TOSHIBA

SERVICE MANUAL

LCD Color Television

52XV645U Ver. 1.00

LEAD-FREE SOLDER

This product is manufactured using lead-free solder as a part of a movement within the consumer products industry at large to be environmentally responsible. Lead-free solder must be used in the servicing and repair of this product.

WARNING: This product is manufactured using lead free solder.
DO NOT USE LEAD BASED SOLDER TO REPAIR THIS PRODUCT!

The melting temperature of lead-free solder is higher than that of leaded solder by 86ºF to 104ºF (30ºC to 40ºC). Use of a soldering iron designed for lead-based solders to repair product made with lead-free solder may result in damage to the component and or PCB being soldered. Great care should be made to ensure high-quality soldering when servicing this product especially when soldering large components, through-hole pins, and on PCBs as the level of heat required to melt lead-free solder is high.

SAFETY INSTRUCTION

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" INSTRUCTIONS BELOW.

Safety Precaution

WARNING: SERVICING SHOULD NOT BE ATTEMPTED BY ANYONE UNFAMILIAR WITH THE NECESSARY PRECAUTIONS ON THIS RECEIVER. THE FOLLOWING ARE THE NECESSARY PRECAUTIONS TO BE OBSERVED BEFORE SERVICING THIS CHASSIS.

1. An isolation transformer should be connected in the power line between the receiver and the AC line before any service is performed on the receiver.

2. Always disconnect the power plug before any disassembling of the product. It may result in electrical shock.

3. When replacing a chassis in the cabinet, always be certain that all the protective devices are put back in place, such as nonmetallic control knobs, insulating covers, shields, isolation resistor-capacitor network, etc.

4. Always keep tools, components of the product, etc away from the children, These items may cause injury to children.

5. Depending on the model, use an isolation transformer or wear suitable gloves when servicing with the power on, and disconnect the power plug to avoid electrical shock when replacing parts. In some cases, alternating current is also impressed in the chassis, so electrical shock is possible if the chassis is contacted with the power on.

6. Always use the replacement parts specified for the particular model when making repairs. The parts used in products require special safety characteristics such as inflammability, voltage resistance, etc. therefore, use only replacement parts that have these same characteristics. Use only the specified parts when the ⚠ mark is indicated in the circuit diagram or parts list.

7. Parts mounting and routing dressing of wirings should be the same as that used originally. For safety purposes, insulating materials such as isolation tube or tape are sometimes used and printed circuit boards are sometimes mounted floating. Also make sure that wirings is routed and clamped to avoid parts that generate heat and which use high voltage. Always follow the manufactured wiring routes / dressings.

8. Always ensure that all internal wirings are in accordance before re-assembling the external casing after a repairing completed. Do not allow internal wiring to be pinched by cabinets, panels, etc. Any error in reassembly or wiring can result in electrical leakage, flame, etc., and may be hazardous.

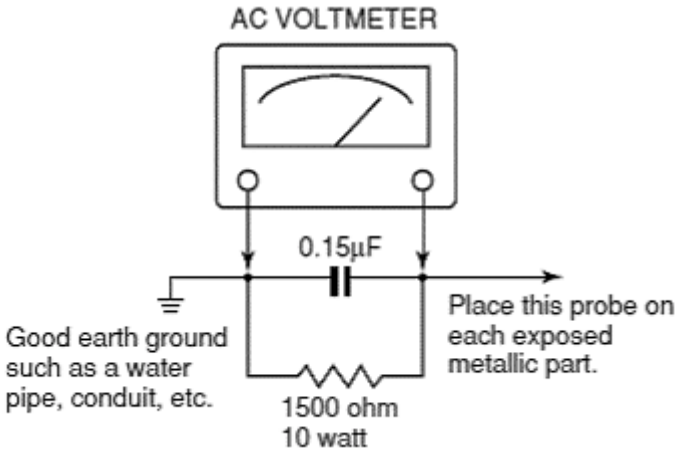
9. NEVER remodel the product in any way. Remodeling can result in improper operation, malfunction, or electrical leakage and flame, which may be hazardous.

10. Always perform an AC leakage current checking on the exposed metallic parts of the cabinet such as antennas, terminals, screw heads, metal overlays, control shafts and etc. to be sure that the set is safe to operate without any dangerous of electrical shocks before returning the set to the customer.

11. The leakage current checking. (After completing the work, measure the leakage current to prevent an electrical shock.)

- Plug the AC line cord directly into a 120V AC outlet. Do not use an isolation transformer for this check.
- Use an AC voltmeter having 5000 ohms per volt or more sensitivity in the following manner.

Connect a 1500 ohm 10 watt resistor, paralleled by a 0.15 µF, AC type capacitor, between a known good earth ground (water pipe, conduit, etc.) and the exposed metallic parts, one at a time. Measure the AC voltage across the combination of 1500 ohm resistor and 0.15 µF capacitor. Reverse the AC plug at the AC outlet and repeat AC voltage measurements for each exposed metallic part. Voltage measured must not exceed 0.3 volts rms. This corresponds to 0.2 milliamp. AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.



SAFETY INSTRUCTION

Product Safety Notice

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this manual and its supplements; electrical components having such features are identified by the international hazard symbols on the schematic diagram and the parts list. Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create electrical shock, fire, or other hazards.

SAFETY INSTRUCTION

Handling the LCD Module

Safety Precaution

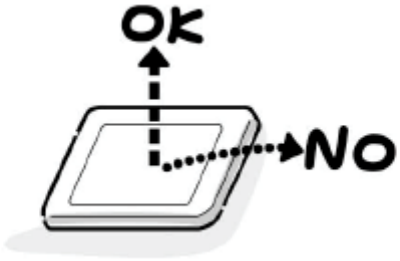
In the event that the screen is damaged or the liquid crystal (fluid) leaks, do not breathe in or drink this fluid.
Also, never touch this fluid. Such actions could cause toxicity or skin irritation. If this fluid should enter the mouth, rinse the mouth thoroughly with water. If the fluid should contact the skin or clothing, wipe off with alcohol, etc., and rinse thoroughly with water. If the fluid should enter the eyes, immediately rinse the eyes thoroughly with running water.

Precautions for Handling the LCD Module

CAUTION: The metal edges of the LCD module are sharp, handle it with care.

The LCD module can easily be damaged during disassembly or reassembly; therefore, always observe the following precautions when handling the module.

1. When attaching the LCD module to the LCD cover, position it appropriately and fasten at the position where the display can be viewed most conveniently.



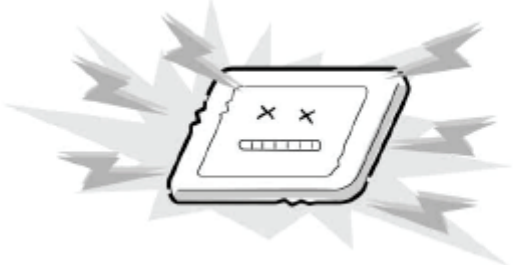
2. Carefully align the holes at all four corners of the LCD module with the corresponding holes in the LCD cover and fasten with screws. Do not strongly push on the module because any impact can adversely affect the performance. Also use caution when handling the polarized screen because it can easily be damaged.

3. If the panel surface becomes soiled, wipe with cotton or a soft cloth. If this does not remove the soiling, breathe on the surface and then wipe again.
   If the panel surface is extremely solied, use a CRT cleaner as a cleaner. Wipe off the panel surface by drop the cleaner on the cloth. Do not drop the cleaner on the panel. Pay attention not to scratch the panel surface.

4. Leaving water or other fluids on the panel screen for an extended period of time can result in discoloration or stripes. Immediately remove any type of fluid from the screen.

5. Glass is used in the panel, so do not drop or strike with hard objects. Such actions can damage the panel.

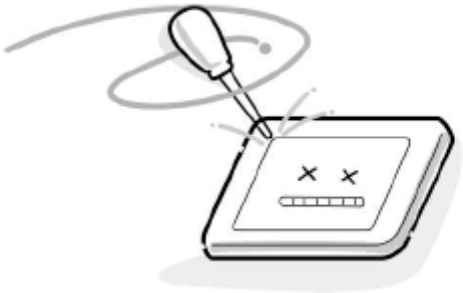
6. CMOS-LSI circuitry is used in the LCD module, so avoid damage due to static electricity. When handling the module, use a wrist ground or anchor ground.



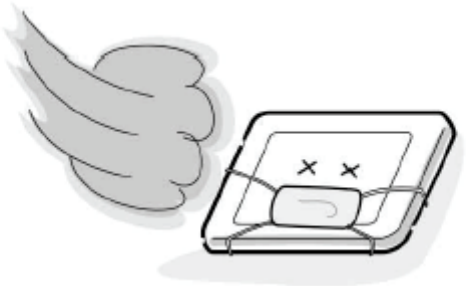
7. Do not expose the LCD module to direct sunlight or strong ultraviolet rays for an extended period of time.

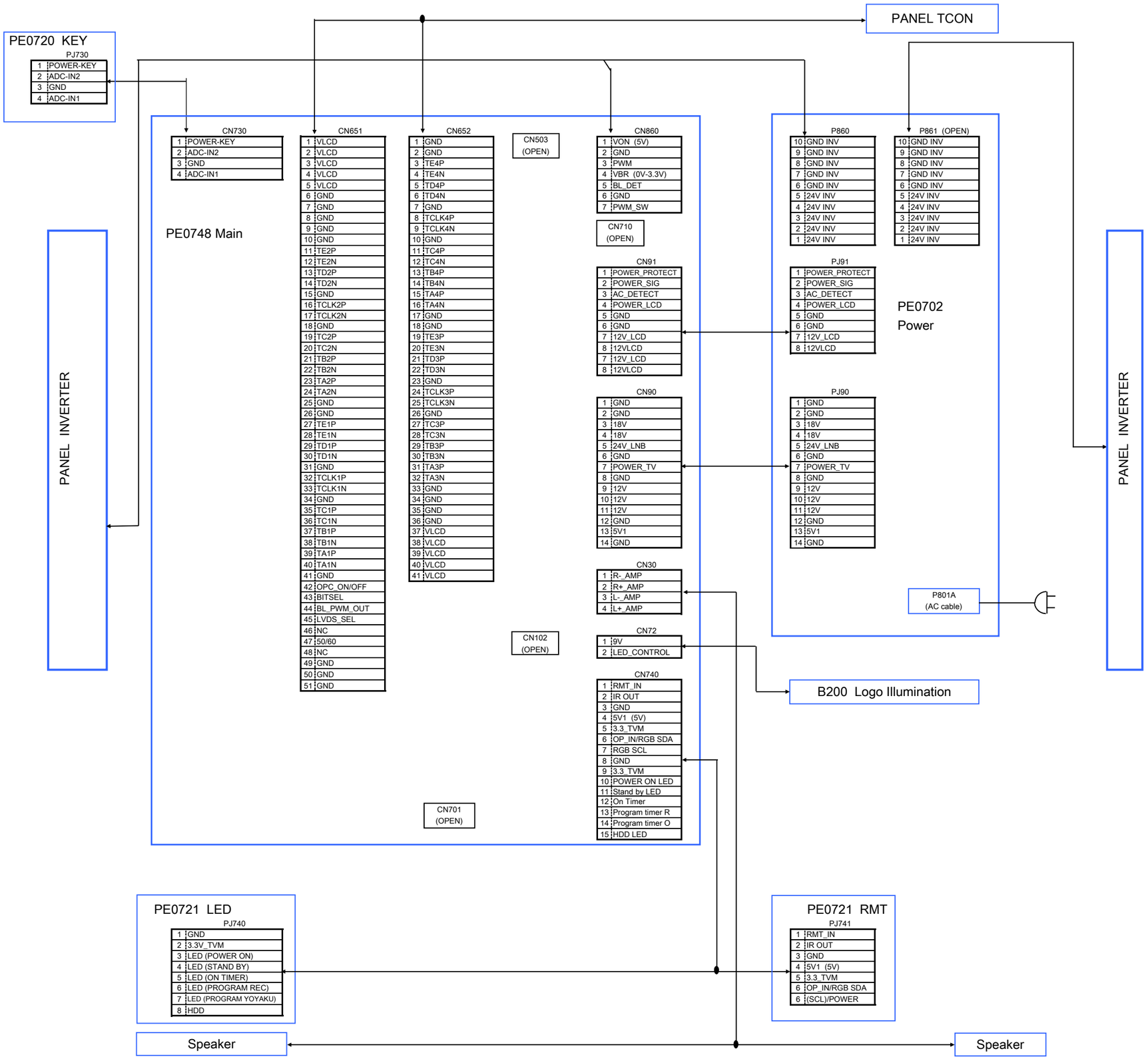
8. Do not store the LCD module below the temperature conditions described in the specifications. Failure to do so could result in freezing of the liquid crystal due to cold air or loss of resilience or other damage.

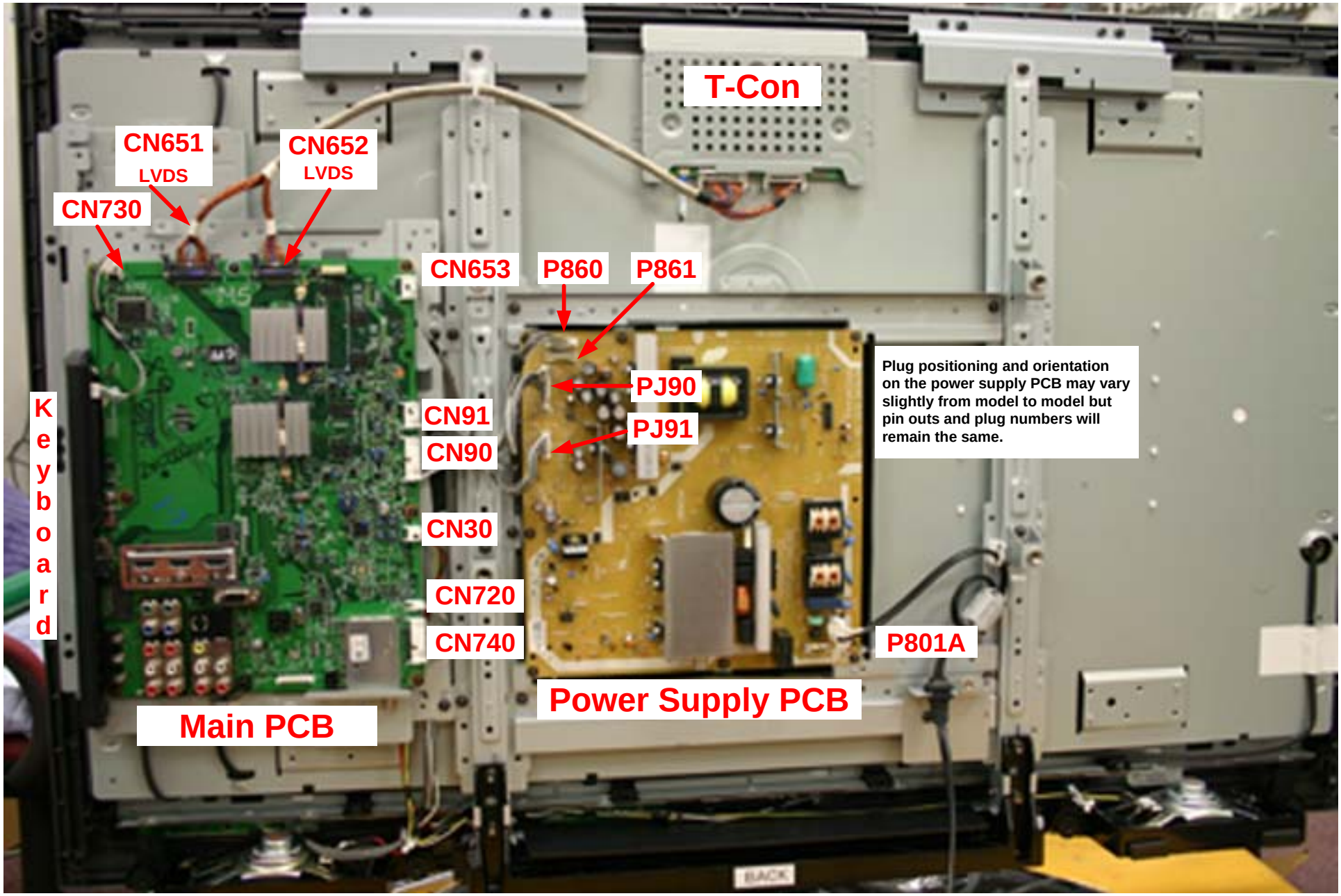
9. Do not disassemble the LCD module. Such actions could result in improper operation.



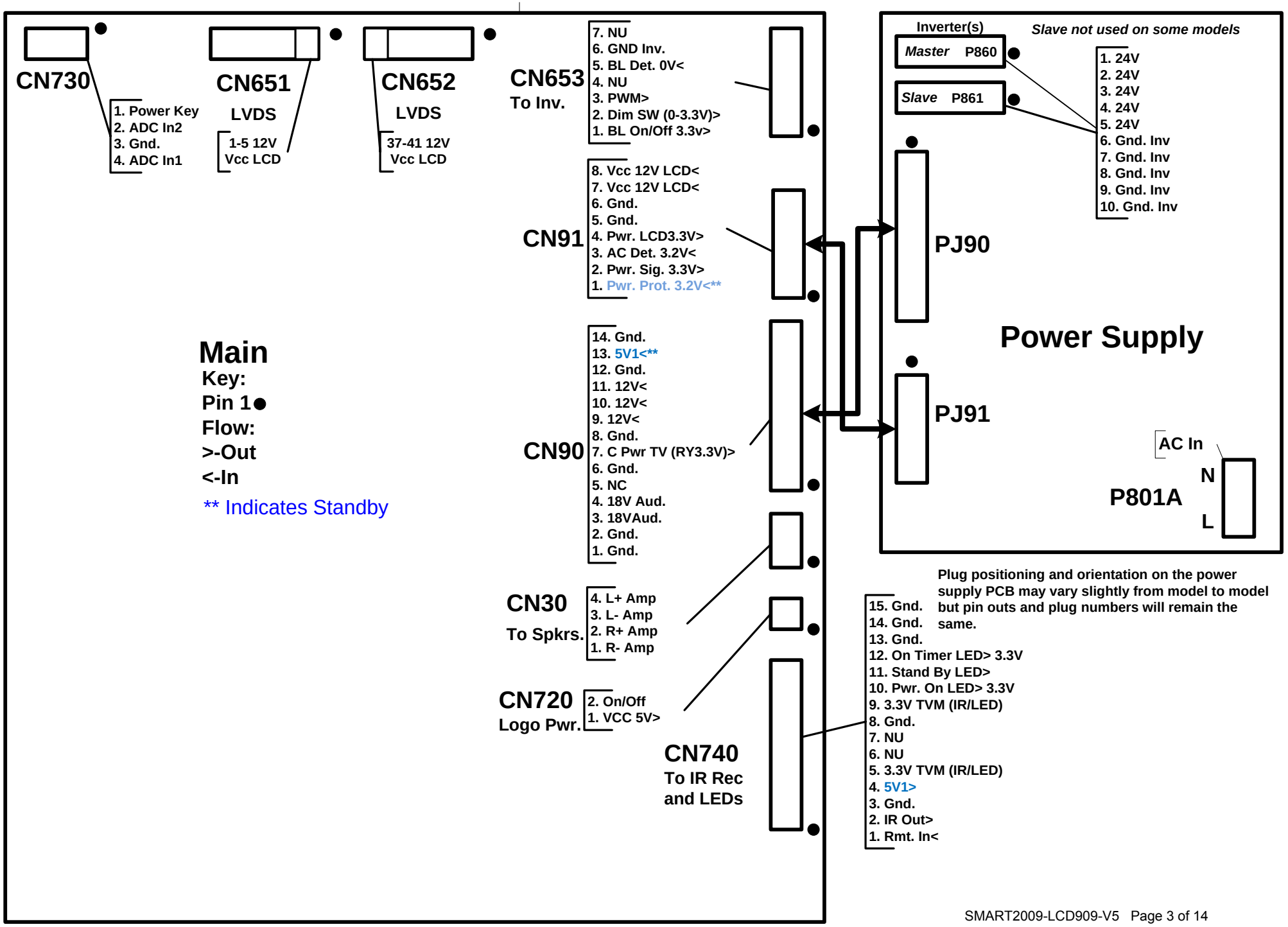
10. When transporting the LCD module, do not use packing containing epoxy resin (amine) or silicon resin (alcohol or oxim). The gas generated by these materials can cause loss of polarity.



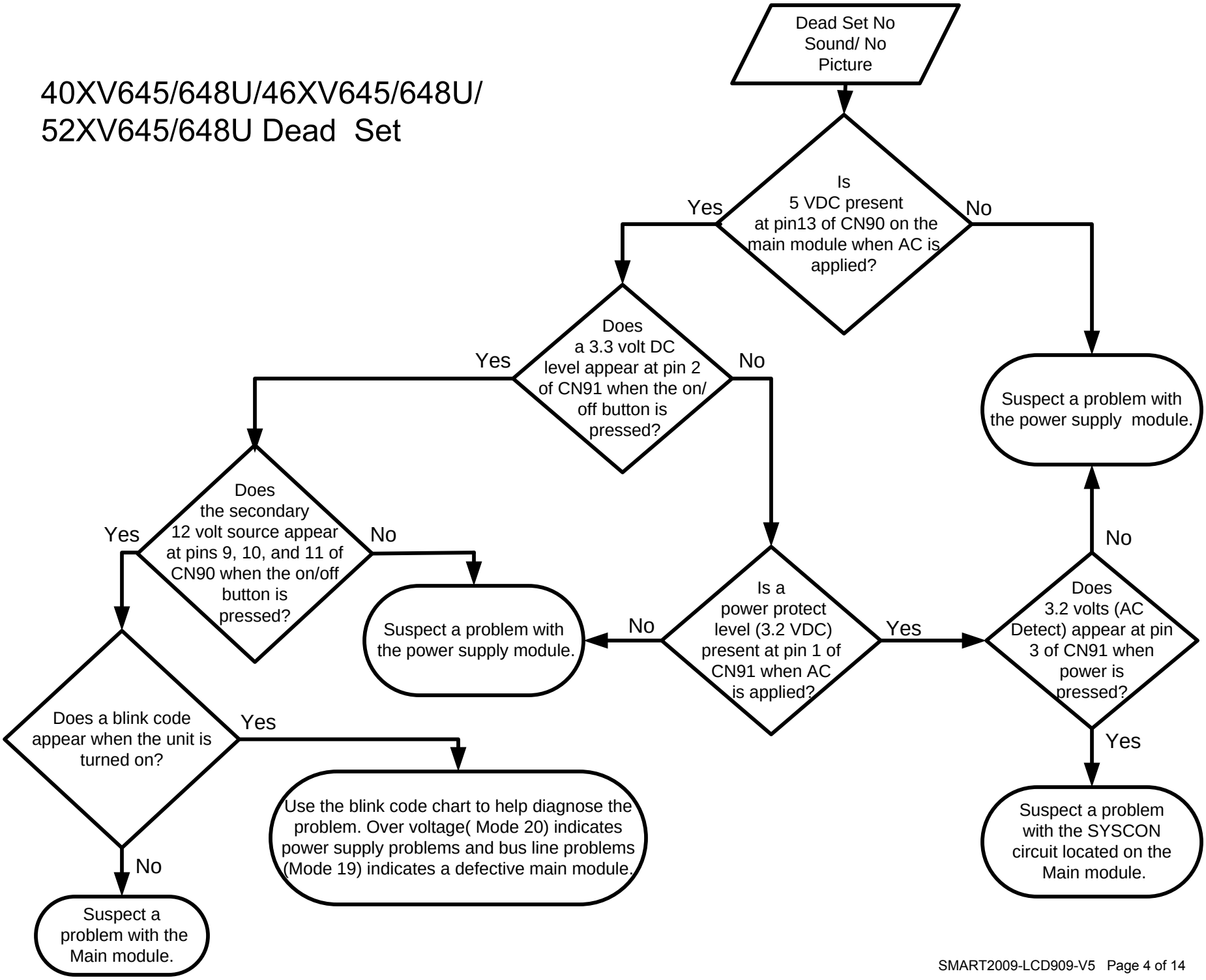

PANEL TCON
PE0720 KEY
PJ730
1 POWER-KEY
2 ADC-IN2
3 GND
4 ADC-IN1
PANEL INVERTER
PE0748 Main
CN730
1 POWER-KEY
2 ADC-IN2
3 GND
4 ADC-IN1
CN651
1 VLCD
2 VLCD
3 VLCD
4 VLCD
5 VLCD
6 GND
7 GND
8 GND
9 GND
10 GND
11 TE2P
12 TE2N
13 TD2P
14 TD2N
15 GND
16 TCLK2P
17 TCLK2N
18 GND
19 TC2P
20 TC2N
21 TB2P
22 TB2N
23 TA2P
24 TA2N
25 GND
26 GND
27 TE1P
28 TE1N
29 TD1P
30 TD1N
31 GND
32 TCLK1P
33 TCLK1N
34 GND
35 TC1P
36 TC1N
37 TB1P
38 TB1N
39 TA1P
40 TA1N
41 GND
42 OPC_ON/OFF
43 BITSEL
44 BL_PWM_OUT
45 LVDS_SEL
46 NC
47 50/60
48 NC
49 GND
50 GND
51 GND
CN652
1 GND
2 GND
3 TE4P
4 TE4N
5 TD4P
6 TD4N
7 GND
8 TCLK4P
9 TCLK4N
10 GND
11 TC4P
12 TC4N
13 TB4P
14 TB4N
15 TA4P
16 TA4N
17 GND
18 GND
19 TE3P
20 TE3N
21 TD3P
22 TD3N
23 GND
24 TCLK3P
25 TCLK3N
26 GND
27 TC3P
28 TC3N
29 TB3P
30 TB3N
31 TA3P
32 TA3N
33 GND
34 GND
35 GND
36 GND
37 VLCD
38 VLCD
39 VLCD
40 VLCD
41 VLCD
CN503
(OPEN)
CN102
(OPEN)
CN701
(OPEN)
CN860
1 VON (5V)
2 GND
3 PWM
4 VBR (0V-3.3V)
5 BL_DET
6 GND
7 PWM_SW
CN710
(OPEN)
CN91
1 POWER_PROTECT
2 POWER_SIG
3 AC_DETECT
4 POWER_LCD
5 GND
6 GND
7 12V_LCD
8 12VLCD
7 12V_LCD
8 12VLCD
CN90
1 GND
2 GND
3 18V
4 18V
5 24V_LNB
6 GND
7 POWER_TV
8 GND
9 12V
10 12V
11 12V
12 GND
13 5V1
14 GND
CN30
1 R-_AMP
2 R+_AMP
3 L-_AMP
4 L+_AMP
CN72
1 9V
2 LED_CONTROL
CN740
1 RMT_IN
2 IR OUT
3 GND
4 5V1 (5V)
5 3.3_TVM
6 OP_IN/RGB SDA
7 RGB SCL
8 GND
9 3.3_TVM
10 POWER ON LED
11 Stand by LED
12 On Timer
13 Program timer R
14 Program timer O
15 HDD LED
P860
10 GND INV
9 GND INV
8 GND INV
7 GND INV
6 GND INV
5 24V INV
4 24V INV
3 24V INV
2 24V INV
1 24V INV
P861 (OPEN)
10 GND INV
9 GND INV
8 GND INV
7 GND INV
6 GND INV
5 24V INV
4 24V INV
3 24V INV
2 24V INV
1 24V INV
PJ91
1 POWER_PROTECT
2 POWER_SIG
3 AC_DETECT
4 POWER_LCD
5 GND
6 GND
7 12V_LCD
8 12VLCD
PE0702
Power
PJ90
1 GND
2 GND
3 18V
4 18V
5 24V_LNB
6 GND
7 POWER_TV
8 GND
9 12V
10 12V
11 12V
12 GND
13 5V1
14 GND
P801A
(AC cable)
PANEL INVERTER
B200 Logo Illumination
PE0721 LED
PJ740
1 GND
2 3.3V_TVM
3 LED (POWER ON)
4 LED (STAND BY)
5 LED (ON TIMER)
6 LED (PROGRAM REC)
7 LED (PROGRAM YOYAKU)
8 HDD
PE0721 RMT
PJ741
1 RMT_IN
2 IR OUT
3 GND
4 5V1 (5V)
5 3.3_TVM
6 OP_IN/RGB SDA
6 (SCL)/POWER
Speaker
Speaker


T-Con
CN651
LVDS
CN652
LVDS
CN730
CN653
P860
P861
PJ90
PJ91
CN91
CN90
CN30
CN720
CN740
P801A
Keyboard
Main PCB
Power Supply PCB
Plug positioning and orientation on the power supply PCB may vary slightly from model to model but pin outs and plug numbers will remain the same.

Interconnect - 40XV645/648U/46XV645/648U/52XV645/648U



40XV645/648U/46XV645/648U/ 52XV645/648U Dead Set



40XV645/648U/46XV645/648U/ 52XV645/648U – No or distorted Video

No or distorted video

Does the back light function normally when the unit is turned on?

NO

Troubleshoot for backlight problelms.

YES

Is the screen discolored or have streaks as shown in the example or are dark areas present ?

YES

If the LCD Control Board is available, try it. If this does not help, replace the LCD display panel. ***

NO

When the input button is pressed on the receiver or remote, is the on screen display clear and normal?

YES

Replace the Main Module.

NO

Using the power distribution diagram, are the voltages normal at pins 9, 10, and 11 of CN90 and pins 7 and 8 of CN91?

YES

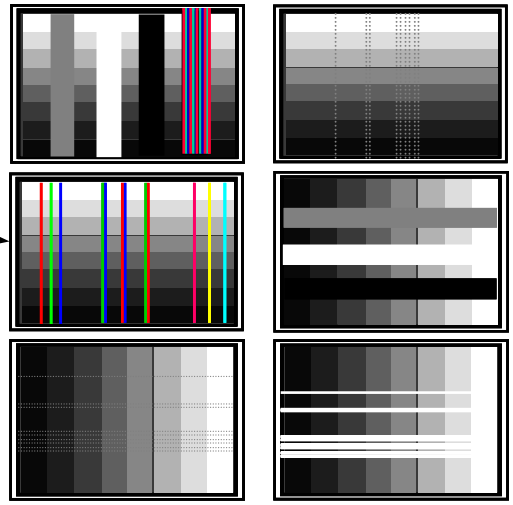
Check for LVDS activity at CN651 and CN652. If it is present, suspect a problem with the display control board (Tcon). If it is not present, replace the main PCB.

NO

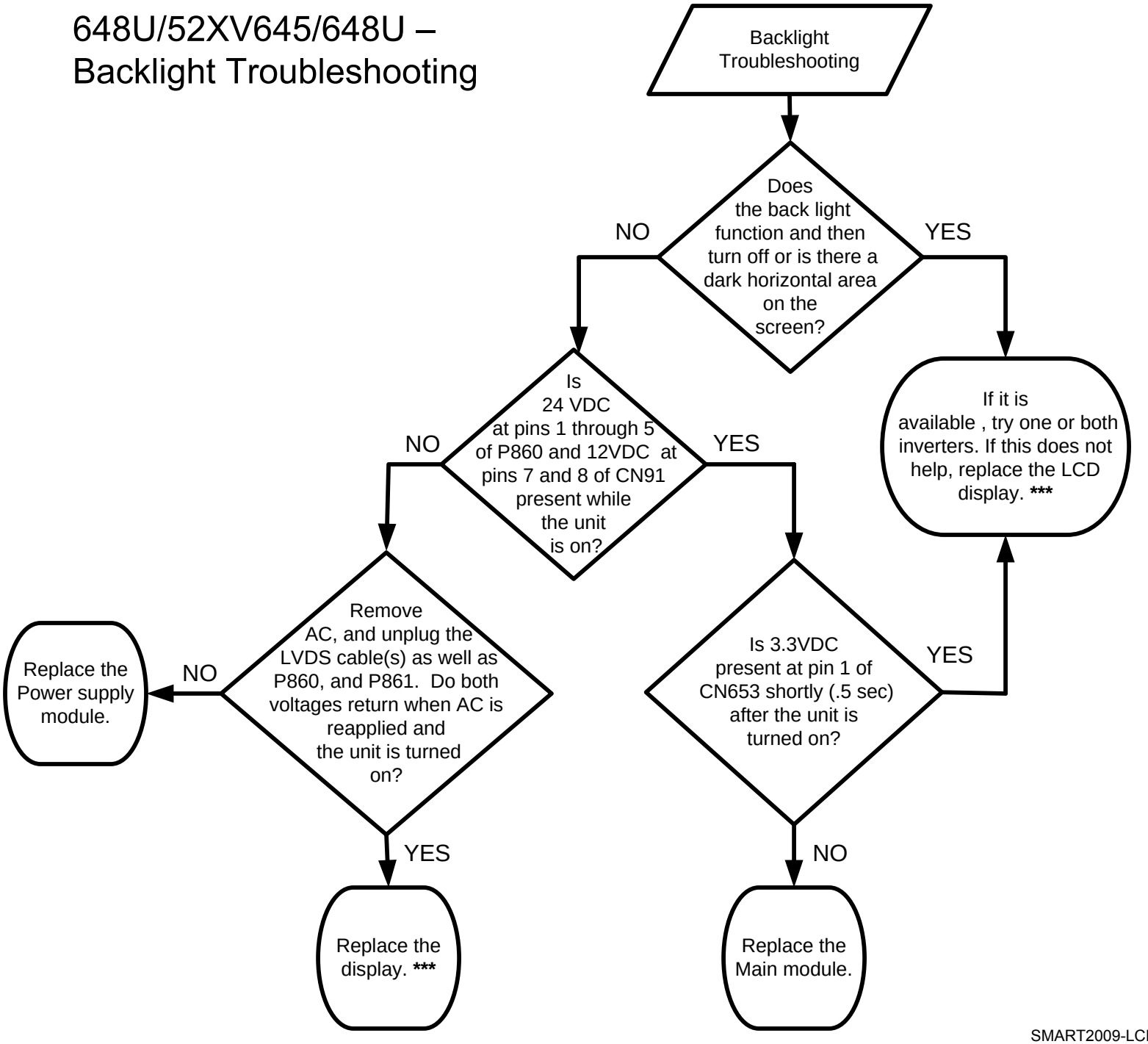
Suspect the power supply module.

This signal viewed from the twisted cable pairs at the LVDS connectors while referencing cold ground.

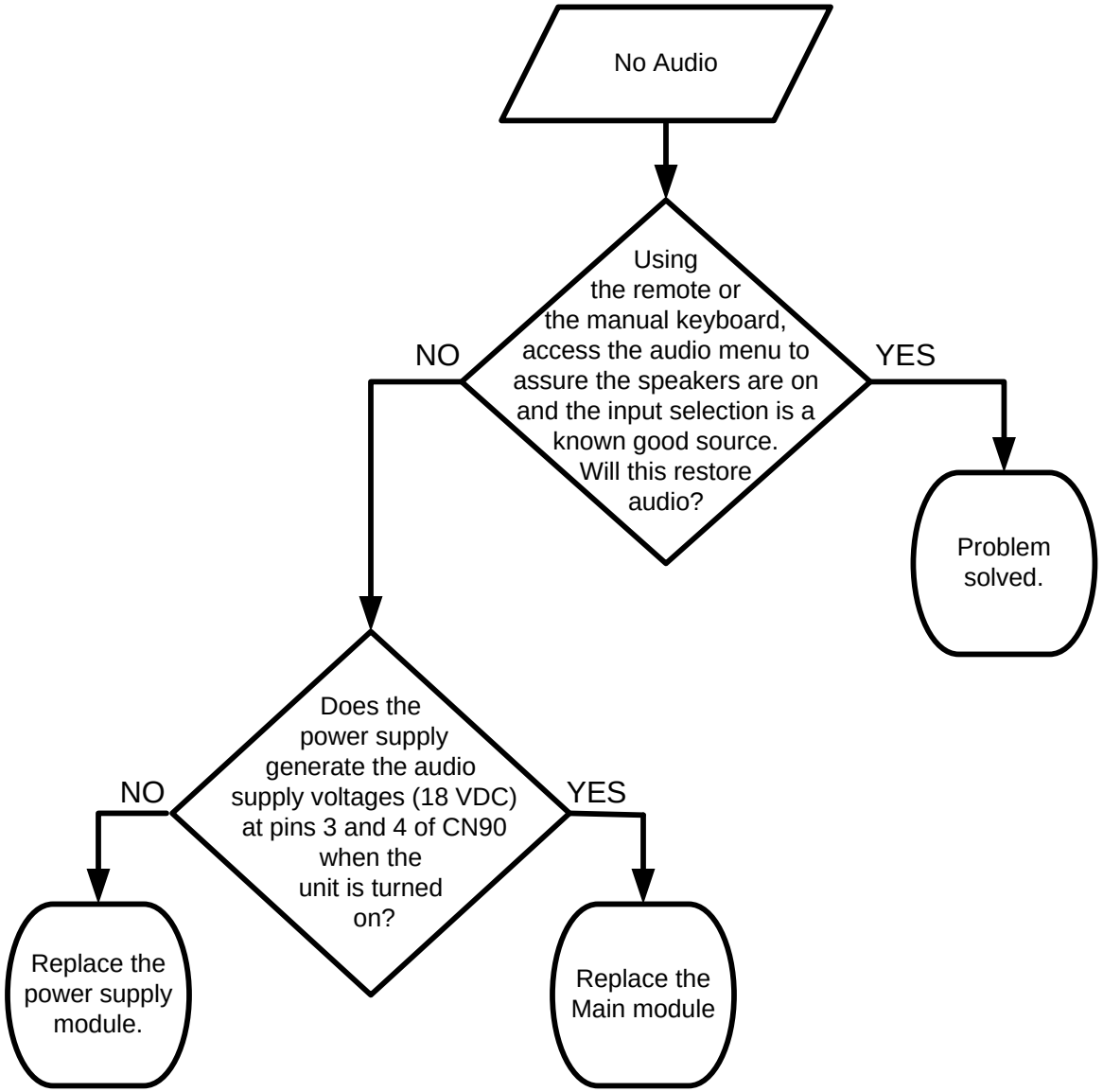
Examples



40XV645/648U/46XV645/ 648U/52XV645/648U – Backlight Troubleshooting



40XV645/648U/46XV645/648U /52XV645/648U – No Sound



ADJUSTMENT

Service Mode

Entering to Service Mode

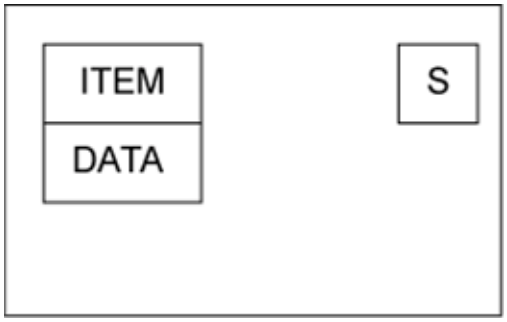
1. Press MUTE button twice on the Remote Control.

↓

2. Press MUTE button again and hold button down.

↓

Service Mode display



3. While holding the MUTE button, press MENU button on the TV.

ADJUSTMENT

Service Mode

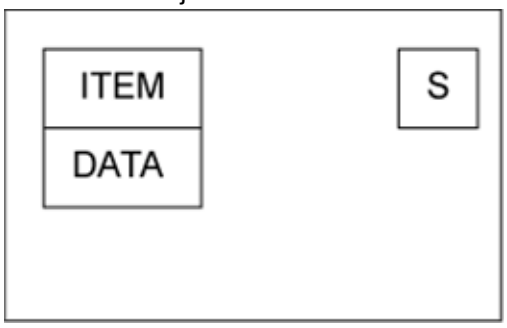
Displaying Adjustment Menu

Press MENU button on the TV.

Service Mode

Press ↑ ↓ Press

Adjustment Mode



ADJUSTMENT

Service Mode

Key Function in Service Mode

The following key entry during display of adjustment menu provides special functions.

Test signal selection	button (on Remote)
Selection of the adjustment items	Channel ▲/▼ (on TV or Remote)
Change of the data value	Volume +/- (on TV or Remote)
Adjustment menu mode ON/OFF	MENU button (on TV)
"RCUT" selection	1 button
"GCUT" selection	2 button
"BCUT" selection	3 button
"CNTX" selection	4 button
"COLC" selection	5 button
"UVTT" selection	6 button
Self diagnostic display ON/OFF	9 button

ADJUSTMENT

Service Mode

Selecting the Adjusting Item

Every pressing of CHANNEL▲ button in Service Mode changes the adjustment items in the order of table below. (▼ button for reverse order)

SETTING & ADJUSTING DATA

[SERVICE MODE]

ADJUSTING ITEMS AND DATA IN SERVICE MODE:

Item	Name of adjustment	Data			
		40XV645U	46XV645U	52XV645U	
R-CUT	R CUTOFF	0FH	0FH	0FH	(a)
G-CUT	G CUTOFF	00H	00H	00H	(a)
B-CUT	B CUTOFF	00H	00H	00H	(a)
R-DRV	R DRIVE	7CH	7CH	7CH	(a)
G-DRV	G DRIVE	78H	78H	78H	(a)
B-DRV	B DRIVE	86H	86H	86H	(a)
BRTC	BRIGHTNESS CENTER	74H	74H	74H	(a)
COLC	COLOR CENTER	A4H	A4H	A4H	(a)
UVTT	BASE BAND TINT	7BH	7BH	7BH	(a)
CNTX	CONTRAST MAX	7FH	7FH	7FH	(a)
OPT1	TV SET OPTION 1	00H	00H	00H	(b)
OPT2	TV SET OPTION 2	00H	00H	00H	(b)
OPT3	TV SET OPTION 3	E0H	E0H	E0H	(b)
OPT4	TV SET OPTION 4	6EH	6AH	6BH	(b)
OPT5	TV SET OPTION 5	00H	00H	00H	(b)
SET-ID	MODEL ID	8CH	8DH	8EH	(b)

(a) Seine Data
(b) TV-Micro Data

ADJUSTMENT

Service Mode

Adjusting the Data

Pressing of VOLUME +/- button will change the value of data in the range from 00H to FFH. The variable range depends on the adjusting item.

Service Mode

Setting Panel Option and Model-ID Data

Model	Size	Panel Maker		OPT4		OPT3	OPT5	Model-ID
		TOP	Running change	TOP	Running change			
XV645U	40	SAMSUNG	-	6EH	-	E0H	00H	8CH
	46	SAMSUNG	-	6AH	-	E0H	00H	8DH
	52	SAMSUNG	-	6BH	-	E0H	00H	8EH

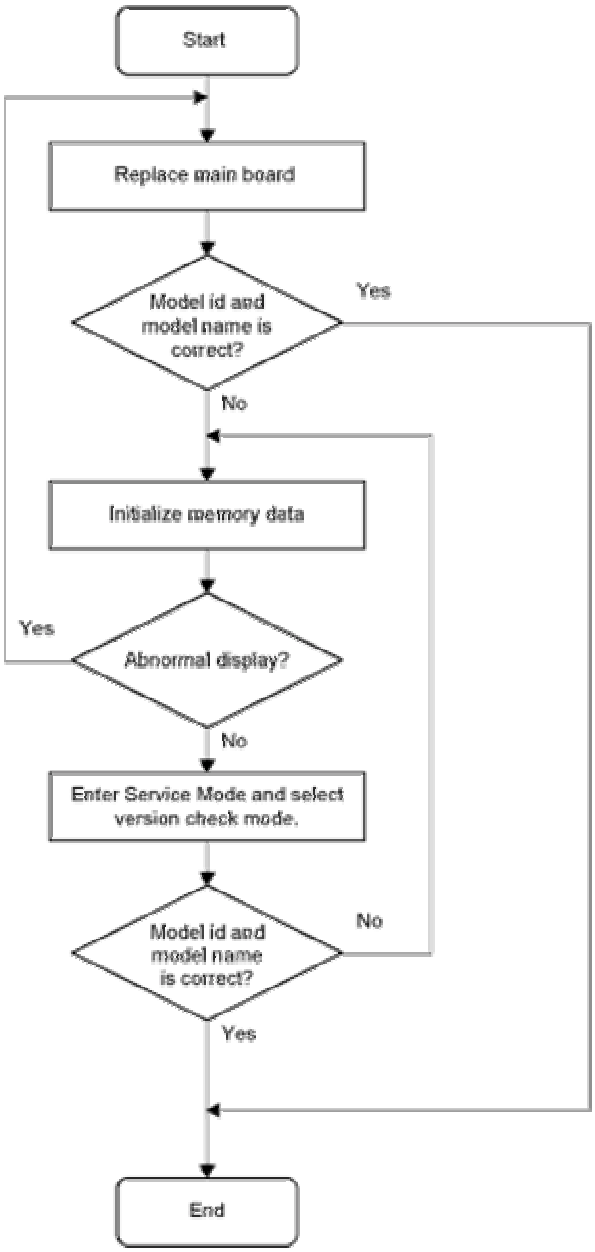
Exit from Service Mode

Pressing POWER button to turn off the TV once.

ADJUSTMENT

Service Mode

Flow Chart of Replacing Main Board



ADJUSTMENT

Service Mode

INITIALIZATION OF MEMORY DATA

After replacing Main board, the following initialization is required.

1. Enter Service Mode.
2. Select "SET-ID" by pressing CHANNEL▲ or CHANNEL▼ button during display of adjustment menu in Service Mode.
3. Change the data to Model ID of the TV set by pressing VOLUME + or -.
4. While holding RECALL button on Remote Control, press CHANNEL▲ button on the TV. The TV goes to standby mode.
5. Turn on power of the TV, then the initialization is completed.
6. Enter Service Mode and select Version Check Mode. Confirm if the model name and MODEL ID is correct. If not, repeat from 1. again.

Note:

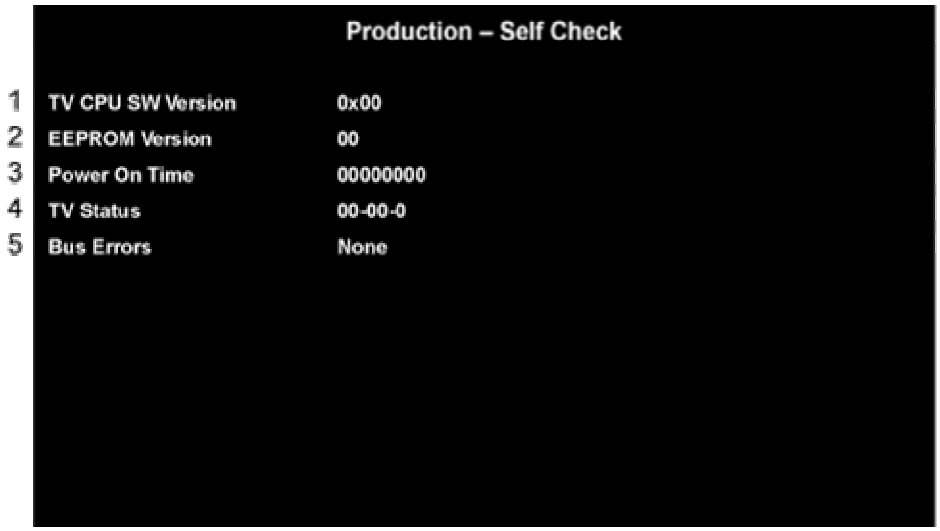
If wrong MODEL ID was set, abnormal display might appear.

ADJUSTMENT

Service Mode

Self Diagnostic Function

1. Press "9" button on Remote Control during display of adjustment menu in Service Mode. The diagnosis will begin to check if interface among IC's is executed properly.
2. During diagnosis, the following displays are shown.



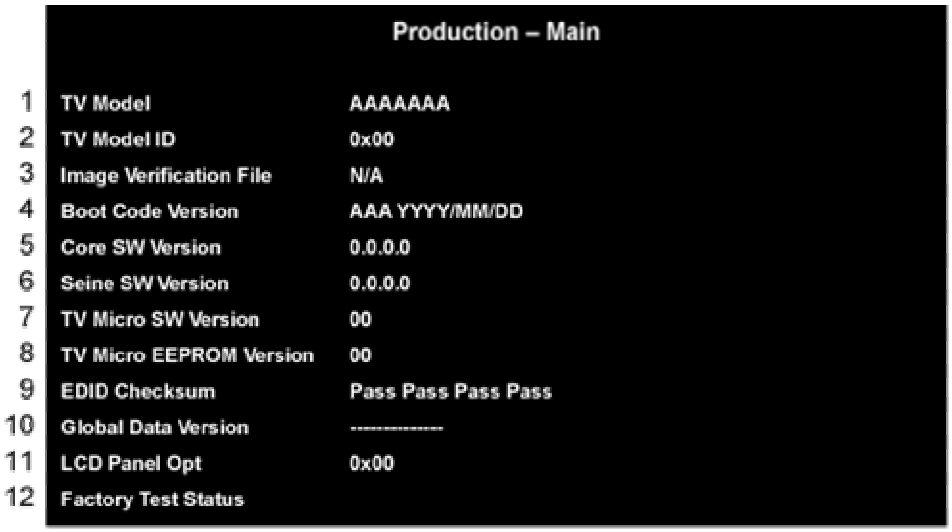
	Explanation	Data Format
1	Version information of TV-MICRO	Display 1 byte data.
2	Version information of TV-MICRO EEPROM	Display 1 byte data.
3	Total brightness hour of TV	Display 4 bytes data.
4	V-MICRO System status	not used.
5	IIC-BUS status	None is normal. "SCL-GN" (Red indication) SCL-GND short circuit "SDA-GND" (Red indication) SDA-GND short circuit

ADJUSTMENT

Service Mode

Version Check Mode

1. Press "9" button twice on Remote Control during display of adjustment menu in Service Mode. Press cursor button and then the version of main MPU will begin to check.
2. During Version Check, the following displays are shown.



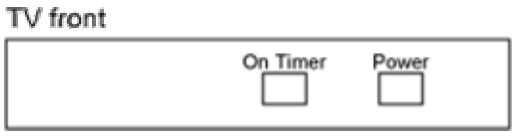
	Explanation	Data Format
1	TV model name	Display model name strings
2	TV model ID value	Display 1 byte data.(Hex)
3	Image Verification File name	Display directory path and file name of Image Verification file
4	Boot Code version strings	Display version strings
5	Core SW version value	Display *.*.*.* format (* is decimal)
6	Seine SW Version	Display *.*.*.* format (* is decimal)
7	Version information of TV-MICRO	Display 1 byte data.
8	Version information of TV-MICRO EEPROM	Display 1 byte data.
9	EDID Checksum	Pass/Fail Result Listed for HDMI 1-4 (left to right)
10	Global Data Version	Display version strings
11	LCD Panel Opt	Panel Option (OPT4) Data: Display 1 byte data. (Please see page 8, SETTING PANEL OPTION and MODEL-ID DATA)
12	Factory Test Status	Optional Data Bits that can be used by factory

ADJUSTMENT

Service Mode

LED Indication

The green and red LED lights on the TV indicate the TV's status, as described below:



LED Combinations	LED1	LED2	TV Conditions
	PowerOn/Standby	OnTimer	
	Green/Red/ Orange (G+R)	Green/Red/ Orange (G+R)	
Mode3	Green	Green	Power ON OnTimer is set Program Timer is NOT set
Mode6	Green	Off	Power ON OnTimer is NOT set Program Timer is NOT set
Mode13	Orange	Green	Power OFF (Standby) Power-On Mode: Fast OnTimer is set Program Timer is NOT set
Mode14	Orange	Off	Power OFF (Standby) Power-On Mode: Fast OnTimer is NOT set Program Timer is NOT set
Mode15	Off	Green	Power OFF (Standby) Power-On Mode: Saving OnTimer is set Program Timer is NOT set
Mode16	Off	Off	Power OFF (Standby) Power-On Mode: Saving OnTimer is NOT set Program Timer is NOT set

Mode18	Green Blink (3 Times)	Off	Booting (Transition from Standby to On)
Mode19	Green Blink	Off	For Service IIC BUS Error
Mode20	Red Blink	Off	For Service Power Protect Error
Mode21	Off	Green Blink	For Service Fan Stop Error
Mode22	Orange Blink	Off	For Service Back Light Error
Mode23	Orange	Green	For Service SW Upgrade in Progress
Mode24	Red	Off	For Service SW Upgrade Failed
Mode25	Green	Off	For Service SW Upgrade Successful

ADJUSTMENT

Service Mode

Update of SEINE SOFTWARE

1. Turn off power of the TV.
2. Prepare a USB memory storing the update software data.
3. Insert the USB device into the USB terminal at the right side of the TV.
4. Turn on power of the TV while holding Menu button on the TV.
5. LED indication is displayed as following,
   Mode18 → Mode23 → Mode25 (If update is failed, Mode24 is shown.)
   Refer "LED Indication" for each mode.
6. Turn off power of the TV.
7. Remove the USB memory from the USB terminal.
8. Turn on power of the TV.
9. Perform reset of the TV.
   9-1. Press Menu key. ("MENU" is displayed.)
   9-2. Select "SETUP Menu".
   9-3. Select "Reset TV" and press the ENTER key. ("Reset TV Menu" is displayed)
   9-4. Select "YES" and press the ENTER key. (Reset operation starts.)
10. The TV goes to standby mode after the reset opration is completed.
11. Turn on power of the TV.
12. Software update is completed.