



# SERVICE Manual

Model: KTL201S-\*\* <Top Box>

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Note) KTL201S-\*\* 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) LTM201M1

- 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 (FIF2064)**

- Suitable Load : 20.1inch TFT LCD (6 U shape Lamp)
- Single Operate voltage 12V
- Backlight on/off and Dimming control
- Output current range : 3.0mA (min) ~5.0mA(max) / 7.0mA(typical)
- Operating frequency : 47~55KHz

- **BLU**

- Lamp Current : 4.0mA(min)~7.5mA(max)/7.0mA(typical)
- Lamp Voltage : 760Vrms(typical)
- Lamp Frequency : 40kHz(min)~60kHz(max)
- Operating Life Time : 50,000Hr(min)
- Startup Voltage : 0°C = 1,800Vrms, 25°C = 1,250Vrms

### 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)

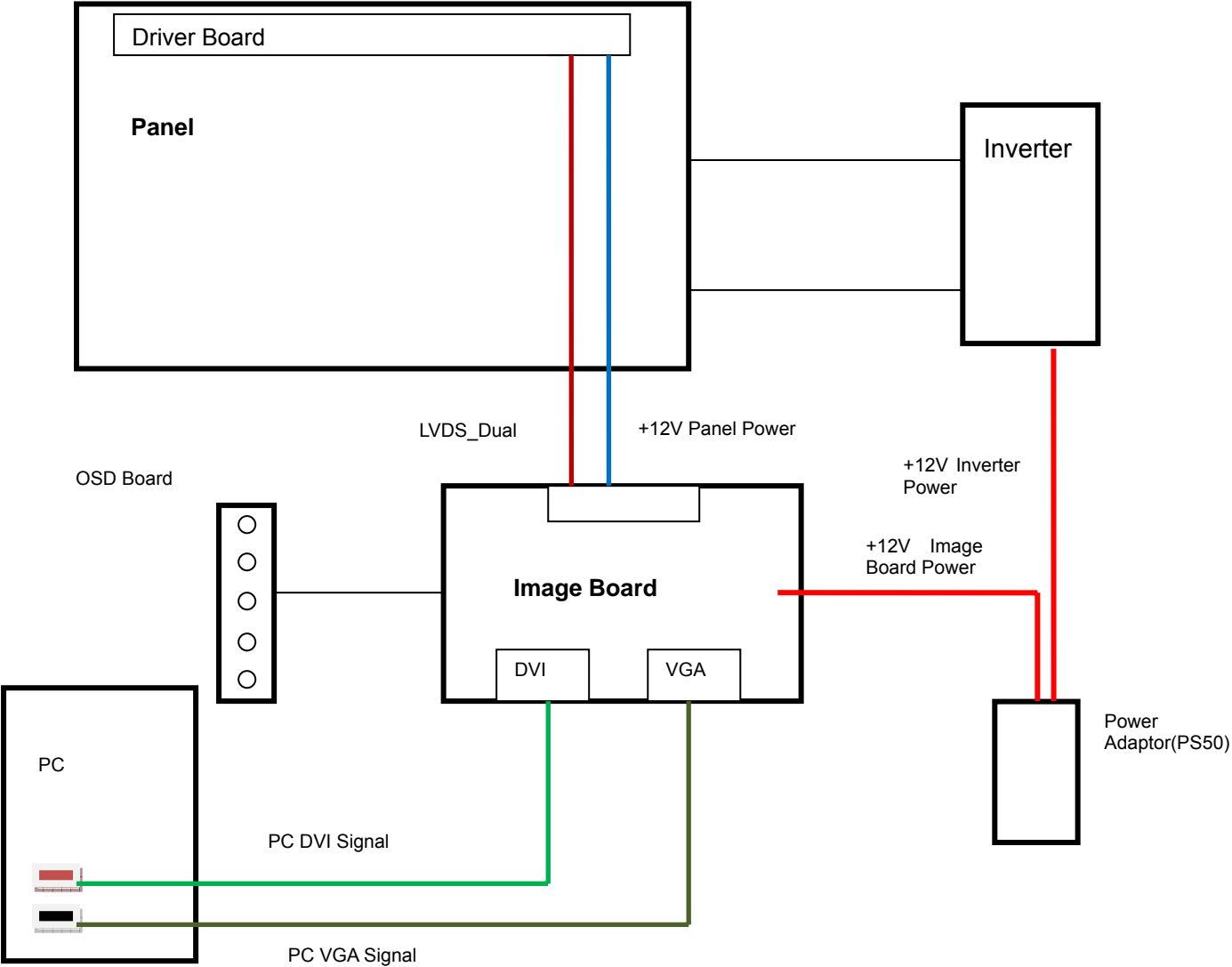
:DVI (TMDS)

max 165MHz sampling rate support UXGA/60Hz

## 2) Support Input resolution (Timing Table)

<b>IGT AVP WIDE 16X10 VIDEO TIMING MODES</b>									
<b>DESCRIPTION</b>	<b>640X480</b>	<b>640X480</b>	<b>720X400</b>	<b>768X480</b>	<b>800X600</b>	<b>1280X1024</b>	<b>1440X900</b>	<b>1680X1050</b>	
<b>H</b>	<b>f KHz</b>	37.50	31.469	31.649	29.820	37.880	63.938	<b>55.935</b>	<b>65.290</b>
	<b>A uS</b>								
	<b>B uS</b>								
	<b>C uS</b>								
	<b>D uS</b>								
	<b>E uS</b>								
	<b>POL</b>	POS	NEG	POS	NES	POS	POS	<b>NEG</b>	<b>POS</b>
<b>V</b>	<b>F Hz</b>	75.00	59.94	70.087	60.00	60.310	60.020	<b>59.89</b>	<b>59.95</b>
	<b>O mS</b>								
	<b>P mS</b>								
	<b>Q mS</b>								
	<b>R mS</b>								
	<b>S mS</b>								
	<b>POL</b>	POS	NEG	POS	POS	POS	POS	<b>NEG</b>	<b>POS</b>

# 4. Block Diagram



## 5. Service Parts (BOM)

01+512010100					
PRODUCT,LCD,SET					
KTL201S-**(W/G)(RoHS)					
NO	CD_CHILD	DC_ITEM_SPEC	NM_ITEM	QT_REAL	DC_ITEM_UNIT
1	07+112209100	LOTUS(AD220), IGT(RoHS)	OSD MANUAL	1	PCS
2	09+590000001	TOUCH-25*15M(3n9469)(RoHS)	FOAM TAPE	0.009	ROLL
3	10+210122013	17-9320-206-01(RoHS)	T/S 20.1" (CT3)	1	EA
4	10+220120003	EXII-5710UC-02,IGT(RoHS)	CONTROLLER PCB	1	EA
5	10+31090003C	LOTUS(AD220)12V(RoHS)	AD B'D(WSXGA+)	1	EA
6	10+410900006	FIF2064-31B(RoHS)	INVERTER	1	EA
7	10+510303001	KT-PS50, 12V,4/16A(RoHS)	AD ADAPTOR(20.1" LCD)	1	EA
8	47+032210001	6P/10P/6W,355mm(RoHS)	CABLE INVERTER(AD220)	1	EA
9	47+042210002	30P/30P/200mm(RoHS)	CABLE LVDS(P6GND)	1	EA
10	47+051910000	4P/4P/4W 350mm(RoHS)	CABLE ADAPTER	1	EA
11	54+320ASS000	LTM201M1-L01-L(RoHS)	TFT LCD 20.1"	1	EA
12	60+220100101	FRONT 201 IGT(RoHS)	FRAME TFT LCD(67341400 A)	1	EA
13	60+220100102	BASE 201LCD IGT(RoHS)	FRAME TFT LCD(68586800 A)	1	EA
14	60+220100104	IVT COVER 201 IGT(RoHS)	FRAME TFT LCD(54000400 A)	1	EA
15	60+220100105	COVER 201 IGT(RoHS)	FRAME TFT LCD(68867500 A)	1	EA
16	64+200010103	D-SUB B/K(TRIMLINE)(RoHS)	BRACKET	1	EA
17	64+200010104	DVI B/K(TRIMLINE)(RoHS)	BRACKET	1	EA
18	68+112103201	PHW M3*20 (RoHS)	MACHINE BOLT	2	EA
19	68+112403061	PH*SW*PW M3*6 (RoHS)	MACHINE BOLT	4	EA
20	68+112403081	PH+SW+PW M3*8 (RoHS)	MACHINE BOLT	13	EA
21	68+112404081	PH+SW+PW M4*8 (RoHS)	MACHINE BOLT	4	EA
22	68+142004081	FH M4*8 (RoHS)	MACHINE BOLT	1	EA
23	72+120004001	M4 PI FN (RoHS)	NUT FLANGE	10	EA
24	73+160000101	SJCT-100 mm(RoHS)	CABLE TIE	2	EA
25	90+220010100	530*191*408(I)-201LCD(RoHS)	PACKING BOX	1	EA
26	91+220010130	IGT 201LCD(RoHS)	CUSHION-P.E FOAM	1	SET
27	92+110011003	1100*1100*120(RoHS)	PALLET IGT 19UR(CRT)	0	EA
28	93+030000023	(600*600) RS-471 IGT(RoHS)	POLY BAG-HD	1	EA
29	93+060000018	40W70L(RoHS)	EMI TAPE(AL TAPE)	1	EA
30	93+072010001	2T*7*450 SPONGE(RoHS)	SPONGE TAPE	2	EA



31	93+072010002	2T*7*288 SPONGE(RoHS)	SPONGE TAPE	2	EA
32	93+081510001	16500*6*1.6t VHB4956(RoHS)	FOAM TAPE( )	0.15	ROLL
33	93+1315A5006	20W15T100L (Panel )	EMI GASKET(L)	2	EA
34	93+220000002	SILICA-GEL 20G(RoHS)	SILICAGEL	1	EA
35	96+120000056	ELECTRONIC(38*34)-IGT(RoHS)	LABEL(WARNING)	1	EA
36	96+140400101	40mm*10mm(RoHS)	BAR CODE LABEL	5	EA
37	96+140600151	60mm*15mm(RoHS)	BAR CODE LABEL	1	EA
38	96+140600352	60mm*35mm (RoHS)	BAR CODE LABEL	2	EA
39	96+141051051	105mm*105mm BOX (RoHS)	BAR CODE LABEL	1	EA
40	96+320750701	TFT LCD MONITOR(75x70)-UL/TUV/CE(ROHS)	LABEL PRODUCT-IGT	1	EA

# POWER SPECIFICATION

## 1. Description

This Product is AC to DC Power transfer device, it can provide for a 48W Single DC output With constant voltage source.

## 2. Electrical

### 2.1 Input Voltage (AC)

- a. From 100-240 V ac Nominal
- b. From 90-264 V ac Maximum

### 2.2 Input Frequency

From 47-63Hz

### 2.3 Input Current

- a. 0.9 A MAX at 90Vac
- b. 0.5 A Max at 265Vac

### 2.4 Inrush Current

- a. 50A max at cold-start and 25% , dc output full-loading and 115Vac input
- b. 80A max at cold-start and 25% , dc output full-loading and 230Vac input

### 2.5 Hold-up Time

10msec minimum at dc output full loading and 115Vac 50/60 Hz

### 2.6 Input wattage at output no-load /100mA load condition

- a. Less than 5.0W at DC no load and 240Vac input Voltage and frequency
- a. Less than 5.0W at DC 200mA load and 240Vac input Voltage and Frequency condition

### 2.7 Efficiency

78% Minimum at dc output full loading and nominal AC input voltage range included dc output Cable voltage drop loss.

### 2.8 Safety Test

- a. Leakage current less than 0.195mA at 254Vac, 50Hz
- b. Hi-Pot Test : 1500Vac /60Hz for 1minute (Line /Neutral in common to the Monitor Chassis, No Break down

- c. Insulation resistance: at dc 500Vdc, 1Sec between Primary to Secondary circuit, IR Shall 20MΩ.
- d. Grounding test: AC 30A, 2Sec between input safety ground and SELV output GND, GR 0.1 .

**2.9 Output Voltage and Current(DC)**

V out	Range	I out(min)	I out(max)
12.0V	12.6-11.4V	0.2A	4.0A

**2.10 Ripple and Noise**

Low frequency ripple (<100KHz) 300mVp-p, tested by dc loading side parallel with a 10μF/EC AND 0.1μF/Ceramic. Capacitor and Measured Band Width with dc-20MHz

**2.11 Over-Shoot and under-Shoot**

Less than of Nominal Voltage Value

**2.12 Protection**

- a. SCP: For short circuited protection and with auto-recovery function.
- b. OVP: Over-voltage protection with dc output voltage shutdown will be than less 18.0 Vac at full load
- c. OCP: Over – Current Protection, Range: 8.0A (max) on nominal AC input.

**2.13 Turn on Delay time**

The output voltage should turn on from AC on to settle within regulation in less than 3.0 sec

**2.14 Output voltage Temperature Coefficiene**

Less than 0.2%/C

**2.15 Output Transient Response**

Dynamic loading condition

Dc output	I1(A)	I2(A)	dVmax(V)	Test-max	dl /dT
12.0	0.00	2.0	+1.0V	10msec	50mA/usec
12.0	2.2	3.5	+1.0V	10msec	50mA/usec

**3. Environment**

**3.1 Temperature**

- a. Operation : 0 ~ 40
- b. Storage: -10 to 70

**3.2 Humidity**

- a. Operation: 20 to 80%

b. Storage: 10 to 90%

#### 4. Reliability

##### 4.1 MTBF

26280 Power On Hours at 25

##### 4.2 Temperature Rise

Less than 45 at nominal AC input/ DC output full loading and environment

Temperature 25 +/- 1 on Top /Bottom of plastic case.

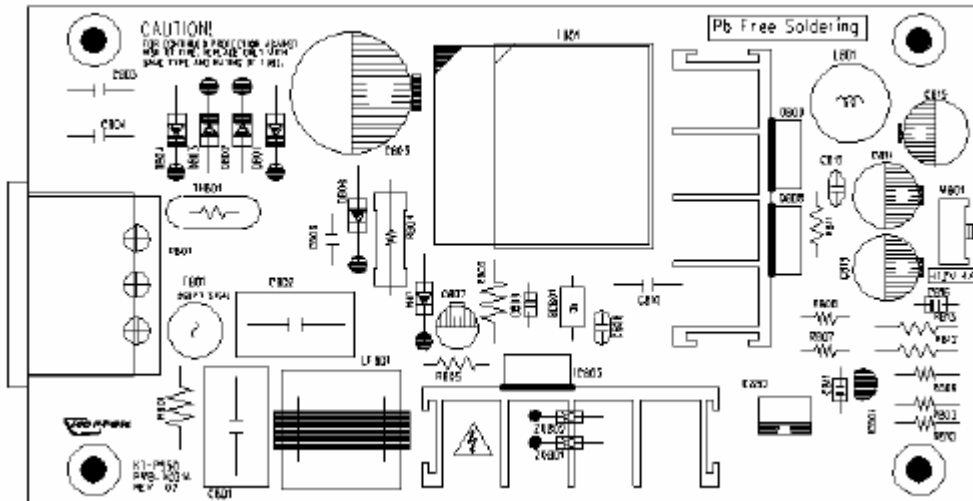
##### 4.3 Burn - in

Burn in with 2~3A loading & 35~45 Environment temperature,

#### 5. Mechanical

##### 5.1 Component Structure

##### 5.1.1. LAYOUT VIEW (TOP VIEW)



##### 5.2 Physical size

L \* W \* H = 145 \* 75 \* 35

## 6. PART LIST

No.	Loc.No.	Description	Vendor	Q'ty
	PCB	PWB-A031A REV:01=>02 (CEM-1 75*145*1.6t )	Nuri circuit, Han Kook PCB, S &tech	1
1	R810,R803	R CFR 1/6W 1KJ	SMART/Jeil elect, Jae young elect, DHO elect	2
2	R807	R CFR 1/6W 100KJ		1
3	R808	R CFR 1/6W 15KF		1
4	R809	R CFR 1/6W 51KF		1
5	R801	R CFR 1/2W1MJ		1
6	R812	R CFR 1/4W 821J		1
7	R805	R CFR 1/4W 10J		1
8	R802	R CFR 1/2W 75KJ		1
9	C811	CC 50V 104Z Axail	TAIYO YUDEN	1
10	C809	CC 50V 224Z Axail	TAIYO YUDEN	1
11	ZD801	DIODE ZENER 12V	ROHM/DELTA	1
12	ZD802	DIODE ZENER 22V	ROHM/DELTA	1
13	D806 ,D807	DIODE 1N4937GP	PCTRONIX/DIODES/GS/KI/ROHM/DELTA	2
14	C806	CC CK2HYB472K	NETTRON/Dong il elect/Dae Myung elect	1
15	C815	EC 16V 470UF TP 8*11.5 105	SAM WHA/SAM YOUNG/ RUBYCON	1
16	C807	EC 50V 47UF TP 6.3*11 105	SAM WHA/SAM YOUNG/ RUBYCON	1
17	IC804	IC KA431A ZTA/KIA431	FAIRCHILD/KEC	1
18	F801	FUSE SR-5 3.15A 250V	Save fuse tech/LITTLE	1
19	TH801	DSC 5D-9 TP	DSC	1
20	D801,D802D803,D804	DIODE 2A05 /RL205/2A07	DIODES/Vishay/DELTA	4
21	BC801	B-Core BAS3550T1	BO SUNG/SAM WHA	1
22	R804	R MOS 2W 56KJ LF20mm	SMART/Jeil elect/ JAE Young elect/DHO elect	1
23	C813 C814	EC 25V 1000UF TP 10*20105	SAM WHA/SAM YOUNG/RUBYCON	2
24	C805	EC 400V 68M 105	SAM WHA/SAM YOUNG/ RUBYCON	1

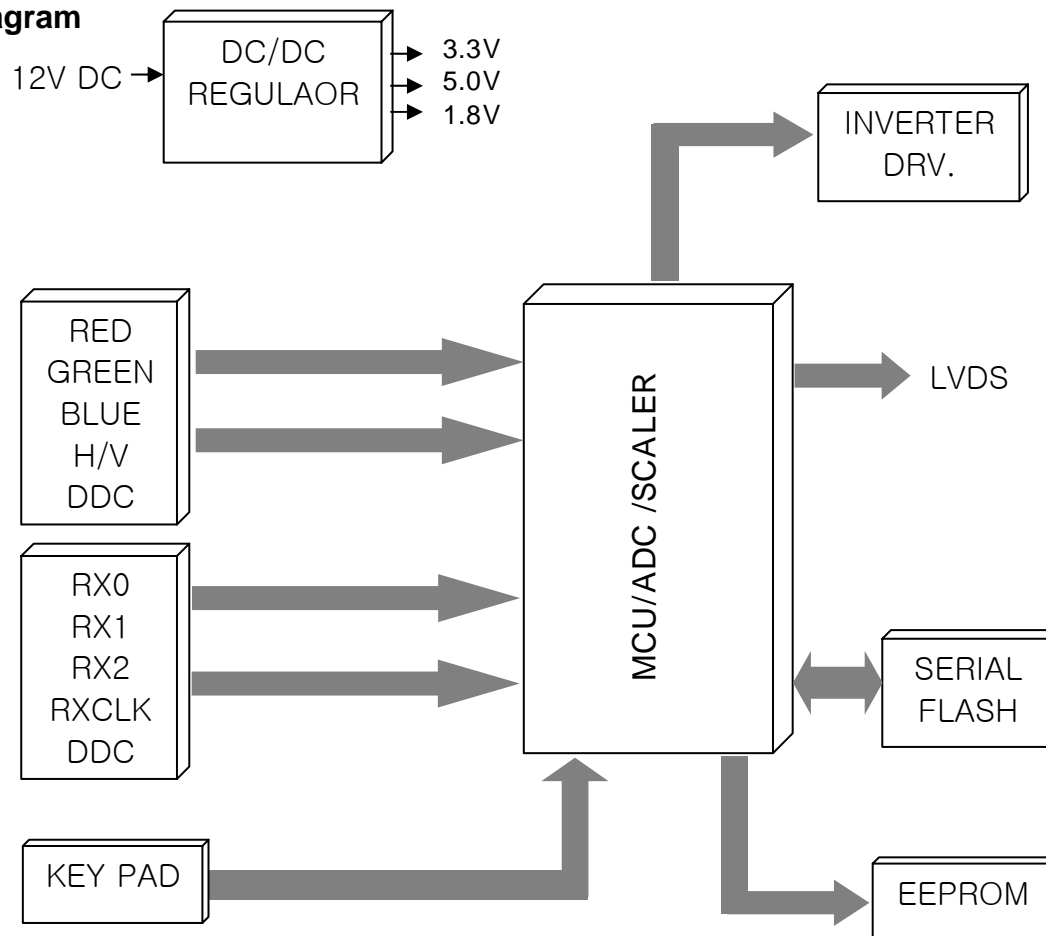
25	C801 C802	PC MPE 275V 224 M RTP	FILKOR /CARLI	2
26	C803 C804,C810	CC 250VAD102M(Y1)/DA2EYE102M	NETTRON/Dong-il elect	3
27	IC852	IC PHOTO COUPLER H11A817B/LTV817B	FAIRCHILD/LITE - ON/EVERLITE	1
28	L801	COIL AD -8002 (2.9uH Bar CHOKE)	KOREA COIL ENGINEERING	1
29	T801	TRANS AP1520	KOREA COIL ENGINEERING	1
30	LF801	FILTER LINE AD -3501	KOREA COIL ENGINEERING	1
31	P801	IN LET SOCKET SS -120 Gap 1.5mm&2mm + inlet Shield Bracket Add	Rongpeng Adview	1
32	W801	SMW200 -04	Yeon -Ho	1
33	HEAT SINK	27x45 , HEAT SINK , N1(HOLE 1EA)	Yu - one	1
34	HEAT SINK	27x45 , HEAT SINK , N2(HOLE 2EA)	Yu - one	1
35	D808,D809	DIODE MBR20H100CTG (100V 20A) FCH20U10	Vishay//DELTA	2
36	IC803	FSDM07652RTCYDT	FAIRCHILD	1
37		Bar code	Ace system	1
38	FG Wire	FG WIRE 1015 #18 110mm	Samwan elect	1

# MAIN KEY PARTS SPECIFICATION

- IMAGE BOARD : LOTUS / KEYPAD
- INVERTER : FIF2064
- MODULE ASSAY : Panel

## 1) LOTUS (10+31090003C)

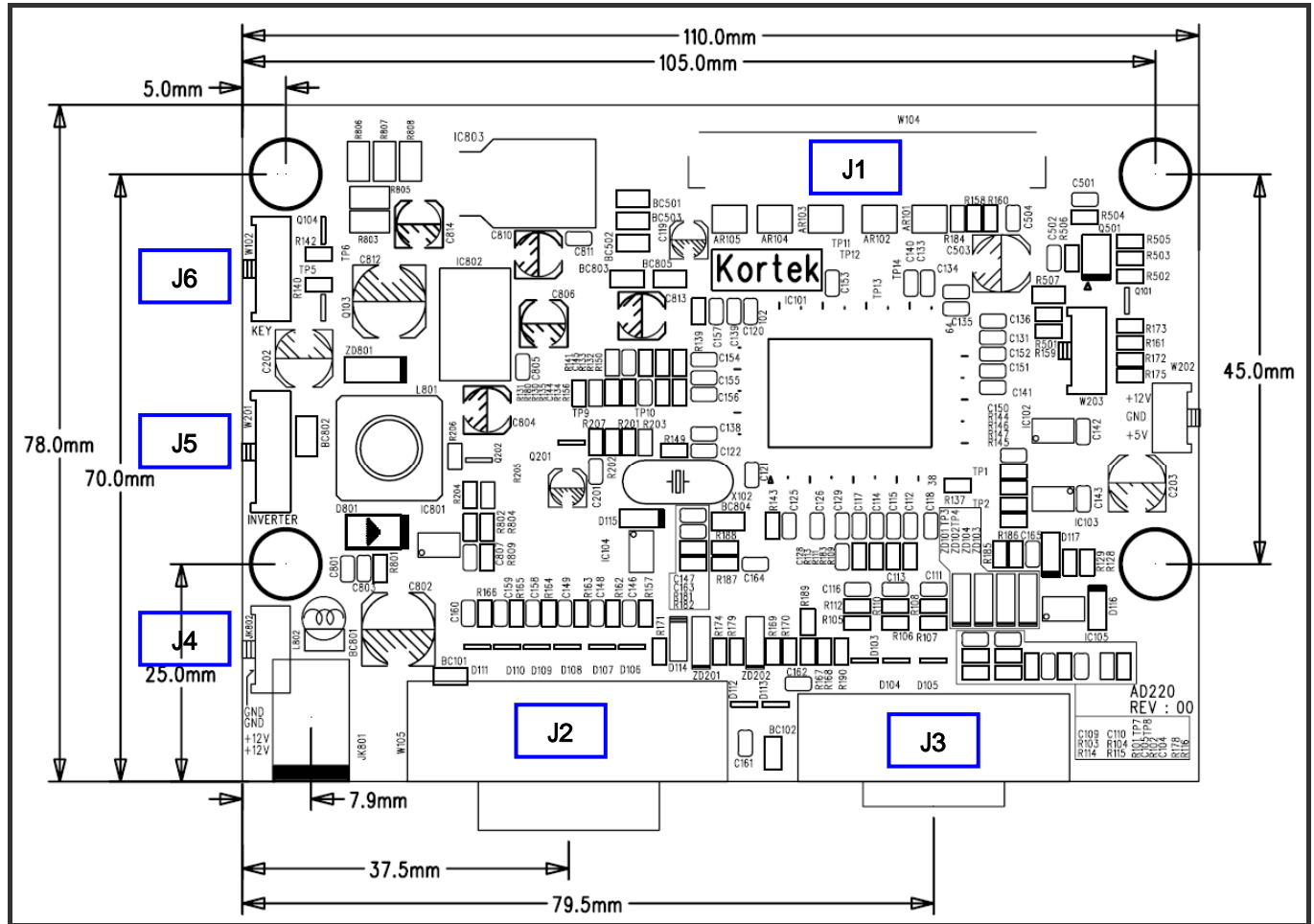
### ■ Block Diagram



■ 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)

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1,2	GND	GND	3,4	Vin	+12Vdc

### ◆ 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

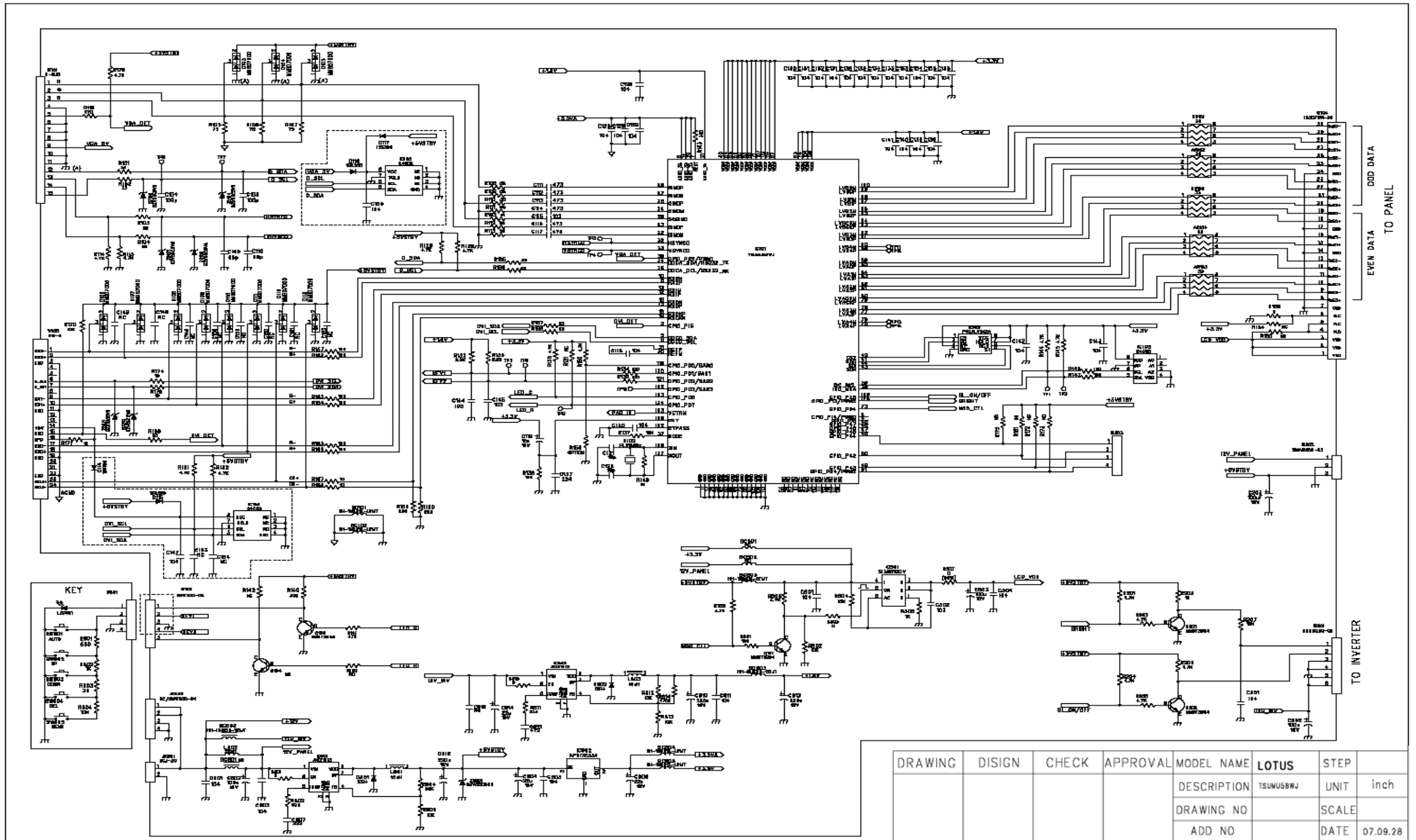
## ■ FEATURES

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

## ■ ELECTRICAL PARAMETERS

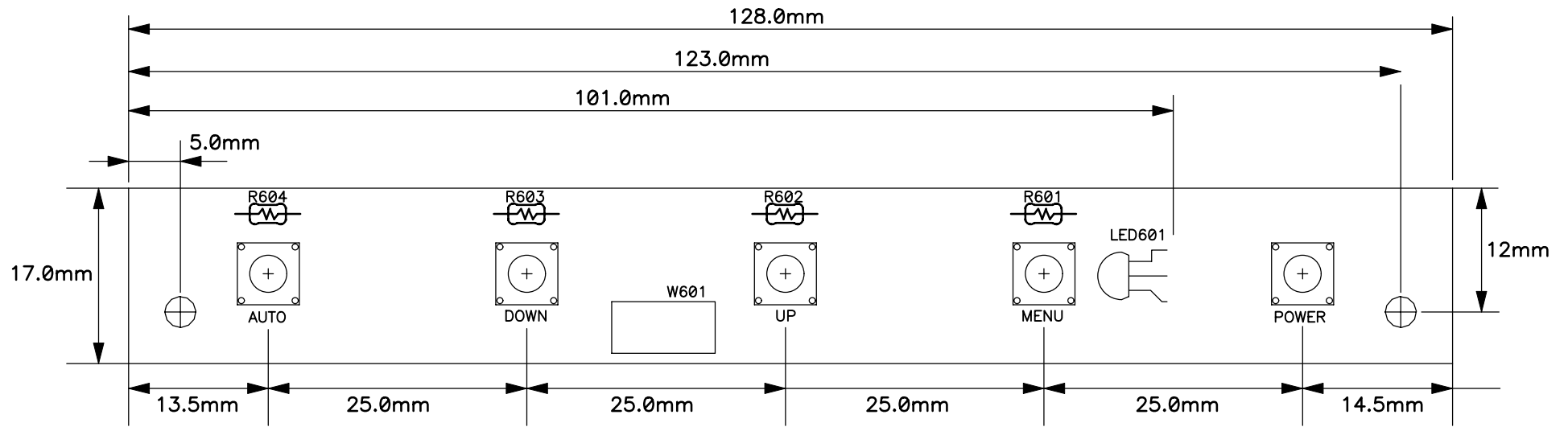
Symbol	Description	Min.	Typ.	Max.	Unit
Vdd	+12Vdc power supply	11.4	12	12.6	V
V <sub>I(R,G,B)</sub>	Video input signal	0.5	0.7	1.0	Vpp
f <sub>s</sub>	Input Video sample rate			205	MHz
f <sub>HS</sub>	Horizontal sync frequency	30		110	kHz
f <sub>VS</sub>	Vertical sync frequency	55		75	Hz
F <sub>SIH</sub>	Sync. input high level	2.5		5	Vdc
V <sub>SIL</sub>	Sync. input low level	0		0.8	Vdc
I <sub>DD2</sub>	Supply current +12V (with LCD)		3.0	3.5	A

■ SCHEMATIC

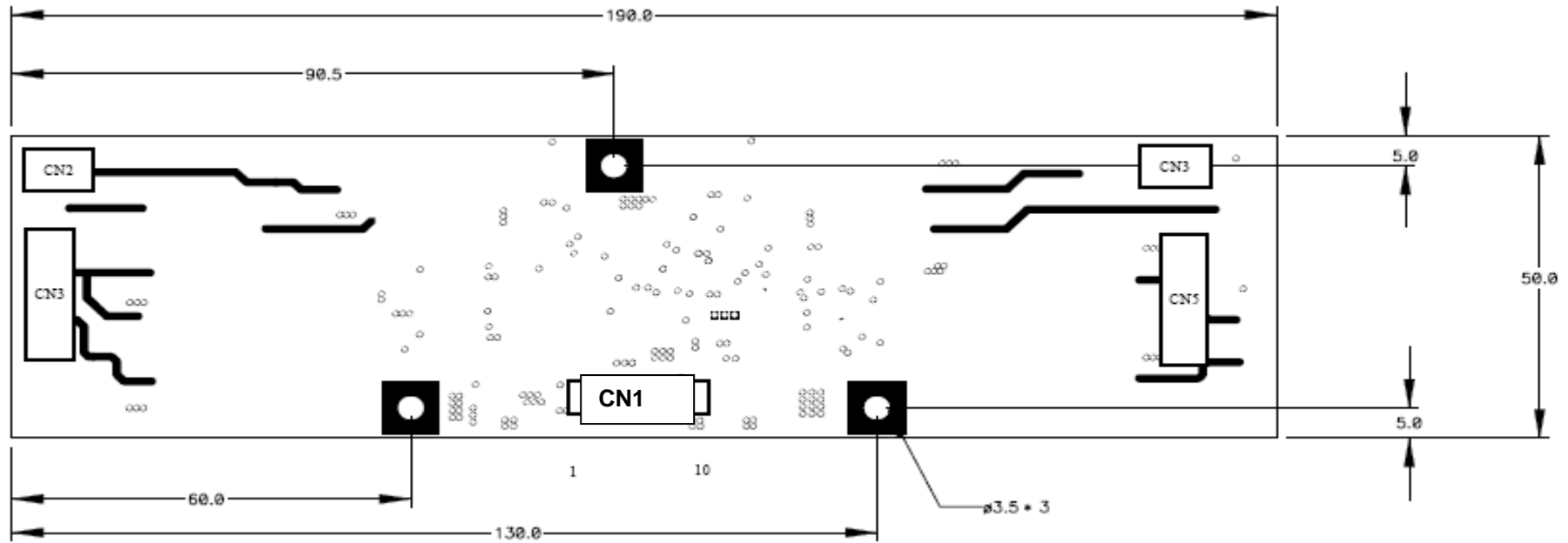


## 2) KEYPAD (07+112209100)

### PCB Dimension



3) INVERTER : FIF2064 (10+410900006)  
1. Dimension



## 2. Pin Assign

### ■ CONNECTOR (CN1) : 12505WR-10A00 (YEON-HO S/N)

PIN NO.	SYMBOL	REMARK
1	DIM	Dim Adjust 0V~3V
3,4,7,8	GND	Power System Return.
5	ON/OFF	Power System Return(5V:On, 0V:Off)
2	NC	
6,9,10	Vin	Input Voltage : 11V~13V

### ■ Absolute Maximum Ratings

ITEM	SYMBOL	SPEC	UNIT	REMARKS
INPUT VOLTAGE1	Vin1	11~13	V	
OPERATING TEMPERATURE	Top	0~60	℃	
STORAGE TEMPERATURE	Tstg	-30~80	℃	
RELATIVE HUMIDITY	RH	85	%	

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	12V	3.3V	LAMP	3.0	4.0	5.0	mArms
	IOMIN	12V	0V	LAMP	6.0	7.0	8.0	
INPUT CURRENT	Iin	12V	3.3V	LAMP	-	-	2.2	A
FREQUENCY	F	12V	3.3V	LAMP	47	51	55	KHz

#### 4) TFT-LCD (54+320ASS000)

##### ■ General Information(LCD Panel)

Item	Specification	Unit	Note
Pixel Pitch	0.258(H) x 0.258(V)	mm	
Active Area	433.44(H) x 270.9(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)	458.9	459.4	459.9	mm	w/o Inveter ass'y
	Vertical (V)	295.9	296.4	296.9	mm	
	Depth (D)			23.3	mm	
Weight				3,100	g	LCD module only

##### ■ Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	VDD	GND-0.3	13.2	V	Ta= 25 ± 2 °C
Storage temperature	TSTG	-20	65	°C	
Center Glass surface temperature (Operation)	TOPR	0	50	°C	
Shock ( non - operating )	Snop	-	50	G	
Vibration ( non - operating )	Vnop	-	1.5	G	



■ **Optical characteristics**

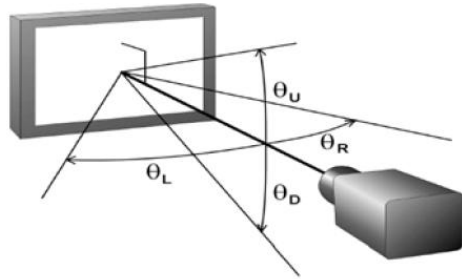
The optical characteristics should be measured in a dark room or equivalent.

Measuring equipment : TOPCON BM-7, SPECTRORADIOMETER SR-3, CA-210

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

Item	Unit	Specification				Notes	
		Min	/	Typical	/		Max
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	-	/	433.44	/	-	Horizontal
		-	/	270.9	/	-	Vertical
Pixel H x V		-	/	1680	/	-	Horizontal
		-	/	1050	/	-	Vertical
Pixel Pitch	mm	-	/	0.258 x 0.258	/	-	
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 <sup>2</sup>	250	/	300	/	-	
White Luminance (with 3M touch sensor)	Cd/m <sup>2</sup>	230	/	275	/	-	Luminance calibration level during assembly after aging process
Brightness uniformity	%	-	/	-	/	25	
Contrast Ratio	C/R	(500)	/	900	/	-	
Response Time	ms	-	/	16	/	25	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	459.90(H) x 296.9(V) x 23.3(D)					Outer module dimensions

■ Viewing Angle



Item	Unit	Specification (Typ)	Notes
$\Theta_R$	°	89	Measured with CR ≥ 10 at centre of active area
$\Theta_L$	°	89	
$\Theta_U$	°	89	
$\Theta_D$	°	89	

Color Chromaticity Coordinates

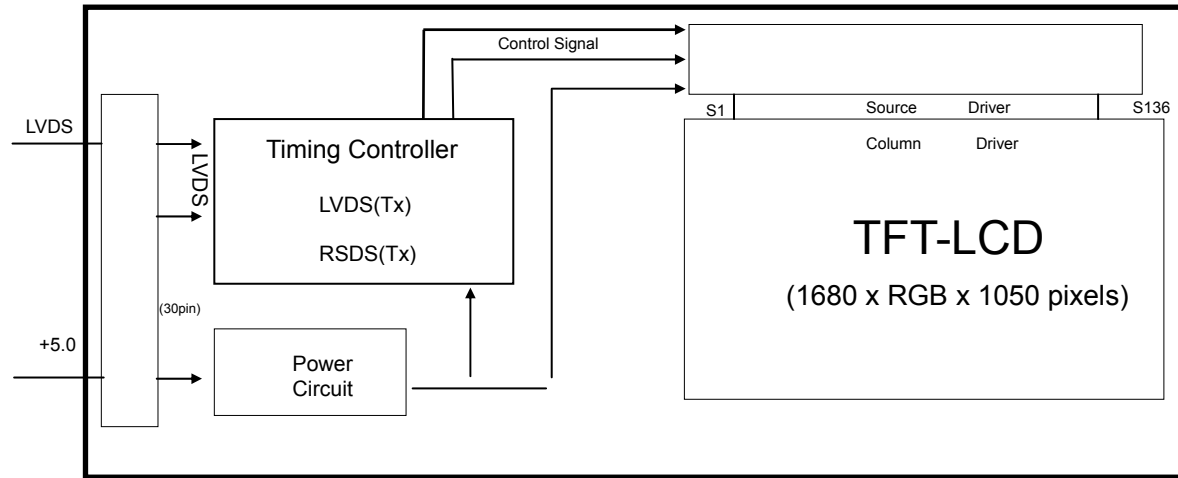
Color Chromaticity	x	y
White	0.31	0.32
Red	0.64	0.33
Green	0.29	0.60
Blue	0.15	0.06

X, Y (CIE 1931) – typical values (Tolerance:  $x \pm 0.03$  ,  $y \pm 0.03$ )

■ LVDS Pin map

PIN NO	SYMBOL	PIN NO	SYMBOL	PIN NO	SYMBOL	PIN NO	SYMBOL	PIN NO	SYMBOL
1	RX00N	7	GND	13	RXE0P	19	RXE2P	25	NC
2	RX00P	8	RXOC-	14	GND	20	RXEC-	26	NC
3	RX01N	9	RXOC+	15	RXE1N	21	RXEC+	27	NC
4	RX01P	10	RX03N	16	RXE1P	22	RXE3N	28	VDD +12V
5	RX02N	11	RX03P	17	GND	23	RXE3P	29	VDD +12V
6	RX02P	12	RXE0N	18	RXE2N	24	GND	30	VDD +12V

## ■ TFT LCD Module

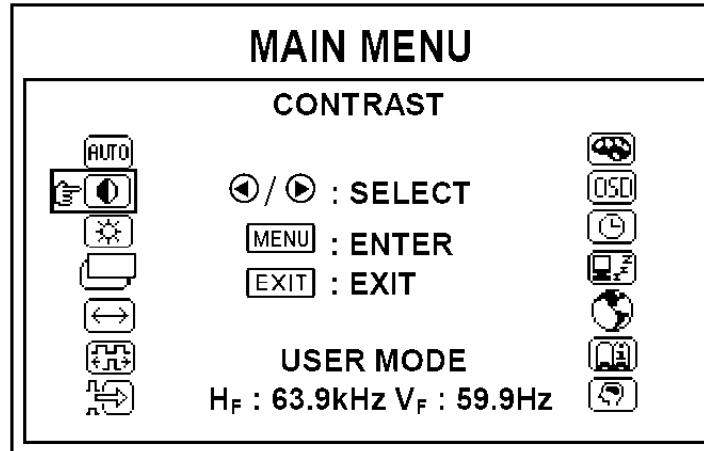


## ■ LCD Driver Board Electrical Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	
Voltage of Power Supply		VDD	10.8	12	13.2	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	-	650	-	mA
	(b) White		-	750	-	mA
	(c) Dot		-	900	1,100	mA
Vsync Frequency	fV	56.5	60	63	Hz	
Hsync Frequency	fH	61.56	64.80	68.04	kHz	
Main Frequency	fDCLK	56.5	59.5	62.5	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 expand 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.

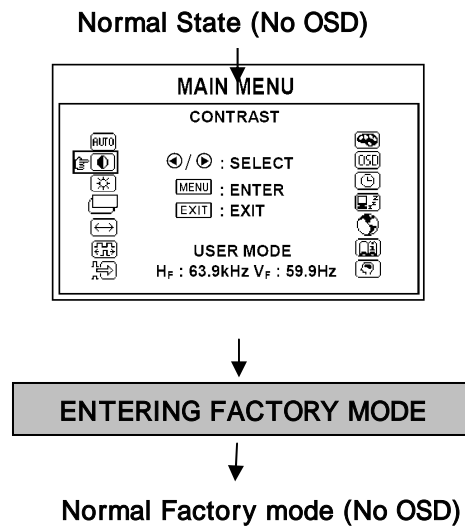
Exit Menu items by SEL(EXIT) key

# HOW TO SET FACTORY

## ■ Factory Mode LOTUS

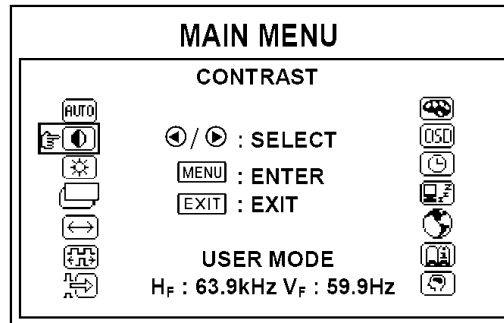
### 1. Go to Factory Mode

- 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**

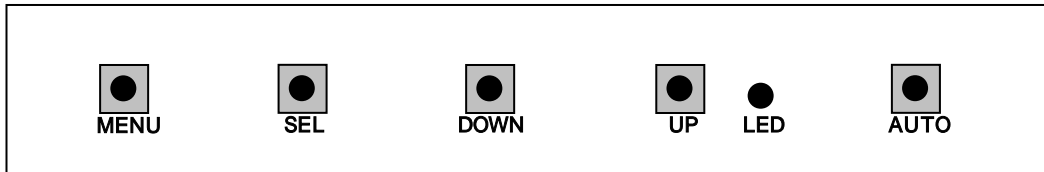
Push a “SEL(EXIT)” Key at the state of factory mode OSD or power off/on.

**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
720X400 <sup>1</sup>	640X480 <sup>1</sup>	640X480 <sup>1</sup>	800X600 <sup>1</sup>	1280X1024 <sup>1</sup>	1680x1050	768X480 <sup>1</sup>	1280x1024	1440X900 <sup>1</sup>	1680x1050

Std Timing Dtl Block1 Dtl Block2

Pixel Clock : 108.0 MHz  
 Resolution : 1280 x 1024  
 None - Interlaced  
 Horizontal Frequency : 64.0 KHz  
 Vertical Frequency : 60.0 Hz  
 Size (H / V) : 474 mm / 296 mm  
 Blanking (H / V) : 408 / 42  
 Sync Offset (H / V) : 48 / 1

Dtl Block1 Dtl Block2 Dtl Block3

Pixel Clock : 106.4 MHz  
 Resolution : 1440 x 900  
 None - Interlaced  
 Horizontal Frequency : 55.9 KHz  
 Vertical Frequency : 60.0 Hz  
 Size (H / V) : 474 mm / 296 mm  
 Blanking (H / V) : 464 / 32  
 Sync Offset (H / V) : 152 / 1

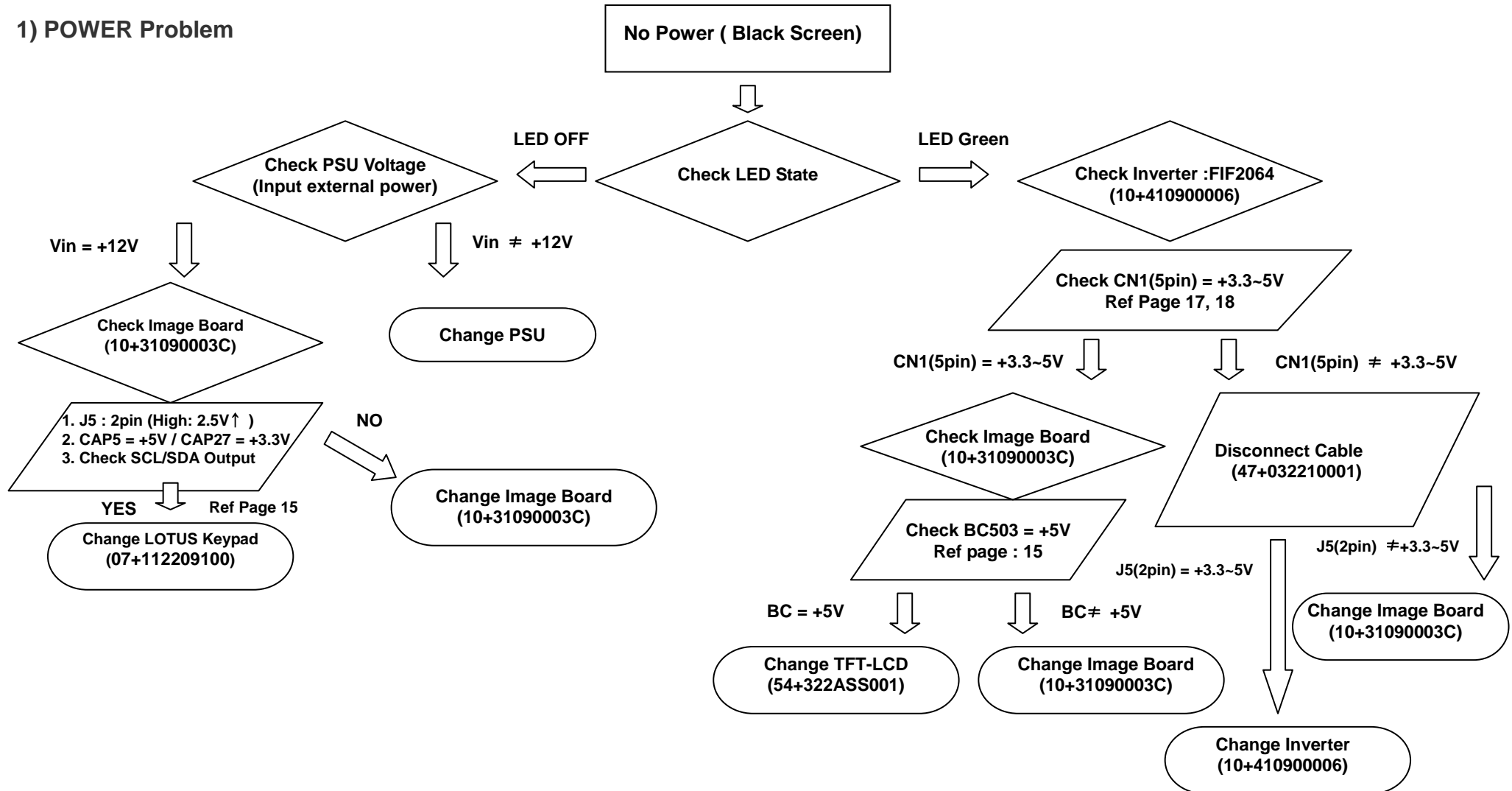
Dtl Block1 Dtl Block2 Dtl Block3

Pixel Clock : 147.0 MHz  
 Resolution : 1680 x 1050  
 None - Interlaced  
 Horizontal Frequency : 65.2 KHz  
 Vertical Frequency : 59.9 Hz  
 Size (H / V) : 474 mm / 296 mm  
 Blanking (H / V) : 576 / 37  
 Sync Offset (H / V) : 104 / 1

# ANALYZE THE CAUSE OF FAILURE

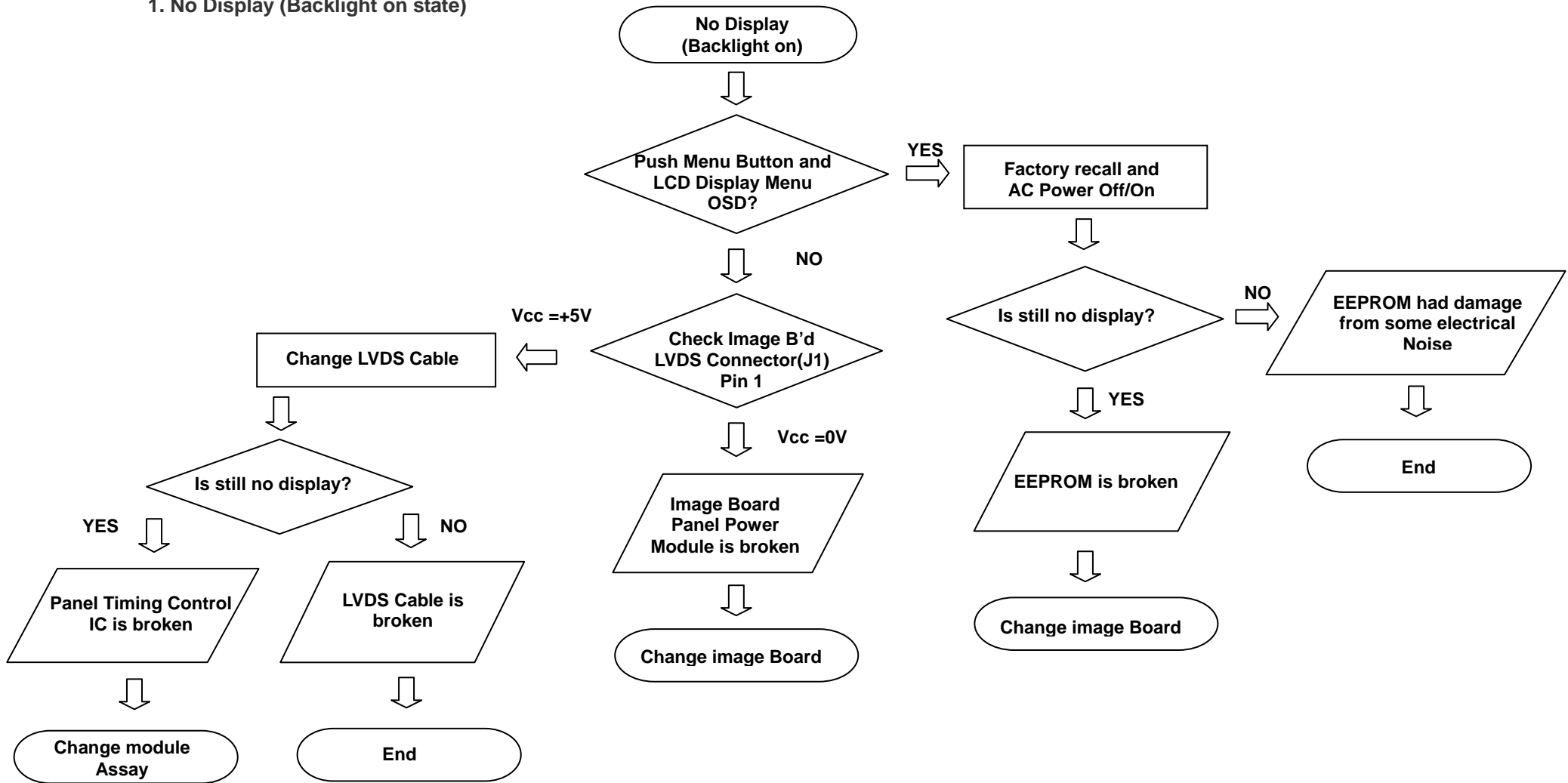
- Debug condition : 1) Resolution : 640x480/60Hz or 800x600/60Hz 2) Test Pattern : 16Gray Scale or Pure R/G/B.

## 1) POWER Problem

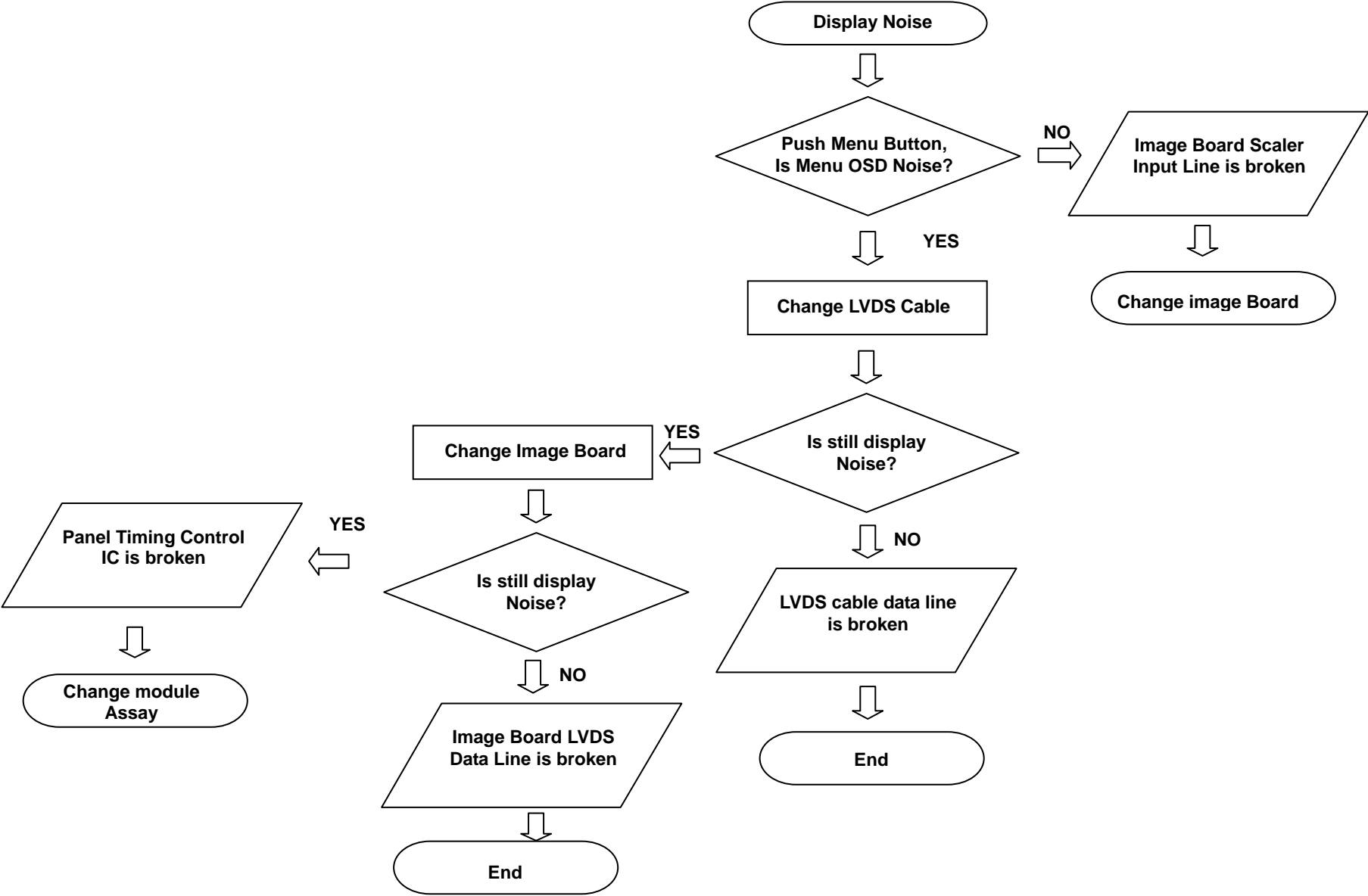


## 2) DISPLAY Problem

### 1. No Display (Backlight on state)



2. Display Noise

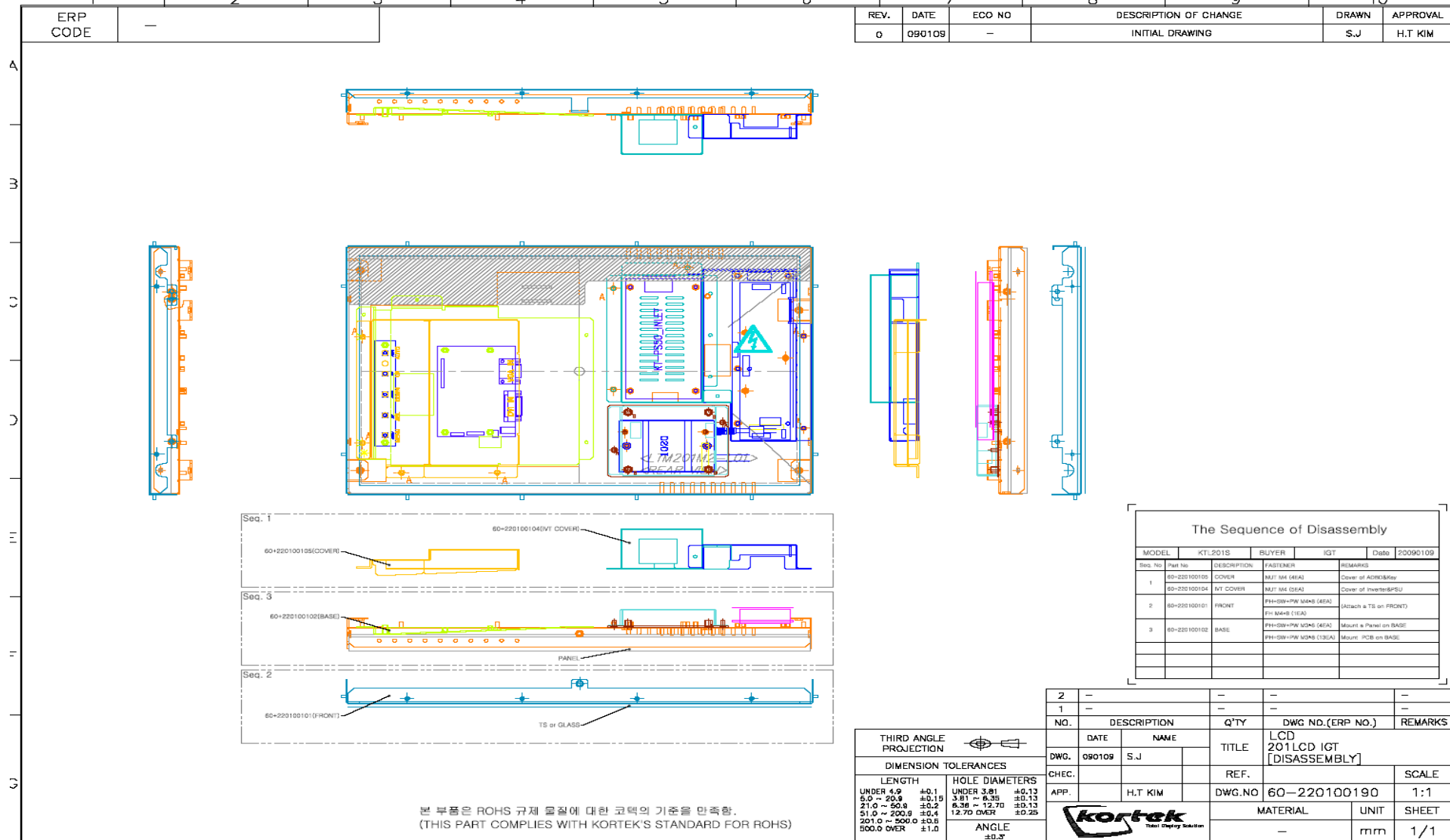


■ TROUBLE SHOOTING

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



KF-D-007(A3)

KORTEK CORPORATION

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