

SERVICE Manual

Model: KTL220S-**

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Note) KTL220S- Patented by IGT**

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SAFETY NOTICE

WARNING: Only competent service personnel may carry out work involving the testing or repair of this equipment.
This receiver must operate under AC 100-240 volts, 50/60Hz.
Never connect to a DC supply of any other voltage or frequency.

Potential high voltages are present when this receiver is operating.
Operation of the receiver outside the cabinet or with the back cover removed involves a shock hazard from the receiver.
Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high voltage equipment.

Keep wires away from high voltage or high temperature component.

When replacing a high wattage resistor (oxide metal film resistor) in circuit board, keep the resistor body 10mm away from the circuit board.
Many electrical and mechanical parts in this equipment have special safety-related characteristics.
Replacement parts which have such features are identified by designated symbol on the parts list.
Before replacing any of these components, read the parts list carefully.
If the fuse is blown, replace it with the fuse specified in the Parts List.

SPECIFICATIONS

1. General Description

The LOTUS is an advanced TFT LCD Monitor Control Board. This design enables a full
conventional CRT monitor with a large size Active Matrix LCD module.
It is suitable for video resolution up to UXGA @ 60Hz in all video modes, the full display area of the module is used. The design is implemented as a single printed circuit board.

The LOTUS is designed to act as a full monitor.

The LOTUS is designed to support various TFT LCDs under UXGA resolution by
BIOS option, customers line-up their monitors with their own identity with following options.

2. Components Features

● Image B'd (LOTUS)

- State of the art high performance picture quality design
- **Analog RGB , DVI**
- Full CRT multi-sync monitor compatibility
- **Multi-sync capability up to UXGA resolution @ 60Hz (1600x1200,60Hz)**
  Compatible standard DOS, VGA, SVGA, XGA, SXGA and UXGA@60Hz VESA timing
- True color (16.7M) data processing and display driving
- Single control operated & transparent On-Screen-Display (OSD) user interface
- Full control of all relevant display and interface parameters via OSD
- VESA DDC2B compliant (TBD)
- Compatible with VESA DPMS power saving modes(option)
- Form factor: 78mm (L) x 110mm (W) x 13mm(H)
- +12VDC single power: DC power adapter recommended.
- **Ambient Operating temperature: 0 to 40°C**

● Panel

1) LTM220M3

- High contrast ratio, high aperture structure
- High speed response
- SPVA (Super Patterned Vertical Alignment) mode
- **Wide Viewing Angle(L89,R89,U89,D89)**
- WSXGA+ (1680 x 1050 pixels) resolution
- U-type 6 CCFTs(Cold Cathod Fluorescent Tube)
- DE (Data Enable) only mode
- LVDS (Low Voltage Differential Signaling) interface (2pixel/clock)

- **Inverter (GH239A)**

- Suitable Load : 22inch TFT LCD (6 U shape Lamp)
- Single Operate voltage 24V
- Backlight on/off and Dimming control
- Output current range : 5.5mA (min) ~6.5mA(max) / 6.0mA(typical)
- Operating frequency : 60KHz(typical)

- **BLU**

- Lamp Current : 5.5mA(min)~7.0mA(max)/6.0mA(typical)
- Lamp Voltage : 1655Vrms(min)~1904Vrms(max)/1780Vrms(typical)
- Lamp Frequency : 35kHz(min)~60kHz(max)/45kHz(typical)
- Operating Life Time : 30,000Hr(min)
- Startup Voltage : 0°C = 2,950Vrms, 25°C = 2,360Vrms

3. Input signal

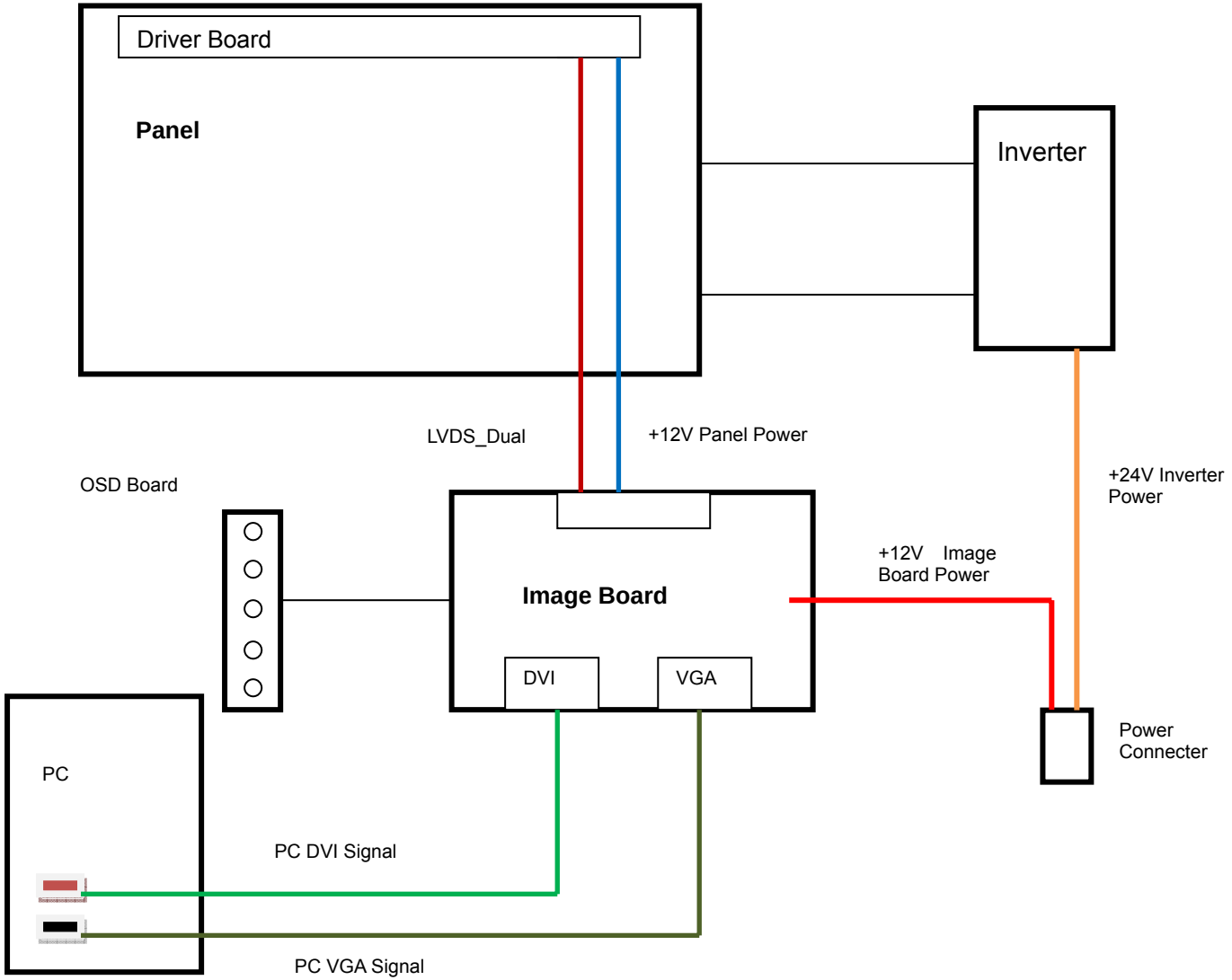
1) Input signal Interface

: ANALOG RGB(ADC)
max 165MHz sampling rate support UXGA/60Hz
analog R'B'G' known as SOG (Sync-on-Green)
:DVI (TMDS)
max 165MHz sampling rate support UXGA/60Hz

2) Support Input resolution (Timing Table)

IGT AVP WIDE 16X10 VIDEO TIMING MODES								
DESCRIPTION		640X480	640X480	720X400	800X600	1280X1024	**1440X900**	**1680X1050**
H	**f KHz**	37.50	31.469	31.649	37.880	63.938	**55.935**	**65.290**
	A uS							
	B uS							
	C uS							
	D uS							
	E uS							
	POL	POS	NEG	POS	POS	POS	**NEG**	**POS**
V	**F Hz**	75.00	59.94	70.087	60.310	60.020	**59.89**	**59.95**
	O mS							
	P mS							
	Q mS							
	R mS							
	S mS							
	POL	POS	NEG	POS	POS	POS	**NEG**	**POS**

4. Block Diagram



5. Service Parts (BOM)

01+562210101					
PRODUCT,LCD,SET					
KTL220S-03(W/T)(RoHS)					
No	CD_CHILD	DC_ITEM_SPEC	NM_ITEM	Qty	DC_ITEM_UNIT
1	07+112209100	LOTUS(AD220), IGT(RoHS)	OSD MANUAL	1	PCS
2	09+590000001	TOUCH-25*15M(3n9469)(RoHS)	FOAM TAPE	0.003	ROLL
3	10+210122200	17-9332-206-01(RoHS)	T/S 22" (CT2)	1	EA
4	10+220120003	EXII-5710UC-02,IGT(RoHS)	CONTROLLER PCB	1	EA
5	10+31090002C	LOTUS(AD220)(RoHS)	AD B'D(WSXGA+)	1	EA
6	10+41130001B	GH239A(RoHS)	INVERTER	1	EA
7	47+042210002	30P/30P/200mm(RoHS)	CABLE LVDS(P6GND)	1	EA
8	47+052210001	9P/6P/14P,300/400mm(AMP9P)(RoHS)	CABLE ASSY	1	EA
9	54+322ASS001	LTM220M3-L02-0(RoHS)	TFT LCD 22.0"	1	EA
10	60+222100201	FRONT- 22M3 IGT(RoHS)	FRAME TFT LCD(67341800 A)	1	EA
11	60+222100202	BASE- 22M3 IGT(RoHS)	FRAME TFT LCD(68587300 A)	1	EA
12	60+222100203	MIDDLE- 22M3 IGT(RoHS)	FRAME TFT LCD(68587401 A)	1	EA
13	60+222100204	COVER- 22M3 IGT(RoHS)	FRAME TFT LCD(68867801 A)	1	EA
14	60+222100205	COVER_IVT 22M3 IGT(RoHS)	FRAME TFT LCD(54001200 A)	1	EA
15	64+200010103	D-SUB B/K(TRIMLINE)(RoHS)	BRACKET	1	EA
16	64+200010104	DVI B/K(TRIMLINE)(RoHS)	BRACKET	1	EA
17	68+112103201	PHW M3*20 천연(RoHS)	MACHINE BOLT	2	EA
18	68+112403061	PH*SW*PW M3*6 천연(RoHS)	MACHINE BOLT	4	EA
19	68+112403081	PH+SW+PW M3*8 천연(RoHS)	MACHINE BOLT	6	EA
20	68+192003061	FH-5PI M3*6 천연(RoHS)	MACHINE BOLT	8	EA
21	72+120004001	M4 PI FN 천연(RoHS)	NUT FLANGE	6	EA
22	73+160000101	SJCT-100 mm(RoHS)	CABLE TIE	2	EA
23	90+222010100	646*191*428(I)22"LCD(RoHS)	PACKING BOX	1	EA
24	91+222100130	LTM220M3_IGT(RoHS)	CUSHION-P.E FOAM	1	SET
25	92+110011003	1100*1100*120(RoHS)	PALLET IGT 19UR(CRT)	0	EA
26	93+030000024	(650*600) RS-471 IGT(RoHS)	POLY BAG-HD	1	EA
27	93+060000018	40W70L(RoHS)	EMI TAPE(AL TAPE)	2	EA
28	93+060010011	0.3T*7*486 IGT22LCD(RoHS)	FELT TAPE	2	EA
29	93+070010012	0.3T*7*310 IGT22LCD(RoHS)	FELT TAPE	2	EA

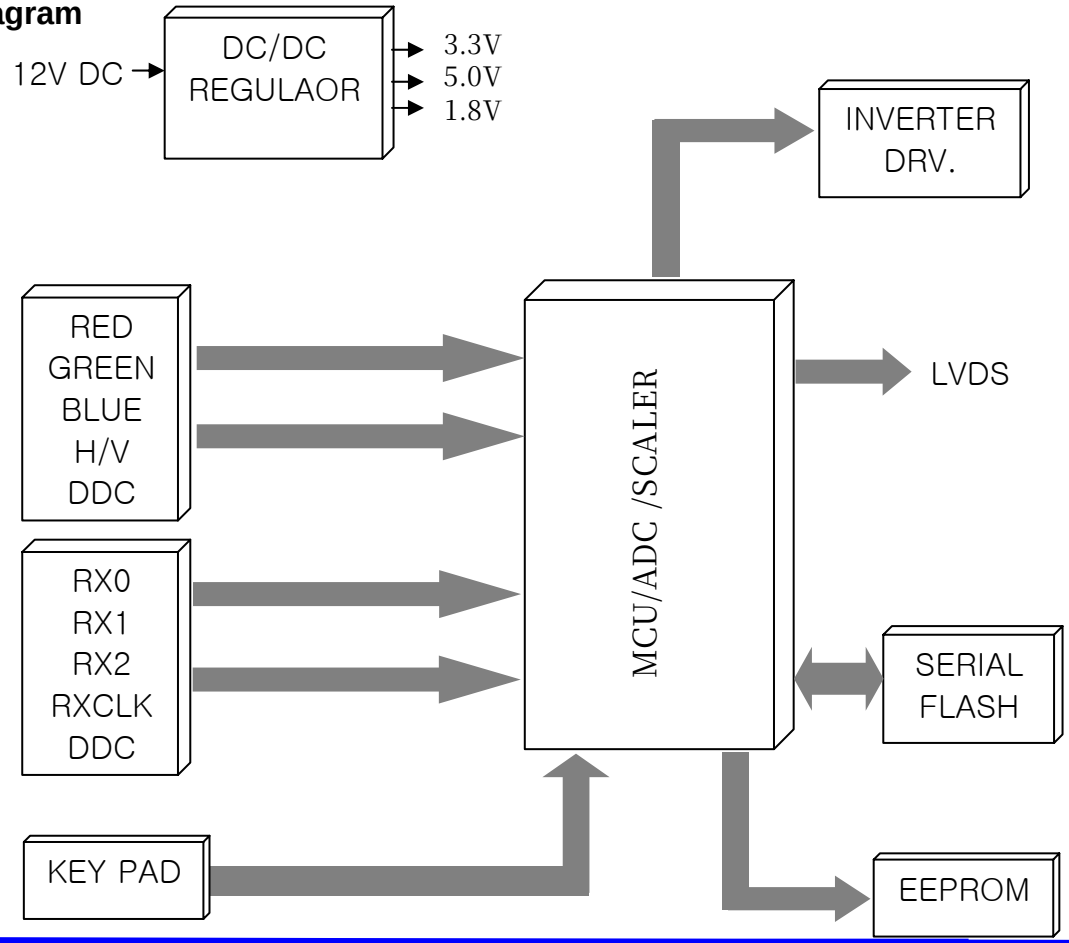
30	93+081510001	16500*6*1.6t VHB4956(RoHS)	FOAM TAPE(양면)	0.15	ROLL
31	93+134000001	URU 15-8-150-15(RoHS)	EMI GASKET	2	EA
32	93+220000002	SILICA-GEL 20G(RoHS)	SILICAGEL	1	EA
33	93+992000001	20" CRT LAP(RoHS)	기타 부자재	0.002	ROLL
34	96+120000056	ELECTRONIC(38*34)-IGT(RoHS)	LABEL(WARNING)	1	EA
35	96+140400101	40mm*10mm(RoHS)	BAR CODE LABEL	6	EA
36	96+140600151	60mm*15mm(RoHS)	BAR CODE LABEL	1	EA
37	96+140600352	60mm*35mm 무지(RoHS)	BAR CODE LABEL	2	EA
38	96+141051051	105mm*105mm BOX 용(RoHS)	BAR CODE LABEL	1	EA
39	96+320750701	TFT LCD MONITOR(75x70)-UL/TUV/CE(ROHS)	LABEL PRODUCT-IGT	1	EA

MAIN KEY PARTS SPECIFICATION

- **IMAGE BOARD : LOTUS / KEYPAD**
- **INVERTER : GH239A**
- **MODULE ASSAY : Panel**

1) LOTUS (10+31090002C)

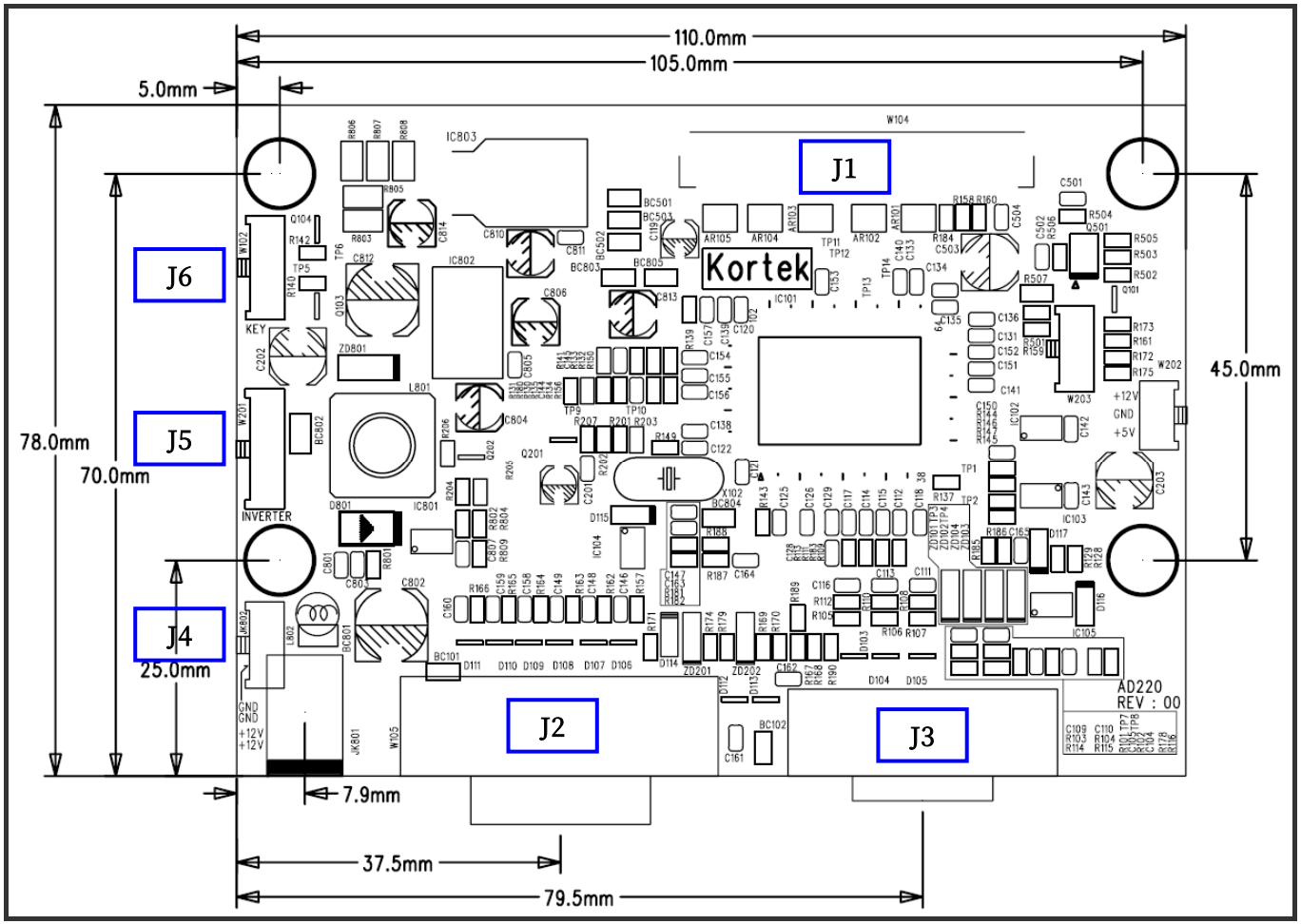
■ **Block Diagram**



■ LOTUS DIMENSION & CONNECTORS

1. Dimension

Dimension: 78mm (L) x 110mm (W) x 13mm(H)



2. CONNECTORS

◆ **Power Input connector Connector : SMAW200-4p/ YeonHo Elec. (J4)**



◆ **Analog RGB Input Connector : D_Sub 15pin(J3)**

pin no	Symbol	Description	pin no	Symbol	Description
1	RED	Analog Red	9	N.C	Reserved
2	GREEN	Analog Green	10	SGND	Sync Return
3	BLUE	Analog Blue	11	GND	GND
4	N.C	Reserved	12	SDA	DDC SDA
5	GND	DDC Return	13	HSYNC	Horizontal Sync
6	RGND	Red Return	14	VSYNC	Vertical Sync.
7	GGND	Green Return	15	SCL	DDC SCL
8	BGND	Blue Return			

◆ **DVI Input Connector : DVI-D 24pin(J2)**

Pin No	Description	Pin No	Description	Pin No	Description
1	TMDS DATA2-	9	TMDS DATA1-	17	TMDS DATA0-
2	TMDS DATA2+	10	TMDS DATA1+	18	TMDS DATA0+
3	TMDS DATA2/4 Shield	11	TMDS DATA1/3 Shield	19	TMDS DATA0/5 Shield
4	TMDS DATA4-	12	TMDS DATA3-	20	TMDS DATA5-
5	TMDS DATA4+	13	TMDS DATA3+	21	TMDS DATA5+
6	DDC Clock	14	+5V POWER	22	TMDS Clock Shield
7	DDC Data	15	GND (for +5V)	23	TMDS Clock+
8	NC	16	Hot Plug Detect	24	TMDS Clock-

◆ **Keypad Interface Connector : SMAW200-05 / YeonHo Elec. (J6)**

Pin No.	Symbol	Description	Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	LED	LED	2	Key	KEY1	3	GND	GND
4	KEY	KEY2	5	LED	NC			

◆ **LVDS Output Connector : 12507WR-30p/ YeonHo Elec. (J1)**

Pin No.	Function	Pin No.	Function	Pin No.	Function
1	Vcc (5v)	11	RXEC-	21	RXO3-
2	Vcc (5v)	12	RXE2+	22	RXOC+
3	Vcc (5v)	13	RXE2-	23	RXOC-
4	NC	14	GND	24	GND
5	NC	15	RXE1+	25	RXO2+
6	NC	16	RXE1-	26	RXO2-
7	GND	17	GND	27	RXO1+
8	RXE3+	18	RXE0+	28	RXO1-
9	RXE3-	19	RXE0-	29	RXO0+
10	RXEC+	20	RXO3+	30	RXO0-

◆ **Backlight Power Connector : SMW200-06p/ YeonHo Elec. (J5)**

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	BRIGHT	Brightness adjust	4	GND	GND
2	ON/OFF	Backlight on/off	5	Vcc	12V
3	GND	GND	6	Vcc	12V

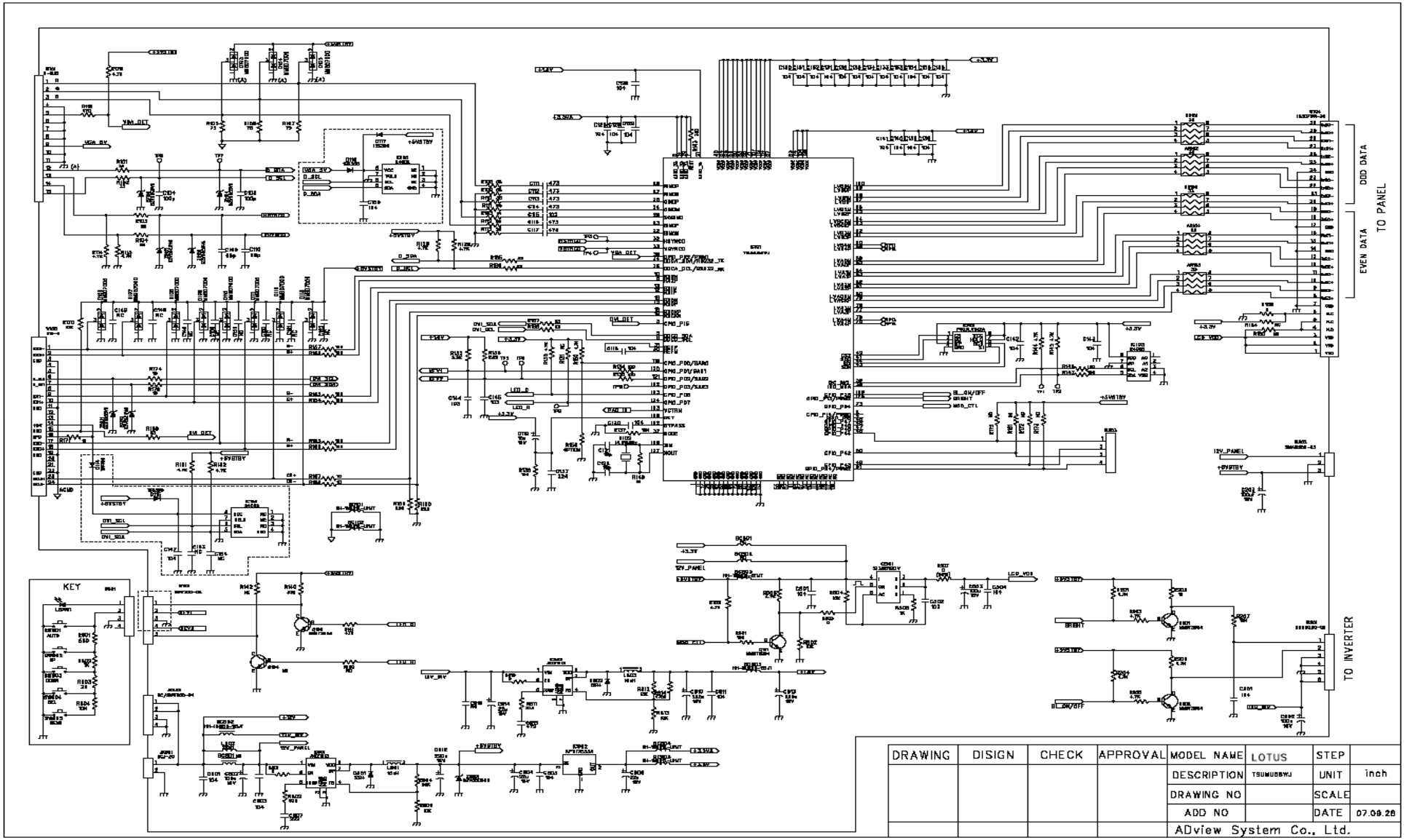
■ FEATURES

Parameter	Value	Unit
Overall dimensions Width Height Length	 110 13 78	 mm mm mm
Max. output resolution	1680 x 1050,60Hz	pixels
Data processing	24(8bit*3)	bits
Input impedance	75	ohms
Sync. polarities	+/-	
Sync. levels	TTL compatible	
Supply voltage	12.0	Vdc
Max. number of colors	16.7M	colors
Operating temperature (Ambient Temp)	0~50	° C
Storage temperature	-20 ~ 70	° C

■ ELECTRICAL PARAMETERS

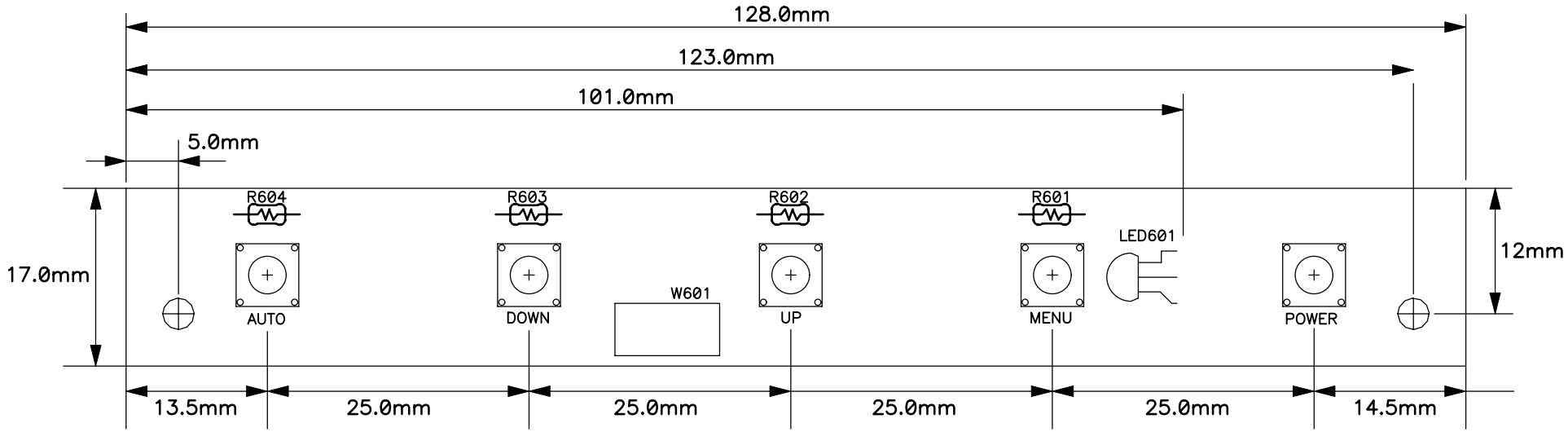
Symbol	Description	Min.	Typ.	Max.	Unit
Vdd	+12Vdc power supply	11.4	12	12.6	V
$V_{I(R,G,B)}$	Video input signal	0.5	0.7	1.0	Vpp
fs	Input Video sample rate			205	MHz
f_{HS}	Horizontal sync frequency	30		110	kHz
fvs	Vertical sync frequency	55		75	Hz
F_{SIH}	Sync. input high level	2.5		5	Vdc
V_{SIL}	Sync. input low level	0		0.8	Vdc
I_{DD2}	Supply current +12V (with LCD)		3.0	3.5	A

■ SCHEMETIC


TO PANEL
ODD DATA
EVEN DATA
TO INVERTER
KEY
DRAWING
DISIGN
CHECK
APPROVAL
MODEL NAME
LOTUS
STEP
DESCRIPTION
TSUM05BWJ
UNIT
inch
DRAWING NO
SCALE
ADD NO
DATE
07.09.28
ADview System Co., Ltd.

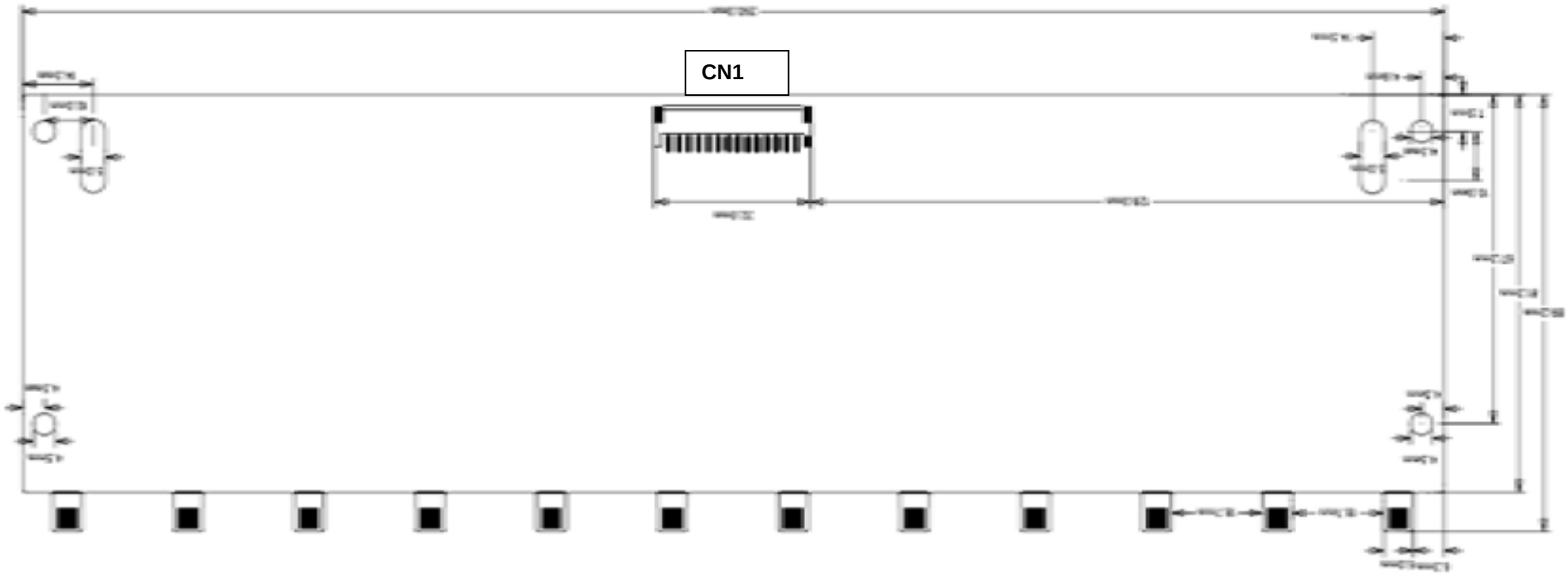
2) KEYPAD (07+112209100)

■ PCB Dimension



3) INVERTER : GH239A (10+41130001B)

1. Dimension



2. Pin Assign

■ CONNECTOR (CN1) : 20022WS-14AM / Equivalent

PIN NO.	SYMBOL	REMARK
1,2,3,4,5	VCC	SupplyVoltage:(24V).
6,7,8,9,10	GND	Power System Return.
11	N.C	
12	ON/OFF	On/Off signal for control inverter on/off
13	IN-PWM	0 ~ 3.3V
14	N.C	

Note) Control Signal PIN

PIN NO.	SYMBOL	STATUS	ACTION	REMARKS
CN1 #12	BKLT_ON	HIGH	LAMP(CCFL)-ON	2.4~5.25V
		LOW	LAMP(CCFL)-OFF	0.8V MAX

■ Absolute Maximum Ratings

ITEM	SYMBOL	SPEC	UNIT	REMARKS
INPUT VOLTAGE1	Vin1	21.6~26.4	V	
INPUT VOLTAGE2	Vin2	4.9~5.1	V	
OPERATING TEMPERATURE	Top	0～60	℃	
STORAGE TEMPERATURE	Tstg	-30～80	℃	
RELATIVE HUMIDITY	RH	90	%	

Note) INPUT VOLTAGE1 Recommended Over than 12V

Note) Output Characteristics

ITEM	SYMBOL	CONDITION			SPECIFICATION			UNIT
		Vin1(V) (DC-IN)	BRT ADJ	LAMP	MIN	TYP	MAX	
OUTPUT CURRENT	IOMAX	24V	3.3V	LAMP	5.5	6.0	6.5	mArms
	IOMIN	24V	0V	LAMP	3.5	4	4.5	
INPUT CURRENT	Iin	24V	3.3V	LAMP	-	-	3.5	A
FREQUENCY	F	24V	3.3V	LAMP	55	60	65	KHz

4) TFT-LCD (54+322ASS001)

■ General Information(LCD Panel)

Item	Specification	Unit	Note
Pixel Pitch	0.282(H) x 0.282(V)	mm	
Active Area	473.76(H) x 296.1(V)	mm	
Number of Pixel	1,680 x 1,050	pixel	
Display mode	Normally Black		
Pixel Arrangement	RGB vertical stripe		
Display color	16.7M	colors	

■ Mechanical Information (Module)

Item		Min.	Typ.	Max.	Unit	Note
Dimension	Horizontal (H)	497.26	497.76	498.26	mm	w/o Inveter ass'y
	Vertical (V)	319.6	320.1	320.6	mm	
	Depth (D)			35.8	mm	
Weight				TBD	g	LCD module only

■ Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	V_{DD}	GND-0.5	6.5	V	Ta= 25 ± 2 °C
Storage temperature	T_{STG}	-20	65	℃	
Center Glass surface temperature (Operation)	T_{OPR}	0	50	℃	
Shock (non - operating)	Snop	-	50	G	
Vibration (non - operating)	Vnop	-	1.5	G	

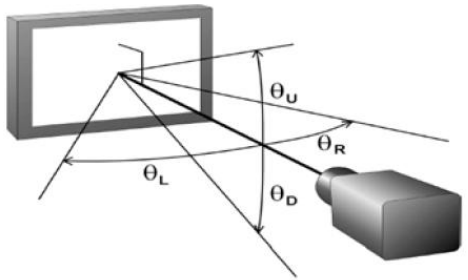
■ Optical characteristics

The optical characteristics should be measured in a dark room or equivalent.
Measuring equipment : TOPCON BM-7, SPECTRORADIOMETER SR-3, CA-210

(Ta = 25 ± 2°C, VDD=5.0V, fv= 60Hz, fDCLK=59.3MHz, IL = 6.5mArms)

Item	Unit	Specification Min / Typical / Max	Notes
Operating Humidity	%RH	8 / - / 85	
Storage Temperature	°C	-20 / - / 60	
Storage Humidity	%RH	5 / - / 90	
Input Voltage	V DC	4.5 / 5.0 / 5.5	
Operating Current	A	- / 10 / -	
Power Consumption	W	- / 120 / 125	Dependant on brightness setting
Active Area	mm	- / 473.76 / - - / 296.1 / -	Horizontal Vertical
Pixel H x V		- / 1680 / - - / 1050 / -	Horizontal Vertical
Pixel Pitch	mm	- / 0.282 x 0.282 / -	
Format		- / 16:10 / -	
Pixel Arrangement		R G B vertical stripe	
Display Mode		SPVA mode, normally black	
Panel Separation	mm	- / 8.0 / -	Between facing polarizer film surfaces of front and rear LCD panels
White Luminance (without touch sensor)	Cd/m^2	- / - / 300	
White Luminance (with 3M touch sensor)	Cd/m^2	225 / 250 / 275	Luminance calibration level during assembly after aging process
Brightness uniformity	%	- / - / 25	
Contrast Ratio	C/R	(700) / 1000 / -	
Response Time	ms	- / 16 / 20	Tr (B→W) + Tf (W→B)
Video Signal Interface		VGA ,DVI-D	
Supported Colors		16.7M colors (8-bit for R,G,B)	
Weight	kg		
Physical Size	mm	469.40(H) x 314.65(V) x 105.25(D)	Outer module dimensions

■ Viewing Angle



Item	Unit	Specification (Typ)	Notes
Θ_R	°	89	Measured with CR ≥ 10 at centre of active area
Θ_L	°	89	
Θ_U	°	89	
Θ_D	°	89	

Color Chromaticity Coordinates

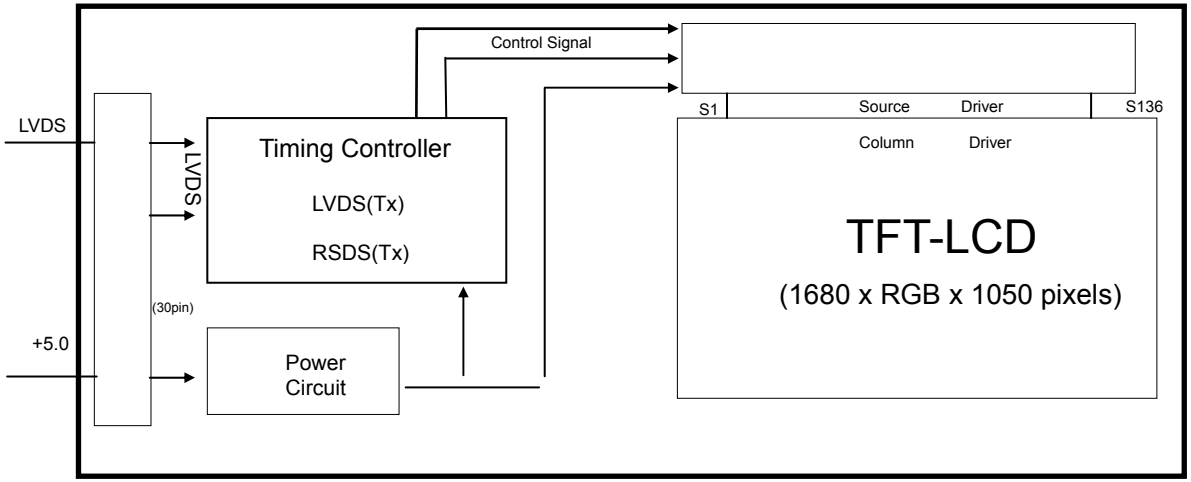
Color Chromaticity	x	y
White	0.31	0.32
Red	0.66	0.31
Green	0.21	0.67
Blue	0.14	0.08

X, Y **(CIE 1931) – typical values (Tolerance: *x* ± 0.03 , *y* ± 0.03)**

■ LVDS Pin map

PIN NO	SYMBOL	PIN NO	SYMBOL	PIN NO	SYMBOL	PIN NO	SYMBOL	PIN NO	SYMBOL
1	RXO0N	7	GND	13	RXE0P	19	RXE2P	25	NC
2	RXO0P	8	RXOC-	14	GND	20	RXEC-	26	NC
3	RXO1N	9	RXOC+	15	RXE1N	21	RXEC+	27	NC
4	RXO1P	10	RXO3N	16	RXE1P	22	RXE3N	28	VDD +5V
5	RXO2N	11	RXO3P	17	GND	23	RXE3P	29	VDD +5V
6	RXO2P	12	RXE0N	18	RXE2N	24	GND	30	VDD +5V

■ TFT LCD Module

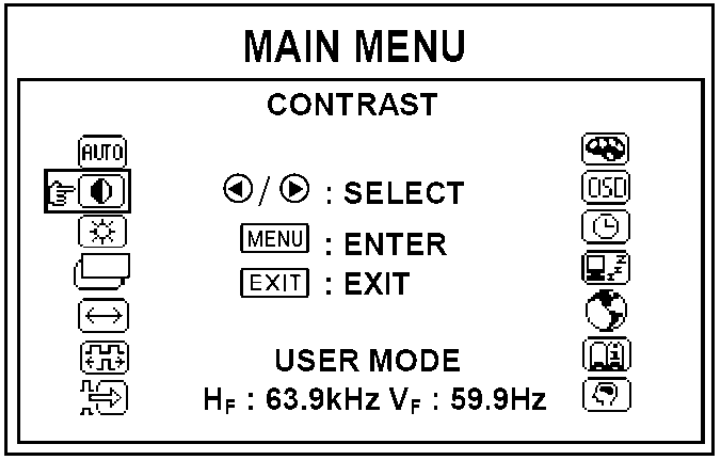


■ LCD Driver Board Electrical Characteristics

Item		Symbol	Min.	Typ.	Max.	Unit
Voltage of Power Supply		VDD	(4.5)	5.0	(5.5)	V
LVDS Input Characteristics	Differential Input Voltage for LVDS Receiver Threshold	High	-	-	+100	mV
		Low	-100	-	-	mV
	LVDS skew	tSKEW	-300		300	psec
	Differential input voltage	|VID|	200		600	mV
	Input voltage range (single-ended)	VIN	0		2.4	V
	Common mode voltage	VCM	0+ |VID|/2	1.2	2.4- |VID|/2	V
Current of Power Supply	(a) Black	IDD	-	1,680	-	mA
	(b) White		-	2,100	-	mA
	(c) Dot		-	2,310	-	mA
Vsync Frequency		fV	56.5	60	63	Hz
Hsync Frequency		fH	61.56	64.80	68.04	kHz
Main Frequency		fDCLK	56.63	59.61	62.59	MHz
Rush Current		IRUSH	-	-	4.0	A

HOW TO SET MENU

1. OSD (On Screen Display)



AUTO-TUNE
This control will automatically make adjustments to the horizontal and vertical size, horizontal and vertical position, phase and color.

CONTRAST
This control allows you to make adjustments to the contrast of the display screen.

BRIGHTNESS
Selecting this control menu allows you to make adjustments to the luminosity level of the display screen

H/V-POSITION (HORIZONTAL POSITION and VERTICAL POSITION)

HORIZONTAL POSITION
Select this control menu, and then use the ◀ and ▶ buttons to center the image horizontally on the screen.

VERTICAL POSITION

Select this control menu, and then use the ◄ and ► buttons to center the image vertically on the screen.

H-SIZE (HORIZONTAL SIZE)
Select this control menu, and then use the ◄ and ► buttons to expend or decrease the image width to horizontally fill the display screen.

PHASE
Select this control menu, and then use the ◄ and ► buttons to adjust the screen image until it looks focused, crisp and sharp.

AUTO-LEVEL
Unused. (Only Factory Mode function)

COLOR CONTROL
Select this control menu, then use the ◄ and ► buttons to scroll to the desired color temperature.
Use the “MENU” button to select the 9300K, 6500K, 5500K or USER for custom setting.

R-GAIN (RED)
Select “USER” then use the “MENU” button to scroll up and down the RGB menu to R(Red). Use the ▲ and ▼ buttons to adjust the red level of the display.

G-GAIN (GREEN)
Select “USER” then use the “MENU” button to scroll up and down the RGB menu to G(Green). Use the ▲ and ▼ buttons to adjust the red level of the display.

B-GAIN (BLUE)
Select “USER” then use the “MENU” button to scroll up and down the RGB menu to B(Blue). Use the ◄ and ► buttons to adjust the red level of the display.

OSD POSITION
Select this control menu, and then use the “MENU” button to select the direction to move the OSD menu. Use the ◄ and ► buttons to move the OSD menu

OSD TIME-OUT

Select this control menu, and then use the “MENU” button to select the duration time for the OSD menu. Use the ◀ and ▶ buttons to select the time. (5, 15, 30, 60 SEC)

POWER SAVE DELAY

Unused.

LANGUAGE

Select this control menu, and then use the ◀ and ▶ buttons to choose from English (*ENGLISH*), German (*DEUTSCH*), Spanish (*ESPAÑOL*), Italian (*ITALIANO*) or French (*FRANÇAIS*).

INFORMATION

Select this menu allows you to confirm information of the display.

RECALL

Unused. (Only Factory Mode function)

2. How to select item(s) & set up level

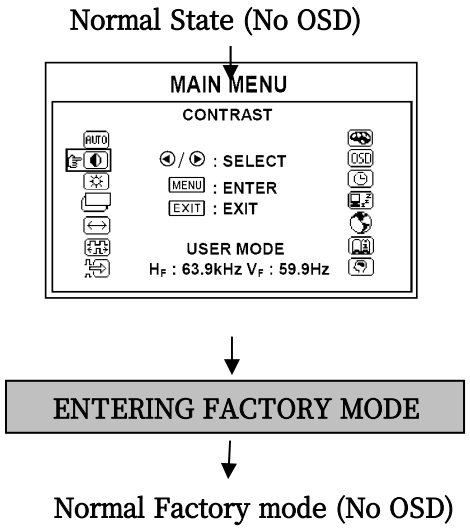
Select item(s) by using Menu key.
Change figure using UP/DOWN key.
Exit Menu items by SEL(EXIT) key

HOW TO SET FACTORY

■ Factory Mode LOTUS

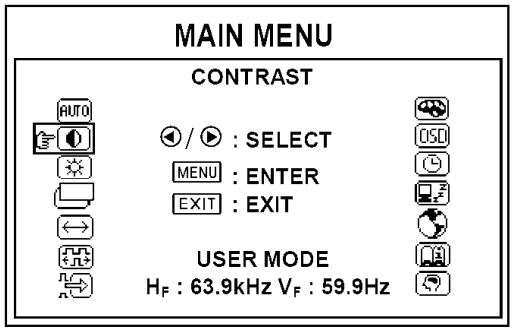
1. Go to Factory Mode

- Push long a “MENU” Key at normal state. (5 Second)
- OSD will be changed to the factory mode:



2. Explain Of Setting Item

- Push a “MENU” Key at the state of factory mode. (No OSD)



* This OSD has a white color background.

AUTO-TUNE

CONTRAST

Before shipping, This control allows you to make adjustments to the contrast of the display screen.

BRIGHTNESS

Before shipping, This control allows you to make adjustments to the luminosity level of the display screen.

H/V-POSITION (HORIZONTAL POSITION and VERTICAL POSITION)

H-SIZE (HORIZONTAL SIZE)

PHASE

AUTO-LEVEL

This control will automatically adjust the input levels of video signal.(ex. 0.714Vp-p, 1.0Vp-p)

COLOR CONTROL
Unused. (Only user mode function)

OSD POSITION

OSD TIME-OUT

POWER SAVE DELAY
Unused.

LANGUAGE

BTN/SPVA
Select this control menu, and then use the ◀ and ▶ buttons to choose from BTN LCD Panel (*BTN*) or SPVA LCD Panel (*SPVA*).

RECALL
All the factors go to the default value. (All factor reset)

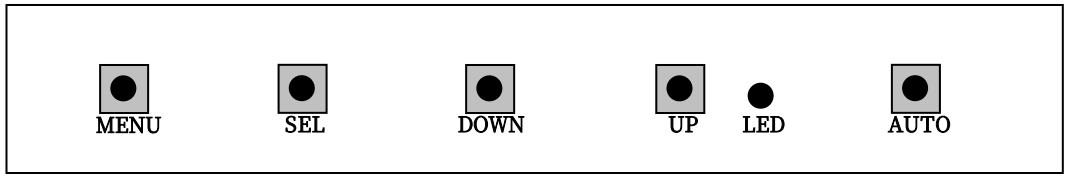
3. Esc Factory Mode

Push a “SEL(EXIT)” Key at the state of factory mode OSD or power off/on.

4. How to select item(s) & set up level

Select item(s) by using Menu key.
Change figure using UP/DOWN key.

KEY & LED



- **AUTO :** This Function will automatically make adjustments to the horizontal and vertical size, horizontal and vertical position/ phase
- **LED :** Display Green

  Normal operation : Green display
  Override mode : Green display
  Out of range : Green display
  Stand-by, Suspend : Green blinking per 1 second
- **[◀] or [▶] (Up / Down) :** Use these buttons to increase or decrease each value.

  a. No OSD :

  - **▶ :** Audio volume control menu will be shown.(Audio option)
  - **◀:** Contrast & Brightness control menu will be shown.

    Press “AUTO” to switch to another menu between Contrast and Brightness.

  b. Main OSD menu : Use these button to move up (or down) the OSD selection menu and adjust the attribute of the monitor while in OSD mode.

■ **[SEL(EXIT)]**

a. No OSD : Change the input.(D_SUB↔DVI)

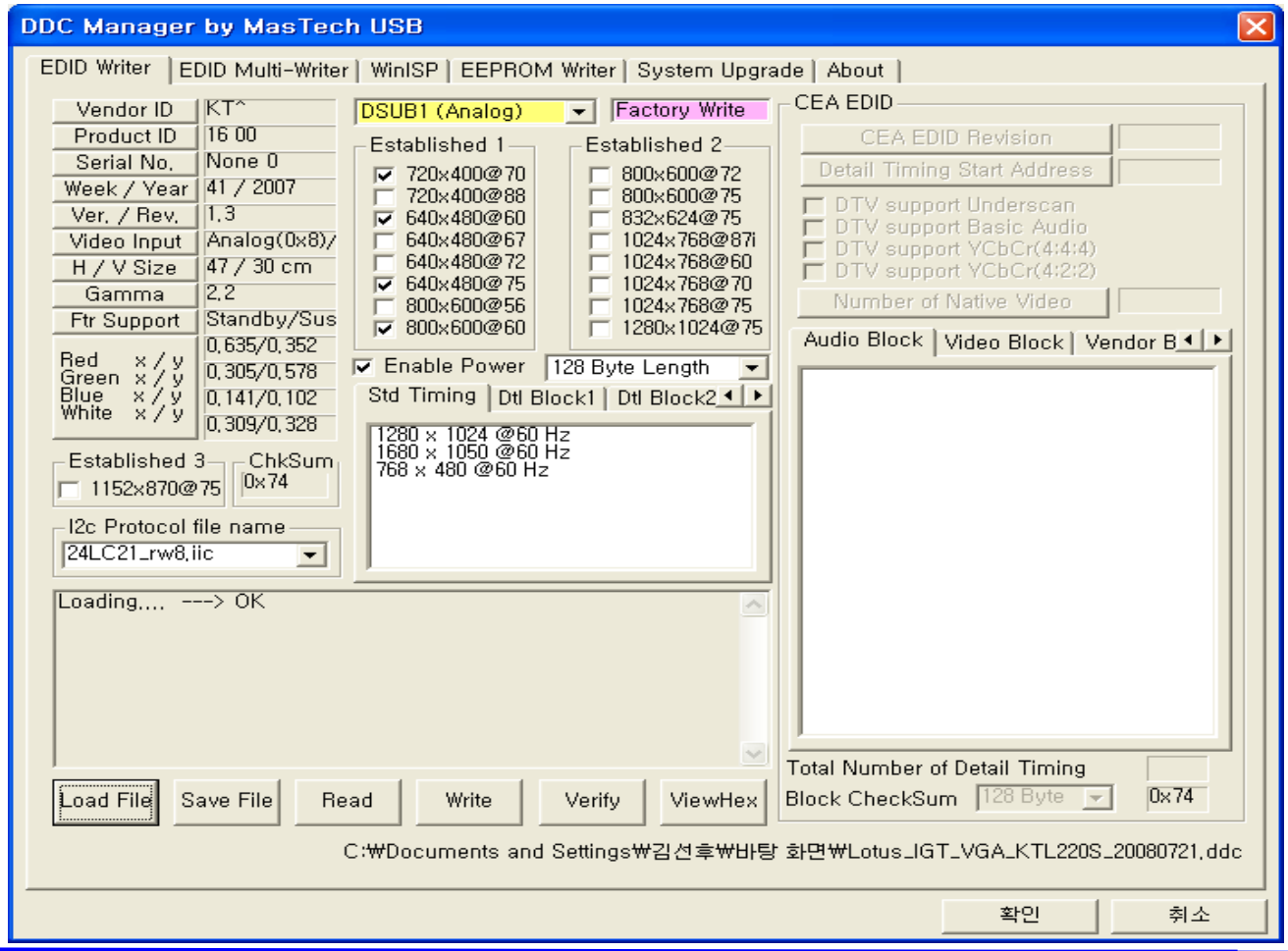
b. Main OSD menu : Disappear OSD menu.

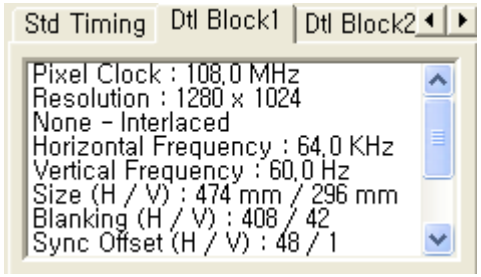
c. OSD control menu : Return to the previous menu.

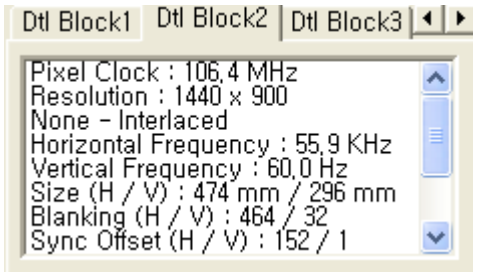
EDID INFORMATION

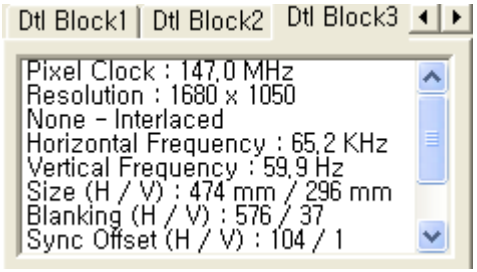
■ **EDID Timing Table.**

EST 1	EST 2	EST 3	EST 4	STD 1	STD 2	STD 3	DETAIL 1	DETAIL 2	DETAIL 3
720X400¹	640X480¹	640X480¹	800X600¹	1280X1024¹	1680x1050	768X480¹	1280x1024	1440X900¹	1680x1050





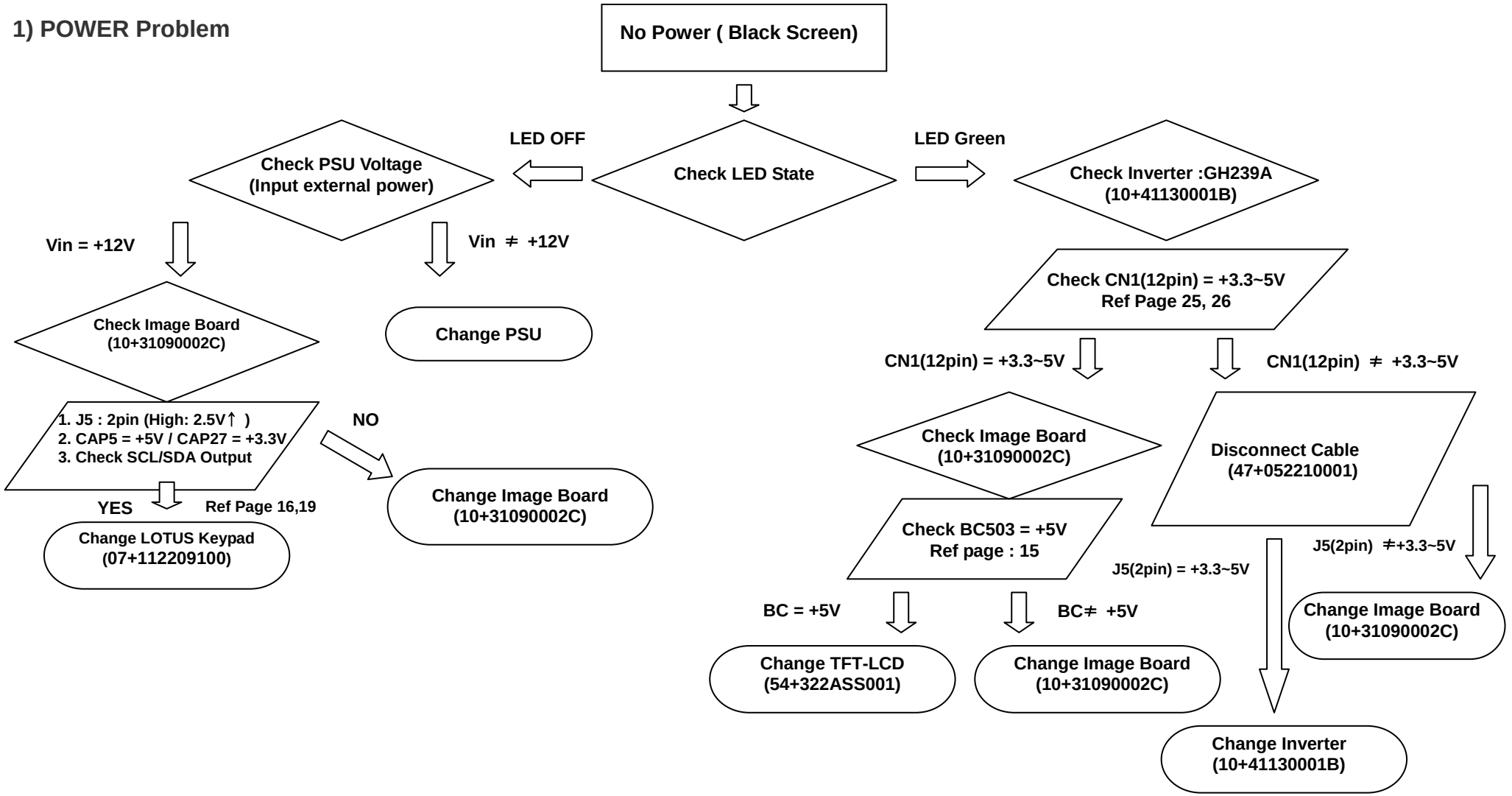




ANALYZE THE CAUSE OF FAILURE

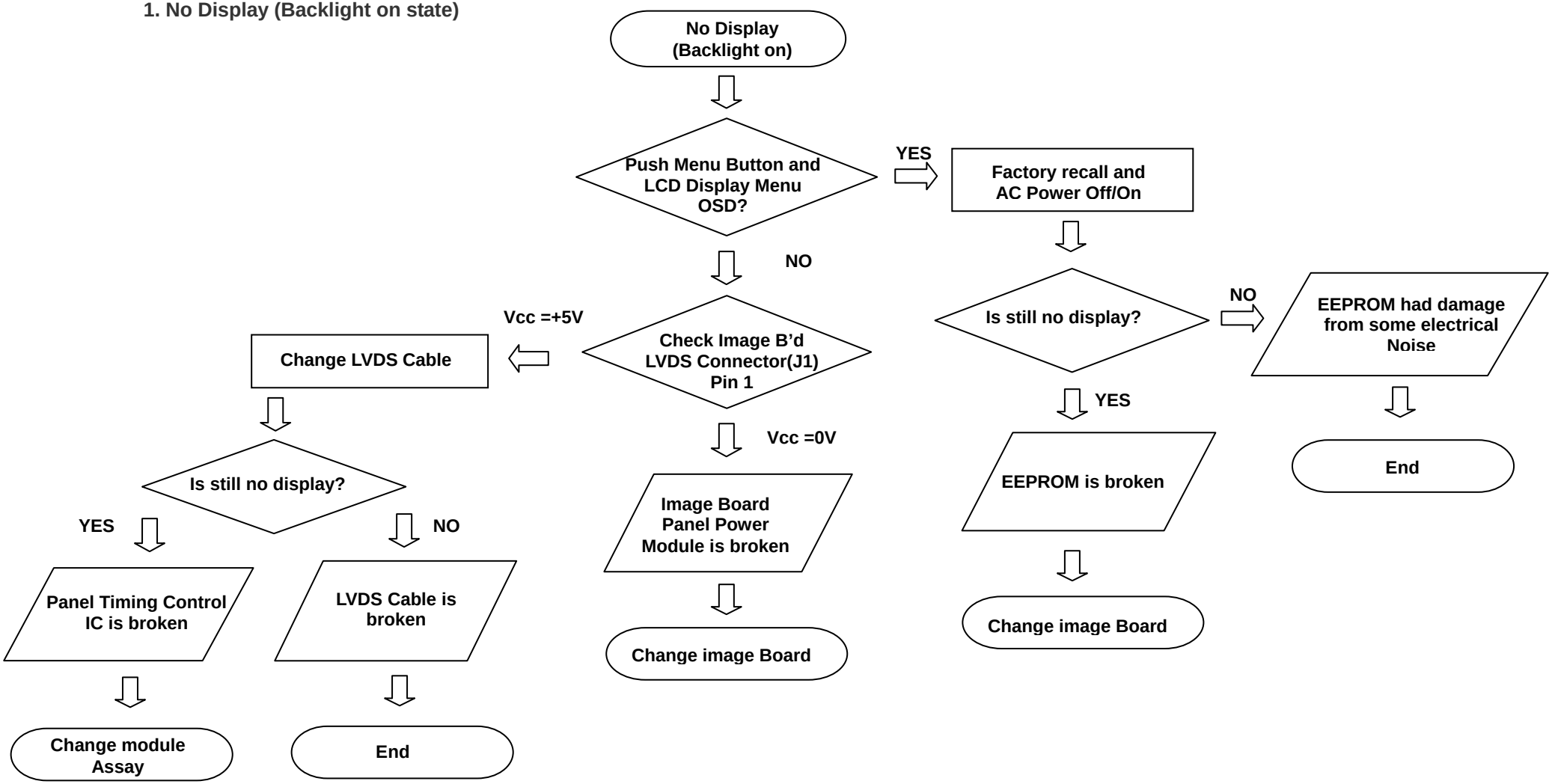
■ Debug condition : 1) Resolution : 640x480/60Hz or 800x600/60Hz 2) Test Pattern : 16Gray Scale or Pure R/G/B.

1) POWER Problem

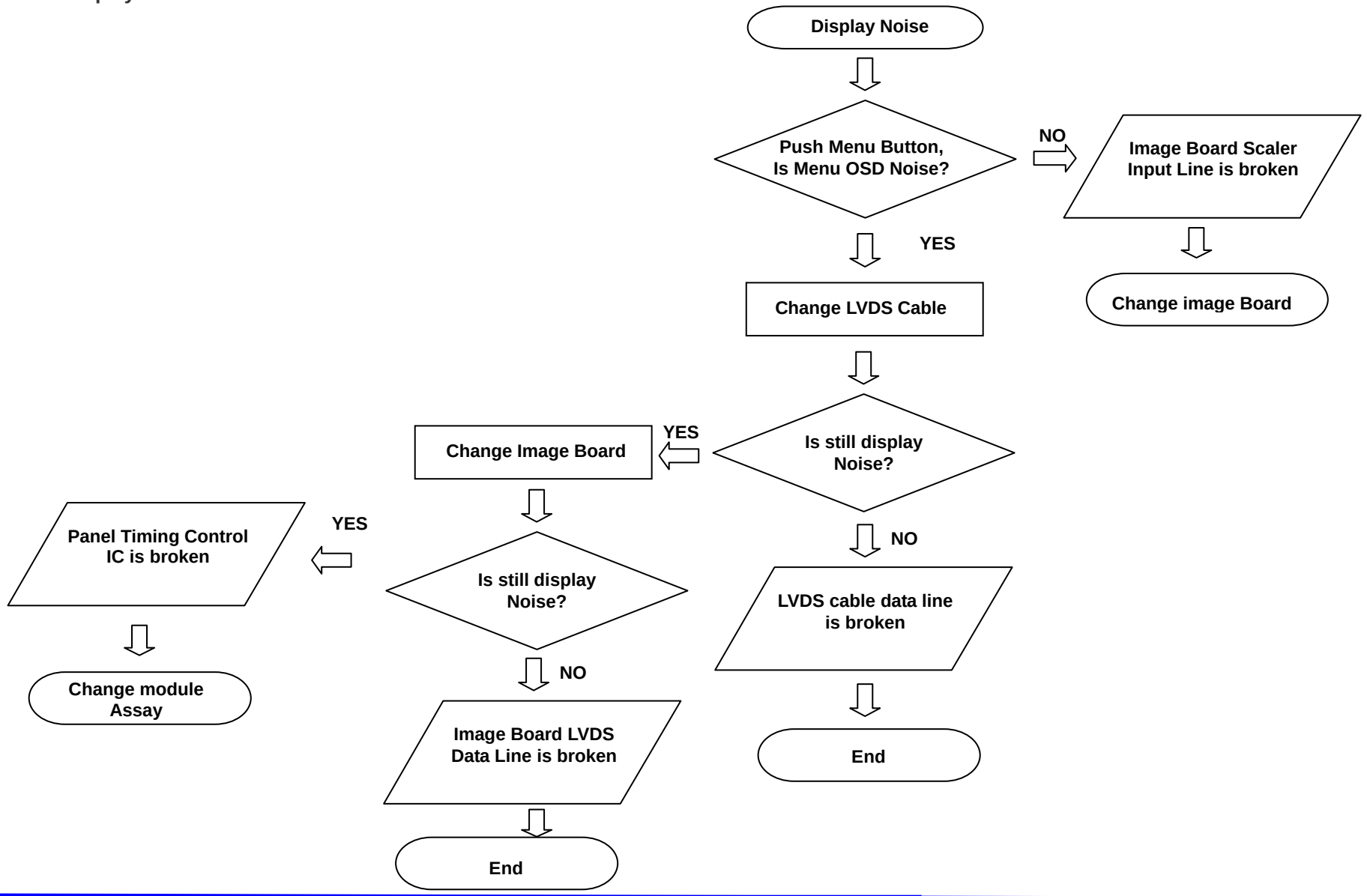


2) DISPLAY Problem

1. No Display (Backlight on state)



2. Display Noise



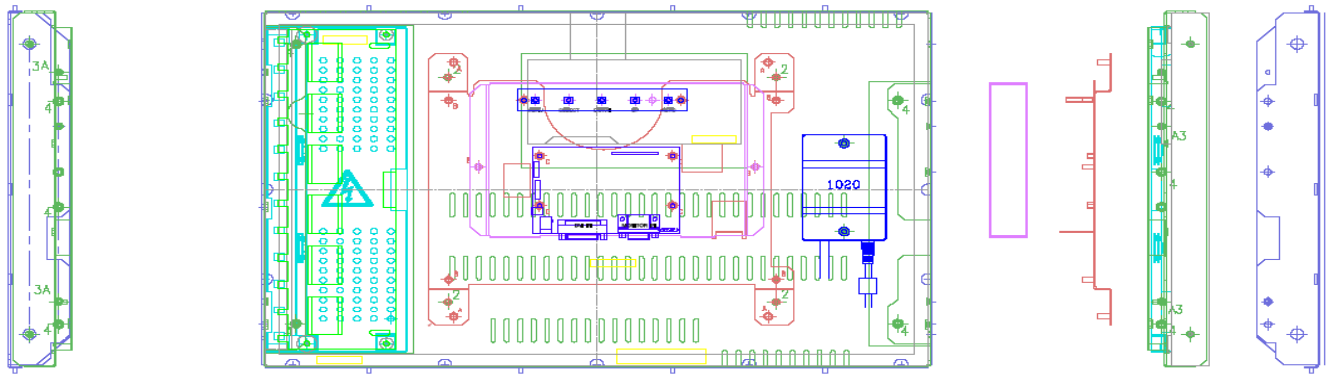
■ TROUBLE SHOOTING

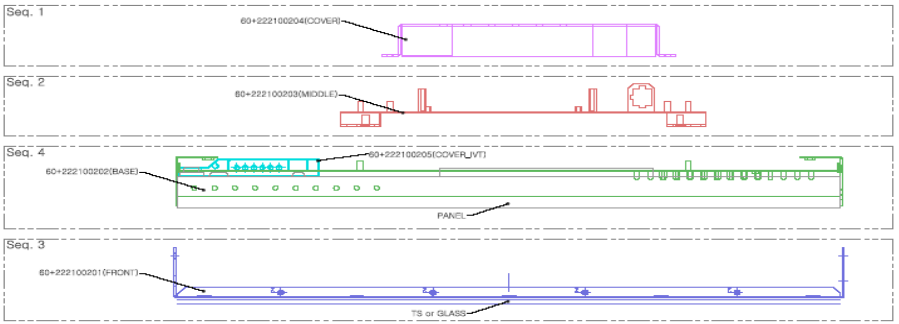
NO	Problem	Possible solution
1	"NO SYNC" message	Check if the signal cable (15Pin D-sub) is properly connected to the computer.
2	"UNSUPPORTED" message	This message may appear when the resolution and frequency of the video card in the computer are out the range of the Monitor. Select the proper resolution and frequency for the Monitor
3	LED doesn't work / No image	Check if the display is switched on or the power cable is properly connected.
4	A shadowed area appears on the screen.	Make sure the resolution and frequency of the computer video card are set properly to the range of the Monitor. Set the picture again referring to the standard display mode and current mode.
5	Image is unstable (Flicker, Interference, Noise, etc.)	Check if signal cable is secured, Check if frame (vertical) frequency of video signal is lower than 75Hz because this monitor can not run over 75Hz. In this case, please change the setting of 'Display Control Panel' of Windows to 60Hz, that displays the best performance
6	Dull image	Adjust the Frequency or Phase. Adjust the frame (vertical) frequency to 60Hz. Remove any video signal distributor.
7	The image is too light or too dark	Adjust the Brightness and Contrast in the picture menu.
8	Dark or saturated image	Adjust the Brightness or Contrast.
9	Image appears to be discolored	Select the desired color setting in the picture menu. Select or adjust the desired color temperature.

MECHANICAL DIMENSION AND DISASSEMBLE

ERP CODE	–

REV.	DATE	ECO NO	DESCRIPTION OF CHANGE	DRAWN	APPROVAL
0	090109	–	INITIAL DRAWING	S.J	H.T KIM





The Sequence of Disassembly

MODEL	KTL220S	BUYER	IGT	Date	20090109

Seq. No	Part No	DESCRIPTION	FASTENER	REMARKS
1	60+222100204	COVER	NUT M4 (2EA)	Cover of ADBD&Key
2	60+222100203	MIDDLE	NUT M4 (4EA)	Mount a MUDDLE on BASE
			PH+SW+PW M3×8 (6EA)	Mount PCB on MIDDLE
3	60+222100201	FRONT	FH-SPI M3×8 (4EA)	(Attach a TS on FRONT)
4	60+222100202	BASE	FH-SPI M3×8 (4EA)	Mount a Panel on BASE
5	60+222100205	COVER_JVT	PH+SW+PW M3×8 (4EA)	Mount a Inverter on Panel

NO.	DESCRIPTION	Q'TY	DWG NO.(ERP NO.)	REMARKS
2	–	–	–	–
1	–	–	–	–

THIRD ANGLE PROJECTION

DIMENSION TOLERANCES

LENGTH		HOLE DIAMETERS	
UNDER 4.9	±0.1	UNDER 3.81	±0.13
5.0 ~ 20.9	±0.15	3.81 ~ 6.35	±0.13
21.0 ~ 50.9	±0.2	6.36 ~ 12.70	±0.13
51.0 ~ 200.9	±0.4	12.70 OVER	±0.25
201.0 ~ 500.0	±0.5		
500.0 OVER	±1.0		

ANGLE ±0.5°

	DATE	NAME
DWG.	090109	S.J
CHEC.		
APP.		H.T KIM

TITLE	LCD 22LCD (SPVA)_IGT [DISASSEMBLY]	
REF.		SCALE
DWG.NO	60-222100290	1:1
MATERIAL	UNIT	SHEET
–	mm	1/1

본 부품은 ROHS 규제 물질에 대한 코텍의 기준을 만족함.
(THIS PART COMPLIES WITH KORTEK'S STANDARD FOR ROHS)

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Touch Drawing

