

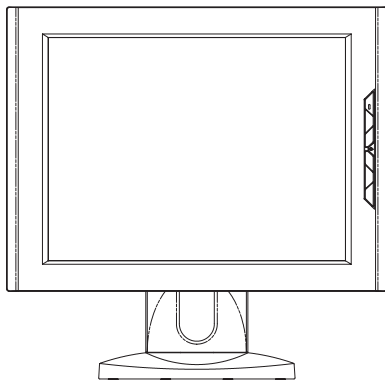
**SAMSUNG**

# TFT-LCD MONITOR

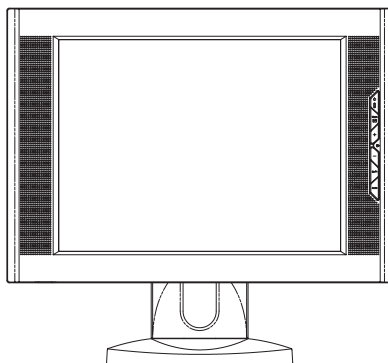
**GH15LS  
GH15ES  
GH15MS**

# **SERVICE** *Manual*

## TFT-LCD MONITOR



**GH15LS/GH15ES**



**GH15MS**

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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*).

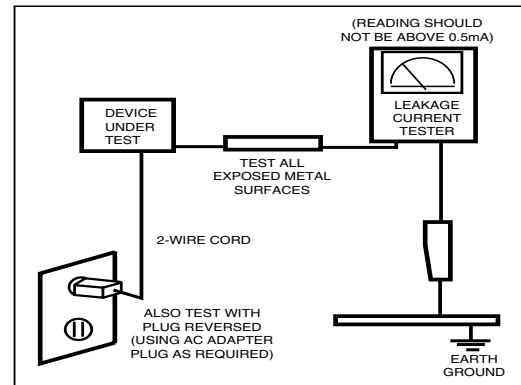



Figure 1-1. Leakage Current Test Circuit

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.

## 1-2 Servicing Precautions

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**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

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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.

## 2 Product Specifications

### 2-1 Specifications

Item	Description	
	GH15LS/GH15ES	GH15MS
LCD Panel	TFT-LCD panel, RGB vertical stripe, normally white, 15-Inch viewable, 0.297 (H) pixel pitch	
Scanning Frequency	Horizontal : 30 kHz ~ 61 kHz (Referring ~ Timing chart, Page 2-3, 2-4) Vertical : 50 Hz ~ 75 Hz (Referring ~ 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 $\Omega$ , 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 (W x D x H) With Simple Stand Without Simple stand With Pivot Stand Without Pivot Stand	15.4 x 15.1 x 6.8 Inches (391.4 x 383.6 x 173 mm) 15.4 x 11.5 x 2.5 Inches (391.4 x 292.8 x 64.0 mm) 15.4 x 15.1 x 6.8 Inches (391.4 x 383.6 x 173 mm) 15.4 x 17.1 x 6.8 Inches (391.4 x 433.6 x 173 mm) 15.4 x 11.5 x 2.5 Inches (391.4 x 292.8 x 64.0 mm)	16.5 x 15.2 x 6.8 Inches (417.9 x 386.1 x 173 mm) 16.5 x 11.7 x 2.5 Inches (417.9 x 297.9 x 64.2 mm) 16.5 x 15.2 x 6.8 Inches (417.9 x 386.1 x 173 mm) 16.5 x 17.2 x 6.8 Inches (417.9 x 436.1 x 173 mm) 16.5 x 11.7 x 2.5 Inches (417.9 x 297.9 x 64.2 mm)
Weight (Net/Gross)	4.2 kg (9.3 lbs) / 5.2 kg (11.5 lbs)	4.3 kg (9.5 lbs) / 5.5 kg (12.1 lbs)
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 (GH15MS)	<ul style="list-style-type: none"> <li>• Built-in Microphone: High-sensitivity condenser microphone (mono)</li> <li>• Audio input: Left/Right Stereo phone jack, 0.5 Vrms</li> <li>• Sound output: 1.0 W (left) + 1.0 W (right)/THD 1% at 8ohm</li> <li>• Frequency response: 80 Hz~20 kHz (at -3dB)</li> <li>• Headphone: Max 50mW output (3.5-pi jack)</li> <li>• Speaker: Internal semi Dome (16ohm x 2)</li> </ul>	
<ul style="list-style-type: none"> <li>• GH15LS/GH15ES/GH15MS complies with SWEDAC (MPR II) recommendations for reduced electromagnetic fields.</li> <li>• Designs and specifications are subject to change without prior notice.</li> </ul>		

## 2-2 Pin Assignments

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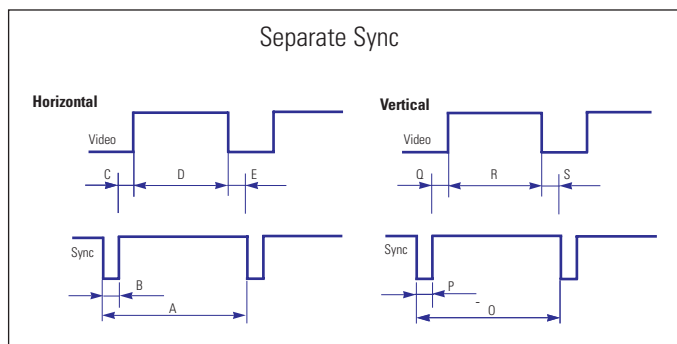
Pin No.	Sync Type	15-Pin Signal Cable Connector		
		Separate	Composite	Sync-on-green
1		Red	Red	Red
2		Green	Green	Green + H/V Sync.
3		Blue	Blue	Blue
4		GND	GND	GND
5		GND (DDC Return)	GND (DDC Return)	GND (DDC Return)
6		GND-R	GND-R	GND-R
7		GND-G	GND-G	GND-G
8		GND-B	GND-B	GND-B
9		No Connection	No 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

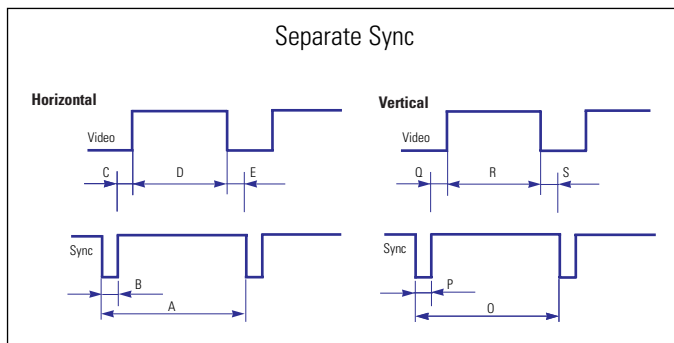
Mode Timing	IBM			VESA			
	VGA1/70 Hz 640 x 350	VGA2/70 Hz 720 x 400	VGA3/60 Hz 640 x 480	640/72 Hz 640 x 480	640/75 Hz 640 x 480	800/56 Hz 800 x 600	800/60 Hz 800 x 600
fH (kHz)	31.469	31.469	31.469	37.861	37.500	35.156	37.879
A $\mu$ sec	31.778	31.777	31.778	26.413	26.667	28.444	26.400
B $\mu$ sec	3.813	3.813	3.813	1.270	2.032	2.000	3.200
C $\mu$ sec	1.589	1.589	1.589	3.810	3.810	3.556	2.200
D $\mu$ sec	26.058	26.058	26.058	20.825	20.317	22.222	20.000
E $\mu$ sec	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 $\mu$ sec	20.800	21.333	20.677	17.707	16.660	28.571	20.110
B $\mu$ sec	2.400	1.616	2.092	1.813	1.219	2.116	1.117
C $\mu$ sec	1.280	3.232	2.462	1.920	2.235	3.175	3.910
D $\mu$ sec	16.000	16.162	15.754	13.653	13.003	21.164	14.524
E $\mu$ 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	

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## 3 Disassembly and Reassembly

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This section of the service manual describes the disassembly and reassembly procedures for the GH15LS/GH15ES/GH15MS monitor.

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

### 3-1 Disassembly

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- 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. Disconnect Power Cord and Signal Cable.
3. Pry it off the back of the monitor.

#### 3-1-2 Main Body Disassembly

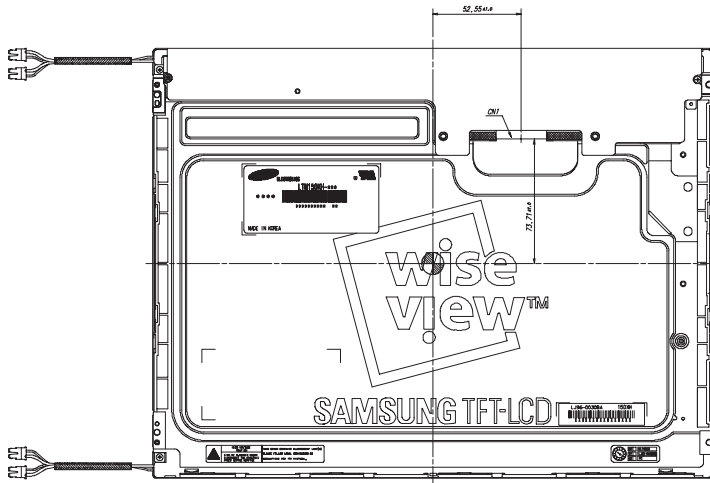
1. Remove 2 screws on the two corner of the Rear Cover.
2. Remove Rear Cover from the Front Cover.
3. Remove 4 screws on the Shield and remove the shield.
4. Disconnect Inverter wire, Function PCB wire and Interface wire.  
Remove 3 screws on the Main PCB and remove 2 screws on the D sub shield.
5. Remove 3 screws on the power PCB and remove 2 screws on the Inverter PCB.
6. Remove the Main PCB Assembly.
7. Remove 3 screws on the Function PCB from locking area of Function knob and remove Function PCB.

#### 3-1-3 Standard Stand Disassembly

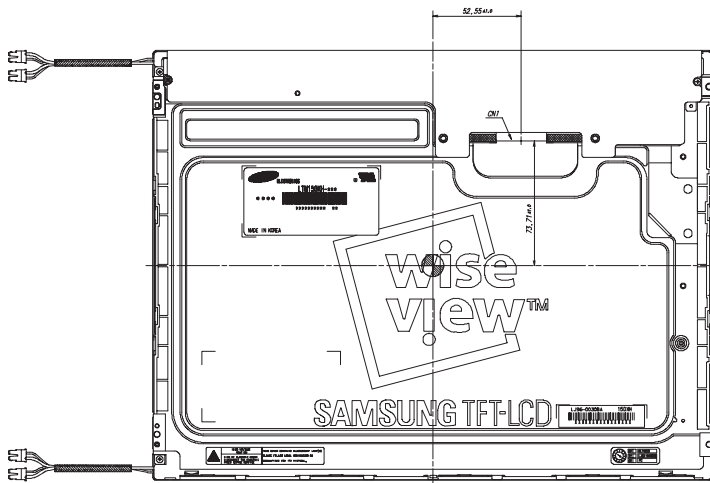
1. Remove 2 screws from the Stand front.
2. Remove 7 screws from the Stand Bottom.
3. Remove Stand Rear from the Stand assembly.
4. Remove 5 screws from the Stand assembly.
5. Remove the Neck front from the Stand assembly.
6. Remove 2 screws from the Stand assembly.
7. Remove Neck Rear from the Stand assembly.
8. Remove 4 screws from the Stand assembly.



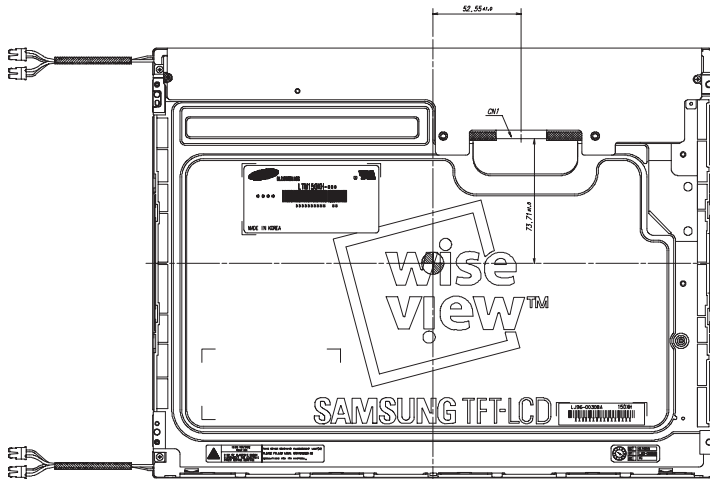
### 3-2 Replacement Order of Lamp Assemblies (GH15LS/GH15ES/GH15MS : Samsung Panel)



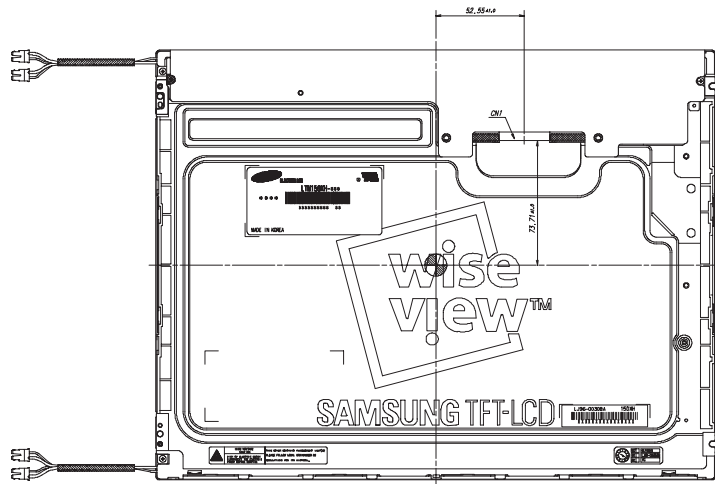
1. After confirm there is nothing on the disk  
Turn the LCD module over and put it on a flat desk set to the ground.



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

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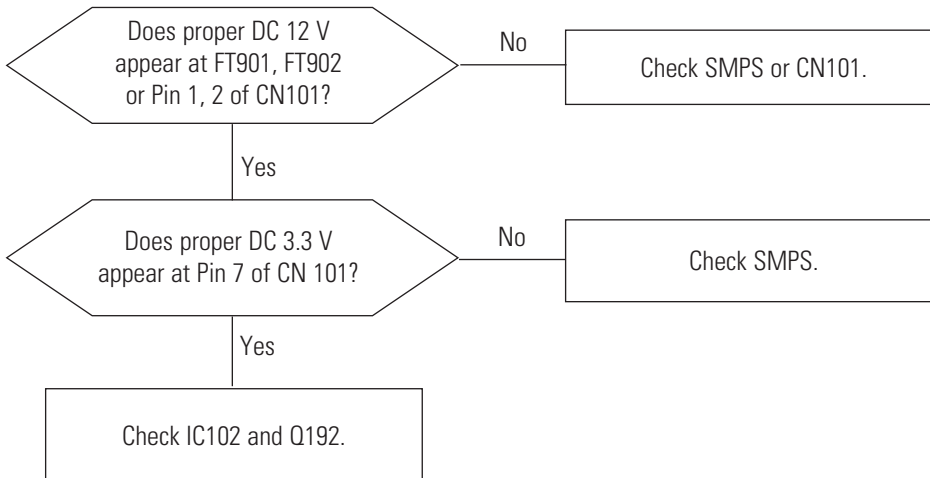
Reassembly procedures are in the reverse order of Disassembly procedures.

## **Memo**

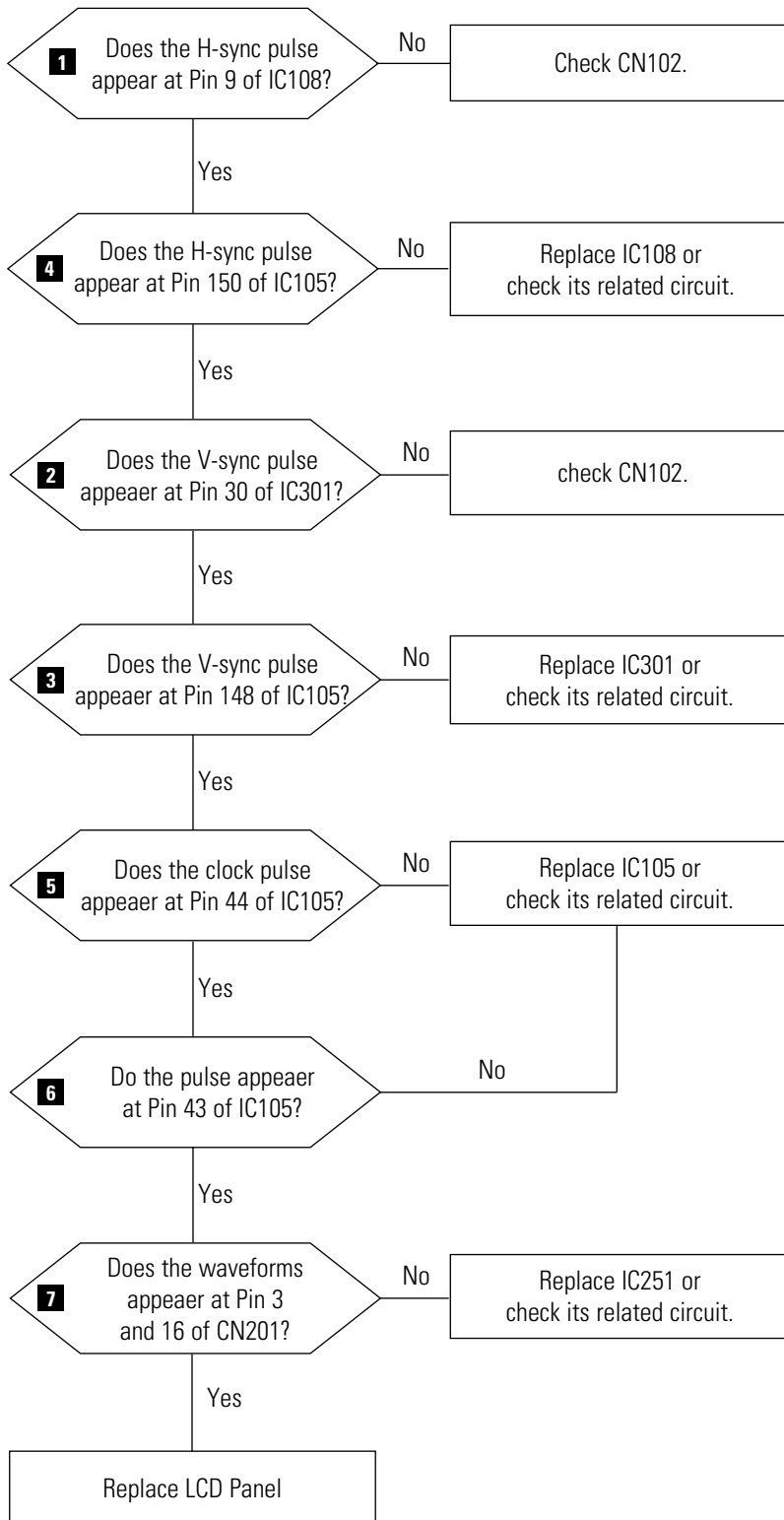
## 4 Troubleshooting

- 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.

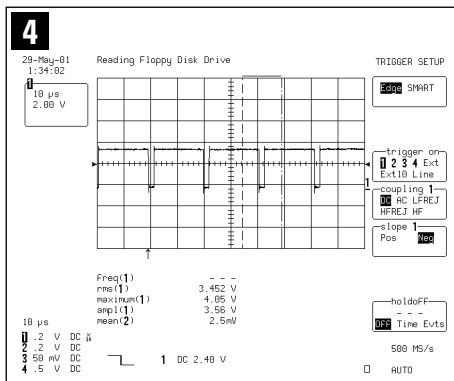
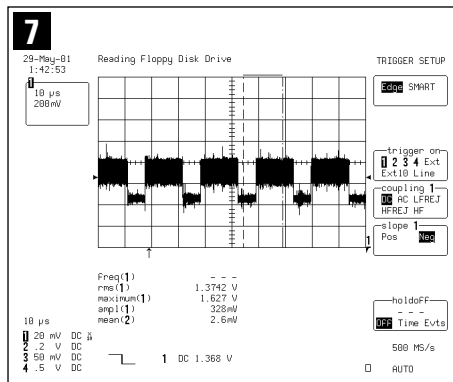
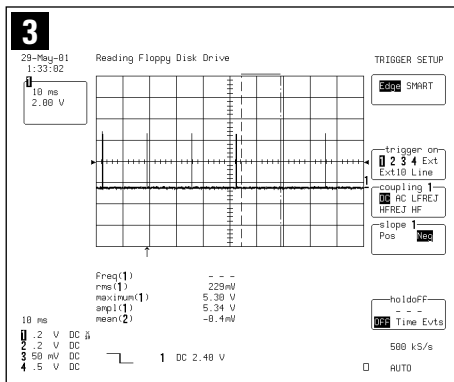
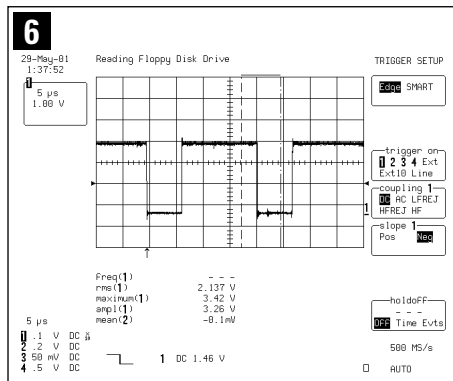
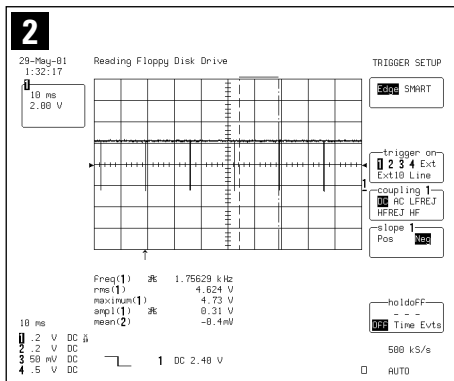
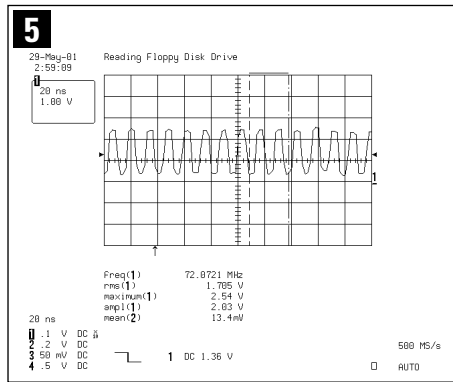
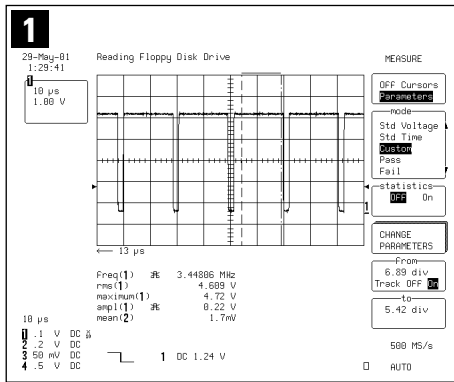
### 4-1 No Power (GH15LS/GH15ES/GH15MS)



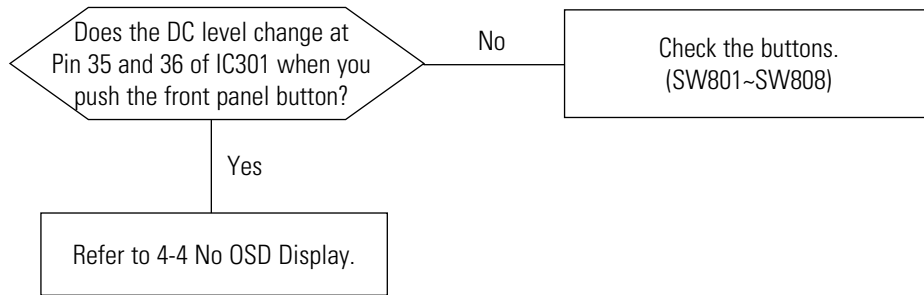
## 4-2 No Video



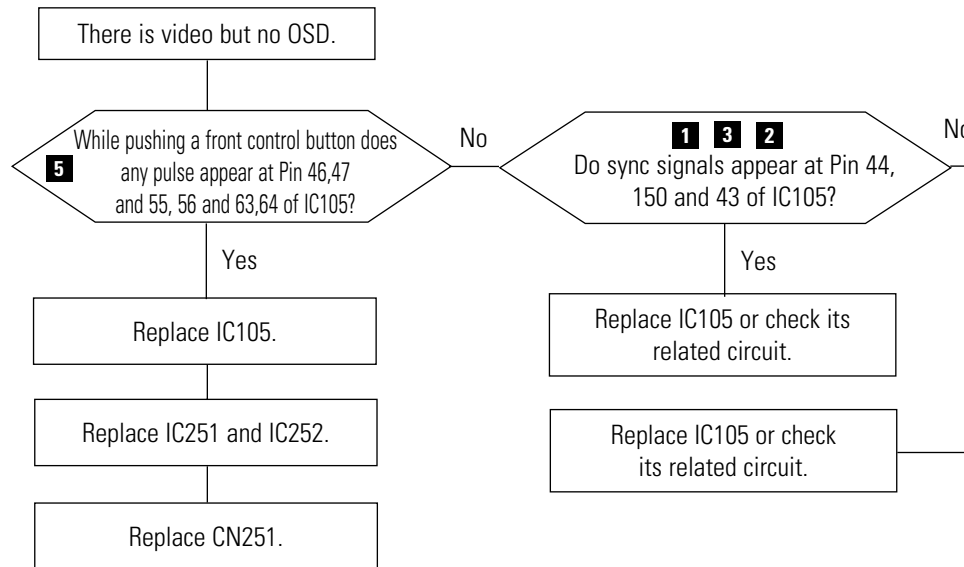
# WAVEFORMS



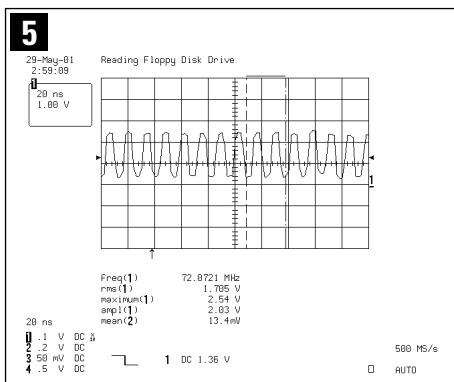
### 4-3 User Controls Don't Work



### 4-4 No OSD

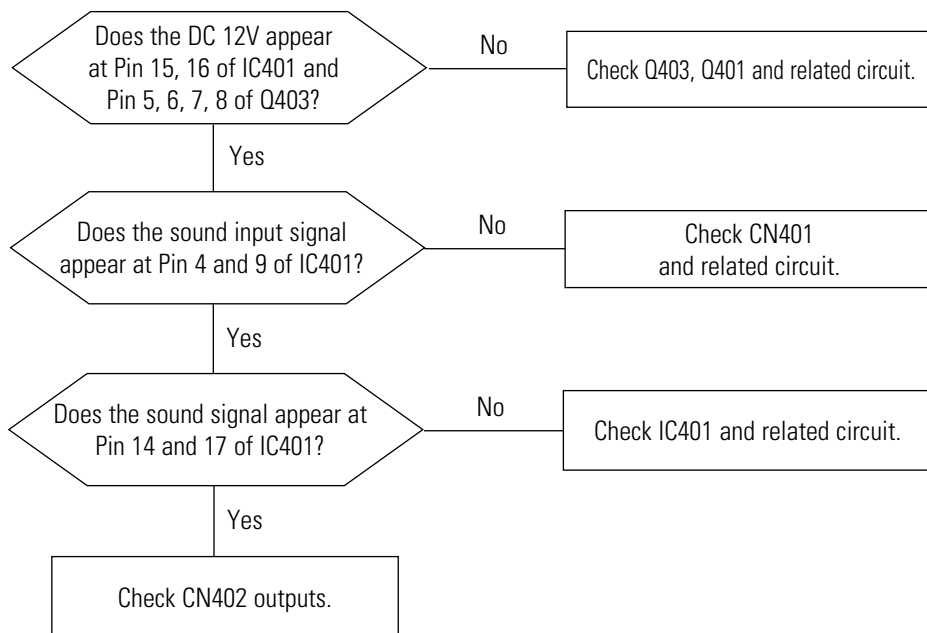


## WAVEFORMS



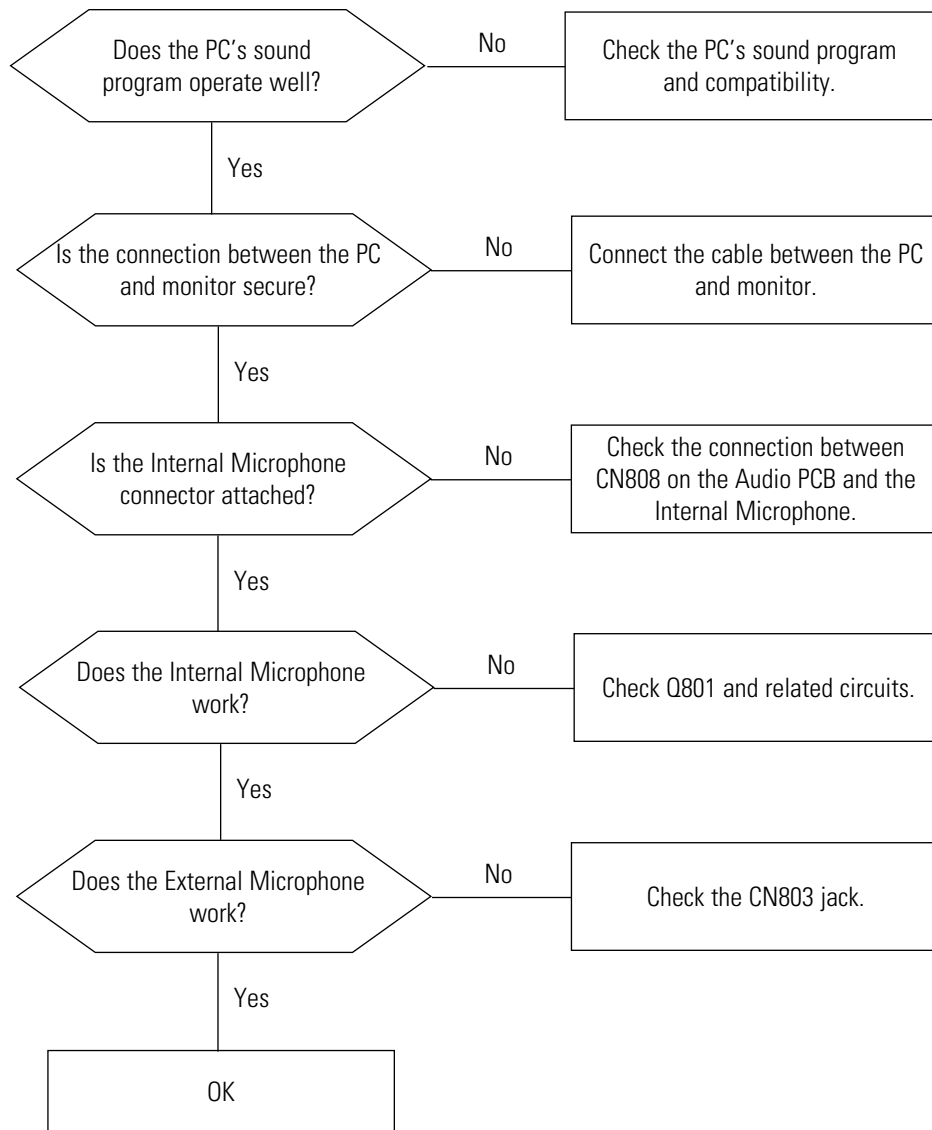
**4-5 No SOUND (GH15MS)**

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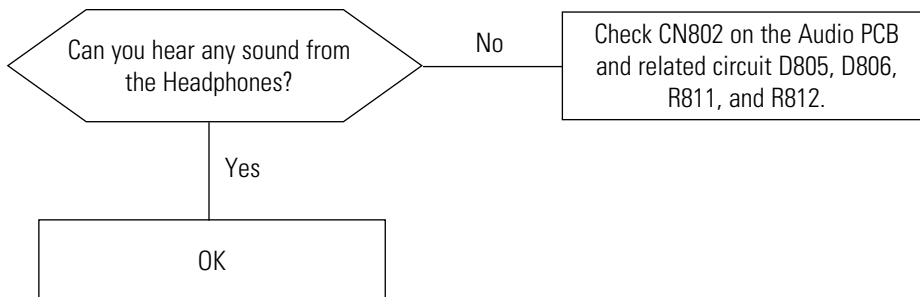




## 4-6 Microphones Don't Work

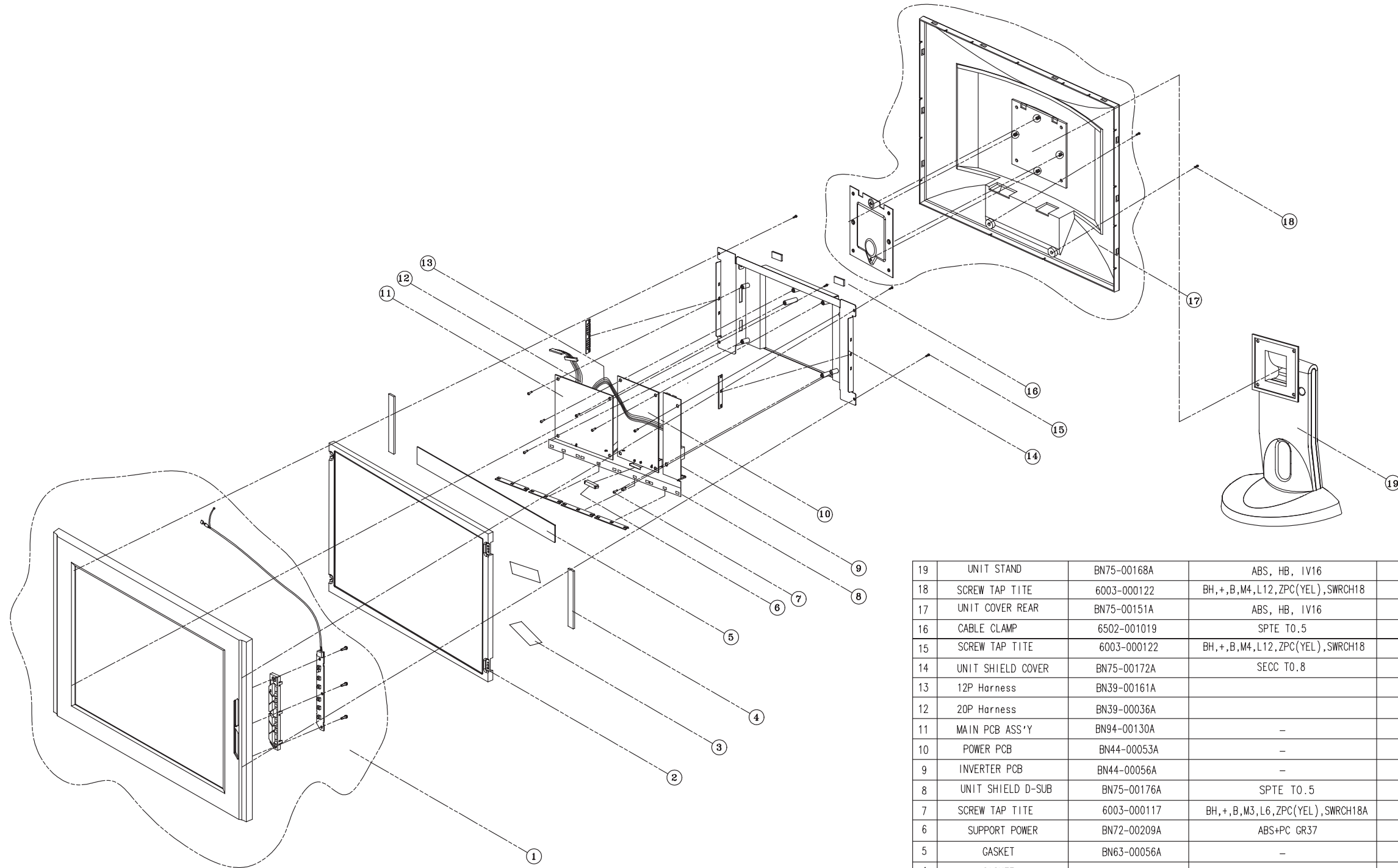


## 4-7 Headphones Don't Work



## 5 Exploded View and Parts List

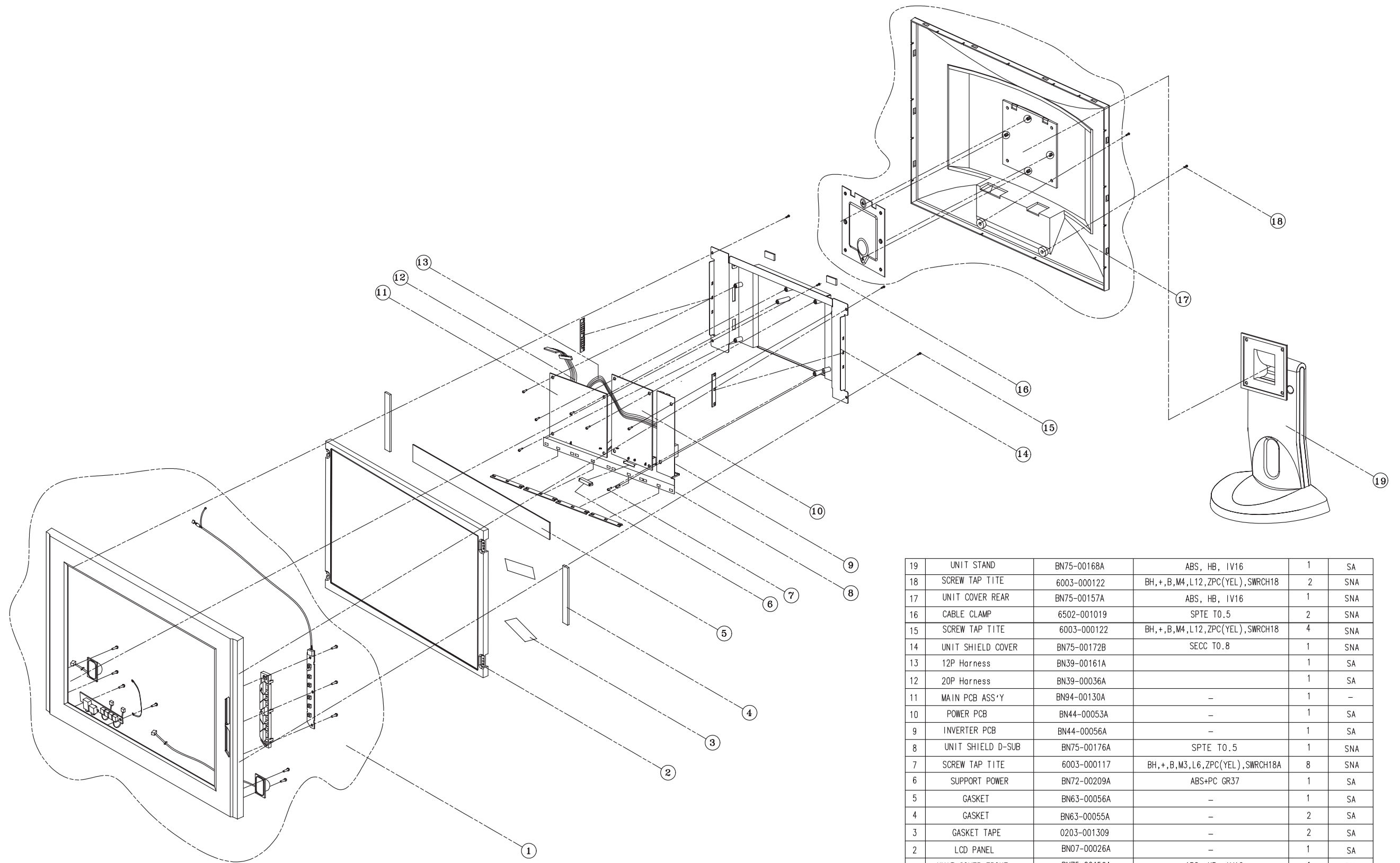
### 5-1 GH15LS/GH15ES



19	UNIT STAND	BN75-00168A	ABS, HB, IV16	1	SA
18	SCREW TAP TITE	6003-000122	BH,+,B,M4,L12,ZPC(YEL),SWRCH18	2	SNA
17	UNIT COVER REAR	BN75-00151A	ABS, HB, IV16	1	SNA
16	CABLE CLAMP	6502-001019	SPT E T0.5	2	SNA
15	SCREW TAP TITE	6003-000122	BH,+,B,M4,L12,ZPC(YEL),SWRCH18	4	SNA
14	UNIT SHIELD COVER	BN75-00172A	SECC T0.8	1	SNA
13	12P Harness	BN39-00161A		1	SA
12	20P Harness	BN39-00036A		1	SA
11	MAIN PCB ASS'Y	BN94-00130A	-	1	-
10	POWER PCB	BN44-00053A	-	1	SA
9	INVERTER PCB	BN44-00056A	-	1	SA
8	UNIT SHIELD D-SUB	BN75-00176A	SPT E T0.5	1	SNA
7	SCREW TAP TITE	6003-000117	BH,+,B,M3,L6,ZPC(YEL),SWRCH18A	8	SNA
6	SUPPORT POWER	BN72-00209A	ABS+PC GR37	1	SA
5	GASKET	BN63-00056A	-	1	SA
4	GASKET	BN63-00055A	-	2	SA
3	GASKET TAPE	0203-001309	-	2	SA
2	LCD PANEL	BN07-00026A	-	1	SA
1	UNIT COVER FRONT	BN75-00149A	(GH15LS) ABS, HB, IV16	1	SNA
		BN75-00149C	(GH15ES)		
NO	DESCRIPTION	PART CODE-NO	SPECIFICATION	Q'TY	REMARK

UNIT PART LIST

### 5-2 GH15MS



19	UNIT STAND	BN75-00168A	ABS, HB, 1V16	1	SA
18	SCREW TAP TITE	6003-000122	BH,+ ,B,M4,L12,ZPC(YEL),SWRCH18	2	SNA
17	UNIT COVER REAR	BN75-00157A	ABS, HB, 1V16	1	SNA
16	CABLE CLAMP	6502-001019	SPT E T0.5	2	SNA
15	SCREW TAP TITE	6003-000122	BH,+ ,B,M4,L12,ZPC(YEL),SWRCH18	4	SNA
14	UNIT SHIELD COVER	BN75-00172B	SECC T0.8	1	SNA
13	12P Harness	BN39-00161A		1	SA
12	20P Harness	BN39-00036A		1	SA
11	MAIN PCB ASS'Y	BN94-00130A	-	1	-
10	POWER PCB	BN44-00053A	-	1	SA
9	INVERTER PCB	BN44-00056A	-	1	SA
8	UNIT SHIELD D-SUB	BN75-00176A	SPT E T0.5	1	SNA
7	SCREW TAP TITE	6003-000117	BH,+ ,B,M3,L6,ZPC(YEL),SWRCH18A	8	SNA
6	SUPPORT POWER	BN72-00209A	ABS+PC GR37	1	SA
5	GASKET	BN63-00056A	-	1	SA
4	GASKET	BN63-00055A	-	2	SA
3	GASKET TAPE	0203-001309	-	2	SA
2	LCD PANEL	BN07-00026A	-	1	SA
1	UNIT COVER FRONT	BN75-00156A	ABS, HB, 1V16	1	SNA
NO	DESCRIPTION	PART CODE-NO	SPECIFICATION	Q'TY	REMARK
<b>UNIT PART LIST</b>					

# 6 Electrical Parts List

## 6-1 Main PCB Parts

Loc. No.	Code No.	Description	Specification	Remarks
CIS	BN44-00053A	ADAPTOR	DPA30L,150S,100-240VAC,47 - 63 HZ,12VDC/3.3VDC,2A/2A,-,30.6,AC-DC,-,10-40C,-,-	
CIS	BN72-00209A	SUPPORT-POWER	GH15LS,ABS+PC,GR37,-,5V,-,-,-	SNA
CIS	BN75-00176A	UNIT-SHIELD/DSUB	GH15LS,-,SPT E TO.5,-,-,-,-	SNA
CIS	BN70-00204A	SHIELD-D/SUB	-,SPT E,-,TO.5,-,-,-,-,-	SNA
CIS	BN71-00024A	EARTH-PLATE	GH17LS,SUS,TO.15,-,-,-	SNA
CN101	3711-004853	CONNECTOR-HEADER	BOX,7P,1R,2MM,ANGLE,SN,WHT	SNA
CN102	3701-001219	CONNECTOR-DSUB	15P,3R,FEMALE,ANGLE,AUF	
IC301	0903-001194	IC-MICROCONTROLLER	3P863,8Bit,SDIP,42P,600MIL,12MHz,ST,CMOS,PLASTIC,5V,-,-40to+85C,1040BYTE,48KBYTE	SNA
IC301_SOCKET	3704-001071	SOCKET-IC	42P,DIP,SN,1.778mm	
CIS	BN46-00008L	MICOM-S/W,GOGH	GH15LS,-,-,-,-,-,-	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	2402-001044	C-AL,SMD	100uF,20%,25V,-,TP,8.3x8.3x6.3	
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	
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	2402-000168	C-AL,SMD	100uF,20%,16V,GP,TP,8.3x8.3x6.3mm	
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	

Loc. No.	Code No.	Description	Specification	Remarks
C166	2203-000280	C-CERAMIC,CHIP	0.01nF,0.5pF,50V,NPO,TP,1608	
C167	2203-000626	C-CERAMIC,CHIP	0.022nF,5%,50V,NPO,TP,1608	
C168	2203-000236	C-CERAMIC,CHIP	0.1nF,5%,50V,NPO,TP,1608	
C169	2203-000236	C-CERAMIC,CHIP	0.1nF,5%,50V,NPO,TP,1608	
C170	2203-000384	C-CERAMIC,CHIP	0.015nF,5%,50V,NPO,TP,1608	
C171	2203-000384	C-CERAMIC,CHIP	0.015nF,5%,50V,NPO,TP,1608	
C172	2203-000384	C-CERAMIC,CHIP	0.015nF,5%,50V,NPO,TP,1608	
C173	2203-000280	C-CERAMIC,CHIP	0.01nF,0.5pF,50V,NPO,TP,1608	
C187	2402-000170	C-AL,SMD	1uF,20%,50V,GP,TP,4.3x4.3x5.4	
C188	2402-000108	C-AL,SMD	10uF,20%,16V,WT,TP,4.3x4.3x5.4	
C189	2203-000257	C-CERAMIC,CHIP	10nF,10%,50V,X7R,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,NPO,TP,1608	
C312	2203-000626	C-CERAMIC,CHIP	0.022nF,5%,50V,NPO,TP,1608	
C313	2203-005005	C-CERAMIC,CHIP	100nF,10%,16V,X7R,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,NPO,TP,1608	
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
D131	0401-001056	DIODE-SWITCHING	MMBD4148SE,75V,200MA,SOT-23,TP	
D132	0401-001056	DIODE-SWITCHING	MMBD4148SE,75V,200MA,SOT-23,TP	
D133	0401-001056	DIODE-SWITCHING	MMBD4148SE,75V,200MA,SOT-23,TP	
D301	0401-001056	DIODE-SWITCHING	MMBD4148SE,75V,200MA,SOT-23,TP	
D302	0401-001056	DIODE-SWITCHING	MMBD4148SE,75V,200MA,SOT-23,TP	
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
FT901	3301-001145	CORE-FERRITE BEAD	AB,4.5x1.6x1.6mm,-,-	SNA
FT902	3301-001145	CORE-FERRITE BEAD	AB,4.5x1.6x1.6mm,-,-	SNA
FT903	3301-001145	CORE-FERRITE BEAD	AB,4.5x1.6x1.6mm,-,-	SNA
FT904	3301-001145	CORE-FERRITE BEAD	AB,4.5x1.6x1.6mm,-,-	SNA
FT905	3301-001145	CORE-FERRITE BEAD	AB,4.5x1.6x1.6mm,-,-	SNA
FT906	3301-001145	CORE-FERRITE BEAD	AB,4.5x1.6x1.6mm,-,-	SNA
IC102	1203-001488	IC-POS.FIXED REG.	7805,TO-252,3P,-,PLASTIC,4,8/5	
IC105	1003-001377	IC-LCD CONTROLLER	GMZAN1,QFP,160P,1102MIL,SINGLE,-,TR,PLASTIC,3.47V,0TO+70C,1.8W,-,LCD CONTROLLER	
IC108	0803-000122	IC-TTL	74F125,BUFFER,SOP,14P,150MIL,Q	
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	
MP1.0	BN41-00088A	PCB MAIN	GH15L/M,FR-4,4,-,1.6,120*110*1.6,-,-,-,-	SNA
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	

Loc. No.	Code No.	Description	Specification	Remarks
Q104	0501-002080	TR-SMALL SIGNAL	2SC2412K,NPN,200mW,SC-59,TP,120-270	
Q105	0501-002080	TR-SMALL SIGNAL	2SC2412K,NPN,200mW,SC-59,TP,120-270	
Q106	0501-002080	TR-SMALL SIGNAL	2SC2412K,NPN,200mW,SC-59,TP,120-270	
Q107	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	
R106	2007-000102	R-CHIP	100Kohm,5%,1/16W,DA,TP,1608	
R107	2007-000090	R-CHIP	10KOHM,5%,1/16W,DA,TP,1608	
R108	2007-000078	R-CHIP	1Kohm,5%,1/16W,DA,TP,1608	
R109	2007-000090	R-CHIP	10KOHM,5%,1/16W,DA,TP,1608	
R110	2007-000090	R-CHIP	10KOHM,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	2007-000072	R-CHIP	47ohm,5%,1/16W,DA,TP,1608	
R118	2007-000072	R-CHIP	47ohm,5%,1/16W,DA,TP,1608	
R119	2007-000072	R-CHIP	47ohm,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	
R185	2007-000102	R-CHIP	100Kohm,5%,1/16W,DA,TP,1608	
R186	2007-000090	R-CHIP	10KOHM,5%,1/16W,DA,TP,1608	
R187	2007-000084	R-CHIP	4.7Kohm,5%,1/16W,DA,TP,1608	
R188	2007-000090	R-CHIP	10KOHM,5%,1/16W,DA,TP,1608	
R189	2007-000084	R-CHIP	4.7Kohm,5%,1/16W,DA,TP,1608	
R190	2007-000090	R-CHIP	10KOHM,5%,1/16W,DA,TP,1608	
R203	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R204	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R205	2007-000070	R-CHIP	0ohm,5%,1/16W,DA,TP,1608	
R207	2007-000070	R-CHIP	0ohm,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	
R334	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	

## 6 Electrical Parts List

Loc. No.	Code No.	Description	Specification	Remarks
R347	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	
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	
R378	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608	
R381	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	
R913	2007-000078	R-CHIP	1Kohm,5%,1/16W,DA,TP,1608	
R918	2007-000092	R-CHIP	15Kohm,5%,1/16W,DA,TP,1608	
R919	2007-000070	R-CHIP	0ohm,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	
RC201	2503-001018	C-NETWORK	15PFX4,10%,50V,-	
RC202	2503-001018	C-NETWORK	15PFX4,10%,50V,-	
RC203	2503-001018	C-NETWORK	15PFX4,10%,50V,-	
RC204	2503-001018	C-NETWORK	15PFX4,10%,50V,-	
RC205	2503-001018	C-NETWORK	15PFX4,10%,50V,-	
RC206	2503-001018	C-NETWORK	15PFX4,10%,50V,-	
RC207	2503-001018	C-NETWORK	15PFX4,10%,50V,-	
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
-	BN95-00225A	ASSY MANUAL	GH15LS,-,-,-	GH15LS
-	BN95-00234A	ASSY MANUAL	GH15MS,-,-,-	GH15MS
-	BN95-00254A	ASSY MANUAL	GH15ES,-,-,-	GH15ES
CIS	BN07-00026A	LCD	LTM150XH-L01,CZB,8BIT,331.6*254.76*12.5,16.19M,-,0.297*0.297,-,-,AMLCD/1 LVDS,-	GH15LS/ES/MS
CIS	BN44-00056A	INVERTER	GOGH,SIC1542,48KHZ,12VDC,1.5MARMS,5.6MARMS,48KHZ,37*140*16.0,4LAMP,40-56KV,-,SIC	GH15LS/ES/MS
CIS	BN44-00053A	ADAPTOR	DPA30L,150S,100-240VAC,47 - 63 HZ,12VDC/3.3VDC,2A/2A,-,30.6,AC-DC,-,10-40C,-,-	GH15LS/ES/MS
M/PCB+PAN	BN39-00036A	CBF-HARNESS	20P,150MM,BLU/GRY/WHT,UL1571,AWG30,DF14-20S-1.25C	GH15LS/ES/MS
IN/PCB+M/PCB	BN39-00161A	CBF HARNESS	GH15LS,UL/CSA,UL1061#28,12P/12P,160MM,WHT,AWG28,51021-1200,51021-1200,-,-,1.25MM	GH15LS/ES/MS
CIS	BN39-00114A	CBF SIGNAL	NL15MO,15P/15P,2990,1830MM,UL2990,IVORY,D-SUB/MALE,-,-,-	GH15LS/ES/MS
-	BN59-00167A	PBA SUB-FUNCTION	GH15MS,GH15_FUNCTION,-,-,-,-,-	GH15LS/ES/MS
-	BN59-00168A	PBA SUB-PHONE	GH15MS,GH15_PHONE,-,-,-,-,-	GH15MS
CIS	BN59-00169A	SPEAKER SYSTEM	GH15MS,-,-,-,-,-,RIGHT	GH15MS
CIS	BN59-00169B	SPEAKER SYSTEM	GH15MS,-,-,-,-,-,LEFT	GH15MS

## 6-3-1 Different Part List (GH15ES)

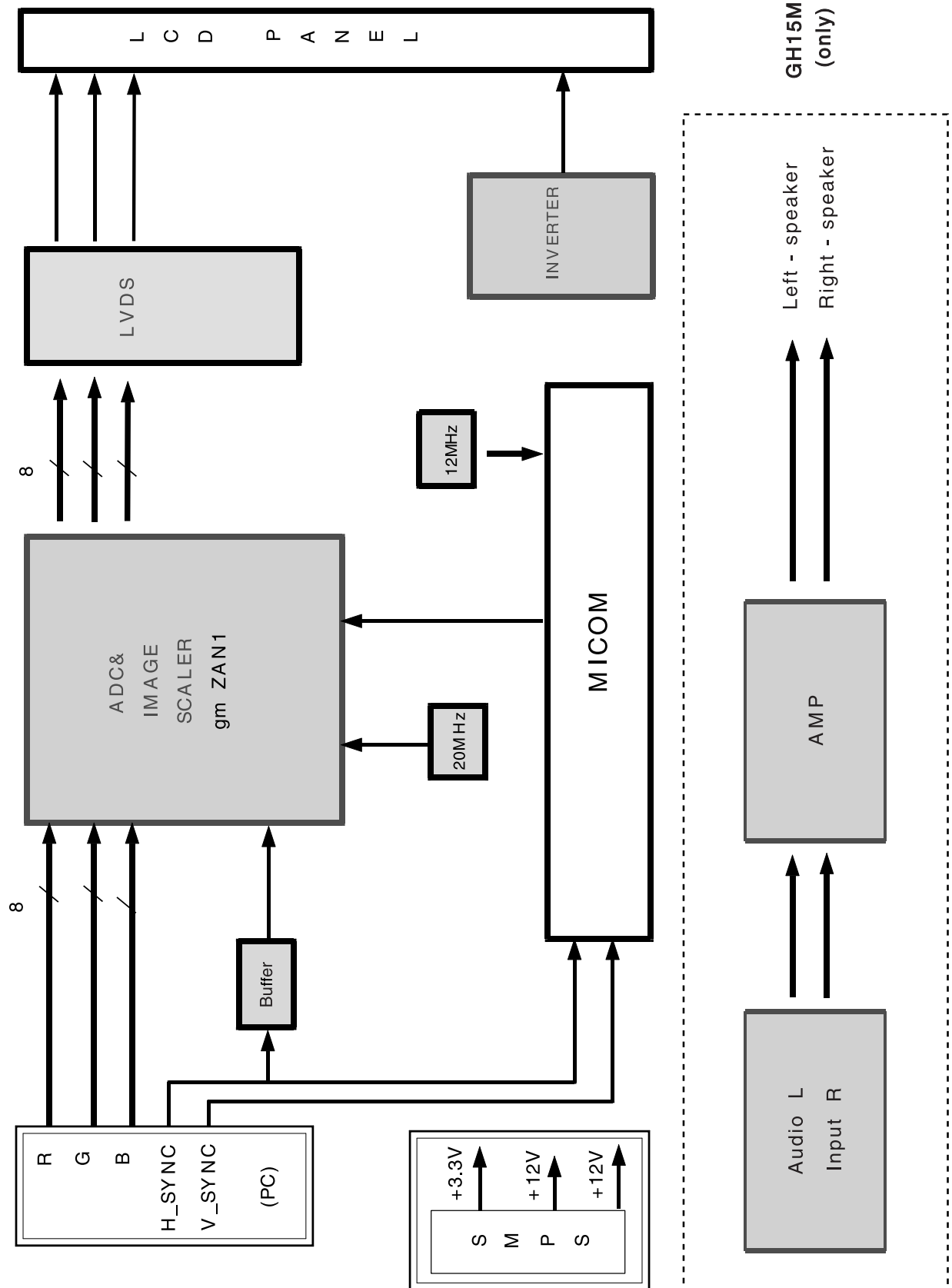
Location	Code	Spec.	Desc.
C190	2203-000236	C-CERAMIC,CHIP	100pF,5%,50V,NPO,TP,1608,-
C191	2402-000108	C-AL,SMD	10uF,20%,16V,WT,TP,4.3x4.3x5.4
C192	2203-000257	C-CERAMIC,CHIP	10nF,10%,50V,X7R,TP,1608,-
C193	2203-005005	C-CERAMIC,CHIP	100nF,15%,16V,W5R,TP,1608,1.6m
C194	2203-000257	C-CERAMIC,CHIP	10nF,10%,50V,X7R,TP,1608,-
IC109	1204-000292	IC-VIDEO SYSTEM	IC-VIDEO,LM1881M,SOP,8P,150MIL
R192	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608
R193	2007-001114	R-CHIP	680Kohm,5%,1/16W,DA,TP,1608
R195	2007-000076	R-CHIP	330ohm,5%,1/16W,DA,TP,1608



**6-3-2 Different Part List (GH15MS)**

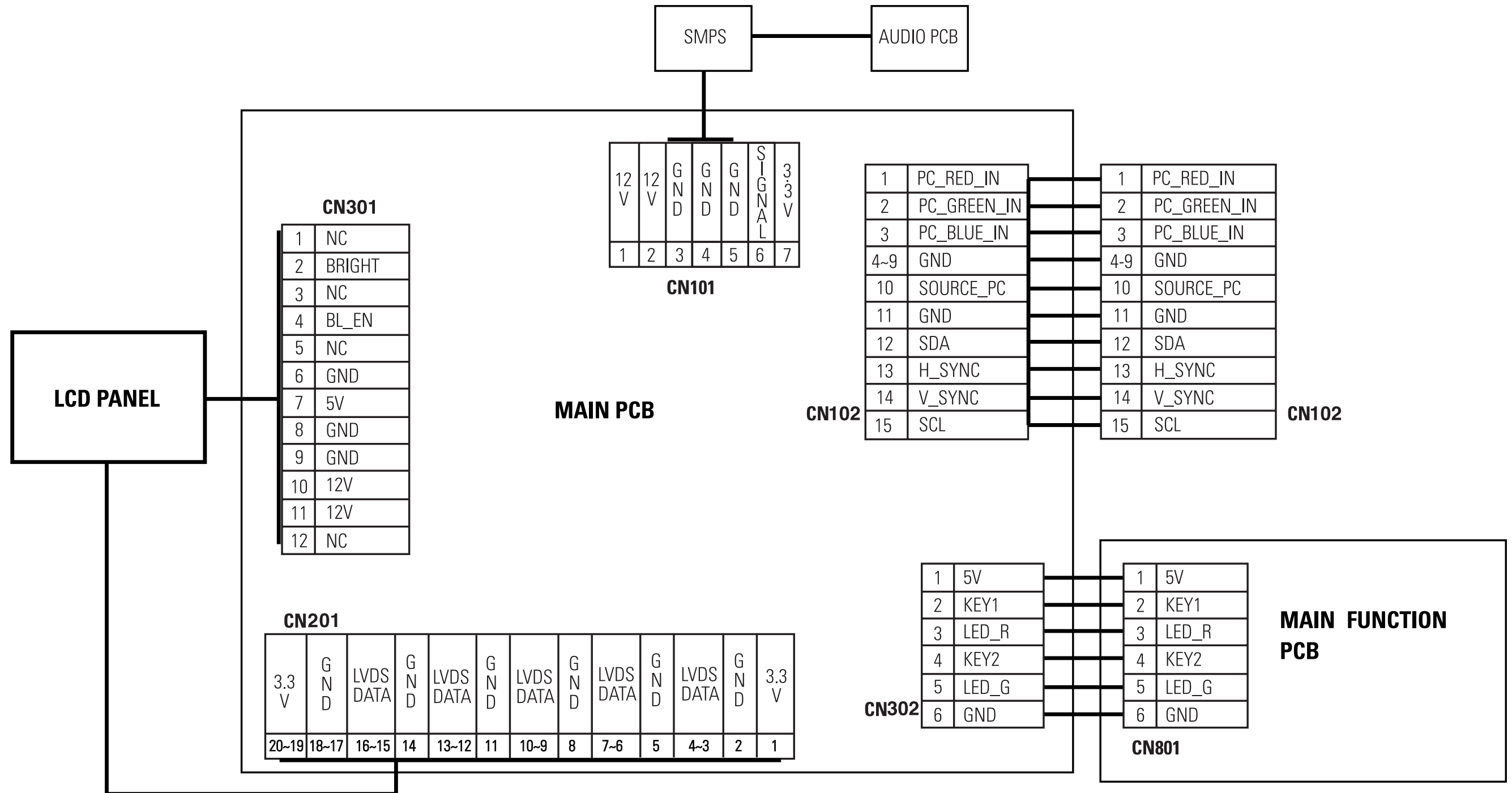
Location	Code	Spec.	Desc.
C190	2203-000236	C-CERAMIC,CHIP	100pF,5%,50V,NPO,TP,1608,-
C191	2402-000108	C-AL,SMD	10uF,20%,16V,WT,TP,4.3x4.3x5.4
C192	2203-000257	C-CERAMIC,CHIP	10nF,10%,50V,X7R,TP,1608,-
C193	2203-005005	C-CERAMIC,CHIP	100nF,15%,16V,W5R,TP,1608,1.6m
C194	2203-000257	C-CERAMIC,CHIP	10nF,10%,50V,X7R,TP,1608,-
C401	2203-005015	C-CERAMIC,CHIP	150nF,+80-20%,16V,Y5V,TP,1608
C402	2203-005015	C-CERAMIC,CHIP	150nF,+80-20%,16V,Y5V,TP,1608
C403	2203-000236	C-CERAMIC,CHIP	100pF,5%,50V,NPO,TP,1608,-
C404	2203-000236	C-CERAMIC,CHIP	100pF,5%,50V,NPO,TP,1608,-
C405	2402-000168	C-AL,SMD	100uF,20%,16V,-,8.3x8.3x6.2mm,
C406	2402-000108	C-AL,SMD	10uF,20%,16V,WT,TP,4.3x4.3x5.4
C407	2203-005005	C-CERAMIC,CHIP	100nF,15%,16V,W5R,TP,1608,1.6m
C408	2203-005005	C-CERAMIC,CHIP	100nF,15%,16V,W5R,TP,1608,1.6m
C409	2402-000168	C-AL,SMD	100uF,20%,16V,-,8.3x8.3x6.2mm,
C410	2401-001363	C-AL	470uF,20%,16V,GP,10x12.5mm,5mm
C412	2401-001363	C-AL	470uF,20%,16V,GP,10x12.5mm,5mm
C416	2402-000179	C-AL,SMD	47uF,20%,16V,GP,TP,6.3x5.4
C420	2402-000147	C-AL,SMD	33uF,20%,25V,-,TP,6.3x5.2,-
CN401	3711-004270	CONNECTOR-HEADER	BOX,2P,1R,2MM,ANGLE,SN
CN402	3711-004386	CONNECTOR-HEADER	BOX,3P,1R,2mm,ANGLE,SN
FT401	3301-001145	CORE-FERRITE BEAD	AB,4.5x1.6x1.6mm,-,-
FT402	3301-001145	CORE-FERRITE BEAD	AB,4.5x1.6x1.6mm,-,-
IC109	1204-000292	IC-VIDEO SYSTEM	IC-VIDEO,LM1881M,SOP,8P,150MIL
IC401	1204-001833	IC-VOLUME CONTROL	TDA7496L,DIP,20P,-,PLASTIC,26V
Q401	0501-002080	TR-SMALL SIGNAL	2SC2412K,NPN,200mW,SOT-23,TP,1
Q403	0505-000275	FET-SILICON	SI4435DY,P,-30V,+8.0A,0.02ohm
R192	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608
R193	2007-001114	R-CHIP	680Kohm,5%,1/16W,DA,TP,1608
R195	2007-000076	R-CHIP	330ohm,5%,1/16W,DA,TP,1608
R361	2007-000090	R-CHIP	10Kohm,5%,1/16W,DA,TP,1608
R380	2007-000078	R-CHIP	1Kohm,5%,1/16W,DA,TP,1608
R401	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608
R402	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608
R403	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608
R404	2007-000074	R-CHIP	100ohm,5%,1/16W,DA,TP,1608
R405	2007-000078	R-CHIP	1Kohm,5%,1/16W,DA,TP,1608
R406	2007-000090	R-CHIP	10Kohm,5%,1/16W,DA,TP,1608
R412	2007-000102	R-CHIP	100Kohm,5%,1/16W,DA,TP,1608
R413	2007-000102	R-CHIP	100Kohm,5%,1/16W,DA,TP,1608
R414	2007-000090	R-CHIP	10Kohm,5%,1/16W,DA,TP,1608
ZD401	0403-001052	DIODE-ZENER	RD8.2MB,8.2V,7.7-8.64V,200mW,S
ZD402	0403-001052	DIODE-ZENER	RD8.2MB,8.2V,7.7-8.64V,200mW,S

# 7 Block Diagram



# Memo

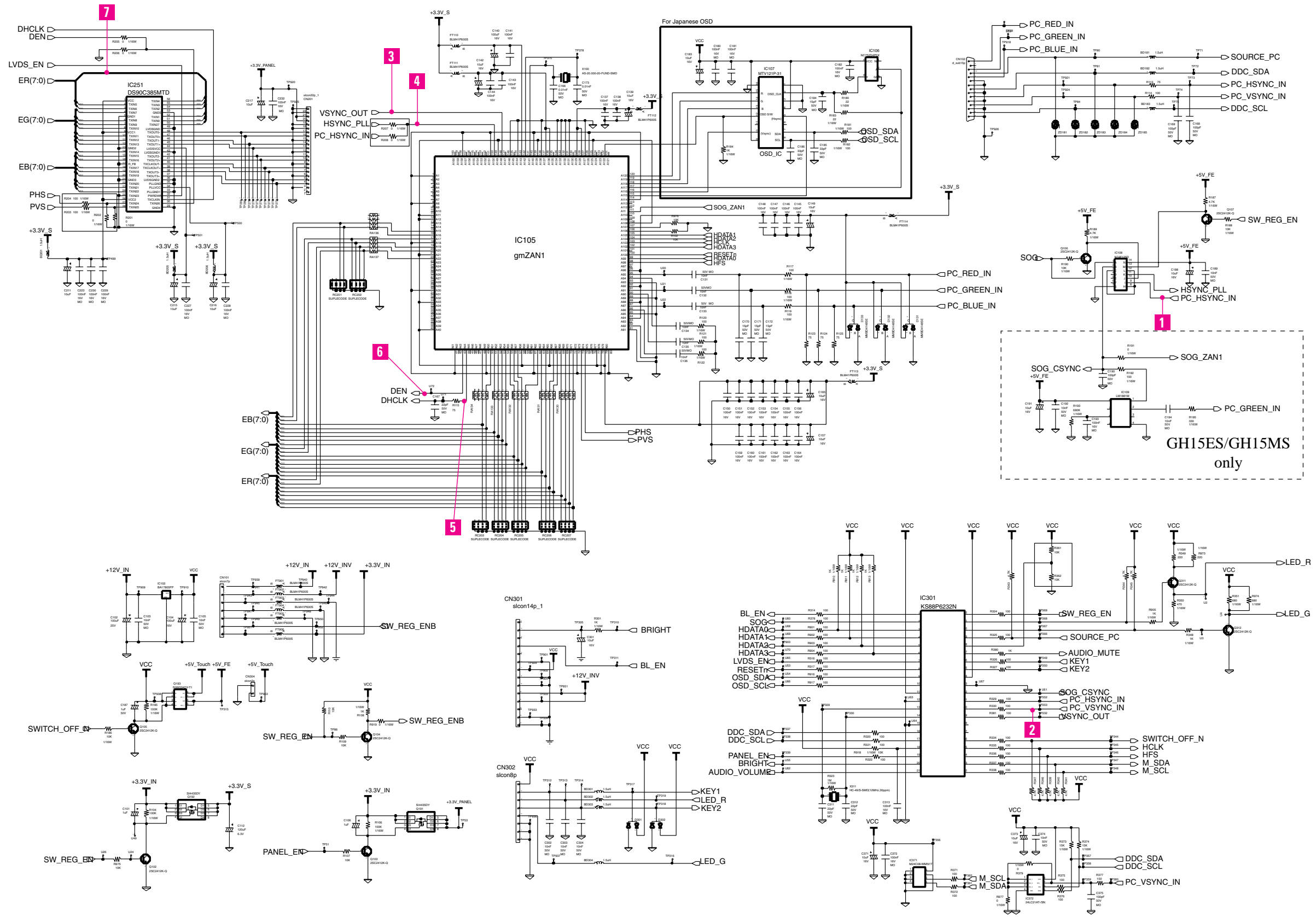
# 8 Wiring Diagram



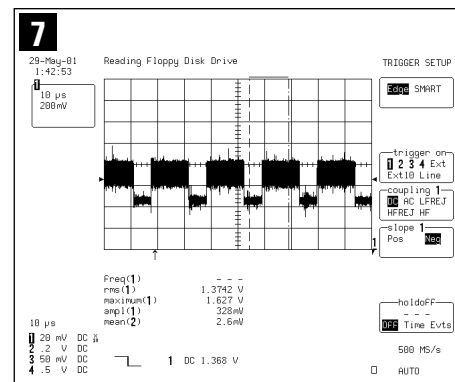
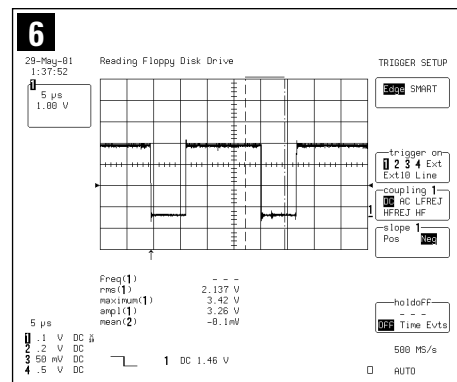
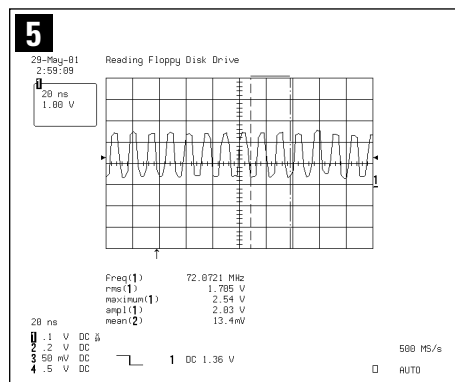
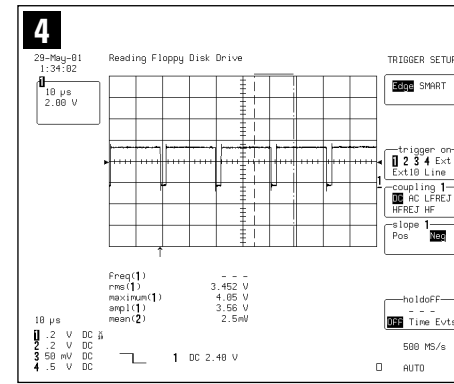
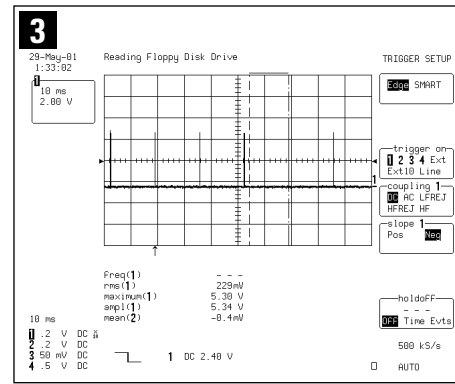
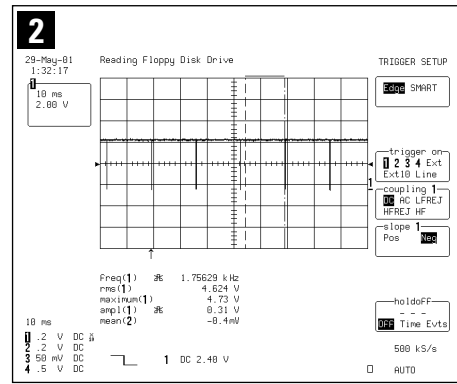
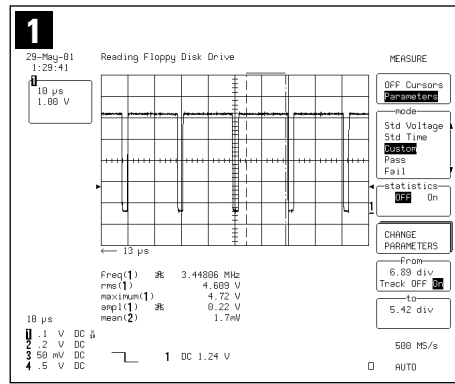
## Memo

# 9 Schematic Diagrams

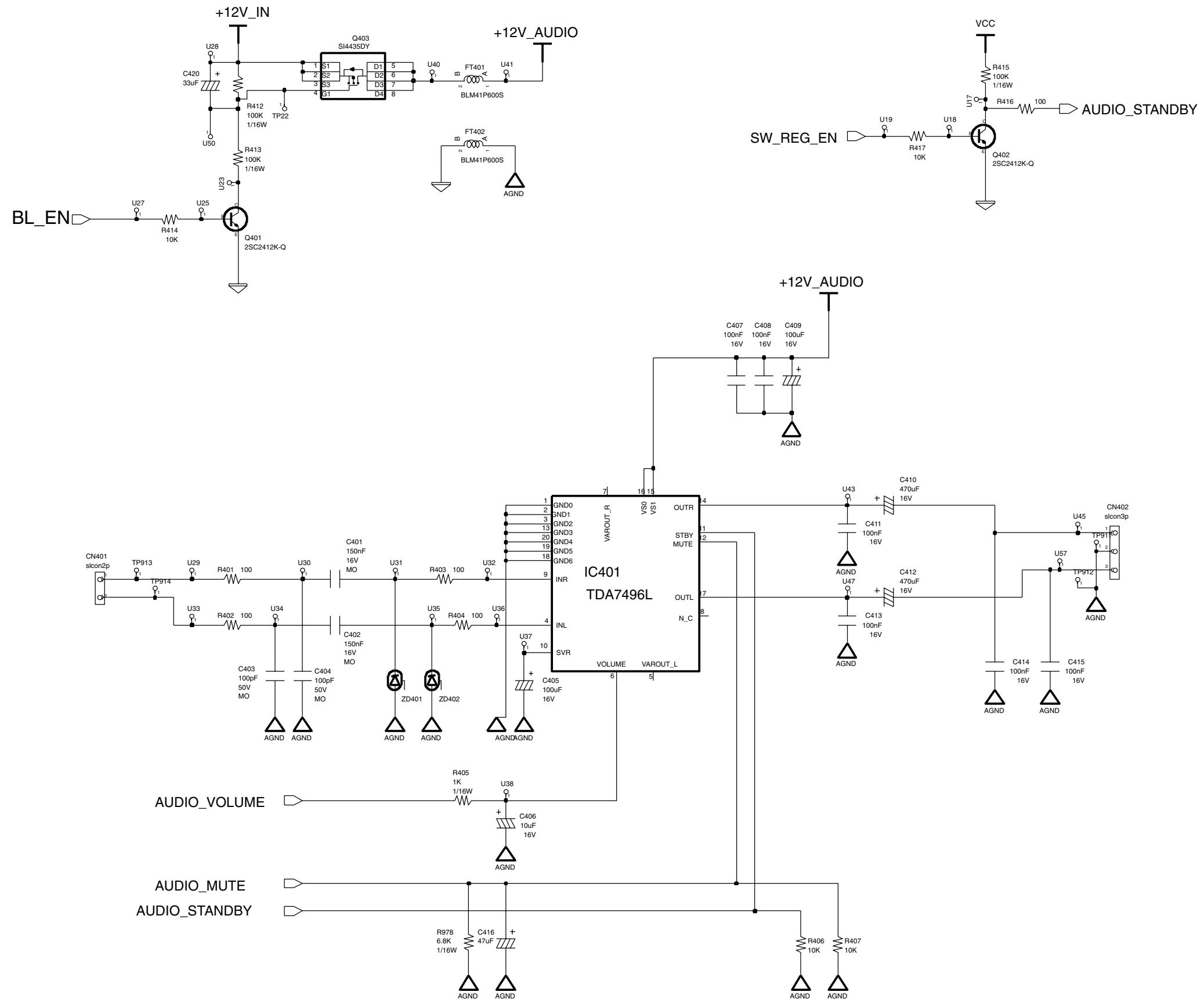
## 9-1 Main Part Schematic diagram (GH15LS/GH15ES/GH15MS)



## 9 Schematic Diagrams



9-2 Audio Part Schematic diagram (GH15MS only)





## **Memo**



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