



LCD-Monitor

Model 720N

SERVICE Manual

LCD Monitor



Fashion Feature

- SXGA Display (1280 x1024)
- Response Time: 8ms
- Connectivity: Analog (15P D-sub)
- Power Consumption: 17"(34W)
- DPMS: under 1W (230Vac)



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1 Precautions

Follow these safety, servicing and ESD precautions to prevent damage and to protect against potential hazards such as electrical shock.

1-1 Safety Precautions

1-1-1 Warnings

1. For continued safety, do not attempt to modify the circuit board.
2. Disconnect the AC power and DC power jack before servicing.

1-1-2 Servicing the LCD Monitor

1. When servicing the LCD Monitor, Disconnect the AC line cord from the AC outlet.
2. It is essential that service technicians have an accurate voltage meter available at all times. Check the calibration of this meter periodically.

1-1-3 Fire and Shock Hazard

Before returning the monitor to the user, perform the following safety checks:

1. Inspect each lead dress to make certain that the leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the monitor.
2. Inspect all protective devices such as nonmetallic control knobs, insulating materials, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacitor networks, mechanical insulators, etc.
3. Leakage Current Hot Check (Figure 1-1):

WARNING : 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 Publication UL1410, 59.7*).

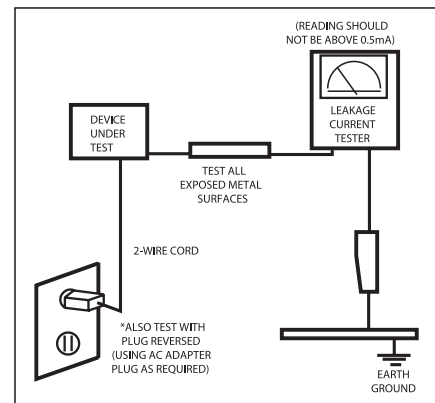


Figure 1-1. Leakage Current Test Circuit

4. With the unit completely reassembled, plug the AC line cord directly into a 120V AC outlet. With the unit's AC switch first in the ON position and then OFF, measure the current between a known earth ground (metal water pipe, conduit, etc.) and all exposed metal parts, including: metal cabinets, screwheads and control shafts. The current measured should not exceed 0.5 milliamp. Reverse the power-plug prongs in the AC outlet and repeat the test.

1-1-4 Product Safety Notices

Some electrical and mechanical parts have special safety-related characteristics which are often not evident from visual inspection. The protection they give may not be obtained by replacing them with components rated for higher voltage, wattage, etc. Parts that have special safety characteristics are identified by \triangle on schematics and parts lists. A substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire and/or other hazards. Product safety is under review continuously and new instructions are issued whenever appropriate.

1 Precautions

1-2 Servicing Precautions

- WARNING:** An electrolytic capacitor installed with the wrong polarity might explode.
- Caution:** Before servicing units covered by this service manual, read and follow the Safety Precautions section of this manual.
- Note:** If unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions, always follow the safety precautions.

1-2-1 General Servicing Precautions

1. Always unplug the unit's AC power cord from the AC power source and disconnect the DC Power Jack before attempting to:
(a) remove or reinstall any component or assembly, (b) disconnect PCB plugs or connectors, (c) connect a test component in parallel with an electrolytic capacitor.
2. Some components are raised above the printed circuit board for safety. An insulation tube or tape is sometimes used. The internal wiring is sometimes clamped to prevent contact with thermally hot components. Reinstall all such elements to their original position.
3. After servicing, always check that the screws, components and wiring have been correctly reinstalled. Make sure that the area around the serviced part has not been damaged.
4. Check the insulation between the blades of the AC plug and accessible conductive parts (examples: metal panels, input terminals and earphone jacks).
5. Insulation Checking Procedure: Disconnect the power cord from the AC source and turn the power switch ON. Connect an insulation resistance meter (500 V) to the blades of the AC plug.
The insulation resistance between each blade of the AC plug and accessible conductive parts (see above) should be greater than 1 megohm.
6. Always connect a test instrument's ground lead to the instrument chassis ground before connecting the positive lead; always remove the instrument's ground lead last.

1-3 Static Electricity Precautions

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

1. Immediately before handling any semiconductor components or assemblies, drain the electrostatic charge from your body by touching a known earth ground. Alternatively, wear a discharging wrist-strap device. To avoid a shock hazard, be sure to remove the wrist strap before applying power to the monitor.
2. After removing an ESD-equipped assembly, place it on a conductive surface such as aluminum foil to prevent accumulation of an electrostatic charge.
3. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ESDs.
4. Use only a grounded-tip soldering iron to solder or desolder ESDs.
5. Use only an anti-static solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ESDs.
6. Do not remove a replacement ESD from its protective package until you are ready to install it. Most replacement ESDs are packaged with leads that are electrically shorted together by conductive foam, aluminum foil or other conductive materials.
7. Immediately before removing the protective material from the leads of a replacement ESD, touch the protective material to the chassis or circuit assembly into which the device will be installed.
Caution: Be sure no power is applied to the chassis or circuit and observe all other safety precautions.
8. Minimize body motions when handling unpackaged replacement ESDs. Motions such as brushing clothes together, or lifting your foot from a carpeted floor can generate enough static electricity to damage an ESD.

1-4 Installation Precautions

1. For safety reasons, more than two people are required for carrying the product.
2. Keep the power cord away from any heat emitting devices, as a melted covering may cause fire or electric shock.
3. Do not place the product in areas with poor ventilation such as a bookshelf or closet. The increased internal temperature may cause fire.
4. Bend the external antenna cable when connecting it to the product. This is a measure to protect it from being exposed to moisture. Otherwise, it may cause a fire or electric shock.
5. Make sure to turn the power off and unplug the power cord from the outlet before repositioning the product. Also check the antenna cable or the external connectors if they are fully unplugged. Damage to the cord may cause fire or electric shock.
6. Keep the antenna far away from any high-voltage cables and install it firmly. Contact with the highvoltage cable or the antenna falling over may cause fire or electric shock.
7. When installing the product, leave enough space (10cm) between the product and the wall for ventilation purposes.
A rise in temperature within the product may cause fire.

1 Precautions

Memo

3 Alignments and Adjustments

This section of the service manual explains how to use the RS232 JIG.
This function is needed for AD board change.

3-1 Required Equipment

The following equipment is necessary for adjusting the monitor:

- Computer with Windows 95, Windows 98, Windows NT, Windows 2000, or Windows XP.
- MTI-2031 DDC MANAGER JIG

3-2 Automatic Color Adjustment

To Analog video, In 16gray or any pattern using black and white and any mode.(16gray and XGA mode recommend)

1. Push the OSD Menu button to open the OSD
2. Select language English
3. Push enter button during 5 seconds.
4. See the screen flashing

3-3 DDC EDID Data Input

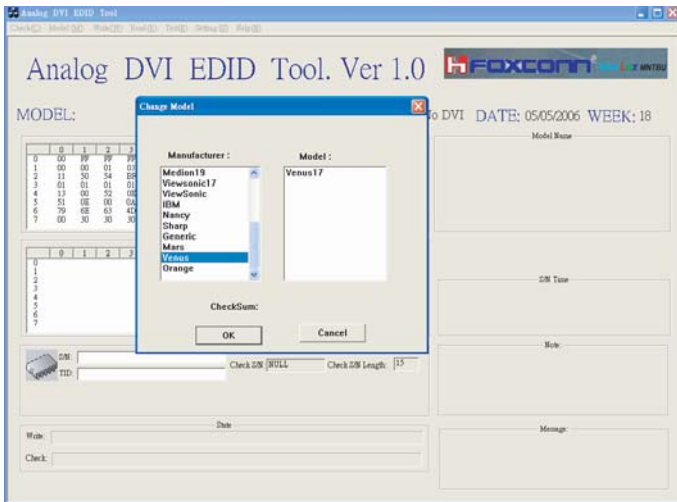
1. Input DDC EDID data when replacing AD PCB.
2. Receive/Download the proper DDC file for the model from HQ quality control department.
Install the below jig (Figure 1) and enter the data.



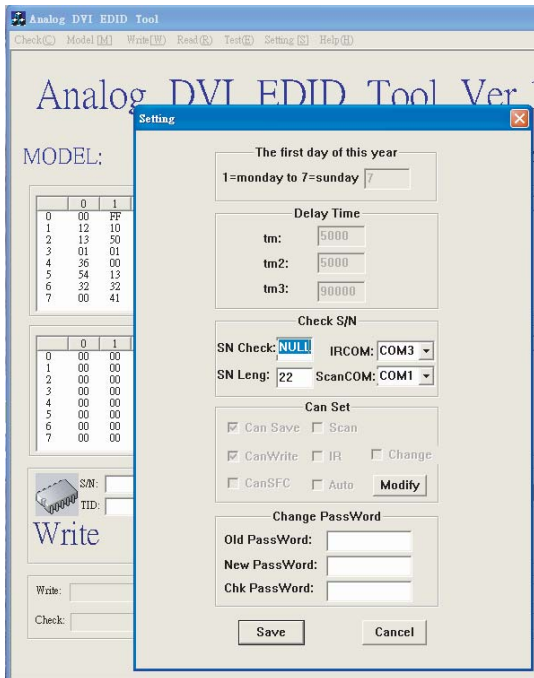
Figure 1.

3 Alignments and Adjustments

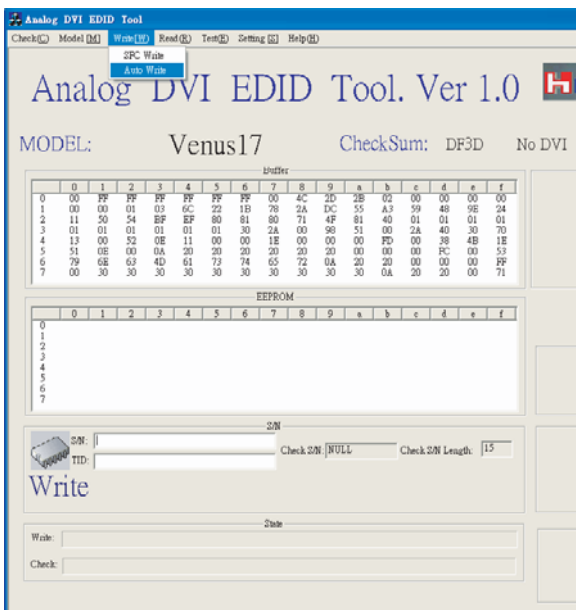
3-4 How to execute DDC



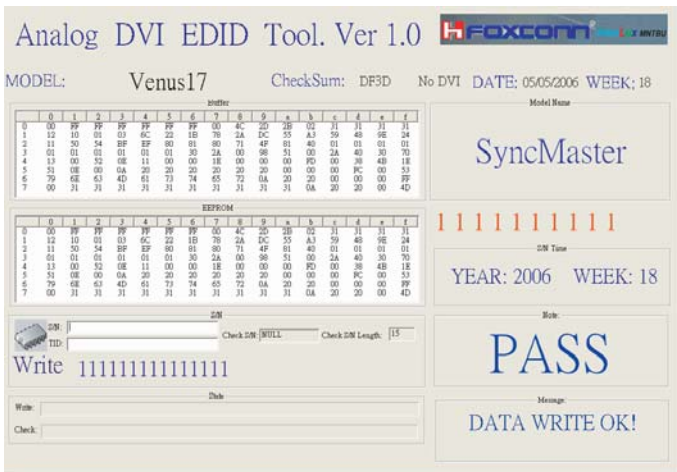
1. Install Analog DVI EDID Tool Program
2. Click the Analog DVI EDID Tool icon.
3. Select mode The password is 1234. Select the manufacture is Venus and the model name is Venus 17.



4. Setting The password is 1234. Select the port1 and the SN Leng is 22. Save the change.

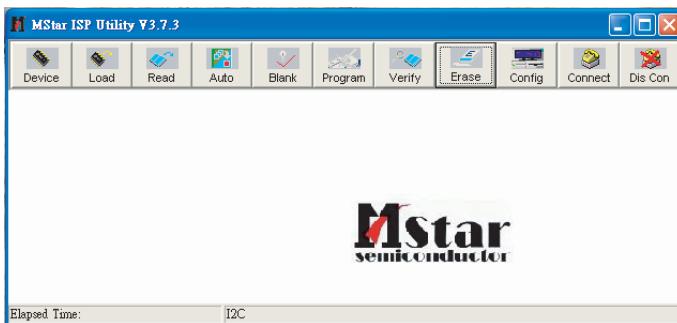


5. Select Write-Auto Write The SN number is a 22 random numbers.



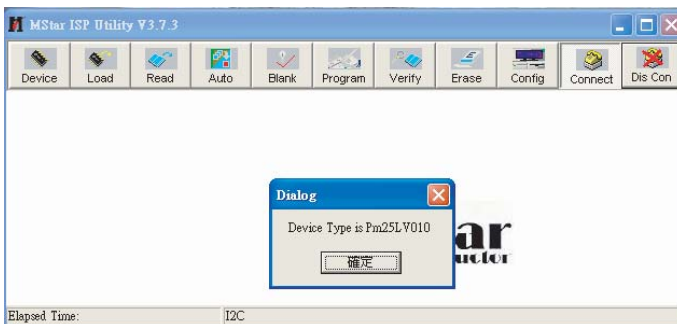
6. Write DDC ok.

3-5 How to execute MCU Code

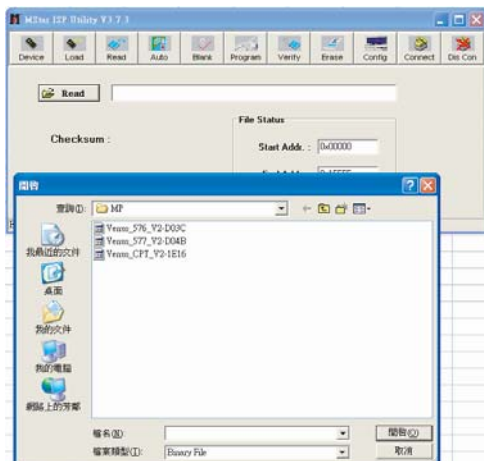


1. Set the options.

- Manufacture: MSTAR
- Device Type: TSUM16_ROM128K_ext_flash
- Communication Port: DSUB15 (Analog)
- External Memory: PM25LV010E

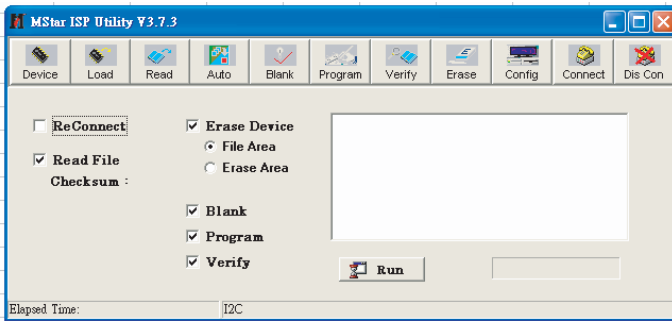


2. Click 'Connect File' button, and select the MCU code.

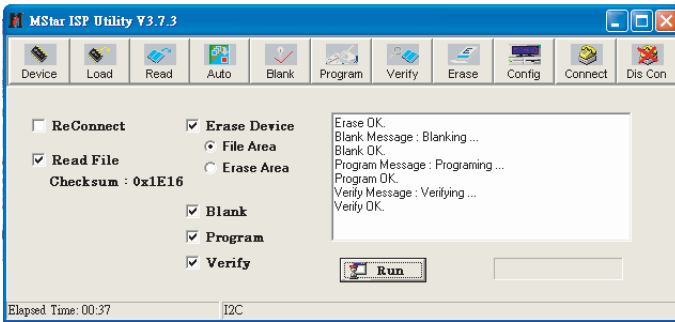


3. Click 'Read File' button, and select the MCU code.

3 Alignments and Adjustments



4. Click 'Auto Program' button.



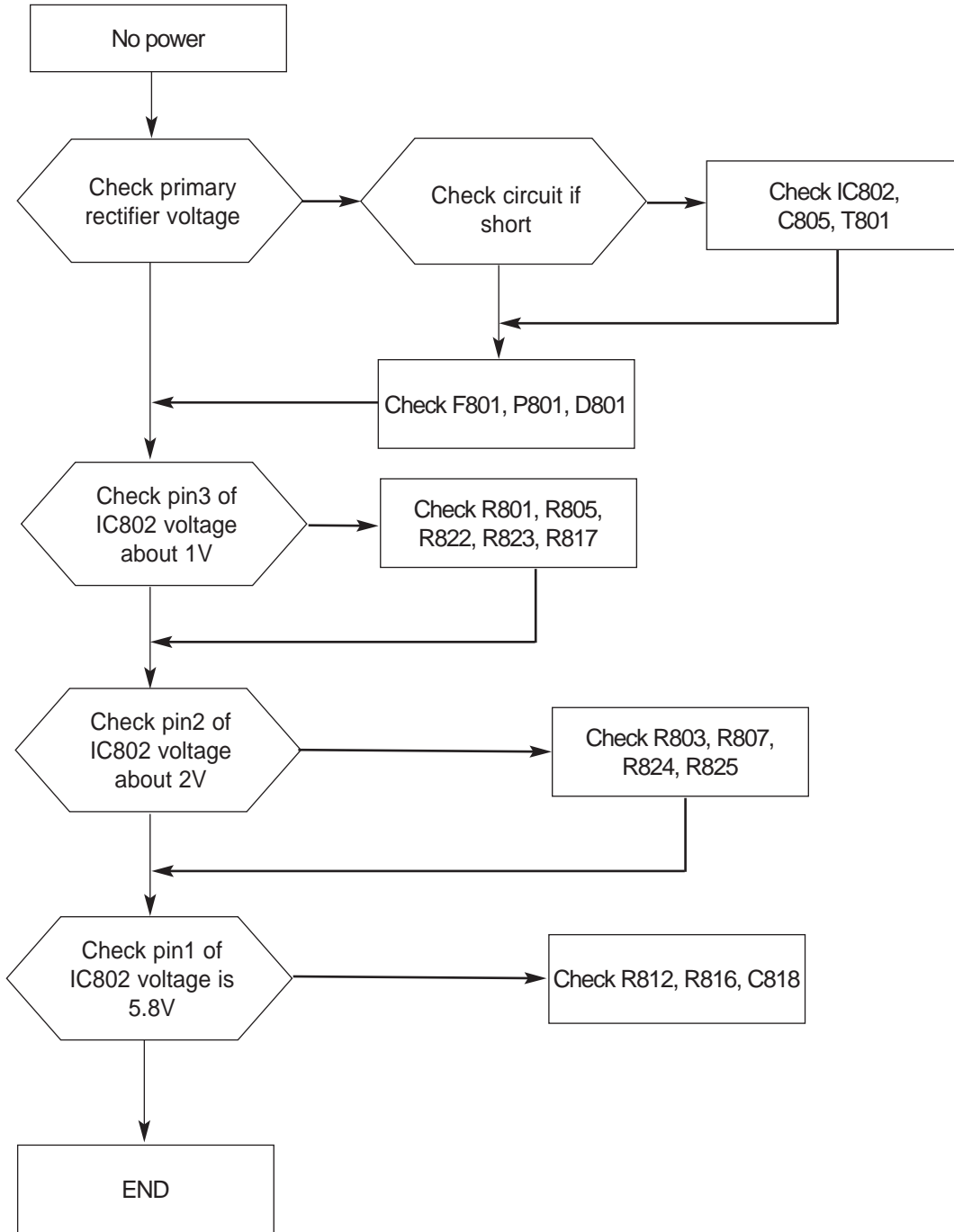
5. If Program and Verify is OK, turn off the hard power and than turn on again.

4 Troubleshooting

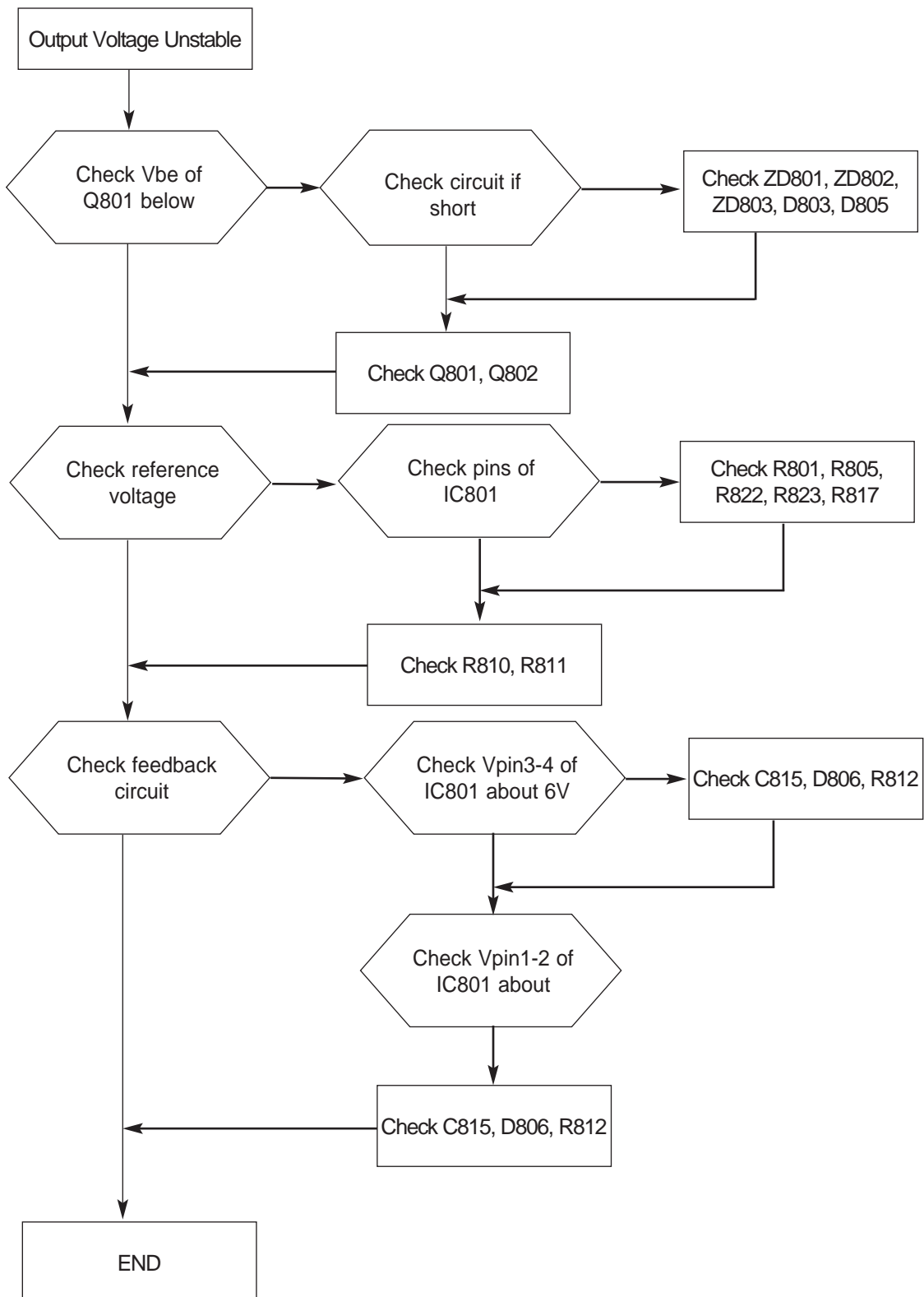
4-1 Common Acknowledge

- If you change the interface board, be sure that the U105, U106 and U103 these three components also changed to the new I/F board because there was program inside. If not, please re-write EDID or upload firmware into Flash memory via VGA Cable.
- If you adjust clock and phase, please do it at the condition of Windows shut down pattern.
- If you confirm the R.G.B. color is normal or not, please do it under 16-grey scalar pattern.
- This LCM is analog interface. So if the entire screen is an abnormal color that means the problem happen in the analog circuit part, if only some scale appears abnormal color that stand the problem happen in the digital circuit part.
- If you check the H/V position, please use the crosshatch pattern.
- This LCM support more than 30 timing modes, if the input timing mode is out of specification, the picture may appears abnormally.
- If brightness uneven, repairs Inverter circuit or change a new panel.
- If you find the vertical line or horizontal line lost on the screen, please change panel.

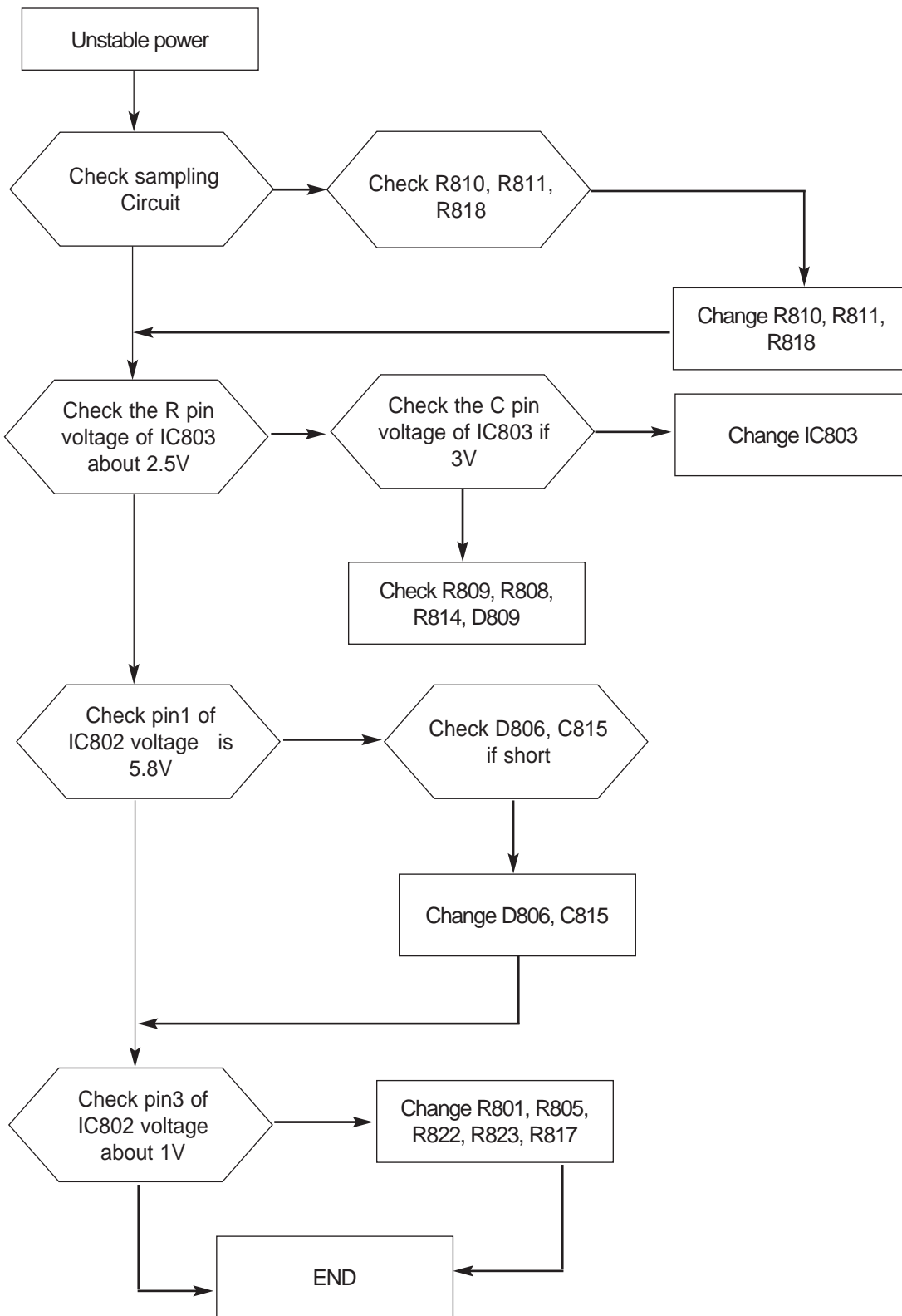
4-2 No Power & Power LED Off



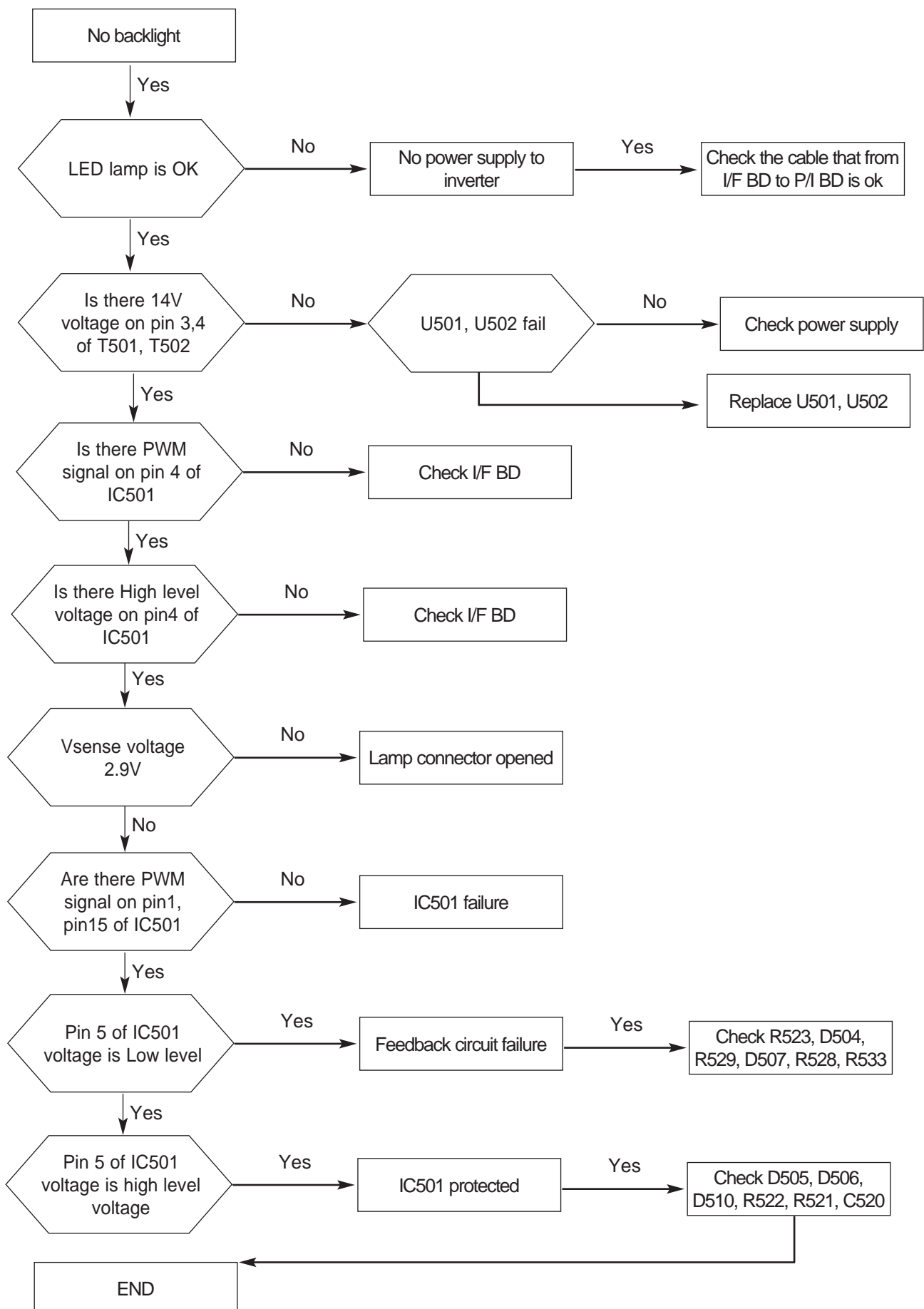
4-3 DC output voltage is unstable



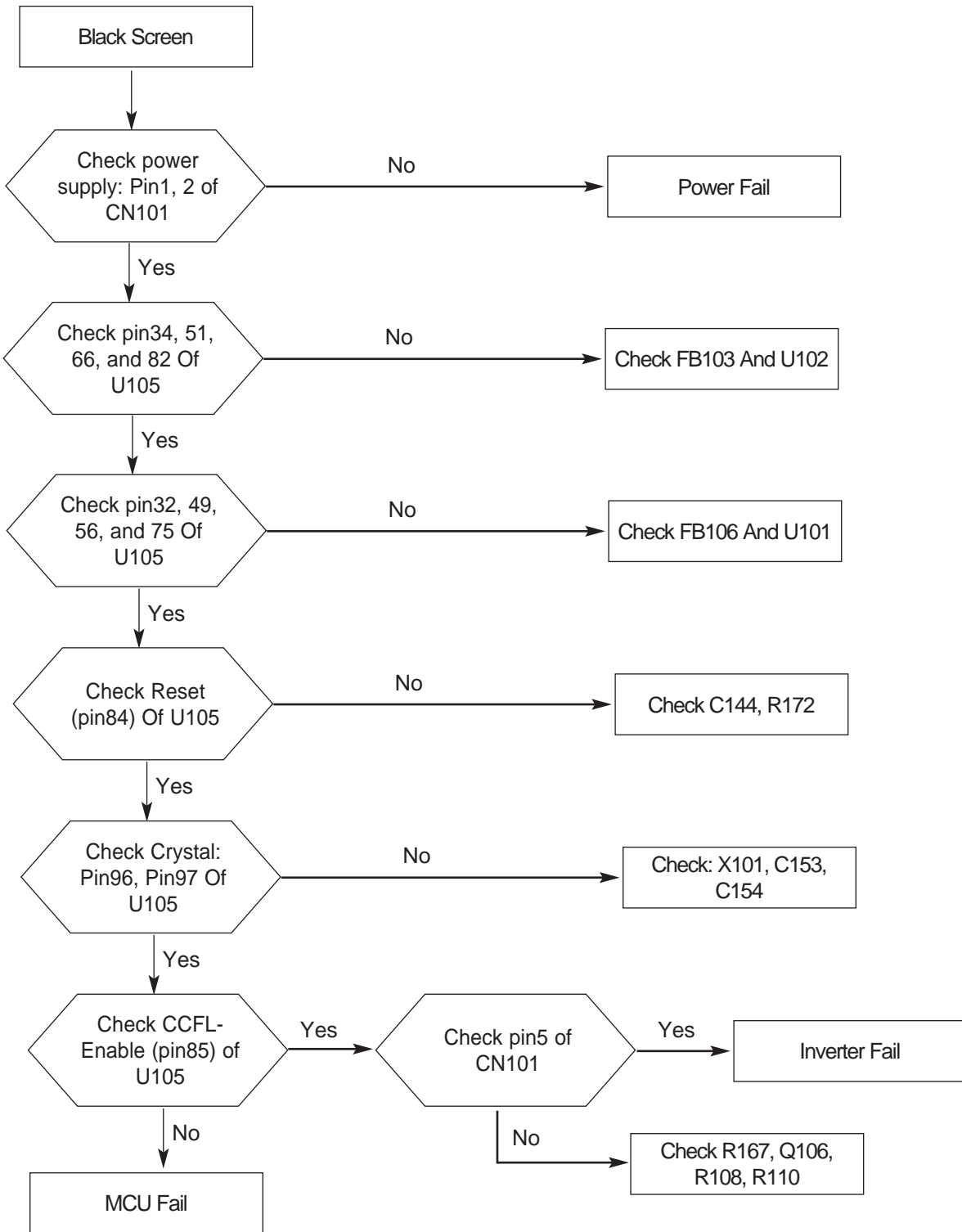
4-4 Output power is unstable



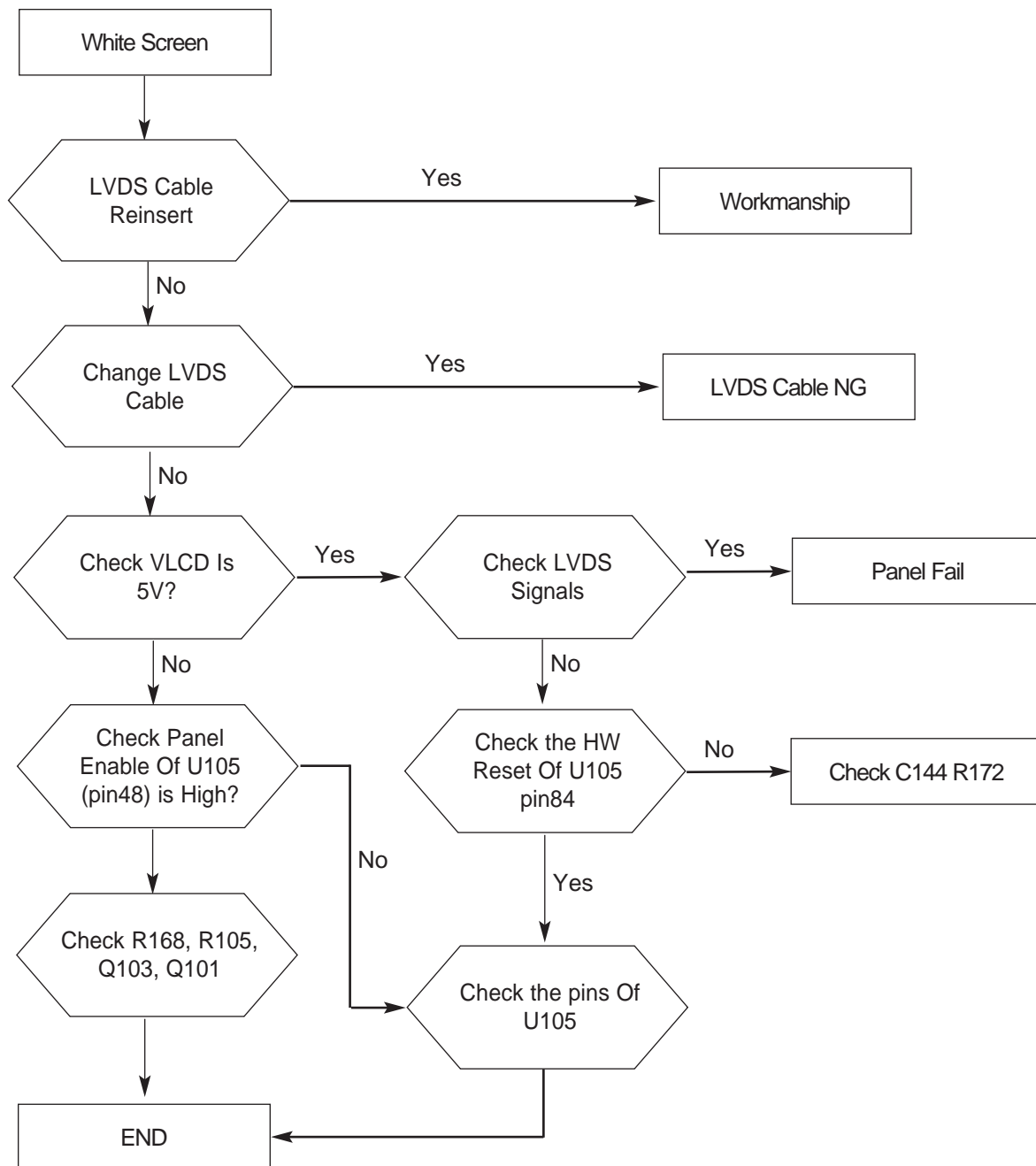
4-5 Backlight can't be turned on



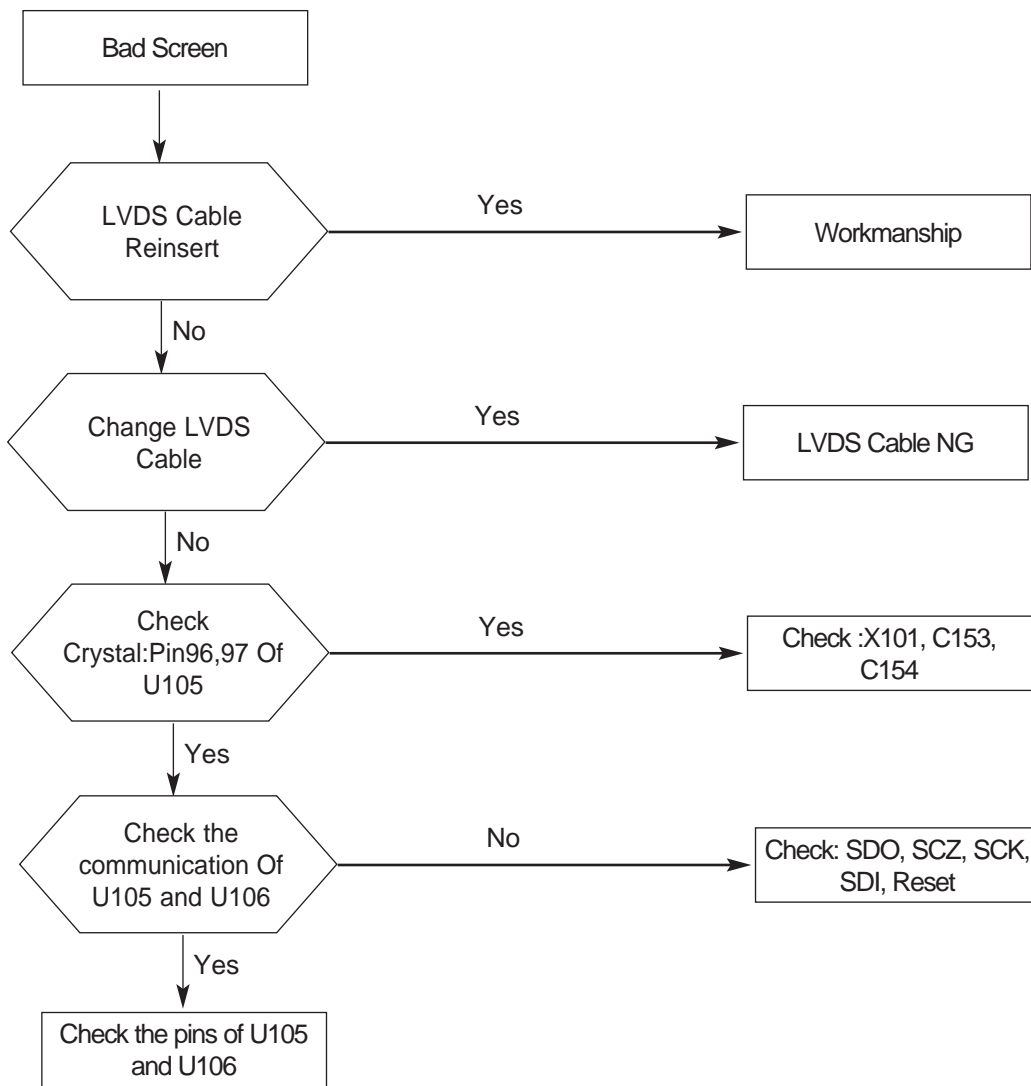
4-6 Black Screen and backlight turn on



4-7 White Screen



4-8 Bad Screen

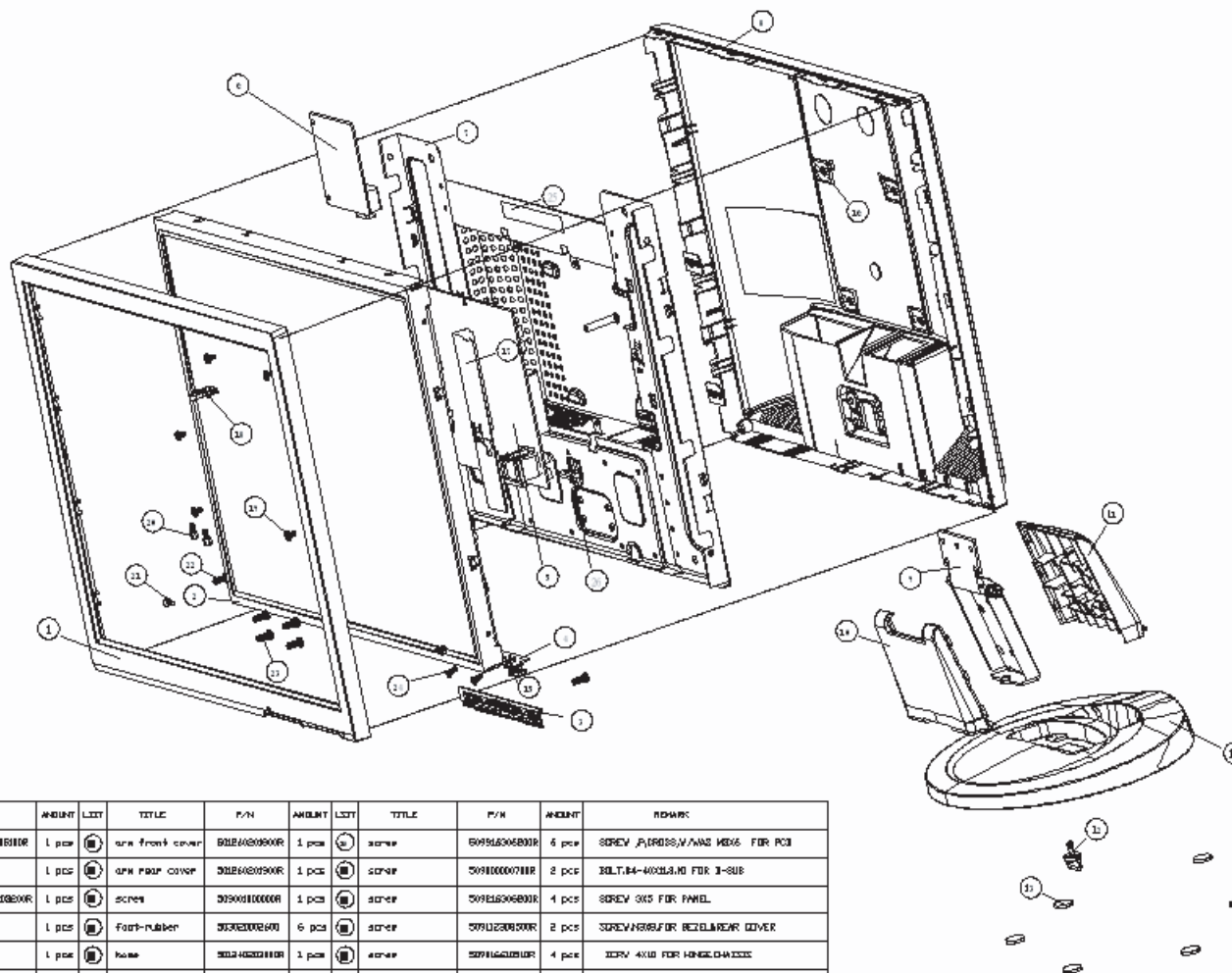


5 Exploded View and Parts List

-You can search for updated part codes through ITSELF web site.

URL : <http://itself.sec.samsung.co.kr>

5-1 Exploded View and Parts List



LIST	TITLE	P/N	AMOUNT	LIST	TITLE	P/N	AMOUNT	LIST	TITLE	P/N	AMOUNT	REMARKS
1	front cover	50010015110R	1 pc	20	aux front cover	5016000900R	1 pc	21	screw	509516306200R	6 pc	SCREW_P/PROB/V/VAS M2X5 FOR PCB
2	panel		1 pc	21	aux rear cover	5016000900R	1 pc	22	screw	509100000711R	2 pc	BLT.14-40X0.8X0 FOR 2-SUB
3	key button	50030020200R	1 pc	22	screw	50900100000R	1 pc	23	screw	509516306200R	4 pc	SCREW S15 FOR PANEL
4	control board		1 pc	23	front-rubber	50330002600	6 pc	24	screw	509122001000R	2 pc	SCREW#505 FOR REAR REAR COVER
5	power board		1 pc	24	base	501240001110R	1 pc	25	screw	50911600100R	4 pc	SCRV 4X10 FOR HINGE-DH-12333
6	interface board		1 pc	25	lens	50120010000R	1 pc	26	screw	50942001000R	3 pc	4X10 FOR HINGE-DH-REAR
7	bracket	50019000110R	1 pc	26	vesa	50260011410R	4 pc	27	adhesive tape	500300010111R	1 pc	tape size 60x20mm
8	rear cover	50030020010R	1 pc	27	shielding_1	50304061490R	1 pc	28	clip wire	50910020000R	2 pc	CLIP_INVERTER Only use on the OPT
9	Hinge assembly	50016002901R	1 pc	28	vine padfile	51110000600R	1 pc					

Memo

6 Electrical Parts List

-You can search for updated part codes through ITSELF web site.

URL : <http://itself.sec.samsung.co.kr/>

6-1 Main PCB Parts

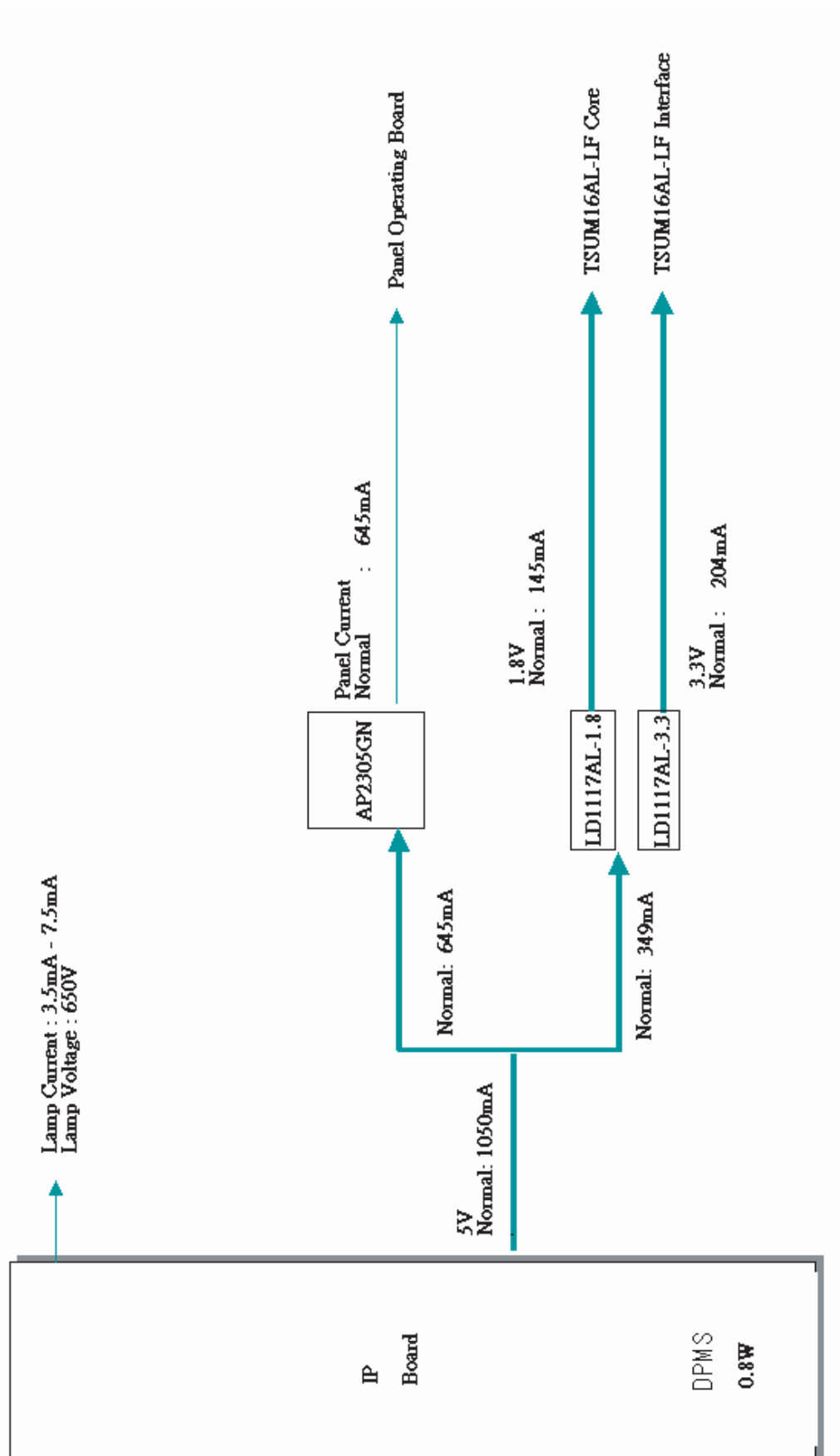
Loc. No.	Code No.	Description & Specification	Q'ty	SA/SNA
B7143	BN82-00161A	ASSY,BEZEL(S), LE1729		SA
B790E	BN82-00166A	ASSY,PCB&RIVENT,LE1729		SA
B4160	BN81-00330A	CAP CD NPO 47pF 1KV J,VT RoHS	1	SA
B4160	BN81-00332A	CAP CD SL 10pF 3KV J,ST,RoHS CC45SL3FD10	1	SA
B4160	BN81-00333A	CAP CD SL 5pF 3KV D,ST, RoHS CC45SL3FD05	1	SA
B4160	BN81-00331A	CAP CD X7R 1000pF 600V K VT RoHS	1	SA
B4160	BN81-00334A	CAP CD X7R 4700pF 1KV K,W/O FO RMING,RoH	1	SA
B4200	BN81-00338A	CAP EC 1000uF/10V M,105J E N-F 10x16(L-ES	1	SA
B4200	BN81-00339A	CAP EC 100uF 16V M,105J E ST 5x11(SK) RoH	1	SA
B4200	BN81-00335A	CAP EC 10uF 25V M,105J E ST 5x11 RoHS	1	SA
B4200	BN81-00337A	CAP EC 220uF 16V M,105J E ST 6.3x11 RoHS	1	SA
B4200	BN81-00336A	CAP EC 22uF 16V M,105J E ST, 5x11,RoHS	1	SA
B4160	BN81-00340A	CAP MEB 0.1uF 100V J,(RSB),VT RSBE3100D	1	SA
B4160	BN81-00341A	CAP MEX 0.47uF 275V K X2,F15 RoHS	1	SA
B4160	BN81-00344A	CAP MEY 2200pF 250V M Y2 Y5V P=7.5mm RoH	1	SA
B4160	BN81-00342A	CAP MEY 2200pF 400V M Y,F10mm RoHS	1	SA
B4160	BN81-00343A	CAP MEY 4700pF 400V M Y,F10mm RoHS	1	SA
B4190	BN81-00345A	CAP MTL X7R 0.1uF 50V K,VT, RoHS	1	SA
B4200	BN81-00346A	CAP SD 1000uF 25V M,105J E F 13x20 RoHS	1	SA
B4200	BN81-00347A	CAP SD 470uF/25V M 105J E ST 10x16,RoHS	1	SA
B4200	BN81-00348A	CAP SEK 82uF/450V M,105J E CF 18x35,ROHS,	1	SA
B4200	BN81-00349A	CAP SH 47uF 25V M,125J E,VT, 6.3x11,RoHS	1	SA
B506E	BN81-00350A	CARD,RUSSIAN LCD QUICK REFERENCE, LE1729	1	SA
B506E	BN81-00351A	CARD,WARRANTY, LE1729	1	SA
B4260	BN81-00352A	CHOKE L-FILTER 12mH LIN-007 ET-20,RoHS	1	SA
B4250	BN81-00353A	COIL CHK 5uH 7.8X10 CHK-053 0 181085ROL	1	SA
B4400	BN81-00355A	CON, SMD 1.0mm 30PIN RoHS AL2309-A0G1Z	1	SA
B4400	BN81-00354A	CON,D-SUB,FEM.15P RA W/O SCREW DZ11AA1-H	1	SA
B501B	BN81-00356A	COVER,BACK,BLACK,W/DVI, LE1939	1	SA
B4110	BN81-00360A	DIO 1N4148 75V/0.2A AT (PHIL) RoHS	1	SA
B4110	BN81-00368A	DIO 1N4148-35 75V/0.15A,DO35(P EC)RoHS	1	SA
B4110	BN81-00367A	DIO 1N4148-LF 75V/0.15A AT (FEC)RoHS	1	SA
B4110	BN81-00369A	DIO 1N4148W 75V/0.15A(PEC)RoHS SOD-123	1	SA
B4110	BN81-00372A	DIO 1N4148W-F 75V/0.15A(DIODES RoHS,SOD-	1	SA
B4110	BN81-00357A	DIO A02-LF 200V/1A R1(FEC)RoHS	1	SA
B4110	BN81-00363A	DIO BAV99 350mW 70V SOT-23(PHI) RoHS	1	SA
B4110	BN81-00364A	DIO BAV99 350mW 75V SOT-23(PEC RoHS	1	SA
B4110	BN81-00358A	DIO BAV99,SOT-23(INFINEON)RoHS	1	SA
B4110	BN81-00371A	DIO BAV99-LF 350mW 70V SOT-23 (FEC)RoHS	1	SA
B4110	BN81-00373A	DIO BRDG BL4-06-BF52-LF 600V/4A(FRONTIER	1	SA
B4110	BN81-00359A	DIO BRDG FL406 600V/4A(PEC)RoH S	1	SA
B4110	BN81-00365A	DIO BRDG KBL06M 600V/4A(MOSPEC RoHS	1	SA
B4110	BN81-00361A	DIO BRDG KBL405G 600V/4A(TSC) RoHS	1	SA
B4110	BN81-00374A	DIO FR10-10-LF 1000V/1A AT(FRO NTIER)RoH	1	SA
B4110	BN81-00366A	DIO FR103 200V/1A DO-41(MOSPEC RoHS	1	SA
B4110	BN81-00362A	DIO MUR1100ERL AXIAL LEAD(ON) RoHS	1	SA
B4110	BN81-00370A	DIO P6KE200A 600W/100A DO-15(T SC)RoHS	1	SA
B4110	BN81-00375A	DIO P6KE200A 600W/100A,DO-15(P ANJIT)RoH	1	SA
B4110	BN81-00376A	DIO P6KE200A-LF 600W/100A DO-1 5(FRONTIE	1	SA
B4110	BN81-00377A	DIO SN4148-LF 75V/0.15A SMD 1206 (FEC)Ro	1	SA
B4303	BN82-00160A	HRN ASSY 6P 105mm UL1007#24,RoHS	1	SA
B4120	BN81-00500A	IC AP431VL TO-92 1% VT (ATC) RoHS	1	SA
B4120	BN81-00513A	IC AS1117L-1.8/TR-LF,SOT223(A1 SEMI)RoHS	1	SA
B4120	BN81-00509A	IC AS1117L-3.3/TR-LF,SOT223(A1S EMI)RoHS	1	SA
B4120	BN81-00498A	IC AS431 TO-92 VT(A1SEMI)RoHS	1	SA
B4120	BN81-00514A	IC AT24C02BN-10SU-1.8 SOIC8 2K (ATMEL)Ro	1	SA
B4120	BN81-00515A	IC AT24C04N-10SU-2.7 SOP8 4K(A TMEL)RoHS	1	SA
B4120	BN81-00510A	IC CAT24C02WI-TE13 SOIC-8(CATALYST)RoHS	1	SA
B4120	BN81-00511A	IC CAT24C04WI-TE13 SOIC-8(CATALYST)RoHS	1	SA
B4120	BN81-00496A	IC EL817M-B(EVERLIGHT)RoHS	1	SA
B4120	BN81-00501A	IC KA431AZ 1%,VT (FAIRCHILD) RoHS	1	SA
B4120	BN81-00505A	IC LD1117AL-1.8V-A SOT223(UTC) RoHS	1	SA
B4120	BN81-00506A	IC LD1117AL-3.3V-A SOT-223(UTC RoHS	1	SA
B4120	BN81-00512A	IC LTV817M-PR VDE (LITE-ON) P=10mm RoHS	1	SA
B4120	BN81-00497A	IC M24C02-RMN6TP SO8(ST)RoHS	1	SA
B4120	BN81-00502A	IC M24C04-WMN6TP4K SOP8 (ST) RoHS	1	SA
B4120	BN81-00499A	IC OZ9938GN SOIC16(O2 MICRO)RoHS	1	SA
B4120	BN81-00507A	IC PM25LV010A-100SCE SOIC8(PMC)RoHS	1	SA
B4120	BN81-00508A	IC PS25LV010-33SCE SOIC8(MSTAR)RoHS	1	SA
B4120	BN81-00516A	IC SST25VF010A-33-4C-SAE,SOIC- 8(SST)RoH	1	SA
B4120	BN81-00503A	IC TL431ACLPG TO-92 1%,VT(ON)RoHS	1	SA
B4120	BN81-00517A	IC TOP245YN,TO-220-7C,RoHS (POWER INTEGR	1	SA
B4120	BN81-00504A	IC TSUM16AL-LF PQFP100(MSTAR)R oHS	1	SA
B4304	BN81-00522A	JMPR ROLL/KG D=0.6mm,AT,RoHS	1	SA

6 Electrical Parts List

Loc. No.	Code No.	Description & Specification	Q'ty	SA/SNA
B453B	BN81-00270A	CABLE,D-SUB 15P MALE 6FT BLACK/BLUE,RoHS	1	SA
B5050	BN81-00282A	INSULATOR,MYLAR,20x15x15mm, LE1730	1	SA
B7030	BN81-00283A	KIT,ACCESSORY, LE1729	1	SA
B4100	BN81-00384A	XSTR PMBT3906 PNP 200MA,40V SOT23(PHILIP	1	SA
B4100	BN81-00385A	XSTR SN7002N N-CH SOT-23(INFINEON),RoHS	1	SA
B4100	BN81-00386A	XSTR SSM9971GM DUAL N-CH,SO8(SILICON)RoH	1	SA
B4100	BN81-00387A	XSTR UTC2SC1815L-GR NPN TO92 (UTC)RoHS	1	SA
B432A	BN81-00388A	XTAL 14.31818MHz HC-49US DIP 16pF 30PPM	1	SA
B4110	BN81-00389A	ZENER 16V 0.5W DDZ16-F,SOD123(DIODES)RoH	1	SA
B4110	BN81-00390A	ZENER 16V MMSZ5246A SOD123(PEC RoHS	1	SA
B4110	BN81-00391A	ZENER 16V MTZS05-16-G SOD-123 (MITSUBISH	1	SA
B4110	BN81-00392A	ZENER 5.6V 0.5W DDZ5V6B-F,SOD1 23(DIODES	1	SA
B4110	BN81-00393A	ZENER 5.6V MMSZ5232A SOD123(PE C)RoHS	1	SA
B4110	BN81-00394A	ZENER 5.6V MTZS05-5.6-G,SOD-12 3(MMC)RoH	1	SA
B4110	BN81-00395A	ZENER 9.1V 0.5W DDZ9V1C-F,SOD1 23(DIODES	1	SA
B4110	BN81-00396A	ZENER 9.1V MMSZ5239A SOD123(PE C)RoHS	1	SA
B4110	BN81-00397A	ZENER 9.1V MTZS05-9.1-G SOD-123 (MITSUBI	1	SA
B4110	BN81-00398A	ZENER BZV55-C5V6 SOD80C(PHILIP S) RoHS	1	SA
B506D	BN81-00399A	MNL USER'S(CD), LE1729	1	SA
B4260	BN81-00480A	XFMR 750u@1K,+8%,3m,113m,SPW- 051,DIP-1	1	SA
B4260	BN81-00481A	XFMR SW,121.5uH EEL19M DIP SPW-068,RoHS	1	SA
B4100	BN81-00482A	XSTR 2N7002 N-CH SOT-23(PANJIT)RoHS	1	SA
B4100	BN81-00483A	XSTR 2N7002,N-CH FET SOT-23 (PHILIPS)RoH	1	SA
B4100	BN81-00484A	XSTR 2PC1815GR*1 VT (PHILIPS) RoHS REV:	1	SA
B4100	BN81-00485A	XSTR 2SC1815-GR (T2SPF.T) VT (TOSHIBA)Ro	1	SA
B4100	BN81-00486A	XSTR AO3401L P-CH(ALPHA-OMEGA) SOT23 RoH	1	SA
B4100	BN81-00487A	XSTR AP2305GN P-CH SOT23(APEC) RoHS	1	SA
B4100	BN81-00488A	XSTR AP9971GM,N-CH,SO8(APEC) RoHS	1	SA
B4100	BN81-00489A	XSTR MMBT3904 NPN SOT-23(INFIN EON)RoHS	1	SA
B4100	BN81-00490A	XSTR MMBT3904 NPN SOT-23(PANJIT)RoHS	1	SA
B4100	BN81-00491A	XSTR MMBT3904LT1G NPN 200MA 40V SOT23(ON	1	SA
B4100	BN81-00492A	XSTR MMBT3906 PNP SOT-23(INFIN EON)RoHS	1	SA
B4100	BN81-00493A	XSTR MMBT3906 PNP SOT-23(PANJIT)RoHS	1	SA
B4100	BN81-00494A	XSTR MMBT3906LT1G PNP 200mA 40V SOT23(ON	1	SA
B4100	BN81-00495A	XSTR PMBT3904 NPN 200MA,40V SOT23(PHILIP	1	SA
B7145	BN82-00151A	ASSY,BACK COVER(B), LE1729	1	SA
B7142	BN82-00152A	ASSY,BASE(B), LE1729	1	SA
B7143	BN82-00153A	ASSY,BEZEL(B), LE1729	1	SA
B7140	BN82-00158A	ASSY,STAND(B), LE1729	1	SA
B4303	BN82-00159A	HRN ASSY 5P 250mm UL2651#28,RoHS	1	SA

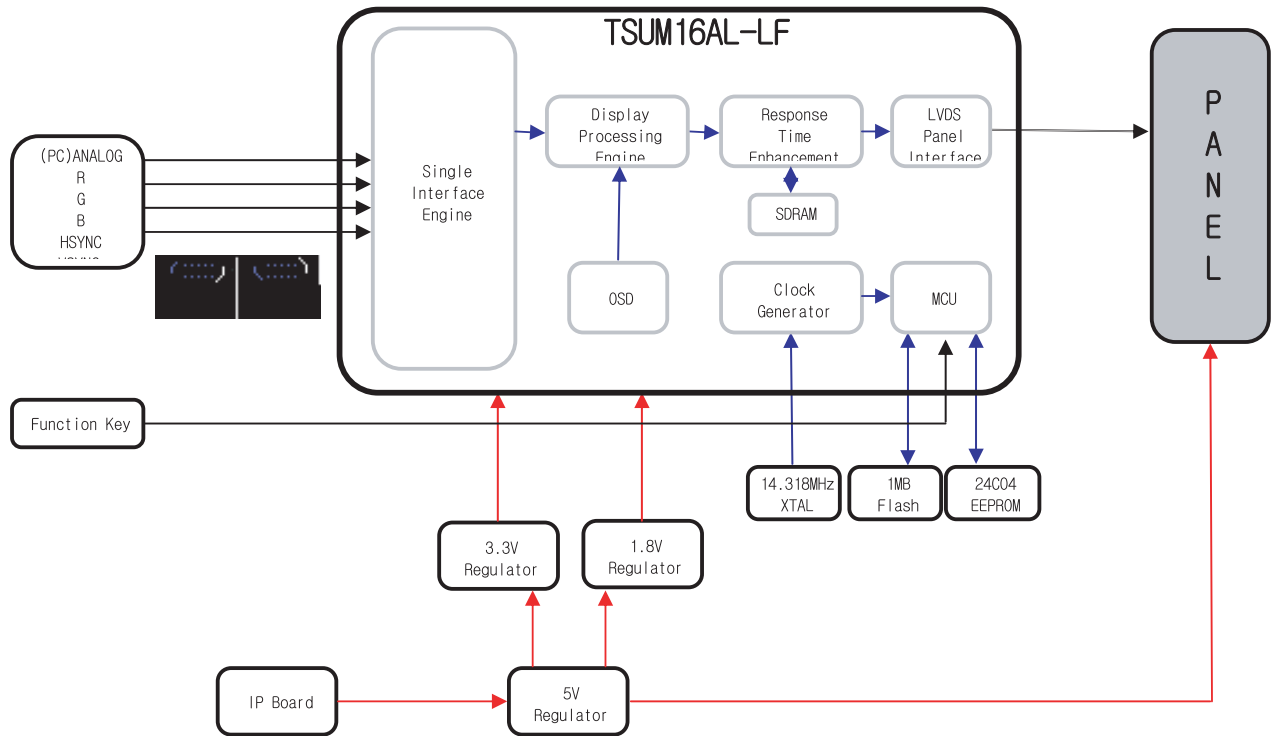
7 Block Diagram

7-1 Power tree

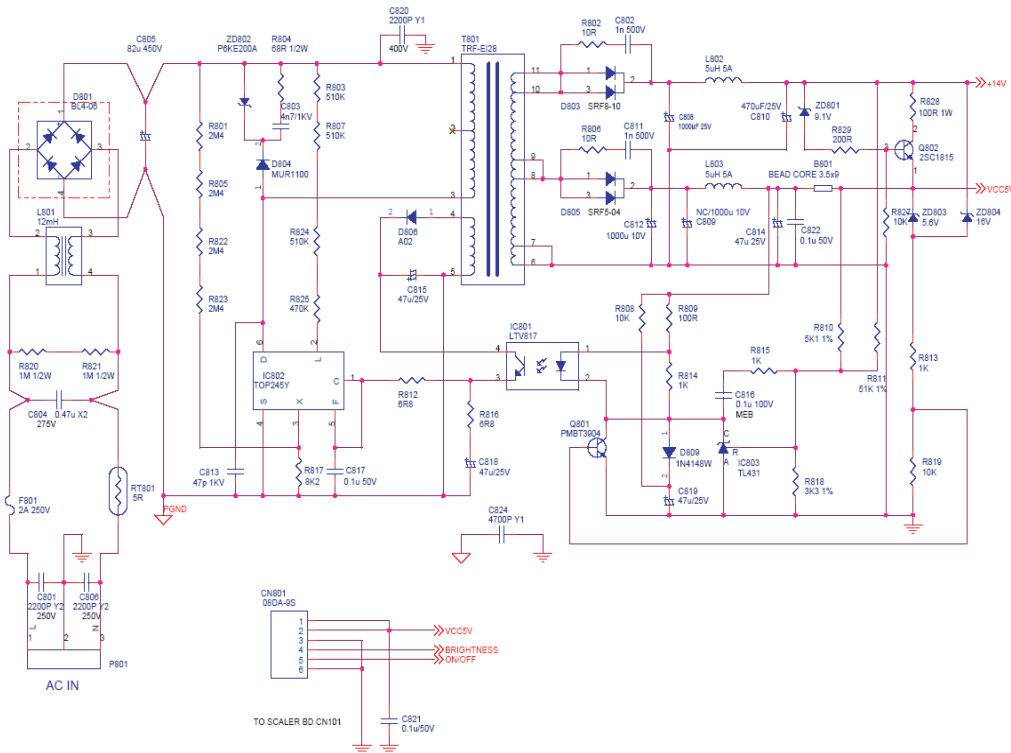


7 Block Diagrams

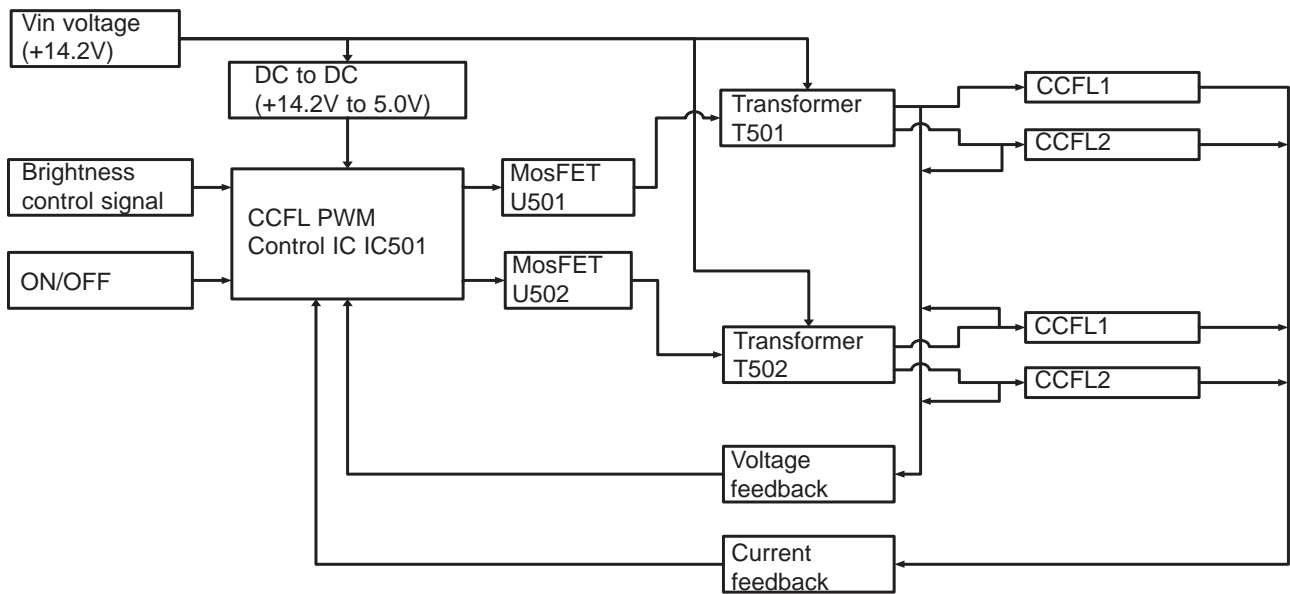
7-2 Mainboard part



7-3 IP Board Part(SMPS Part)



7-4 IP BOARD part(Inverter Part)



Memo

8 Block Diagram

30	VLCD5V
29	VLCD5V
28	VLCD5V
27	NC
26	NC
25	NC
24	GND
23	RXE3+
22	RXE3-
21	RXEC+
20	RXEC-
19	RXE2+
18	RXE2-
17	GND
16	RXE1+
15	RXE1-
14	GND
13	RXE0+
12	RXE0-
11	RXO3+
10	RXO3-
9	RXOC+
8	RXOC-
7	GND
6	RXO2+
5	RXO2-
4	RXO1+
3	RXO1-
2	RXO0+
1	RXO0-

CN104(Connected with LVDS Cable)

CN101(Connected with the Inverter Cable)

6	GND
5	GND
4	ON/OFF
3	Brightness
2	VCC5V
1	VCC5V

Main board

(Connected with function wire) CN106

1	Led
2	Power
3	Key Right
4	Key Left
5	GND

CN103(Connected with the D-Sub Cable)

Data clock line (SC	15
VSYNC	14
H / H+V SYNC	13
Serial data (SDA)	12
NC	11
Cable Detect	10
NC	9
Blue GND	8
Green GND	7
Red GND	6
GND	5
NC	4
Blue video input	3
Green video input	2
Red video input	1

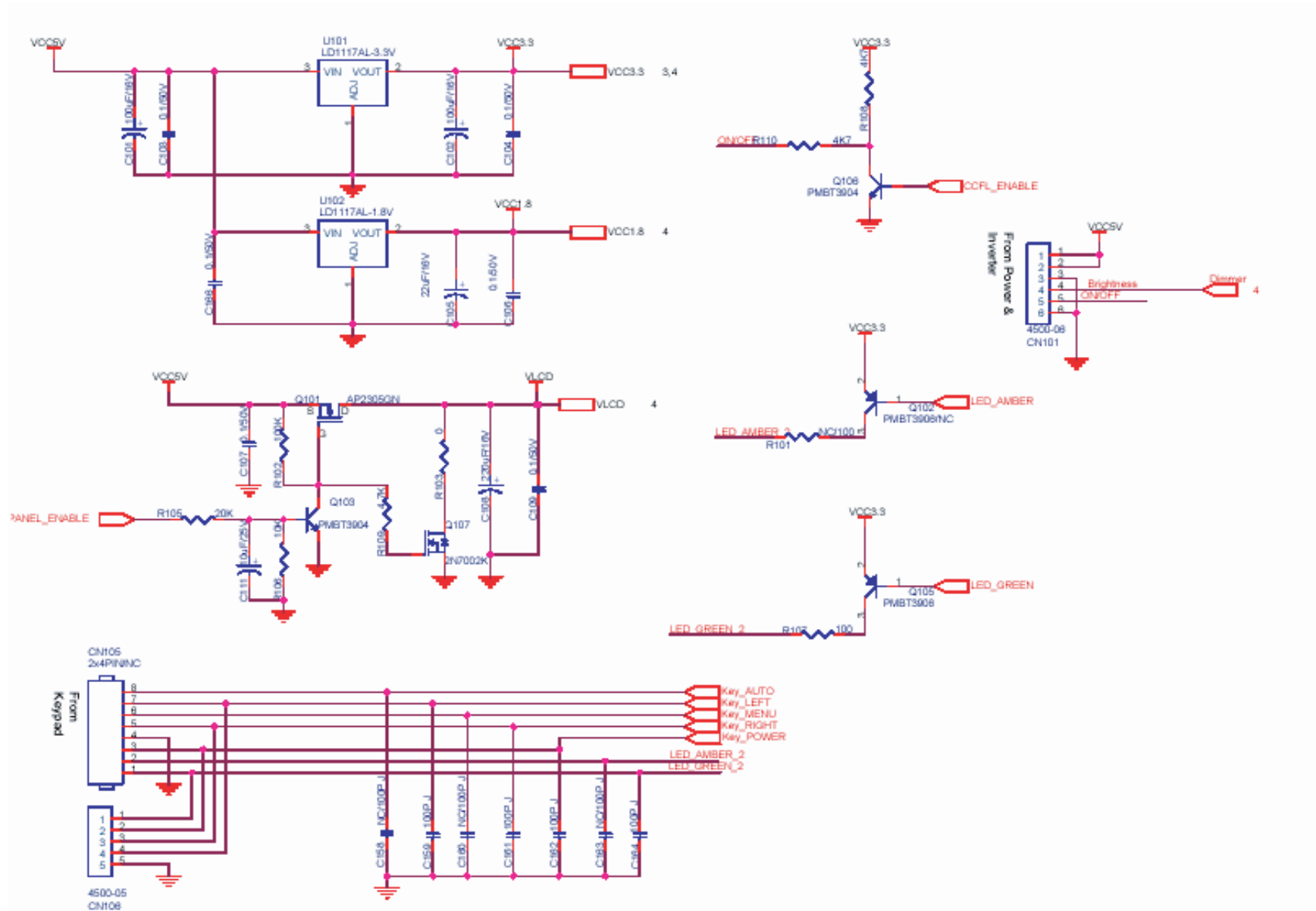
8 Wiring Diagram

Memo

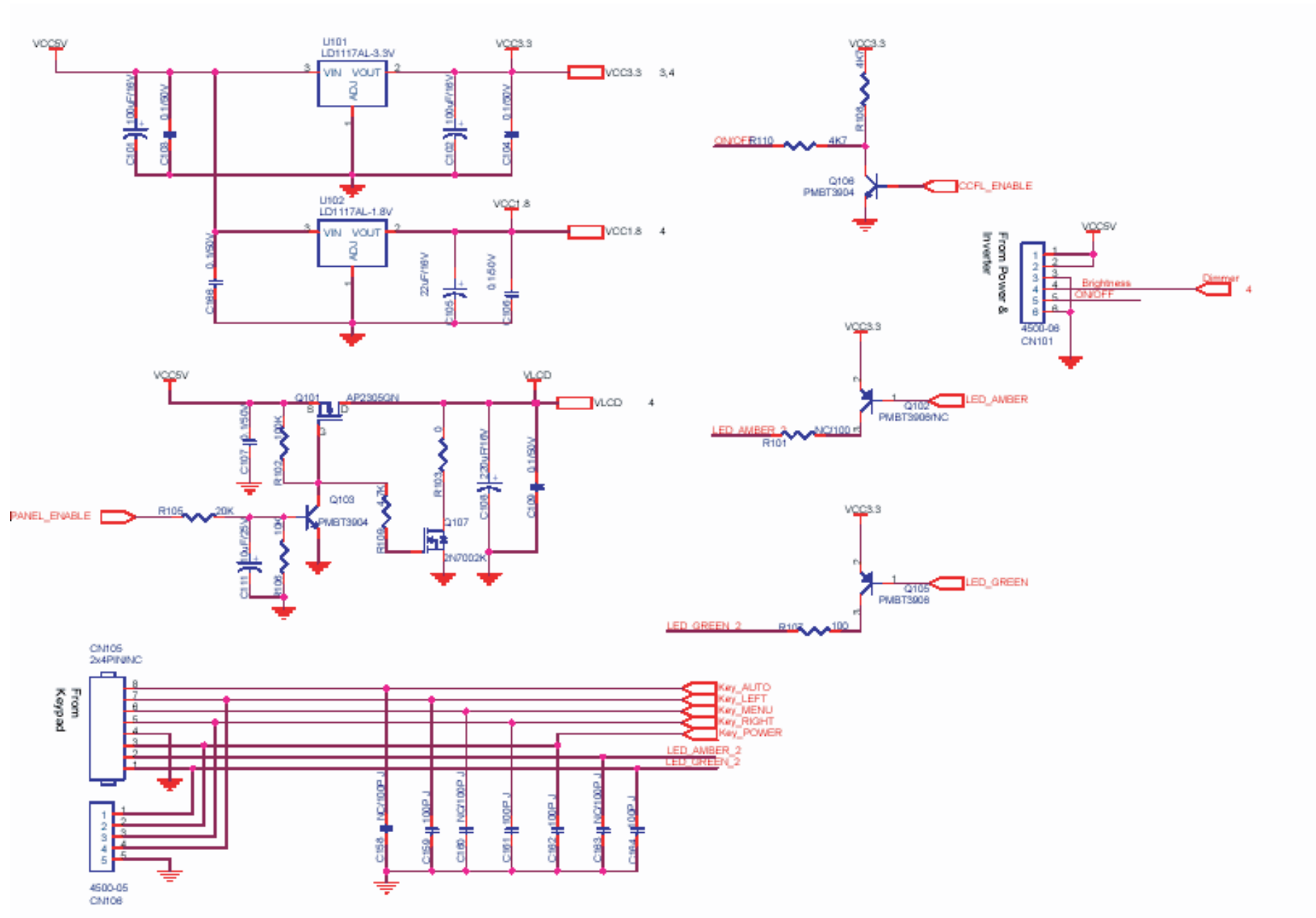
9 Schematic Diagrams

- This Document can not be used without Samsung's authorization.

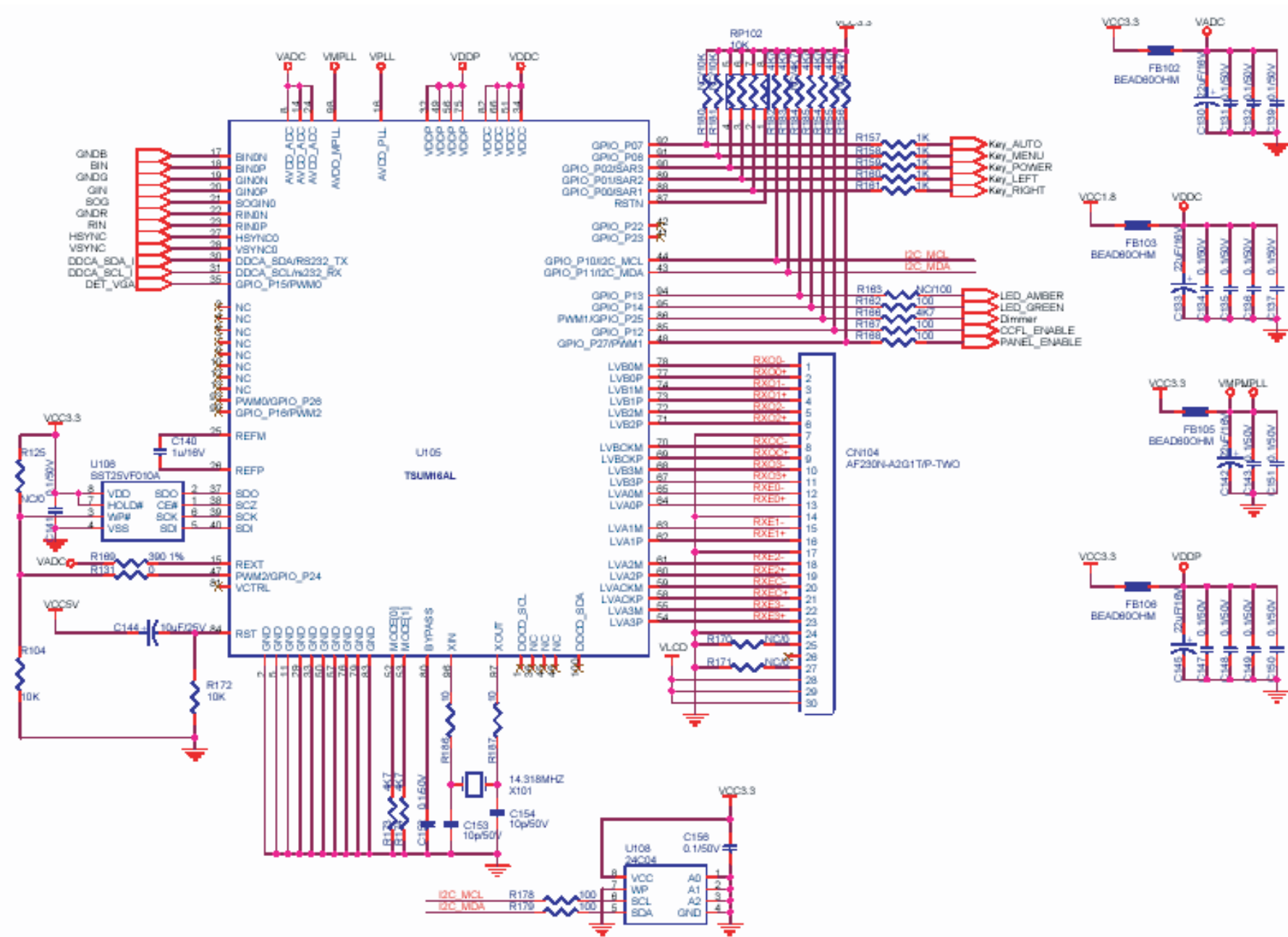
9-1 DC-DC



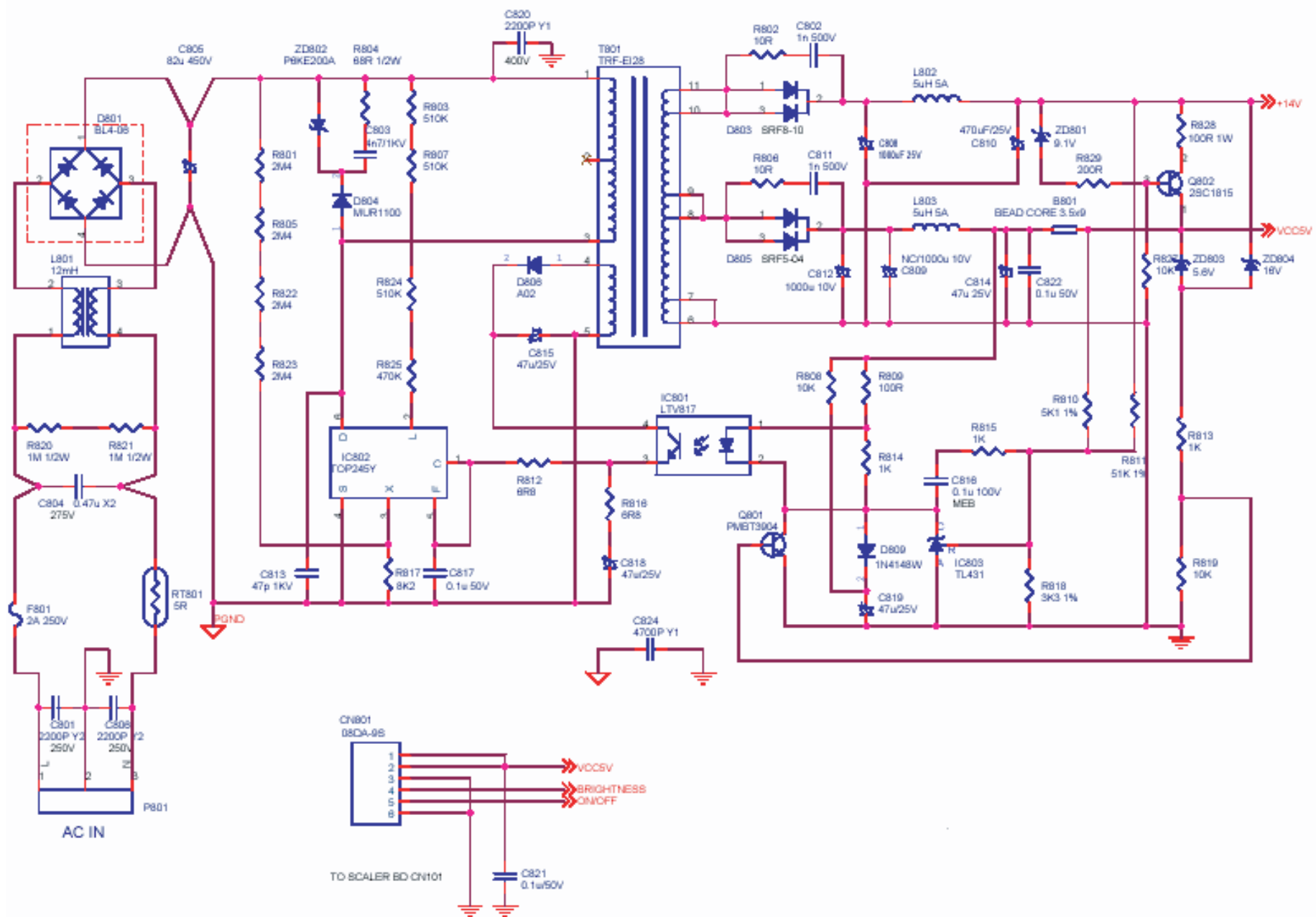
9-2 INPUT



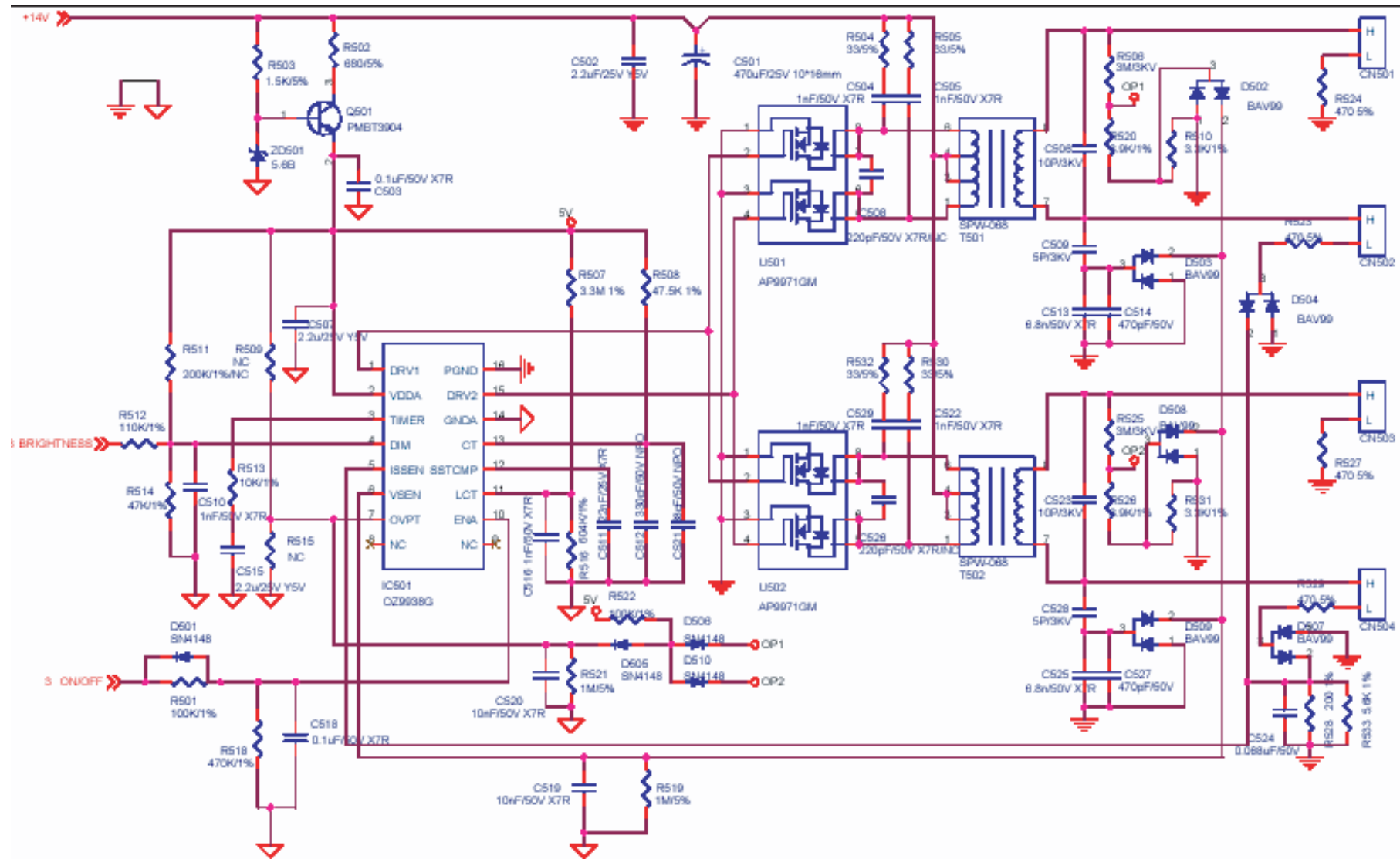
9-3 TSUM16AL



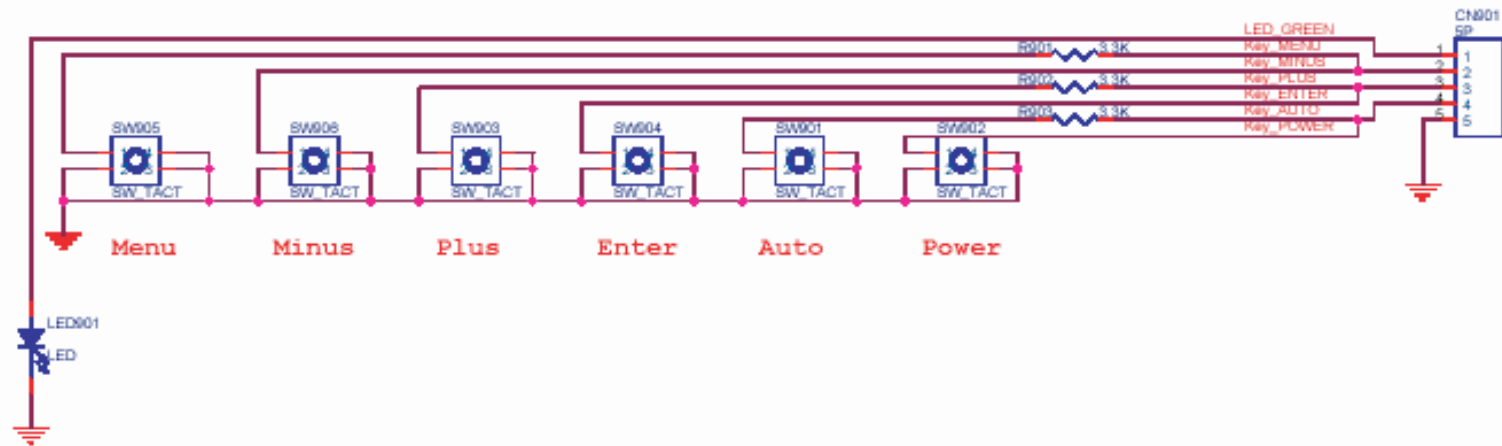
9-4 POWER



9-5 INVERTER



9-6 KEYPAD



10 Operating Instructions and Installation

10-1 Front



1. Menu button

Opens the OSD menu. Also use to exit the OSD menu or return to the previous menu.

2. MagicBright button

MagicBright is a new feature providing optimum viewing environment depending on the contents of the image you are watching. Currently six different modes are available: Custom, Text, Internet, Game, Sport and Movie. Each mode has its own pre-configured brightness value. You can easily select one of six settings by simply pressing MagicBright control buttons.

1) Custom

Although the values are carefully chosen by our engineers, the pre-configured values may not be comfortable to your eyes depending on your taste. If this is the case, adjust the brightness and contrast by using the OSD menu.

2) Text : Normal brightness

For documentations or works involving heavy text.

3) Internet : Medium brightness

For working with a mixture of images such as text and graphics.

4) Entertain

For watching motion pictures such as a DVD or Video CD

3. Brightness button

When OSD is not on the screen, push the button to adjust brightness.

2,3. Adjust buttons

Adjust items in the menu.

4. Enter button

Activates a highlighted menu item.

5. Auto button

Use this button for auto adjustment.

6. Power button / Power indicator

Use this button for turn the monitor on and off.

/This light glows green during normal operation, and blinks green once as the monitor saves your adjustments..

10-2 Rear



1. Power port

Connect the power cord for your monitor to the power port on the back of the monitor.

2. D-sub 15-pin port

Connect the signal cable to the 15-pin, D-sub connector on the back of your monitor.

3. Kensington Lock

The Kensington lock is a device used to physically fix the system when using it in a public place. (The locking device has to be purchased separately.)

To get the information on using the Kensington Lock, contact an authorized dealer.

10-3 Monitor Assembly



10-4 Attaching a Base



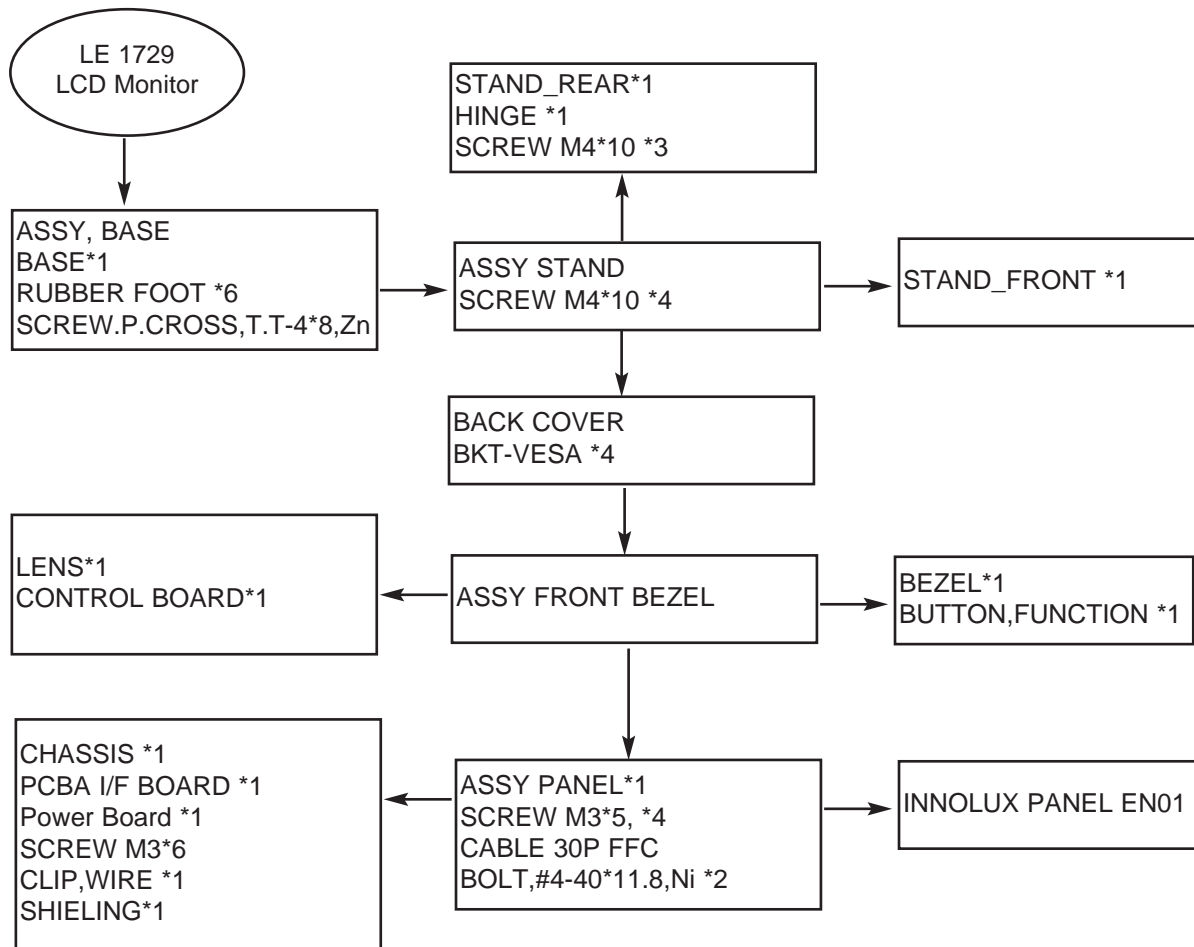
A. Monitor

B. Mounting interface pad

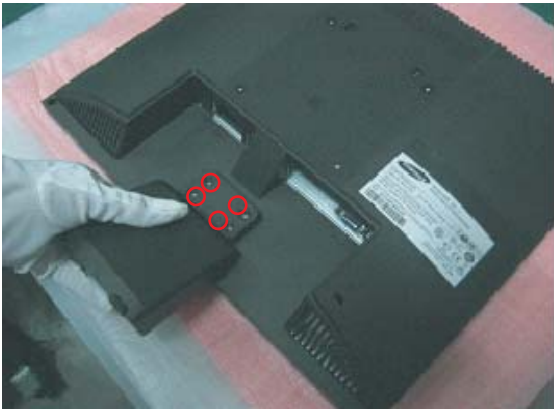

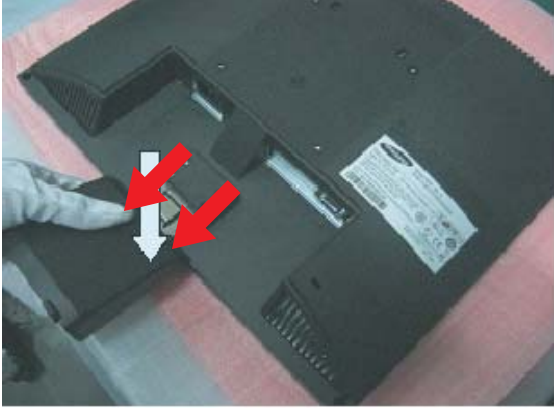
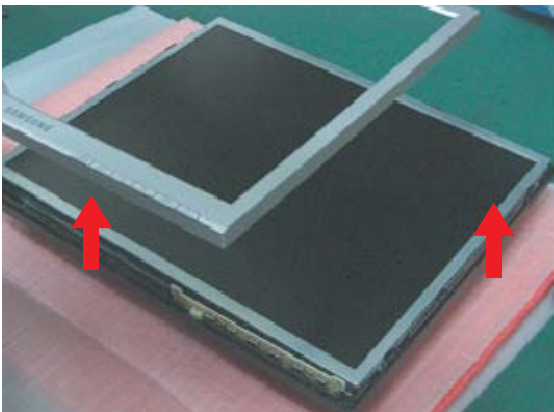
1. Turn off your monitor and unplug its power cord.
2. Lay the LCD monitor face-down on a flat surface with a cushion beneath it to protect the screen.
3. Remove four screws and then remove the stand from the LCD monitor.
4. Align the mounting interface Pad with the holes in the rear cover mounting pad and secure it with four screws that came with the arm-type base, wall mount hanger or other base.

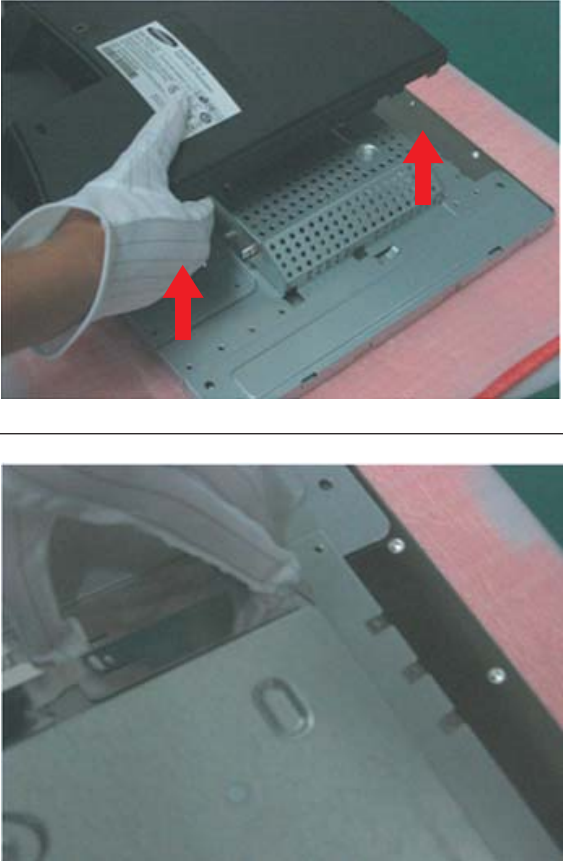
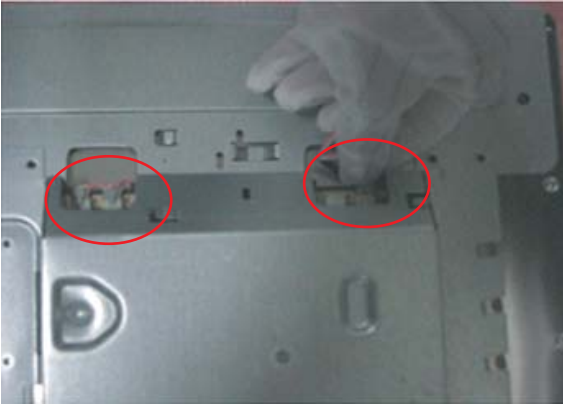

11 Disassembly and Reassembly


11-1 Disassembly Block



Note: The DIS assembly direction please following direction of arrowhead

Description	Picture Description
<p>1. Remove 4 screw from the stand</p>	
	
<p>2. Remove the stand and front color</p>	
	

Description	Picture Description
3. Lift the back cover and use the jig to remove the shield lamp.	
4. Disconnect cables	
5. Lift up the shield and disconnect LVDS cables	

Description	Picture Description
6. Lift up the LCD panel	

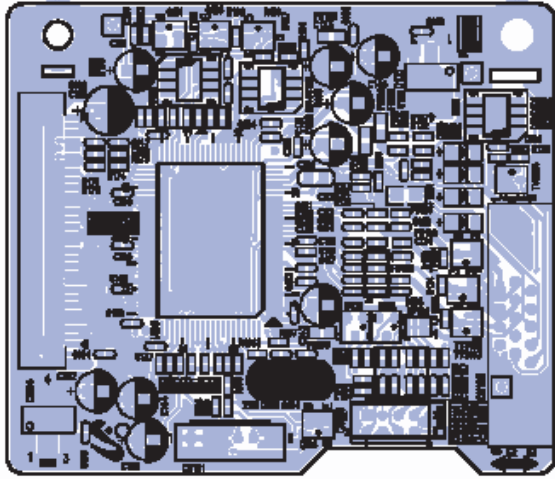
11-2 Reassembly

Reassembly procedures are in the reverse order of disassembly procedures.

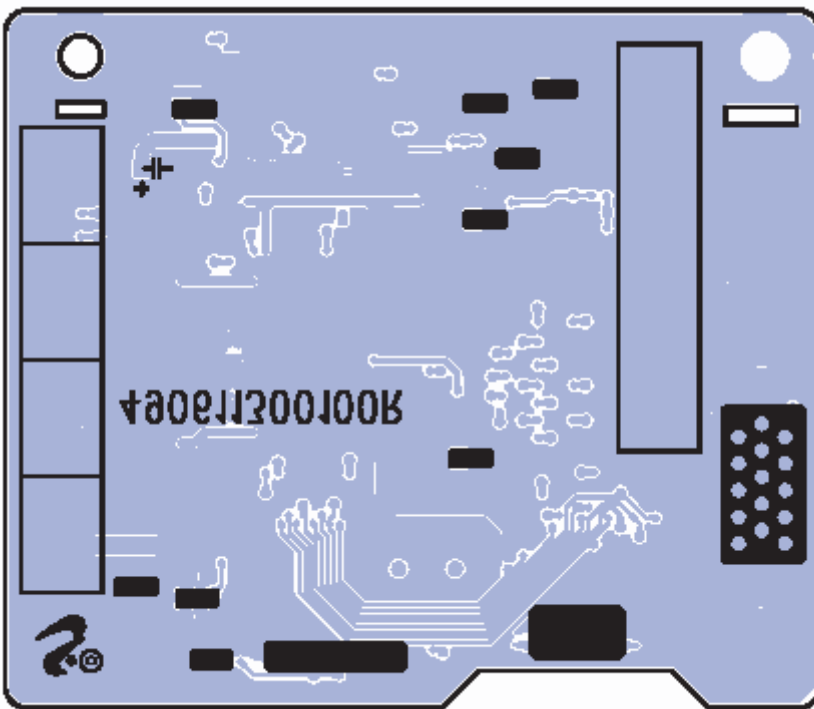
12 PCB Diagram

12-1 Main Board

12-1-1 Main Board Top Layer



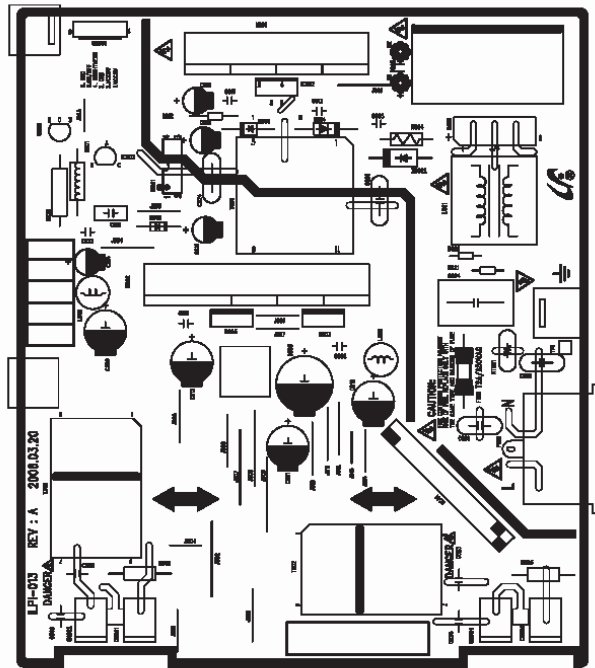
12-1-2 Main Board Bottom Layer



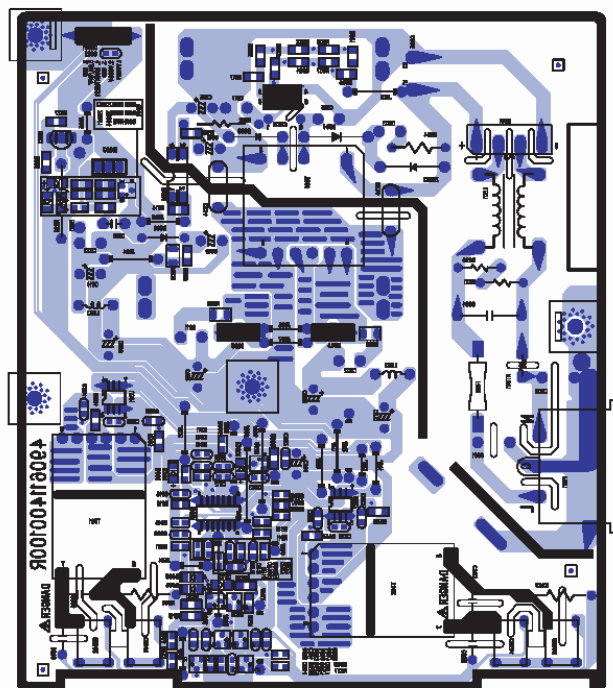
12 PCB Diagram

12-2 Power Board

12-2-1 Power Board TOP Layer



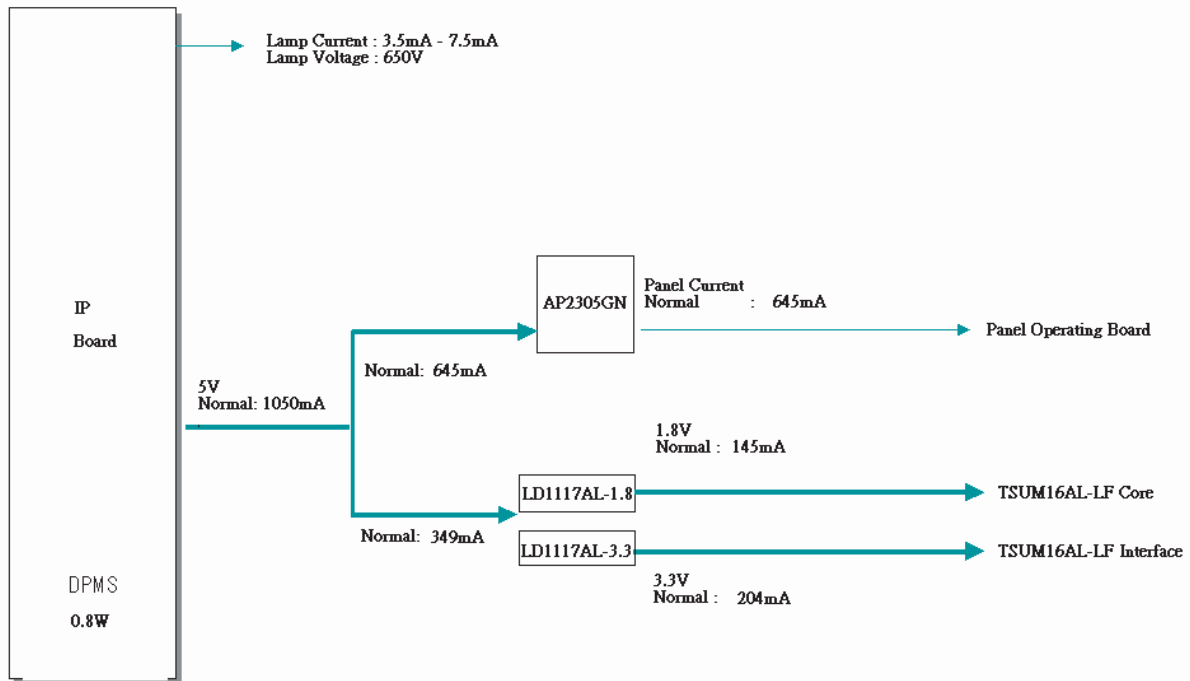
12-2-2 Power Board BOTTOM Layer



13 Circuit Descriptions

13-1 Overall Block Structure

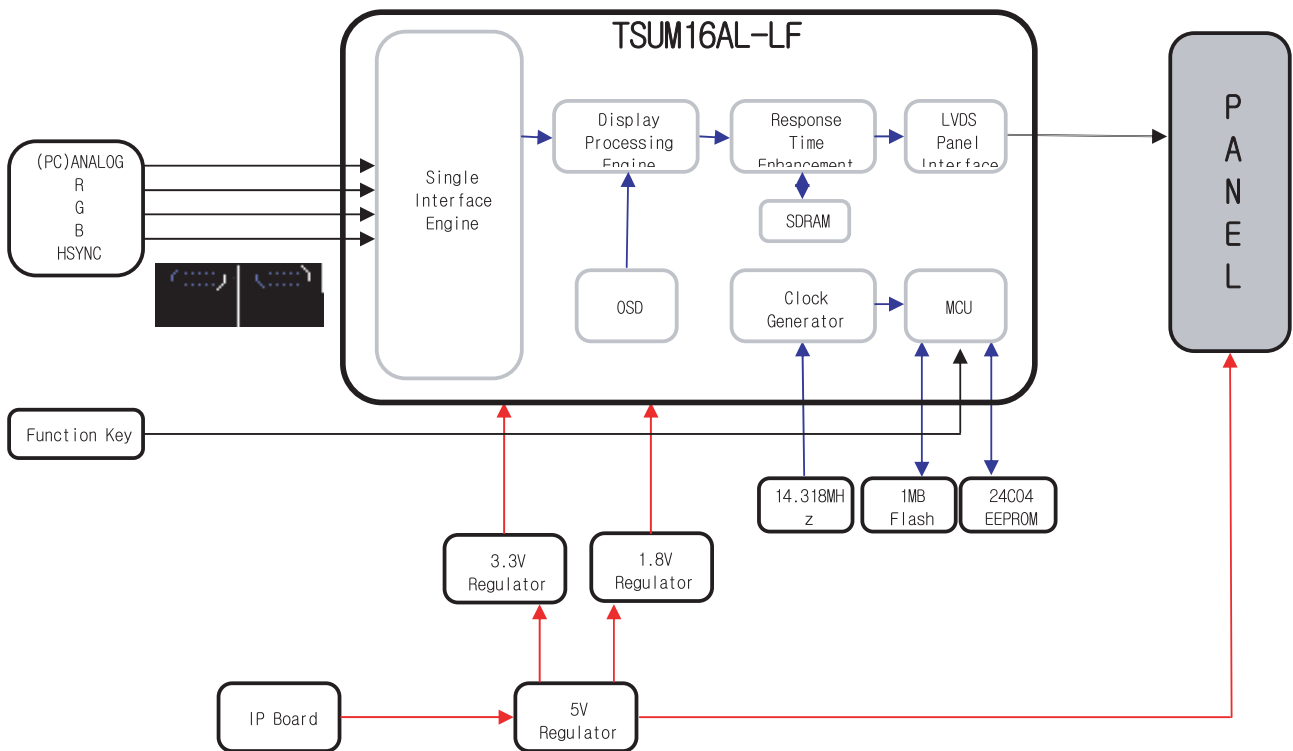
13-1-1 Power Tree



1. When the AD board is in DPMS state:
 - 1.1 The IP has been designed so that it operates with a power consumption of less than 0.6W of.
 - 1.2 The Scaler consumes power up to 37mA
 - 1.3 The power to the panel is switched off
2. When the AD board is operating normally:
 - 2.1 The maximum power consumption of the panel lamps is described below (It may vary depending on the panel manufacturer)

$$17'' : 4 * (7.0mA * 650V_{rms}) = 4 * 4.55W = 18.2W$$
 - 2.2 The power consumption of the Panel Control board is as follows: $5V * 645mA = 3.23W$
 - 2.3 The power consumption of the Scaler is as follows: $3.3V * 204mA + 1.8V * 145mA = 0.93W$

13-1-2 Main board Parts



1. Inverter: A conversion device that converts DC rated voltage/current to high ones necessary for the panel lamp.

2. DC/DC(Regulator): General term for DC to DC converting devices. The IP board receives 5V and outputs 1.8 or 3.3V that is supplied to the scaler (TSUM16AL-LF).

3. Power MosFET: The IP board receives 5V and outputs a lower voltage in DPMS mode and supplies the whole 5V for the panel operating board in normal conditions. In that case, the switching of Power MosFET is controlled by Micom.

4. Scaler: Receives the analog R,G,B signals and convert them to proper resolutions using up- or down- scaling that are transferred to the panel in the LDVS formats.

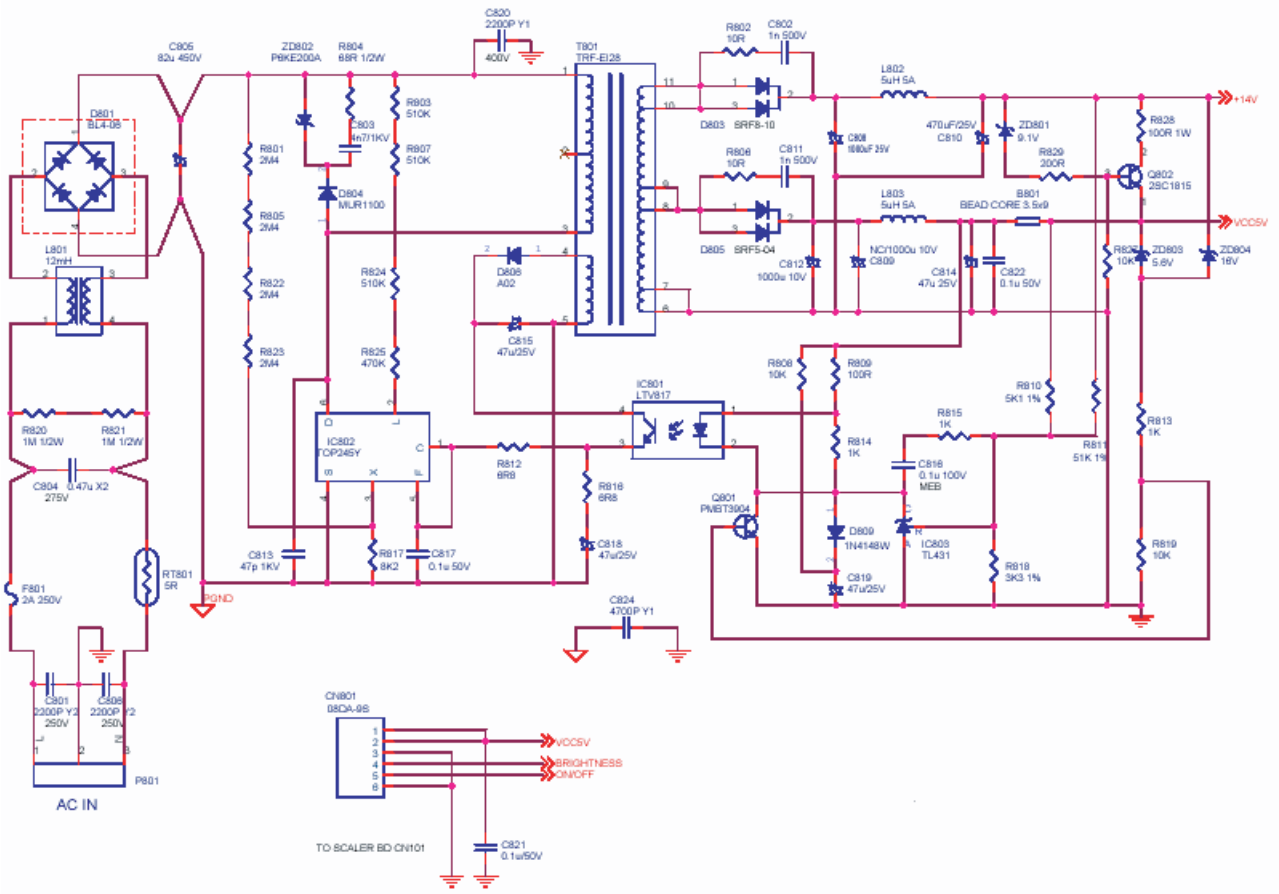
5. Crystal(Oscillator): Use one 14.318MHz oscillator externally to supply power to both MCU and Scaler at the same time.

6. Scaler & EEPROM: I2C is a two-way serial bus of two lines that supports communications across the integrated circuits as well as between FLASH and EEPROM.

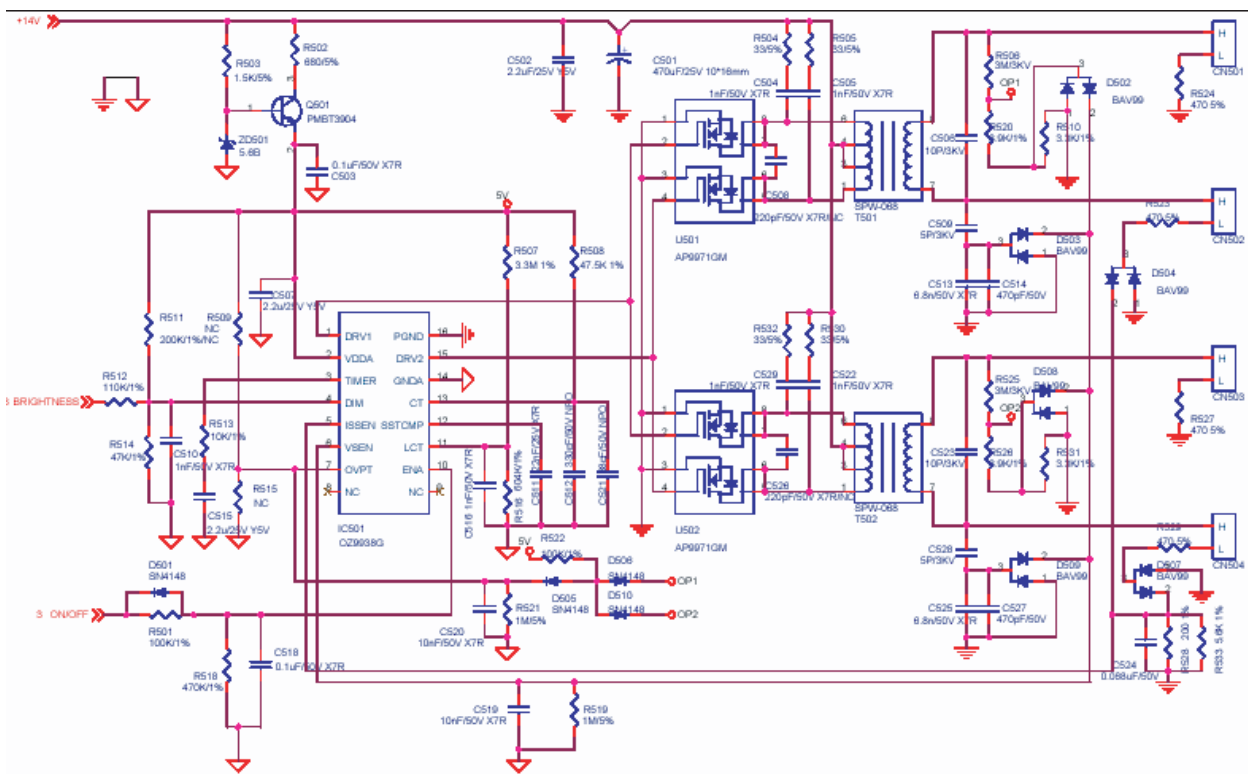
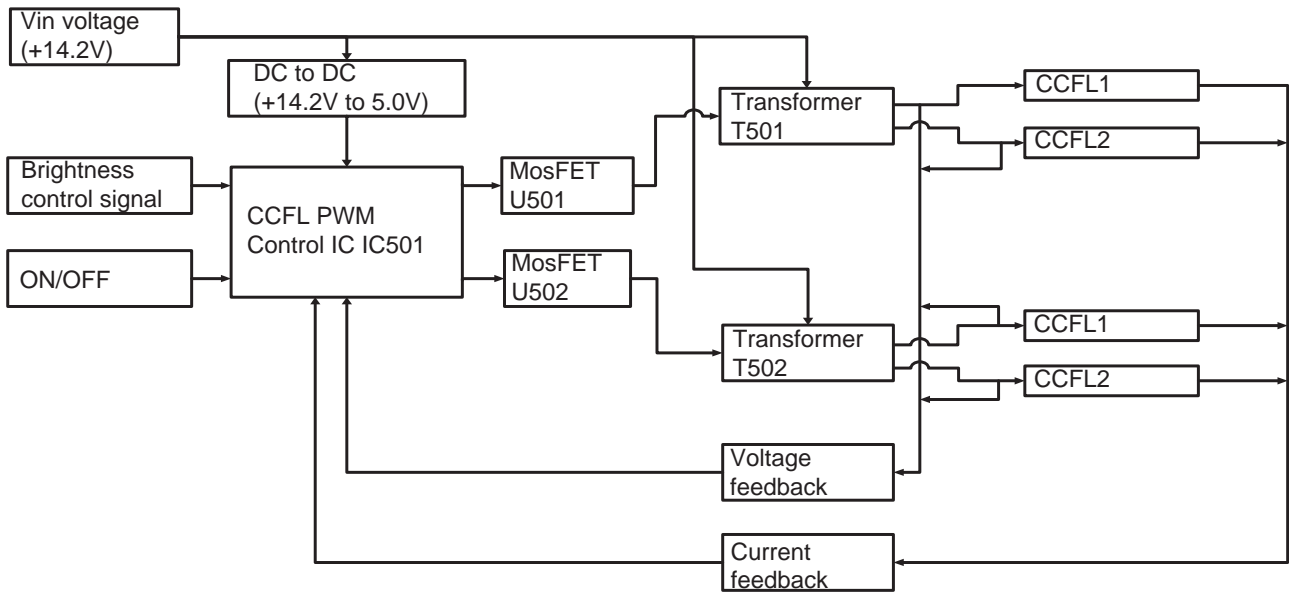
In particular, MCU(TSUM16AL-LF) and use the SDR direct bus for mutual communications, which is an effective, speedy system because it allows 4 additional address/data lines compared to the old serial systems.

7. Function Key: A certain keystroke generates a certain electrical potential, which is transferred into ADC input port of the MCU and then converted to a digital value by the A/D converter of the chip. The digital value (data) is a clue to which key is entered.

13-1-3 IP Board Part(Power) Schematic Diagrams



13-2 IP BOARD part(Inverter Part)



14 Reference Information

14-1 Technical Terms

-TFT-LCD

Thin film Transistor Liquid Crystal Display

-ADC(Analog to Digital Converter)

This is a circuit that converts from analog signal to digital signals.

-PLL(Phase Locked Loop)

During progressing ADC, Device makes clock synchronizing HSYNC with Video clock

-Inverter

Device that supplies Power to LCD panel lamp. This device generates about 1,500~2,000V.

AC Adapter

Device that converts AC(90V~240V) to DC(+12V or 14V)

-SMPS(Switching Mode Power Supply)

Switching Mode Power supply. This design technology is used to step up/down the input power by switching on/off

-FRC(Frame Rate Controller)

Technology that changes the number of frames displayed on screen per second. TFT-LCD panel requires 60 frames per second. This technology is needed to convert input image to 60 frames per second regardless input frame quantity.

-Image Scaler

Technology that convert various input resolution to other resolution.(ex. 640* 480 to 1024*768)

-Auto Configuration(Auto adjustment)

This is an algorithm to adjust monitor to optimum condition by pushing one key.

-OSD(On Screen Display)

Customers can easily control the screen settings using the OSD.

-FINE

The "Fine" adjustment is used to adjust visibility by controlling phase difference.

-COARSE

This adjustment adjusts the display by tuning Video clock and PLL clock.

-L.V.D.S.(Low Voltage Differential Signaling)

A kind of transmission method for Digital. It can be used from Main PBA to Panel.

-DDC(Display data channel)

It is a communication method between a Host Computer and related equipment. It enables Plug and Play between PC and Monitor.

-EDID

Extended Display Identification Data PC can recognize monitor information, such as Product data, Product name, Display mode, Serial number, Signal source, etc. Data is recognized via DDC Line linking PC and Monitor.

-Dot Pitch

The image on a monitor is composed of red, green and blue dots. The closer the dots, the higher the resolution. The distance between two dots of the same color is called the 'Dot Pitch'. Unit: mm

-Vertical Frequency

The screen must be redrawn several times per second in order to create and display an image for the user. The frequency of this repetition per second is called Vertical Frequency or Refresh Rate. Unit: Hz Example: If the same light repeats itself 60 times per second, this is regarded as 60 Hz.

-Horizontal Frequency

The time to scan one line connecting the right edge to the left edge of the screen horizontally is called Horizontal Cycle. The inverse number of the Horizontal Cycle is called Horizontal Frequency. Unit: kHz

-Interlace and Non-Interlace Methods

Showing the horizontal lines of the screen from the top to the bottom in order is called the Non-Interlace method while showing odd lines and then even lines in turn is called the Interlace method. The Non-Interlace method is used for the majority of monitors to ensure a clear image. The Interlace method is the same as that used in TVs.

-Plug & Play

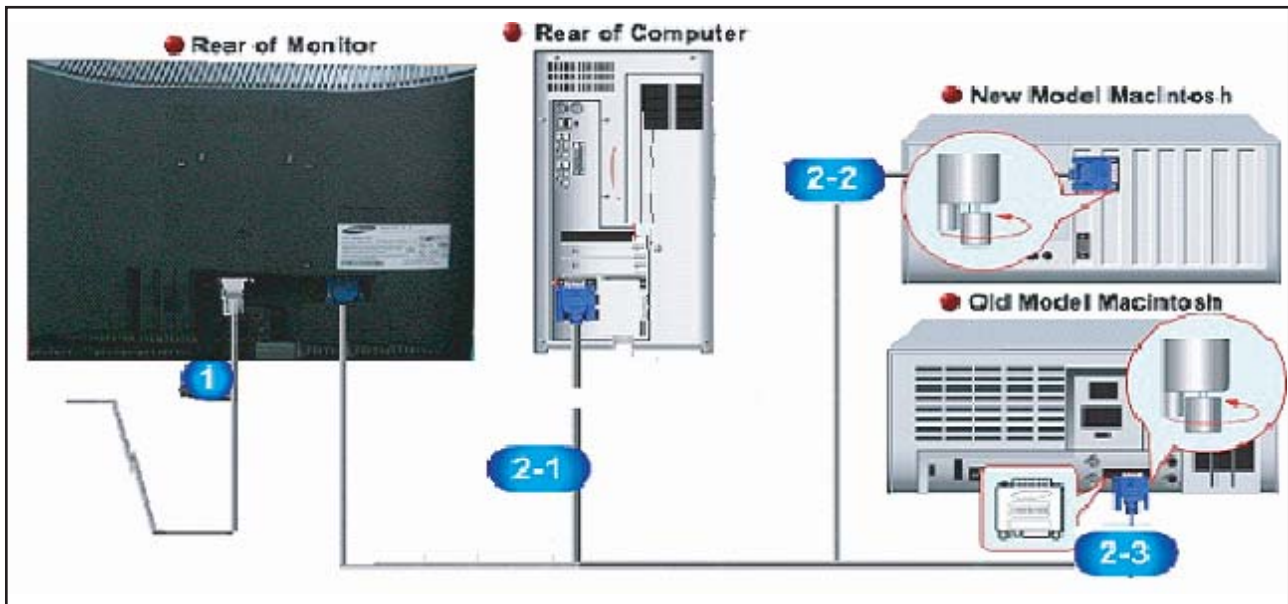
This is a function that provides the best quality screen for the user by allowing the computer and the monitor to exchange information automatically. This monitor follows the international standard VESA DDC for the Plug & Play function.

-Resolution

The number of horizontal and vertical dots used to compose the screen image is called 'resolution'. This number shows the accuracy of the display. High resolution is good for performing multiple tasks as more image information can be shown on the screen.

Example: If the resolution is 1280 x 1024 , this means the screen is composed of 1280 horizontal dots (horizontal resolution) and 1024 vertical lines (vertical resolution).

14-2 Connecting the monitor



1. Connect the power cord for your monitor to the power port on the back of the monitor. Plug the power cord for the monitor into a nearby outlet.
- 2-1. Using the D-sub (Analog) connector on the video card.
Connect the signal cable to the 15-pin, D-sub connector on the back of your monitor.



- 2-2. Connected to a Macintosh.
Connect the monitor to the Macintosh computer using the D-SUB connection cable.
- 2-3. In the case of an old model Macintosh, you need to connect the monitor using a special Mac adapter.
3. Turn on your computer and monitor. If your monitor displays an image, installation is complete.

14-3 Pin Assignments

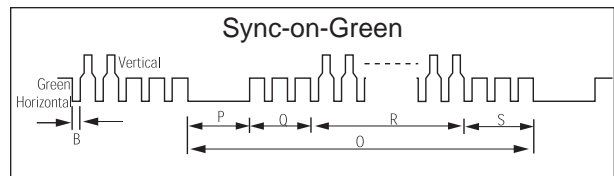
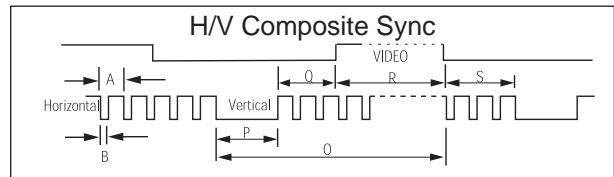
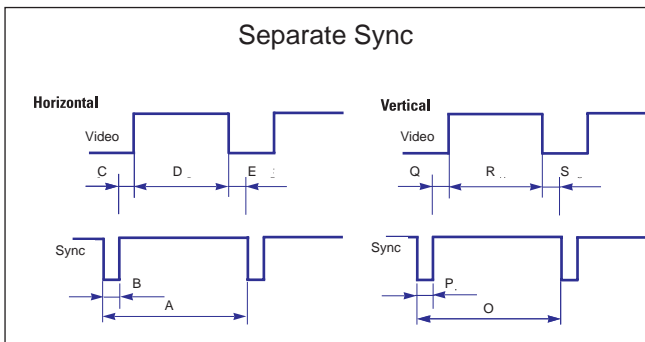
Pin No.	Sync Type	15-Pin D-Sub Signal Cable Connector	
		Separate	Sync-on-green
1		Red	Red
2		Green	Green + H/V Sync.
3		Blue	Blue
4		NC	NC
5		DDC Return (GND)	DDC Return (GND)
6		GND-R	GND-R
7		GND-G	GND-G
8		GND-B	GND-B
9		NC	NC
10		Cable Detect	Cable Detect
11		NC	NC
12		Bi-Dr Data (SDA)	Bi-Dr Data (SDA)
13		H-Sync.	Not Used
14		V-Sync.	Not Used
15		DDC Clock (SCL)	DDC Clock (SCL)

14-4 Timing Chart

- This section of the service manual describes the timing that the computer industry recognizes as standard for computer-generated video signals.

Table 1 Timing Chart

No	Name	Timing ID	dot_clk (MHz)	h_freq (kHz)	v_freq (Hz)
1	IBM 640*350/70Hz	640*350/70Hz	25.175	31.469	70
2	IBM 720*400/70Hz	720*400/70Hz	28.322	31.469	70
3	IBM 640*480/60Hz	640*480/60Hz	25.175	31.469	60
4	MAC 640*480/67Hz	640*480/67Hz	30.240	35.000	66.7
5	VESA 640*480/72Hz	640*480/72Hz	31.500	37.861	72
6	VESA 640*480/75Hz	640*480/75Hz	31.500	37.500	75
7	VESA 800*600/56Hz	800*600/56Hz	36.000	35.156	56
8	VESA 800*600/60Hz	800*600/60Hz	40.000	37.879	60
9	VESA 800*600/72Hz	800*600/72Hz	50.000	48.077	72
10	VESA 800*600/75Hz	800*600/75Hz	49.500	46.875	75
11	MAC 832*624/75Hz	832*624/75Hz	57.284	49.726	75
12	VESA 1024*768/60Hz	1024*768/60Hz	65.000	48.363	60
13	VESA 1024*768/70Hz	1024*768/70Hz	75.000	56.476	70
14	VESA 1024*768/75Hz	1024*768/75Hz	78.750	60.023	75
15	VESA 1152*864/75Hz	1152*864/75Hz	108.000	67.500	75
16	MAC 1152*870/75Hz	1152*870/75Hz	100.000	68.681	75
17	VESA 1280*1024/60Hz	1280*1024/60Hz	108.000	63.981	60
18	VESA 1280*1024/75Hz	1280*1024/75Hz	135.000	79.976	75



A : Line time total
 B : Horizontal sync width
 C : Back porch
 D : Active time
 E : Front porch

O : Frame time total
 P : Vertical sync width
 Q : Back porch
 R : Active time
 S : Front porch

14-5 Preset Timing Modes

- If the signal transferred from the computer is the same as the following Preset Timing Modes, the screen will be adjusted automatically. However, if the signal differs, the screen may go blank while the power LED is on. Refer to the video card manual and adjust the screen as follows.

TIMING	FH(KHZ) FV(HZ)	SYNC POLARITY	TOTAL (DOT/LINE)	ACTIVE (DOT/LINE)	SYNC WIDTH (DOT/LINE)	FRONT PORCH (DOT/LINE)	BACK PORCH (DOT/LINE)	PIXEL FOREQ (MHZ)
IBM 640*350@70Hz	31.469	+	800	640	96	8	40	25.175
	70	-	449	350	2	31	54	
IBM 720*400@70Hz	31.469	-	900	720	108	9	45	28.322
	70	+	449	400	2	6	27	
IBM 640*480@60Hz	31.469	-	800	640	96	8	40	25.175
	60	-	525	480	2	2	25	
MAC 640*480@67Hz	35	-	864	640	64	64	96	30.24
	66.7	-	525	480	3	3	39	
VESA 640*480@72Hz	37.861	-	832	640	40	16	120	31.5
	72	-	520	480	3	1	20	
VESA 640*480@75Hz	37.5	-	840	640	64	16	120	31.5
	75	-	500	480	3	1	16	
VESA 800*600@56Hz	35.156	+	1024	800	72	24	128	36
	56	+/-	625	600	2	1	22	
VESA 800*600@60Hz	37.879	+	1056	800	128	40	88	40
	60	+	628	600	4	1	23	
VESA 800*600@72Hz	48.077	+	1040	800	120	56	64	50
	72	+	666	600	6	37	23	
VESA 800*600@75Hz	46.875	+	1056	800	80	16	160	49.5
	75	+	625	600	3	1	21	
MAC 832*624@75Hz	49.726	-	1152	832	64	32	224	57.284
	75	-	667	632	3	1	39	
VESA 1024*768@60Hz	48.363	-	1344	1024	136	24	160	65
	60	-	806	768	6	3	29	
VESA 1024*768@70Hz	56.476	-	1328	1024	136	24	144	75
	70	-	806	768	6	3	29	
VESA 1024*768@75Hz	60.023	+	1312	1024	96	16	176	78.75
	75	+	800	768	3	1	28	
VESA 1152*864@75Hz	67.5	+	1600	1152	128	64	256	108
	75	+	900	864	3	1	32	
MAC 1152*870@75Hz	68.681	-	1456	1152	128	32	144	100
	75	-	915	870	3	3	39	
VESA 1280*1024@60Hz	63.981	+	1688	1280	112	48	248	108
	60	+	1066	1024	3	1	38	
VESA 1280*1024@75Hz	79.976	+	1688	1280	144	16	248	135
	75	+	1066	1024	3	1	38	

Horizontal Frequency

The time to scan one line connecting the right edge to the left edge of the screen horizontally is called Horizontal Cycle and the inverse number of the Horizontal Cycle is called Horizontal Frequency. Unit: kHz

Vertical Frequency

Like a fluorescent lamp, the screen has to repeat the same image many times per second to display an image to the user. The frequency of this repetition is called Vertical Frequency or Refresh Rate. Unit: Hz

14-6 Panel Description

Maker	VENDOR P/N	PANEL_CODE	PANEL_ABB	STICKER_CODE	Remarks
INL CPT	631102071830r 631102070680r				LCD PANEL 17" MT170EN01 LCS PANEL 17" CLAA170EA07Q(CPT)

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