MODIFICATION HISTORY

MODEL NAME : KZ-32TS1U/32TS1E

SERVICE MANUAL

PARTS No. : 9-878-209-02

* Blue characters are linking.

No.	DATA	CONTENTS
△1	2004.03	Correction of The Parts Information. (P.79)

KZ-32TS1U/32TS1E

PANEL MODULE SERVICE MANUAL

UC Model
AEP Model

PDP Module Name

FPF32C106128UA

FLAT PANEL COLOR TV

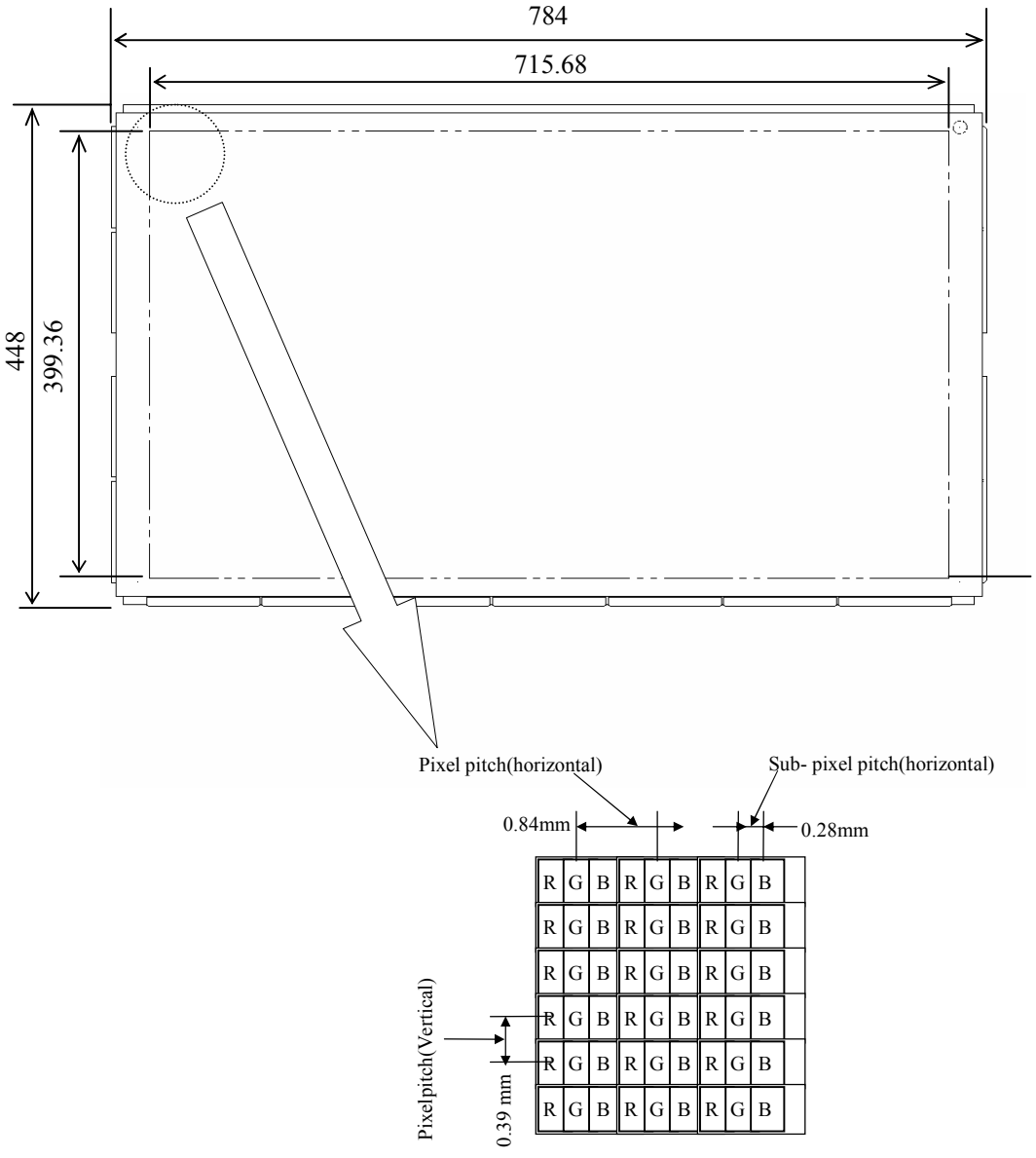
SONY®

Contents

1. Out line

The module is a plasma display module which can be designed in there is no fan in addition to a general feature of the plasma display such as a flat type, lightness, and high-viewing-angle and terrestrial magnetism.

1.1 Out view



1.2 Feature

1. For high definition television by ALIS method
2. For FAN Less design(Low consumption electric power)
3. Thin Depth and Lightness
4. Customizing of module equipped with communication function

1.3 Specification

1.3.1 Functional specification

Item		NO	Specification		
			UA-1x	UA-6x	
Externals	Module size	1	784 x 448 x 65.5 mm	←	
	Weight	2	13 kg	11.4 kg	
Display panel	Display size	3	715.68 x 399.36 mm (32inch: 16:9)	←	
	Aspect ratio	4	16:9		
	Resolution	5	852 x 1024 pixel	←	
	Pixel pitch	6	0.84(H) x 0.39(V) mm	←	
	Sub pixel pitch	7	0.28(H) x 0.39(V) mm	←	
Color	Grayscale (standard)	8	RGB each color 256 Grayscale	←	
BrightNess	White (display load Ratio 1%, standard)	9	650 cd/㎡ (TYP.)	←	
Chromaticity Coordinates	(x,y), white 10%	10	(0.300, 0.290) (TYP.)	←	
Contrast	Contrast in Darkroom (60Hz)	11	500:1 (TYP.)	←	
Data signal	Video signal (RGB each color)	12	LVDS (8bit)	←	
	Dot clock (max)	13	52 MHz	←	
Sync Signal	Horizontal Sync Signal (max)	14	50KHz (LVDS)	←	
	Vertical Sync Signal	15	50Hz ± 19/60 ± 1.7Hz (LVDS)	←	
Powersupply	Input voltage/current	16	100-120/200-240VAC 4.0-1.7A 50/60Hz	+3.3/+5/+70-90/+30-70VDC 0.05/6/ 2.5 /2A	
	Standby electric power (max)	17	1W	No Spec	
Noise	Shade noise at 18dB(A) or less	18	25dB(A) orless	←	
Guarantee environment	Temperature (operation)	19	0 - 55°C	←	
	Temperature (storage)	20	0 - 55°C	←	
	Humidity (operation)	21	20 - 85%RH (no condensation)	←	
	Humidity (storage)	22	20 - 80%RH (no condensation)	←	

※ It is made to give priority when there is a delivery specification according to the customer.

1.3.2 Display quality specification

Item		NO	Specification		
			UA-1x	UA-6x	
Non-lighting cell defect	Total number (subpixel)	1	15 or less	←	
	Density (subpixel/cm^2)	2	2 or less (However,1 continuousness or less)	←	
	Size(HxV) (subpixel)	3	1x2 or less, Or 2x1 or less	←	
Non-extinguishing cell defect	Total number (subpixel)	4	6 or less (each color 2 or less)	←	
	Density (subpixel/ cm^2)	5	Each color 2 cells max (However,1 continuousness or less)	←	
Flickering cell defect	Flickering lighting cell defect (sub pixel/ cm^2)	6	5 or less	←	
	Flickering non-extinguishing cell defect	7	Number on inside of Non-extinguishing cell defect	←	
High intensity cell defect	Twice or more bright point	8	0	←	
Brightness variation	White block of 10% load [9 point](%)	9	20 or less	←	
	In area adjacent 20mm [White](%)	10	10 or less	←	
Color variation	White block of 10% load [9 point]	11	X: Average ±0.015 y: Average ±0.015	←	

Note: It is made to give priority when there is a delivery specification according to the customer.

1.3.3 I/0 Interface Specification

(1) I/O signal

No.	Item	Signal Name		Number of signals	I/O	Form	Content of definition
1	Display Data	Reflection signal Timing Signal	RXIN0- RXIN0+ RXIN1- RXIN1+ RXIN2- RXIN2+ RXIN3- RXIN3+	1 1 1 1 1 1 1 1	Input	LVDS Differential	Differential serial data signal. Input video and timing signals after differential serial conversion using a dedicated transceiver. The serial data signal is transmitted seven times faster than the base signal.
		Clock	RXCLKIN- RXCLKIN+	1 1	Input	LVDS Differential	Differential clock signal. Input the clock signal after differential conversion using a dedicated transceiver. The clock signal is transmitted at the same speed as the base signal.
		Power down Signal	PDWN	1	Input	LVTTL	Low: LVDS receiver outputs are all L. High: Input signals are active.
2	MPU Communication/ Control	Communication	SDA	1	I/O	LVTTL (I^2C)	I^2C bus serial data communication signal. Communication with the control MPU of this product is enabled.
			SCL	1	I/O		
		Control	CPUGO	1	Input	LVTTL	Low power consumption mode of the control MPU of this product is released.
			PDPGO	1	Input	LVTTL	"High": This product is started. (CPUGO="High" Effective)
			IRQ	1	Output	LVTTL	It changes into "Low" ➔ "High" when this product enters the undermentioned state. 1.Vcc/Va/Vs output decrease 2.Circuit abnormality detection

(2) LVDS Signal Definition and Function

A video signal (display data signal and control signal) is converted from parallel data to serial data with the LVDS transmitter and further converted into four sets of differential signals before input to this product.

These signals are transmitted seven times faster than dot clock signals.

The dot clock signal is converted into one set of differential signals by the transmitter before input to this product.

The LVDS signal definition and function are summarized below:

Signal name	Symbol	Number of signals	Signal definition and function
Video signal Timing signal Transmission line	RXIN0- RXIN0+	1 1	Display data signal R0,R1,R2,R3,R4,R5,G0
	RXIN1- RXIN1+	1 1	Display data signal G1,G2,G3,G4,G5,B0,B1
	RXIN2- RXIN2+	1 1	Display data signal, Sync Signal, Control signal B2,B3,B4,B5 $\overline{\text{Hsync}}$, $\overline{\text{Vsync}}$, $\overline{\text{BLANK}}$
	RXIN3- RXIN3+	1 1	Display data signal, Control signal R6,R7,G6,G7,B6,B7,PARITY
Clock transmission line	RXCLKIN- RXCLKIN+	1 1	Clock signal $\overline{\text{DCLK}}$

(3) Video Signal Definition and Function

The table below summarizes the definitions and functions of input video signals before LVDS conversion.

Item	Signal name		Number of signals	Input/ output	Signal definition and function
Original Display signal (before LVDS transmittance)	Video signal (digital RGB)	DATA-R DATA-G DATA-B	8 8 8	Input	Display data signal R7/G7/B7 is the highest intensity bit. R0/G0/B0 is the lowest intensity bit.
	Data Clock	$\overline{\text{DCLK}}$	1	Input	Display data timing signal: Data are read when $\overline{\text{DCLK}}$ is low. $\overline{\text{DCLK}}$ is continuously input.
	Horizontal sync signal	$\overline{\text{Hsync}}$	1	Input	Regulates one horizontal line of data: Begins control of the next screen when Hsync is lowered.
	Vertical sync signal	$\overline{\text{Vsync}}$	1	Input	Screen starts up control timing signal: Begins control of the next screen when $\overline{\text{Vsync}}$ is lowered. Input the same frequency in both odd-numbered and even-numbered fields.
	Parity signal	PARITY	1	Input	This signal specifies the display field. H: Odd-numbered field L: Even-numbered field Parity signal should be alternated in every Vsync cycle. This signal is arbitrarily reversed internally when there is no reversing signal.
	Blanking signal	$\overline{\text{BLANK}}$	1	Input	Display period timing signal. H indicates the display period and L indicates the non display period. Note: Set this timing properly like followings, as is used internally for signal processing. ・Set the blanking period so that the number of effective display data items in one horizontal period is 852. ・Set the number of blanking signals in one vertical period to 512, which is one half the number of effective scan lines. If the BLANK changes when the Vsync frequency is switched, the screen display may be disturbed or brightness may change. The screen display is restored to the normal state later when the BLANK length is constant again.

(4) Connector Specifications

The connector specification is shown below.

Please do not connect anything with the terminal NC.

(I) Signal connector CN1: DF13-20DP-1.25 V (tin-plated) (Maker: HIROSE DENKI)

Pin No.	Signal name	Pin No.	Signal name
1	RXIN0-	2	GND
3	RXIN0+	4	SCL
5	RXIN1-	6	GND
7	RXIN1+	8	SDA
9	RXIN2-	10	GND
11	RXIN2+	12	CPUGO
13	RXCLKIN-	14	PDPGO
15	RXCLKIN+	16	IRQ
17	RXIN3-	18	PDWN
19	RXIN3+	20	GND

[Conforming connector] Housing: DF13-20DS-1.25C
Contact: DF-2630SCF

(II) Power Source Connectors (Type UA-1x)

(a) Power input connector

CN61: B06P-VH

(Maker: JST)

Pin No.	Symbol
1	AC(L)
2	N.C
3	AC(N)
4	N.C
5	N.C
6	F.G

[Conforming connector]
Housing: VHR-06N (or M)
Contact: SVH-21T-P1.1

(b) Power supply output connector for system

CN62:B03P-VH

(Maker: JST)

Pin No.	Symbol
1	V_{AUX}
2	N.C
3	GND

[Conforming connector]
Housing: VHR-03N (or M)
Contact: SVH-21T-P1.1

(c) Power supply output connector for system

CN63: B5B-XH-A

(Maker: JST)

Pin No.	Symbol
1	Vpr1
2	N.C.
3	Vpr2
4	N.C.
5	GND

[Conforming connector]
Housing: XHP-5
Contact: SXH-001T-P0.6

(III) Power Source Connectors (Type UA-51)

(a)Power supply output connector for system

CN6: B6B-PH-SM3-TB(JST)

Pin No.	Symbol
1	Vpr2
2	N.C.
3	GND
4	GND
5	N.C.
6	Vcc

[Conforming connector]
Housing: PHR-6
Contact: SPH-002T-P0.5L

(b)Power supply output connector for system

CN23: B10PS-VH(JST)

Pin No.	Symbol
1	Va
2	N.C.
3	Vcc
4	GND
5	GND
6	GND
7	N.C.
8	Vs
9	Vs
10	Vs

[Conforming connector]
Housing: VHR-10N
Contact: SVH-21T-P1.1

(c)Power supply output connector for system

CN33: B9PS-VH(JST)

Pin No.	Symbol
1	Vcc
2	GND
3	GND
4	GND
5	GND
6	N.C.
7	Vs
8	Vs
9	Vs

[Conforming connector]
Housing: VHR-9N
Contact: SVH-21T-P1.1

(d)Power supply output connector for system

CN42: B7B-PH-SM3-TB(JST)

Pin No.	Symbol
1	Va
2	N.C.
3	N.C.
4	GND
5	GND
6	N.C.
7	Vcc

[Conforming connector]
Housing: PHR-7
Contact: SPH-002T-P0.5L

(e)Power supply output connector for system

CN52: B7B-PH-SM3-TB(JST)

Pin No.	Symbol
1	Va
2	N.C.
3	N.C.
4	GND
5	GND
6	N.C.
7	Vcc

[Conforming connector]
Housing: PHR-7
Contact: SPH-002T-P0.5L

(f)Power supply output
connector for system

CN7: 00 6200 520 330 000 [ZIF Right Angle Connector](kyousera elco)

Pin No.	Symbol	Pin No.	Symbol
1	N.C.	11	GND
2	N.C.	12	Vra
3	N.C.	13	GND
4	N.C.	14	Vrs
5	GND	15	GND
6	VSAGO	16	Iak
7	GND	17	GND
8	VCEGO	18	Vak
9	GND	19	GND
10	PFCGO	20	Vsk

2. Notes on safe handling of the plasma display

2. 1 Notes to follow during servicing

- The work procedures shown with the Note indication are important for ensuring the safety of the product and the servicing work. Be sure to follow these instructions.
- Before starting the work, secure a sufficient working space.
- At all times other than when adjusting and checking the product, be sure to turn OFF the main POWER switch and disconnect the power cable from the power source of the display (jig or the display itself) during servicing.
- To prevent electric shock and breakage of PC board, start the servicing work at least 30 seconds after the main power has been turned off. Especially when installing and removing the power supply PC board and the SUS PC board in which high voltages are applied, start servicing at least 2 minutes after the main power has been turned off.
- While the main power is on, do not touch any parts or circuits other than the ones specified.

  The high voltage power supply block within the PDP module has a floating ground. If any connection other than the one specified is made between the measuring equipment and the high voltage power supply block, it can result in electric shock or activation of the leakage-detection circuit breaker.
- When installing the PDP module in, and removing it from the packing carton, be sure to have at least two persons perform the work while being careful to ensure that the flexible printed-circuit cable of the PDP module does not get caught by the packing carton.
- When the surface of the panel comes into contact with the cushioning materials, be sure to confirm that there is no foreign matter on top of the cushioning materials before the surface of the panel comes into contact with the cushioning materials. Failure to observe this precaution may result in the surface of the panel being scratched by foreign matter.
- When handling the circuit PC board, be sure to remove static electricity from your body before handling the circuit PC board.
- Be sure to handle the circuit PC board by holding the such large parts as the heat sink or transformer. Failure to observe this precaution may result in the occurrence of an abnormality in the soldered areas.
- Do not stack the circuit PC boards.

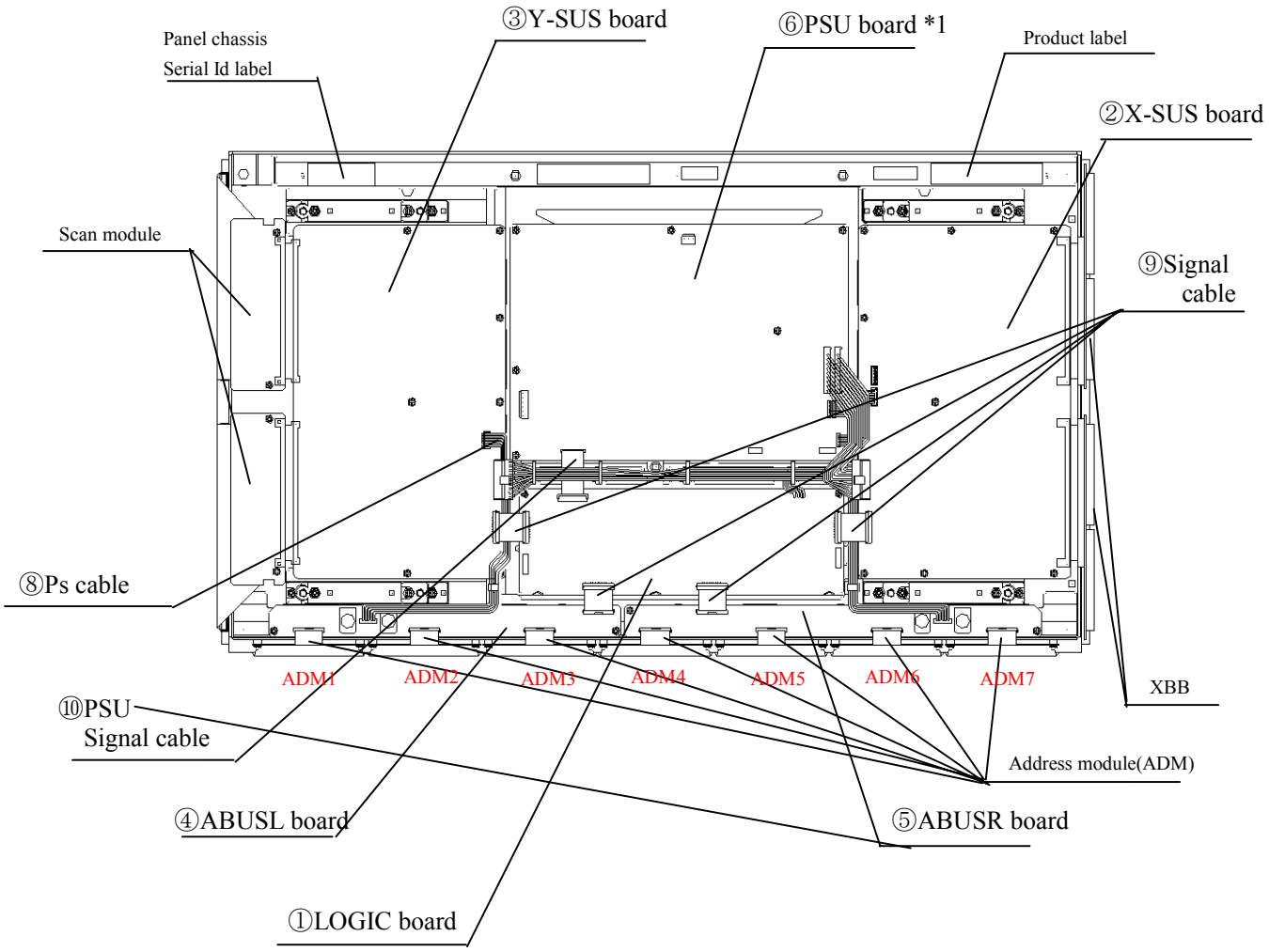
  Failure to observe this precaution may result in problems resulting from scratches on the parts, the deformation of parts, and short-circuits due to residual electric charge.
- Routing of the wires and fixing them in position must be done in accordance with the original routing and fixing configuration when servicing is completed.

  All the wires are routed far away from the areas that become hot (such as the heat sink). These wires are fixed in position with the wire clamps so that the wires do not move, thereby ensuring that they are not damaged and their materials do not deteriorate over long periods of time. Therefore, route the cables and fix the cables to the original position and states using the wire clamps.
- Perform a safety check when servicing is completed.

  Verify that the peripherals of the serviced points have not undergone any deterioration during servicing. Also verify that the screws, parts and cables removed for servicing purposes have all been returned to their proper locations in accordance with the original setup.

3. Name and Function

3.1 Configuration

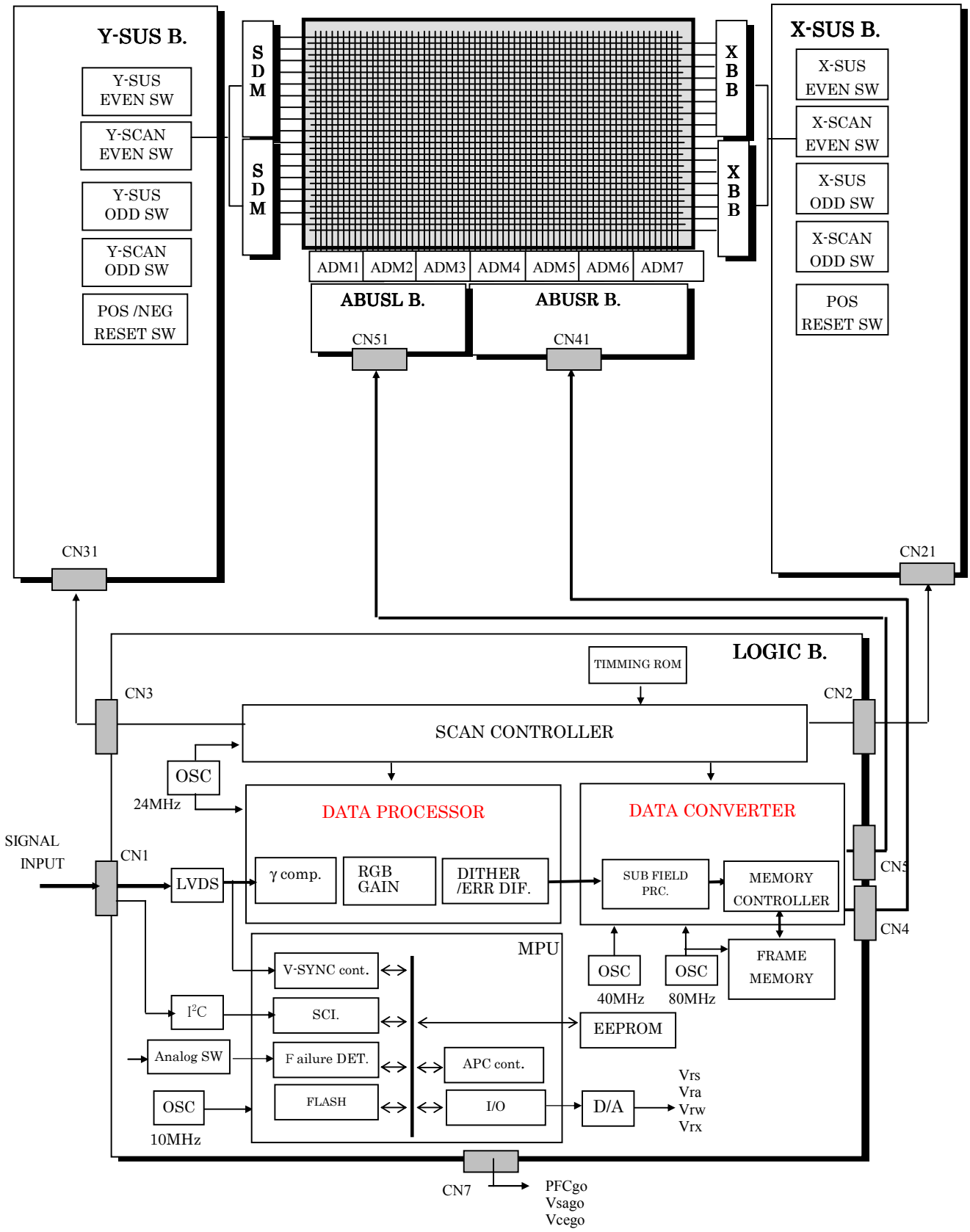


The figure shows the article number in the parts information table of clause 7.

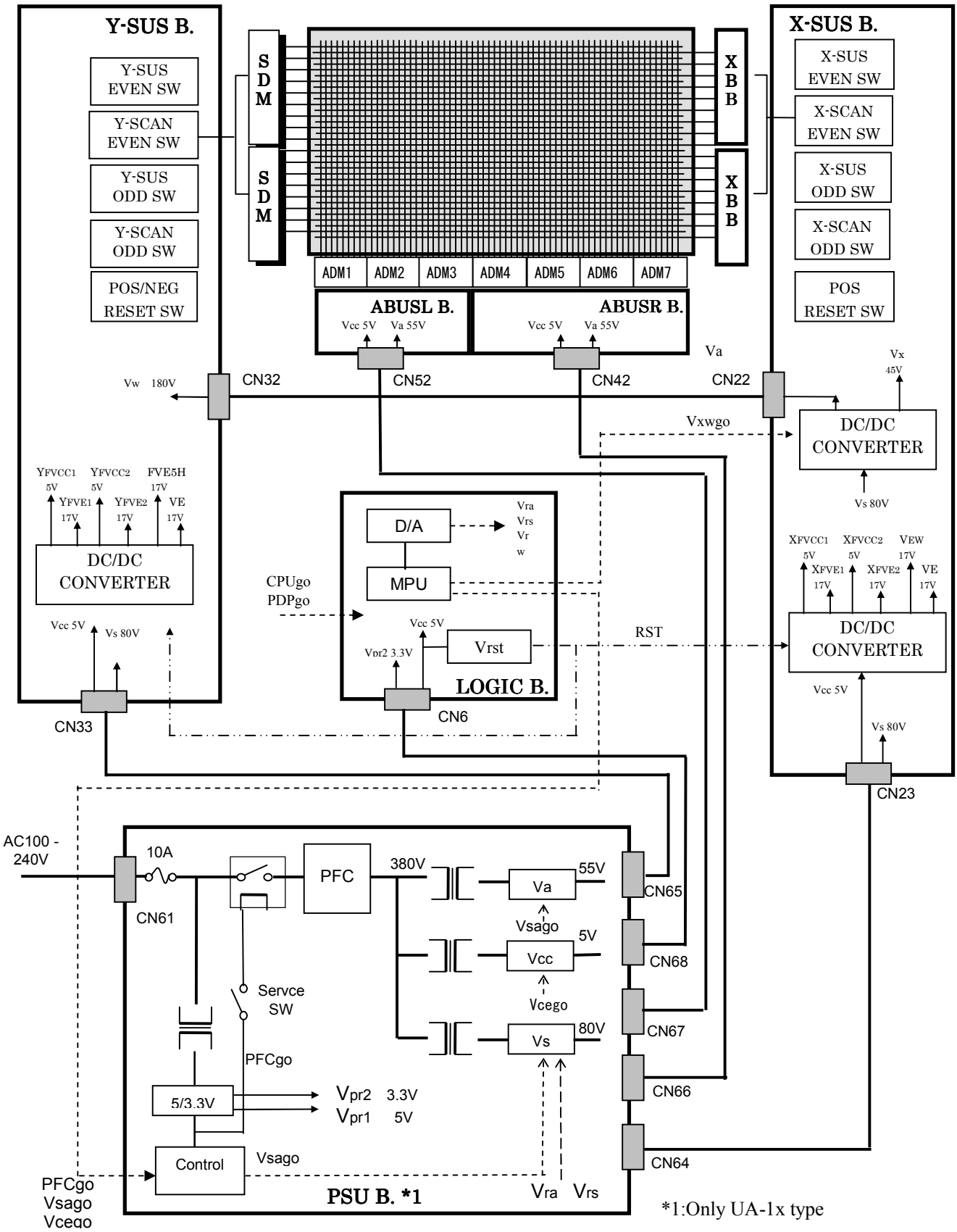
*1:Only UA-1x type

3.2 Block Diagrams

3.2.1 Signal Diagrams



3.2.2 Power Diagrams



3.3 Function

3.3.1 Logic board Function

(1) Data Processor

- γ adjustment (1/2.2/2.4/2.6/2.8)
- NTSC/EBU format（Color matrix）Switch
- RGB gain Control（White balance adjustment、Amplitude limitation）
- Error Diffusion Technology (Grayscale adjustment)
- Dithering (Grayscale adjustment)
- Burn-in Pattern generation

(2) Scan Controller

- Address driver control signal generator (ADM)
- Scan driver control signal generator (SDM)
- X/Y sustain control signal generator

(3) Waveform ROM

- Waveform Pattern for drive / Timing memory

(4) MPU

- Synchronous detection
- System control
- Driving voltage (Va,Vs,Vr,Vw) adjustment and tuning
- Abnormal watching (breakdown detection) / abnormal processing
- Is (sustain) current control (sustain pulse control)
- Ia (address) current control (sub-field control)
- External communication control

(5) EEPROM

- Control parameter memory
- The accumulation energizing time (Every hour).
- Abnormal status memory (16 careers)

Sub Address	Data bit	Symbol	Item	Function	Setting [hex]	
					RANGE	INITIAL value
00	7-0	MAPVER	address MAP Version	Indicates the version number of the address map.	00 ~ FF	01
01	7	ERRF	update of Error Flag	Indicates that an error has occurred. It can be cleared with the ErrRST setting. If this flag is set, • Error code is written. • Cannot enter the PDP-ON mode.	0: Not updated 1: Updated	0
	6	OHRF	update of Operation Hours Flag	Indicates that the drive hours are counted.	0: Not updated 1: Updated	0
	5	PSDF	Power Shut Down Flag	Indicates that shutdown of the AC power is detected and the PDP has executed the OFF-sequence. It can be cleared with the PSDRST setting.	0: Not detected 1: Detected	0
	4-0	CNDC	Condition Code	Indicates status of the module.	-	-
02	7-0	ERRC	Error Code	Indicates error code. The error codes of as many as 16 errors in the past can be retrieved with the ERRS setting. . Same error code is not stored continuously.	00~FF	00
03	7-0	OHRH	Operation Hours Higher bits	Indicates the higher 8 bits of the module driving hours. *1)	00~FF	00
04	7-0	OHRL	Operation Hours Lower bits	Indicates the lower 8 bits of the module driving hours. *1)	00~FF	00
20	7	PATSEL	Selecting patterns	It selects the built-in test pattern signals of this display. This setting is valid when the PATON setting is 1.	0: The single color display is switched every 2 seconds. A total of 8 colors are displayed. 1: All white (Different from actual white.)	0
	6	PATON	Built-in pattern display is set to ON.	Display of the built-in pattern signal in this product is turned ON/OFF.	0: Displaying the input signal 1: Displaying the built-in pattern	0
	5	ADEN	Address data enable	The black screen is displayed. 0 is set when the input video signal has disturbance.	0: Blank 1: Displaying the input signal	1
	4	-	-	Be sure to use the display with the setting fixed to 0.	0~1	0
	3	-	-	Be sure to use the display with the setting fixed to 1.	0~1	1
	2	IFON	Interface power supply ON	Switches the interface power ON/OFF. Use this item when you want turn ON the main power of the interface side only when the PDPON is set to 0. This setting is invalid when PDPON is set to 1.	0: Power OFF 1: Power ON	0
	1	PDPON	High voltage power supply ON	Switches ON/OFF the high voltage power supply of PDP.	0: Power OFF 1: Power ON	0
	0			Be sure to use the display with the setting fixed to 1.	0~1	1

*1) It is not the one to guarantee brightness.

Sub Address	Data bit	Symbol	Item	Function	Setting[hex]	
					RANGE	INITIAL value
21	7-5	-	-	Be sure to use the display with the setting fixed to 0.	0~7	0
	4	CCFMD	Color correction mode	Selecting the color correction modes. Valid when the CCFON setting is 1	0: Luminance has priority. 1: Gradation has priority	0
	3	DCBON	Dynamic Color Balance	Tracking correction of white balance between the high luminance and the low luminance.	0: OFF 1: ON	0
	2	HAON	Heat APC function	When a picture with high luminance/small area is displayed for about 3 minutes or longer, the number of pulses is reduced to about 20% at a maximum. This item can be used to reduce panel temperature/extend useful life when the display is used to show a still image.	0: OFF 1: ON	0
	1	-	-	Be sure to use the display with the setting fixed to 0.	0~1	0
	0	DSETEN	Data set enable	Whether the register value is reflected to the operating status of this product, selected by this item. The following switch is executed. 0: The received register value is reflected from the next field. 1: The received register value is stored so that the DSET setting is reflected from the next field. (DSET setting: Setting bit 0 of address FF)	0: Invalid 1: Valid	1
22	7	CCFON	Color correction	Color collection process is turned ON/OFF.	0: OFF 1: ON	0
	6	CCFORM	Color correction format	Color collection process is switched. This item is valid when CCFON setting is 1.	0: NTSC 1: EBU	0
	5-3	-	-	Be sure to use the display with the setting fixed to 0.	0~7	0
	2-0	GAMSEL	Selecting the reverse γ correction	Reverse γ correction level is set. The setup 7 is the test mode. Do not select the setup 7. When the setup 6 is selected, setting of the addressed in the range of 31~51 become valid.	0: OFF 1: 1.0 th power 2: 2.2 nd power 3: 2.4 th power 4: 2.6 th power 5: 2.8 th power 6: USER 7: TEST	2
23	7-0	CONTRAST	Peak luminance	Peak luminance is adjusted. When the display picture load is heavy, the peak luminance is automatically limited.	00~FF	FF
24	7-0	R-RATIO	R ratio	White balance is adjusted. Use the display with at least one item being set to FF (hex).	00~FF	FF
25	7-0	G-RATIO	G ratio		00~FF	FF
26	7-0	B-RATIO	B ratio		00~FF	FF

Sub Address	Data bit	Symbol	Item	Function	Setting [hex]	
					RANGE	INITIAL value
27	7	IRQRST	Clearing the IRQ output signal	This item implements control to return the IRQ signal from "HIGH" to "Low" level when an error occurs. When this item is set to 1, the IRQ signal is returned to "Low" level.	0: Normal 1: IRQ signal clear	0
	6	ERRRST	Clearing the ERRF flag	This item implements control to return the ERRF flag to 0 when an error occurs. When this item is set to 1, this setting automatically returns to 0 after returning the ERRF flag to 0.	0: Normal 1: ERRF flag clear	0
	5	-	-	Be sure to use the display with the setting fixed to 0.	0~1	0
	4	PSDRST	Clearing the PSDF flag	This item exercise control to return the PSDF flag to 0 when this machine performs the OFF sequence at AC power shutdown. When this item is set to 1, this setting automatically returns to 0 after returning the PSDF flag to 0.	0: Normal 1: PSDF flag clear	0
	3-0	ERRS	Error code selection	When this setting is changed and the ERRC setting is read out, the error contents (as many as 16 errors) of the module that have occurred in the past can be checked. If more than 16 errors have occurred, the error code is updated starting from the oldest error.	0: Latest error 1: Previous error 2: | E: F: Oldest error	0
28	7-6	-	-	Be sure to use the display with the setting fixed to 0.	0~3	0
	5-4	PWMAX	Maximum power consumption	Sets the maximum power consumption. Set this item in accordance with the status of the machine. Make sure that the respective parts' temperature/panel temperature stays within the specifications. If the setting is set to 3, power consumption increases to a level exceeding the standard consumption. Be sure to execute the heat dissipation design so that respective parts' temperature/panel temperature stays within the specifications.	0: −20W 1: −10W 2: ±0W 3: +10W	2
	3-0	-	-	Be sure to use the display with the setting fixed to 0.	0~F	0
31	7-0	GAM00	Reverse γ correction DC	Sets the input level that implements the forced 0 [LSB] output.	00~FF	1F
32	7-2	-	<no use>	-	00~FF	00
	1-0	GAM01 [9: 8]	Reverse γ coefficient 01	Reverse γ coefficient value is set. Input Output value of 8 [LSB]		
33	7-0	GAM01 [7: 0]			00~FF	04
34	7-3	-	<no use>	-	00~FF	00
	2-0	GAM02[10: 8]	Reverse γ correction 02	Reverse γ coefficient value is set. Input Output value of 16 [LSB]		
35	7-0	GAM02 [7: 0]			00~FF	24
36	7-4	-	<no use>	-	00~FF	00
	7-4	GAM03 [11:8]	Reverse γ correction 03	Reverse γ coefficient value is set. Input Output value of 24 [LSB]		

Sub Address	Data bit	Symbol	Item	Function	Setting [hex]	
					RANGE	INITIAL value
37	7-0	GAM03 [7: 0]			00~FF	58
38	7-4	-	<no use>	-	00~FF	00
	3-0	GAM04[11: 8]	Reverse γ correction 04	Reverse γ coefficient value is set. Input Output value of 32 [LSB]		
39	7-0	GAM04[7: 0]			00~FF	A7
3A	7-5	-	<no use>	-	00~FF	01
	4-0	GAM05[12: 8]	Reverse γ correction 05	Reverse γ coefficient value is set. Input Output value of 40 [LSB]		
3B	7-1	GAM05[7: 1]			00~FF	12
	0	-	<no use>	-		
3C	7-5	-	<no use>	-	00~FF	01
	4-0	GAM06[12: 8]	Reverse γ correction 06	Reverse γ coefficient value is set. Input Output value of 48 [LSB]		
3D	7-1	GAM06[7: 1]			00~FF	9A
	0	-	<no use>	-		
3E	7-5	-	<no use>	-	00~FF	02
	4-0	GAM07[12: 8]	Reverse γ correction 07	Reverse γ coefficient value is set. Input Output value of 56 [LSB]		
3F	7-2	GAM07[7: 2]			00~FF	40
	1-0	-	<no use>	-		
40	7-5	-	<no use>	-	00~FF	03
	4-0	GAM08[12: 8]	Reverse γ correction 08	Reverse γ coefficient value is set. Input Output value of 64 [LSB]		
41	7-2	GAM08[7: 2]			00~FF	04
	1-0	-	<no use>	-		
42	7-6	-	<no use>	-	00~FF	04
	5-0	GAM09[13: 8]	Reverse γ correction 09	Reverse γ coefficient value is set. Input Output value of 80 [LSB]		
43	7-4	GAM09[7: 4]			00~FF	F0
	3-0	-	<no use>	-		
44	7-6	-	<no use>	-	00~FF	07
	5-0	GAM10[13: 8]	Reverse γ correction 10	Reverse γ coefficient value is set. Input Output value of 96 [LSB]		
45	7-4	GAM10[7: 4]	Reverse γ correction 10	Reverse γ coefficient value is set. Input Output value of 96 [LSB]	00~FF	60
	3-0	-	<no use>	-		

Sub Address	Data bit	Symbol	Item	Function	Setting [hex]	
					RANGE	INITIAL value
46	7-6	-	<no use>	-	00~FF	0A
	5-0	GAM11[13: 8]	Reverse γ correction 11	Reverse γ coefficient value is set. Input Output value of 112 [LSB]		
47	7-4	GAM11[7: 4]			00~FF	50
	3-0	-	<no use>	-		
48	7-6	-	<no use>	-	00~FF	0D
	5-0	GAM12[13: 8]	Reverse γ correction 12	Reverse γ coefficient value is set. Input Output value of 128 [LSB]		
49	7-4	GAM12[7: 4]			00~FF	D0
	3-0	-	<no use>	-		
4A	7-6	-	<no use>	-	00~FF	16
	5-0	GAM13[13: 8]	Reverse γ correction 13	Reverse γ coefficient value is set. Input Output value of 160 [LSB]		
4B	7-4	GAM13[7: 4]			00~FF	A0
	3-0	-	<no use>	-		
4C	7-6	-	<no use>	-	00~FF	21
	5-0	GAM14[13: 8]	Reverse γ correction 14	Reverse γ coefficient value is set. Input Output value of 192 [LSB]		
4D	7-4	GAM14[7: 4]			00~FF	E0
	3-0	-	<no use>	-		
4E	7-6	-	<no use>	-	00~FF	2F
	5-0	GAM15[13: 8]	Reverse γ correction 15	Reverse γ coefficient value is set. Input Output value of 224 [LSB]		
4F	7-4	GAM15[7: 4]			00~FF	90
	3-0	-	<no use>	-		
50	7	-	<no use>	-	00~FF	40
	6-0	GAM16[14: 8]	Reverse γ correction 16	Reverse γ coefficient Input Output value of 256 [LSB]		

Sub Address	Data bit	Symbol	Item	Function	Setting [hex]	
					RANGE	INITIAL value
51	7-5	GAM16[7: 5]			00~FF	00
	4-0	-	<no use>	-		
E5	7-0	UVrs	USER Vrs	Setting Vrs voltage Standard equation: Vrs=2.99*UVrs/255	00~AA	Adjusted in factory
E6	7-0	UVra	USER Vra	Setting Vra voltage Standard equation: Vra=2.99*UVra/255	00~AA	Adjusted in factory
FE	7-3	—	<no use>	Be sure to use the display with the setting fixed to 0.	0	0
	2	RCLVr	UVrs/UVra RECALL	Resetting the UVrs, UVra in both of register and EEPROM to the initial value by setting RCLVr to 1. This setting automatically returns to 0 after resetting the UVrs,Uvra.	0:Normal 1:UVrs,UVra initialized	0
	1	EWRVr	UVrs/UVra Write	Storing the UVrs,UVra in register to EEPROM by setting EWRVr to 1. This setting automatically returns to 0 after resetting the UVrs,Uvra.	0:Normal 1:UVrs,UVra stored in EEPROM	0
	0	-	-	Be sure to use the display with the setting fixed to 0.	0	0
FF	7-1	-	-	Be sure to use the display with the setting fixed to 0.	0	0
	0	DSET	Data setup	When the DSETEN setting is 1, setting this bit causes all the register setups that have been set up to now, to be reflected to the operation status of this product. They are reflected from the next field after this bit is accepted.	0: Normal 1: Execute	0

3.3.2 Function of X-SUS Board

(1) DC/DC power supply block

Vs (+80V) ➔ Vw (+180V)/Vx (+45V)

Vcc (+5V) ➔ XFvcc (+5V, floating)/XFve (+17V, floating)/Ve (+17V)

(2) X switching block

Switching during address period

Switching during sustain period

Switching during reset period

(3) Current detector block

Isx (sustain) current detection

3.3.3 Function of Y-SUS Board

(1) DC/DC power supply block

Vcc (+5V) ➔ Y Fvcc (+5V, floating)/Y Fve (+17V, floating)/Ve (+17V)

(2) Switching block

Switching during address period

Switching during sustain period

Switching during reset period

(3) Current detector block

Isy (sustain) current detection

Isp (SDM) current detection

3.3.4 Function of PSU Board (Only UA-1x Model)

(1) Standby power supply block

AC100–200 ➔ Vpr1 (+5V)/Vpr2 (+3.3v)

(2) PFC block (AD/DC power supply block)

AC100–200 ➔ 380V

(3) AD/DC power supply block

+380V ➔ Vcc (+5V) / Vs (+80V)/Va (+55V)

(4) Current detection block

Ia (address) current detection

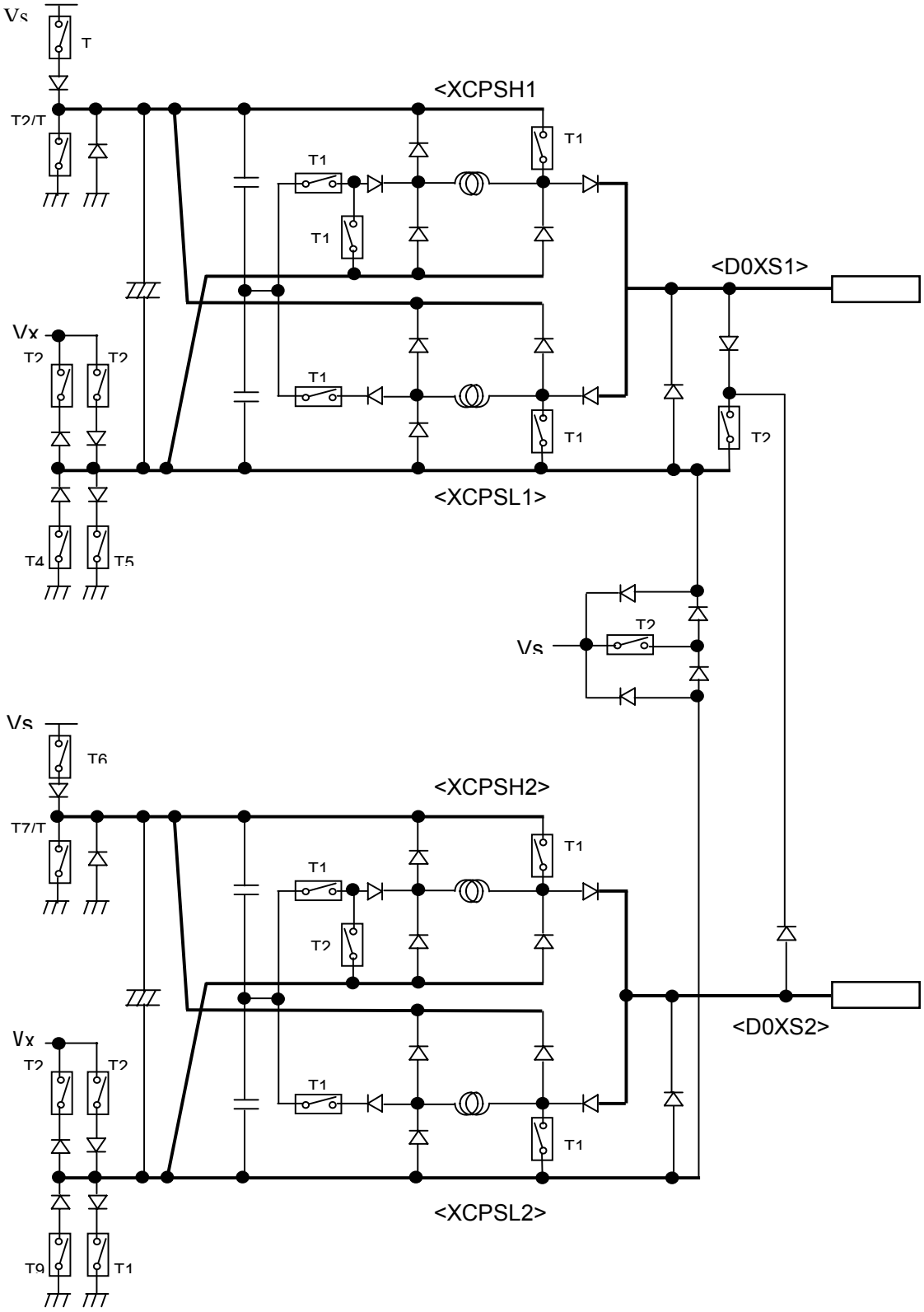
(5) Abnormal voltage monitoring

Vs excess voltage monitoring

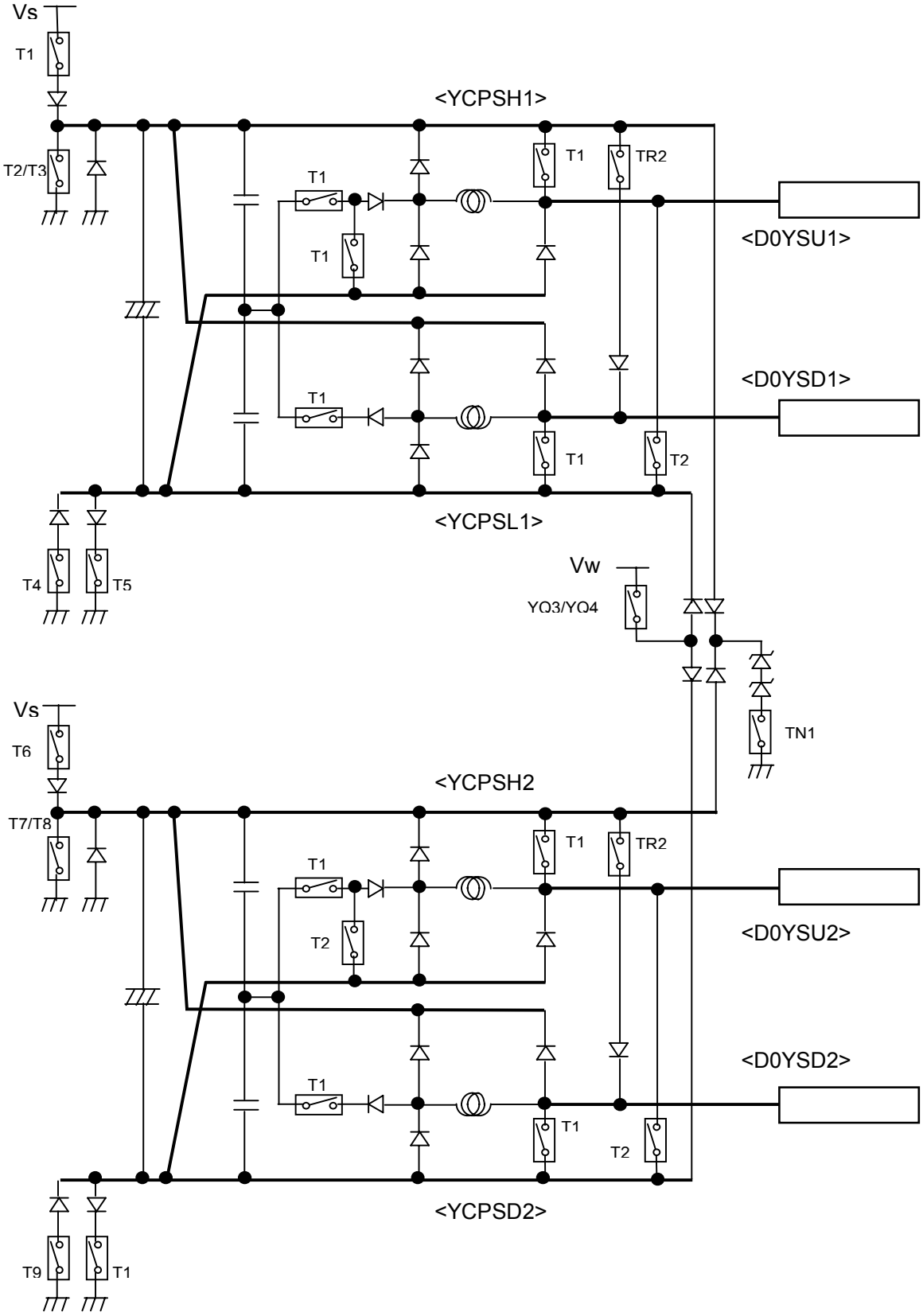
Va excess voltage monitoring

3.4 Circuit Block Diagrams

3.4.1 X Circuit Block Diagrams



3.4.2 Y Circuit Block Diagrams

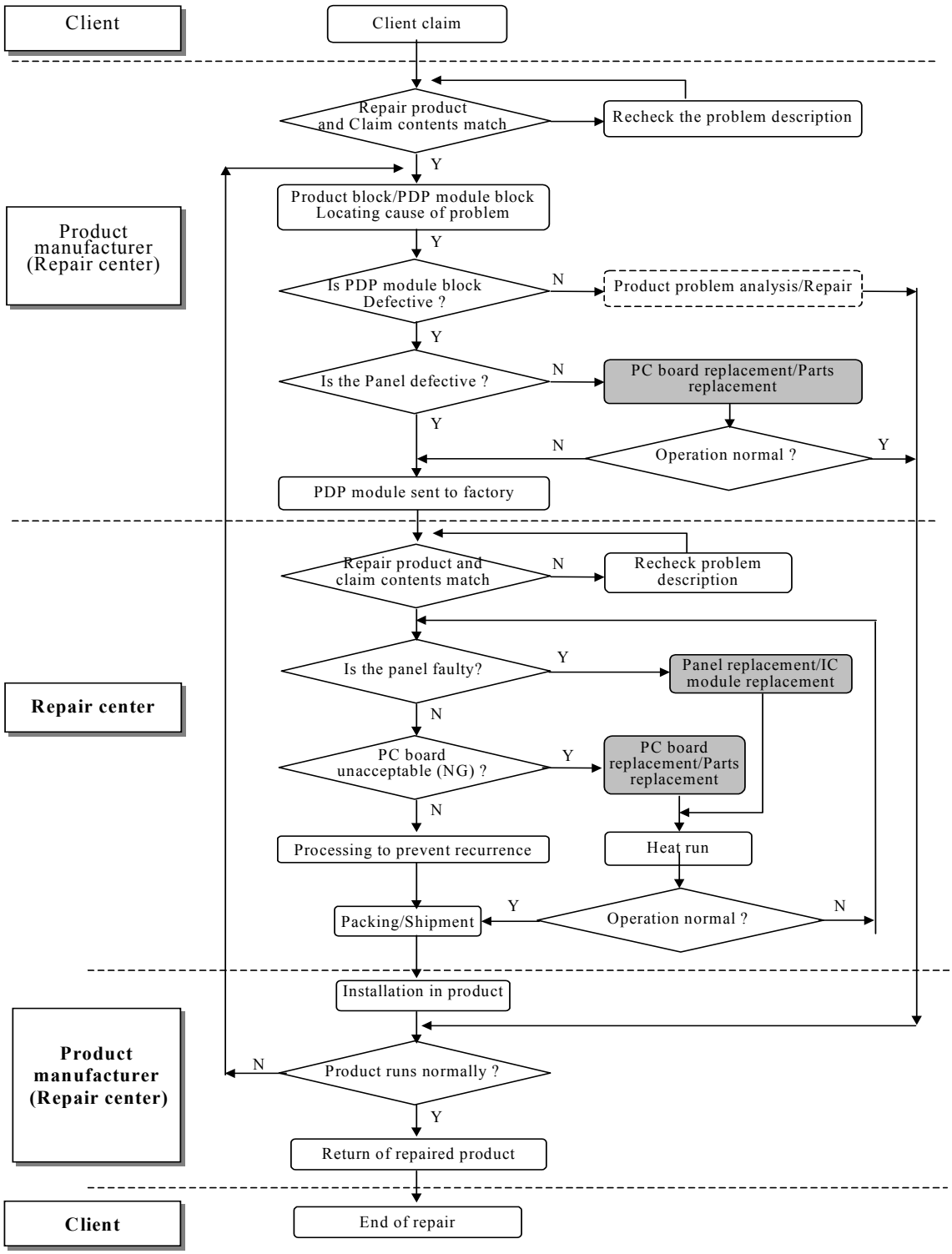


3.5 Protection function

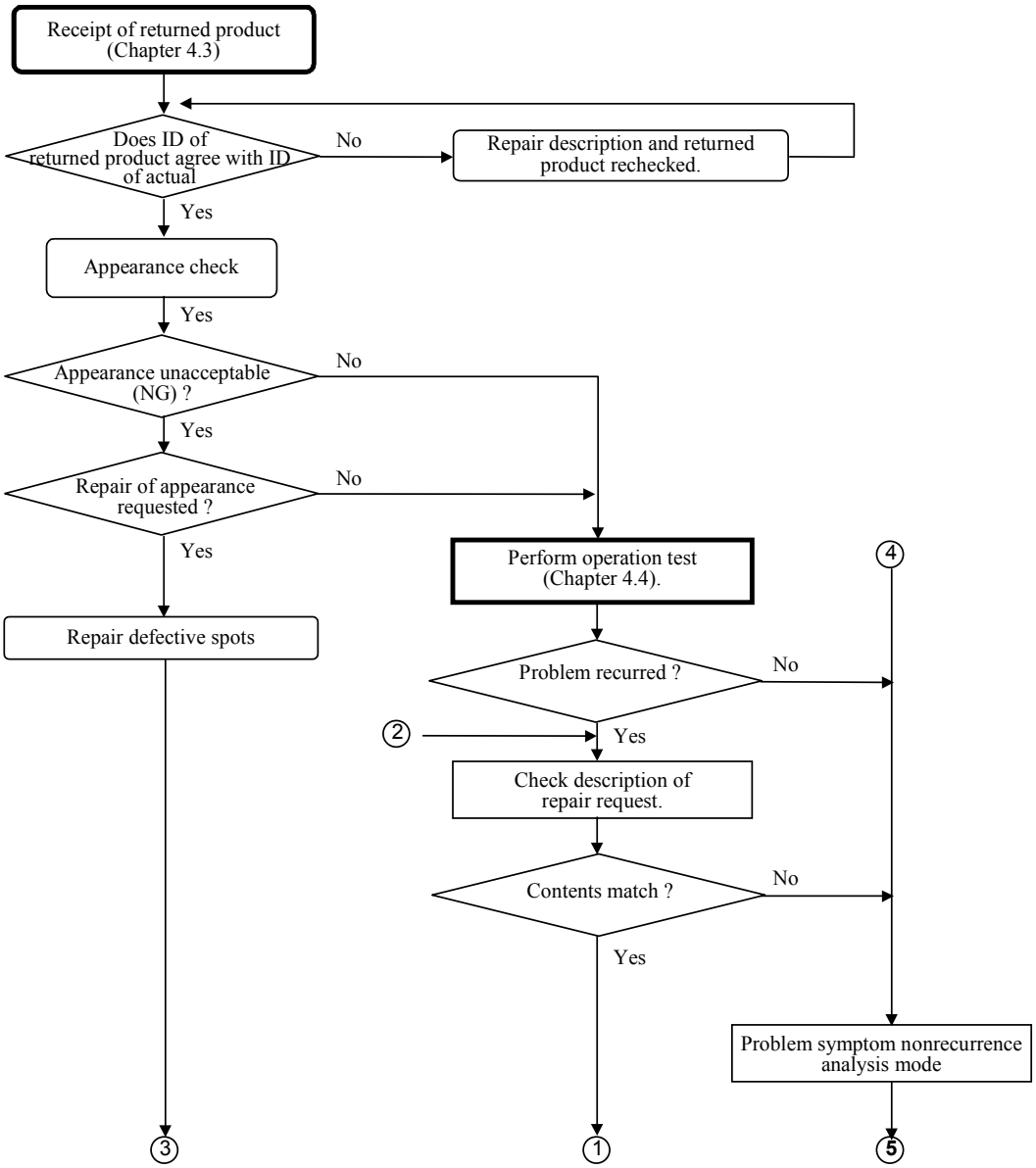
Abnormality part		State of protection operation (×:State change , There is no change at the blank)										Reactivation condition when abnormal content is excluded	
		State	Vw,	Vx	Vs	Va	Vex	Vey	Vcc	Vpr	Vaux	AC Re-turning on	PFCgo Reset
Vw	Overvoltage	Stop(no latch)	×	×	×	×	×	×	×			○	○
	Overcurrent	Delay Latch	×	×	×	×	×	×	×			○	○
Vx	Overvoltage	Stop(no latch)	×	×	×	×	×	×	×			○	○
	Overcurrent	Delay Latch	×	×	×	×	×	×	×			○	○
Vs	Overvoltage	Latch	×	×	×	×	×	×	×			○	○
	Low voltage	Latch	×	×	×	×	×	×	×			○	○
	Overcurrent	Delay Latch	×	×	×	×	×	×	×			○	○
Va	Overvoltage	Latch	×	×	×	×	×	×	×			○	○
	Low voltage	Latch	×	×	×	×	×	×	×			○	○
	Overcurrent	Delay Latch	×	×	×	×	×	×	×			○	○
Vex Vey	Overvoltage	Stop(no latch)	×	×	×	×	×	×	×			○	○
	Overcurrent	Voltage pendency (no latch)	×	×	×	×	×	×	×			○	○
Vcc	Overvoltage	Latch	×	×	×	×	×	×	×			○	○
	Overcurrent	Delay Latch	×	×	×	×	×	×	×			○	○
Vpr1	Overvoltage	Latch	×	×	×	×	×	×	×	×	×	○	
	Overcurrent	Delay Latch	×	×	×	×	×	×	×	×	×	○	
Vpr2	Overcurrent	Delay Latch	×	×	×	×	×	×	×	×	×	○	
Vaux	Overvoltage	Latch	×	×	×	×	×	×	×	×	×	○	
	Overcurrent (Note 2)	Voltage pendency (no latch)	×	×	×	×	×	×	×				
PSU Heat sink	Temperature	Latch	×	×	×	×	×	×	×	×	×	○	

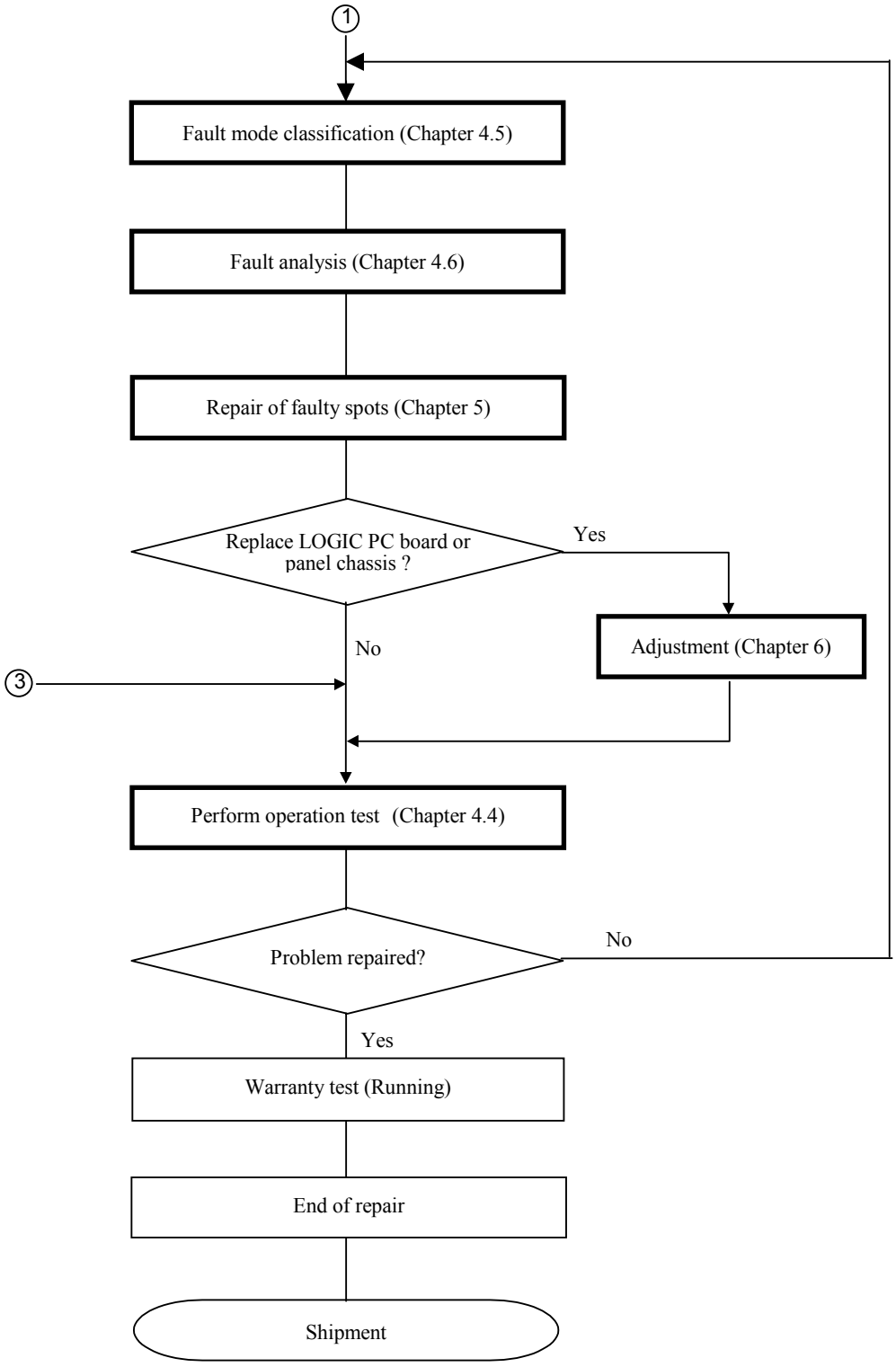
4. Problem Analysis

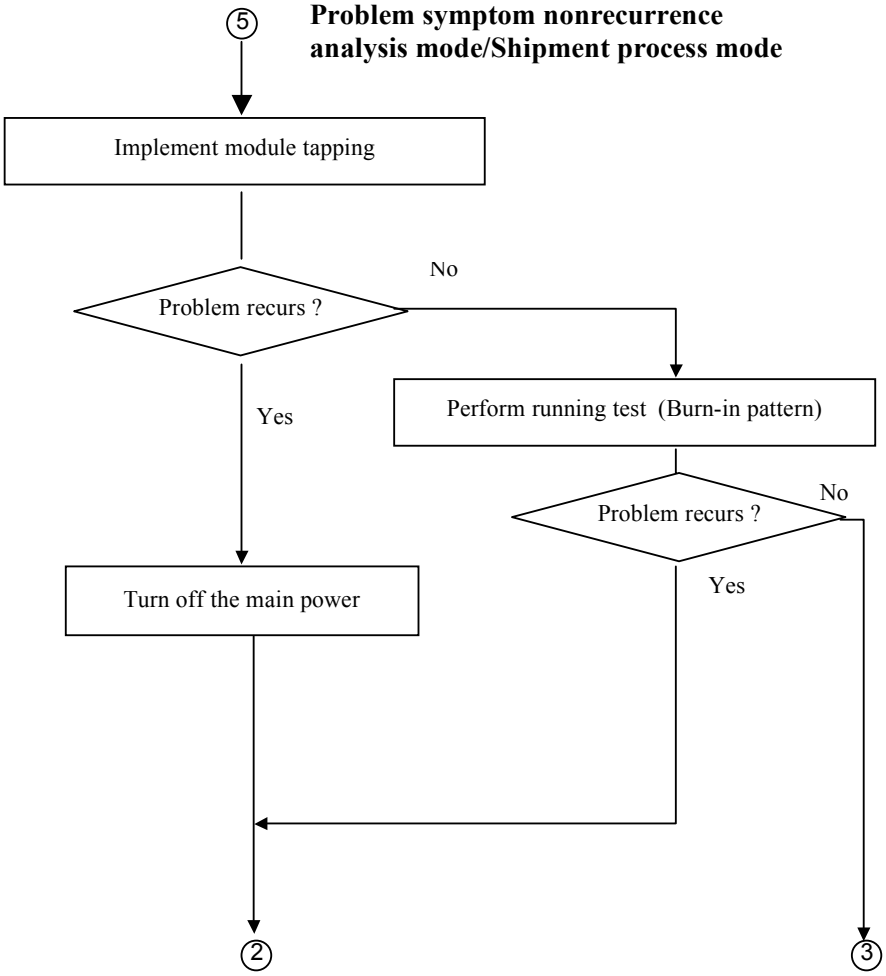
4. 1 Outline of Repair Flow



4.2 Outline of PDP Module Repair Flow




1
Fault mode classification (Chapter 4.5)
Fault analysis (Chapter 4.6)
Repair of faulty spots (Chapter 5)
Replace LOGIC PC board or panel chassis ?
Yes
No
Adjustment (Chapter 6)
3
Perform operation test (Chapter 4.4)
Problem repaired?
No
Yes
Warranty test (Running)
End of repair
Shipment


5
Problem symptom nonrecurrence analysis mode/Shipment process mode
Implement module tapping
Problem recurs ?
No
Yes
Perform running test (Burn-in pattern)
Problem recurs ?
No
Yes
Turn off the main power
2
3

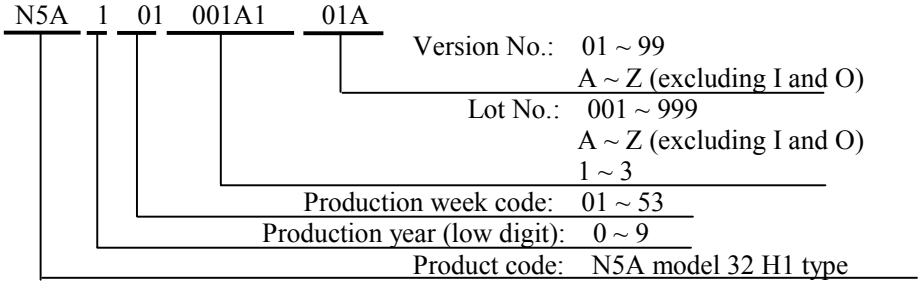
4.3 Checking the Product Requested for Repair

Check the serial ID number of the product requested for repair before starting the problem analysis and repair.
Structure of serial ID number is shown below.

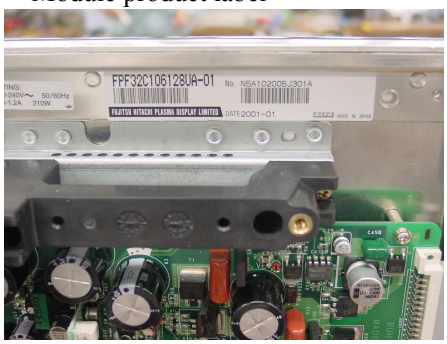
(1) Checking serial ID number of PDP module (14 digits)

The serial ID number of the product that is brought in for service and that of the completed panel chassis has the structure as shown below.

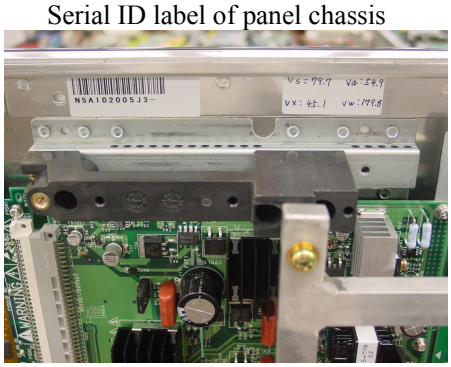
The serial ID number is shown on the bar code label that is attached to the rear of the chassis (aluminum).



Module product label



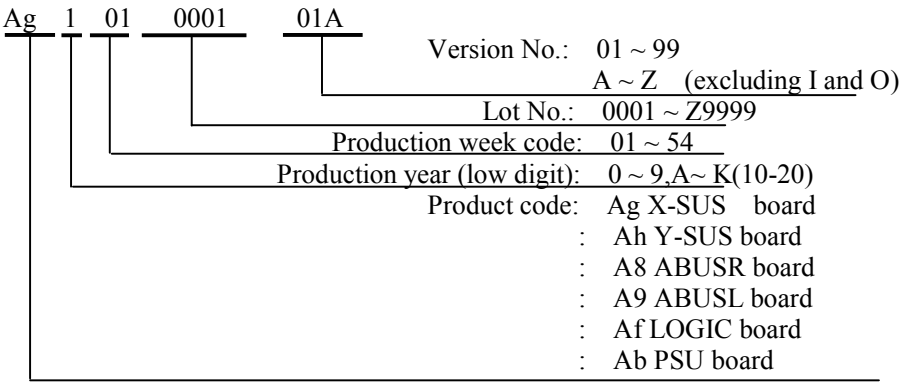
Serial ID label of panel chassis



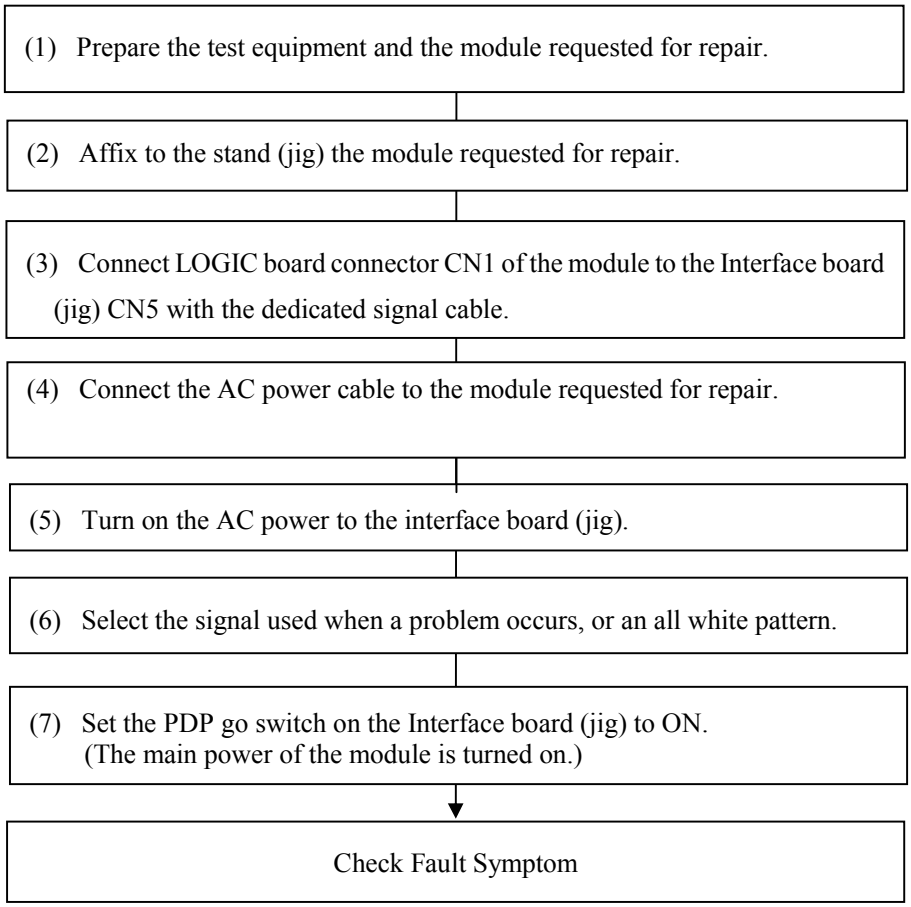
∗ The module serial ID number and the serial ID number of the completed chassis (product requested for repair) are usually the same when the product is brought in for repair for the first time.

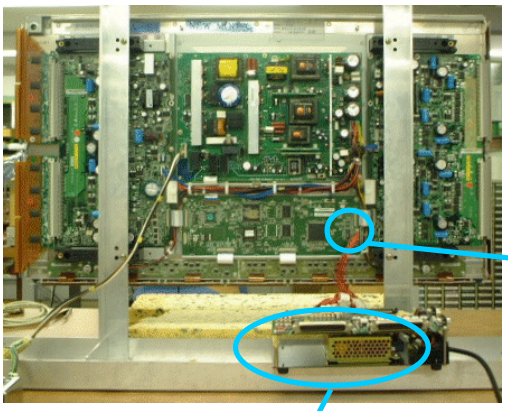
(2) Checking serial ID number of constituent PC boards (12 digits)

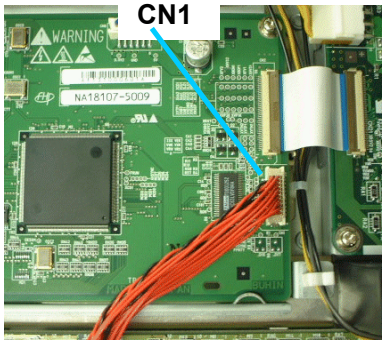
The serial ID number of the module constituent PC boards has the following structure.
The serial ID number is shown on the bar code label that is attached to each PC board.



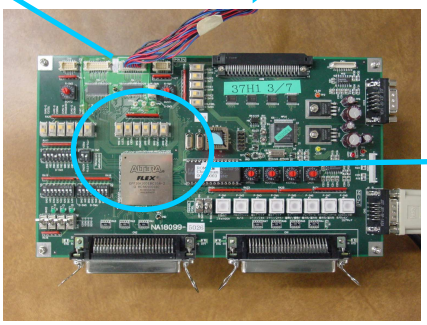
4.4 Operation Test Procedure

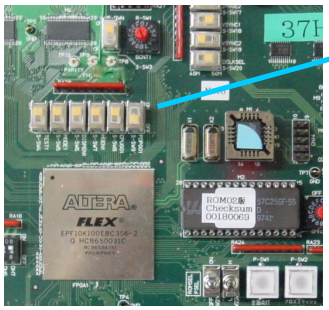




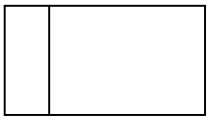
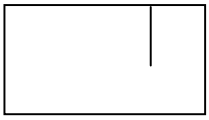
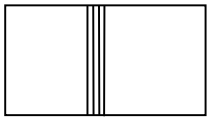
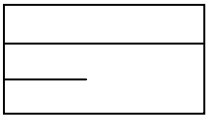
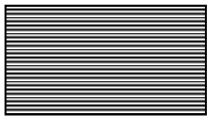


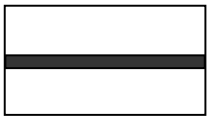
CN5





4.5 Fault Symptom

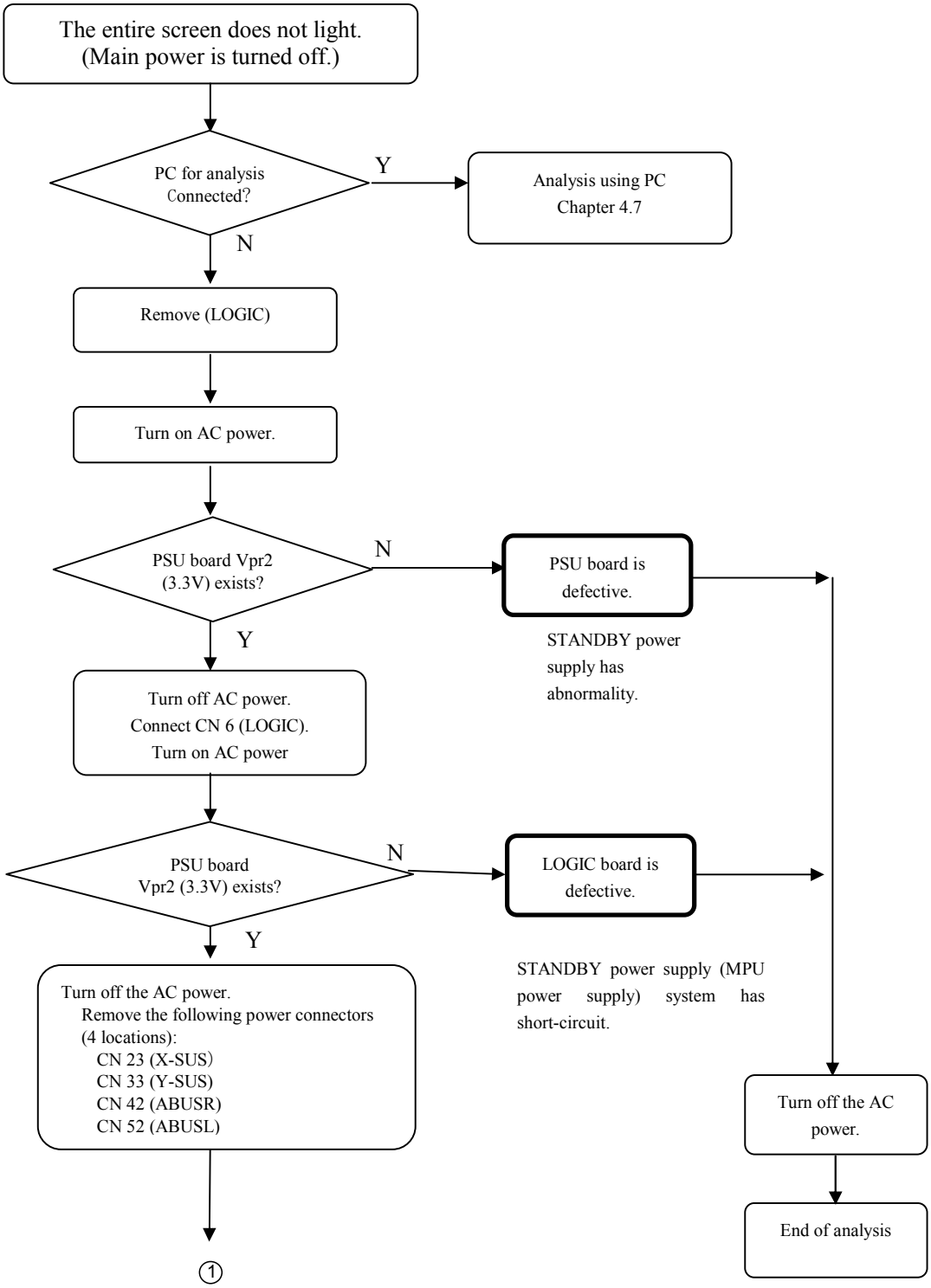
NO	Fault contents	Fault status		Suspected fault location	Analysis procedure and measure
1	Entire screen does not light.	After momentarily going on, the screen becomes black immediately or after a few seconds. (Main power is turned off.)		X-SUS Y-SUS Panel chassis LOGIC ABUSL ABUSR	Refer to Chapter 4.6.1
2		Screen lights dimly even on the back screen.		LOGIC	Replace LOGIC board
3	Vertical line	Single vertical line (of different color)		Panel chassis LOGIC	Refer to Chapter 4.6.2
4		Vertical line from the middle of effective scan area (Vertical line of different color)		Panel chassis	Replace panel chassis
5	Vertical bar	Bar width of 1/7 of horizontal size or in multiples of 1/7, is displayed. Abnormal display.		Panel chassis ABUSL ABUSR LOGIC Above boards are connected.	Refer to Chapter 4.6.2
6		Bar width of 3/7 or 4/7 of the screen width, is displayed. Abnormal display. (Vertical line of different color)		ABUSL ABUSR LOGIC Above boards are connected.	Refer to Chapter 4.6.2
7	Horizontal line	Single horizontal line (No light) Or single horizontal line does not light among the effective scanning area. Single horizontal line does not light.		Panel chassis	Replace panel chassis
8		Occurrence by one line(No light) ,full screen		X-SUS Y-SUS	Replace X-SUS Y-SUS

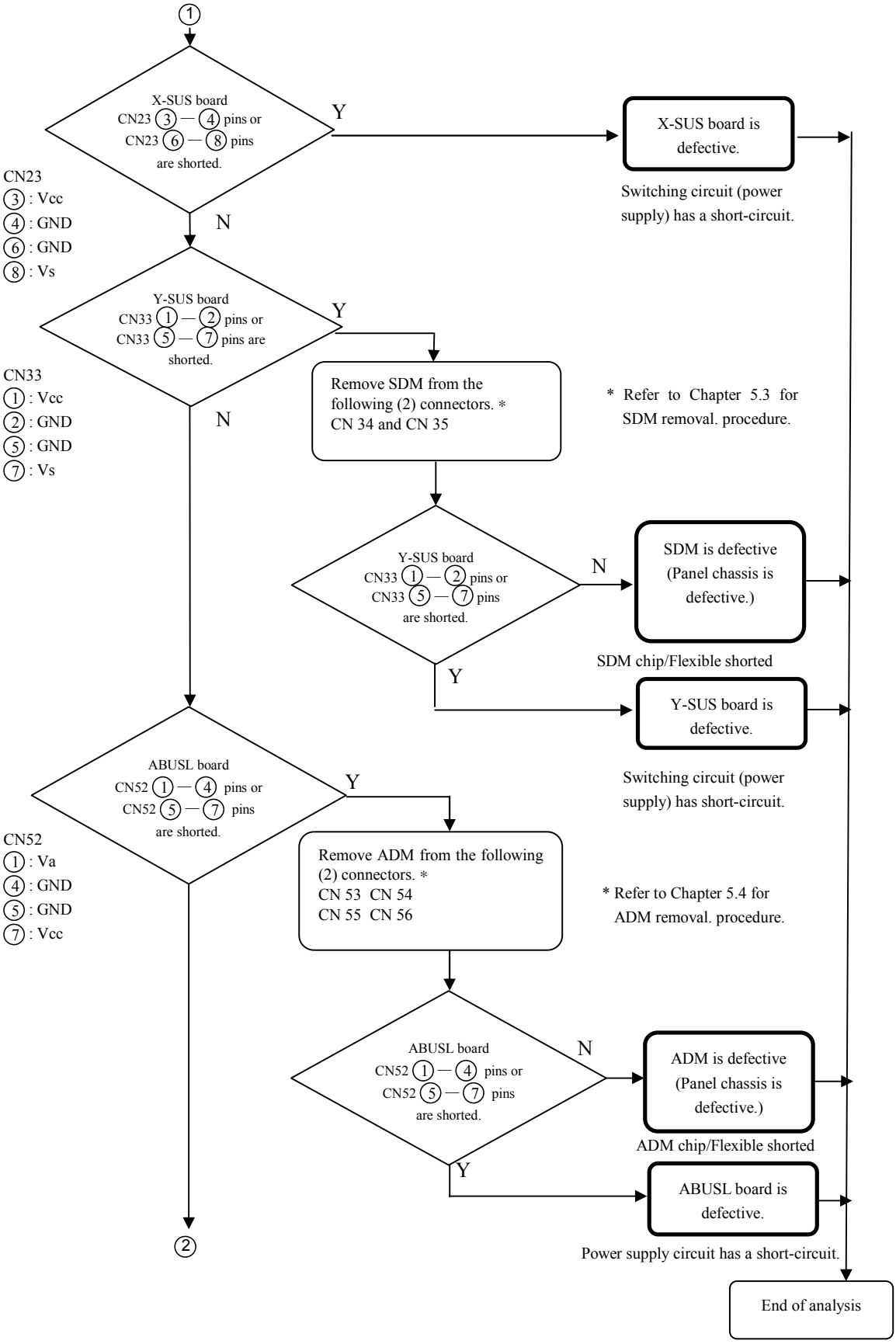
NO	Fault contents	Fault status		Suspected fault location	Analysis procedure and measure
9	Horizontal bar	Bar width of 1/8 or multiples of 1/8 of the screen height, is displayed. Abnormal (Screen does not light)		Panel chassis	Replace panel chassis
10		Bar width of 1/2 of the screen height. Abnormal display (Screen does not light)		Panel chassis Y-SUS X-SUS Above boards are connected.	Refer to Chapter 4.6.3
11	Image burn-in	Fixed display contents are always displayed.		Panel chassis	Perform all white heat run. After judgment, replace panel chassis
12	Stains	Oval-shaped points having abnormal luminance are scattered in the upper or lower part of screen.		Panel chassis	Perform all white heat run. After judgment, replace panel chassis
13	Flicker	The entire screen flickers continuously.		Connector	Reconnecting of connector and cable, or exchanges the cable.
14	Chrominance is abnormal	Colors cannot be displayed correctly.		LOGIC	Replace LOGIC board
15	Sync is disturbed			LOGIC	Replace LOGIC board
18	Picture distorted			LOGIC	Replace LOGIC board
19	Steps of gradation are skipped	Luminance linearity is poor.		LOGIC	Replace LOGIC board

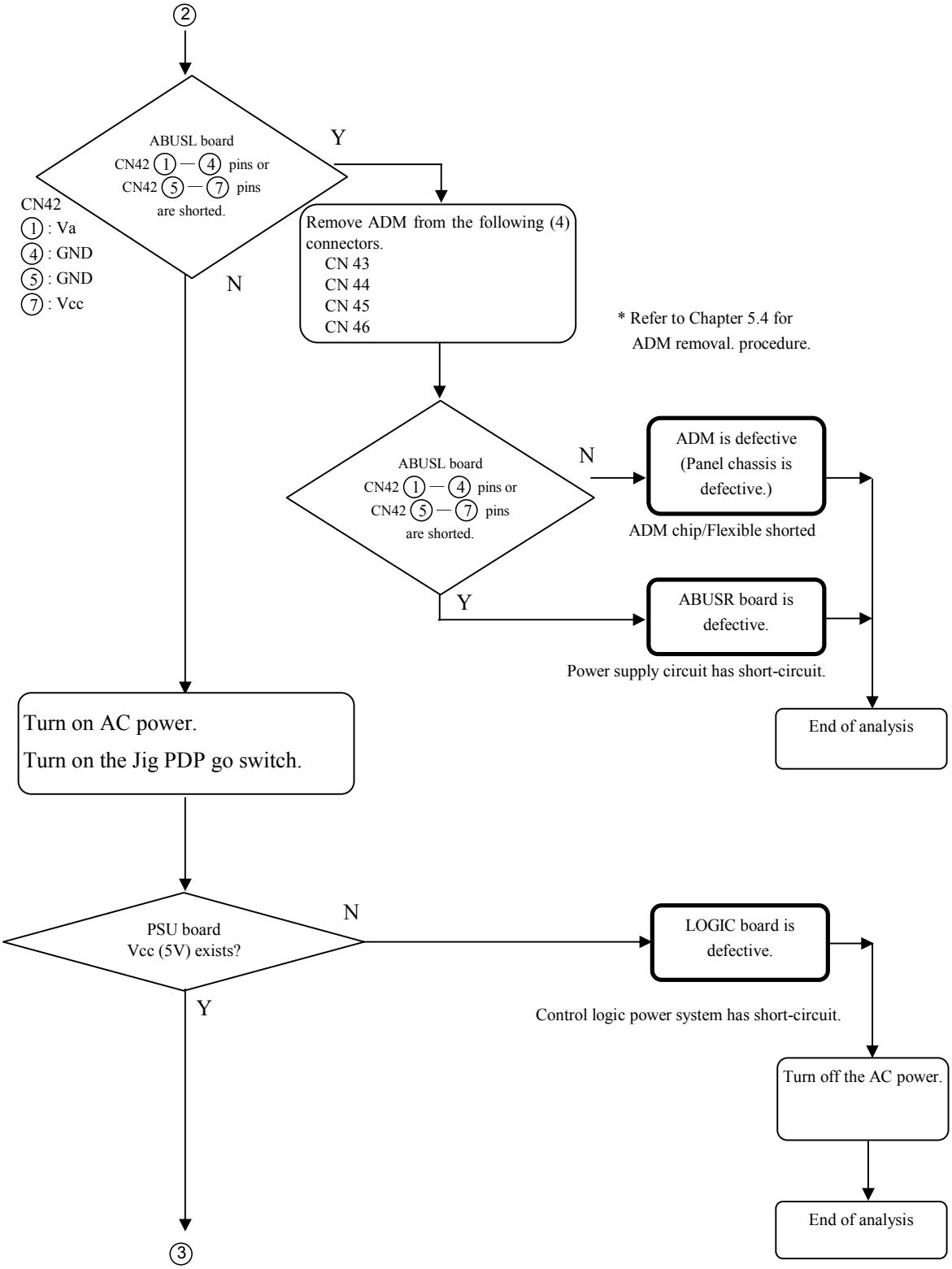
NO	Fault contents	Fault status		Suspected fault location	Analysis procedure and measure
20	Abnormal sound			PSU X-SUS Y-SUS (Core is broken, or transformer is abnormal.)	Locate cause of abnormality from listening and viewing. Replace the cause of problem.
21	Control on external communication is abnormal	Contrast, color temperature adjustment and ϒ cannot be changed.		LOGIC	Replace LOGIC board

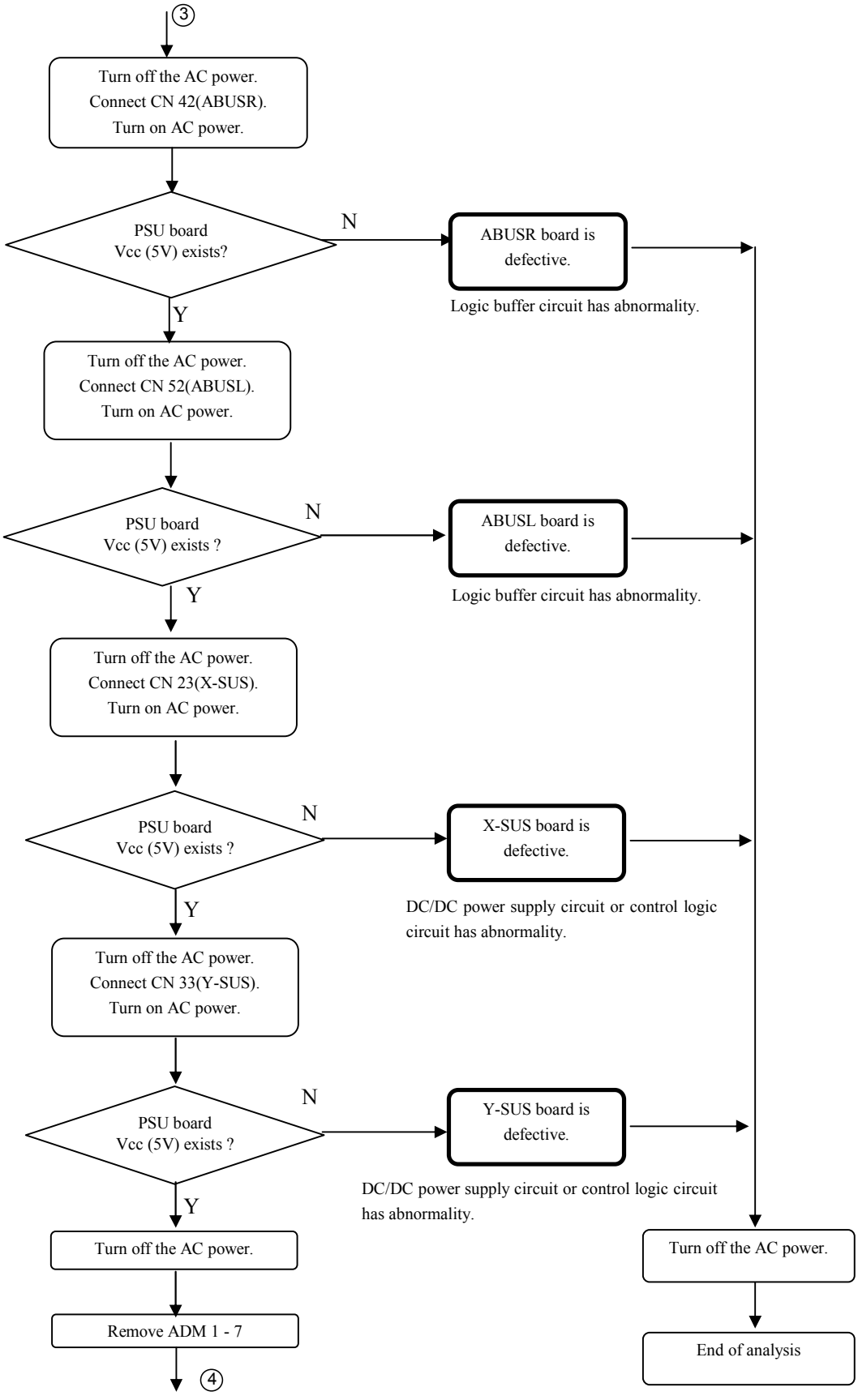
4.6 Problem Analysis Procedure

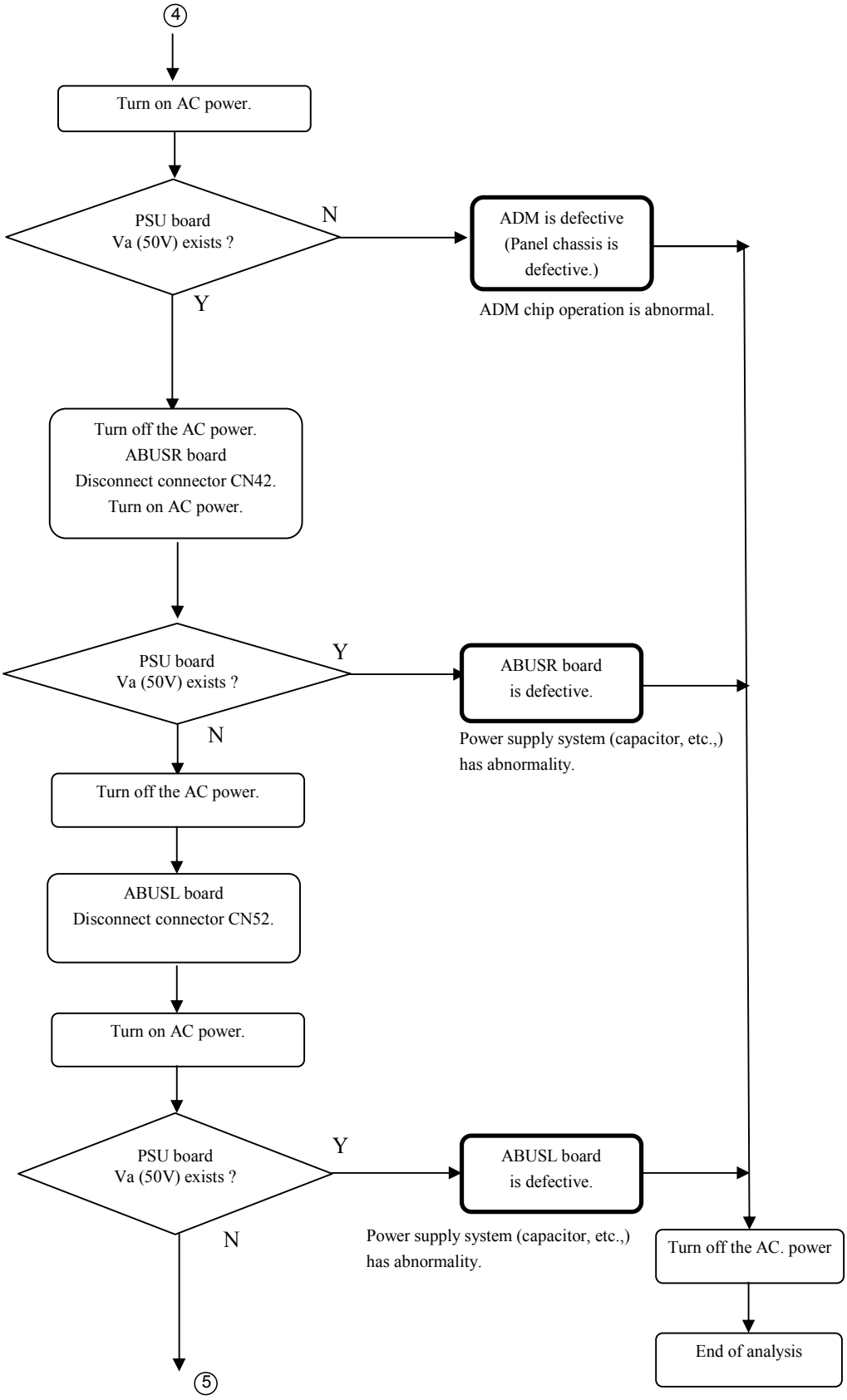
4.6.1 "The entire screen does not light (Main power is turned off)" problem analysis procedure

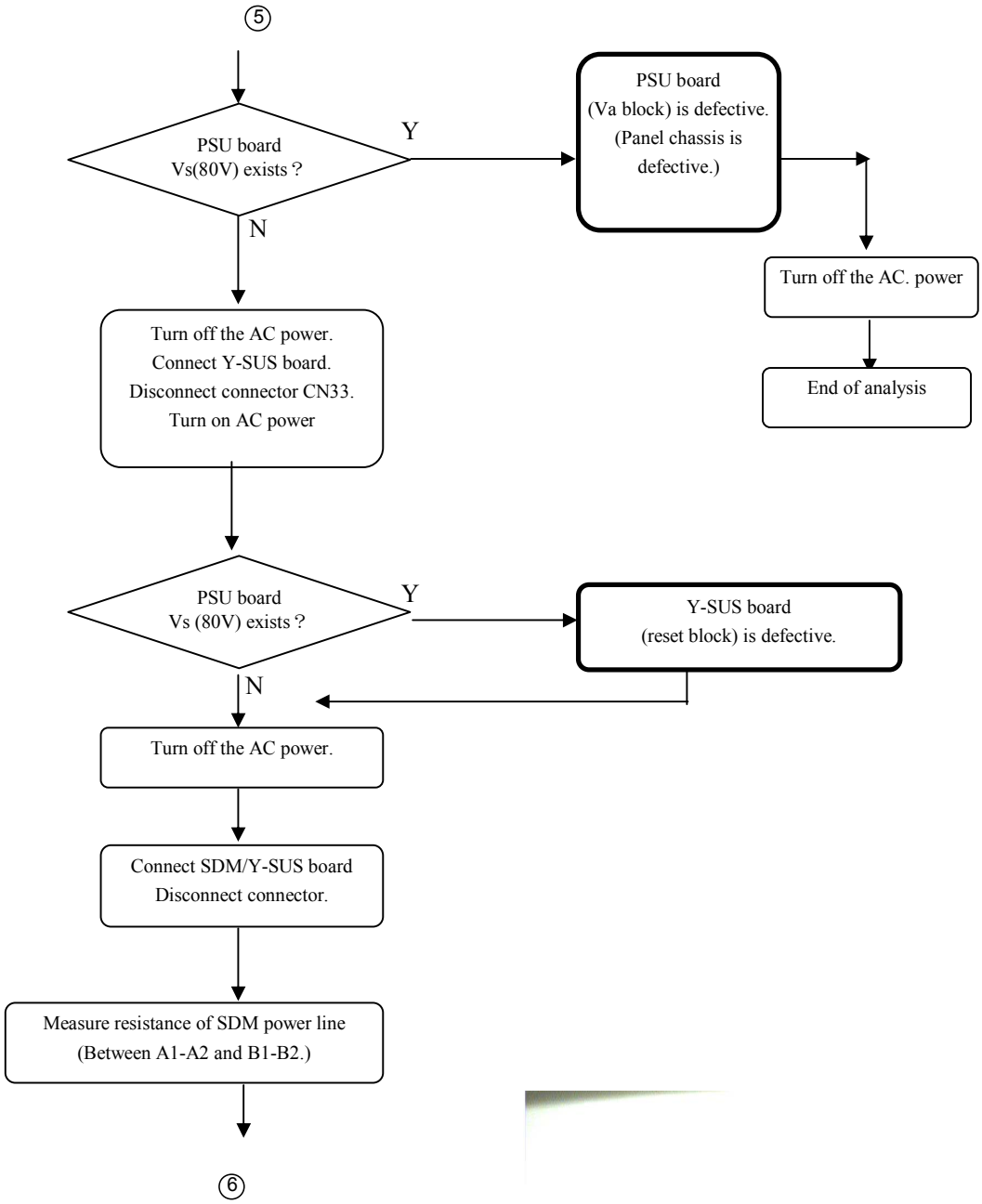


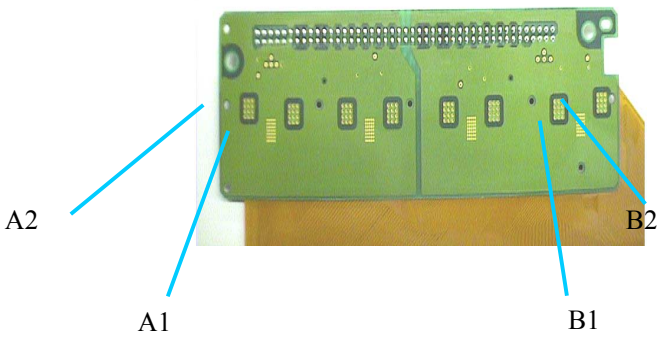

①
X-SUS board
CN23 ③ — ④ pins or
CN23 ⑥ — ⑧ pins
are shorted.
Y
X-SUS board is defective.
Switching circuit (power supply) has a short-circuit.
CN23
③ : Vcc
④ : GND
⑥ : GND
⑧ : Vs
N
Y-SUS board
CN33 ① — ② pins or
CN33 ⑤ — ⑦ pins are shorted.
Y
CN33
① : Vcc
② : GND
⑤ : GND
⑦ : Vs
N
Remove SDM from the following (2) connectors. *
CN 34 and CN 35
* Refer to Chapter 5.3 for SDM removal. procedure.
Y-SUS board
CN33 ① — ② pins or
CN33 ⑤ — ⑦ pins
are shorted.
N
SDM is defective (Panel chassis is defective.)
SDM chip/Flexible shorted
Y
Y-SUS board is defective.
Switching circuit (power supply) has short-circuit.
ABUSL board
CN52 ① — ④ pins or
CN52 ⑤ — ⑦ pins
are shorted.
Y
CN52
① : Va
④ : GND
⑤ : GND
⑦ : Vcc
Remove ADM from the following (2) connectors. *
CN 53 CN 54
CN 55 CN 56
* Refer to Chapter 5.4 for ADM removal. procedure.
ABUSL board
CN52 ① — ④ pins or
CN52 ⑤ — ⑦ pins
are shorted.
N
ADM is defective (Panel chassis is defective.)
ADM chip/Flexible shorted
Y
ABUSL board is defective.
Power supply circuit has a short-circuit.
②
End of analysis

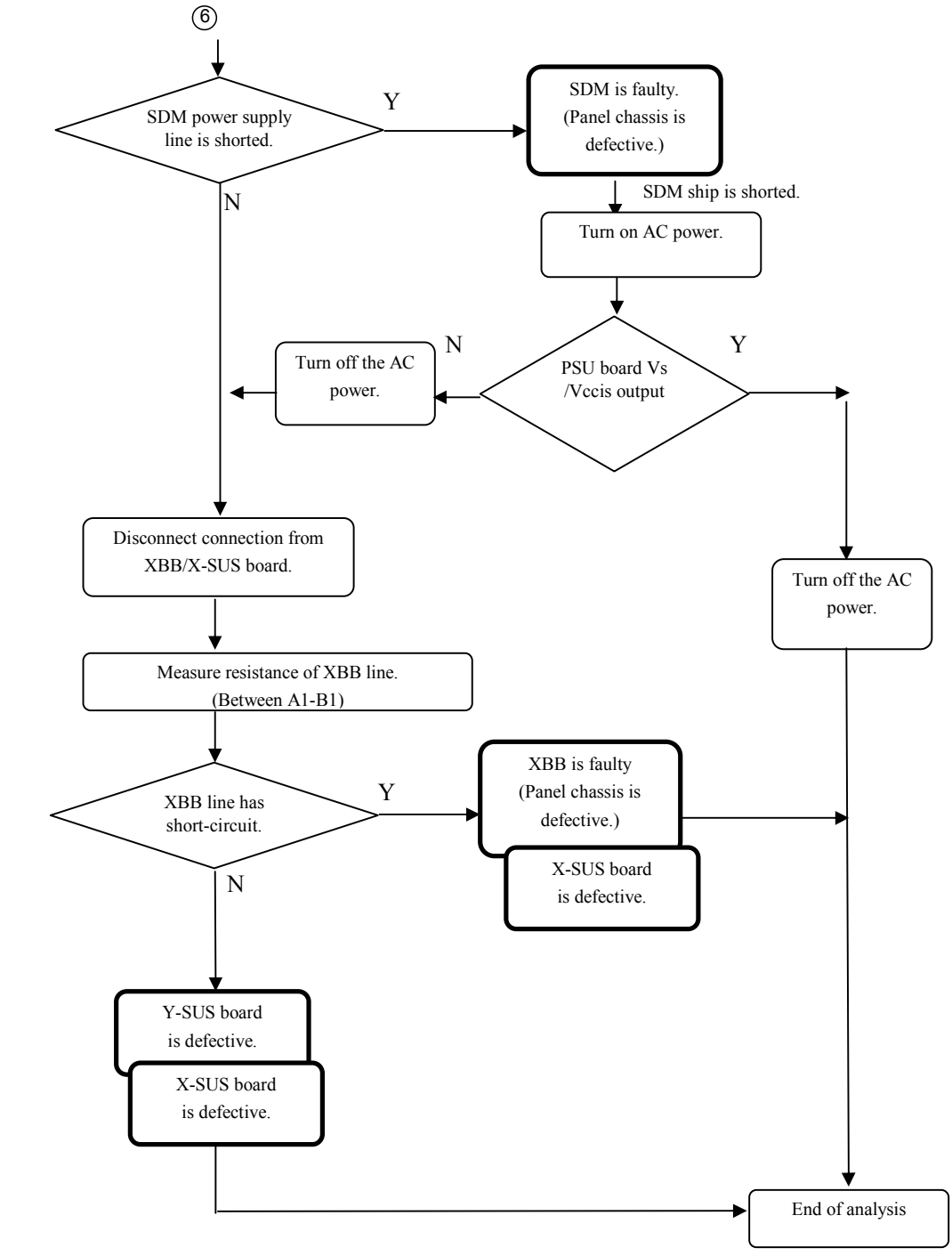

②
ABUSL board
CN42 ① — ④ pins or
CN42 ⑤ — ⑦ pins
are shorted.
Y
N
CN42
① : Va
④ : GND
⑤ : GND
⑦ : Vcc
Remove ADM from the following (4) connectors.
CN 43
CN 44
CN 45
CN 46
* Refer to Chapter 5.4 for ADM removal. procedure.
ABUSL board
CN42 ① — ④ pins or
CN42 ⑤ — ⑦ pins
are shorted.
N
ADM is defective (Panel chassis is defective.)
ADM chip/Flexible shorted
Y
ABUSR board is defective.
Power supply circuit has short-circuit.
End of analysis
Turn on AC power.
Turn on the Jig PDP go switch.
PSU board
Vcc (5V) exists?
N
LOGIC board is defective.
Control logic power system has short-circuit.
Y
Turn off the AC power.
End of analysis
③

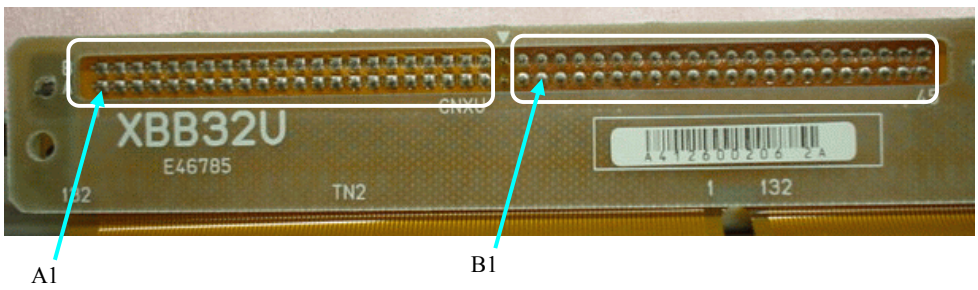

③
Turn off the AC power.
Connect CN 42(ABUSR).
Turn on AC power.
PSU board
Vcc (5V) exists?
N
ABUSR board is
defective.
Logic buffer circuit has abnormality.
Y
Turn off the AC power.
Connect CN 52(ABUSL).
Turn on AC power.
PSU board
Vcc (5V) exists ?
N
ABUSL board is
defective.
Logic buffer circuit has abnormality.
Y
Turn off the AC power.
Connect CN 23(X-SUS).
Turn on AC power.
PSU board
Vcc (5V) exists ?
N
X-SUS board is
defective.
DC/DC power supply circuit or control logic
circuit has abnormality.
Y
Turn off the AC power.
Connect CN 33(Y-SUS).
Turn on AC power.
PSU board
Vcc (5V) exists ?
N
Y-SUS board is
defective.
DC/DC power supply circuit or control logic circuit
has abnormality.
Y
Turn off the AC power.
Remove ADM 1 - 7
④
Turn off the AC power.
End of analysis


④
Turn on AC power.
PSU board
Va (50V) exists ?
N
ADM is defective
(Panel chassis is
defective.)
ADM chip operation is abnormal.
Y
Turn off the AC power.
ABUSR board
Disconnect connector CN42.
Turn on AC power.
PSU board
Va (50V) exists ?
Y
ABUSR board
is defective.
Power supply system (capacitor, etc.,)
has abnormality.
N
Turn off the AC power.
ABUSL board
Disconnect connector CN52.
Turn on AC power.
PSU board
Va (50V) exists ?
Y
ABUSL board
is defective.
Power supply system (capacitor, etc.,)
has abnormality.
N
Turn off the AC. power
End of analysis
⑤

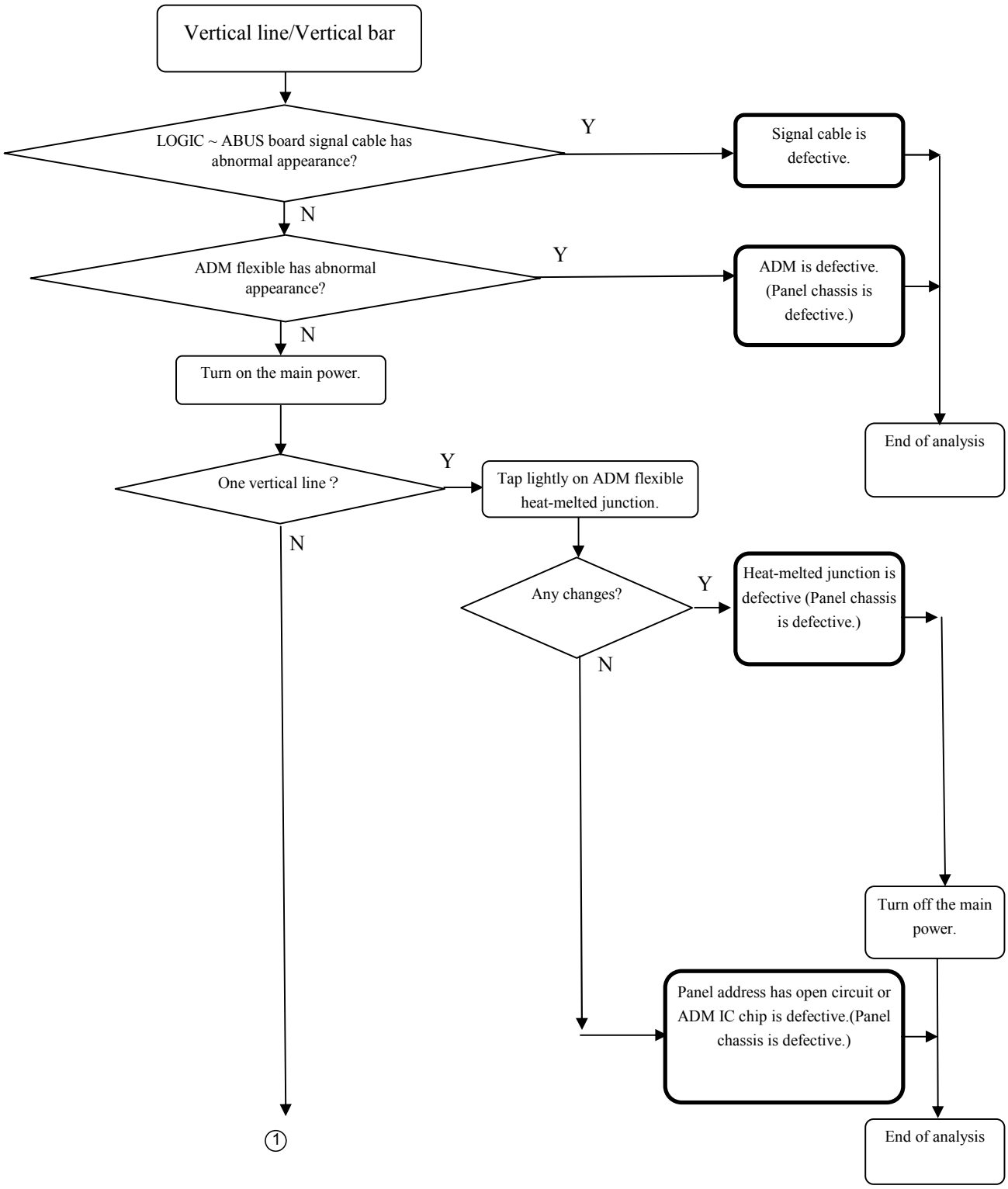

⑤
PSU board
Vs(80V) exists ?
Y
N
PSU board
(Va block) is defective.
(Panel chassis is
defective.)
Turn off the AC. power
End of analysis
Turn off the AC power.
Connect Y-SUS board.
Disconnect connector CN33.
Turn on AC power
PSU board
Vs (80V) exists ?
Y
N
Y-SUS board
(reset block) is defective.
Turn off the AC power.
Connect SDM/Y-SUS board
Disconnect connector.
Measure resistance of SDM power line
(Between A1-A2 and B1-B2.)
⑥

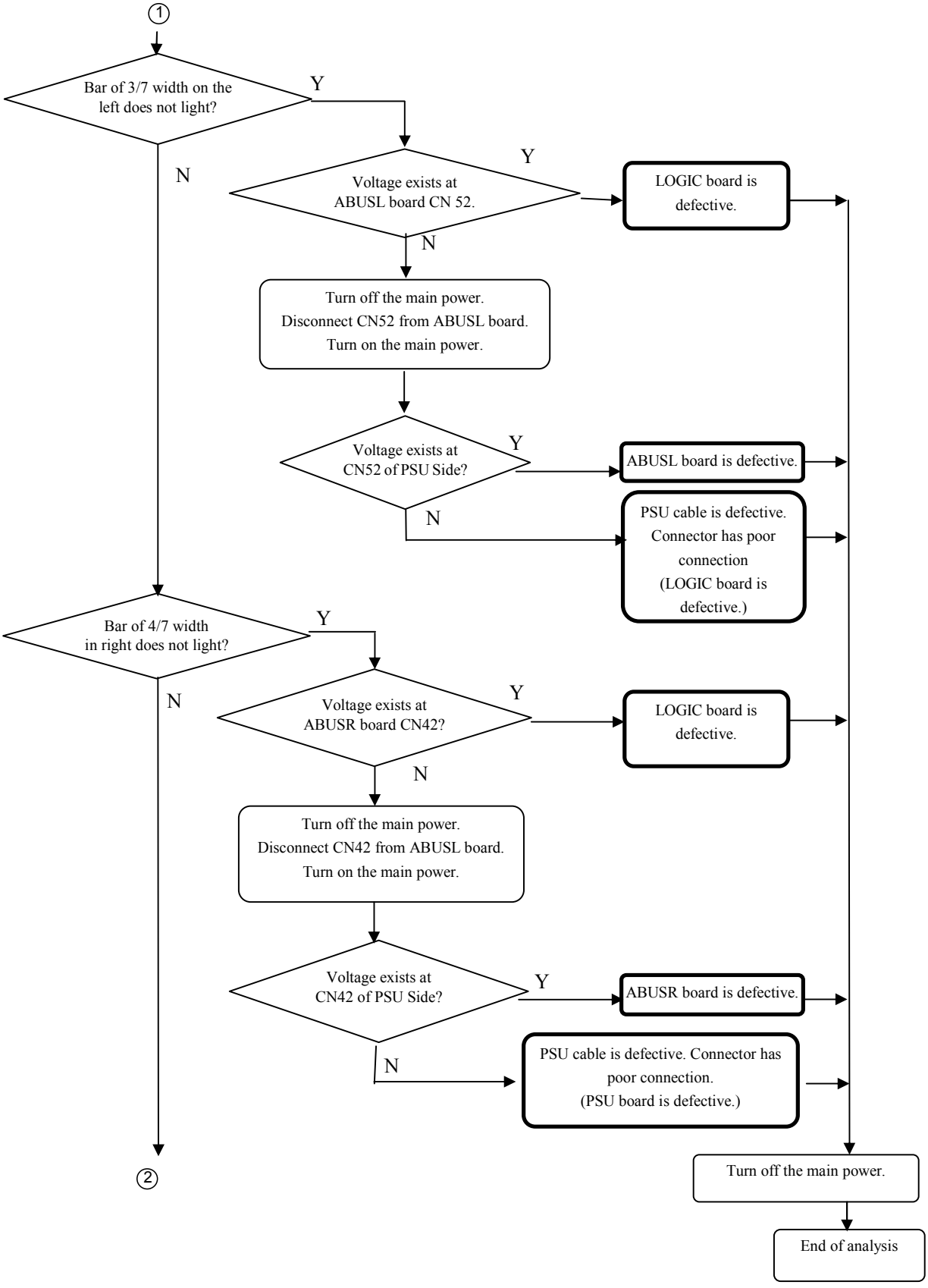

A2
B2
A1
B1

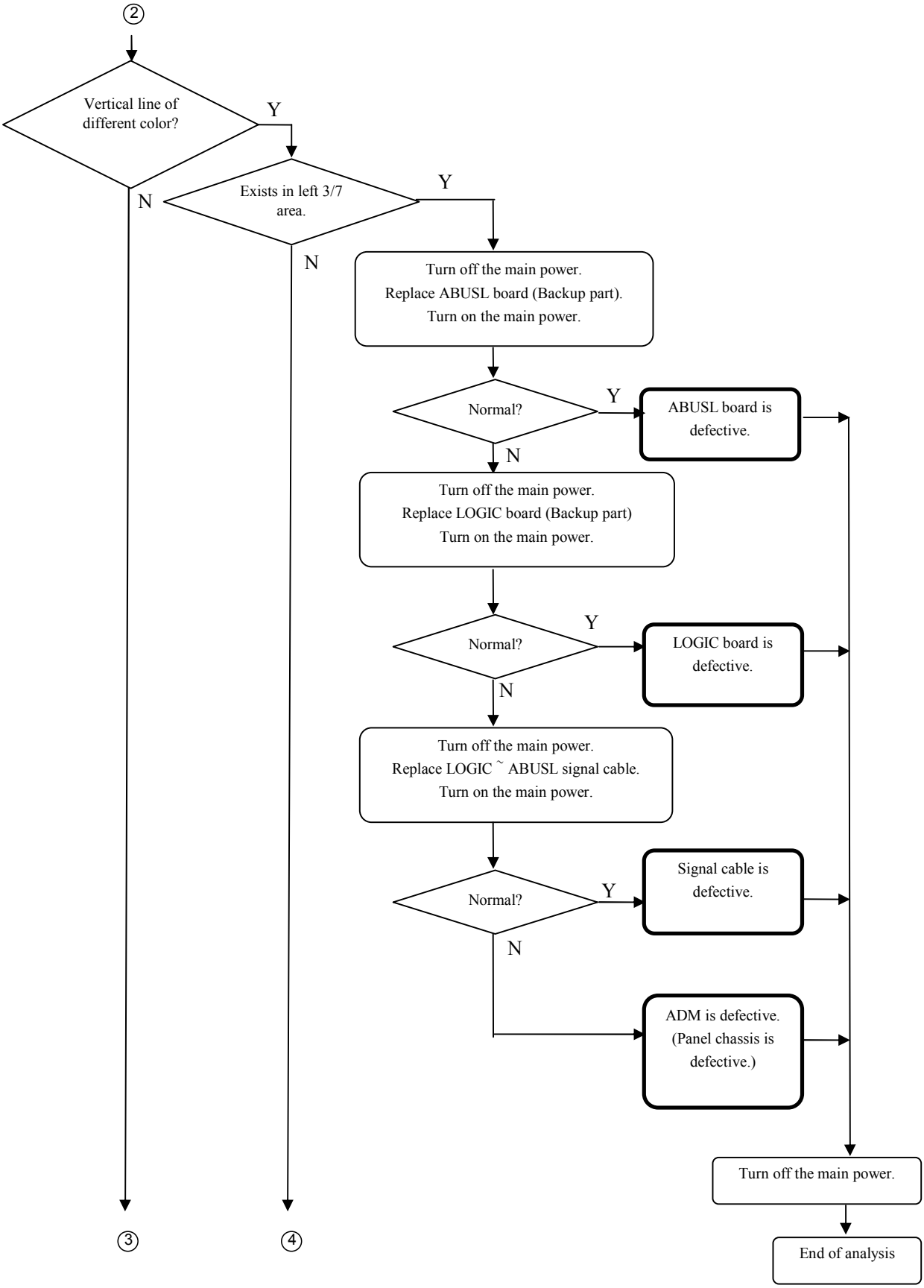

⑥
SDM power supply line is shorted.
Y
SDM is faulty. (Panel chassis is defective.)
SDM ship is shorted.
N
Turn on AC power.
PSU board Vs /Vccis output
N
Y
Turn off the AC power.
Disconnect connection from XBB/X-SUS board.
Turn off the AC power.
Measure resistance of XBB line. (Between A1-B1)
XBB line has short-circuit.
Y
XBB is faulty (Panel chassis is defective.)
X-SUS board is defective.
N
Y-SUS board is defective.
X-SUS board is defective.
End of analysis

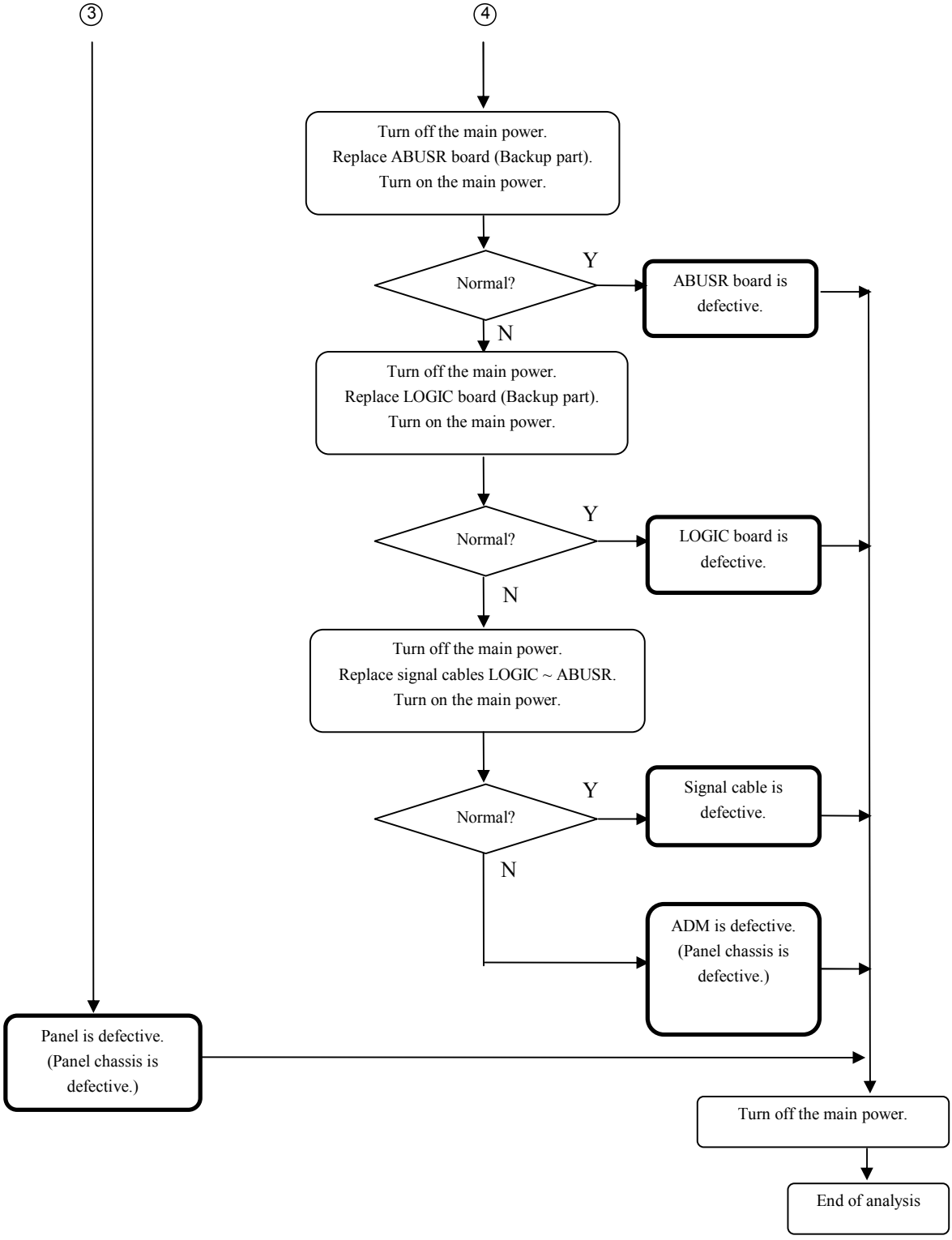

XBB32U
E46785
TN2
1
132
A1
B1

4. 6. 2 "Vertical line/Vertical bar" problem analysis procedure

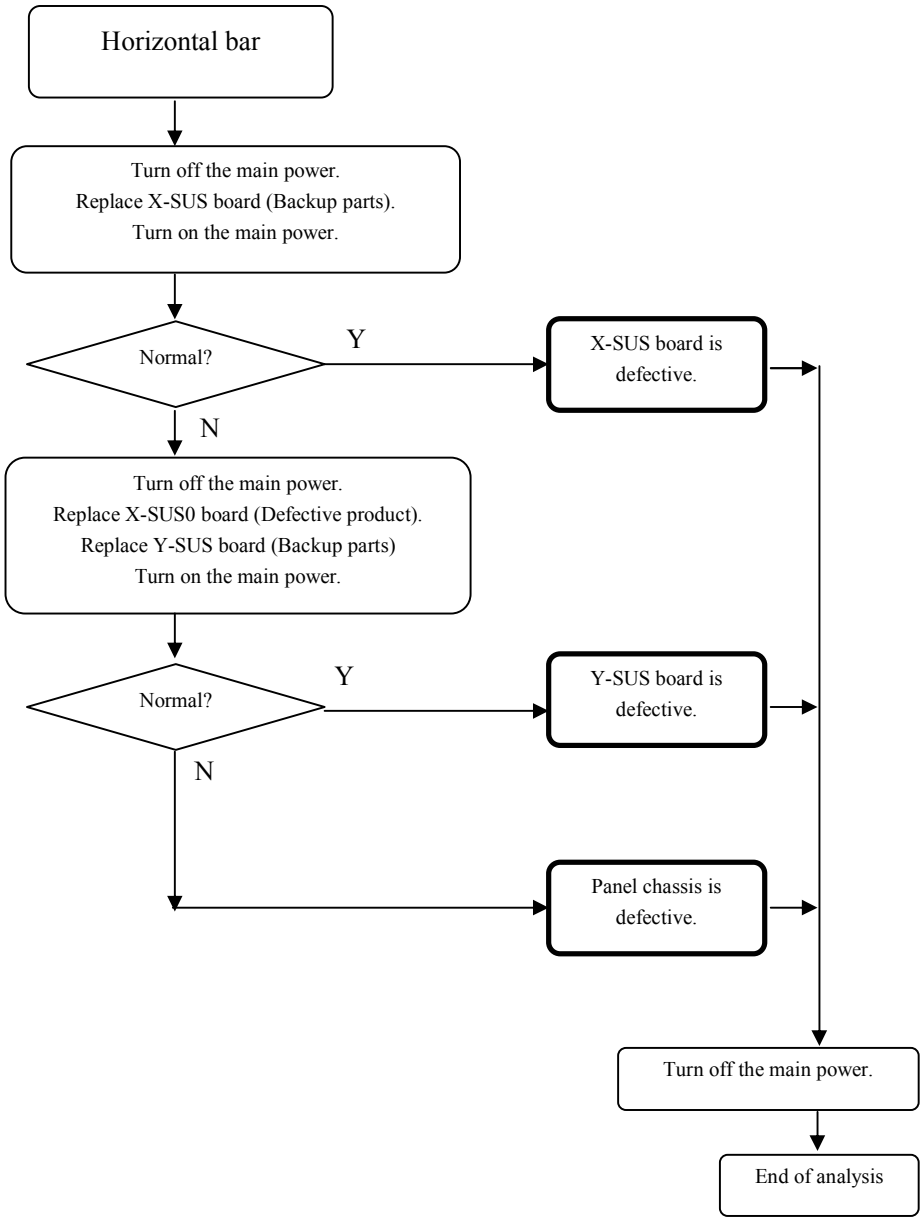



①
Bar of 3/7 width on the left does not light?
Y
N
Voltage exists at ABUSL board CN 52.
Y
LOGIC board is defective.
N
Turn off the main power.
Disconnect CN52 from ABUSL board.
Turn on the main power.
Voltage exists at CN52 of PSU Side?
Y
ABUSL board is defective.
N
PSU cable is defective.
Connector has poor connection
(LOGIC board is defective.)
Bar of 4/7 width in right does not light?
Y
N
Voltage exists at ABUSR board CN42?
Y
LOGIC board is defective.
N
Turn off the main power.
Disconnect CN42 from ABUSL board.
Turn on the main power.
Voltage exists at CN42 of PSU Side?
Y
ABUSR board is defective.
N
PSU cable is defective. Connector has poor connection.
(PSU board is defective.)
②
Turn off the main power.
End of analysis


②
Vertical line of different color?
Y
N
Exists in left 3/7 area.
Y
N
Turn off the main power.
Replace ABUSL board (Backup part).
Turn on the main power.
Normal?
Y
ABUSL board is defective.
N
Turn off the main power.
Replace LOGIC board (Backup part)
Turn on the main power.
Normal?
Y
LOGIC board is defective.
N
Turn off the main power.
Replace LOGIC ~ ABUSL signal cable.
Turn on the main power.
Normal?
Y
Signal cable is defective.
N
ADM is defective.
(Panel chassis is defective.)
Turn off the main power.
End of analysis
③
④


③
④
Turn off the main power.
Replace ABUSR board (Backup part).
Turn on the main power.
Normal?
Y
ABUSR board is defective.
N
Turn off the main power.
Replace LOGIC board (Backup part).
Turn on the main power.
Normal?
Y
LOGIC board is defective.
N
Turn off the main power.
Replace signal cables LOGIC ~ ABUSR.
Turn on the main power.
Normal?
Y
Signal cable is defective.
N
ADM is defective.
(Panel chassis is defective.)
Panel is defective.
(Panel chassis is defective.)
Turn off the main power.
End of analysis

4.6.3 "Horizontal bar" Problem analysis procedure



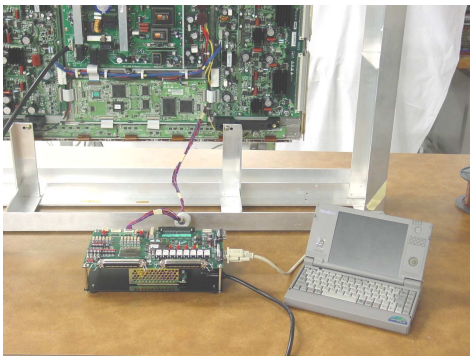
4.7 Problem Analysis Using a Personal Computer

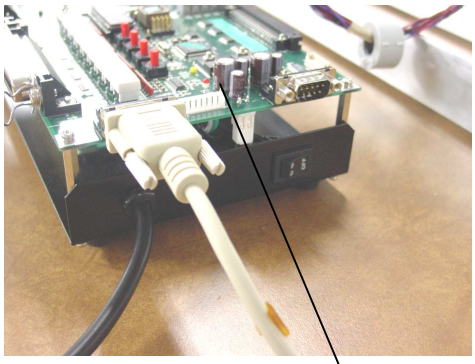
4.7.1 Connecting a computer

(1) Set the module in accordance with Chapter 4.4.

(2) Connect the RS-232C terminal of the computer to the RS-232C terminal of the interface board.

(3) Turn on the main power to the interface board. (Red LED goes on.)





4.7.2 Preparing a computer

(1) Turn on the main power to the computer.

(2) Set the PDPgo switch on the interface board to ON and turn on the main power to the module.

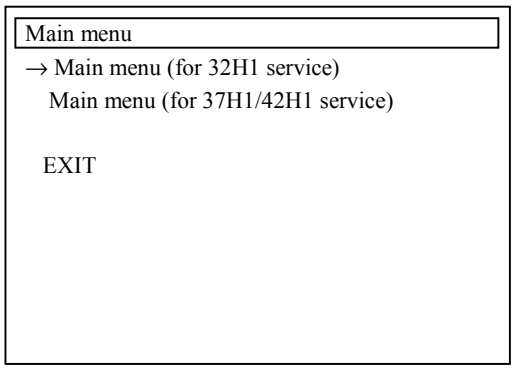
(3) For computer running DOS/V:

C : \ > FHPH1<ENTER>

For computer running WINDOWS:

Start menu → Run → **FHPH1<ENTER>**

(4) The following menu screen appears.



(4) 32H1 main menu is selected with the ↑ key or ↓ key and press <ENTER> key to start the following menu screen appears.

```
Main menu (For 32H1 service)
 →Module information menu          (32H1)
   POWER ON menu                   (32H1)
   Problem analysis menu           (32H1)
   Voltage adjustment menu         (32H1)
   Power-on time menu              (32H1)
   Logic board change menu         (32H1)
   Shipment from service setting/execute

   RETURN
   EXIT
```

*1: Use COM1: the computer's communication port.

*2: Set the communication setup as follows.

Speed: 9600 bps
Data: 7 bits
Parity: 1 none
Stop bit: 1 bit

*3: If the program starts up while the module standby power is not yet turned on, the menu screen will not be displayed.

4.7.3 Problem Analysis Procedure

(1) Select the problem analysis menu from the main menu using the ↑ key or ↓ key and press <ENTER> key to start the program.

```
Main menu (For 32H1 service)
   Module information menu         (32H1)
   POWER ON menu                   (32H1)
 →Problem analysis menu            (32H1)
   Voltage adjustment menu         (32H1)
   Power-on time menu              (32H1)
   Logic board change menu         (32H1)
   Shipment from service setting/execute

   RETURN
   EXIT
```

(2) Check the error code (hexadecimal number) from the Latest error code read-out menu and locate the faulty position from the following table.

Trouble analysis menu

→Condition code	* * [Hex]
Latest error code	* * [Hex]
Previous error code	* * [Hex]
2nd previous error code	* * [Hex]
3rd previous error code	* * [Hex]
4th previous error code	* * [Hex]
5th previous error code	* * [Hex]
6th previous error code	* * [Hex]
7th previous error code	* * [Hex]
8th previous error code	* * [Hex]
9th previous error code	* * [Hex]
10th previous error code	* * [Hex]
11th previous error code	* * [Hex]
12th previous error code	* * [Hex]
13th previous error code	* * [Hex]
14th previous error code	* * [Hex]
15th previous error code	* * [Hex]
Error code clear · Execute	
RETURN	
EXIT	

(3) Select RETURN using the ↑ key or ↓ key and press <ENTER> key to start the program, then the screen returns to the menu screen.

* When EXIT is selected, the screen returns to the WINDOWS or DOS screen.

Error code table

ERR code	Detect position (board)	Contents	Suspected faulty board (In the order of higher probability of defect)							Remarks
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	
00	LOGIC	STANDBY power is stopped	PSU							PSU temperature has probably increased
04	LOGIC	3.3V power voltage has dropped	LOGIC	PSU						
06		3.3V power startup is faulty	X-SUS	Y-SUS	ADM1 - 8	PSU	ABUS-L	ABUS-R	LOGIC	
18		Internal I2C_SCL1_LOW level	LOGIC							
19		Internal I2C_ACK does not respond	LOGIC							
1C		EEPROM initial setting is defective	LOGIC							
1D		EEPROM write-down is defective	LOGIC							
1E		EEPROM user initial setting is defective	LOGIC							
1F		EEPROM factory setting reading is defective	LOGIC							
24	X-SUS	Vex power voltage has decreased	X-SUS	LOGIC						
25		Vex power voltage is excessive	X-SUS							
26		Vex power startup is faulty.	X-SUS	LOGIC						
28		Vx power voltage has dropped	X-SUS	LOGIC						
29		Vx power voltage is excessive	X-SUS							
2A		Vx power startup is faulty.	X-SUS	LOGIC						
2C		Vpx voltage has dropped	X-SUS	LOGIC						
2D		Vpx voltage is excessive	X-SUS	LOGIC						
30		Vpx1 voltage has dropped	X-SUS	LOGIC						
31		Vpx1 voltage is excessive	X-SUS	LOGIC						
34		Vpx2 voltage has dropped	X-SUS	LOGIC						
35		Vpx2 voltage is excessive	X-SUS	LOGIC						
39		Vs power current is excessive (during operation)	X-SUS	Panel	LOGIC					
3B		Vs power current is excessive (during startup)	X-SUS	Panel	LOGIC					
44	Y-SUS	Vey power voltage has dropped	Y-SUS	LOGIC						
45		Vey power voltage is excessive	Y-SUS							
46		Vey power startup is faulty.	Y-SUS	LOGIC						
4C		Vpy voltage has dropped	Y-SUS	LOGIC						
4D		Vpy voltage is excessive	Y-SUS	LOGIC						
50		Vpy1 voltage has dropped	Y-SUS	LOGIC						
51		Vpy1 voltage is excessive	Y-SUS	LOGIC						
54		Vpy2 voltage has dropped	Y-SUS	LOGIC						
55		Vpy2 voltage is excessive	Y-SUS	LOGIC						
59		Vs power current is excessive (during operation)	Y-SUS	Panel	LOGIC					
5B		Vs power current is excessive (during startup)	Y-SUS	Panel	LOGIC					
5D		Vs power current is excessive (during operation)	Y-SUS	SDM	Panel	LOGIC				
61	PSU	Vs power voltage is excessive	PSU	LOGIC						
62		Vs power startup is faulty.	X-SUS	Y-SUS	PSU	LOGIC				
64	X-SUS Y-SUS	Vex and Vpy power voltage has dropped	LOGIC	X-SUS	Y-SUS					
65		Vex and Vey power voltage is excessive	X-SUS	Y-SUS						
66		Vex and Vey power startup is faulty.	LOGIC	X-SUS	Y-SUS					
68	X-SUS	Vw power voltage has dropped	Y-SUS	X-SUS	LOGIC					
69		Vw power voltage is excessive	X-SUS							
6A		Vw power startup is faulty.	Y-SUS	X-SUS	LOGIC					
6C	X-SUS Y-SUS	Vpx and Vpy voltage has dropped	LOGIC	X-SUS	Y-SUS					
6D		Vpx and Vpy voltage is excessive	LOGIC	X-SUS	Y-SUS					

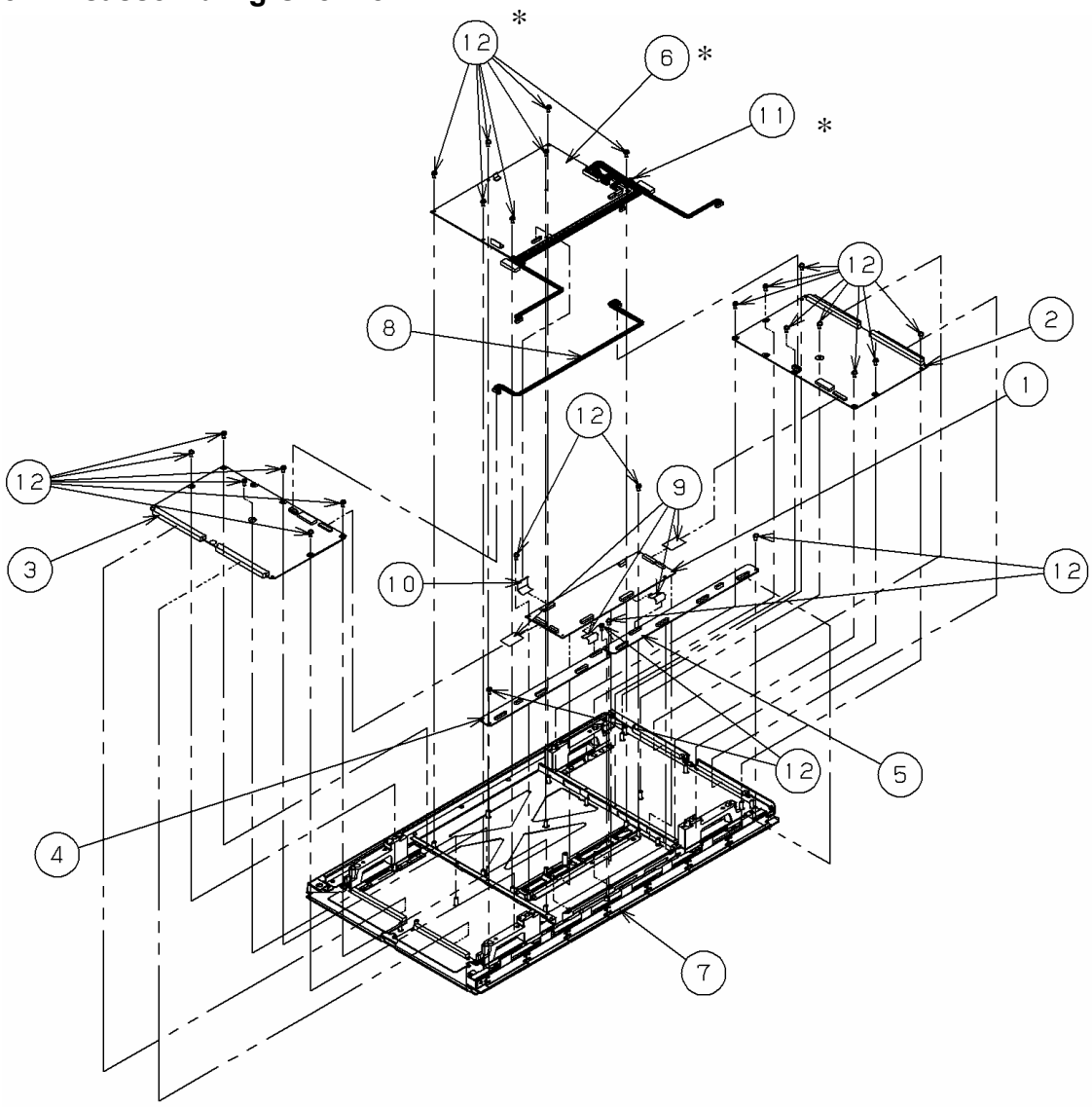
ERR code	Detect position (board)	Contents	Suspected faulty board (In the order of higher probability of defect)							Remarks
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	
81	PSU	Va power voltage is excessive	PSU	LOGIC						
82		Va power startup is faulty.	ADM1 - 8	PSU	LOGIC	ABUS-L	ABUS-R			
99		Va power current is excessive (during operation)	ADM1 - 8	ABUS-L	ABUS-R	PSU	LOGIC			
9B		Va power current is excessive (during startup)	ADM1 - 8	ABUS-L	ABUS-R	PSU	LOGIC			
9D		Va power current is excessive (during operation)	ADM1 - 8	ABUS-L	ABUS-R	PSU	LOGIC			Excess current is detected in ACCC operation.
A5	ADM1	ADM1 has abnormal heat generation.	ADM1	PSU	LOGIC					It can possibly occur depending on screen display.
A9	ADM2	ADM2 has abnormal heat generation.	ADM2	PSU	LOGIC					
AD	ADM3	ADM3 has abnormal heat generation.	ADM3	PSU	LOGIC					
B1	ADM4	ADM4 has abnormal heat generation.	ADM4	PSU	LOGIC					
B5	ADM5	ADM5 has abnormal heat generation.	ADM5	PSU	LOGIC					
B9	ADM6	ADM6 has abnormal heat generation.	ADM6	PSU	LOGIC					
BD	ADM7	ADM7 has abnormal heat generation.	ADM7	PSU	LOGIC					
C5	ADM8	ADM8 has abnormal heat generation.	ADM8	PSU	LOGIC					
E2	LOGIC	5V power startup is faulty.	X-SUS	Y-SUS	PANEL	PSU	ABUS-L	ABUS-R	LOGIC	
E2	PSU	Detection error of Vs and Va voltage.	PSU	LOGIC						

5. Disassembling and Reassembling

Unless otherwise specified, use the torque screwdriver for screw tightening, following the tightening torques below.

Screw size	Tightening torque
M 3	0.69 ± 0.049Nm (7 ± 0.5kg·cm)
M 4	1.18 ± 0.098Nm (12 ± 1.0kg·cm)

5.1 Disassembling Overview



The encircled numbers indicate the item numbers of the constituent parts described in item 7.

*: Applied to UA-1x only

5.2 X-SUS Circuit Board Removal/Installation Procedure

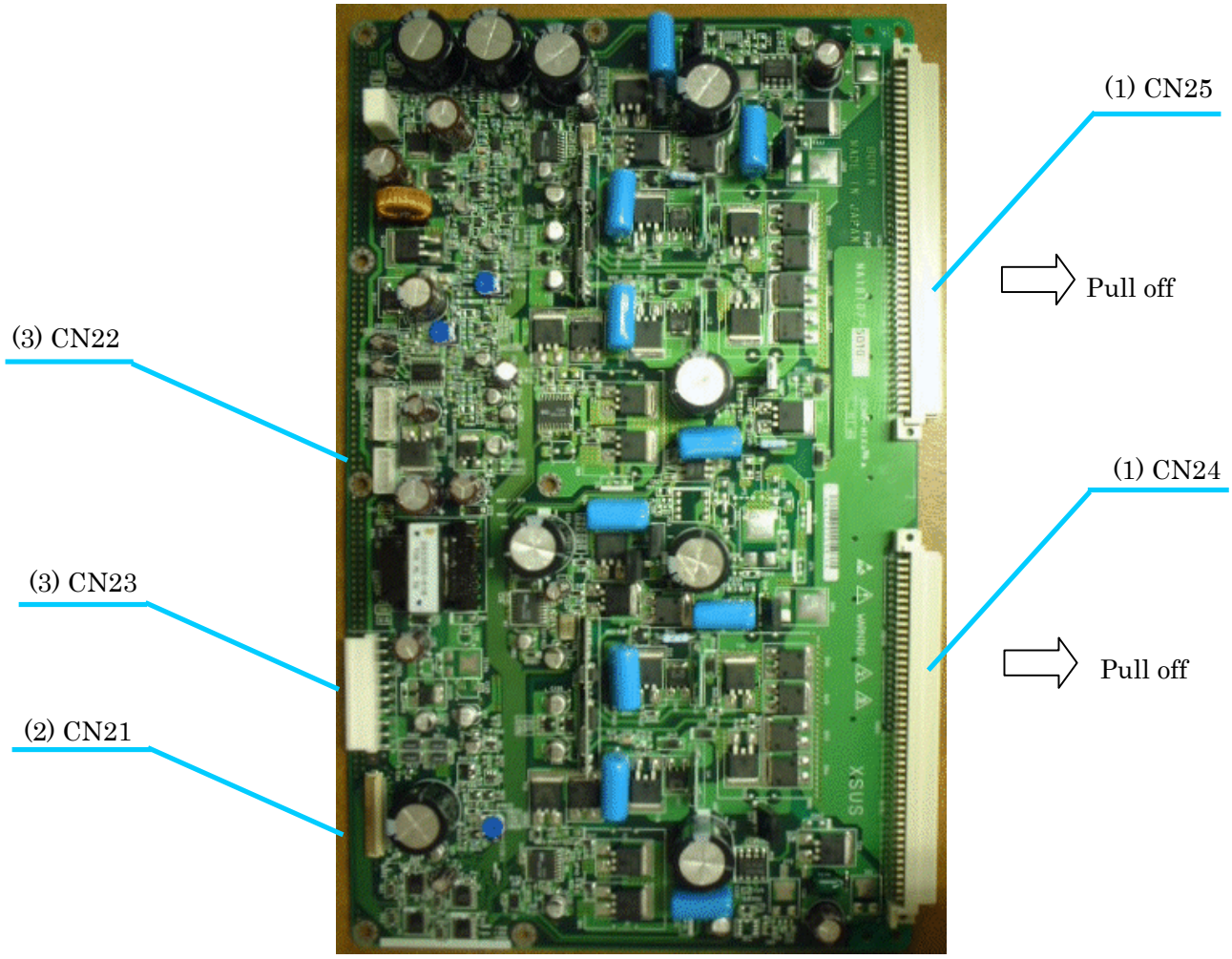
Note

When removing the circuit board after the main power is turned on/off, wait for at least one minute before starting to remove the circuit board.

If the circuit board removal is started immediately after turning off the main power, it can result in electric shock or damage to the circuit due to residual electric charge.

Remove the circuit board following the steps below. To install the circuit board, reverse the removal procedure.

(1) Pull off the BUS-XU/XD horizontally. Disconnect the connectors (CN24, CN25).
(2) Release the lock of the FPC connector (CN21) and disconnect the signal cable.
(3) Disconnect the cables from the VH connectors (CN22, CN23).

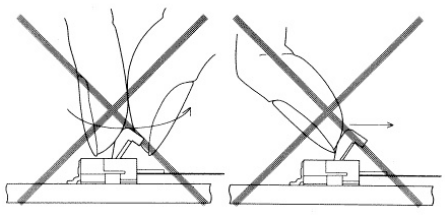


Note

* On handling the FPC connector

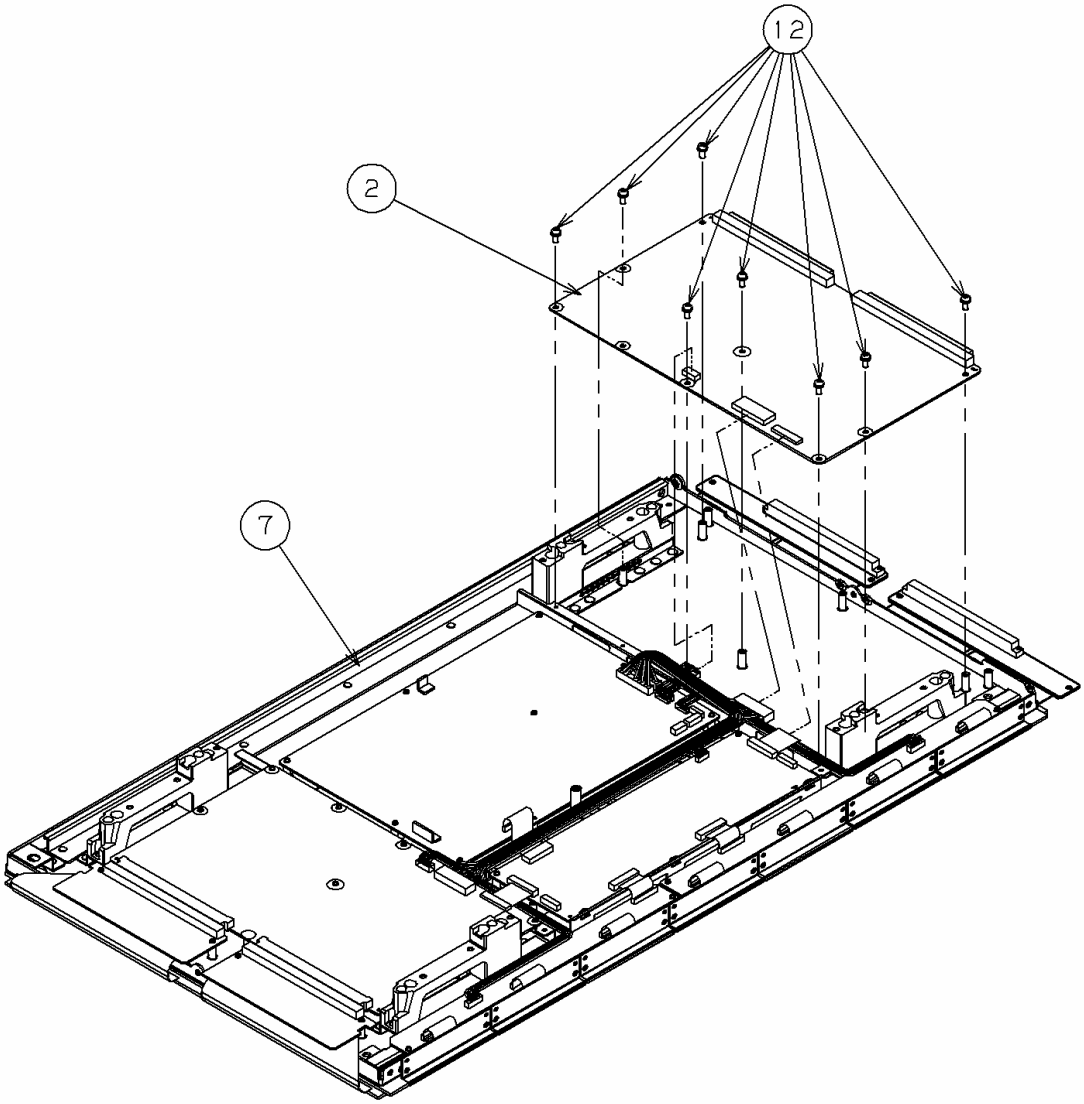
To release the lock, release it by gently flipping it with the nail of the thumb or forefinger.

Never pinch the lock lever with fingers or hook on it (especially with a fingernail). Doing so might damage the lock lever.



(4) Remove the fixing screws (M3 × 6) at the 8 locations.

(5) Remove the X-SUS board.

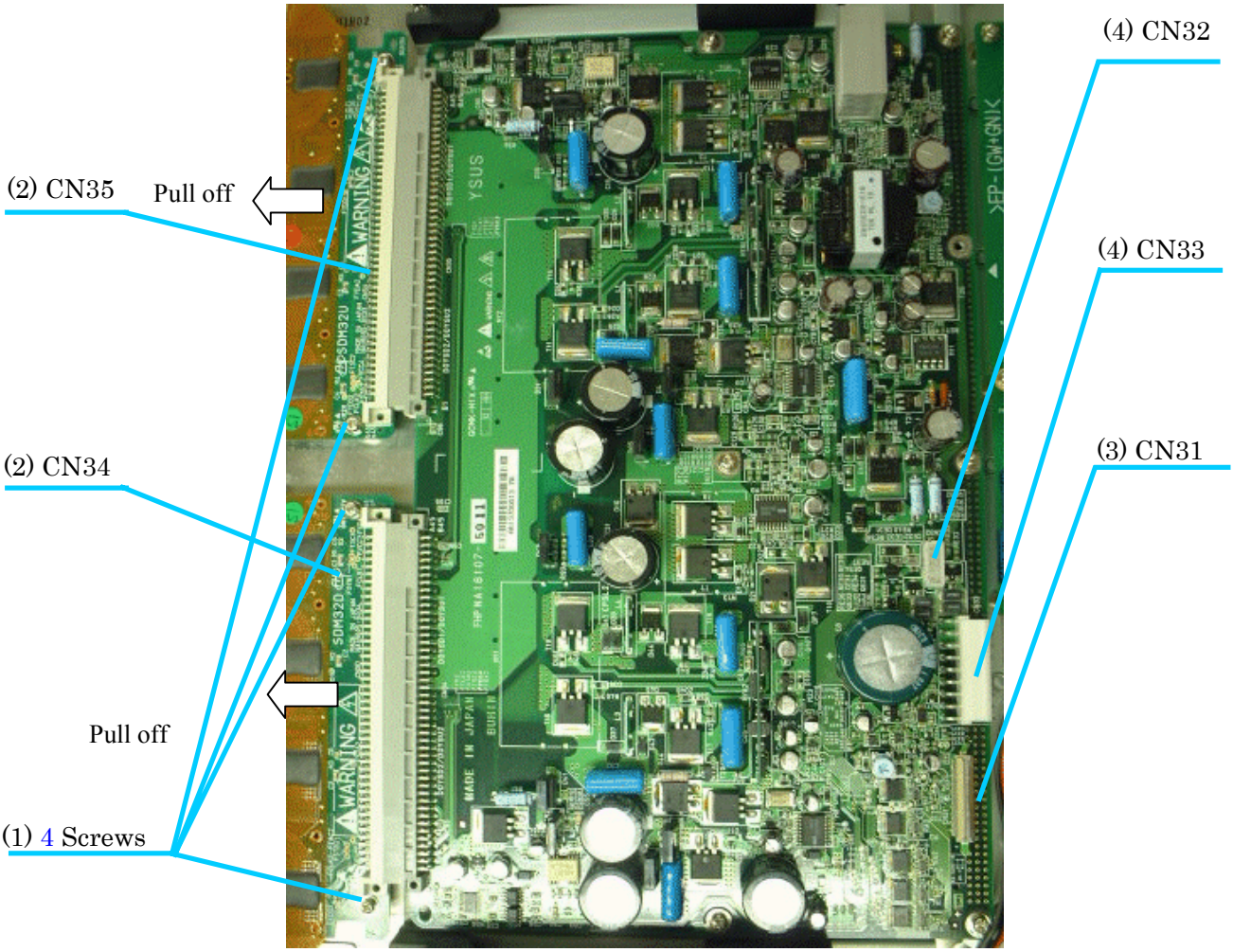


5.3 Y-SUS Circuit Board Removal/Installation Procedure

Note

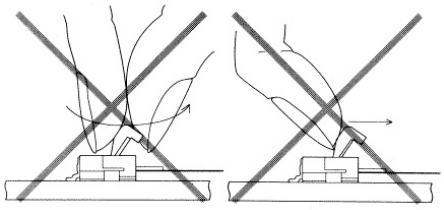
When removing the circuit board after the main power is turned on/off, wait for at least one minute before starting to remove the circuit board.
If the circuit board removal is started immediately after turning off the main power, it can result in electric shock or damage to the circuit due to residual electric charge.
Remove the circuit board by following the steps below. To install the circuit board, reverse the removal procedure.

(1) Remove the screws (M3X6) fixing SDM (4 locations).
(2) Pull out the SMD horizontally and disconnect the connectors (CN34, CN35).
(3) Release the lock of the FPC connector (CN31) and disconnect the signal cable.
(4) Disconnect the cables from the VH connectors (CN32, CN33).



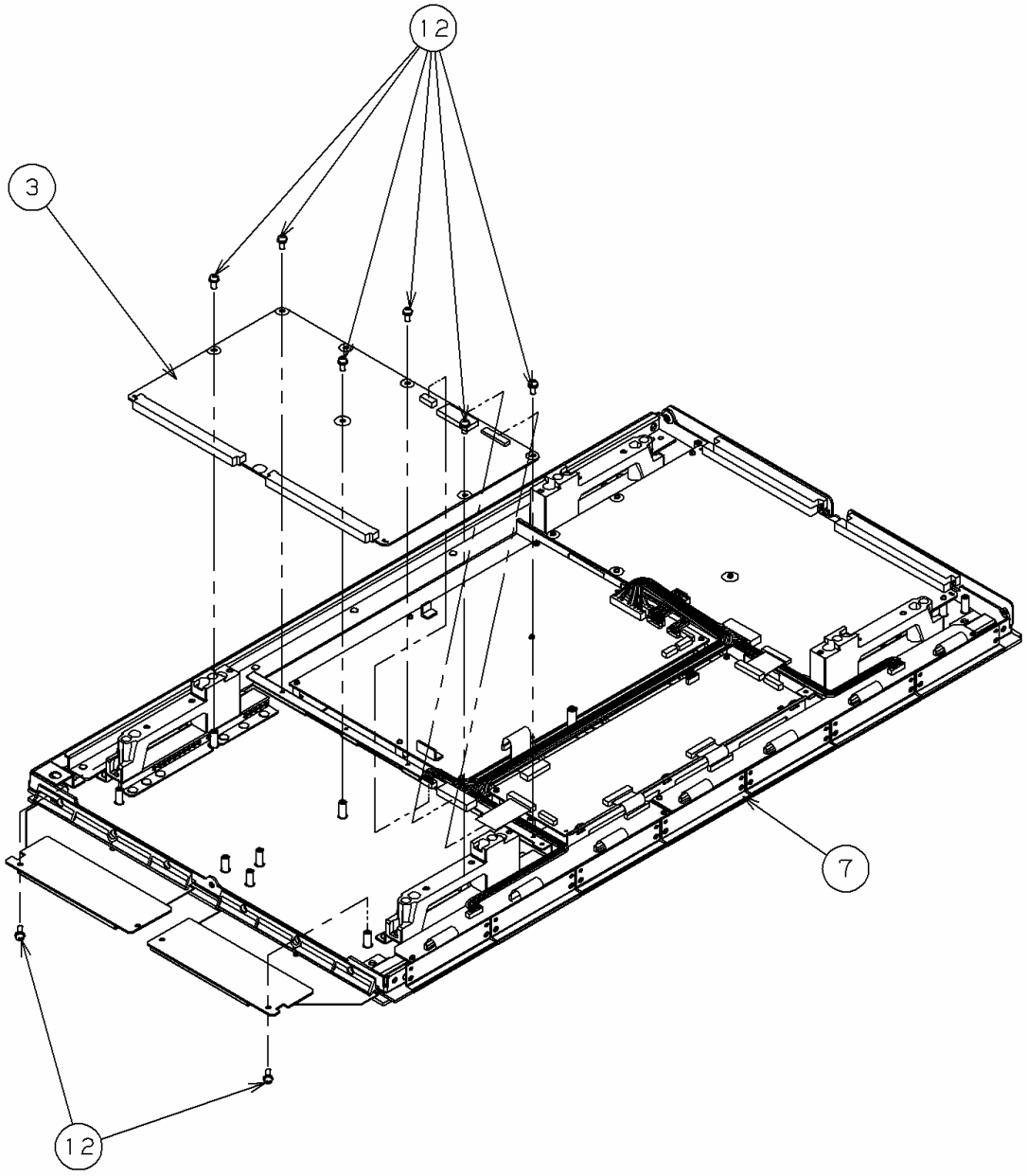
Note

* On handling the FPC connector
To release the lock, release it by gently flipping it with the nail of the thumb or forefinger.
Never pinch the lock lever with fingers or hook onto it (especially with fingernails). Doing so might damage the lock lever.



(5) Remove the fixing screws (M3 × 6) at 6 locations.

(6) Remove the Y-SUS board.



5.4 ABUS-L Circuit Board Removal/Installation Procedure

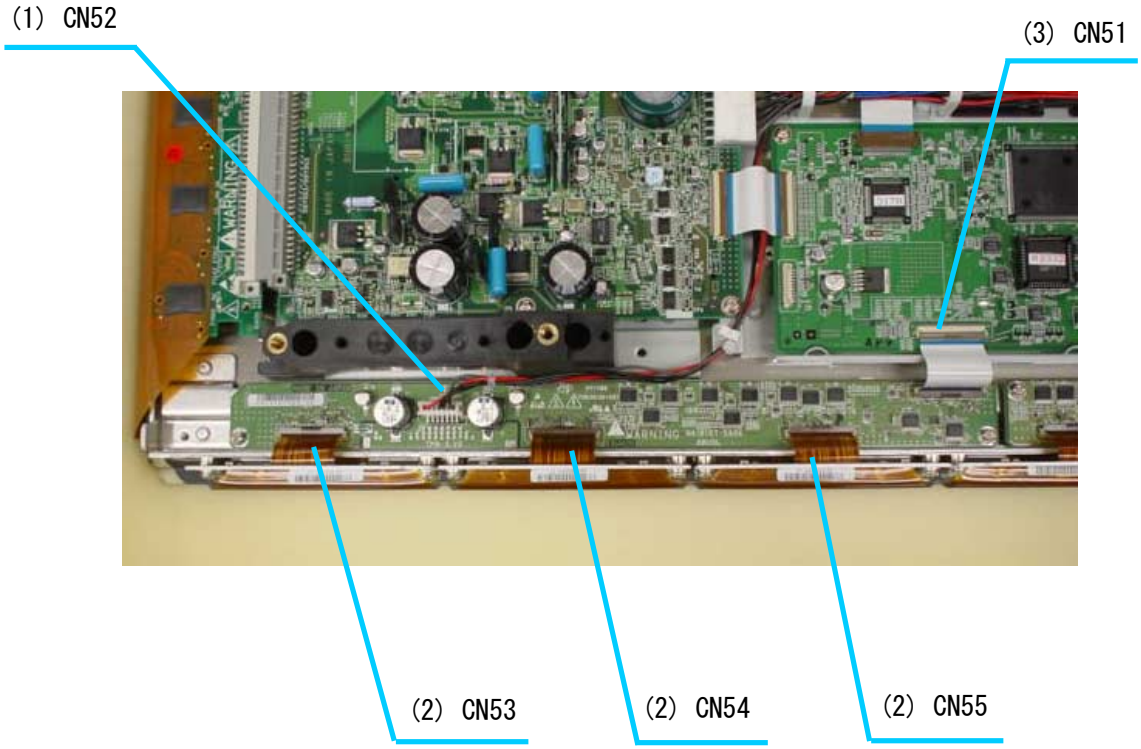
When removing the circuit board after the main power is turned on/off, wait for at least one minute before starting to remove the circuit board.

Note

If the circuit board removal is started immediately after turning off the main power, it can result in electric shock or damage of the circuit due to residual electric charge.

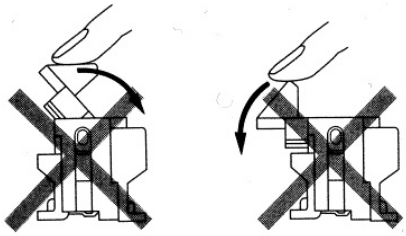
Remove the circuit board by following the steps below. To install the circuit board, reverse the removal procedure.

(1) Disconnect the connector CN52 from the ABUS-L board.
(2) Raise the lock of the FPC connectors CN53, CN54, CN55 to release it and remove the ADM flexible board.
(3) Release the lock of the FPC connector CN51 and disconnect the signal cable (FPC).



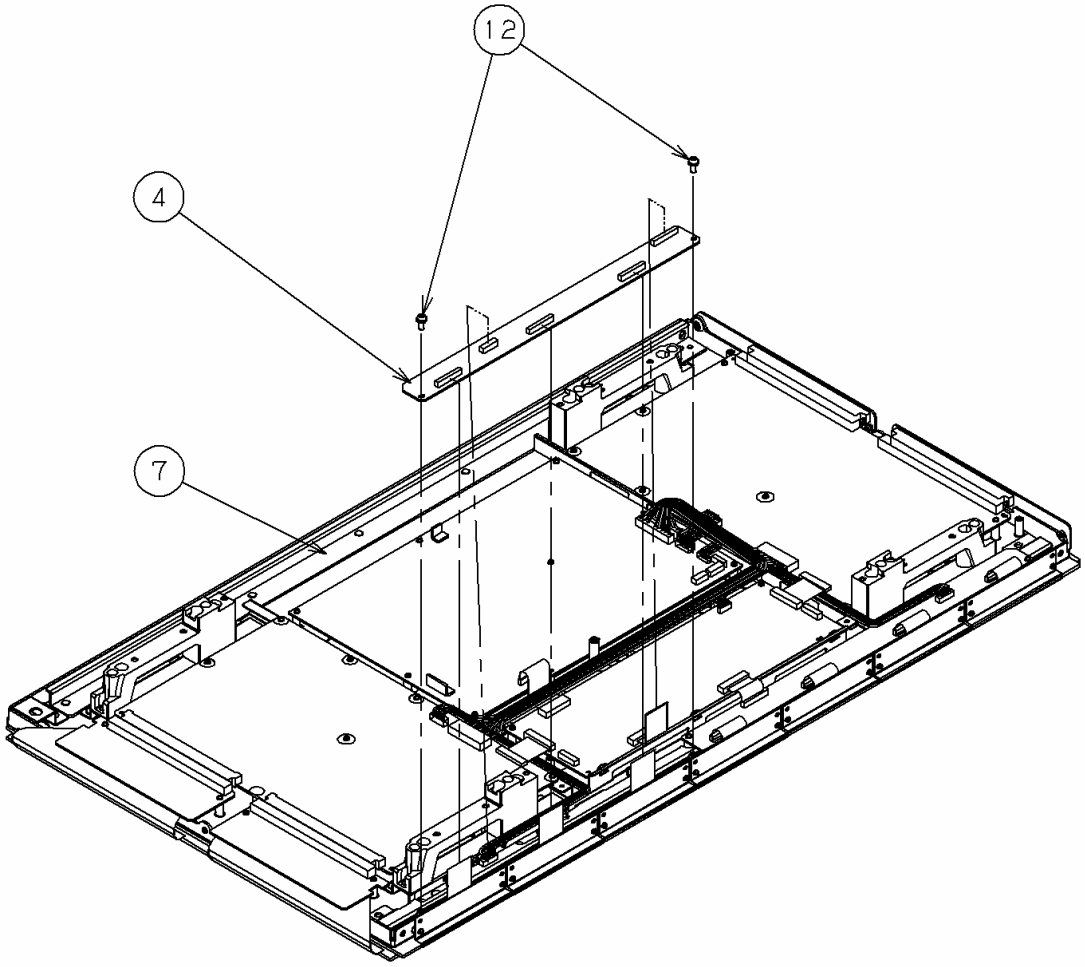
Note

* On handling the FPC connector
To release the lock, release it by pulling up the lever.
Never pinch the lock lever with the fingers or push hard on it without a cable in it. Doing so might damage the lock lever.



(4) Remove the screws (M3X6) fixing the ABUS-L board at the 2 locations.

(5) Remove the ABUS-L board.



5.5 ABUS-R Circuit Board Removal/Installation Procedure

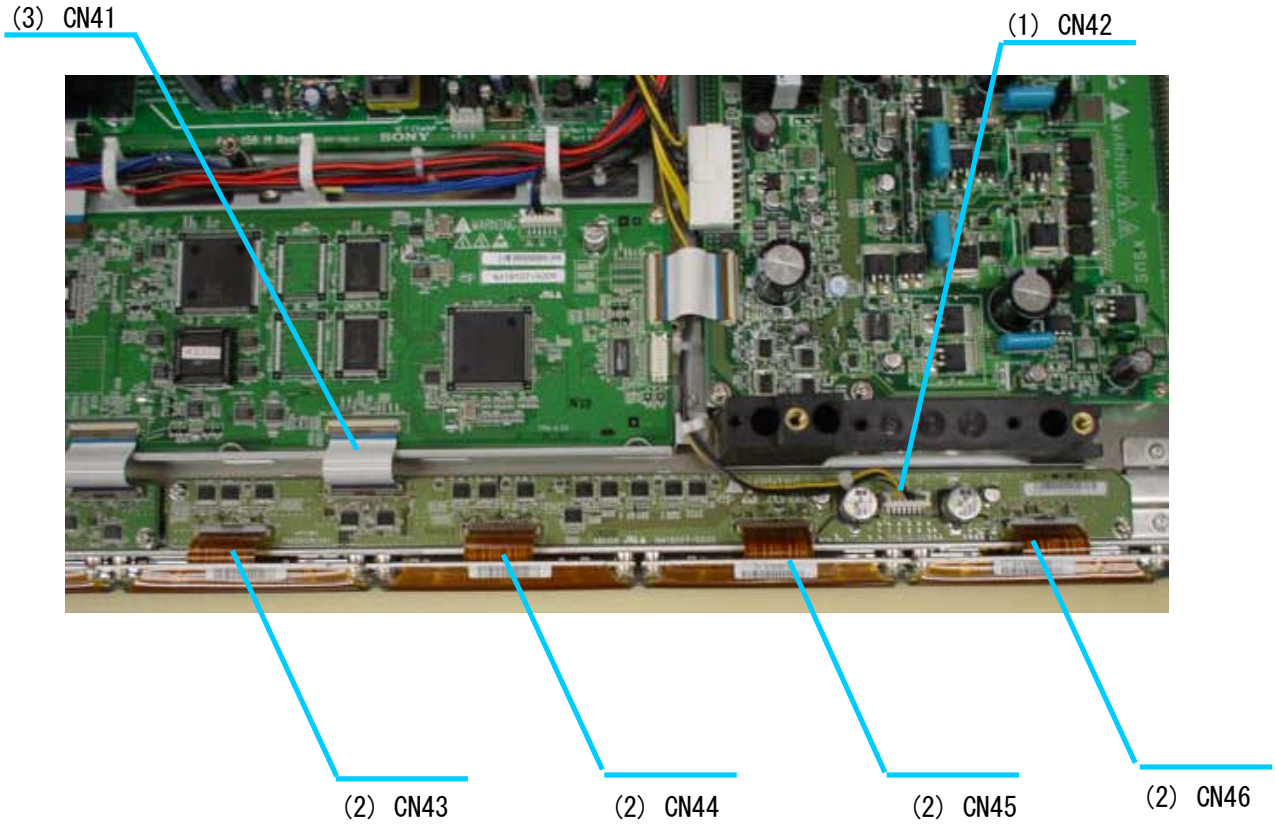
Note

When removing the circuit board after the main power is turned on/off, wait for at least one minute before starting to remove the circuit board.

If the circuit board removal is started immediately after turning off the main power, it can result in electric shock or damage of the circuit due to residual electric charge.

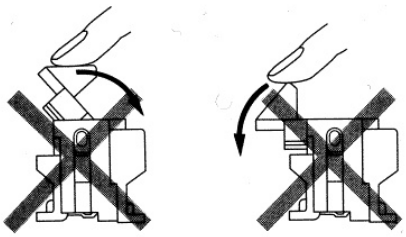
Remove the circuit board by following the steps below. To install the circuit board, reverse the removal procedure.

(1) Disconnect the connector CN42 on the ABUS-R board.
(2) Raise the lock of the FPC connectors CN43, CN44, CN45, CN46 to release it and disconnect the ADM flexible board.
(3) Release the lock of the FPC connector CN41 and disconnect the signal cable (FPC).



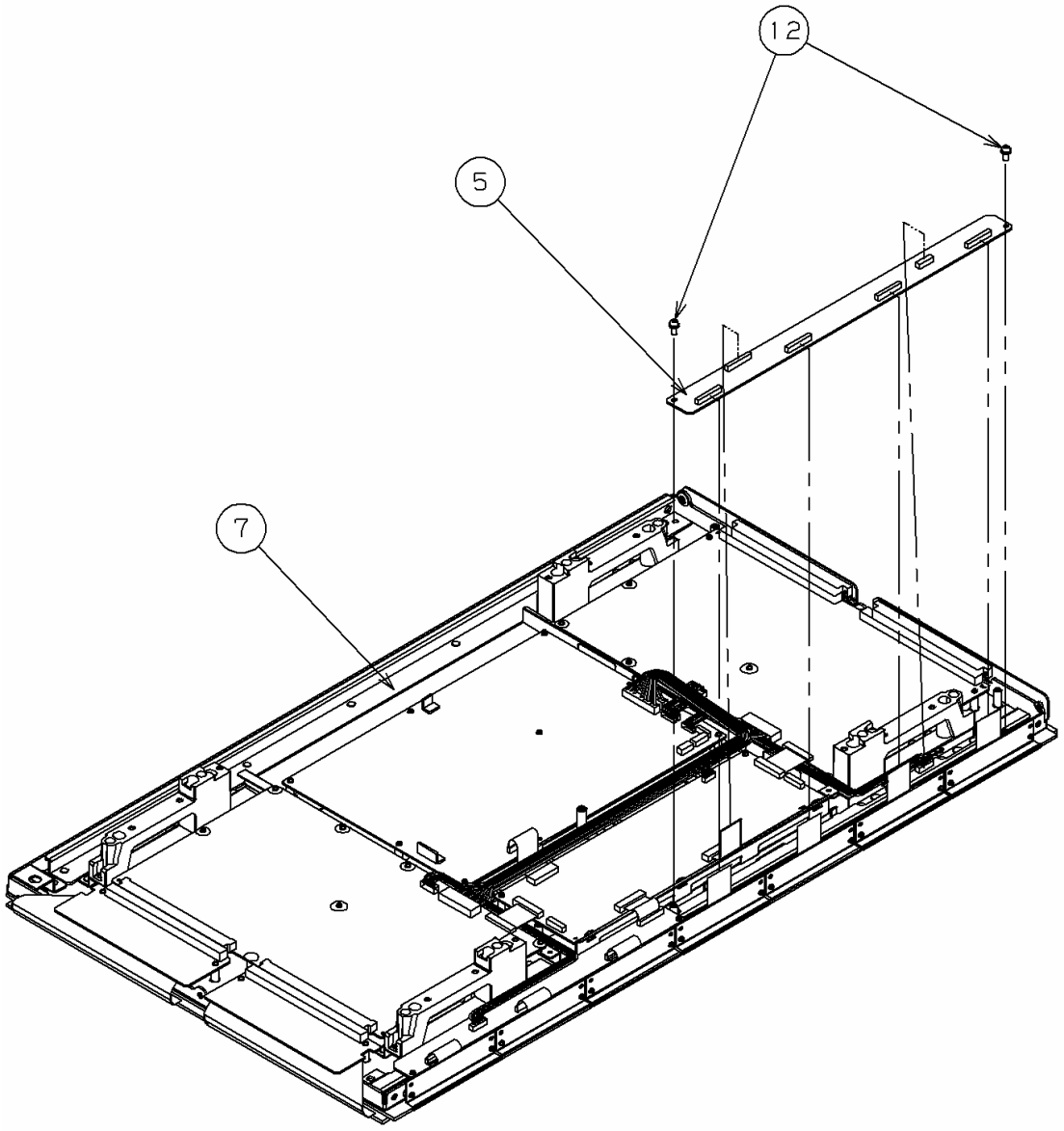
Note

* On handling the FPC connector
To release the lock, release it by pulling up the lever.
Never pinch the lock lever with the fingers or push hard on it without a cable in it. Doing so might damage the lock lever.



(4) Remove the screws (M3 × 8) fixing the ABUS-R board at in position at 2 locations.

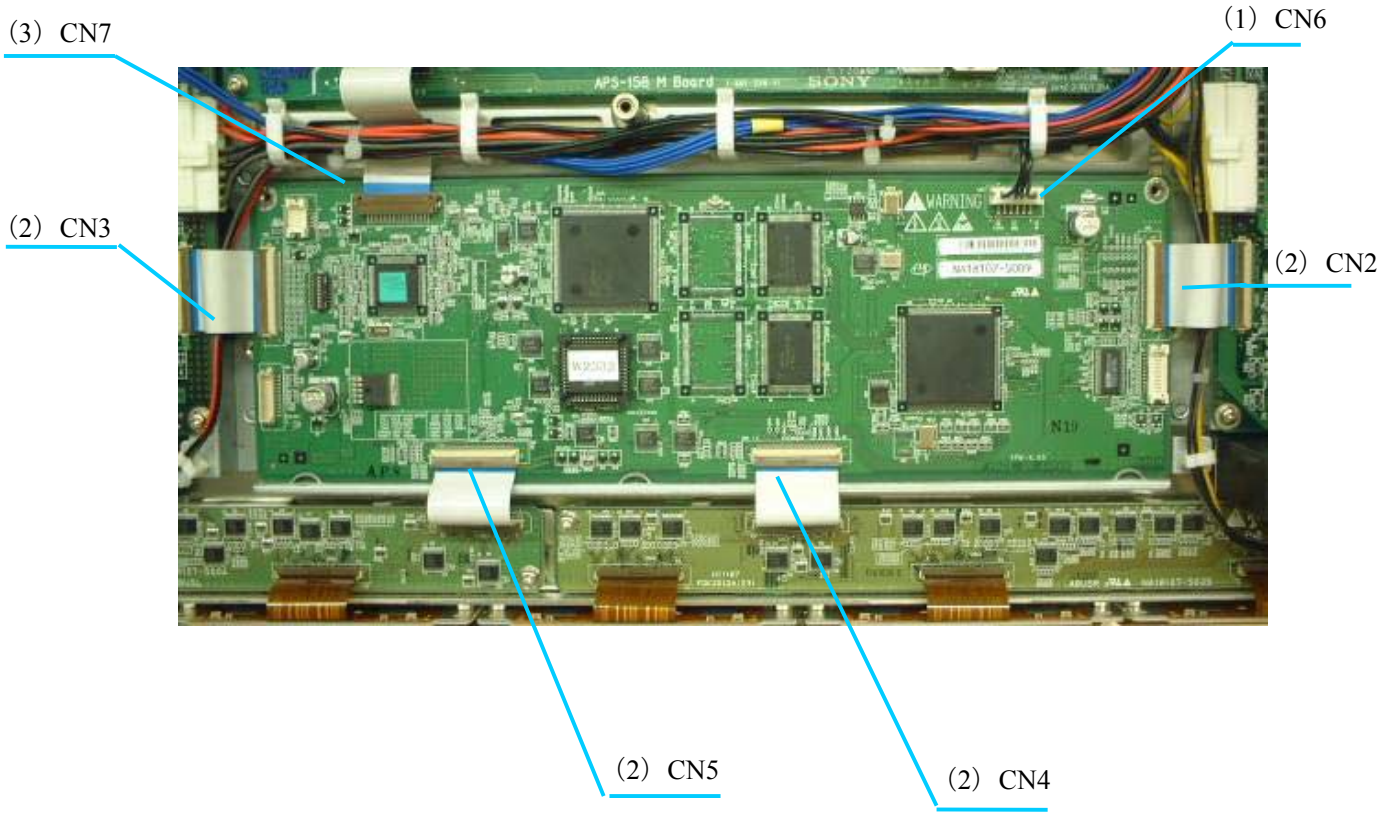
(5) Remove the ABUS-R board.



5.6 LOGIC Board Removal/Installation Procedure

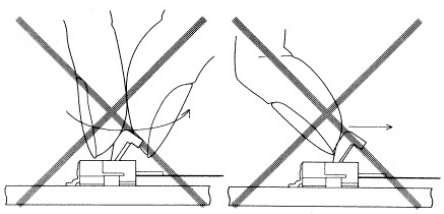
Remove the circuit board by following the steps below. To install the circuit board, reverse the removal procedure.

(1) Disconnect the EH connector CN6.
(2) Release the lock of the FPC connectors CN2, CN3, CN4, CN5 and disconnect the signal cable (FPC).
(3) Slide the lock of the FPC connector CN7 toward the PSU board side, then press it down toward the front and remove the PSU signal cable.



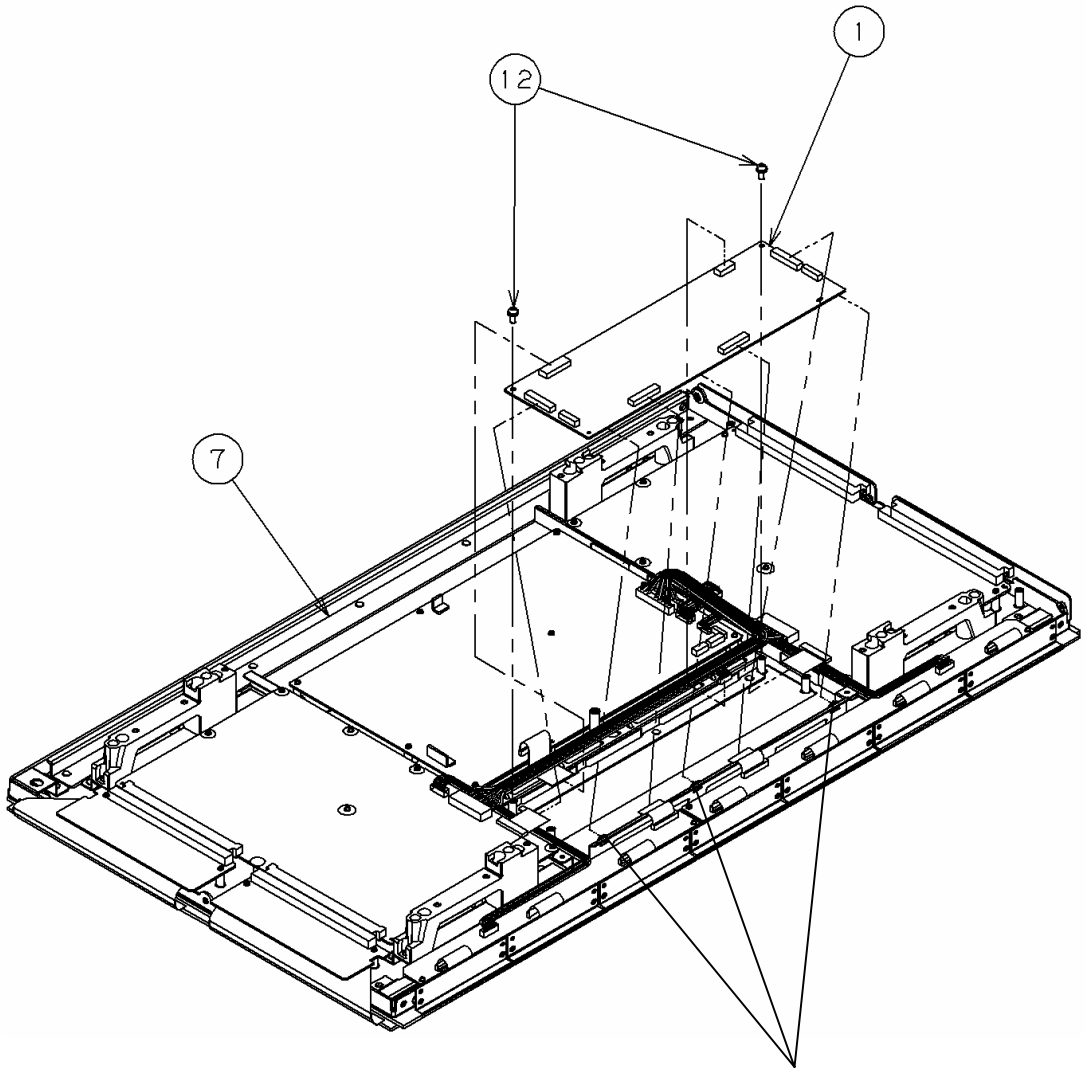
Note

* On handling the FPC connector
To release the lock, release it by gently flipping it. Never pinch the lock lever with the fingers or hook onto it (especially with fingernails). Doing so might damage the lock lever.



(4) Remove the screws (M3 × 6) fixing the LOGIC board in position at 2 locations.

(5) Remove the LOGIC board.



(6) Tabs for fixing

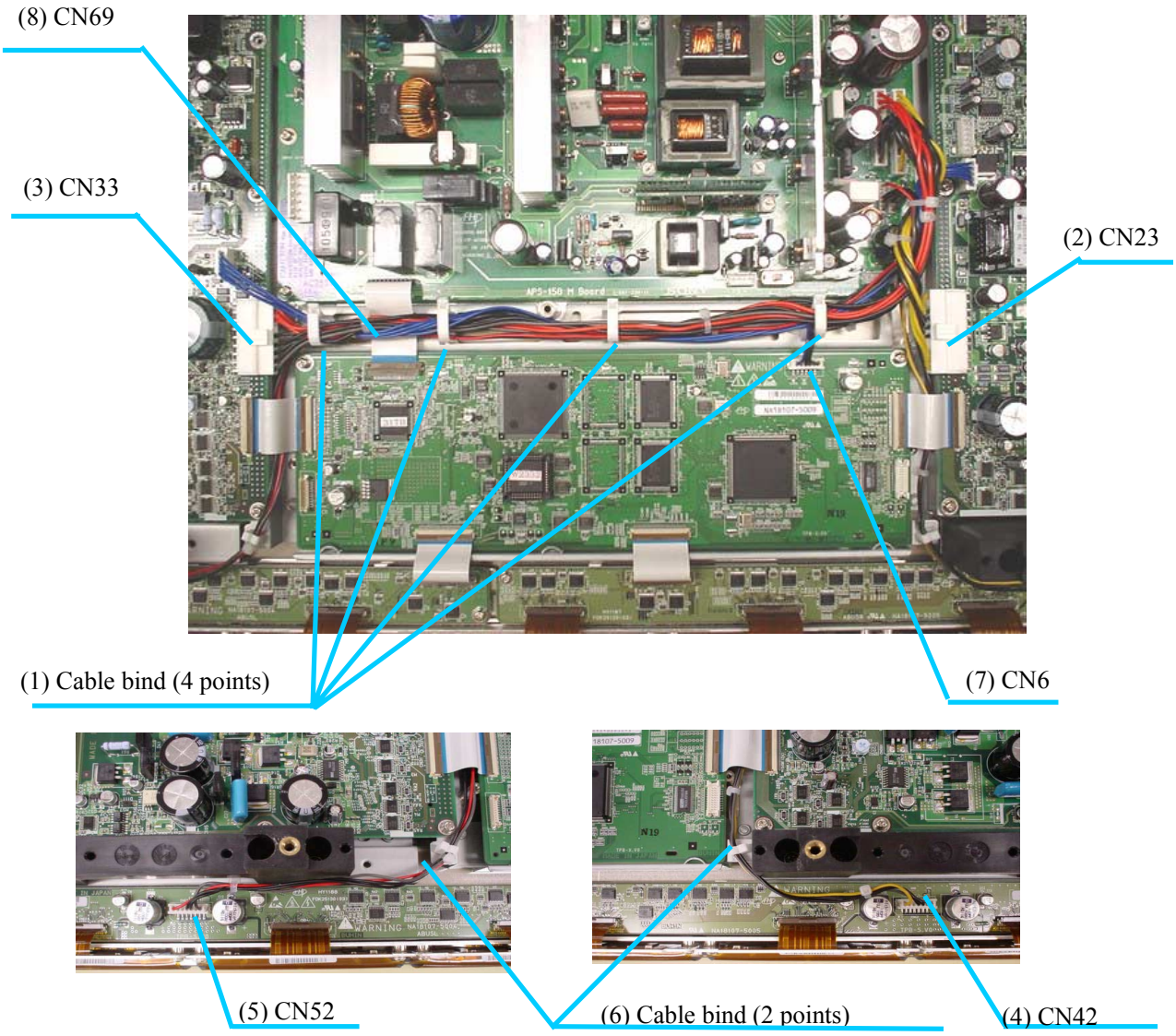
(6) When installing the LOGIC board, place it so that the LOGIC board is locked by the tabs for fixing it in position (at 3 locations).

5.7 PSU Board Removal/Installation Procedure (only UA-1x type)

Note

When removing the circuit board after the main power is turned on/off, wait for at least one minute before starting to remove the circuit board.
If the circuit board removal is started immediately after turning off the main power, it can result in electric shock or damage to the circuit due to residual electric charge.
Remove the circuit board by following the steps below. To install the circuit board, reverse the removal procedure.

(1) Release the lock of the cable clamp (large) .(At 4 locations)
(2) Disconnect the X-SUS board connector CN23.
(3) Disconnect the Y-SUS board connector CN33.
(4) Disconnect the ABUSR board connector CN42.
(5) Disconnect the ABUSL board connector CN52.
(6) Remove the wires (4), (5) from the cable clamp (small) .
(7) Disconnect the LOGIC board connector CN6.
(8) Disconnect the PSU signal cable from the PSU board connector CN69 side.

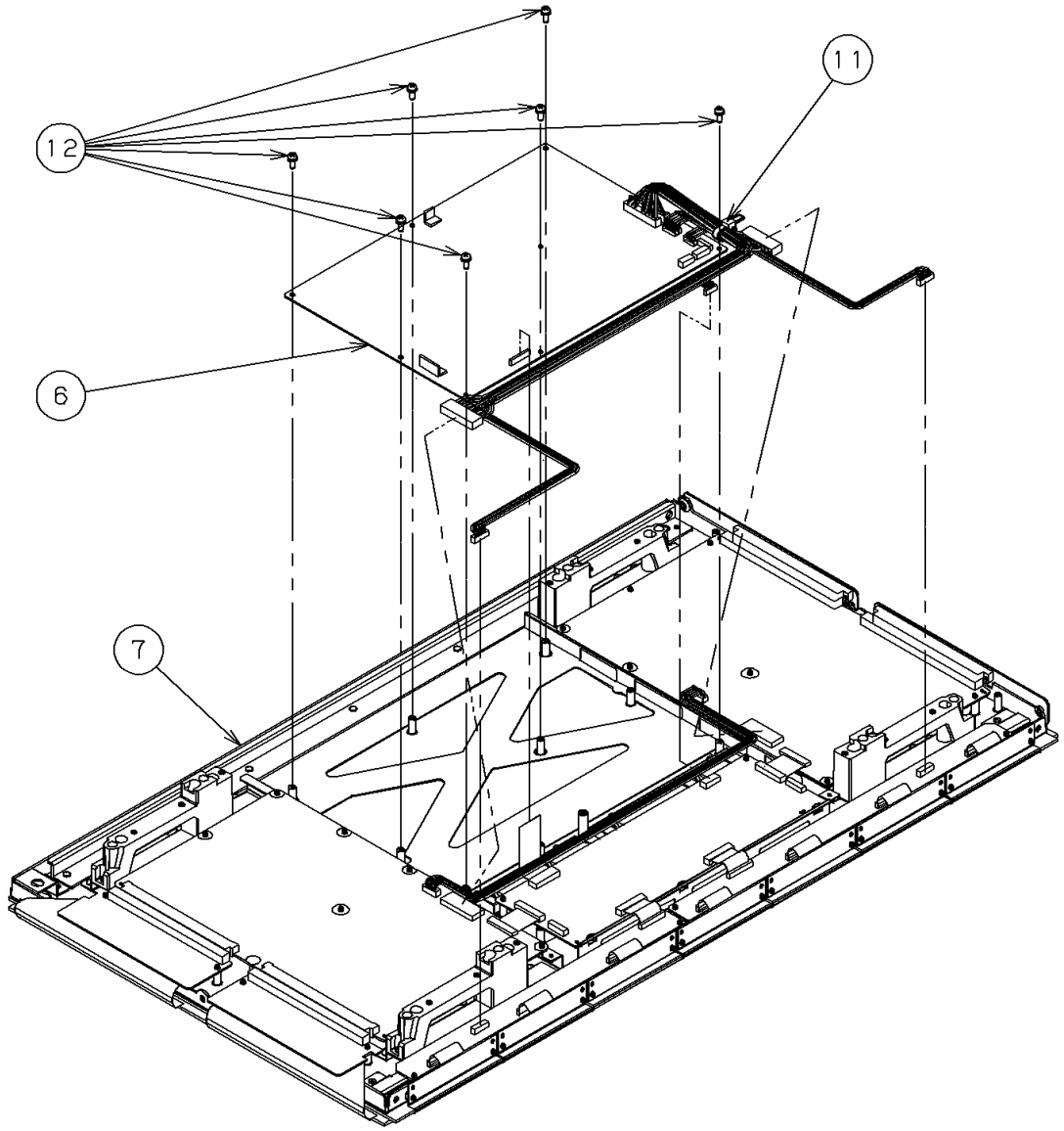


(9) Remove the screws (M3 × 6) fixing the PSU board in position. (7 locations)

(10) Use cutting pliers to cut the nylon bands tying the following 5 power cables.

- CN64 (PSU) ~ CN32 (Y-SUS) :
- CN65 (PSU) ~ CN23 (X-SUS) :
- CN66 (PSU) ~ CN42 (ABUSR) :
- CN67 (PSU) ~ CN52 (ABUSL) :
- CN22 (X-SUS) ~ CN23 (Y-SUS) :

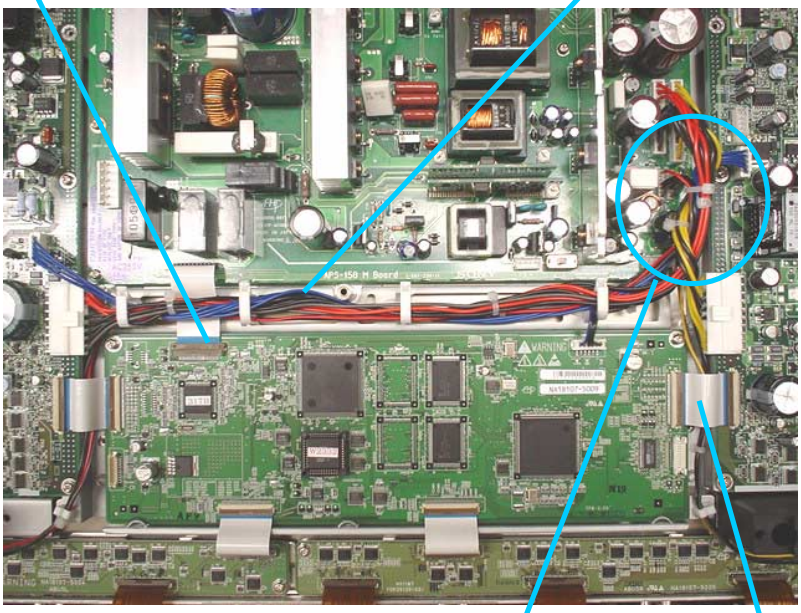
(11) Remove the PSU board.



(12) When the installation of the board is complete, route the wires as shown below.

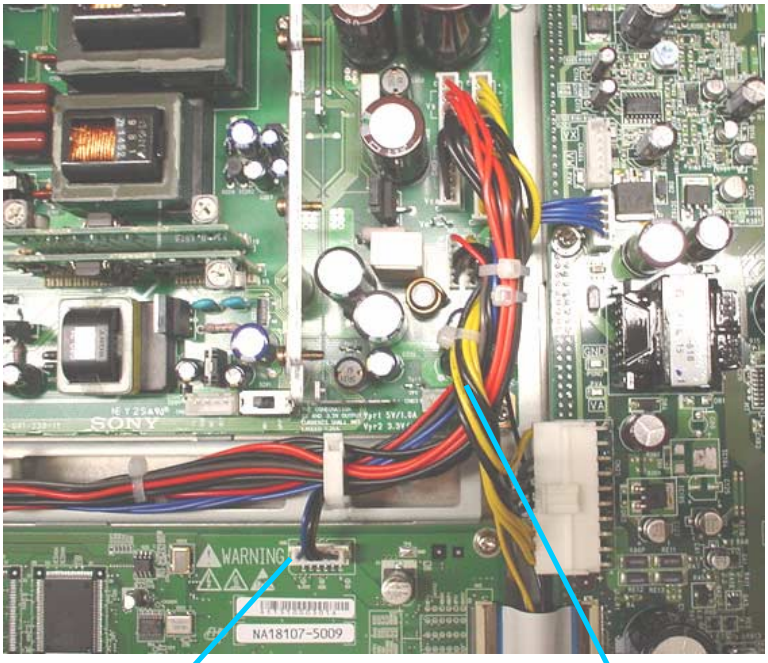
Pass the CN52 cable (RED/ BLK/ GRY)
under the signal cable.

Route it on top of the PSU signal cable.



Enlarged

Pass the CN42 cable (YEL/BLK/GRY)
under the signal cable.



CN63

Wrap the CN23 cable (YEL/BLK/GRY) around the other cables (4 types) coming from the PSU board by one full turn and then insert CN23 into the X-SUS board. (Note that the cable must not touch the PSU board CN63.)

5.8 Panel Chassis Replacement Procedure

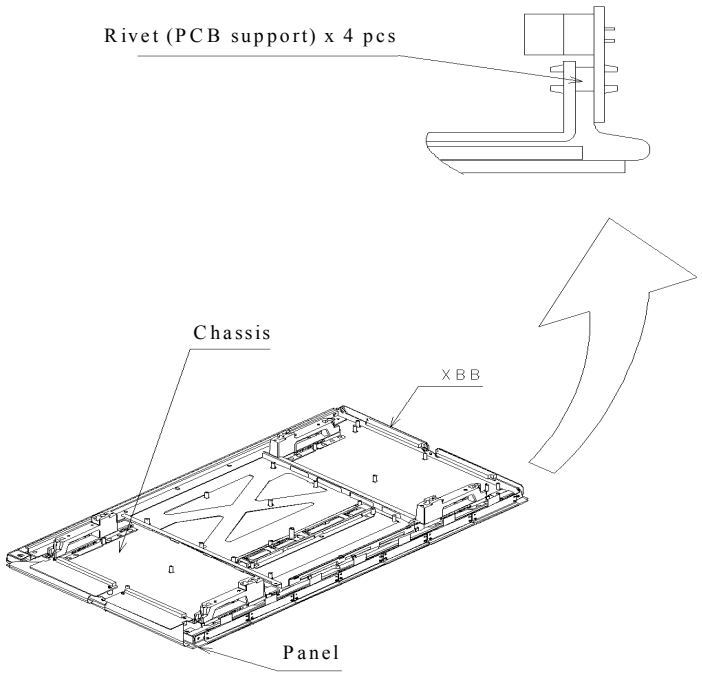
(1) Remove the 6 types of printed-circuit board (X-SUS, Y-SUS, ABUSL, ABUSR, LOGIC, and PSU) that are installed in the panel module.

For the removal procedure, refer to Section 5.2 to 5.7.

* Before removing the above 6 types of board, be sure to remove both ends of the single power cable (BLU) and those of the four FPC cables (WHT) that are used to connect the circuit boards.

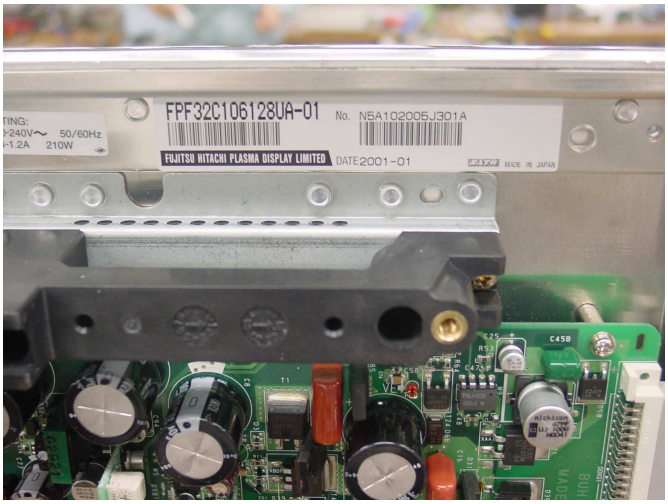
(2) Remove the rivets fixing the complete panel chassis (maintenance part) and XBB board in position (4 locations).

* The removed rivets are used only for keeping the machine from shifting during transportation, and are not used for the product.



(3) Install panel chassis (repair parts) the printed-circuit board that was removed in step (1) and fix it in position. (Refer to the exploded view shown in Section 5.1.)

(4) Print the serial ID number of the product to be repaired on the product label, which is prepared separately. Attach the product label to the panel chassis on top of the X-SUS board (See the photo)



6 Operation Check and Adjustment Method

6.1 List of Check and Adjustment Items

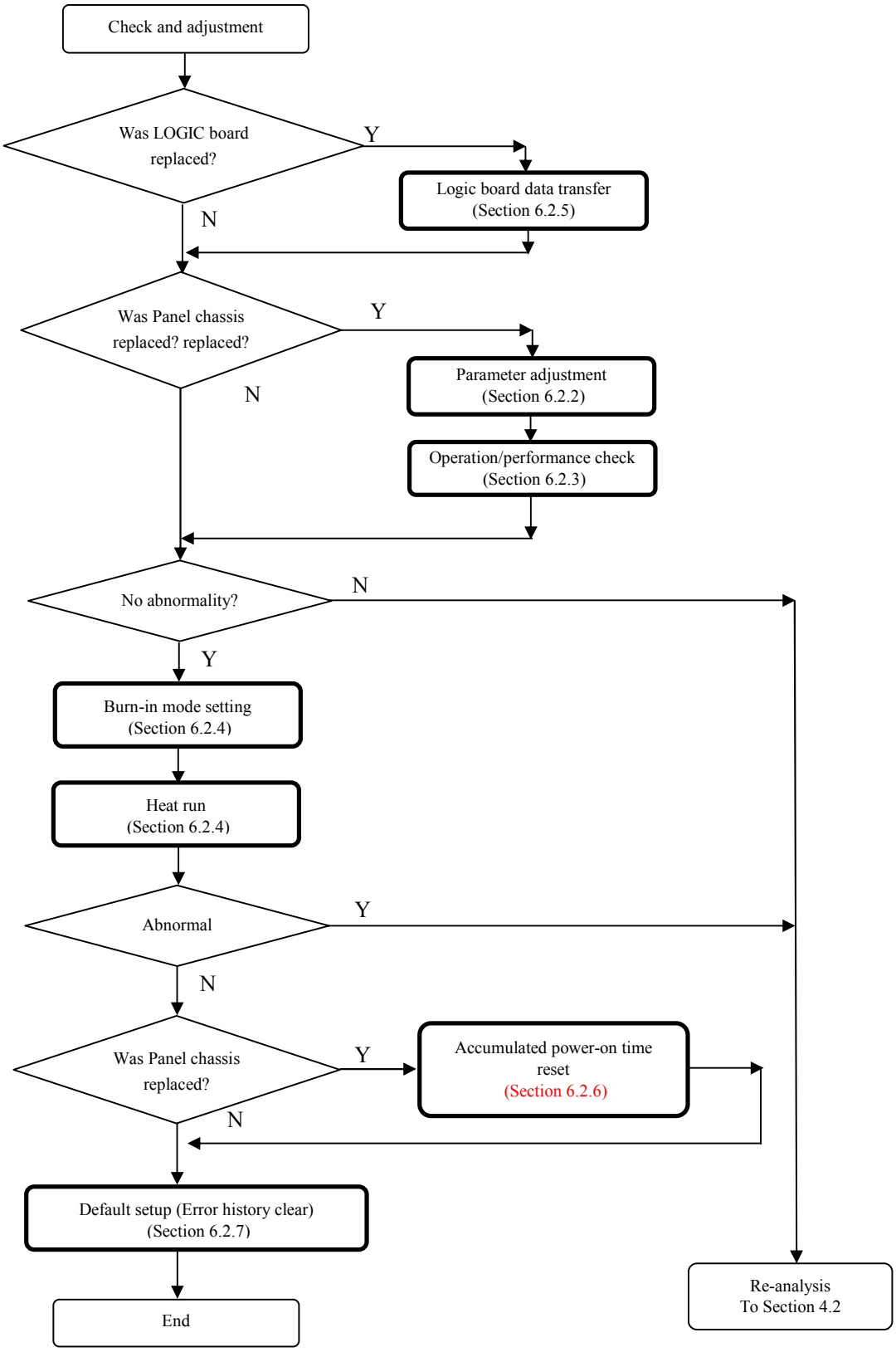
Adjustment item (Major item)	Adjustment item (Minor item)	Adjustment position (Name of the part)	Check and adjustment Required timing						Jig/tools	Labor required	
			When PDP panel is replaced	When X-SUS board is replaced	When Y-SUS board is replaced	When LOGIC board is replaced	When ABUS board is replaced	When PSU board is replaced		Labor (persons)	Time (minutes)
VR adjustment	Is detection adjustment	X-SUS board RE1							Digital voltmeter , screwdriver	1	1
	Ve voltage adjustment	X-SUS board RE108								1	1
	Vw voltage adjustment	X-SUS sub-board R10								1	1
	Vx voltage adjustment	X-SUS sub-board R39								1	1
	CU timing adjustment	X-SUS sub-board VR1								1	1
	CD timing adjustment	X-SUS sub-board VR2								1	1
	LU timing adjustment	X-SUS sub-board VR3								1	1
	LD timing adjustment	X-SUS sub-board VR4								1	1
	Ve voltage adjustment	Y-SUS board RY75								1	1
	Is detection adjustment	Y-SUS board RE1Y								1	1
	CU timing adjustment	Y-SUS sub-board VR1								1	1
	CD timing adjustment	Y-SUS sub-board VR2								1	1
	LU timing adjustment	Y-SUS sub-board VR3								1	1
	LD timing adjustment	Y-SUS sub-board VR4								1	1
	PFC voltage adjustment	PSU board RV301								1	1
	Vs adj1	PSU board RV801								1	1
	Vs adj2	PSU board RV802								1	1
	Va adj2	PSU board RV803								1	1
	Vs f min	PSU board RV901								1	1
	Vpr adj	PSU sub-board RV201								1	1
	Vcc f min	PSU sub-board RV150								1	1
	Vcc adj	PSU sub-board RV270								1	1
	Va adj1	PSU sub-board RV860								1	1
	Vaa	PSU sub-board RV861								1	1
	Va f min	PSU sub-board RV950								1	1
Parameter adjustment	Vs voltage adjustment	LOGIC board(Vsvolt)	○			○			Interface board, personal computer, Digital voltmeter	1	1
	Va voltage adjustment	LOGIC board(Vavolt)	○			○				1	1
	Vw voltage adjustment	LOGIC board(Vwvolt)	○			○				1	1
	Vx voltage adjustment	LOGIC board(Vxvolt)	○			○				1	1
Default setting	Error history clear	LOGIC board (EEPROM)	○	○	○	○	○		Interface board, personal computer	1	1
	Accumulated power-on time clear	LOGIC board (EEPROM)	○							1	1
Resisting pressure examination Only UA-11 type	Insulation resisting pressure examination	-	○	○	○	○	○	○	Resisting pressure examination machine Interface board,	1	1

Be sure to keep the default setup set at the factory.
(Do not change the VR control settings.)

○ : Check, adjustment, or setup

6.2 Check and Adjustment Method

6.2.1 Check and adjustment procedure

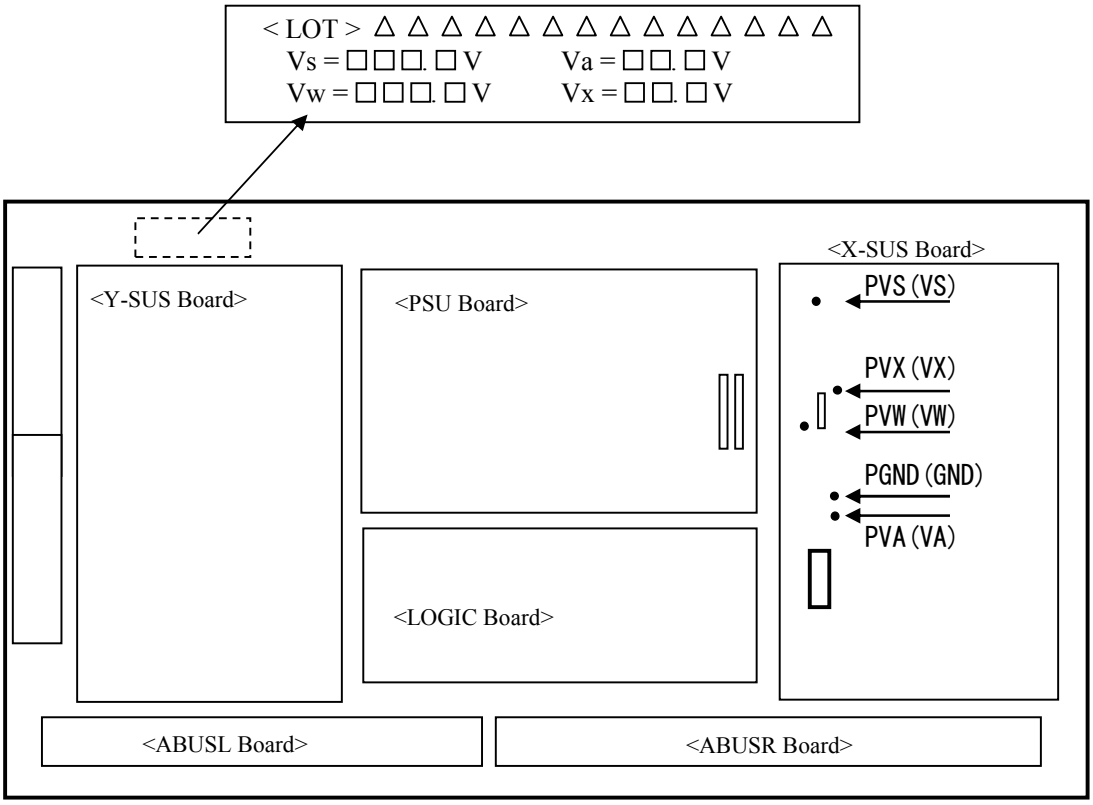


6.2.2 Glass Panel Driving Voltage Adjustment (Voltage Data Loading)

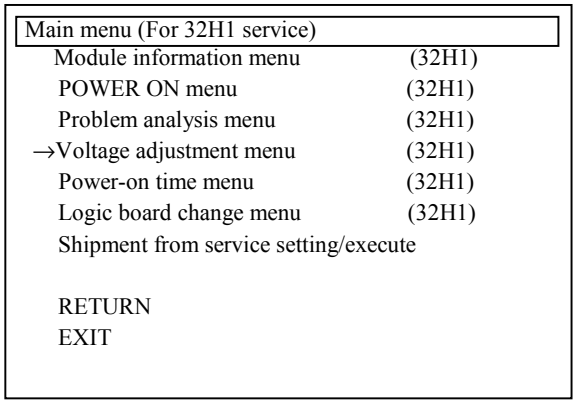
List of parameter adjustment items

Item	Adjustment items	Measurement point	Adjustment value (conditions)	Remarks
1	Vs voltage adjustment	PSU board TP5	Voltage setting label indication value* ±1% (all black)	
2	Va voltage adjustment	PSU board TP4	Voltage setting label indication value* ±1% (all black)	
3	Vw voltage adjustment	X-SUS board connector CNX01 6-pin	Voltage setting label indication value* ±1% (all black)	
4	Vx voltage adjustment	X-SUS board connector CNX01 1-pin	Voltage setting label indication value* ±1% (all black)	

*: Voltage setting label shows the following messages at the top left of the back of the chassis.

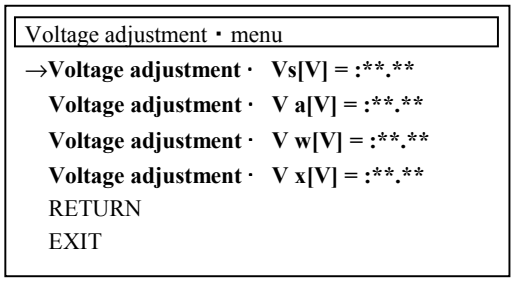


(1) From the main menu, select the voltage adjustment menu with the ↑ key or ↓ key and press the <ENTER> key.



(2) From the voltage adjustment menu, adjust parameters in the order starting from Vs, Va, Vw, and Vx.

Select parameter with the ↑ key or ↓ key and adjust the parameter with the → key (increment) or ← key (decrement). The adjustment values are shown on the voltage label that is attached to the panel chassis.



** numbers are shown in decimal values.

Input the numeric value/dot and press the <ENTER> key and then press the <ENTER> key again to set the adjustment value directly.

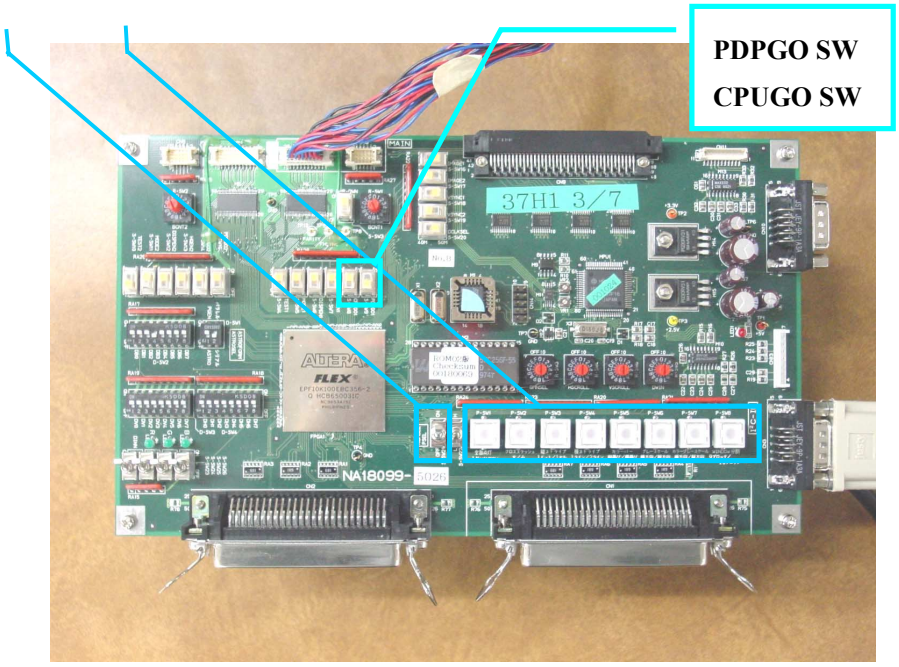
(3) Select RETURN with the ↑ key or ↓ key and press the <ENTER> key to return to the menu screen.

6.2.3 Operation performance check items

(1) Environmental conditions
Temperature: Room temperature
Judgment distance: 1 meter from panel screen
Preheat run: 5 minutes with entire screen lit (white)

(2) Test patterns:

PSEL	Push SW	Display pattern	Size	Details
H	0	White screen		
H	1	Cross slash	Large	24 × 24
H	2	Vertical stripe	Every other dot	
H	3	Horizontal stripe	Every other line	
H	4	Color bars	Vertical bar	H_blk divided in 8
H	5	Gray scale	Horiz. direction	Every 3 dots
H	6	Color gray scale	Horiz. direction	Every 3 dots
H	7	Divided WINDOW	9 blocks	Follow the ROM
L	0	1% WINDOW	Center	Follow the ROM
L	1	Cross slash	Small	12 × 12
L	2	Vertical stripe	Every other cell	
L	3	Horizontal stripe	Every 2 lines	
L	4	Color bars	Horizontal bar	V_blk divided in 8
L	5	Gray scale	Vert. direction	Every 4 dots
L	6	Color gray scale	Vert. direction	Every 4 dots *2
L	7	Divided WINDOW	16 blocks	Follow ROM *3



(3) Judgment

Item	Test items	Test signal	Judgment criterion
1	Brightness non-uniformity	White screen (W)	Brightness non-uniformity in the form of stripes must not be visible in vertical and horizontal directions.
2	Black noise	Horizontal gray scale (Each color of R/G/B)	Rank 3 or higher in the 5-step evaluation. <Rank> 5: No noise 4: Small noise is intermittently visible 3: Noise of 1 line is not visible continuously 2: Noise occurs continuously 1: Much noise occurs continuously
3	Number of defects	The entire screen lights (Each color of W/R/G/B)	Conforms to Section 1.3.2 Display quality specifications. However, when Delivery Specifications Sheets are prepared for each client, the specifications shown in the Delivery Specifications Sheet must be met.
4	Number of extra dots		
5	Number of flickering dots		

(4) Power ON/OFF

- Power ON

  Both PDPGO-SW and CPUGO-SW are made set of turning on.
- Power OFF

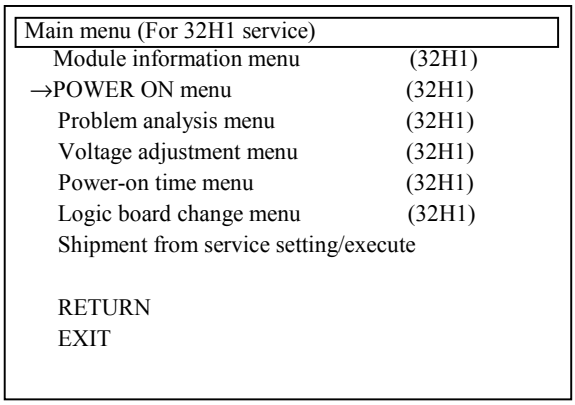
  Only PDPGO-SW is made set of turning off.

  (CPUGO-SW is in the state of turning on.)

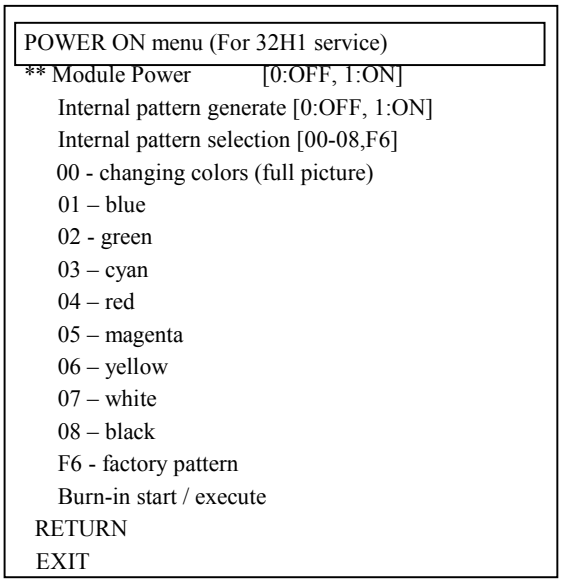
6.2.4 Heat Run Test

(1) Set the module by following the same procedure as that for Problem Analysis in Section 4.7.

(2) From the main menu, select the POWER ON menu with the ↑ key or ↓ key and press the <ENTER> key.



(3) From the POWER ON menu, select the Module power with the ↑ key or ↓ key and press the <ENTER> key. When you press the → key, the main power of the module is turned on. (When you press the ← key, the main power is turned off.)



(4) To change the internal pattern, select the internal pattern selection from the POWER ON menu using the ↑ (up) or ↓ (down) key, and press the <ENTER> key.

Setup value	Display pattern	Setup value	Display pattern
00	01 to 08 patterns are displayed every 2 seconds.	05	Entire screen is cyan
01	Entire screen is blue	06	Entire screen is yellow
02	Entire screen is red	07	Entire screen is white
03	Entire screen is magenta	08	Entire screen is black
04	Entire screen is green	09	Plant burn-in pattern

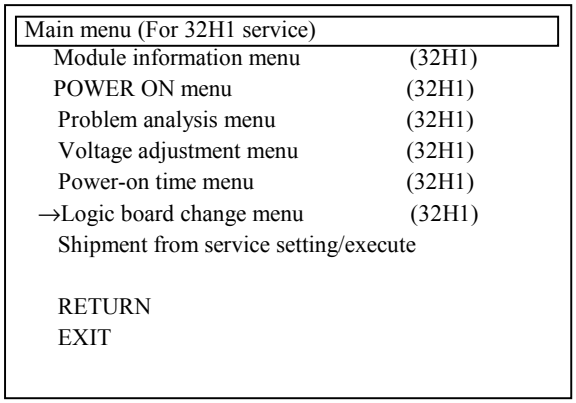
(5) From the POWER ON menu, select Burn-in start with the ↑ key or ↓ key and press the <ENTER> key. The display pattern is automatically generated in PDP.

(6) Select RETURN with ↑ key or ↓ key and press <ENTER> key to return to the menu screen

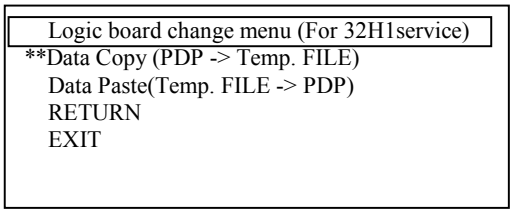
6.2.5 Logic board parameter forwarding

(1) The module is set according to the same to failure analysis procedure in clause 4.7.
The logic board before being exchanged is installed in the module.

(2) From the main menu, select change Logic board menu with the ↑ key or ↓ key and press the <ENTER> key.

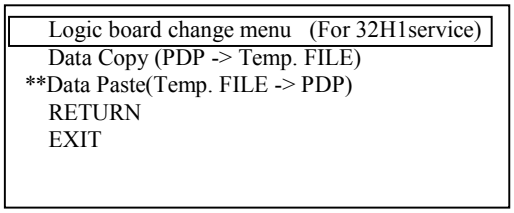


(3) From the logic board change menu, select data copy with the ↑ key or ↓ key and press the <ENTER> key. Data is read before the Logic board is exchanged.



(4) The Logic board is exchanged.

(5) From the logic board change menu, select data paste with the ↑ key or ↓ key and press the<ENTER> key. Data is written in the exchanged Logic board.

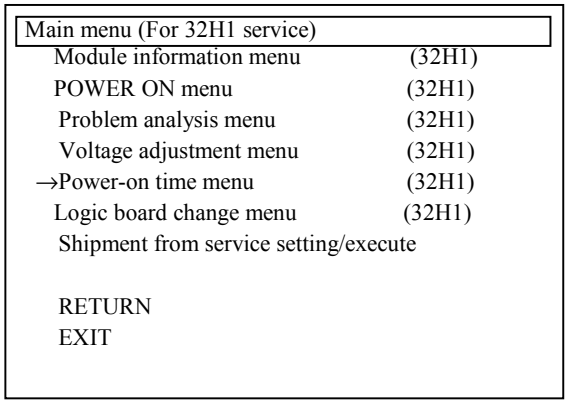


(6) Select RETURN with ↑ key or ↓ key and press <ENTER> key to return to the menu screen.

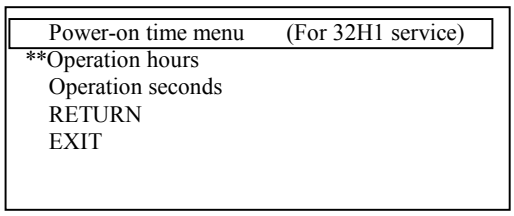
6.2.6 Accumulation time reset

(1) The module is set according to the same to failure analysis procedure in clause 4.7.

(2) From the main menu, select Power-on time menu with the ↑ key or ↓ key and press the <ENTER> key.



(3) From the Power-on time menu, select Operation hours with the ↑ key or ↓ key and press the <ENTER> key. The Operation hour is input.



(4) From the Power-on time menu, select Operation seconds with the ↑ key or ↓ key and press the <ENTER> key. The Operation second is input.

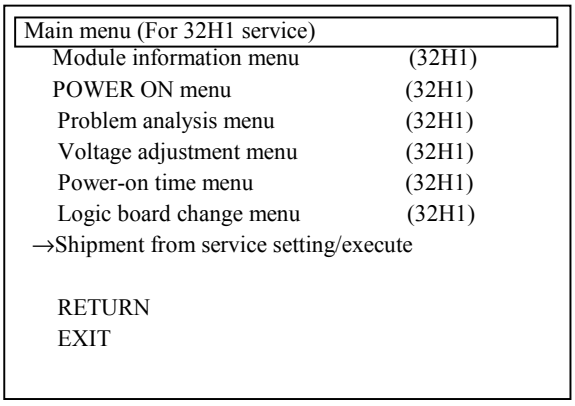
(5) Select RETURN with ↑ key or ↓ key and press <ENTER> key to return to the menu screen.

6.2.7 Setup Before Shipment

Before shipment from Service Center, perform the following setup or initialization.

1) Initial values that are shown in the List of EEPROM contents in Section 3.3.1.
   (Main power of the module is turned off.)
2) Clearing the error codes

(1) From the main menu, select the Shipment from service setting/execute with the ↑ key or ↓ key and press the <ENTER> key.



The message "Process in progress" appears while the setting is in progress. "OK" is displayed when the setting ends successfully.

"NG" is displayed when the setting ends with a failure.

(2) From the main menu, select EXIT with the ↑ key or ↓ key and press the <ENTER> key.
The service program ends.

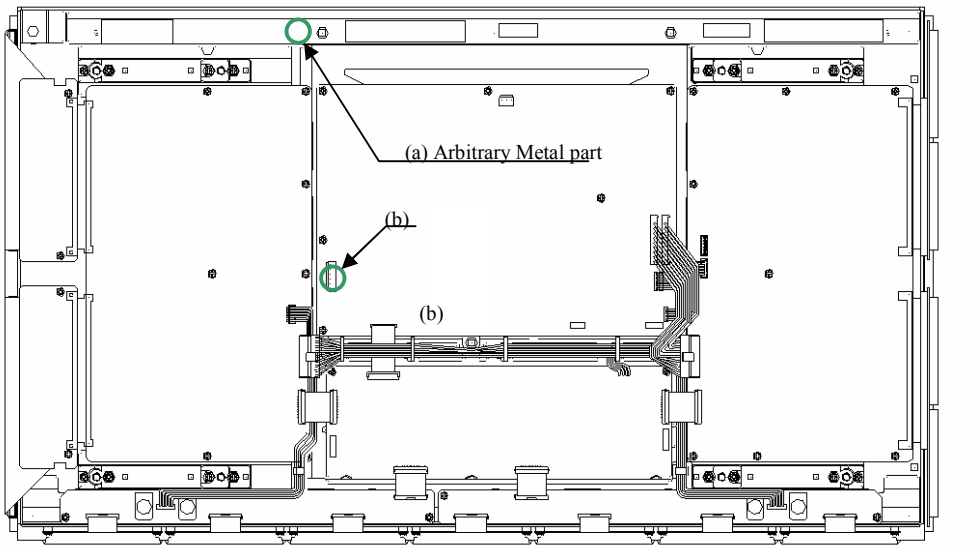
6.2.8 Withstanding Voltage Test procedure

* This test procedure is only applied to the AC/DC PSU integrated model (UA-1x).

Attention

l processes from the examination beginning to the end enough so that this examination may use a high voltage and a large current. Connect the AC input part with the earth, and discharge the residual charge in the product because there is a possibility that the high voltage remains in the product to be examined after the examination ends.

(1) The PDP module unit is leid on the insulation material.
(2) An arbitrary part in a metallic part is assumed to be F.G. …(a)
(3) Short-circuit between 1st-pin and 3rd-pin of the AC input part (CN61)…(b)



(4) Apply the following test voltage between (a) and (b).

Test voltage	Sign acceptable time	Interception current setting
AC 3000V, 50Hz	1.0 sec	25mA

(5) Under such a condition, after the examination ends, the PDP module is left for 20 seconds or more.

(6) Confirm normal operation in accordance with chapter 4.4 procedure.

7. The parts information

		Model Name	Module Name	Part Number	Parts Name	Others
△1	1	KZ-32TS1	FPF32C106128UA-73	9-885-048-63	FPF17R-XSS5010 BOARD	
	2			9-885-048-64	FPF17R-YSS5011 BOARD	
	3			9-885-048-65	FPF17R-LGC5009 BOARD	
	4			9-885-048-66	FPF17R-ABR5005 BOARD	
	5			9-885-048-67	FPF17R-ABL5004 BOARD	
△1	6			9-885-053-30	Panel module FPF32C106128UA-73	Panel module for Service. (32H2 type)

9-878-209-02

Sony EMCS Corporation
Ichinomiya TEC

2004CL08-Data
Made in Japan