

# PHILIPS

**32" LCD TV  
chassis PL13.9**

# Service Manual

## Contents

32PFL4508/F7    PHILIPS    (Serial No.: ME1)

## **IMPORTANT SAFETY NOTICE**

**Proper service and repair is important to the safe, reliable operation of all P&F Equipment. The service procedures recommended by P&F and described in this service manual are effective methods of performing service operations. Some of these service special tools should be used when and as recommended.**

**It is important to note that this service manual contains various CAUTIONS and NOTICES which should be carefully read in order to minimize the risk of personal injury to service personnel. The possibility exists that improper service methods may damage the equipment. It also is important to understand that these CAUTIONS and NOTICES ARE NOT EXHAUSTIVE. P&F could not possibly know, evaluate and advice the service trade of all conceivable ways in which service might be done or of the possible hazardous consequences of each way. Consequently, P&F has not undertaken any such broad evaluation. Accordingly, a servicer who uses a service procedure or tool which is not recommended by P&F must first use all precautions thoroughly so that neither his safety nor the safe operation of the equipment will be jeopardized by the service method selected.**

<p><b>The LCD panel is manufactured to provide many years of useful life. Occasionally a few non active pixels may appear as a tiny spec of color. This is not to be considered a defect in the LCD screen.</b></p>
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# SPECIFICATIONS

## < TUNER / NTSC >

Description	Condition	Unit	Nominal	Limit
1. AFT Pull-In Range	---	MHz	±2.3	±2.1
2. Synchronizing Sens.	TV.ch.4	dBμ	18	20
	CA.ch.31	dBμ	18	20
	CA.ch.87	dBμ	18	23

## < TUNER / ATSC >

Description	Condition	Unit	Nominal	Limit
1. Received Freq. Range (-28dBm)	---	kHz	---	±100
2. ATSC Dynamic Range (min / max)	ch.4	dBm	---	-76/0
	ch.10	dBm	---	-76/0
	ch.41	dBm	---	-76/+4

## < LCD PANEL >

Description	Condition	Unit	Nominal	Limit
1. Native Pixel Resolution	Horizontal	pixels	1366	---
	Vertical	pixels	768	---
2. Brightness (w / filter)	---	cd/m <sup>2</sup>	280	---
3. Viewing Angle	Horizontal	°	-88 to 88	---
	Vertical	°	-88 to 88	---

## < VIDEO >

Description	Condition	Unit	Nominal	Limit
1. Over Scan	Horizontal	%	5	5±5
	Vertical	%	5	5±5
2. Color Temperature	---	°K	12000	---
	x		0.272	±3%
	y		0.278	±3%
3. Resolution (composite video)	Horizontal	line	400	---
	Vertical	line	350	---

## < AUDIO >

All items are measured across 8 Ω load at speaker output terminal with L.P.F.

Description	Condition	Unit	Nominal	Limit
1. Audio MAX Output (ATSC 0dBfs)	Lch/Rch	W	8.0/8.0	7.0/7.0
2. Audio Distortion (NTSC)	500mW: Lch/Rch	%	0.5/0.5	2.0/2.0
3. Audio Freq. Response (NTSC)	-6dB: Lch	Hz	70 to 10 k	100 to 8 k
	-6dB: Rch	Hz	70 to 10 k	100 to 8 k

# IMPORTANT SAFETY PRECAUTIONS

Prior to shipment from the factory, our products are strictly inspected for recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

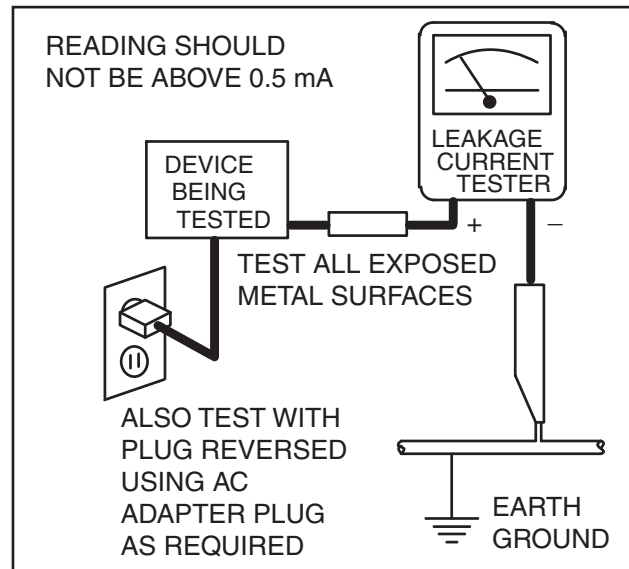
## Safety Precautions for LCD TV Circuit

1. **Before returning an instrument to the customer**, always make a safety check of the entire instrument, including, but not limited to, the following items:

- a. Be sure that no built-in protective devices are defective and have been defeated during servicing. (1) Protective shields are provided on this chassis to protect both the technician and the customer. Correctly replace all missing protective shields, including any removed for servicing convenience. (2) When reinstalling the chassis and/or other assembly in the cabinet, be sure to put back in place all protective devices, including but not limited to, nonmetallic control knobs, insulating fishpapers, adjustment and compartment covers/shields, and isolation resistor/capacitor networks. **Do not operate this instrument or permit it to be operated without all protective devices correctly installed and functioning. Servicers who defeat safety features or fail to perform safety checks may be liable for any resulting damage.**
- b. Be sure that there are no cabinet openings through which an adult or child might be able to insert their fingers and contact a hazardous voltage. Such openings include, but are not limited to, (1) spacing between the Liquid Crystal Panel and the cabinet mask, (2) excessively wide cabinet ventilation slots, and (3) an improperly fitted and/or incorrectly secured cabinet back cover.


- c. **Antenna Cold Check** - With the instrument AC plug removed from any AC source, connect an electrical jumper across the two AC plug prongs. Place the instrument AC switch in the on position. Connect one lead of an ohmmeter to the AC plug prongs tied together and touch the other ohmmeter lead in turn to each tuner antenna input exposed terminal screw and, if applicable, to the coaxial connector. If the measured resistance is less than 1.0 megohm or greater than 5.2 megohm, an abnormality exists that must be corrected before the instrument is returned to the customer. Repeat this test with the instrument AC switch in the off position.

- d. **Leakage Current Hot Check** - With the instrument completely reassembled, plug the AC line cord directly into a 120 V AC outlet. (Do not use an isolation transformer during this test.) Use a leakage current tester or a metering system that complies with American National Standards Institute (ANSI) C101.1 Leakage Current for Appliances and Underwriters Laboratories (UL) 1410, (50.7). With the instrument AC switch first in the on position and then in the off position, measure from a known earth ground (metal water pipe, conduit, etc.) to all exposed metal parts of the instrument (antennas, handle brackets, metal cabinet, screw heads, metallic overlays, control shafts, etc.), especially any exposed metal parts that offer an electrical return path to the chassis. Any current measured must not exceed 0.5 milli-ampere. Reverse the instrument power cord plug in the outlet and repeat the test.



**ANY MEASUREMENTS NOT WITHIN THE LIMITS SPECIFIED HEREIN INDICATE A POTENTIAL SHOCK HAZARD THAT MUST BE ELIMINATED BEFORE RETURNING THE INSTRUMENT TO THE CUSTOMER OR BEFORE CONNECTING THE ANTENNA OR ACCESSORIES.**

2. Read and comply with all caution and safety-related notes on or inside the receiver cabinet, on the receiver chassis, or on the Liquid Crystal Panel.

3. **Design Alteration Warning** - Do not alter or add to the mechanical or electrical design of this TV receiver. Design alterations and additions, including, but not limited to circuit modifications and the addition of items such as auxiliary audio and/or video output connections, might alter the safety characteristics of this receiver and create a hazard to the user. Any design alterations or additions will void the manufacturer's warranty and may make you, the servicer, responsible for personal injury or property damage resulting therefrom.
4. **Hot Chassis Warning** -
  - a. Some TV receiver chassis are electrically connected directly to one conductor of the AC power cord and maybe safety-serviced without an isolation transformer only if the AC power plug is inserted so that the chassis is connected to the ground side of the AC power source. To confirm that the AC power plug is inserted correctly, with an AC voltmeter, measure between the chassis and a known earth ground. If a voltage reading in excess of 1.0 V is obtained, remove and reinsert the AC power plug in the opposite polarity and again measure the voltage potential between the chassis and a known earth ground.
  - b. Some TV receiver chassis normally have 85V AC(RMS) between chassis and earth ground regardless of the AC plug polarity. This chassis can be safety-serviced only with an isolation transformer inserted in the power line between the receiver and the AC power source, for both personnel and test equipment protection.
  - c. Some TV receiver chassis have a secondary ground system in addition to the main chassis ground. This secondary ground system is not isolated from the AC power line. The two ground systems are electrically separated by insulation material that must not be defeated or altered.
5. Observe original lead dress. Take extra care to assure correct lead dress in the following areas: a. near sharp edges, b. near thermally hot parts-be sure that leads and components do not touch thermally hot parts, c. the AC supply, d. high voltage, and, e. antenna wiring. Always inspect in all areas for pinched, out of place, or frayed wiring. Check AC power cord for damage.
6. Components, parts, and/or wiring that appear to have overheated or are otherwise damaged should be replaced with components, parts, or wiring that meet original specifications. Additionally, determine the cause of overheating and/or damage and, if necessary, take corrective action to remove any potential safety hazard.
7. **Product Safety Notice** - Some electrical and mechanical parts have special safety-related characteristics which are often not evident from visual inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage, etc. Parts that have special safety characteristics are identified by a  on schematics and in parts lists. Use of a substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire, and/or other hazards. The product's safety is under review continuously and new instructions are issued whenever appropriate. Prior to shipment from the factory, our products are strictly inspected to confirm they comply with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

## Precautions during Servicing

- A.** Parts identified by the **▲** symbol are critical for safety.  
Replace only with part number specified.
- B.** In addition to safety, other parts and assemblies are specified for conformance with regulations applying to spurious radiation. These must also be replaced only with specified replacements.  
Examples: RF converters, RF cables, noise blocking capacitors, and noise blocking filters, etc.
- C.** Use specified internal wiring. Note especially:
  - 1) Wires covered with PVC tubing
  - 2) Double insulated wires
  - 3) High voltage leads
- D.** Use specified insulating materials for hazardous live parts. Note especially:
  - 1) Insulation Tape
  - 2) PVC tubing
  - 3) Spacers
  - 4) Insulators for transistors.
- E.** When replacing AC primary side components (transformers, power cord, etc.), wrap ends of wires securely about the terminals before soldering.
- F.** Observe that the wires do not contact heat producing parts (heat sinks, oxide metal film resistors, fusible resistors, etc.)
- G.** Check that replaced wires do not contact sharp edged or pointed parts.
- H.** When a power cord has been replaced, check that 11~13 lb (5~6 kg) of force in any direction will not loosen it.
- I.** Also check areas surrounding repaired locations.
- J.** Use care that foreign objects (screws, solder droplets, etc.) do not remain inside the set.
- K.** When connecting or disconnecting the internal connectors, first, disconnect the AC plug from the AC supply outlet.
- L.** When installing parts or assembling the cabinet parts, be sure to use the proper screws and tighten certainly.

## Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions. Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

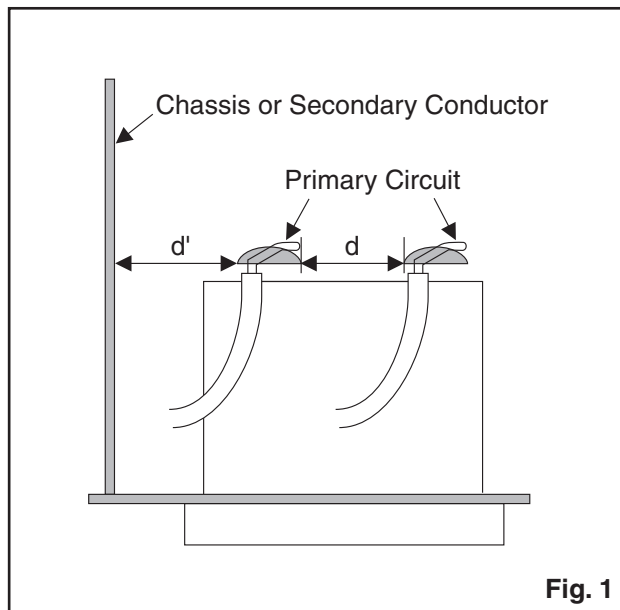
### 1. Clearance Distance

When replacing primary circuit components, confirm specified clearance distance ( $d$ ) and ( $d'$ ) between soldered terminals, and between terminals and surrounding metallic parts. (See Fig. 1)

**Table 1: Ratings for selected area**

AC Line Voltage	Region	Clearance Distance ( $d$ ), ( $d'$ )
110 to 130 V	U.S.A. or Canada	$\geq 3.2$ mm (0.126 inches)

**Note:** This table is unofficial and for reference only. Be sure to confirm the precise values.



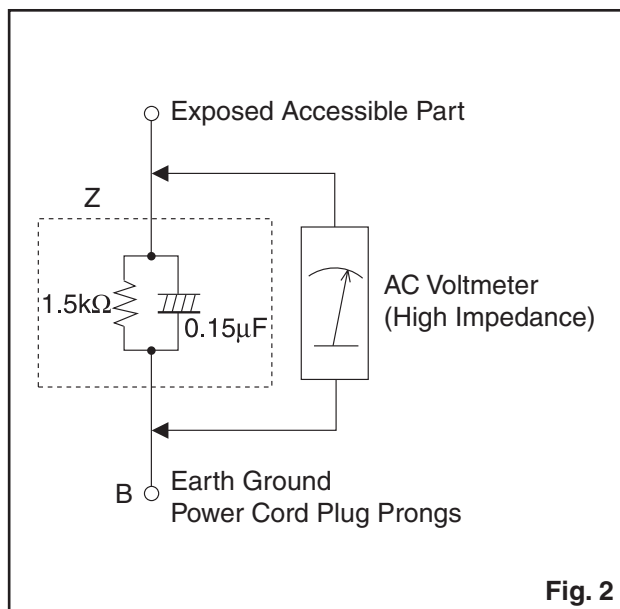
**Fig. 1**

### 2. Leakage Current Test

Confirm the specified (or lower) leakage current between B (earth ground, power cord plug prongs) and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.) is lower than or equal to the specified value in the table below.

#### Measuring Method: (Power ON)

Insert load Z between B (earth ground, power cord plug prongs) and exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See Fig. 2 and following table.



**Fig. 2**

**Table 2: Leakage current ratings for selected areas**

AC Line Voltage	Region	Load Z	Leakage Current ( $i$ )	Earth Ground (B) to:
110 to 130 V	U.S.A. or Canada	$0.15 \mu F$ CAP. & $1.5 k\Omega$ RES. Connected in parallel	$i \leq 0.5$ mA rms	Exposed accessible parts

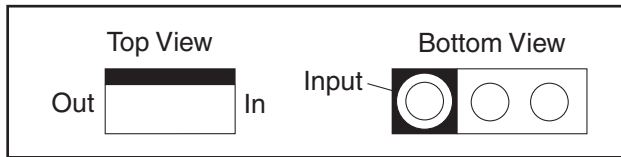
**Note:** This table is unofficial and for reference only. Be sure to confirm the precise values.



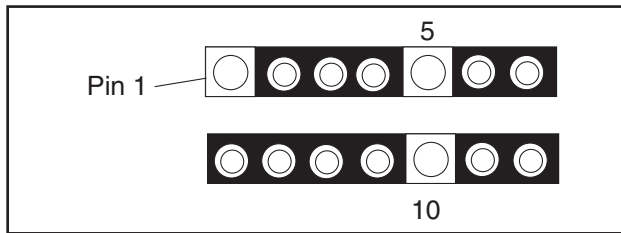
# STANDARD NOTES FOR SERVICING

## Circuit Board Indications

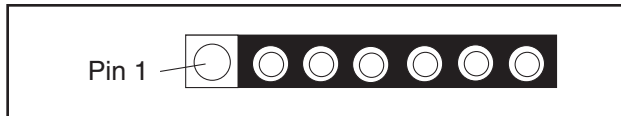
1. The output pin of the 3 pin Regulator ICs is indicated as shown.



2. For other ICs, pin 1 and every fifth pin are indicated as shown.

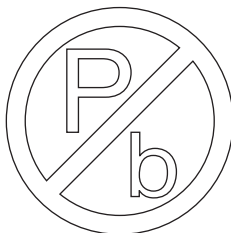


3. The 1st pin of every male connector is indicated as shown.



## Pb (Lead) Free Solder

**Pb free mark will be found on PCBs which use Pb free solder. (Refer to figure.) For PCBs with Pb free mark, be sure to use Pb free solder. For PCBs without Pb free mark, use standard solder.**



Pb free mark

## How to Remove / Install Flat Pack-IC

### 1. Removal

**With Hot-Air Flat Pack-IC Desoldering Machine:**

1. Prepare the hot-air flat pack-IC desoldering machine, then apply hot air to the Flat Pack-IC (about 5 to 6 seconds). (Fig. S-1-1)

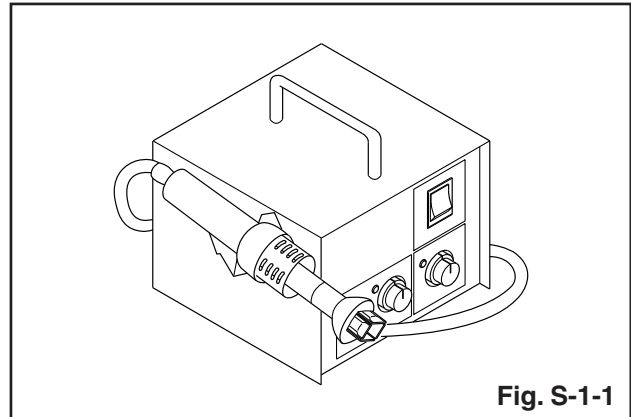


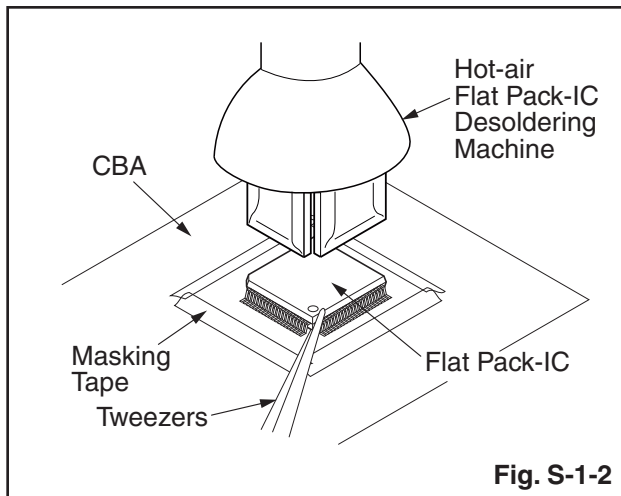
Fig. S-1-1

2. Remove the flat pack-IC with tweezers while applying the hot air.
3. Bottom of the flat pack-IC is fixed with glue to the CBA; when removing entire flat pack-IC, first apply soldering iron to center of the flat pack-IC and heat up. Then remove (glue will be melted). (Fig. S-1-6)
4. Release the flat pack-IC from the CBA using tweezers. (Fig. S-1-6)

### CAUTION:

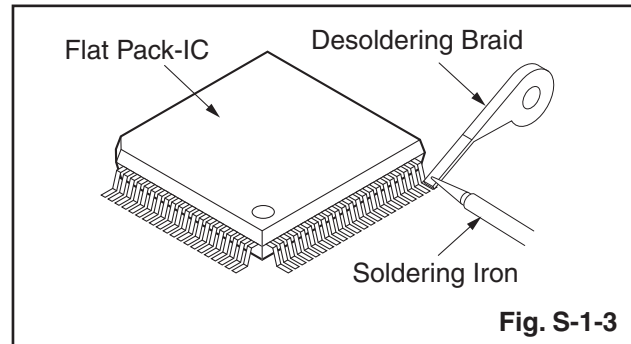
1. The Flat Pack-IC shape may differ by models. Use an appropriate hot-air flat pack-IC desoldering machine, whose shape matches that of the Flat Pack-IC.
2. Do not supply hot air to the chip parts around the flat pack-IC for over 6 seconds because damage to the chip parts may occur. Put masking tape around the flat pack-IC to protect other parts from damage. (Fig. S-1-2)

3. The flat pack-IC on the CBA is affixed with glue, so be careful not to break or damage the foil of each pin or the solder lands under the IC when removing it.

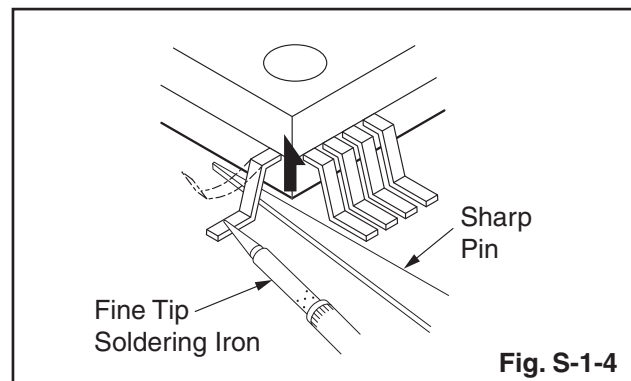


#### With Soldering Iron:

1. Using desoldering braid, remove the solder from all pins of the flat pack-IC. When you use solder flux which is applied to all pins of the flat pack-IC, you can remove it easily. (Fig. S-1-3)



2. Lift each lead of the flat pack-IC upward one by one, using a sharp pin or wire to which solder will not adhere (iron wire). When heating the pins, use a fine tip soldering iron or a hot air desoldering machine. (Fig. S-1-4)

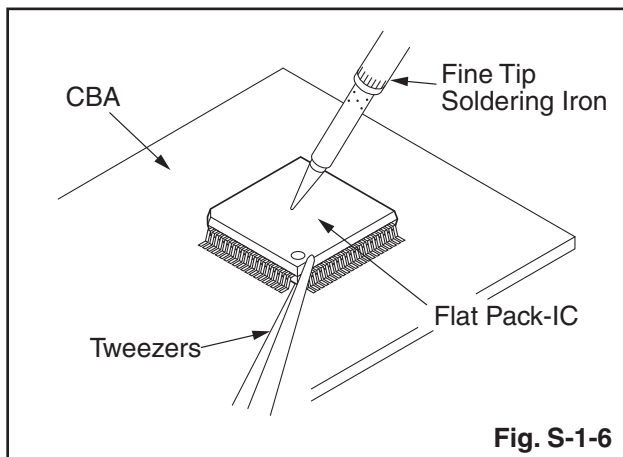
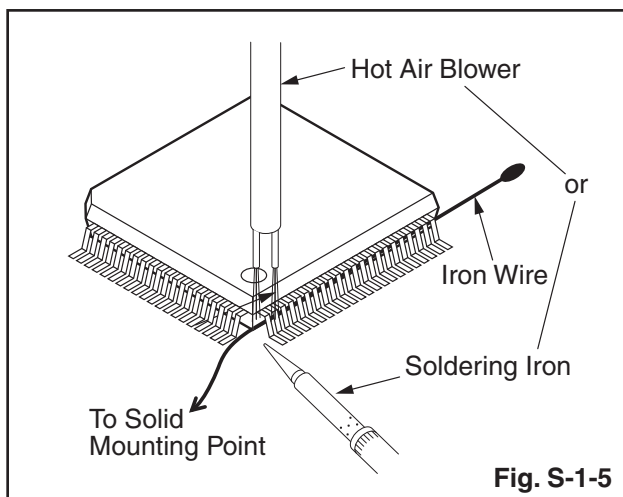


3. Bottom of the flat pack-IC is fixed with glue to the CBA; when removing entire flat pack-IC, first apply soldering iron to center of the flat pack-IC and heat up. Then remove (glue will be melted). (Fig. S-1-6)
4. Release the flat pack-IC from the CBA using tweezers. (Fig. S-1-6)

### With Iron Wire:

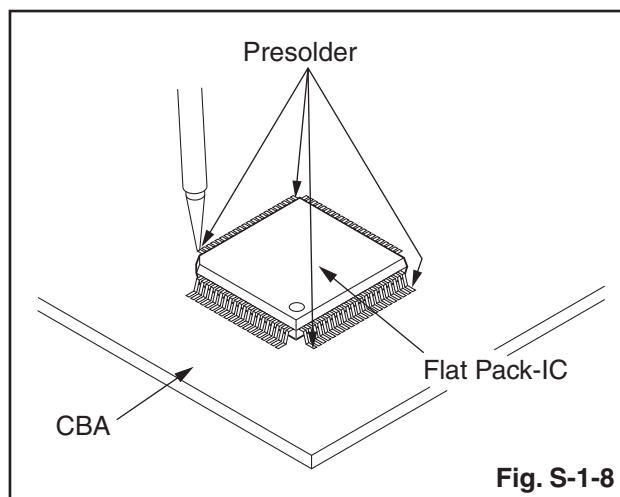
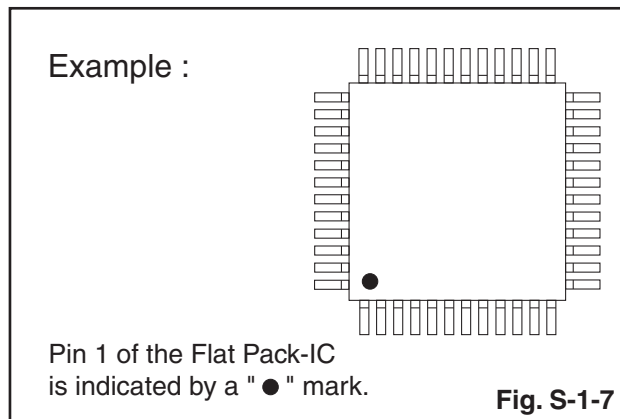
1. Using desoldering braid, remove the solder from all pins of the flat pack-IC. When you use solder flux which is applied to all pins of the flat pack-IC, you can remove it easily. (Fig. S-1-3)
2. Affix the wire to a workbench or solid mounting point, as shown in Fig. S-1-5.
3. While heating the pins using a fine tip soldering iron or hot air blower, pull up the wire as the solder melts so as to lift the IC leads from the CBA contact pads as shown in Fig. S-1-5.
4. Bottom of the flat pack-IC is fixed with glue to the CBA; when removing entire flat pack-IC, first apply soldering iron to center of the flat pack-IC and heat up. Then remove (glue will be melted). (Fig. S-1-6)
5. Release the flat pack-IC from the CBA using tweezers. (Fig. S-1-6)

**Note:** When using a soldering iron, care must be taken to ensure that the flat pack-IC is not being held by glue. When the flat pack-IC is removed from the CBA, handle it gently because it may be damaged if force is applied.



### 2. Installation

1. Using desoldering braid, remove the solder from the foil of each pin of the flat pack-IC on the CBA so you can install a replacement flat pack-IC more easily.
2. The "●" mark on the flat pack-IC indicates pin 1. (See Fig. S-1-7.) Be sure this mark matches the pin 1 on the PCB when positioning for installation. Then presolder the four corners of the flat pack-IC. (See Fig. S-1-8.)
3. Solder all pins of the flat pack-IC. Be sure that none of the pins have solder bridges.



# Instructions for Handling Semi-conductors

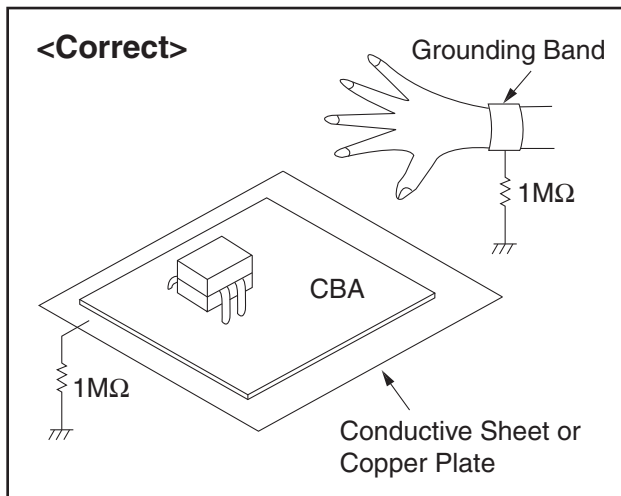
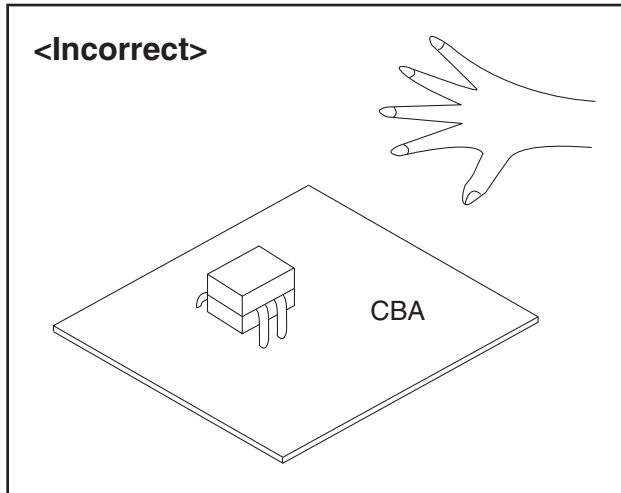
Electrostatic breakdown of the semi-conductors may occur due to a potential difference caused by electrostatic charge during unpacking or repair work.

## 1. Ground for Human Body

Be sure to wear a grounding band ( $1\text{ M}\Omega$ ) that is properly grounded to remove any static electricity that may be charged on the body.

## 2. Ground for Workbench

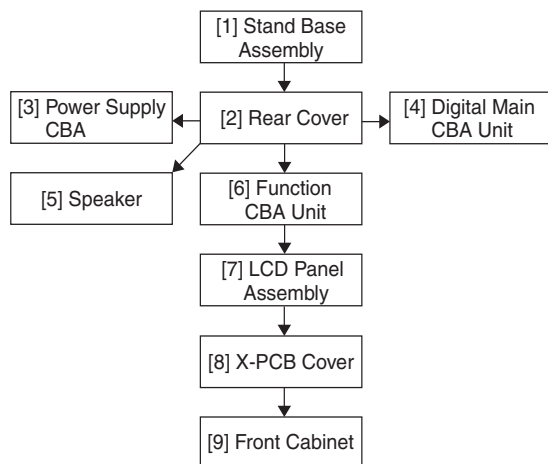
Be sure to place a conductive sheet or copper plate with proper grounding ( $1\text{ M}\Omega$ ) on the workbench or other surface, where the semi-conductors are to be placed. Because the static electricity charge on clothing will not escape through the body grounding band, be careful to avoid contacting semi-conductors with your clothing.



# CABINET DISASSEMBLY INSTRUCTIONS

## 1. Disassembly Flowchart

This flowchart indicates the disassembly steps for the cabinet parts and the CBA in order to gain access to items to be serviced. When reassembling, follow the steps in reverse order. Bend, route and dress the cables as they were.



## 2. Disassembly Method

Step/ Loc. No.	Part	Fig. No.	Removal	Note
[1]	Stand Base Assembly	D1	3(S-1), Stand Neck	---
[2]	Rear Cover	D1	8(S-2), 2(S-3), (S-4)	---
[3]	Power Supply CBA	D2 D5	4(S-5), CN601, CN501, CN1001	---
[4]	Digital Main CBA Unit	D2 D5	4(S-6), CN3013, CN3101, CN3801, Jack Holder	---
[5]	Speaker	D3	-----	---
[6]	Function CBA Unit	D3 D5	2(S-7), Leading Edge Cover, Shield Plate	2
[7]	LCD Panel Assembly	D4	-----	---
[8]	X-PCB Cover	D4	2(S-8)	1
[9]	Front Cabinet	D4	2(S-9), Decoration Plate	2

↓      ↓      ↓      ↓      ↓  
(1)    (2)    (3)    (4)    (5)

### Note:

- (1) Order of steps in procedure. When reassembling, follow the steps in reverse order. These numbers are also used as the Identification (location) No. of parts in figures.
- (2) Parts to be removed or installed.
- (3) Fig. No. showing procedure of part location
- (4) Identification of parts to be removed, unhooked, unlocked, released, unplugged, unclamped, or desoldered.  
P = Spring, L = Locking Tab, S = Screw,  
H = Hex Screw, CN = Connector  
e.g. 2(S-2) = two Screws of (S-2),  
2(L-2) = two Locking Tabs of (L-2)
- (5) Refer to the following "Reference Notes in the Table."

### Precautions concerning the LCD Panel Assembly:

#### 1. When you disassemble/re-assemble the X-PCB Cover

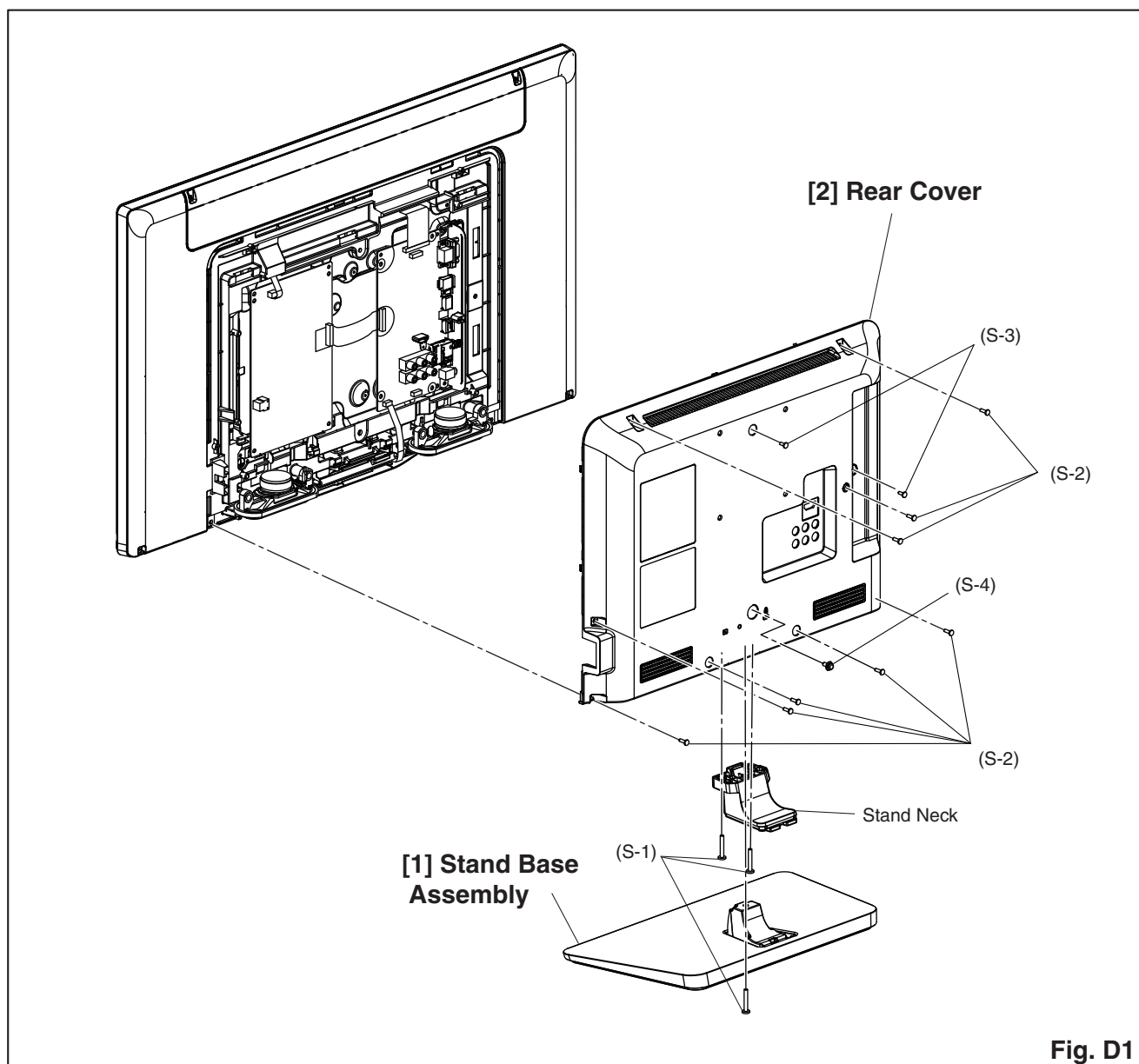
- Be careful not to break the hooks. If you pull with too much force, the hooks may be damaged.
- When disassembling, first hold the top and bottom of the X-PCB Cover on both ends and then moving toward the center, lift up the top side to detach the hooks.
- When assembling be careful not to damage the X-PCB Board or the COF(Chip On Film).
- Make sure the hooks are securely in place when re-assembling.
- The screw tightening torque must be 6kgf·cm (5.2lb·in).

#### 2. When you disassemble/re-assemble the Front Cabinet or Function CBA Unit

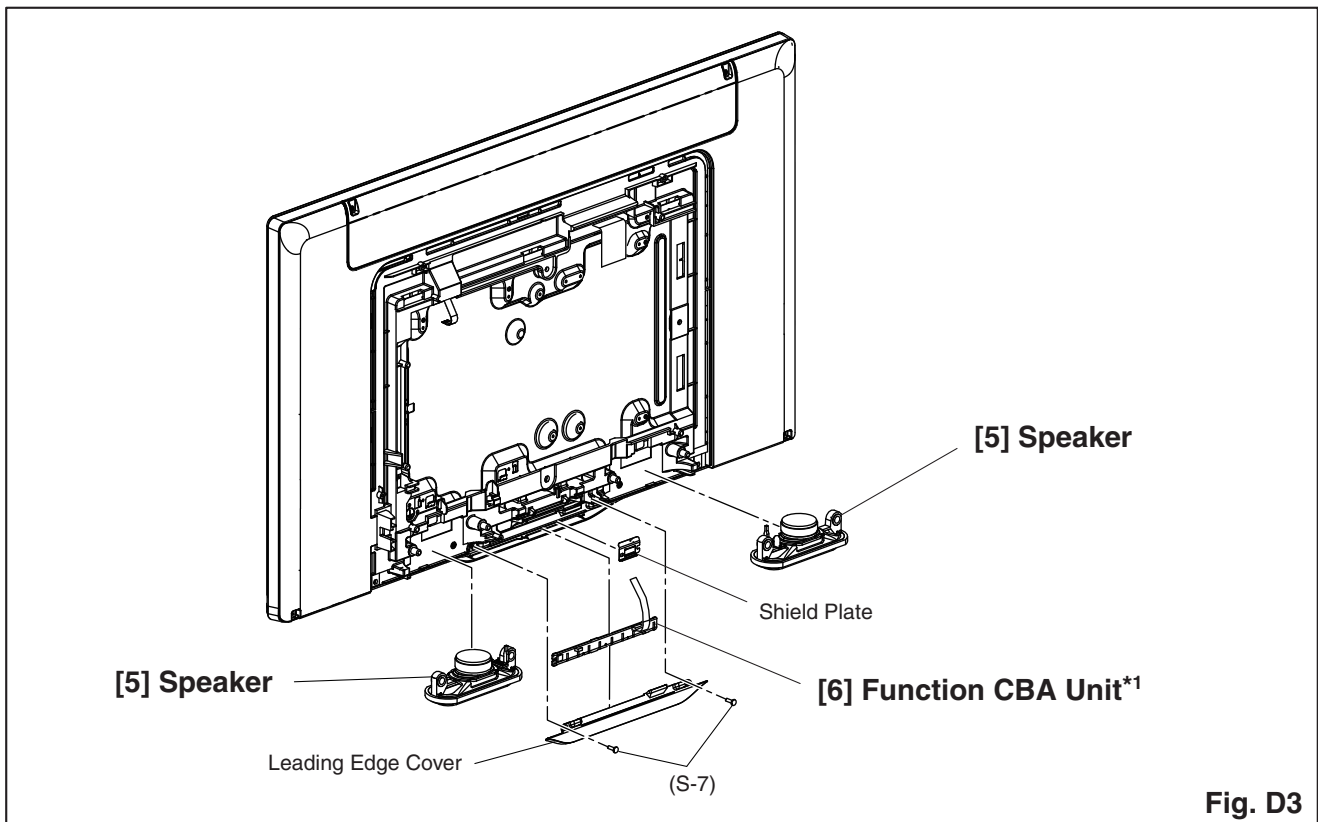
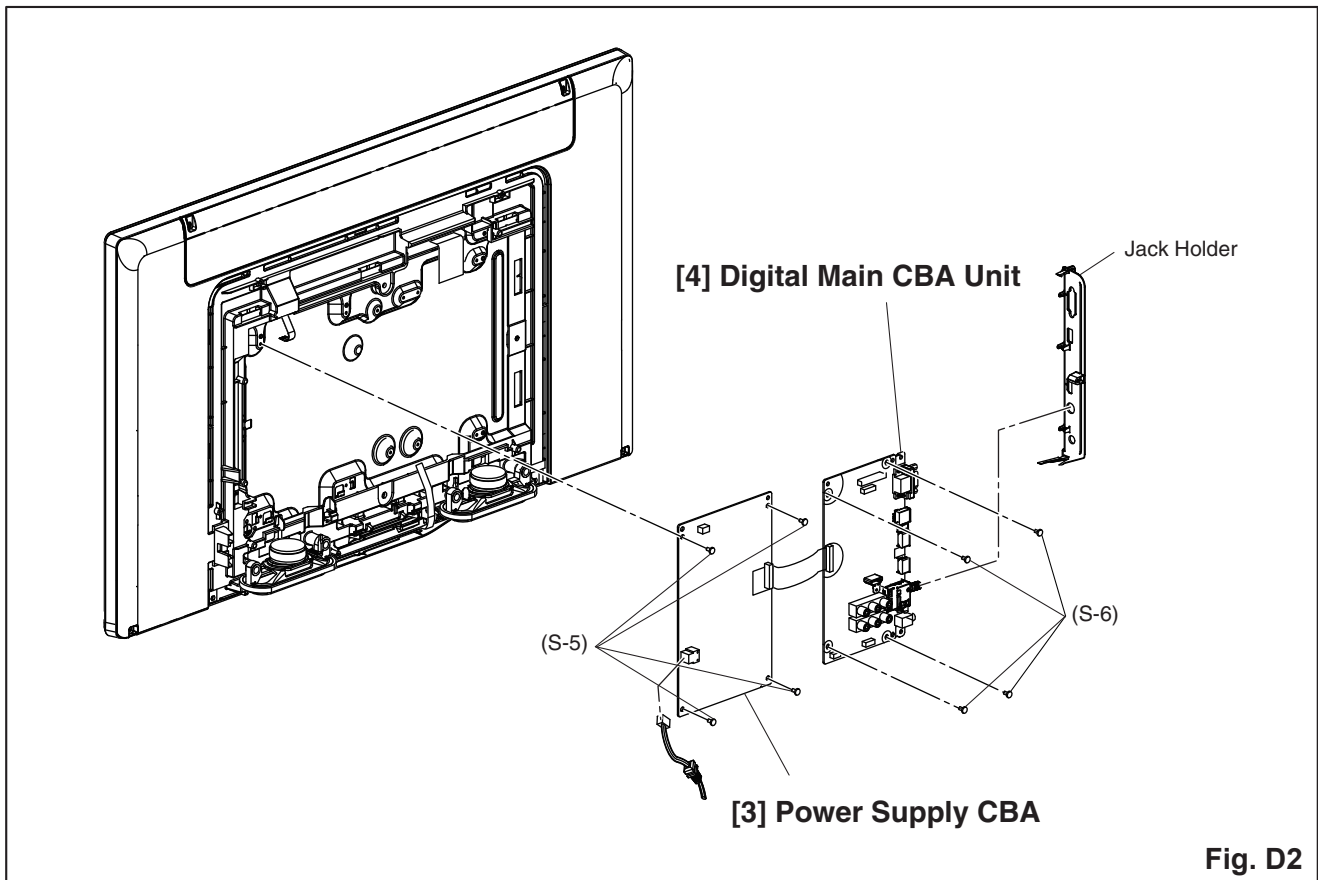
- Be careful not to break the hooks. If you pull with too much force, the hooks may be damaged.
- When disassembling, first detach the hooks on each end on the bottom side, then detach the remaining hooks.
- Make sure the hooks are securely in place when assembling.
- Be careful not to scratch the display panel when assembling.
- Make sure the Function CBA Unit and Shield Plate are securely in place when re-assembling.
- The screw tightening torque must be 6kgf·cm (5.2lb·in).

- After reassembling the Front Cabinet or Function CBA Unit, check the operational sensitivity of the touch sensor to make sure it functions normally.

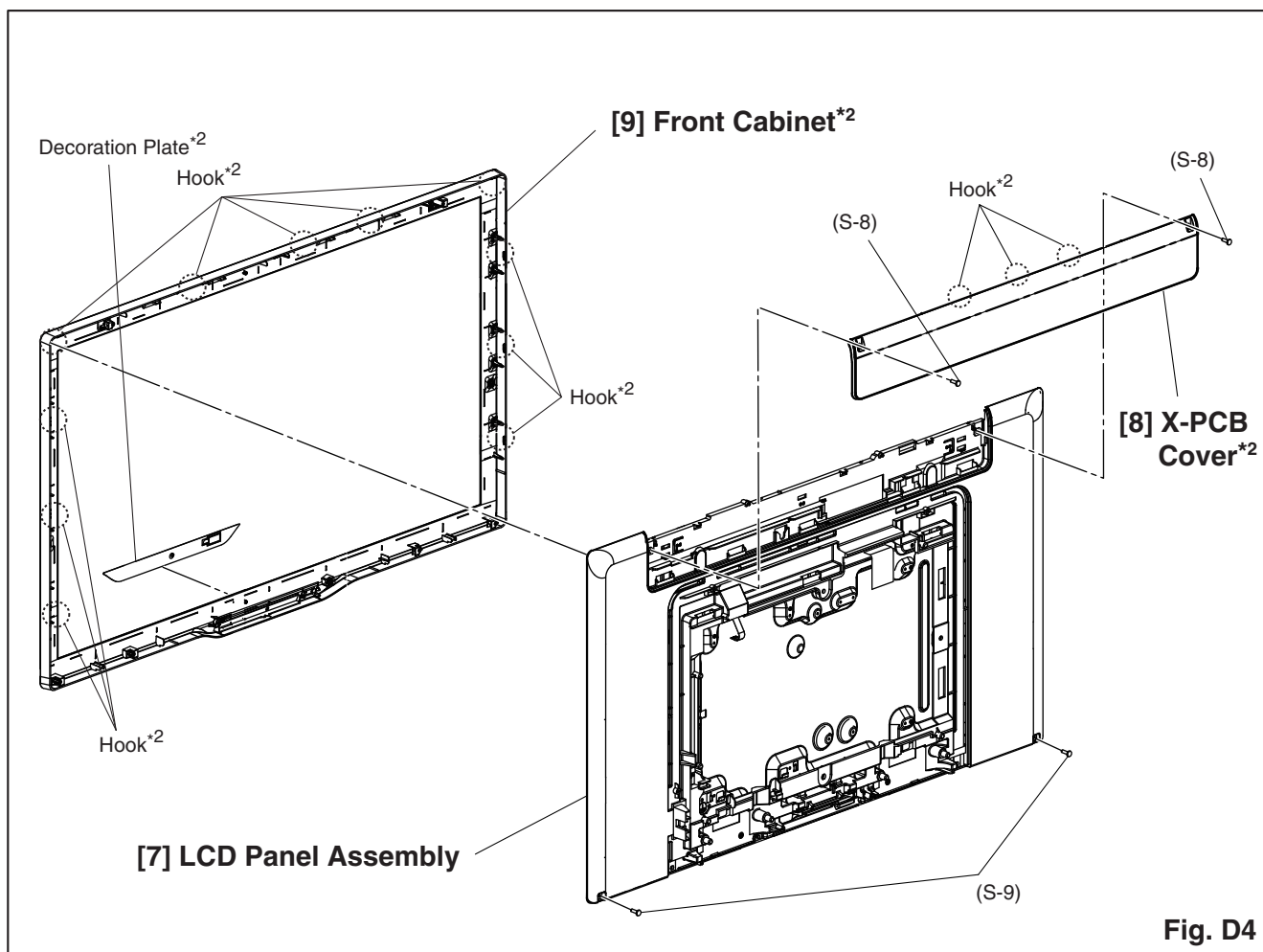
- Make sure to replace the Decoration Plate to a new one when replacing the Front Cabinet.



**Fig. D1**



\*1: Make sure to read all the precautions on page 4-1 when you disassemble/re-assemble the Function CBA Unit.

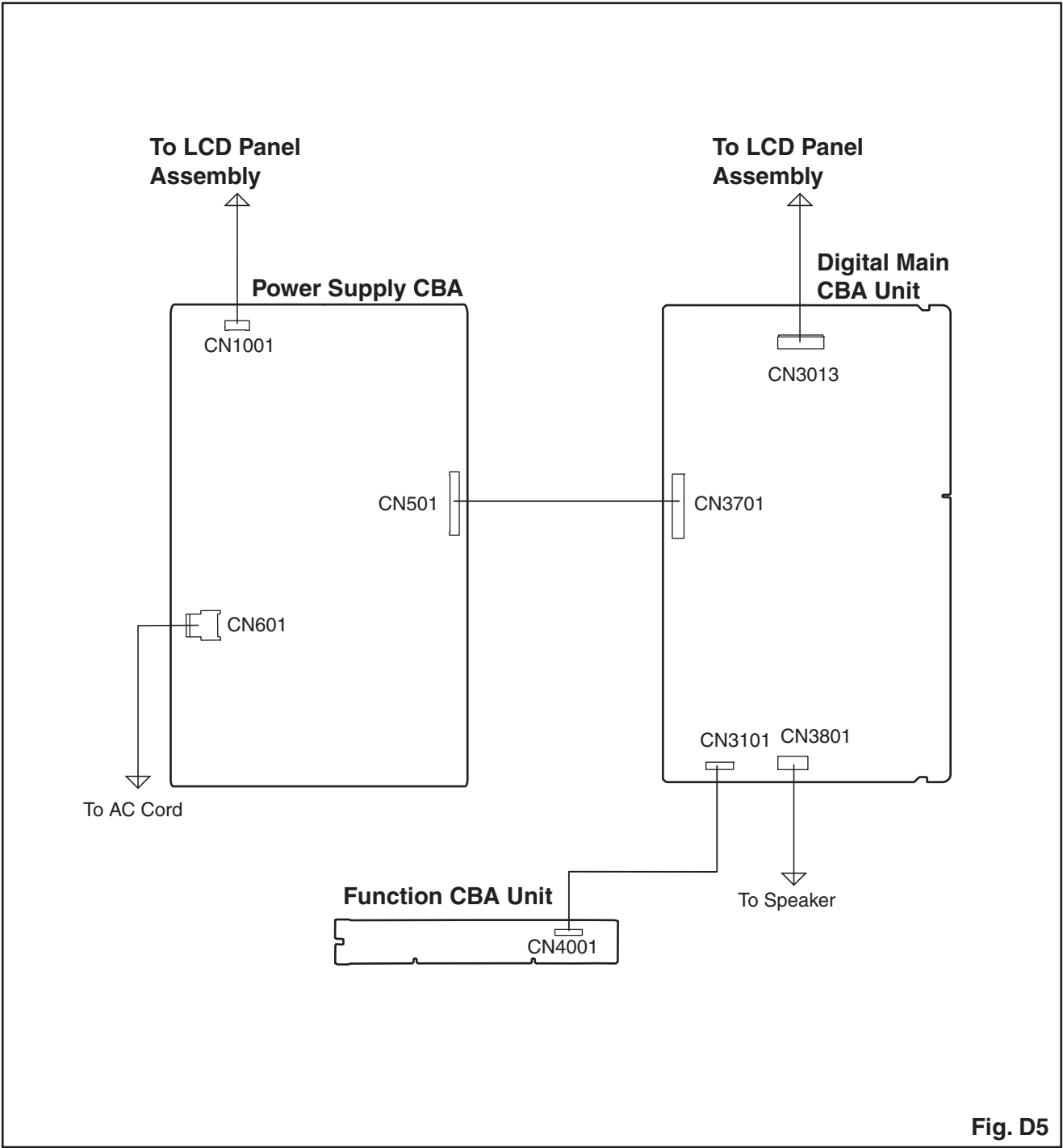


**Fig. D4**

**\*2: Make sure to read all the precautions on page 4-1 when you disassemble/re-assemble the LCD Panel Assembly (X-PCB Cover or Front Cabinet).**



TV Cable Wiring Diagram



# ELECTRICAL ADJUSTMENT INSTRUCTIONS

**General Note: “CBA” is abbreviation for “Circuit Board Assembly.”**

**Note:** Electrical adjustments are required after replacing circuit components and certain mechanical parts. It is important to perform these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.

## Test Equipment Required

1. Remote control unit
2. Color Analyzer, CA-310 (KONICA MINOLTA Luminance meter) or measuring instrument as good as CA-310.

## How to set up the service mode:

### Service mode:

1. Turn the power on.
2. Press [MENU] button to display Setup menu.
3. Select “Features”.
4. Select “Software Upgrade”.
5. Select “Current Software Info”.
6. Press [0], [6], [2], [5], [9], [6] and [INFO] buttons on the remote control unit in this order. The following screen appears.

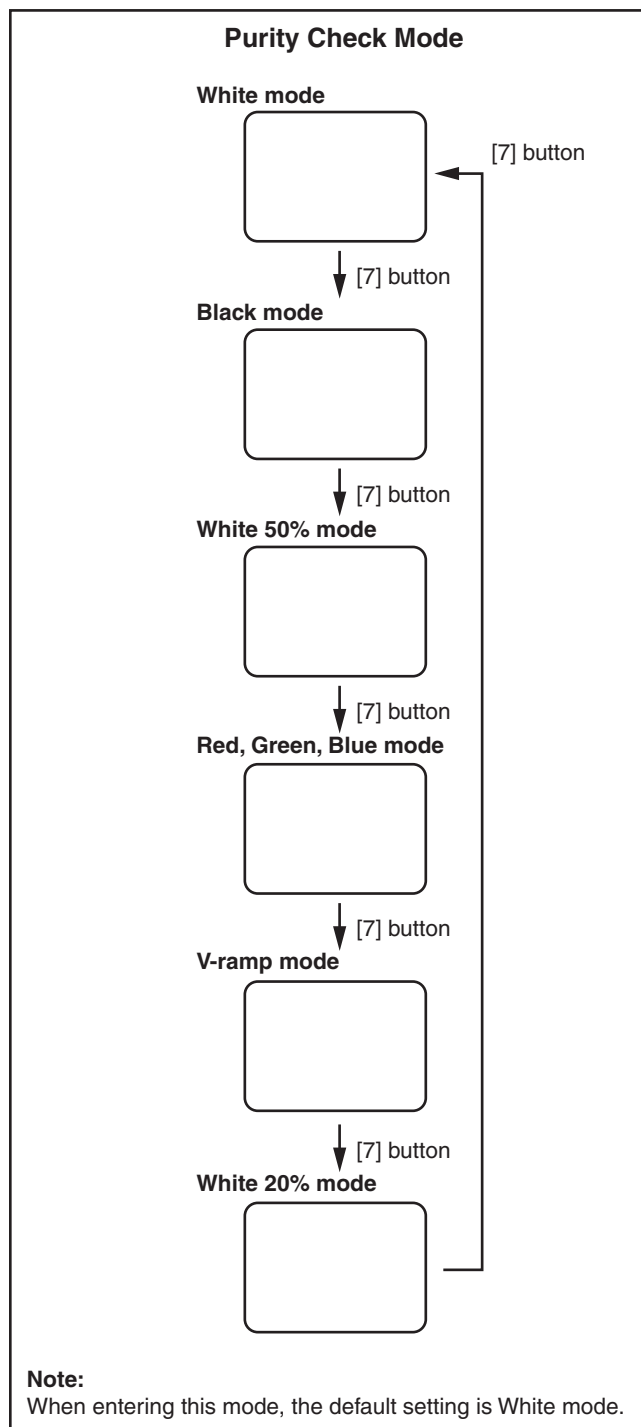
"\*" differs depending on the models.

Code:	*****_**_**_**_**_**
Pic code:	***_*****_***_**_**
Panel-Option code:	**_***_***_***_***
MIPS:	Push 0 key
Press "POWER" key to exit.	
Safety:	Safety_Non
HDMI EDID:	**
HDMI UART:	OFF
Touch Sensor Ver:	-.-- / ---
Total Watch Time:	*****
Lightsensor:	**

## 1. Purity Check Mode

This mode cycles through full-screen displays of red, green, blue, and white to check for non-active pixels.

1. Enter the service mode.
2. Each time the [7] button on the remote control unit is pressed, the display changes as follows.



3. To cancel or to exit from the Purity Check Mode, press [CH RETURN] or [PREV CH] button.

**The White Balance Adjustment should be performed when replacing the LCD Panel or Digital Main CBA.**

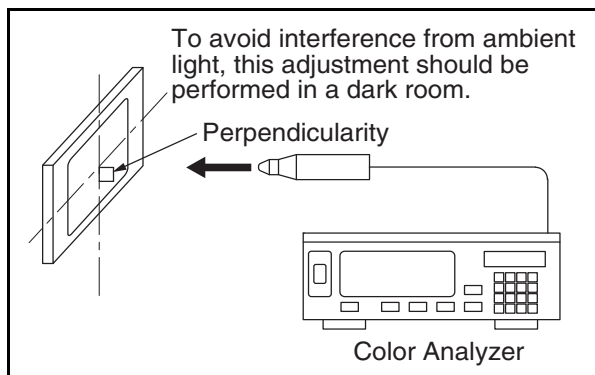
## 2. White Balance Adjustment

**Purpose:** To mix red and blue beams correctly for pure white.

**Symptom of Misadjustment:** White becomes bluish or reddish.

ITEM	SPECIFICATION
Color temperature	$x = 0.272 \pm 0.002$ $y = 0.278 \pm 0.002$
Input Signal	Internal pattern (40/80% raster)
Measurement point	Screen center
M. EQ.	CA-310 (KONICA MINOLTA Luminance meter) or measuring instrument as good as CA-310.
Aging time	60min. (Retail MODE/100IRE Raster HDMI 1080i@60)
MODE setting of TV	Shipment setting/ Retail MODE
Ambient temperature	$25^{\circ}\text{C} \pm 5^{\circ}\text{C}$

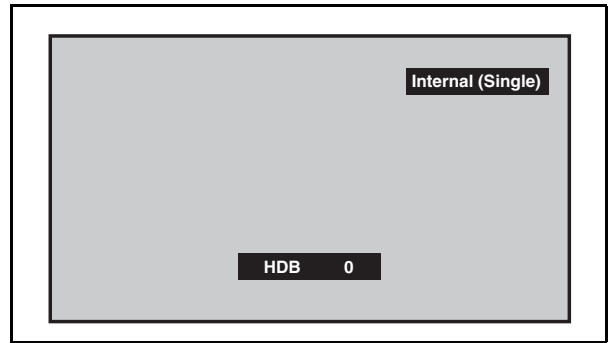
1. Operate the unit for more than 60 minutes.
2. Enter the service mode.
3. Press [VOLUME DOWN] button three times on the remote control unit to select "Drive setting" mode. "Drive" appears in the screen.
4. Set the color analyzer at the CHROMA mode and zero point calibration. Bring the optical receptor pointing at the center of the LCD-Panel.



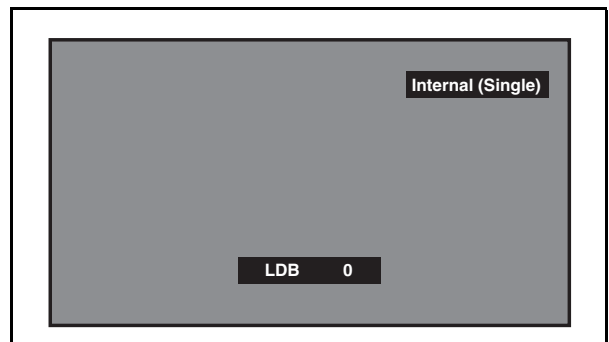
**Note:** The optical receptor must be set perpendicularly to the LCD Panel surface.

5. Press [3] button to select the "HDB" for High Drive Blue adjustment. ("HDB" appears in the screen.)

6. Press [MENU] button. The internal Raster signal appears in the screen. ("Internal (Single)" appears in the upper right of the screen as shown below.)



7. Press [CHANNEL UP/DOWN] buttons to adjust the color temperature becomes  $12000^{\circ}\text{K}$  ( $x = 0.272 / y = 0.278 \pm 0.002$ ).
8. Press [1] button to select the "HDR" for High Drive Red adjustment ("HDR" appears in the screen.) and press [CHANNEL UP/DOWN] buttons to adjust the color temperature.
9. If necessary, adjust the "HDB" or "HDR" again.
10. Press [6] button to select the "LDB" for Low Drive Blue adjustment ("LDB" appears in the screen.) and press [CHANNEL UP/DOWN] buttons to adjust the color temperature.



11. Press [4] button to select the "LDR" for Low Drive Red adjustment ("LDR" appears in the screen.) and press [CHANNEL UP/DOWN] buttons to adjust the color temperature.
12. If necessary, adjust the "LDB" or "LDR" again.
13. Press [VOLUME DOWN] button to shift to the "Debugging Message" mode.  
If there is no message under "[WB]" section, this adjustment completes.  
If "Drive settings are NG. Retry again." is displayed, repeat above steps from 5. to 12. Then check "Debugging Message" again. If "Drive settings are NG. Retry again." is displayed, replace the LCD Panel or Digital Main CBA.
14. To cancel or to exit from the White Balance Adjustment, press [CH RETURN] or [PREV CH] button.

# HOW TO INITIALIZE THE LCD TV

The purpose of initialization is to place the set in a new out of box condition. The customer will be prompted to select a language and program channels after the set has been initialized.

To put the program back at the factory-default, initialize the LCD TV using the following procedure.

**NOTE:** Disconnect any device from the USB Port before you conduct on this procedure.

1. Turn the power on.
2. Enter the service mode.
  - To cancel the service mode, press [⏻] button on the remote control unit.
3. Press [BACK] button to enter the Panel Key Confirmation Menu.
4. Press any button on the touch sensor panel.
5. Press [INFO] button to proceed with the self check mode.
6. Make sure to confirm the "INITIALIZED FINISH" appears in the green screen.
7. Unplug the AC Cord and plug it back on again.

# FIRMWARE RENEWAL MODE

## Equipment Required

- a. USB storage device
- b. Remote Control Unit

## Firmware Update Procedure

### User Upgrade (Filename example: TVNB012\_00\_PF\_XX91\_AC.ecc)

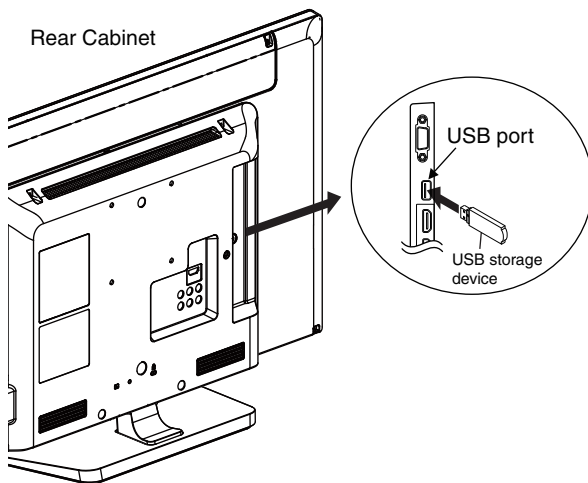
Upgrade the firmware only. The setting values will not be initialized.

The User Upgrade and the Firmware Upgrade (Factory Upgrade) will be done by the same file. If you want to upgrade the firmware and initialize the setting values also, add "FACT\_" at the beginning of the filename.

If you want to upgrade the firmware only and leave the setting values as they are, eliminate the "FACT\_" from the filename.

### Update procedure

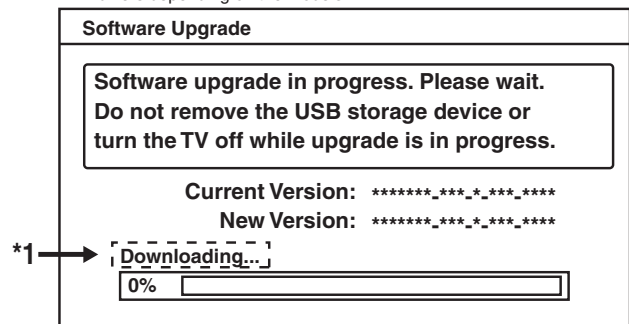
1. Turn the power on.
2. Press [MENU] button to display Menu.
3. Select "Features".
4. Select "Software Upgrade".
5. Select "Upgrade" to display Upgrade screen.
6. Press [OK] button to display Software Upgrade screen.
7. Select "USB" and press [OK] button.
8. Insert the USB storage device to the USB port as shown below.



9. Select "Check" and press [OK] button.
10. Select "Upgrade" and press [OK] button to start software upgrade.

11. The update will start and the following will appear in the screen.

"\*" differs depending on the models.

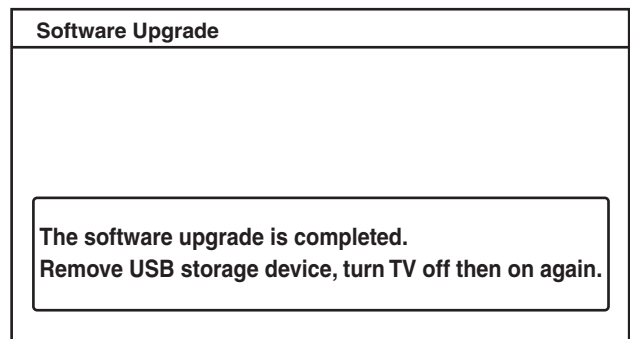


**Note:** If the above screen isn't displayed, repeat from step 1.

The appearance shown in \*1 is described as follows.

Appearance	State
Downloading...	Downloading the firmware from the USB storage device.
Writing...	Writing the downloaded firmware in flash memory.
Checking...	Checking the new firmware.

12. When the firmware update is completed, the following will appear in the screen.



Remove the USB storage device from the USB port.  
Turn the power off and turn the power on again.

# Factory Upgrade (Firmware Upgrade/Flash Upgrade)

## Firmware Upgrade (Filename example: FACT\_TVNB012\_00\_PF\_XX91\_AC.ecc)

Upgrade the firmware and initialize the setting values.

The User Upgrade and the Firmware Upgrade (Factory Upgrade) will be done by the same file. If you want to upgrade the firmware and initialize the setting values also, add "FACT\_" at the beginning of the filename.

If you want to upgrade the firmware only and leave the setting values as they are, eliminate the "FACT\_" from the filename.

## Flash Upgrade (Filename example: ALL\_TVNB012\_00\_PF\_XX91\_AC.ecc)

Upgrade the firmware and initialize the setting values along with the factory default such as White Balance, etc.

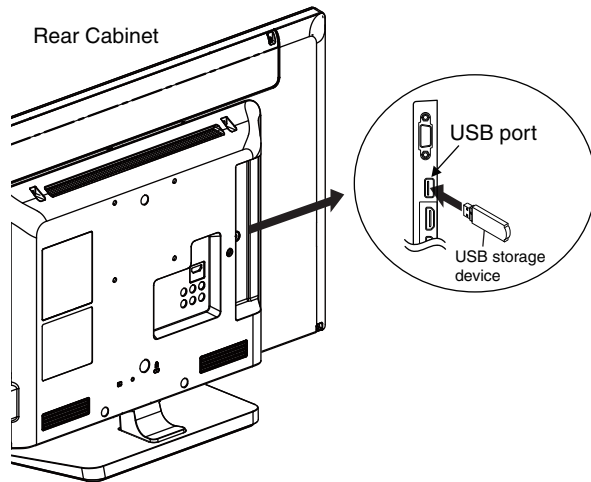
Before the upgrade, you will need to make a note of all the factory default so you will be able to set it back on the TV after the initialization.

The Flash Upgrade will be done by it's unique file.

The User Upgrade/Firmware Upgrade (Factory Upgrade) file cannot be used for this upgrade.

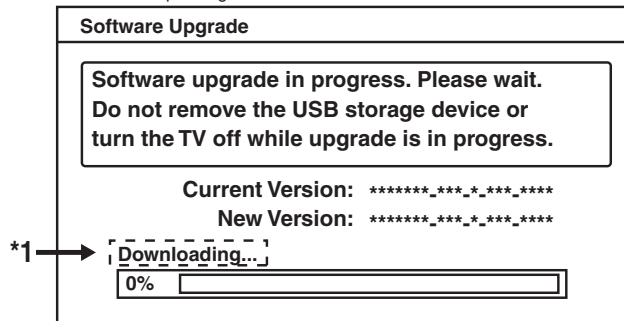
## Update procedure

1. Turn the power off.
2. Insert the USB storage device to the USB port as shown below.



3. Turn the power on.
4. The update will start and the following will appear in the screen.

"\*" differs depending on the models.

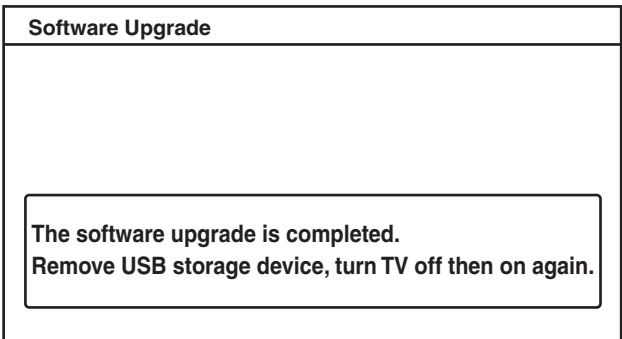


**Note:** If the above screen isn't displayed, repeat from step 1.

The appearance shown in \*1 is described as follows.

Appearance	State
Downloading...	Downloading the firmware from the USB storage device.
Writing...	Writing the downloaded firmware in flash memory.
Checking...	Checking the new firmware.

5. When the firmware update is completed, the following will appear in the screen.



Remove the USB storage device from the USB port.

Turn the power off and turn the power on again.

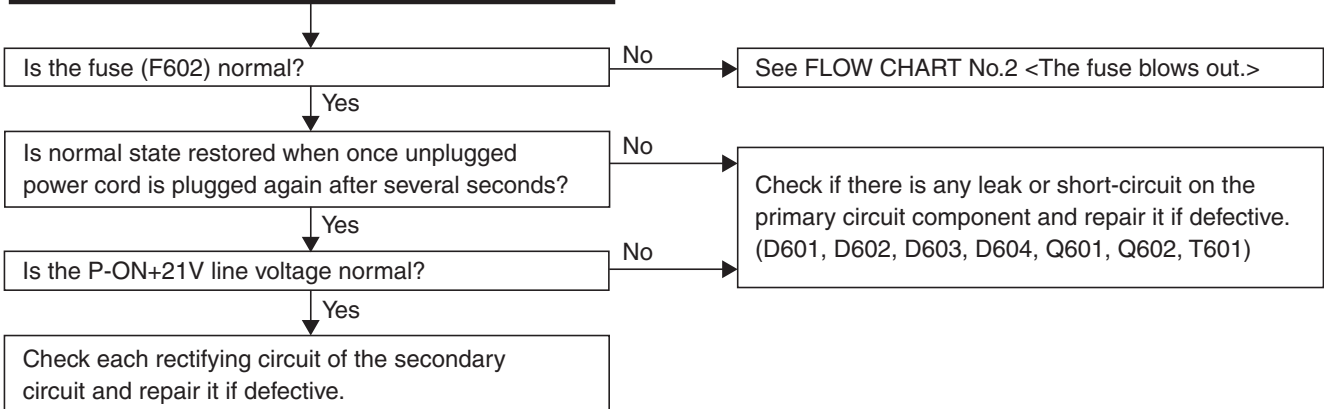
Service mode initial screen with a word "INITIALIZED" will appear in the screen. The color of the word "INITIALIZED" will change from red to green when initialization is completed.

# TROUBLESHOOTING

## [Power Supply Section]

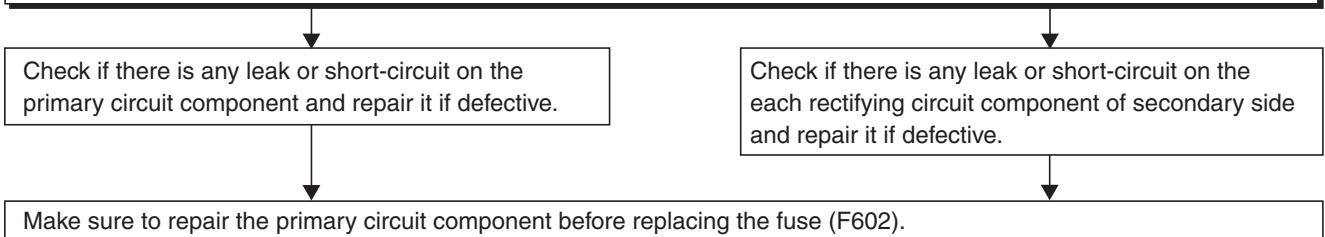
### FLOW CHART NO.1

The power cannot be turned on.



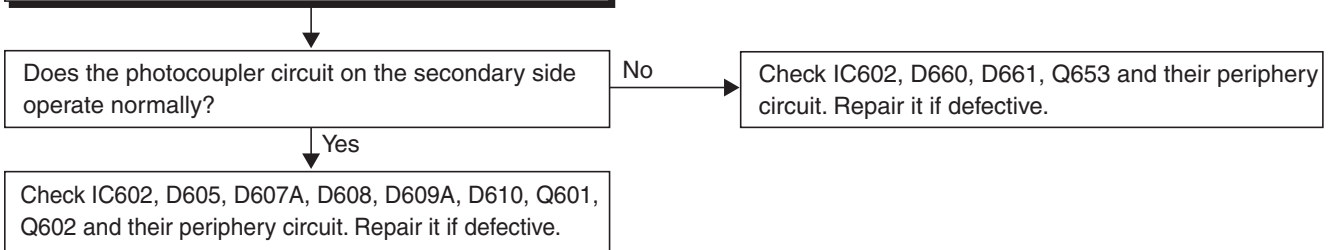
### FLOW CHART NO.2

The fuse blows out.



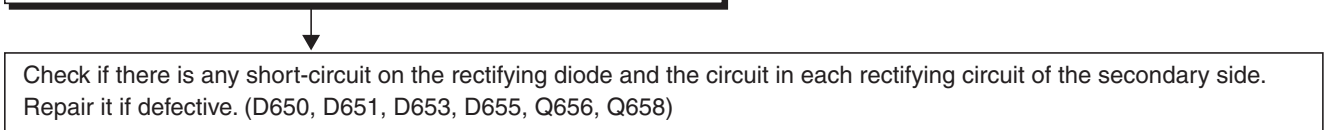
### FLOW CHART NO.3

When the output voltage fluctuates.

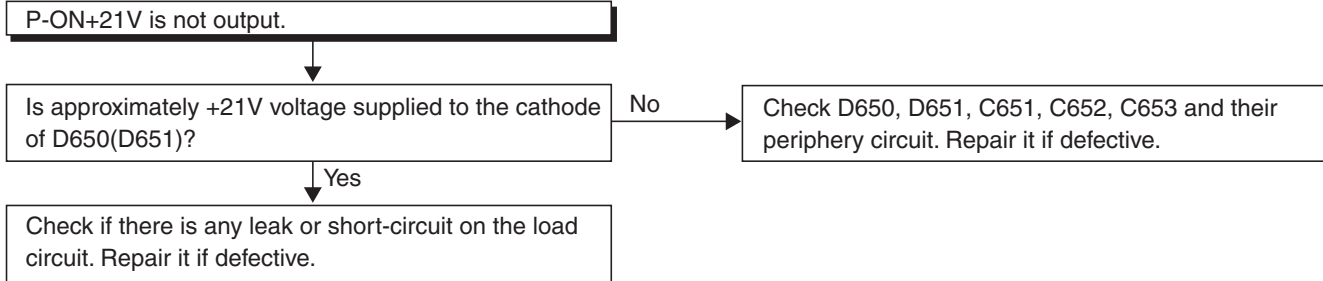


### FLOW CHART NO.4

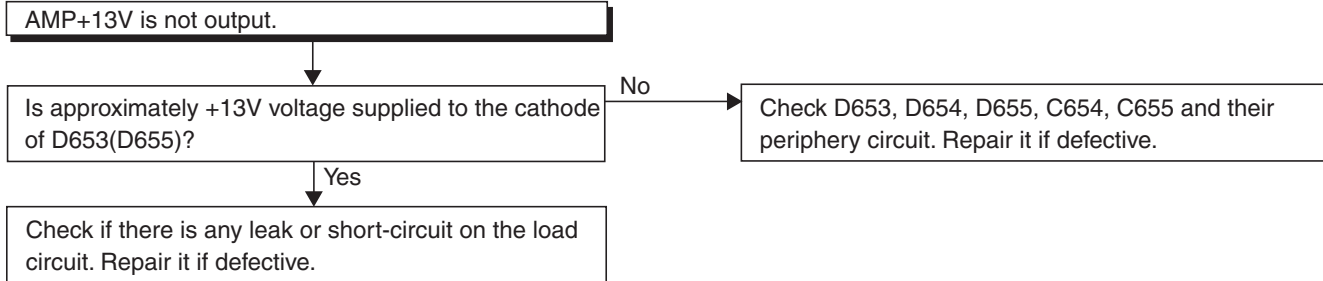
When buzz sound can be heard in the periphery of power circuit.



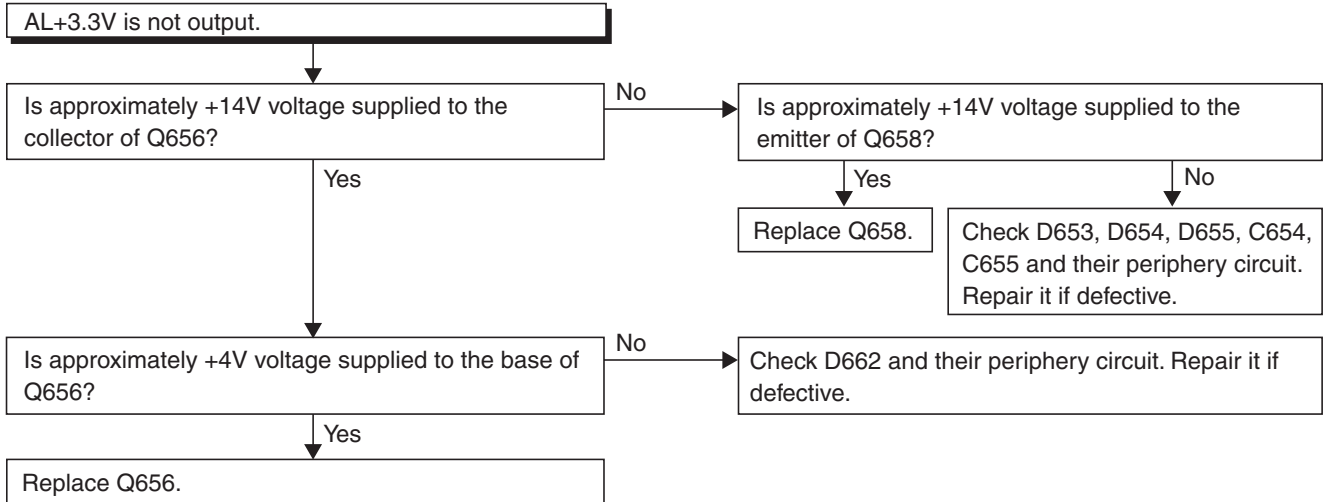
#### FLOW CHART NO.5



#### FLOW CHART NO.6



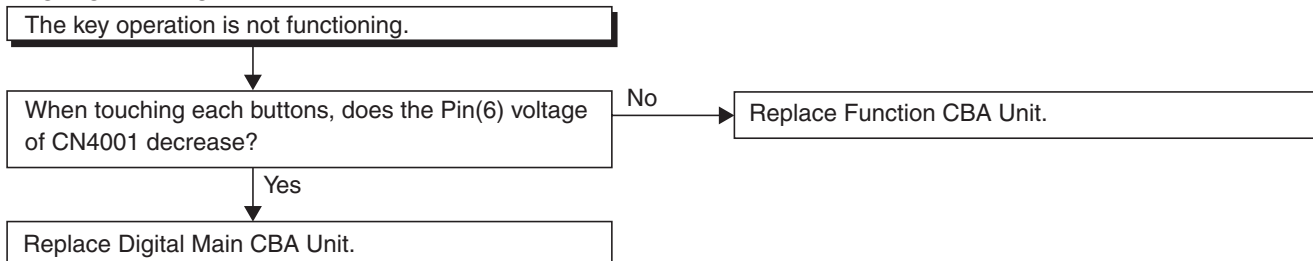
#### FLOW CHART NO.7



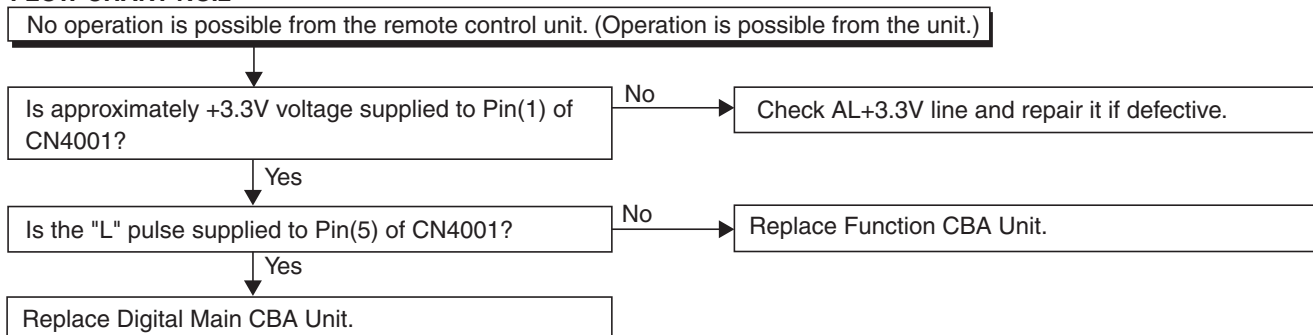


## [Video Signal Section]

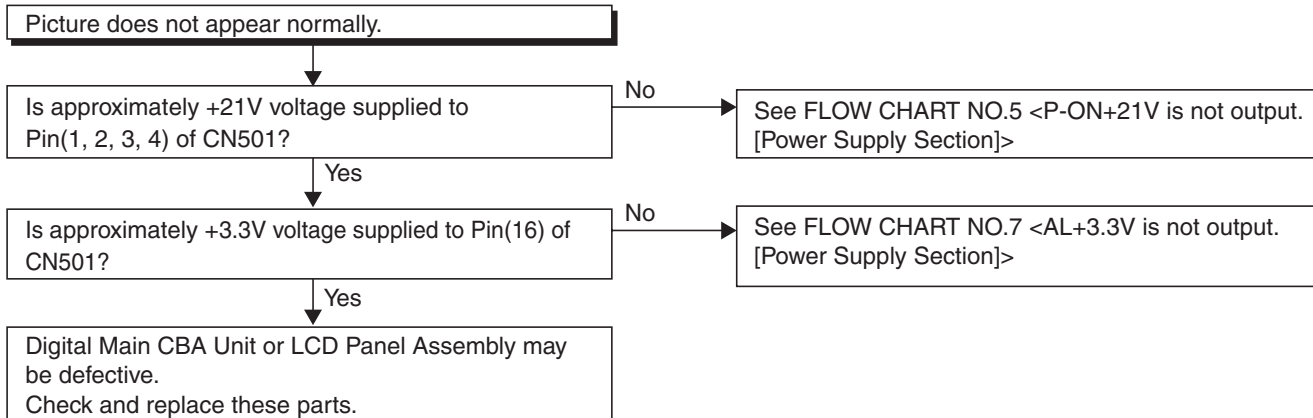
### FLOW CHART NO.1



### FLOW CHART NO.2

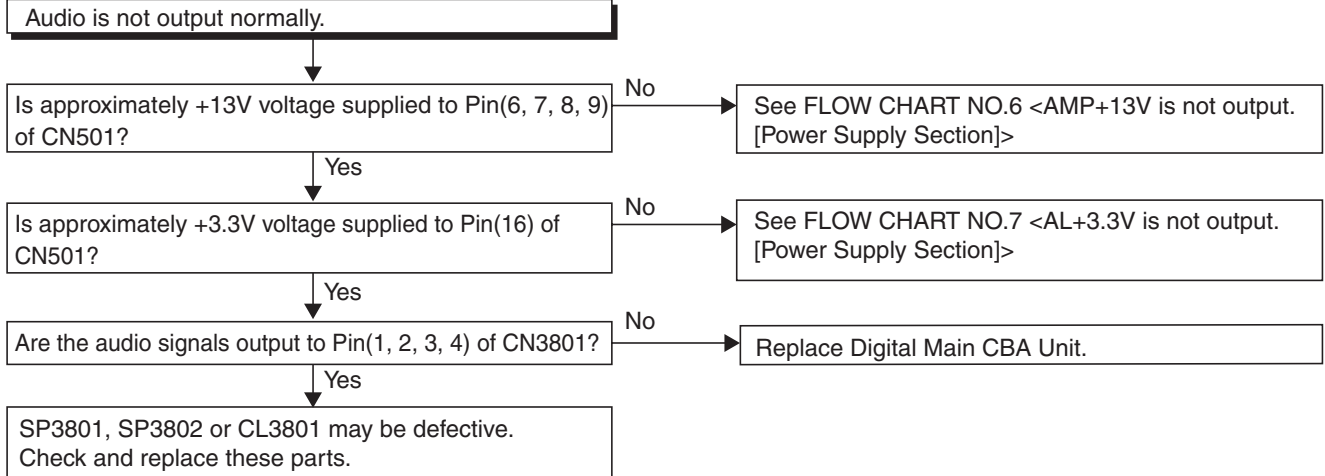


### FLOW CHART NO.3



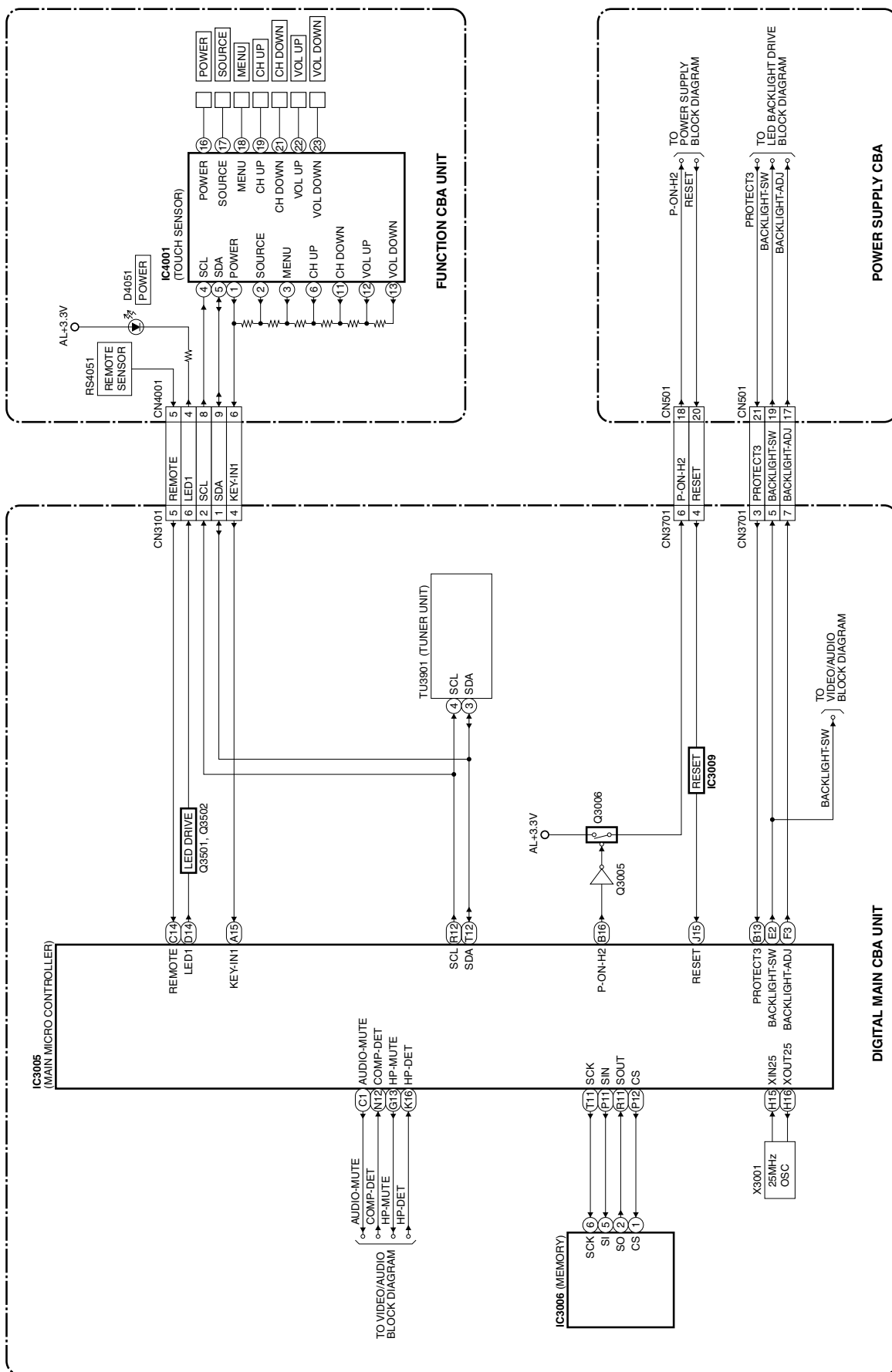
## [Audio Signal Section]

### FLOW CHART NO.1

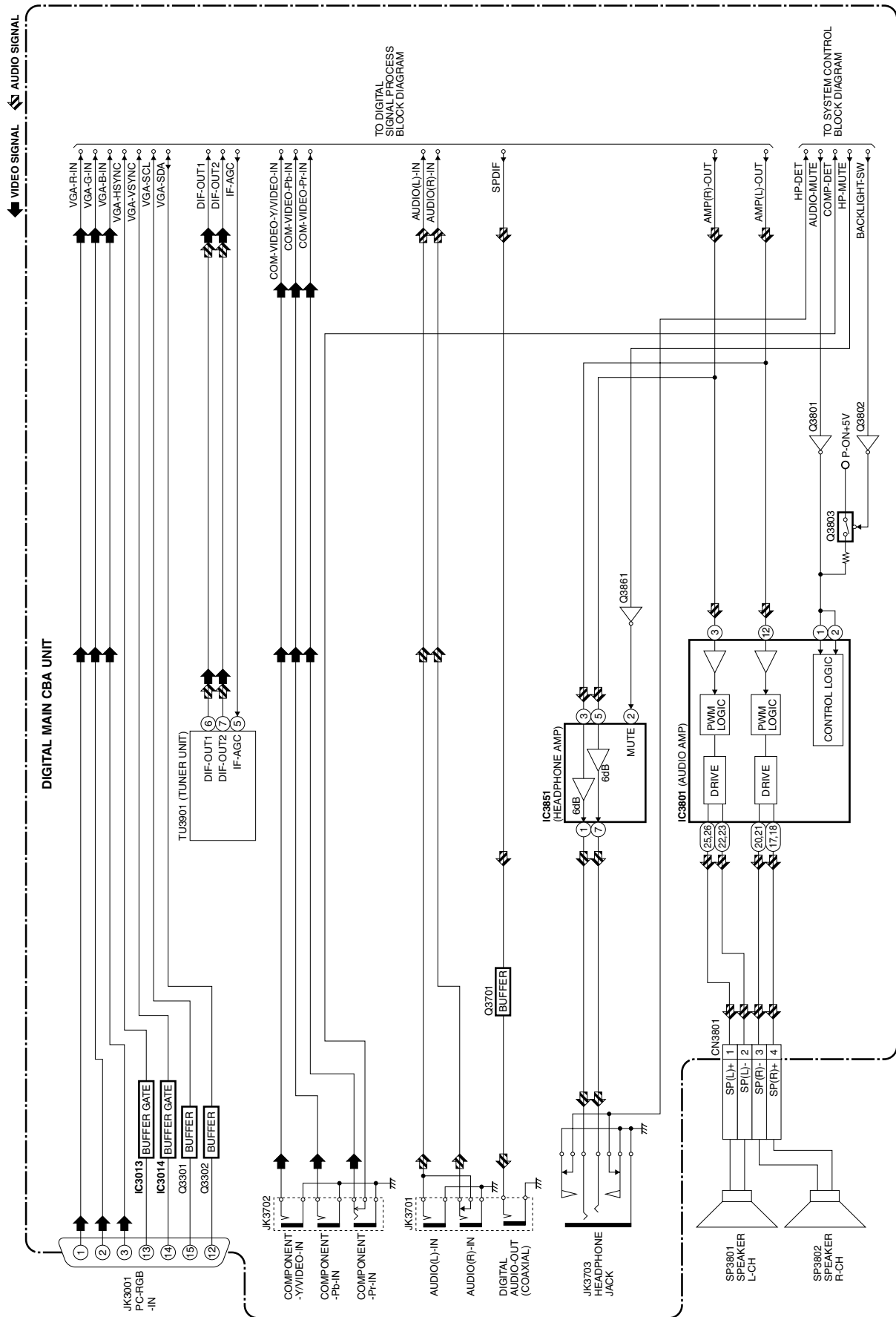


# BLOCK DIAGRAMS

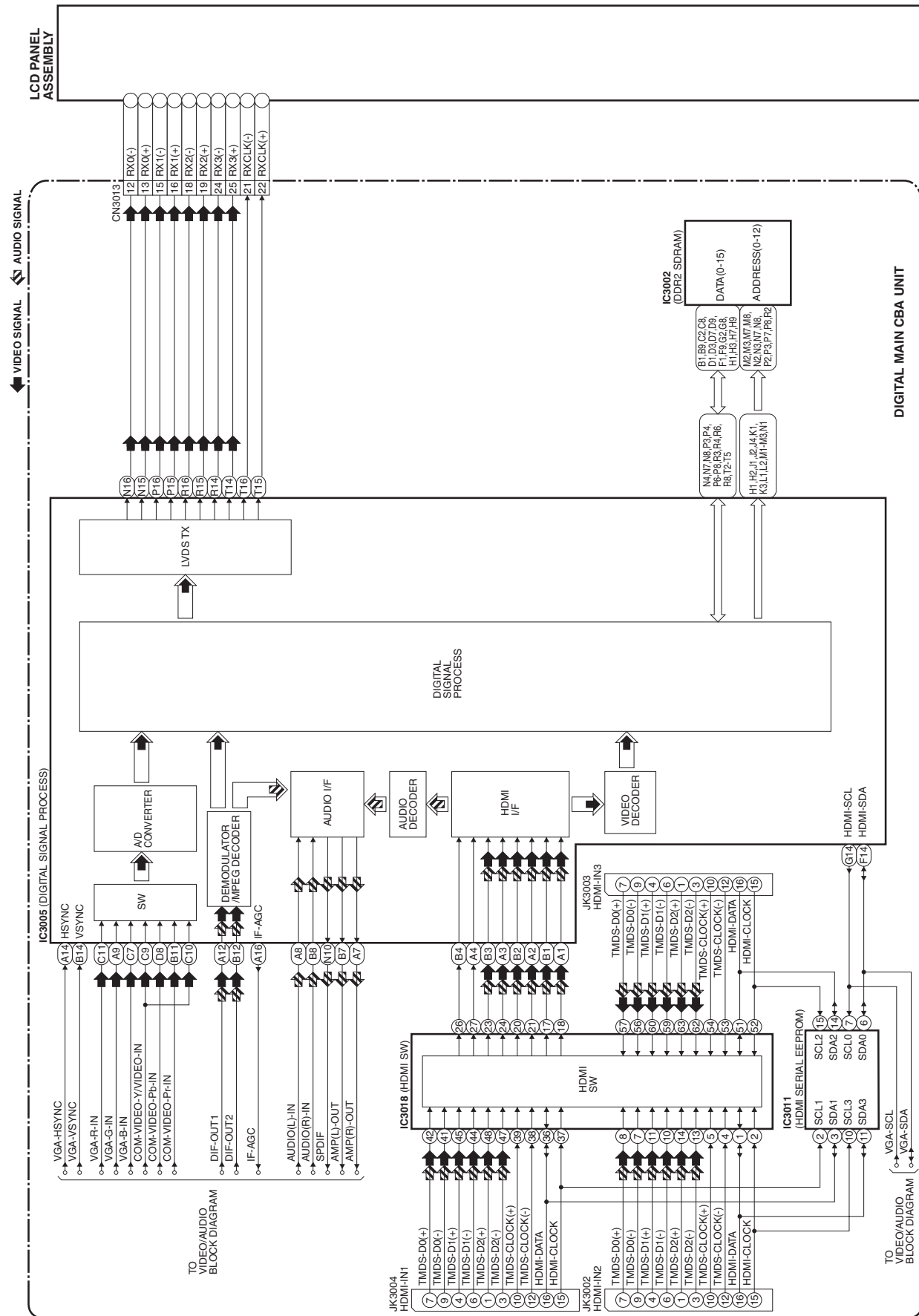
## 1. System Control Block Diagram



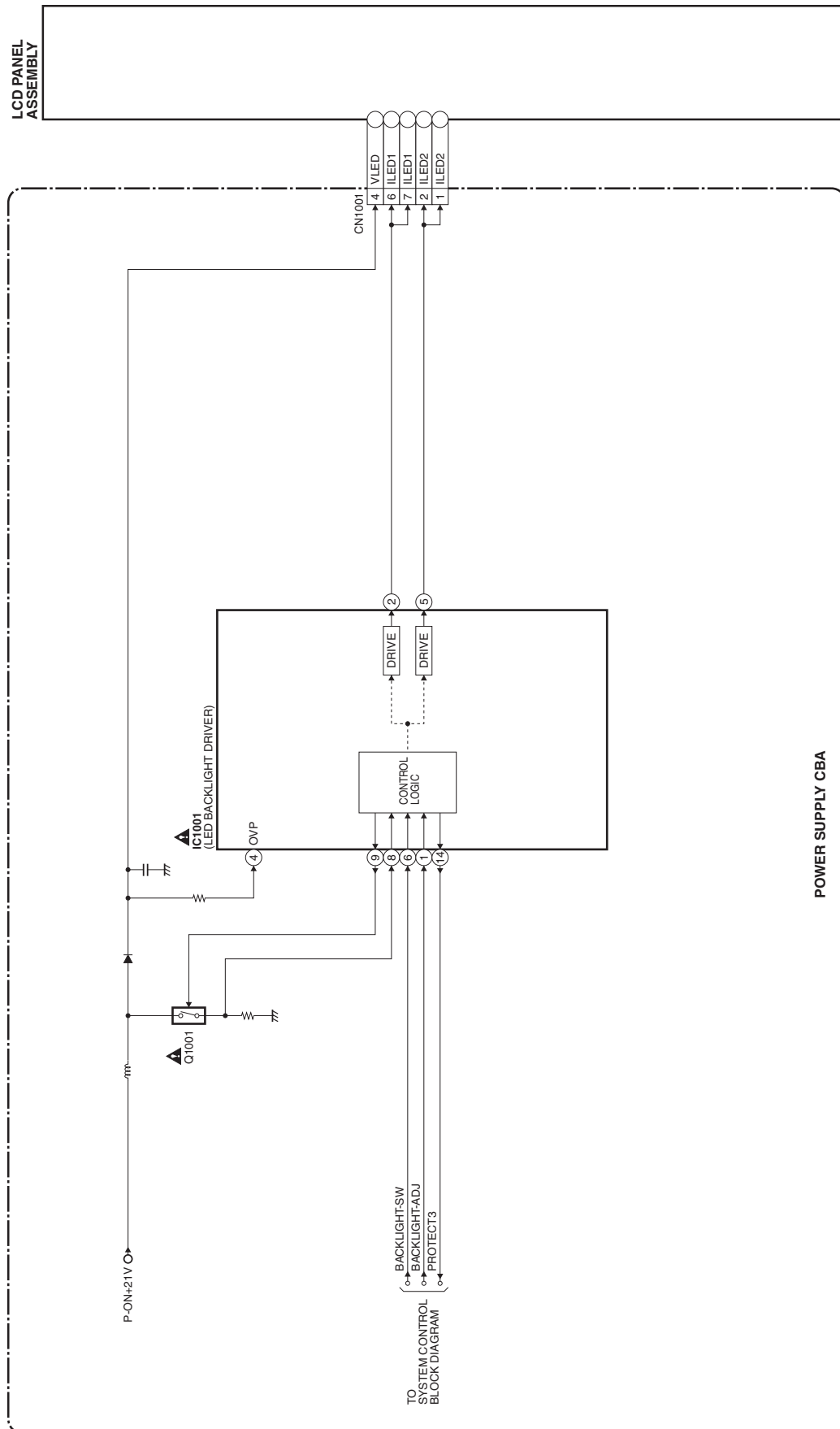
## 2. Video/Audio Block Diagram



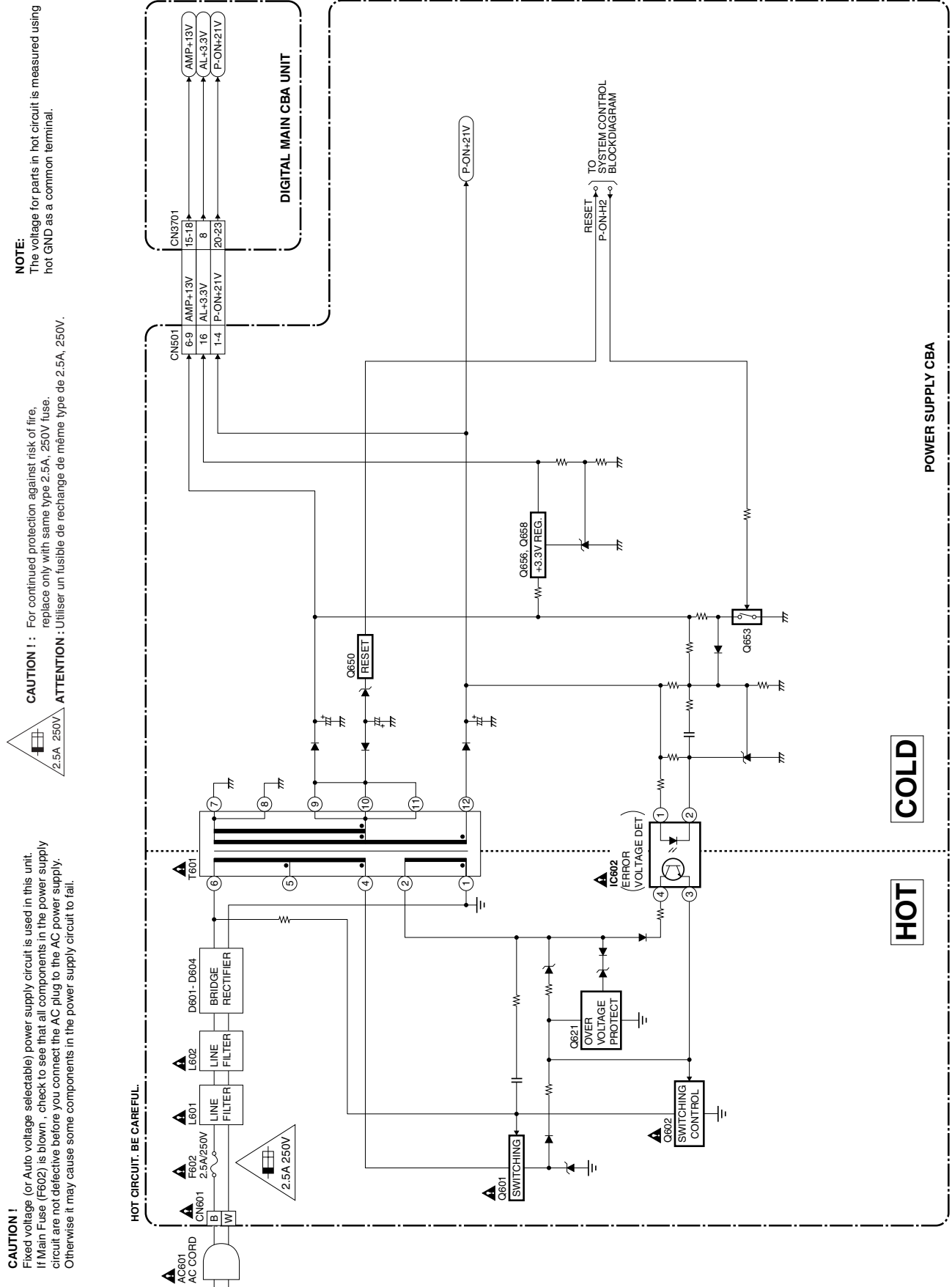
### 3. Digital Signal Process Block Diagram



## 4. LED Backlight Drive Block Diagram



## 5. Power Supply Block Diagram



# SCHEMATIC DIAGRAMS / CBA AND TEST POINTS

## Standard Notes

### WARNING

Many electrical and mechanical parts in this chassis have special characteristics. These characteristics often pass unnoticed and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts that have these special safety characteristics are identified in this manual and its supplements; electrical components having such features are identified by the mark “▲” in 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 that do not have the same safety characteristics as specified in the parts list may create shock, fire, or other hazards.

### Notes:

1. Do not use the part number shown on these drawings for ordering. The correct part number is shown in the parts list, and may be slightly different or amended since these drawings were prepared.
2. All resistance values are indicated in ohms ( $K = 10^3$ ,  $M = 10^6$ ).
3. Resistor wattages are 1/4W or 1/6W unless otherwise specified.
4. All capacitance values are indicated in  $\mu F$  ( $P = 10^{-6} \mu F$ ).
5. All voltages are DC voltages unless otherwise specified.
6. This schematic diagrams are masterized version that should cover the entire PL13.9 chassis models. Thus some parts in detail illustrated on this schematic diagrams may vary depend on the model within the PL13.9 chassis. Please refer to the parts lists for each models.
7. The Circuit Board layout illustrated on this service manual is the latest version for this chassis at the moment of making this service manual. Depend on the mass production date of each model, the actual layout of each Board may differ slightly from this version.



## LIST OF CAUTION, NOTES, AND SYMBOLS USED IN THE SCHEMATIC DIAGRAMS ON THE FOLLOWING PAGES:

### 1. CAUTION:

**CAUTION:** FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ONLY WITH SAME TYPE\_A,\_V FUSE.

**ATTENTION:** UTILISER UN FUSIBLE DE RECHANGE DE MÊME TYPE DE\_A,\_V.

### 2. CAUTION:

Fixed Voltage (or Auto voltage selectable) power supply circuit is used in this unit.

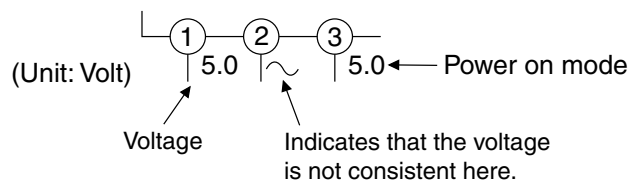
If Main Fuse (F602) is blown, first check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.

### 3. Note:

1. Do not use the part number shown on the drawings for ordering. The correct part number is shown in the parts list, and may be slightly different or amended since the drawings were prepared.
2. To maintain original function and reliability of repaired units, use only original replacement parts which are listed with their part numbers in the parts list section of the service manual.

### 4. Voltage indications on the schematics are as shown below:

Plug the TV power cord into a standard AC outlet.:

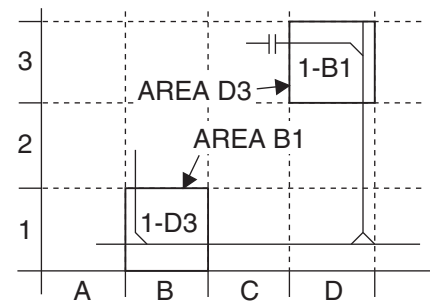


### 5. How to read converged lines

1-D3  
  
 Distinction Area  
 Line Number  
 (1 to 3 digits)

Examples:

1. "1-D3" means that line number "1" goes to the line number "1" of the area "D3".
2. "1-B1" means that line number "1" goes to the line number "1" of the area "B1".



### 6. Test Point Information

: Indicates a test point with a jumper wire across a hole in the PCB.

: Used to indicate a test point with a component lead on foil side.

: Used to indicate a test point with no test pin.

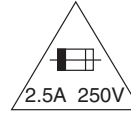
: Used to indicate a test point with a test pin.

The reference number of parts on Schematic Diagrams/CBA can be retrieved by application search function.

## Power Supply Schematic Diagram

**CAUTION !**

Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit. If Main Fuse (F602) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.

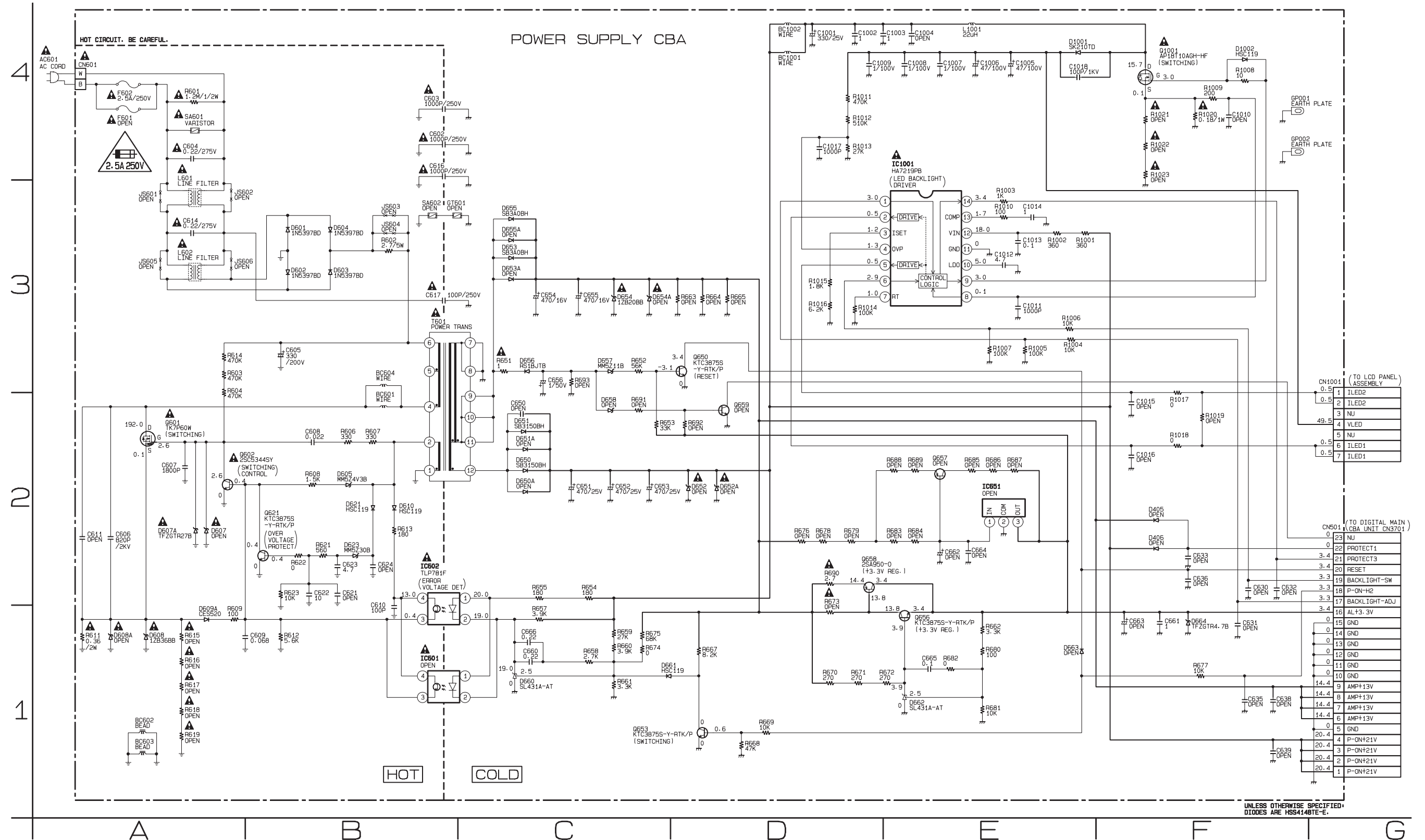


**CAUTION ! :** For continued protection against risk of fire,  
replace only with same type 2.5A, 250V fuse.

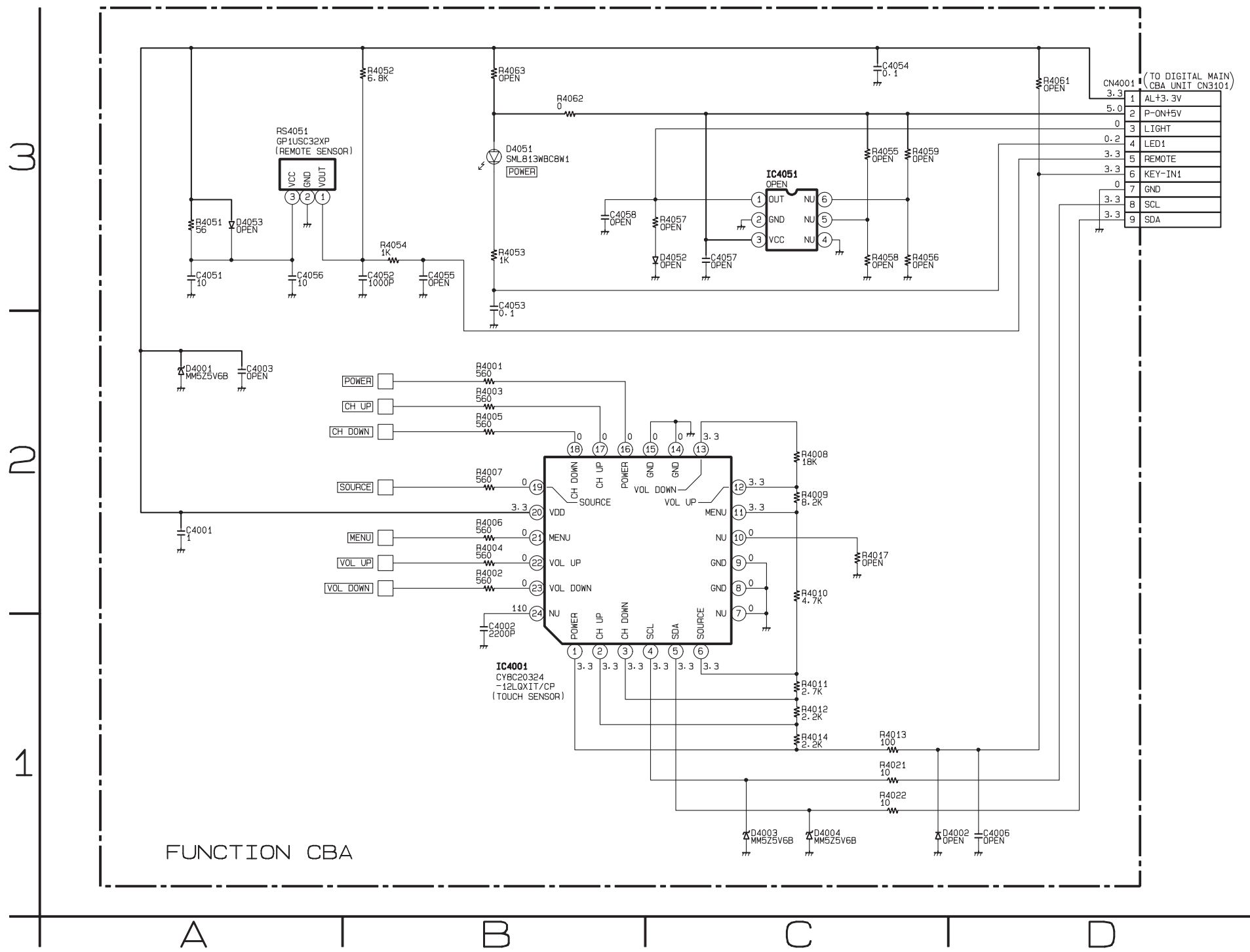
**ATTENTION :** Utiliser un fusible de rechange de même type de 2.5A, 250V.

**NOTE:**

The voltage for parts in hot circuit is measured using hot GND as a common terminal.



Function Schematic Diagram

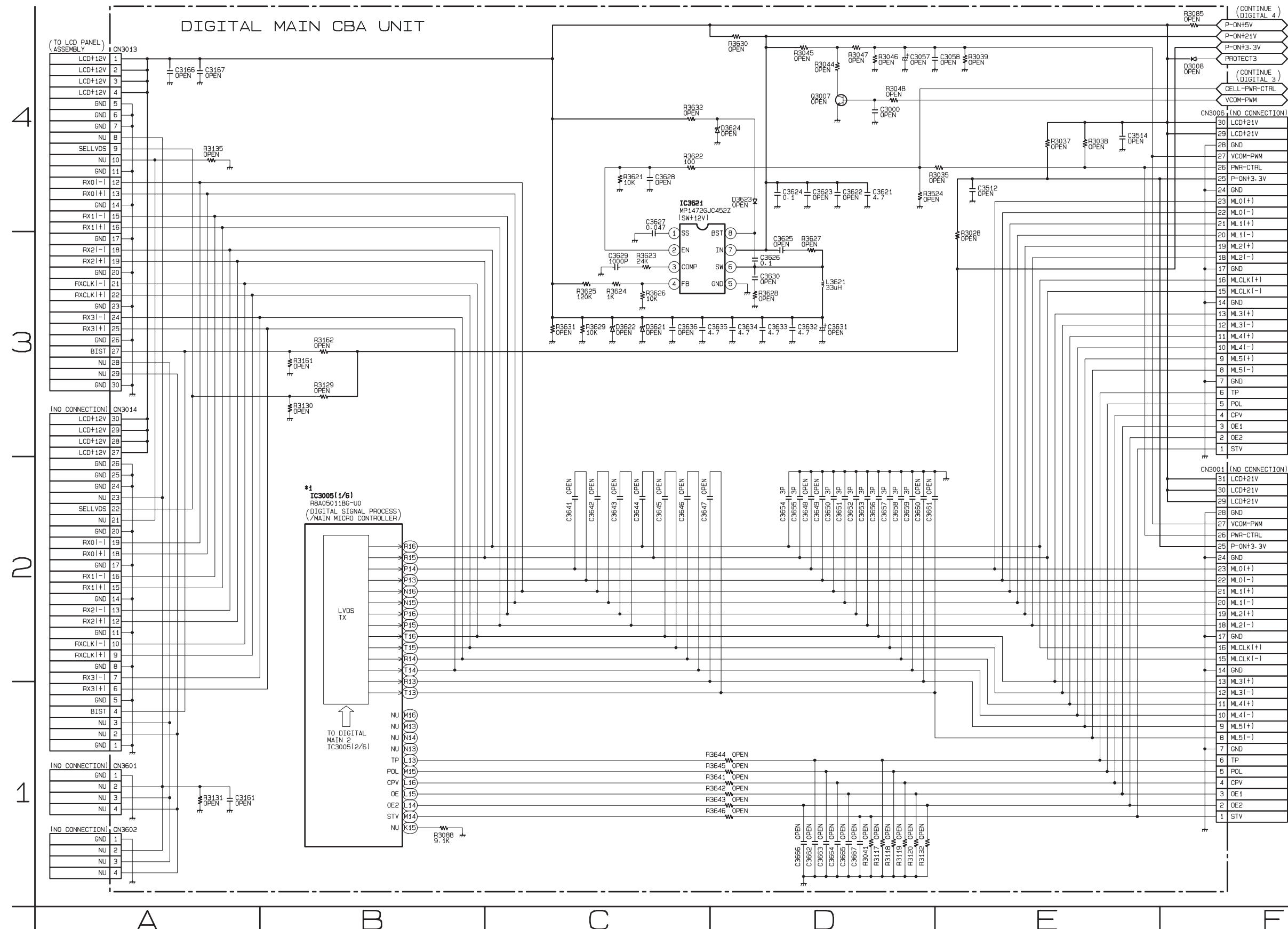


## Digital Main 1 Schematic Diagram

**\*1 NOTE:**

The order of pins shown in this diagram is different from that of actual IC3005.

IC3005 is divided into six and shown as IC3005 (1/6) ~ IC3005 (6/6) in this Digital Main Schematic Diagram Section.

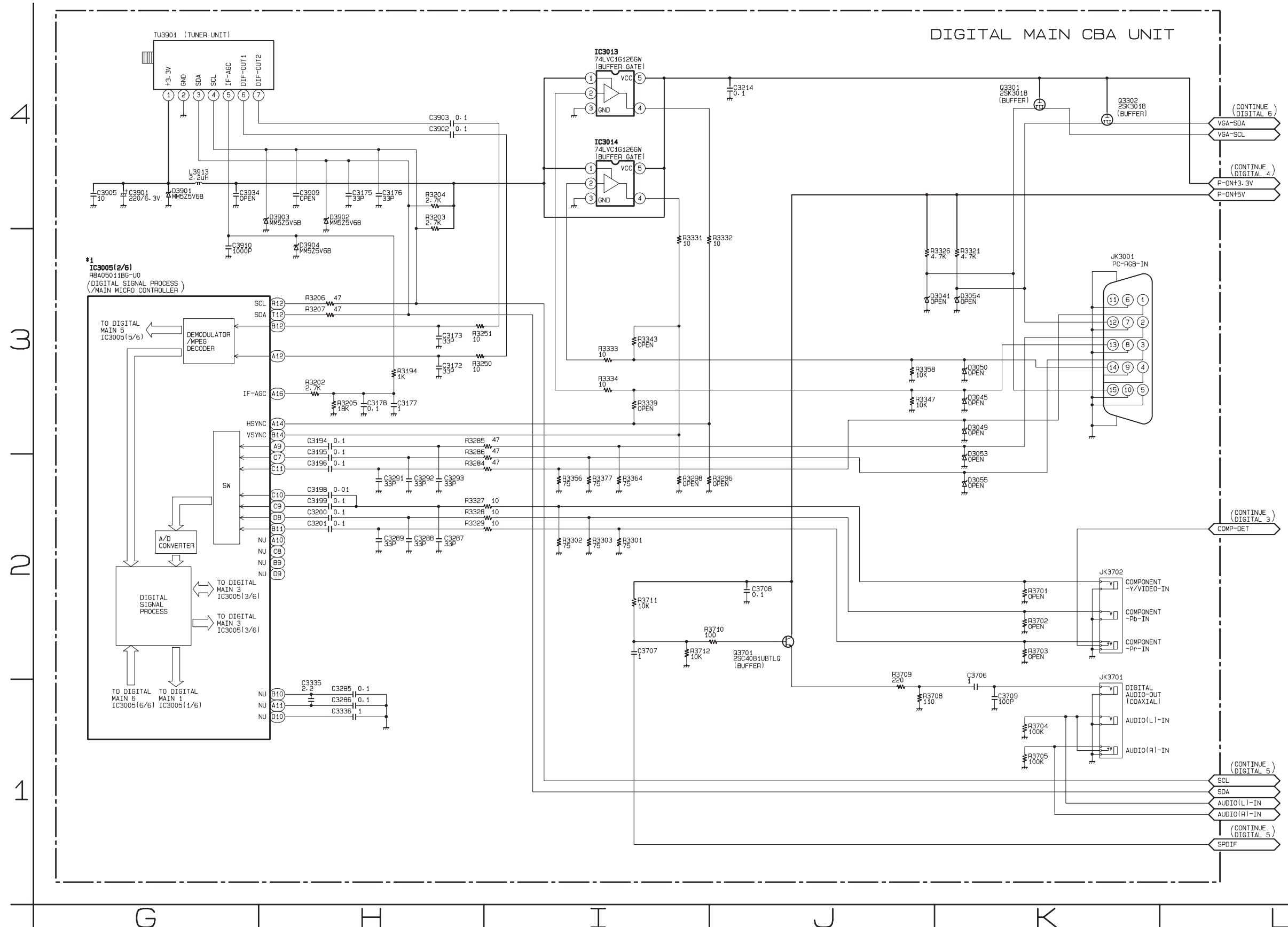


## Digital Main 2 Schematic Diagram

**\*1 NOTE:**

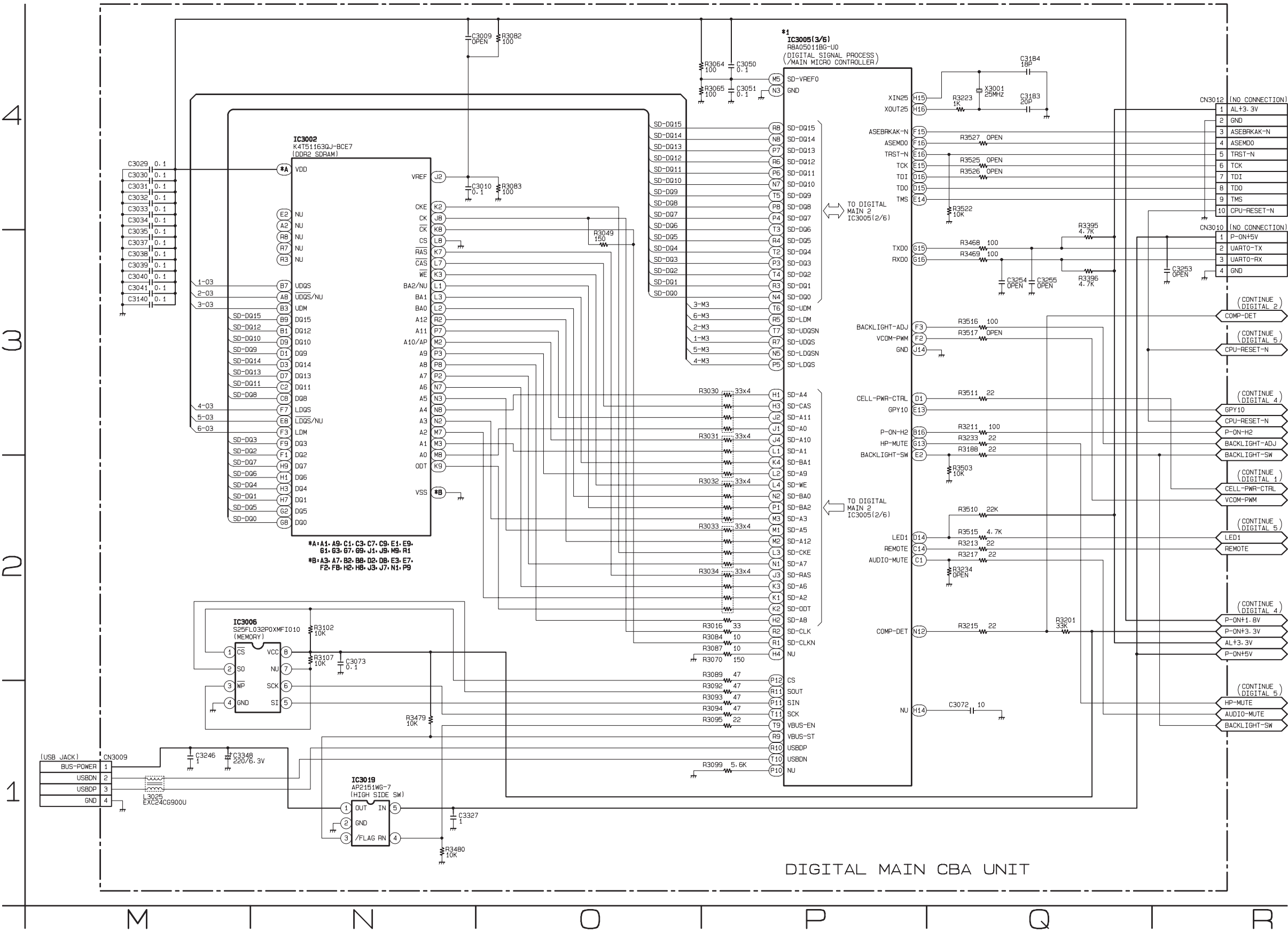
The order of pins shown in this diagram is different from that of actual IC3005.

IC3005 is divided into six and shown as IC3005 (1/6) ~ IC3005 (6/6) in this Digital Main Schematic Diagram Section.



Digital Main 3 Schematic Diagram

\*1 NOTE:  
The order of pins shown in this diagram is different from that of actual IC3005.  
IC3005 is divided into six and shown as IC3005 (1/6) ~ IC3005 (6/6) in this Digital Main Schematic Diagram Section.





## 4

3

2

1



## 4

3

2



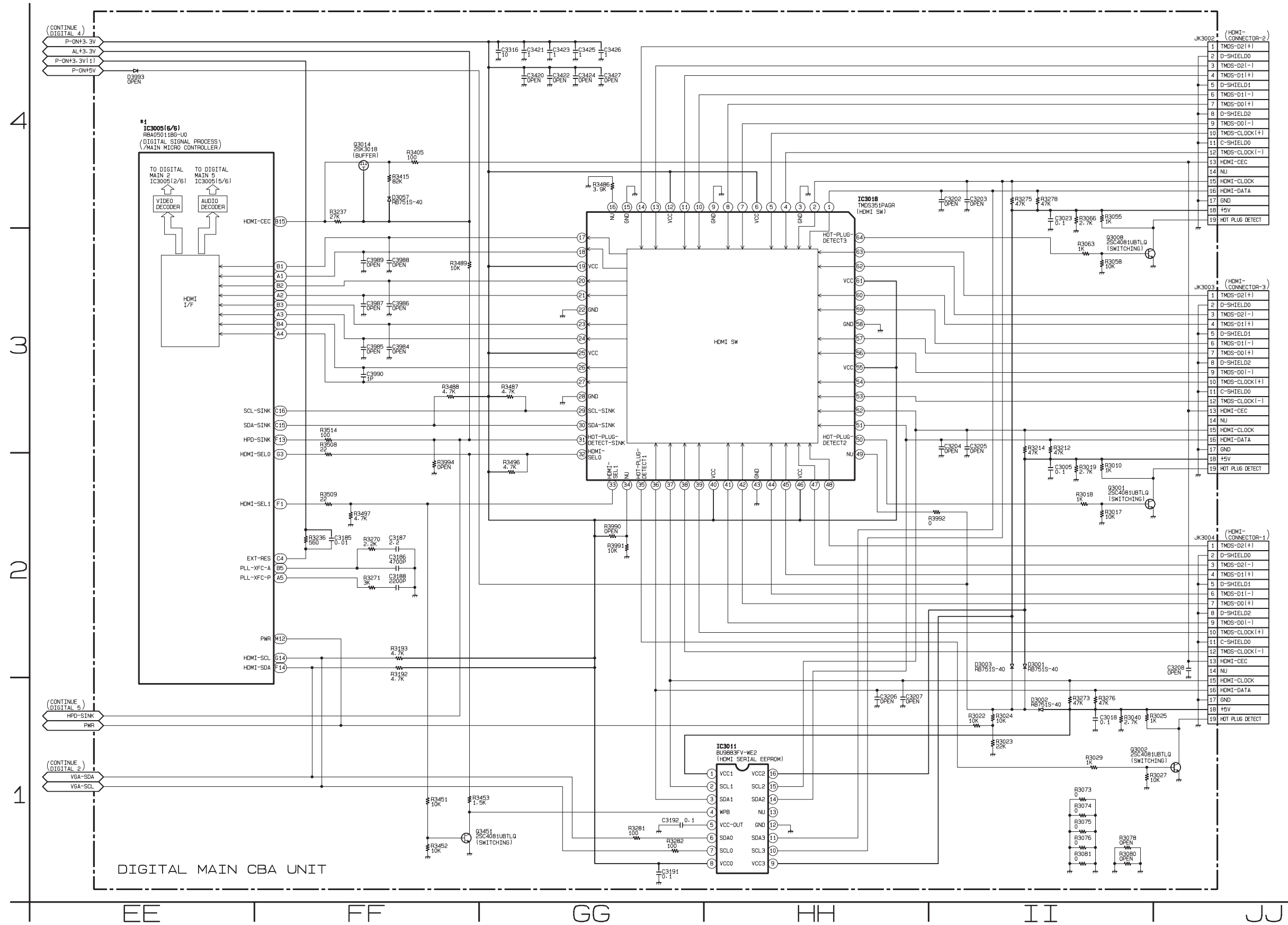


## Digital Main 6 Schematic Diagram

**\*1 NOTE:**

The order of pins shown in this diagram is different from that of actual IC3005.

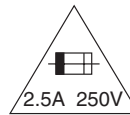
IC3005 is divided into six and shown as IC3005 (1/6) ~ IC3005 (6/6) in this Digital Main Schematic Diagram Section.



## Power Supply CBA Top View

**CAUTION !**

Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit. If Main Fuse (F602) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.



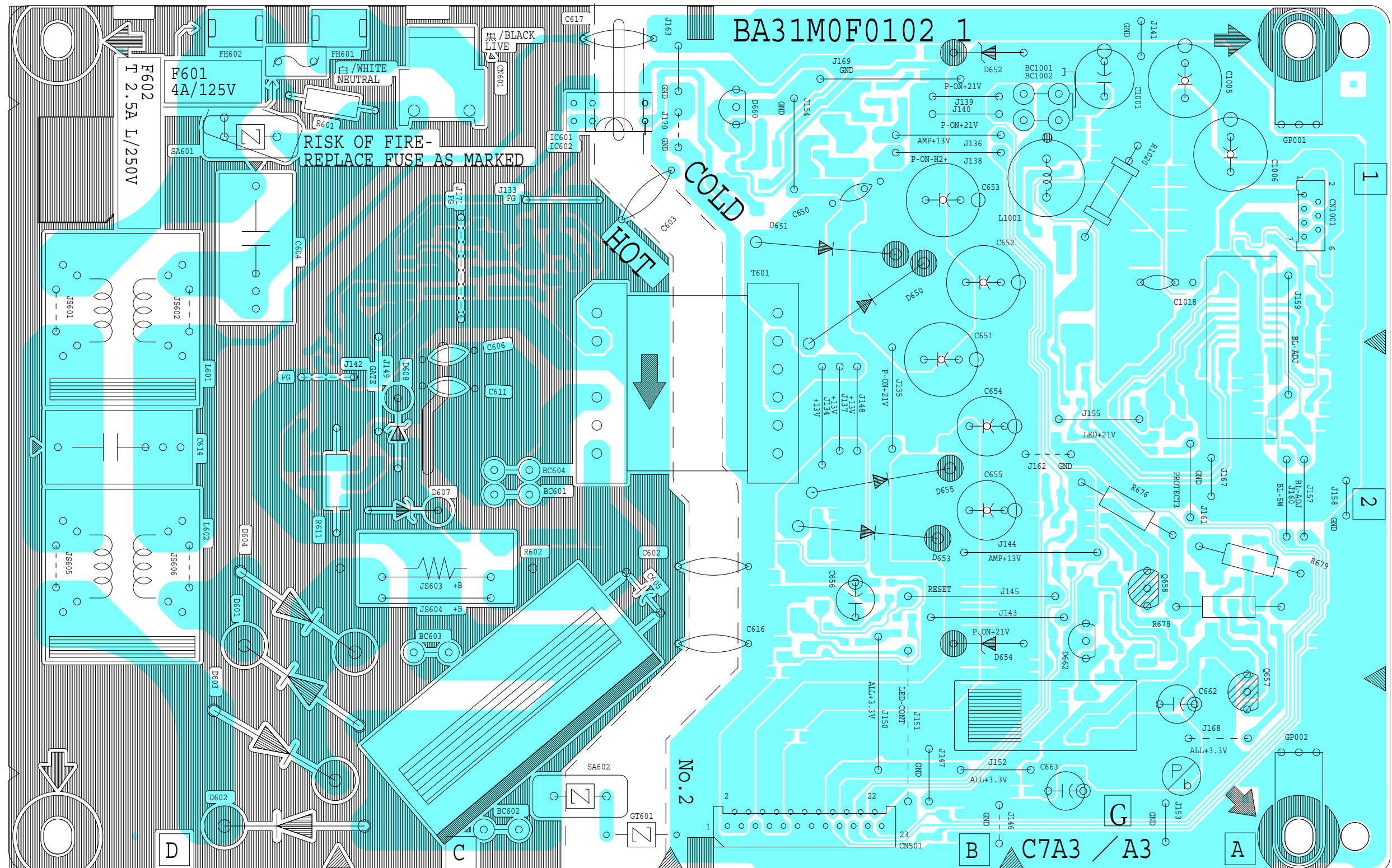
**CAUTION !:** For continued protection against risk of fire, replace only with same type 2.5A, 250V fuse.

**ATTENTION :** Utiliser un fusible de rechange de même type de 2.5A, 250V.

Because a hot chassis ground is present in the power supply circuit, an isolation transformer must be used when repairing. Also, in order to have the ability to increase the input slowly, when troubleshooting this type of power supply circuit, a variable isolation transformer is required.

**NOTE:**

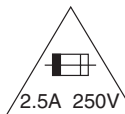
The voltage for parts in hot circuit is measured using hot GND as a common terminal.



# Power Supply CBA Bottom View

### CAUTION !

Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit.  
If Main Fuse (F602) is blown , check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply.  
Otherwise it may cause some components in the power supply circuit to fail.



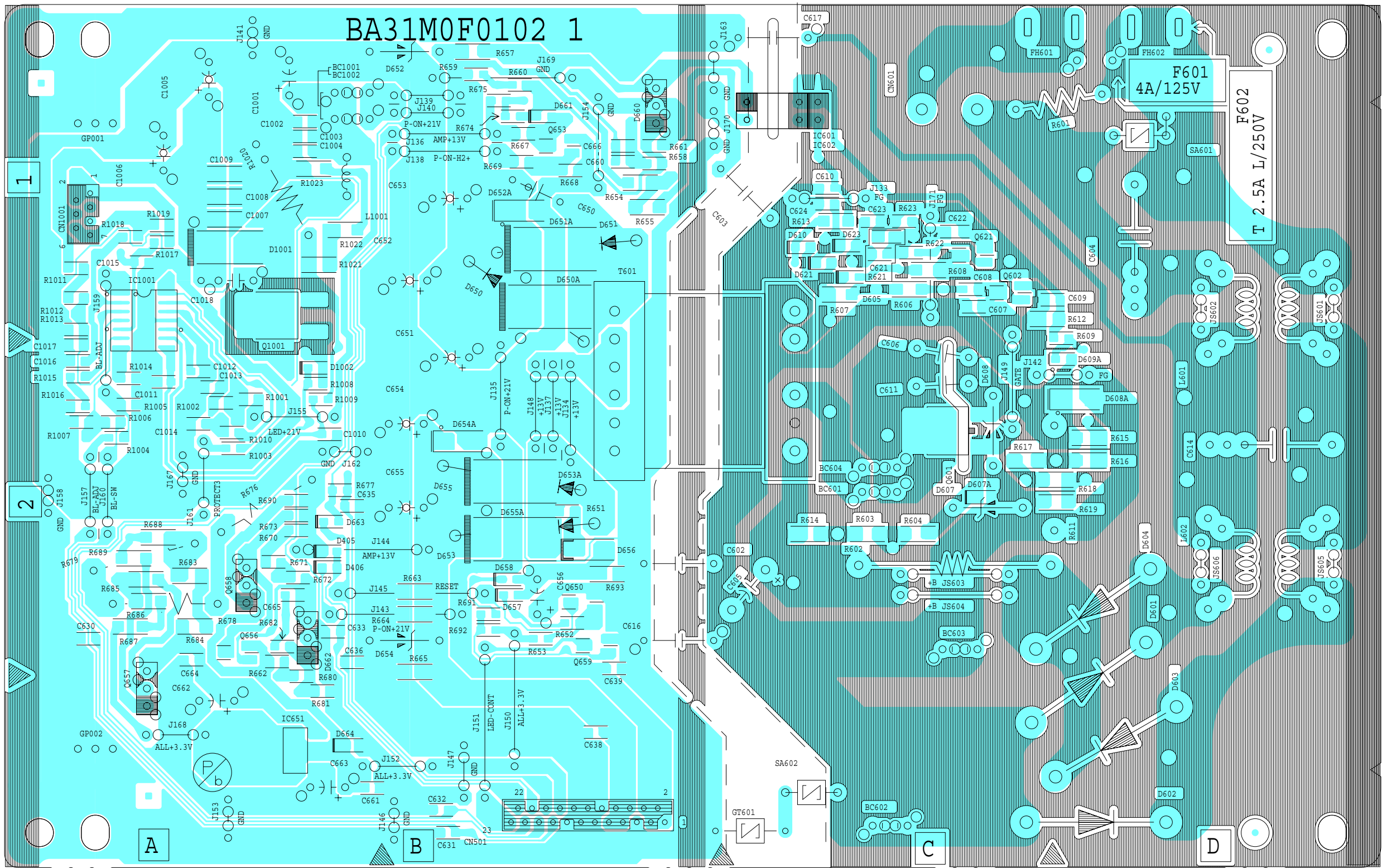
**CAUTION ! :** For continued protection against risk of fire,  
replace only with same type 2.5A, 250V fuse.

**ATTENTION :** Utiliser un fusible de rechange de même type de 2.5A, 250V.

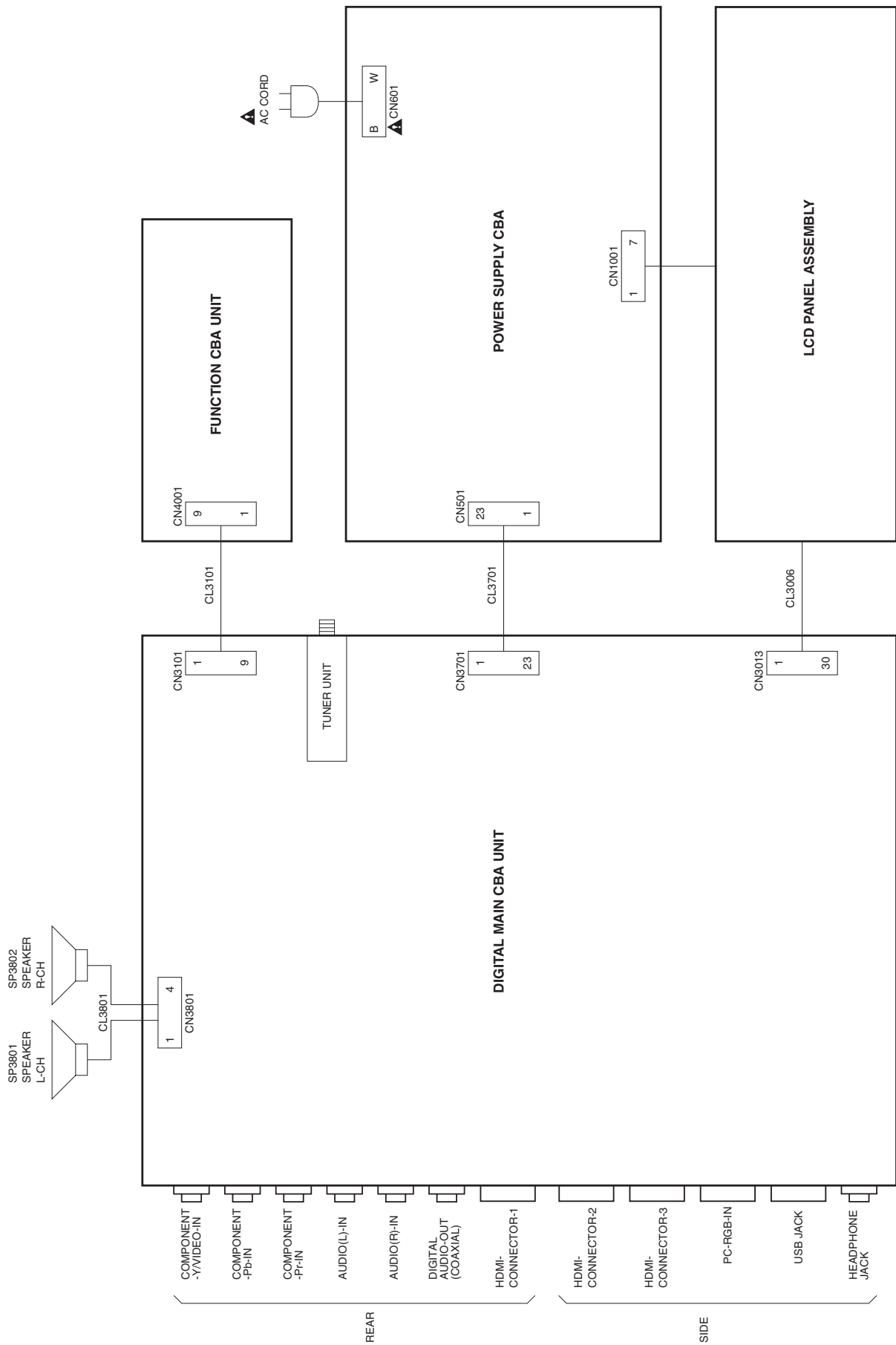
Because a hot chassis ground is present in the power supply circuit, an isolation transformer must be used when repairing.  
Also, in order to have the ability to increase the input slowly, when troubleshooting this type of power supply circuit, a variable isolation transformer is required.

### NOTE:

The voltage for parts in hot circuit is measured using hot GND as a common terminal.



# WIRING DIAGRAM

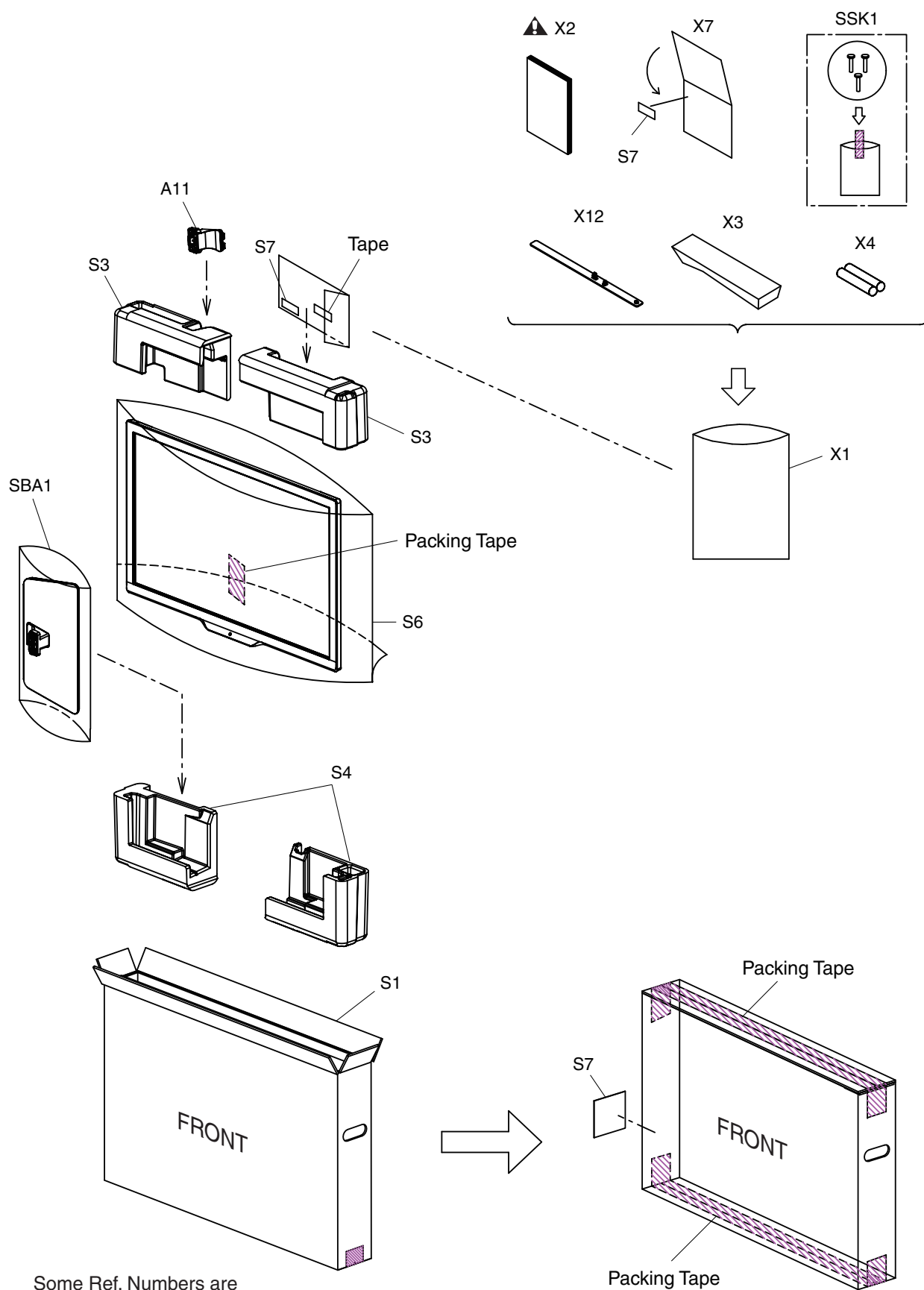


## 12-1





# Packing



	20121205	
	32PFL4508/F7(A31F2UT)(ME1)	
Ref.No.	Description	Parts No.
MECHANICAL PARTS		
A3	REAR COVER A31F0UT	1EM030132
A11	STAND NECK A31M2UT	1EM228000
A13	JACK HOLDER A31M0UT	1EM334000
A15!	RATING LABEL A31F2UT	-----
A16	LOGO LABEL A31M2UT	-----
A17	ENERGY GUIDE LABEL A31F2UT	-----
A20	LEADING EDGE COVER A31M2UT	1EM228001
AC601!	AC CORD W/O A GND WIRE UL/CSA/1700/NO/BLACK	WAC172L7E005
B17	WALL MOUNT BRACKET A11N0UH	1EM434637
B18	WALL MOUNT COVER A2170UT	1EM332137
CL3101	FFC WIRE ASSEMBLY 9PIN 9PIN/WHITE/115MM	WX1A31M0S104
CL3701	FFC WIRE ASSEMBLY 23PIN 23PIN/WHITE/98MM	WX1A31M0S103
CL3801	WIRE ASSEMBLY 4PIN 4PIN/220MM&45MM	WX1A31M0C302
L7	SCREW P-TIGHT 3X10 BIND HEAD+	GBHP3100
L23	SCREW S-TIGHT M3X6 BIND HEAD+	GBJS3060
L27	SCREW S-TIGHT M3X8 BIND HEAD+	GBHS3080
L45	DOUBLE SEMS SCREW M4X10 + BLK	FPH34100
SBA1	STAND BASE ASSEMBLY A31M2UT	1ESA34000
SP3801	SPEAKER MAGNETIC 8OHM/8W S0310F14	DS08110XQ002
SP3802	SPEAKER MAGNETIC 8OHM/8W S0310F14	DS08110XQ002
SSK1	STAND SCREW KIT A31M2UT	1ESA34003
S1	CARTON A31F2UT	1EM334817
S3	STYROFOAM TOP A31F2UT	1EM030505
S4	STYROFOAM BOTTOM A31F2UT	1EM030506
S6	SET BAG A1AF8UT	1EM334734
S7	SERIAL NO. LABEL A01PBUH	-----
X1	POLYETHYLENE BAG HDPE 180X340XT0.03	1EM435579
X2!	OWNERS MANUAL A31M2UT	1EMN30002
X3	REMOTE CONTROL UNIT YKF335-001	URMT39JHG001
X4	BATTERY R03-B500/01S	XB0M451CZB01
X6	QUICK START GUIDE A31M2UT	1EMN30003
X7	REGISTRATION CARD (PHILIPS) A2176UT	1EMN29339
X12	CABLE MANAGEMENT TIE(BLACK) A01F2UH	1EM431197
LCD1	LCD PANEL ASSEMBLY	U3FF1PA
	Consists of the following	
A1	FRONT CABINET A31F2UT	1EM030385
A4	X-PCB COVER A31F0UT	1EM030131
A5	DECORATION PLATE A31M2UT	1EM228002
B12	SHIELD PLATE A31M2UT	1EM334002
CL3006	FFC WIRE ASSEMBLY 30PIN(W//SHIELD) 30PIN/FFC/SHIELD/177	WX1A31F0P401
L7	SCREW P-TIGHT 3X10 BIND HEAD+	GBHP3100
	LCD MODULE	-----
ELECTRICAL PARTS		
	DIGITAL MAIN CBA UNIT	A31F2MMA-001
IC3001	IC DC-DC CONVERTER MP1472GJC452Z	NSCA0T09M021
IC3002	IC 512MB DDR2 SDRAM K4T51163QJ-BCE7	NSCA0R0SM048
IC3003	IC DC-DC CONVERTER MP1472GJC452Z	NSCA0T09M021
IC3004	IC REGULATOR BD00IA5WEFJ-E2	QSCA0T0RM233
IC3005	IC DTV-C7V R8A05011BG-U0/256FHP	QSAA0R0HT057
IC3006	32MBIT C-MOS SERIAL FLASH S25FL032P0XMF1010 /S	QSCA0R0FJ008
IC3007	IC LDO REGULATOR BD00ICOWEFJ/HTSOP-J8	QSCA0T0RM397
IC3008	IC DC-DC CONVERTER MP1472GJC452Z	NSCA0T09M021
IC3009	IC RESET IC-PST8429UR	QSCA0T0MM075
IC3011	IC EEPROM BU9883FV-WE2	QSCA0T0RM105
IC3013	IC SINGLE BUS BUFFER 74LVC1G126GW	NSCA0TNXP004
IC3014	IC SINGLE BUS BUFFER 74LVC1G126GW	NSCA0TNXP004
IC3018	IC HDMI SW TMDS351PAGR /PAG-64	NSCA0T0TY068

IC3019	IC USB HIGH-SIDE SW AP2151WG-7/SOT25/5PI	NSCA0TDES015
IC3601	IC REGULATOR AP2121AK-3.3TRE1	NSCA0TBCD026
IC3621	IC DC-DC CONVERTER MP1472GJC452Z	NSCA0T09M021
IC3801	IC D-CLASS AUDIO POWER AMPLIFI TPA3110D2PWPR	NSCA0T0TY073
IC3851	IC HEADPHONE AMP BH3547F SOP 8PIN	QSZBA0TRM119
TU3901	TUNER UNIT U9001UT	U9001UT
	FUNCTION CBA UNIT	A31F2MSW-001
IC4001	IC TOUCHSENSOR MICON NON-AUTOT CY8C20324-12LQXIT/CP	NSCA0T0TY080
	POWER SUPPLY CBA	A31F2MPW-001
C602!	SAFTY CAP. 1000PF/250V KX	CA2E102MR101
C603!	SAFTY CAP. 1000PF/250V KX	CA2E102MR101
C604!	CAP METALLIZED FILM 0.22UF/275V/K	CTA224PKR001
C605	CAP ELE 330UF/200V/M/87	CEB3310S6016
C606	CERAMIC CAP. 820PF/2KV	CA3D821PAN04
C607	CHIP CERAMIC CAP. B K 1800PF/50V	CHD1JK30B182
C608	CHIP CERAMIC CAP.(1608) B K 0.022UF/50V	CHD1JK30B223
C609	CHIP CERAMIC CAP. B K 0.068UF/50V	CHD1JK30B683
C610	CHIP CERAMIC CAP.(1608) CH J 100PF/50V	CHD1JJ3CH101
C614!	CAP METALLIZED FILM 0.22UF/275V/K	CTA224PKR001
C616!	SAFTY CAP. 1000PF/250V KX	CA2E102MR101
C617!	CAP CERAMIC 100PF/250V KX	CA2E101MR100
C622	CHIP CERAMIC CAP.(2125) B K 10UF/6.3V	CHE0KK30B106
C623	CHIP CERAMIC CAP.(1608) B K 4.7UF/6.3V	CHD0KK30B475
C651	CAP ELE 470UF/25V/M/85	CED4710V8006
C652	CAP ELE 470UF/25V/M/85	CED4710V8006
C653	CAP ELE 470UF/25V/M/85	CED4710V8006
C654	CAP ELE 470UF/16V/M/85	CEC4710V8006
C655	CAP ELE 470UF/16V/M/85	CEC4710V8006
C656	CAP ELE 1UF/50V/M/85	CEF1R00V8006
C660	CHIP CERAMIC CAP.(1608) B K 0.22UF/25V	CHD1EK30B224
C661	CHIP CERAMIC CAP.(1608) B K 1UF/25V	CHD1EK30B105
C665	CHIP CERAMIC CAP.(1608) B K 0.1UF/50V	CHD1JK30B104
C666	CHIP CERAMIC CAP.(1608) B K 0.22UF/25V	CHD1EK30B224
C1001	CAP ELE 330UF/25V/M/85	CED3310V8006
C1002	CHIP CERAMIC CAP.(1608) B K 1UF/25V	CHD1EK30B105
C1003	CHIP CERAMIC CAP.(1608) B K 1UF/25V	CHD1EK30B105
C1005	CAP ELE 47UF/100V/M/85	CEH4700V8006
C1006	CAP ELE 47UF/100V/M/85	CEH4700V8006
C1007	CHIP CERAMIC CAP.(3216) X7R K 1.0UF/100V	CA2A105MR080
C1008	CHIP CERAMIC CAP.(3216) X7R K 1.0UF/100V	CA2A105MR080
C1009	CHIP CERAMIC CAP.(3216) X7R K 1.0UF/100V	CA2A105MR080
C1011	CHIP CERAMIC CAP.(1608) B K 1000PF/50V	CHD1JK30B102
C1012	CHIP CERAMIC CAP.(1608) B K 4.7UF/6.3V	CHD0KK30B475
C1013	CHIP CERAMIC CAP.(1608) B K 0.1UF/50V	CHD1JK30B104
C1014	CHIP CERAMIC CAP.(1608) B K 1UF/25V	CHD1EK30B105
C1017	CHIP CERAMIC CAP.(1608) B K 1000PF/50V	CHD1JK30B102
C1018	CERAMIC CAP. B K 100PF/1KV	CCD3AKN0B101
CN501	FPC/FFC CONNECTOR IMSA-9615S-23C-PP-A	JC96J23ER009
CN601!	CONNECTOR S2P3-VH (LF)(SN)	JCVHCO2JG002
CN1001	FPC/FFC CONNECTOR IMSA-9615S-07A-PP-A	JC96J07ER007
D601	DIODE 1N5397BD	NDL1001N5397
D602	DIODE 1N5397BD	NDL1001N5397
D603	DIODE 1N5397BD	NDL1001N5397
D604	DIODE 1N5397BD	NDL1001N5397
D605	ZENER DIODE MM524V3B	ND1BMM524V3B
D607A!	ZENER DIODE SMD TF2GTR27B	QD1B000TF227
D608!	DIODE ZENER 1ZB36BB	NDWZ0001ZB36
D609A	DIODE SCHOTTKY SMD CES520 L3F/D	QD1Z00CES520
D610	DIODE SWITCHING HSC119 TRF -E	QD1Z00HSC119
D621	DIODE SWITCHING HSC119 TRF -E	QD1Z00HSC119
D623	ZENER DIODE MM5230B	ND1B0MM5230B
D650	DIODE SCHOTTKY SB3150BH	NDWZ00SB3150

D651	DIODE SCHOTTKY SB3150BH	NDWZ00SB3150
D653	DIODE SCHOTTKY SB3A0BH	NDWZ000SB3A0
D654!	DIODE ZENER 1ZB20BB	NDWZ0001ZB20
D655	DIODE SCHOTTKY SB3A0BH	NDWZ000SB3A0
D656	DIODE FAST RECOVERY RS1BJTB	ND1Z0RS1BJTB
D657	ZENER DIODE MM5Z11B	ND1B0MM5Z11B
D660	IC SHUNT REGULATOR SL431A-AT	NSZBA0TAUK01
D661	DIODE SWITCHING HSC119 TRF -E	QD1Z00HSC119
D662	IC SHUNT REGULATOR SL431A-AT	NSZBA0TAUK01
D664	ZENER DIODE SMD TFZGTR4.7B	QD1B00TFZ4R7
D1001	DIODE SCHOTTKY SMD SK210TD	ND1Z0SK210TD
D1002	DIODE SWITCHING HSC119 TRF -E	QD1Z00HSC119
IC602!	IC PHOTOCOUPLER TLP781F(D4-FUNBLL F)	QPEL781FBLLF
IC1001!	IC LED BACKLIGHT CONTROLLER HA7219PB/SOP/14PIN	NSCA0T00H005
L601!	COIL LINE FILTER JLB20154/18MH	LLEG020XB022
L602!	COIL LINE FILTER JLB20154/18MH	LLEG020XB022
L1001	POWER INDUCTORS CWKBNP-220K	LLF2200KV002
Q601!	FET MOS TK7P60W RQ(S	QF2207K7P60W
Q602!	NPN TRANSISTOR SMD 2SC5344SY	NQZY2SC5344S
Q621	CHIP TRANSISTOR KTC3875S-Y-RTK/P	NQ1YKTC3875S
Q650	CHIP TRANSISTOR KTC3875S-Y-RTK/P	NQ1YKTC3875S
Q653	CHIP TRANSISTOR KTC3875S-Y-RTK/P	NQ1YKTC3875S
Q656	CHIP TRANSISTOR KTC3875S-Y-RTK/P	NQ1YKTC3875S
Q658	TRANSISTOR 2SA950-O (TE2 F T)	QQS002SA950F
Q1001!	FET MOS SMD AP18T10AGH-HF	NF2Z18T10AGH
R601!	RES. CARBON FILM J 1/2W J 1.2M OHM	RCX2125T1003
R602	RES CEMENT 5W J 2.7 OHM	RWJ2R7PAK007
R603	RES CHIP 3216 1/4W J 470K OHM	RRX4474HH034
R604	RES CHIP 3216 1/4W J 470K OHM	RRX4474HH034
R606	RES CHIP 3216 1/4W J 330 OHM	RRX4331HH034
R607	RES CHIP 3216 1/4W J 330 OHM	RRX4331HH034
R608	RES CHIP 3216 1/4W J 1.5K OHM	RRX4152HH034
R609	RES CHIP 1608 1/10W J 100 OHM	RRXA101HH013
R611!	METAL OXIDE RES. 2W J 0.36 OHM	RN02R36ZU001
R612	RES CHIP 3216 1/4W J 5.6K OHM	RRX4562HH034
R613	RES CHIP 3216 1/4W J 180 OHM	RRX4181HH034
R614	RES CHIP 3216 1/4W J 470K OHM	RRX4474HH034
R621	RES CHIP 1608 1/10W J 560 OHM	RRXA561HH013
R622	RES CHIP 1608 1/10W 0 OHM	RRXA000HH014
R623	RES CHIP 1608 1/10W J 10K OHM	RRXA103HH013
R651!	RES CHIP 1608 1/10W J 1.0 OHM	RRXA1R0HH013
R652	RES CHIP 1608 1/10W F 56.0K OHM	RTW5602HH008
R653	RES CHIP 1608 1/10W F 33.0K OHM	RTW3302HH008
R654	RES CHIP 3216 1/4W J 180 OHM	RRX4181HH034
R655	RES CHIP 3216 1/4W J 180 OHM	RRX4181HH034
R657	RES CHIP 3216 1/4W J 3.9K OHM	RRX4392HH034
R658	RES CHIP 1608 1/10W J 2.7K OHM	RRXA272HH013
R659	RES CHIP 1608 1/10W F 27.0K OHM	RTW2702HH008
R660	RES CHIP 1608 1/10W F 3.90K OHM	RTW3901HH008
R661	RES CHIP 1608 1/10W F 3.30K OHM	RTW3301HH008
R662	RES CHIP 1608 1/10W F 3.30K OHM	RTW3301HH008
R667	RES CHIP 1608 1/10W J 8.2K OHM	RRXA822HH013
R668	RES CHIP 1608 1/10W J 47K OHM	RRXA473HH013
R669	RES CHIP 1608 1/10W J 10K OHM	RRXA103HH013
R670	RES CHIP 1608 1/10W J 270 OHM	RRXA271HH013
R671	RES CHIP 1608 1/10W J 270 OHM	RRXA271HH013
R672	RES CHIP 1608 1/10W J 270 OHM	RRXA271HH013
R674	RES CHIP 1608 1/10W 0 OHM	RRXA000HH014
R675	RES CHIP 1608 1/10W F 68.0K OHM	RTW6802HH008
R677	RES CHIP 1608 1/10W J 10K OHM	RRXA103HH013
R680	RES CHIP 1608 1/10W J 100 OHM	RRXA101HH013
R681	RES CHIP 1608 1/10W F 10.0K OHM	RTW1002HH008
R682	RES CHIP 1608 1/10W 0 OHM	RRXA000HH014
R690!	RES CHIP 1608 1/10W J 2.7 OHM	RRXA2R7HH013

R1001	RES CHIP 1608 1/10W J 360 OHM	RRXA361HH013
R1002	RES CHIP 1608 1/10W J 360 OHM	RRXA361HH013
R1003	RES CHIP 1608 1/10W J 1.0K OHM	RRXA102HH013
R1004	RES CHIP 1608 1/10W J 10K OHM	RRXA103HH013
R1005	RES CHIP 1608 1/10W J 100K OHM	RRXA104HH013
R1006	RES CHIP 1608 1/10W J 10K OHM	RRXA103HH013
R1007	RES CHIP 1608 1/10W J 100K OHM	RRXA104HH013
R1008	RES CHIP 1608 1/10W J 10 OHM	RRXA100HH013
R1009	RES CHIP 1608 1/10W J 200 OHM	RRXA201HH013
R1010	RES CHIP 1608 1/10W F 100 OHM	RTW1000HH008
R1011	RES CHIP 1608 1/10W F 470K OHM	RTW4703HH008
R1012	RES CHIP 1608 1/10W F 510K OHM	RTW5103HH008
R1013	RES CHIP 1608 1/10W F 27.0K OHM	RTW2702HH008
R1014	RES CHIP 1608 1/10W F 100K OHM	RTW1003HH008
R1015	RES CHIP 1608 1/10W F 1.80K OHM	RTW1801HH008
R1016	RES CHIP 1608 1/10W F 6.20K OHM	RTW6201HH008
R1017	RES CHIP 1608 1/10W 0 OHM	RRXA000HH014
R1018	RES CHIP 1608 1/10W 0 OHM	RRXA000HH014
R1020!	METAL OXIDE RES. 1W J 0.18 OHM	RN01R18ZU001
BC601	WIRE CP STP-S-0.50	XZ40FOREN001
BC602	BEADS INDUCTOR FBR07HA121SB-00	LLBF00STU030
BC603	BEADS INDUCTOR FBR07HA121SB-00	LLBF00STU030
BC604	WIRE CP STP-S-0.50	XZ40FOREN001
BC1001	WIRE CP STP-S-0.50	XZ40FOREN001
BC1002	WIRE CP STP-S-0.50	XZ40FOREN001
F602!	FUSE TIME RAG SLT250V2.5A	PDGSLBONG252
GP001	EARTH PLATE A31FBUT	1EM440258
GP002	EARTH PLATE A31FBUT	1EM440258
SA601!	VARISTOR 10D 471K SVR	NVQZVR10D471
T601!	TRANS POWER SRW26LEC-T11H016	LTT2PCOTE005



# REVISION HISTORY

## Chassis PL13.9

- 2012/12/19 32PFL4508/F7 (Serial No.: ME1) 1st draft added

# COMPARISON LIST OF MODEL NAMES

## Chassis PL13.9

32PFL4508/F7      (ME1)      A31F2UT