

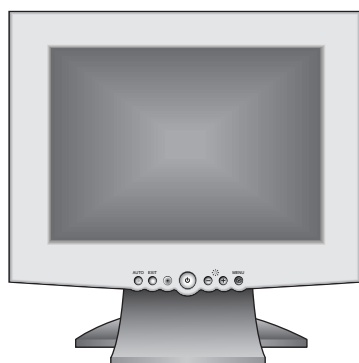


TFT-LCD MONITOR

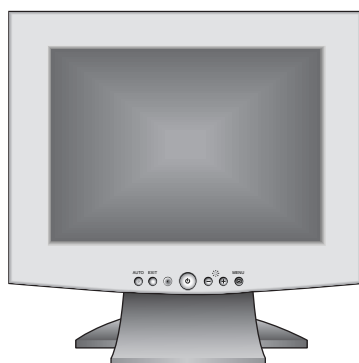
CN15V*

SERVICE *Manual*

TFT-LCD MONITOR



CN15VS



CN15VO

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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.
3. When the chassis is operating, semiconductor heatsinks are potential shock hazards.

1-1-2 Servicing the LCD Monitor

1. When servicing the LCD Monitor, remove the static charge by connecting a 10k ohm resistor in series with an insulated wire (such as a test probe) between the chassis and the anode lead. (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*).

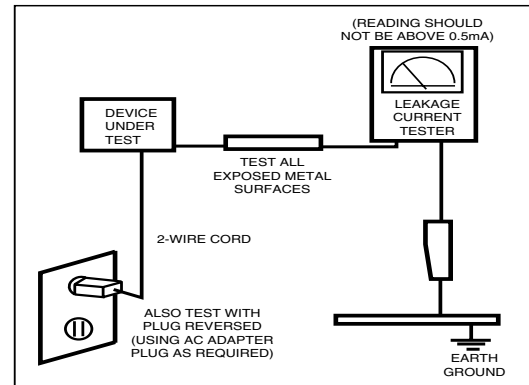


Figure 1-1. Leakage Current Test Circuit

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 ⚠ 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.

2 Product Specifications

2-1 Specifications

Item	Description
LCD Panel	TFT-LCD panel, RGB vertical stripe, normally white, 15-Inch viewable, 0.297 (H) x 0.297 (V) pixel pitch
Scanning Frequency	Horizontal : 30 kHz ~ 61 kHz (Referring to Timing chart, Page 2-3, 2-4) Vertical : 50 Hz ~ 75 Hz (Referring to Timing chart, Page 2-3, 2-4)
Display Colors	16,003,008 colors
Maximum Resolution	Horizontal : 1024 Pixels Vertical : 768 Pixels
Input Video Signal	Analog, 0.714 Vp-p $\pm$ 5% positive at 75 Ω , internally terminated
Input Sync Signal	Type: Separate H/V sync, Composite H/V, Sync-on-Green, automatic synchronization without external switch of sync type Level: TTL level
Maximum Pixel Clock rate	80 MHz
Active Display Horizontal/Vertical	304.1 mm / 228.1 mm
AC power voltage & Frequency	AC 90 ~ 264 Volts, 60/50 Hz ~ 12V/3A
Power Consumption	25 W (normal)
Dimensions / Unit Weight / incl. Carton Unit (W x D x H) with:	
Standard base	385.4 x 364.7 x 173 mm / 5.20kg / 8.4kg
MultiMedia base	385.4 x 406.2 x 179 mm / 5.95kg / 9.6kg
Pivot MM base	385.4 x 406.2 x 179 mm / 5.95kg / 9.6kg
Angle Pivot base	385.4 x 431.6 x 179.9 mm / 6.6kg / 9.8kg
Wire-frame base	385.4 x 339.2 x 79.7 mm / 4.4kg / 7.6kg
Carton (W x D x H)	500 x 260 x 457 mm
Environmental Considerations	Operating Temperature : 50 °F ~ 104 °F (10 °C ~ 40 °C) Humidity : 10 % ~ 80 % Storage Temperature : 13 °F ~ 113 °F (-25 °C ~ 45 °C) Humidity : 5 % ~ 95 %
Audio Characteristics	• Built-in Microphone: High-sensitivity condenser microphone (mono) • Audio input: Left/Right Stereo phone jack, 0.5 Vrms • Sound output: 1.0 W (left) + 1.0 W (right)/THD 1% at 8ohm • Frequency response: 80 Hz~20 kHz (at -3dB) • Headphone: Max 50mW output (3.5-pi jack) • Speaker: Internal semi Dome (16ohm x 2)
• CN15V* complies with SWEDAC (MPR II) recommendations for reduced electromagnetic fields. • Designs and specifications are subject to change without prior notice.	

3 Disassembly and Reassembly

This section of the service manual describes the disassembly and reassembly procedures for the CN15V* monitor.

WARNING: This monitor contains electrostatically sensitive devices. Use with caution when handling these components.

3-1 Disassembly

- Cautions:**
1. Disconnect the monitor from the power source before disassembly.
 2. Follow these directions carefully; never use metal instruments to pry apart the cabinet.

3-1-1 Removing the Stand

1. Remove 4 screws in the hinge area.
2. Pry it off the back of the monitor.
3. Disconnect Power Cord and Signal Cable.

3-1-2 Main Body Disassembly

1. Remove 4 screws on the four corner of the Rear Cover.
2. Remove Rear Cover from the Front Cover.
3. Remove 11 screws on the Shield and remove the shield.
4. Disconnect Inverter wire, Function PCB wire and Interface wire.
Remove 4 screws on the Main PCB and remove 2 screws on the D sub shield.
5. Remove the Main PCB Assembly.
6. Remove 6 screws on the Inverter PCB Assembly and then remove it
7. Remove 6 screws on the Rear Panel Bracket.
8. Remove the Bracket Assembly from the Front Cover.
9. Remove 3 screws on the Function PCB from locking area of Function knob and remove Function PCB.
10. Remove 4 screws on the Shield of Panel.
11. Remove the Shield.
12. Remove Rear Bracket from Panel.
13. Remove 2 screws between Panel Rear and Inverter PCB.
14. Remove the Interface wire on the Rear Side of Panel.

3-1-3 Standard Stand Disassembly

1. Remove 5 screws from the Stand Rear
2. Remove 4 screws from the Stand Bottom.

3. Remove Stand Front from the Stand assembly.
4. Remove 2 screws from the Stand assembly.
5. Remove the Stand Rear from the Stand assembly.
6. Remove 5 screws on the Vesa Brkt from the Stand assembly.
7. Remove cover hinge from the Stand assembly.
8. Remove Stand Base from the Stand assembly.

3-1-4 Pivot Multi-media Stand Disassembly (option)

1. Stand the stand assembly with the base close to you.
2. Remove 4 screws on the back cover of the stand and remove it.
3. Stand the stand assembly upside down.
4. Remove 4 screws.
5. Disconnect CN805, CN806, CN807, CN808, CN809, CN812 and F1.
6. Remove the Back Cover of the Stand Front assembly.
7. Remove 4 screws on the external adaptor and remove the adaptor.
8. Remove 2 screws between hinge and Stand Body.
9. Remove the hinge.
10. Remove 2 screws on Audio main PCB and remove it.
11. Remove 2 screws on the Audio Function PCB and remove it.

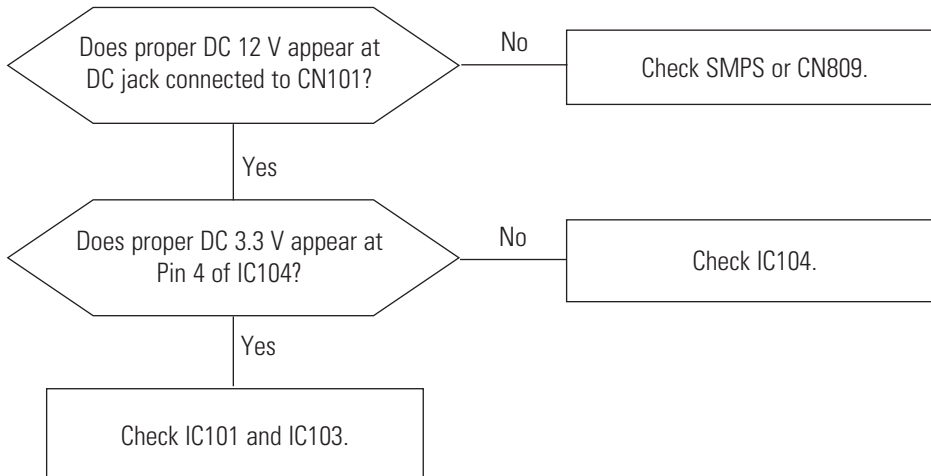
3-1-5 Angle Pivot Stand Disassembly (option)

1. Remove the cap pivot from the stand assembly.
2. Remove 4 screws on the hinge assembly.
3. Remove 4 screws on the Stand Rear.

4 Troubleshooting

- Notes:**
- Before troubleshooting, setup the PC's display as below.
 - Resolution: 1024 x 768
 - H-frequency: 48 kHz
 - V-frequency: 60 Hz
 - If no picture appears, make sure the power cord is correctly connected.
 - Check the following circuits.
 - No raster appears: Audio PCB, SMPS PCB, Main PCB
 - 12V develop but no screen: Main PCB
 - 12V does not develop: Audio PCB, SMPS PCB
 - If you push and hold the "EXIT" button for more than 5 seconds, the monitor automatically turns back to the factory preset.

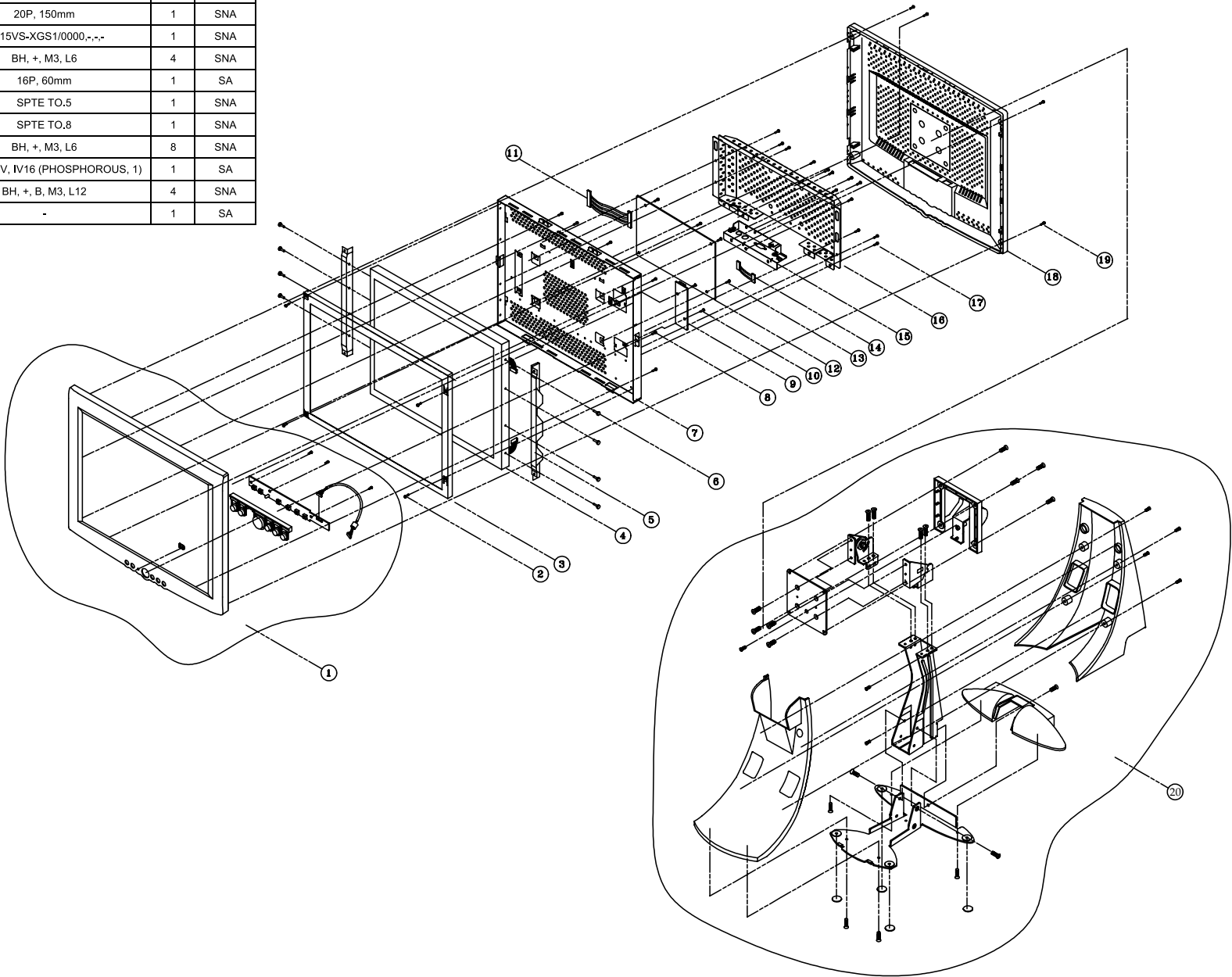
4-1 No Power



5 Exploded View and Parts List

5-1 Simple Base

NO	DESCRIPTION	PART NO	SPECIFICATION	Q'TY	REMARK
1	UNIT COVER FRONT	BN75-00015B	ABS+PS, 5V, IV16 (PHOSPHOROUS, 1)	1	SA
2	SCREW TAP TITE	6003-000135	BH, +, B, M3, L12	4	SNA
3	SHIELD FRONT	BN70-00015A	SPTE TO.5	1	SNA
4	LCD PANEL	BN07-00021A	TM150XG-22LO3	1	SA
5	SIDE BRKT L/R	BN71-00001A, 00002A	SUS T1.0	2	SNA
6	SCREW TAP TITE	6003-000125	RH, +, S,M2.5,L5,ZPC(YEL) SWRCH18A	8	SNA
7	UNIT BRKT PANEL	BN75-00127A	SECC T1.0	1	SNA
8	SCREW TAP TITE	6003-00135	BH, +, B, M3, L12	6	SNA
9	INVERTER	BN44-00048A	KO21025	1	SA
10	SCREW TAP TITE	6003-000177	BH, +, M3, L6	2	SNA
11	LVDS HARNESS	BN39-00036A	20P, 150mm	1	SNA
12	MAIN PCB ASS'Y	BN98-00032A	CN15VS-XGS1/0000,-,-,-	1	SNA
13	SCREW TAP TITE	6003-000177	BH, +, M3, L6	4	SNA
14	INVERTER HARNESS	BN39-00002A	16P, 60mm	1	SA
15	SHIELD D-SUB	BN70-00018A	SPTE TO.5	1	SNA
16	SHIELD PCB	BN70-00017A	SPTE TO.8	1	SNA
17	SCREW TAP TITE	6003-000177	BH, +, M3, L6	8	SNA
18	COVER REAR	BN72-00007A	ABS+PS, 5V, IV16 (PHOSPHOROUS, 1)	1	SA
19	SCREW TAP TITE	6003-000135	BH, +, B, M3, L12	4	SNA
20	UNIT STAND MULTI	BN59-00017A	-	1	SA

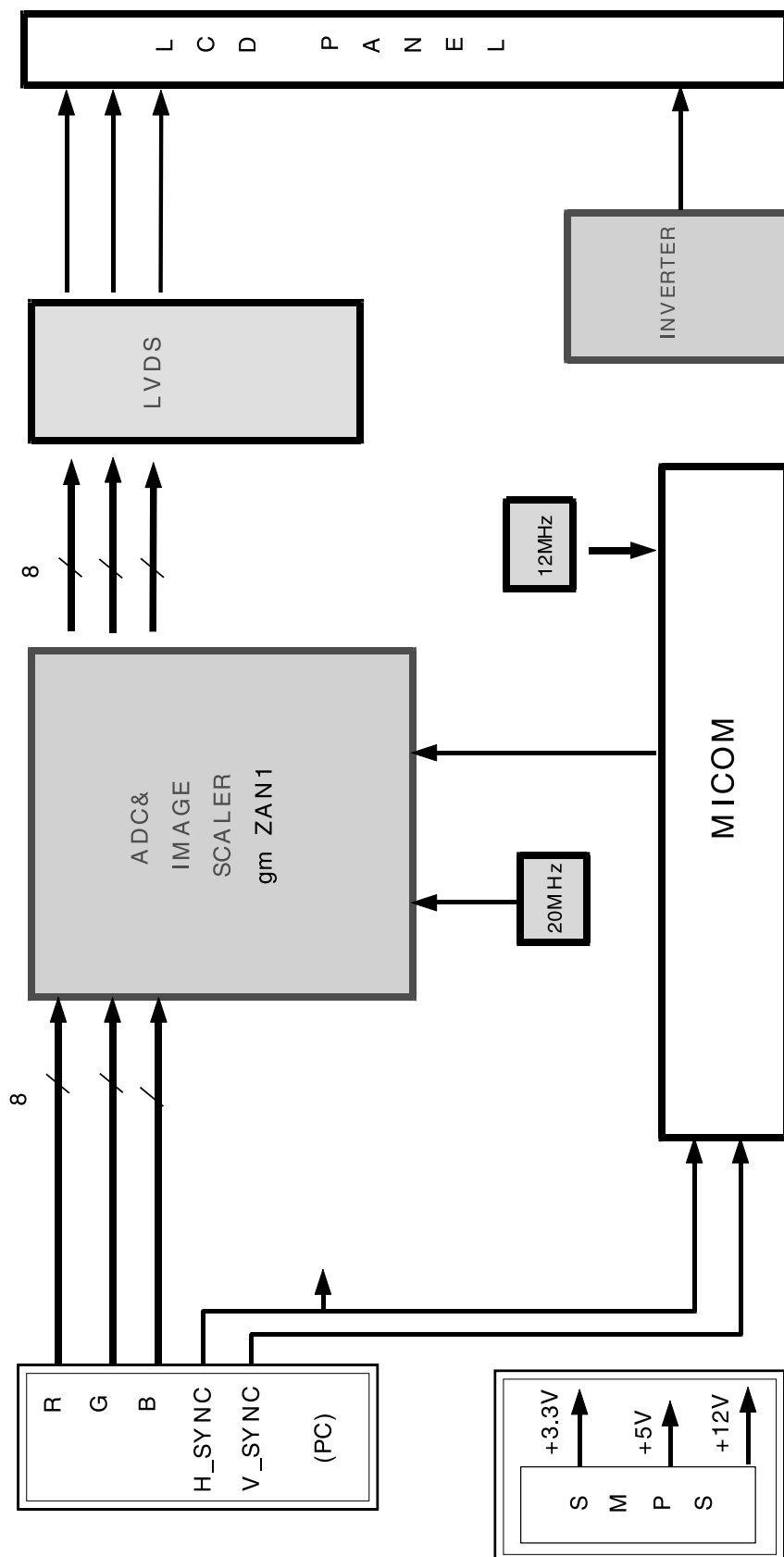


6 Electrical Parts List

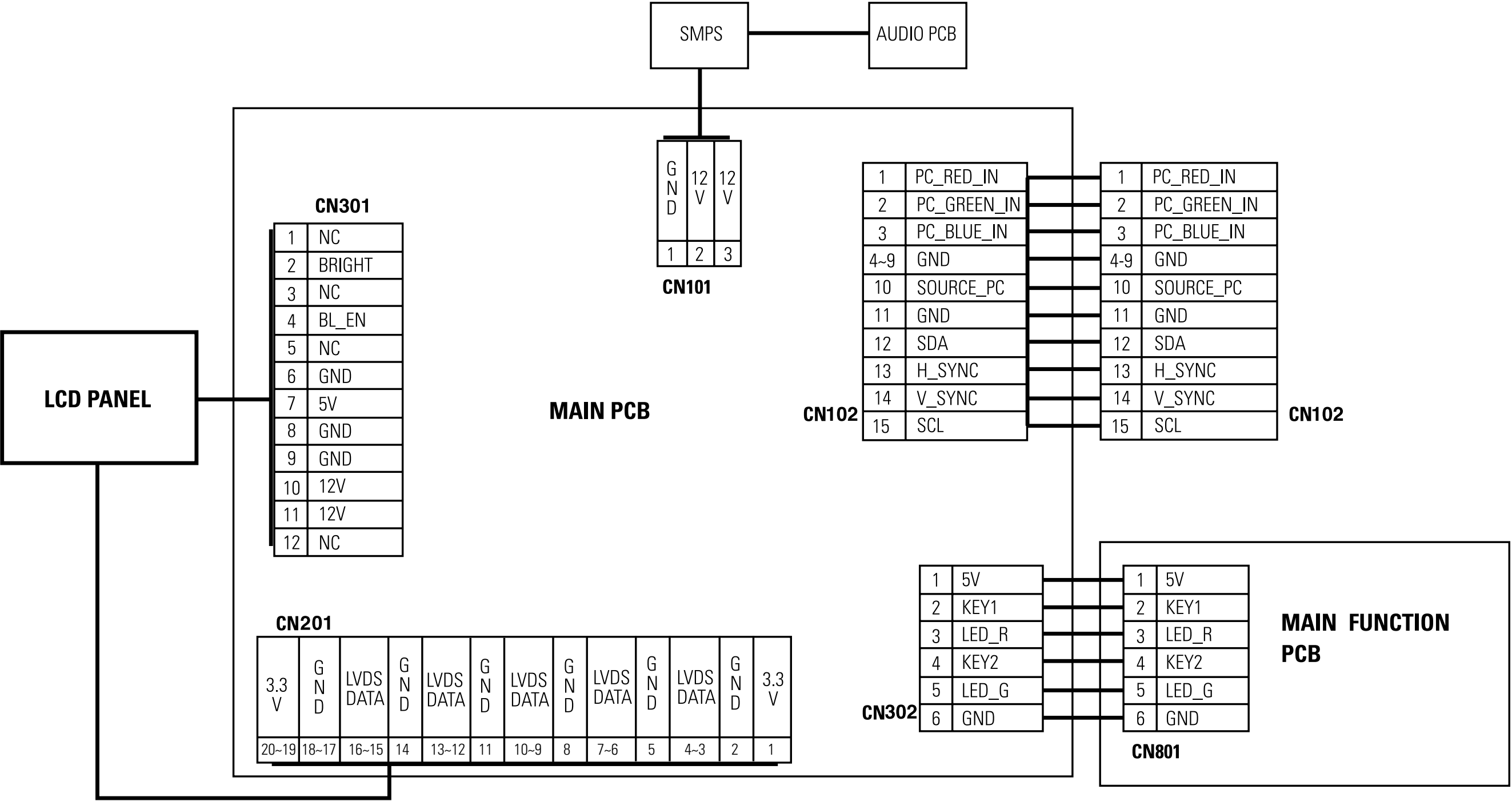
6-1 Main PCB Parts

Loc. No.	Code No.	Description	Specification	Remarks
CIS	3704-001071	SOCKET-IC	42P,DIP,SN,1.778mm	
CIS	BN70-00018A	SHIELD-D/SUB	RN15AS,SPT,E,0.5,-,-	SNA
CIS	BN46-00007M	MICOM-S/W,NILL(L01)	NILL(L01),-,-,-,-,-,-	SNA
CN101	3722-000117	JACK-DC POWER	3P,3.5mm,AG,BLK,NO	SNA
CN102	3701-001160	CONNECTOR-DSUB	15P,3R,FEMALE,ANGLE,AU15U	
IC301	0903-001194	IC-MICROCONTROLLER	3P863,8Bit,SDIP,42P,600MIL,12MHz,ST,CMOS,PLASTIC,5V,-,-40to+85C,1040BYTE,48KBYTE	SNA
BD181	2703-001334	INDUCTOR-SMD	1.5uH,10%,2x1.25x0.85mm	
BD182	2703-001334	INDUCTOR-SMD	1.5uH,10%,2x1.25x0.85mm	
BD183	2703-001334	INDUCTOR-SMD	1.5uH,10%,2x1.25x0.85mm	
BD201	2703-001334	INDUCTOR-SMD	1.5uH,10%,2x1.25x0.85mm	
BD205	2703-001334	INDUCTOR-SMD	1.5uH,10%,2x1.25x0.85mm	
BD206	2703-001334	INDUCTOR-SMD	1.5uH,10%,2x1.25x0.85mm	
BD301	2703-001334	INDUCTOR-SMD	1.5uH,10%,2x1.25x0.85mm	
BD302	2703-001334	INDUCTOR-SMD	1.5uH,10%,2x1.25x0.85mm	
BD303	2703-001334	INDUCTOR-SMD	1.5uH,10%,2x1.25x0.85mm	
BD304	2703-001334	INDUCTOR-SMD	1.5uH,10%,2x1.25x0.85mm	
C101	2402-000170	C-AL,SMD	1uF,20%,50V,GP,TP,4.3x4.3x5.4,	
C102	2402-000168	C-AL,SMD	100uF,20%,16V,GP,TP,8.3x8.3x6.3mm	
C103	2203-000257	C-CERAMIC,CHIP	10nF,10%,50V,X7R,TP,1608	
C104	2402-000168	C-AL,SMD	100uF,20%,16V,GP,TP,8.3x8.3x6.3mm	
C105	2203-000257	C-CERAMIC,CHIP	10nF,10%,50V,X7R,TP,1608	
C106	2402-000170	C-AL,SMD	1uF,20%,50V,GP,TP,4.3x4.3x5.4,	
C109	2203-000257	C-CERAMIC,CHIP	10nF,10%,50V,X7R,TP,1608	
C110	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C111	2402-000168	C-AL,SMD	100uF,20%,16V,GP,TP,8.3x8.3x6.3mm	
C112	2409-001029	C-ORGANIC	120uF,20%,6.3V,WT,TP,10.3x10.3x10.3mm,9	
C131	2203-000257	C-CERAMIC,CHIP	10nF,10%,50V,X7R,TP,1608	
C132	2203-000257	C-CERAMIC,CHIP	10nF,10%,50V,X7R,TP,1608	
C133	2203-000257	C-CERAMIC,CHIP	10nF,10%,50V,X7R,TP,1608	
C134	2203-000257	C-CERAMIC,CHIP	10nF,10%,50V,X7R,TP,1608	
C135	2203-000257	C-CERAMIC,CHIP	10nF,10%,50V,X7R,TP,1608	
C136	2203-000257	C-CERAMIC,CHIP	10nF,10%,50V,X7R,TP,1608	
C137	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C138	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C139	2402-000108	C-AL,SMD	10uF,20%,16V,WT,TP,4.3x4.3x5.4	
C140	2402-000108	C-AL,SMD	10uF,20%,16V,WT,TP,4.3x4.3x5.4	
C141	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C142	2402-000108	C-AL,SMD	10uF,20%,16V,WT,TP,4.3x4.3x5.4	
C143	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C144	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C145	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C146	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C147	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C148	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C149	2402-000108	C-AL,SMD	10uF,20%,16V,WT,TP,4.3x4.3x5.4	
C150	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C151	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C152	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C153	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C154	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C155	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C156	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C157	2402-000108	C-AL,SMD	10uF,20%,16V,WT,TP,4.3x4.3x5.4	
C159	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C160	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C161	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C162	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C163	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C164	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C165	2402-000108	C-AL,SMD	10uF,20%,16V,WT,TP,4.3x4.3x5.4	
C166	2203-000280	C-CERAMIC,CHIP	0.01nF,0.5pF,50V,NP0,TP,1608	

7 Block Diagram

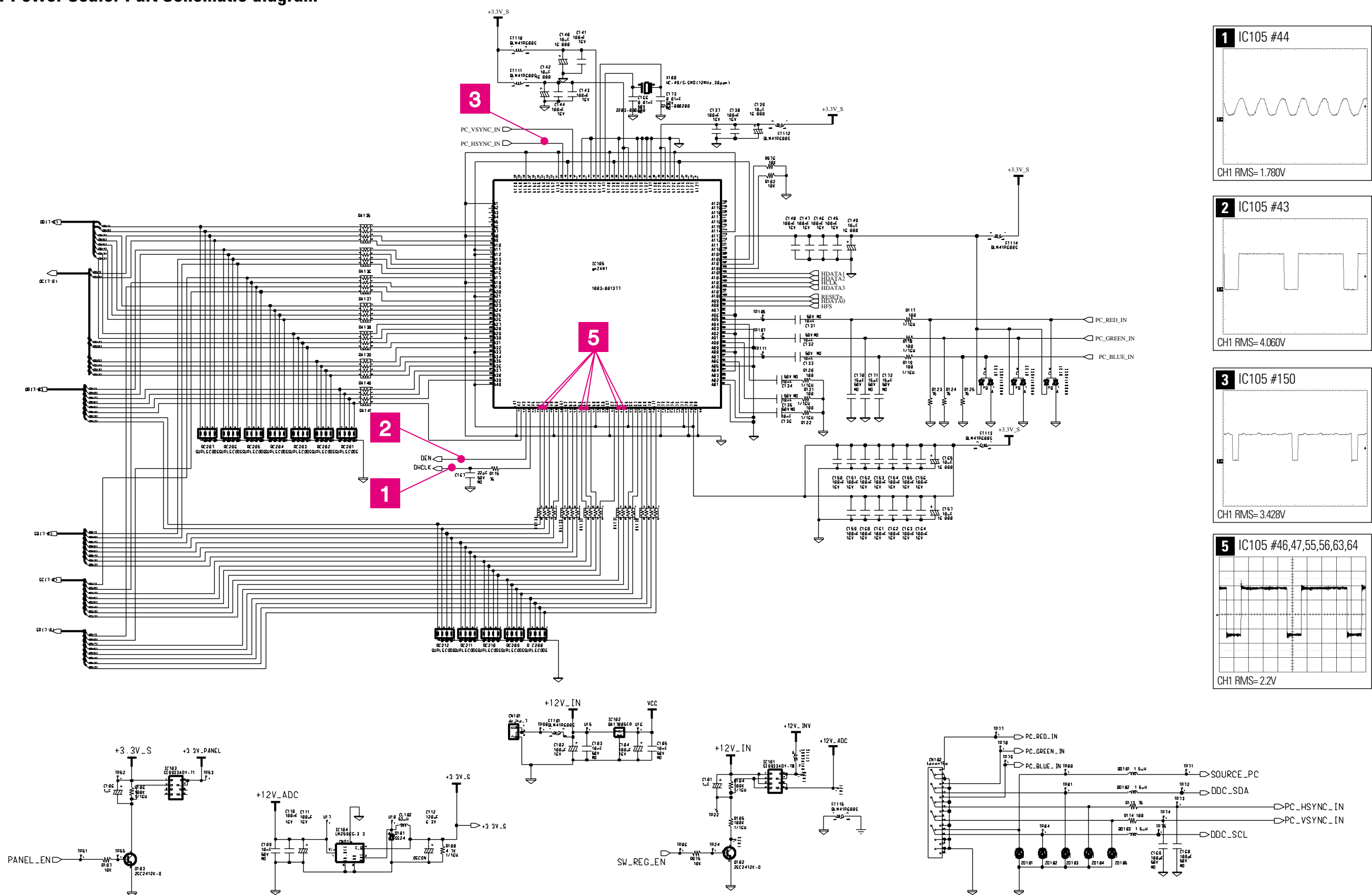


8 Wiring Diagram

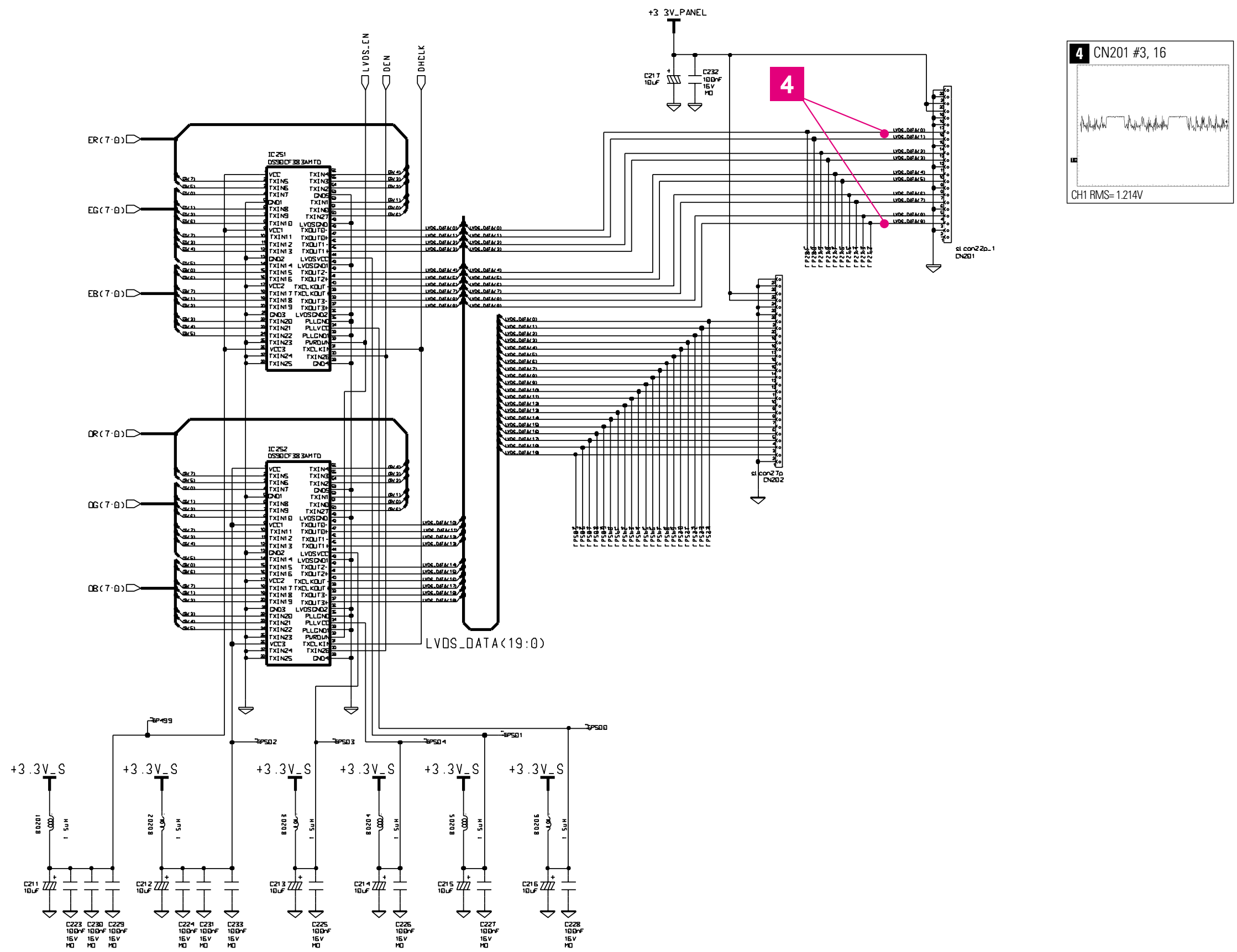


9 Schematic Diagrams

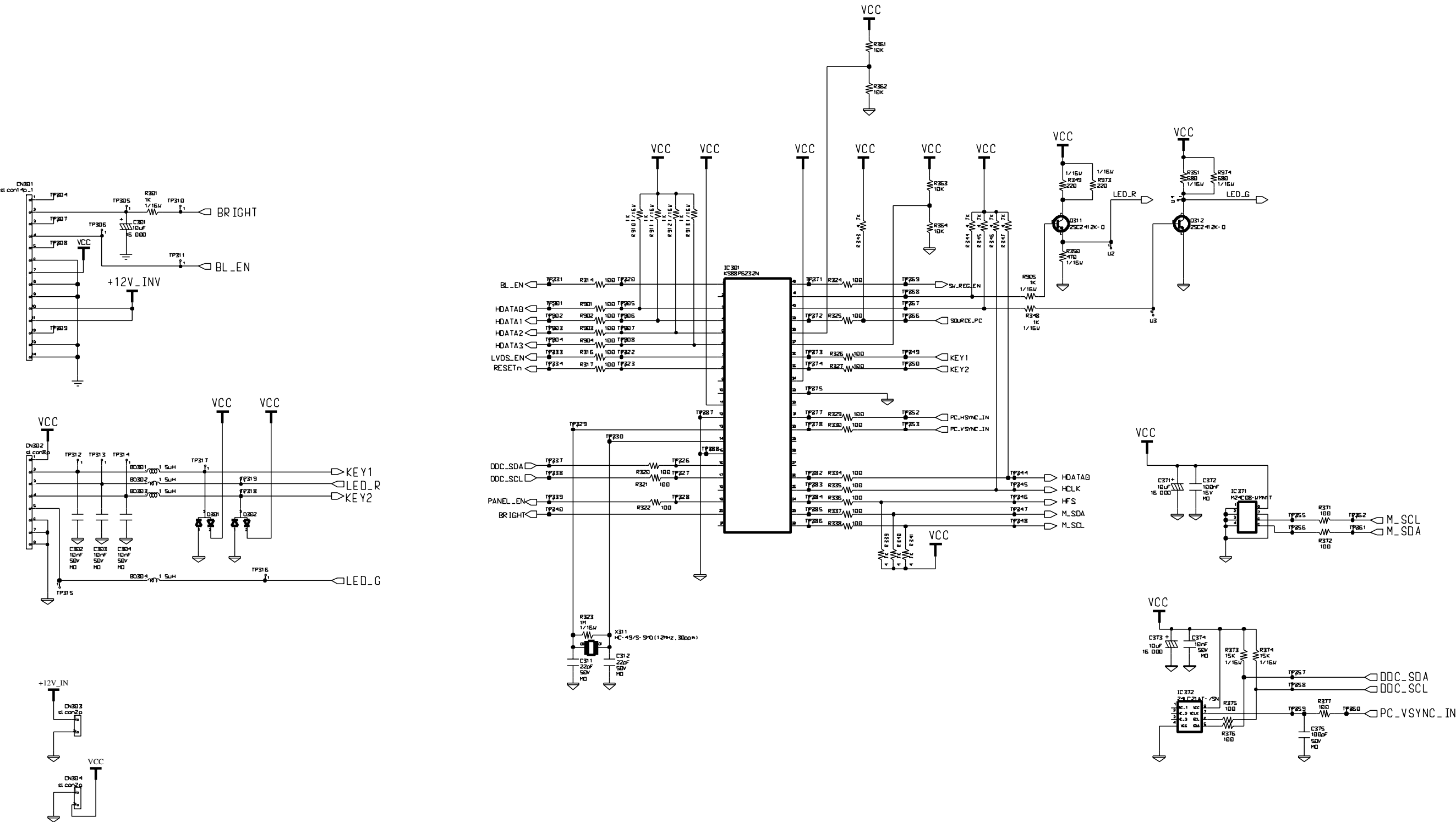
9-1 Power Scaler Part Schematic diagram



9-2 LVDS Part Schematic diagram



9-3 Micom Part Schematic diagram



Memo

Memo

Memo

Loc. No.	Code No.	Description	Specification	Remarks
C167	2203-000626	C-CERAMIC,CHIP	0.022nF,5%,50V,NP0,TP,1608	
C168	2203-000236	C-CERAMIC,CHIP	0.1nF,5%,50V,NP0,TP,1608	
C169	2203-000236	C-CERAMIC,CHIP	0.1nF,5%,50V,NP0,TP,1608	
C170	2203-000384	C-CERAMIC,CHIP	0.015nF,5%,50V,NP0,TP,1608	
C171	2203-000384	C-CERAMIC,CHIP	0.015nF,5%,50V,NP0,TP,1608	
C172	2203-000384	C-CERAMIC,CHIP	0.015nF,5%,50V,NP0,TP,1608	
C173	2203-000280	C-CERAMIC,CHIP	0.01nF,0.5pF,50V,NP0,TP,1608	
C211	2402-000108	C-AL,SMD	10uF,20%,16V,WT,TP,4.3x4.3x5.4	
C215	2402-000108	C-AL,SMD	10uF,20%,16V,WT,TP,4.3x4.3x5.4	
C216	2402-000108	C-AL,SMD	10uF,20%,16V,WT,TP,4.3x4.3x5.4	
C217	2402-000108	C-AL,SMD	10uF,20%,16V,WT,TP,4.3x4.3x5.4	
C223	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C227	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C228	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C229	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C230	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C232	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C301	2402-000108	C-AL,SMD	10uF,20%,16V,WT,TP,4.3x4.3x5.4	
C302	2203-000257	C-CERAMIC,CHIP	10nF,10%,50V,X7R,TP,1608	
C303	2203-000257	C-CERAMIC,CHIP	10nF,10%,50V,X7R,TP,1608	
C304	2203-000257	C-CERAMIC,CHIP	10nF,10%,50V,X7R,TP,1608	
C311	2203-000626	C-CERAMIC,CHIP	0.022nF,5%,50V,NP0,TP,1608	
C312	2203-000626	C-CERAMIC,CHIP	0.022nF,5%,50V,NP0,TP,1608	
C371	2402-000108	C-AL,SMD	10uF,20%,16V,WT,TP,4.3x4.3x5.4	
C372	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,TP,1608	
C373	2402-000108	C-AL,SMD	10uF,20%,16V,WT,TP,4.3x4.3x5.4	
C374	2203-000257	C-CERAMIC,CHIP	10nF,10%,50V,X7R,TP,1608	
C375	2203-000236	C-CERAMIC,CHIP	0.1nF,5%,50V,NP0,TP,1608	
CIS	BN41-00069A	PCB MAIN	CEZANNE-II,FR-4,4,-,1.6T,117.0*172.4*1.6,CN,-,-,-	
CL102	BN27-20001A	COIL-CHOKE		
CN201	3711-003161	CONNECTOR-HEADER	BOX,20P,1R,1.25mm,ANGLE,SN	SNA
CN301	3711-000556	CONNECTOR-HEADER	BOX,12P,1R,1.25mm,SMD-A,SN	SNA
CN302	3711-002049	CONNECTOR-HEADER	BOX,6P,1R,1.25mm,SMD-A,SN	SNA
D101	0402-000553	DIODE-RECTIFIER	SS24,40V,2.0A,DO-214AA	
D131	0401-001056	DIODE-SWITCHING	MMBD4148SE,75V,600mA,SOT-23,TP	
D132	0401-001056	DIODE-SWITCHING	MMBD4148SE,75V,600mA,SOT-23,TP	
D133	0401-001056	DIODE-SWITCHING	MMBD4148SE,75V,600mA,SOT-23,TP	
D301	0401-001056	DIODE-SWITCHING	MMBD4148SE,75V,600mA,SOT-23,TP	
D302	0401-001056	DIODE-SWITCHING	MMBD4148SE,75V,600mA,SOT-23,TP	
FT101	3301-001145	CORE-FERRITE BEAD	AB,4.5x1.6x1.6mm,-,-	SNA
FT110	3301-001145	CORE-FERRITE BEAD	AB,4.5x1.6x1.6mm,-,-	SNA
FT111	3301-001145	CORE-FERRITE BEAD	AB,4.5x1.6x1.6mm,-,-	SNA
FT112	3301-001145	CORE-FERRITE BEAD	AB,4.5x1.6x1.6mm,-,-	SNA
FT113	3301-001145	CORE-FERRITE BEAD	AB,4.5x1.6x1.6mm,-,-	SNA
FT114	3301-001145	CORE-FERRITE BEAD	AB,4.5x1.6x1.6mm,-,-	SNA
FT115	3301-001145	CORE-FERRITE BEAD	AB,4.5x1.6x1.6mm,-,-	SNA
FT116	3301-001145	CORE-FERRITE BEAD	AB,4.5x1.6x1.6mm,-,-	SNA
IC102	1203-001488	IC-POSI.FIXED REG.	7805,T0-252,3P,-,PLASTIC,4.8/5	
IC104	1203-001447	IC-POSI.FIXED REG.	2596,T0-263,5P,-,PLASTIC,3.135	
IC105	1003-001377	IC-LCD CONTROLLER	GMZAN1,QFP,160P,1102MIL,SINGLE,-,TR,PLASTIC,3.47V,0TO+70C,1.8W,-,LCD CONTROLLER	
IC251	1205-001740	IC-TRANSMITTER	DS90C385,TSSOP,56P,240MIL,PLASTIC,4V,1.63W,-10 TO +70C,ST,FPD LINK-85MHZ(LVDS)	
IC371	1103-001023	IC-EEPROM	524C80D81,1028x8Bit,SOP,8P,150MIL,10mS,5V,10%,PLASTIC,0to+70C,110uA,CMOS,TP	
IC372	1103-001164	IC-EEPROM	24LC21A,128X8BIT,SOP,8P,150MIL,-,5V,10%,PLASTIC,0 TO +70C,100UA,CMOS,TP	
Q102	0501-002080	TR-SMALL SIGNAL	2SC2412K,NPN,200mW,SC-59,TP,120-270	
Q103	0501-002080	TR-SMALL SIGNAL	2SC2412K,NPN,200mW,SC-59,TP,120-270	
Q311	0501-002080	TR-SMALL SIGNAL	2SC2412K,NPN,200mW,SC-59,TP,120-270	
Q312	0501-002080	TR-SMALL SIGNAL	2SC2412K,NPN,200mW,SC-59,TP,120-270	
R102	2007-000090	R-CHIP	10Kohm,5%,1/16W,DA,TP,1608	
R104	2007-000102	R-CHIP	100Kohm,5%,1/16W,DA,TP,1608	
R105	2007-000102	R-CHIP	100Kohm,5%,1/16W,DA,TP,1608	
R106	2007-000102	R-CHIP	100Kohm,5%,1/16W,DA,TP,1608	

Loc. No.	Code No.	Description	Specification	Remarks
R107	2007-000090	R-CHIP	10Kohm,5%,1/16W,DA,TP,1608	
R108	2007-000084	R-CHIP	4.7Kohm,5%,1/16W,DA,TP,1608	
R113	2007-001167	R-CHIP	75ohm,5%,1/16W,DA,TP,1608	
R114	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R115	2007-001167	R-CHIP	75ohm,5%,1/16W,DA,TP,1608	
R117	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R118	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R119	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R120	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R121	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R122	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R123	2007-001167	R-CHIP	75ohm,5%,1/16W,DA,TP,1608	
R124	2007-001167	R-CHIP	75ohm,5%,1/16W,DA,TP,1608	
R125	2007-001167	R-CHIP	75ohm,5%,1/16W,DA,TP,1608	
R301	2007-000078	R-CHIP	1Kohm,5%,1/16W,DA,TP,1608	
R314	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R316	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R317	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R320	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R321	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R322	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R323	2007-000109	R-CHIP	1Mohm,5%,1/16W,DA,TP,1608	
R324	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R325	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R326	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R327	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R329	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R330	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R335	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R336	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R337	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R338	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R339	2007-000084	R-CHIP	4.7Kohm,5%,1/16W,DA,TP,1608	
R340	2007-000084	R-CHIP	4.7Kohm,5%,1/16W,DA,TP,1608	
R341	2007-000084	R-CHIP	4.7Kohm,5%,1/16W,DA,TP,1608	
R343	2007-000084	R-CHIP	4.7Kohm,5%,1/16W,DA,TP,1608	
R344	2007-000084	R-CHIP	4.7Kohm,5%,1/16W,DA,TP,1608	
R345	2007-000084	R-CHIP	4.7Kohm,5%,1/16W,DA,TP,1608	
R346	2007-000084	R-CHIP	4.7Kohm,5%,1/16W,DA,TP,1608	
R348	2007-000078	R-CHIP	1Kohm,5%,1/16W,DA,TP,1608	
R349	2007-000075	R-CHIP	220ohm,5%,1/16W,DA,TP,1608	
R350	2007-000077	R-CHIP	470ohm,5%,1/16W,DA,TP,1608	
R351	2007-000120	R-CHIP	680ohm,5%,1/16W,DA,TP,1608	
R362	2007-000090	R-CHIP	10Kohm,5%,1/16W,DA,TP,1608	
R364	2007-000090	R-CHIP	10Kohm,5%,1/16W,DA,TP,1608	
R371	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R372	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R373	2007-000092	R-CHIP	15Kohm,5%,1/16W,DA,TP,1608	
R374	2007-000092	R-CHIP	15Kohm,5%,1/16W,DA,TP,1608	
R375	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R376	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R377	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R901	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R902	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R903	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R904	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R905	2007-000078	R-CHIP	1Kohm,5%,1/16W,DA,TP,1608	
R910	2007-000078	R-CHIP	1Kohm,5%,1/16W,DA,TP,1608	
R911	2007-000078	R-CHIP	1Kohm,5%,1/16W,DA,TP,1608	
R912	2007-000078	R-CHIP	1Kohm,5%,1/16W,DA,TP,1608	

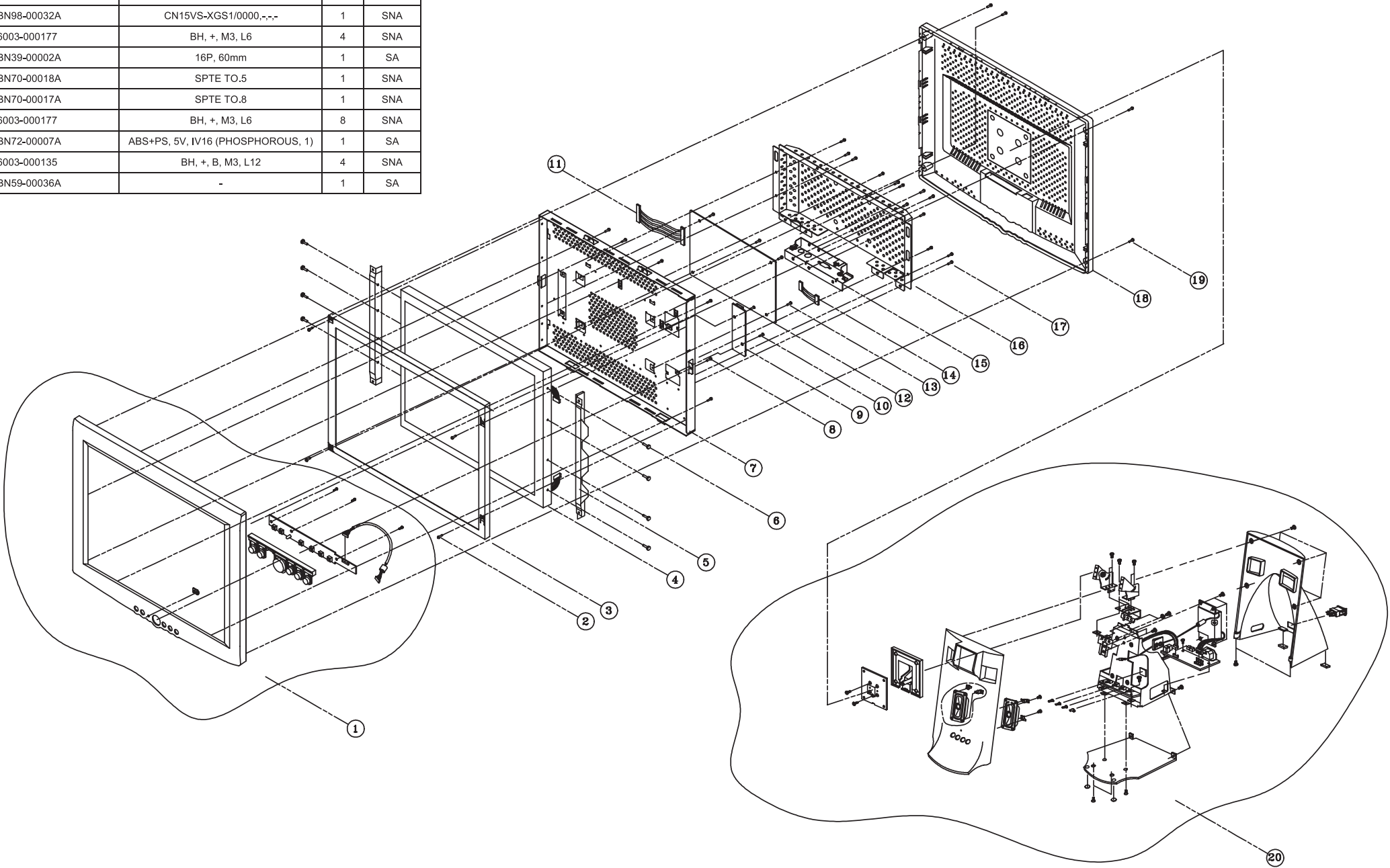
Loc. No.	Code No.	Description	Specification	Remarks
R913	2007-000078	R-CHIP	1Kohm,5%,1/16W,DA,TP,1608	
R973	2007-000075	R-CHIP	220ohm,5%,1/16W,DA,TP,1608	
R974	2007-000120	R-CHIP	680ohm,5%,1/16W,DA,TP,1608	
R975	2007-000090	R-CHIP	10Kohm,5%,1/16W,DA,TP,1608	
R976	2007-000090	R-CHIP	10Kohm,5%,1/16W,DA,TP,1608	
RA130	2011-000002	R-NETWORK	22ohm,5%,63mW,L,CHIP,8P,TP	
RA131	2011-000002	R-NETWORK	22ohm,5%,63mW,L,CHIP,8P,TP	
RA132	2011-000002	R-NETWORK	22ohm,5%,63mW,L,CHIP,8P,TP	
RA133	2011-000002	R-NETWORK	22ohm,5%,63mW,L,CHIP,8P,TP	
RA134	2011-000002	R-NETWORK	22ohm,5%,63mW,L,CHIP,8P,TP	
RA136	2011-000002	R-NETWORK	22ohm,5%,63mW,L,CHIP,8P,TP	
RA137	2011-000002	R-NETWORK	22ohm,5%,63mW,L,CHIP,8P,TP	
X100	2801-003755	CRYSTAL-SMD	20MHZ,30PPM,28-AAN,20PF,500HM,TP	
X311	2801-003773	CRYSTAL-SMD	12MHZ,30PPM,28-AAN,20PF,500HM,TP	
ZD181	0403-000579	DIODE-ZENER	BZX84C5V1,5.1V,5%,200mW,SOT-23	
ZD182	0403-000579	DIODE-ZENER	BZX84C5V1,5.1V,5%,200mW,SOT-23	
ZD183	0403-000579	DIODE-ZENER	BZX84C5V1,5.1V,5%,200mW,SOT-23	
ZD184	0403-000579	DIODE-ZENER	BZX84C5V1,5.1V,5%,200mW,SOT-23	
ZD185	0403-000579	DIODE-ZENER	BZX84C5V1,5.1V,5%,200mW,SOT-23	

6-2 Others

Loc. No.	Code No.	Description	Specification	Remarks
CIS	BN39-00030A	CBF-SIGNAL	DETACHABLE,1830MM,15P/15P,-,2990,D-SUB-MALE	
CIS	BN44-00048A	INVERTER	CS15M0,SIC251SF,47Khz,11.5~12.5V,1.5mAmps,7.0mAmps,-,121*30.5*14.0,2LAMP,-,1.4-2	
CIS	BN41-00069A	PCB MAIN	CEZANNE-II,FR-4 ,4,-,1.6T,117.0*172.4*1.6,CN,-,-,-	
CIS	BH39-10007A	CBF POWER CORD	DET,250V/6A,H05VV-F,LP-34A/KKP	
CN201+PAN	BN39-00083A	CBF-HARNESS	20P,140MM,-,UL1571,AWG30,DF14-20S-1.25C	
CN301+INV	BN39-00002A	CBF-HARNESS	-,60,BLU/WHT,-,26,-	
CIS	BN41-00069A	PCB MAIN	CEZANNE-II,FR-4 ,4,-,1.6T,117.0*172.4*1.6,CN,-,-,-	

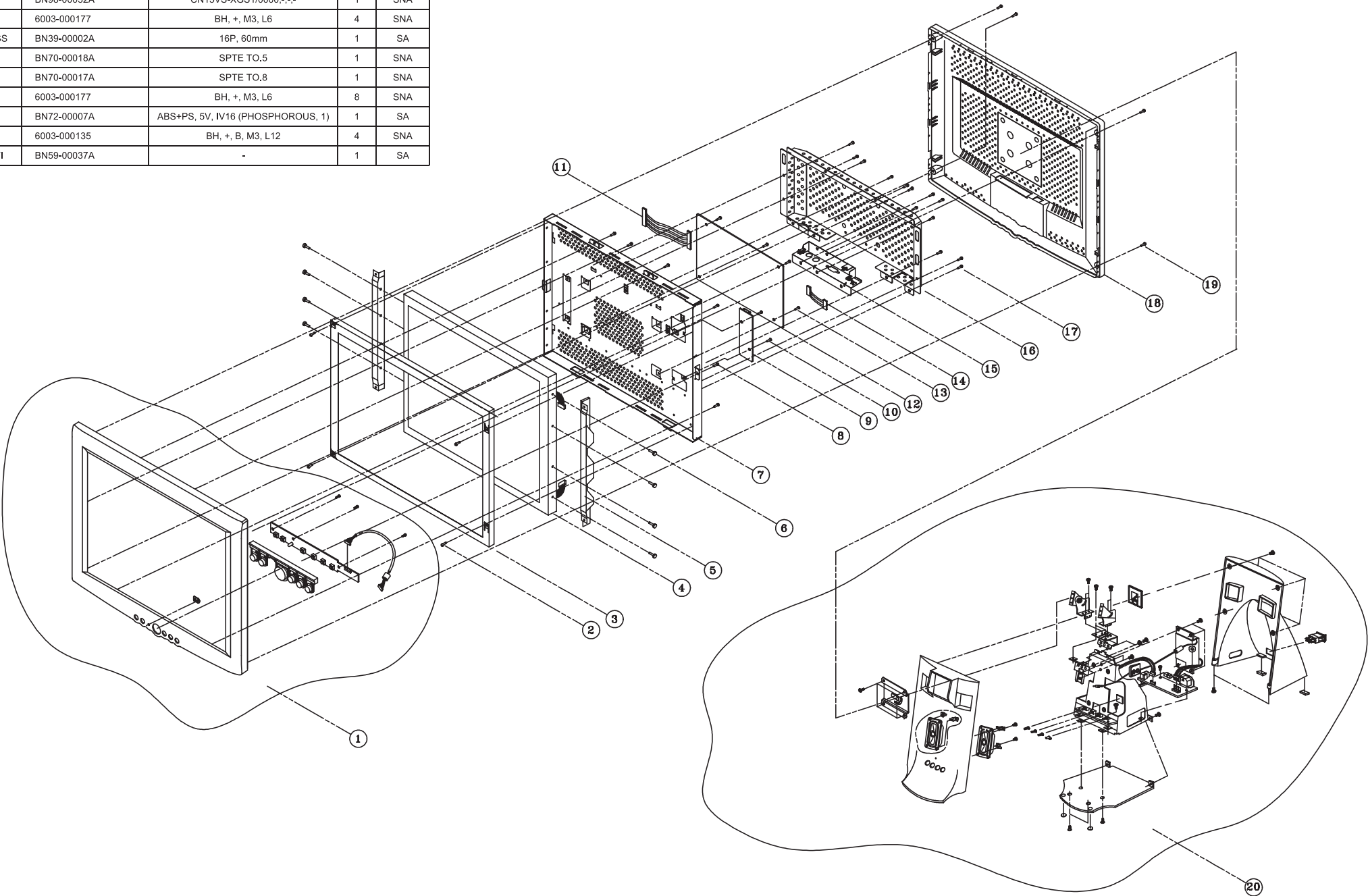
5-2 Multi Media Base

NO	DESCRIPTION	PART NO	SPECIFICATION	Q'TY	REMARK
1	UNIT COVER FRONT	BN75-00015B	ABS+PS, 5V, IV16 (PHOSPHOROUS, 1)	1	SA
2	SCREW TAP TITE	6003-000135	BH, +, B, M3, L12	4	SNA
3	SHIELD FRONT	BN70-00015A	SPTE TO.5	1	SNA
4	LCD PANEL	BN07-00021A	TM150XG-22LO3	1	SA
5	SIDE BRKT L/R	BN71-00001A, 00002A	SUS T1.0	2	SNA
6	SCREW TAP TITE	6003-000125	RH, +, S,M2.5,L5,ZPC(YEL) SWRCH18A	8	SNA
7	UNIT BRKT PANEL	BN75-00127A	SECC T1.0	1	SNA
8	SCREW TAP TITE	6003-00135	BH, +, B, M3, L12	6	SNA
9	INVERTER	BN44-00048A	KO21025	1	SA
10	SCREW TAP TITE	6003-000177	BH, +, M3, L6	2	SNA
11	LVDS HARNESS	BN39-00036A	20P, 150mm	1	SNA
12	MAIN PCB ASS'Y	BN98-00032A	CN15VS-XGS1/0000,-,-,-	1	SNA
13	SCREW TAP TITE	6003-000177	BH, +, M3, L6	4	SNA
14	INVERTER HARNESS	BN39-00002A	16P, 60mm	1	SA
15	SHIELD D-SUB	BN70-00018A	SPTE TO.5	1	SNA
16	SHIELD PCB	BN70-00017A	SPTE TO.8	1	SNA
17	SCREW TAP TITE	6003-000177	BH, +, M3, L6	8	SNA
18	COVER REAR	BN72-00007A	ABS+PS, 5V, IV16 (PHOSPHOROUS, 1)	1	SA
19	SCREW TAP TITE	6003-000135	BH, +, B, M3, L12	4	SNA
20	UNIT STAND MULTI	BN59-00036A	-	1	SA



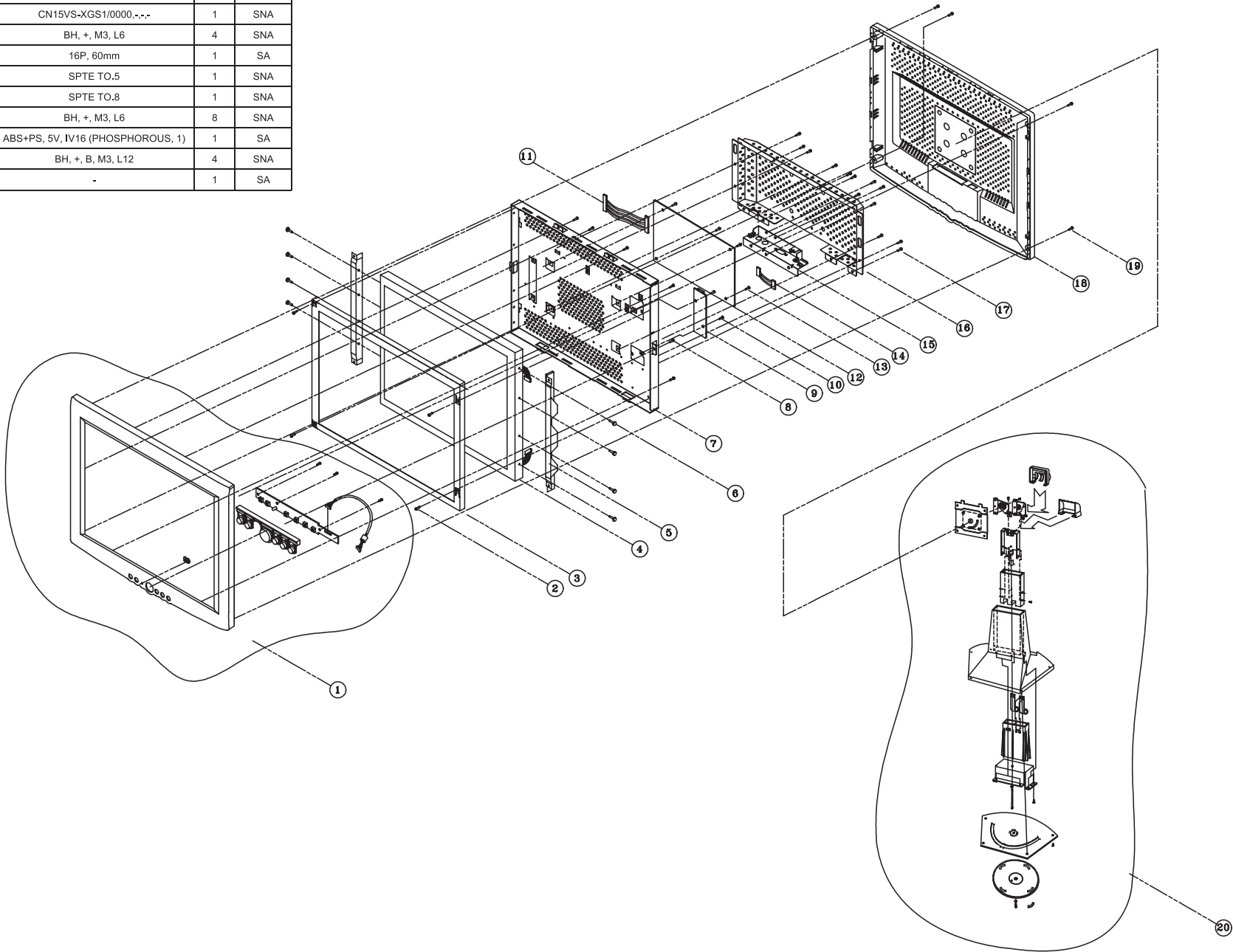
5-3 Pivot-MultiMedia Base

NO	DESCRIPTION	PART NO	SPECIFICATION	QTY	REMARK
1	UNIT COVER FRONT	BN75-00015B	ABS+PS, 5V, IV16 (PHOSPHOROUS, 1)	1	SA
2	SCREW TAP TITE	6003-000135	BH, +, B, M3, L12	4	SNA
3	SHIELD FRONT	BN70-00015A	SPTE TO.5	1	SNA
4	LCD PANEL	BN07-00021A	TM150XG-22LO3	1	SA
5	SIDE BRKT L/R	BN71-00001A, 00002A	SUS T1.0	2	SNA
6	SCREW TAP TITE	6003-000125	RH, +, S,M2.5,L5,ZPC(YEL) SWRCH18A	8	SNA
7	UNIT BRKT PANEL	BN75-00127A	SECC T1.0	1	SNA
8	SCREW TAP TITE	6003-00135	BH, +, B, M3, L12	6	SNA
9	INVERTER	BN44-00048A	KO21025	1	SA
10	SCREW TAP TITE	6003-000177	BH, +, M3, L6	2	SNA
11	LVDS HARNESS	BN39-00036A	20P, 150mm	1	SNA
12	MAIN PCB ASS'Y	BN98-00032A	CN15VS-XGS1/0000,-,-,-	1	SNA
13	SCREW TAP TITE	6003-000177	BH, +, M3, L6	4	SNA
14	INVERTER HARNESS	BN39-00002A	16P, 60mm	1	SA
15	SHIELD D-SUB	BN70-00018A	SPTE TO.5	1	SNA
16	SHIELD PCB	BN70-00017A	SPTE TO.8	1	SNA
17	SCREW TAP TITE	6003-000177	BH, +, M3, L6	8	SNA
18	COVER REAR	BN72-00007A	ABS+PS, 5V, IV16 (PHOSPHOROUS, 1)	1	SA
19	SCREW TAP TITE	6003-000135	BH, +, B, M3, L12	4	SNA
20	UNIT STAND MULTI	BN59-00037A	-	1	SA



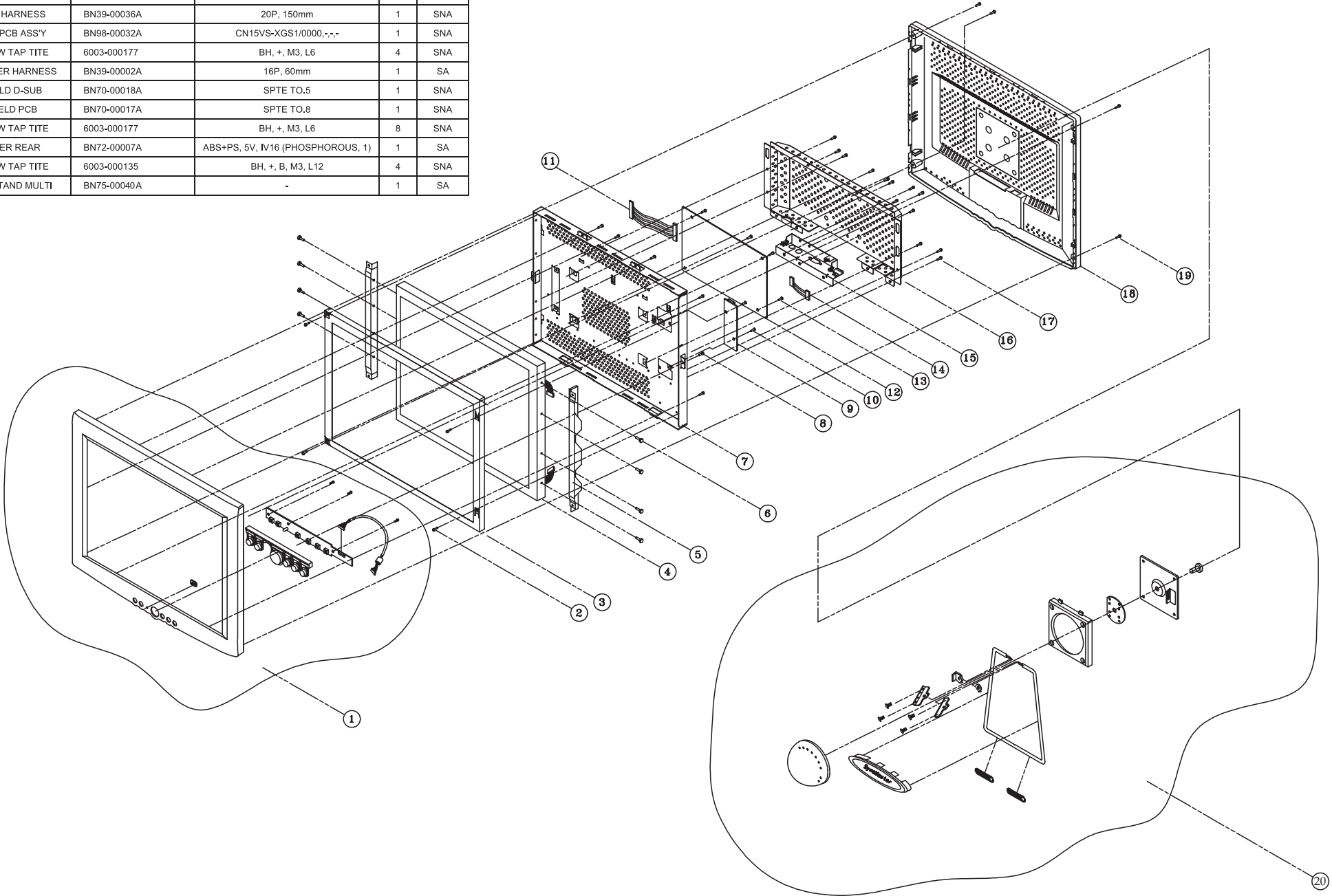
5-4 Angle-Pivot Base

NO	DESCRIPTION	PART NO	SPECIFICATION	Q'TY	REMARK
1	UNIT COVER FRONT	BN75-00015B	ABS+PS, 5V, IV16 (PHOSPHOROUS, 1)	1	SA
2	SCREW TAP TITE	6003-000135	BH, +, B, M3, L12	4	SNA
3	SHIELD FRONT	BN70-00015A	SPTT TO.5	1	SNA
4	LCD PANEL	BN07-00021A	TM150XG-22LO3	1	SA
5	SIDE BRKT L/R	BN71-00001A, 00002A	SUS T1.0	2	SNA
6	SCREW TAP TITE	6003-000125	RH, +, S,M2.5,L5,ZPC(YEL) SWRCH18A	8	SNA
7	UNIT BRKT PANEL	BN75-00127A	SECC T1.0	1	SNA
8	SCREW TAP TITE	6003-00135	BH, +, B, M3, L12	6	SNA
9	INVERTER	BN44-00048A	KO21025	1	SA
10	SCREW TAP TITE	6003-000177	BH, +, M3, L6	2	SNA
11	LVDS HARNESS	BN39-00036A	20P, 150mm	1	SNA
12	MAIN PCB ASS'Y	BN98-00032A	CN15VS-XGS1/0000,-,-,-	1	SNA
13	SCREW TAP TITE	6003-000177	BH, +, M3, L6	4	SNA
14	INVERTER HARNESS	BN39-00002A	16P, 60mm	1	SA
15	SHIELD D-SUB	BN70-00018A	SPTT TO.5	1	SNA
16	SHIELD PCB	BN70-00017A	SPTT TO.8	1	SNA
17	SCREW TAP TITE	6003-000177	BH, +, M3, L6	8	SNA
18	COVER REAR	BN72-00007A	ABS+PS, 5V, IV16 (PHOSPHOROUS, 1)	1	SA
19	SCREW TAP TITE	6003-000135	BH, +, B, M3, L12	4	SNA
20	UNIT STAND MULTI	BN75-00085B	-	1	SA



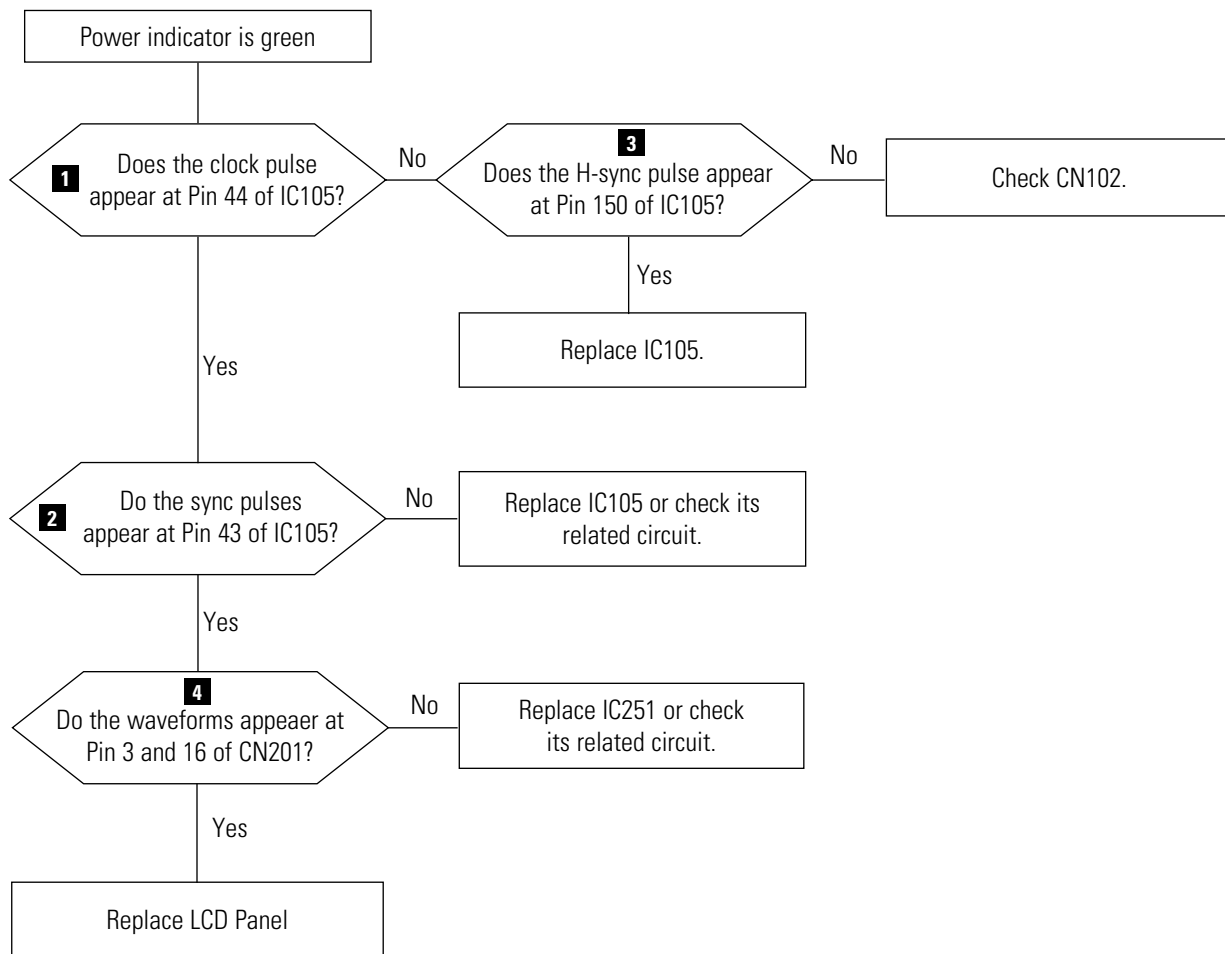
5-5 Wire-Frame Base

NO	DESCRIPTION	PART NO	SPECIFICATION	Q'TY	REMARK
1	UNIT COVER FRONT	BN75-00015B	ABS+PS, 5V, IV16 (PHOSPHOROUS, 1)	1	SA
2	SCREW TAP TITE	6003-000135	BH, +, B, M3, L12	4	SNA
3	SHIELD FRONT	BN70-00015A	SPTE TO.5	1	SNA
4	LCD PANEL	BN07-00021A	TM150XG-22LO3	1	SA
5	SIDE BRKT L/R	BN71-00001A, 00002A	SUS T1.0	2	SNA
6	SCREW TAP TITE	6003-000125	RH, +, S,M2.5,L5,ZPC(YEL) SWRCH18A	8	SNA
7	UNIT BRKT PANEL	BN75-00127A	SECC T1.0	1	SNA
8	SCREW TAP TITE	6003-000135	BH, +, B, M3, L12	6	SNA
9	INVERTER	BN44-00048A	KO21025	1	SA
10	SCREW TAP TITE	6003-000177	BH, +, M3, L6	2	SNA
11	LVDS HARNESS	BN39-00036A	20P, 150mm	1	SNA
12	MAIN PCB ASS'Y	BN98-00032A	CN15VS-XGS1/0000,-,-,-	1	SNA
13	SCREW TAP TITE	6003-000177	BH, +, M3, L6	4	SNA
14	INVERTER HARNESS	BN39-00002A	16P, 60mm	1	SA
15	SHIELD D-SUB	BN70-00018A	SPTE TO.5	1	SNA
16	SHIELD PCB	BN70-00017A	SPTE TO.8	1	SNA
17	SCREW TAP TITE	6003-000177	BH, +, M3, L6	8	SNA
18	COVER REAR	BN72-00007A	ABS+PS, 5V, IV16 (PHOSPHOROUS, 1)	1	SA
19	SCREW TAP TITE	6003-000135	BH, +, B, M3, L12	4	SNA
20	UNIT STAND MULTI	BN75-00040A	-	1	SA

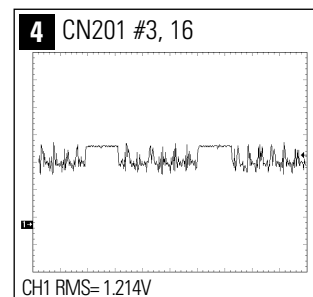
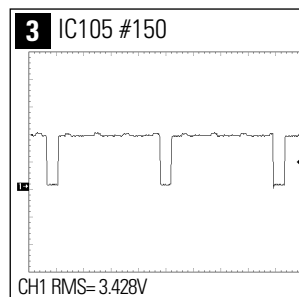
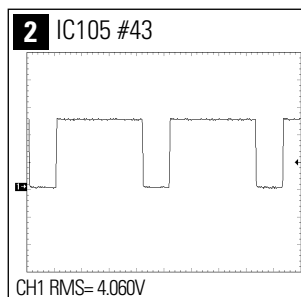
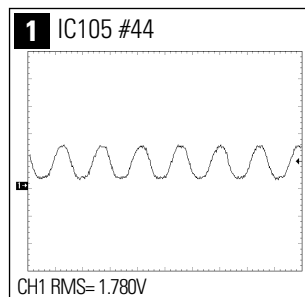


Memo

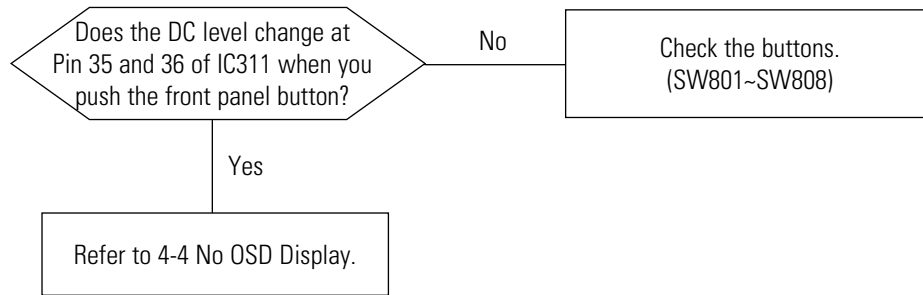
4-2 No Video



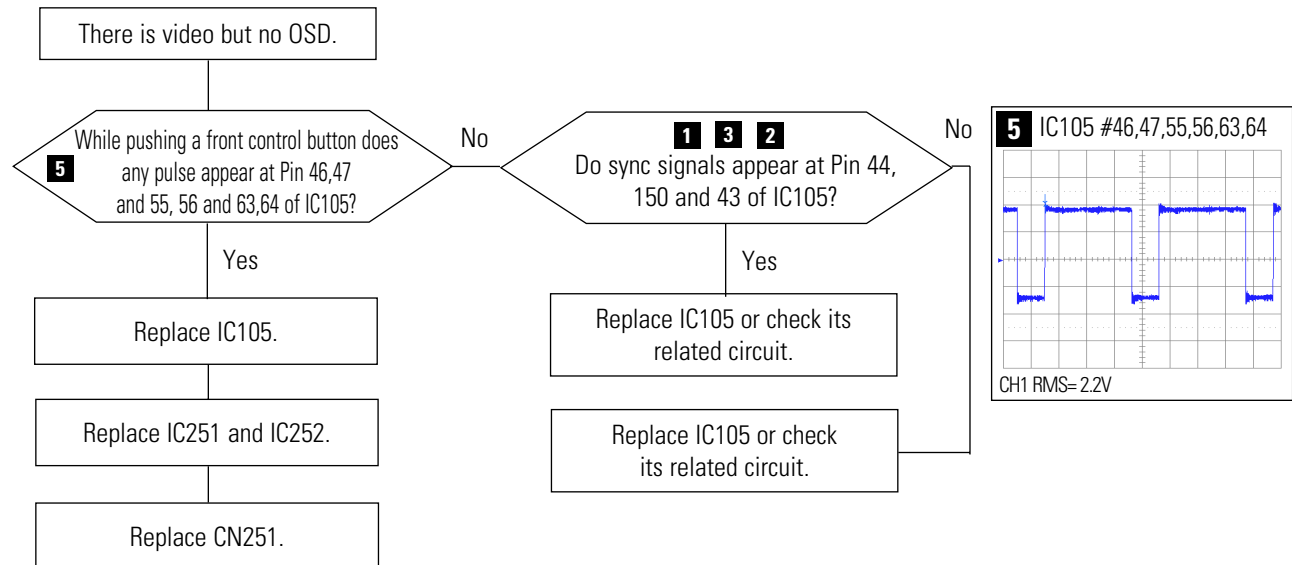
WAVEFORMS



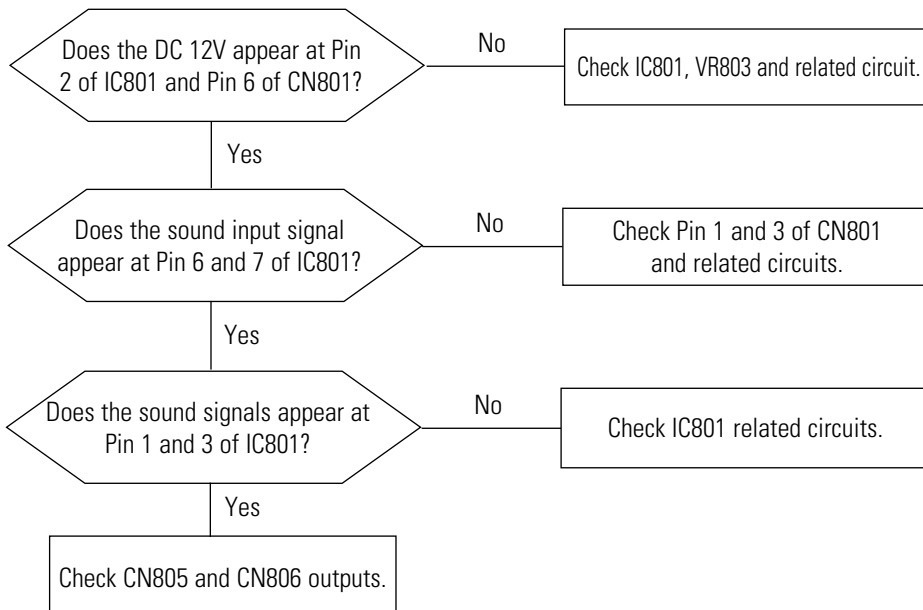
4-3 User Controls Don't Work



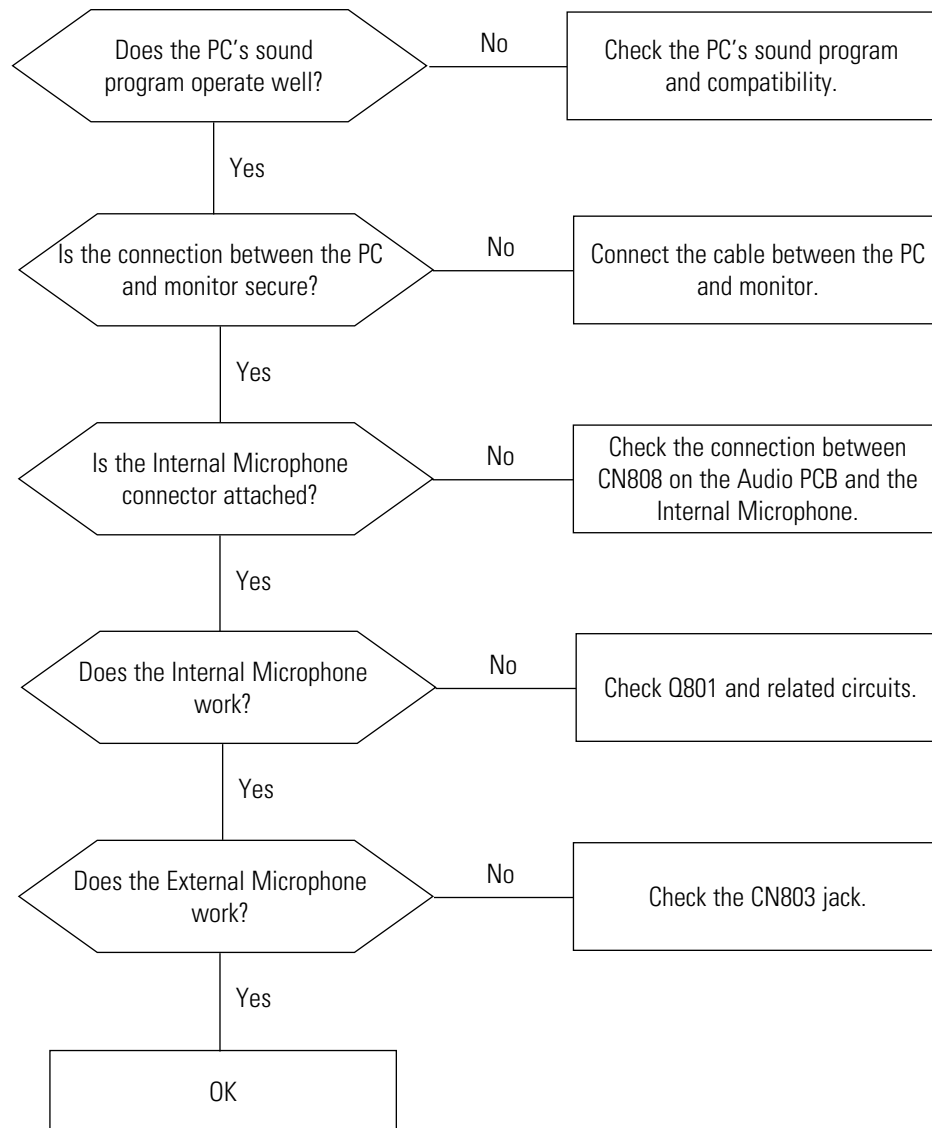
4-4 No OSD



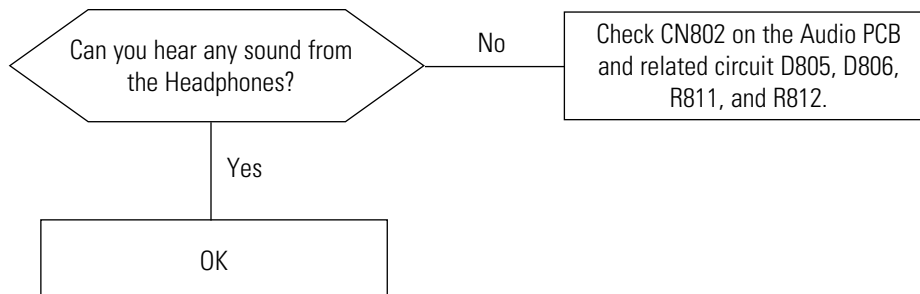
4-5 No SOUND



4-6 Microphones Don't Work



4-7 Headphones Don't Work

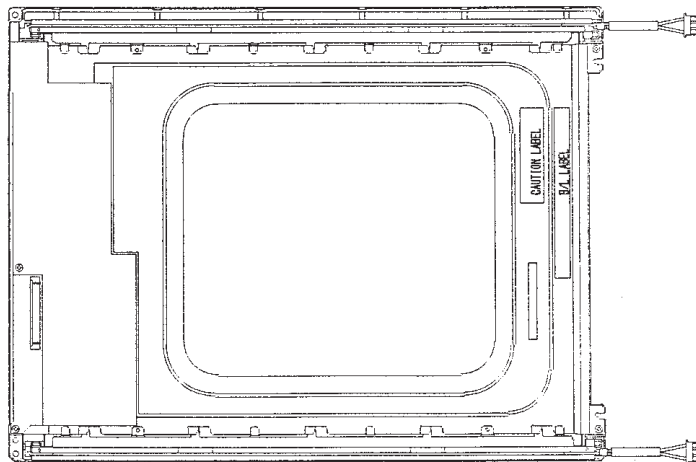


4. Remove the Stand Rear from the Stand assembly.
5. Remove the Stand Front from the Stand assembly.
6. Remove the Neck Rear from the Stand assembly.
7. Remove 4 Rubbers on the four corner of the Stand Bottom and 4 screws on the four corner of the Stand Bottom.
8. Remove 5 stopper hinges from the Bracket Bottom.
9. Remove the Stand Base from the Stand Assembly.

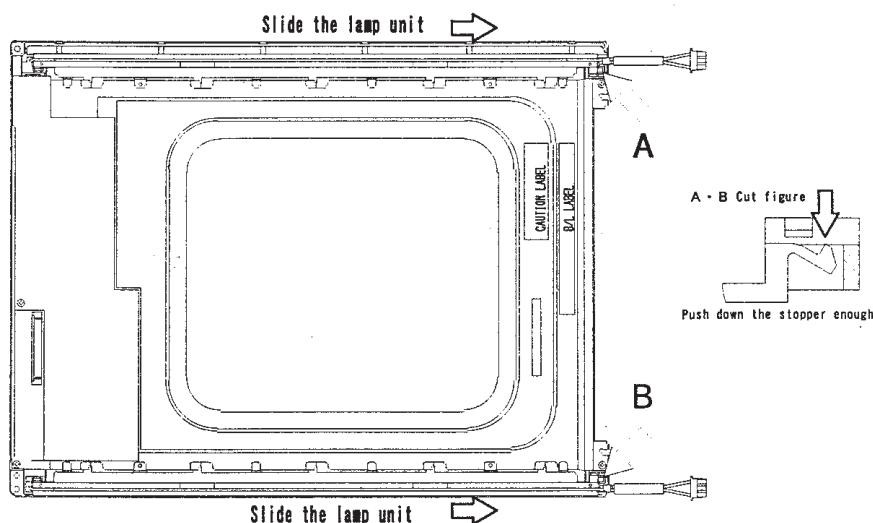
3-1-6 Wire frame stand Disassembly (option)

1. Carefully pull the cover hinge.
2. Remove the cover vesa from the Stand assembly.
3. Remove 4 screws on the assembly Bracket assembly.

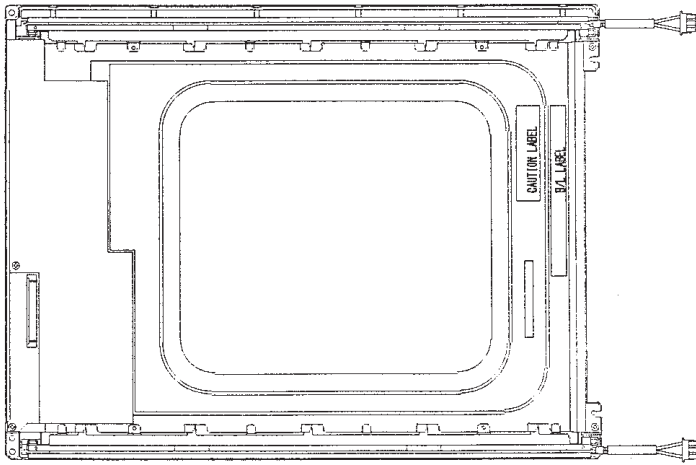
3-2 Replacement Order of Lamp Assemblies (CN15VS/CN15V0 : Samsung Panel) (CN15VS/CN15V0 : TORISAN Panel)



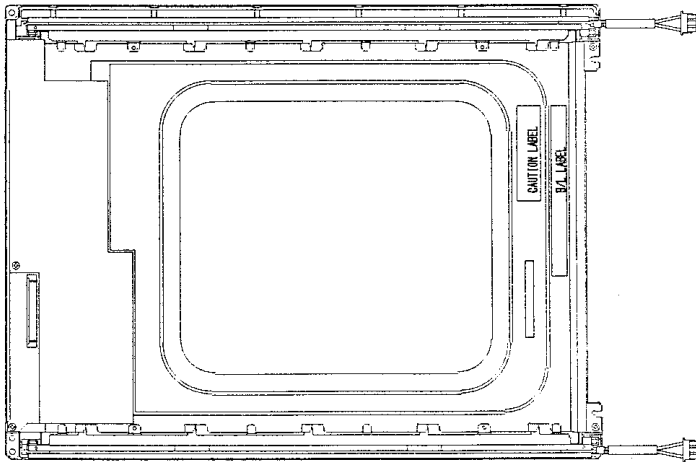
1. After confirm there is nothing on the disk
Turn the LCD module over and put it on a flat desk set to the ground.



2. Push down the stopper and slide the lamp unit.



3. Please take out the lamp unit from the LCD module.



4. Please fix the new lamp units on the LCD module :
opposite process 2 and 3

* Replacement of lamp unit should be done at the power off state and recommended clean bench condition.

3-3 Reassembly

Reassembly procedures are in the reverse order of Disassembly procedures.

Memo

2-2 Pin Assignments

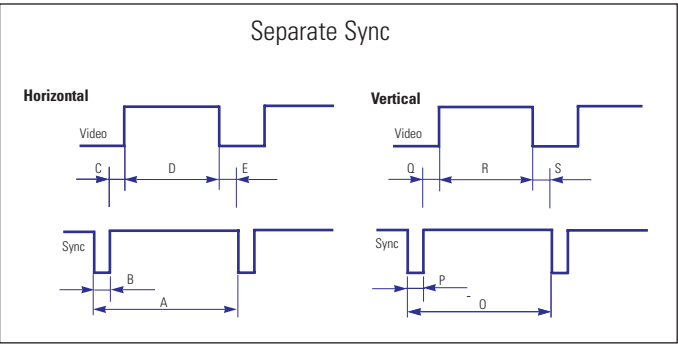
Sync Type Pin No.	15-Pin Signal Cable Connector		
	Separate	Composite	Sync-on-green
1	Red	Red	Red
2	Green	Green	Green + H/V Sync.
3	Blue	Blue	Blue
4	GND	GND	GND
5	GND (DDC Return)	GND (DDC Return)	GND (DDC Return)
6	GND-R	GND-R	GND-R
7	GND-G	GND-G	GND-G
8	GND-B	GND-B	GND-B
9	No Connection	No Connection	Not Used
10	GND-Sync./Self Test	GND-Sync./Self Test	GND-Sync./Self Test
11	GND	GND	GND
12	DDC Data	DDC Data	DDC Data
13	H-Sync.	H/V-Sync.	Not Used
14	V-Sync.	Not Used	Not Used
15	DDC Clock	DDC Clock	DDC Clock

2-3 Timing Chart

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

Table 2-1. Timing Chart

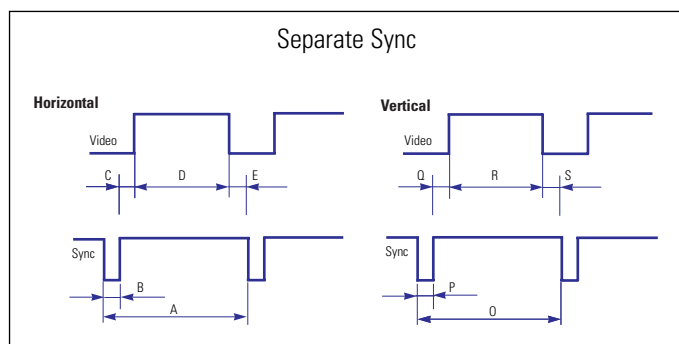
Mode Timing	IBM			VESA			
	VGA1/70 Hz 640 x 350	VGA2/70 Hz 720 x 400	VGA3/60 Hz 640 x 480	640/72 Hz 640 x 480	640/75 Hz 640 x 480	800/56 Hz 800 x 600	800/60 Hz 800 x 600
fH (kHz)	31.469	31.469	31.469	37.861	37.500	35.156	37.879
A µsec	31.778	31.777	31.778	26.413	26.667	28.444	26.400
B µsec	3.813	3.813	3.813	1.270	2.032	2.000	3.200
C µsec	1.589	1.589	1.589	3.810	3.810	3.556	2.200
D µsec	26.058	26.058	26.058	20.825	20.317	22.222	20.000
E µsec	0.318	0.318	0.318	0.508	0.508	0.667	1.000
fV (Hz)	70.086	70.087	59.940	72.809	75.000	56.250	60.317
O msec	14.268	14.268	16.683	13.735	13.333	17.778	16.579
P msec	0.064	0.064	0.064	0.079	0.080	0.057	0.106
Q msec	1.716	0.858	0.794	0.528	0.427	0.626	0.607
R msec	11.504	13.155	15.761	13.100	12.800	17.067	15.840
S msec	0.985	0.191	0.064	0.026	0.027	0.028	0.026
Clock Frequency (MHz)	25.175	28.322	25.175	31.500	31.500	36.000	40.000
Polarity H.Sync	Positive	Negative	Negative	Negative	Negative	Positive	Positive
V.Sync	Negative	Positive	Negative	Negative	Negative	Negative	Positive
Remark	Separate	Separate	Separate	Separate	Separate	Separate	Separate



A : Line time total	B : Horizontal sync width	O : Frame time total	P : Vertical sync width
C : Back porch	D : Active time	Q : Back porch	R : Active time
E : Front porch		S : Front porch	

Table 2-1. Timing Chart Continued

Mode Timing	VESA					MAC.	
	800/72 Hz 800 x 600	800/75 Hz 800 x 600	1024/60Hz 1024x768	1024/70Hz 1024x768	1024/75Hz 1024x768	640/67 Hz 640 x 480	832/75 Hz 832 x 624
fH (kHz)	48.077	46.875	48.363	56.476	60.023	35.000	49.726
A μ sec	20.800	21.333	20.677	17.707	16.660	28.571	20.110
B μ sec	2.400	1.616	2.092	1.813	1.219	2.116	1.117
C μ sec	1.280	3.232	2.462	1.920	2.235	3.175	3.910
D μ sec	16.000	16.162	15.754	13.653	13.003	21.164	14.524
E μ sec	1.120	0.323	0.369	0.320	0.203	2.116	0.559
fV (Hz)	72.188	75.000	60.004	70.069	75.029	66.667	74.551
O msec	13.853	13.333	16.666	14.272	13.328	15.000	13.414
P msec	0.125	0.064	0.124	0.106	0.050	0.086	0.060
Q msec	0.478	0.448	0.600	0.513	0.466	1.114	0.784
R msec	12.480	12.800	15.880	13.599	12.795	13.714	12.549
S msec	0.770	0.021	0.062	0.053	0.017	0.086	0.020
Clock Frequency (MHz)	50.000	49.500	65.000	75.000	78.750	30.240	57.284
Polarity H.Sync	Positive	Positive	Negative	Negative	Positive	Negative	Negative
V.Sync	Positive	Positive	Negative	Negative	Positive	Negative	Negative
Remark	Separate	Separate	Separate	Separate	Separate	Separate	Separate



A : Line time total	B : Horizontal sync width	O : Frame time total	P : Vertical sync width
C : Back porch	D : Active time	Q : Back porch	R : Active time
E : Front porch		S : Front porch	

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 Electrostatically Sensitive Devices (ESD) 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 devices 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.



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