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MONITOR SIGNAGE SERVICE MANUAL

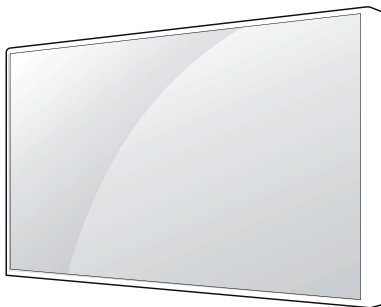
CHASSIS : LW43B

MODEL : 49MS75A

49MS75A-5BB

CAUTION

BEFORE SERVICING THE CHASSIS,
READ THE SAFETY PRECAUTIONS IN THIS MANUAL.



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PRECAUTION

WARNING FOR THE SAFETY-RELATED COMPONENT.

- There are some special components used in LCD monitor that are important for safety. **These parts are marked \triangle on the schematic diagram and the Exploded View.** It is essential that these critical parts should be replaced with the manufacturer's specified parts to prevent electric shock, fire or other hazard.
- Do not modify original design without obtaining written permission from manufacturer or you will void the original parts and labor guarantee.

TAKE CARE DURING HANDLING THE LCD MODULE WITH BACKLIGHT UNIT.

- Must mount the module using mounting holes arranged in four corners.
- Do not press on the panel, edge of the frame strongly or electric shock as this will result in damage to the screen.
- Do not scratch or press on the panel with any sharp objects, such as pencil or pen as this may result in damage to the panel.
- Protect the module from the ESD as it may damage the electronic circuit (C-MOS).
- Make certain that treatment person's body are grounded through wrist band.
- Do not leave the module in high temperature and in areas of high humidity for a long time.
- The module not be exposed to the direct sunlight.
- Avoid contact with water as it may a short circuit within the module.
- If the surface of panel become dirty, please wipe it off with a softmaterial. (Cleaning with a dirty or rough cloth may damage the panel.)

\triangle CAUTION

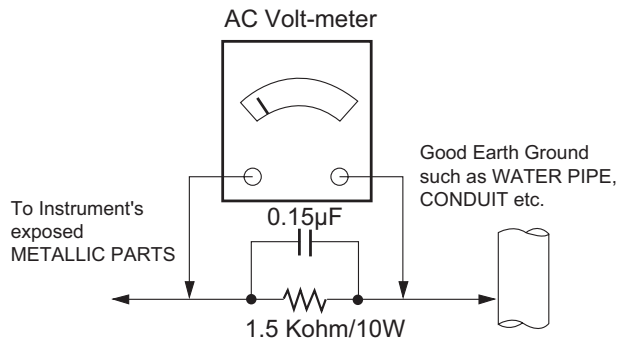
Please use only a plastic screwdriver to protect yourself from shock hazard during service operation.

\triangle WARNING

BE CAREFUL ELECTRIC SHOCK !

- If you want to replace with the new backlight or inverter circuit, must disconnect the AC adapter because high voltage appears at inverter circuit about 650Vrms.
- Handle with care wires or connectors of the inverter circuit. If the wires are pressed cause short and may burn or take fire.

Leakage Current Hot Check Circuit



When 25A is impressed between Earth and 2nd Ground for 1 second, Resistance must be less than 0.1

*Base on Adjustment standard

• Replaceable batteries

\triangle CAUTION

RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE.
DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.
REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE.

ADVARSEL

Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandøren.

注意

電池を誤って交換すると爆発する危険があります。
必ず同一又は同等のタイプのもものと交換して下さい。

SERVICING PRECAUTIONS

CAUTION: Before servicing receivers covered by this service manual and its supplements and addenda, read and follow the SAFETY PRECAUTIONS on page 3 of this publication.

NOTE: If unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions on page 3 of this publication, always follow the safety precautions. Remember: Safety First.

General Servicing Precautions

1. Always unplug the receiver AC power cord from the AC power source before;
 - a. Removing or reinstalling any component, circuit board module or any other receiver assembly.
 - b. Disconnecting or reconnecting any receiver electrical plug or other electrical connection.
 - c. Connecting a test substitute in parallel with an electrolytic capacitor in the receiver.
CAUTION: A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.

2. Test high voltage only by measuring it with an appropriate high voltage meter or other voltage measuring device (DVM, FETVOM, etc) equipped with a suitable high voltage probe. Do not test high voltage by "drawing an arc".

3. Do not spray chemicals on or near this receiver or any of its assemblies.

4. Unless specified otherwise in this service manual, clean electrical contacts only by applying the following mixture to the contacts with a pipe cleaner, cotton-tipped stick or comparable non-abrasive applicator; 10% (by volume) Acetone and 90% (by volume) isopropyl alcohol (90%-99% strength)
CAUTION: This is a flammable mixture.

Unless specified otherwise in this service manual, lubrication of contacts in not required.

5. Do not defeat any plug/socket B+ voltage interlocks with which receivers covered by this service manual might be equipped.
6. Do not apply AC power to this instrument and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.
7. Always connect the test receiver ground lead to the receiver chassis ground before connecting the test receiver positive lead.

Always remove the test receiver ground lead last.

8. Use with this receiver only the test fixtures specified in this service manual.
CAUTION: Do not connect the test fixture ground strap to any heat sink in this receiver.

Electrostatically Sensitive (ES) Devices

Some semiconductor (solid-state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed to prevent potential shock reasons prior to applying power to the

unit under test.

2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static type solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.
CAUTION: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

General Soldering Guidelines

1. Use a grounded-tip, low-wattage soldering iron and appropriate tip size and shape that will maintain tip temperature within the range or 500 °F to 600 °F.
2. Use an appropriate gauge of RMA resin-core solder composed of 60 parts tin/40 parts lead.
3. Keep the soldering iron tip clean and well tinned.
4. Thoroughly clean the surfaces to be soldered. Use a mall wire-bristle (0.5 inch, or 1.25cm) brush with a metal handle. Do not use freon-propelled spray-on cleaners.
5. Use the following unsoldering technique
 - a. Allow the soldering iron tip to reach normal temperature. (500 °F to 600 °F)
 - b. Heat the component lead until the solder melts.
 - c. Quickly draw the melted solder with an anti-static, suction-type solder removal device or with solder braid.
CAUTION: Work quickly to avoid overheating the circuit board printed foil.
6. Use the following soldering technique.
 - a. Allow the soldering iron tip to reach a normal temperature (500 °F to 600 °F)
 - b. First, hold the soldering iron tip and solder the strand against the component lead until the solder melts.
 - c. Quickly move the soldering iron tip to the junction of the component lead and the printed circuit foil, and hold it there only until the solder flows onto and around both the component lead and the foil.
CAUTION: Work quickly to avoid overheating the circuit board printed foil.
 - d. Closely inspect the solder area and remove any excess or splashed solder with a small wire-bristle brush.

IC Remove/Replacement

Some chassis circuit boards have slotted holes (oblong) through which the IC leads are inserted and then bent flat against the circuit foil. When holes are the slotted type, the following technique should be used to remove and replace the IC. When working with boards using the familiar round hole, use the standard technique as outlined in paragraphs 5 and 6 above.

Removal

1. Desolder and straighten each IC lead in one operation by gently prying up on the lead with the soldering iron tip as the solder melts.
2. Draw away the melted solder with an anti-static suction-type solder removal device (or with solder braid) before removing the IC.

Replacement

1. Carefully insert the replacement IC in the circuit board.
2. Carefully bend each IC lead against the circuit foil pad and solder it.
3. Clean the soldered areas with a small wire-bristle brush. (It is not necessary to reapply acrylic coating to the areas).

"Small-Signal" Discrete Transistor

Removal/Replacement

1. Remove the defective transistor by clipping its leads as close as possible to the component body.
2. Bend into a "U" shape the end of each of three leads remaining on the circuit board.
3. Bend into a "U" shape the replacement transistor leads.
4. Connect the replacement transistor leads to the corresponding leads extending from the circuit board and crimp the "U" with long nose pliers to insure metal to metal contact then solder each connection.

Power Output, Transistor Device

Removal/Replacement

1. Heat and remove all solder from around the transistor leads.
2. Remove the heat sink mounting screw (if so equipped).
3. Carefully remove the transistor from the heat sink of the circuit board.
4. Insert new transistor in the circuit board.
5. Solder each transistor lead, and clip off excess lead.
6. Replace heat sink.

Diode Removal/Replacement

1. Remove defective diode by clipping its leads as close as possible to diode body.
2. Bend the two remaining leads perpendicular to the circuit board.
3. Observing diode polarity, wrap each lead of the new diode around the corresponding lead on the circuit board.
4. Securely crimp each connection and solder it.
5. Inspect (on the circuit board copper side) the solder joints of the two "original" leads. If they are not shiny, reheat them and if necessary, apply additional solder.

Fuse and Conventional Resistor

Removal/Replacement

1. Clip each fuse or resistor lead at top of the circuit board hollow stake.
2. Securely crimp the leads of replacement component around notch at stake top.
3. Solder the connections.

CAUTION: Maintain original spacing between the replaced component and adjacent components and the circuit board to prevent excessive component temperatures.

Circuit Board Foil Repair

Excessive heat applied to the copper foil of any printed circuit board will weaken the adhesive that bonds the foil to the circuit board causing the foil to separate from or "lift-off" the board. The following guidelines and procedures should be followed whenever this condition is encountered.

At IC Connections

To repair a defective copper pattern at IC connections use the following procedure to install a jumper wire on the copper pattern side of the circuit board. (Use this technique only on IC connections).

1. Carefully remove the damaged copper pattern with a sharp knife. (Remove only as much copper as absolutely necessary).
2. Carefully scratch away the solder resist and acrylic coating (if used) from the end of the remaining copper pattern.
3. Bend a small "U" in one end of a small gauge jumper wire and carefully crimp it around the IC pin. Solder the IC connection.
4. Route the jumper wire along the path of the out-away copper pattern and let it overlap the previously scraped end of the good copper pattern. Solder the overlapped area and clip off any excess jumper wire.

At Other Connections

Use the following technique to repair the defective copper pattern at connections other than IC Pins. This technique involves the installation of a jumper wire on the component side of the circuit board.

1. Remove the defective copper pattern with a sharp knife. Remove at least 1/4 inch of copper, to ensure that a hazardous condition will not exist if the jumper wire opens.
2. Trace along the copper pattern from both sides of the pattern break and locate the nearest component that is directly connected to the affected copper pattern.
3. Connect insulated 20-gauge jumper wire from the lead of the nearest component on one side of the pattern break to the lead of the nearest component on the other side. Carefully crimp and solder the connections.
CAUTION: Be sure the insulated jumper wire is dressed so the it does not touch components or sharp edges.

SPECIFICATION

1. Application range

This specification is applied to the LW43B chassis.

3. Test method

- 1) Performance: LGE Monitor test method followed.
- 2) Demanded other specification
 - Safety : CE, IEC specification
 - EMC : CE, IEC

2. Requirement for Test

Each part is tested as below without special appointment.

- 1) Temperature: 25 °C ± 5 °C(77 °F ± 9 °F),
CST: 40 °C ± 5 °C
- 2) Relative Humidity: 65 % ± 10 %
- 3) Power Voltage
: Standard input voltage (AC 100 - 240 V~, 50 / 60 Hz)
- * Standard Voltage of each products is marked by models.
- 4) Specification and performance of each parts are followed each drawing and specification by part number in accordance with BOM.
- 5) The receiver must be operated for about 5 minutes prior to the adjustment.

4. General Specification

4.1. General Specification

No.	Item	Content	Remark
1	HDMI Input (2EA)	HDMI	Rear / support D-TV&PC resolution
2	DVI Input (1EA)	DVI	
3	DP Input(1EA)/Output(1EA)	DP	Rear / support D-TV&PC resolution
4	Audio Input (1EA)	DVI Audio	L/R Input
5	OPS Input(1EA)	OPS(Open Pluggable Specification: Built-in PC)	Optional Docking Port(OPS Kit Accessory)
6	Speaker Output (1EA)	Compatible with common speaker	10W*2Ch Output
7	IR&Brightness Sensor Input (1EA)	IR&Brightness Sensor	
8	Pixel Sensor Input (1EA)	Pixel Sensor	Optional
9	External USB (1EA)	Picture, Music, Movie, SVC	Device : Memory Stick, Mouse, Keyboard, Wi-Fi USB Dongle
10	RS-232C Input(1EA)/Output (1EA)	Display Control	
11	LAN(1EA)	RJ45, 100BASE-T	Network Connection for SuperSign-W/SuperSign-C
12	Local Key	^, v, +, -, √, S, √, Φ(Power)	8 keys

4.2. DVI-D, HDMI, Display Port (PC) Specification

No.	Item	Specification	Remarks
1	Supported Sync. Type	Digital	
2	Operating Frequency	Horizontal	30 - 83 kHz
		Vertical	60 Hz Only
3	Resolution	Max	1920 × 1080 @ 60 Hz
		Recommend	1920 × 1080 @ 60 Hz

5. Signal Timing (Supporting Resolution)

5.1. DVI, HDMI, Display Port (PC Mode)

No.	Section	Pol.	Dot Clock [MHz]	Frequency [kHz]/[Hz]	Total Cycle (E)	Display (A)	Front Porch(B)	Sync. (D)	Back Porch(F)	Resolution
1	H(Pixels)	-	25.175	31.469	800	640	16	96	48	640 x 480
	V(Lines)	-		59.94	525	480	10	2	33	
2	H(Pixels)	+	40.0	37.879	1056	800	40	128	88	800 x 600
	V(Lines)	+		60.317	628	600	1	4	23	
3	H(Pixels)	-	65.0	48.363	1344	1024	24	136	160	1024 x 768
	V(Lines)	-		60.0	806	768	3	6	29	
4	H(Pixels)	+	74.5	44.772	1664	1280	64	128	192	1280 x 720
	V(Lines)	+		59.855	748	720	3	5	20	
5	H(Pixels)	-	85.86	47.7	1800	1366	72	144	216	1366 x 768
	V(Lines)	-		60	795	768	1	3	23	
6	H(Pixels)	+	108.0	63.981	1688	1280	48	112	248	1280 x 1024
	V(Lines)	+		60.02	1066	1024	1	3	38	
7	H(Pixels)	-	146.25	65.290	2240	1680	104	176	280	1680 x 1050
	V(Lines)	+		59.954	1089	1050	3	6	30	
8	H(Pixels)	+	148.5	67.5	2200	1920	88	44	88	1920 x 1080
	V(Lines)	+		60	1125	1080	4	5	46	

5.2. HDMI, DisplayPort (DTV Mode)

* DVI Input dont support DTV Mode

No.	Specification				Remark
	Resolution	H-freq(kHz)	V-freq(Hz)	Proposed	
1	480/60P	31.5	60	EDTV 480p	
2	576/50P	31.25	50	EDTV 576p	
3	720/50P	37.5	50	HDTV 720p	
4	720/60P	45	60	HDTV 720p	
5	1080/50i	28.1	50	HDTV 1080i 50Hz	For Australian
6	1080/60i	33.75	60	HDTV 1080i 60Hz	
7	1080/50P	56.25	50	HDTV 1080P 50Hz	
8	1080/60P	67.5	60	HDTV 1080P 60Hz	

ADJUSTMENT INSTRUCTION

1. Application Range

This spec sheet is applied all of the Digital Signage Product with LW43B chassis.

2. Specification

- 1) Because this is not a hot chassis, it is not necessary to use an isolation transformer. However, the use of isolation transformer will help protect test instrument.
- 2) Adjustment must be done in the correct order.
- 3) The adjustment must be performed in the circumstance of $25\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ of temperature and $65\% \pm 10\%$ of relative humidity if there is no specific designation.
- 4) The input voltage of the receiver must keep AC 100-240 V~, 50/60 Hz.
- 5) At first Worker must turn on the SET by using Power Only key.
- 6) The receiver must be operated for about 5 minutes prior to the adjustment when module is in the circumstance of over 15.

In case of keeping module is in the circumstance of $0\text{ }^{\circ}\text{C}$, it should be placed in the circumstance of above $15\text{ }^{\circ}\text{C}$ for 2 hours.

In case of keeping module is in the circumstance of below $-20\text{ }^{\circ}\text{C}$, it should be placed in the circumstance of above $15\text{ }^{\circ}\text{C}$ for 3 hours.

Caution) When still image is displayed for a period of 20 minutes or longer (especially where W/B scale is strong. Digital pattern 13ch and/or Cross hatch pattern 09ch), there can some afterimage in the black level area

3. Adjustment items

3.1. Main PCBA Adjustments MAC Address

Download

- 1) ADC adjustment: Digital Only [does not apply]
 - 2) EDID / DDC Download.
 - 3) MAC Address Download
- * Remark

- Above adjustment items can be also performed in Final Assembly if needed. Adjustment items in both PCBA and final assembly stages can be checked by using the INSTART Menu → ADJUST CHECK.

3.2. Final Assembly adjustment

- 1) White Balance adjustment
- 2) RS-232C functionality check
- 3) Factory Option setting per destination
- 4) Shipment mode setting (IN-STOP)
- 5) GND and HI-POT test

3.3. Appendix.

- 1) Ship-out mode
- 2) Service Option Default
- 3) Tool option menu, USB Download (S/W Update, Option, service only)
- 4) ISP Download (Optional)

4. MAIN PCBA Adjustments

4.1. ADC Calibration [MS75A Model Digital Only Model: does not apply]

- An ADC calibration is not necessary because MAIN SoC (LGExxxx) is already calibrated from IC Maker
- If it needs to adjust manually, refer to appendix.

4.2. MAC Address

4.2.1. Equipment & Condition

- 1) Play file: keydownload.exe

4.2.2. Communication Port connection

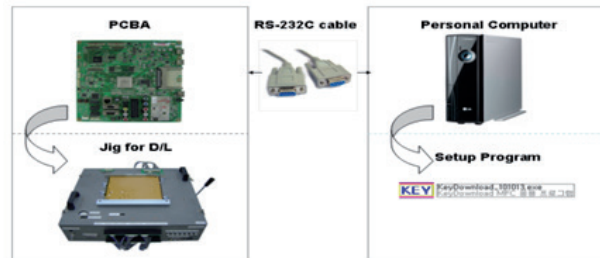
- 1) Key Write: Com 1,2,3,4 and 115200 (Baudrate)
- 2) Barcode: Com 1,2,3,4 and 9600 (Baudrate)

4.2.3. Download process

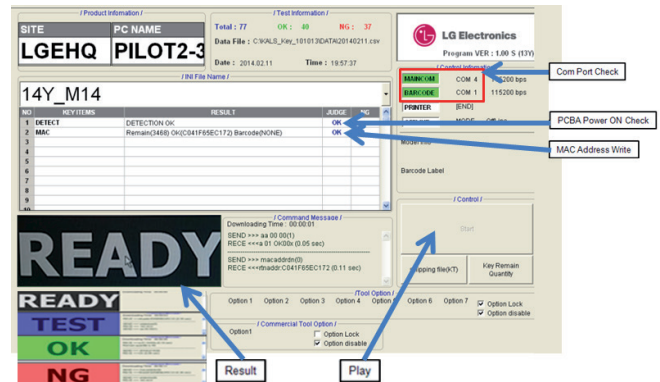
- 1) Select the download items.
- 2) Mode check: Online Only
- 3) Check the test process : DETECT → MAC_WRITE
- 4) Play: START
- 5) Check of result: Ready, Test, OK or NG

4.2.4. Communication Port connection

- 1) Connect : PCBA Jig → RS-232C Port == PC → RS-232C Port



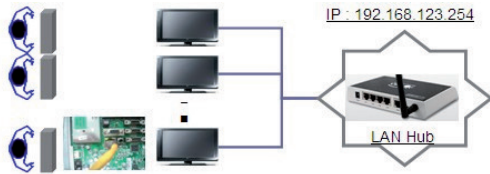
4.2.5. Download



4.3. LAN Inspection

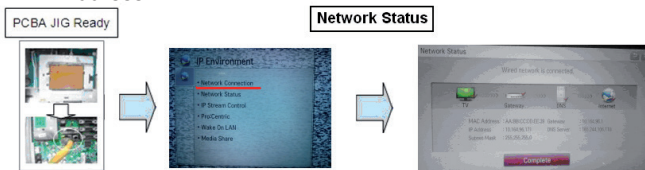
4.3.1. Equipment & Condition

- Each other connection to LAN Port of IP Hub and Jig



4.3.2. LAN inspection solution

- LAN Port connection with PCB
- Network setting at MENU Mode of SET (Installer Menu → 119 → 253 → Menu)
- Setting automatic IP
- Setting state confirmation
→ If automatic setting is finished, you confirm IP and MAC Address.



4.4. LAN PORT INSPECTION(PING TEST)

4.4.1. Equipment setting

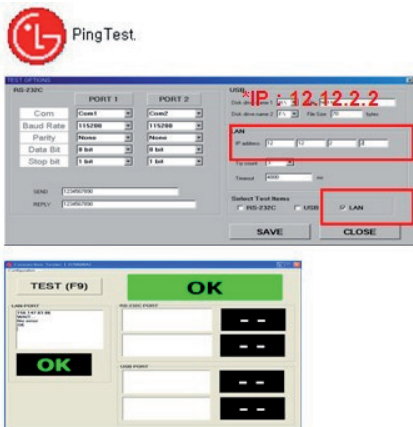
- Play the LAN Port Test PROGRAM.
- Input IP set up for an inspection to Test Program.
*IP Number : 12.12.2.2

Connect: SET-> LAN Port == PC-> LAN Port



4.4.2. LAN PORT inspection(PING TEST)

- Play the LAN Port Test Program.
- Connect each other LAN Port Jack.
- Play Test (F9) button and confirm OK Message.
- Remove LAN cable.



4.5 Serial number download

Connect Bar Code scan equipment and set by RS-232C cable.

1) E2PROM Data Write

CMD	LENGTH	ID_1	ID_2	DATA_1	...	DATA_N	CR
-----	--------	------	------	--------	-----	--------	----

- CMD : A0h
- LENGTH : 85 ~ 94h(1~16 BYTES)
- ID_1 : 73h('s')
- ID_2 : 1) Serial Number - 61h('a') 2) Model Name - 62h('b')
- CR : 0Dh
- RETURN : A0h + CR

2) E2PROM Data Read

CMD	LENGTH	ID_1	ID_2	CR
-----	--------	------	------	----

- CMD : A1h
- LENGTH : 85 ~ 94h(1~16 BYTES)
- ID_1 : 73h('s')
- ID_2 : 1) Serial Number - 61h('a') 2) Model Name - 62h('b')
- CR : 0Dh
- RETURN : DATA + CR

4.6 EDID/DDC Download (EDID PCM)

4.6.1 Overview

It is a VESA regulation. A PC or a MNT will display an optimal resolution through information sharing without any necessity of user input. It is a realization of "Plug and Play".

4.6.2 Equipment

- Since EDID data is embedded, EDID download JIG, HDMI cable and D-sub are not need.
- Adjust by using remote controller.

4.6.3 Download method

- Press Adj. key on the Adj. R/C,
- Select EDID D/L (PCM) menu.
- By pressing Enter key, EDID download will begin
- If Download is successful, OK is display, but If Download is failure, NG is displayed.
- If Download is failure, Re-try downloads.

→ Caution) When EDID Download, must remove HDMI / D-sub Cable.

4.6.4. EDID DATA

1) DVI (Check Sum : 0x3C)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	76	9E	01	01	01	01
10	1E	17	01	03	80	7A	45	78	EA	7C	5B	A6	54	4E	9A	26
20	0F	47	4A	A1	08	00	B3	00	81	40	81	80	71	40	61	40
30	45	40	31	40	81	C0	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	BF	AE	42	00	00	1E	66	21	56	AA	51	00	1E	30
50	46	8F	33	00	BF	AE	42	00	00	18	00	00	00	FD	00	38
60	3C	1E	53	0F	00	0A	20	20	20	20	20	20	20	00	00	FC
70	00	4C	47	20	53	49	47	4E	41	47	45	0A	20	20	00	3C

2) HDMI 1 (Check Sum : 0x3E, 0xA2)

0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	FF	FF	FF	FF	FF	FF	00	1E	6D	77	9E	01	01	01	01
10	1E	17	01	03	80	7A	45	78	EA	7C	5B	A6	54	4E	9A
20	0F	47	4A	A1	08	00	B3	00	81	40	81	80	71	40	61
30	45	40	31	40	81	C0	02	3A	80	18	71	38	2D	40	58
40	45	00	BF	AE	42	00	00	1A	66	21	56	AA	51	00	1E
50	46	8F	33	00	BF	AE	42	00	00	18	00	00	00	FD	00
60	3C	1E	53	0F	00	0A	20	20	20	20	20	20	20	00	00
70	00	4C	47	20	53	49	47	4E	41	47	45	0A	20	20	01
0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	02	03	1F	F1	4A	90	05	04	14	1F	12	03	13	02	11
10	09	07	07	83	01	00	00	67	03	0C	00	10	00	80	2D
20	3A	80	18	71	38	2D	40	58	2C	45	00	BF	AE	42	00
30	1E	01	1D	80	18	71	1C	16	20	58	2C	25	00	BF	AE
40	00	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00
50	AE	42	00	00	1E	01	1D	80	D0	72	1C	16	20	10	2C
60	80	BF	AE	42	00	00	9E	02	3A	80	D0	72	38	2D	40
70	2C	45	20	BF	AE	42	00	00	1E	00	00	00	00	00	A2

3) HDMI 2 (Check Sum : 0x3E, 0x92)

0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	FF	FF	FF	FF	FF	FF	00	1E	6D	77	9E	01	01	01	01
10	1E	17	01	03	80	7A	45	78	EA	7C	5B	A6	54	4E	9A
20	0F	47	4A	A1	08	00	B3	00	81	40	81	80	71	40	61
30	45	40	31	40	81	C0	02	3A	80	18	71	38	2D	40	58
40	45	00	BF	AE	42	00	00	1A	66	21	56	AA	51	00	1E
50	46	8F	33	00	BF	AE	42	00	00	18	00	00	00	FD	00
60	3C	1E	53	0F	00	0A	20	20	20	20	20	20	20	00	00
70	00	4C	47	20	53	49	47	4E	41	47	45	0A	20	20	01
0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	02	03	1F	F1	4A	90	05	04	14	1F	12	03	13	02	11
10	09	07	07	83	01	00	00	67	03	0C	00	10	00	80	2D
20	3A	80	18	71	38	2D	40	58	2C	45	00	BF	AE	42	00
30	1E	01	1D	80	18	71	1C	16	20	58	2C	25	00	BF	AE
40	00	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00
50	AE	42	00	00	1E	01	1D	80	D0	72	1C	16	20	10	2C
60	80	BF	AE	42	00	00	9E	02	3A	80	D0	72	38	2D	40
70	2C	45	20	BF	AE	42	00	00	1E	00	00	00	00	00	92

4) DP (Check Sum : 0x3C, 0xA2)

0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	FF	FF	FF	FF	FF	FF	00	1E	6D	77	9E	01	01	01	01
10	1E	17	01	04	80	7A	45	78	EA	7C	5B	A6	54	4E	9A
20	0F	47	4A	A1	08	00	B3	00	81	40	81	80	71	40	61
30	45	40	31	40	81	C0	02	3A	80	18	71	38	2D	40	58
40	45	00	BF	AE	42	00	00	1A	66	21	56	AA	51	00	1E
50	46	8F	33	00	BF	AE	42	00	00	18	00	00	00	FD	00
60	3C	1E	53	0F	00	0A	20	20	20	20	20	20	20	00	00
70	00	4C	47	20	53	49	47	4E	41	47	45	0A	20	20	01
0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	02	03	1F	F1	4A	90	05	04	14	1F	12	03	13	02	11
10	09	07	07	83	01	00	00	67	03	0C	00	10	00	80	2D
20	3A	80	18	71	38	2D	40	58	2C	45	00	BF	AE	42	00
30	1E	01	1D	80	18	71	1C	16	20	58	2C	25	00	BF	AE
40	00	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00
50	AE	42	00	00	1E	01	1D	80	D0	72	1C	16	20	10	2C
60	80	BF	AE	42	00	00	9E	02	3A	80	D0	72	38	2D	40
70	2C	45	20	BF	AE	42	00	00	1E	00	00	00	00	00	A2

5) OPS (Check Sum : 0x3E, 0x82)

0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	FF	FF	FF	FF	FF	FF	00	1E	6D	77	9E	01	01	01	01
10	1E	17	01	03	80	7A	45	78	EA	7C	5B	A6	54	4E	9A
20	0F	47	4A	A1	08	00	B3	00	81	40	81	80	71	40	61
30	45	40	31	40	81	C0	02	3A	80	18	71	38	2D	40	58
40	45	00	BF	AE	42	00	00	1A	66	21	56	AA	51	00	1E
50	46	8F	33	00	BF	AE	42	00	00	18	00	00	00	FD	00
60	3C	1E	53	0F	00	0A	20	20	20	20	20	20	20	00	00
70	00	4C	47	20	53	49	47	4E	41	47	45	0A	20	20	01
0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	02	03	1F	F1	4A	90	05	04	14	1F	12	03	13	02	11
10	09	07	07	83	01	00	00	67	03	0C	00	10	00	80	2D
20	3A	80	18	71	38	2D	40	58	2C	45	00	BF	AE	42	00
30	1E	01	1D	80	18	71	1C	16	20	58	2C	25	00	BF	AE
40	00	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00
50	AE	42	00	00	1E	01	1D	80	D0	72	1C	16	20	10	2C
60	80	BF	AE	42	00	00	9E	02	3A	80	D0	72	38	2D	40
70	2C	45	20	BF	AE	42	00	00	1E	00	00	00	00	00	82

5. Final Assembly Adjustment

5.1. White Balance Adjustment

5.1.1. Overview

5.1.1.1. W/B adj. Objective & How-it-works

- Objective: To reduce each Panel's W/B deviation
- How-it-works : When R/G/B gain in the OSD is at 192, it means the panel is at its Full Dynamic Range. In order to prevent saturation of Full Dynamic range and data, one of R/G/B is fixed at 192, and the other two is lowered to find the desired value.
- Adjustment condition : normal temperature
 - Surrounding Temperature : 25 °C ± 5 °C
 - Warm-up time: About 5 Min
 - Surrounding Humidity : 20 % ~ 80 %
 - Before White balance adjustment, Keep power on status, don't power off

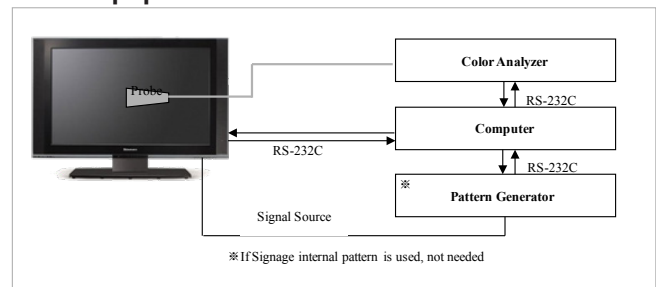
5.1.1.2. Adj. condition and cautionary items

- Lighting condition in surrounding area surrounding lighting should be lower 10 lux. Try to isolate adj. area into dark surrounding.
- Probe location: Color Analyzer (CA-210) probe should be within 10cm and perpendicular of the module surface (80°~100°)
- Aging time
 - After Aging Start, Keep the Power ON status during 5 Minutes.
 - In case of LCD, Back-light on should be checked using no signal or Full-white pattern.

5.1.2. Equipment

- Color Analyzer: CA-210 (NCG: CH 9 / WCG: CH12 / LED: CH14)
 - Adj. Computer(During auto adj., RS-232C protocol is needed)
 - Adjust Remocon
 - Video Signal Generator MSPG-925F 720p/204-Gray(Model:217, Pattern:49)
- * Only when internal pattern is not available
* Color Analyzer Matrix should be calibrated using CS-1000.

5.1.3. Equipment connection MAP



5.1.4. Adj. Command (Protocol)

- RS-232C Command used during auto-adjustment.

RS-232C COMMAND [CMD ID DATA]			Explanation
wb	00	00	Begin White Balance adjustment
wb	00	ff	End White Balance adjustment (internal pattern disappears)

Ex) wb 00 00 -> Begin white balance auto-adj.
 wb 00 10 -> Gain adj.
 ja 00 ff -> Adj. data
 jb 00 c0
 ...
 ...

wb 00 1f → Gain adj. completed

*(wb 00 20(Start), wb 00 2f(end)) → Off-set adj.

wb 00 ff → End white balance auto-adj.

- Adj. Map

	Adj. item	Command (lower caseASCII)		Data Range (Hex.)		Default (Decimal)
		CMD1	CMD2	MIN	MAX	
Cool	R Gain	j	G	00	C0	
	G Gain	j	H	00	C0	
	B Gain	j	I	00	C0	
	R Cut					
	G Cut					
	B Cut					
Medium	R Gain	j	A	00	C0	
	G Gain	j	B	00	C0	
	B Gain	j	C	00	C0	
	R Cut					
	G Cut					
	B Cut					
Warm	R Gain	j	D	00	C0	
	G Gain	j	E	00	C0	
	B Gain	j	F	00	C0	
	R Cut					
	G Cut					
	B Cut					

5.1.5. Adj. method

5.1.5.1 Auto WB calibration

- 1) Set in ADJ mode using P-ONLY key (or POWER ON key)
- 2) Place optical probe on the center of the display
 - It need to check probe condition of zero calibration before adjustment.
- 3) Connect RS-232C Cable
- 4) Select mode in ADJ Program and begin a adjustment.
- 5) When WB adjustment is completed with OK message, check adjustment status of pre-set mode (Cool, Medium, Warm)
- 6) Remove probe and RS-232C cable.
 - W/B Adj. must begin as start command "wb 00 00" , and finish as end command "wb 00 ff", and Adj. offset if need

5.1.5.2 Manual adjustment Method.

- 1) Set in Adj. mode using POWER ON
- 2) Zero Calibrate the probe of Color Analyzer, then place it on the center of LCD module within 10cm of the surface..
- 3) Press ADJ key → EZ adjust using adj. R/C → White-

Balance then press the cursor to the right (KEY ►). When KEY (►) is pressed 204 Gray (80IRE) internal patterns will be displayed.

4) Adjust Cool modes

- Fix the one of R/G/B gain to 192 (default data) and decrease the others. (If G gain is adjusted over 172 and R and B gain less than 192 , Adjust is O.K.)
- If G gain is less than 172, Increase G gain by up to 172, and then increase R gain and G gain same amount of increasing G gain.

- If R gain or B gain is over 255, Readjust G gain less than 172, Conform to R gain is 255 or B gain is 255

5) Adj. is performed in COOL, MEDIUM, WARM 3 modes of color temperature.

6) Adj. is completed, Exit adjust mode using "EXIT" key on Remote controller.

- If internal pattern is not available, use RF input. In EZ Adj. menu 6.White Balance, you can select one of 2 Test-pattern : ON, OFF. Default is inner (ON). By selecting OFF, you can adjust using RF signal in 206 Gray pattern.

5.1.5.3 Adj. condition and cautionary items

- 1) Lighting condition in surrounding area Surrounding lighting should be lower 10 lux. Try to isolate adj. area into dark surrounding.
- 2) Probe location: CA-210 probe should be within 10cm and perpendicular of the module surface (80°~ 100°)
- 3) Aging time
 - After Aging Start, Keep the Power ON status during 5 Minutes.
 - In case of LCD, Back-light on should be checked using no signal or Full-white pattern.

5.1.6. Reference (White balance Adj. coordinate and color temperature)

- Luminance : 204 Gray (80IRE)
- Standard color coordinate and temperature using CA-210 (CH14) : [applied only LGD Module]

Mode	Coordinate		Temp	Δuv
	x	y		
Cool	0.271±0.002	0.270±0.002	13,000K	-0.003
Medium	0.286±0.002	0.289±0.002	9,300K	0.0000
Warm	0.313±0.002	0.329±0.002	6,500K	0.0000

- Standard color coordinate and temperature using CA-210(CH 14) – by aging time

1) Edge LED models (applied only LGD Module) in LGEKR (GUMI) And LGEKRS

Net Cast 3.0	Aging time (Min)	Cool		Medium		Warm	
		X	y	x	y	x	y
		271	270	286	289	313	329
1	0-2	276	278	291	297	318	337
2	3-5	275	276	290	295	317	335
3	6-9	274	275	289	294	316	334
4	10-19	273	274	288	293	315	333
5	20-35	272	273	287	292	314	332
6	36-49	272	272	287	291	314	331
7	50-79	271	271	286	290	313	330
8	80-119	271	270	286	289	313	329
9	Over 120	271	270	286	289	313	329

2) Edge Direct LED models (applied only LGD Module) in LGEKR (GUMI for Winter Season)

Net Cast	Aging time (Min)	Cool		Medium		Warm	
		X	y	x	y	x	y
3.0		271	270	286	289	313	329
1	0-2	280	282	295	301	322	341
2	3-5	279	281	294	300	321	340
3	6-9	278	280	293	299	320	339
4	10-19	277	279	292	298	319	338
5	20-35	276	277	291	296	318	336
6	36-49	274	275	289	294	316	334
7	50-79	273	273	288	292	315	332
8	80-119	272	271	287	290	314	320
9	Over 120	271	270	286	289	313	329

• Standard color coordinate and temperature using CA-210(CH-14) – by aging time

5.2. Ship-out mode check (In-stop)

• After final inspection, press In-Stop key of the Adj. R/C and check that the unit goes to Stand-by mode

6. Audio

6.1. Audio input condition

1) Only DVI PC Input

6.2. Specification

No.	Item	Min	Typ	Max	Unit	Remark
1.	Audio practical max Output, L/R (Distortion=10% max Output)	9.0	10.0	12.0	W	Measurement condition EQ Off AVL Off Clear Voice Off
		8.5	8.9	9.8	Vrms	
2.	Speaker (8Ω Impedance)		10.0	14.0	W	

7. GND and HI-POT Test

7.1. GND & HI-POT auto-check preparation

1) Check the POWER CABLE and SIGNAL CABLE insertion condition

7.2. GND & HI-POT auto-check

- 1) Pallet moves in the station. (POWER CORD / AV CORD is tightly inserted)
- 2) Connect the AV JACK Tester.
- 3) Controller (GWS103-4) on.
- 4) GND Test (Auto)
 - If Test is failed, Buzzer operates.
 - If Test is passed, execute next process (Hi-pot test). Remove A/V CORD from A/V JACK BOX

5) HI-POT test (Auto)

- If Test is failed, Buzzer operates.
- If Test is passed, GOOD Lamp on and move to next process automatically.

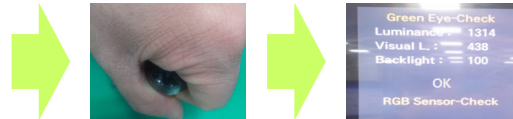
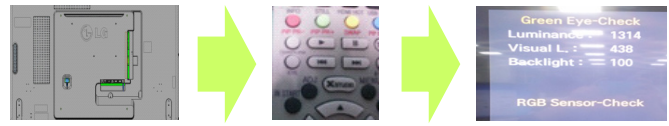
7.3. Checkpoint

- 1) Test voltage
 - GND: 1.5KV/min at 100mA
 - SIGNAL: 3KV/min at 100mA
- 2) TEST time: 1 second
- 3) TEST POINT
 - GND Test = POWER CORD GND and SIGNAL CABLE GND.
 - Hi-pot Test = POWER CORD GND and LIVE & NEUTRAL.
- 4) LEAKAGE CURRENT: At 0.5mArms

8. EYE Q Green Inspection

8.1 Method

- 1) Connect the Power and IR+Brightness Sensor cable to the set.
- 2) Turn on the Signage SET.
- 3) Press "P-Only → Exit → EYE" Button on the adjustment of R/C.

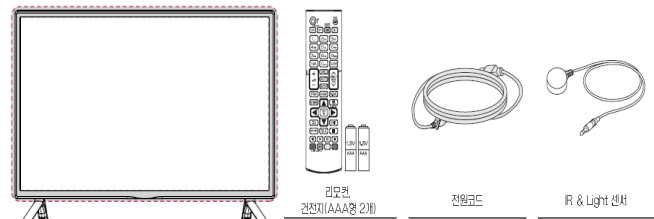


- 4) Green Eye-Check Box on the screen after 3 seconds.
 - 5) Cover the IR+Brightness Cable Assy with your hands, hold it for 3 second
 - 6) If normal operation is indicated the "OK " on the screen
 - 7) If the "NG ", replace the IR+Brightness Cable Assy or Sensor.
 - 8) Please test again after changing the cable.
 - 9) Please Press the In-Stop Button after completing the test.
- [Note] Check the sensor data on the screen, make certain that data is below 20. If data isn't below 20 in 3 seconds, EYE Q sensor would be bad. You should change EYE Q sensor.

8.2 Pixel Sensor Inspection Manual

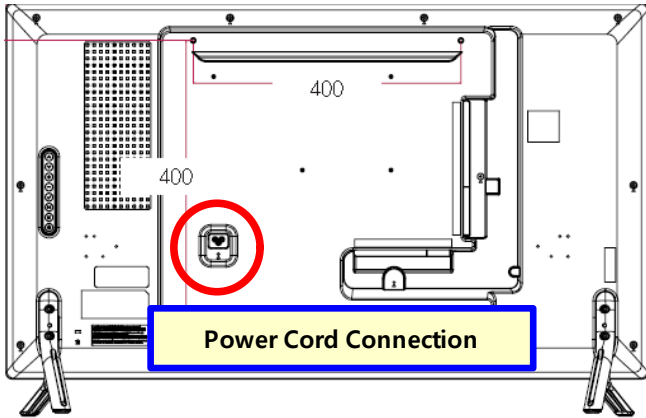
* Pixel Sensor Kit Parts

- SET / Power Cord / IR+Brightness Cable Assy / Remote Control

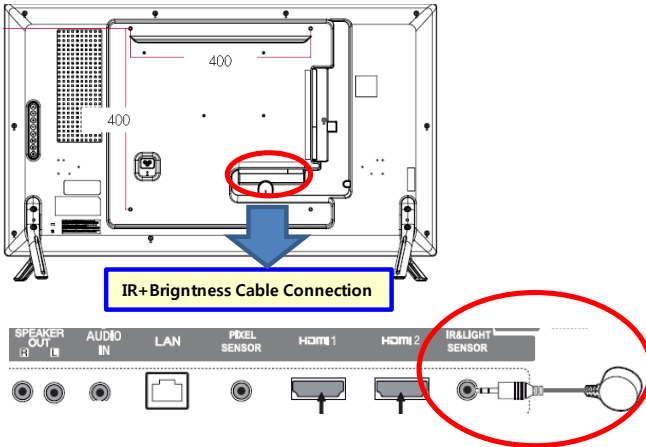


*** Method**

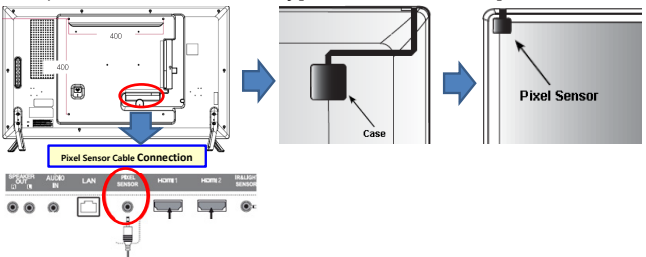
1) Connect the cable Assy[Power Cord] on the set.



2) Connect the cable Assy[IR+Brightness Cable] on the set.



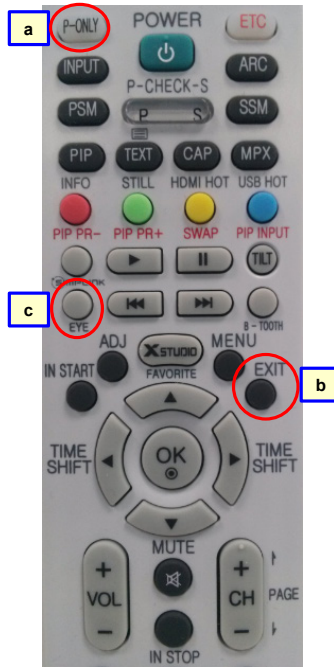
3) Connect the cable Assy[Pixel Sensor Cable] on the set.



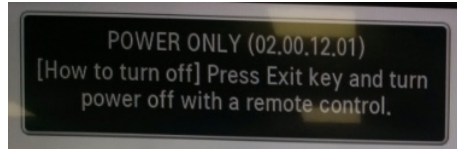
4) Turn on the Signage SET.



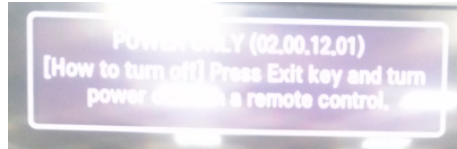
5) As follows: the remote control operation.



a. Press " P-ONLY " on the adjustment of R/C.



b. Press " EXIT " on the adjustment of R/C.



c. Press "EYE Button" on the adjustment of R/C
- Please Check the R,G,B pattern on the Screen.

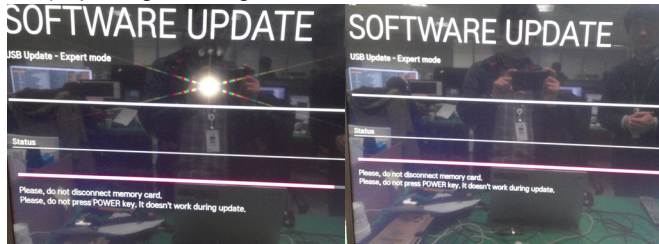


- Check the sensor data on the screen
- Please check RGB Sensor-Check On the screen.
OK : Pass . NG : Fail [Re-Run]



9. USB S/W Download(Service only)

- 1) Put the USB Stick to the USB socket
- 2) Automatically detecting update file in USB Stick
 - If your downloaded program version in USB Stick is lower than that of Signage set, it didn't work. Otherwise USB data is automatically detected.
- 3) Updating is starting.



- 4) Updating Completed, The Signage will restart automatically
- 5) If your Signage is turned on, check your updated version and Tool option.(explain the Tool option, next stage)
 - * If downloading version is more high than your Signage have, Signage can lost all channel data. In this case, you have to channel recover. If all channel data is cleared, you didn't have a DTV/ATV test on production line.

* After downloading, have to adjust Tool Option again.

- 1) Push "IN-START" key in service remote control.
- 2) Select "Tool Option 1" and push "OK" key.
- 3) Punch in the number. (Each model has their number)

10. Optional adjustments

10.1. Manual ADC Calibration

10.1.1. Equipment & Condition

- 1) Adjustment Remocon
- 2) 801GF (802B, 802F, 802R) or MSPG925FA Pattern Generator
 - Resolution: 480i Comp1 (MSPG-925FA: model-209, pattern-65)
 - Resolution: 1080p Comp1 (MSPG-925FA: model-225, pattern-65)
 - Resolution : 1080p RGB (MSPG-925FA: model-225, pattern-65)
 - Pattern: Horizontal 100% Color Bar Pattern
 - Pattern level: 0.7±0.1 Vp-p

10.1.2 Adjust method

10.1.2.1 ADC 480i/1080p Comp

[MS75A Model Digital Only Model: does not apply]

- 1) Check connected condition of Comp cable to the equipment
- 2) Give a 480i Mode, Horizontal 100% Color Bar Pattern to Comp1. (MSPG-925FA → Model: 209, Pattern: 65)
- 3) Change input mode as Component1 and picture mode as "Standard"
- 4) Press the In-start Key on the ADJ remote after at least 1 min of signal reception. Then, select 7.External ADC. And Press OK or Right Button for going to sub menu.
- 5) Press OK in Comp 480i menu
- 6) Give a 1080p Mode, Horizontal 100% Color Bar Pattern to Comp1. (MSPG-925FA → Model: 225, Pattern: 65)

- 7) Press OK in Comp 1080p menu
- 8) If ADC Comp is successful, "ADC Component Success" is displayed.
- 9) If ADC calibration is failure, "ADC Component Fail" is displayed.
- 10) If ADC calibration is failure, after rechecking ADC pattern or condition, retry calibration

10.2. Manual White balance Adjustment

10.2.1. Adj. condition and cautionary items

- 1) Lighting condition in surrounding area surrounding lighting should be lower 10 lux. Try to isolate adj. area into dark surrounding.
- 2) Probe location: Color Analyzer (CA-210) probe should be within 10cm and perpendicular of the module surface (80°~100°)
- 3) Aging time
 - After Aging Start, Keep the Power ON status during 5 Minutes.
 - In case of LCD, Back-light on should be checked using no signal or Full-white pattern.

10.2.2. Equipment

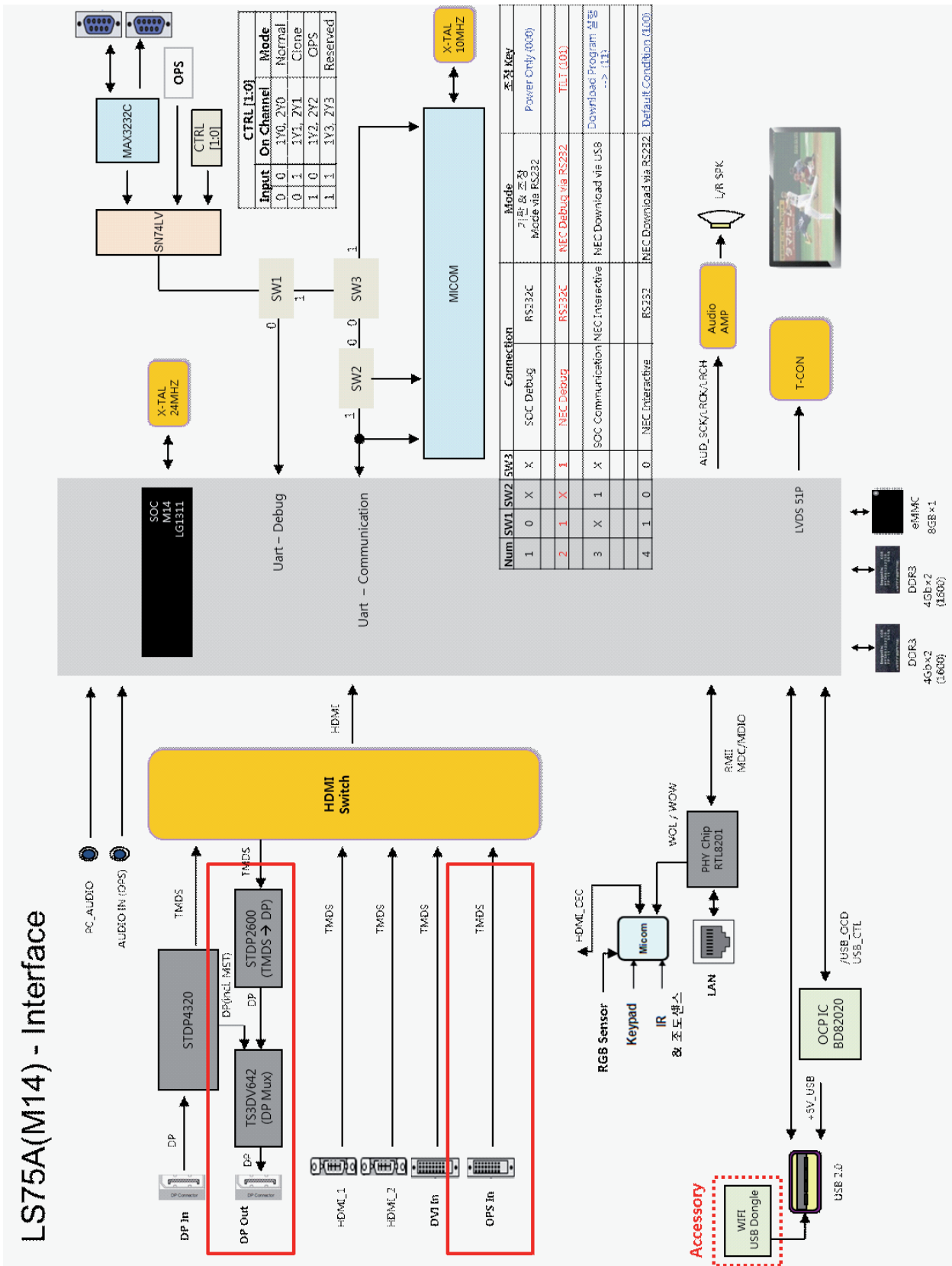
- 1) Color Analyzer: CA-210 (NCG: CH 9 / WCG: CH12 / LED: CH14)
- 2) Adj. Computer (During auto adj., RS-232C protocol is needed)
- 3) Adjust Remocon
- 4) Video Signal Generator MSPG-925F 720p/204-Gray (Model: 217, Pattern: 49)

10.2.3. Adjustment

[MS75A Model Digital Only Model: does not apply]


- 1) Set in Adj. mode using POWER ON
 - 2) Zero Calibrate the probe of Color Analyzer, then place it on the center of LCD module within 10cm of the surface.
 - 3) Press ADJ key → EZ adjust using adj. R/C → White-Balance then press the cursor to the right (KEY▶). When KEY(▶) is pressed 216 Gray internal pattern will be displayed.
 - 4) One of R Gain / G Gain / B Gain should be fixed at 192, and the rest will be lowered to meet the desired value.
 - 5) Adj. is performed in COOL, MEDIUM, WARM 3 modes of color temperature.
- If internal pattern is not available, use RF input. In EZ Adj. menu 6.White Balance, you can select one of 2 Test-pattern: ON, OFF. Default is inner(ON). By selecting OFF, you can adjust using RF signal in 216 Gray pattern.

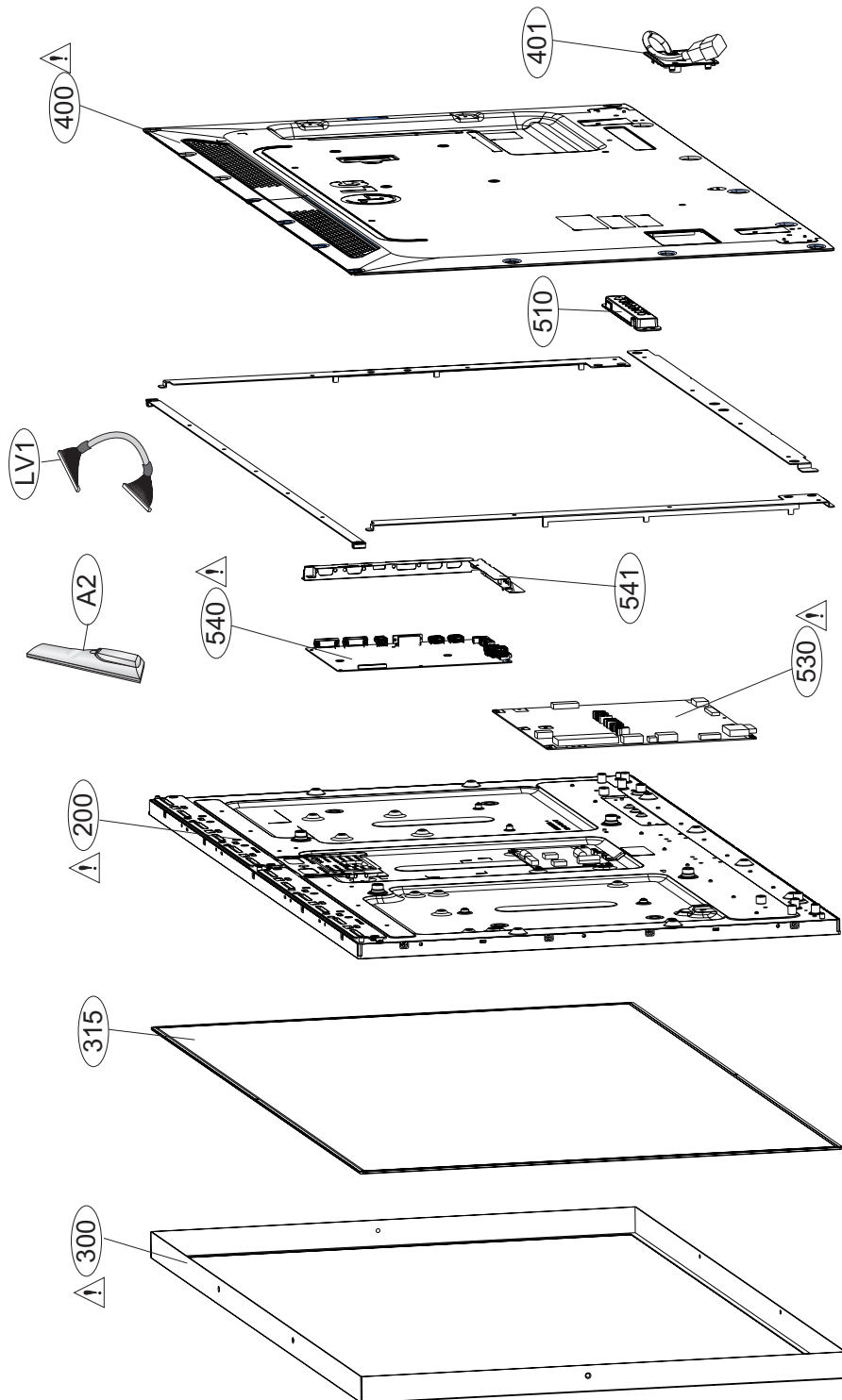
BLOCK DIAGRAM



EXPLODED VIEW

IMPORTANT SAFETY NOTICE

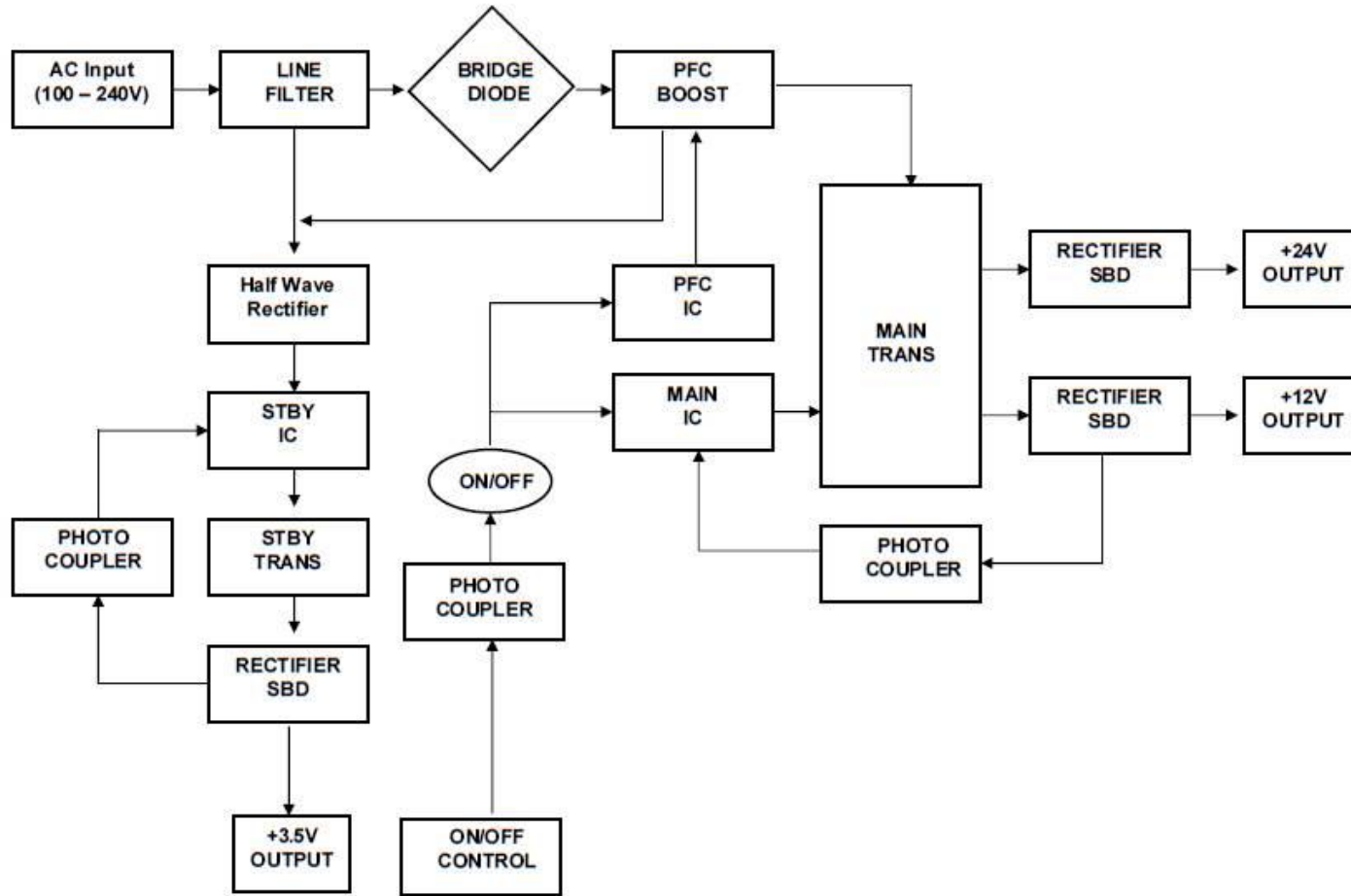
Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by  in the Schematic Diagram and EXPLODED VIEW. It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent Shock, Fire, or other Hazards. Do not modify the original design without permission of manufacturer.





M14(Signage) Training Manual

1. Power Block Diagram LPB

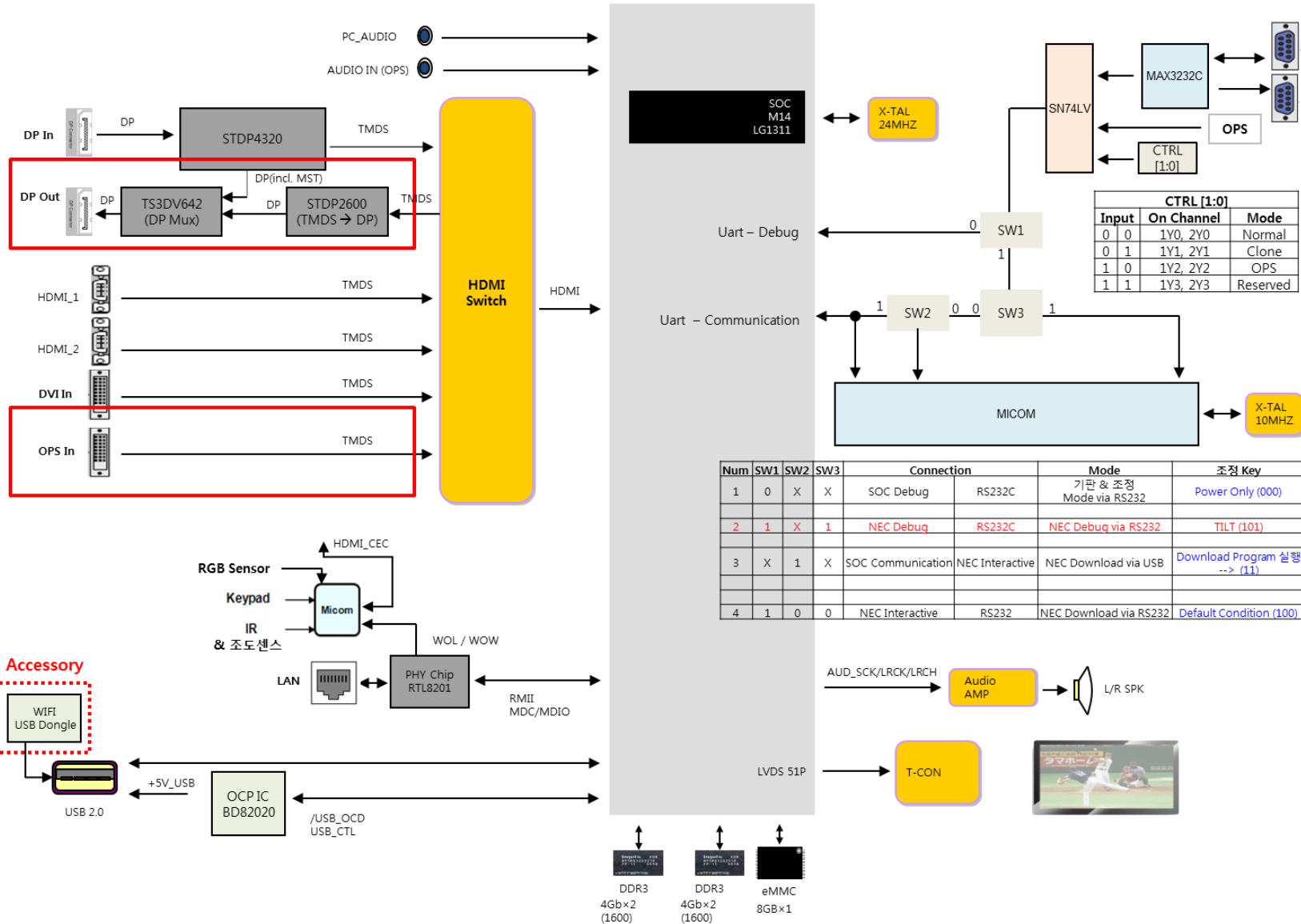


11SPH 4247" Monitor Power Specification

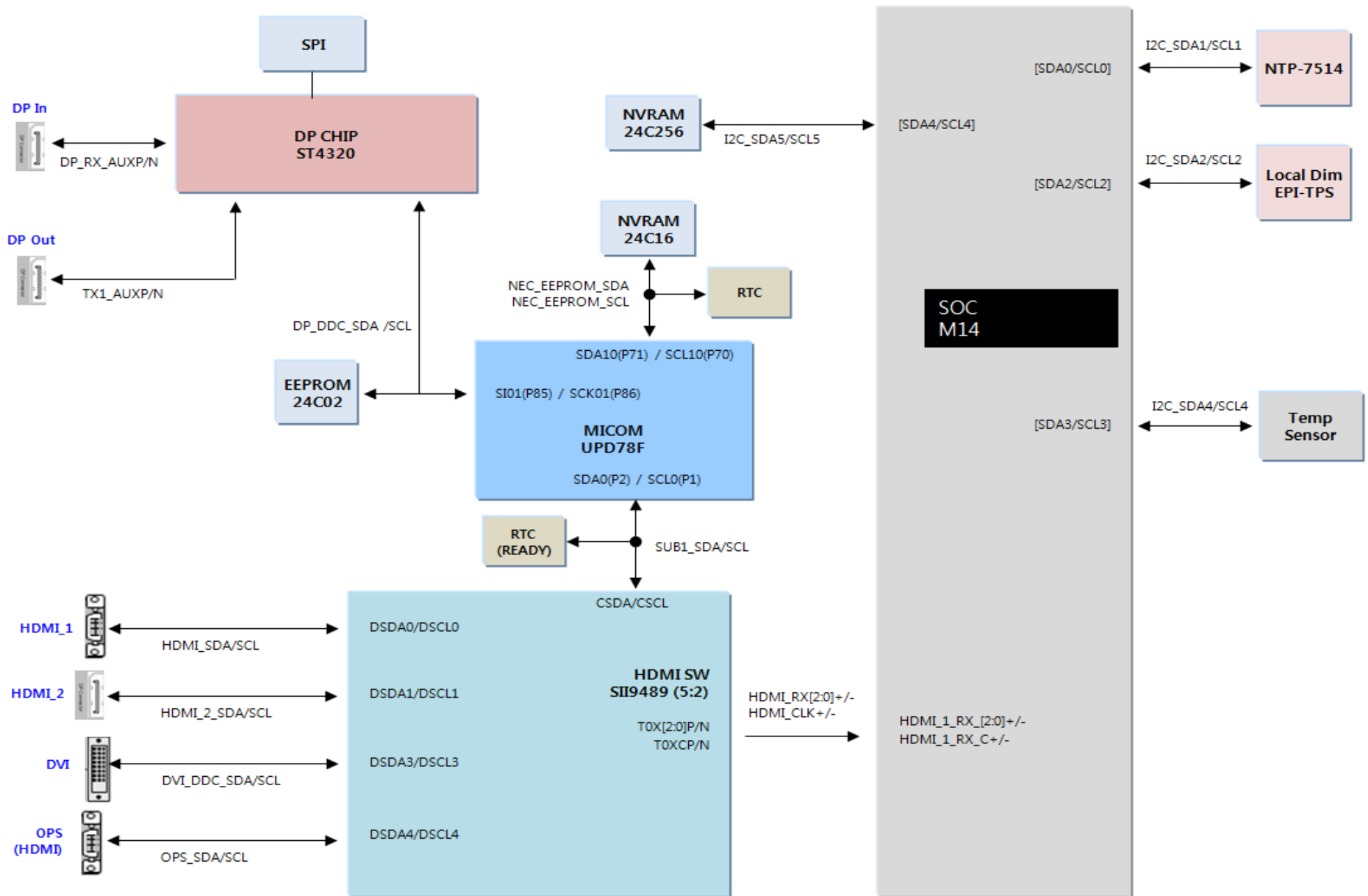
Rev 1.6

2-1. Block Diagram

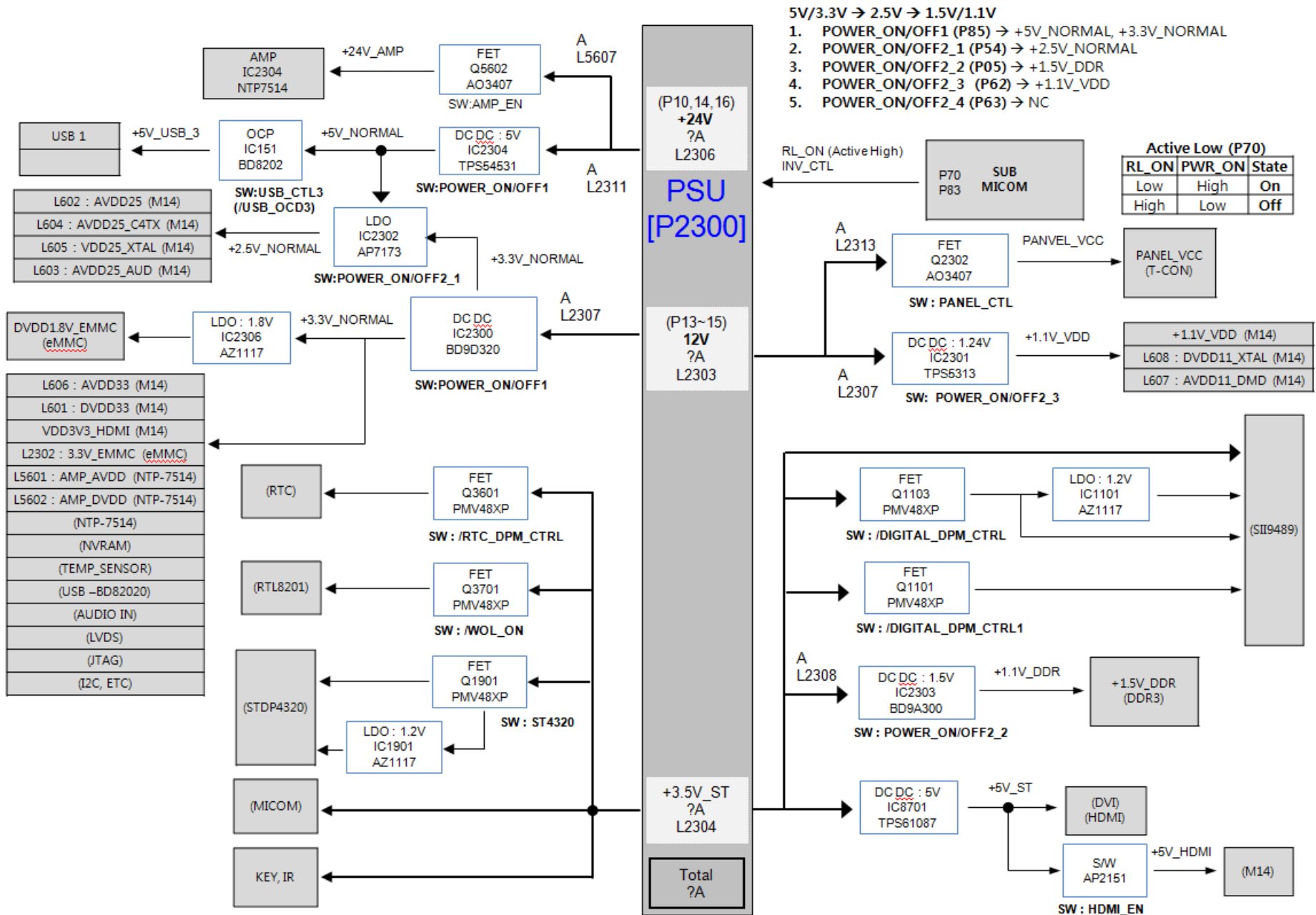
LS75A(M14) - Interface



2-2. I2C Map

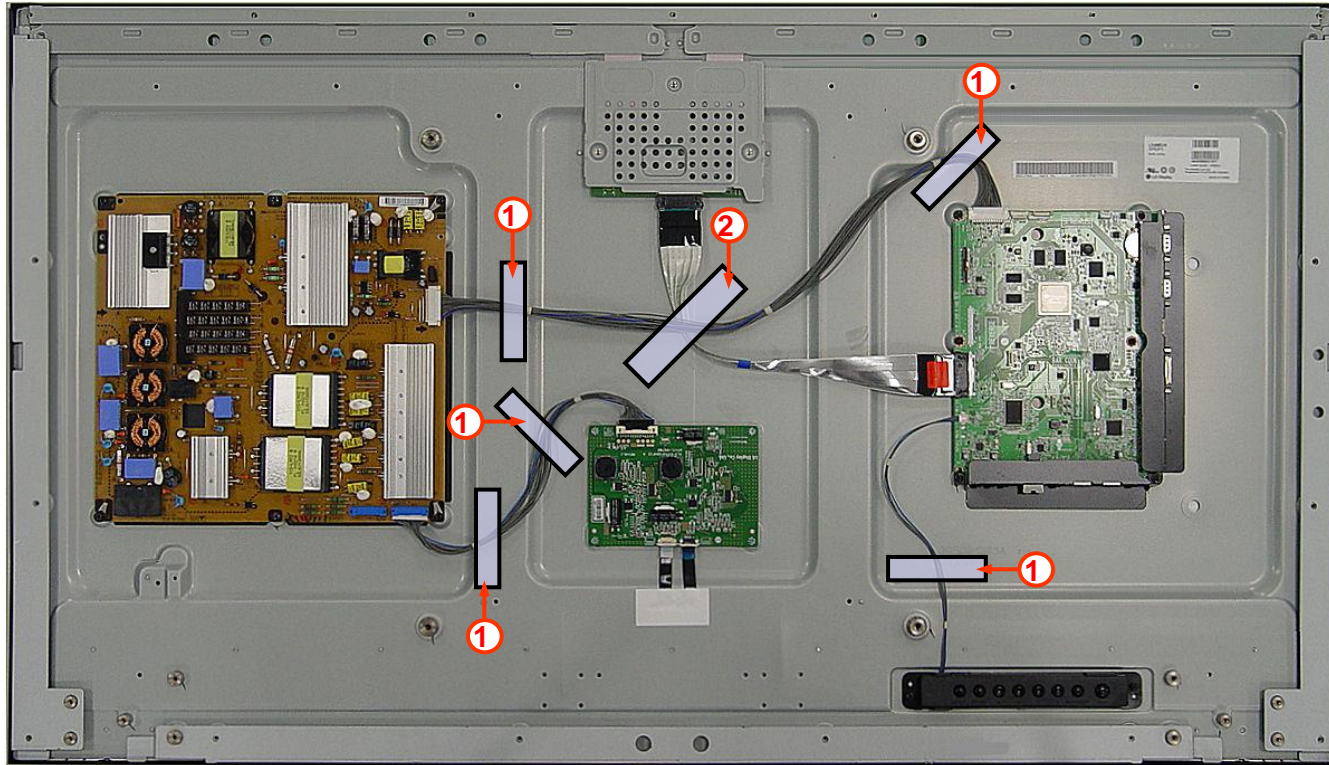


2-3. Main Power Block



3. Model Cable Dressing Tapes

49MS75A



- Wearing the Wrist strap while the working.
- * Using the clean gloves.(None pollution)
- Scrub the tape about 2-3 timesfor protecting come off the tape.
- * Be careful the taping position.

No	Part No	Description	Qty	Specification
①	RAB33632804	TAPE,POLYESTER	5 EA	POLYESTER 100% FR(FIRE RESISTANCE)/// GRAY 200UM 20mM 80mM SERVEONE CO., LTD.
②	RAB33632803	TAPE,POLYESTER	1 EA	POLYESTER 100% FR(FIRE RESISTANCE)// GRAY 200UM 30mM 120mM SERVEONE CO., LTD.

M14 Repair Process

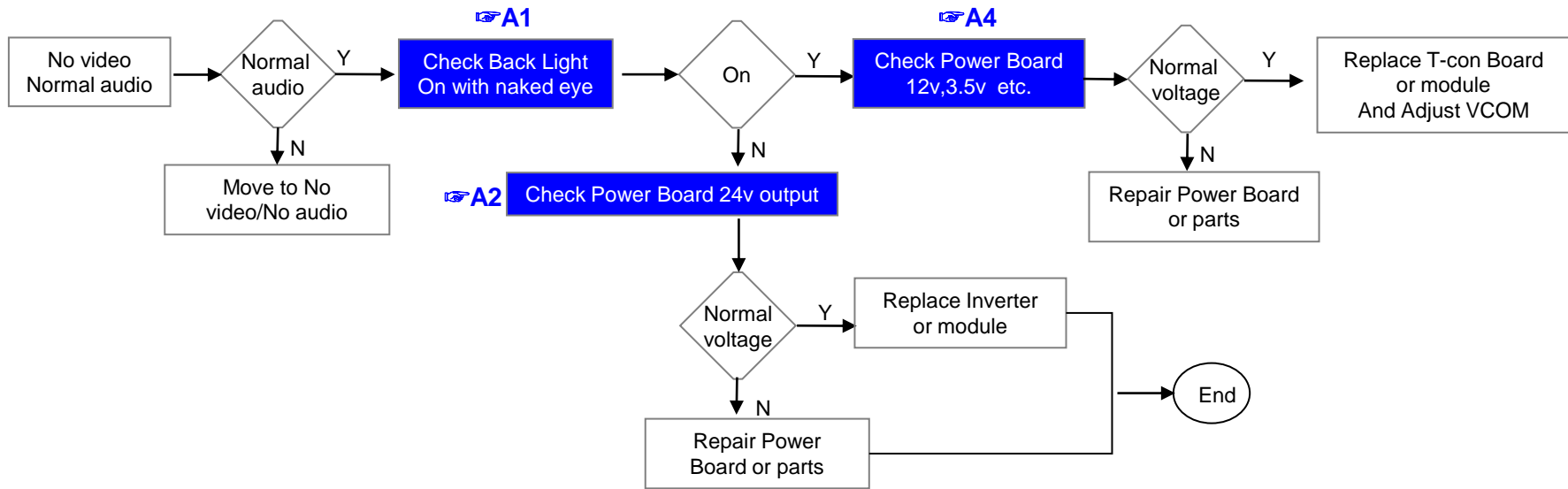
Contents of Monitor Signage Standard Repair Process

No.	Error symptom (High category)	Error symptom (Mid category)	Page	Remarks
1	A. Video error	No video/Normal audio	2	
2		No video/No audio	3	
3		Color error	4	
4		Vertical/Horizontal bar, residual image, light spot, external device color error	5	
5	B. Power error	No power	6	
6		Off when on, off while viewing, power auto on/off	7	
7	C. Audio error	No audio/Normal video	8	
8		Wrecked audio/discontinuation/noise	9	
9	D. Function error	Remote control & Local switch checking	10	
10		External device recognition error	11	
11	E. Noise	Circuit noise, mechanical noise	12	
12	F. Exterior error	Exterior defect	13	

First of all, Check whether there is SVC Bulletin in GCSC System for these model.

Signage Monitor	Error symptom	A. Video error	Established date	
		No video/ Normal audio	Revised date	1/13

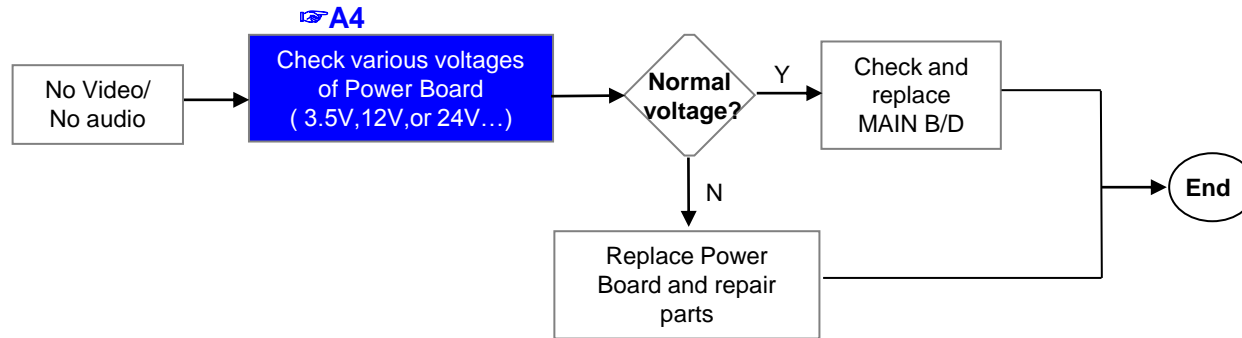
**First of all, Check whether all of cables between board is inserted properly or not.
(Main B/D↔ Power B/D, Power Cable, FFC LVDS Cable, Key Cable,,)**



※ Precaution A7 & A3

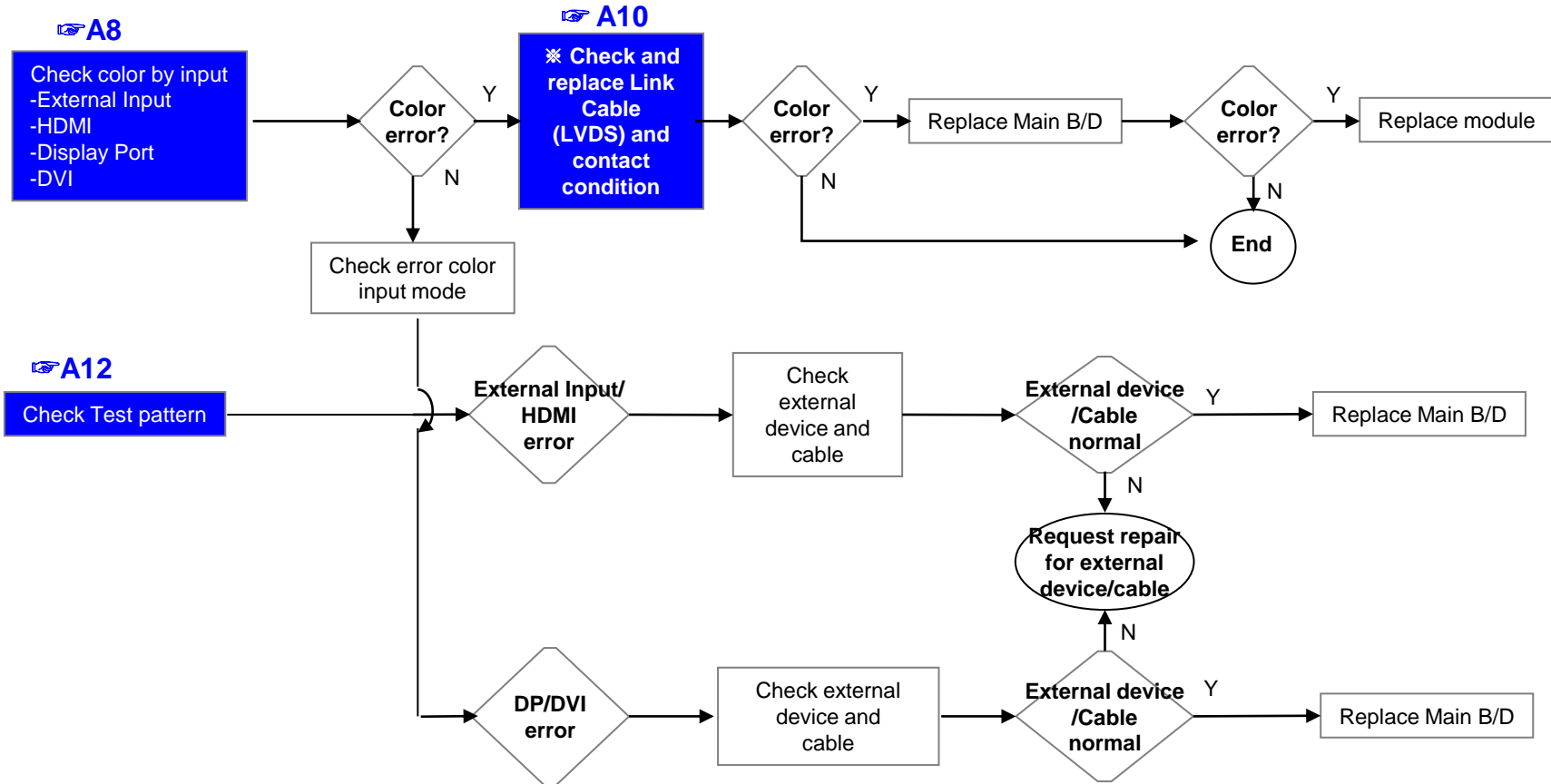


Signage Monitor	Error symptom	A. Video error	Established date	
		No video/ No audio	Revised date	2/13



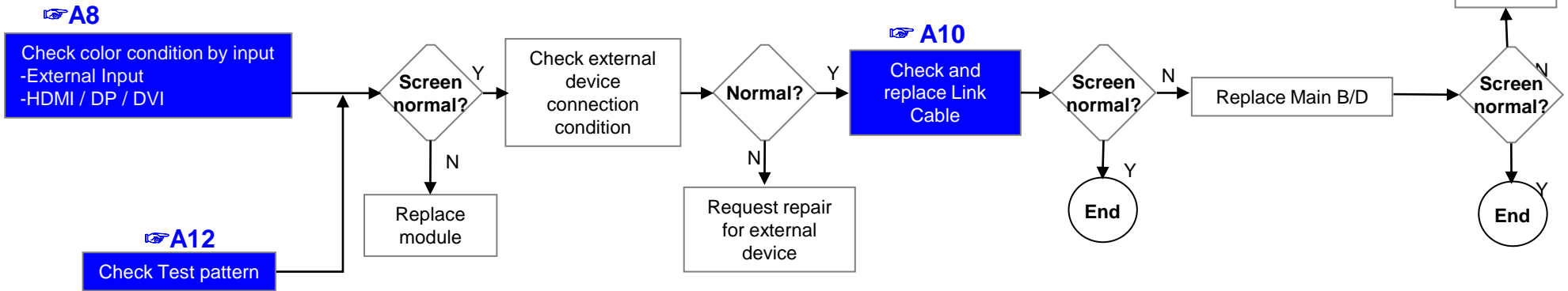
Standard Repair Process

Signage Monitor	Error symptom	A. Video error	Established date	
		Color error	Revised date	4/13

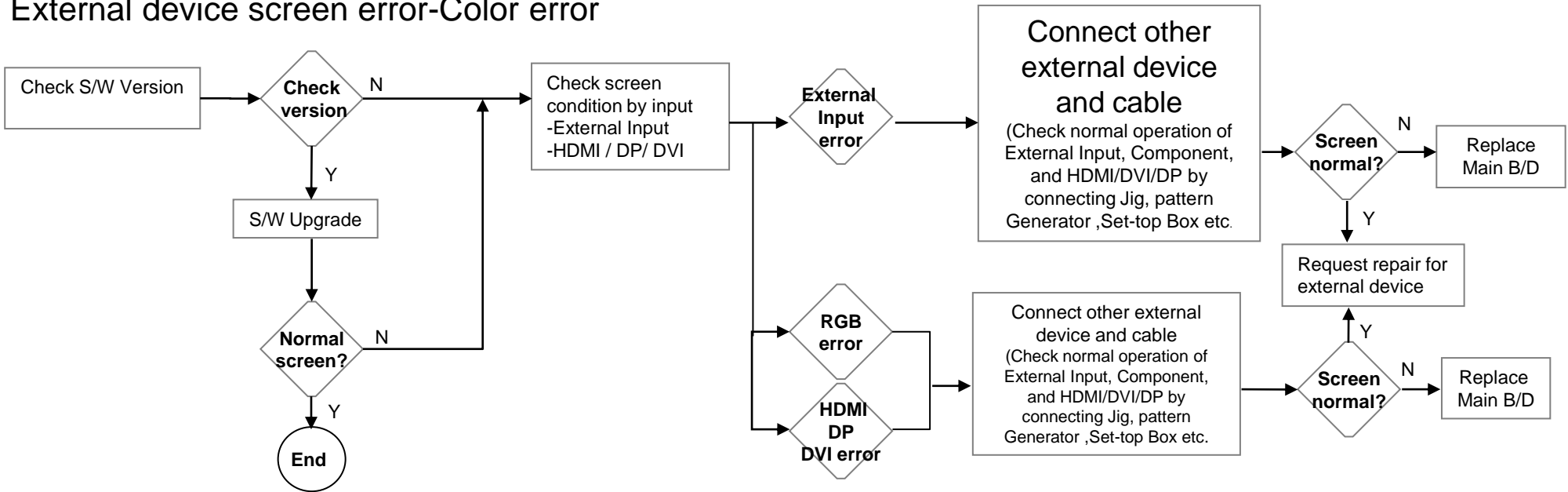


Signage Monitor	Error symptom	A. Video error	Established date	
		Vertical / Horizontal bar, residual image, light spot, external device color error	Revised date	5/13

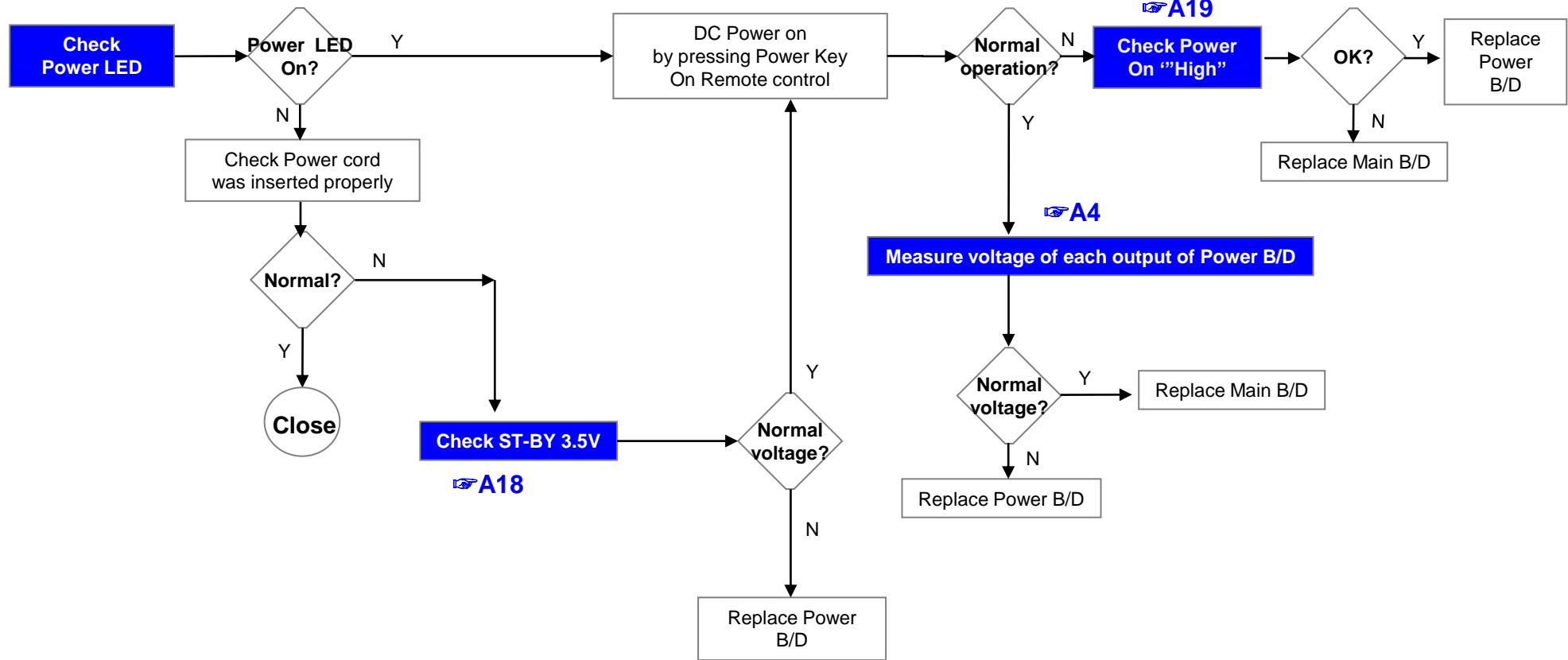
Vertical/Horizontal bar, residual image, light spot



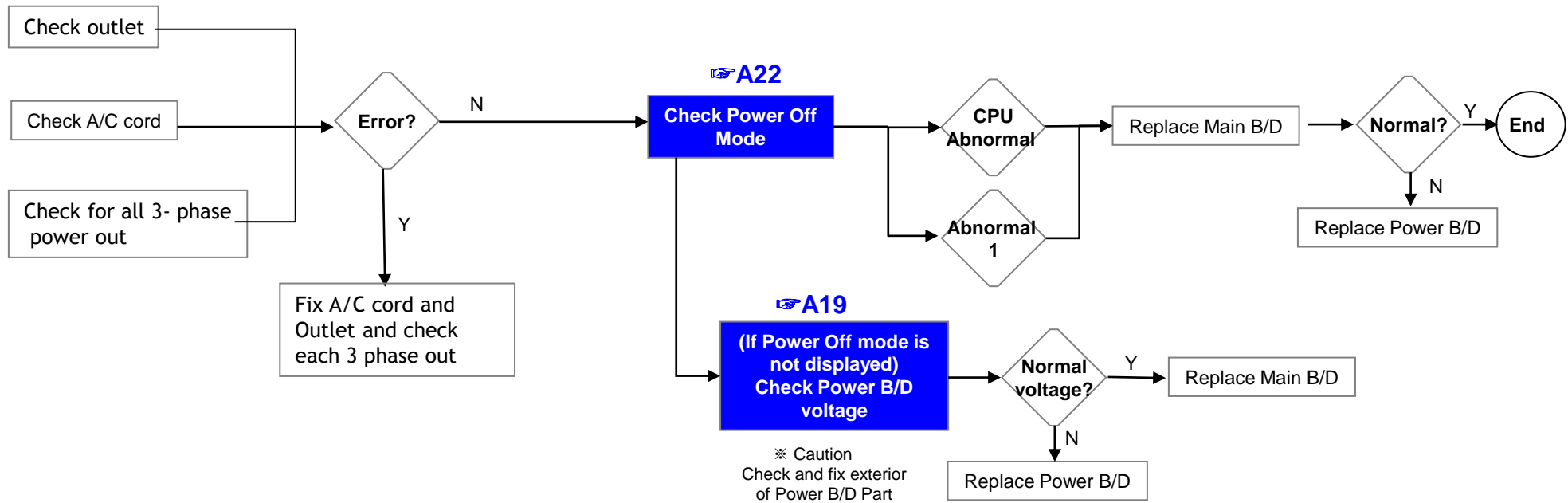
External device screen error-Color error



Signage Monitor	Error symptom	B. Power error	Established date	
		No power	Revised date	6/13



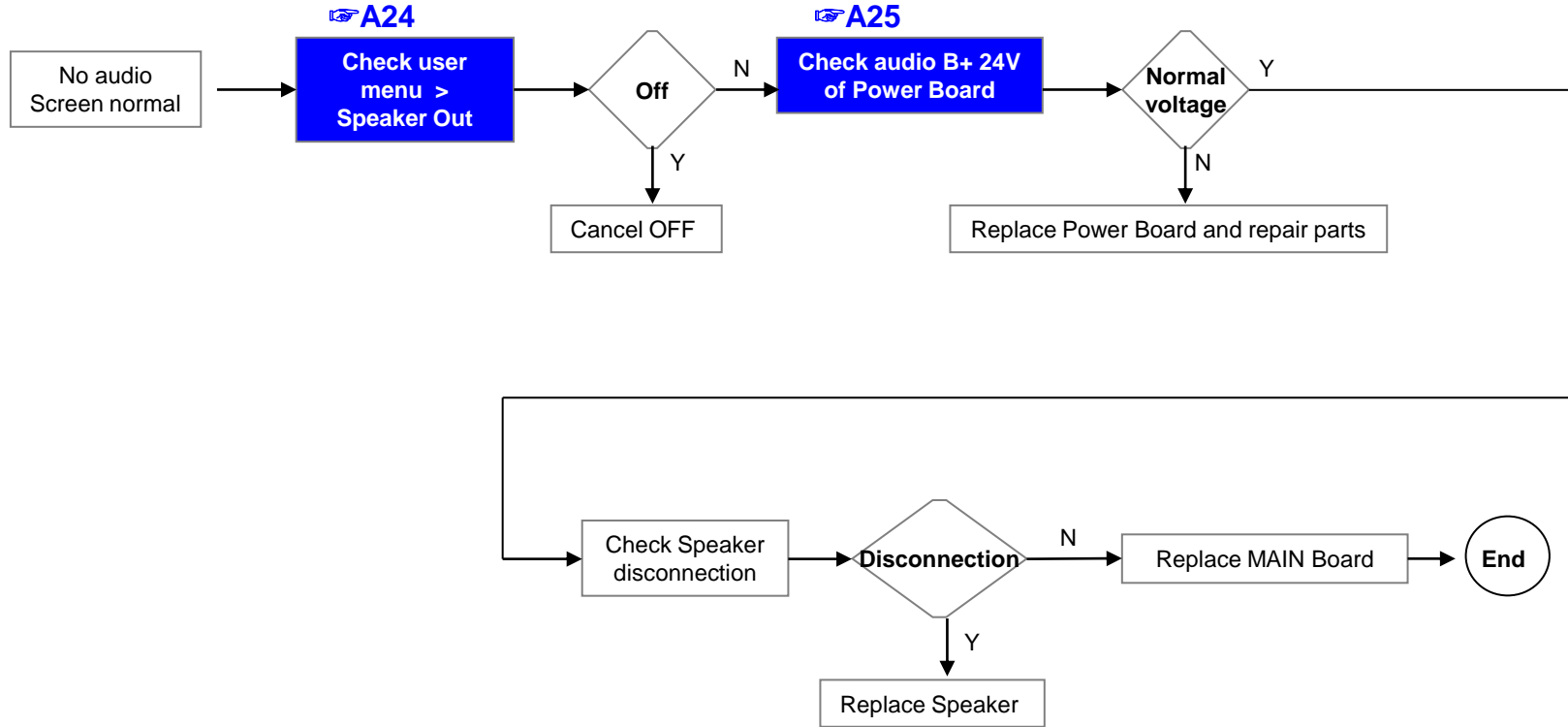
Signage Monitor	Error symptom	B. Power error	Established date	
		Off when on, off while viewing, power auto on/off	Revised date	7/13



* Please refer to the all cases which can be displayed on power off mode.

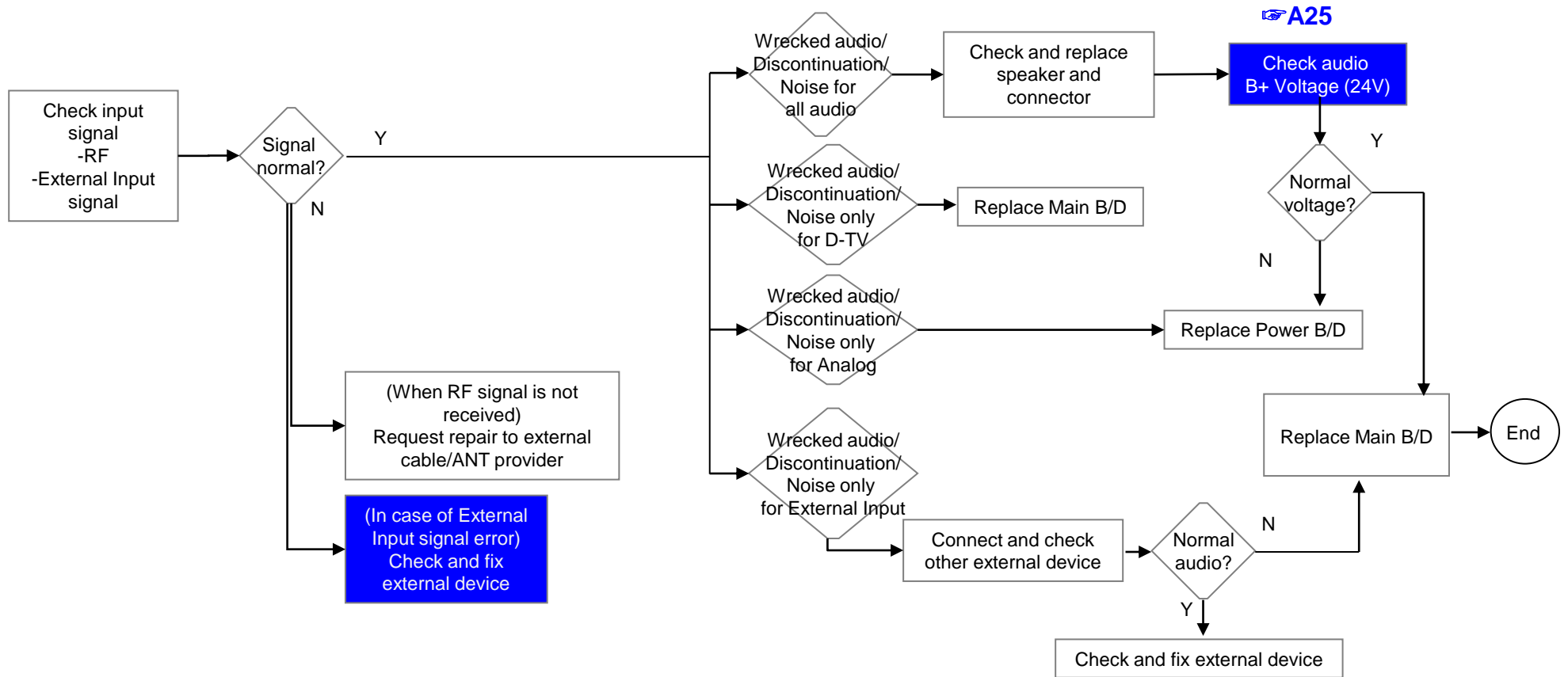
Status	Power off List	Explanation
Normal	"POWEROFF_REMOTEKEY"	Power off by REMOTE CONTROL
	"POWEROFF_OFFTIMER"	Power off by OFF TIMER
	"POWEROFF_SLEEPTIMER"	Power off by SLEEP TIMER
	"POWEROFF_INSTOP"	Power off by INSTOP KEY
	"POWEROFF_AUTOOFF"	Power off by AUTO OFF
	"POWEROFF_ONTIMER"	Power off by ON TIMER
	"POWEROFF_RS232C"	Power off by RS232C
	"POWEROFF_RESREC"	Power off by Reserved Record
	"POWEROFF_RECEND"	Power off by End of Recording
	"POWEROFF_SWDOWN"	Power off by S/W Download
	"POWEROFF_UNKNOWN"	Power off by unknown status except listed case
Abnormal	"POWEROFF_ABNORMAL1"	Power off by abnormal status except CPU trouble
	"POWEROFF_CPUABNORMAL"	Power off by CPU Abnormal

Signage Monitor	Error symptom	C. Audio error	Established date		
		No audio/ Normal video	Revised date		8/13



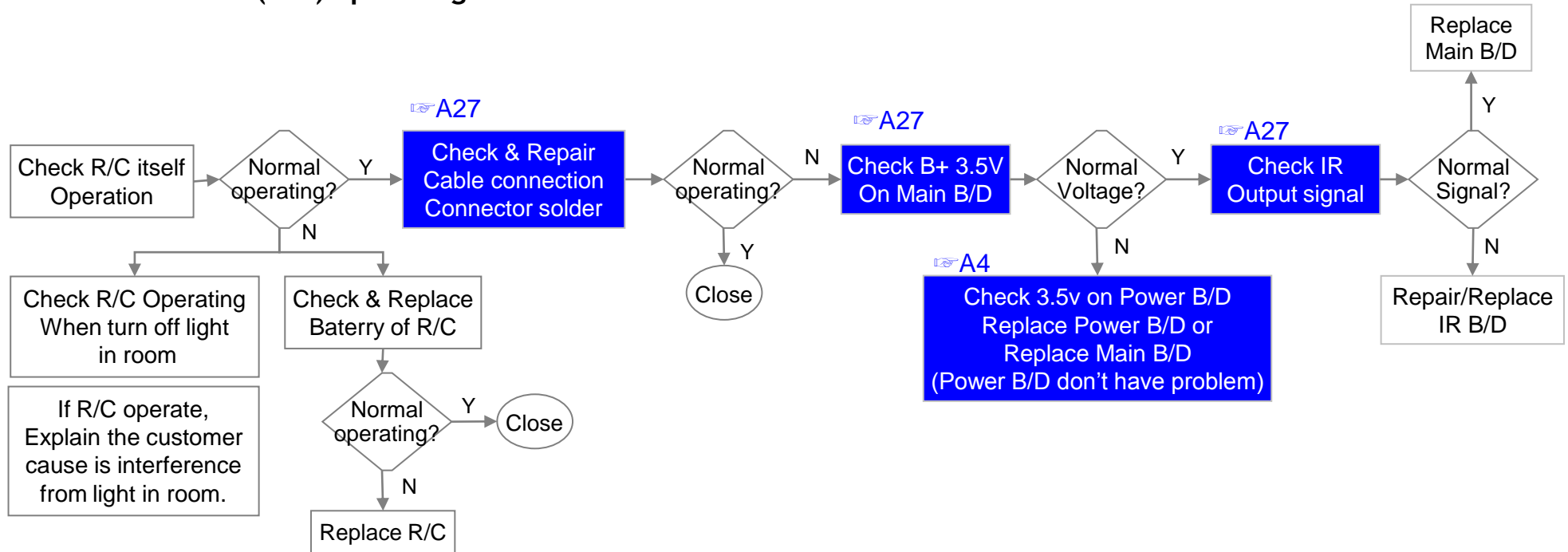
Signage Monitor	Error symptom	C. Audio error	Established date	
		Wrecked audio/ discontinuation/noise	Revised date	

→ abnormal audio/discontinuation/noise is same after “Check input signal” compared to No audio

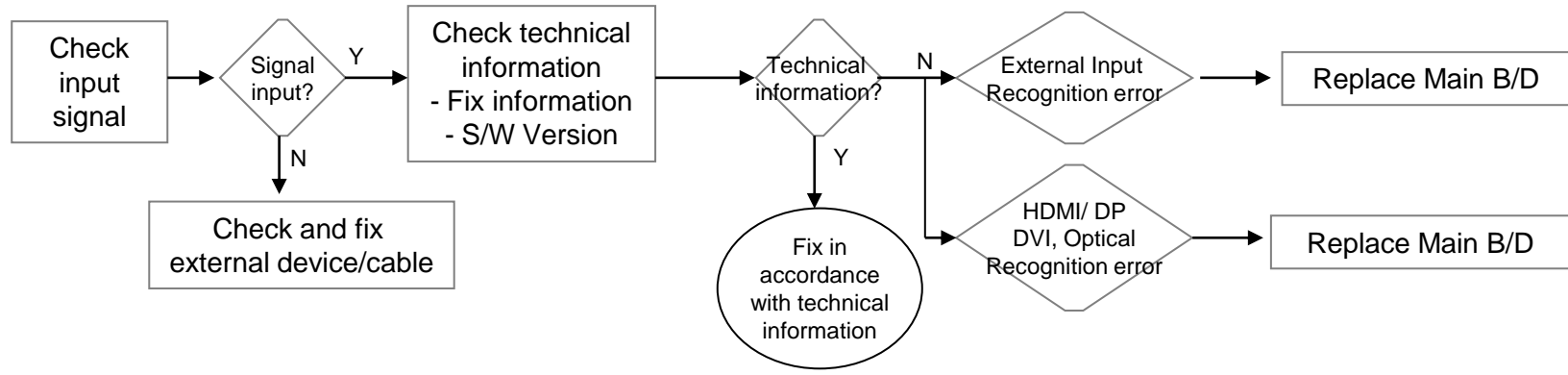


Signage Monitor	Error symptom	D. General Function Problem	Established date		
		Remote control & Local switch checking	Revised date		10/13

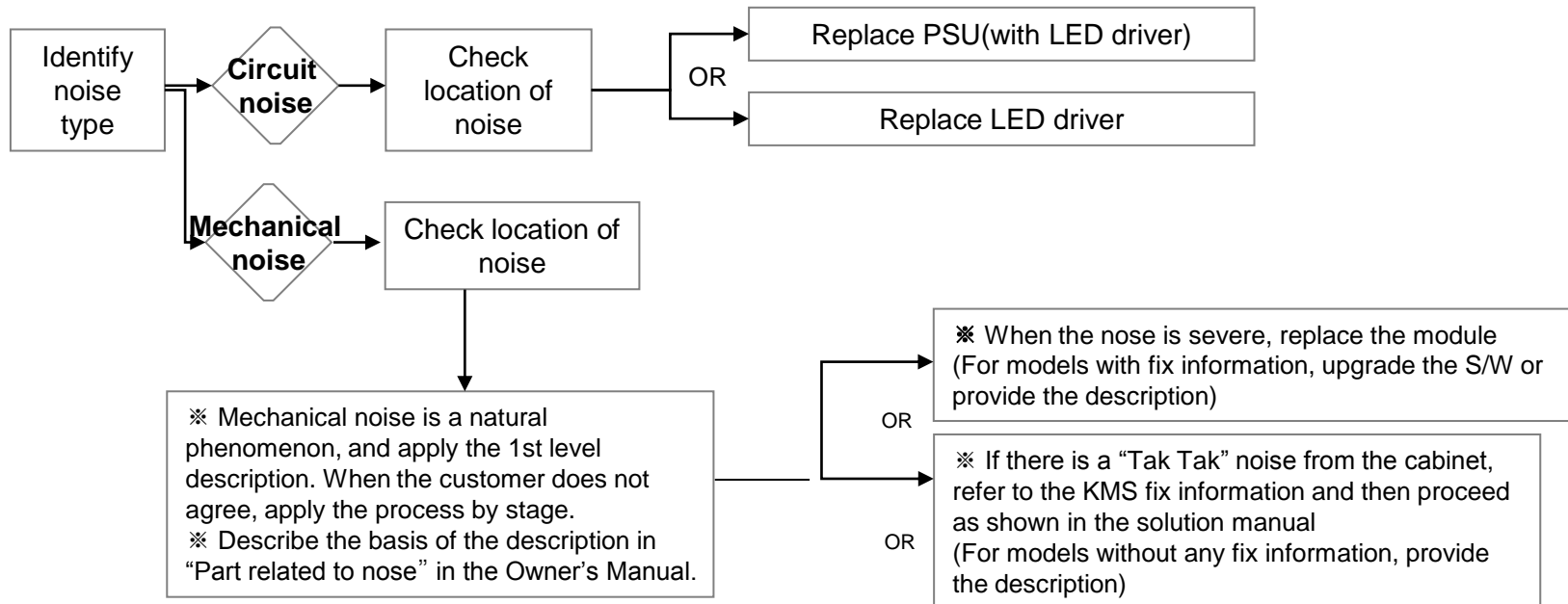
1. Remote control(R/C) operating error



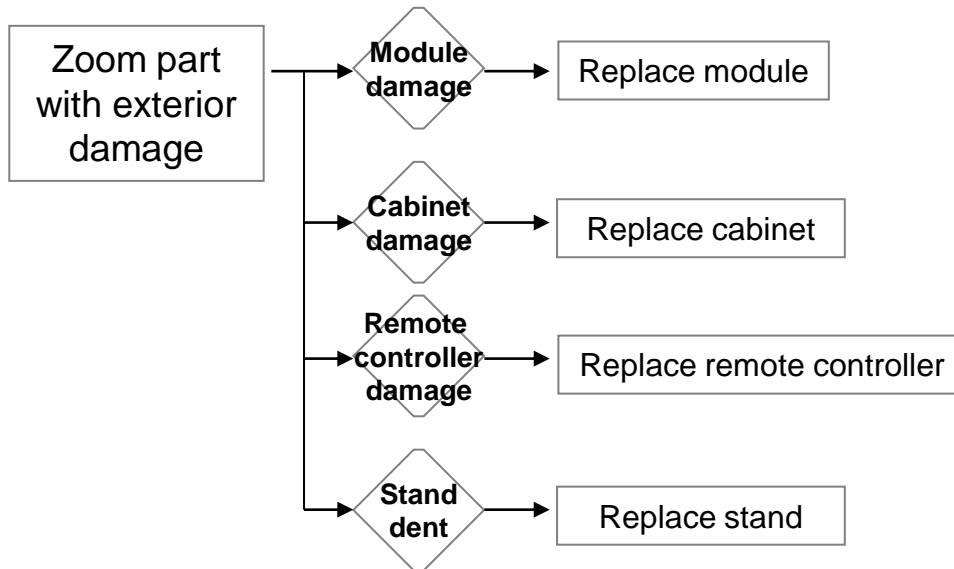
Signage Monitor	Error symptom	D. Function error	Established date		
		External device recognition error	Revised date		11/13



Signage Monitor	Error symptom	E. Noise	Established date		
		Circuit noise, mechanical noise	Revised date		12/13



Signage Monitor	Error symptom	F. Exterior defect	Established date		
		Exterior defect	Revised date		13/13



Contents of LCD TV Standard Repair Process Detail Technical Manual

No.	Error symptom	Content	Page	Remarks
1	A. Video error_ No video/Normal audio	Check LCD back light with naked eye	A1	
2		LED driver B+ 24V measuring method	A2	
3		Check White Balance value	A3	
4		Power Board voltage measuring method	A4	
5	A. Video error_Color error	LCD-TV Version checking method	A7	
6		LCD TV connection diagram	A8	
7		Check Link Cable (LVDS) reconnection condition	A10	
8		Adjustment Test pattern - ADJ Key	A12	
9	A. Video error_Vertical/Horizontal bar, residual image, light spot	Check Link Cable (LVDS) reconnection condition	A10 A11	
10		Adjustment Test pattern - ADJ Key	A12	
11	<Appendix>	Exchange LED driver Board (PSU)	A-3/5	
12	Defected Type caused by Main/ Inverter/ Module	Exchange Module itself (1)	A-4/5	
13		Exchange Module itself (2)	A-5/5	

Contents of LCD TV Standard Repair Process Detail Technical Manual

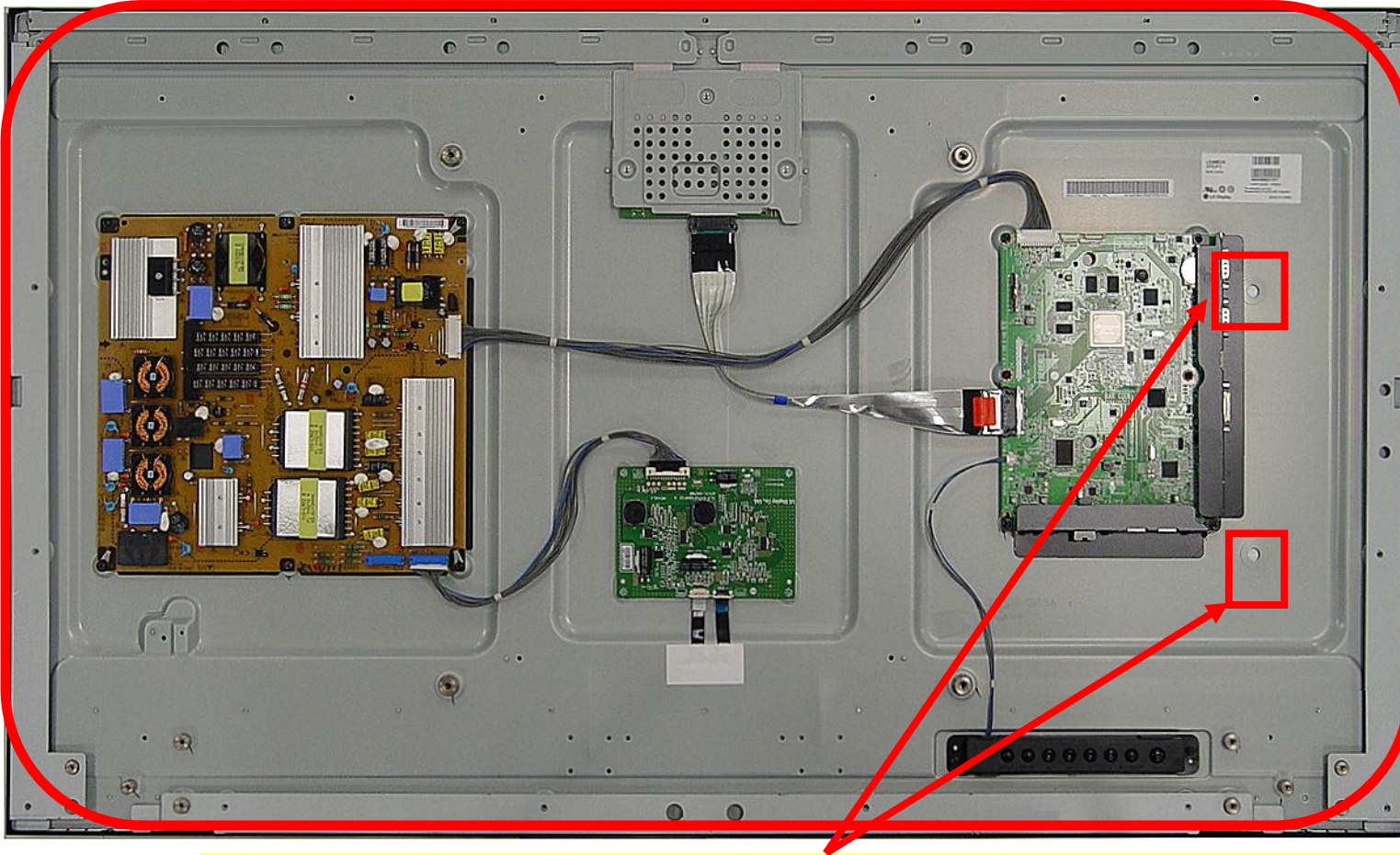
Continued from previous page

No.	Error symptom	Content	Page	Remarks
14	B. Power error_No power	Check power input Voltage & ST-BY 5V	A18	
15		Checking method when power is ON	A19	
16	B. Power error_Off when on, off while viewing	POWER OFF MODE checking method	A22	
17	C. Audio error_No audio/Normal video	Checking method in menu when there is no audio	A24	
18		Voltage and speaker checking method when there is no audio	A25	
19	D. Function error_ No response in remote controller, key error	Remote controller operation checking method	A27	

Standard Repair Process Detail Technical Manual

Signage Monitor	Error symptom	A. Video error_No video/Normal audio	Established date		
	Content	Check LCD back light with naked eye	Revised date		A1

<All MODELS>

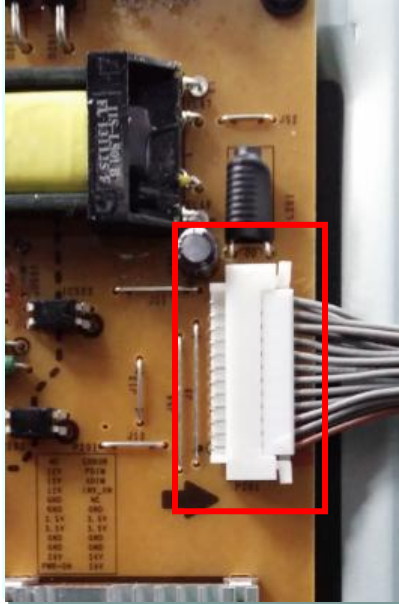


After turning on the power and disassembling the case, check with the naked eye, whether you can see light from module holes.

A1

Standard Repair Process Detail Technical Manual

Signage Monitor	Error symptom	A. Video error_No video/Normal audio	Established date		
	Content	LED driver B+ 24V measuring method	Revised date		A2



Check the DC 24V

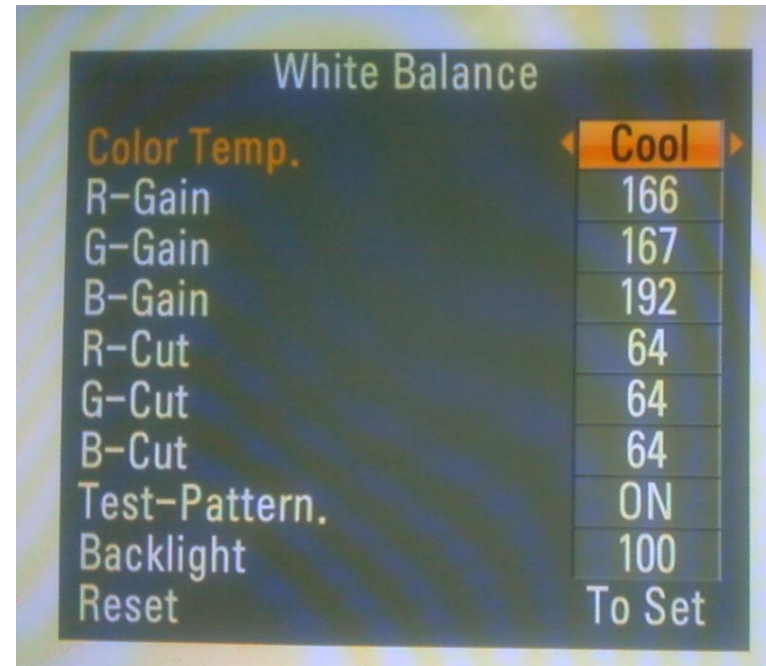
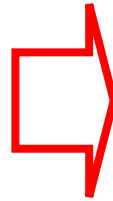
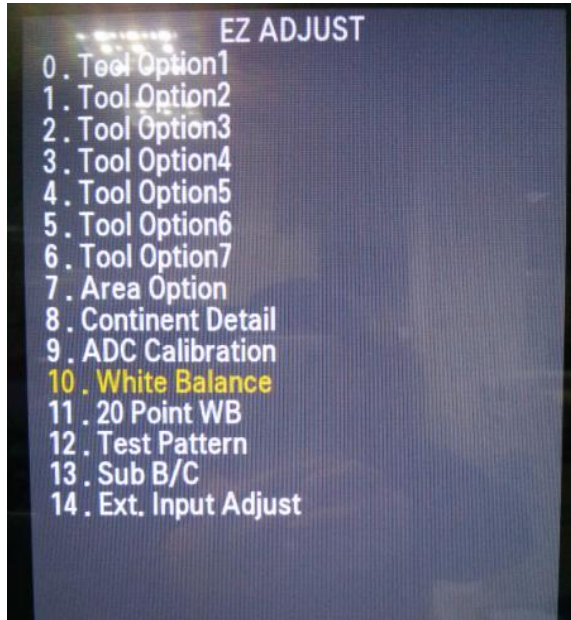
24 Pin	
2, 3, 4	24V

1. Measure DC 24V applying to inverter PCB from Power Board.
2. Output 24V from Power Board -> supply to inverter PCB.
Check Pin contacting statement and connection statement.

Standard Repair Process Detail Technical Manual

Signage Monitor	Error symptom	A. Video error_No video/Normal audio	Established date		
	Content	Check White Balance value	Revised date		A3

<ALL MODELS>



Entry method

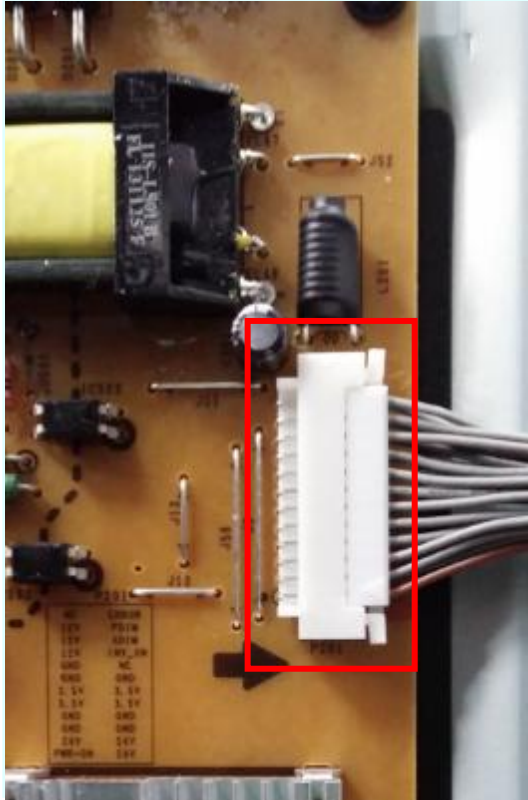
1. Press the ADJ button on the remote controller for adjustment.
2. Enter into White Balance of item 10.
3. After recording the R, G, B (GAIN, Cut) value of Color Temp (Cool/Medium/Warm), re-enter the value after replacing the MAIN BOARD.

A3

Standard Repair Process Detail Technical Manual

Signage Monitor	Error symptom	A. Video error_No video/ Audio	Established date		
	Content	Power Board voltage measuring method	Revised date		A4

Check the DC 3.5V, 12V, 24V.



24 Pin (Power Board ↔ Main Board)			
SMAW200-H24S2			
1	Power on	2	24V
3	24V	4	24V
5	GND	6	GND
7	GND	8	GND
9	3.5V	10	3.5V
11	3.5V	12	3.5V
13	GND	14	GND
15	GND	16	N.C
17	12V	18	Inverter On
19	12V	20	PWM#1
21	12V	22	PWM#2
23	N.C	24	ERROR

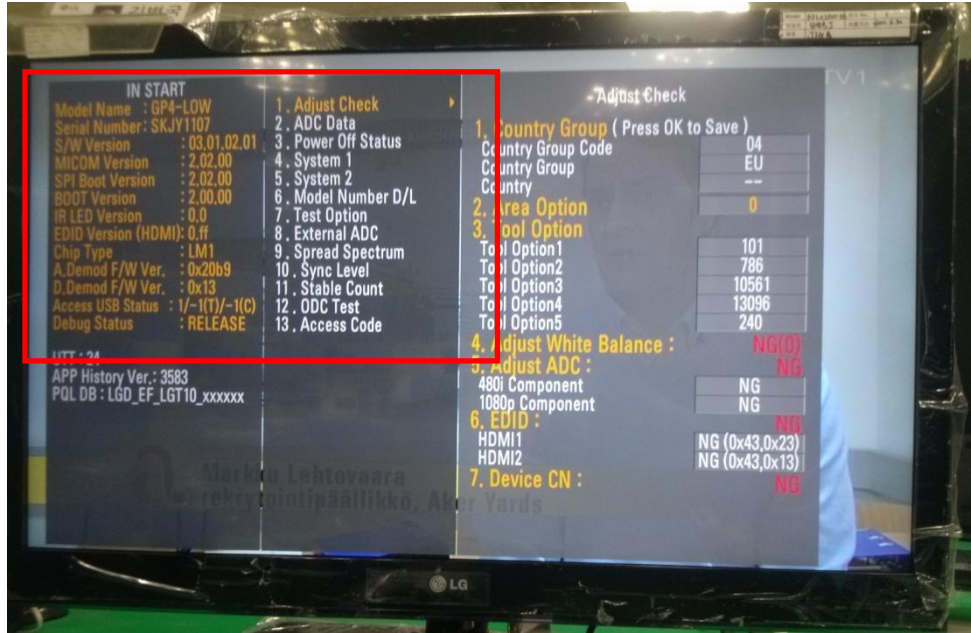
Standard Repair Process Detail Technical Manual

Signage Monitor	Error symptom	A. Video error_Video error, video lag/stop	Established date		
	Content	LCD-TV Version checking method	Revised date		A7

<ALL MODELS>

1. Checking method for remote controller for adjustment

Version

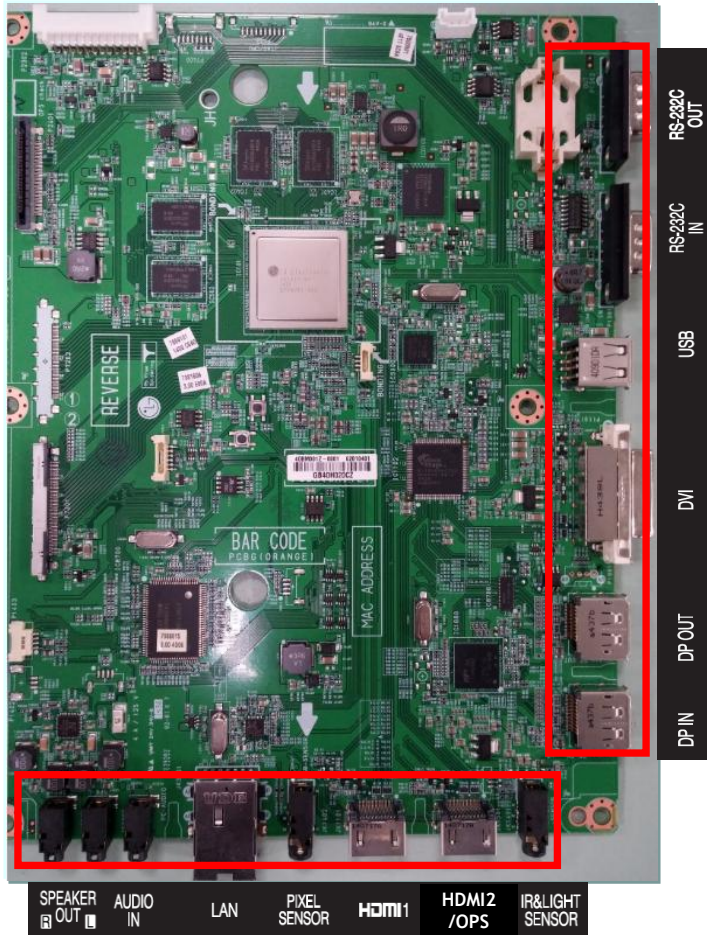


Press the IN-START with the remote controller for adjustment

Standard Repair Process Detail Technical Manual

Signage Monitor	Error symptom	A. Video error _Vertical/Horizontal bar, residual image, light spot	Established date		
	Content	LCD TV connection diagram	Revised date		A8

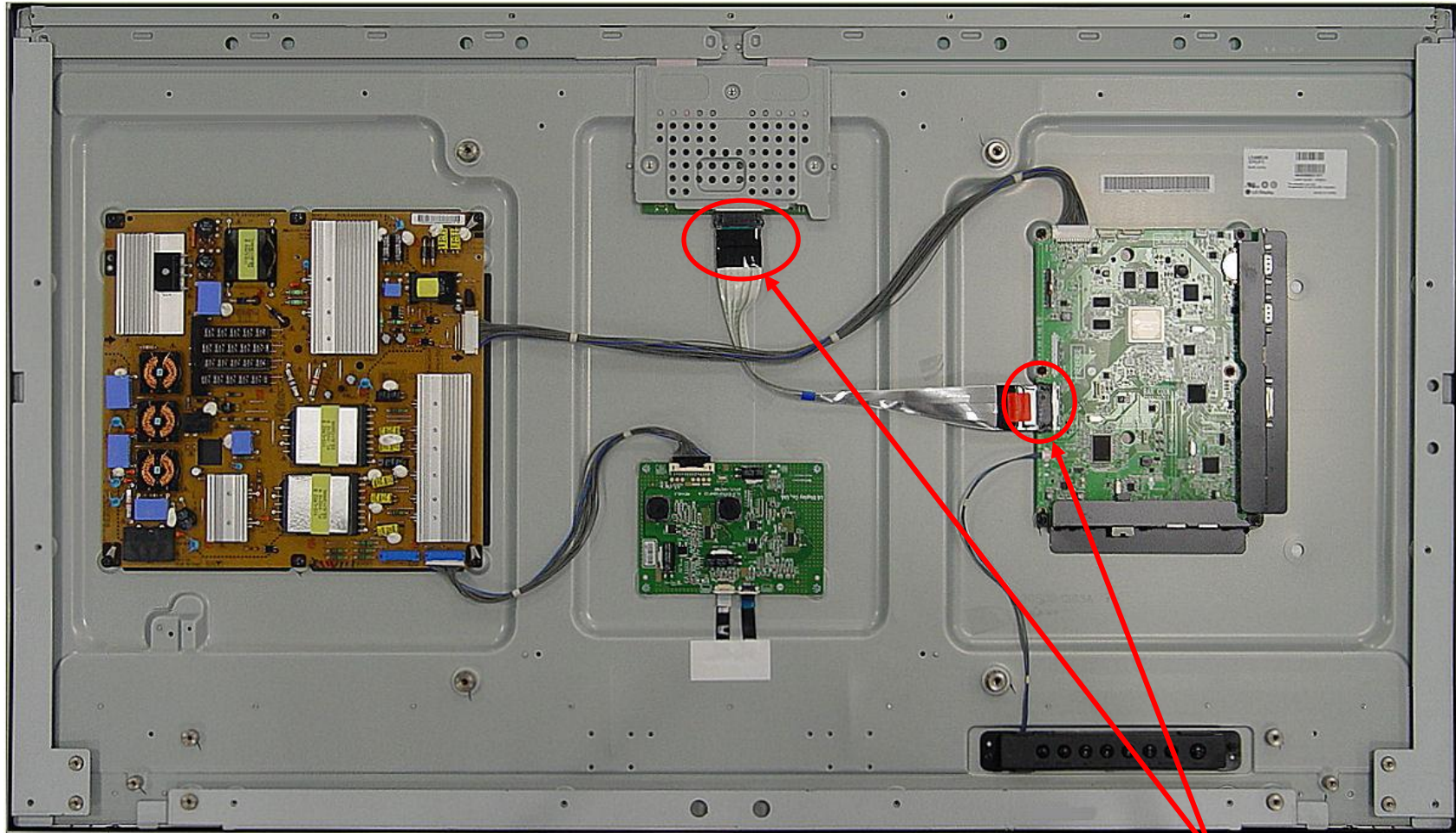
[MS75A]



As the part connecting to the external input, check the screen condition by signal

Standard Repair Process Detail Technical Manual

Signage Monitor	Error symptom	A. Video error_Color error	Established date		
	Content	Check Link Cable reconnection condition	Revised date		A10

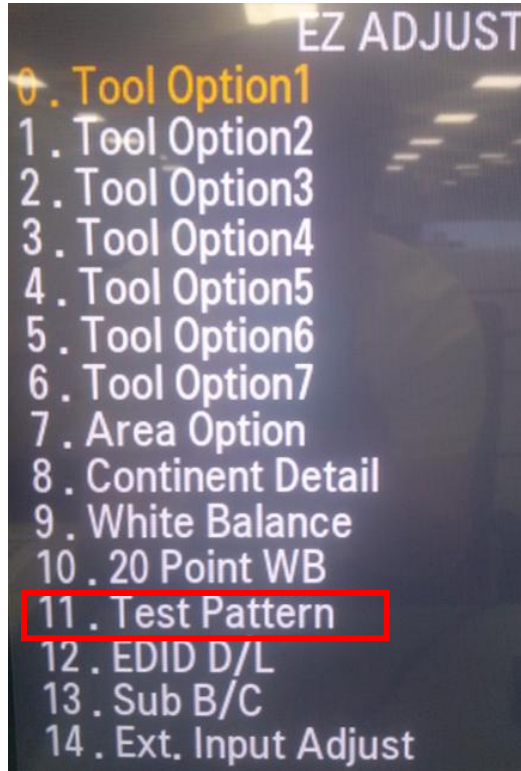


Check the contact condition of the Link Cable, especially dust or mis insertion.

A10

Standard Repair Process Detail Technical Manual

Signage Monitor	Error symptom	A. Video error_Color error	Established date		
	Content	Adjustment Test pattern - ADJ Key	Revised date		A12



You can view 6 types of patterns using the ADJ Key

Checking item : 1. Defective pixel 2. Residual image 3. MODULE error (ADD-BAR,SCAN BAR..) 4.Video error (Classification of MODULE or Main-B/D!)

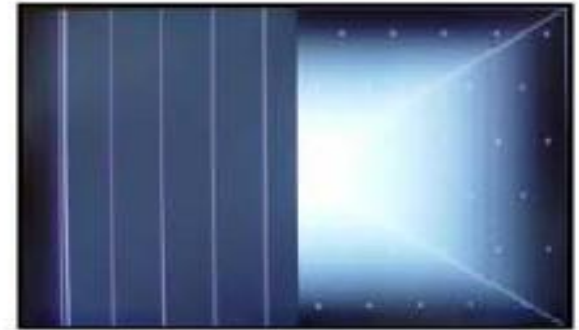
Appendix : Exchange LVDS Cable or Main B/D (1)



Solder defect, CNT Broken



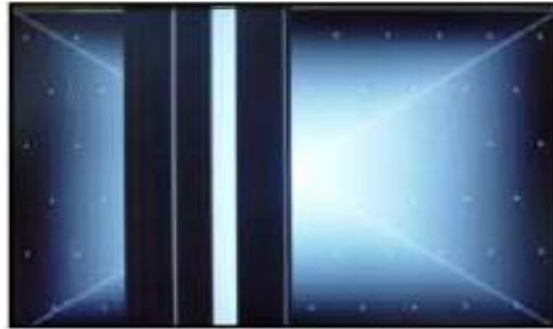
Solder defect, CNT Broken



Solder defect, CNT Broken



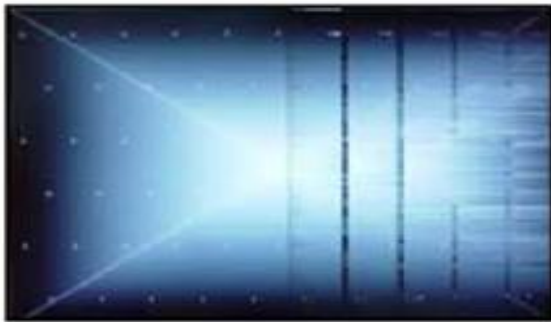
Solder defect, CNT Broken



Solder defect, CNT Broken



Abnormal Power Section



Solder defect, Short/Crack

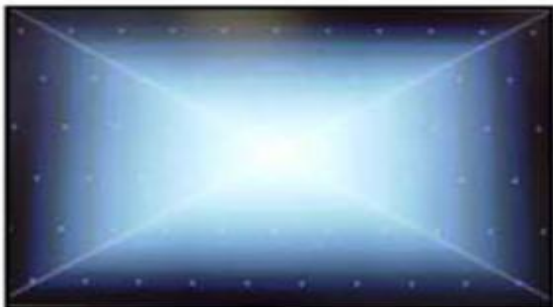


Abnormal Power Section



Solder defect, Short/Crack

Appendix : Exchange LVDS Cable or Main B/D (2)



Abnormal Power Section



Abnormal Power Section



Solder defect, Short/Crack



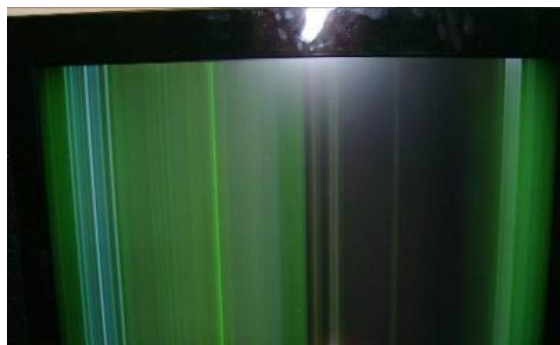
Solder defect, Short/Crack



Fuse Open, Abnormal power section



Abnormal Display



GRADATION



Noise



GRADATION

Appendix : Exchange Power Board



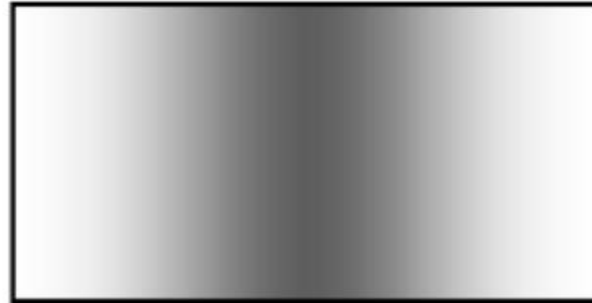
No Light



Dim Light



Dim Light



Dim Light



No picture/Sound Ok

Appendix : Exchange the Module (1)



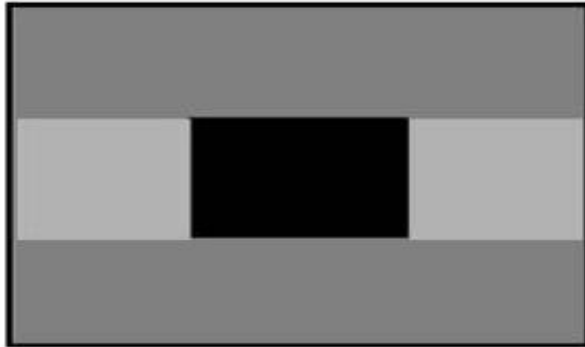
Panel Mura, Light leakage



Panel Mura, Light leakage



Press damage



Crosstalk



Press damage



Crosstalk

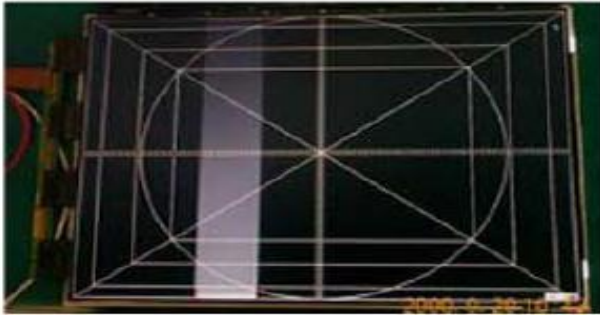


Press damage

Un-repairable Cases

In this case please exchange the module.

Appendix : Exchange the Module (2)



Vertical Block
Source TAB IC Defect



Vertical Line
Source TAB IC Defect



Vertical Block
Source TAB IC Defect



Horizontal Block
Gate TAB IC Defect



Horizontal Block
Gate TAB IC Defect



Horizontal line
Gate TAB IC Defect



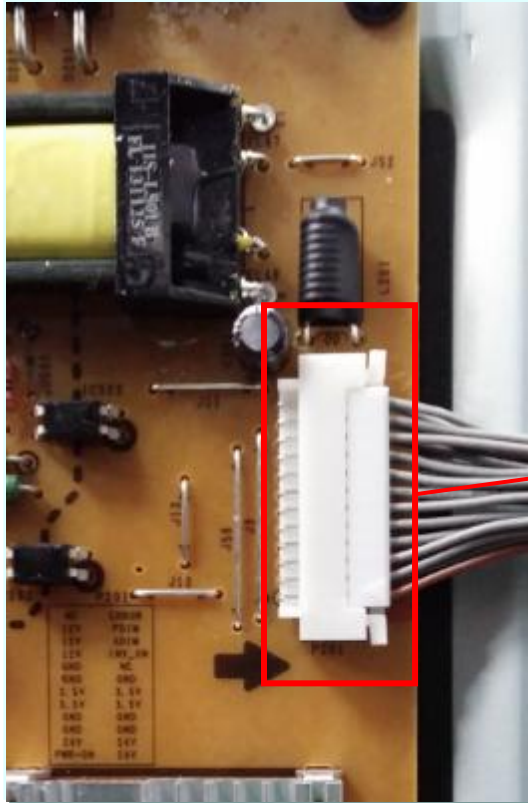
Horizontal Block
Gate TAB IC Defect

Un-repairable Cases

In this case please exchange the module.

Standard Repair Process Detail Technical Manual

Signage Monitor	Error symptom	B. Power error _No power	Established date		
	Content	Check power input voltage and ST-BY 3.5V	Revised date		A18



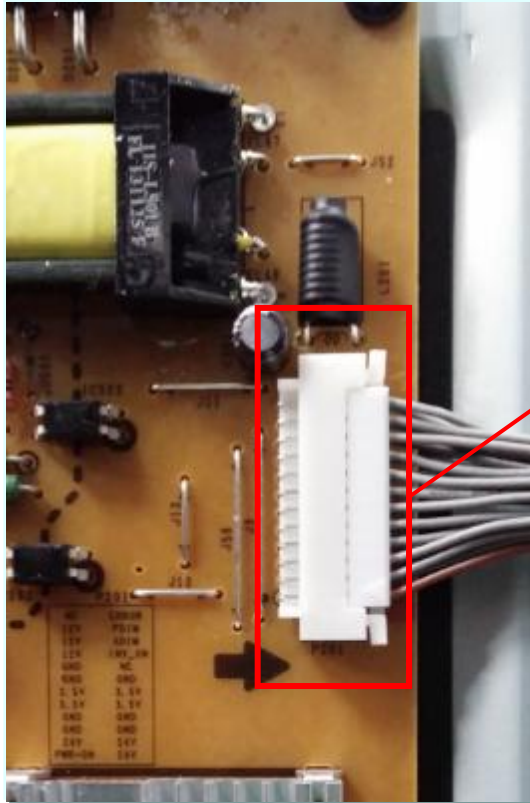
Check DC 3.5V

24 Pin (Power Board ↔ Main Board)			
SMAW200-H24S2			
1	Power on	2	24V
3	24V	4	24V
5	GND	6	GND
7	GND	8	GND
9	3.5V	10	3.5V
11	3.5V	12	3.5V
13	GND	14	GND
15	GND	16	N.C
17	12V	18	Inverter On
19	12V	20	PWM#1
21	12V	22	PWM#2
23	N.C	24	ERROR

A18

Standard Repair Process Detail Technical Manual

Signage Monitor	Error symptom	B. Power error _No power	Established date		
	Content	Checking method when power is ON	Revised date		A19



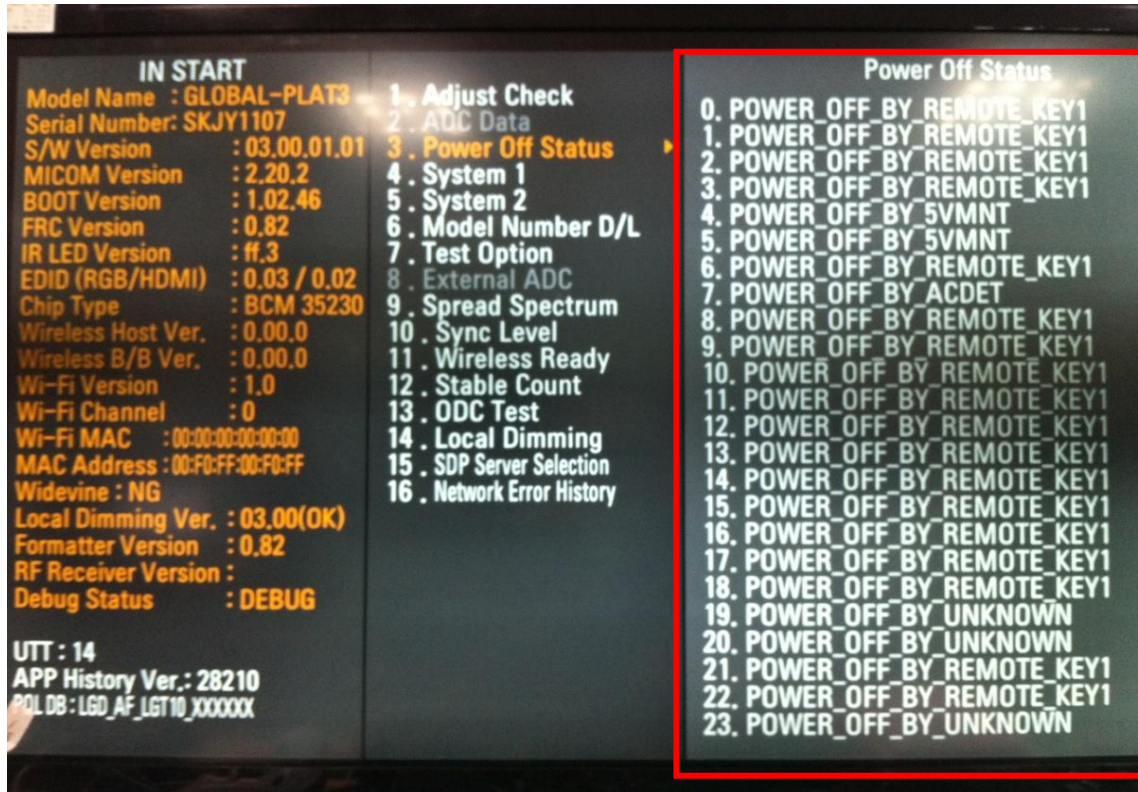
Check “power on(Pin 1)” pin is high(about 3.3V)

24 Pin (Power Board ↔ Main Board)			
SMAW200-H24S2			
1	Power on	2	24V
3	24V	4	24V
5	GND	6	GND
7	GND	8	GND
9	3.5V	10	3.5V
11	3.5V	12	3.5V
13	GND	14	GND
15	GND	16	N.C
17	12V	18	Inverter On
19	12V	20	PWM#1
21	12V	22	PWM#2
23	N.C	24	ERROR

Standard Repair Process Detail Technical Manual

Signage Monitor	Error symptom	B. Power error _Off when on, off whiling viewing	Established date		
	Content	POWER OFF MODE checking method	Revised date		A22

<ALL MODELS>



Entry method

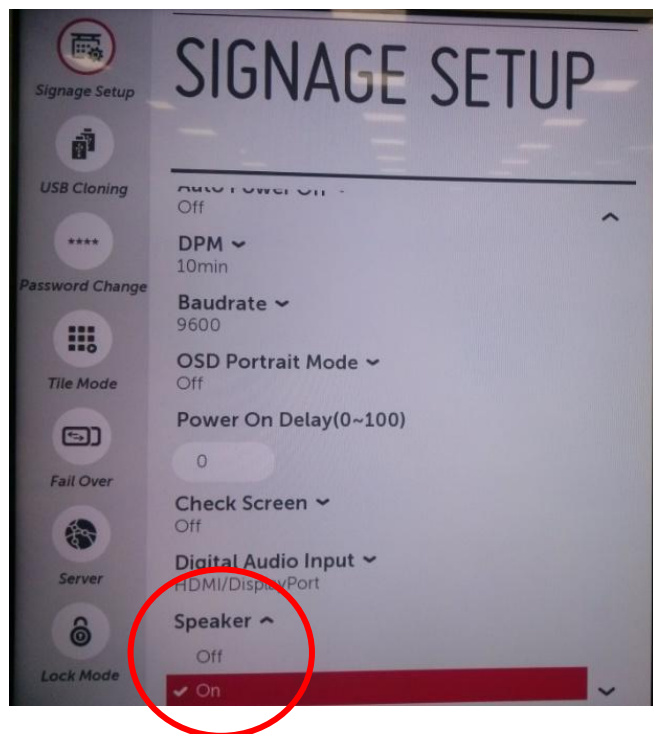
1. Press the IN-START button of the remote controller for adjustment
2. Check the entry into adjustment item 3

A22

Standard Repair Process Detail Technical Manual

Signage Monitor	Error symptom	C. Audio error_No audio/Normal video	Established date		
	Content	Checking method in menu when there is no audio		Revised date	

<ALL MODELS>



Checking method

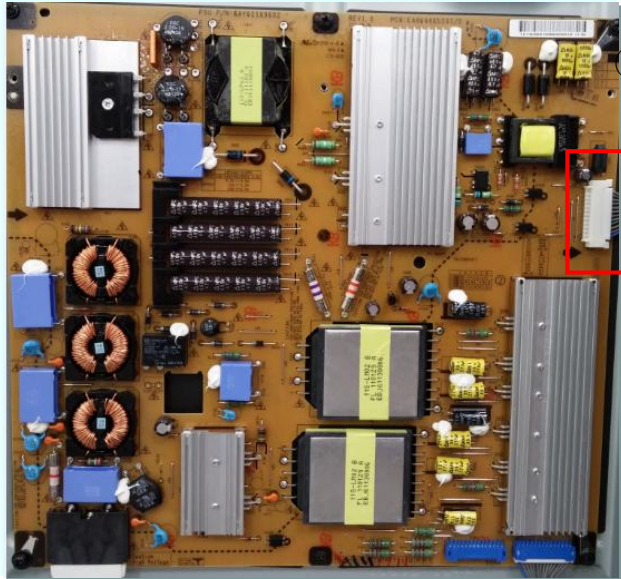
1. Press the MENU button on the remote controller for five seconds.
2. A balloon is marked to a screen.
3. Select the Speaker of Signage Setup
4. Select "ON"

A24

Standard Repair Process Detail Technical Manual

Signage Monitor	Error symptom	C. Audio error_No audio/Normal video	Established date		
	Content	Voltage and speaker checking method when there is no audio	Revised date		A25

[MS75A]



24 Pin (Power Board ↔ Main Board)			
SMAW200-H24S2			
1	Power on	2	24V
3	24V	4	24V
5	GND	6	GND
7	GND	8	GND
9	3.5V	10	3.5V
11	3.5V	12	3.5V
13	GND	14	GND
15	GND	16	N.C
17	12V	18	Inverter On
19	12V	20	PWM#1
21	12V	22	PWM#2
23	N.C	24	ERROR



< Main Ass'y >

Checking order when there is no audio

- ① Check the contact condition of or 24V connector of Main Board
- ② Measure the 24V input voltage supplied from Power Board
(If there is no input voltage, remove and check the connector)
- ③ Connect the tester RX1 to the speaker terminal and if you hear the Chik Chik sound when you touch the GND and output terminal, the speaker is normal.

Standard Repair Process Detail Technical Manual

Signage Monitor	Error symptom	D. Function error_ No response in remote controller, key error	Established date		
	Content	Remote controller operation checking method	Revised date		A27

[MS75A Model]



JK1401	
M7	GND
M4	+3.5V_ST
M3	NC
M1	IR
M6	SCL
M5	SDA

Checking order

1. Check IR cable condition between IR & Main board
2. Check the st-by 3.5V on the terminal M1.
3. When checking the Pre-Amp when the power is in ON condition, it is normal when the Analog Tester needle moves slowly, and defective when it does not move at all.

JK1401

A27