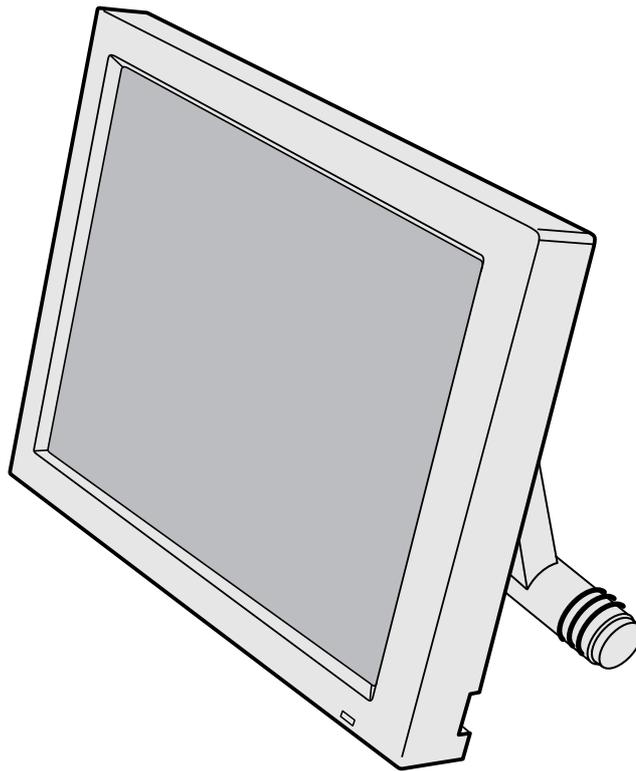


SERVICE MANUAL

INDUSTRIAL MONITOR

LMU-TK12A (Without Touch Panel)
LMU-TK12AT (With Touch Panel)
(GENERAL)

PRODUCT CODE NO.	
LMU-TK12A	1 938 102 06
LMU-TK12AT	1 938 102 07



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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 cord.
DAMAGE TO THE AC CORD IS A SAFETY RISK AND CAN CAUSE A FIRE.
- 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 40°C, or 41°F to 104 °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

Model Name		LMU-TK12AT	LMU-TK12A
Display			
Panel Type		TFT	
Screen Size		12.1"	
Pixel Pitch		0.308 X 0.308 mm	
Effective Viewing Area		246.0 X 184.5 mm	
Pixel Format		800 X 600	
Brightness		200cd/m ² typ.	
Response Time		50ms	
Contrast		150 : 1 typ.	
Viewing Angle (minimum)		Left & Right :60 deg Up :30 deg Down :45 deg	
Back Light		CCFL x 1	
Panel Life Time		20,000 hours	
Video Control			
Input Signal	System	Analog RGB	
	Video	0.7Vp-p 75 ohm	
	Sync.Type/Level	Separate TTL (+/-)	
Synchronization Frequencies	Horizontal	24.8k - 53.7kHz	
	Vertical	56.4 - 85Hz	
Colors		16.19million	
Touch panel			
Type		Resistive	-
Electrical Resolution		10bit (1,024 X 1,024)	-
Communication		Bi-directional asynchronous RS-232C serial communication	-
Baud rate		9,600 BPS (1,200 - 19,200 BPS)	-
Data		7 bit (7bit or 8bit)	-
Stop bit		2 bit (1bit or 2bit)	-
Parity		non (odd, even, or non)	-
Touch Life		Greater than 20 million touches in any location.	-
Touch Down Speed		15 ms	-
Physical			
Input	Video Signal	15pin mini D-Sub	
	Serial	9pin D-Sub	
	Power Supply	DC Jack	
Environment	Operating Temperature	operating : 5°C to 40 °C Storage : -20 °C to 60 °C	
	Humidity	30% to 80% RH	
	Model Name	G140-US1225	
Power Supply (AC Adapter)	Input	100-240V 1.0A-0.55A, 50-60Hz	
	Output	12V 2.5A	
	Power Supply Consumption	20W max.	15W max.
		5W in Energy Saving mode	
Dimensions		295(W) X 233(D) X 42(H) mm	
Weight		2.0 kg	1.8 kg
Accessories		AC Adapter, Power Cord, RGB cable, Serial cable, OSD control box, Adjustment FD, Touch Ware CD-ROM, User's Guide	AC Adapter, Power Cord, RGB cable, OSD control box, Adjustment FD, User's Guide

2. TROUBLE SHOOTING

The "TROUBLESHOOTING for LCD Monitor" is described in below. Please refer to the manual "TROUBLE SHOOTING for Touch-Screen" in CD-ROM.

No.	SYMPTOM	CHECK POINTS	TREATMENTS	
1	No Picture with Power Indicator OFF	1 Is the Power to a LCD monitor "ON"?	Check AC outlet, AC cord, DC Jack and Power switch for a LCD monitor	◎
		2 Is an AC Adapter defective?	Replace an AC Adapter with the new one	◇
		3 Is the wire harness between main PCB and DC-IN PCB secured firmly ?	Check the connection	◇
		4 The Power Supply circuit on main PCB may be defective	Replace the main PCB with the new one	◇
2	No Picture with Power Indicator in Amber	1 Is the Power to a computer "ON"?	Check AC outlet, AC cord, DC Jack and Power switch for a computer	◎
		2 Is a computer standing by ?	Be out of standing by condition, by operating to a computer	◎
		3 The Image Processing circuit on main PCB may be defective	Replace the main PCB with the new one	◇
3	No Picture with Power Indicator in Green	1 Is a screen saver programming running ?	Press any key or touch the mouse, to end the screen saver program	◎
		2 Is a signal cable connected securely ?	Check the connection of a signal cable	◎
		3 Disconnected a signal cable ? or Bent a terminal pin ?	Replace a signal cable with the new one	△
		4 Is the computer's signal timing not agreeable to the LCD's specification ?	Adjust the computer's signal timing, if possible	◎
		5 Is the wire harness between Inverter PCB and a LCD module secured firmly ?	Check the connection of wire harness	◇
		6 Is the wire harness between main PCB and Inverter PCB secured firmly ?	Check the connection of wire harness	◇
		7 The Brightness control volume may be defective	Replace the Volume PCB with new one, and check the screen	◇
		8 The LCD module may be defective	Replace a LCD module with the new one	◇
		9 The Inverter unit may be defective	Replace an Inverter unit with the new one	◇
		10 The display circuit on main PCB may be defective ?	Replace the main PCB with the new one	◇
4	No Picture with Power Indicator blinking in Green	1 Is a computer standing by ?	Be out of standing by condition, by operating to a computer	◎
		2 Is a signal cable connected securely ?	Check the connection of a signal cable	◎
		3 Disconnected a signal cable ? or Bent a terminal pin ?	Replace a signal cable with the new one	△

◎ It is possible to treated by end-user

◇ It must be treated by Professional Technical Staff

△ It might be possible to treat by end-user in some case.

No.	SYMPTOM	CHECK POINTS		TREATMENTS	
5	White/Grey on whole screen (Nothing on screen)	1	Is the wire harness between main PCB and LCD module secured firmly ?	Check the connection of wire harness	◇
		2	Is the LCD module defective ?	Replace a LCD module with the new one	◇
		3	Is the main PCB defective ?	Replace the main PCB with the new one	◇
6	Screen's display range is incorrect	1	Is the adjustment for screen performed correctly ?	Adjust the screen correctly	◎
		2	Is the output level on image from a computer not agreeable to LCD's specification ?	Check the specification of a computer	△
		3	Is the size of screen set correctly ?	Set the size of screen again(refer to User's Manual for computer)	◎
7	Screen is distorted	1	Is the adjustment for screen performed correctly ?	Adjust the screen correctly	◎
		2	Is a signal cable connected securely ?	Check the connection of a signal cable	◎
		3	Is a signal cable extended ?	Don't extend a signal cable	◎
		4	Is the output level on image from a computer not agreeable to LCD's specification ?	Check the specification of a computer	△
		5	The Image Processing circuit on main PCB may be defective	Replace the main PCB with the new one	◇
8	Part of colors(R/G/B) is not displayed Black line is appeared vertically	1	Is a signal cable connected securely ?	Check the connection of a signal cable	◎
		2	Is the connection between main PCB and a LCD module securely ?	Check the connector	◇
		3	The Image Processing circuit on main PCB may be defective	Replace the main PCB with the new one	◇

- ◎ It is possible to treated by end-user
◇ It must be treated by Professional Technical Staff
△ It might be possible to treat by end-user in some case

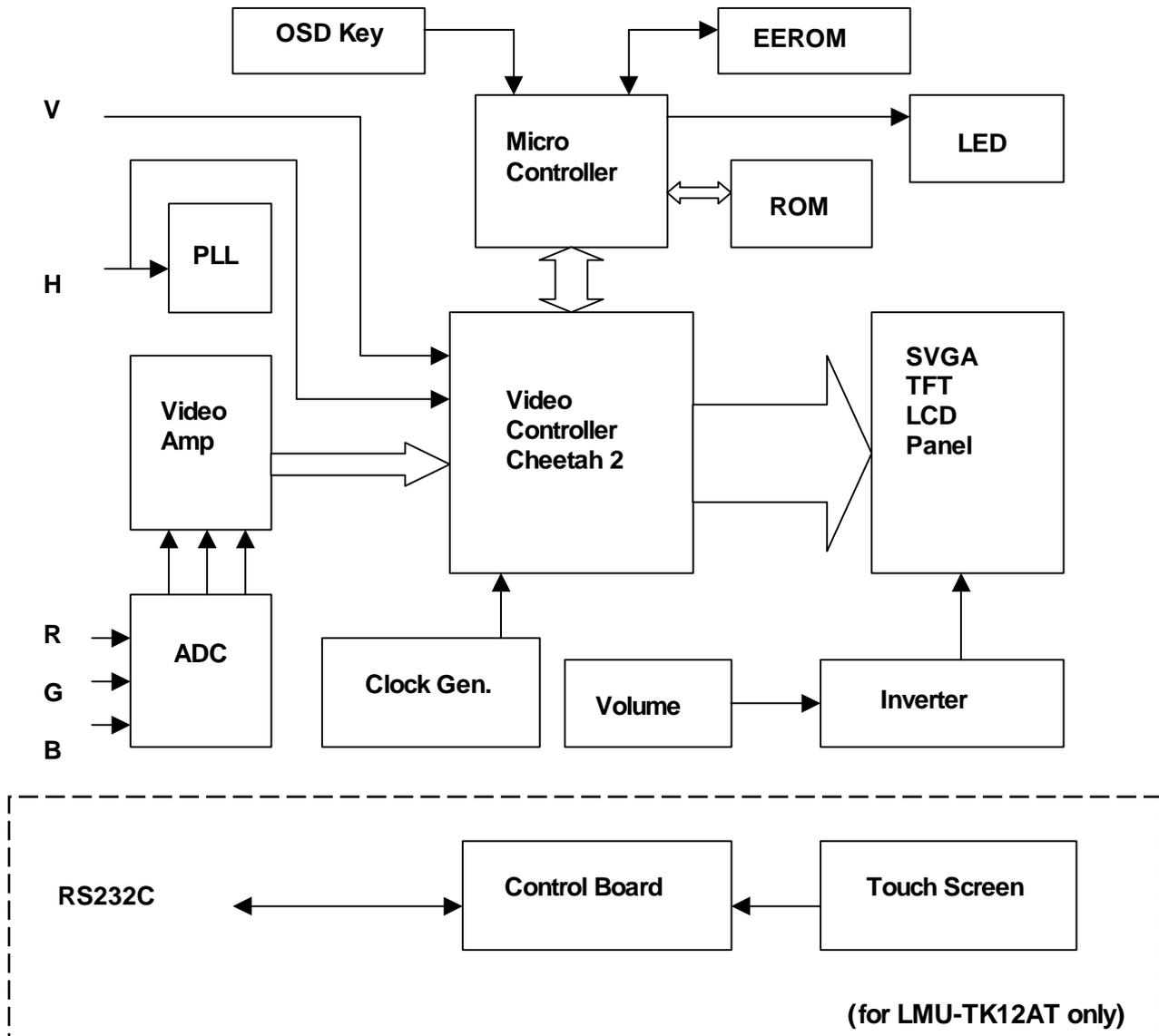
3 MAINTENANCE

3-2 LMU-TK12AT

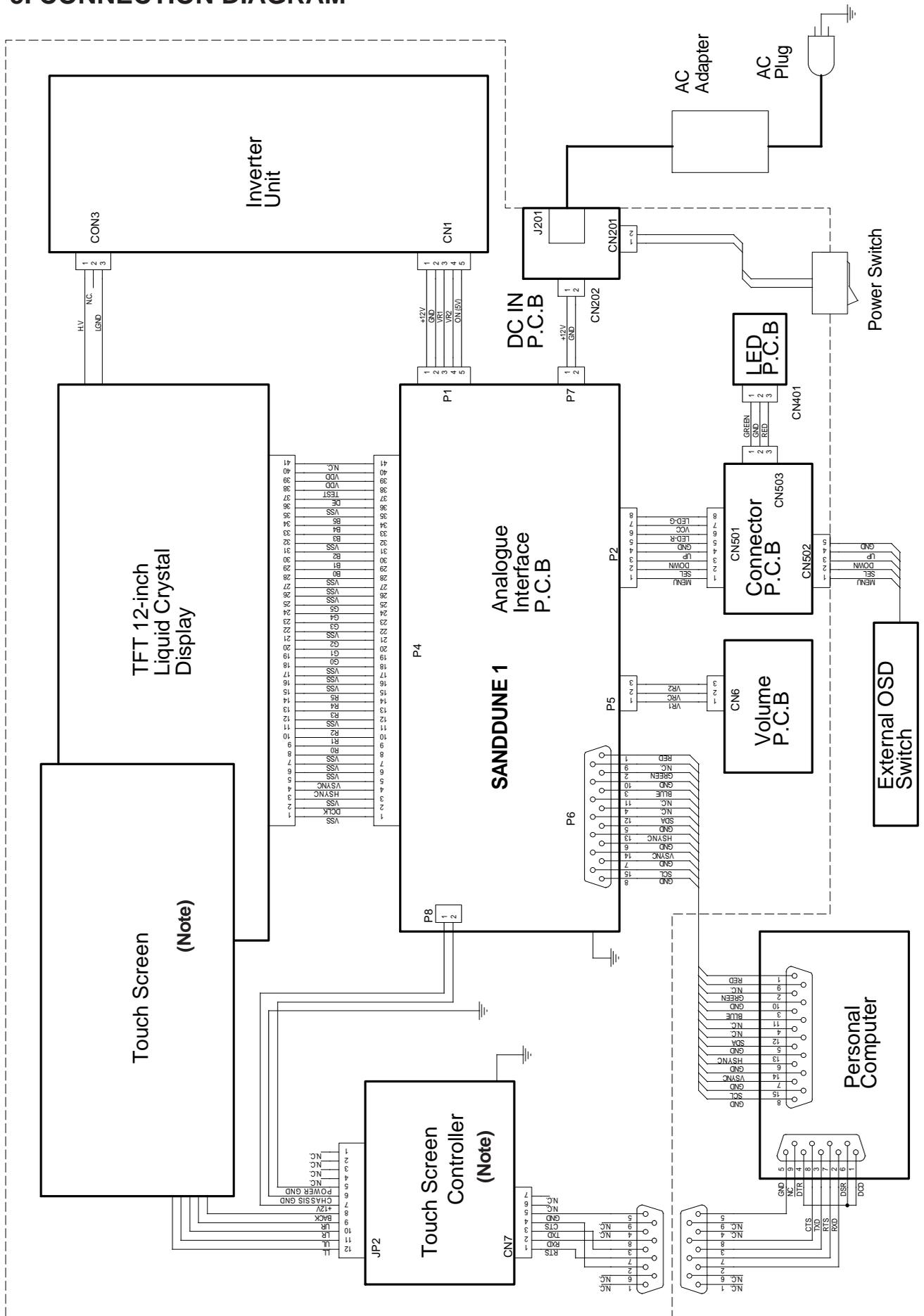
Disassembling the major components

- (1) Cabinet
 1. Unscrew to secure the cabinet(8-position)
 2. Pull the cabinet upward to remove it
- (2) LCD Panel and Touch Panel
 1. A Touch panel is on a LCD panel. The clearance between a Touch Panel and a bottom case are filled with 8 rubber pieces. Pull the left-side of a Touch panel upward carefully, then turn it over at the right side of a bottom case.
 2. Unscrew to secure the LCD panel(4-position)
 3. Pull the LCD panel up carefully. Disconnect a FPC from main PCB, and pull a connector out to inverter unit.
 4. Unscrew to secure the earth terminal(1-position)
 5. Disconnect the cable on the main PCB(Orange, Grey)
 6. Disconnect the cable on the Touch controller PCB
- (3) Inverter Unit
 1. Unscrew to secure the Inverter Unit(3-position)
 2. Disconnect the cable from the main PCB
- (4) Main PCB
 1. Pull a RGB signal cable out
 2. Unscrew to secure the main PCB(4-position)
 3. Disconnect the cables on the main PCB(6-position)
 - / Two cables have already been disconnected
 - / One connector from Joint PCB
 - / One connector from the LCD panel
 - / One connector from the DC-IN PCB
 - / One connector from the Inverter PCB
 4. Unscrew to secure the bracket for RGB Connector(2-position)
- (5) Touch Controller PCB
 1. Unscrew to secure the Touch controller PCB(2-position)
 2. Disconnect a serial cable
- (6) Serial Cable(Connector and Cable with bracket)
 1. Unscrew to secure the bracket for serial cable(2-position)
- (7) Joint PCB
 1. Unscrew to secure the Joint PCB(2-position)
 2. Disconnect the cables from the main PCB and the LED PCB
- (8) VR PCB
 1. Unscrew to secure the VR PCB(2-position)
 2. Disconnect the cable to the main PCB
- (9) DC-IN PCB
 1. Unscrew to secure the DC-IN PCB(2-position)
 2. Disconnect one cable from Power Switch, and another cable from the main PCB
- (10) Power Switch
 1. Remove the Power Switch, while pressing the hook of the Power Switch
- (11) LED PCB
 1. Unscrew to secure the LED PCB(1-position)
 2. One cable has already been disconnected.

4 BLOCK DIAGRAM



5. CONNECTION DIAGRAM



Notes: for LMU-TK12AT only

6. TABLE OF SIGNAL NAME

Symbol	Signal Name	Location	Notes
DCLK	Data Clock	P4-2	
HSYNC	Horizontal Sync.	P4-4	This signal is invalid, input H or L.
VSYNC	Vertical Sync.	P4-5	This signal is invalid, input H or L.
R0	Red Data (LSB)	P4-9	
R1	Red Data	P4-10	
R2	Red Data	P4-11	
R3	Red Data	P4-13	
R4	Red Data	P4-14	
R5	Red Data (MSB)	P4-15	
G0	Green Data (LSB)	P4-19	
G1	Green Data	P4-20	
G2	Green Data	P4-21	
G3	Green Data	P4-23	
G4	Green Data	P4-24	
G5	Green Data (MSB)	P4-25	
B0	Blue Data (LSB)	P4-29	
B1	Blue Data	P4-30	
B2	Blue Data	P4-31	
B3	Blue Data	P4-33	
B4	Blue Data	P4-34	
B5	Blue Data (MSB)	P4-35	
DE	Data Enable (positive)	P4-37	
TEST	Display test	P4-38	For display test, to be L.
VDD	Power Supply	P4-39	3.3V
VDD	Power Supply	P4-40	3.3V
VIN	Inverter Power	P1-1	12V
VR1,2	Controlled Voltage	P13,4	
ON	Back Light Control	P1-5	H : Light ON
VR1,2	Brightness Volume	P5-1,3	
VRC	Brightness Volume	P5-2	
MENU	MENU Key	P2-1	
SEL	SELECT Key	P2-2	
DOWN	DOWN Key	P2-3	
UP	UP Key	P2-4	
LED-R	LED Red	P2-6	
LED-G	LED Green	P2-8	
RED	VIDEO Red Signal	P6-1	
GREEN	VIDEO Green Signal	P6-2	
BLUE	VIDEO Blue Signal	P6-3	
HSYNC	Horizontal Sync.	P6-13	
VSYNC	Vertical Sync.	P6-14	
SDA	DDC Data	P6-12	
SCL	DDC Clock	P6-15	
VR1,2	Controlled Voltage	P1-3,4	
ON	Back Light Control	P1-5	H : Light ON

6. TABLE OF SIGNAL NAME

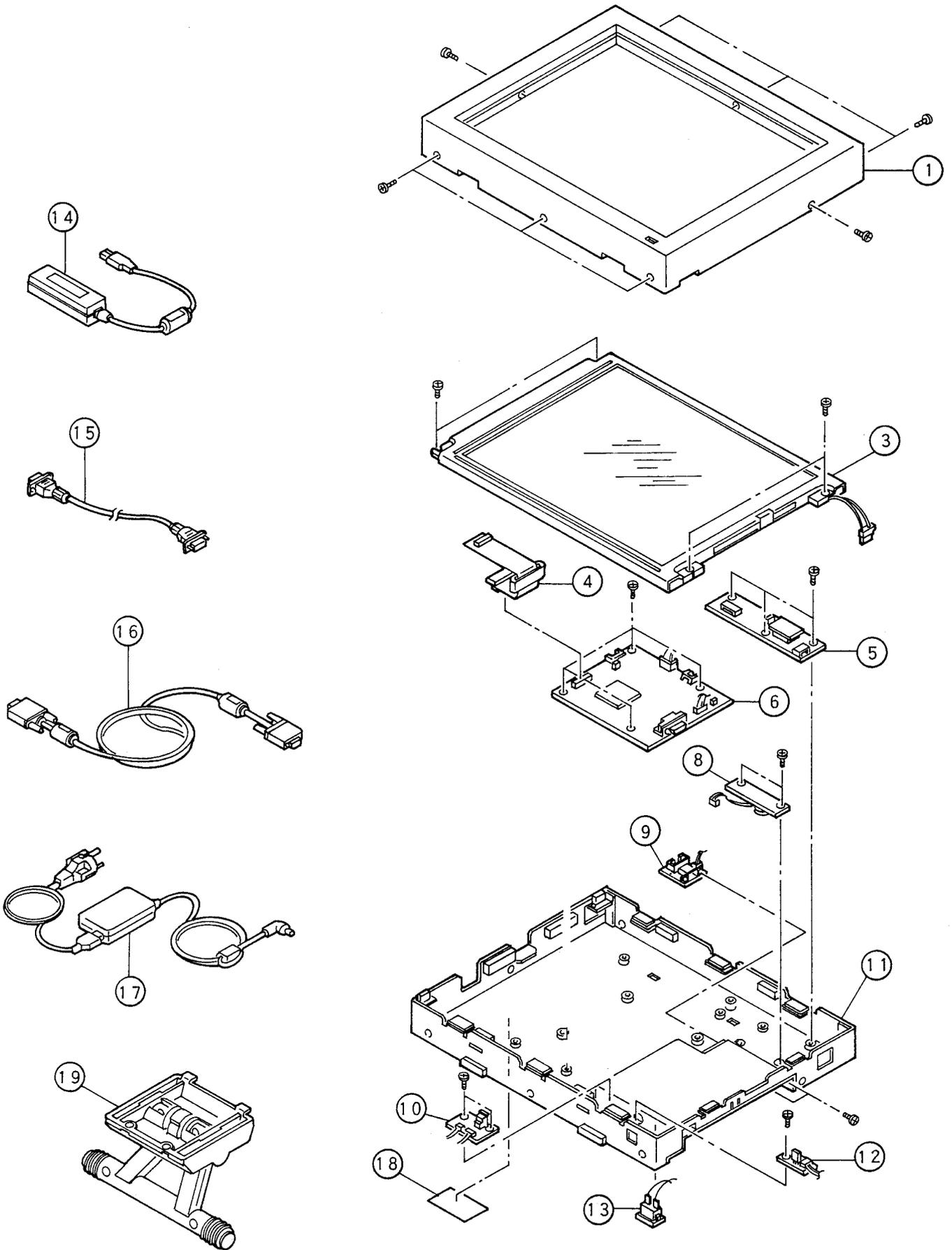
Touch Screen Controller

(for LMU-TK12AT only)

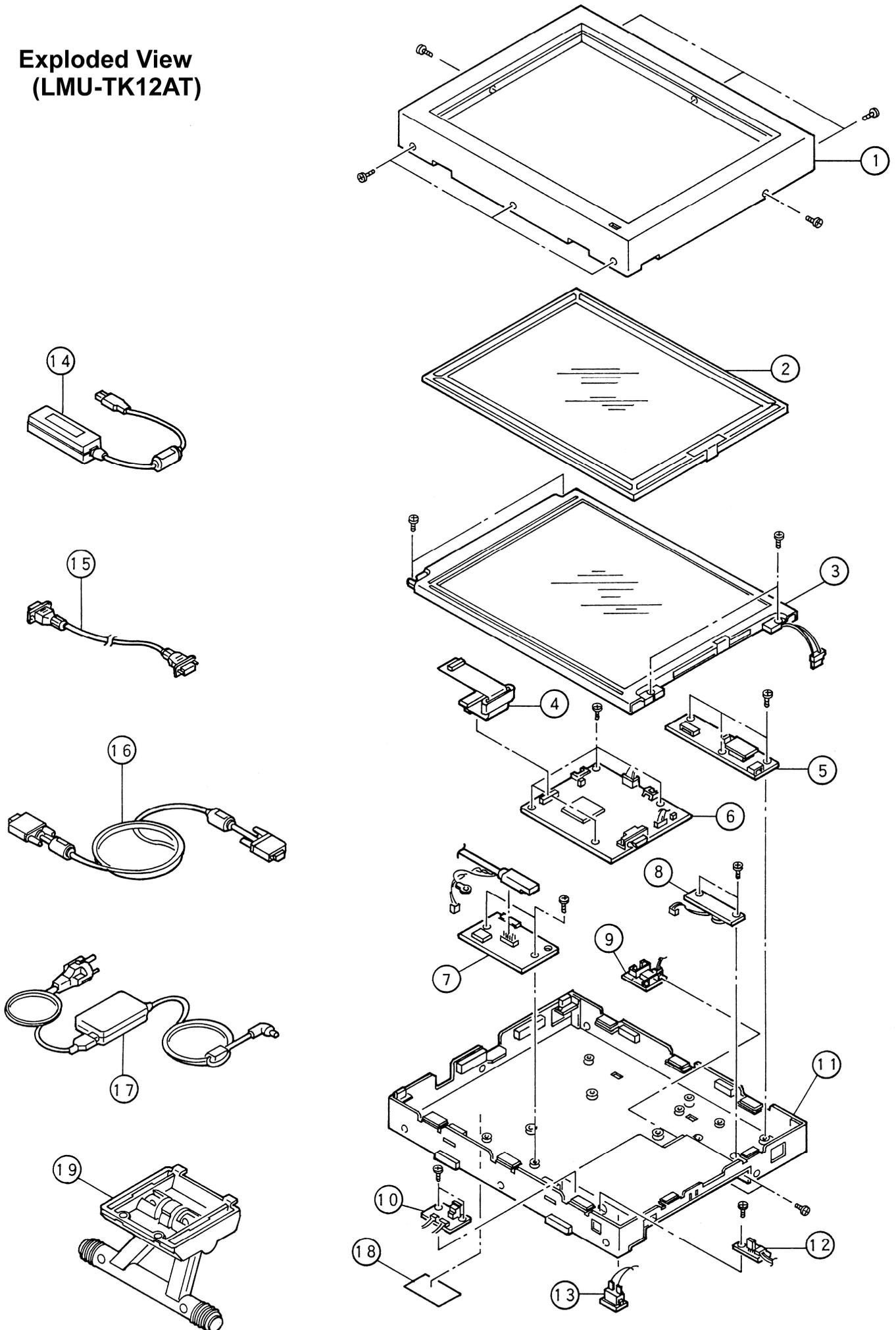
Symbol	Signal Name	Location	Notes
RTS	Request To Send	JP1-1	
RXD	Receive Data	JP1-2	
TXD	Transmit Data	JP1-3	
CTS	Clear To Send	JP1-4	
DCD	Data Carrier Detect	NC	
DTR	Data Terminal Ready	NC	
GND	Signal ground	NC	
DSR	Data Set Ready	NC	
GND	Chassis (earth) ground	NC	
UR	Upper right (UR) corner	JP2-9	
LR	Lower right (LR) corner	JP2-10	
UL	Upper left (UL) corner	JP2-11	
LL	Lower left (LL) corner	JP2-12	

7 EXPLODED VIEW AND PARTS LIST

7-1 Exploded View (LMU-TK12A)



**Exploded View
(LMU-TK12AT)**



7-2. Parts List

CAUTION

Parts marked as  Are very important to secure safety.

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

7-2-1 LMU-TK12A

REF No.		PART No.	DESCRIPTION	Q'ty	NOTES
OUTER					
		(632 872 2563)	OUTER CARTON	1	
		(632 613 4436)	LABEL, BARCODE	1	
INDIVIDUAL					
		(632 872 2570)	PAD, BOTTOM	1	
		(632 872 2587)	PAD, SIDE	1	
		(632 872 2594)	PAD, ACCESSORY	1	
		(632 872 2600)	PAD, TOP	1	
		(632 298 2376)	POLYETHYLENE BAG	1	FOR SERIAL CABLE, CNT BOX
		(632 603 0998)	POLYETHYLENE BAG, 130X500	1	FOR AC ADAPTER
		(632 822 4425)	POLYETHYLENE BAG, 300X450	1	FOR MONITOR
		(632 607 4824)	POLYETHYLENE BAG, L180X270	1	FOR USER'S GUIDE
ACCESSORY					
		(632 860 9925)	FLOPPY DISK	1	
		(632 869 1968)	INSTRUCTION MANUAL, ENGLISH	1	
CABINET1					
1		(632 882 0979)	TOP LID ASS'Y	1	
CHASSIS					
11		(632 882 0986)	BOTTOM LID ASS'Y	1	
18		(632 882 0993)	RATING PLATE ASS'Y	1	
STAND					
19		(632 880 1350)	STAND ASS'Y	1	
CHASSIS ELC.					
3		(632 880 1381)	LIQUID CRYSTAL DIS. ASS'Y	1	
5		(632 880 1428)	DC-AC INVERTER ASS'Y	1	
17		(632 880 1411)	AC ADAPTER ASS'Y	1	
4		(632 880 1442)	FPC BOARD ASS'Y	1	
16		(632 873 4696)	VGA CABLE, 150CM	1	
13		(632 880 1459)	POWER SWITCH ASS'Y	1	
14		(632 880 1329)	REMOTE CONTROLLER ASS'Y	1	
PC BOARD 1					
6		(632 880 1466)	PW BOARD UNIT ASS'Y	1	
PC BOARD 3					
8		(632 880 1473)	PW BOARD ASS'Y, VR	1	
PC BOARD 4					
10		(632 880 1480)	PW BOARD ASS'Y, DC-IN	1	
PC BOARD 5					
12		(632 880 1497)	PW BOARD ASS'Y, LED	1	
PC BOARD 6					
9		(632 880 1503)	PW BOARD ASS'Y, JOINT	1	

! CAUTION

Parts marked as ! Are very important to secure safety.
In case of replacement, it is required to use designated parts for safety.

7-2-2 LMU-TK12AT

REF No.	!	PART No.	DESCRIPTION	Q'ty	NOTES
OUTER					
		(632 872 2563)	OUTER CARTON	1	
		(632 613 4436)	LABEL, BARCODE	1	
INDIVIDUAL					
		(632 872 2570)	PAD, BOTTOM	1	
		(632 872 2587)	PAD, SIDE	1	
		(632 872 2594)	PAD, ACCESSORY	1	
		(632 872 2600)	PAD, TOP	1	
		(632 298 2376)	POLYETHYLENE BAG	1	FOR SERIAL CABLE, CNT BOX
		(632 603 0998)	POLYETHYLENE BAG, 130X500	1	FOR AC ADAPTER
		(632 822 4425)	POLYETHYLENE BAG, 300X450	1	FOR MONITOR
		(632 607 4824)	POLYETHYLENE BAG, L180X270	1	FOR USER'S GUIDE
ACCESSORY					
		(632 860 9925)	FLOPPY DISK	1	
		(632 867 2325)	CD-ROM DISK, TOUCHWARE	1	
		(632 869 1968)	INSTRUCTION MANUAL, ENGLISH	1	
CABINET1					
1		(632 880 1336)	TOP LID ASS'Y	1	
CHASSIS					
11		(632 880 1343)	BOTTOM LID ASS'Y	1	
18	!	(632 880 1435)	RATING PLATE ASS'Y	1	
STAND					
19		(632 880 1350)	STAND ASS'Y	1	
CHASSIS ELC.					
3		(632 880 1381)	LIQUID CRYSTAL DIS. ASS'Y	1	
2		(632 880 1398)	GLID POINT ASS'Y, 12.1	1	
5	!	(632 880 1428)	DC-AC INVERTER ASS'Y	1	
17	!	(632 880 1411)	AC ADAPTER ASS'Y	1	
4		(632 880 1442)	FPC BOARD ASS'Y	1	
15		(632 866 8397)	SERIAL CABLE, 1.8M	1	
16		(632 873 4696)	VGA CABLE, 150CM	1	
7		(632 880 1404)	CONTROLLER, SMT3R	1	
13		(632 880 1459)	POWER SWITCH ASS'Y	1	
14		(632 880 1329)	REMOTE CONTROLLER ASS'Y	1	
PC BOARD 1					
6		(632 880 1466)	PW BOARD UNIT ASS'Y	1	
PC BOARD 3					
8		(632 880 1473)	PW BOARD ASS'Y, VR	1	
PC BOARD 4					
10		(632 880 1480)	PW BOARD ASS'Y, DC-IN	1	
PC BOARD 5					
12		(632 880 1497)	PW BOARD ASS'Y, LED	1	
PC BOARD 6					
9		(632 880 1503)	PW BOARD ASS'Y, JOINT	1	

APPENDIX

Version of Firmware

The Version of Firmware is displayed on screen.

Turn the Power Switch to 'OFF'. While pressing of the [SELECT] button, turn the Power Switch to 'ON'.