

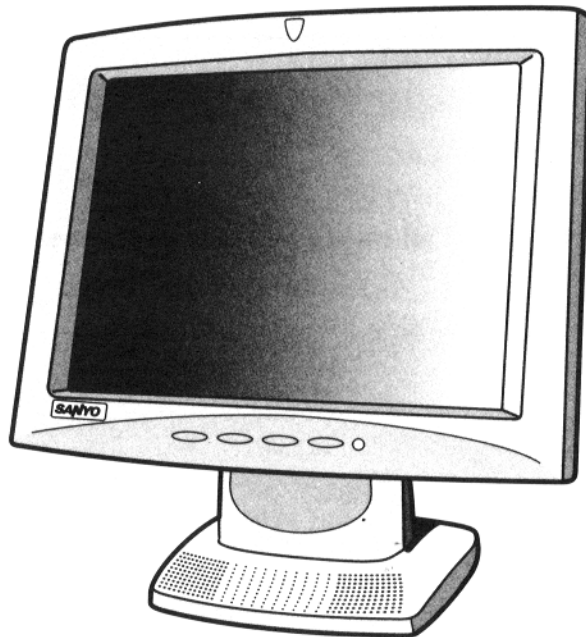


SERVICE MANUAL

LCD COLOR MONITOR

LMU-TF150A1
(GENERAL)

PRODUCT CODE NO.	
LMU-TF150A1	1 938 102 00



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Refer to the separate volume user's guide for instruction.

Precautions

Placement precautions

- Avoid placing the unit in humid or dusty places, or where it will be exposed to excessive heat (direct sunlight, heaters, etc.)
- Do not step on or set anything on the AC power cord. **DAMAGE TO THE AC POWER CORD IS A SAFETY RISK AND CAN CAUSE A FIRE.**
- Install the unit only on a stable and smooth surface.
- Do not connect the unit to the same AC as outlet with appliances that generate large amounts of interference (such as heaters with thermostats, appliances with motors, etc.). It is best to use a completely separate electrical outlet.
- Keep the unit away from water. If water accidentally enters the unit, unplug the AC power cord immediately. **DO NOT PLUG IN THE UNIT AGAIN.**

Handling precautions

- Avoid bending, kinking or damaging the AC power cord.
- Never insert or remove the power cord with wet hands. Also, be sure to hold cord by the plug when removing it from the outlet.
- Do not remove any parts that are held in place with screws. (The unit does not contain any user-serviceable items.)
- Maintain standard room temperature (5°C to 35°C, or 41°F to 95°F) during use. Do not subject the unit to shock or vibration. Do not move the unit while it is in use.
- A rapid increase in room temperature in cool weather can cause condensation to form inside the unit. If this occurs, wait at least 15 minutes after turning the unit on before attempting to operate it.

1. MAIN SPECIFICATION

LCD	Panel Type	TFT
	Screen Size	15.0"
	Pixel Pitch	0.297 × 0.297 mm
	Surface Treatment	Haze 13 , Hard - Coating (3H)
	Pixel Format (dot)	1024 × 768
	Brightness	200cd/m ² max.
	Response Time	40ms
	Contrast	200 : 1 typ.
	Viewing Angle (minimum)	Left & right : ±50° Up & Down : ±40°
	Back Light	CCFL × 2
Synchronization	Horizontal	30k~70kHz
Frequencies	Vertical	50~85Hz
Input Signal	System	Analog RGB
	Video	0.7Vp-p 75 Ω
	Sync.Type/Level	Separate TTL(±)
Input	Video Signal	Mini Dsub 15 pin
	Power Supply	DC Jack
Effective Viewing Area		304 × 228 mm
Color		16.19million
External Control		BRIGHTNESS, DOT-CLOCK, H-POSITION, V-POSITION PHASE, LEVEL, R-LEVEL, G-LEVEL, B-LEVEL
Environment		Operating Temperature : 5°C~35°C Humidity : 30%~80% RH (no condensation)
Power Supply (AC Adapter)	Model Name :	ADP35WC 13.5
	Input :	100-240VAC 1.0A-0.55A, 50-60 Hz
	Output :	DC 13.5V 2.5A
Power Supply Consumption		25W max.
Dimensions		399(W) × 412(H) × 199(D) mm
Weight		4.6kg
Accessories		AC Adapter & Cord, RGB Cable, Screen Adjustment FD, Operating Manual

2. TROUBLE SHOOTING

Check the following for troubles of LCD analog monitor.

	SYMPTOM	CAUSE	SOLUTION
1	Power LED does not light.	(1) The power might not be turned on.	◎ Check the outlet, DC jack connection, and the power switch.
		(2) AC power supply voltage might not be normal.	△ Stop plugging too many leads into a single socket. ◇ Measure AC power supply voltage.
		(3) AC adapter might be out of order.	◇ Measure DC plug voltage outputted from AC adapter. Replace AC adapter if it is out of order.
		(4) The main board (LED etc.) might be out of order.	◇ Replace the main board.
2	No picture (when the power LED is fully on green.)	(1) A screen-saver program might be running.	◎ Press any key or move the mouse to end the screen-saver program.
		(2) The connector between CN2, CN3 on the main board and the liquid crystal module might not be connected securely.	◇ Check the connection.
		(3) The connector between CN6 on the main board and the inverter board, or between the inverter board and the liquid crystal module might not be connected securely.	◇ Check the connection.
		(4) The connector between CN7 on the main board and the volume board might not be connected securely.	◇ Check the connection.
		(5) The volume board might be out of order.	◇ Replace the volume board. Adjust the volume and check the screen.
		(6) The inverter unit might be out of order.	◇ Replace the inverter unit.
		(7) The main board might be out of order.	◇ Replace the main board. Adjust the brightness volume and check the screen.
		(8) The LCD module might be out of order.	◇ Replace the LCD module.
3	No picture (when the power LED is fully on orange.)	(1) The computer might be in the standby status (suspension mode).	◎ Use the computer and end the standby status.
		(2) The computer might not be turned on.	◎ Check the power of the computer.
		(3) The signal cable might not be connected securely.	◎ Check the connection of the signal cable.

	SYMPTOM	CAUSE	SOLUTION
		(4) An extended cable might be used.	◎Stop extension of the monitor cable.
		(5) The signal conversion adapter might not be connected securely.	◎Check the connection of the signal conversion adapter. (for MAC user)
		(6)The signal timing pattern of the computer might not be supported by the monitor specification.	△Change the timing pattern if it is possible. △Try replacing the computer.
		(7)The output circuit of the computer might be out of order.	△Try replacing the computer.
4	Screen's display range is incorrect.	(1) Part of the screen is missing.	◎Adjust the screen.
		(2) When using WINDOWS, the computer's screen size might not be set correctly.	◎Reset the screen size.
5	Picture is distorted.	(1) The screen synchronicity might not be taken when the screen size is not set correctly.	◎Reset the screen size.
		(2) The signal cable might not be connected securely.	◎Check the connection of the signal cable.
		(3) Outside noise (by high voltage wire, trains etc.) might be led to the signal cable etc.	◎ Change the location and direction of the monitor and cables.
		(4) The signal timing pattern of the computer might not be supported by the monitor specification.	△Check the specification. Try replacing the computer.
		(5) The video output level of the computer might not be supported by the monitor specification.	◎ Adjust the brightness volume. △Check the specification. Try replacing the computer.
		(6) The wire inside of the signal cable might be snapped.	◇Replace the signal cable.
		(7) The main board might be out of order.	◇Replace the main board.

◎ :problem that users can cope with. ◇ :problem that users might be able to cope with.
△ :problem that service person deals with.

3. MAINTENANCE

Removing the main parts

(1) Removing the Stand Cover.

Place your middle fingers in the depressions on the sides of the stand cover, press in and pull the cover towards you.

(2) Removing the substance and the stand

Remove four (4) screws of hinge between the substance and the stand.

(3) Removing the cabinet

1. Remove six (6) screws on back side of the cabinet.
2. Holding the upper part of the panel, pull the hook toward the front to remove.
3. Remove the connector between the SW/LED board and the VR board.

(4) Removing the SW/LED board and the VR board.

Remove six (6) screws fixed on the cabinet.

(5) Removing the liquid crystal panel.

1. Remove four (4) screws fixing the liquid crystal panel.
2. Lifting up the liquid crystal panel, remove two (2) connectors on the inverter unit.
3. remove two (2) connectors on the main board.
4. Remove two (2) screws fixing the black wire.

(6) Removing the inverter unit.

1. Remove two (2) connectors on the inverter unit.
2. Remove three (3) fixing screws.

(7) Removing the main board.

1. Remove the RGB signal cable.
2. Remove seven (7) fixing screws. (two screws are already removed at (5)-4.)
3. Remove five (5) screws on the shield plate shielding the main board.
4. Remove VR connector, Inverter connector, DC connector, SW/LED connector and LCD connector (which is already removed at (5)-3).
5. Remove two (2) screws fixing a metal fitting which holds RGB connector.

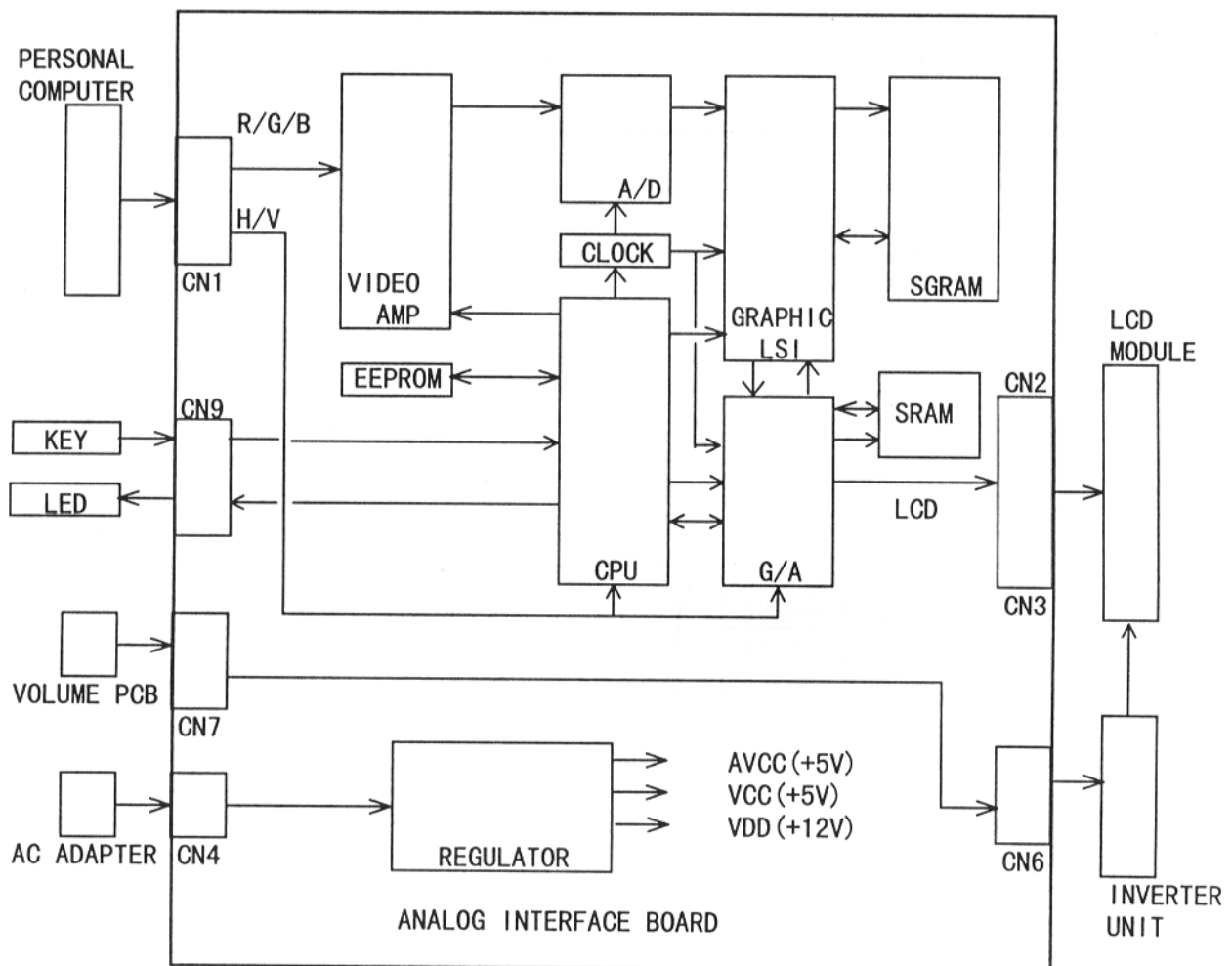
(8) Removing the DC board.

1. Remove two (2) screws.
2. Remove the seesaw switch connector and the DC connector.

(9) Removing the seesaw switch.

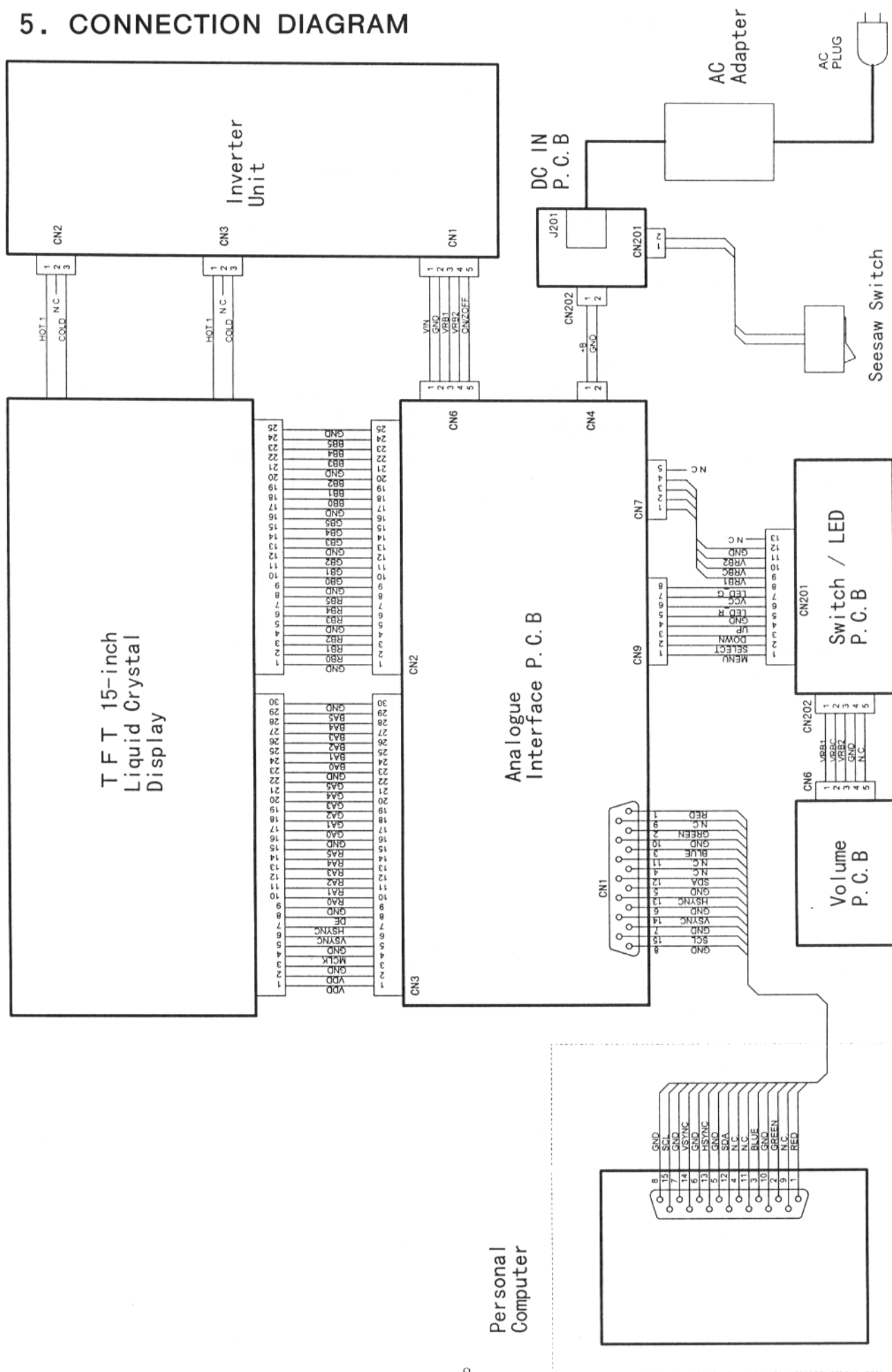
Holding its hook, remove the seesaw switch.

4. BLOCK DIAGRAM



- 1.Video signal (three colors of R,G and B) and Synchronic signal (HSYNC, VSYNC) inputted from the connector CN1 are inputted to Video amplifier (VIDEO AMP), CPU, and Gate array (G/A).
- 2.Comparing with the display parameter of the fixed memory (EEPROM), CPU analyzes inputted VSYN's polarity, frequency, HSYNC's number and polarity. It decides which mode to display, and establishes parameter to GRAPHIC LSI, Gate array and Clock generator (CLOCK).
- 3.Clock generator generates sampling clock which is synchronized with HSYNC by established parameter, and supplies it to Gate array and A/D converter.
- 4.Video signal which is inputted to VIDEO AMP is adjusted to the level demanded, and converted to digital signal as sampled clock through A/D converter, then inputted to GRAPHIC LSI.
- 5.Limiting vertical and horizontal blanking periods according to display parameter, GRAPHIC LSI takes the picture data in and writes down on SGRAM after doing expansion process.
- 6.GRAPHIC LSI outputs picture data written on SGRAM according to G/A's demand.
- 7.G/A outputs the picture data to the LCD module after controlling frame rate. At the same time it displays OSD according to CPU control.

5. CONNECTION DIAGRAM

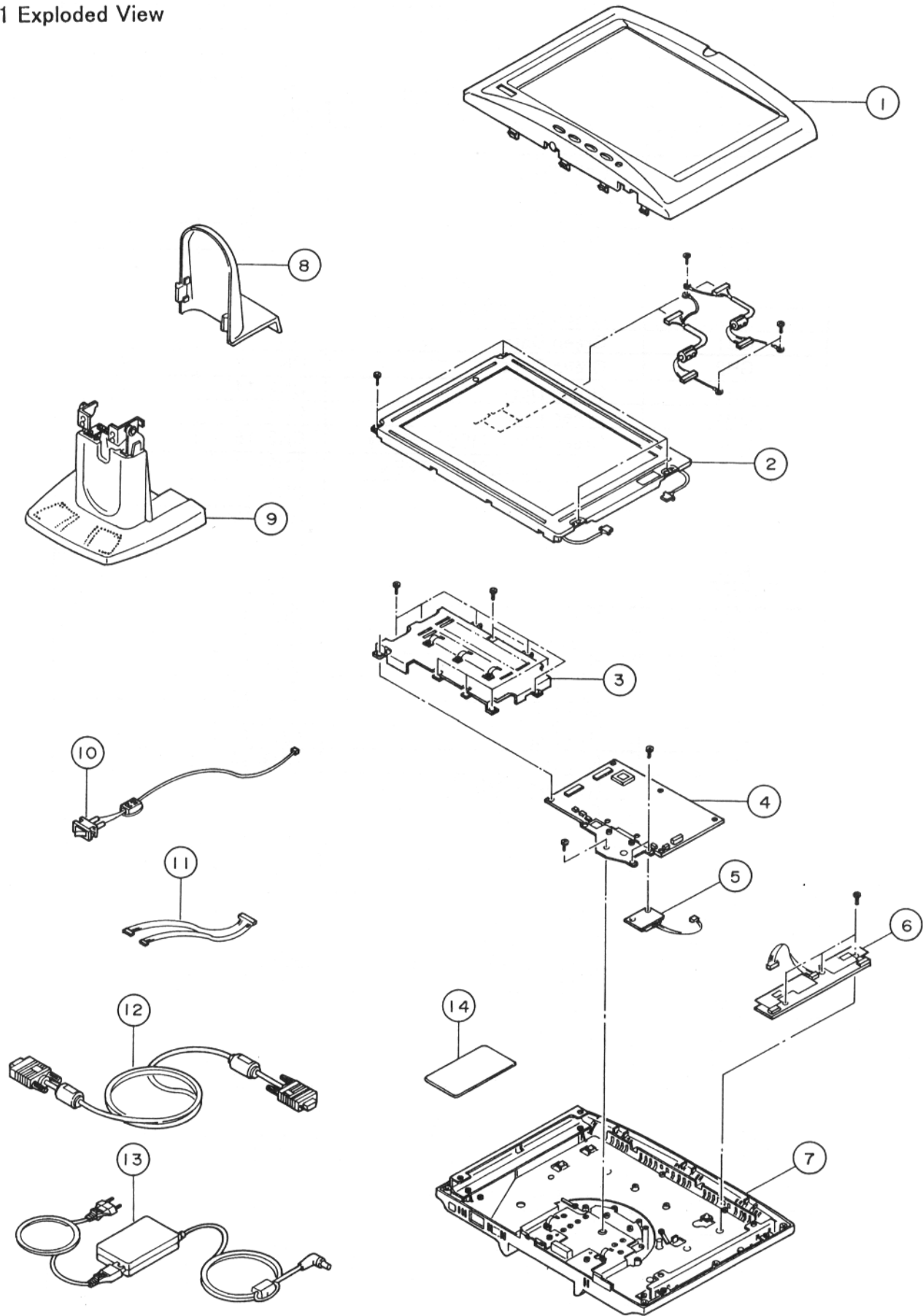


6. TABLE OF SIGNAL NAME

Symbol	Function	Location	Notes
RED	Red Video Signal	CN1-1	
GREEN	Green Video Signal	CN1-2	
BLUE	Blue Video signal	CN1-3	
SDA	DDC Data	CN1-12	
HSYNC	Horizontal Sync. Signal	CN1-13	
VSYNC	Vertical Sync. Signal	CN1-14	
SCL	DDC Data Clock	CN1-15	
RB0(EVEN)	Red Data [LSB] - EVEN	CN2-2	Positive
RB1	Red Data	CN2-3	//
RB2	Red Data	CN2-4	//
RB3	Red Data	CN2-6	//
RB4	Red Data	CN2-7	//
RB5	Red Data [MSB] - EVEN	CN2-8	//
GB0(EVEN)	Green Data [LSB] -EVEN	CN2-10	//
GB1	Green Data	CN2-11	//
GB2	Green Data	CN2-12	//
GB3	Green Data	CN2-14	//
GB4	Green Data	CN2-15	//
GB5	Green Data [MSB] -EVEN	CN2-16	//
BB0(EVEN)	Blue Data [LSB] - EVEN	CN2-18	//
BB1	Blue Data	CN2-19	//
BB2	Blue Data	CN2-20	//
BB3	Blue Data	CN2-22	//
BB4	Blue Data	CN2-23	//
BB5	Blue Data [MSB] - EVEN	CN2-24	//
MCLK	Data Clock	CN3-4	-
DE	Data Enable	CN3-8	Negative
RA0(ODD)	Red Data [LSB] - ODD	CN3-10	Positive
RA1	Red Data	CN3-11	//
RA2	Red Data	CN3-12	//
RA3	Red Data	CN3-13	//
RA4	Red Data	CN3-14	//
RA5	Red Data [MSB] - ODD	CN3-15	//
GA0(ODD)	Green Data [LSB] - ODD	CN3-17	//
GA1	Green Data	CN3-18	//
GA2	Green Data	CN3-19	//
GA3	Green Data	CN3-20	//
GA4	Green Data	CN3-21	//
GA5	Horizontal Sync. Signal	CN3-22	//
BA0(ODD)	Blue Data [LSB] - ODD	CN3-24	//
BA1	Blue Data	CN3-25	//
BA2	Blue Data	CN3-26	//
BA3	Blue Data	CN3-27	//
BA4	Blue Data	CN3-28	//
BA5	Blue Data [MSB] - ODD	CN3-29	//
VIN	Inverter Power	CN6-1	
VRB1,2	Controlled Voltage	CN6-3,4	
ON/ZOFF	Back Light Control	CN6-5	H : Light ON
VRB1,2	Brightness Volume	CN7-1,3	
VRBC	Brightness Volume	CN7-2	
MENU	MENU Key	CN9-1	
SELECT	SELECT Key	CN9-2	
DOWN	DOWN Key	CN9-3	
UP	UP Key	CN9-4	
LED_R	Red LED	CN9-6	
LCD_G	Green LED	CN9-8	

7. EXPLODED VIEW AND PARTS LIST

7-1 Exploded View




CAUTION

Parts marked as  are very important to secure safety.

In case of replacement, it is required to use designated parts for safety.

7-2 Parts List

REF No.		PART No.	DESCRIPTION	Q'ty	NOTES
INDIVIDUAL					
		(632 834 2815)	STYRO-FOAM CUSHION, R	1	
		(632 834 2839)	STYRO-FOAM CUSHION, L	1	
		(632 834 2891)	PAD, ACCESSORY	1	
		(632 297 9901)	POLYETHYLENE BAG	1	FOR MONITOR
		(632 607 4824)	POLYETHYLENE BAG,L180X270	1	FOR USER'S GUIDE
		(632 607 4800)	POLYETHYLENE BAG,L130X250	1	FOR WARRANTY
		(632 298 2376)	POLYETHYLENE BAG	1	FOR RGB CABLE
		(632 607 4794)	POLYETHYLENE BAG,L120X230	2	AC ADAPTER, AC CORD
		(632 840 4056)	PAD, CUSHION	1	
		(632 840 3639)	PAD	1	
		(632 842 9509)	PAD, FRONT	1	
ACCESSORY					
		(632 846 2643)	INSTRUCTION MANUAL,ENGLIS	1	
		(632 844 4052)	FLOPPY DISK, APPLICATION	1	
CABINET1					
1		(632 850 6064)	CABINET ASS'Y, 150AT	1	
7		(632 850 6040)	BOTTOM LID ASS'Y, 150T	1	
14		(632 846 3978)	RATING PLATE	1	
CHASSIS					
3		(632 850 6057)	SHIELD CASE ASS'Y	1	
CHAGER					
9		(632 850 6071)	STAND ASS'Y	1	
8		(632 832 1957)	COVER, STAND	1	
CHASSIS ELC.					
2		(632 850 6088)	LIQUID CRYSTAL DIS. ASS'Y	1	
6		(632 850 6118)	DC-AC INVERTER ASS'Y	1	
13		(632 851 2478)	AC ADAPTER ASS'Y	1	
12		(632 835 1060)	CABLE, VGA	1	
11		(632 846 6122)	WIRE HARNESS, MAIN-SW/LED	1	
10		(632 850 6095)	SEESAW SWITCH ASS'Y	1	
PC BOARD1					
4		(632 839 5798)	POWER BOARD ASS'Y, MAIN	1	
PC BOARD5					
5		(632 843 2349)	POWER BOARD ASS'Y, DC-IN	1	