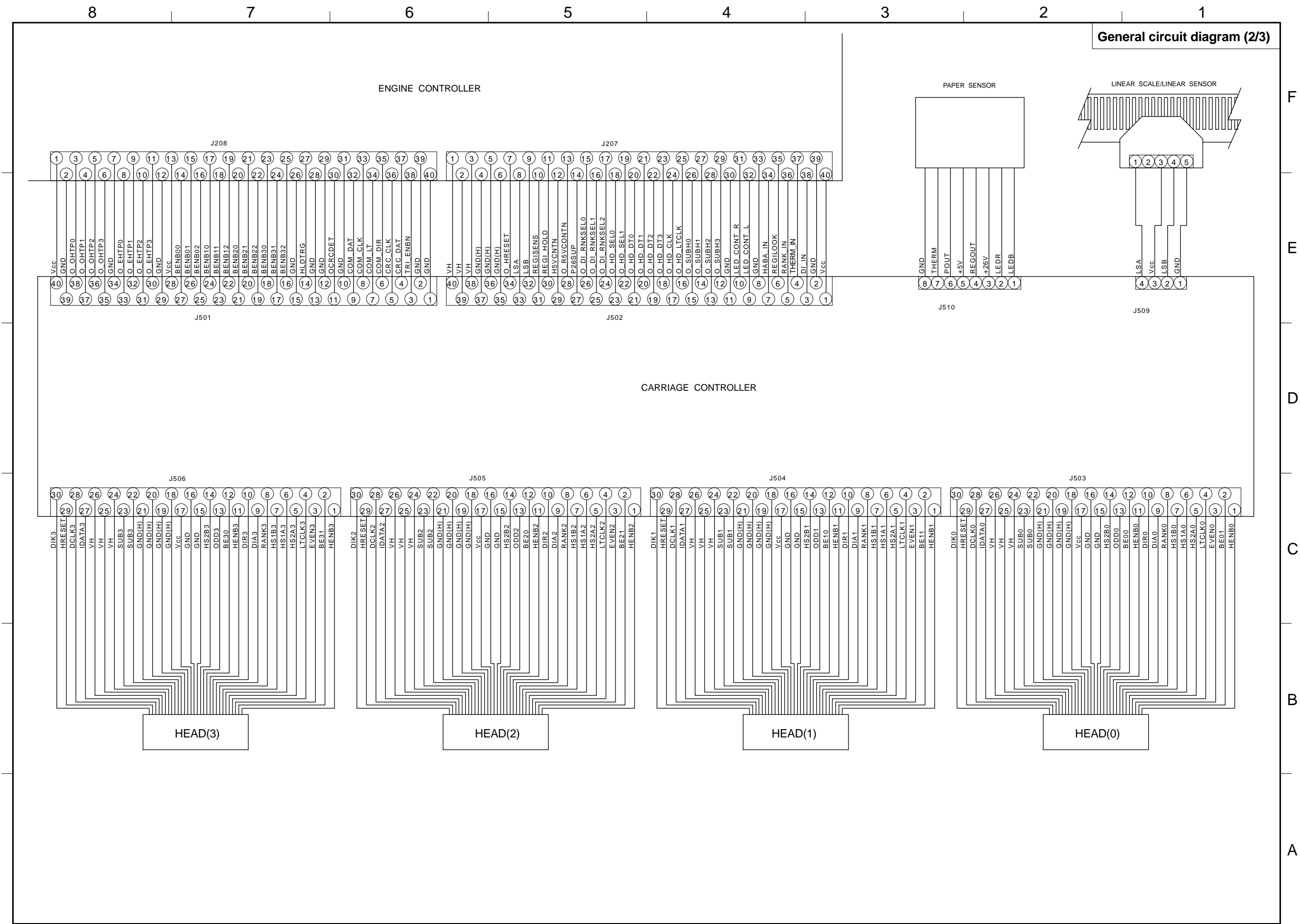
CIRCUIT DIAGRAM

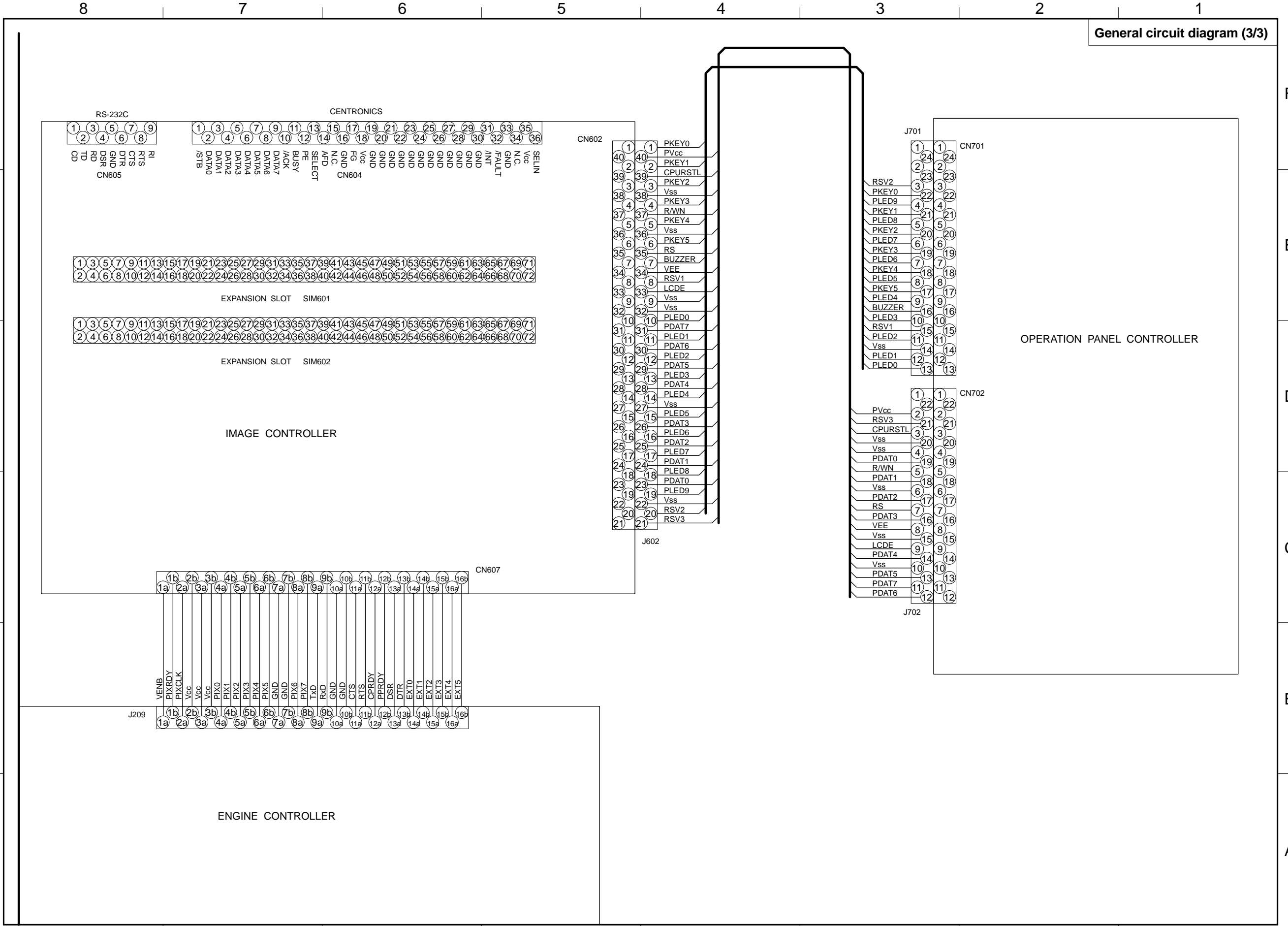
A. GENERAL CIRCUIT DIAGRAM	6-1
B. IMAGE CONTROLLER.....	6-4
C. ENGIN CONTROLLER.....	6-16

D. CARRIAGE CONTROLLER	6-33
E. PAPER SENSOR	6-41
F. OPERATION PANEL CONTROLLER	6-42

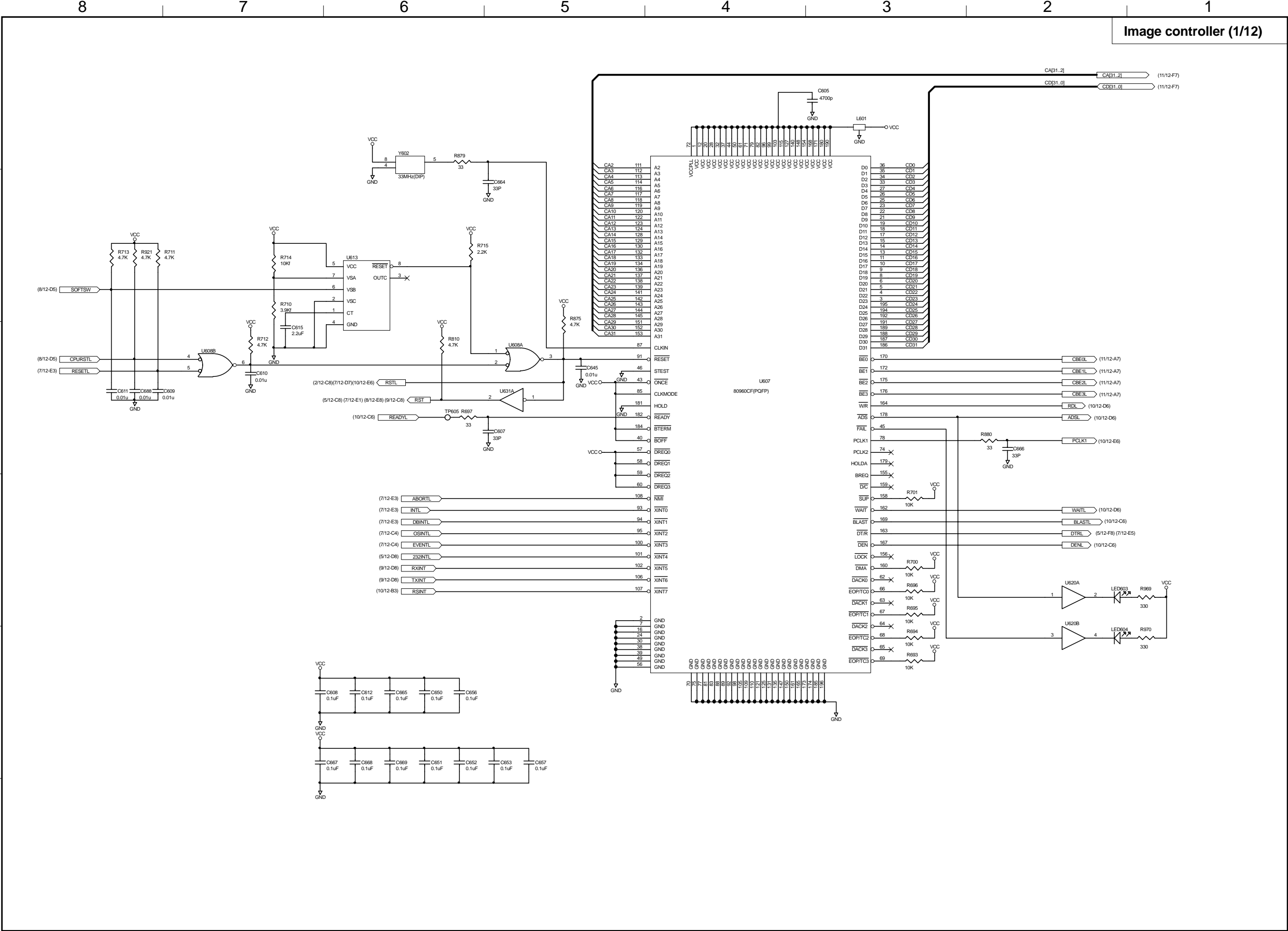
A. GENERAL CIRCUIT DIAGRAM

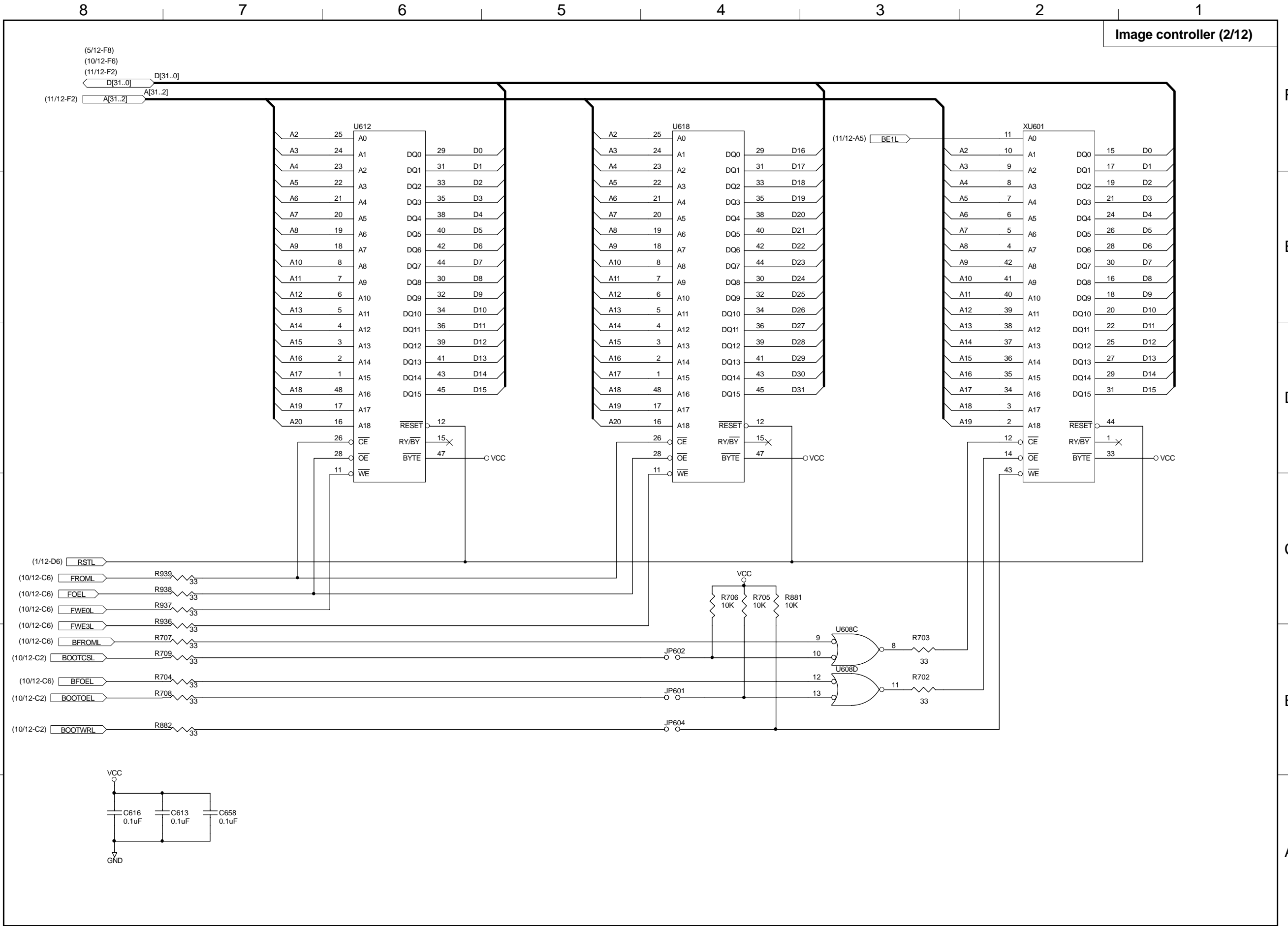


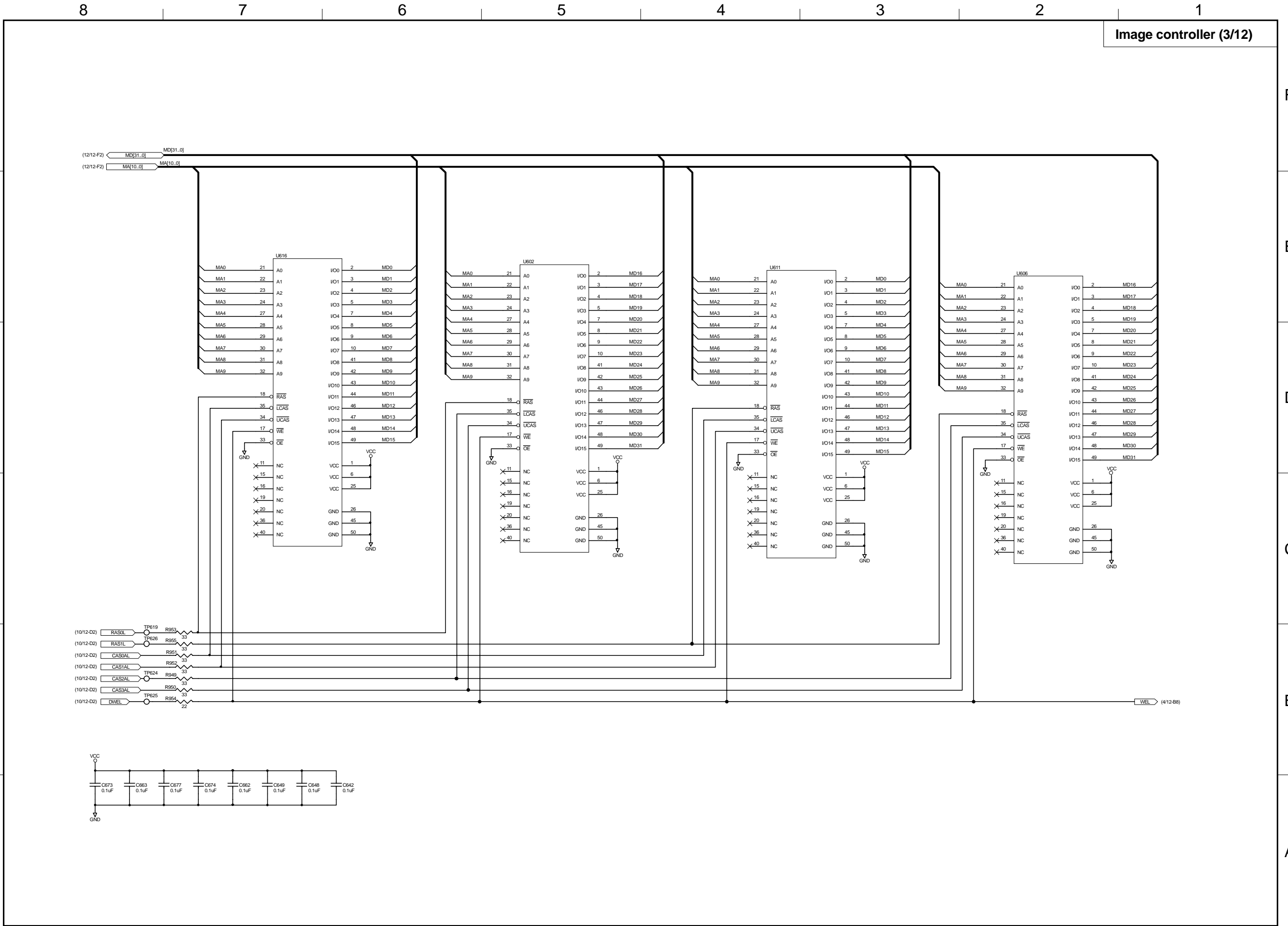


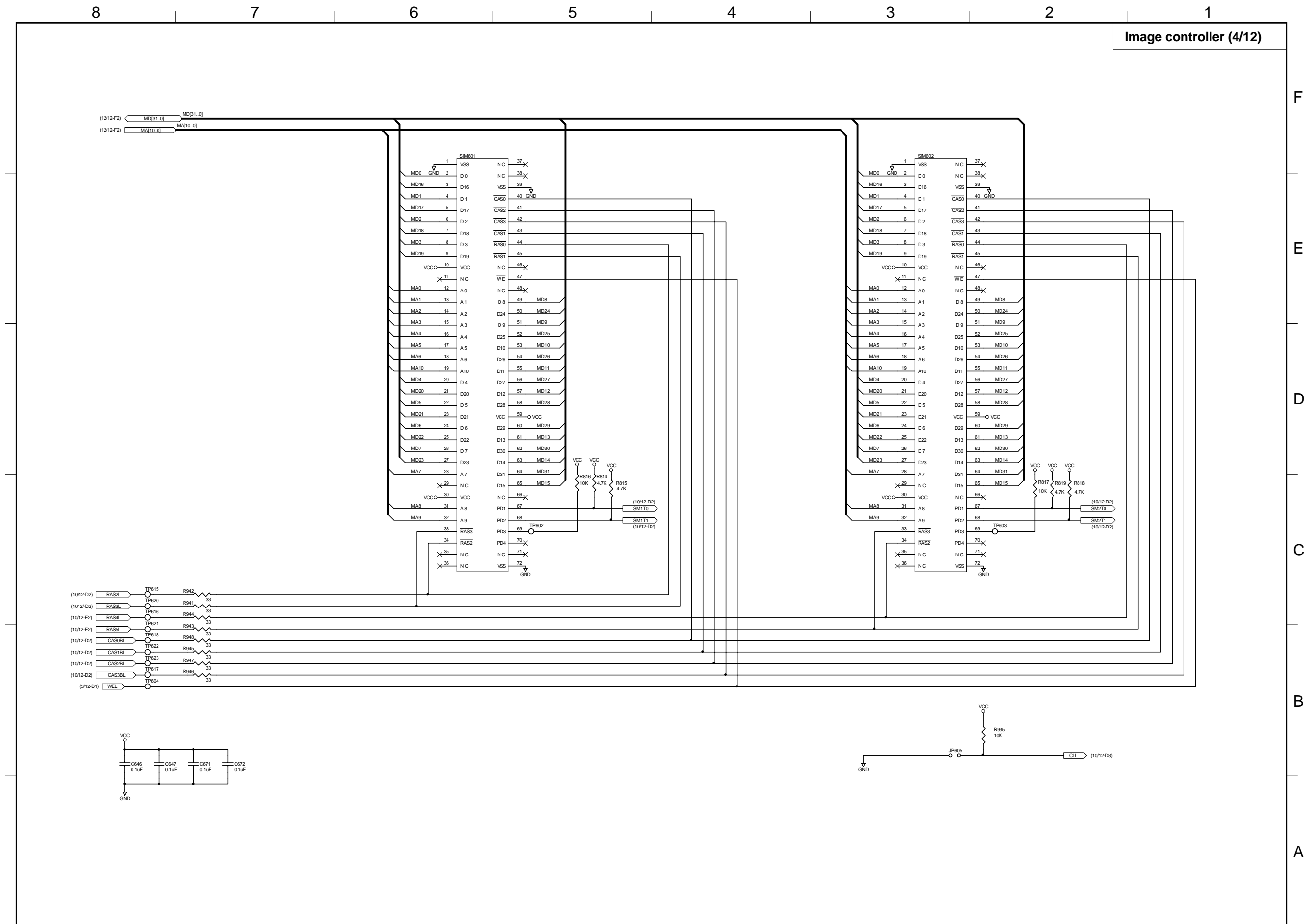


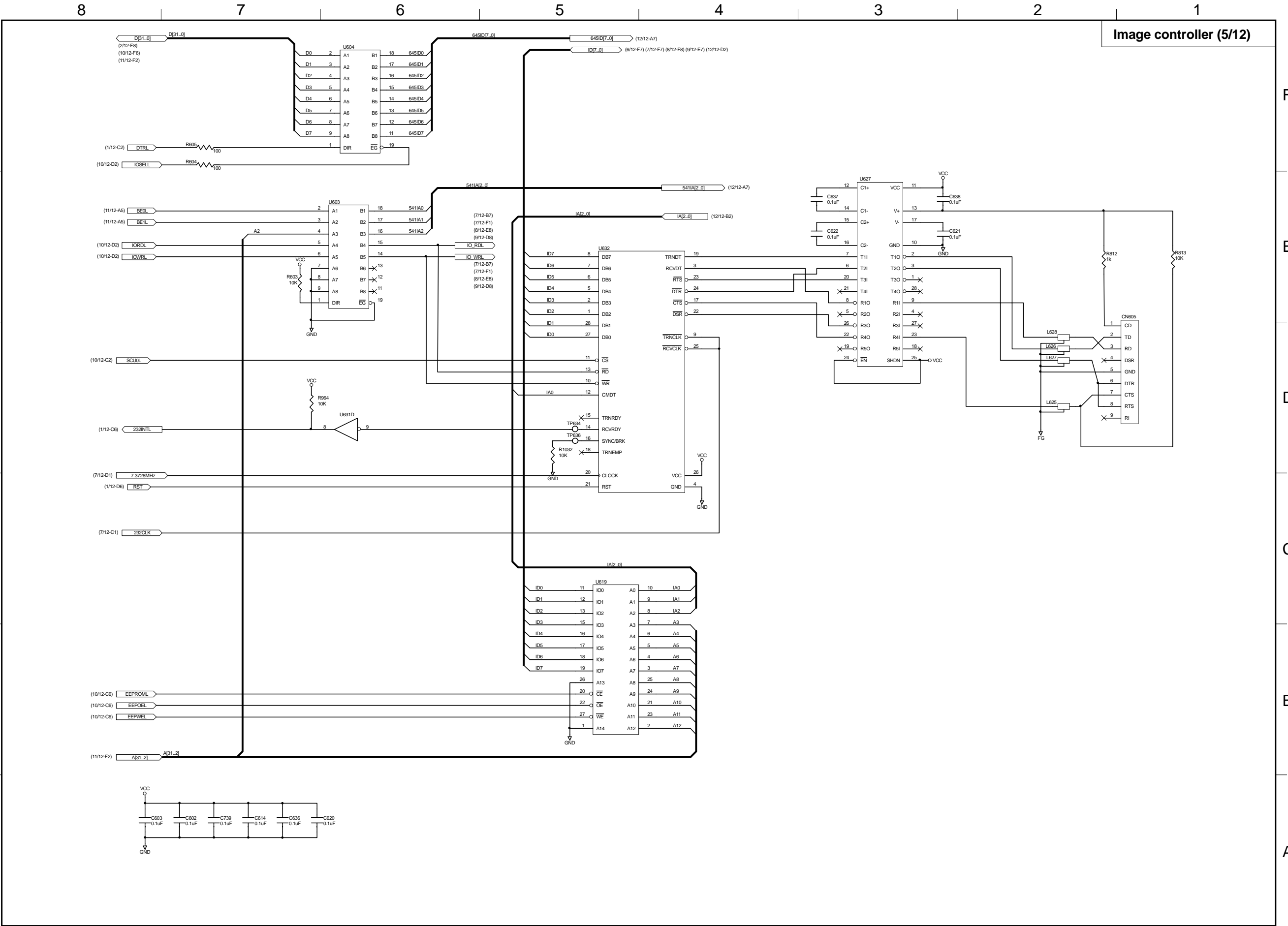
B. IMAGE CONTROLLER

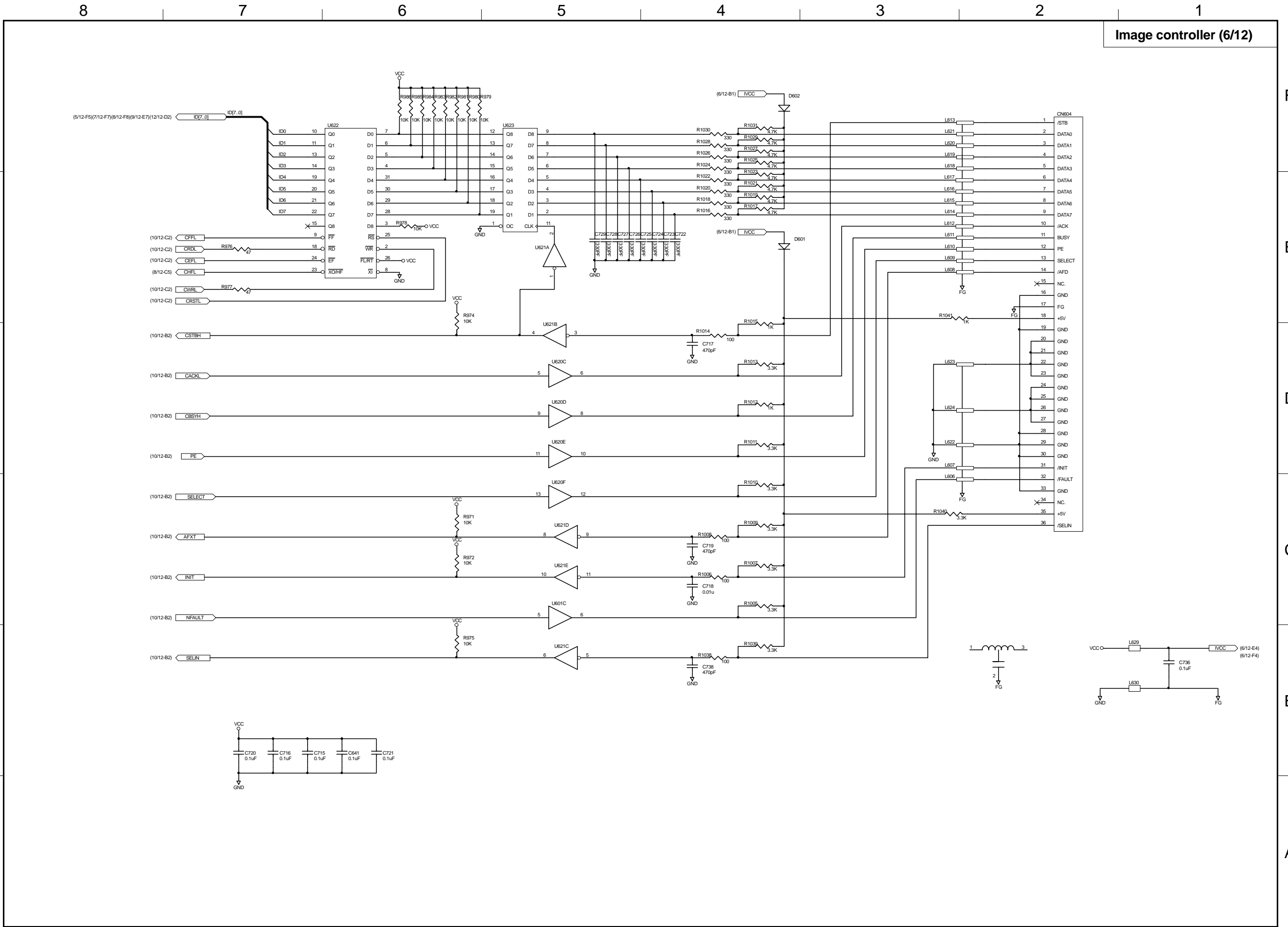


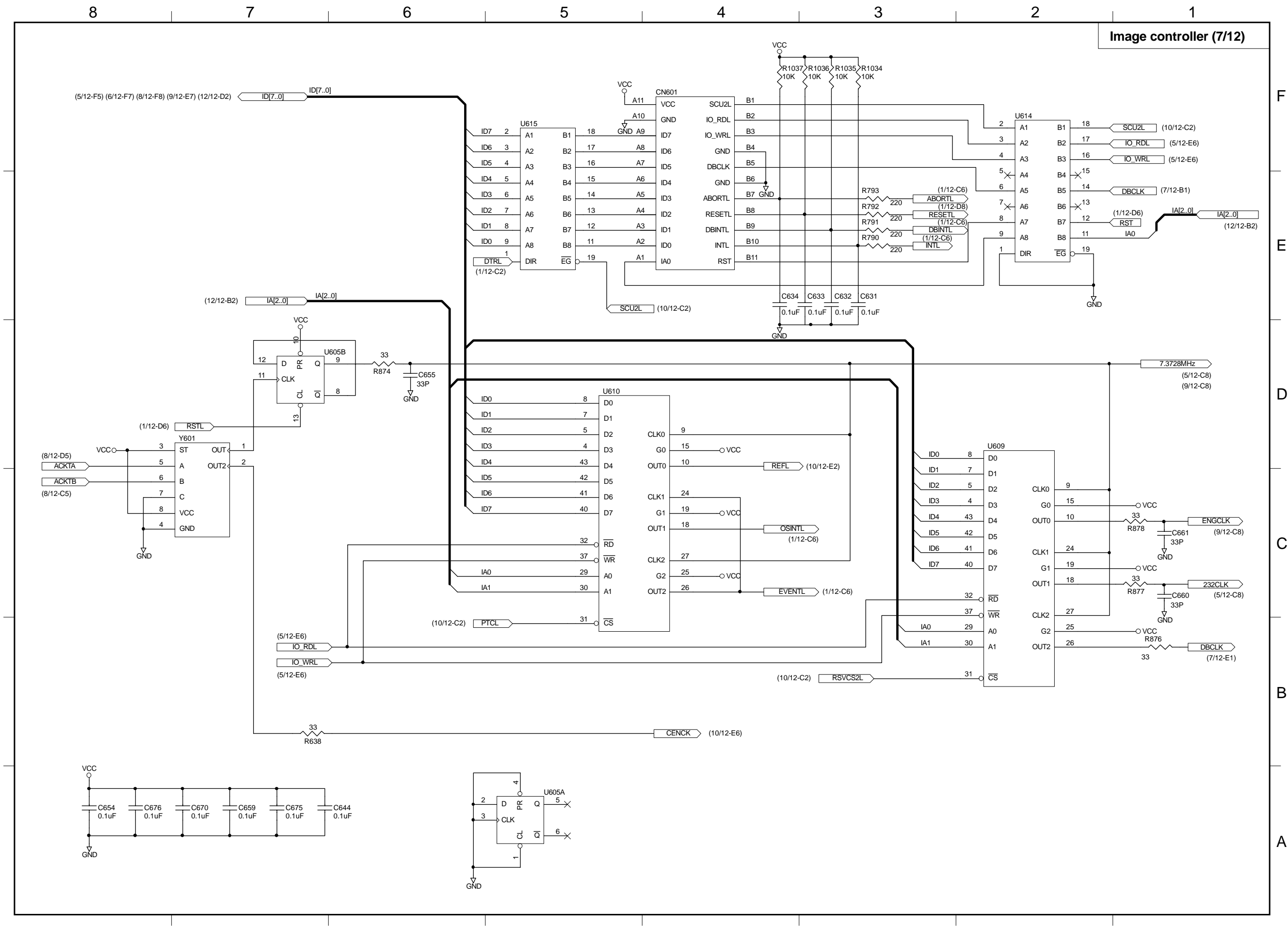


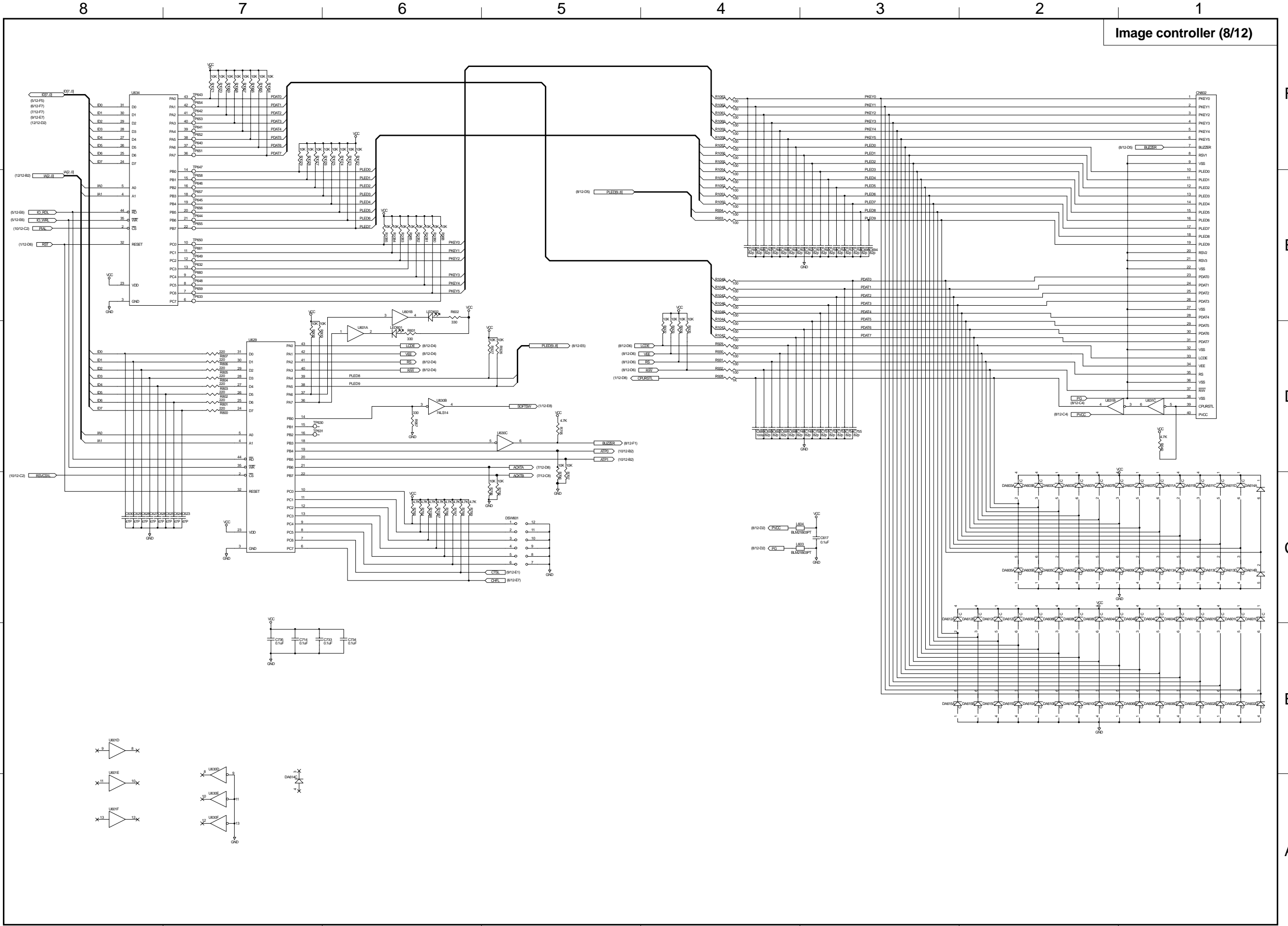




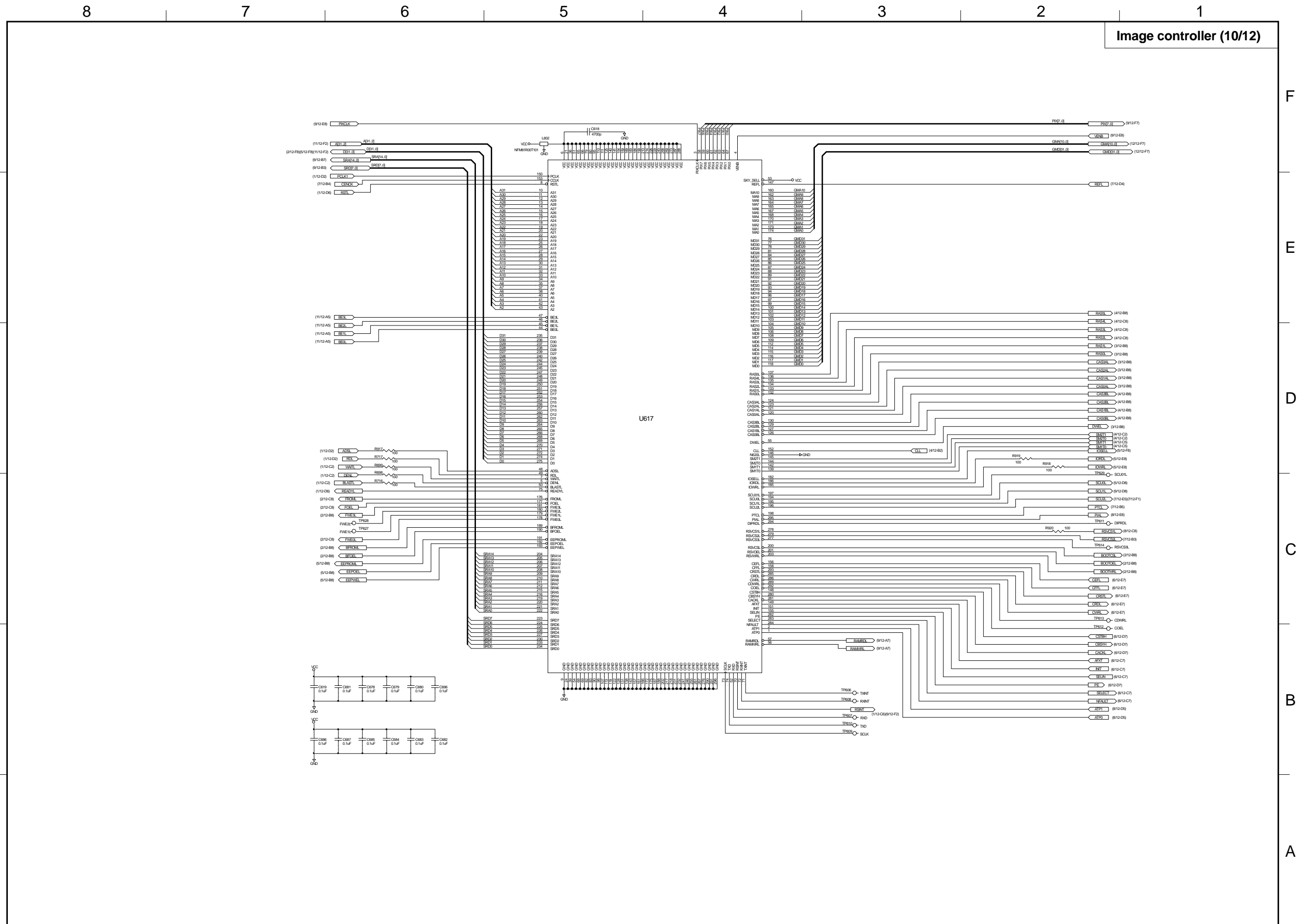


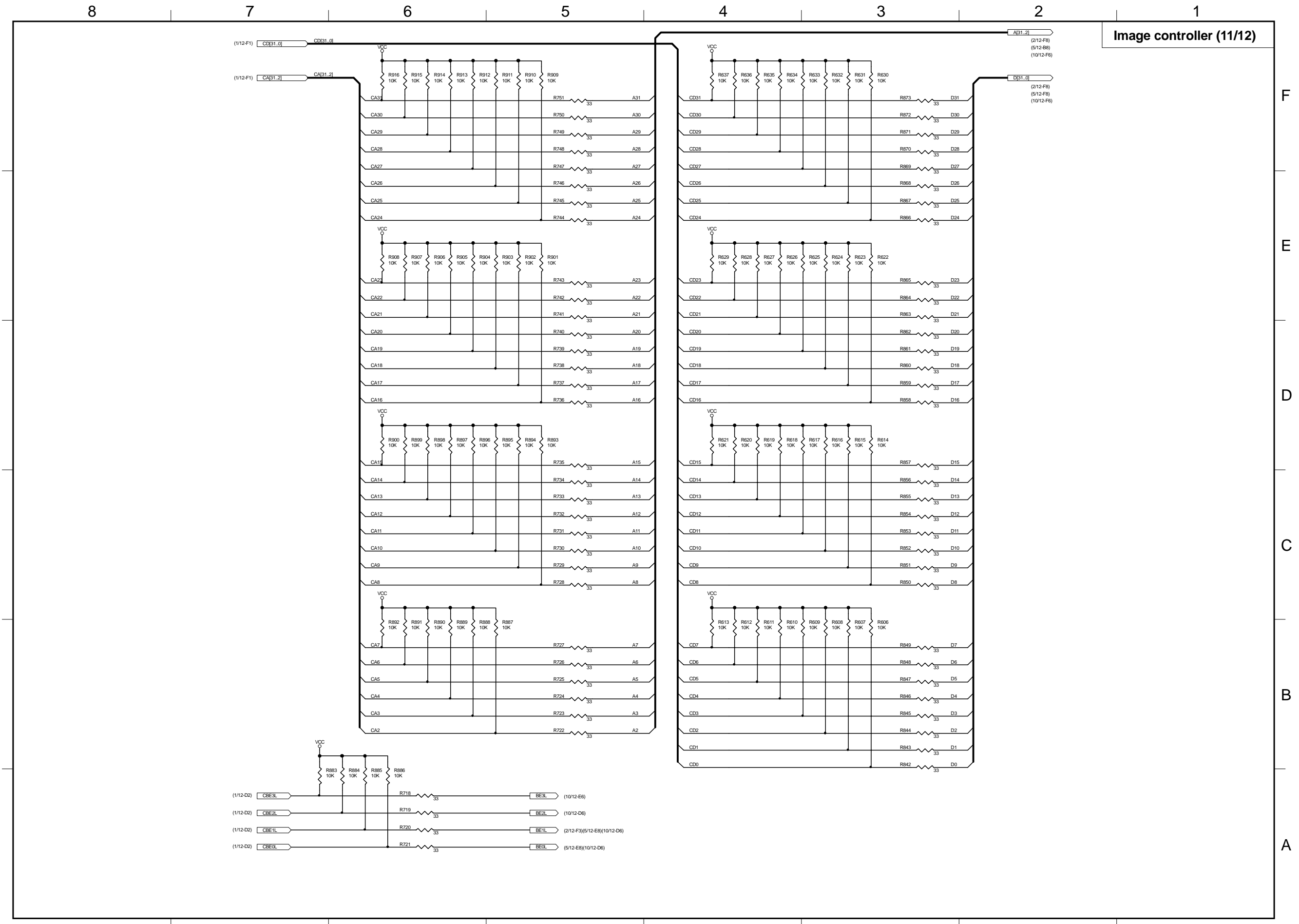


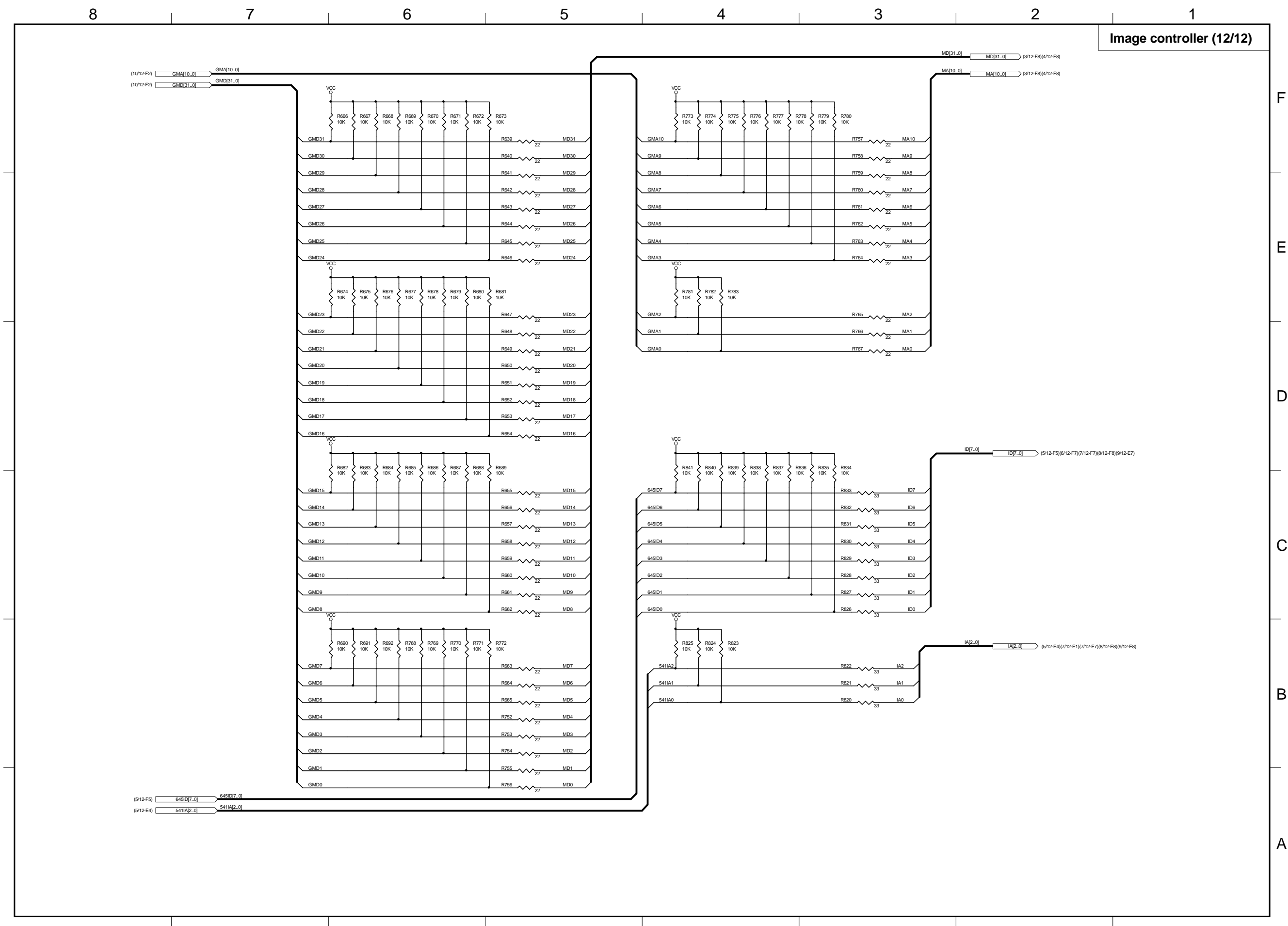




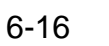


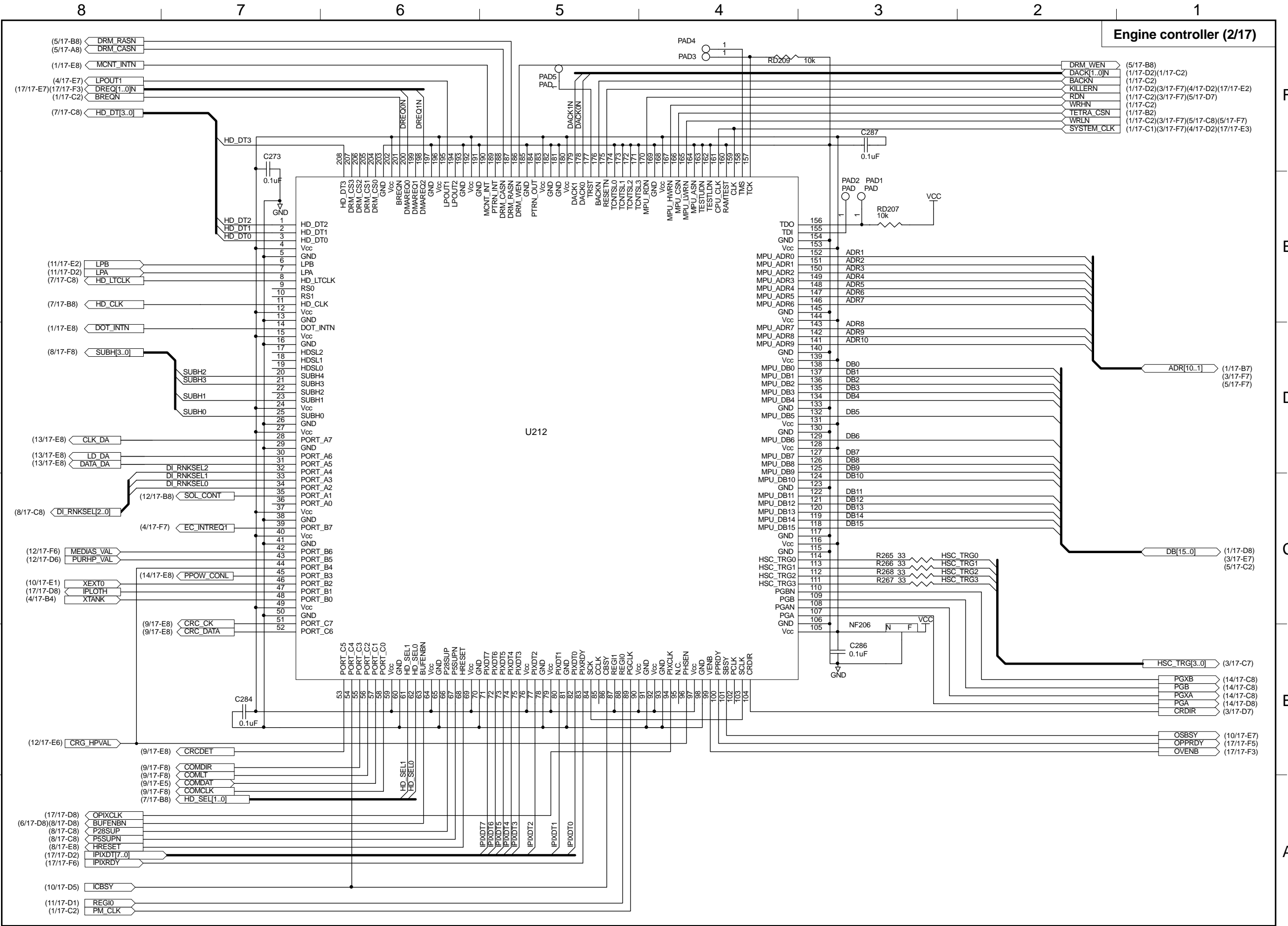


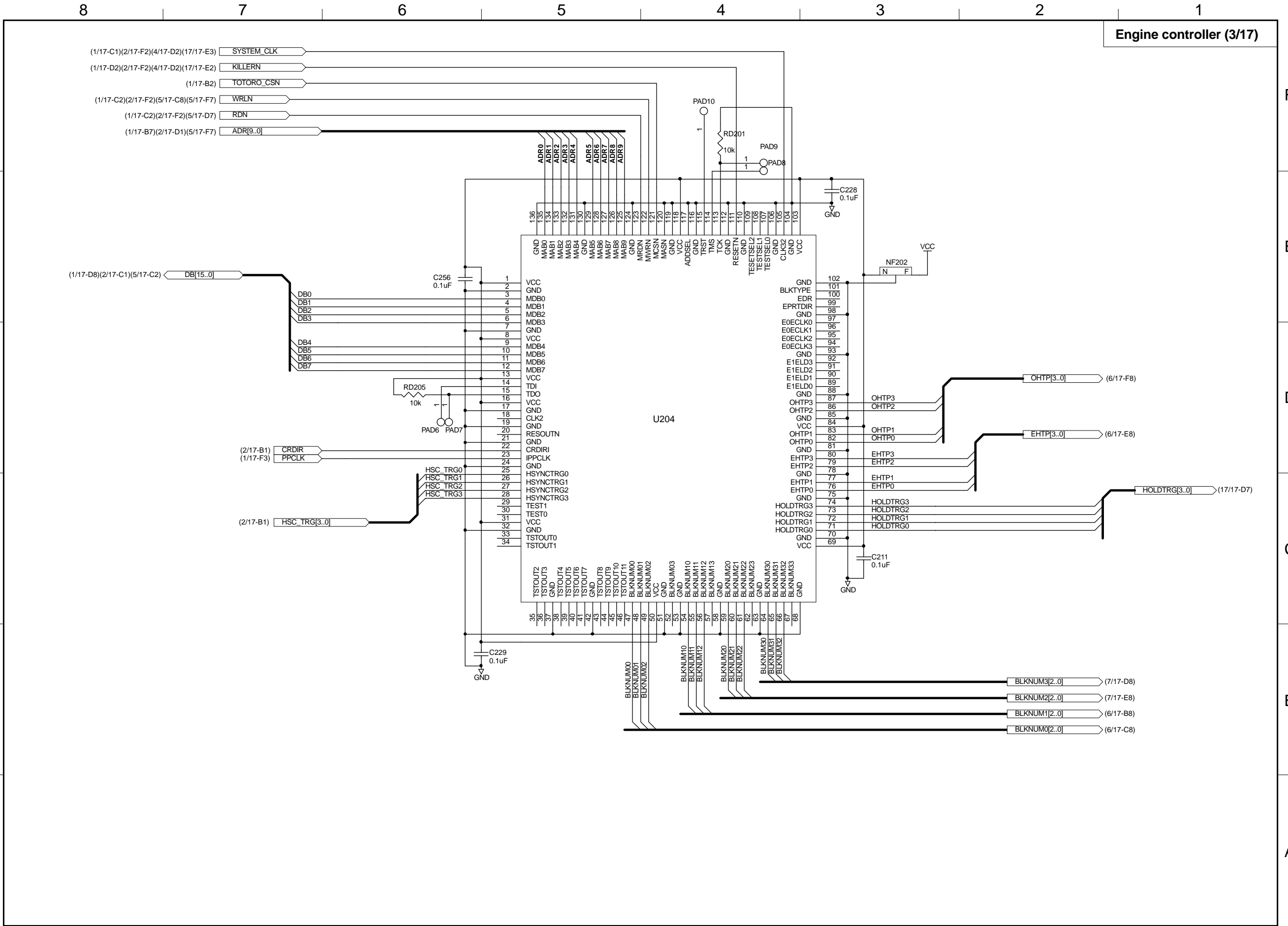


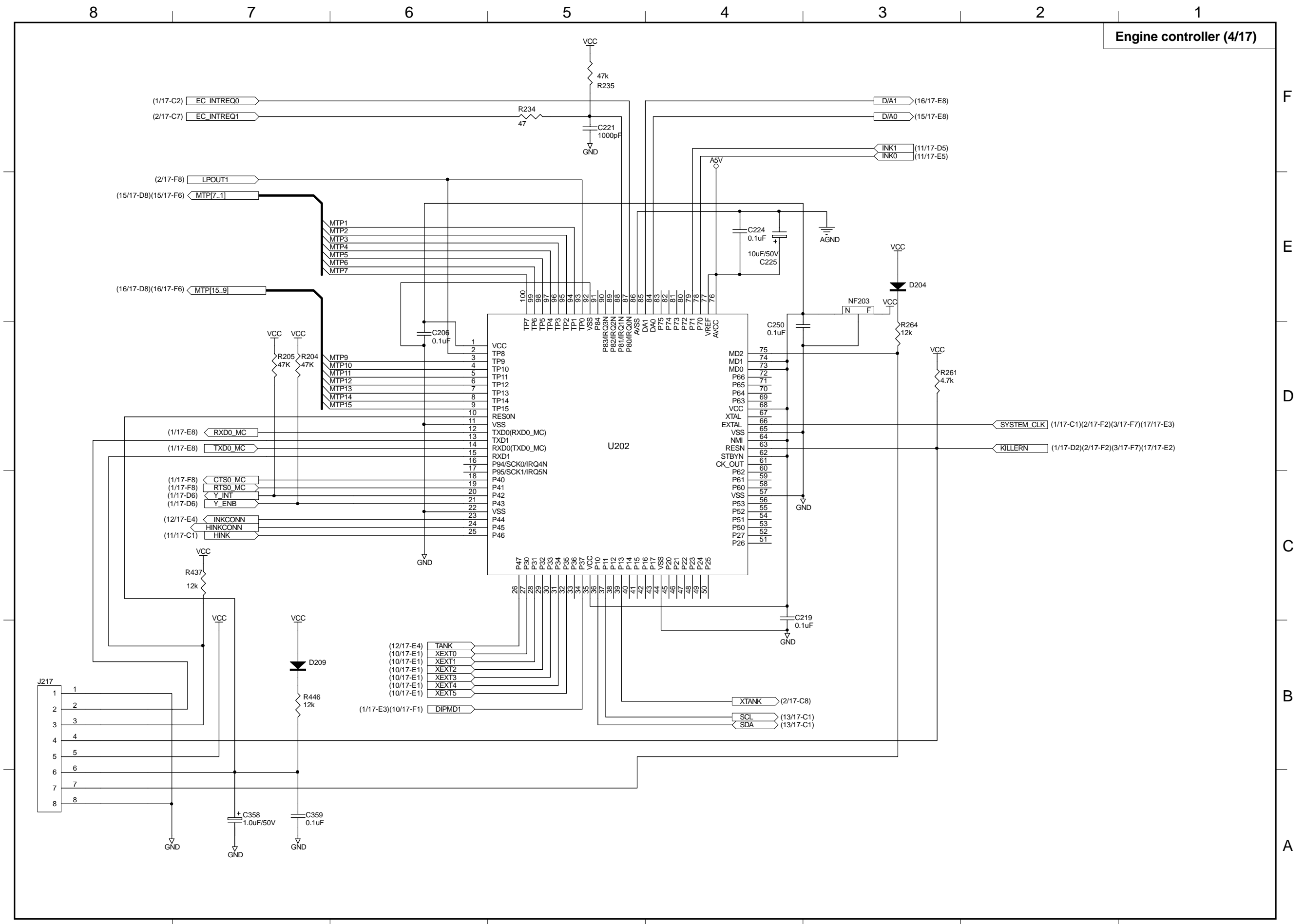


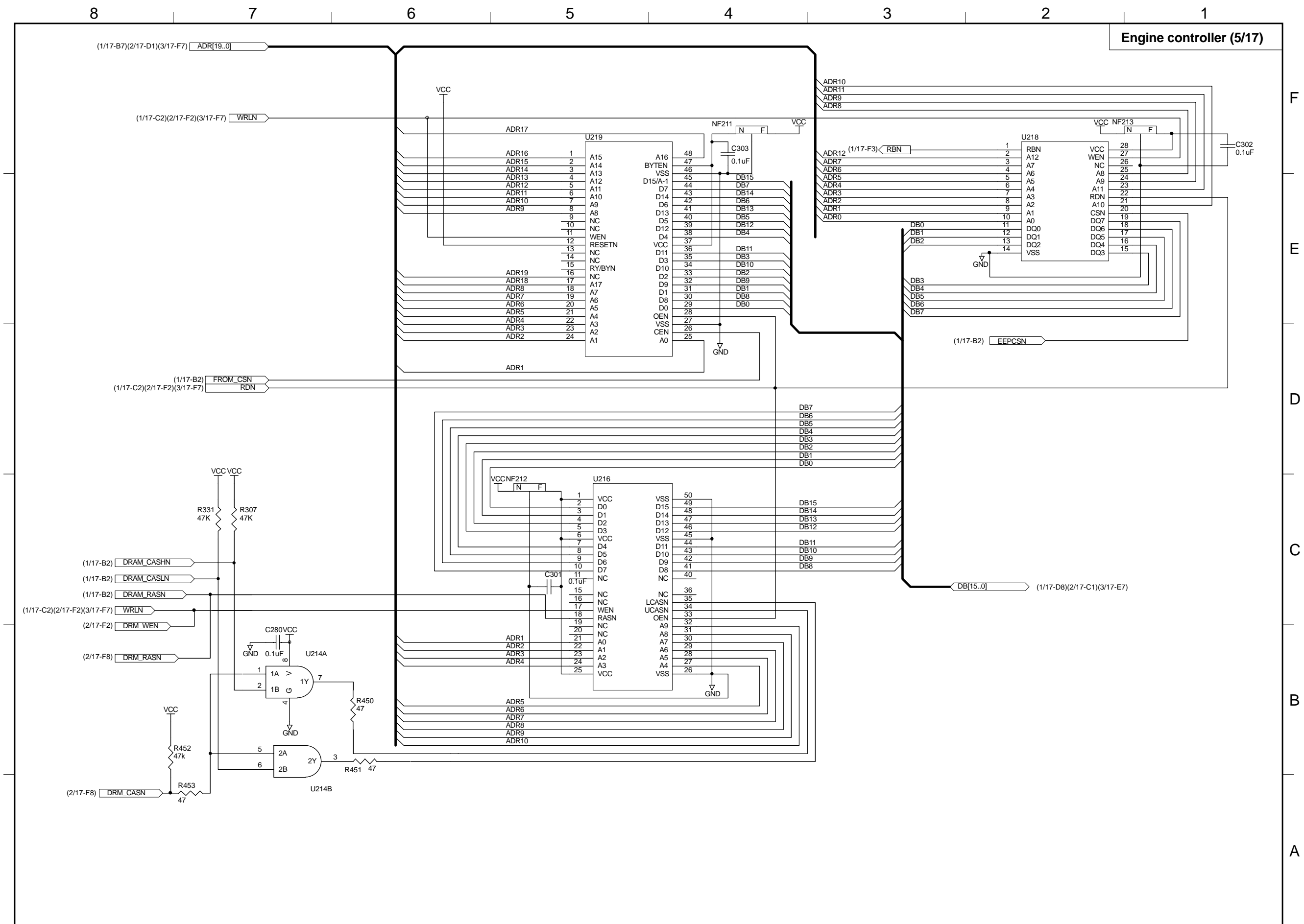
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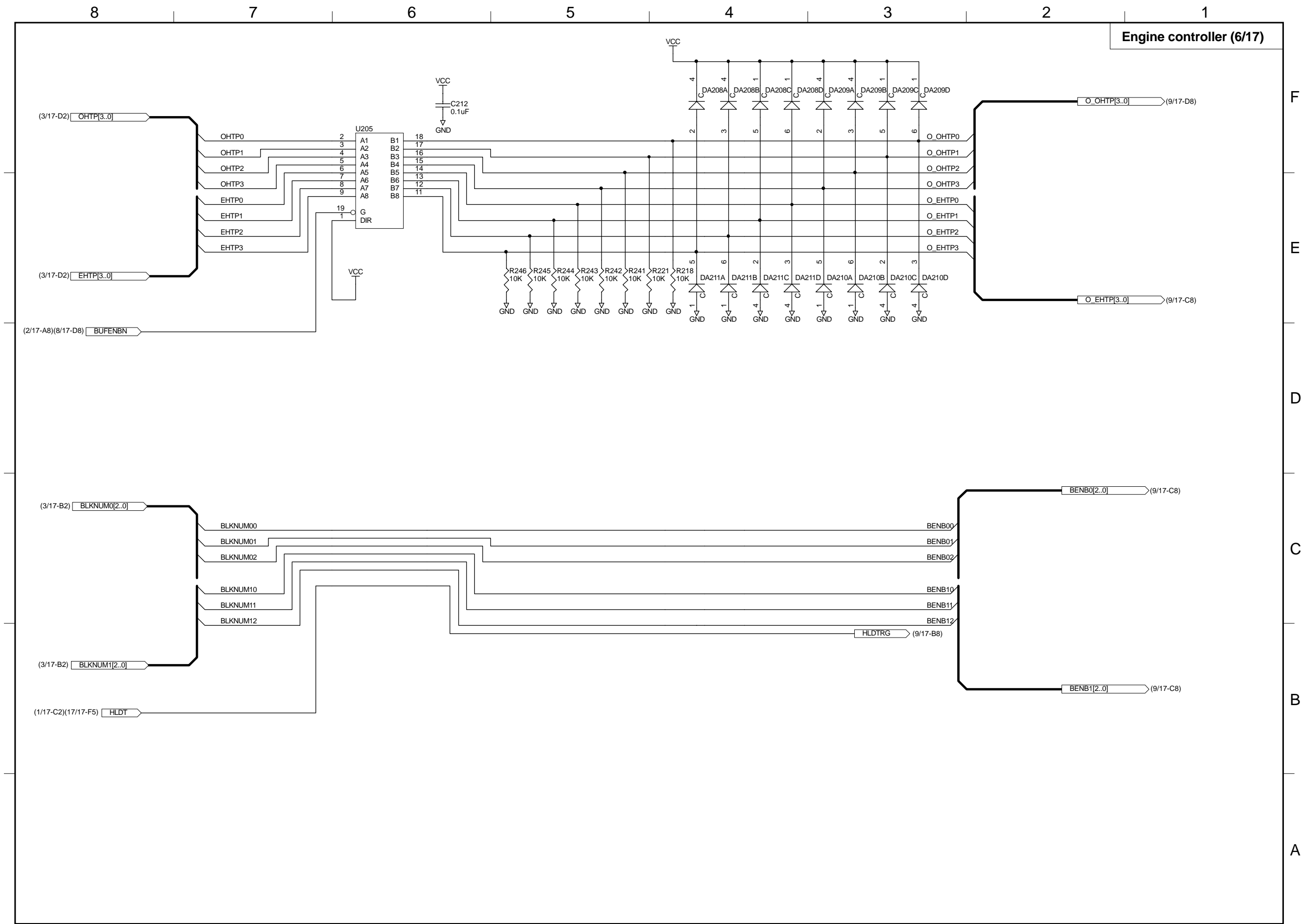


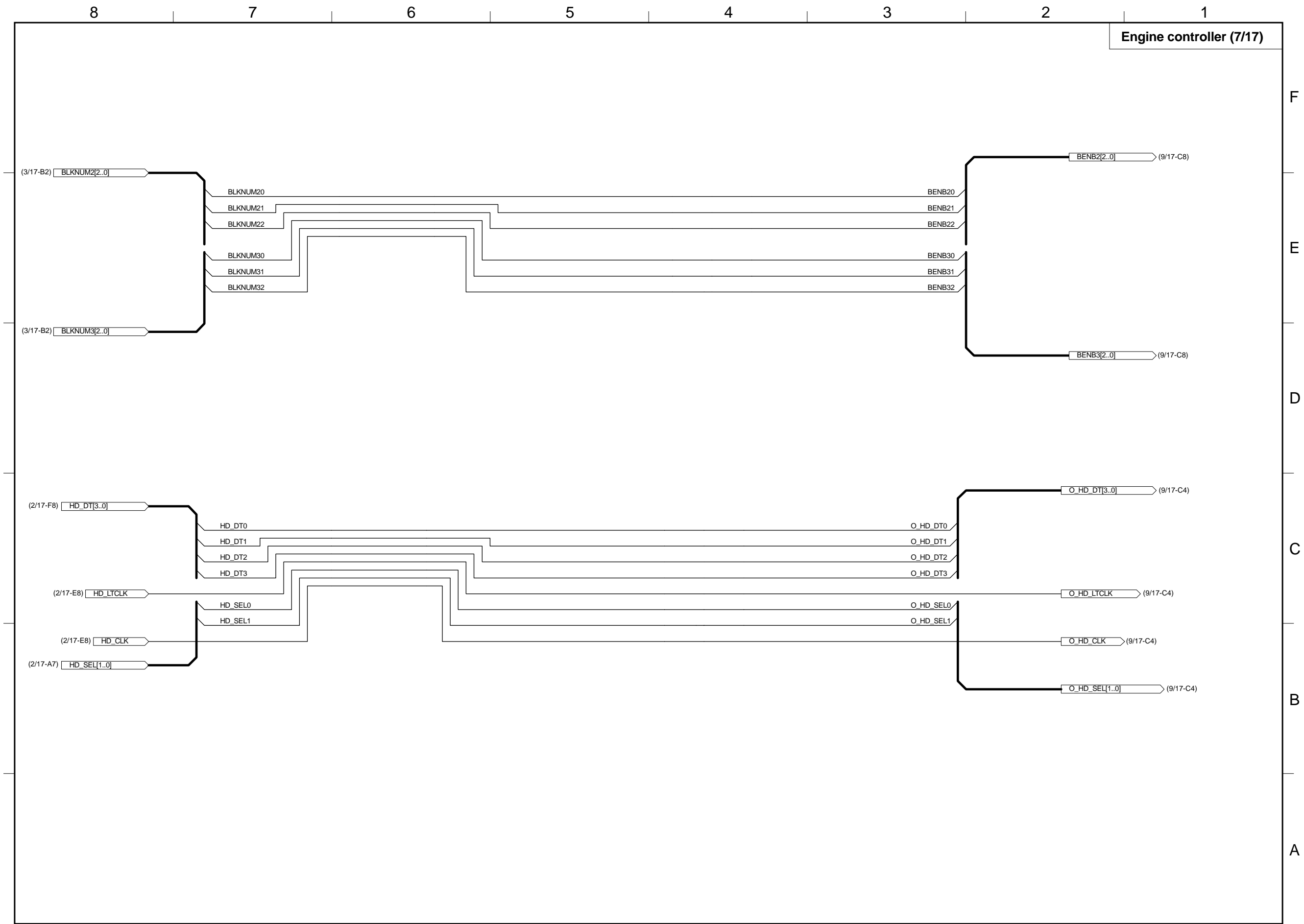


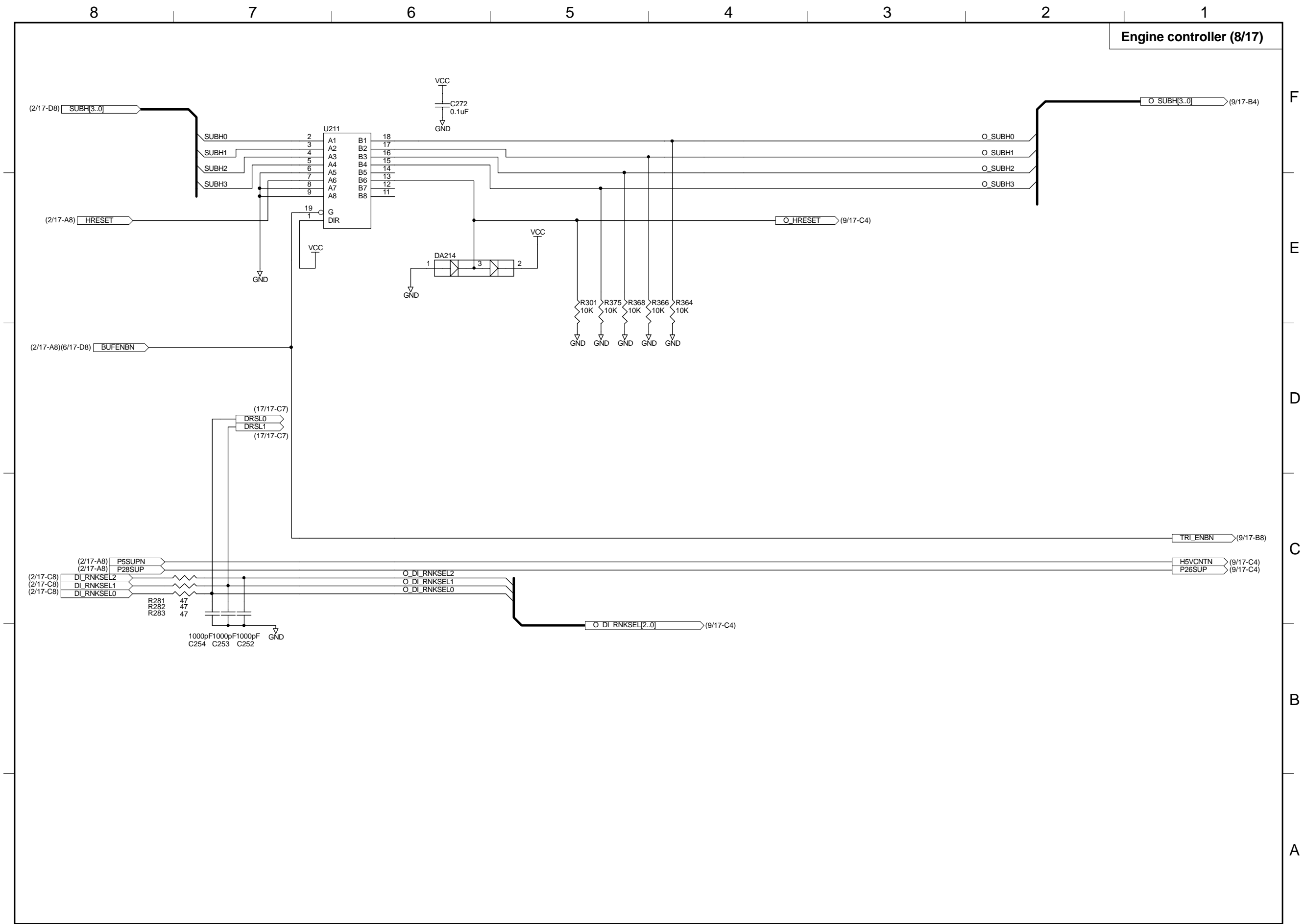


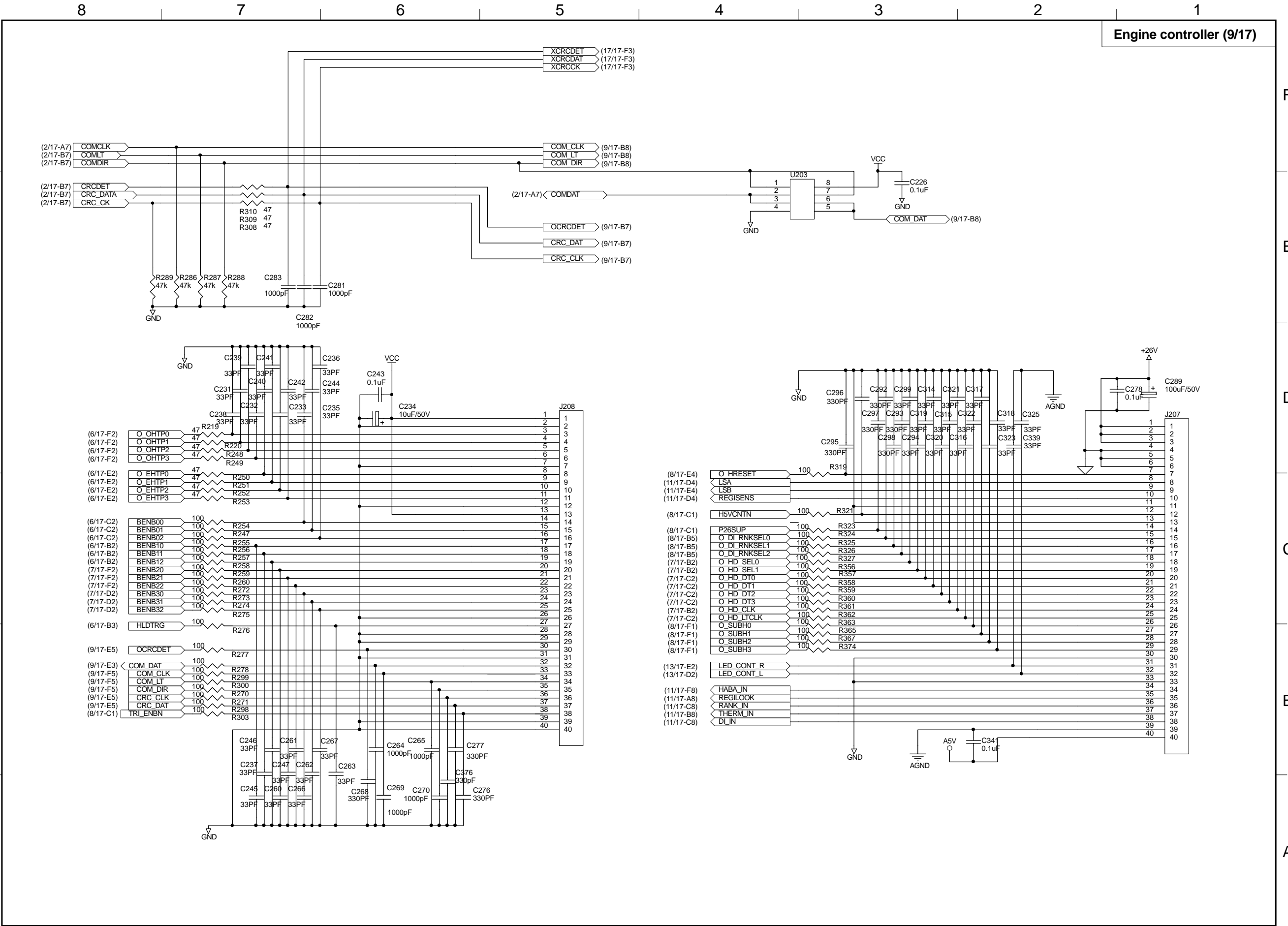


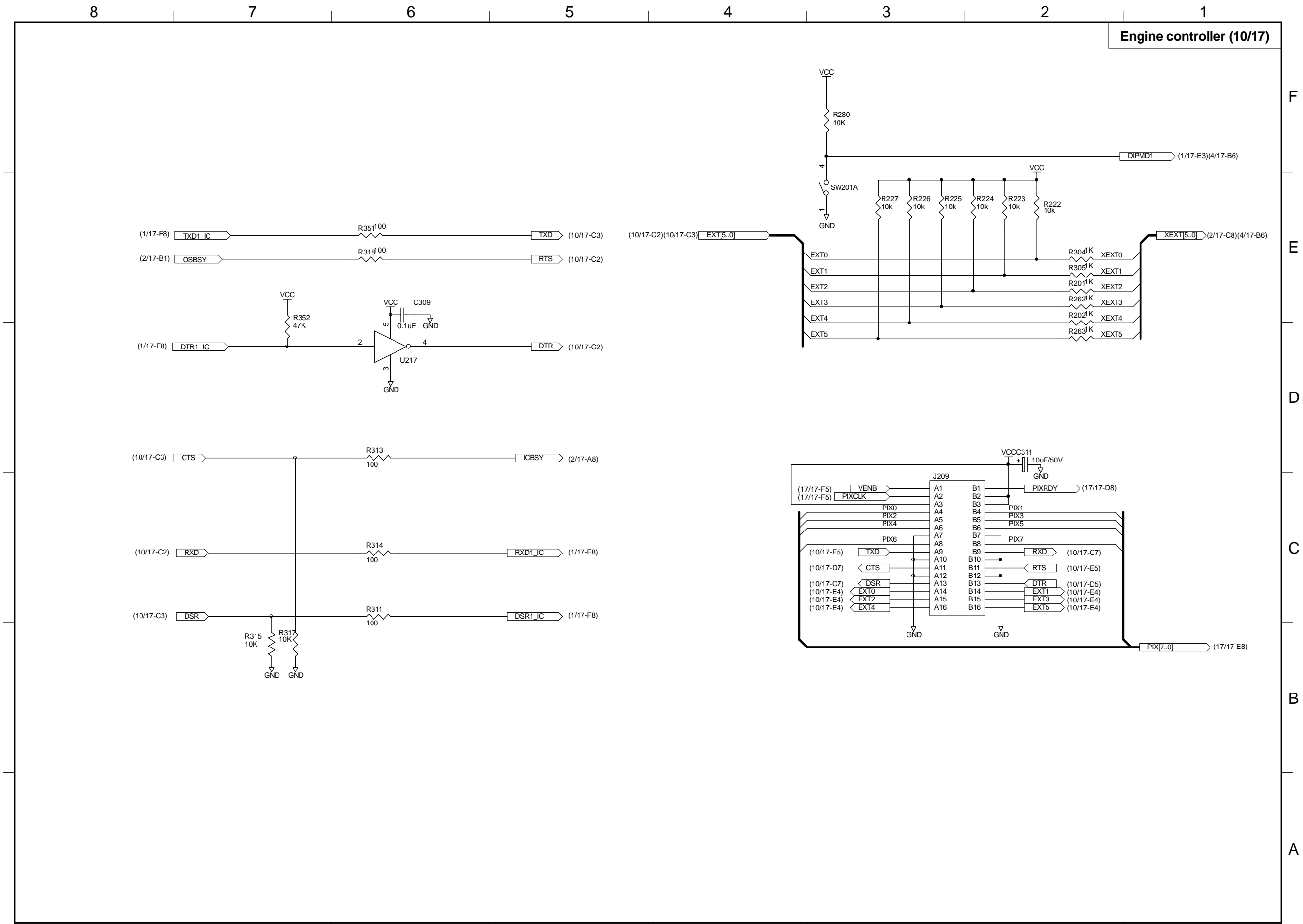


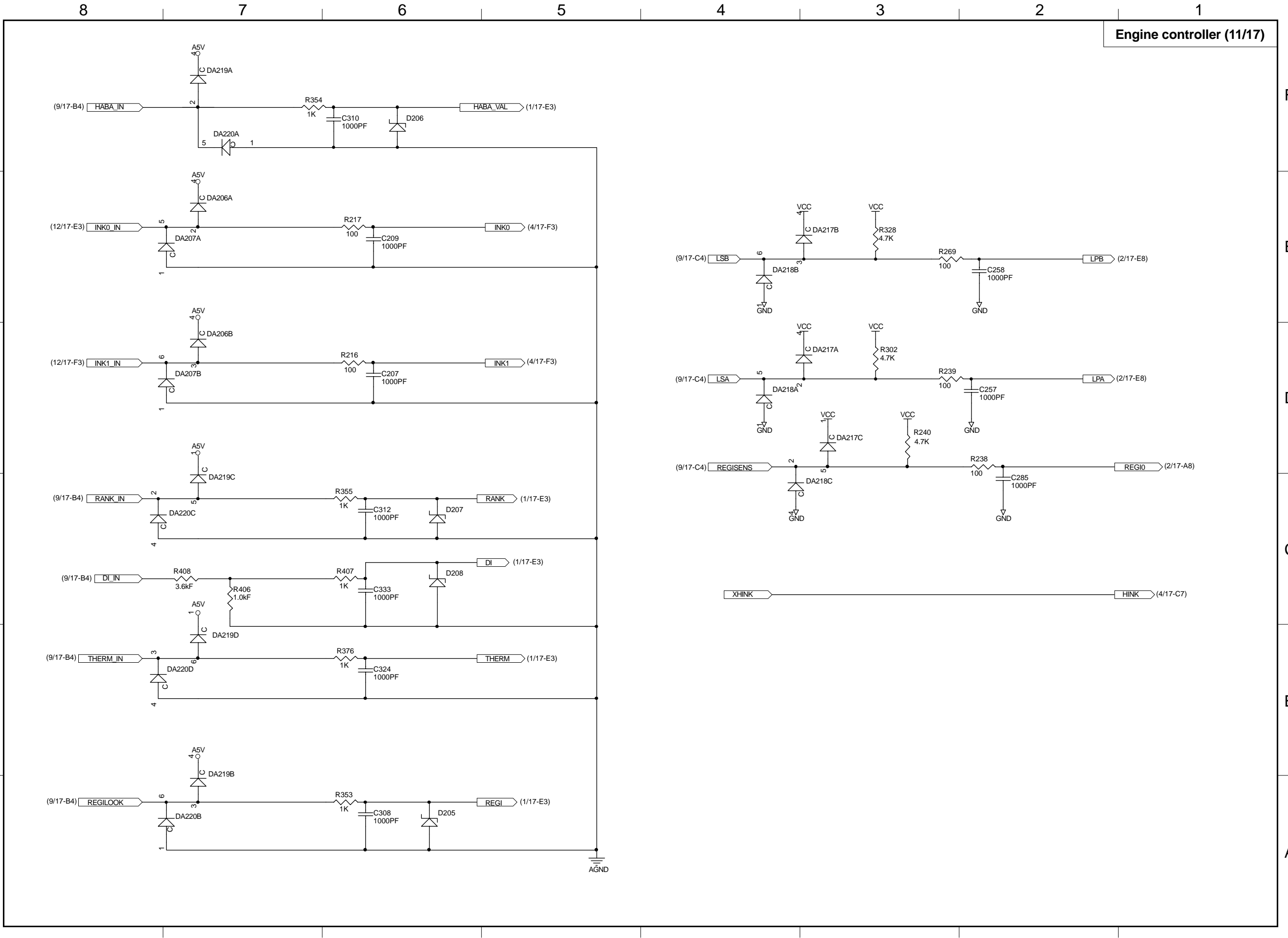


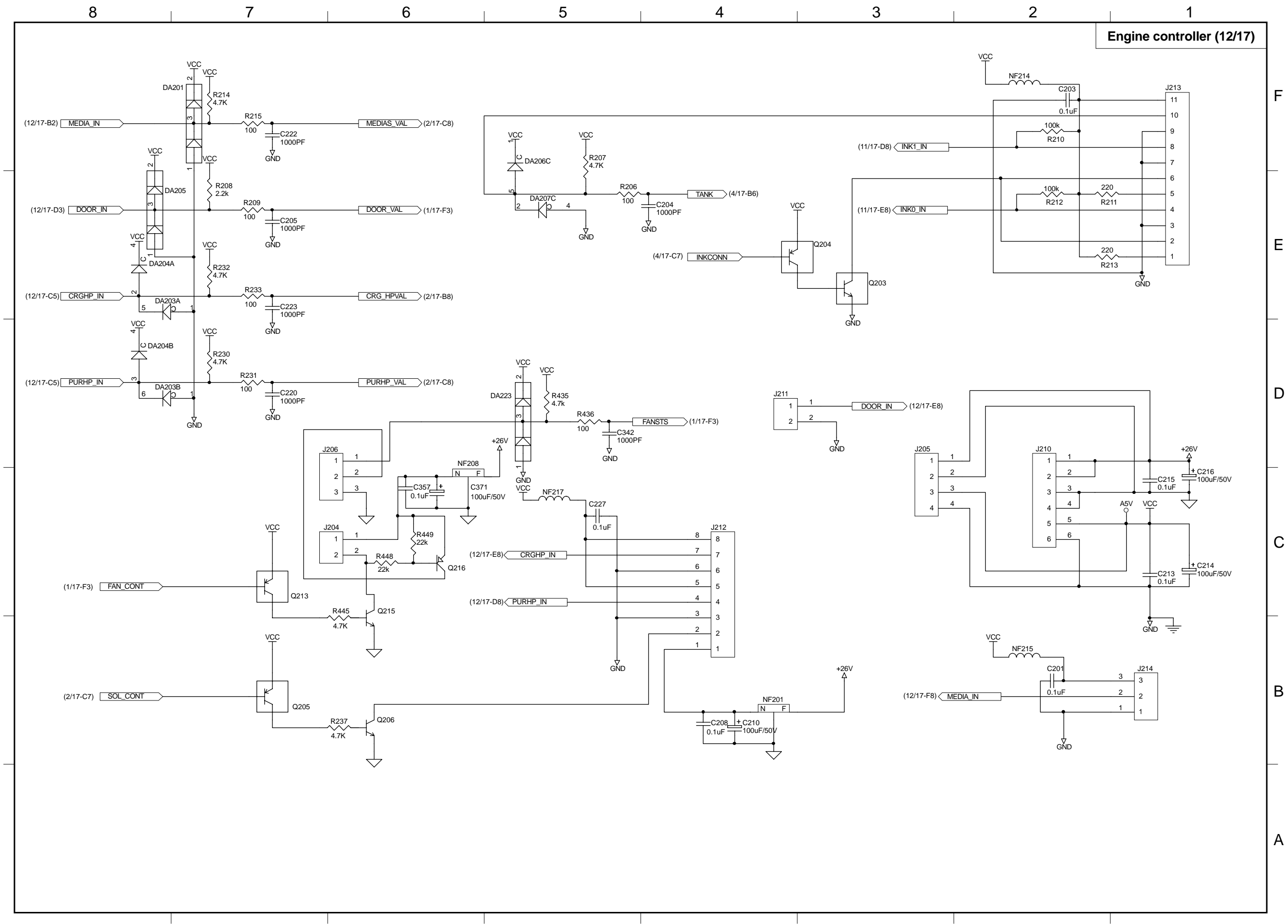


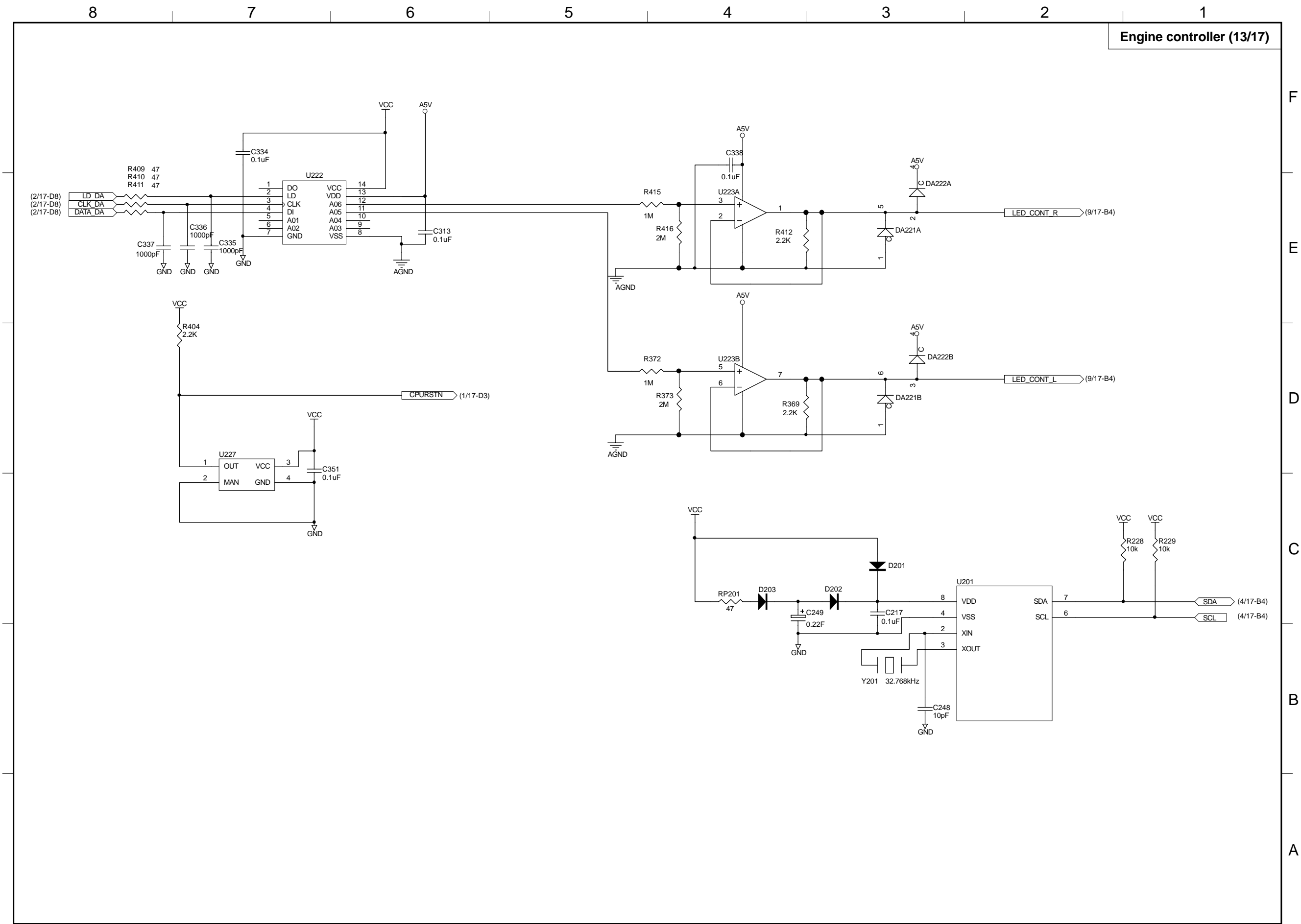


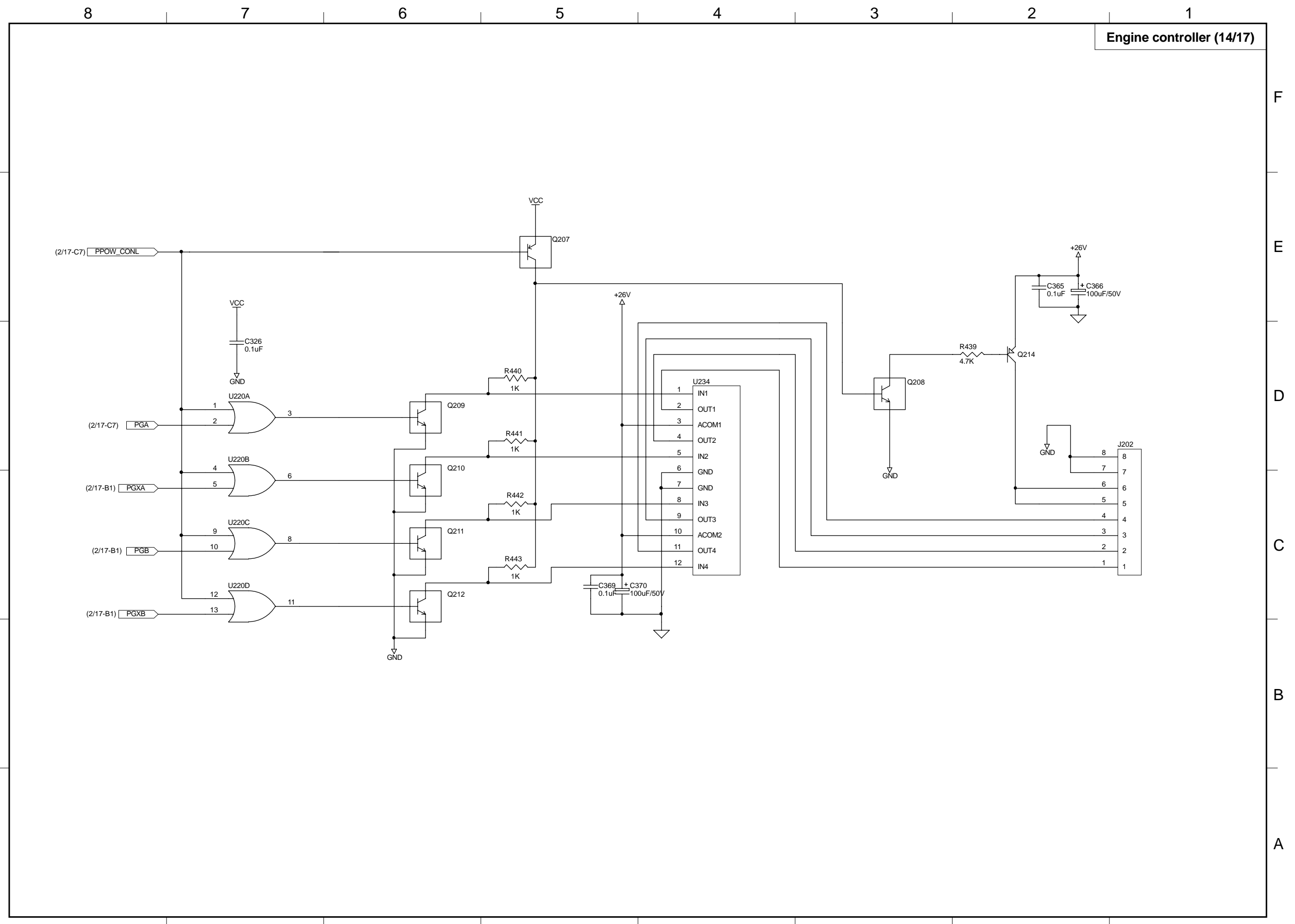


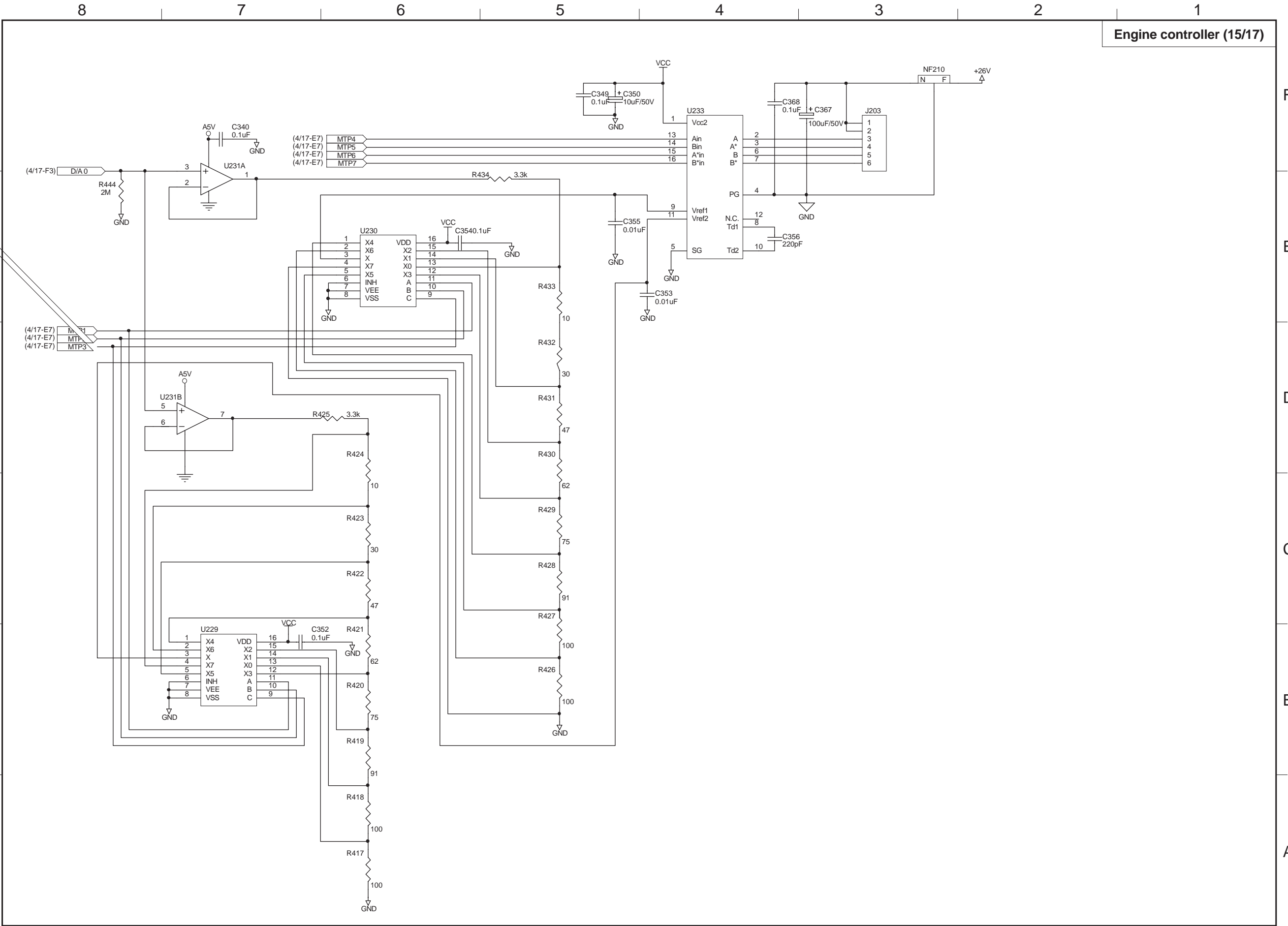


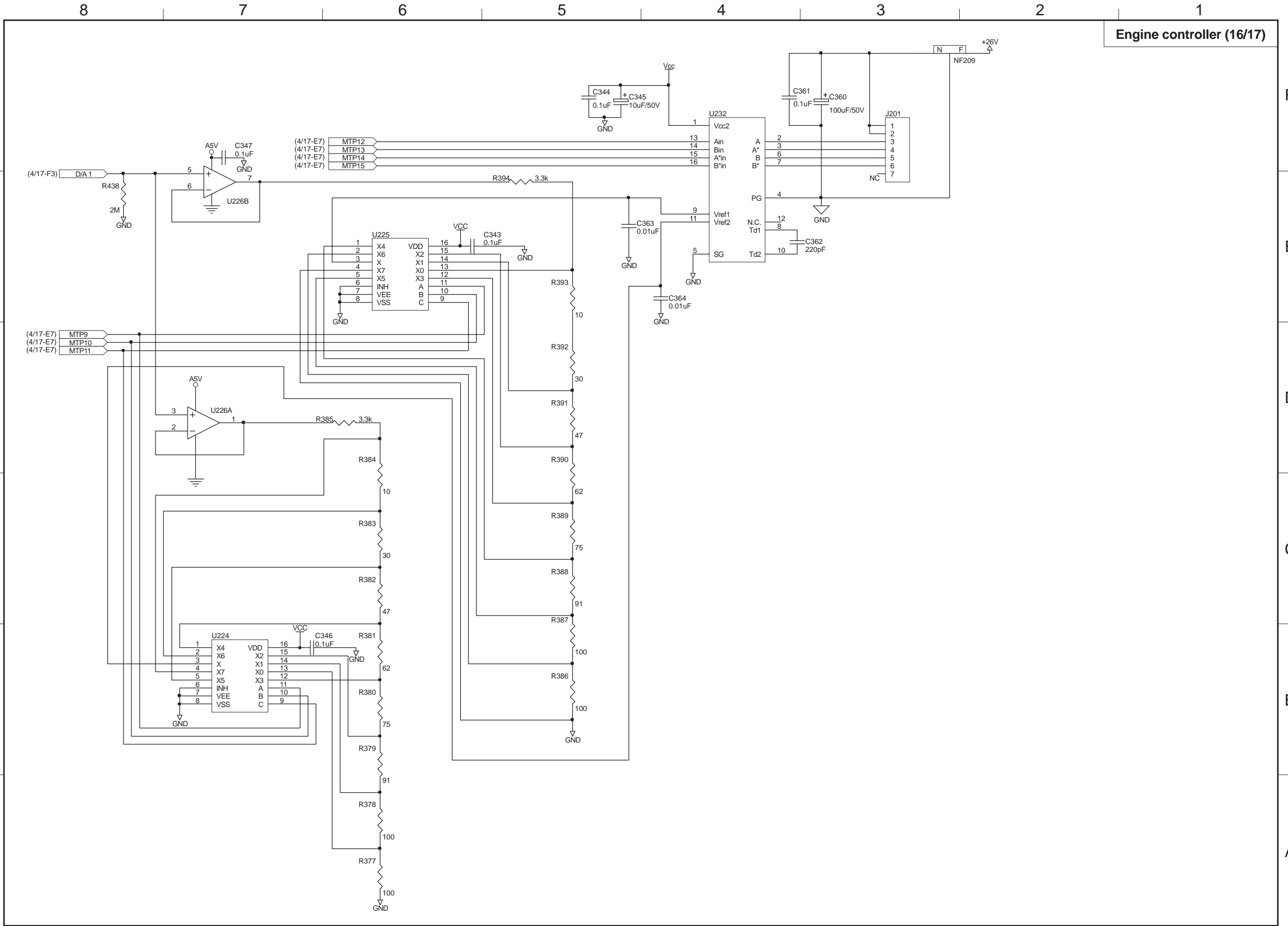


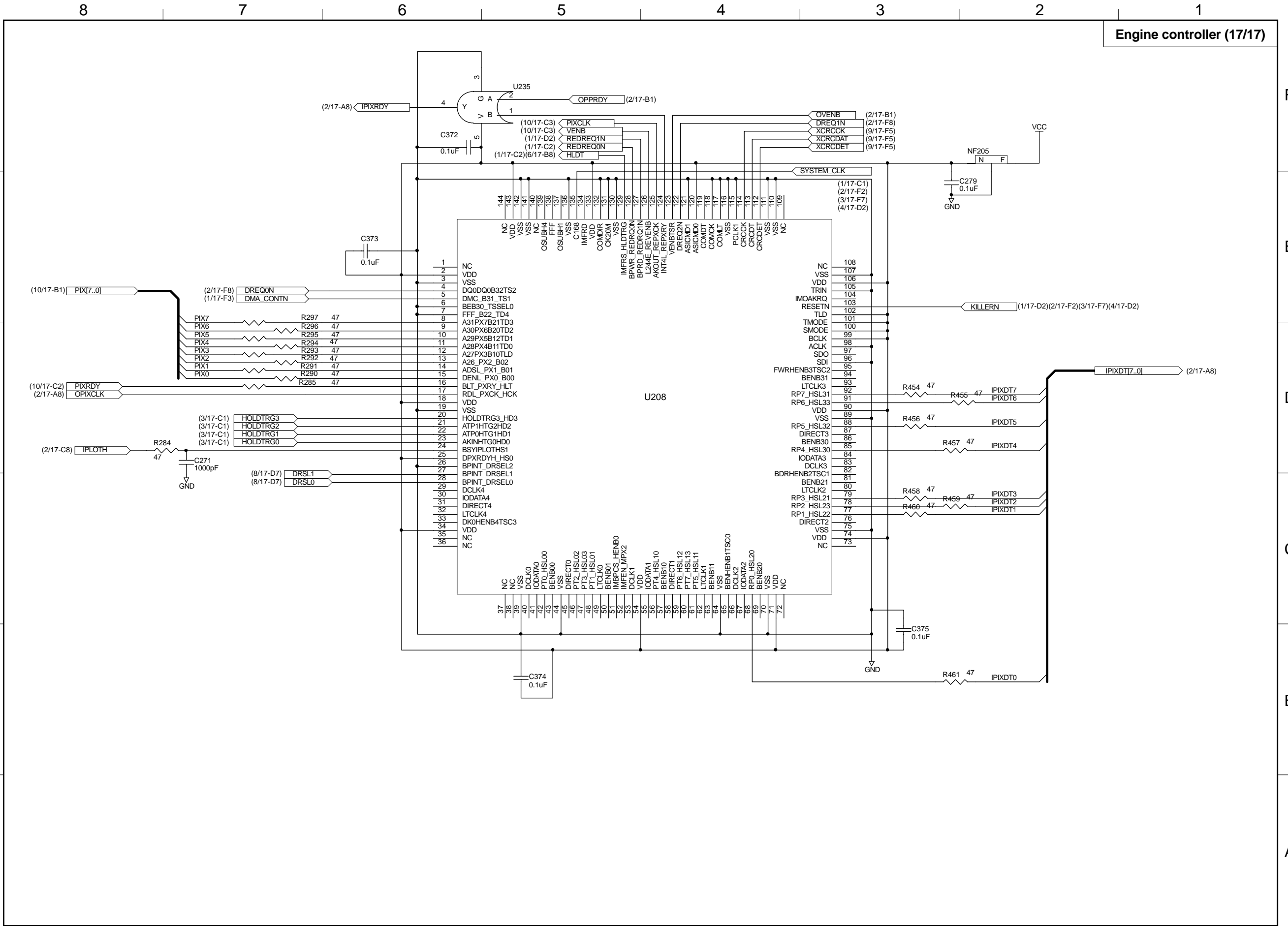




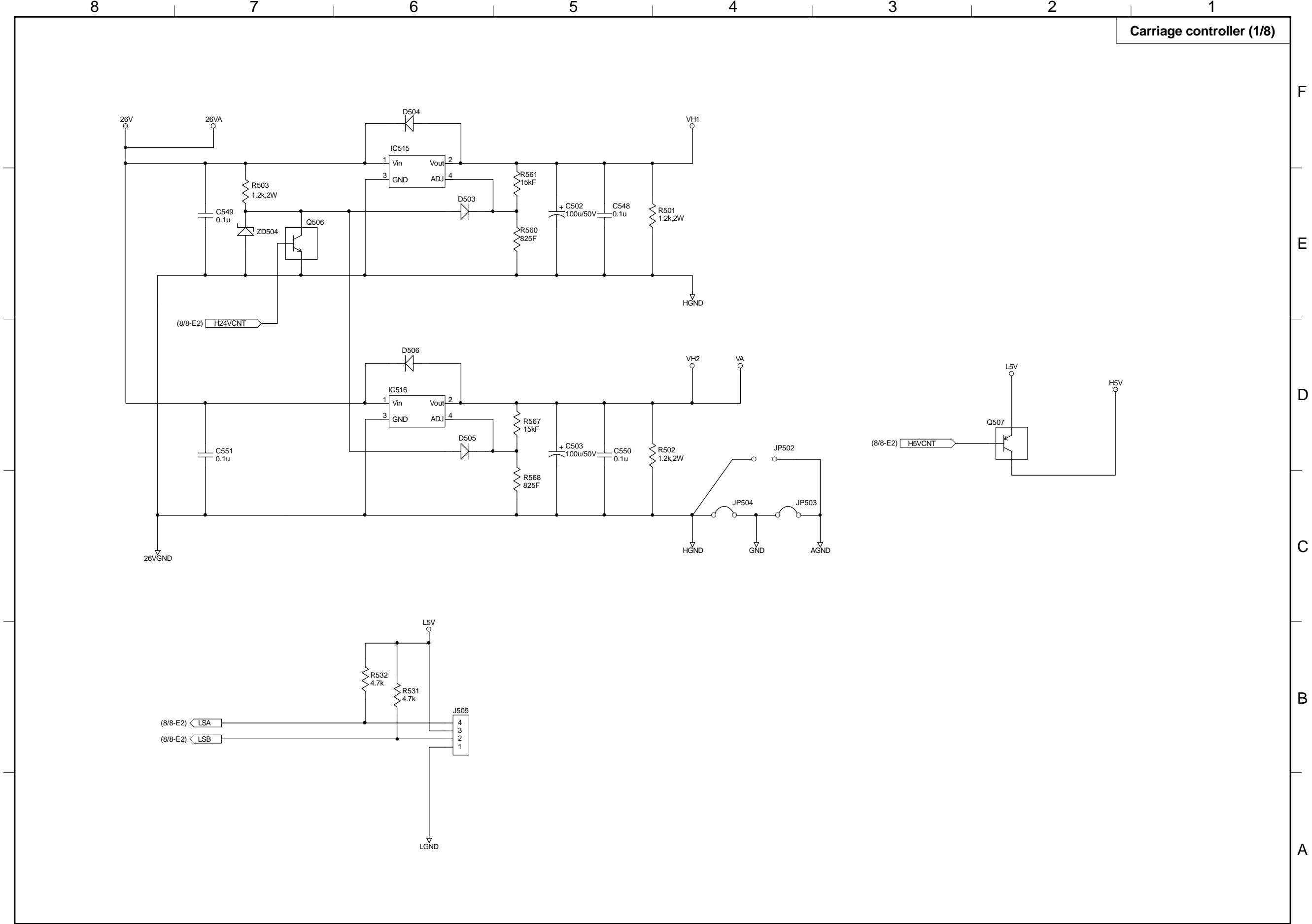


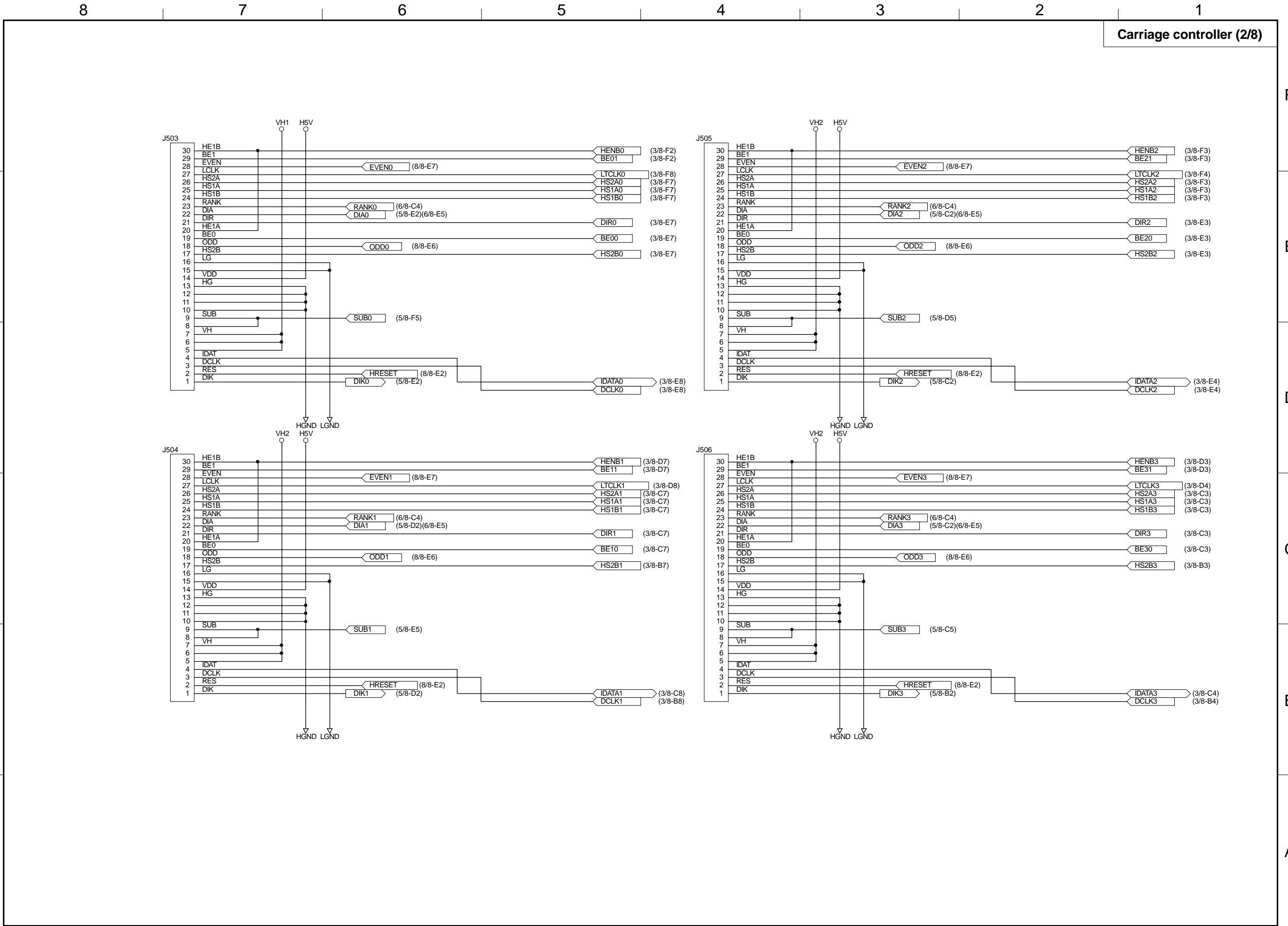


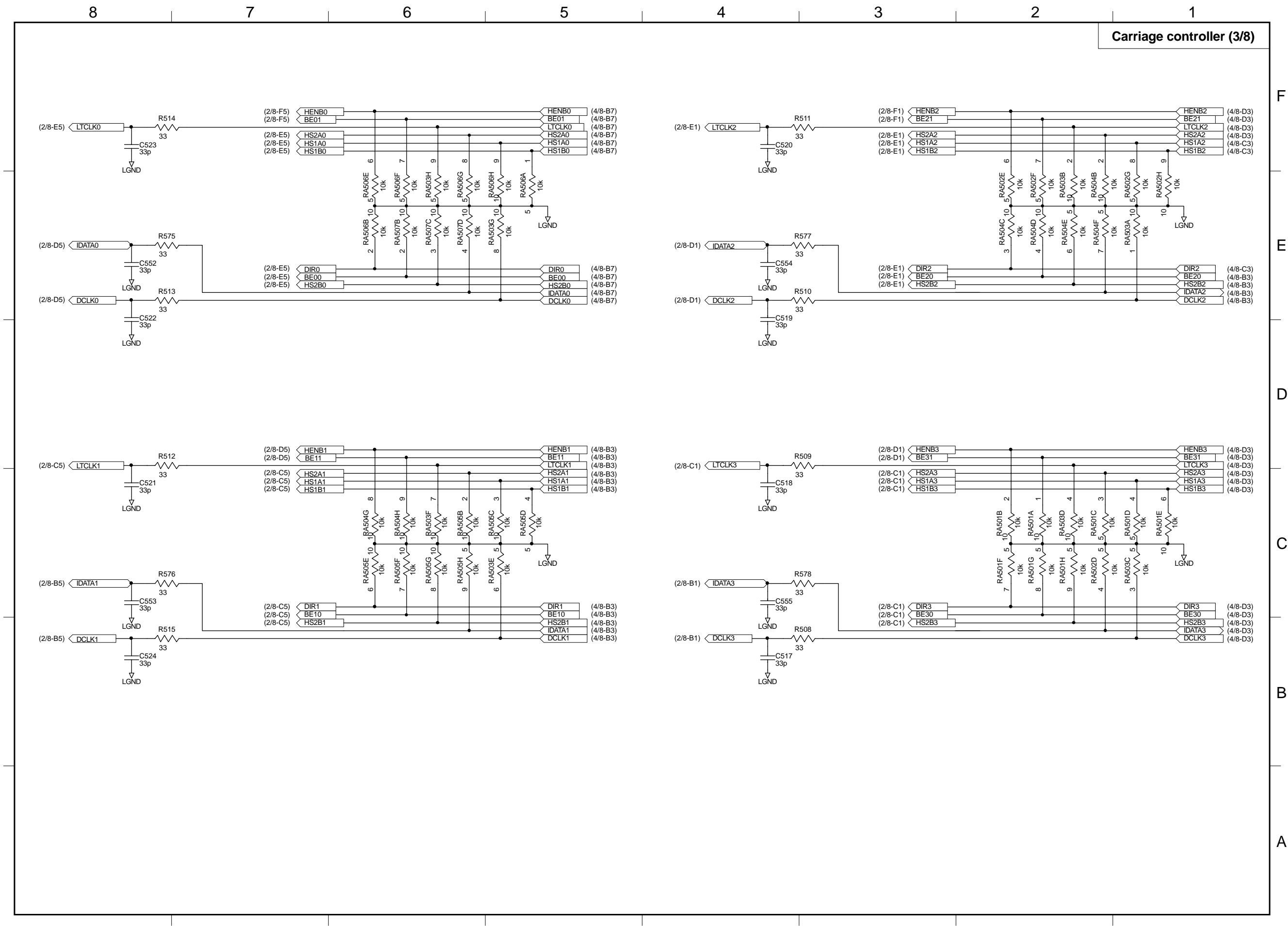


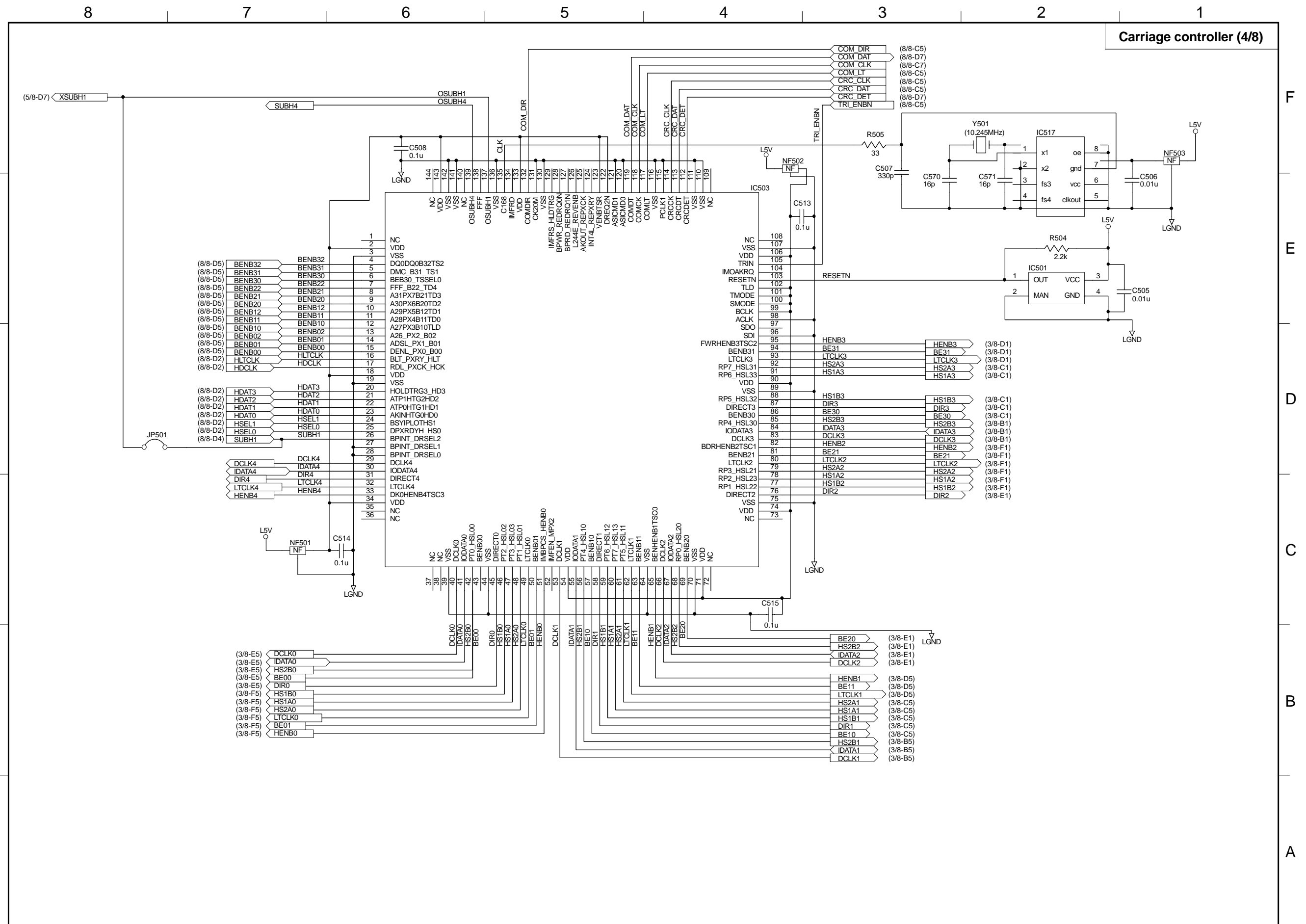


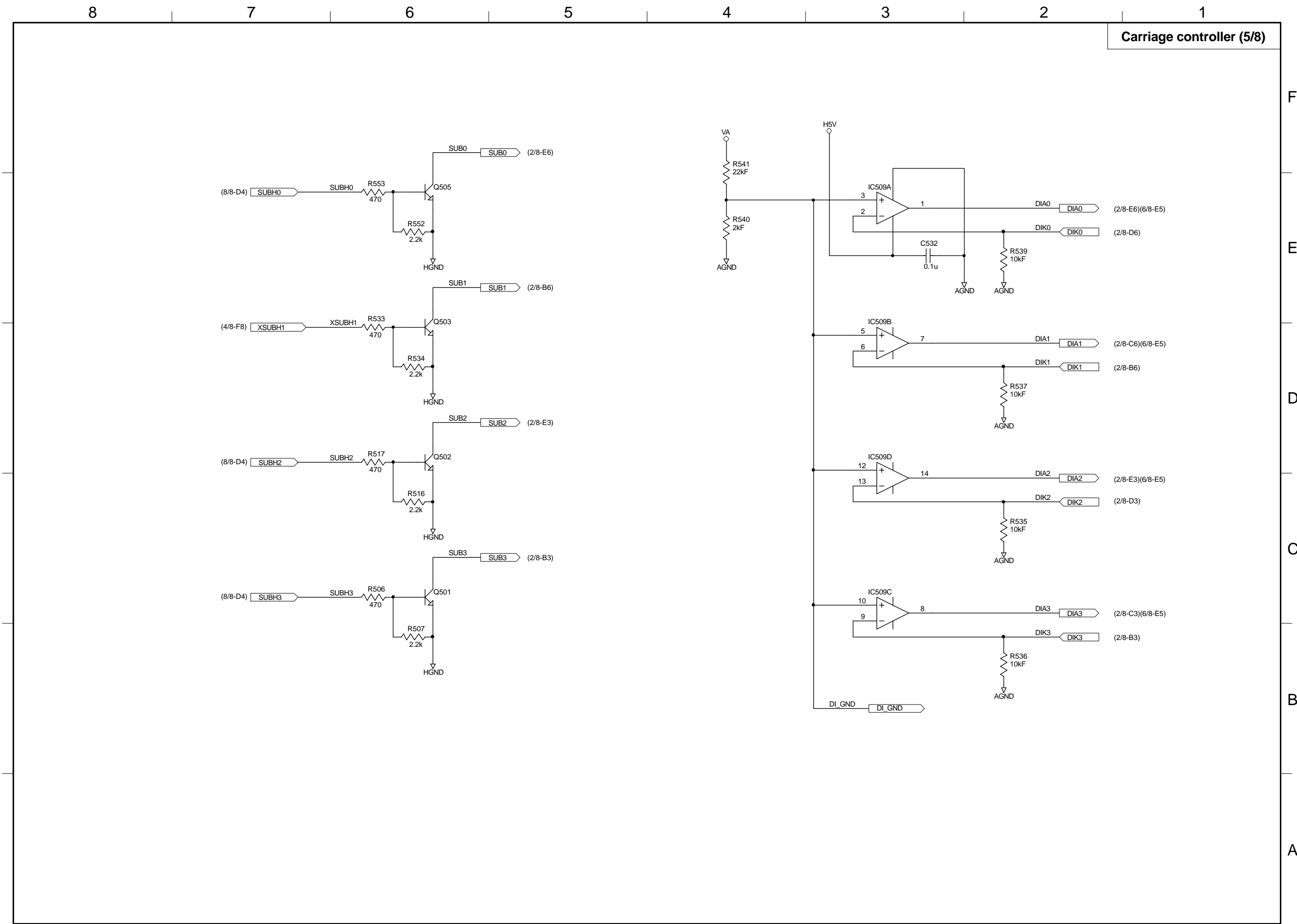
D. CARRIAGE CONTROLLER

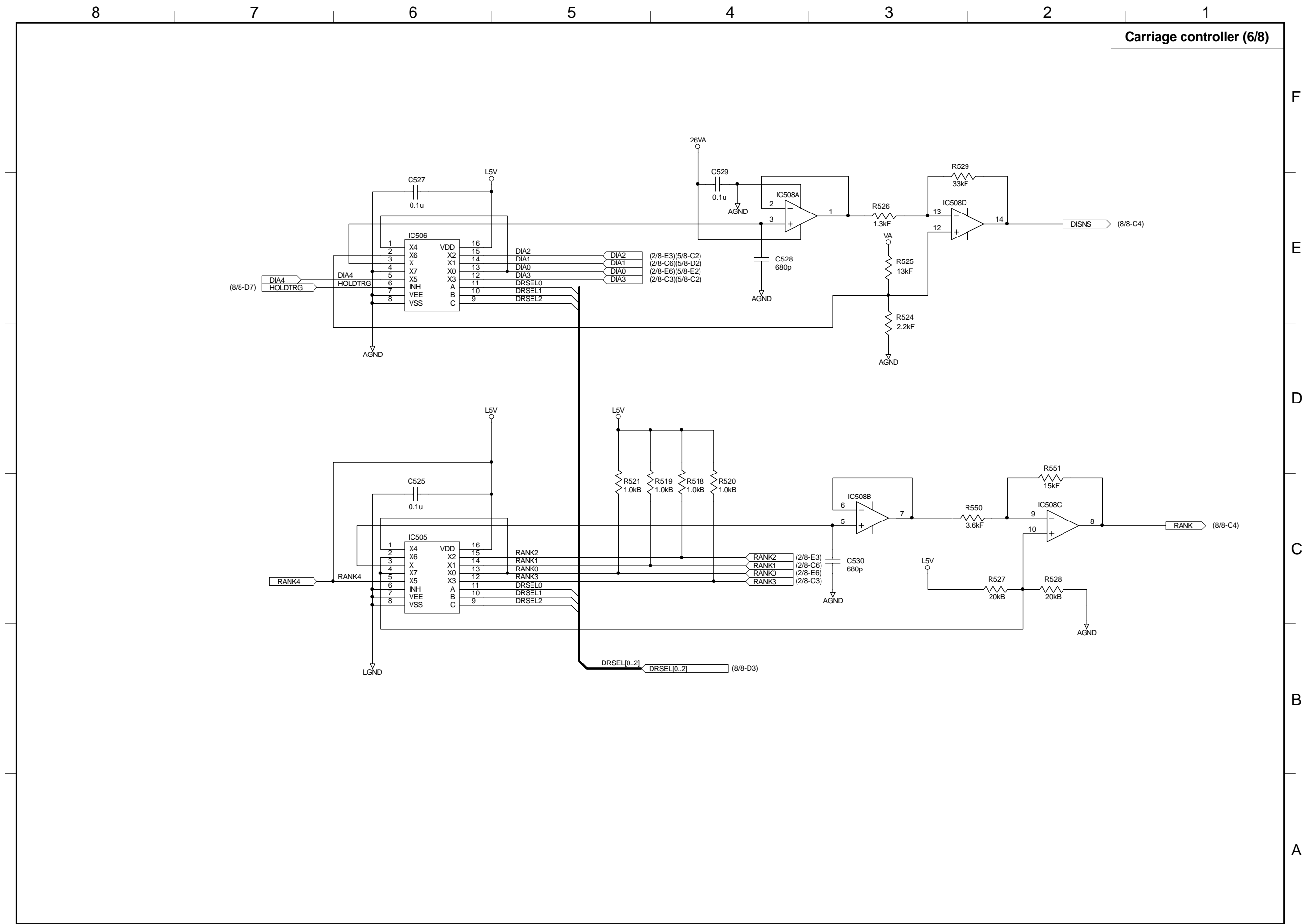


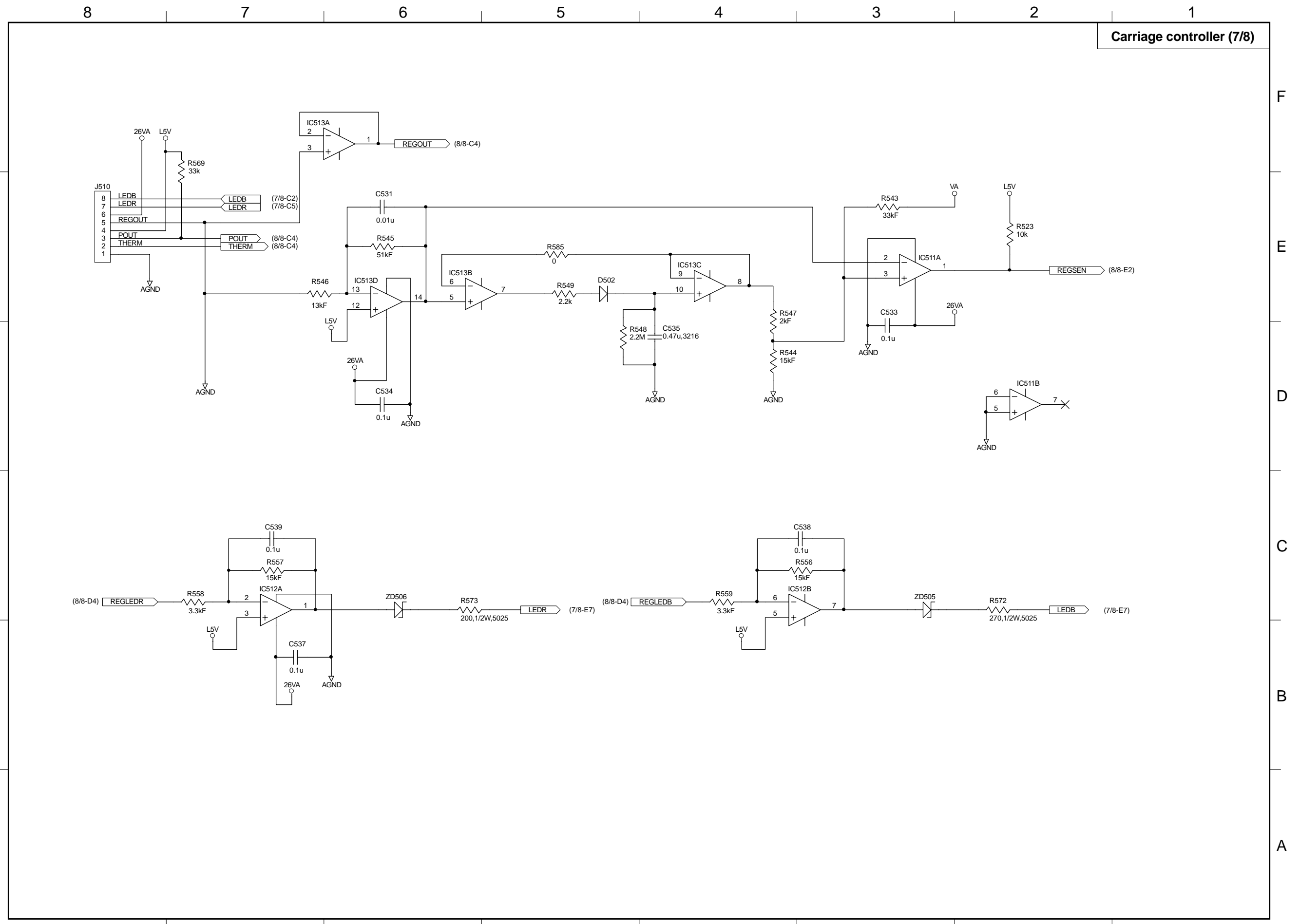


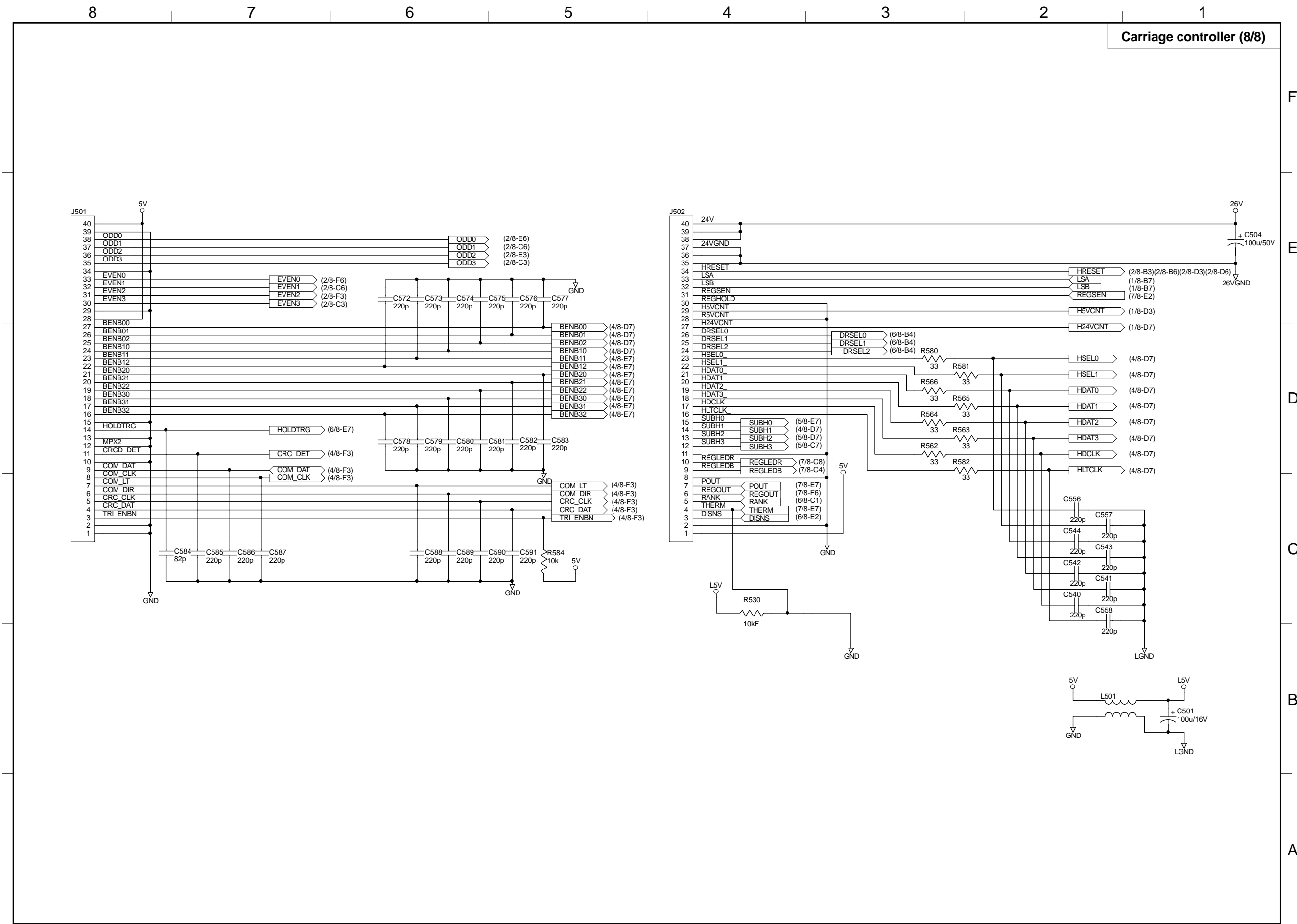




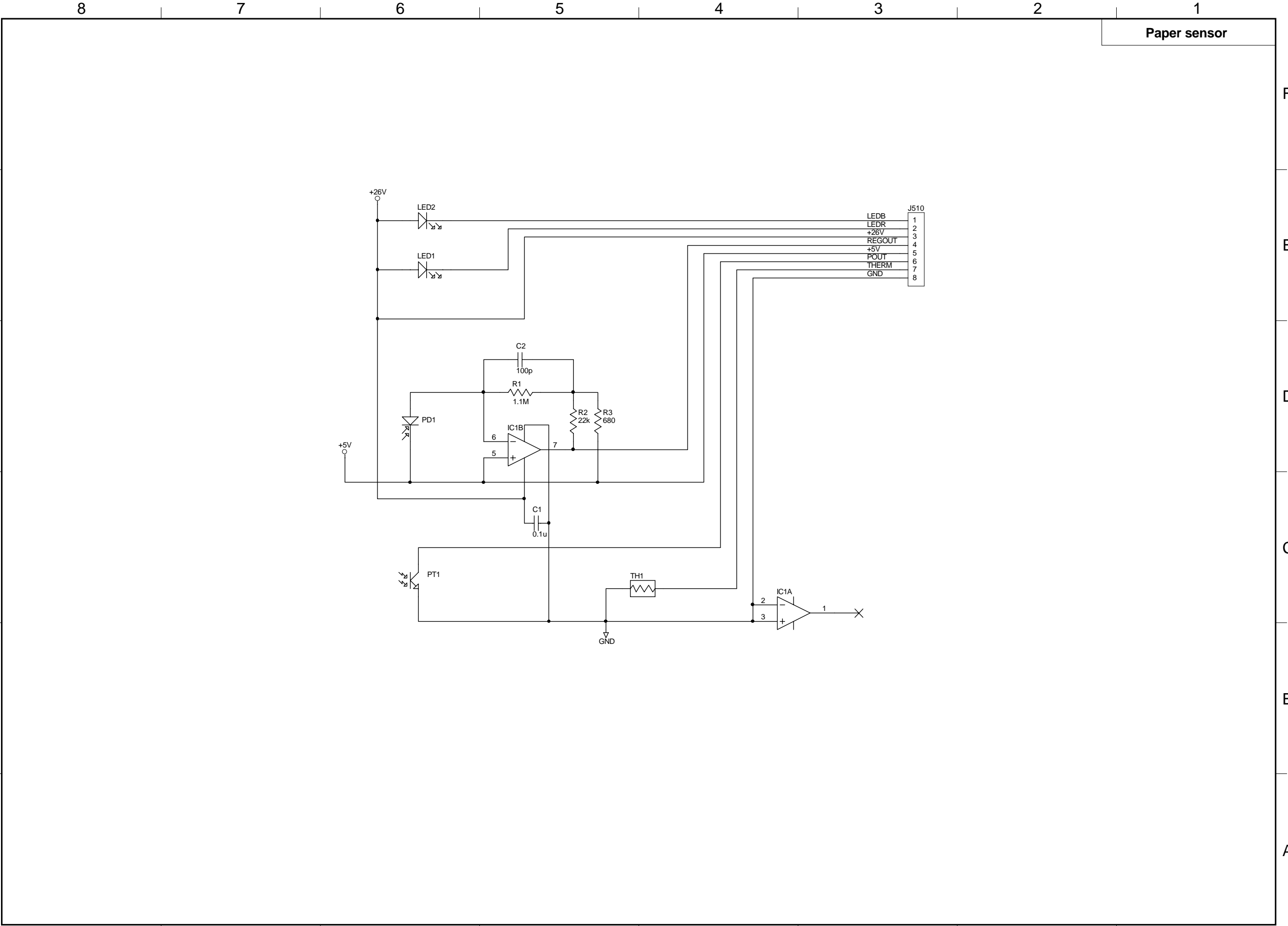




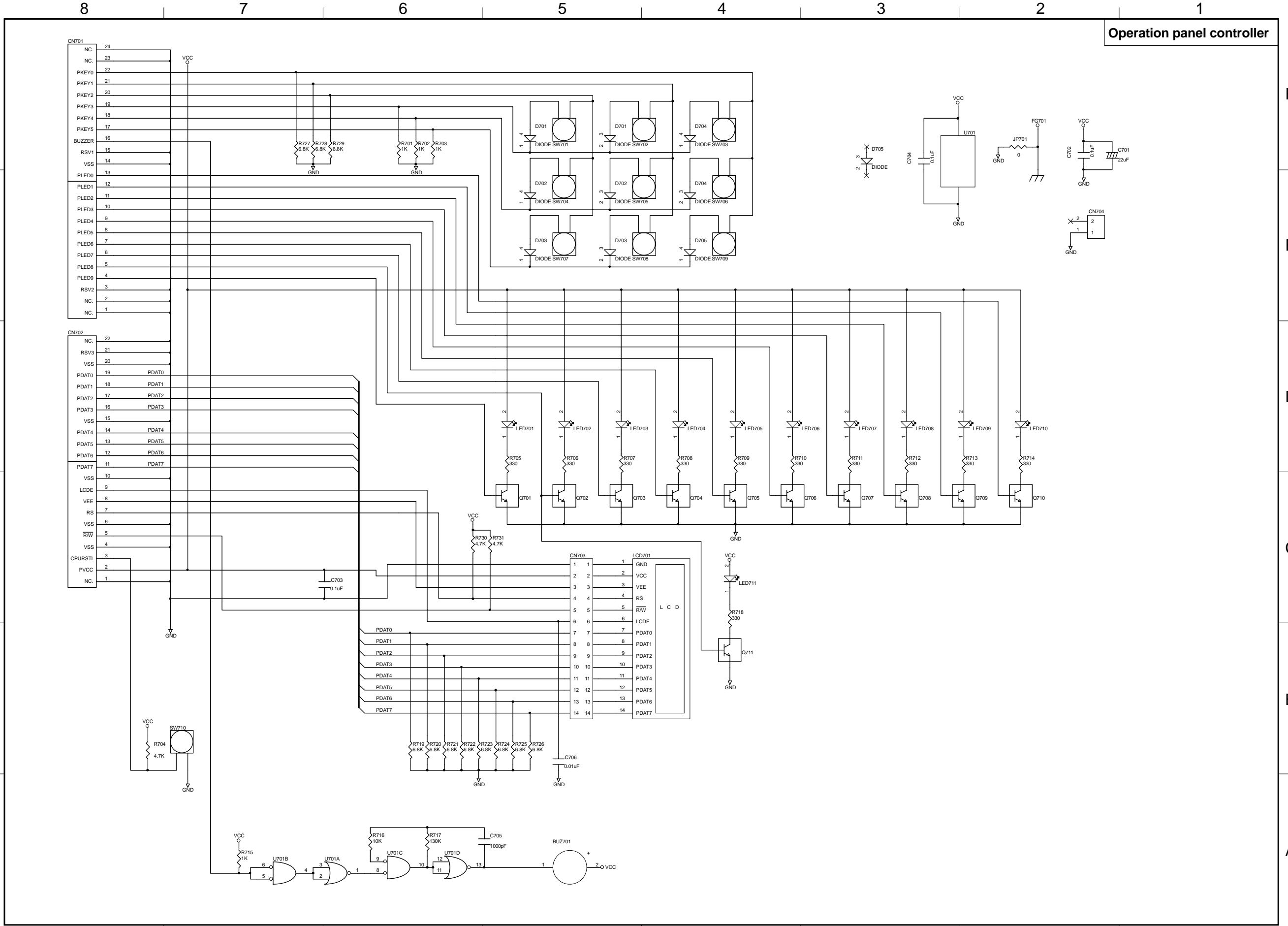




E. PAPER SENSOR



F. OPERATIN PANEL CONTROLLER

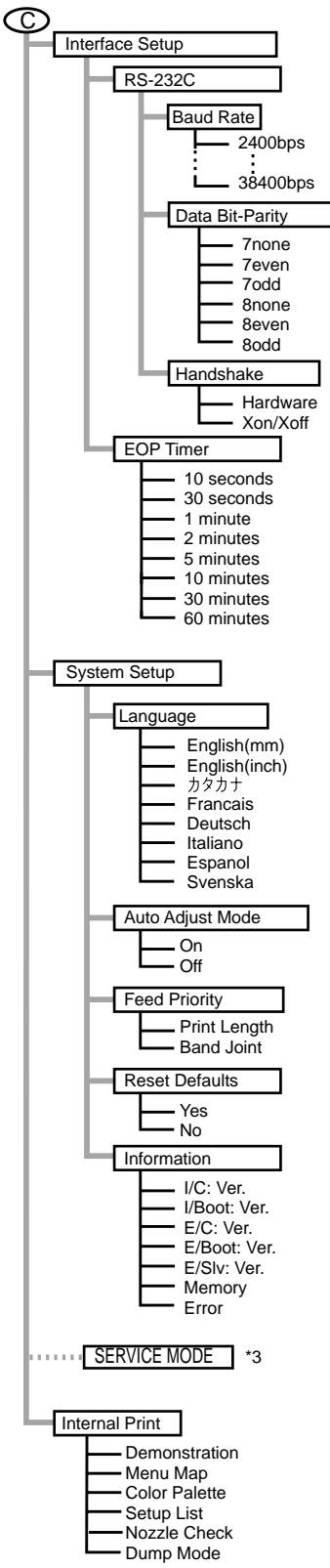
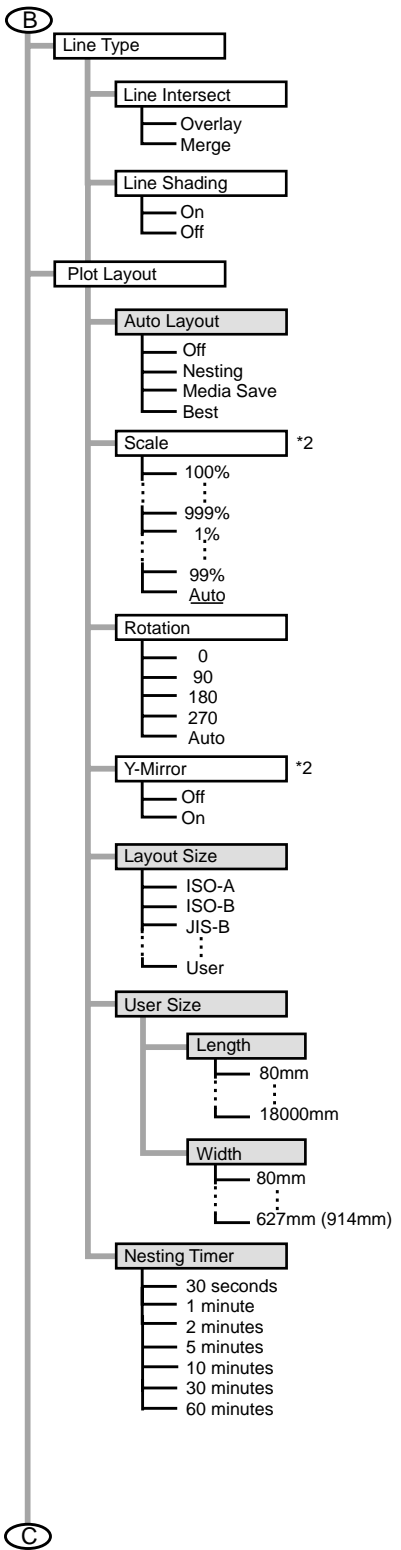
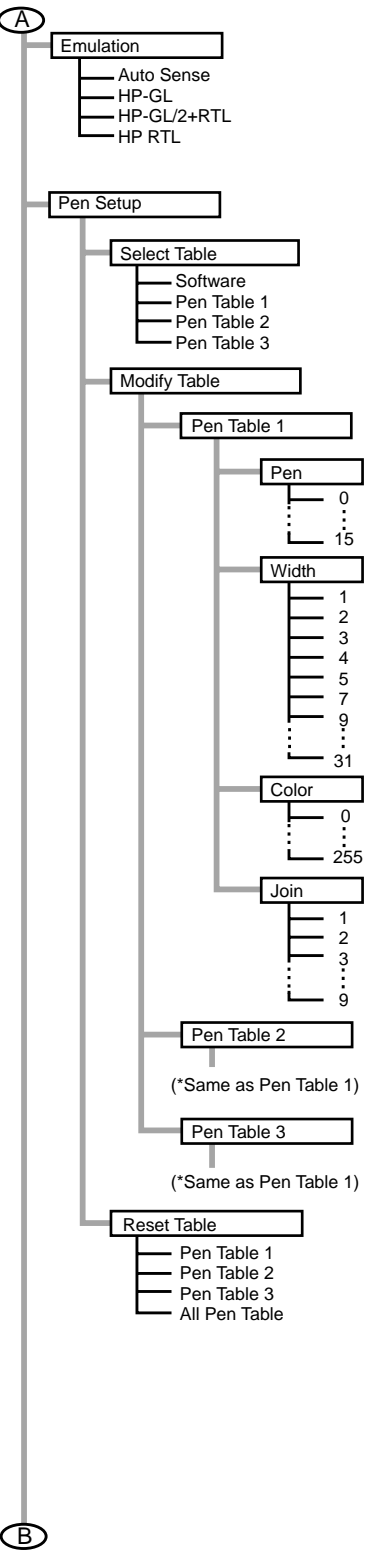
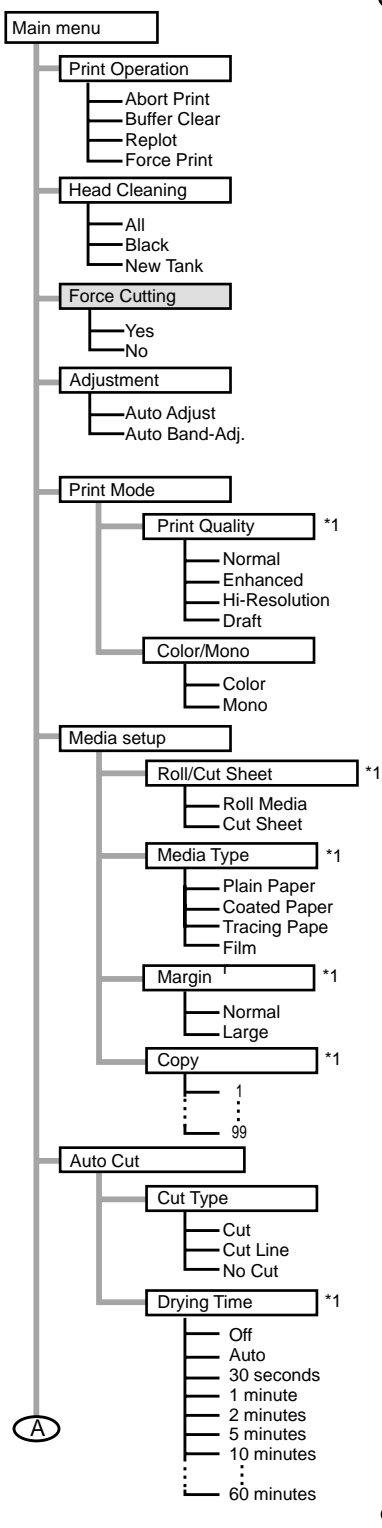


APPENDIX

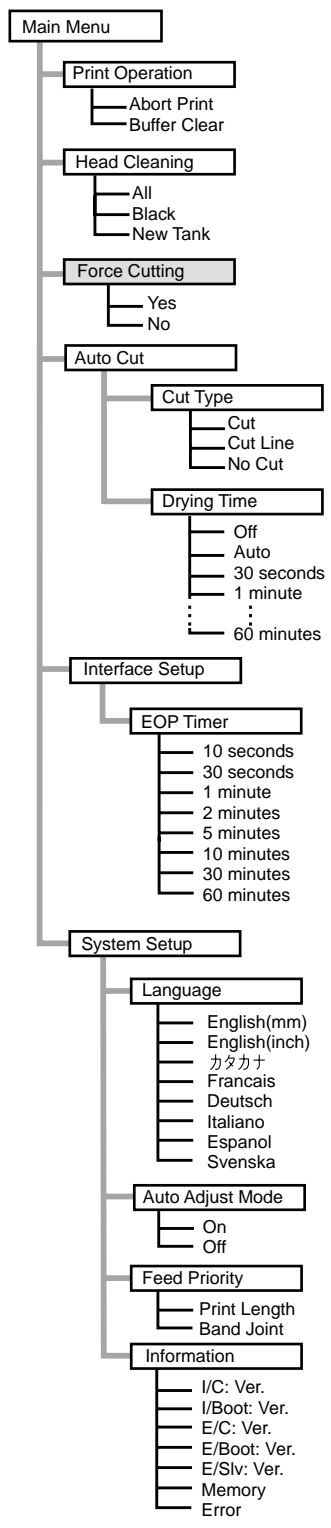
MENU GUIDE

Menu Guide

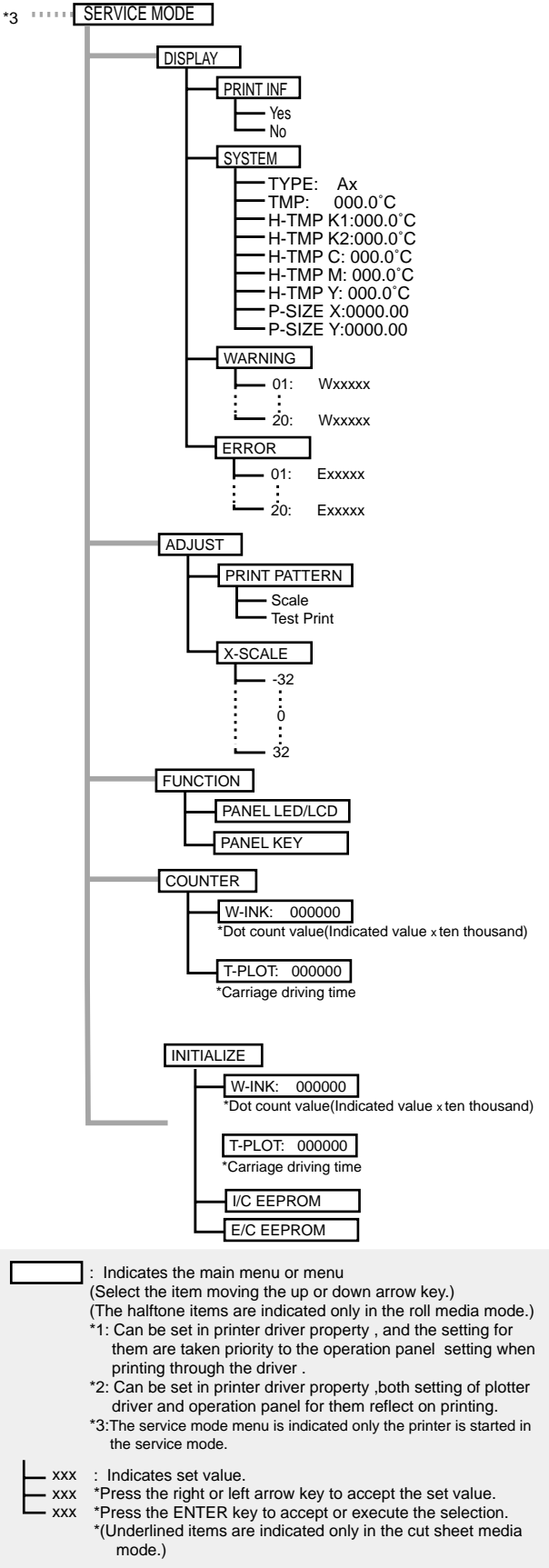
Normal Menu



Printing Menu



Service Mode Menu





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