Product Specification
AD-L037D

■ **Preliminary Specifications**

☐ **Final Specifications**

Module	LCD Controller Board (AD Board) For LCD Display With Auto Dimming (Light Sensor) Function
Model Name	AD-L037D
Document Version	Rev.V0

Customer _____ Approved by Date _____ _____
Notice : This Specification is subject to change without notice.

Approved By	Prepared By
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Contents

Revision History

Version	Date	Revised Content/Summary	Page	Remark
0	2022/08/30	First Edition	All	

1. General Function

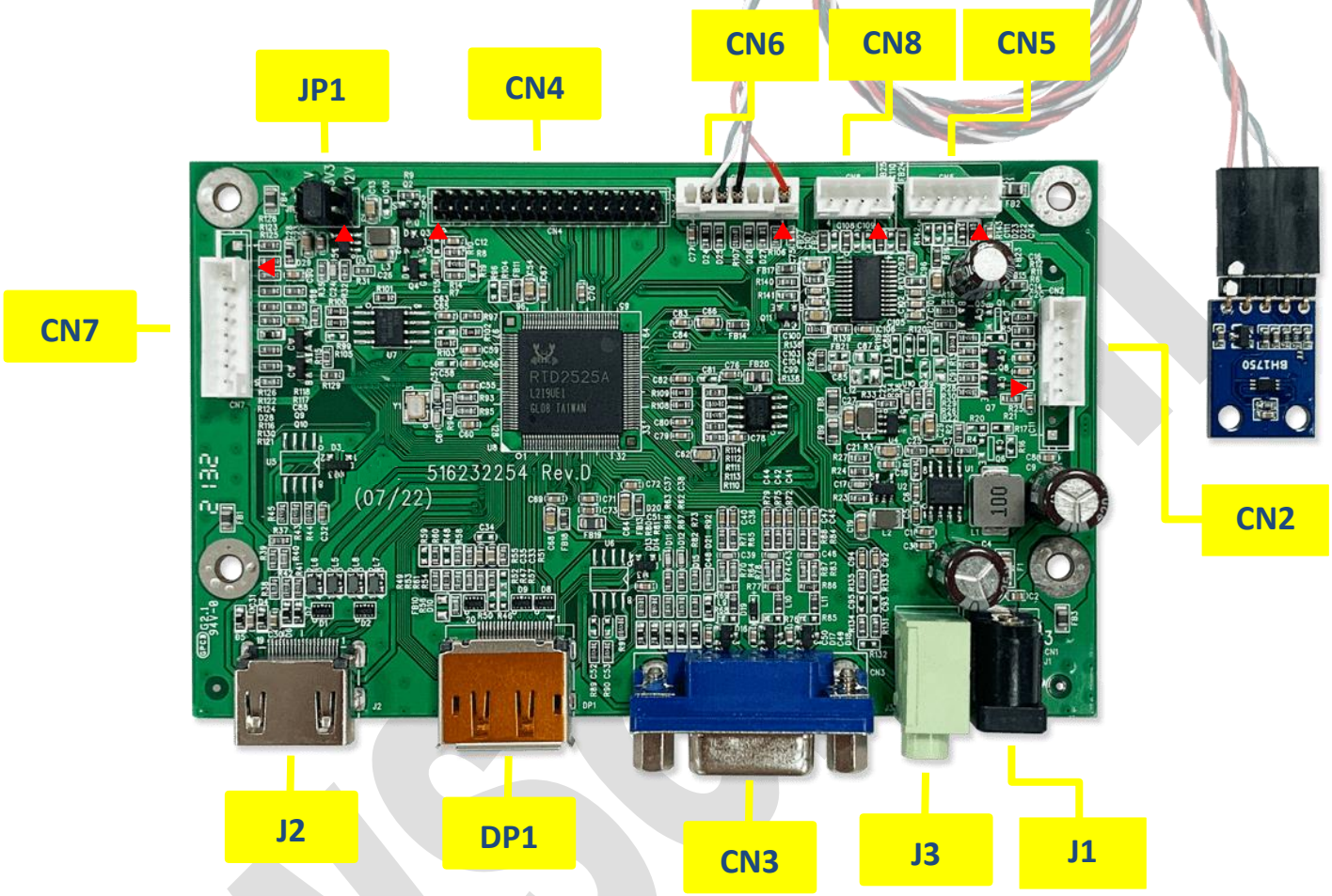
A. TFT-LCD Module Driver Board
B. Resolution UP TO 1920 x 1200 @ 60Hz (Note)
C. 15 PIN D-SUB VGA Connector Input
D. HDMI Connector Input
E. Display Port Connector Input
F. LVDS Interface Output to Panel
G. OSD (On Screen Display) Control Menu
H. Supporting HDCP Protocol (Optional)
I. Supporting DDC/CI Protocol
J. Audio Input And Audio Output 1.4W x 2 at 8ohm Speaker
K. Auto Dimming (Light Sensor) Function

Note：No FRC Function

2. Specification

Model	AD-L037D
Panel Interface	Single/Dual LVDS
Maximum Resolution	Up to WUXGA 1920x1200 8 bits per color , total 16.7M colors
Vertical Refresh Rate	VGA，SVGA，XGA VESA Standard up to 75Hz WUXGA up to 60Hz (No FRC Function)
Input Source	VGA Analog (15pin D-Sub) HDMI 1.4a (HDCP 1.4) Display Port 1.2 (HDCP1.4)
Audio Output	1.4W+1.4W at 8 Ohm speaker
Dot Clock Maximum (Pixel clock)	VGA：210 MHz HDMI：165 MHz
User Controls	Power On/Off OSD Menu Adjust － Adjust ＋ Auto/Exit
Board Dimension	120 x 74 x 14.5 mm
Voltage for LCD Panel	3.3V，5V，12V DC (Jump Select)
Storage Temperature Limits	Temperature –40℃~70℃
Operation Temperature Limits	Temperature -20℃~70℃ Humidity：Less than 85%

3. Interface



Note：Without Sensor Board & Cable

3-1. JP1 : Panel Power Voltage Selector
3-2. J1 : Power Input (DC 12V)
3-3. J2 : HDMI Connect (HDMI Signal Input)
3-4. J3 : Audio Signal Input (Phone Jack) for VGA Mode Only
3-5. DP1 : Display Port Connect (Display Port Signal Input)
3-6. CN2 : Backlight Control
3-7. CN3 : VGA Connect (VGA Signal Input)
3-8. CN4 : LVDS Signal Output
3-9. CN5 : IR and Reserve Control (Optional)
3-10. CN6 : RS232 and I2C (Digital Light Sensor) Control
3-11. CN7 : OSD Key Control Connect
3-12. CN8 : Audio Speaker Signal Output

4. Support PC Timing

NO.	Description	H-Freq. (KHz)	V-Freq. (Hz)
1	VGA640×480	31.649	60
2	VESA 640×480	37.5	75
3	VESA 800×600	37.9	60
4	VESA 800×600	46.875	75
5	VESA 1024×768	48.363	60
6	VESA 1024×768	60.023	75
7	VESA 1280×720	45.0	60
8	VESA 1280×800	49.3	60
9	VESA 1280×1024	63.981	60
10	VESA 1280×1024	79.977	75
11	VESA 1366x768	48.0	60
12	VESA 1440x900	59.9	60
13	VESA 1440x900	75	75
14	VESA 1600x900	60	60
15	VESA 1600x1200	75	60
16	VESA 1680x1050	65.3	60
17	VESA 1920x1080	67.5	60
18	VESA 1920x1200	74	60

Note: depends on panel

5. Signal input connections

5-1 Panel Power Voltage Selector

Location – JP1 : 2x3pin pitch 2.54mm

Pin1,Pin2 Short Panel Power 12V

Pin3,Pin4 Short Panel Power 3.3V

Pin5,Pin6 Short Panel Power 5V

5-2 Power Input

Location – J1 : DC JACK D=2.0mm 12V DC Input

5-3 HDMI Connect (HDMI Signal Input)

Location – J2 : 19pin HDMI Connector

Pin Assign and Definition

Pin No.	SYMBOL	Pin No.	SYMBOL	Pin No.	SYMBOL
1	HDMI_DATA2+	8	GND	15	HDMI_SCL
2	GND	9	HDMI_DATA0-	16	HDMI_SDA
3	HDMI_DATA2-	10	HDMI_CLK+	17	GND
4	HDMI_DATA1+	11	HDMI_Cable_DET	18	HDMI_5V
5	GND	12	HDMI_CLK-	19	HDMI_HPD
6	HDMI_DATA1-	13	NC	------	----------
7	HDMI_DATA0+	14	NC	------	----------

5-4 Audio Signal Input (Phone Jack)

Location – J3 : SCJ368R0NXS0G04G 3P Green or equivalent

Audio Signal Input 1Vp-p Max. For VGA Mode Only

5-5 Display Port Connect (Display Port Signal Input)

Location – DP1 : 20pin Display Port Connector

Pin Assign and Definition

Pin No.	SYMBOL	Pin No.	SYMBOL	Pin No.	SYMBOL
1	LANE3-	8	GND	15	AUX_CHP
2	GND	9	LANE1+	16	DP_Cable_DET
3	LANE3+	10	LANE0-	17	AUX_CHN
4	LANE2-	11	GND	18	HPD
5	GND	12	LANE0+	19	RETURN
6	LANE2+	13	GND	20	DP_5V
7	LANE1-	14	GND	------	----------

5-6 Backlight Control

Location – CN2 : 6pin wafer pitch 2.0mm STM M24266 or equivalent

Pin Assign and Definition

Pin No.	SYMBOL	Pin No.	SYMBOL
1	GND	4	Backlight Enable
2	GND	5	+12V
3	Dimming control	6	+12V

5-6A Dimming : PWM Ratio 100% (LED Current Max) to PWM Ratio 10% (LED Current Min)

5-6B Backlight Enable : 5V (ON) or 0V (OFF)

5-7 VGA Connect (VGA Signal Input)

Location – CN3 : 15pin Hi-Density Female D-SUB

Pin Assign and Definition

Pin No.	SYMBOL	Pin No.	SYMBOL	Pin No.	SYMBOL
1	RED IN	6	R-GND	11	GND
2	GREEN IN	7	G-GND	12	SDA DDC
3	BLUE IN	8	B-GND	13	SYNC H
4	NC	9	PC 5V	14	SYNC V
5	VGA_Cable_ DET	10	GND	15	SCL DDC

5-8 LVDS Signal Output

Location – CN4 : 2x15pin DuPont pitch 2.0mm

Pin Assign and Definition

Pin No.	SYMBOL	Pin No.	SYMBOL	Pin No.	SYMBOL
1	VLCD for panel	11	LVDS RXE 2-	21	LVDS RXO 1-
2	VLCD for panel	12	LVDS RXE 2+	22	LVDS RXO 1+
3	VLCD for panel	13	GND	23	LVDS RXO 2-
4	NC	14	GND	24	LVDS RXO 2+
5	GND	15	LVDS RXE CLK-	25	GND
6	GND	16	LVDS RXE CLK+	26	GND
7	LVDS RXE 0-	17	LVDS RXE 3-	27	LVDS RXO CLK-
8	LVDS RXE 0+	18	LVDS RXE 3+	28	LVDS RXO CLK+
9	LVDS RXE 1-	19	LVDS RXO 0-	29	LVDS RXO 3-
10	LVDS RXE 1+	20	LVDS RXO 0+	30	LVDS RXO3+

5-9 IR and Reserve Control (Optional)

Location – CN5 : 5pin wafer pitch 2.0mm STM M24265 or equivalent

Pin Assign and Definition

Pin No.	SYMBOL	Pin No.	SYMBOL
1	+5V	4	Reserve
2	IR Signal	5	GND
3	GND	---	----------

5-10 RS232 and I2C (Digital Light Sensor) Control

Location – CN6 : 7pin wafer pitch 2.0mm STM M24267 or equivalent

Pin Assign and Definition

Pin No.	SYMBOL	Pin No.	SYMBOL
1	3.3V (Digital LS)	5	SCL (Digital LS)
2	TXD	6	SDA (Digital LS)
3	RXD	7	5V
4	GND (Digital LS)	---	----------

Note：5V/500mA Max 3.3V/200mA Max (Optional)

5-11 OSD Key Control Connect

Location – CN7 : 8pin wafer pitch 2.0mm STM M24268 or equivalent

All Key Active Low Level , All LED Active HI Level , Output Current 10mA MAX

Pin assign and definition

Pin No.	SYMBOL	Pin No.	SYMBOL	Pin No.	SYMBOL
1	MENU KEY	4	UP KEY	7	LED_O
2	AUTO KEY	5	GND	8	POWER KEY
3	DOWN KEY	6	LED_G	---	----------

5-12 Audio Output For Speaker

Location – CN8 : 4pin wafer pitch 2.0mm STM M24264 or equivalent

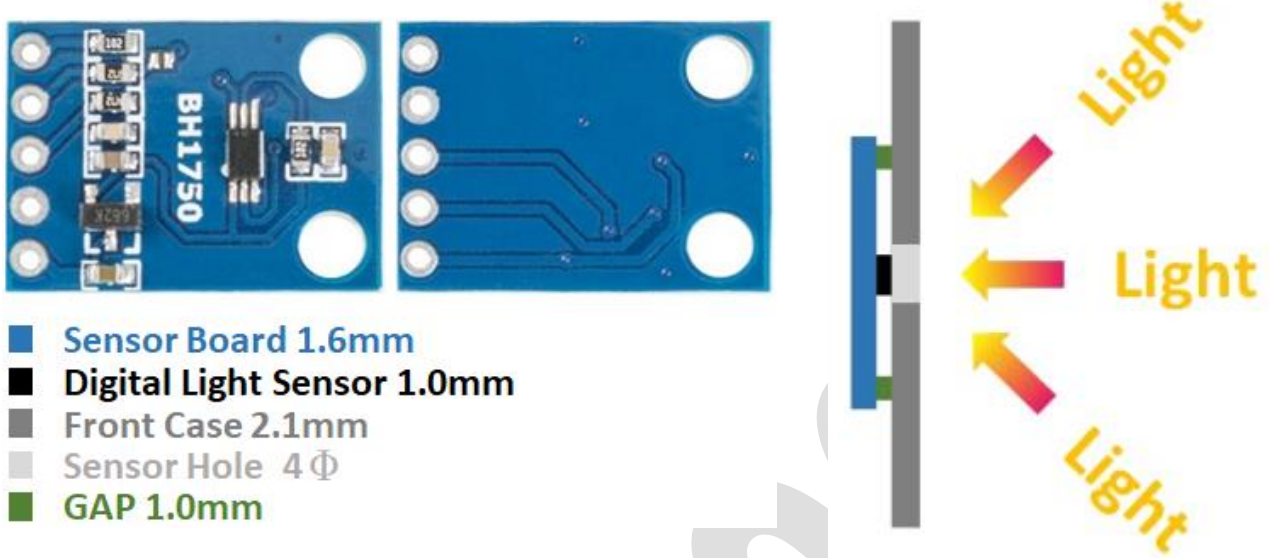
Audio Speaker Signal Output 1.4W + 1.4W at 8 Ohm

Pin assign and definition

Pin No.	Signal
1	R -
2	R +
3	L +
4	L -

6. The Condition of Auto Dimming for Reference (Digital Light Sensor)

6-1 Recommended installation location for Auto Dimming



Note：Auto dimming performance will be different according install place of device.

6-2 Standard light sensor setting with the corresponding stages value and level

3 Mode adjust brightness automatically

Light Sensor Mode	Light Sensor Value	Brightness (nits) By Panel	Ambient light level (lux)
Outdoor Panel 1000nits (UP)	100%	1000	14001~UP
	80%	800	4501~14000
	60%	600	451~4500
	40%	400	31~450
	10%	100	0~30
Semi-Outdoor Panel 700~800nits	100%	700	4501~UP
	80%	560	901~4500
	60%	420	151~900
	40%	280	31~150
	10%	70	0~30
Indoor Panel 300~500nits	100%	300	801~UP
	80%	240	351~800
	60%	180	101~350
	40%	120	31~100
	10%	30	0~30

Note：Brightness depend on panel type

6-3 Weak & Poor Sensitivity Level & Value

Light Sensor Setting -> Follow Specification Definition Diagram

Ambient light level (lux)		Light Sensor Value	Brightness (nits) By Panel
801~ UP	step5	100%	300 nits
351~800	step4	80%	240 nits
101~350	step3	60%	180 nits
31~100	step2	40%	120 nits
0~30	step1	**10%**	30 nits

Light Sensor Setting -> Weak Sensitivity

Ambient light level (lux)		Light Sensor Value	Brightness (nits) By Panel
	step5	100%	300 nits
	step4	80%	240 nits
801~ UP	step3	60%	180 nits
351~800	step2	40%	120 nits
101~350	step1	**10%**	30 nits
31~100			
0~30			

Light Sensor Setting -> Poor Sensitivity

Ambient light level (lux)		Light Sensor Value	Brightness (nits) By Panel
	step5	100%	300 nits
	step4	80%	240 nits
	step3	60%	180 nits
	step2	40%	120 nits
801~ UP	step1	**10%**	30 nits
351~800			
101~350			
31~100			
0~30			

7. LCD Controller Board Dimension

UNIT：mm