

C O N T E N T S

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9 | TROUBLESHOOTING

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6.1. Introduction

This chapter describes troubleshooting procedures against printer troubles. To start troubleshooting, we recommend that *General Flow Chart* in section 6.3. is followed first of all. It will help locate an appropriate troubleshooting approach to be taken as explained below.

Before starting troubleshooting, ensure that the printer is installed in accordance with the conditions described in section 6.2.1.

6.1.1. Using the flow charts

In the following flow charts, problems are categorized as follows, depending on the part of the printer in which the trouble has been located.

- * *Power problem.* Malfunctions caused by the defects in the power supply section.
- * *Front panel problem.* Malfunctions concerning the display and key entry functions.
- * *Problems with error message.* Malfunctions detected by the internal microprocessors and messaged on the front panel.
- * *Paper feed problem.* Defects in the paper feed path.
- * *Print quality problem.* Defects of print quality.
- * *Host interface problem.* Malfunctions in the host interfaces (a parallel interface and an option interface).

After the part which is causing the problem is isolated, refer to the corresponding subsection in section 6.4., *Troubleshooting Procedures*. This section describes the troubleshooting procedures for each problem as categorized in section 6.3.

6.2. Environmental Requirements

Examine first the compliance of the specific location of the printer to the requirements below before proceeding with troubleshooting.

The use of the printer in a location which does not satisfy these requirements may cause subsequent troubles and may shorten its service life. If the printer appears to be used in an adverse condition, advise the user to use it in a proper environment.

6.2.1. Environment conditions

Temperature: 10°C to 32.5°C (50°F to 90.5°F)

Humidity: 20% to 80% RH

Optimum condition: 20°C, 65% RH

Altitude: Maximum 2000 m (6500 feet)

Power source: The tolerance of the power voltage should be less than $\pm 10\%$ and the frequency $\pm 1\text{Hz}$ for all countries.

Placement: The printer should be placed on a firm, stable base.

Others: Away from heat sources, steam, humidized air, etc.; Away from generation of ammonium gas, etc.

6.3. General Flow Chart

Figure 6.1. General Troubleshooting Flow

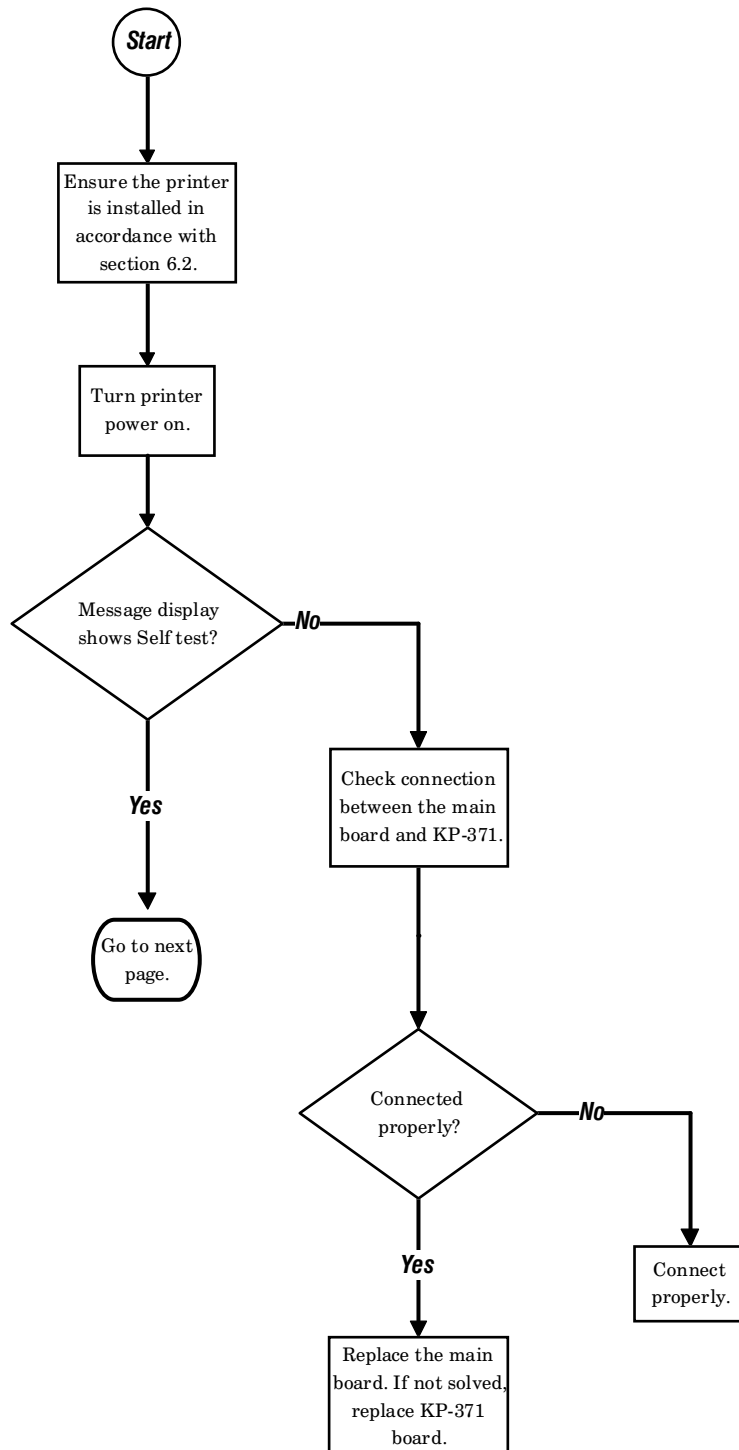
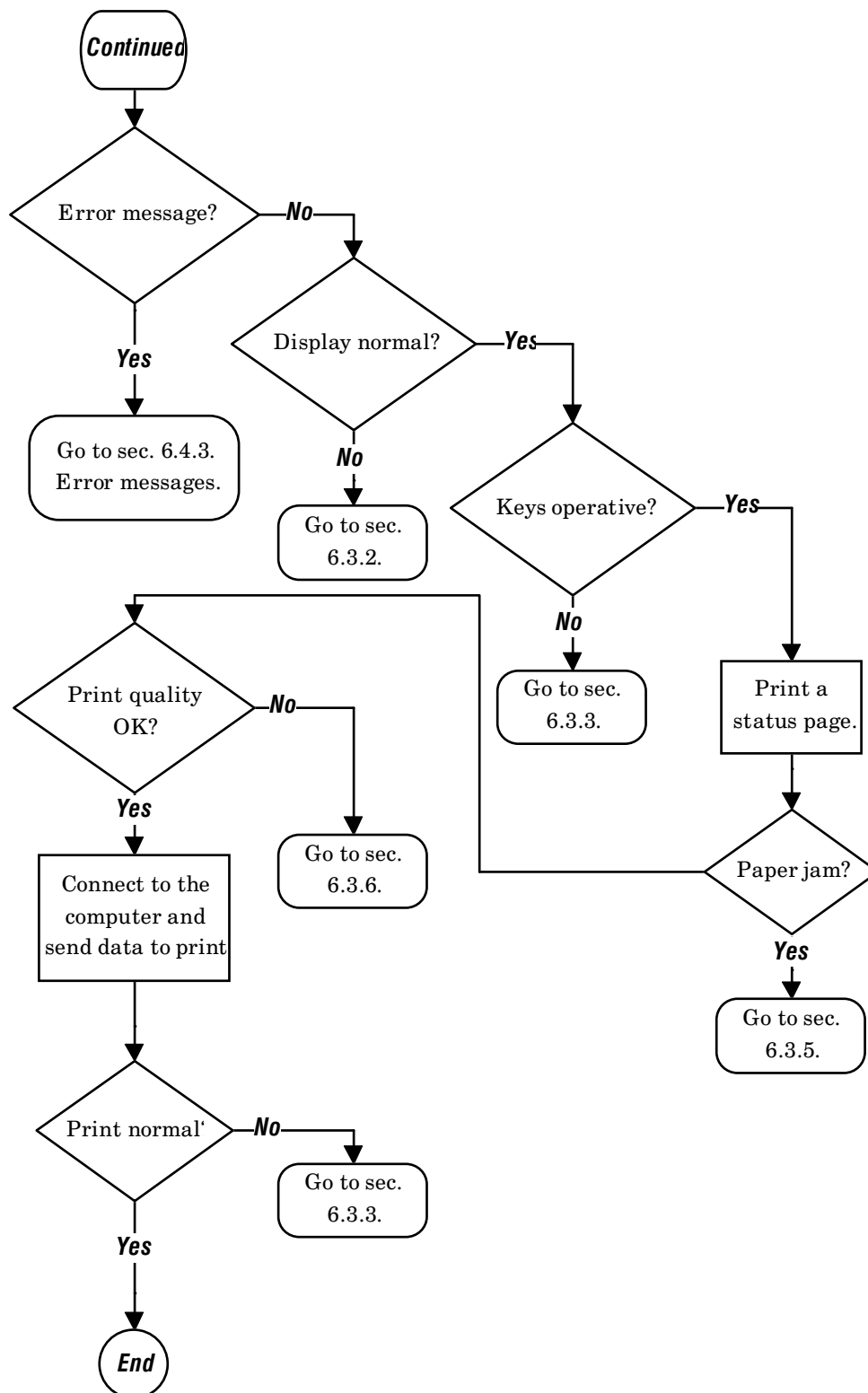


Figure 6.2. General Troubleshooting Flow



6.3.1. Power/front panel problems

A failed power supply and a failed front operator panel may cause the similar symptoms of defect. The following procedure helps determine whether the problem is caused by the front panel or the power supply.

Start with checking whether +5V line is active.

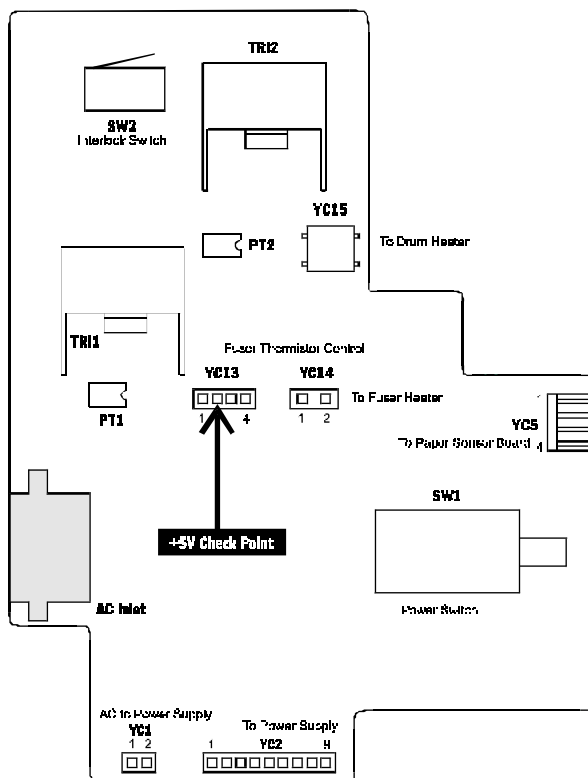
6.3.2. +5V DC Check

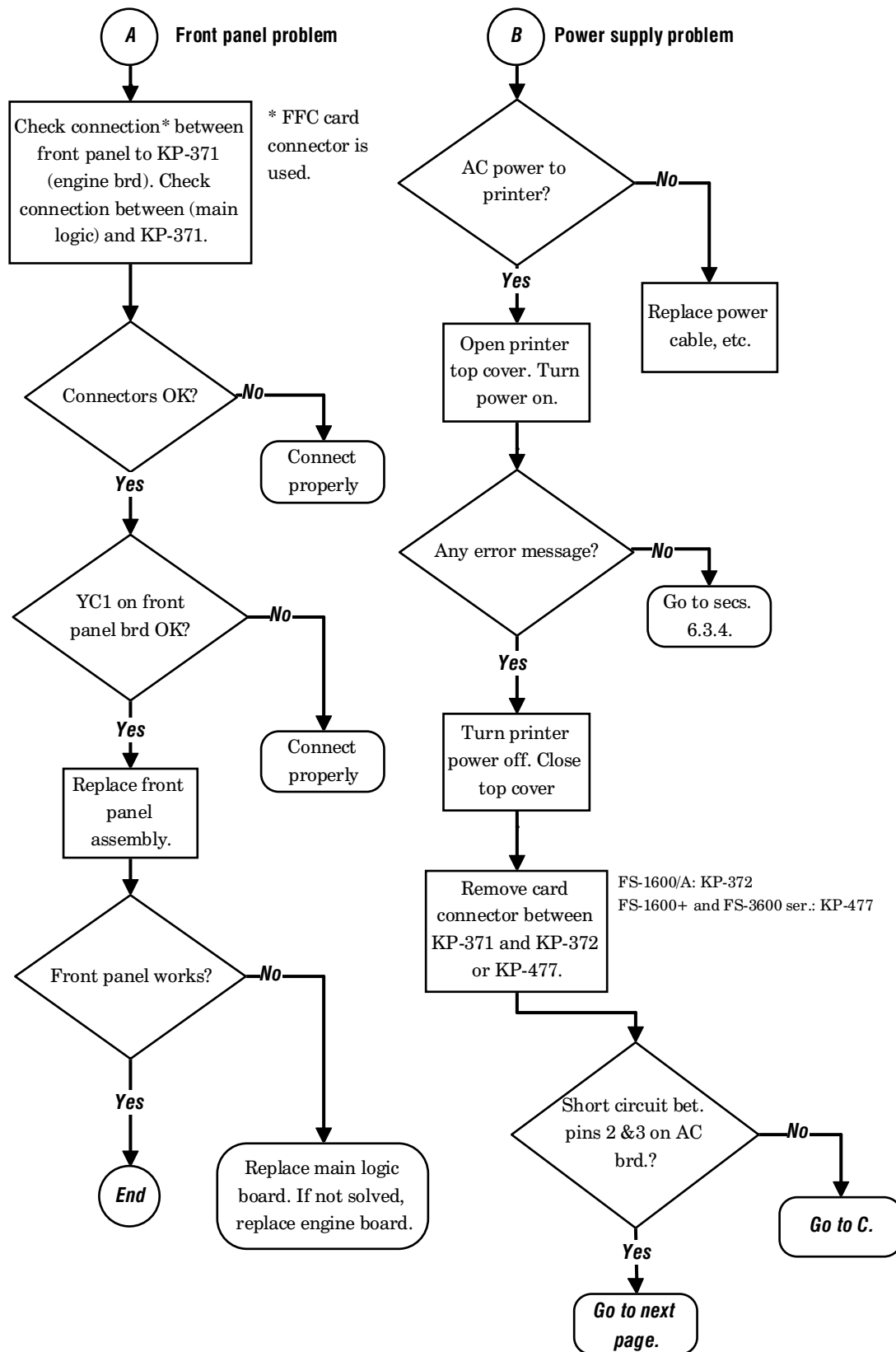
Check if the +5V line is active at '+5V Check Point' in the figure below.

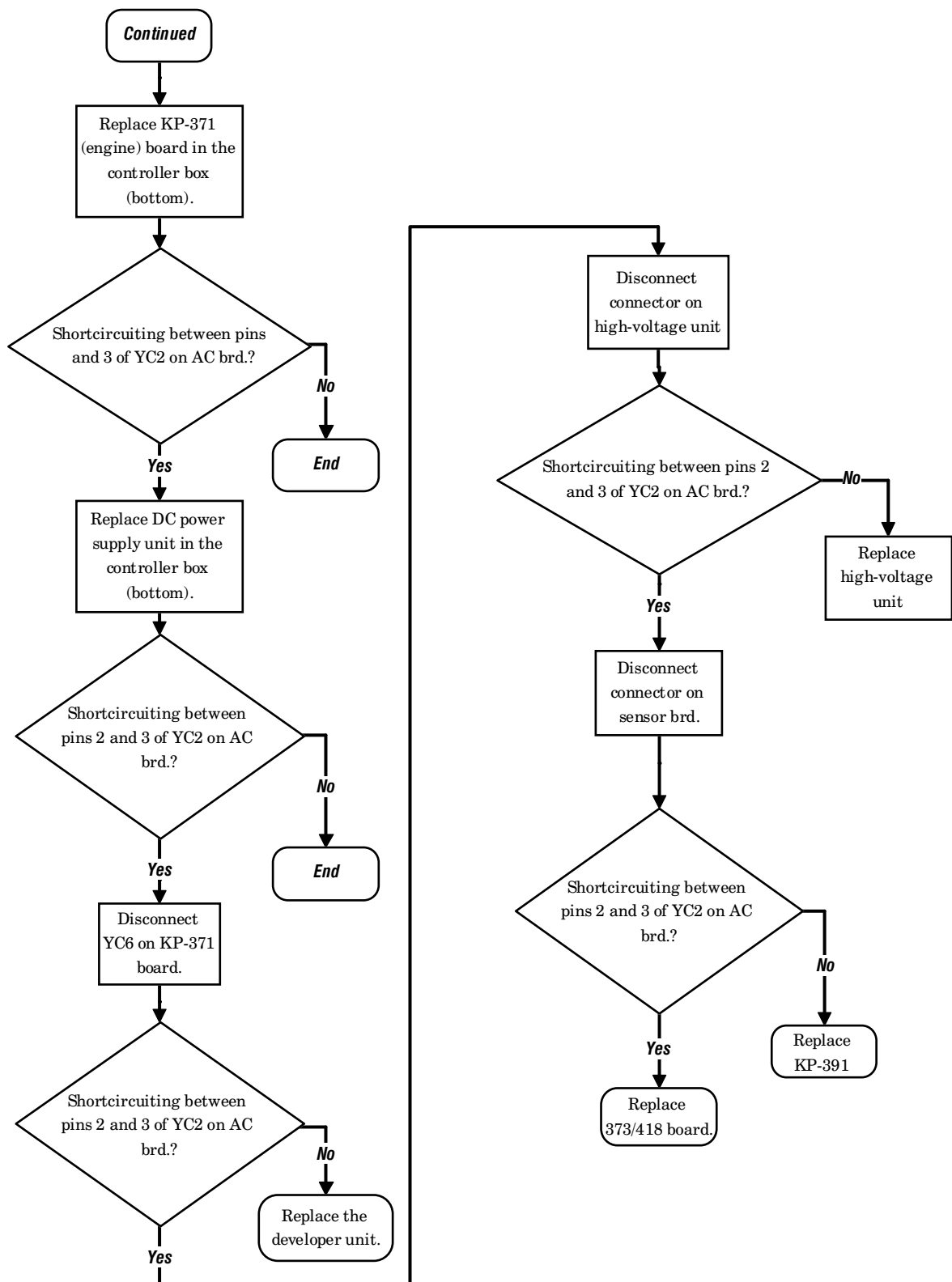
If yes, the front panel may be defective: Go to flowchart A on the next page.

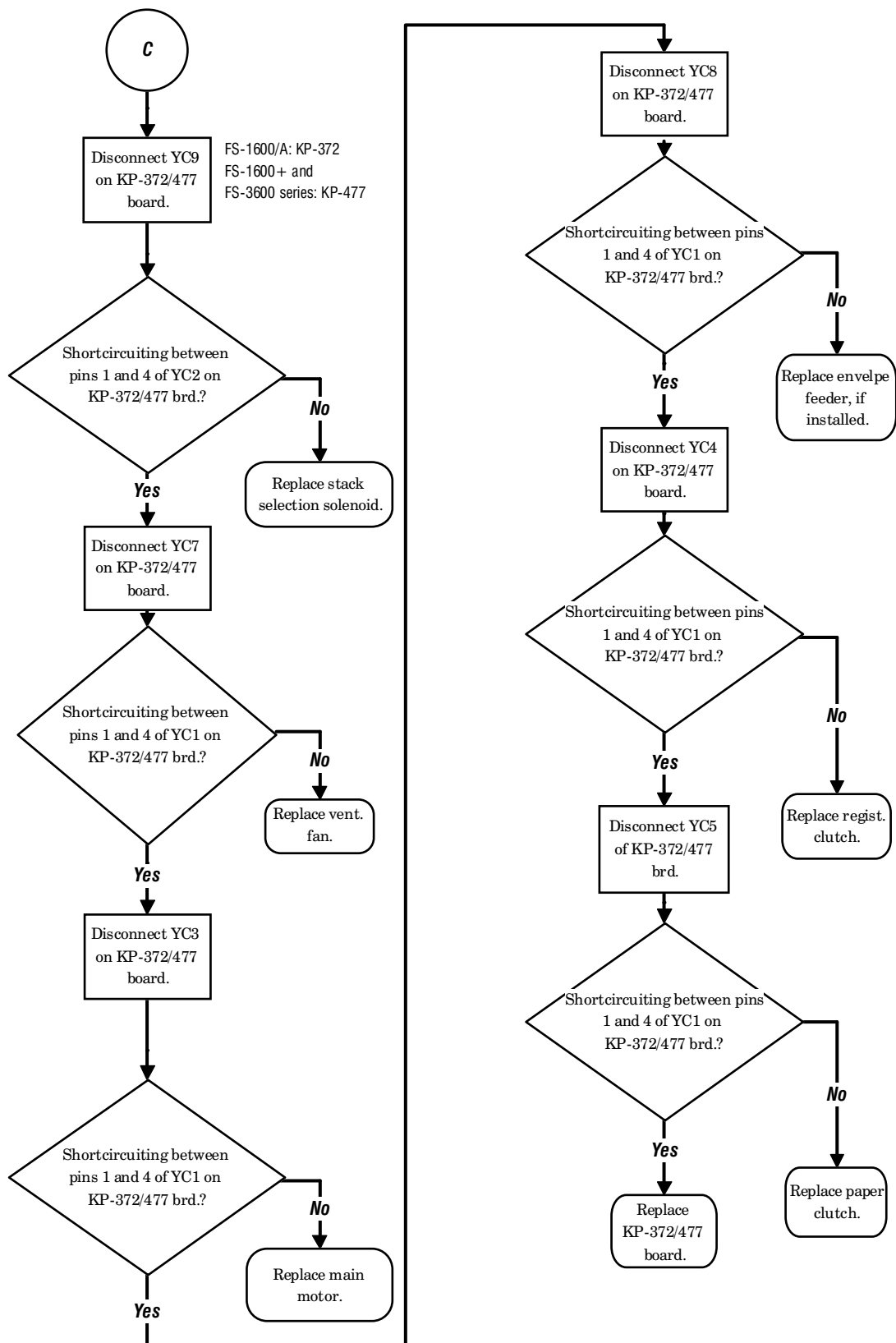
If no, the power supply may be defective: Go to flowchart B on the next page.

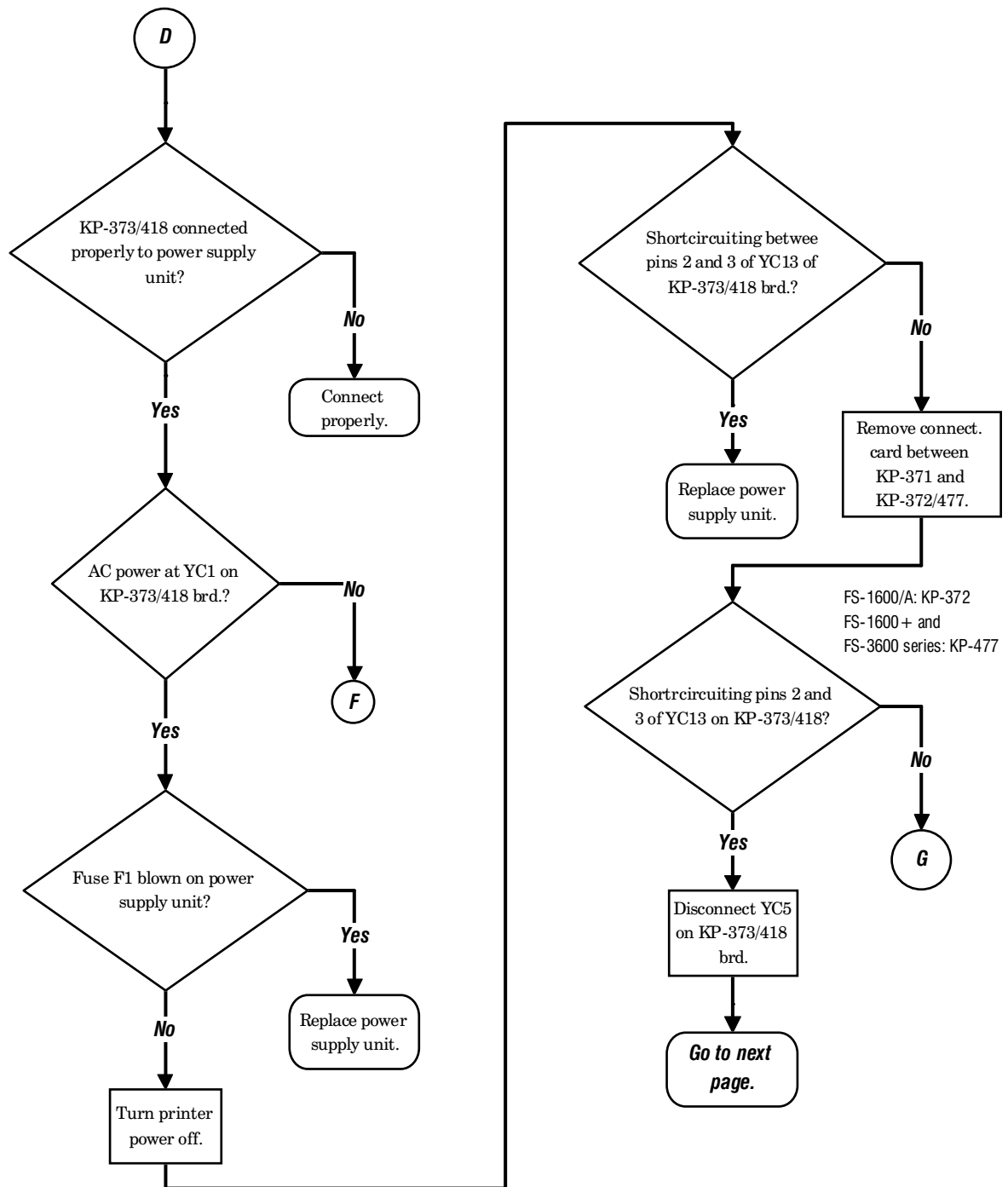
Figure 6.3. +5V check point

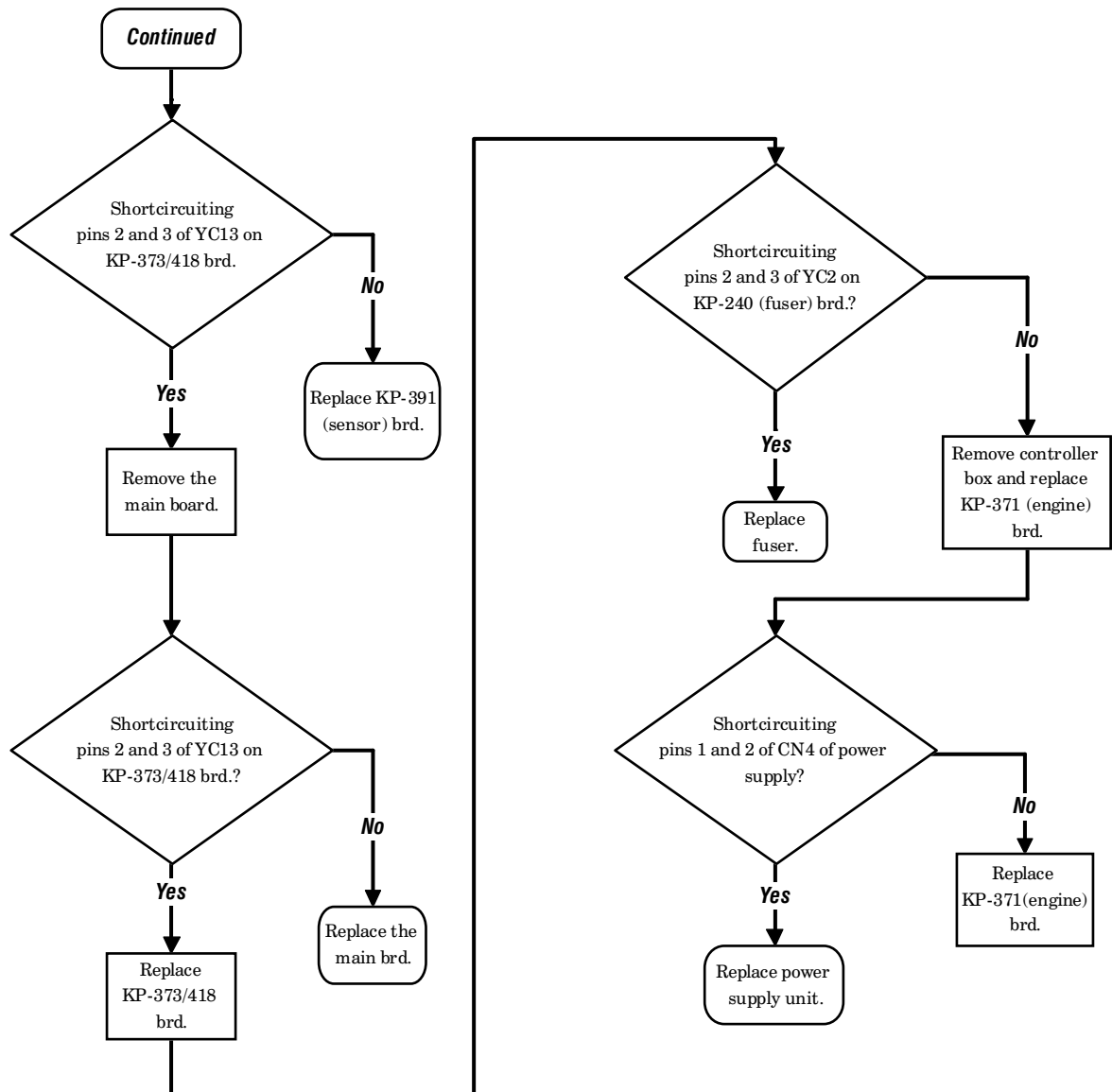


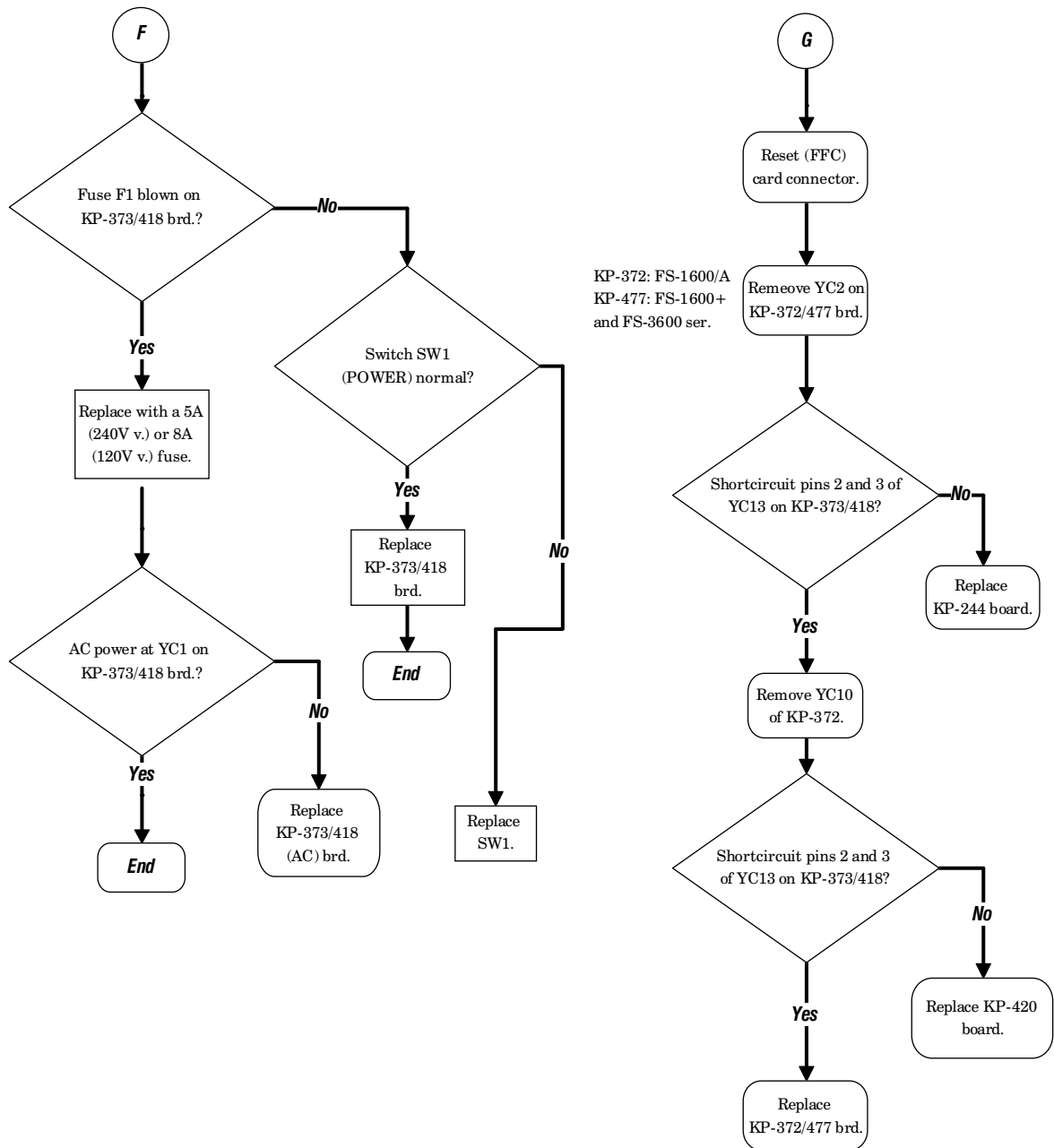




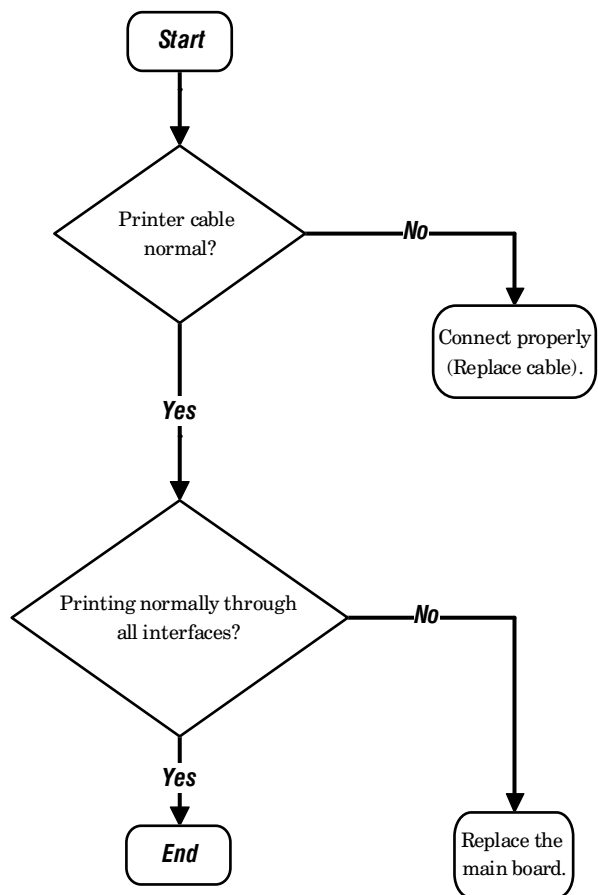








6.3.3. Host interface problem



6.3.4. Error messages

The following table indicates the printer's messages shown on the control panel and how to respond to each of these messages.

Message	Meaning	Corrective action
Call service person E0	Engine communication error. The engine controller won't respond to the command sent by the system via the dual port RAM in approx. 1.2 seconds.	Verify if the engine ROM is inserted into its socket properly or replace KP-371 (engine) board.
Call service person E1	Main motor error. The 406 Hz pulse signal is not detected.	Refer to section 6.4.2.
Call service person EE/EF	Drum heater error/Total page (mechanical) counter error.	Refer to section 6.4.3.
Call service person E4	Fuser Heater Error.	Refer to section 6.4.4.
Call service person E5	Eraser Error. The eraser current is less than 15 mA (normally 65 mA).	Refer to section 6.4.5.
Call service person E6	Engine ROM check sum error.	Verify if the engine ROM is inserted into its socket properly or replace KP-371 E(engine) board.
Call service person E9	Toner Motor Error. The toner motor current is 120 mA or more for one second (normally 30 mA).	Refer to section 6.4.6.
Call service person F1	System Checksum Error. An error is detected in the controller. The Ready-symbol and ON LINE indicators go off; and ATTENTION lights. The printer does not operate when this message is displayed.	Replace the main logic board.
Call service person F2	Main RAM Error.	Replace the main logic board.
Paper feed unit open	The cassette is open in the option paper feeder.	Open the cassette, then close perfectly.
Top cover Open	Interlock (SW2 on KP-373/418 [AC] board) is open.	Open the upper unit, then close tightly.
Opt. feeder 1 (2) rear cover Open	The rear cover of the fist (second) option feeder is open.	Open the rear cover, then close tightly.
Developer unit connection error	The developer connector is loose or not connected.	Connect the developer connector to the mating printer connector properly.
Replace Toner kit TK-12	Toner in the developer has been exhausted and the toner concentration in the developing powder is not restorable. The printer does not operate when this message is displayed.	Replace toner container using a new toner kit (Ecotone TK-12).
Missing toner container	Toner container is not installed.	Install the toner container.
Missing Toner container	Toner container is not installed.	Install a toner container.
Paper jam	Paper is jammed inside the printer. Depending on the part of the printer at which jam has occurred, one of the feed or stack indicators flashes; Ready indicator flashes; and ATTENTION lights. E After the jam is removed, the printer automatically prints the same page again unless the paper was caught before or in the fuser unit.	Open the printer and correct the paper jam according to the printer's User's Manual.

Message	Meaning	Corrective action
Remove manual feed paper	Paper exists on the manual feed tray while the paper source is envelope feeder.	Remove the paper on the manual feed tray. The printer automatically feeds envelope in the envelope feeder.
IC-CARD error insert again	The IC card is accidentally removed while rereading.	Insert the IC card in the printer's slot again.
Insert the same IC CARD	The wrong IC card was inserted, following the IC-CARD error/insert again message.	Remove the IC card from the printer's slot and insert the correct card.
Memory overflow .. Press ON LINE	The total amount of the data received by the printer exceeded the printer's internal memory.	Press ON LINE or CANCEL key to abandon printing. Try adding more memory afterwards to avoid this error (expansion RAM).
Print overrun .. Press ON LINE	The data transferred to the printer was too complex to print on a page.	Press ON LINE or CANCEL key to abandon printing.
Add paper	The paper cassette is empty or not mounted, or manual feed mode is activated but no paper is present in the manual feed tray.	Add paper in the cassette; insert the cassette; or place a sheet of paper in the manual feed tray.
Warning low toner TK-12	The toner supply in the developer is being exhausted. The printer will stop printing after several ten pages of printing.	Replenish the toner supply using a new toner kit at the earliest convenience.
Warning Short memory	The printer's internal memory is running out due to too many macros and fonts downloaded.	Delete unnecessary fonts and macros.

6.3.5. Paper feed problems

The message display displays *Paper jam* when paper becomes stuck in the paper transport system, the paper feed timing is incorrect, or paper fails to feed at all.

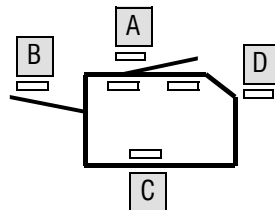
General suggestions for clearing paper jam

- * Replace paper with another ream of paper.
- * Use another type of paper.
- * Check/replace the main PWB (which may be causing incorrect paper feeding timing).
- * Use power line filter (Noise in power line may cause malfunction of CPU which subsequently will develop paper jam).
- * Check for proper operation on all rollers.

If paper jams occur frequently, try using a different type of paper, replace with paper from another ream, turn the stack of paper over, or turn the paper the other way around. Also, read information in Chapter 1.

Depending on the indicator of the printer symbol on the front panel that is flashing, check the following.

Figure 6.4 Printer Symbol Indicators



Symbol indicator	Suggested jam location	Corrective action
A	Check the face-down output tray.	If paper is partially fed out into the tray, pull the paper out the rest of the way by hand, then open and close the printer's top cover or the paper feed unit.
	Check the fuser unit and the face-down paper tray.	Open the printer's top cover. Draw out the paper feed unit. Pull the paper as shown in Figure 6.7.
B	Check the face-up output tray.	Refer to A above.
C	Check the paper feed cassette.	If paper is stacked in the paper cassette, not reaching the registration rollers, remove the paper cassette and draw out the paper feed unit. Remove the paper as shown in Figure 6.5. Close the paper feed unit and install the paper cassette.
	Check the registration rollers.	If the paper is caught by the registration rollers, draw out the paper feed unit half way out and remove the paper as shown in Figure 6.6.
D	Check the manual feed tray.	If the paper is stuck in the manual feed tray, remove the paper by pulling it out.

Figure 6.6. Removing Paper Jam at Fuser

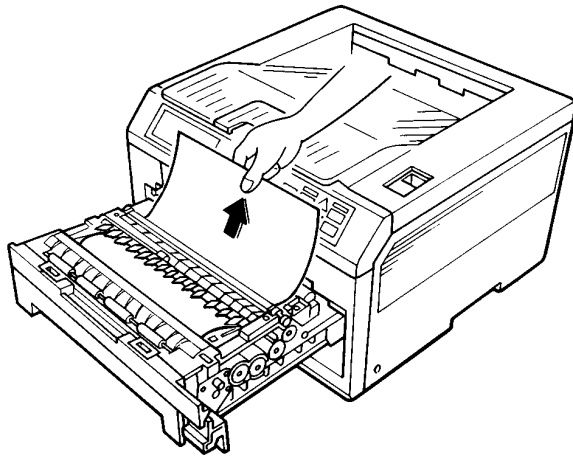


Figure 6.5. Removing Paper Jam at Paper Feed Unit

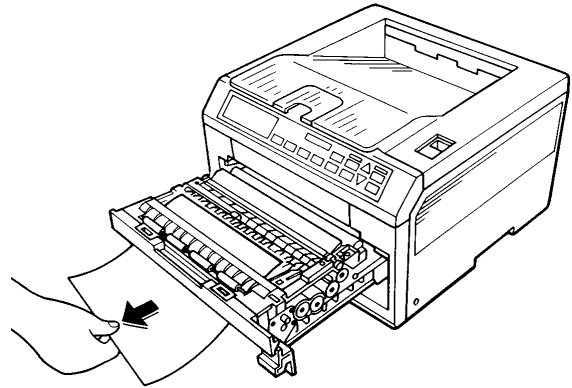
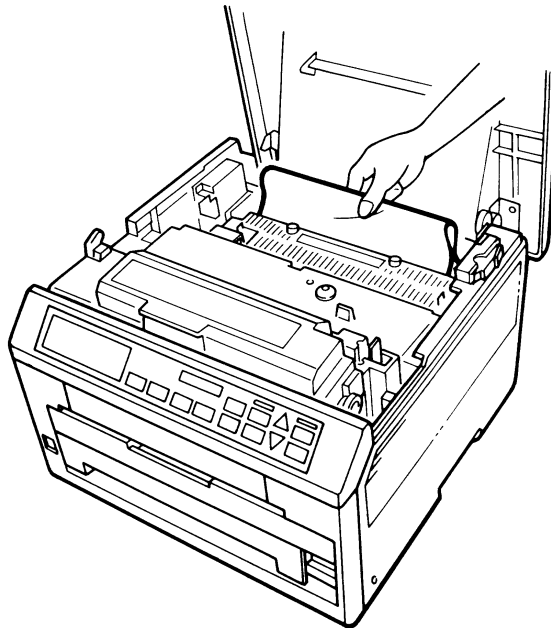


Figure 6.7. Removing Paper Jam at Registration Roller

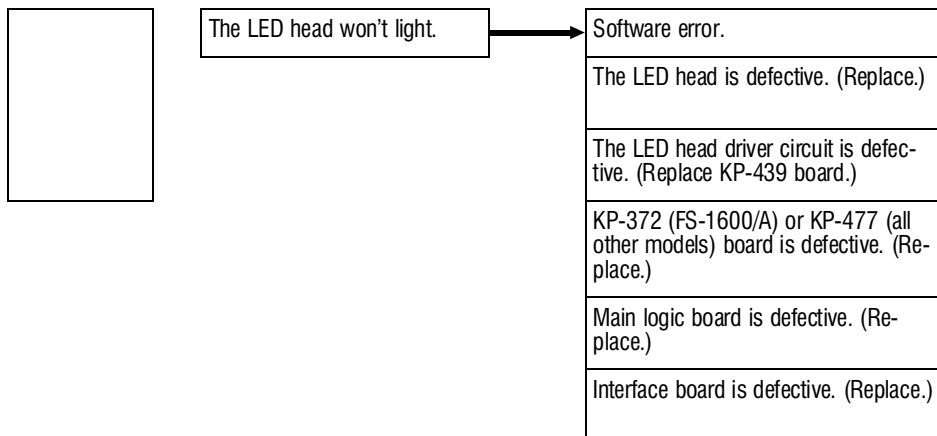


6.3.6. Print quality problems

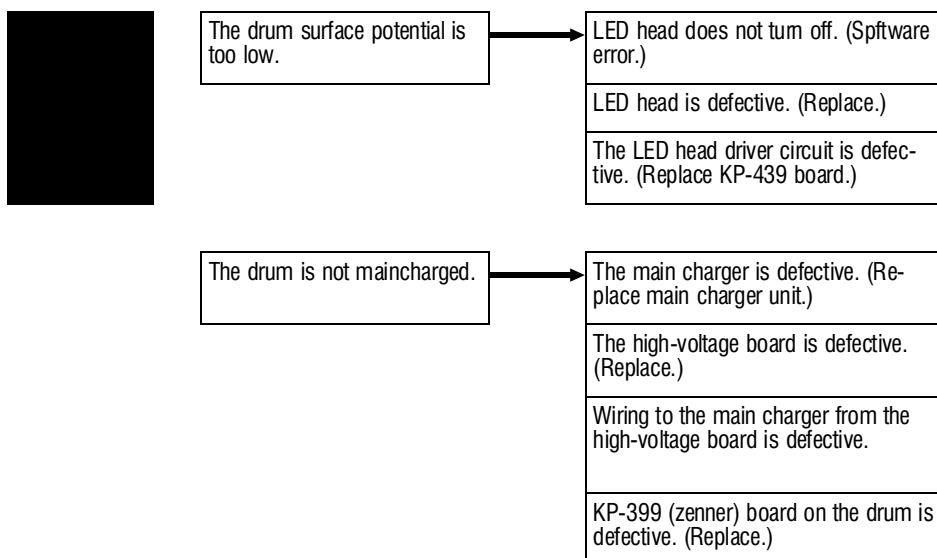
Print quality problems range from uneven tone to completely blank output. The troubleshooting procedure for each type of problem is given on the following pages.

Note: For all print quality problems, clean the main charger wire and other various parts in the paper path before proceeding.

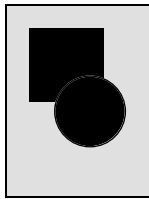
Blank Printout



All-black Printout



Grey Background



The drum surface potential is less than approx. 420V.

See All black printout section above.

The developer is defective.

The toner concentration in the developer is too low. (Replace KP-371 board.)

The developer bias is too low. (Replace high-voltage board.)

Connection between high-voltage board and main charger unit is defective.

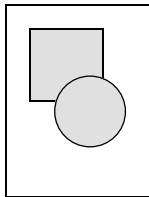
The drum temperature (should be approx. 44°C) is incorrect.

The drum heater is defective. (Replace drum.)

KP-391 (drum controller) board is defective. (Replace.)

KP-371 (engine) board is defective. (Replace.)

Light Printing



Toner concentration is too low in the developer.

Toner is exhausting. (Replace toner container if Warning low toner message is shown.)

The developer is defective. (Replace the developer unit.)

Developer bias is incorrect.

The bias board is defective. (Replace KP-392 board.)

Replace the developer unit.

Carrier is lost in the developer unit.

Replace the developer unit.

The drum surface potential is too high (more than approx. 420V).

The main charger unit is defective. (Replace the main charger unit.)

The drum is not grounded properly.

The eraser is defective. (Replace the drum unit.)

Replace KP-371 (engine) board.

Replace high-voltage board.

Replace KP-399 (zenner) board.

The LED head output is too low.

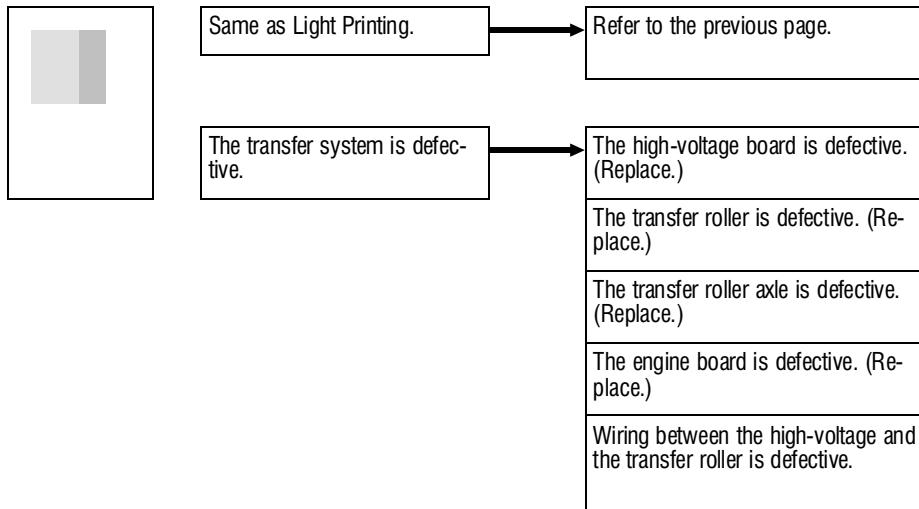
The engine board is defective. (Replace.)

KP-420 (LED drive) board is defective. (Replace.)

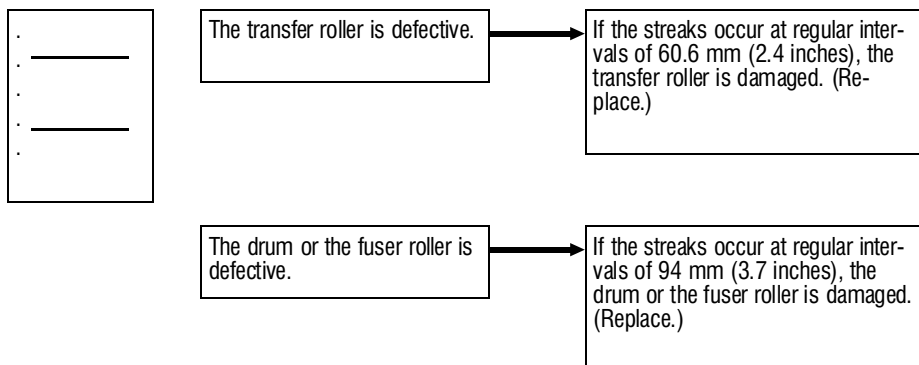
Wiring around the LED head is defective.

LED head driver ICs are defective. (Replace the LED head.)

Non-uniform Printing



Dropouts and Streaks



6.4. Error Code Problems

This section provides information on how to respond to the *Call Service person* messages given on the printer's message display. The messages are followed by a code beginning with *E* or *F*. Codes beginning with *E* imply mechanical problems which are detected by the engine system, while codes beginning with *F* indicate errors occurred in the main logic controller.

The instructions in this section pertain mainly to troubleshooting for the engine errors (*E* errors). The main logic controller unit should be replaced if an *F* error is indicated.

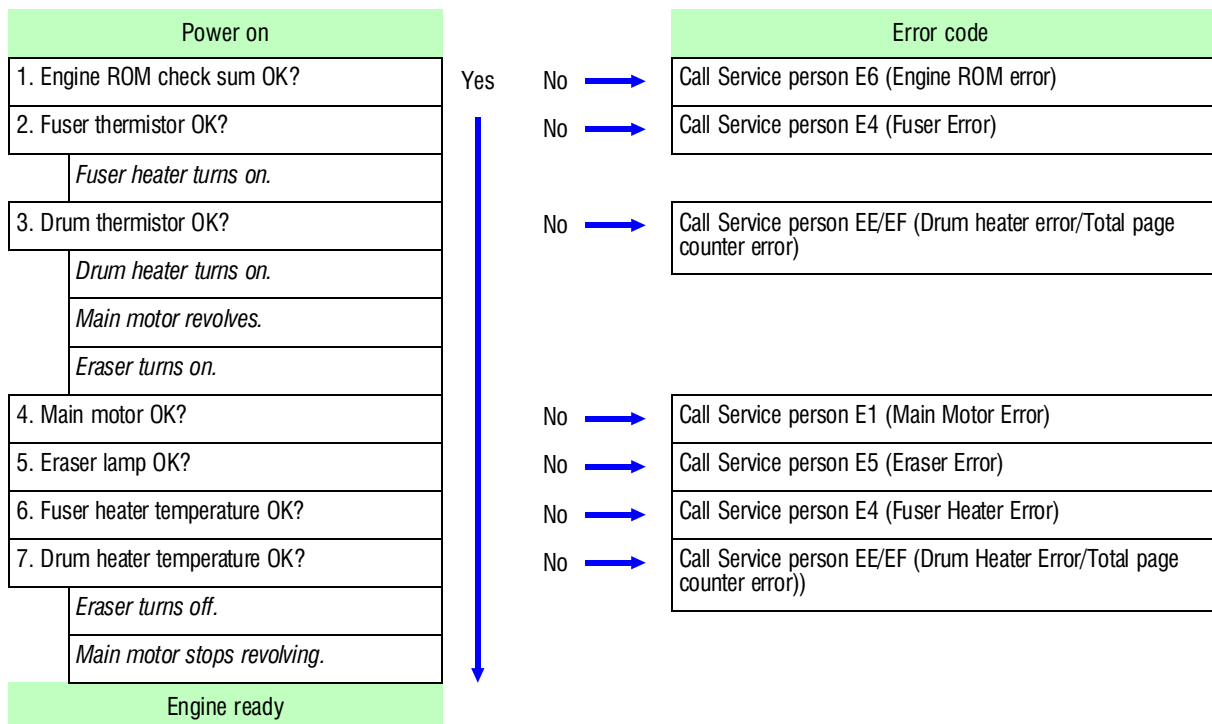
6.4.1. Engine self-diagnostics at power up

The printer thoroughly monitors its internal condition at power up. When it needs operator's attention to a component, it lets an error code to show on the front panel message display.

Figure 6.8. shows the items and the sequence of the diagnostics made at power -up and the relevant E or F error codes. Figure 6.9. on next page shows the main logic controller diagnostics sequence diagram.

The engine check sequence is canceled if the top cover is opened during this sequence is under way.

Figure 6.8. Engine Self-diagnostics Sequence (E Code)

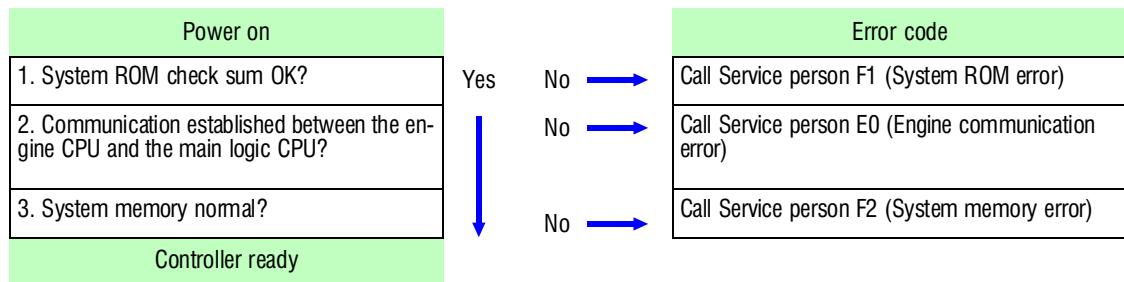


6.4.2. Main logic controller diagnostics sequence

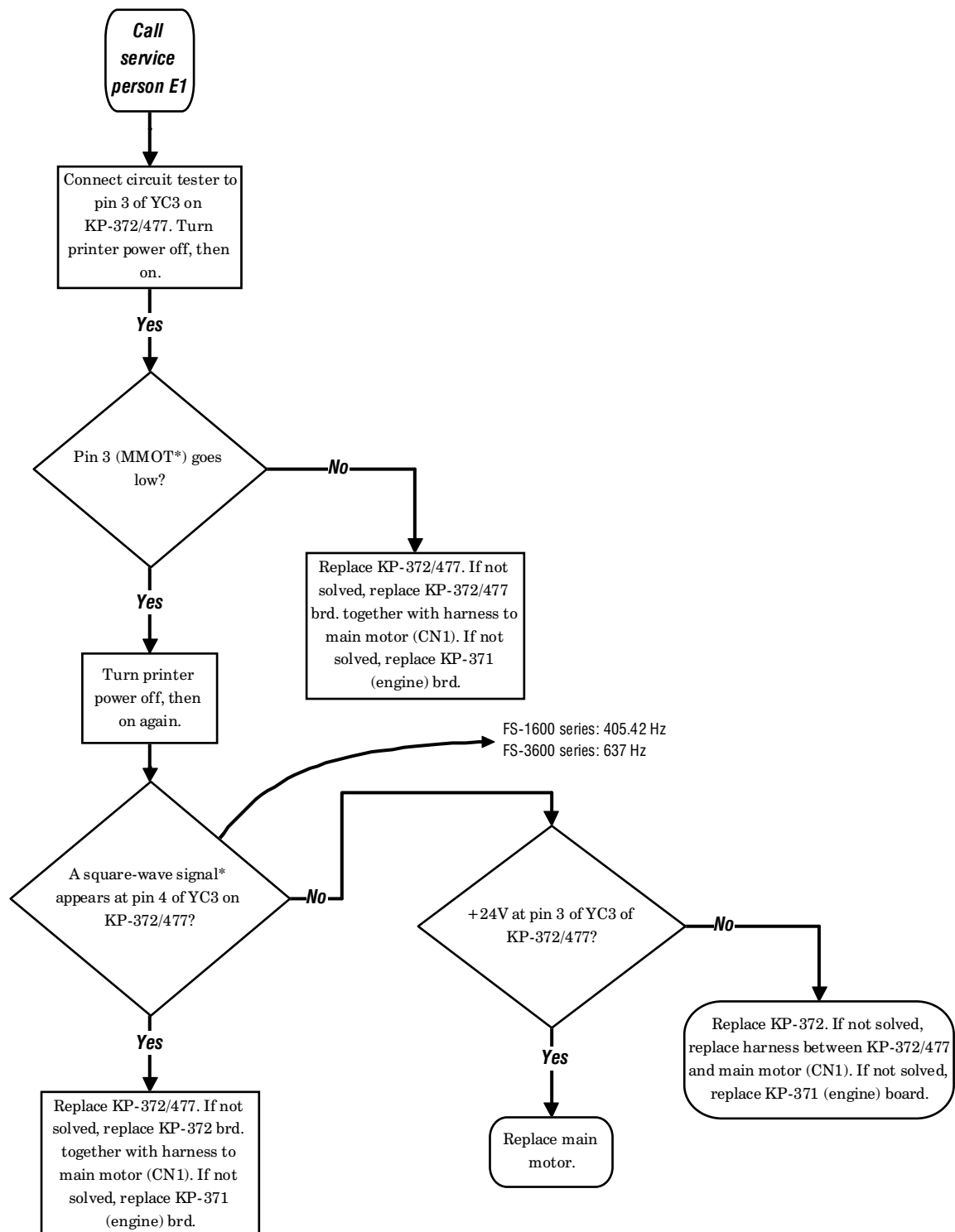
Diagnostics Eon the main logic controller is done only when the printer is turned Eon, along with the engine check sequence. Should an error be recognized, the engine CPU lets the front panel message display to show a *Call Service person F* code and stops operating.

The sequence for the diagnostics is as shown in Figure 4.8.

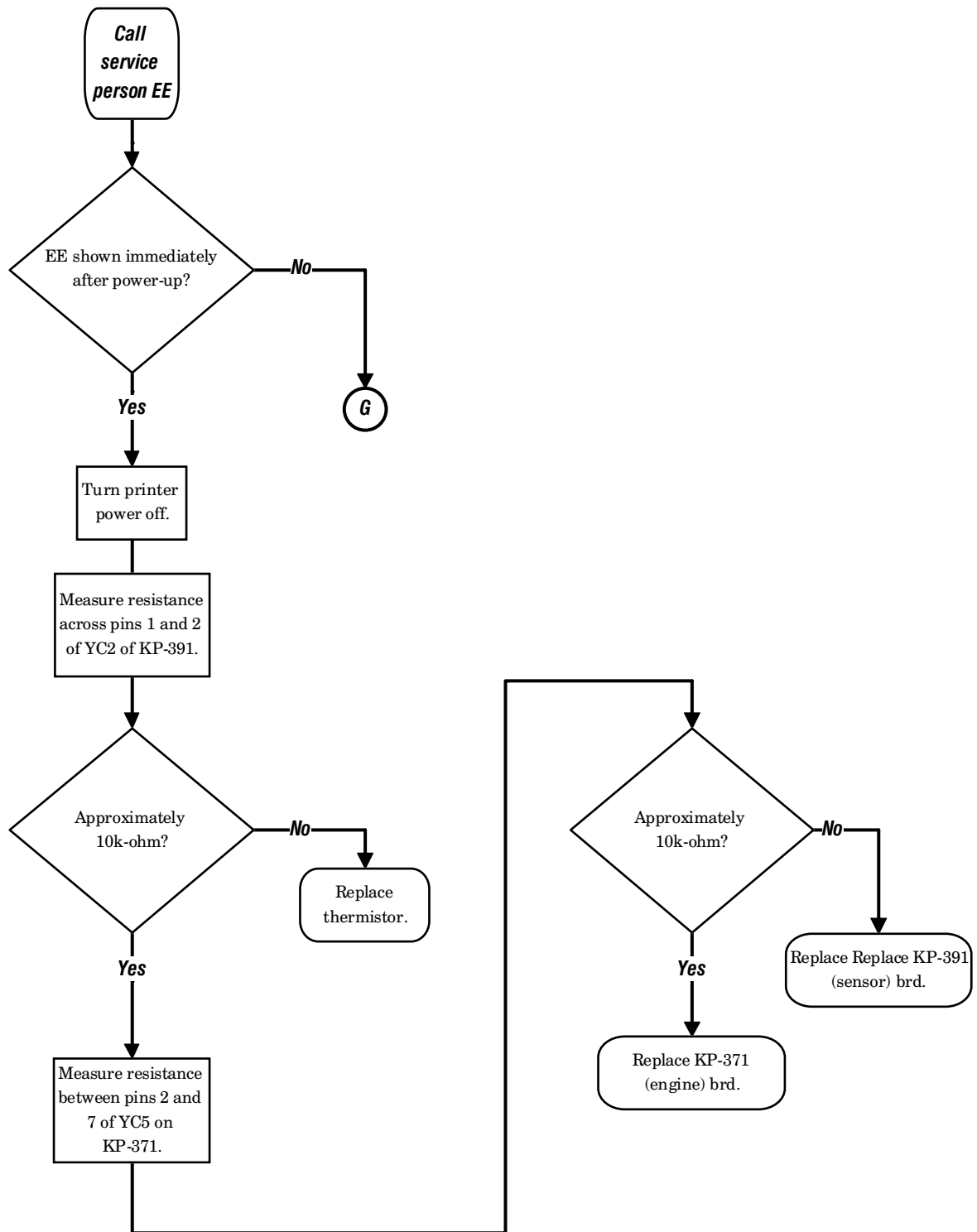
Figure 6.9. Main logic controller diagnostics

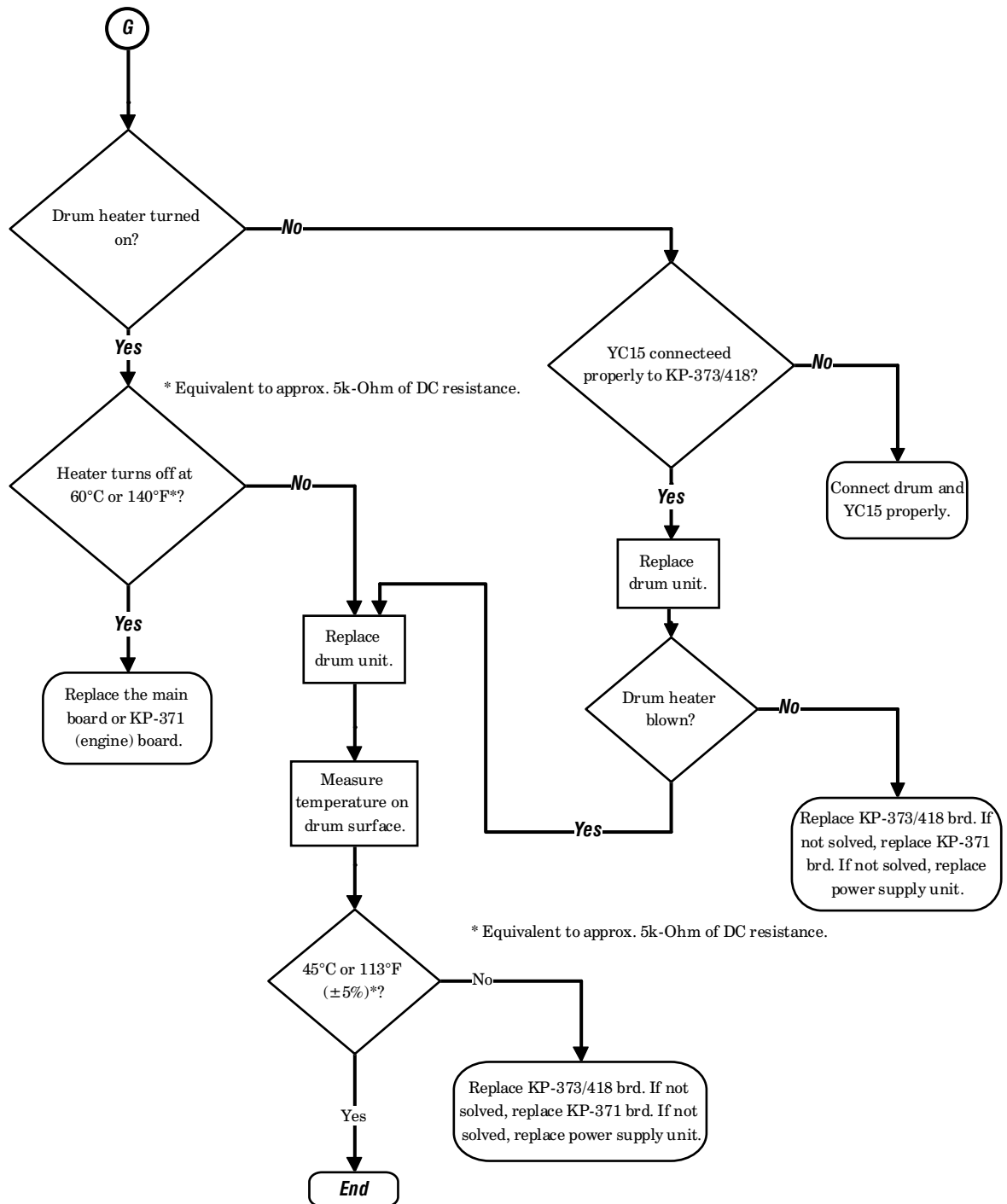


6.4.3. Call Service person E1-Main motor error

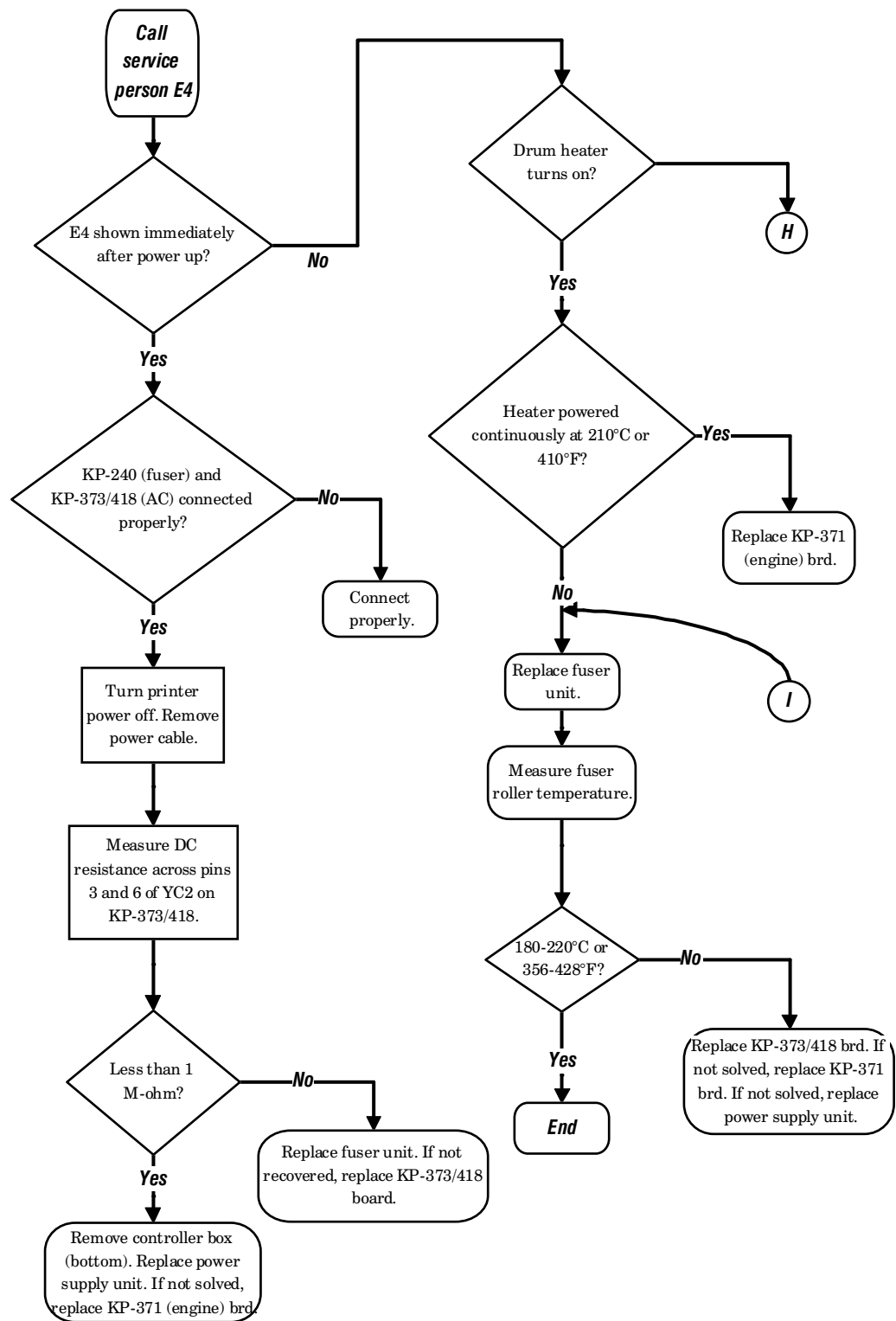


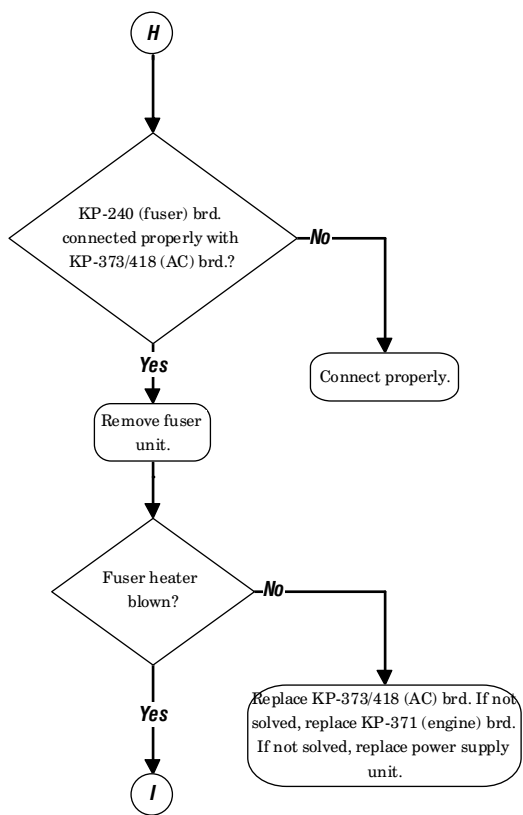
6.4.4. Call Service person EE/EF-Drum heater error/Total page counter error



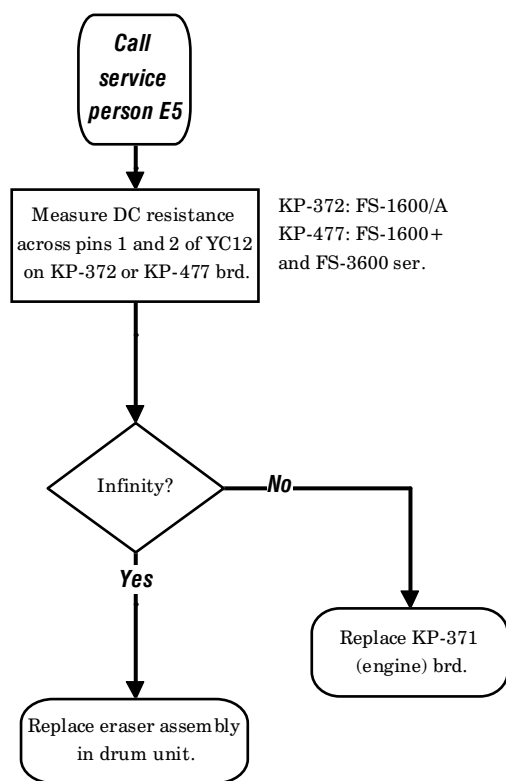


6.4.5. Call Service person E4-Fuser heater error

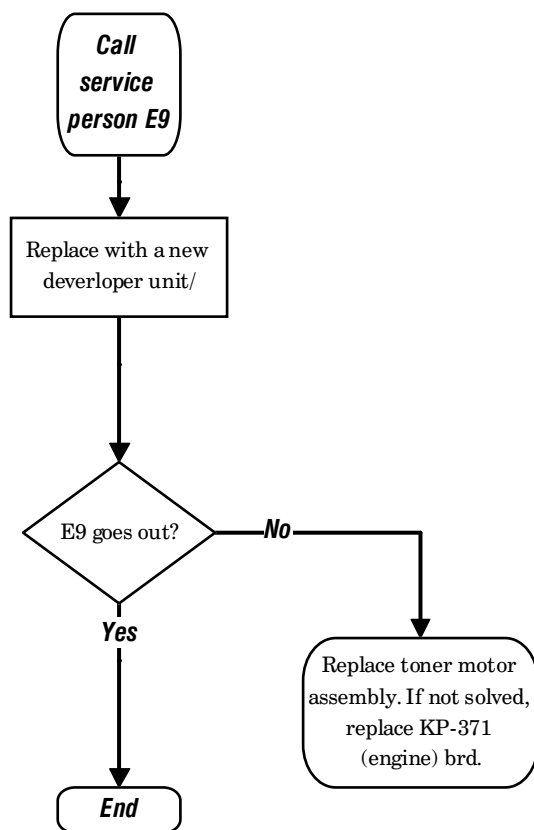




6.4.6. Call Service Person E5-Eraser error



6.4.7. Call Service person E9-Toner motor error



6.5. Connector Configurations

6.5.1. KP-371 (Engine controller) board

YC-1 (to front panel)

Pin	Signal	Description
1	Ground	
2	+5V	
3	FPBA5	Address signal
4	Ground	
5	FPBA6	Address signal
6	KYBD	Keyboard select signal
7	LCDRW	LCD read/write
8	LCDRS	LCD register select
9	FD0	Data bus (LSB)
10	LCDE	LCD enable
11	FD2	Data bus
12	FD1	Data bus
13	FD4	Data bus
14	FD3	Data bus
15	FD6	Data bus
16	FD5	Data bus
17	FD7	Data bus
18	Ground	
19	Ground	
20	+5V	

YC2 (to KP-421)

Pin	Signal	Description
1	VLOW	Speed control
2	MON	Motor control
3	Unnamed	Face-down stack control
4	Unnamed	Face-up stack control
5	COPN	Cover open
6	HSPAP	Paper empty
7	UNIT	Option unit installation
8	+24V2 (P)	+24V power supply
9	Ground	Ground

YC-3 (to KP-372 [FS-1600/A]/KP-477 [FS-1600+ and FS-3600 series] board)

Pin	Signal	Description
1	+5V	
2	+5V	
3	Ground	
4	Ground	

Pin	Signal	Description
5	FAN	Fan control
6	STRCLK	LED head strobe
7	LEDLA	LED head data latch
8	FDCL2	Manual-feed paper clutch
9	FDCL1	Paper feed clutch
10	REGCL	Regist clutch
11	MFEED	Manual-feed sensor input
12	EPAPR	Envelope feeder paper empty
13	EVUNT	Envelope feeder installation
14	EMOTR	Envelope feeder motor control
15	ERRDY	Eraser ready
16	ERASE	Easer control
17	DRMTH	Drum thermistor
18	FUPSD	Face-up solenoid drive
19	MTCLK	Motor clock (FG)
20	VIDEO	Video data output to LED head
21	BLEDLS	LED line sync.
22	VCLK	Video data transfer clock to LED head
23	FDWSD	Face-down solenoid drive
24	VIDEO2	Video data output (for 600 dpi ver.)
25	MMOT	Main motor control
26	Ground	
27	Ground	
28	Ground	
29	+24V2 (P)	+24V power supply
30	+24V2 (P)	+24V power supply
31	+24V2 (P)	+24V power supply

YC-4 (to power supply)

Pin	Signal	Description
1	HTCD	Fuser heater control
2	HDCL	Drum heater control
3	JAM	Eject paper jam sensor
4	THRMC	Fuser thermistor input

YC-5 (to KP-391, high-voltage unit)

Pin	Signal	Description
1	+5V	-
2	Ground	-
3	REGS	Registration sensor input
4	PS	Paper sensor input
5	ILSW	+24V interlock sensing
6	TBSEN	Toner container detect
7	DRMTH	Drum thermistor
8	IL2H	+24V power supply (for high-voltage unit)
9	MMOT	Main motor control

Pin	Signal	Description
10	MHVDRD	Main charger control
11	BIASD	Bias control
12	THVDRD	Transfer charger control
13	Ground	

YC-6 (to developer unit)

Pin	Signal	Description
1	Ground	-
2	T/CSN	Toner concentration sensor input
3	+24V2 (P)	+24V power supply
4	IL2H	+24V power supply for high-voltage unit
5	TNMOT	Toner motor control

YC-8 (to power supply)

Pin	Signal	Description
1	+5V	-
2	Ground	-
3	Ground	-
4	+24V2(P)	+24V power supply

YC-9 (to option unit)

Pin	Signal	Description
10	Ground	-
9	SOD	Serial output data
8	SID	Serial input data
7	SEL2D	Device select
6	SEL1D	Device select
5	SEL0D	Device select
4	READY	Ready
3	+5V	-
2	SCKD	Serial clock
1	+24V2 (P)	-

YC-10 (to KP-410)

Pin	Signal	Description
1	+5V	-
2	+5V	-
3	+5V	-
4	+5V	-
5	Ground	-
6	Ground	-
7	Ground	-
8	Ground	-
9	Ground	-
10	Ground	-
11	BSRAMOE	Status RAM output enable

Pin	Signal	Description
12	BSRAMWE	Status RAM write enable
13	Not connected	
14	LCDRS	LCD regist select
15	LCDE	LCD enable
16	Not connected	
17	ENABLE	Data enable (to front panel)
18	DSMCS	Comm. SRAM chip select
19	DSWE	Comm. SRAM write enable
20	DSOE	Comm. SRAM output enable
21	DSNRY	Comm. SRAM not-ready
22-34	A13-A1	Address bus
35	LEDLAN	LED head data latch
36	STRENB	LED head strobe
37-44	D7-D0	Data bus
45	LCDRW	LCD read/write (LSB)
46	LEDENB	LED head enable
47	RDY	Engine ready
48	EGIR	Engine interrupt
49	CNTRIRQ	Controller interrupt
50	VSREQ	Video sync. request
51	VSYNC	Video sync. acknowledge
52	Not connected	-
53	VDATA2	Video data output to LED head
54	CPRDY	Controller power ready
55	VDATA1	Video data output to LED head
56	PRINT	Print request
57	LEDLS	LED line sync.
58	LEDVCLK	Video data transfer clock to LED head
59	KEYBD	Keyboard select signal
60	RES	Reset

6.5.2. KP-410 (main logic board) connectors

YC-3 (to IC card drive)

Pin	Signal	Description
1	GROUND	-
2	ICD3	IC card data
3	ICD4	IC card data
4	ICD5	IC card data
5	ICD6	IC card data
6	ICD7	IC card data
7	CE1*	IC card enable
8	ICA10	IC card address
9	OE*	Data output enable
10	ICA11	IC card address

Pin	Signal	Description
11	ICA9	IC card address
12	ICA8	IC card address
13	ICA13	IC card address
14	ICA14	IC card address
15	WE*	Data write enable
16	-	No connection
17	+5V	-
18	+5V	-
19	ICA16	IC card address
20	ICA15	IC card address
21	ICA12	IC card address
22	ICA7	IC card address
23	ICA6	IC card address
24	ICA5	IC card address
25	ICA4	IC card address
26	ICA3	IC card address
27	ICA2	IC card address
28	ICA1	IC card address
29	-	Open
30	ICD0	IC card data
31	ICD1	IC card data
32	ICD2	IC card data
33	-	No connection
34	GROUND	-
35	GROUND	-
36	CDET1	IC card detect
37	ICD11	IC card data
38	ICD12	IC card data
39	ICD13	IC card data
40	ICD14	IC card data
41	ICD15	IC card data
42	CE2*	IC card enable
43	-	No connection
44	-	No connection
45	-	No connection
46	ICA17	IC card address
47	ICA18	IC card address
48	ICA19	IC card address
49	ICA20	IC card address
50	ICA21	IC card address
51	+5V	-
52	+5V	-
53	ICA22	IC card address
54	ICA23	IC card address
55	GROUND	
56	GROUND	
57	-	No connection

Pin	Signal	Description
58	-	No connection
59	-	No connection
60	-	No connection
61	REG*	IC card register select
62	-	No connection
63	-	No connection
64	ICD8	IC card data
65	ICD9	IC card data
66	ICD10	IC card data
67	CDET2*	IC card detect
68	GROUND	-

YC-4 (to option interface board)

Pin	Signal	Description
1-6	+5V	
7-13	-	No connection
14-30	BA19-BA2	Address bus
31	BA2	Address bus (LSB)
32, 33	-	No connection
34	OPIF*	Option interface select
35	OPRDY*	Option interface ready
36	ID6	ID data (MSB)
37-41	ID5-ID1	ID data
42	ID0	ID data (LSB)
43	-	No connection
44	-	No connection
45	AS*	Address strobe
46	DS*	Data strobe
47	OPDAC*	Option interface DTAC
48	RW	Read/write
49	OPIR*	Option interface interrupt
50	RESET*	Reset signal
51	D15	Data bus (MSB)
52-65	D14-D1	Data bus
66	D0	Data bus (LSB)
67	VDO%	Video (external input)
68	PLSYNC*	Video output sync signal
69	VCLK1	Video clock
70	PRINT%	Print request
71	VSREQ*	Video sync request
72	VSYNC%	Video sync acknowledge
73	RDY%	Engine ready
74	-	No connection
75-80	GROUND	

YS-1/YS-2 (Expansion RAM)

Pin	Signal	Description
1	GROUND	
2	DD0	DRAM data bus
3	DD16	DRAM data bus
4	DD1	DRAM data bus
5	DD17	DRAM data bus
6	DD2	DRAM data bus
7	DD18	DRAM data bus
8	DD3	DRAM data bus
9	DD19	DRAM data bus
10	+5V	-
11	Not connected	-
12-18	RA0-RA6	DRAM multiplexed address
19	RA10	DRAM multiplexed address
20	DD4	DRAM data bus
21	DD20	DRAM data bus
22	DD5	DRAM data bus
23	DD5	DRAM data bus
24	DD6	DRAM data bus
25	DD22	DRAM data bus
26	DD7	DRAM data bus
27	DD23	DRAM data bus
28	RA7	DRAM multiplexed address
29	Not connected	-
30	+5V	-
31	RA8	DRAM multiplexed address
32	RA9	DRAM multiplexed address
33	ORASL3	DRAM RAS signal (select)
34	ORASU3	DRAM RAS signal (select)
35-38	Not connected	
39	Ground	
40	LLCAS	DRAM CAS signal (select)
41	UMCAS	DRAM CAS signal (select)
42	UUCAS	DRAM CAS signal (select)
43	LMCAS	DRAM CAS signal (select)
44	ORASU3	DRAM RAS signal (select)
45	ORASL3	DRAM RAS signal (select)
46	Not connected	-
47	OWE	DRAM write enable
48	Not connected	-
49	DD8	DRAM data bus
50	DD24	DRAM data bus
51	DD9	DRAM data bus
52	DD25	DRAM data bus
53	DD10	DRAM data bus
54	DD26	DRAM data bus

Pin	Signal	Description
55	DD11	DRAM data bus
56	DD27	DRAM data bus
57	DD12	DRAM data bus
58	DD28	DRAM data bus
59	+5V	-
60	DD29	DRAM data bus
61	DD13	DRAM data bus
62	DD30	DRAM data bus
63	DD14	DRAM data bus
64	DD31	DRAM data bus
65	DD15	DRAM data bus
66-71	Not connected	-
72	Ground	

YC-1 (to KP-371)

Pin	Signal	Description
1	+5V	
2	+5V	
3	+5V	
4	+5V	
5	Ground	
6	Ground	
7	Ground	
8	Ground	
9	Ground	
10	Ground	
11	<u>BSRAMOE</u>	Status RAM output enable
12	<u>BSRAMWE</u>	Status RAM write enable
13	Not connected	-
14	<u>LCDRS</u>	LCD regist select
15	<u>LCDE</u>	LCD enable
16	Not connected	-
17	<u>ENABLE</u>	Data enable (to front panel)
18	<u>DSMCS</u>	Comm. SRAM chip select
19	<u>DSWE</u>	Comm. SRAM write enable
20	<u>DSOE</u>	Comm. SRAM output enable
21	<u>DSNRY</u>	Comm. SRAM not-ready
22-34	<u>A13-A1</u>	Address bus
35	<u>LEDLAN</u>	LED head data latch
36	<u>STRENB</u>	LED head strobe
37-44	<u>D7-D0</u>	Data bus
45	<u>LCDRW</u>	LCD read/write (LSB)
46	<u>LEDENB</u>	LED head enable
47	<u>RDY</u>	Engine ready
48	<u>EGIR</u>	Engine interrupt
49	<u>CNTRIRQ</u>	Controller interrupt

Pin	Signal	Description
50	VSREQ	Video sync. request
51	VSYNC	Video sync. acknowledge
52	Not connected	-
53	VDATA2	Video data output to LED head
54	CPRDY	Controller power ready
55	VDATA1	Video data output to LED head
56	PRINT	Print request
57	LEDLS	LED line sync.
58	LEDVCLK	Video data transfer clock to LED head
59	KEYBD	Keyboard select signal
60	RES	Reset