A/D Board for High brightness color TFT-LCD module

Customer:

Customer model name:

Customer part number:

Model name: GL-RS232_AV_Remote

Date: September 29st, 2014

Version: 01

Note: This specification is subject to change without notice

Customer： _____

Date： _____

Approved	**Prepared**
Date:	**Date:**

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A. Scope :

GL-RS232_AV_Remote AD board is a cost effective design and high performance picture quality (with LED driver for most of middle size LED backlight panels as optional). It provides analogue RGB and digital DVI-I inputs.

GL-RS232_AV_Remote AD board supports 8 / 6 bit single/dual LVDS panel up to WUXGA (1920X1200@60) resolution with following features:

1.0) Full control of all relevant displays and interface parameters by OSD .

1.1) Multi language supports 8 languages (English, French, German, Spanish, Italian, Japanese, Russian and Chinese) can be chosen .

1.2) VESA DDC 1/2 Bi, 2B+ compliant, and VESTA .

1.3) Optional LED driver provides 8 LED current sense inputs in an "OR" configuration 1, 2 , 4 , 6 and 8 strings can be defined by changing some components and connectors ,it can cope with from17" to 27" commercial middle size panels.

1.3) 24V/2A ,12V/3.5A or above standard AC/DC power adapter is recommended for commercial middle size panels.

1.4) It supports environmental light sensor application, consult AGL RD or Sales team if necessary.

1.5) To support remote control by RS232 which can adjust most of OSD function.

1.6) EMI class B compliance (it depends on various panels and configuration of final goods)

B. Electrical characteristics （Ta：25℃）:

a) 24V input (option)

Symbol	Description	Min	Typ	Max	Unit
Vdd0	+24V DC Power Supply	21.6	24	26.8	V
Vo0	+12V output	11.4	12	12.6	V
Io0	+12V output current for internal circuit		--	1.0	A
Io0'	+12V output Current for external circuit	--	--	1.5	A
Vripple0	+12V Ripple & Noise	--	--	120	mVpp
η0	Efficiency of 24V convert to 12V at 2.5A O/P	91	--	--	%
Vo1	+5V DC Output is converted from 24V	4.75	5	5.25	V
Io1	+5V Output Current for internal circuit	--	--	2.0	A
Io'	+5V Output Current for internal circuit			0.5	A
Vripple1	+5V Ripple & Noise	--	--	60	mVpp
η1	Efficiency of 12V convert to 5V at 2.5A O/P	88	--	--	%

**) 12V output capacity for internal+ external application is 2.5Amax nominal and 3.0A inrush.

5.0V output capacity for internal+ external application is 2.5Amax nominal and 3.0A inrush.

24V Idd depends on requirement of panel and application.

C) LED driver output characteristics: (option)

Symbol	Description	Min	Typ	Max	Unit	remark
VL	LED backlight operation voltage	--	--	60	V	1
IL at 10%	+12V Supply Current	9	6.5	13	mA	
IL at 100%	+12V DC Power Supply	--	- -	680	mA	1
Ripple	Output Ripple Voltage	--	--	600	mVpp	
Vp	Output floating protection	--	--	Max+6V	V	
η	Efficiency of 12V Power Supply with dimming= 100%	82	--	--		

** The VL and Imax depend on panel's specification. The LED driver's capacity is 24W max

D) Environment :

Temperature	Operating	-20℃ ~ 65℃
	Storage	-20℃ ~ 85℃
Humidity	Operating	20℃ ~ 90℃
	Storage	5℃ ~ 95℃

E) Operating Specification

Category		Specification
Color		16.7M
Input signal	Video signal	Analog 0.7Vpp postive（75ohms）
	Sync signal	TTL L level ＋/－
Frequency	Horizontal	30 ~ 80 KHz
	Vertical	56 ~ 70 Hz

F) Electrical parameters

Symbol	Description	Min	Typ	Max	Unit
Vi（SYNC）	Video input signal	0.55	0.7	0.9	Vpp
Vt+（HSYNC）	Hsync Trigger positive	1.5	1.6	2.2	V
Vt-（HSYNC）	Hsync Trigger negative	0.7	1.1	1.4	V
FS	Video sample rate	10		165	Mhz
VT+（VSYNC）	Vsync Trigger positive		1.8	2.0	V
VT-（VSYNC）	Vsync Trigger negative	0.8	1.5		V
VID	Differential input Voltage	150		1200	mV
VICOM	Input common mode Voltage	AVCC-300		AVCC-37	mV
VBTD	Behavior when transmitter is disabled	AVCC-10		AVCC+10	mV

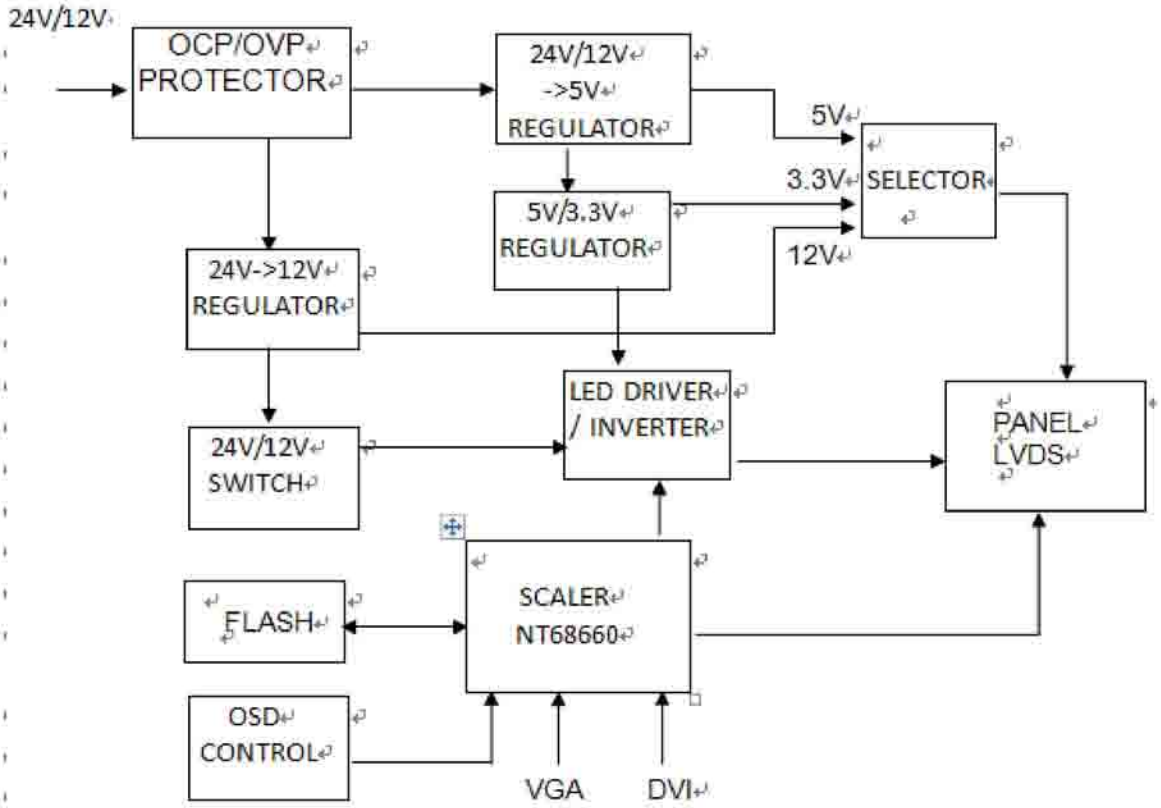
G). Function on OSD menu：

OSD MENU	Description
Auto Adjustment	Automatically adjust the Horizontal position, Vertical position, Horizontal size, Phase and color of the screen's image .Windows's background or characters should be display on full screen prior to proceed this function .
Horizontal Position	Adjust the horizontal position of the screen's image
Vertical Position	Adjust the vertical position of the screen's image
Horizontal Size （clock）	Adjust the horizontal size of the screen's image
Phase	Adjust the focus of the screen's image
Brightness	Adjust the brightness of the screen
Contrast	Adjust the contrast of the screen
Color	9300 , 7500 and 6500 Temperature, user Temperature .
EXIT	OSD off / Return
Sharpness	Adjust the Sharpness of the screen
OSD Position	Adjust the OSD position
OSD display time	Adjust the OSD display time （max＝60sec）
INPUT	Analog / DVI selection

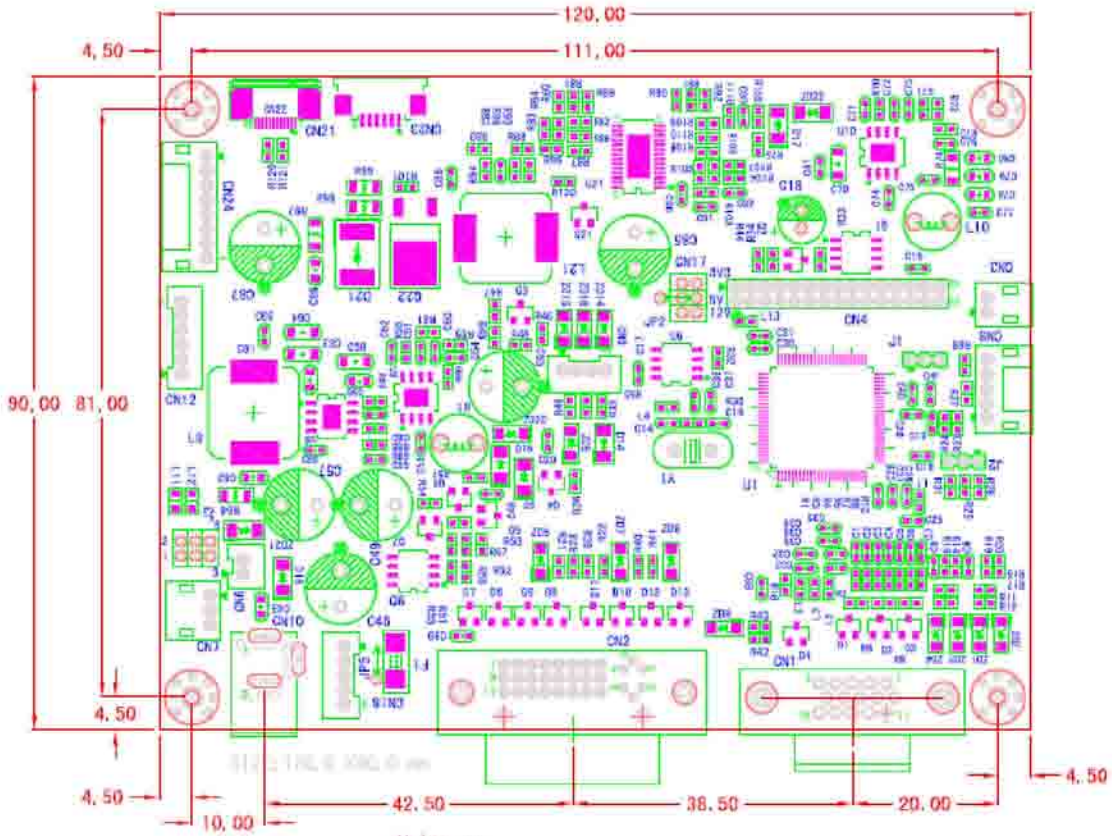
H) Hotkey function definition：

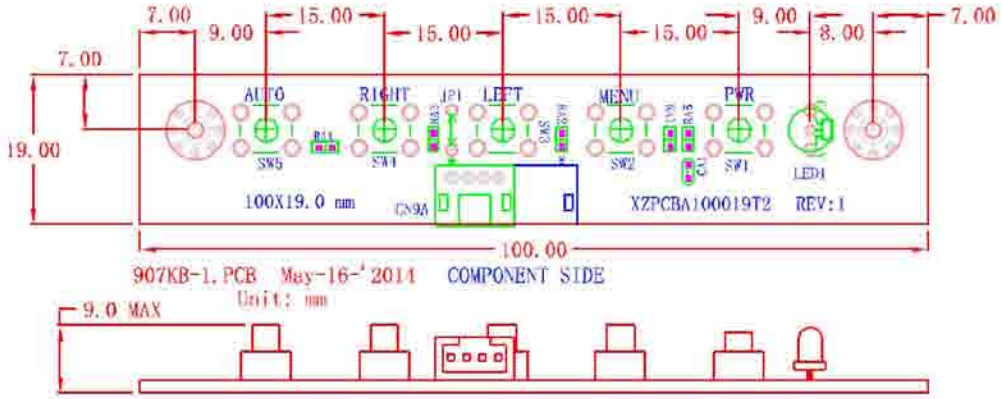
OSD key	Function
LEFT	ADJ－/ SEL－
RIGHT	ADJ＋/SEL＋
EXIT	Auto adjust （OSD OFF）
MENU	OSD ON

I) Block diagram



J) Structural drawing：





CN7 Pin assignment

CN7	12V/5V output
#1	5V
#2	12Vor 24V
#3	GROUND

Pin setting:

*JP1 : left : 3.3V , center : 5.0V , right : 12V .

*JP3 : set 1-2 3-4 for 12/24V i/p inverter or LED driver,
set 1-2 for 12V/24V inverter or LED driver.

L) Vesa timing support :

SPEC	Pixel Freq.	Horizontal Timing				Vertical Timing			
		Sync Polar	Freq.	Total	Active	Sync Polar	Freq.	Total	Active
MODE	MHZ		KHz	Pixel	Pixel		Hz	Line	Line
640×350 @70Hz	24.144 VESA	P	31.430	800	640	N	70.000	449	350
720×400 @70Hz	28.287 VESA	N	31.430	900	720	P	70.000	449	400
640×480 @60Hz	25.175 VESA	N	31.469	800	640	N	59.940	525	480
640×480 @60Hz	25.175 VESA	N	31.469	800	640	N	59.940	525	480
640×480 @72Hz	31.500 VESA	N	37.861	832	640	N	72.809	520	480
640×480 @75Hz	31.500 VESA	N	37.500	840	640	N	75.000	500	480
800×600 @56Hz	36.000 VESA	P	35.156	1024	800	P	56.250	625	600
800×600 @60Hz 0	40.000 VESA	P	37.879	1056	800	P	60.317	628	600
800×600 @72Hz	50.000 VESA	P	48.077	1040	800	P	72.188	666	600
800×600 @75Hz	49.500 VESA	P	46.875	1056	800	P	75.000	625	600
1024×768 @60Hz	65.000 VESA	N	48.363	1344	1024	N	60.005	806	768
1024×768 @60Hz	64.000 VESA	N	48.780	1312	1024	N	60.001	813	768
1024×768 @70Hz	75.000 VESA	N	56.476	1328	1024	N	70.070	806	768
1024×768 @75Hz	80.000 VESA	N	60.241	1328	1024	N	74.927	804	768
1024×768	78.750	P	60.023	1312	1024	P	75.030	800	768

K) Connector：

Location		Original	Compatible	Mating housing
CN1	VGA	VGA D-SUB CONN,15P	D-SUB, STANDARD, 90°, 15P（3*5）, FEMALE	VGA -15P-MALE
CN2	DVI-I	DVI CONN. PCB STRAIGHT TYPE 24+5 PIN FEMALE	DVI-D, 90°, 24+5P（3*8）, FEMALE	DVI INTEGRATE TYPE PLUG-MALE
CN9	OSD	JST-S4B-PH-K-S	ECI-2022-04	JST-PHR-4 ECI-2020-04
CN4	LVDS	PITCH：2.0mm	ECI-2002PS-02 （2*15） 30pin	ECI-2032-2X
CN10	12/24V DC JACK	Center Pin=2.5mm		2.5mm power plug
CN18	12/24V I/P	JST-B5PS-VH	ECI-3962-05	JST-VHR-5N ECI-3960-05
CN7	12V/5V O/P	JST-S3B-PH-K-S	ECI-2022-03	JST-PHR-3 ECI-2020-03
CN23	LED light bar	TU1001WNR-1X06S		TU1001HNO-06
CN24	LED light bar	JST-S7B-PH-K-S	ECI-2022-07	JST-PHR-7 ECI-2020-07
CN3	Light sensor	JST-S2B-PH-K-S	ECI-2022-02	JST-PHR-4 ECI-2020-02

CN6 Pin assignment

CN6	12V or 24V output
#1	12Vor 24V
#2	GROUND

@75Hz	VESA								
1280×960 @60Hz	108.000 VESA	P	60.000	1800	1280	P	60.000	1000	960
1280×1024 @60Hz	108.000 VESA	P	63.981	1688	1280	P	60.020	1066	1024
1280×1024 @75Hz	135.000 VESA	P	79.976	1688	1280	P	75.025	1066	1024
1680×1050 @60Hz	119.000 VESA	P	59.883	1840	1680	N	59.883	1080	1050
1366x768 @60Hz	85.50 VESA	P	47.700	1792	1366	P	60.000	798	768
1440×900 @60Hz	88.750 VESA	P	55.400	1600	1440	N	60.000	926	900
1920×1080 @60Hz	148.500 VESA	P	67.500	2200	1920	P	60.000	1125	1080

Note : Timing depends on LCD Panel's requirement.

M) RS232 protocol Rev 1.0 (for AP development)

1) RS232 Setting:
Baud Rate :9600
Data Bits: 8 Parity
check: None Stop
Bit:1

2) Command packet format (From PC to Monitor):

PC	LCD	PC	PC	PC	PC	
Start	ACK	Command	Index	Value	CRC	
0XAA	0XA0	0X01	0XE1	0X00	0X1E	Write Command
0XAA	0XA0	0X00	0XE1	*	0X1F	Read Command

Note: * = don't care.
EX: * = 0
CRC= 0X100 - 0X00-0XE1-(*= 0X00)=0X1F ^ Read Command checksum
Start =0XAA, Command =0X01 write / 0X00 read , Value = control range.
CRC = 0X100 - (Command + Index + Value) ACK code: 0XA0 =OK, 0X0D =Time out, 0X0E = End , 0X0F = NG. The first byte (0XAA) is a special prefix data packet from PC to LCD.

3) The receiver must send ACK packet back to sender after it receivers START command packet.
If PC receives 0X0D, 0X0E and 0X0F from LCD monitor ,
then PC must resend START packet,

Command packet format (From Monitor to PC):

LCD	LCD	LCD
Start	Value	CRC

CRC = 0X100 – Value

EX: Value = 0 ; CRC = 0X100 -0 =0X00 (1 Byte)

4)

NO	Function		Index	Value	CRC
1		Command			
	Power	0X01	0XE1		
	OFF			0X00	0X1E
2	ON			0X01	0X1D
3	Brightness	0X01	0X10	0~ 0X64	
4	Contrast	0X01	0X11	0 ~0X64	
	Auto-Adjust.	0X01	0X17	0X00	0XE8
	(for VGA				
5	only)				
	Color Temp.	0X01	0X20		
	9300			0X00	0XDF
	7500			0X01	0XDE
6	6500			0X02	0XDD
	Input (option)	0X01	0X40		
	VGA			0X00	
7	DVI			0X01	
	Auto	0X01	0X50		
	Dimming				
	(option)			0X00	
	OFF			0X01	
	ON			0XFF	
	Disable (R)				

Note: (R) = The value is for read only.

Disable does not support auto-dimming function on hardware when read the value 0XFF.

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