

PB-FREE

SPECIFICATION FOR APPROVAL

(FOR LCD MNT A/D BOARD APPLICATION PURPOSE)

TFT LCD A/D BOARD

PART NO. K-1800

BUYER'S PART NO. :

APPROVED	REFERENCE

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Technical Reference

**WUXGA MONITOR
FOR TFT LCD**

Model : K-1800

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1. Description

The K-1800 board from Kangjin is an interface board for TFT LCD panel providing high quality of screen image from the analog RGB, DVI, HDMI from various type of graphics card.

This board supports from VGA to WUXGA resolution at the maximum vertical refresh rate of 75Hz with full screen image expansion.

2. General Features

- Panel Support:
 - VGA, SVGA, XGA & SXGA then WUXGA resolution TFT LCD panels
 - TFT LCD Panels from LG-Philips, Samsung, BOE-Hydis, AUO, Sharp etc.
 - Up to 225M color
 - LVDS type panel interface (8-bit)

 - Input Signal:
 - All VESA standard input with clear image
 - Refresh rate from 56Hz up to 75Hz.
 - Automatic video standard detection
 - High display quality of expanded image from the lower resolution input
 - Digital Visual Interface(DVI)
 - HDMI(v1.4)

 - Easy to use On-screen Display menu to control all supported function
 - Automatic adjustment for screen image control
 - Bright and Contrast control
 - Manual Geometry control for H/V position, H size, and Phase adjustment
 - Color balance and color temperature control
 - Positioning of OSD Menu and 8 language selection.(option)
 - Input source selection
 - Up to 5 ~ 7 key OSD control button

 - DPMS VESA compliant power management

 - VESA DDC1/2B Plug & Play operation

 - Support Audio amplifier(2W)
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3. Electrical Specification

3.1. Input Characteristic

Description	Signal	Unit	Min	Typical	Max.	Remarks
Power In (12Vdc)						
	Input Voltage	Vdc		12		
	Consumption	Watt				< TBD (DPMS)
RGB Input						
	Analog RGB	Vp-p	0		0.7	
	Sync	Vdc	0		5.5	
	H Frequency	KHz	31.43		80.00	
	V Frequency	Hz	56.25		75.03	
DVI input						
	Differential output	mVp-p	150		1200	
	Input clock freq	MHz	20		135	
HDMI						
	Signal Cable	HDMI connector				
	Signal Type	Base on TMDS technology				

3.2. Output Characteristics

Description	Signal	Unit	Min	Typical	Max.	Remarks
LVDS Interface						
	Differential output	mVp-p	250	350	450	
	LCD Power (12v)	Vp-p		12		
	LCD Power (5v)	Vp-p		5		
	LCD Power (3.3v)	Vp-p		3.3		
Inverter Interface						
	Power out	Vdc		12		
		Vdc		5		
	On/off control	Vp-p	0	3.3	5.0	L=off, H=on
	Bright Control	Vp-p	3.3		0	
Audio control(OPTION)						
	Output	Watt		2(8R)		Each Channel

4. Notes for Installation

This controller is designed for RGB, DVI, HDMI monitor using different size of TFT LCD panels.

This section provides some guidelines for assembly and preparation of a finished display solution.

Preparation: Before proceeding, it is important to familiarize yourself with the parts making up a system and the various connectors, mounting holes, and general layout of the controller. All connectors have their own number printed on the controller board. And their signal arrangements are shown in the following relevant sections.

LCD signal cables: In order to provide a good signal, it is recommended that LCD signal cables should be no longer than 20cm. But it depends on signal frequency and LCD interface type.

Inverter: Each LCD panels have their own inverter to obtain optimum performance and long lifetime. Because, Each LCD panel makers use different type of back light tubes for their all different models and Inverter drives the tubes directly. The controller board just supplies the power for inverter logic and controls a light On/Off signal and a brightness control signal. So, it is important to use the inverter that has proper driving capacity and control input signal.

Inverter cable: This cable supplies Inverter's power, an on/off control signal and a brightness control signal to the inverter.

OSD Button: See Operational Function section.

3 Color LED: This LED shows the state of controller.

- ☒ Green – Normal state, No-Signal & No-cable
- ☒ Led Off – Power Off mode (Can't find video signals)
- ☒ Red Blinking a per 1 second – DPMS mode

Power switch: This switch is located on OSD button board.

Power input: +12Vdc is required to supply enough power for the controller, Inverter and LCD panel.

VGA, DVI , HDMI Input Cable: As this may affect regulatory emission test result, a suitably shielded cable should be utilized.

EMI: Shielding will be required for passing certain regulatory emissions tests. Also the choice of video board and power supply can affect the test result.

Consideration should be given to:

- ☒ Electrical insulation.
- ☒ Grounding.
- ☒ EMI shielding.
- ☒ Cable management.
- ☒ Heat & ventilation

Caution: Ensure adequate insulation is provided for all areas of the PCB with special attention to high voltage parts such as the inverter.

5. Setup for Operation

Once the circuit has been connected, a setup procedure for optimal operation is required some time.

The following instructions are likely to form the basis of the finished product operation manual.

LCD Display System Settings

The OSD(On Screen Display) provides certain functions to have clear image and others. This board supports 6 buttons OSD operation as a standard. The control functions defined on OSD operation are as below.

1) OSD Menu(Optional)

OSD Menu		Description	Remarks
Luminance	Brightness	Adjust the Brightness of the screen	
	Contrast	Adjust the Contrast of the screen	
	Gamma	Adjust the Gamma of the screen	
	DCR	Set the DCR on/off of the screen	
Picture	Phase	Adjust the Phase of the screen's image	RGB Only
	Clock	Adjust the Clock of the screen image	RGB Only
	H. Position	Adjust the H-Position of the screen's image	RGB Only
	V. Position	Adjust the V-Position of the screen's image	RGB Only
Color	Color Temperature	Control the temperature of the color	
	Red	Control the intensity of the color of the screen's image(Usable when Color temperature is USER mode.)	
	Green		
	Blue		
OSD Settings	Horizontal	Adjust the H-Position of the OSD Menu	
	Vertical	Adjust the V-Position of the OSD Menu	
	Transparency	Adjust the Transparency of the OSD Menu	
	OSD Time out	Adjust the Off Timer of the OSD Menu	
Setup	Language	Adjust the Language of the OSD Menu	
	Mute	Audio ON/OFF select	
	Input	Input Select	
	Display Size	Display Size select	Option
	Over drive	Over drive ON/OFF select	Option
	Reset	Adjust the Initialize of the Set	
	PowerSystem	PowerSystem ON/OFF select	Option

6. Applicable Graphic and Video Mode

6.1. Input format(VESA)

The microprocessor measures the H-sync, V-sync and V-sync/H-sync polarity for RGB inputs, and uses this timing information to control all of the display operation to get the proper image on a screen.

This board can detect all VESA standard Graphic modes shown on the table below and provide more clear and stable image on a screen.

Table) RGB Input format

Character Mode	Pixel Freq. MHz	Horizontal Timing				Vertical Timing			
		Sync Polar	Freq.	Total	Active	Sync Polar	Freq.	Total	Active
			KHz	Pixel	Pixel		Hz	Line	Line
640x350 @70Hz	25.151	P	31.44	800	640	N	70.02	449	350
720x400 @70Hz	28.295	N	31.44	900	720	P	70.02	449	400
640x480 @60Hz	25.175	-	31.47	800	640	-	59.94	525	480
640x480 @67Hz	30.240	-	35.00	864	640	-	66.67	525	480
640x480 @72Hz	31.500	-	37.86	832	640	-	72.81	520	480
640x480 @75Hz	31.500	-	37.50	840	640	-	75.00	500	480
800x600 @56Hz	36.000	-	35.16	1024	800	-	56.25	625	600
800x600 @60Hz	40.000	-	37.88	1056	800	-	60.32	628	600
800x600 @72Hz	50.000	-	48.08	1040	800	-	72.19	666	600
800x600 @75Hz	49.500	-	46.88	1056	800	-	75.00	625	600
832x624 @74Hz	57.285	-	49.73	1152	832	-	74.55	667	624
1024x768 @60Hz	65.000	-	48.36	1344	1024	-	60.00	806	768
1024x768 @70Hz	75.000	-	56.48	1328	1024	-	70.07	806	768
1024x768 @72Hz	75.235	-	57.70	1304	1024	-	72.30	798	768
1024x768 @75Hz	78.750	-	60.02	1312	1204	-	75.03	800	768
1152x864 @60Hz	88.566	-	54.00	1640	1152	-	60.00	900	864
1152x864 @70Hz	93.930	-	62.62	1500	1152	-	69.58	900	864
1152x864 @75Hz	108.000	-	67.50	1600	1152	-	75.00	900	864
1152x870 @75Hz	100.000	-	68.68	1456	1520	-	75.00	915	870
1280x1024@60Hz	108.000	-	63.98	1688	1280	-	60.02	1066	1024
1280x1024@70Hz	124.995	-	74.40	1680	1280	-	69.99	1063	1024
1280x1024@72Hz	134.626	-	77.91	1728	1280	-	72.00	1082	1024
1280x1024@75Hz	135.001	-	79.98	1688	1280	-	75.03	1066	1024
1440x900@60Hz	106.500	-	55.90	1904	1440	+	60.01	932	900
1440x900@75Hz	136.750	-	70.51	1936	1440	+	75.02	940	900
1600x1200@60Hz	160.875	-	74.48	2160	1600	-	59.96	1242	1200
1680x1050@60Hz	119.000	-	64.72	1840	1680	-	60.02	1080	1050
1920x1080@60Hz	148.500		66.60	2160	1920		60.00	1125	1080
1920x1200@60Hz	154.110		74.10	2080	1920		59.99	1235	1200

*only 20.1" wide Panel(16:10) 1680x1050@60Hz

7. Connectors and Signal Arrangement

7.1 Summary for connectors

Reference	Description	Connector Type
CNK1	OSD Connector for OSD Button, power on/off switch.	20010WS-10
CN2	LCD Interface connector for LVDS type	JS-1235R-30WB (Chyao Shiunn)
JK3	VGA Input connector for 15P DSUB	DR15PF
J650	DVI Input connector for a DVI Jack	DV2457-3BBJASA
J230	HDMI input connector for a HDMI Jack	51U019S-331N-B14R
CPN1	Inverter interface or Lips connector for inverter power and on/off and brightness control	20010WS-06
JA1	PC/DVI Sound input connector for a PHONE Jack	ST-324
J75	Sound input connector a PHONE Jack	ST-324
JA6	Sound output connector for a wire type cable	SMW200-04
J104	Power input connector for a DC Jack	EJ210-2.5pi
CNP3	Power 12V output connector	20010WS-04
CNP2	Power 5V output connector	20010WS-02
P251	RS-232 connector	20010WS-04

7.2 Signal Arrangement

1) OSD Connector for OSD Button, power on/off switch (Direct Key) (CNK1)

Key Name	Function	Remarks
Power Key	Power On / Off	
Menu Key	OSD Menu On / Off	
Up Key	Channel Up / OSD Menu Up Select / AutoAdjust(VGA Only)	
Down Key	Channel Down / OSD Menu Down Select Blue Light Select (Option)	
Left Key	Volume Down	
Right Key	Volume Up	
Select Key	Input Source Select/OSDSubMenuSelect	

2) LCD interface connector for LVDS type (CN2)

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	LCD VCC	LCD Logic power	16	RXEIN1-	Transmit even data1-
2	LCD VCC		17	GND	Ground
3	LCD VCC		18	RXEIN0+	Transmit even data0+
4	NC	Not connected	19	RXEIN0-	Transmit even data0-
5	NC	Not connected	20	RXOIN3+	Transmit odd data3+
6	NC	Not connected	21	RXOIN3-	Transmit odd data3-
7	GND	Ground	22	RXOCKIN+	Transmit odd clk+
8	RXEIN3+	Transmit even data3+	23	RXOCKIN-	Transmit odd clk-
9	RXEIN3-	Transmit even data3-	24	GND	Ground
10	RXECKIN+	Transmit even clk+	25	RXOIN2+	Transmit odd data2+
11	RXECKIN-	Transmit even clk-	26	RXOIN2-	Transmit odd data2-
12	RXEIN2+	Transmit even data2+	27	RXOIN1+	Transmit odd data1+
13	RXEIN2-	Transmit even data2-	28	RXOIN1-	Transmit odd data1-
14	GND	Ground	29	RXOIN0+	Transmit odd data0+
15	RXEIN1+	Transmit even data1+	30	RXOIN0-	Transmit odd data0-

3) Selector for LCD PANEL LOGIC VCC (JP1)

Pin No.	Symbol	Description	Pin No.	Symbol	Description
*		DC +3.3V source			
*		DC +5V source			
*		DC +12V source			

4) VGA Input connector for 15P D-Sub (JK3)

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	Red	Red, analog input	9	NC	Not connected
2	Green	Green, analog input	10	DGND	Detect connector
3	Blue	Blue, analog input	11	NC	Not connected
4	NC	Not connected	12	DDC Data	DDC Data
5	DGND	Digital ground	13	H-sync	Horizontal sync, input
6	AGND	Ground for Red return	14	V-sync	Vertical sync, input
7	AGND	Ground for Green return	15	DDC Clk	DDC Clk
8	AGND	Ground for Blue return			

5) DVI Input connector for a DVI Jack(J650)

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	RX2-	Receive data2-	13	RX3+	Not connected
2	RX2+	Receive data2+	14	5V	DVI 5V
3	GND	AGND	15	GND	AGND
4	RX4-	Not connected	16	HP	HOT PLUG
5	RX4+	Not connected	17	RX0-	Receive data0-
6	SCL	DVI DDC SCL IN	18	RX0+	Receive data0+
7	SDA	DVI DDC SDA IN	19	GND	AGND
8	VS	VS DVI	20	RX5-	Not connected
9	RX1-	Receive data1-	21	RX5+	Not connected
10	RX1+	Receive data1+	22	GND	AGND
11	GND	AGND	23	RXC+	Receive clk+
12	RX3-	Not connected	24	RXC-	Receive clk-

6) HDMI Input connector for a HDMI Jack(J230)

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	RX2P	Receive data2+	13	CEC	Receive CEC
2	GND	AGND	14	N.C	Not connected
3	RX2N	Receive data2-	15	SCL	HDMI DDC SCL IN
4	RX1P	Receive data1+	16	SDA	HDMI DDC SDA IN
5	GND	AGND	17	GND	AGND
6	RX1N	Receive data1-	18	+5V	HDMI +5V
7	RX0P	Receive data0+	19	HPD	HOT PLUG
8	GND	AGND	20	GND	AGND
9	RX0N	Receive data0-	21	GND	AGND
10	CLKP	Receive clk+	22	GND	AGND
11	GND	AGND	23	GND	AGND
12	CLKN	Receive clk-			

7) Inverter interface connector (CPN1)

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	AFGND	Ground			
2	AFGND	Ground			
3	BKLT-VBRI	Brightness adjustment			
4	BKLT-EN	Black-light ON/OFF control			
5	POWER	12V DC Power supply			
6	POWER	12V DC Power supply			

8) Sound input connector for a phone Jack(JA1)

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	GND	GND	4	OUT_L	Headphone Loop_LEFT
2	OUT_L	Headphone Out_LEFT	5	OUT_R	Headphone Loop_RIGHT
3	OUT_R	Headphone Out_RIGHT			

9) Sound output connector for a phonejack (J75)

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	GND	GND	4	OUT_L	Headphone Loop_LEFT
2	OUT_L	Headphone Out_LEFT	5	OUT_R	Headphone Loop_RIGHT
3	OUT_R	Headphone Out_RIGHT			

10) Sound output connector for a wire type cable (JA6)

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	GND	Ground	3	GND	Ground
2	SPK-R	Right speaker	4	SPK-L	Left speaker

11) DC5V Output connector for a wire type cable(CNP2)

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	GND	GND			
2	DC 5V	DC 5V			

12) DC12V Output connector for a wire type cable(CNP03)

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

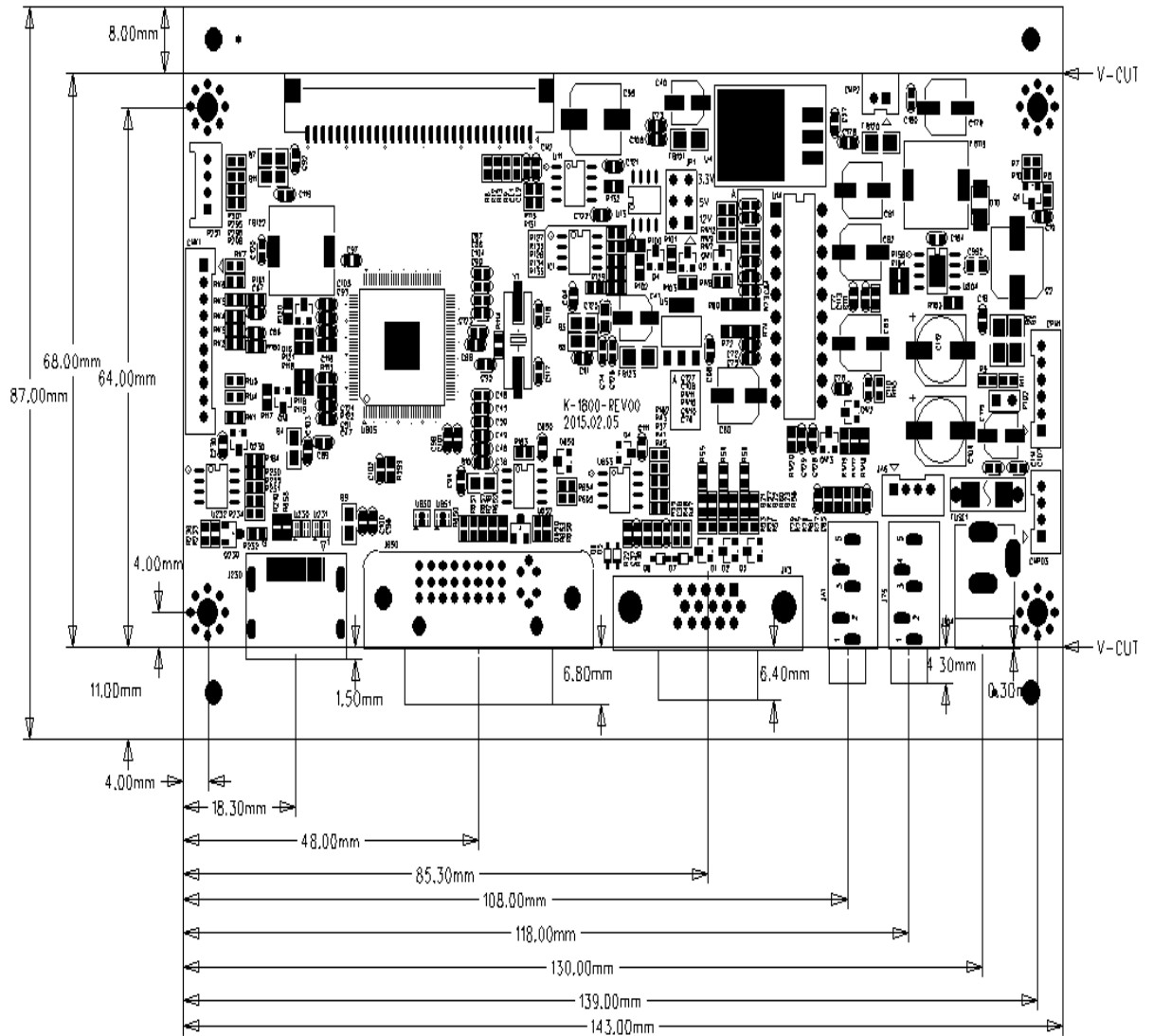
13) DC12V Input connector for a DC JACK(J104)

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

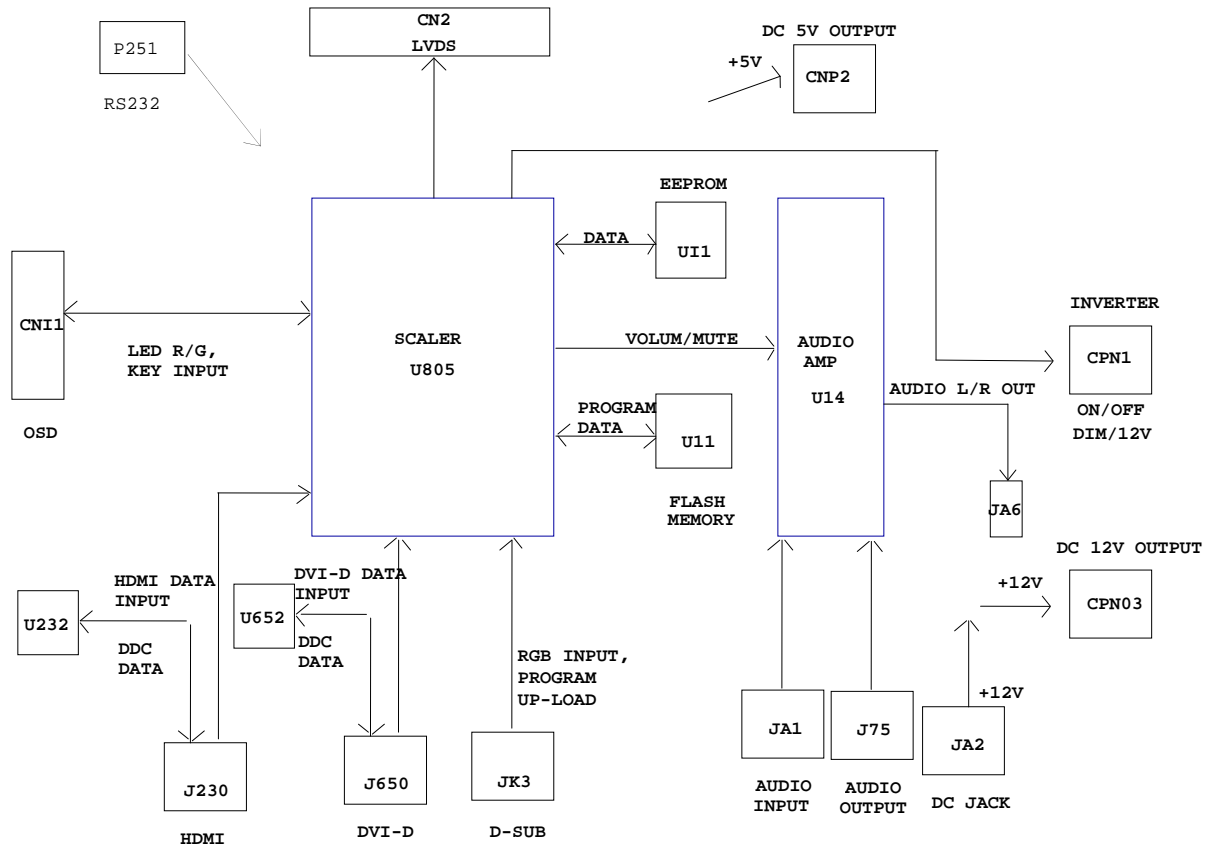
14) RS-232 connector (P251)

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	DC+ 3.3		2	RXD	
3	TXD		4	GND	GND

8. Mechanical Dimension



9. Block Diagram



10. BOARD LAYOUT AND CONNECTORS NAME

