

SHARP SERVICE MANUAL



4K ULTRA HD TV
MODEL: 4T-B70CJ1U

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CHAPTER 1. SPECIFICATIONS

[1] SPECIFICATIONS

ID		
Panel		
	Size	70"
	Backlight Type	D-LED
	Resolution	3840 x 2160
	Refresh Rate	60Hz
	Response Time	8.5 ms
	Color Gamut	97% REC709
	Number of Colors	8-bit+FRC, 1.07B colors
	Brightness (Typ.)	280nits
	Contrast Ratio	4,000 : 1
	Dynamic Contrast Ratio	200,000 : 1
	Backlight Zones	-
	Viewing Angle (H/V)	176°/176°
Picture		
	Local dimming	-
	HDR	-
	Film Mode (1080/24P)	-
	Picture Mode	O
	Color Temperature Adjustment	O
	Video Noise reduction	O
Audio		
	Dolby Digital Decoder	MS11
	Surround sound	-
	Sound Output	20W (10W+10W)
TV SoC		RealTek RTD2991
Memory (DRAM / Flash)		1GB / 4GB
Broadcast System		ATSC / QAM
WiFi		802.11ac, Dual band, 2x2
Bluetooth		-
User Operation		Remote control 7-key Keypad
LED Indicator		Red / Green
Power Input		120~ Vac at 60 Hz
Power Consumption		200W (On), < 0.5W (Standby)

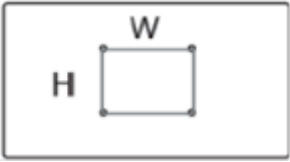
Terminal		
	RF Input	1
	HDMI 1.4 Input / HDCP 1.4 (For 2K) HDMI 2.0 Input / HDCP 2.2 (For 4K)	2 (HDMI 1 with ARC)
	Video+L/R Input(ϕ 3.5mm)	1
	AV Input	1
	RS232C	1
	Headphone Output(ϕ 3.5mm)	1
	USB 2.0 (1.5A)	1
	Ethernet	1
Software		
	Android TV	-
	Play Store	-
	YouTube	-
	NetFlix	-
	Google Cast	-
	Mirroring	-
	DLNA	-
	USB MultiMedia	Video / Music / Photo
	Eco	No signal off / No operation off
	OSD Language	English / Spanish/ French
	Software Update	Manual : USB / Network Auto : Network
Mechanical / Package		
	VESA® Hole Pitch (WxH)	400x400 mm
	Unit Dimension (w/o Stand) (WxHxD)	1568.5 x 904.9 x 72.3 mm
	Unit Dimension (w/i Stand) (WxHxD)	1568.5 x 976.4 x 286.9 mm
	Net Weight (w/o Stand)	25.2 kg
	Net Weight (w/i Stand)	25.7 kg
	Carton Structure	C Type
	Carton Printing	Waterbased print
	Carton Dimension (Outer, WxHxD)	1665 x 1021 x 200 mm
	Gross Weight	34.5kg
Accessory		
	Power Cord	Detachable two prong (IEC)
	Remote Control	IR, 37 buttons
	Battery	AAA x 2
	User Manual	E-manual (English, Spanish, French)
	QSG	B/W print (English, Spanish, French)
	Warranty Sheet	N/A (Combine into QSG)
	Registration Card	-
	Screw Bag (TV-Stand)	O

Certifications / Compliances		
	Safety/EMC	cULus, FCC, BETs-7
	WiFi / Bluetooth	FCC/IC ID
	Energy Saving	NRCan, CEC

[2] DIMENSIONS



Model	A	B	C	D	E	F	G	H	Bezel Width		
									T/R/L	Bottom	BM (T/S/Bottom)
4T-B70CJ1U	1568.48	904.92	976.92	56.09	286.9	72.29	72	1390.07	14	22	0.8/0.8/2.5

		
TV screen size (Inches)	VESA-compatible wall bracket (millimeters)(W*H)	Screw type
70"	400x400mm	Metric 6*12mm

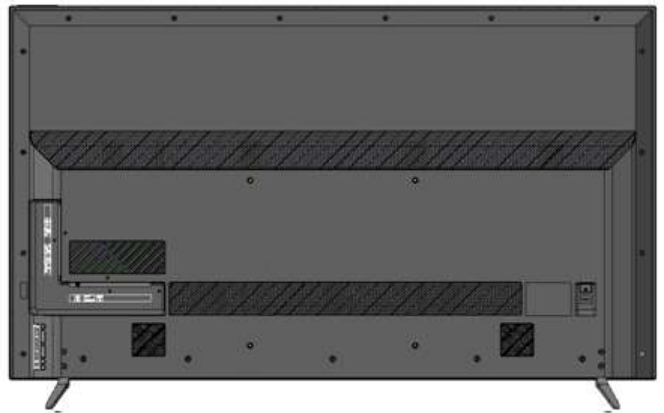
CHAPTER 2. Removing of Major Parts

[1] Removing of Major Parts

Front view

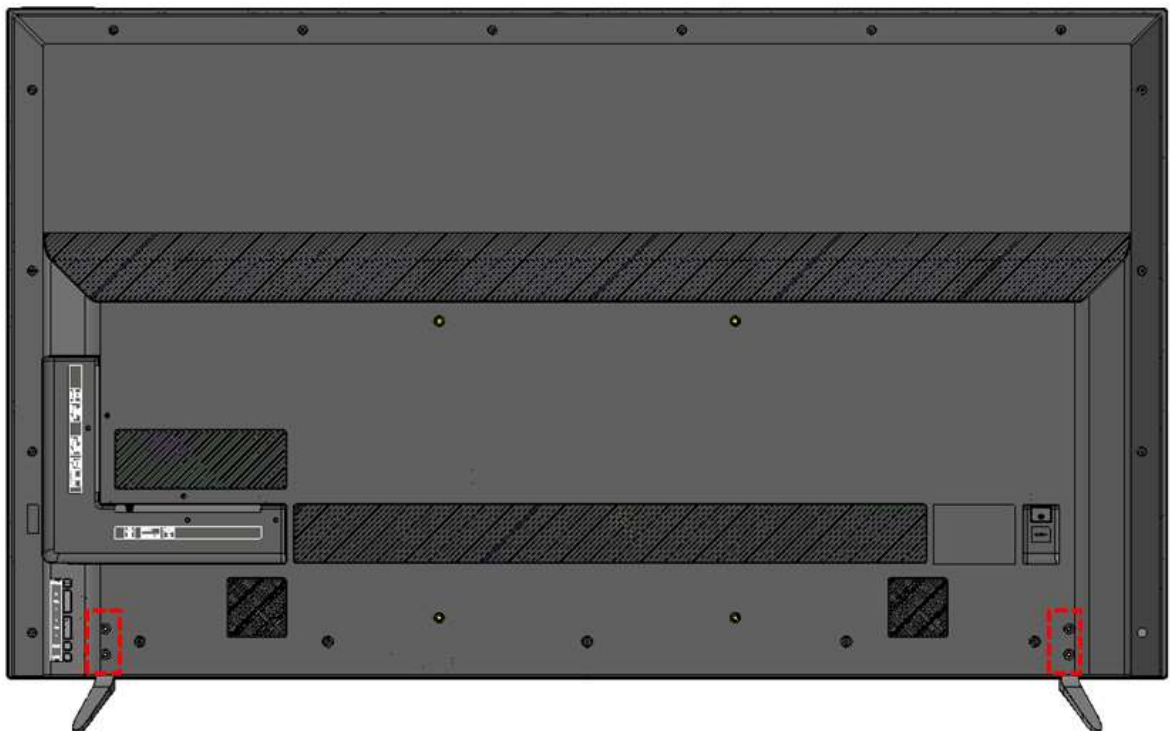


Back view

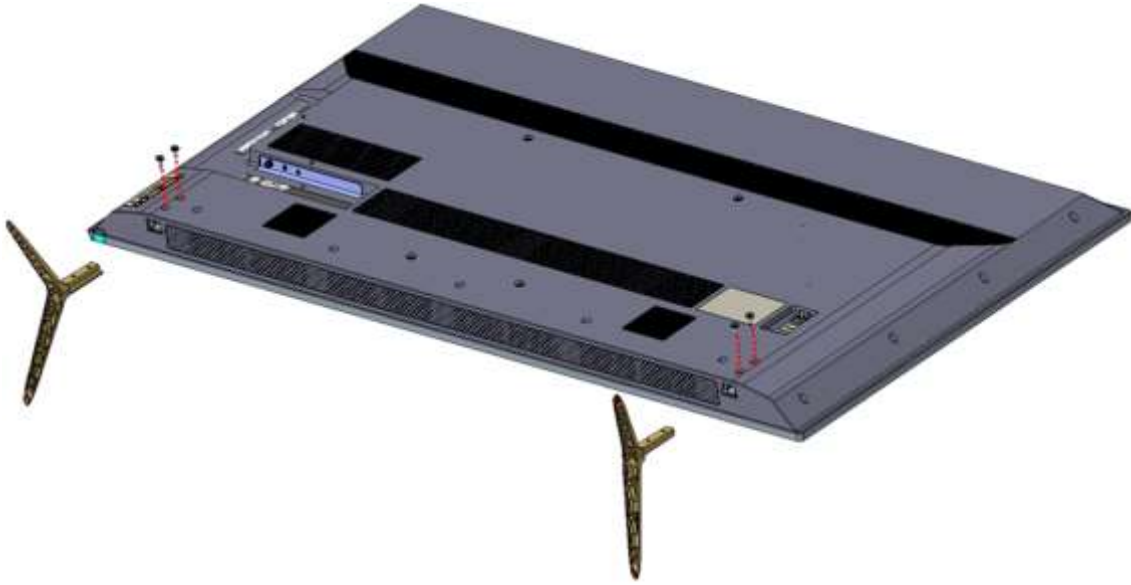


STAND FEET REMOVAL:

- 1.- Remove the screw M5X14 (2 per stand feet)

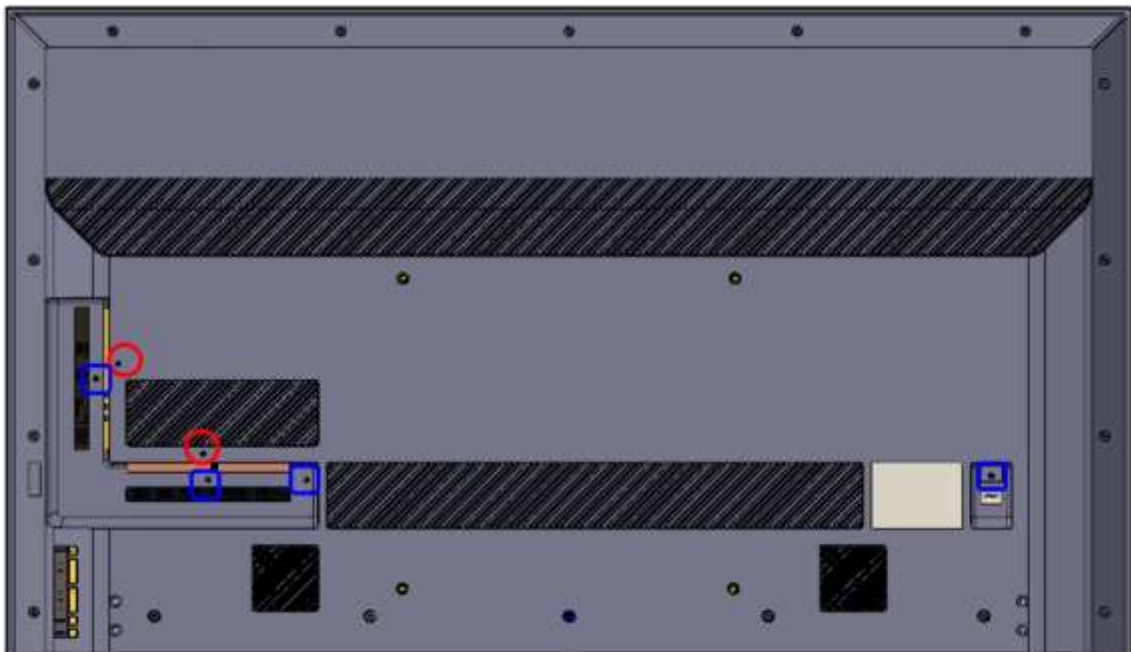


2.- Take the stand and slide out downwards from the TV set.
Note: Repeat operation in the 2nd stand



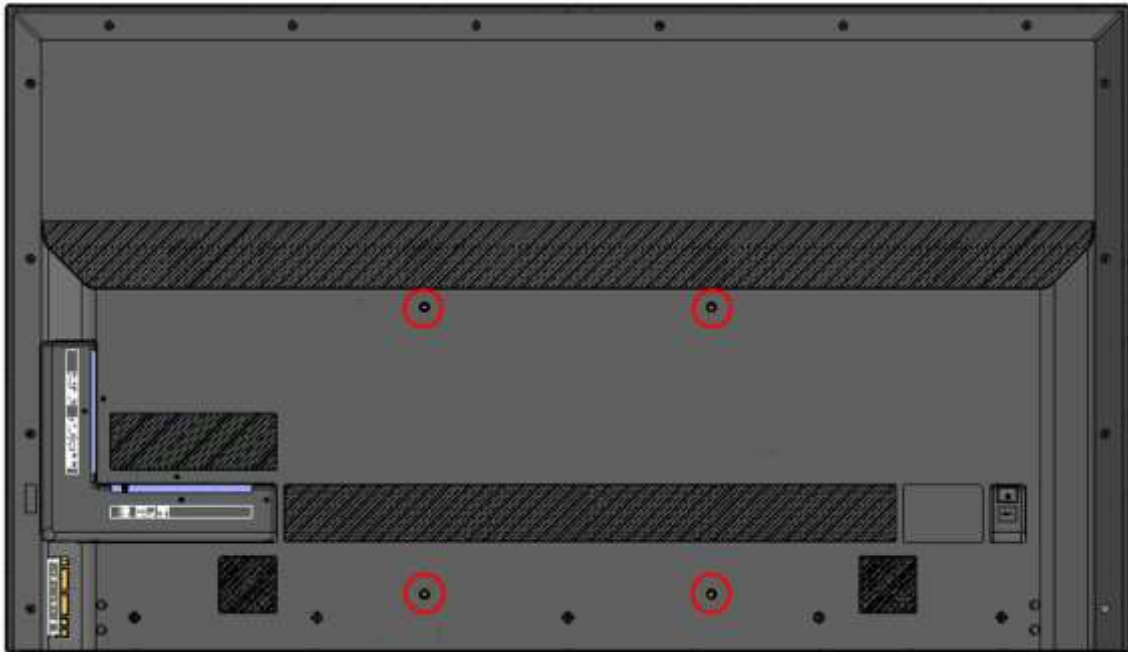
UNSCREW THE REAR COVER ASSY:

1.- Remove the 4 screw 3X4.5 and 2 screw T3x9, around the I/O cover area and AC-INLET.

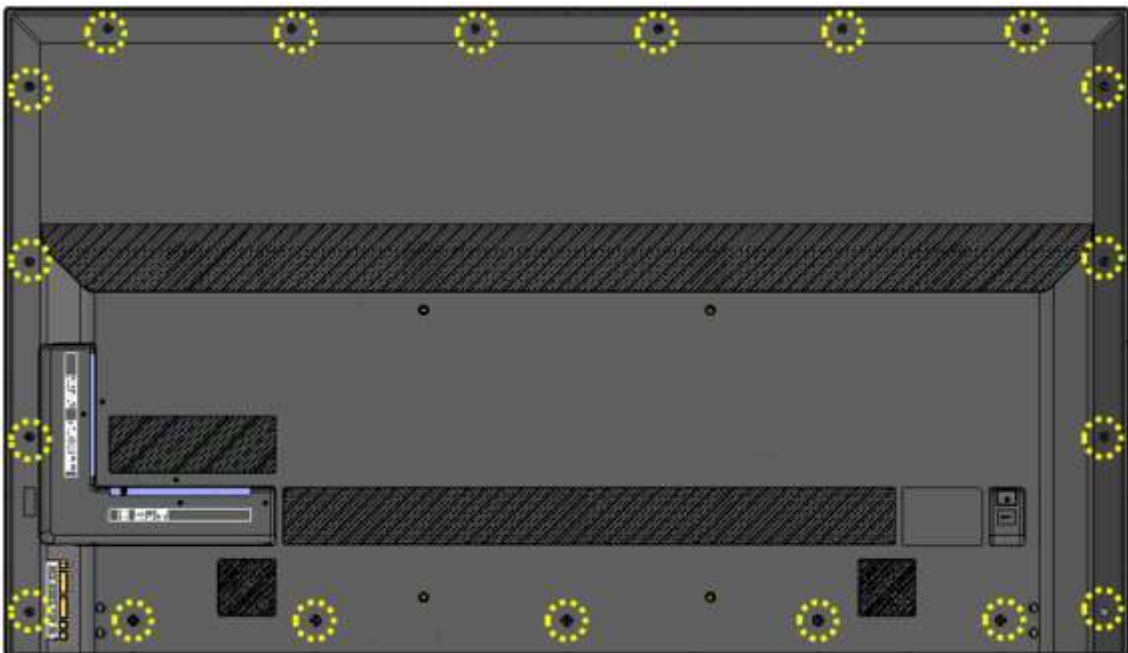


○ T3*9
□ M3*4.5

2.- Remove the 4 VESA screws M6X12

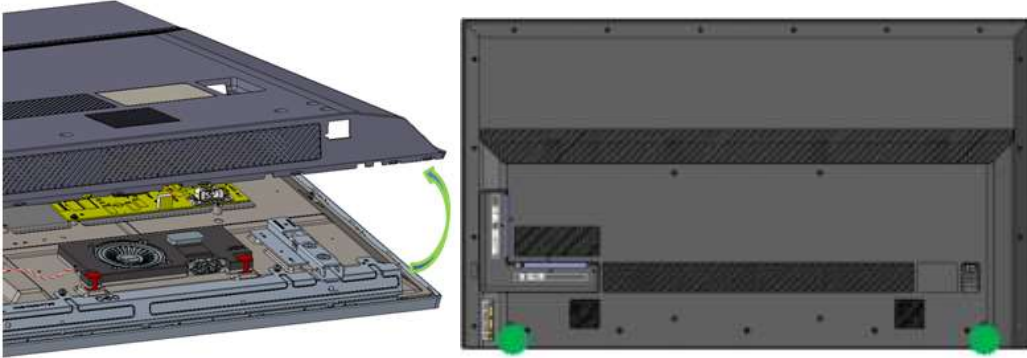


3.- Remove the 19 screws M3X8 at the rear cover area.



REMOVE THE REAR COVER ASSY:

1.-Use stand hole to pull rear cover and create GAP at corner area.

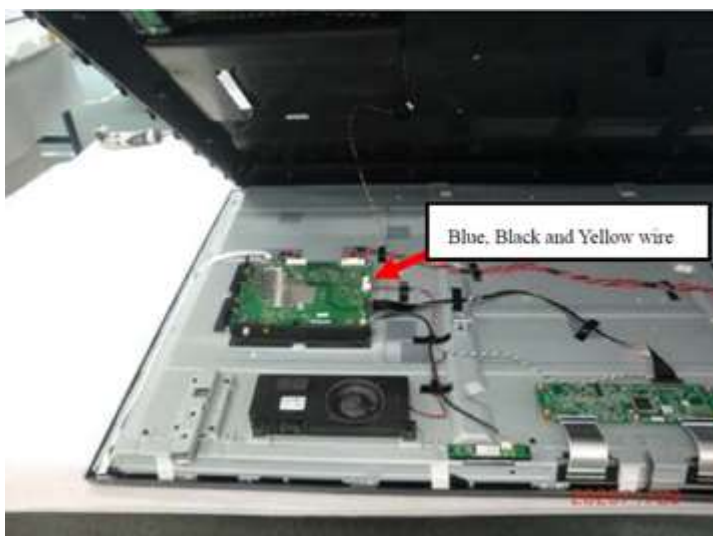


2.- Pull the Rear Cover from the bottom area and side area.

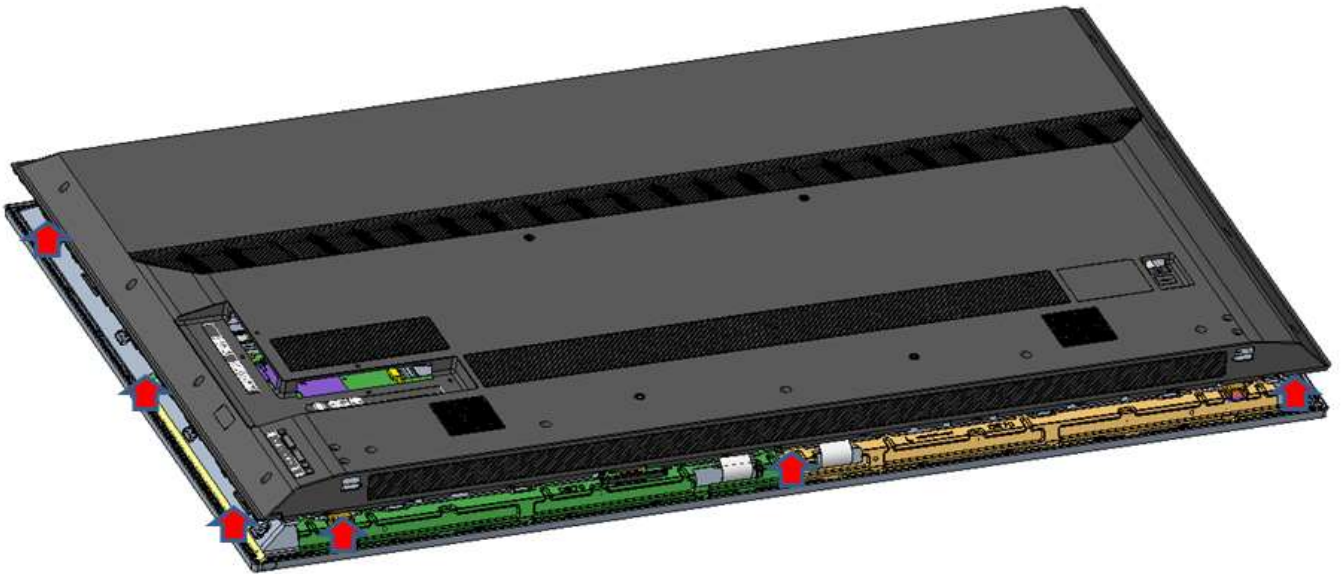
① The outer periphery of the front cover and CAB-B are fitted with hook , lift while pushing slightly inward.



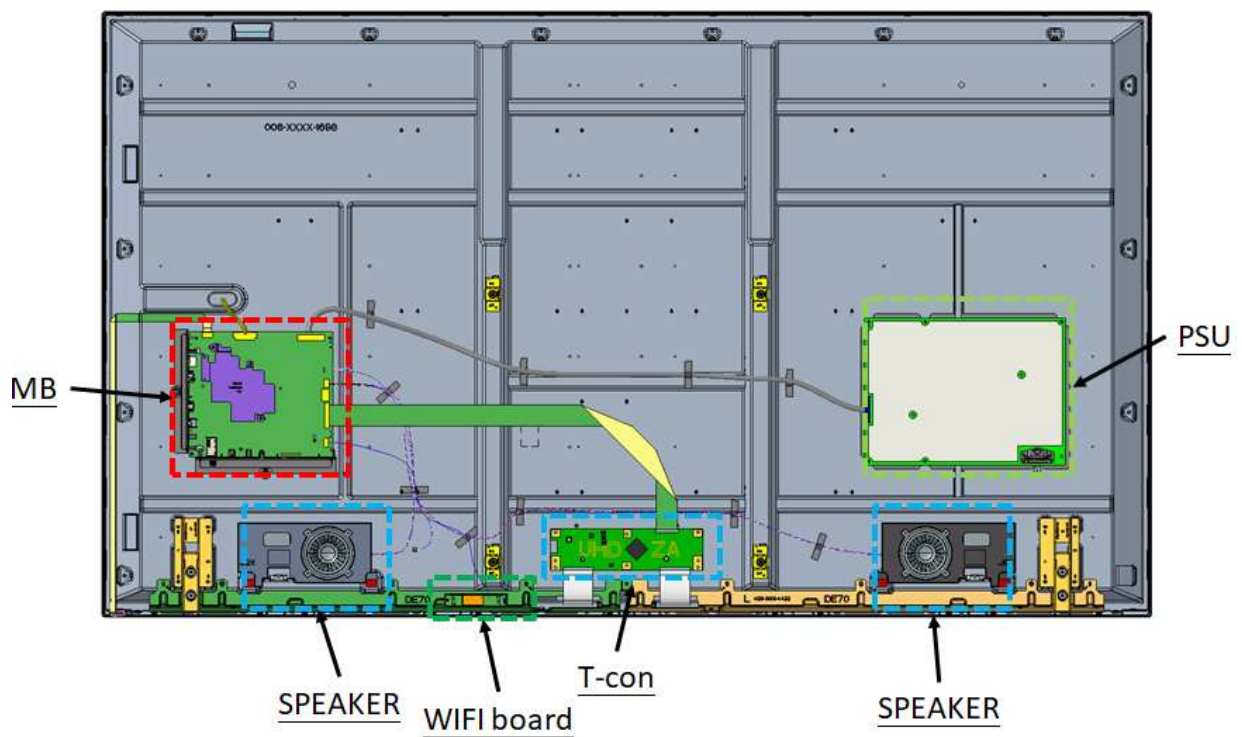
② Remove the key unit wire connector



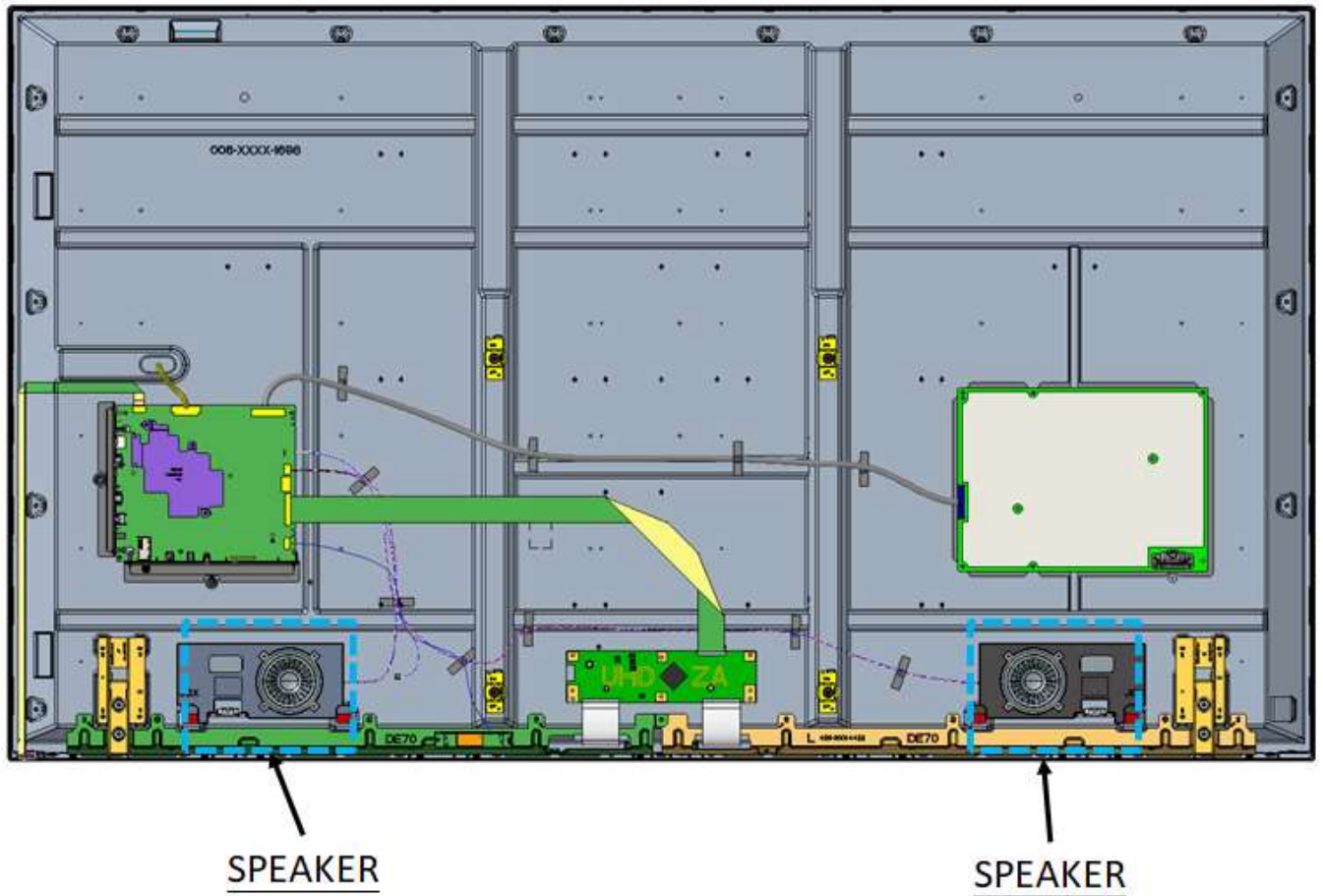
3.- Finally use team-job to remove the Rear Cover completely.



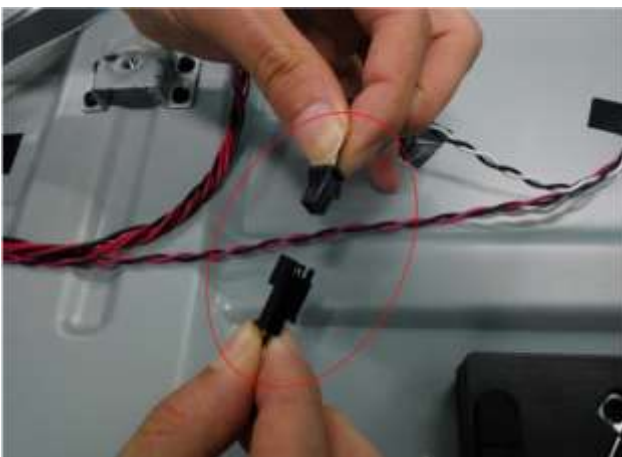
REMOVE SPEAKERS, MAIN Board · Power Board · KEY Board · T-CON Board · WIFI Board and Speakers.



- Speakers

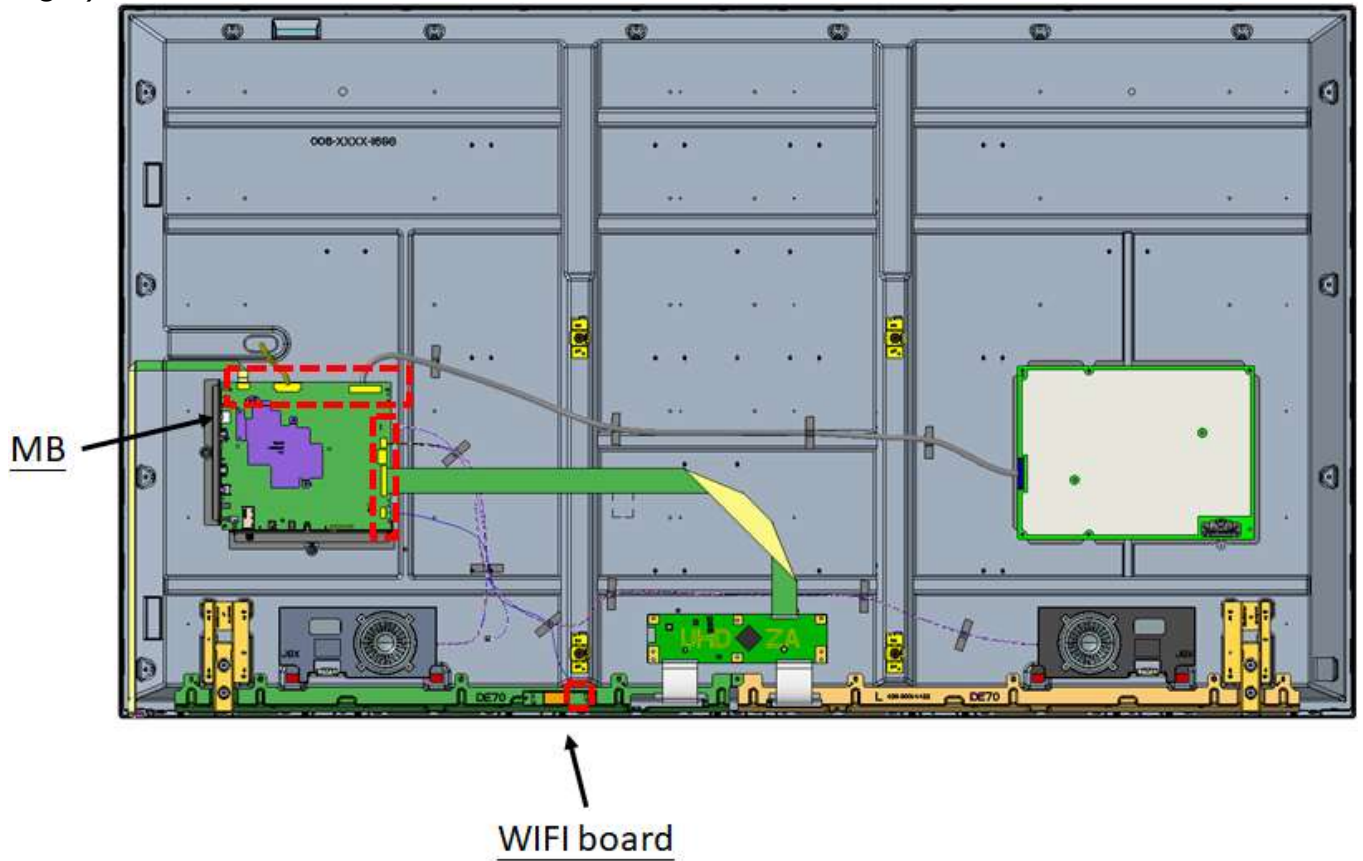


- 1.- Disconnect the cable of speaker
- 2.- Slide out the stud
- 3.- Repeat operation in the 2nd speaker

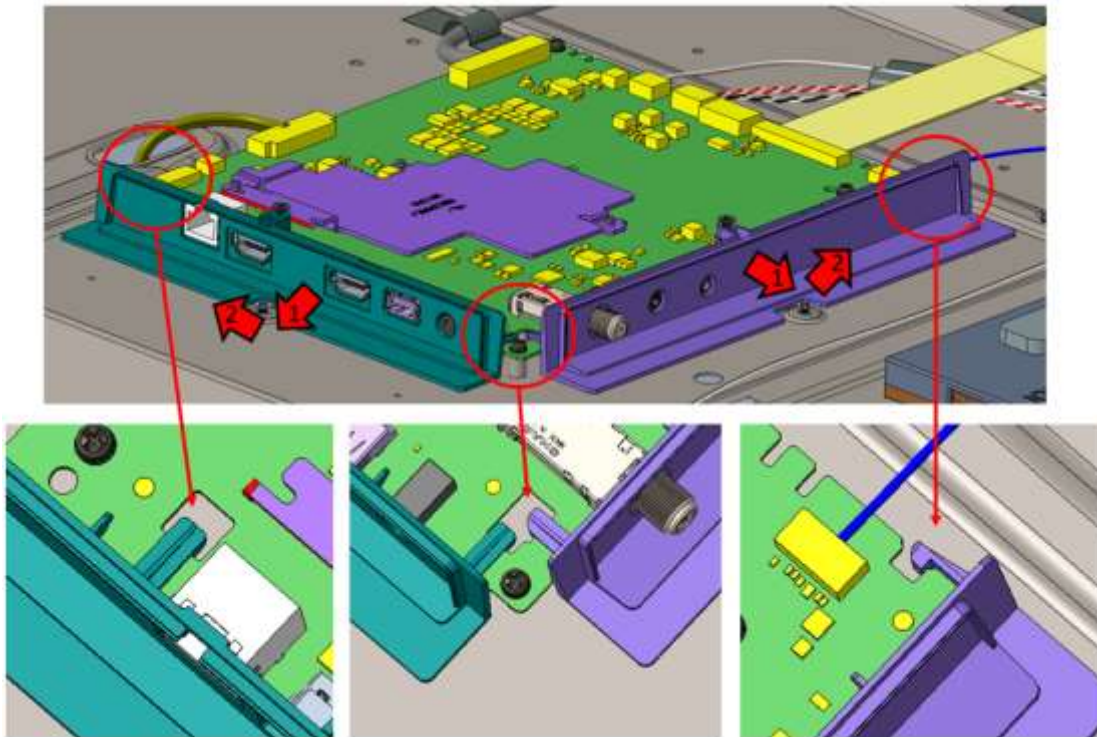


- Main Board and WIFI board

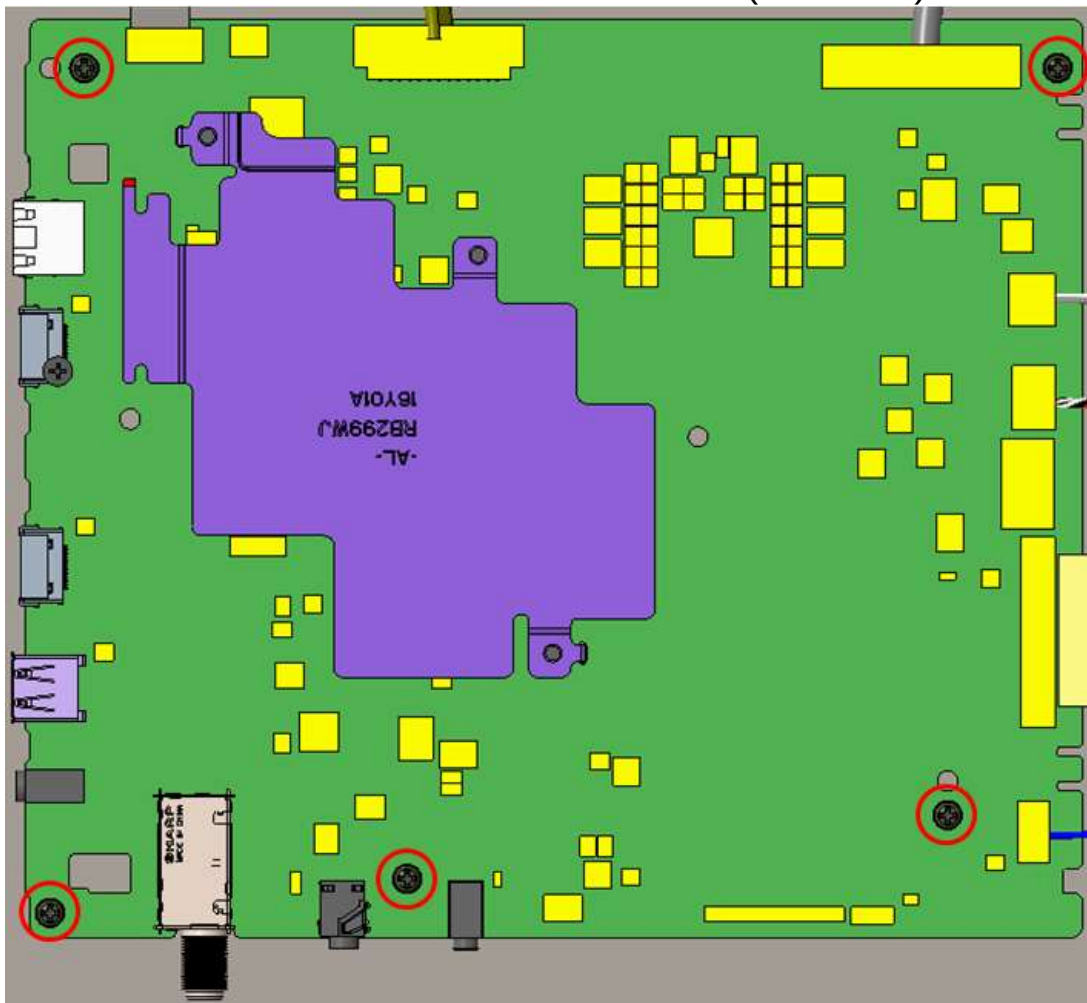
1.- Disconnect the connection of the cable from the MB and WIFI board (Red rectangle).



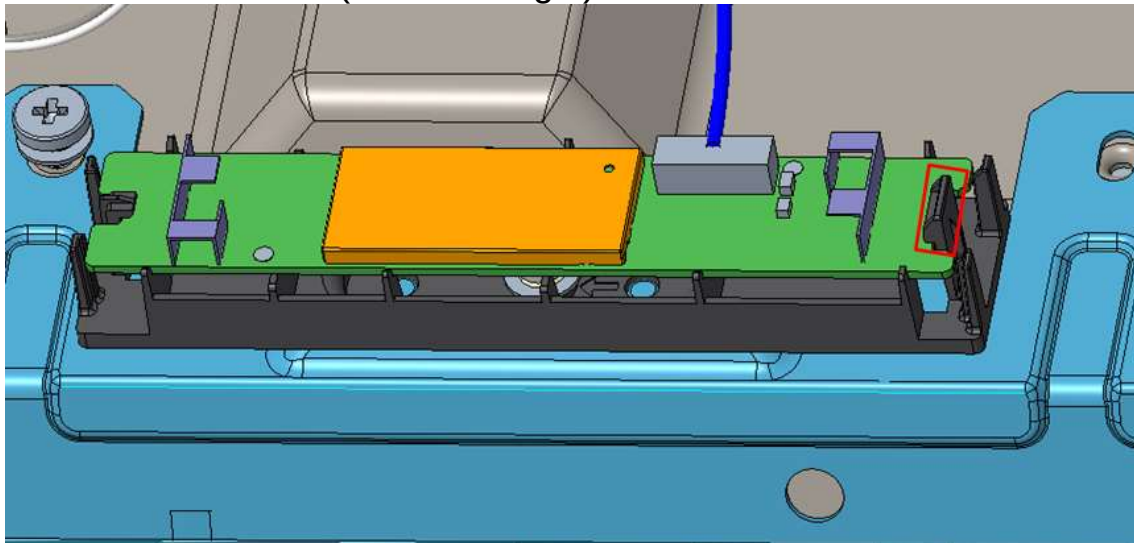
2.- Detach the I/O cover from the MB



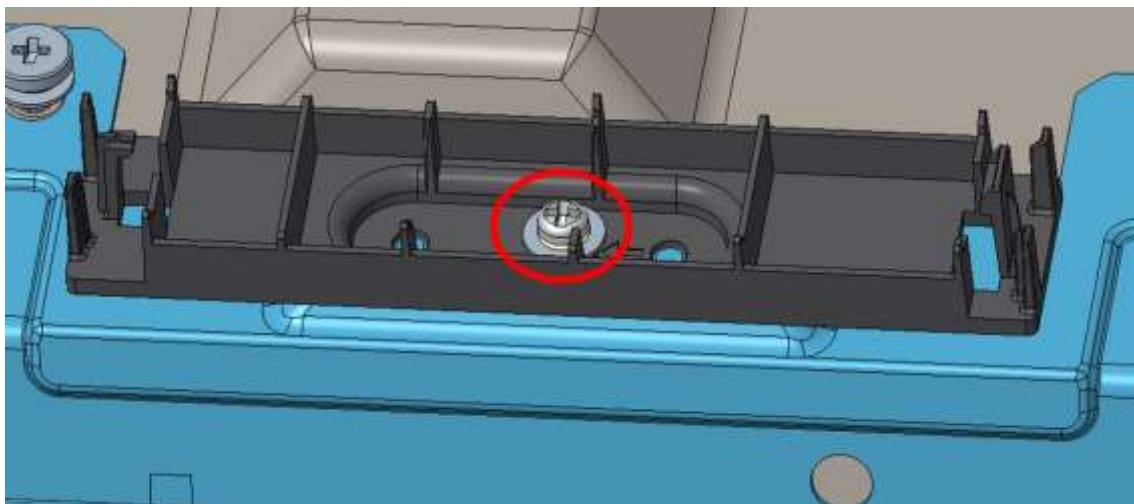
3.- Remove 5 screws M3X6 in the main area (Redcircle).



4.- Unlock the hook (Red rectangle) and remove the WIFI board.

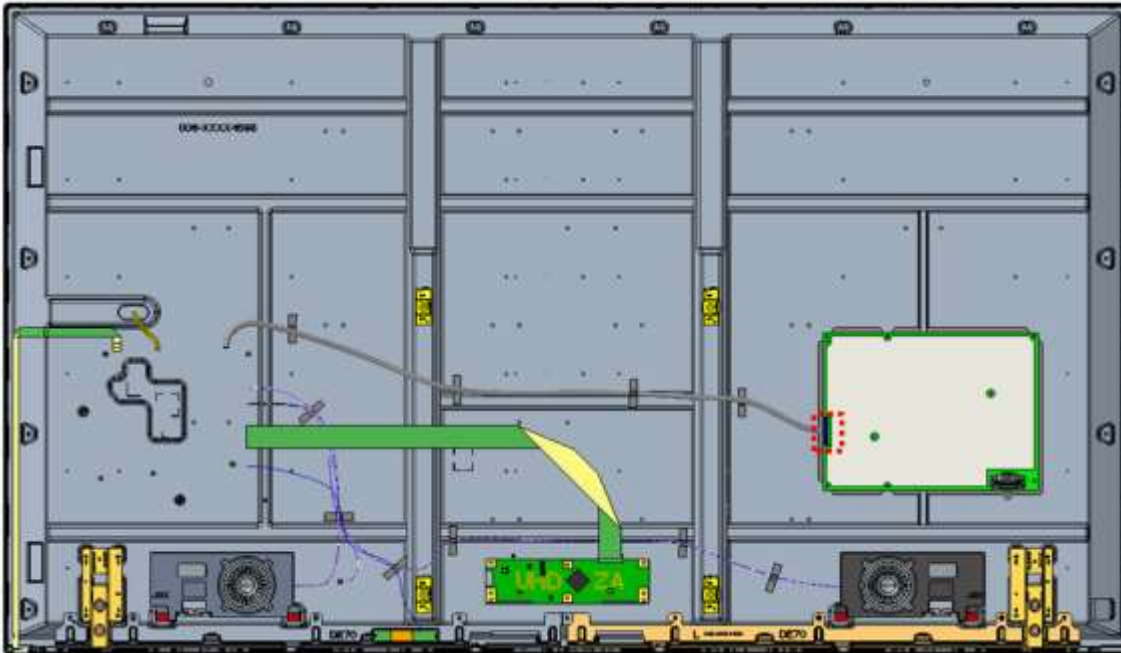


5.- Remove the screws (1pcs +PSW M3X8 [Red circle]) and remove the WIFI holder.

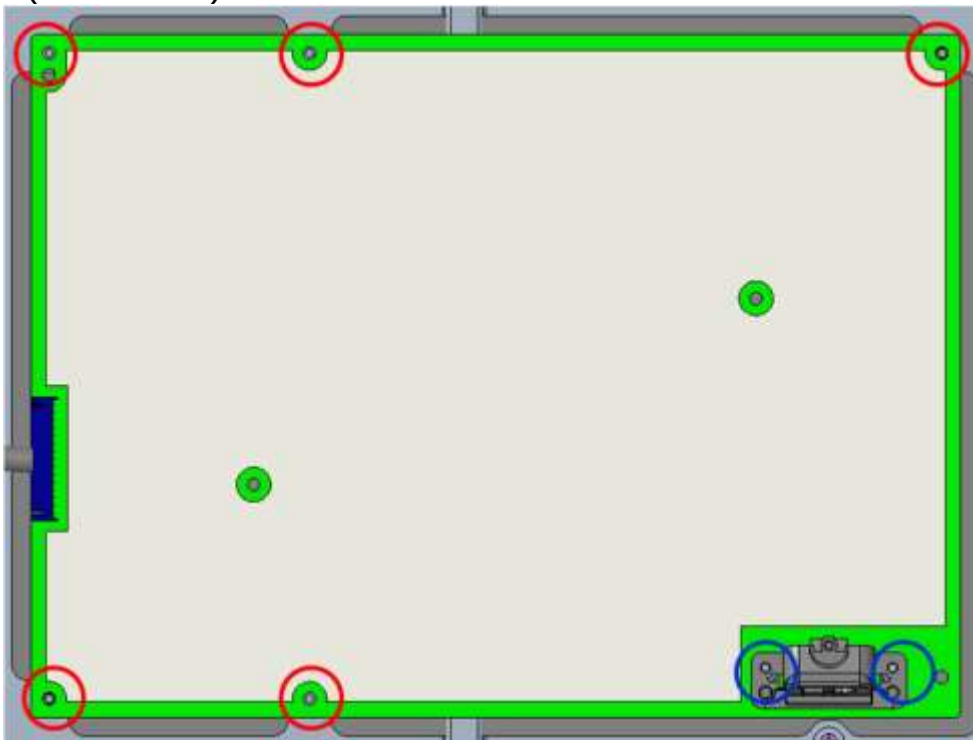


- PSU

1.-Disconnect the connection of the cable from the PSU (Red circle).

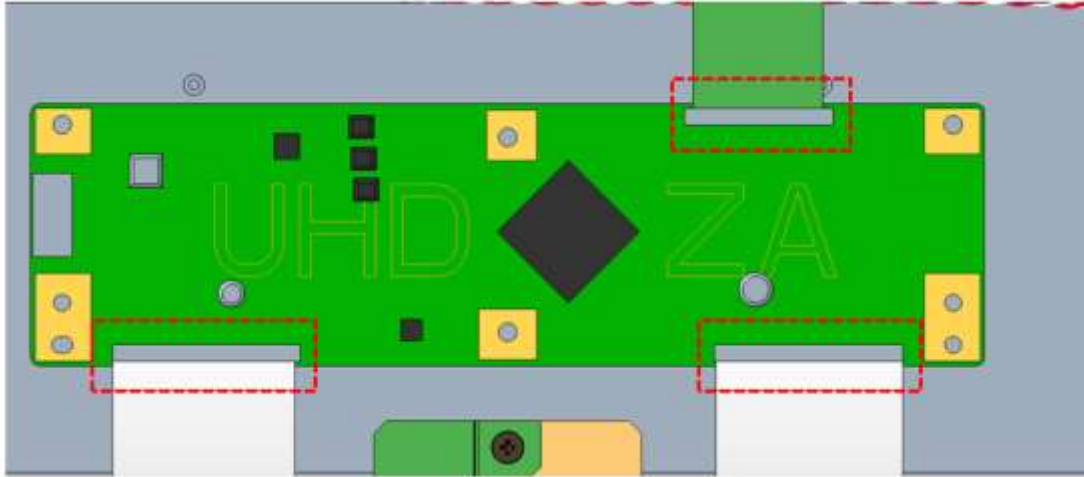


2.- To remove the PSU, unscrew 5 screws M3X6(Red circle)and 2 screws M3X8(Blue circle)

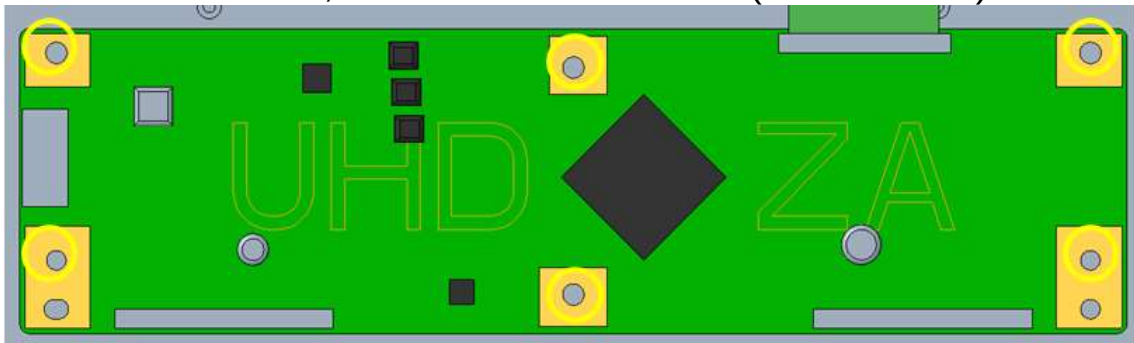


- T-CON Board

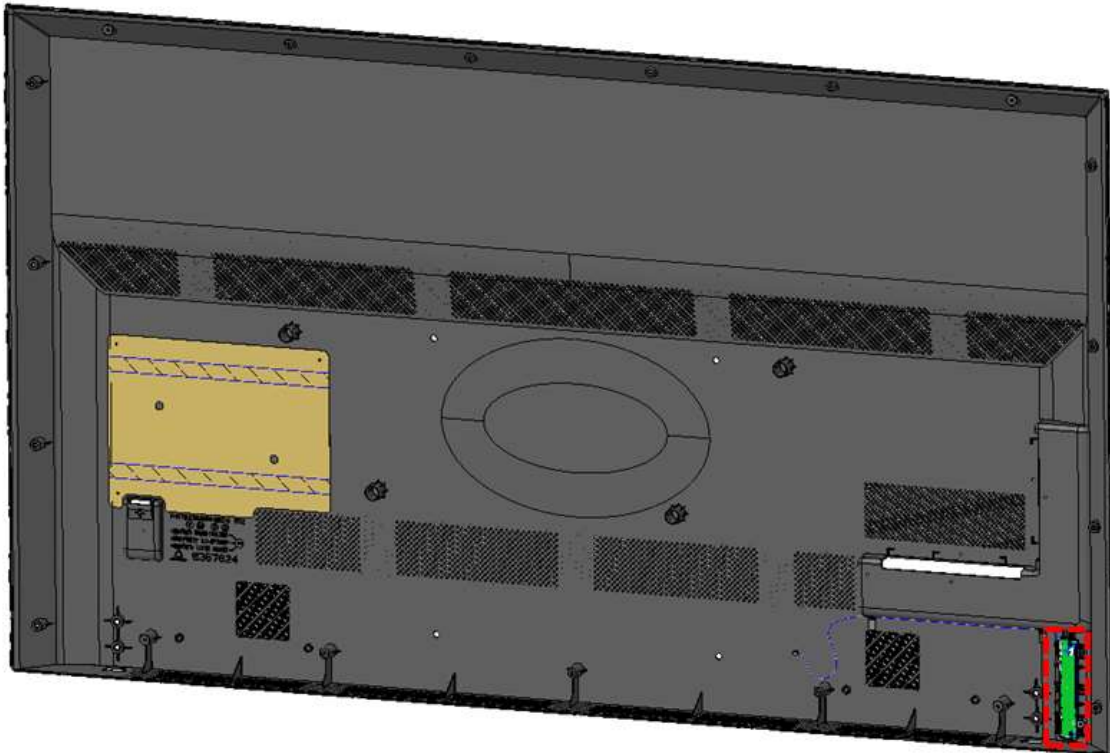
1.- Disconnect the connection of the cable from the T-con (red rectangle)



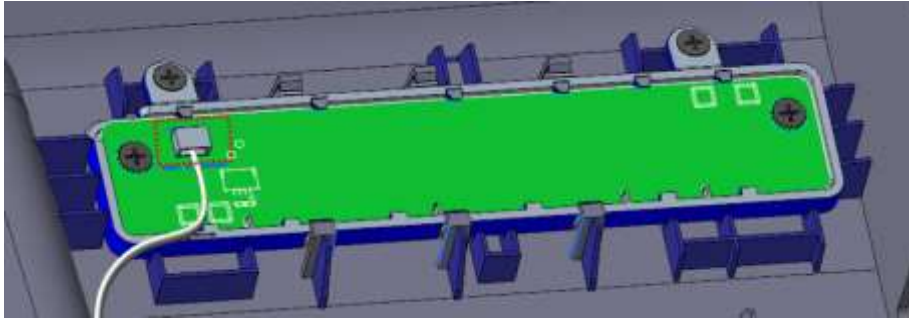
2.- To remove the board, unscrew 6 screws M3X6(Yellow circle)



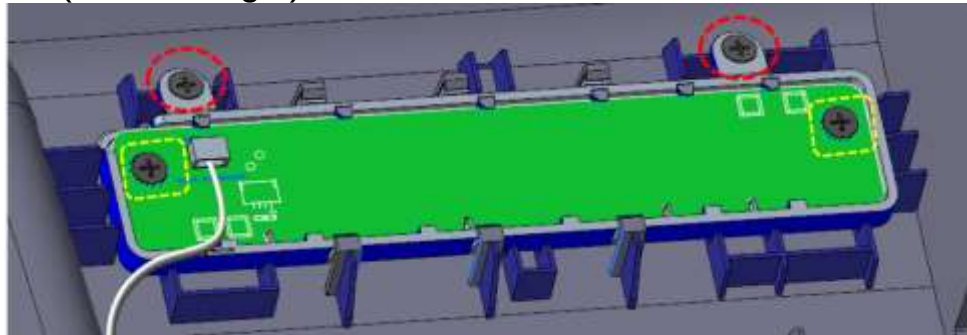
- Key pad



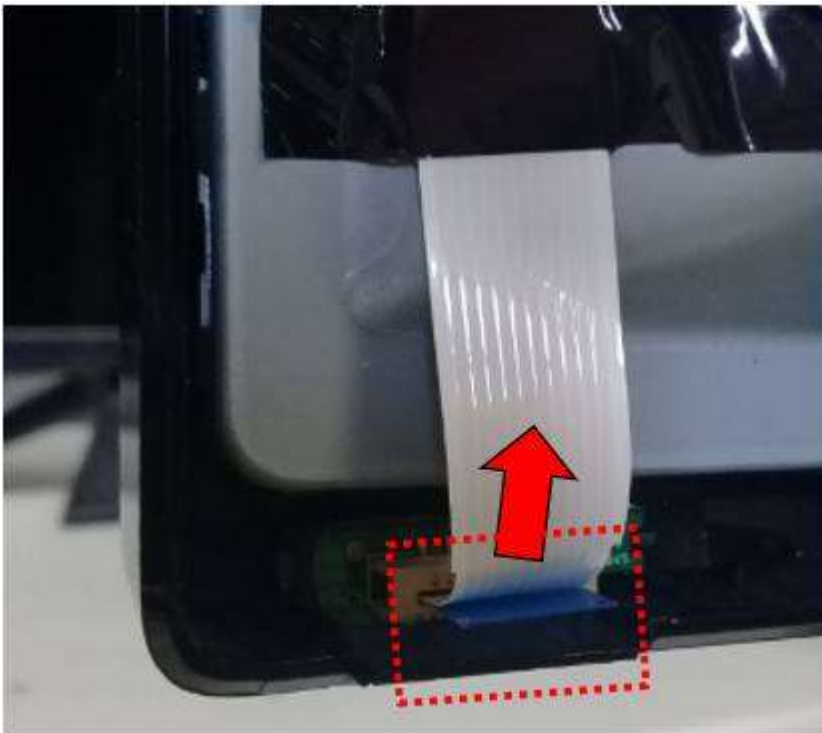
1.- Disconnect the connection of the cable from the key pad (red rectangle)



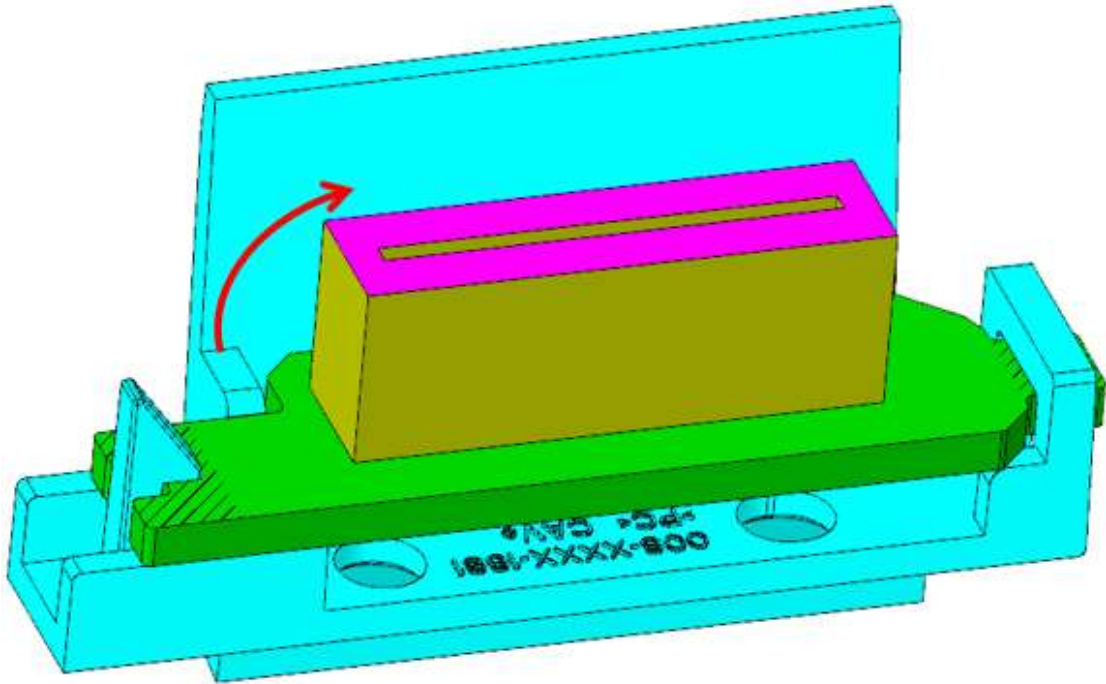
2.- To remove the key board, unscrew 2 screws T3X6 (Yellow rectangle) and 2 screws (red rectangle)



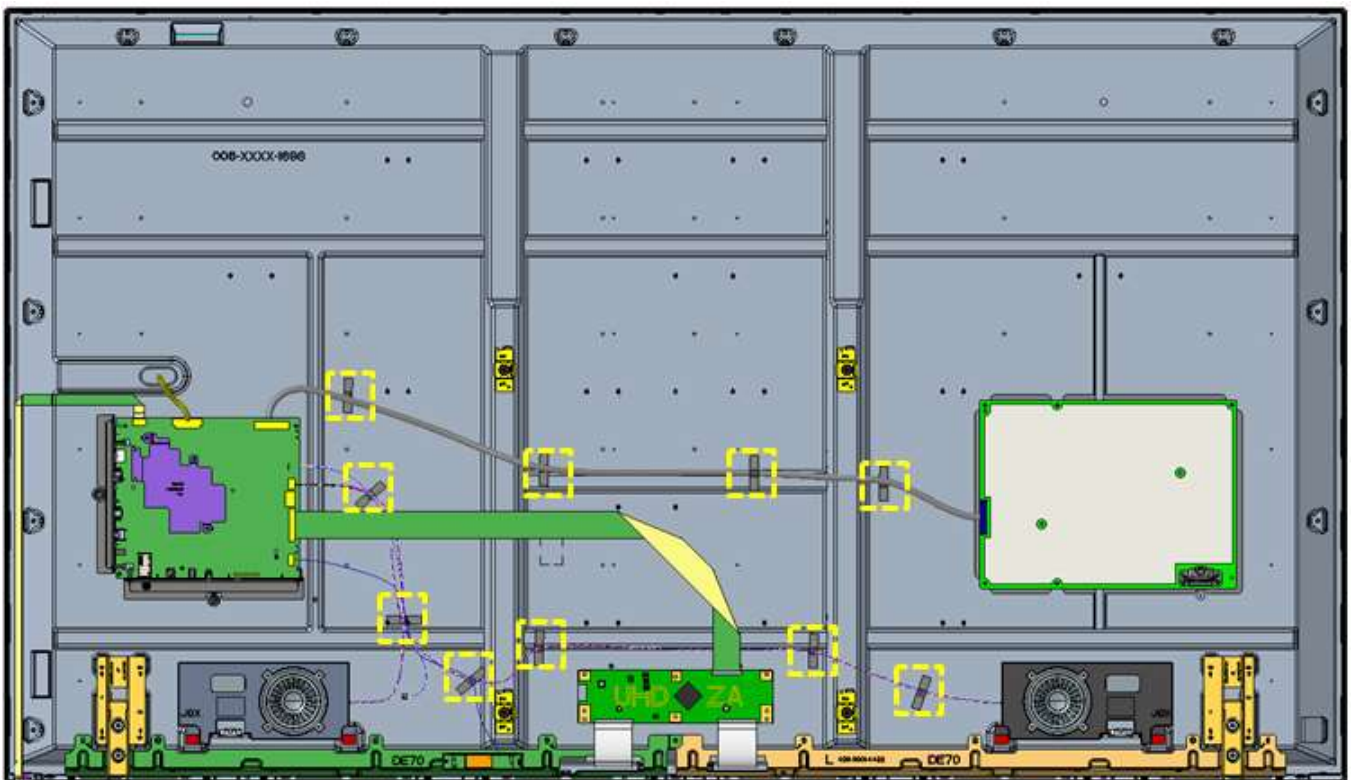
- IR Board
 - 1.- Disconnect the connection of the cable from the IR board (red rectangle)



2. Pull open the hook of IR Lens, then take IR Board out.



WIRE DRESSING LAY-OUT



CHAPTER 3. ADJUSTMENT PROCEDURE

[1] ADJUSTMENT PROCEDURE

1. HOW TO START ADJUSTMENT PROCESS MODE

- 1) While holding down the INPUT and Volume DOWN keys at the same time, plug in the AC cord to turn on the power. (“K” standing for inspection process mode is displayed on the upper left position of the screen.)
- 2) Press the Channel DOWN and Volume DOWN keys at the same time. (The adjustment process mode screen appears.)

2. HOW TO EXIT ADJUSTMENT PROCESS MODE

- 1) To exit it, turn off the power using the Power switch or remote control.

3. REMOTE CONTROLLER KEY OPERATION OF DISPLAY IN ADJUSTMENT PROCESS MODE

1) Key operation

Remote controller key	Main unit key	Function
CH ( / )	CH ( / )	(Remote controller key) Moving an item (line) by one (UP/DOWN) (Main unit key) Moving a page by one (UP/DOWN)
VOL (+/-)	VOL (+/-)	Changing a selected item setting. (Remote controller key) +1/-1 (Main unit key) +10/-10
Cursor ( )	-	Turning a page (PREVIOUS/NEXT)
Cursor ( )	-	Changing a selected line setting (+10/-10)
INPUT button on remote controller	INPUT button	Input source switching (toggle switching) TV -> INPUT1(HDMI1) -> INPUT2(HDMI2) -> INPUT3(VIDEO)
ENTER	-	Execute a function.

2) Description of display

Current page / Total pages	Current selected input	Current color system	LCD panel size / Destination
↓	↓	↓	↓
1/7 [INFO]	INPUT1	NTSC	60:US
Main Version	Eel_ATSC_Pack01 0.71 (BL 0000)		
SVN Number	SVN 1031541		
PANEL Version	SDP : 20 17 07 06 60 03 00 00 00 5A 53 00 00 00 00 00		
TEMP SENSOR	126		
NORMAL STANDBY CAUSE	RC_STANDBY		
ERROR STANDBY CAUSE	[1] NONE	0000H 00M	
	[2] NONE	0000H 00M	
	[3] NONE	0000H 00M	
	[4] NONE	0000H 00M	
	[5] NONE	0000H 00M	

4. LIST OF ADJUSTMENT PROCESS MODE MENU

(*) The page number will be changed at the running change. For the number to be changed, please check ().

PAGE(*) NUMBER	PAGE TITLE	ITEM	FUNCTION
1/7	INFO	Main version	Main Software Version. (Detail) Eel_ATSC_Pack**_v*.**(****) V*.** : SW version (****) : Boot version
		SVN Number	Don't care
		PANEL Version	Don't care
		TEMP SENSOR	TEMP sensor (Thermistor) value every 200msec.
		NORMALSTANDBY CAUSE	Cause of last Stand-By Operation. (Detail) NONE / Remote control / Keyboard / RS232C / No signal off / No operation off / Sleep timer
		ERROR STANDBY CAUSE	Cause of last (up to 5) Error Protection Stand-By Operation and TIME. (If the times have more than 5, the latest information should display at the bottom.)
2/7	INIT	Factory Init	Initialization for factory settings
		Panel Setting	LCD panel module information
		Public Mode	Change of Enable/Disable access to Public Setting MENU.
		Operation Acutime	Accumulate Time of TV-SET Operation.
		RESET	Reset the Accumulate Time of TV-SET Operation.
3/7	WB ADJ	IN POINT LOW	Standard value Low (In AV MODE : STANDARD,MOVIE,GAME,USER,PC)
		IN POINT HIGH	Standard value High
		R LEVEL LOW	WB adjustment Point Low ,R adjustment value
		G LEVEL LOW	WB adjustment Point Low ,G adjustment value
		B LEVEL LOW	WB adjustment Point Low ,B adjustment value
		R LEVEL HIGH	WB adjustment Point High ,R adjustment value
		G LEVEL HIGH	WB adjustment Point High ,G adjustment value
		B LEVEL HIGH	WB adjustment Point High ,B adjustment value
		R LEVEL MAX	WB adjustment Point Max ,R adjustment value
		G LEVEL MAX	WB adjustment Point Max ,G adjustment value
		B LEVEL MAX	WB adjustment Point Max ,B adjustment value
		ADJ DATA STORE	Update and Store all of gamma register value
		RESET ADJUSTMENT	Reset default value above items and Adj-Flag
4/7	ETC	EEP CLEAR	Clear the EEPROM data to 0xFF.
		STANDBYCAUSE RESET	Clear the STANDBY CAUSE history.
		DESTINATION	Indicate the kind of Factory-Initialization command
		L ERR RESET	Indicate the count of Lamp Error Protection. And Reset the counter
		L ERR STOP	Lamp Error protection flag (Enable/Disable)
		TEMP CAUTION	Setting for threshold level of High-Temp. caution (THRS1)
		TEMP SHUTDOWN	Setting for threshold level of High-Temp. protection (THRS2)
5/7	PANEL	VCOM ADJ	V-COM adjustment value
		TCON TEST PATTERN	Display the T-CON Test Pattern
		TEST PATTERN	Display the Test Pattern.

PAGE NUMBER	PAGE TITLE	ITEM	FUNCTION
6/7	SW	Dimmer PT1	Dimmer Temperature Threshold 1
		Dimmer PT2	Dimmer Temperature Threshold 2
		Dimmer PD1	Dimmer Duty Threshold 1
		Dimmer PD2	Dimmer Duty Threshold 2
		SERIAL NUMBER	Display the serial number
		MAC ADDRESS	Display the number of MAC ADDRESS
		WIFI MAC ADDRESS	Display the number of MAC ADDRESS
		HDCP1.4	Display the HDCP KEY
		HDCP2.2	Display the HDCP KEY
		HDCP2.2 Receiver ID	Display Receiver ID
		TEST NETWORK UPDATE	Enable network update test by switching reference xml file name for new version detection
7/7	WIFI	ETHER TEST	Ethernet Network Inspection
		ETHER RESULT	Display the result of Ethernet Network Inspection
		WIFI SSID 2.4GHz	WiFi SSID setting (2.4GHz) for Factory checking
		WIFI SSID 5GHz	WiFi SSID setting (5GHz) for Factory checking
		WIFI RSSI 2.4GHz	Display the minimum value of RSSI (2.4GHz)
		WIFI RSSI 5GHz	Display the minimum value of RSSI (5GHz)
		WIFI TIME 2.4GHz	Display the time out of WiFi 2.4GHz check (sec)
		WIFI TIME 5GHz	Display the time out of WiFi 5GHz check (sec)
		WIFI RSSI TEST	2.4GHz, 5GHz RSSI Level test
		WIFI RSSI RESULT	Display the RSSI Level test result

5. ADJUSTMENT ITEM

■WHITE BALANCE ADJUSTMENT

The white balance adjustment value is used to correct variations in each LCD panel. When the LCD panel is not changed, take over the LCD panel setting to suppress variations. When the LCD panel is changed, set the average value.

(When replacing the main unit [When the LCD panel is not changed])

The white balance adjustment value is saved to the main unit.

When replacing the main unit, read the white balance adjustment value and set it.

1) Before replacement the mainunit.

Read the white balance adjustment value in the 3/7 [WB ADJ] page.

2) After replacement the mainunit

Set the white balance adjustment value read in the step 1) in the 3/7 [WB ADJ] page.

3) After writing, change the "ADJ DATA STORE" to ON and press the ENTER key on the remote control in order to set a flag indicating the completed / incomplete WB adjustment which is heldinside.

08/13 [WB ADJ]	INPUT1	NTSC	NTSC
IN POINT LOW	40		
IN POINT HIGH	229		
R LEVEL LOW	771		
G LEVEL LOW	675		
B LEVEL LOW	641		
R LEVEL HIGH	3600		
G LEVEL HIGH	3497		
B LEVEL HIGH	3583		
R LEVEL MAX	4026		
G LEVEL MAX	3911		
B LEVEL MAX	4007		
ADJ DATA STORE	[OFF		]
RESET ADJUSTMENT	[OFF		]

(MEMO)

When cannot read the white balance adjustment value, set the average value by the same procedure as when replacing the LCD panel.

(When replacing the LCD panel)

- 1) After replacing the LCD panel, set the following average value in the 3/7 [WB ADJ]page.
- 2) After setting, change the "ADJ DATA STORE" to ON and press the ENTER key on the remote control in order to set a flag indicating the completed / incomplete WB adjustment which is held inside.

ITEM	60CJ1U	70CJ1U	80CJ1U
IN POINT LOW	40	40	40
IN POINT HIGH	229	229	229
R LEVEL LOW	586	641	596
G LEVEL LOW	584	619	625
B LEVEL LOW	593	668	739
R LEVEL HIGH	3427	3388	3193
G LEVEL HIGH	3436	3356	3356
B LEVEL HIGH	3580	3640	3607
R LEVEL MAX	3915	3828	3588
G LEVEL MAX	3926	3792	3772
B LEVEL MAX	4080	4080	4054

■ VCOM ADJUSTMENT

When replacing the T-CON unit, perform the VCOM adjustment.

- 1) Enter service mode key and go to 5/7 [PANEL]Page.
- 2) Press "Enter" key (at VCOMADJ)
- 3) Adjust the flicker effect by pressing "VOL +/-" of RC key.
- 4) Press "Enter" key after the best value.

10/13 [PANEL]	INPUT1 NTSC NTSC
VCOM ADJ	55
TCON TEST PATTERN	0
TEST PATTERN	0

■ PANEL SIZE

- 1) Enter the adjustment process mode [PAGE 2/13 (INIT)]
- 2) Point the cursor to [PanelSetting]
- 3) Select Panel Setting and press [ENTER] key
60inch : 60_SDP_UHD
70inch : 70_SDP_UHD
80inch : 80_SDP_UHD

02/13 [INIT]	INPUT1 NTSC 60:US
Factory Init	[US]
Panel Setting	[60_SDP_UHD]
Public Mode	[OFF]
Operation Acutime	0101H 22M
RESET	[OFF]

02/7 [INIT]	
FACTORY INIT	US
PANEL SETTING	xx_SDP_UHD
PUBLIC MODE	OFF
OPERATION ACUTIME	0008H 56M
RESET	OFF

■ FACTORY SETTING

After completing the factory setting, pull out the AC cord to complete the setting.

(Caution)

- Do not turn on the power after completing the factory setting. If the power is turned on, configure the factory setting again.
- Do not insert the USB memory when performing the Factory setting. If the USB memory is inserted, Factory setting fails.

02/13 [INIT]	INPUT1 NTSC 60-US
Factory Init	[US]
Panel Setting	[60_SDP_UHD]
Public Mode	[OFF]
Operation Acutime	0101H 22M
RESET	[OFF]

ITEM	CONDITION	PROCEDURE
Factory setting	Complete the setting by pulling out the AC cord.	• Enter Factory mode then select "Factory Init" in page 2/7 and push Enter Key by remote. • Confirm the green screen on the display. • Turn off the TV with AC plug off. Confirm "US" displayed when factory
		The followings are initialized to factory setting: 1) Usersetting 2) Channel data (e.g. broadcast frequencies) 3) Manufacturer's option settings 4) Password data 5) Setting values are set based on model destination

[2] SERVICE MODE

Enter factory mode menu by remote controller:

Press "INPUT" + Numeric keys "1990" to enter factory mode.

[3] SOFTWARE UPGRADE PROCEDURE

1. SOFTWARE VERSION UPGRADE

When replacing the Main unit, make sure to update the latest software.

The software can be upgraded by using a general-purpose USB memory device. The following are the procedures for upgrading the software.

2. USB MEMORY

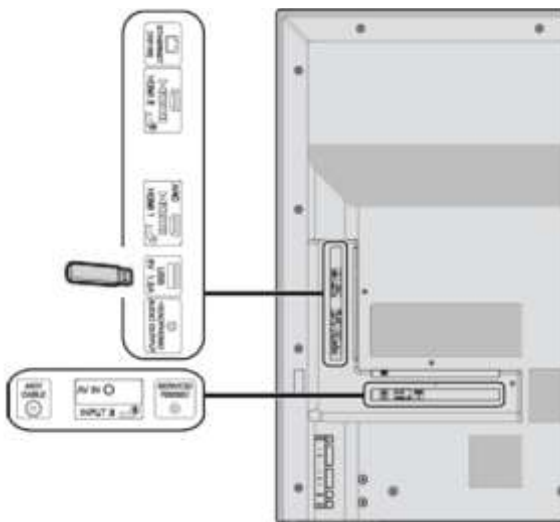
- USB memory of 256MB or higher capacity.
- PC running on Windows operating systems
- USB memory reader/writer or PC with a USB port
- The file system of a USB memory is FAT. (FAT32 supports)
- Use the USB memory without other functions (lock and memory reader ...etc)

3. HOW TO UPGRADE THE SOFTWARE

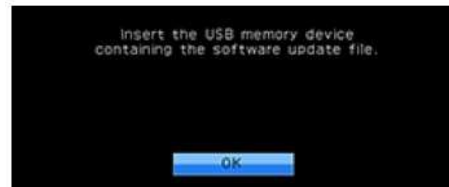
(Caution)

- Do not remove the USB memory device or unplug the AC cord while the software is being updated.
- Be sure to properly follow the whole procedure described below, step by step. Otherwise, for example, the TV cannot read the data in the USB memory device and software updating will fail.: Never "POWER OFF" the LCD TV when software upgrade is ongoing. Otherwise the system may be damaged beyond recovery.

- 1) Make sure LCD TV is on.
- 2) Insert the USB memory device with the update file into the USB terminal on the TV. (Make sure the latest software is installed in the USB memory device)



Press ▲/▼ on the Manual Update screen to select "USB Update", and then press ENTER. Menu -> Information -> Software Update -> Manual Update -> Usb Update -> Start



Press ENTER to start checking the data in the USB memory device.

1) During the data checking, "Checking" blinks.

- The current version of the Monitor software and the version of the update file on the USB memory device are displayed.
- If the USB memory device is not properly installed or the correct update file cannot be found on the USB memory device, an error message is displayed. Check the file on the USB memory device, and then reinsert the USB memory device correctly.

2) When the software is successfully updated, a screen is displayed indicating that the update process is completed. After this screen is displayed, the TV automatically turns off and then turns on again.

- If the update has failed, check the file in the USB memory device and try Software Update again.



Remove the USB memory device.

Check the firmware version.

(Press “Menu button” -> “Information” -> “Identification” -> Version : SW x.xx)



CHAPTER 4.TROUBLESHOOTING TABLE

1. HOW TO RESPOND BY TROUBLE SYMPTOM (IN CASE OF NON-DEFECTIVE MODE)

Defective symptom	Action
No power.	- Check if you pressed POWER on the remote control unit. - Is the AC cord disconnected? - Has the power been turned on?
Unit cannot be operated.	- External influences such as lightning, static electricity, may cause improper operation. In this case, operate the unit after first turning off the power of the TV or unplugging the AC cord and replugging it in after 1 or 2 minutes.
Remote control unit does not operate.	- Are batteries inserted with polarity (+, -) aligned? - Are batteries worn out? (Replace with new batteries.) - Are you using it under strong or fluorescent lighting? - Is a fluorescent light illuminated near the remote control sensor?
Picture is cut off/with sidebar screen.	- Is the image position correct? - Are screen mode adjustments such as picture size made correctly?
Strange color, light color, or color misalignment	- Adjust the picture tone. - Is the room too bright? The picture may look dark in a room that is too bright.
Power is suddenly turned off.	- Is the sleep timer set? - Check the power control settings. - The unit's internal temperature has increased. Remove any objects blocking vent or clean.
No picture	- Is connection to other components correct? - Is the correct input selected? - If the PC image is not displayed, check the following: When connecting a laptop PC to the TV, check that display output mode of the PC is set to external TV. Check the resolution setting on the PC. Is a non-compatible signal being input?
Picture quality of HD videos is poor.	- To enjoy HD images from external equipment, you are required to set up HDMI connection or component connection. - If the Video source is not of HD quality, HD images cannot be displayed. Check that the Video source you are viewing provides HD images. - The HD cable/satellite set-top box may need to be configured to output HD images via cable/satellite.

Defective symptom	Action
The TV sometimes makes a cracking sound.	- This is not a malfunction. This happens when the cabinet slightly expands and contracts according to change in temperature. This does not affect the Monitor's performance.
Some Internet functions used on a PC are not available from the TV.	- The TV has only limited functions compared with regular PC browsers.
No sound	- Is connection to other components correct? - Is the volume too low? - Is "Variable" selected in "Audio Output Select"? - Have you pressed MUTE on the remote control unit? - Check the audio output of the connected external equipment. Is the volume too low or muted? - When external equipment is connected via an HDMI cable, you may need to configure the audio to be output through the HDMI cable.
When the setting of the backlight is set to the setting other than the maximum setting(+16) and the display screen is seen through the camera, the flicker appears.	The symptom occurs because the factory setting(Standard mode) of the backlight is (+8). The backlight control is controlled by PWM dimming (pulse dimming), and if the setting of the backlight is lowered, the period of the pulse decreases and it interferes with the shutter cycle of the camera. - Set the backlight setting to the maximum (+16) by "Picture settings" menu.

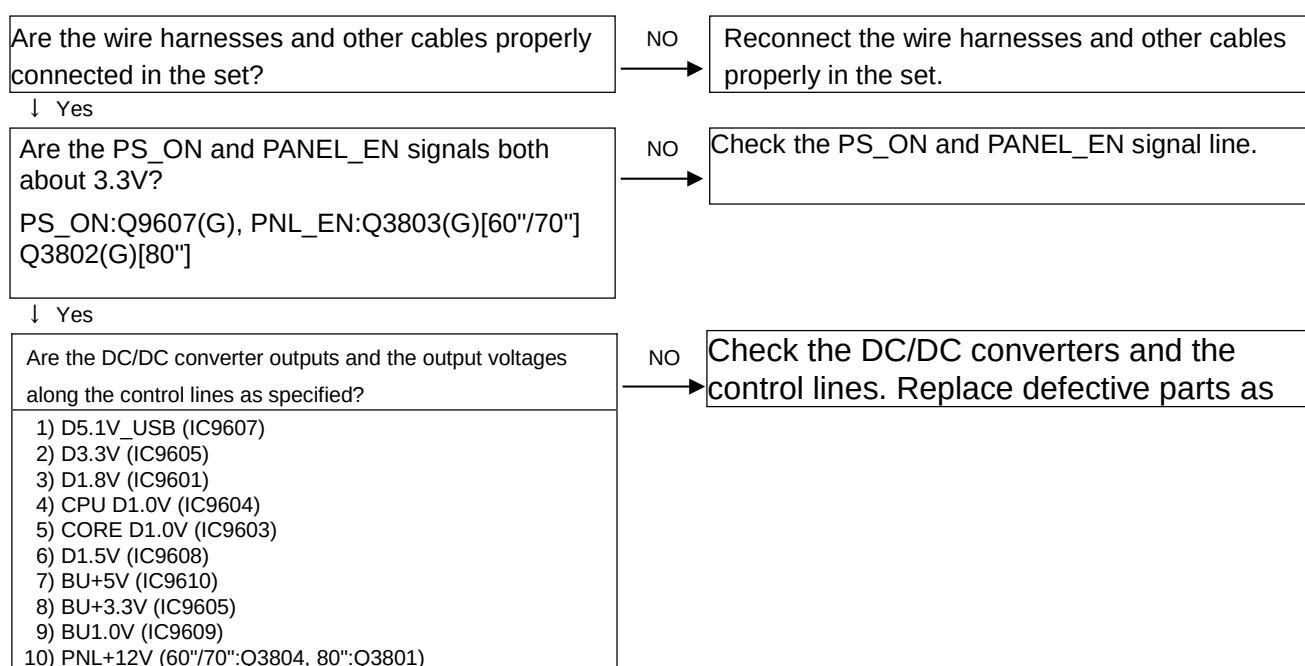
Cautions regarding use in high and low temperature environments

- When the unit is used in a low temperature space (e.g. room, office), the picture may leave trails or appear slightly delayed. This is not a malfunction, and the unit will recover when the temperature returns to normal.
 - Do not leave the unit in a hot or cold location. Also, do not leave the unit in a location exposed to direct sunlight or near a heater, as this may cause the cabinet to deform and the front panel to malfunction.
- Storage temperature: -4°F to +140°F (-20°C to +60°C)

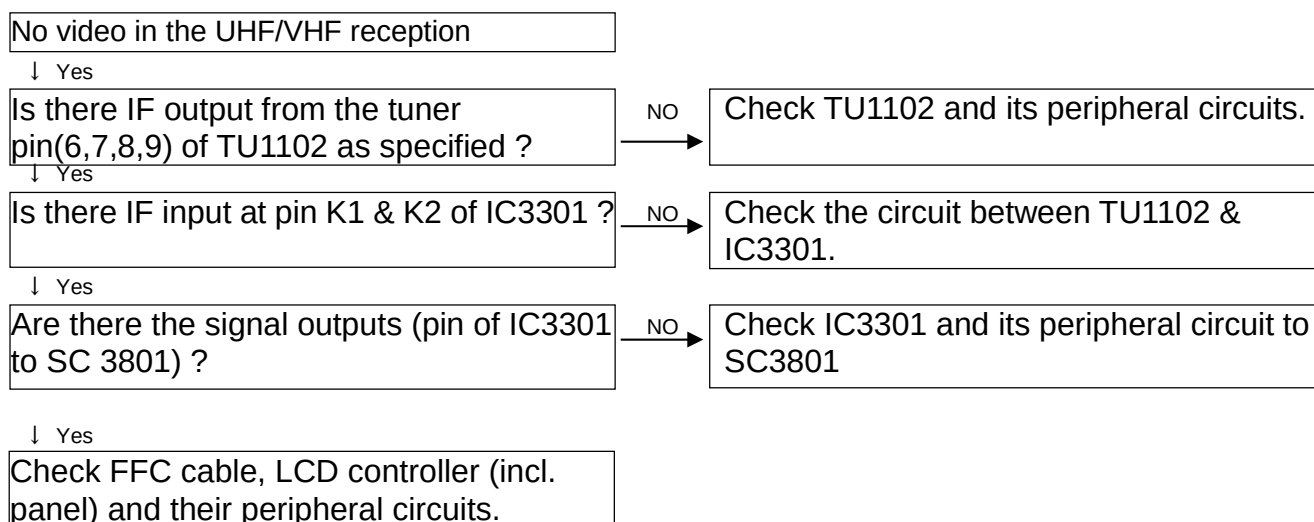
2. HOW TO RESPOND BY TROUBLE SYMPTOM (IN CASE OF DEFECTIVEMODE)

No	Description
1	No Power (front LED failure to light up) or no startup (front LED failure to turn red to green)
2	With [RF]signalinput No video onscreen(1)
3	With <Video>signalinput No video onscreen(2)
4	With <HDMI1/HDMI2>signalinput No video onscreen(3)
5	No audio heard (1)
6	No audio heard (2)
7	No audio heard (3)

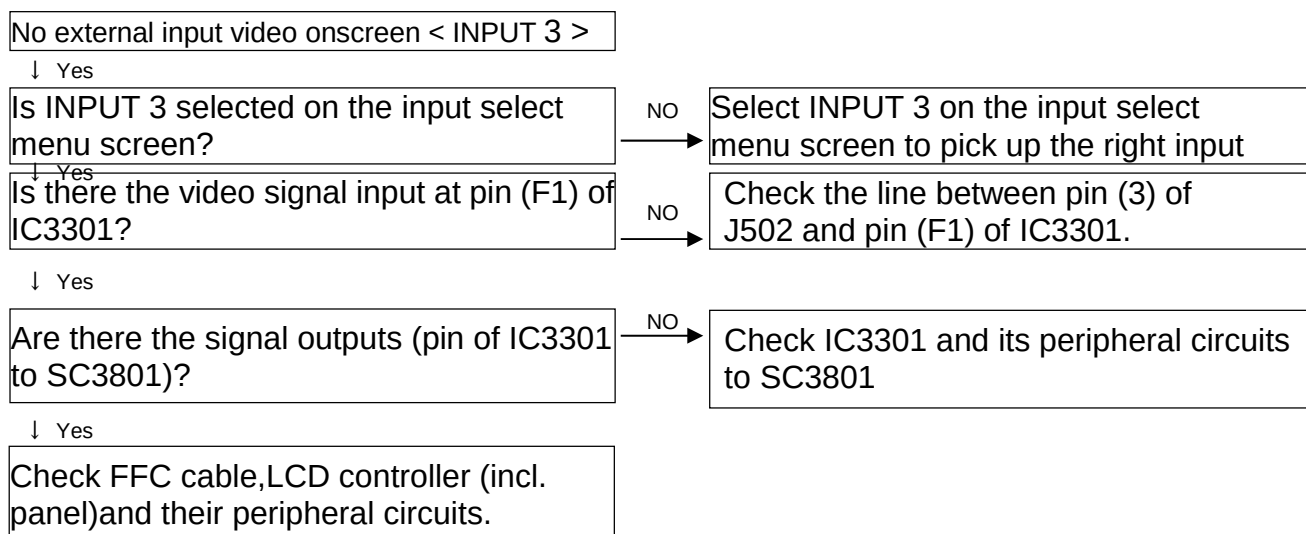
2-1. No Power (front LED failure to light up) or no startup (front LED failure to turn red to green)



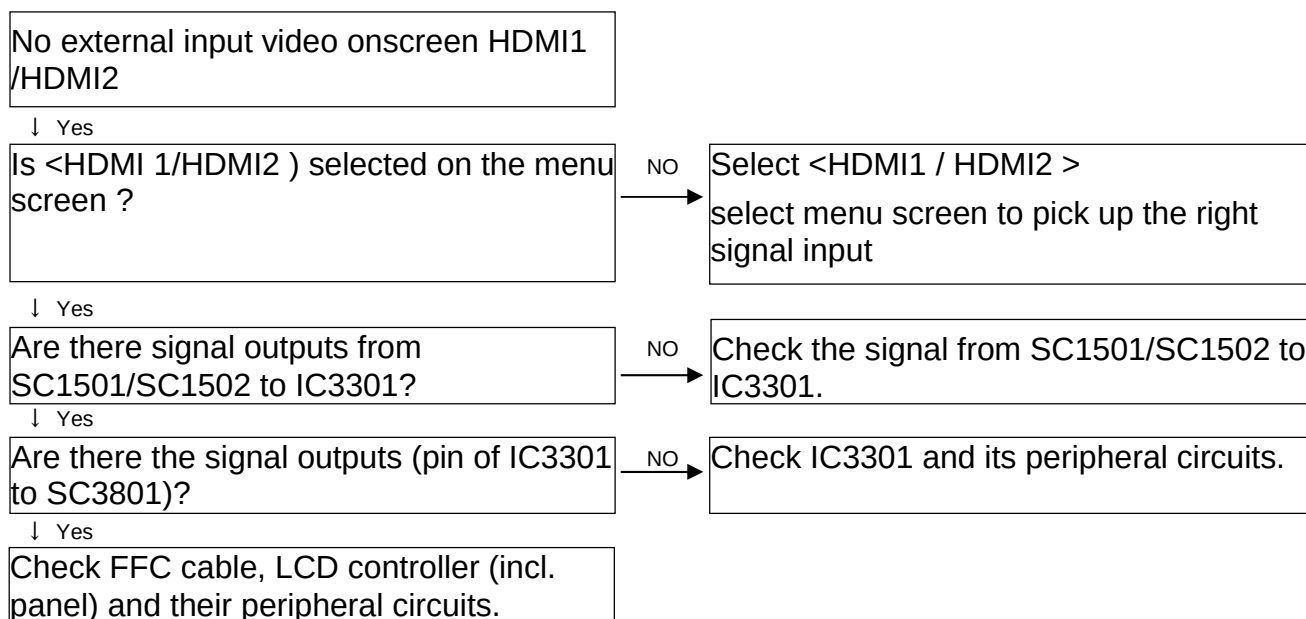
2-2. With [RF]signalinput No video onscreen(1)



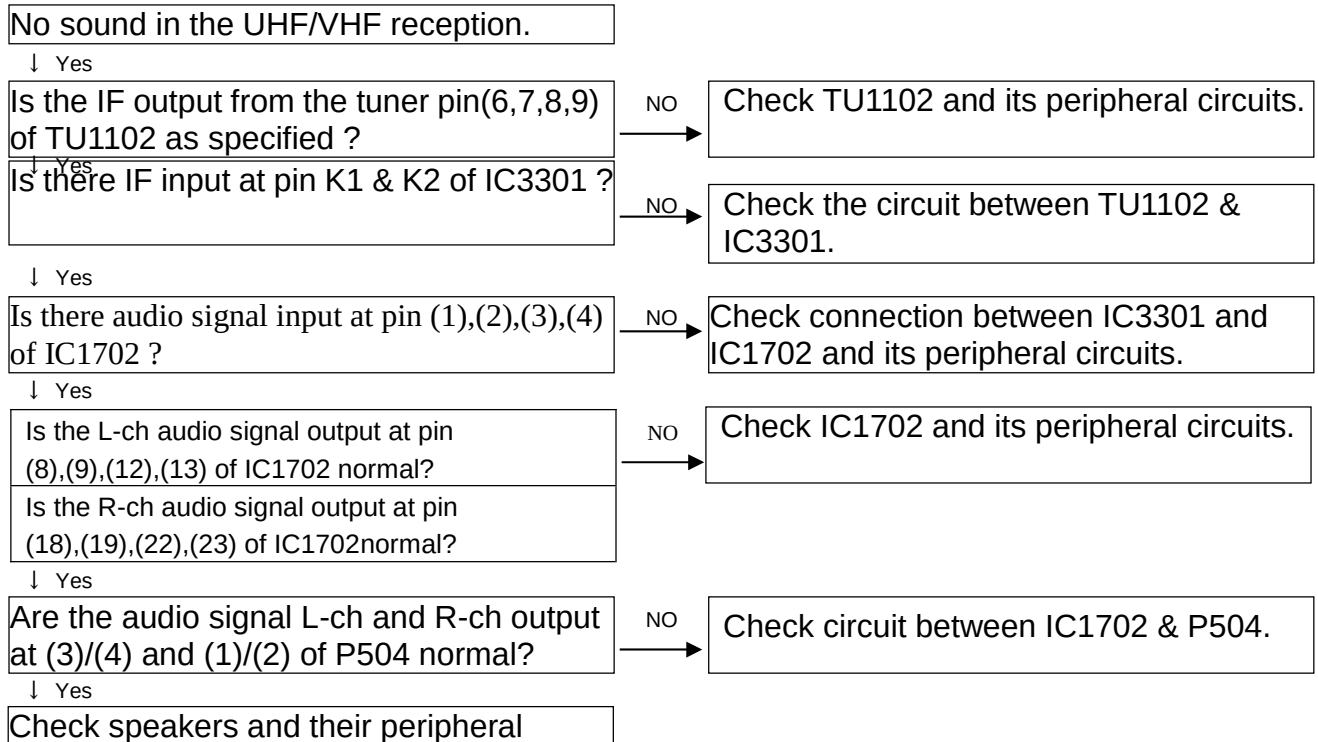
2-3. With <Video>signalinput No video onscreen(2)



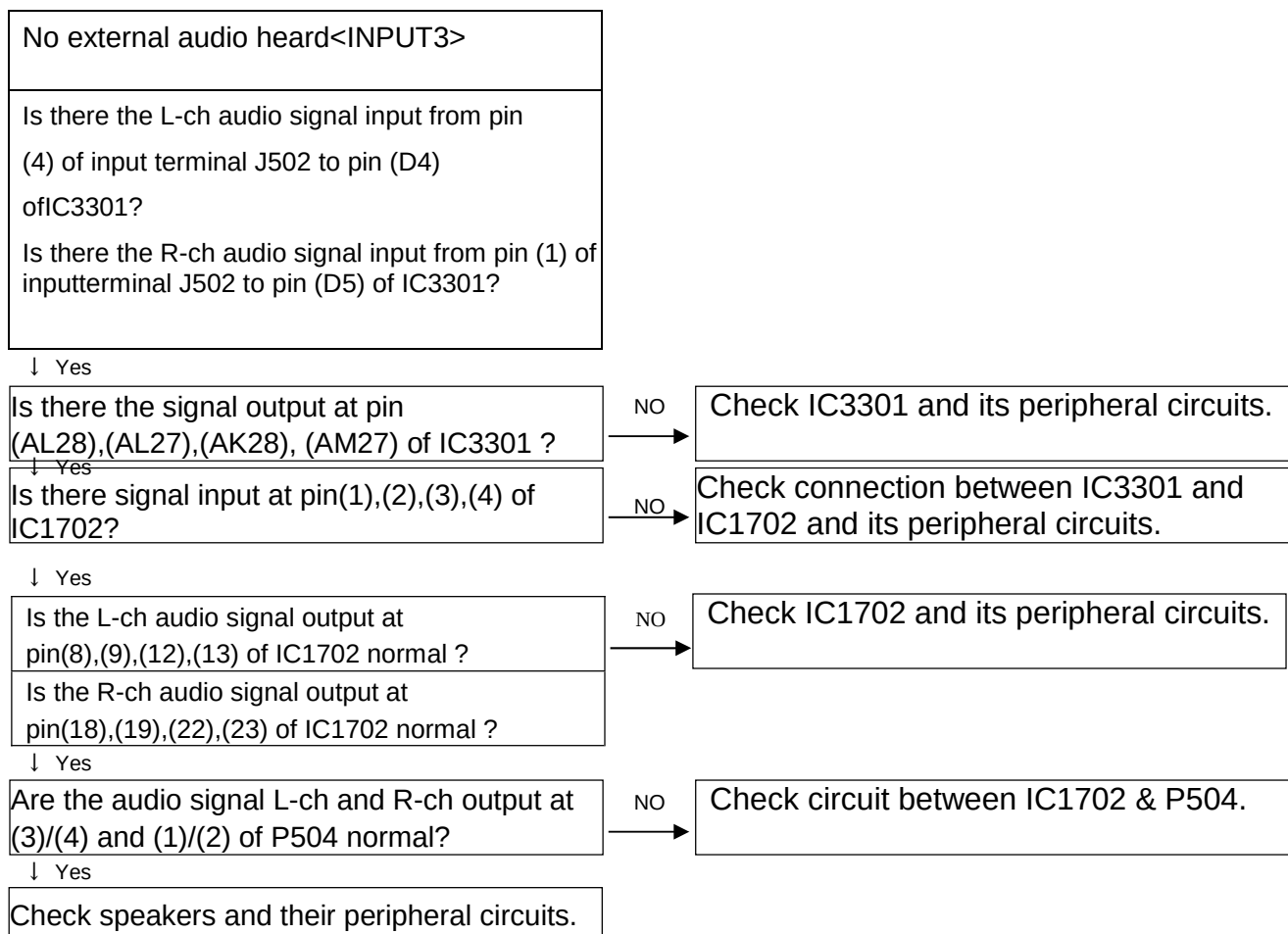
2-4. With <HDMI1/HDMI2>signalinput No video onscreen(3)



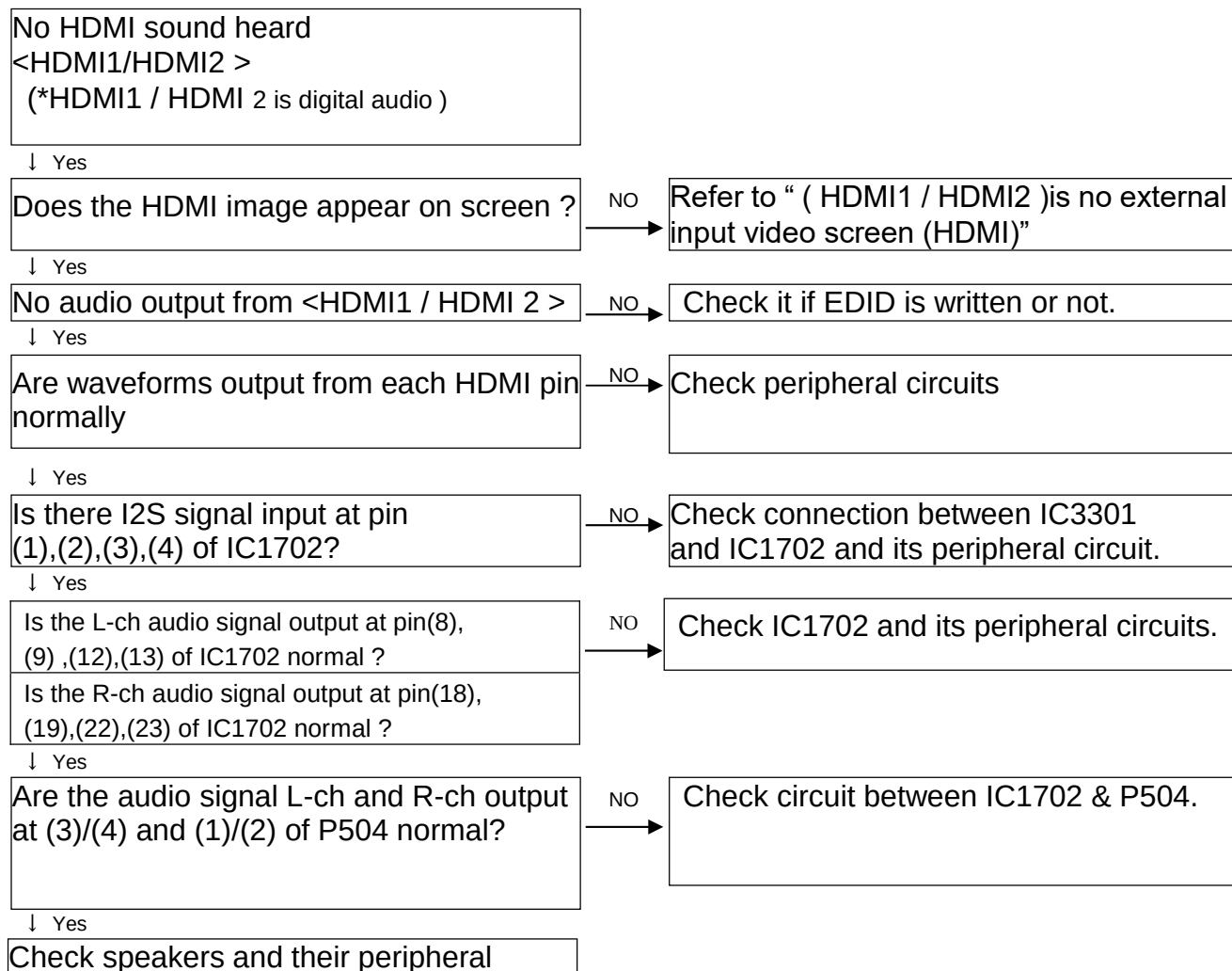
2-5. No audio heard (1)

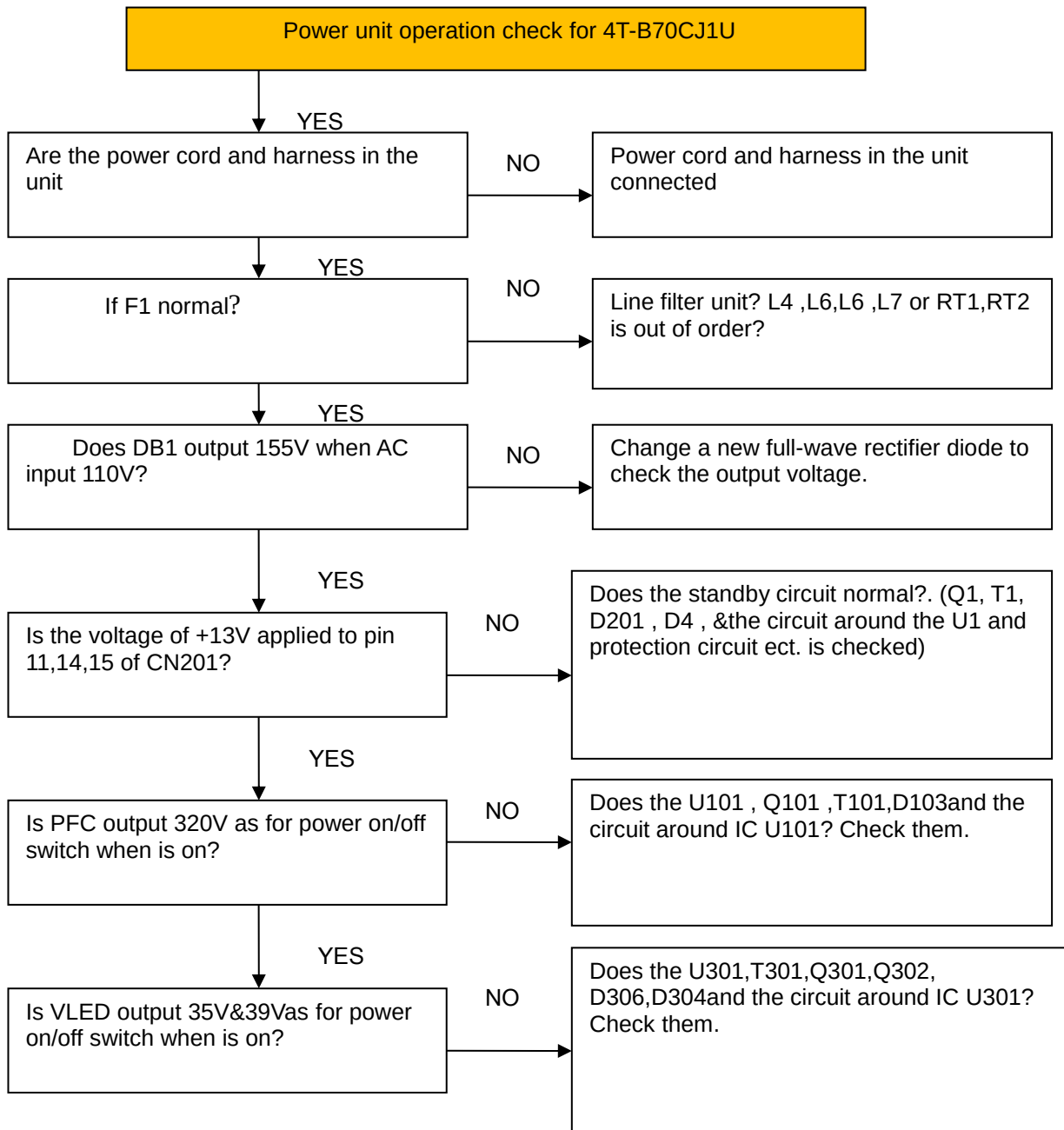


2-6. No audio heard (2)



2-7. No audio heard (3)





CHAPTER 5. MAJOR IC INFORMATIONS

[1] MAJOR IC INFORMATIONS

IC3301(RH-IXE078WJQZQ) --- RealTek , RTD2991

Soc

Feature list

- Audio Input/Output
 - ◆ 4 pairs Analog Stereo Line level inputs
 - ◆ 3 pairs for Audio Stereo Line Output.
 - ◆ Headphone Amplifier embedded
 - ◆ 48KHz baseband ADC Sample rate
 - ◆ 48KHz Audio Sample rate on TV Sound De-modulator
 - ◆ Four Digital I2S slave/master input and Three Digital I2S Output.
 - ◆ One SPDIF out supported.
 - ◆ Non-PCM SPDIF output
 - ◆ Support HDMI ARC
- Video Input
 - ◆ 3 Channel HDMI 1.4/2.0 compliant receiver w/ one MHL 2.0/3.0
 - ◆ Support HDMI 2.0 3D mandatory format and 4K2K format input
 - ◆ Integrated HDCP 2.2 decryption engine for receiving protected audio and video content
 - ◆ Pre-programmed HDCP keys provide highest level of key security, simplifies manufacturing
 - ◆ Support HDMI CEC interface
- Video Decoder
 - ◆ Line-Locked clock generation.
 - ◆ Horizontal and vertical sync detection and locking.
 - ◆ H/W auto multi-standard detection and color decoding:
 - ◆ Support NTSC/PAL/SECAM decode
 - NTSC-M, NTSC-443.
 - PAL-BDGH, PAL-M, PAL-N, PAL-60, PAL-CN
 - SECAM.
 - ◆ High performance adaptive 3D comb filter for Y/C separator.
- Audio Decoder
 - ◆ Supports multi-standard TV broadcasting includes BTSC, EIA-J and FM A2.
 - ◆ NICAM sound for B/G/L/I/D/K system.
 - ◆ Automatic Standard Sound Detection
- VBI Decoder
 - ◆ CC : CC1, 2, 3 and 4, Text 1, 2, 3 and 4, XDS (eXtension Data Service), V Chip
 - ◆ CGMS : ETSI EN 300 294, ITU-R BT.119 method, IEC-61880 method, CC-XDS method
 - ◆ WSS : ETSI EN 300 294, ITU-R BT.119 method, IEC-61880 method, CC-XDS method
 - ◆ TT: Teletext 1.5/2.5 ETSI EN 300 706

- **ATV IF Demodulation**
 - ◆ Fully Support NTSC, PAL, SECAM IF Demodulation.
 - ◆ Multistandard true synchronous demodulation with active carrier regeneration.
 - ◆ Normal IF and Low IF supported
 - ◆ VIF AGC detector for gain control.
 - ◆ SIF-AGC for gain controlled SIF amplifier, Sound IF (SIF) input for single reference Quasi Split Sound (QSS) mode, PLL controlled.
- ◆ SAWless
- **DTV demod**
 - ◆ Embedded DTMB/DVB-C/ATSC/DVB-T/ISDB-T demod inside
- **Multi-format Video Codec**
 - ◆ Support MPEG1/2 and VC-1,AVS, AVS+, MPEG4, RM/RMVB up to full HD (1920x1080)
 - ◆ H.264 1080p encoder
 - ◆ H.264 4K2K@60Hz decoder
 - ◆ HEVC 10bits 4K2K@60Hz decoder
 - ◆ VP9 4K2K@60Hz decoder
- **Video Post-Processing**
 - ◆ Automatic Video Error Concealment
 - ◆ MPEG De-block & De-ringing noise reduction filter
- **Audio Decompression**
 - ◆ Support AC3, MPEG1 Layer 1,2 and 3(mp3), AAC, DTS, and MPEG2 Layer 2, audio format decoding
 - ◆ Support audio transcoding
 - ◆ Support Dolby Digital MS11
- **Audio Post-Processing**
 - ◆ Hardwired Automatic Volume Control, 11-stage Equalizer, Treble/Bass/Loudness/Volume/ Balance control
 - ◆ RealStereo, RealSurround, RealSpace, RealVoice, RealEnvironment, Dynamic Speaker
- **Image Processor**
 - ◆ Input format detection and Smart-Fit™
 - ◆ Compatibility with standard VESA mode and support user-defined mode
 - ◆ Frame-Lock display to keep smooth motion
 - ◆ Color-Recover™ III for video cross color reduction
 - ◆ Clean-Picture™ III for spatial/temporal and Mosquito noise reduction
 - ◆ Pixel-Composer™ III for following feature:
 - ◆ Inverse 3:2:2 pull-down for Film Mode detection
 - ◆ Motion Compensation de-interlace
 - ◆ Ultra-Zoom™
 - ◆ Input color space conversion
 - ◆ Vivid-Color™
 - ◆ Digital hue, saturation, brightness and contrast adjustments
 - ◆ Support DLT/DCTI video-quality improvement
 - ◆ Independent Color Manager
 - ◆ Support Black/White Level Expansion and ACC
 - ◆ Support 2D Y peaking filter and coring
 - ◆ sRGB compliance and Gamma correction
 - ◆ 3Dither™ serves as advanced dithering function
- **OSD, sub-title Engine & Cursor**
 - ◆ Powerful 3D GPU IMAGINATION SGX6110

- ◆ Support 4K2K OSD plane, sub-title Engine & Cursor respectively.
- ◆ Additional 2D graphic engine
- ◆ Support OSD plane up to 4K2Kx32bits
- MEMC engine integration
 - ◆ Support 24Hz/25Hz/30Hz MEMC to 60HzHz
 - ◆ Support film mode detection
- Panel Interface
 - ◆ Built-in fully programmable display timing generator
 - ◆ Support up to 120Hz FHD with EPI, mini-LVDS and LVDS transmitter
 - ◆ Support up to 60Hz 4K2K with Vby1 Tx or EPI
 - ◆ Integrated high-quality Spread-Spectrum Display
 - ◆ Support up to 60Hz FPR/SG 3D panel
- System Controller
 - ◆ RISC processors for System control and audio/video control
 - ◆ Quad core ARM 64bits CPU with 1MB L2 Cache
- Memory Interface
 - ◆ Support eMMC 5.0 HS400
 - ◆ Support SPI Nor Flash and NAND flash
 - ◆ Configurable flash access timing
 - ◆ Support external DDR3@2133 or DDR4@2400 16bits x 2 up to 512Mx16 bits for each DDR
- Peripheral Interface
 - ◆ Low-speed Peripherals
 - ◆ Support two 16550 UARTs, each has 16-byte FIFO.
 - ◆ Support one IrDA Rx interface, which complies with NEC, SHARP, Sony SIRC protocol I, and Philips RC-5.
 - ◆ Support three parallel transport stream input/output and CI+ 1.4
 - ◆ Support 4x I2C master & two I2C Slave
 - ◆ Support up to 10 sets PWM output.
 - ◆ Support 3 Slow Speed ADC for bottom control
- High-speed Peripherals
 - ◆ USB 3.0 Host port x 1
 - ◆ USB 2.0 Host Ports x 3
 - ◆ Embedded 10/100M ETN MAC/PHY
- Basics
 - ◆ Single 27MHz crystal or OSC clock input with embedded PLLs.
 - ◆ 1.0V CPU power (PMU), 1.0V core power, 2.5V/3.3V analog power, 3.3V digital IO power and 1.5V DDR3/1.2V DDR4 power
 - ◆ EDHS-PBGA 27x27

IC1702 (VHIBD28623M-1Y) --- Rohm, BD28623MUV S-out

BD28623MUV

General Description

BD28623MUV is a Class D Speaker Amplifier designed for Flat-panel TVs in particular for space-saving and low-power consumption. This IC delivers an output power of 20W+20W. This IC employs state-of-the-art Bipolar, CMOS, and DMOS (BCD) process technology. With this technology, the IC can achieve high efficiency. In addition, the IC is packaged in a compact back-surface heat-sink type power package to achieve low power consumption and low heat generation and to eliminate need for external heat-sink. With this package, total output power is only 34W as compared to 40W total output power of package with external heat-sink. This product satisfies all needs for drastic downsizing, low-profile structures and powerful high quality playback of sound systems.

Key Specifications

□ Supply Voltage:	8.5V to 24V
□ Speaker Output Power:	17W+17W (Typ) (VCC=18V, RL=8Ω, Gain=26dB)
□ Total Harmonic Distortion:	0.08% (Typ) @ PO=1W (VCC=12V, RL=8Ω, Gain=20dB)
□ Crosstalk:	90dB (Typ)
□ PSRR:	60dB (Typ)
□ Output Noise Voltage:	150μVrms (Typ)
□ Standby Current:	33μA (Typ)
□ Operating Temperature Range:	-25°C to +85°C

IC504 (VHITPA6139A-1Y) ---TI, TPA6139A HP-out

Features

- DirectPath™
 - Eliminates Pops and Clicks
 - Eliminates Output DC-Blocking Capacitors
 - 3-V to 3.6-V Supply Voltage
- Low Noise and THD
 - SNR > 105 dB at –1x Gain
 - Typical Vn < 15 μVrms 20 to 20 kHz at –1x Gain
 - THD+N < 0.003% at 10-kΩ Load and –1x Gain
- 25 mW into 32-Ω Load
- 2-Vrms Output Voltage into 600-Ω Load
- Single-Ended Input and Output
- Programmable Gain Select Reduces Component Count
 - 13x Gain Values
- Active Mute With More Than 80-dB Attenuation
- Short-Circuit and Thermal Protection
- ±8-kV HBM ESD Protected Outputs

IC502 (VHIM3221EIP-1Y) --- TI, MAX3221EIPWR 232c

FEATURES

- ESD Protection for RS-232 Pins
 - ± 15 kV Human-Body Model (HBM)
 - ± 8 kV (IEC 61000-4-2, Contact Discharge)
 - ± 15 kV (IEC 61000-4-2, Air-Gap Discharge)
- Meets or Exceeds the Requirements of TIA/EIA-232-F and ITU v.28 Standards
- Operates With 3-V to 5.5-V V_{CC} Supply
- Operates up to 250 kbit/s
- One Driver and One Receiver
- Low Standby Current . . . 1 μ A Typ
- External Capacitors . . . $4 \times 0.1 \mu$ F
- Accepts 5-V Logic Input With 3.3-V Supply
- Alternative High-Speed Pin-Compatible Device (1 Mbit/s)
 - SN75C3221E and SN65C3221E
- Auto-Powerdown Feature Automatically Disables Drivers for Power Savings

IC8101, 9604, 9607, 9608 (VHITPS56320-1Y) --- TI, TPS563200DDCR , Power

Features

- TPS562200 - 2A converter with Integrated 122 m Ω and 72 m Ω FETs
- TPS563200 - 3A converter with Integrated 68 m Ω and 39 m Ω FETs
- D-CAP2™ Mode Control for Fast Transient Response
- Input Voltage Range: 4.5 V to 17 V
- Output Voltage Range: 0.76 V to 7 V
- 650 kHz Switching Frequency
- Advanced Eco-mode™ Pulse-skip
- Low Shutdown Current Less than 10 μ A
- 1% Feedback Voltage Accuracy (25°C)
- Startup from Pre-Biased Output Voltage
- Cycle-By-Cycle Overcurrent Limit
- Hiccup-Mode Undervoltage Protection
- Non-latch OVP, UVLO and TSD Protections
- Fixed Soft Start: 1 ms

IC3501,3502 (RH-IXE098WJQZQ) --- SAMSUNG, K4B2G1646F-BYMA, DDR

Key Features

[Table 2] 2Gb DDR3 F-die Speed bins

Speed	DDR3-800	DDR3-1066	DDR3-1333	DDR3-1600	DDR3-1866	Unit
	6-6-6	7-7-7	9-9-9	11-11-11	13-13-13	
tCK(min)	2.5	1.875	1.5	1.25	1.071	ns
CAS Latency	6	7	9	11	13	nCK
tRCD(min)	15	13.125	13.5	13.75	13.91	ns
tRP(min)	15	13.125	13.5	13.75	13.91	ns
tRAS(min)	37.5	37.5	36	35	34	ns
tRC(min)	52.5	50.625	49.5	48.75	47.91	ns

- JEDEC standard 1.35V(1.28V~1.45V) & 1.5V(1.425V~1.575V)
- $V_{DDQ} = 1.35V(1.28V\sim1.45V)$ & $1.5V(1.425V\sim1.575V)$
- 400 MHz f_{CK} for 800Mb/sec/pin, 533MHz f_{CK} for 1066Mb/sec/pin, 667MHz f_{CK} for 1333Mb/sec/pin, 800MHz f_{CK} for 1600Mb/sec/pin, 933MHz f_{CK} for 1866Mb/sec/pin
- 8 Banks
- Programmable CAS Latency(posted CAS): 5,6,7,8,9,10,11,13
- Programmable Additive Latency: 0, CL-2 or CL-1 clock
- Programmable CAS Write Latency (CWL) = 5 (DDR3-800), 6 (DDR3-1066), 7 (DDR3-1333), 8 (DDR3-1600) and 9(DDR3-1866)
- 8-bit pre-fetch
- Burst Length: 8 , 4 with tCCD = 4 which does not allow seamless read or write [either On the fly using A12 or MRS]
- Bi-directional Differential Data-Strobe
- Internal(self) calibration : Internal self calibration through ZQ pin (RZQ : 240 ohm $\pm$ 1%)
- On Die Termination using ODT pin
- Average Refresh Period 7.8us at lower than T_{CASE} 85°C, 3.9us at 85°C < $T_{CASE} \leq 95^\circ C$
- Support Industrial Temp (-40 ~ 95°C)
 - tREFI 7.8us at -40 °C $\leq T_{CASE} \leq 85^\circ C$
 - tREFI 3.9us at 85 °C < $T_{CASE} \leq 95^\circ C$
- Asynchronous Reset
- Package : 96 balls FBGA - x16
- All of Lead-Free products are compliant for RoHS
- All of products are Halogen-free

The 2Gb DDR3 SDRAM F-die is organized as a 16Mbit x 16 I/Os x 8 banks device. This synchronous device achieves high speed double-data-rate transfer rates of up to 1866Mb/sec/pin (DDR3-1866) for general applications.

The chip is designed to comply with the following key DDR3 SDRAM features such as posted CAS, Programmable CWL, Internal (Self) Calibration, On Die Termination using ODT pin and Asynchronous Reset .

All of the control and address inputs are synchronized with a pair of externally supplied differential clocks. Inputs are latched at the crosspoint of differential clocks (CK rising and CK falling). All I/Os are synchronized with a pair of bidirectional strobes (DQS and $\overline{DQS}$) in a source synchronous fashion. The address bus is used to convey row, column, and bank address information in a $\overline{RAS}/\overline{CAS}$ multiplexing style. The DDR3 device operates with a single 1.35V(1.28V~1.45V) or 1.5V(1.425V~1.575V) power supply and 1.35V(1.28V~1.45V) or 1.5V(1.425V~1.575V) V_{DDQ} .

The 2Gb DDR3 F-die device is available in 96balls FBGA(x16).

IC3101 (RH-IXE112WJQZQ) --- SAMSUNG, KLM4G1FETE-B041, eMMC

KEY FEATURES

- embedded MultiMediaCard Ver. 5.1 compatible.
- SAMSUNG eMMC supports features of eMMC5.1 which are defined in JEDEC Standard
 - Major Supported Features : HS400, Field Firmware Update, Cache, Command Queuing, Enhanced Strobe Mode, Secure Write Protection, Partition types.
 - Non-supported Features : Large Sector Size (4KB)
- Backward compatibility with previous MultiMediaCard system specification (1bit data bus, multi-eMMC systems)
- Data bus width : 1bit (Default), 4bit and 8bit
- MMC I/F Clock Frequency : 0 ~ 200MHz
MMC I/F Boot Frequency : 0 ~ 52MHz
- Temperature : Operation (-25°C ~ 85°C), Storage without operation (-40°C ~ 85°C)
- Power : Interface power → V_{CCQ} (1.70V ~ 1.95V or 2.7V ~ 3.6V) , Memory power → V_{CC} (2.7V ~ 3.6V)

IC8102 (RH-IXE211WJQZY) --- DIALOG, AS3824E1-ZQFT LED Drive

AS3824



16-Channel White LED Controller for LCD Backlight

NDA Confidential

1 Description

The AS3824 is a 16 channel high precision LED controller for use in LCD-backlight panels. Dynamic power feedback controls the external power supply to guarantee best efficiency. One high accurate global 10 bit DAC can be used to set the LED current as well as each channel has its own additional 8 bit DAC to boost the dynamic range of LED Backlight systems.

Each channel is equipped with an independent PWM generator which can also be synchronized to an external synchronization signal (VSYNC).

A fast mode supports minimum PWM duty cycle operation which helps to further reduce the energy consumption of modern LED Backlight systems.

The PWM generator clock can be generated internally (DPLL) or an external clock source can be connected to the HSYNC input.

Built-in safety features include thermal shutdown as well as open and short LED detection. The device is programmable via serial interface (SPI).

2 Features

- Supports all LED backlight topologies
 - » No limit of VLED or ILED, device is not exposed to high voltage/high current
- Optimum power savings through local dimming
 - » 16 fully flexible 12 bit PWM generators (period, high time, delay, reverse)
- One global highly accurate 10 bit DAC which sets the LED current ($\pm 0.5\%$ accuracy)
- High dynamic range boost function
 - » 16 independent 8 bit DACs can be used to boost/decrease LED current within certain frames
- Global dimming mode option
 - » AS3824E/E1 are pre-programmed as external PWM mode (DPWM mode), V_{SYNC} pin is used as PWM input. AS3824A/A1 are pre-programmed as SPI mode
- VSYNC and HSYNC inputs, as well as integrated digital PLL for synchronization with TV frame
- Lowest BOM
 - » Due to 2 pin concept of the output channel: no HV protection, no cascade FETs
- Feedback function is compatible to every DC-DC architecture and configurable via SPI
- Short/OPEN LED detection, temperature shutdown, register lock/unlock, SPI transfer checksum

3 Applications

- HD TVs
- UHD TVs
- LCD Monitors

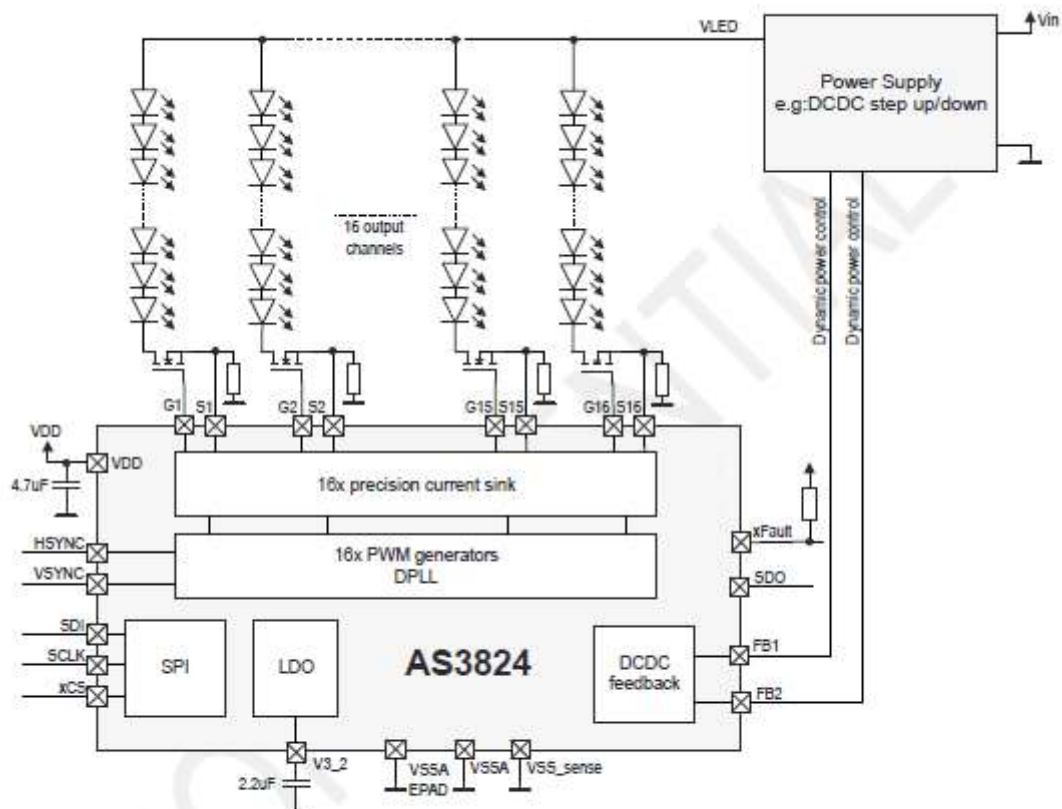
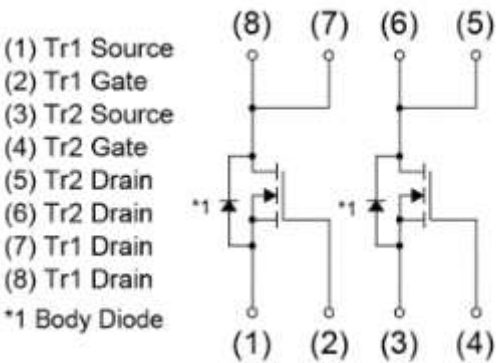


Figure 3.1 : AS3824 Typical Application

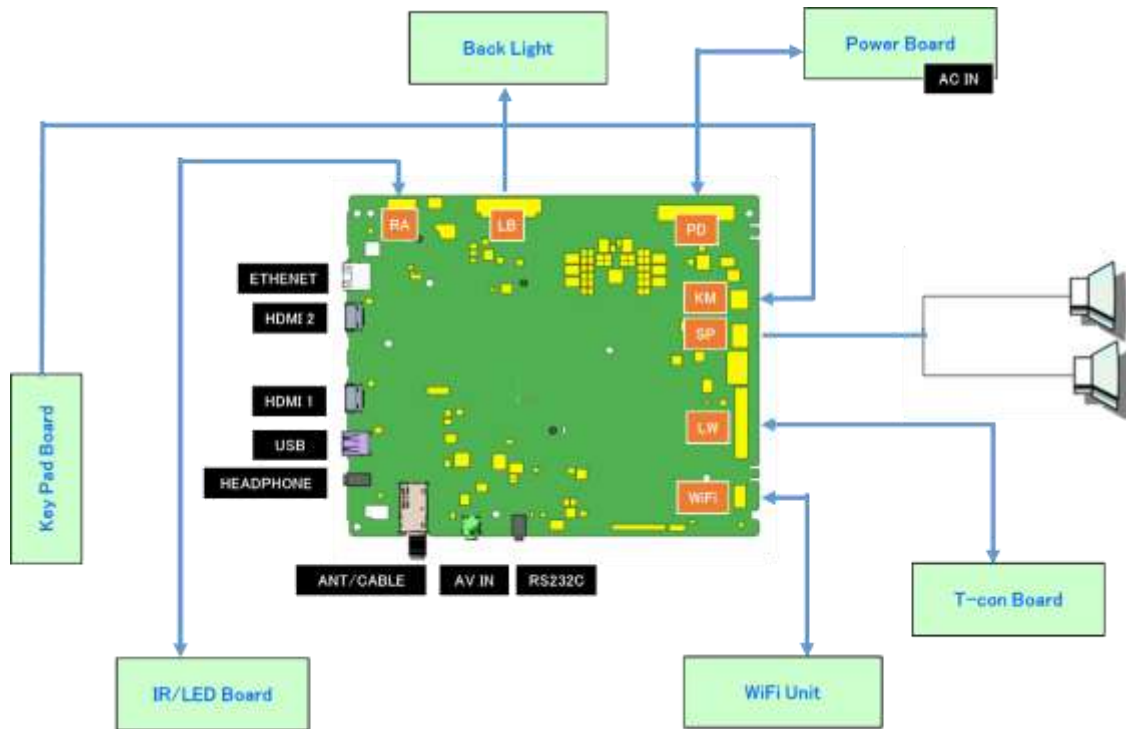
Q8101-8108 (RH-TXA102WJQZY) --- Rohm, SH8KA4TB
30V Nch+Nch Power MOSFET

V_{DSS}	30V
$R_{DS(on)}(Max.)$	21.4mΩ
I_D	±9.0A
P_D	3.0W



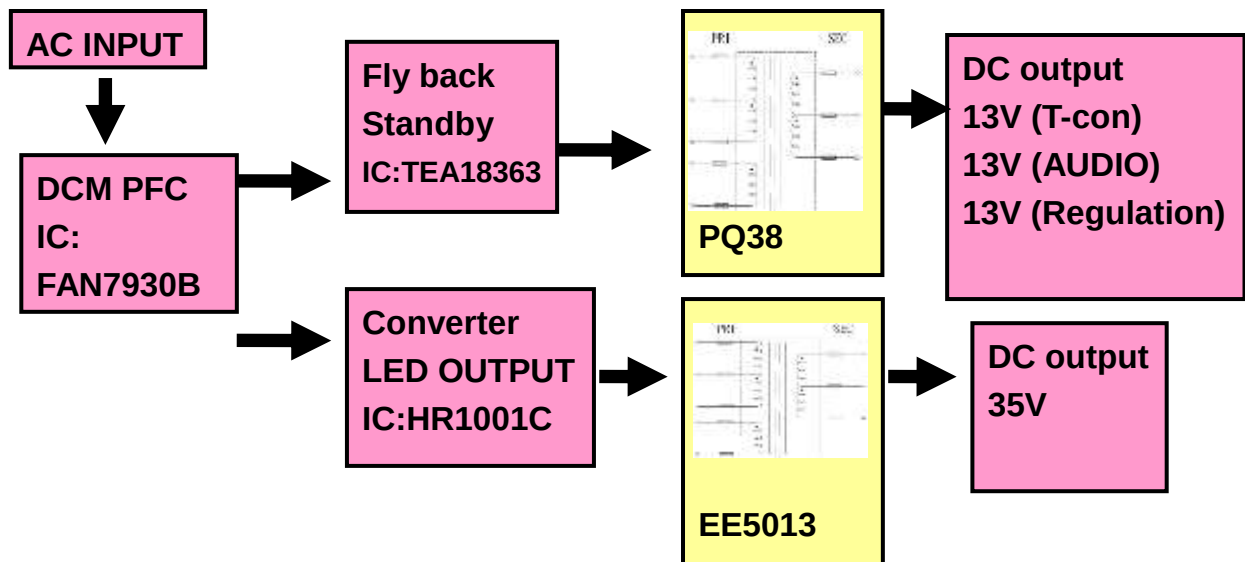
CHAPTER 6.BLOCK DIAGRAM/WIRING DIAGRAM

[1] BLOCK DIAGRAM

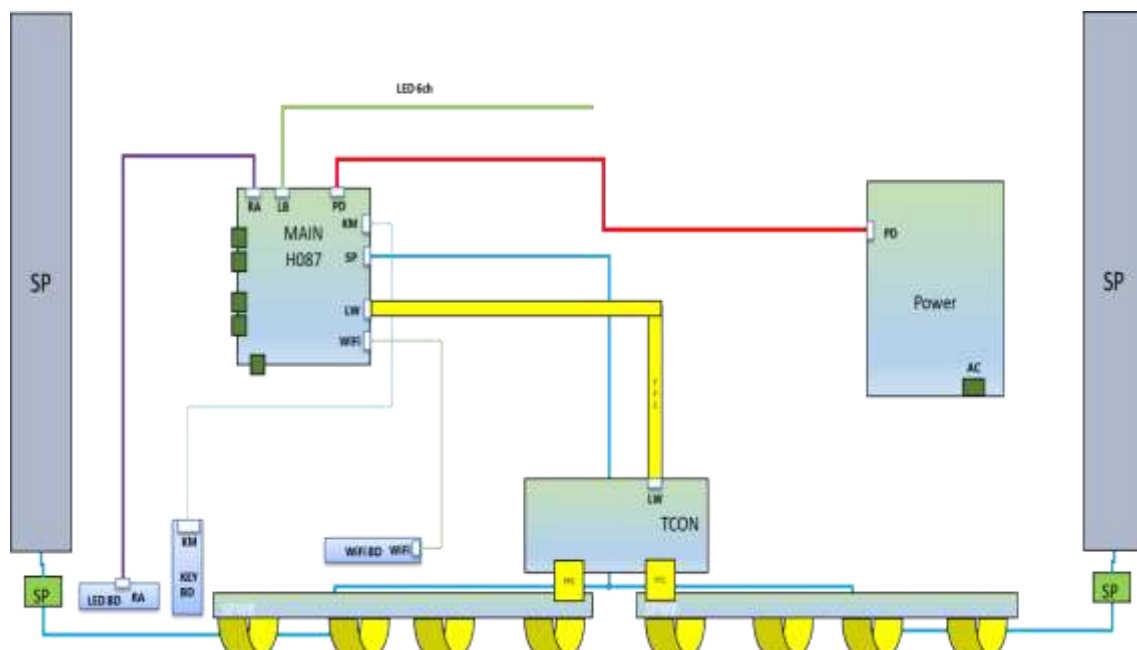


[2] POWER MANAGEMENT BLOCK DIAGRAM

Power board block diagram as below. PCB is a single layer board. There are 2 outputs in the power board, one is +13V interface signals for M/B system, the other +35V is converter output for LCM.



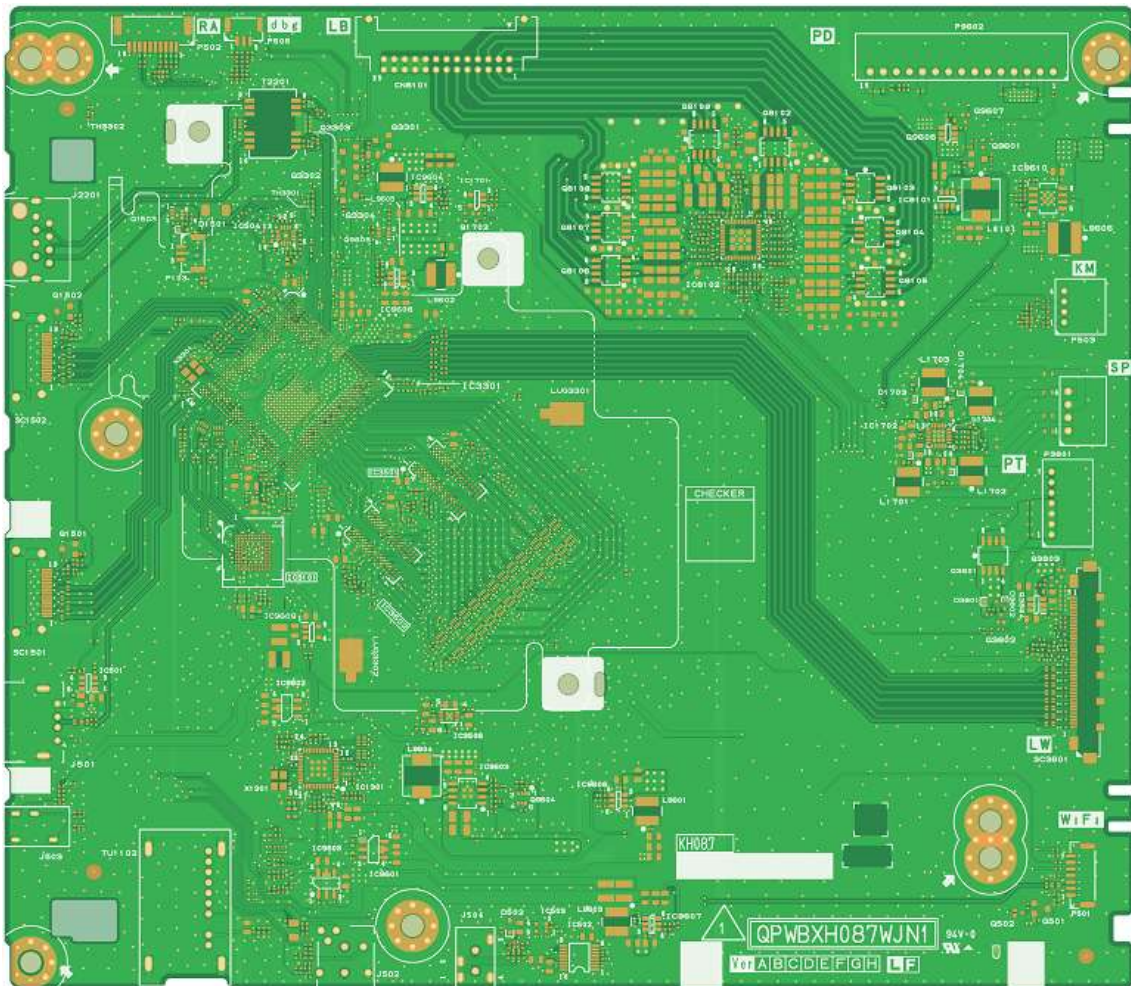
[3] WIRING DIAGRAM



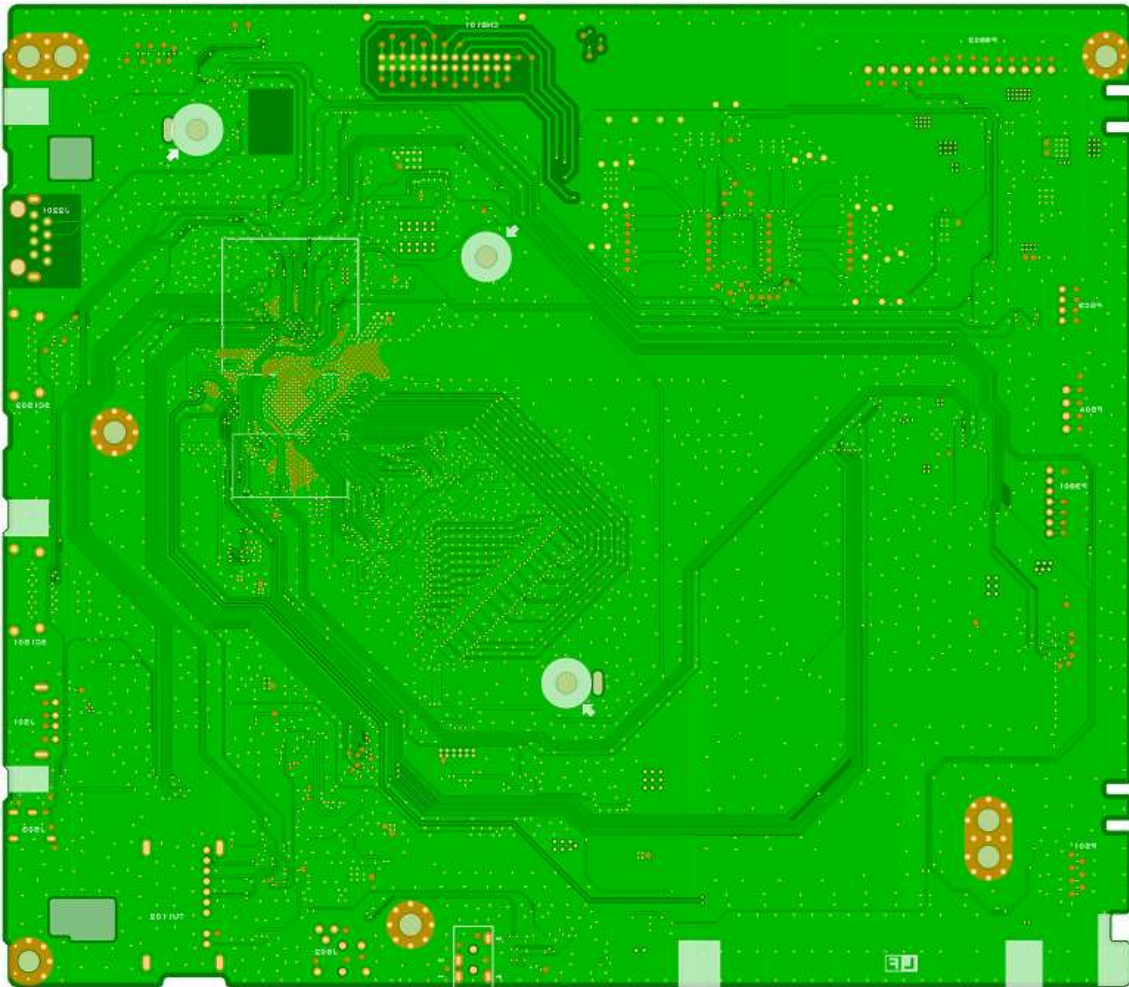
CHAPTER 7.PRINTED WIRING DIAGRAM

[1] MAIN & LED UNIT PRINTED WIRING BOARD

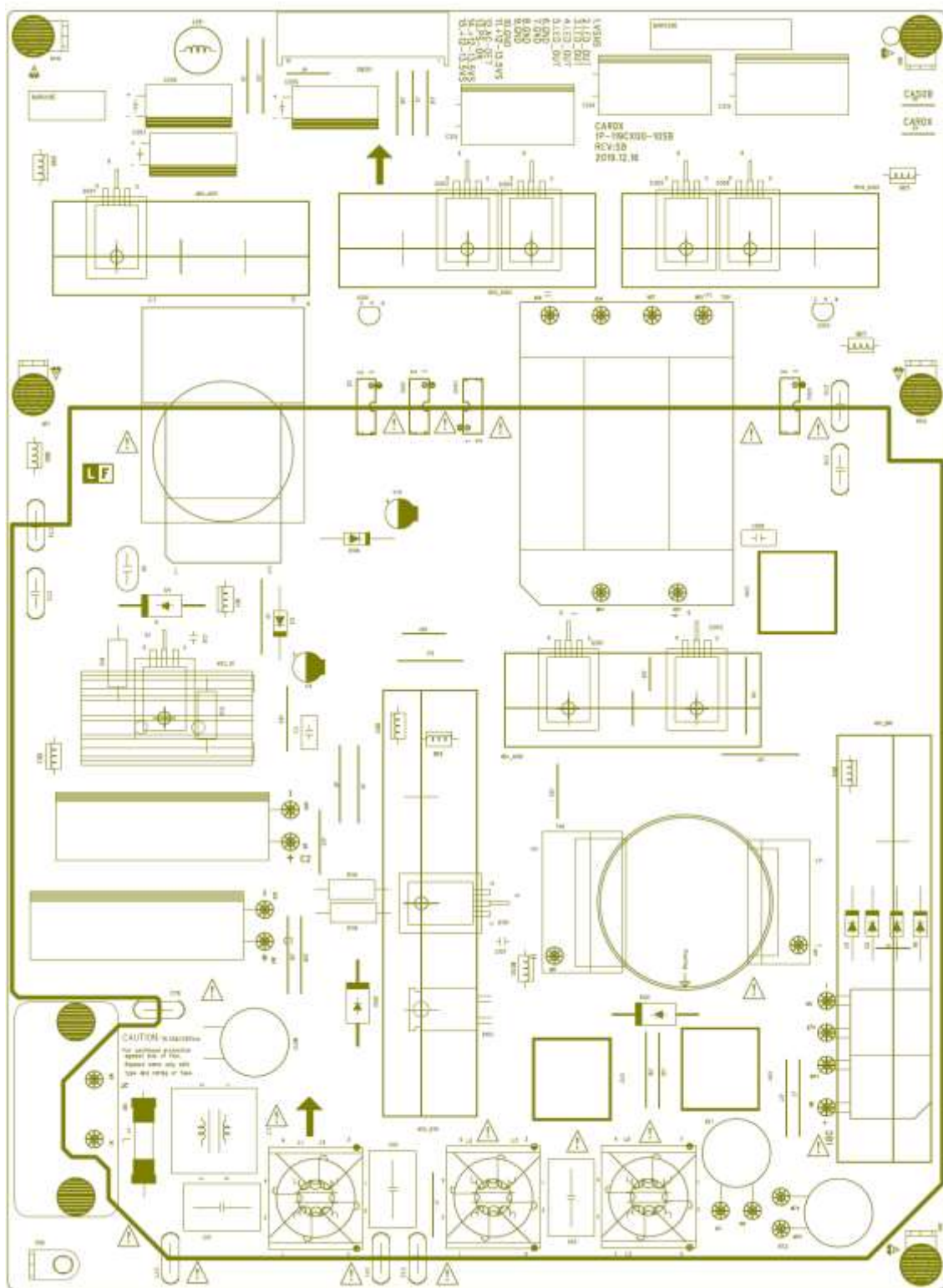
MAIN TOP



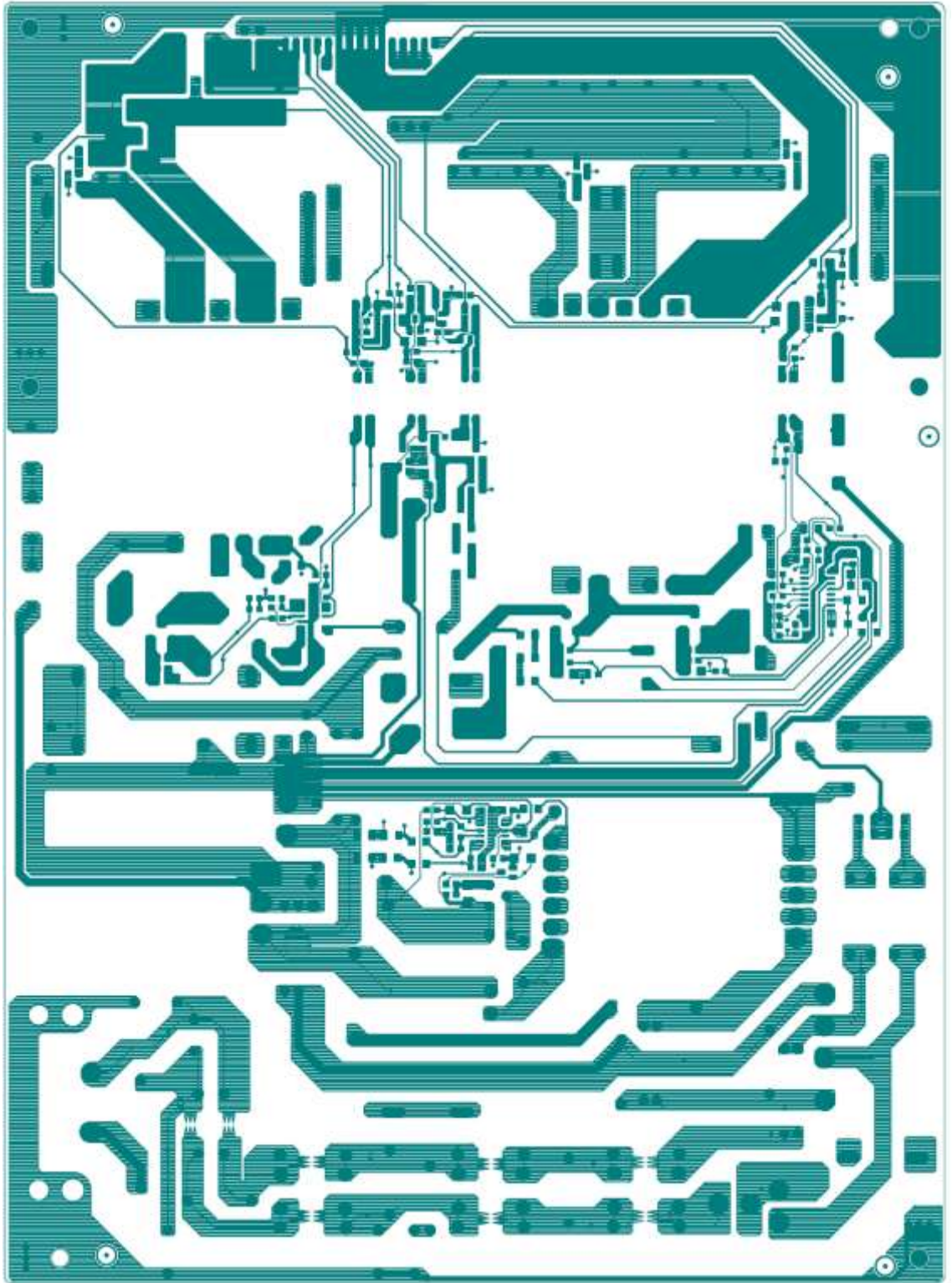
MAIN BOTTOM



POWER TOP

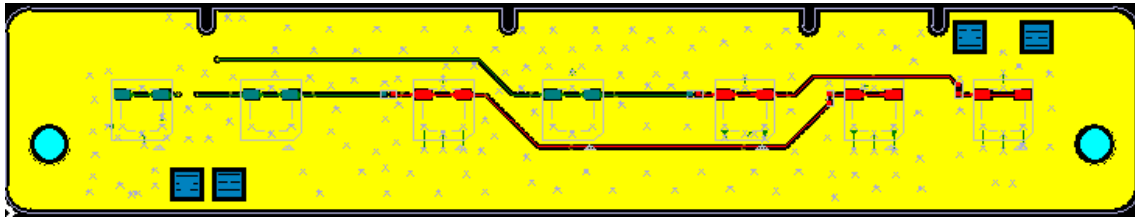


POWERBOTTOM

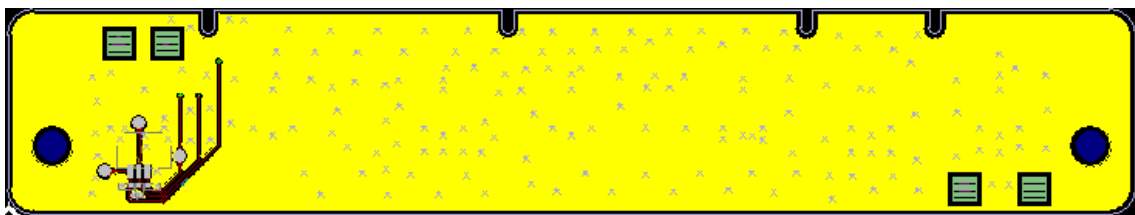


[3] KEY UNIT PRINTED WIRING BOARD

Keypad Board Top



Keypad Board Bottom

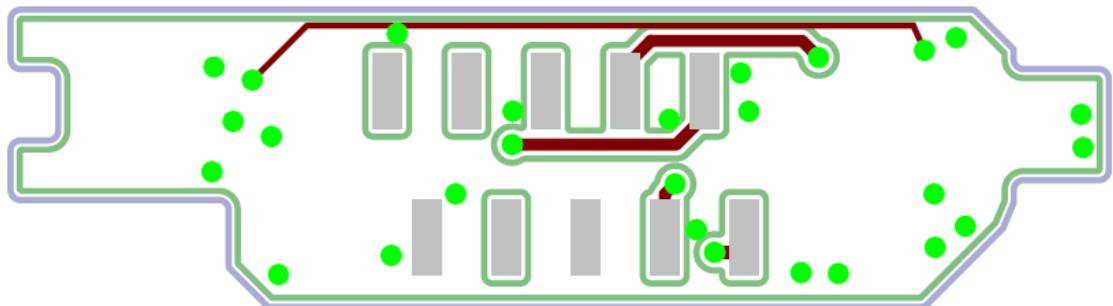


[4] IR UNIT PRINTED WIRING BOARD

IR Board Top

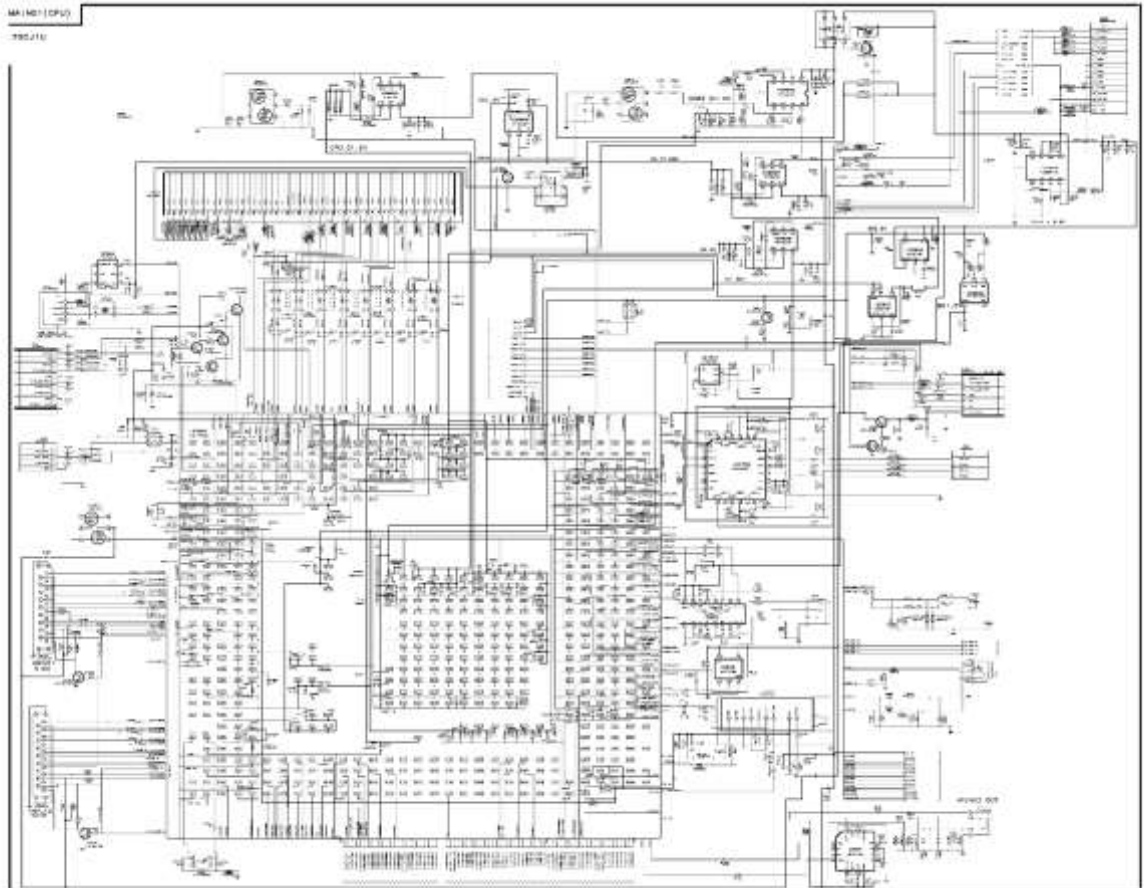


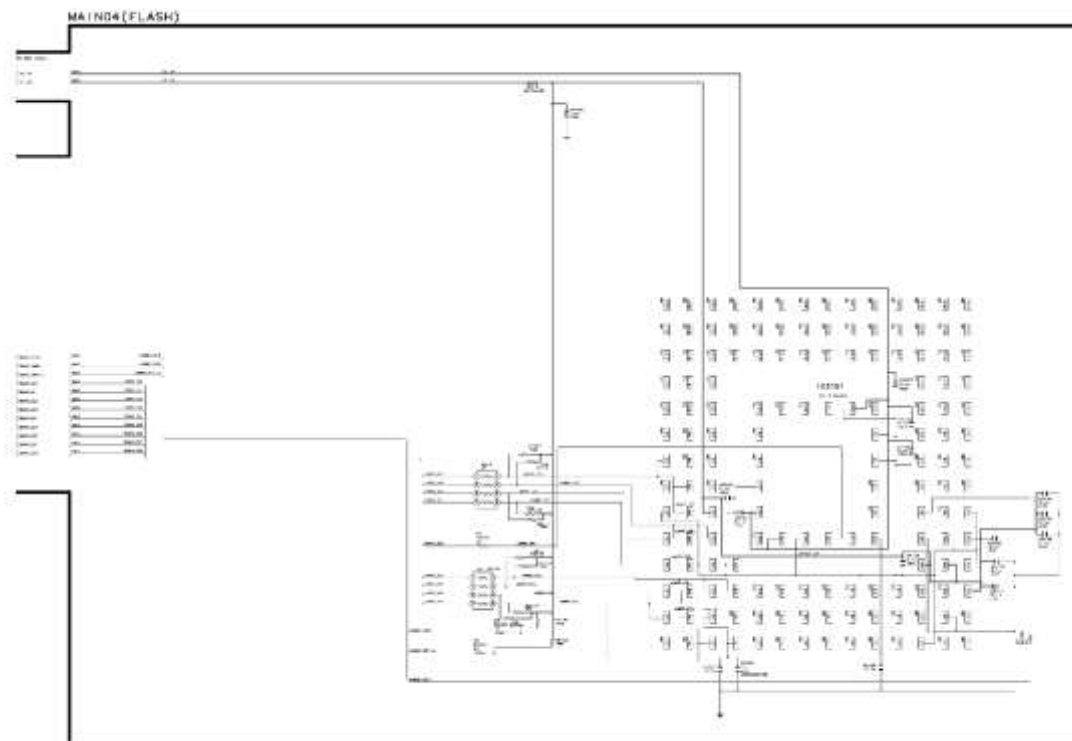
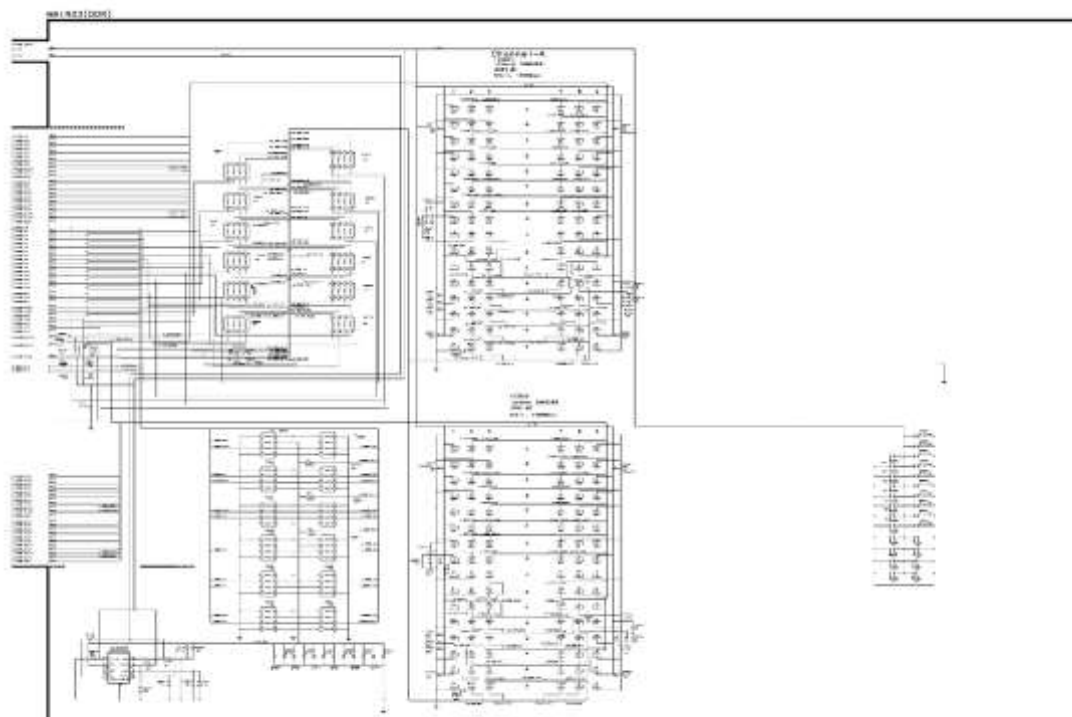
IR Board Bottom



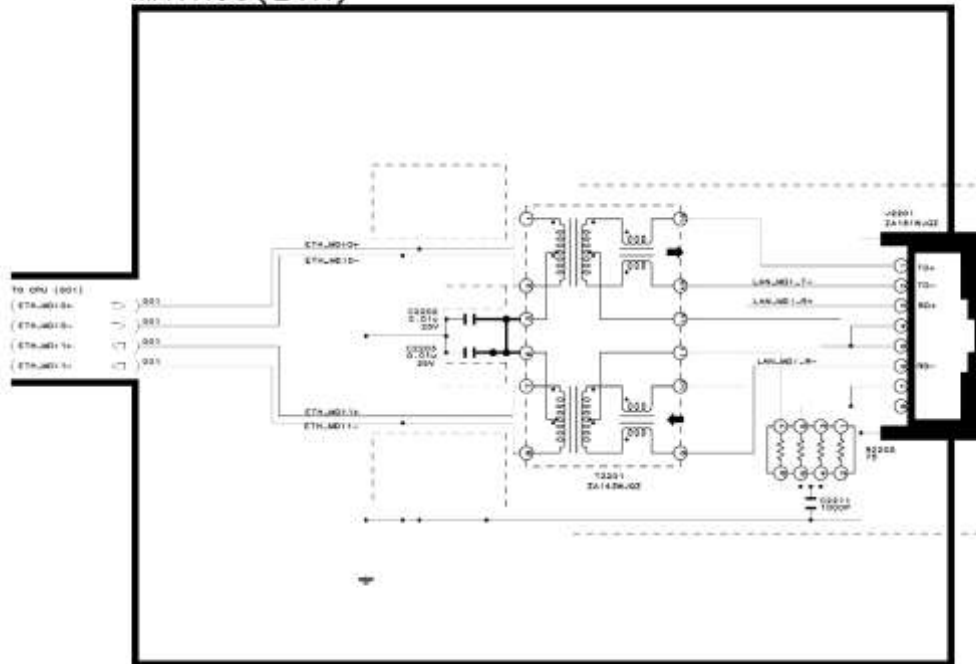
CHAPTER 8.SCHEMATIC DIAGRAM

[1] MAIN SCHEMATIC DIAGRAM



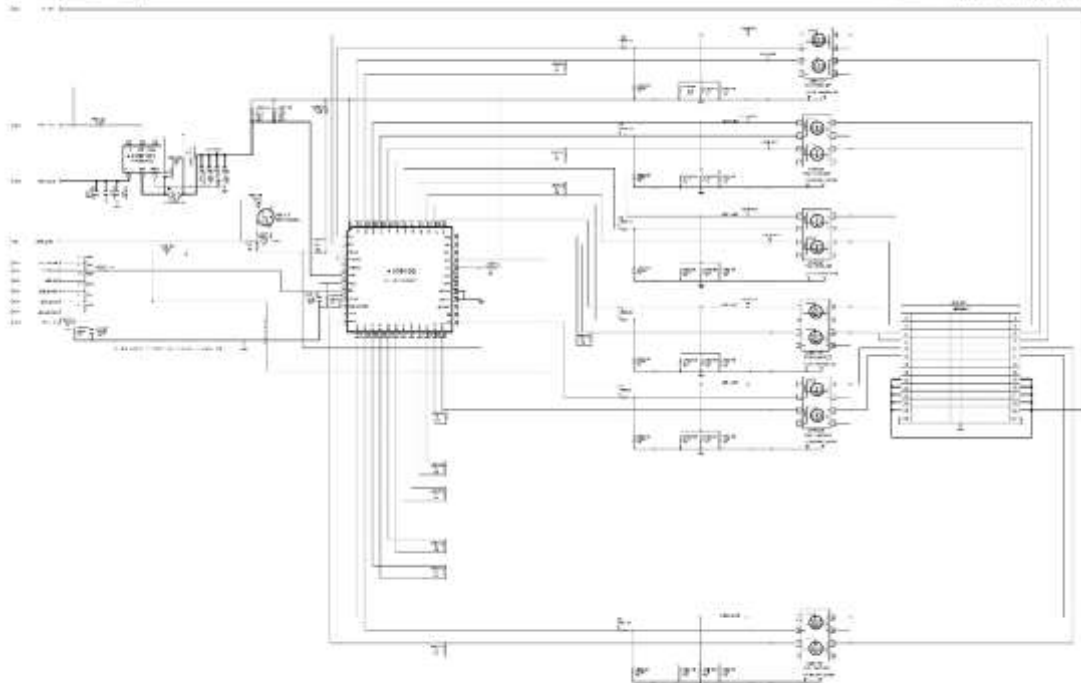


MAIN05(ETH)

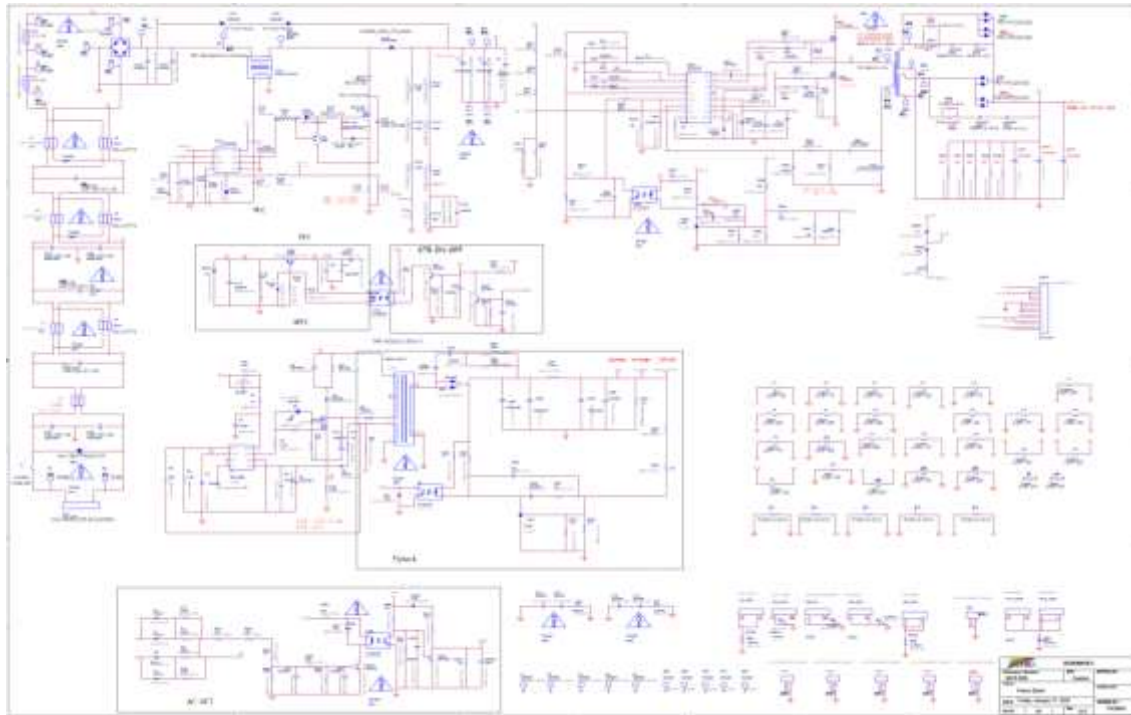


MAIN06(LED Driver)

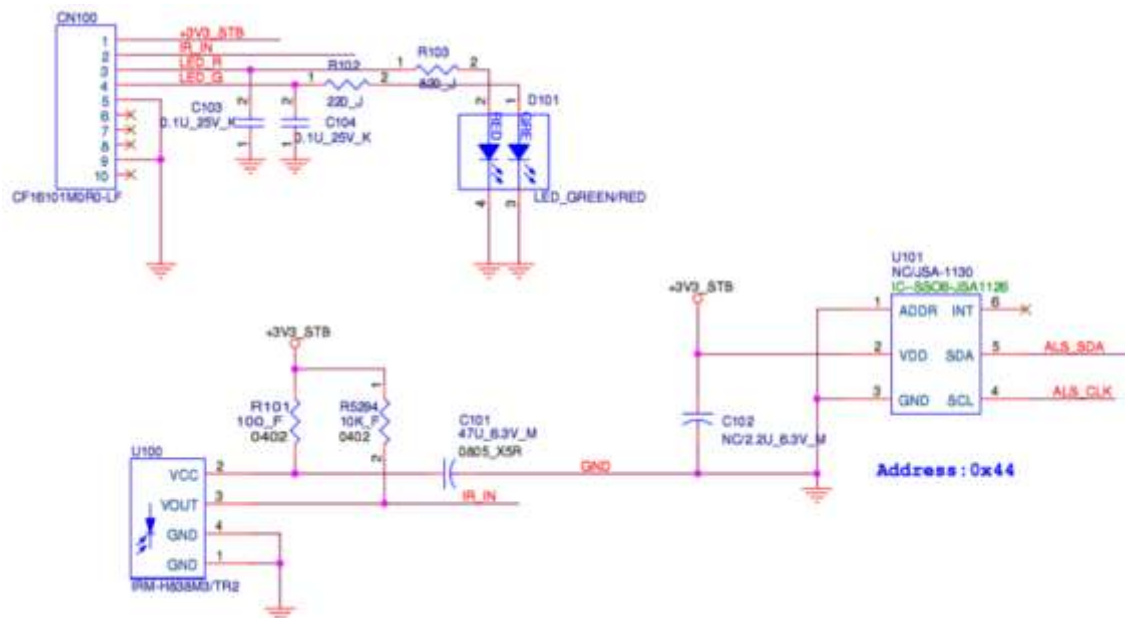
SHARP CONFIDENTIAL



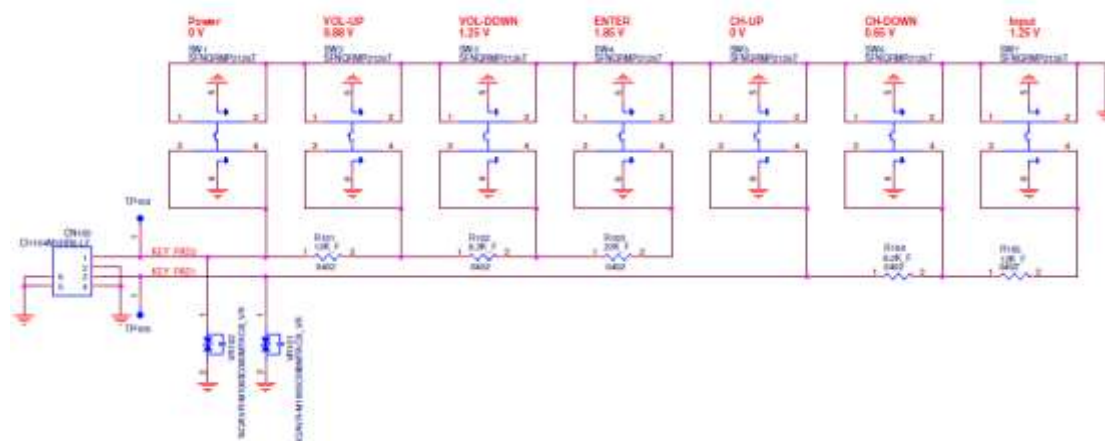
[2] POWER SCHEMATIC DIAGRAM



[3] IR+LED+ALS DRIVER SCHEMATIC DIAGRAM



[4] KEY SCHEMATIC DIAGRAM



a. CHAPTER 9.PARTS GUIDE

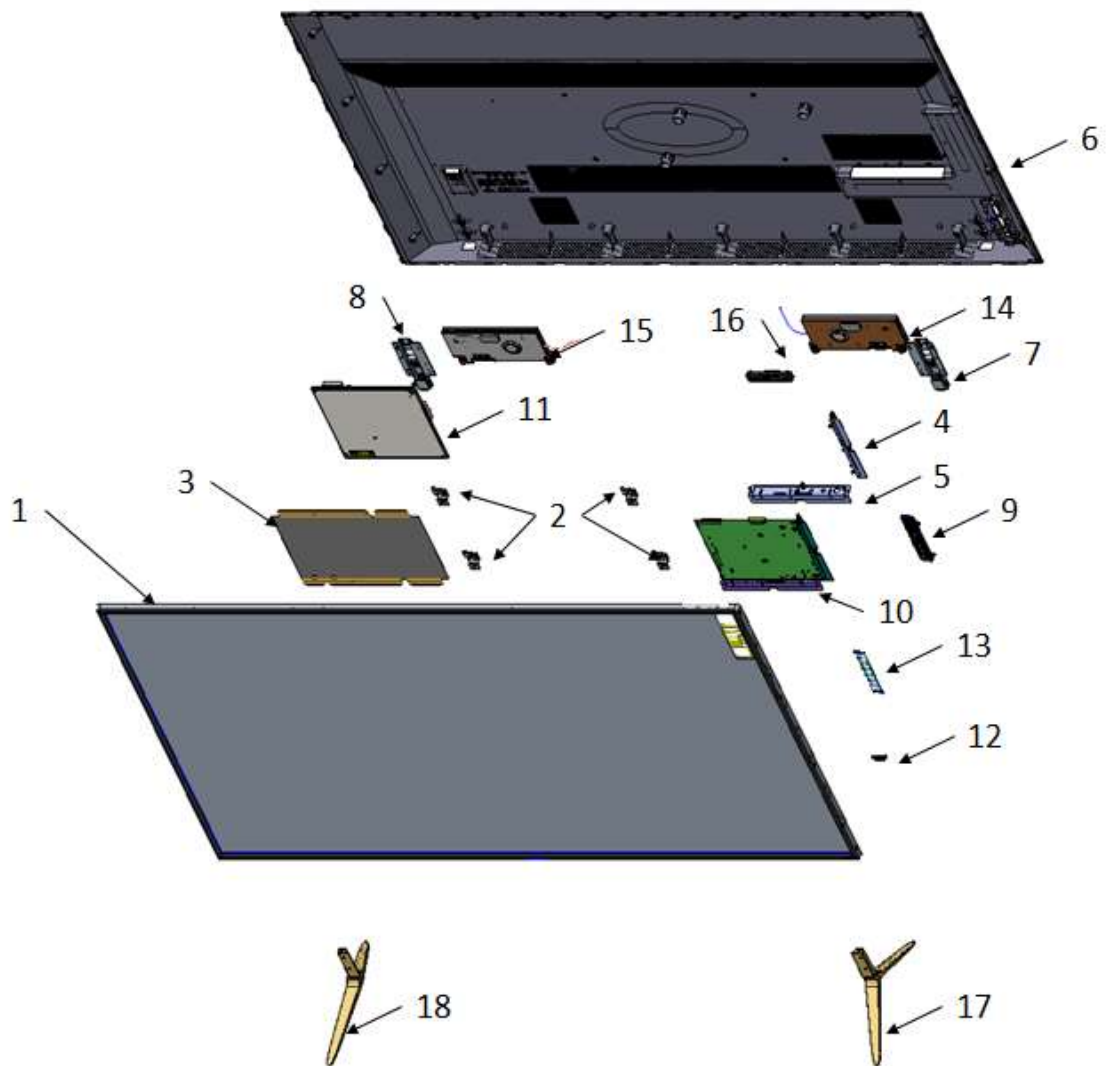
[1]SPARE PARTS LIST

SHARP NA 4T-B70CJ1U

Item	P/N	Description	Quantity
1	1A52JD000-GB2-G-V0	BEZEL ASSY SHARP B2B 70	1
	006-1003-1676 006-0003-1676	MIDDLE CHASSIS ASSY BTM L DE70	1
	006-1003-1678 006-0003-1678	MIDDLE CHASSIS ASSY BTM R DE70	1
	006-1003-1694 006-0003-1694	MIDDLE CHASSIS ASSY SIDE DE70	2
	006-1004-1680 006-0004-1680	MIDDLE CHASSIS ASSY TO R DE70	1
	006-1004-1689 006-0004-1689	MIDDLE CHASSIS ASSY TOP L DE70	1
	006-1002-1698 006-1003-1698	BACK CHASSIS DE 70	1
2	025-0001-7155	VESA_BKT_CAP06,ROHS	4
3	006-0001-1723	MYLAR POWER BOARD DE	1
4	7B328U600-GB2-G	Y19_SHARP_NA_B2B_IO_COVER_SIDE	1
5	7B328U500-GB2-G	Y19_SHARP_NA_B2B_IO_COVER_BTМ	1
6	1A314AS00-GB2-G	Y19_SHARP_NA_B2B_70_RC_ASSY	1
7	006-0002-1703	STAND BRACKET L DE70	1
8	006-0002-1722	STAND BRACKET R DE70	1
9	7B1301L00-GB2-G	KEY BUTTON CAP0L	1
10	01-70CAR0XF-00	4T-B70CJ1U/CAR0X,Mother Board	1
11	09-70CAR0X0-00	4T-B70CJ1U/CAR0X, Power Board	1
12	04-60CAP0N0-00	4T-B60CJ1U/CAP0N,IR Board	1
13	03-60CAP0N0-00	4T-B60CJ1U/CAP0N,KEYPAD Board	1
14	57030B400-77Q-G	Speaker Box,6ohm,10W,2.0 Channel,AC Input(0V~24V),G,BX0804-4F10	1
15	57030B300-02D-G	Speaker Box,6ohm,10W,2.0 Channel,AC Input(0V~24V),G,X20090F-004-3	1

16	RUNTKB293WJZZ	WiFi Module	1
17	1A314AN00-46C-G	STAND BASE ASSY LEFT,CAR0X	1
18	1A314AP00-46C-G	STAND BASE ASSY RIGHT,CAR0X	1
19	351062700-33T-G	MB to Power harness	1
20	351128300-0H5-G	MB to T-CON unit harness (LVDS)	1
	351128200-52F-G		
	351128100-GWV-G		
21	35105HU00-33T-G	MB to Key unit harness (A)	1
22	35105HV00-33T-G	MB to Key unit harness (B)	1
23	35111N000-GWV-G	MB to LED/IR unit harness	1
24	351062A00-33T-G	MB to Speaker box harness	1
25	351062H00-33T-G	MB to WiFi unit harness	1
	351062B00-28T-G		
26	025-0001-8181	Screw for stand unit	1

[2]CABINET PARTS



[3]SUPPLIED ACCESSORIES



Batteries AAA



Remote Commander



RS232 Cable



Screw Bag



AC Cord

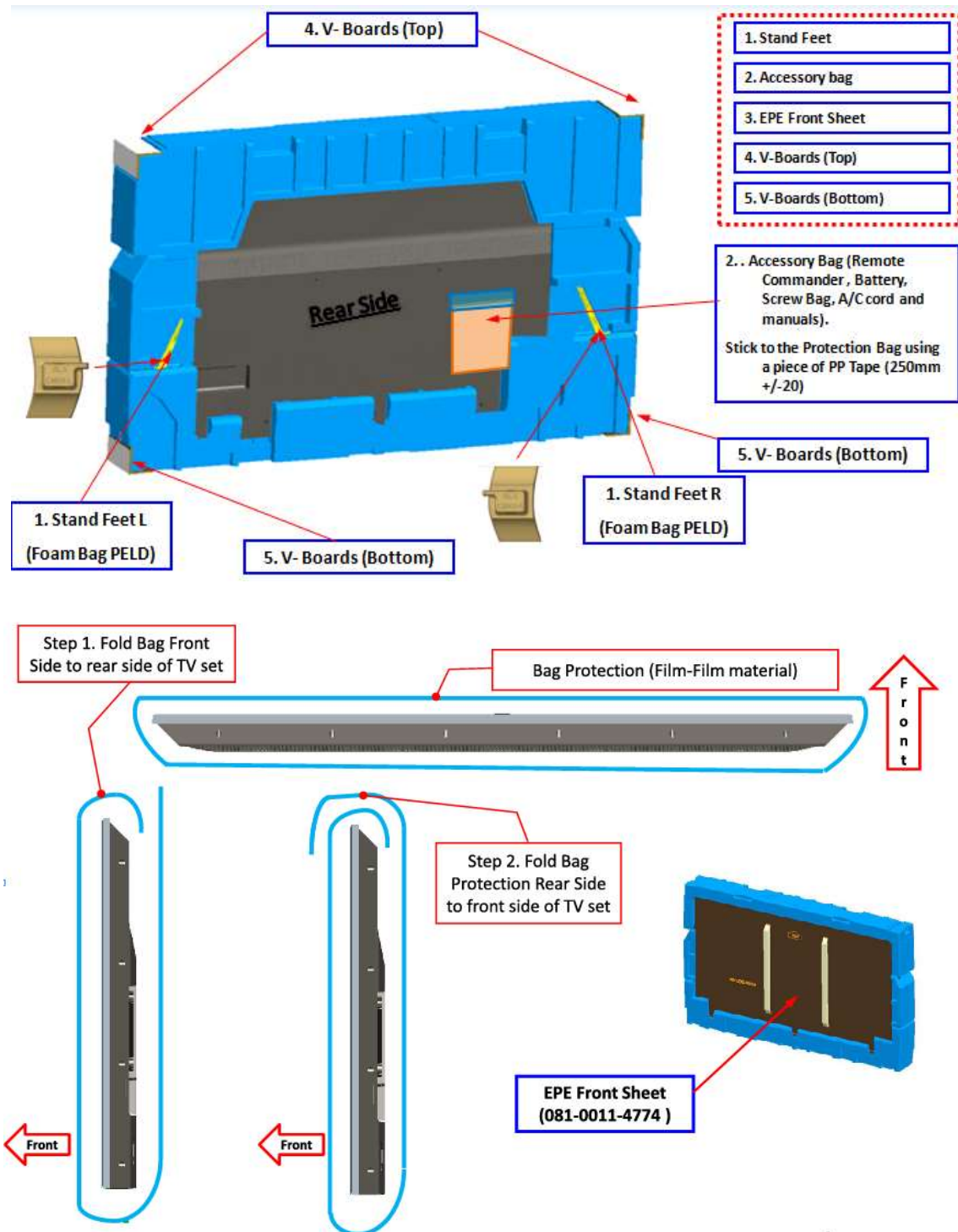


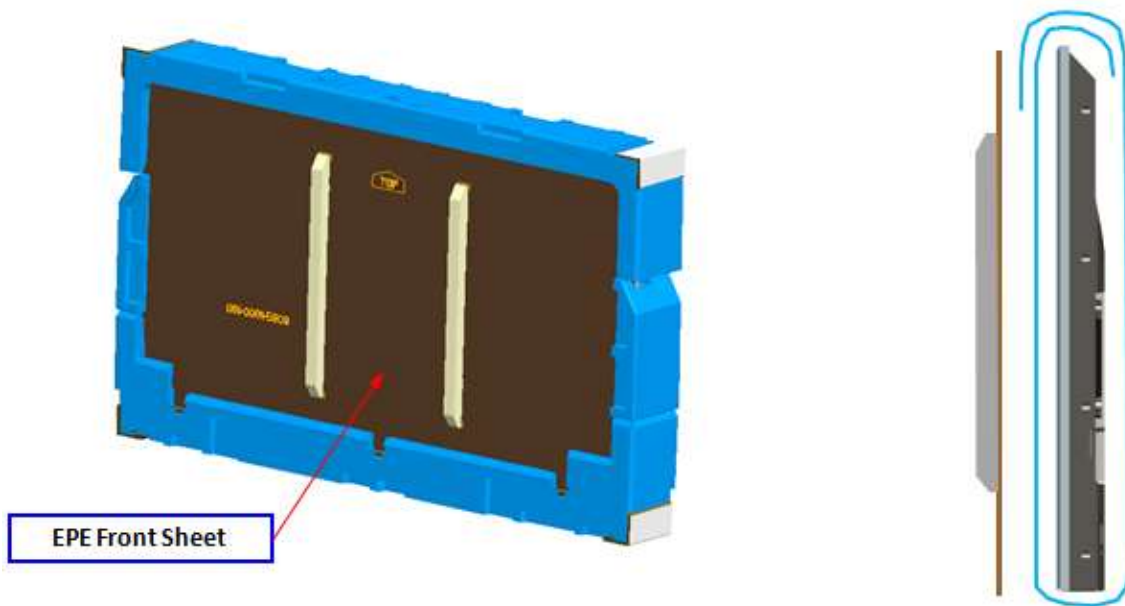
Quick Start Guide

Accessories into the Bag.



[4]PACKING PARTS

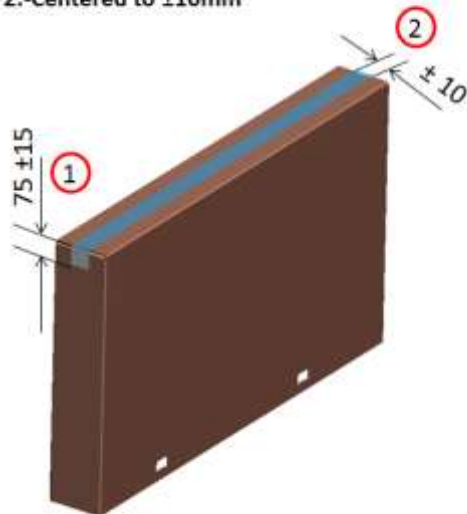




Instruction to Put Tape in FBC

Carton Box Condition

- 1.-Tape length $75\text{mm} \pm 15$
- 2.-Centered to $\pm 10\text{mm}$



These instructions must be applied for top of carton

Avoid these conditions

Gap $\leq 5\text{mm}$



Please, avoid tape peel-off during the tape collocation on carton box..



Please, avoid lifted flaps during the tape collocation on carton box.



Please, avoid wrinkles during the tape collocation on carton box.



Please, avoid bad cutting in tape.

MECHANICAL ENGINEERING - PACKAGING DESIGN

Connector Carton Installation

Install Connector Carton x 4 positions.

