

# SPECIFICATION FOR APPROVAL

(ANALOG RGB AND VIDEO INTERFACE CONTROLLER FOR TFT-LCD  
INTERFACE)

MODEL NO : DCMP-50E

APPROVE	REFERENCE
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(PLEASE RETURN ONE OF THESE TO US IMMEDIATELY WITH YOUR SIGNATURE FOR APPROVAL)

## Content of Specification

<b><u>1.</u></b>	<b><u>Product Overview</u></b> .....	4
<b><u>2.</u></b>	<b><u>Features</u></b> .....	4
<b><u>3.</u></b>	<b><u>System Configuration</u></b> .....	5
<b><u>4.</u></b>	<b><u>Electrical Configuration</u></b> .....	5
4.1.	Video input timing .....	5
4.2.	Electrical Characteristics .....	7
4.3.	Communication Interfaces .....	8
4.3.1.	Remote Control .....	8
4.3.1.1.	Internal connection .....	8
4.3.1.2.	Commands .....	8
4.3.2.	Serial asynchronous Interface .....	10
4.4.	<u>Operational Setup</u> .....	11
<b><u>5.</u></b>	<b><u>OSD</u></b> .....	12
5.1.	Menu Picture .....	12
5.2.	Menu Im. Adj. ....	13
5.3.	Setup .....	14
<b><u>6.</u></b>	<b><u>Input Connectors</u></b> .....	15
6.1.	Power Input connector(J602/ J3) .....	15
6.2.	Analog RGB Input connector .....	15
6.3.	CVBS input connector for Composite Video .....	16
6.4.	S-Video input connector : .....	16
6.5.	OSD, LED Interface Connector() .....	17
<b><u>7.</u></b>	<b><u>Output Connectors for LCD Interface</u></b> .....	17
7.1.	TTL interface() .....	17
7.2.	LVDS Interface(J7) .....	18
7.3.	Backlight Power Connector(J502) Connector : 53015-0710 made by Molex .....	18
<b><u>8.</u></b>	<b><u>Mechanical Dimension</u></b> .....	19

<b><u>9.</u></b>	<b><u>Reliability</u></b> .....	20
<b><u>10.</u></b>	<b><u>Absolute maximum ratings</u></b> .....	20
<b><u>11.</u></b>	<b><u>Mounting rules</u></b> .....	20
<b><u>12.</u></b>	<b><u>Operating Precautions</u></b> .....	20
<b><u>13.</u></b>	<b><u>Packing / Labels</u></b> .....	21
<b><u>14.</u></b>	<b><u>General Cautions</u></b> .....	22

## **1. Product Overview**

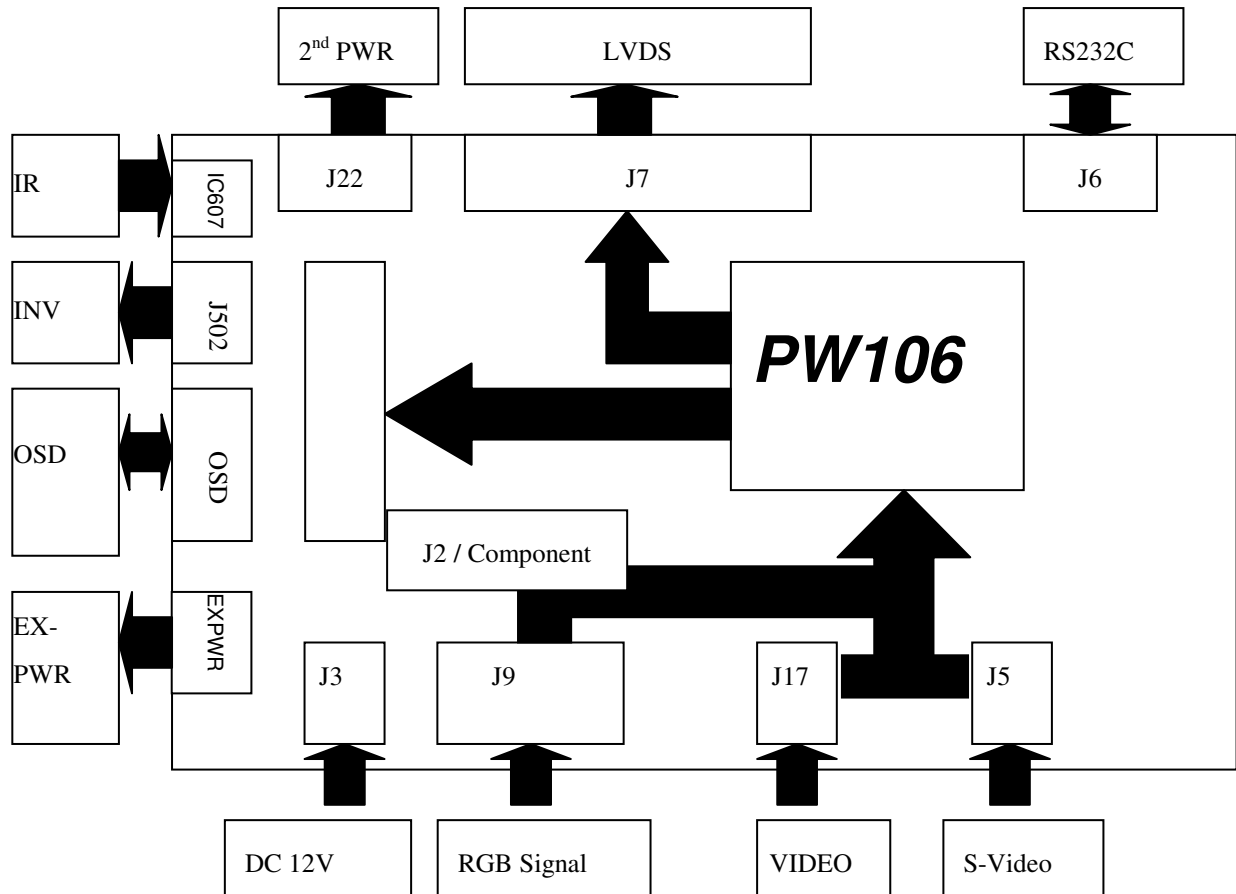
This board accepts standard analog RGB and SYNC(CRT like) signals from any VGA to WUXGA video controller and/or Composite PAL or NTSC signal. And also generates all the necessary control signals and the panel data to drive TFT-LCDs. This board supports to UXGA resolutions at vertical refresh rate up to 85Hz(UXGA is up to 75Hz). Lower resolution modes can be expanded to full-screen or centered through the On-Screen Menu user interface. The user interface includes Phase, Brightness, Contrast, Horizontal and Vertical Position adjustment etc. via on-screen programming.

## **2. Features**

- Support up to UXGA 1600x1200 (1920x1200) resolution.
- Automatic Mode detection from VGA to WUXGA VESA Standard analog display.
- Accept H-/V-Separate Sync, CSynC, Sync On Green, and Interlace mode
- Support Standard Component signals ( YCbCr and YPbPr. 480i, 480P, 720P, 1080i, 1080P).
- Provides up to 1600k Colors.
- Flicker-free, sharp image/text data.
- Refresh rates up to 85Hz without external video memory.
- Full screen image expansion or centered-mode display for lower resolutions.
- User friendly On Screen Display Menu to control image
  - Auto-Adjust
  - Brightness by inverter
  - Brightness by signal
  - Contrast
  - RGB Control
  - Clock Phase
  - Geometry
  - Input Type Select
  - OSD Control
  - Default-Settings
- Power management support(DPMS - VESA compliant)
- VESA-DDC1/2B display ID for Plug and Play Operation (Option)

### 3. System Configuration

● Figure 1. System Block Diagram



### 4. Electrical Configuration

#### 4.1. Video input timing

- Supported vertical refresh rates for each modes are as follow:
  - 320x240            50~70ZHz and interlaced
  - 640x350           70Hz
  - 640x400           70Hz
  - 720x400           70Hz
  - 720x576           56~85Hz and interlaced
  - 640x480           56~85Hz
  - 800x480           56~85Hz

- 800x600 56~85Hz
- 1024x768 56~85Hz
- 1152x864 56~75Hz
- 1280x768 56~75Hz
- 1280x800 56~75Hz
- 1280x1024 56~75Hz
- 1360x768 56~75Hz
- 1366x768 56~75Hz
- 1440x900 56~75Hz
- 1400x1050 56~75Hz
- 1680x1050 60Hz
- 1600x1200 60Hz
- (1920x1200 30Hz, interlaced)
  
- DCMP-5C series  
Additional input formats
  - S-Video
  - NTSC
  - PAL-M 59.939 Hz
  - PAL-60 59.939 Hz
  - AL-B,D,G,H 50 Hz
  - PAL-N 50 Hz
  - PAL-NC 50 Hz
  - SECAM 50 Hz
  
- Synchronisation
  - H/V Separate, Composite Sync, Sync On Green, Interlaced
  
- Video signal level
  - RGB Analog(75 Ohm, 0.7Vp-p)
  - Special Option:  
Component input

## 4.2. Electrical Characteristics

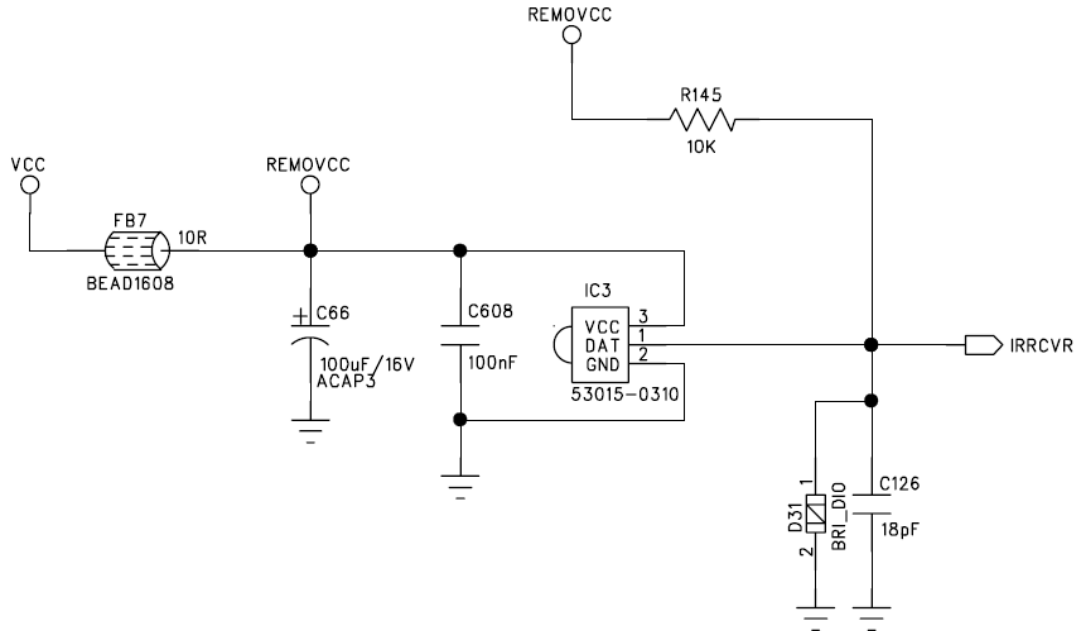
Item	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Supply Voltage		-----	9.5	12.0	24.7	Vdc
Absolute Max. Rating		-----		12.0	24.7	Vdc
Current Consumption <sup>1</sup>		Board Only	0.40	0.44	0.52	A
		With LM151X04		1.8	2.4	A
In rush current		TFT LCD Panel	2A	~	7A	
Fuse	FU2	5A		5		A
Ext. Power out, J22	2nd PWR	Module PW				
Ext. Power Out, J1	5 V	5 V		5		V
Ext. Power Out, J1	12 V	12 V		12		V
JMP501	R23	24 V Module PW		24		V
	R10	12 V Module PW		12		V
	R8	5 V Module PW		5		V
	R7	3.3 V Module PW		3.3		V
RS232, J12				TTL- Level		

<sup>1</sup> Test was performed with the LG's LCDs and inverters which are made by Frontek Inc

### 4.3. Communication Interfaces

#### 4.3.1. Remote Control

##### 4.3.1.1. Internal connection

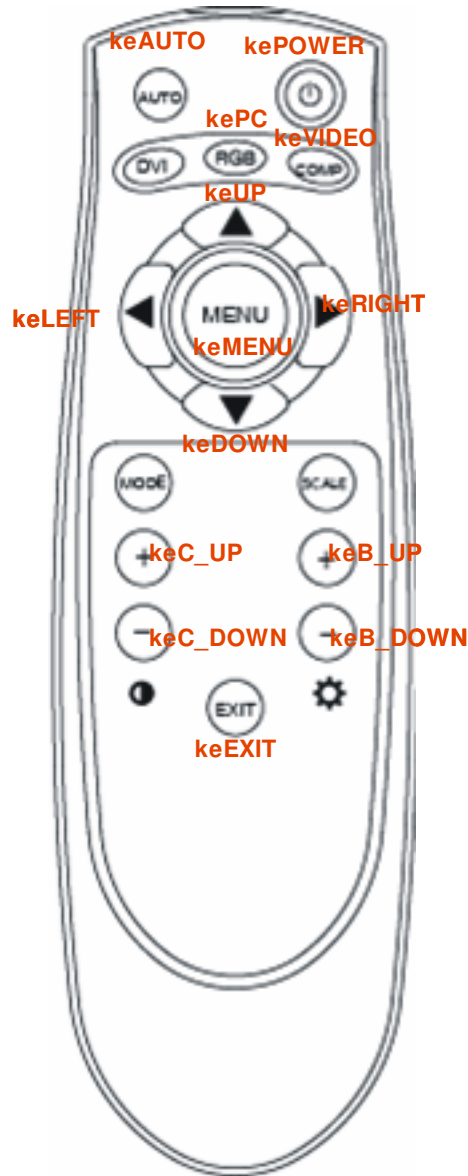


##### 4.3.1.2. Commands

No	Event	Comm. Data
1	keAUTO	BE EF 02 06 00 89 D4 10 00 00 00 00 00
2	kePOWER	BE EF 02 06 00 7F D6 06 00 00 00 00 00
3	kePC	BE EF 02 06 00 62 D7 0B 00 00 00 00 00
4	keVIDEO	BE EF 02 06 00 B3 D6 0A 00 00 00 00 00
5	keUP	BE EF 02 06 00 FB D7 02 00 00 00 00 00
6	keDOWN	BE EF 02 06 00 2A D6 03 00 00 00 00 00
7	keLEFT	BE EF 02 06 00 9D D7 04 00 00 00 00 00
8	keRIGHT	BE EF 02 06 00 4C D6 05 00 00 00 00 00
9	keMENU	BE EF 02 06 00 C8 D7 01 00 00 00 00 00
10	keC_UP	BE EF 02 06 00 97 DE 6E 00 00 00 00 00
11	keC_DOWN	BE EF 02 06 00 46 DF 6F 00 00 00 00 00
12	keB_UP	BE EF 02 06 00 29 DD 70 00 00 00 00 00
13	keB_DOWN	BE EF 02 06 00 F8 DC 71 00 00 00 00 00
14	keEXIT	BE EF 02 06 00 37 D7 0E 00 00 00 00 00



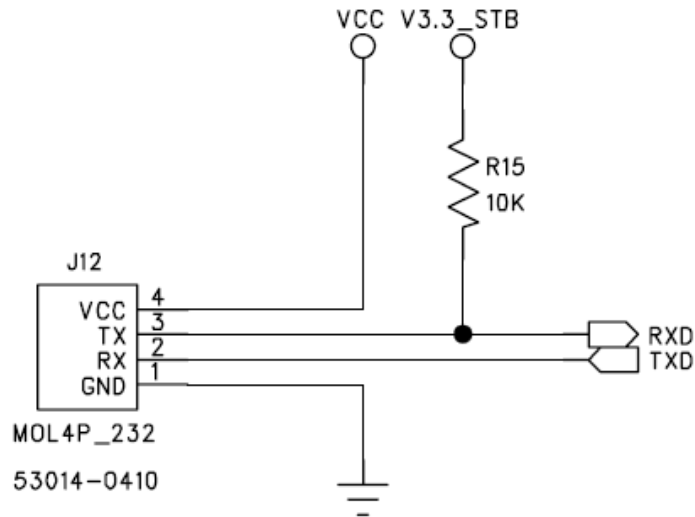
4.3.1.3. Remote control unit



### 4.3.2. Serial asynchronous Interface

#### 4.3.2.1. Signal Level

Low < 0,4 V, High > 2,0V



#### 4.3.2.2. Parameter

1. Data Bits : 8bits
2. Baud Rate : 19200bps
3. Parity Bits : None
4. Stop Bits : 1bit

#### 4.3.2.3. Commands

Similar to remote control command.

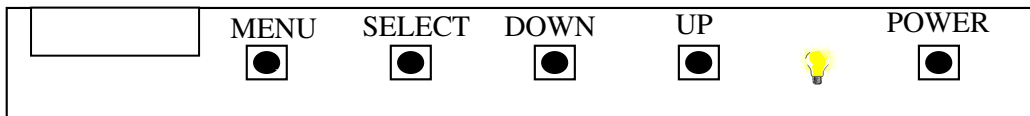
Acknowledge of DCMP-50 for each command is 06H. There is no need to consider the acknowledge.

### 4.4. Operational Setup

Push button switches are provided for fine tuning of various functional Parameters.

Visual feedback is provided in the form of an On-Screen-Menu.

The functionality of these switches are also passed to a header for Connection of remote faceplate-mounted user interface buttons



There are 6 tick switch to control the screen on OSD PCB board And the functions are as follows ;

<Table 1> Function of each OSD key

No.	Button name	Switch Function
1	Menu	1. First click : Appears the OSD Main Menu 2. Second click : Change the value of OSD sub-menu to be able to control (toggle key)
2	Select	1. Move between main menu 2. Move between sub-menu inside main-menu
3	Power	1. put on a power, put off a power
4	Up	1. The adjustment of sub-menu value inside main-menu (Selected value increase)
5	Down	1. The adjustment of sub-menu value inside main-menu (Selected value decrease)

◆ Hot key : One touch control

- Auto adjust : **“down” key**
- Source change(analog RGB, Composite Video, S-Video) : **“up” key**
- Contrast, Brightness **“select” key**

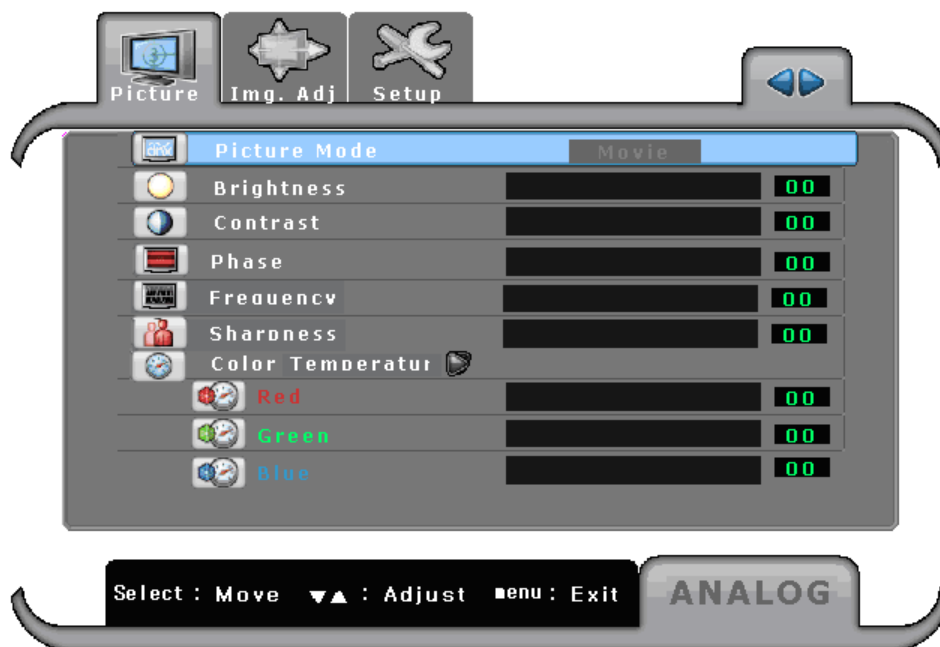
## 5. OSD

If buttons remain untouched for seconds while displaying a menu, the firmware shall save the current adjustments and exit. Menu Key is used for menu display and to be able to change sub-menu while OSD On.

Select Key is used for down shifting main-menu and sub-menu while OSD On. Auto key is used for making a screen the most suitable state.

Power key is used for power on or power off. Up and Down key is used for changing value, increase

### 5.1. Menu Picture



Picture mode : automatic picture settings

Brightness : Adjust to brighten or darken the picture

Contrast : The contrast control determines the white level of the picture

Phase : Fine tuning the screen even though it is not easily distinguishable with naked eyes

Frequency : Fine tuning the screen even though it is not easily distinguishable with naked eyes

Sharpness : Adjust the sharpness of picture

Color Temperature : Adjust the color temperature.(Adjust the value of red,green and blue)

## 5.2. Menue Im. Adj.



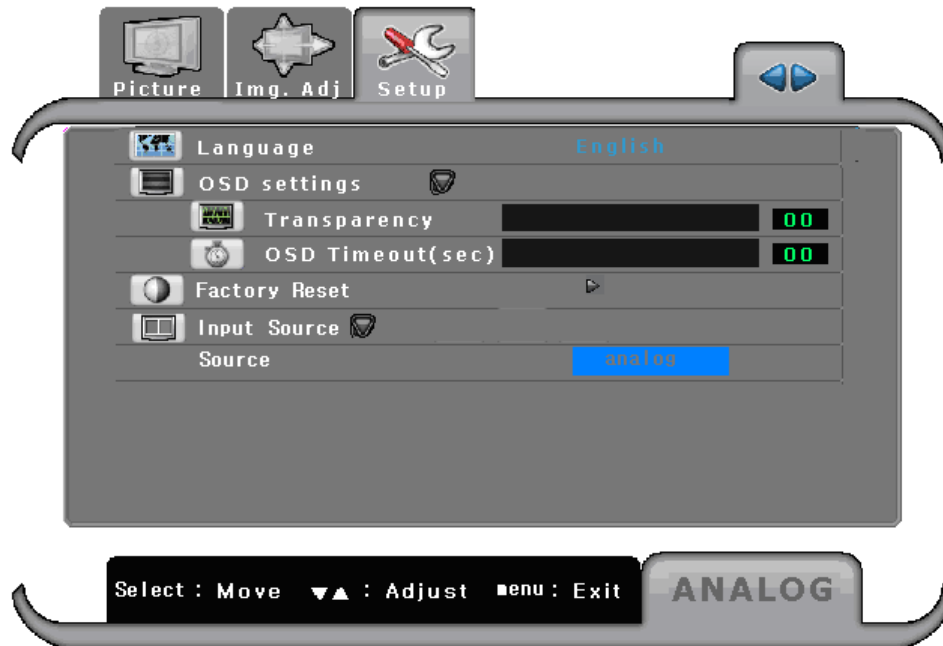
Image size : Resize the input screen image and display

H position : Move the entire screen to the left or right

V position : Move the entire screen to below or upper

Auto : It adjusts automatic adjustment of window position and phase, frequency In ARGB Mode

### 5.3.Setup



Language : OSD language and appearance can be changed

OSD settings

Transparency : Change the transparent(or opaque) status of the background of the OSD

OSD Timeout(sec) : The OSD will automatically tun off if no adjustment are made for a certain time

Factory Reset : Go to all of setting values to Factory Reset values.

Input Source

Source : Analog, C-video, S-video

## 6. Input Connectors

### 6.1. Power Input connector(J602/ J3)

- Connector : DC Jack(J602)

Pin No.	Symbol	Description
1	Vin	+12~24Vdc
2	GND	GND

- Connector : DJ08-4-p 4pin DC Jack(J3) -> Option

Pin No.	Symbol	Description
1	Vin	+12~24Vdc
2	GND	GND
3	Vin	+12~24Vdc
4	GND	GND

### 6.2. Analog RGB Input connector

- Connector : Mini D\_Sub 15pin (J9)

Pin	Symbol	Signal Name	Pin No.	Symbol	Signal Name
1	RED	Analog Red	9	+5V	+5Vdc
2	GREEN	Analog Green	10	SGND	Sync GND
3	BLUE	Analog Blue	11	ID0	Reserved
4	ID2	Reserved	12	SDA	DDC Serial Data
5	GND	Digital GND	13	HSYNC	Horizontal Sync
6	RGND	Red Return	14	VSYNC	Vertical Sync.
7	GGND	Green Return	15	SCL	DDC Data Clock
8	BGND	Blue Return			

- Connector : Right Angle 2mm pitch CN 13 pin (J6) -> Option

Pin	Symbol	Signal Name	Pin No.	Symbol	Signal Name
1	HSYNC	Horizontal Sync	8	GND	Ground
2	GND	Ground	9	RED	Analog Red
3	VSYNC	Vertical Sync	10	GND	Ground

4	NC	Not Connection	11	SCL	DDC Data Clock
5	BLUE	Analog Blue	12	SDA	DDC Data
6	GND	Ground	13	DET	Dsub cable detect
7	GREEN	Analog Green			

### 6.3. CVBS input connector for Composite Video

- RCA Jack (J4)

Pin No.	Symbol	Description
1	CVBS	Composite video signal
2	GND	GND

### 6.4. S-Video input connector :

- DIN4P (J5)

Pin No.	Symbol	Signal Name
1	GND1	GND1
2	GND2	GND2
3	S-VIDEO	LUMINANCE
4	S-VIDEO	COLOR
5	GND3	GND3



## 6.5. OSD, LED Interface Connector

- Connector : 53015-1010 made by Molex

Pin No.	Symbol	Description
1	Menu On/Off	OSD Menu control
2	MENUSEL	OSD menu selection
3	NC	No Connection
4	MENU UP	Increase
5	Menu Down	Decrease
6	LED	Red LED
7	NC	No Connection
8	LED	Green LED
9	GND	Ground
10	Power	On/Off

## 7. Output Connectors for LCD Interface

### 7.1. TTL interface()

- Dip 32 pin / 2mm pitch

No	Description	No	Description
1	GND 0	2	CLOCK
3	GND 1	4	HSYNC
5	VSYNC	6	GND 2
7	R0	8	R1
9	R2	10	R3
11	R4	12	R5
13	GND 3	14	G0
15	G1	16	G2
17	G3	18	G4
19	G5	20	GND 4
21	B0	22	B1
23	B2	24	B3
25	B4	26	B5
27	GND 5	28	DE
29	GND 6	30	Vcc
31	Vcc	32	Vcc

## 7.2. LVDS Interface(J7)

- Yeonho 12507WR-30 / 1.25mm Pitch / 30Pin

Pin No.	Description	Pin No.	Description	Pin No.	Description
1	VCC	11	F R1-	21	S R0+
2	VCC	12	F R1+	22	S R1-
3	VCC	13	F R2-	23	S R1+
4	VCC	14	F R2+	24	S R2-
5	ODE	15	F RCLK-	25	S R2+
6	GND	16	F RCLK+	26	S RCLK-
7	GND	17	F R3-	27	S RCLK+
8	GND	18	F R3+	28	S R3-
9	F R0-	19	GND	29	S R3+
10	F R0+	20	S R0-	30	GND

## 7.3. Backlight Power Connector(J502)

Connector : 53015-0710 made by Molex

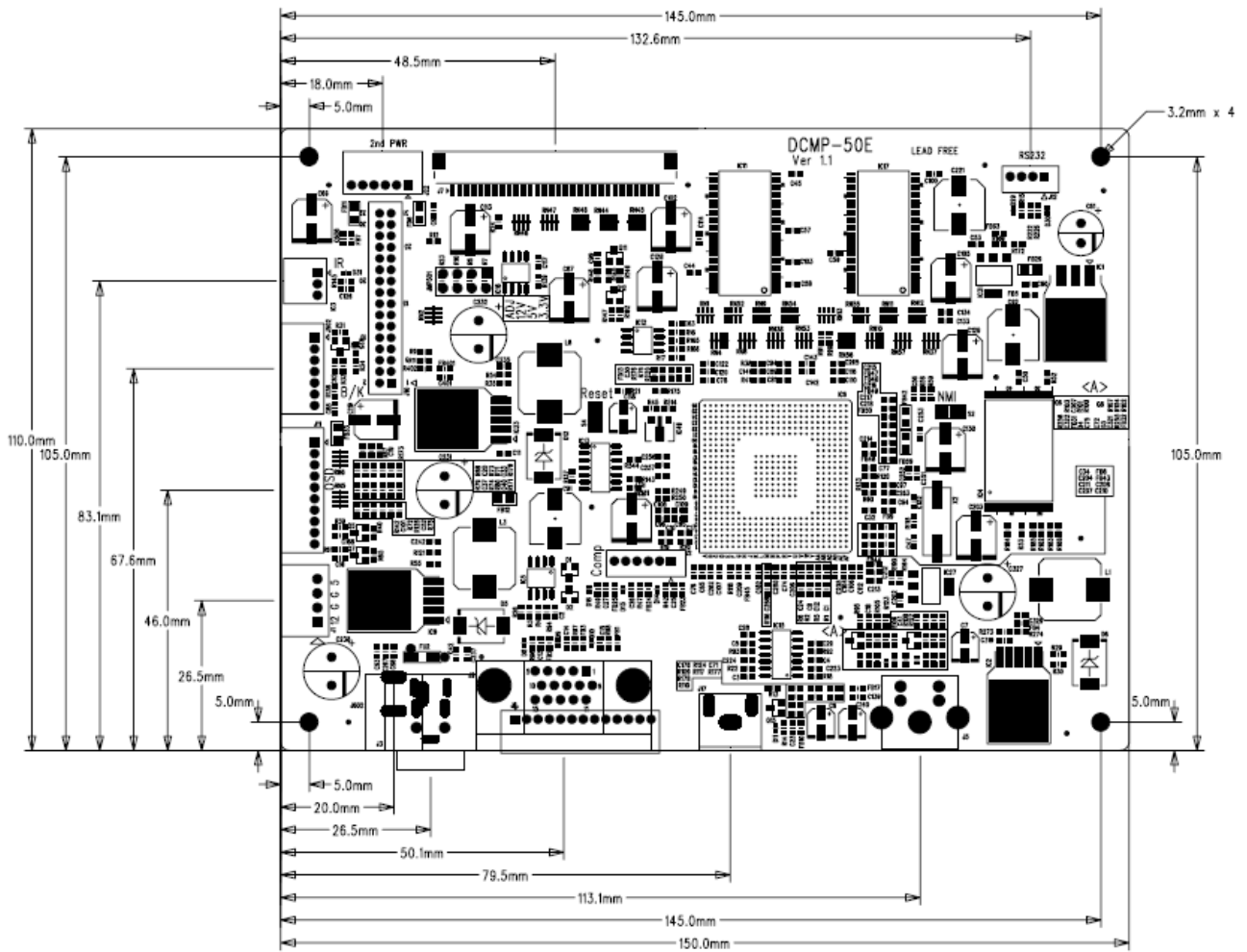
Pin No.	Symbol	Description
1	GND	Ground
2	GND	Ground
3	GND	Ground
4	Vbr	0.0 ~ 3.5Vdc
5	On/Off	0/5Vdc(High Active)
6	Vin	+12~24Vdc Input
7	Vin	+12~24Vdc Input

## 7.4. EX-Power Output (J1)

Connector : 0022057045 made by Molex, matching connector Molex 0050375043

Pin No.	Symbol	Description
1	12	DC 12V
2	GND	Ground
3	GND	Ground
4	5	DC 5V

### 8. Mechanical Dimension



## **9. Reliability**

Test item	Condition
High temperature storage test	+70°
Low temperature storage test	-20°
High temperature operation test	+60°
Low temperature operation test	-10°
Vibration test	
Shock test	
Altitude test	
Humidity test	

## **10. Absolute maximum ratings**

Test item	Condition
High temperature storage	+70°
Low temperature storage	-20°
High temperature operation	+60°
Low temperature operation <sup>2</sup>	-10°

## **11. Mounting rules**

- You must mount a module using holes arranged in four corners.
- Avoid any bend force during mounting

## **12. Operating Precautions**

- The spike noise causes the mis-operation of circuits. It should be lower than following voltage :  $V = \pm 200\text{mV}$  (Over and under shoot voltage)
- Be careful for condensation at sudden temperature change. Condensation makes damage to electrical contacted parts.
- Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimized the interference

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<sup>2</sup> Phase shift or clock shift can appear between -10°C and 0°C

### **13. Packing / Labels**

Tbd.

## **14. General Cautions**

- Never touch the inverter(dc-ac) while power is connected. Inverter should be properly mounted in the system. All transformers on the inverter should be covered with non-conductive heat-resistant material. Inverter is a source of very high voltages. Precaution must be taken to avoid electrical shocks.
- When preparing a cable for a specific flat panel, always refer to appropriate cable pin-out and flat panel specification. Always check the flat panel signals before connecting the cable. Any incorrect pin connection may damage the flat panel permanently.
- Should you need any technical help, please contact Beck GmbH & Co. Elektronik Bauelemente KG