



Product Specification



AD-L037D-2x

- ☐ Draft Specifications
☐ Preliminary Specifications
☒ Final Specifications

Title	LCD Controller Board (AD Board) With Auto Dimming (Light Sensor) Function
Model Name	AD-L037D-2x (the "XX" depend on panel type)
Doc Version	0

Customer

Approved by

Date

Notice: This Specification is subject to change without notice.

Approved By	Prepared By
Tony Chiu 2026-08-04	Frank Kuo 2026-08-04



REVISION HISTORY

Version	ECN No.	Description of Changes	Date	Prepared
0		Final specification first edition	2026-08-04	Frank Kuo



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1. OVERVIEW

1.1. INTRODUCTION

Wide Temperature Industrial AD Board AD-L037D-2x with Light Sensor (Auto Dimming)
Function Support TFT LCD Panel .

1.2. FEATURES

- FHD (1920 x 1080) resolution LVDS Interface
- 15 PIN D-SUB VGA Connector Input
- HDMI Connector Input
- Display Port Connector Input
- Supporting DDC/CI Protocol
- Audio Input and Audio Output 1.4W x 2 at 8ohm Speaker
- OSD 5-Key Control (Power / Menu / Adj+ / Adj- / Exit)
- 3 Mode (Outdoor / Semi-Outdoor / Indoor) Digital Light Sensor Function
- RX/TX Signal for RS232 Level Shift Use (Optional)
- IR Control (Optional)
- Temperature Range : Operating(°C) -30~85 / Storage(°C) -40~85
- MTBF : 100,000hrs
- RoHS product
- Support OS : Windows , Mac , Linux , Android
- Safety Regulations : UL

1.3. GENERAL SPECIFICATIONS

Parameter	Specification	Unit	Remarks
Support Panel Interface	LVDS Single / Dual Channel		(6.5" to 32" Panel)
Maximum Resolution	Up to WUXGA 1920x1200 8 bits per color , total 16.7M colors		
Vertical Refresh Rate	VGA , SVGA , XGA , UXGA VESA Standard up to 75Hz WUXGA up to 60Hz		
Dot Clock Maximum	VGA : 210 MHz		(Pixel clock)
	HDMI : 165 MHz		
Input Source	VGA Analog (15pin D-Sub)		
	HDMI 1.4a (HDCP 1.4)		
	Display Port 1.2 (HDCP 1.4)		
Audio Output	1.4W+1.4W at 8 ohm speaker		
Voltage for LCD Panel	DC 3.3V , 5V ,12V (Jump Select)		JP1
Voltage for Power Input	DC 12V / UP to 1A~5A		CN1 DC Input
User Controls	Power / Menu / Adj - / Adj + / Exit(Auto)		
OSD Key Board LED Color	2 color LED Green / Orange		
AD Board Dimension	120.0 x 74.0 x 14.5	mm	Max.
Light Sensor Function	Outdoor / Semi-Outdoor / Indoor		Default OFF
Other Function	UART RX/TX Signal for RS232 Level Shift		Optional
	IR Control		Optional

1.4. SUPPORT PC TIMING

NO.	Description	H-Freq. (KHz)	V-Freq. (Hz)
1	VESA 640×480	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

2. ABSOLUTE MAXIMUM RATINGS

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit.

Parameter	Symbol	Min.	Max.	Unit
AD Board Power Input Voltage	ADvin	-0.3	+18	V
Operating Temperature	T _{op}	-30	+85	°C
Storage Temperature	T _{st}	-40	+85	°C
Operating Humidity	H _{op}	---	85	%RH

Note: A well-designed thermal dissipation structure is recommended.

3. ELECTRICAL CHARACTERISTICS

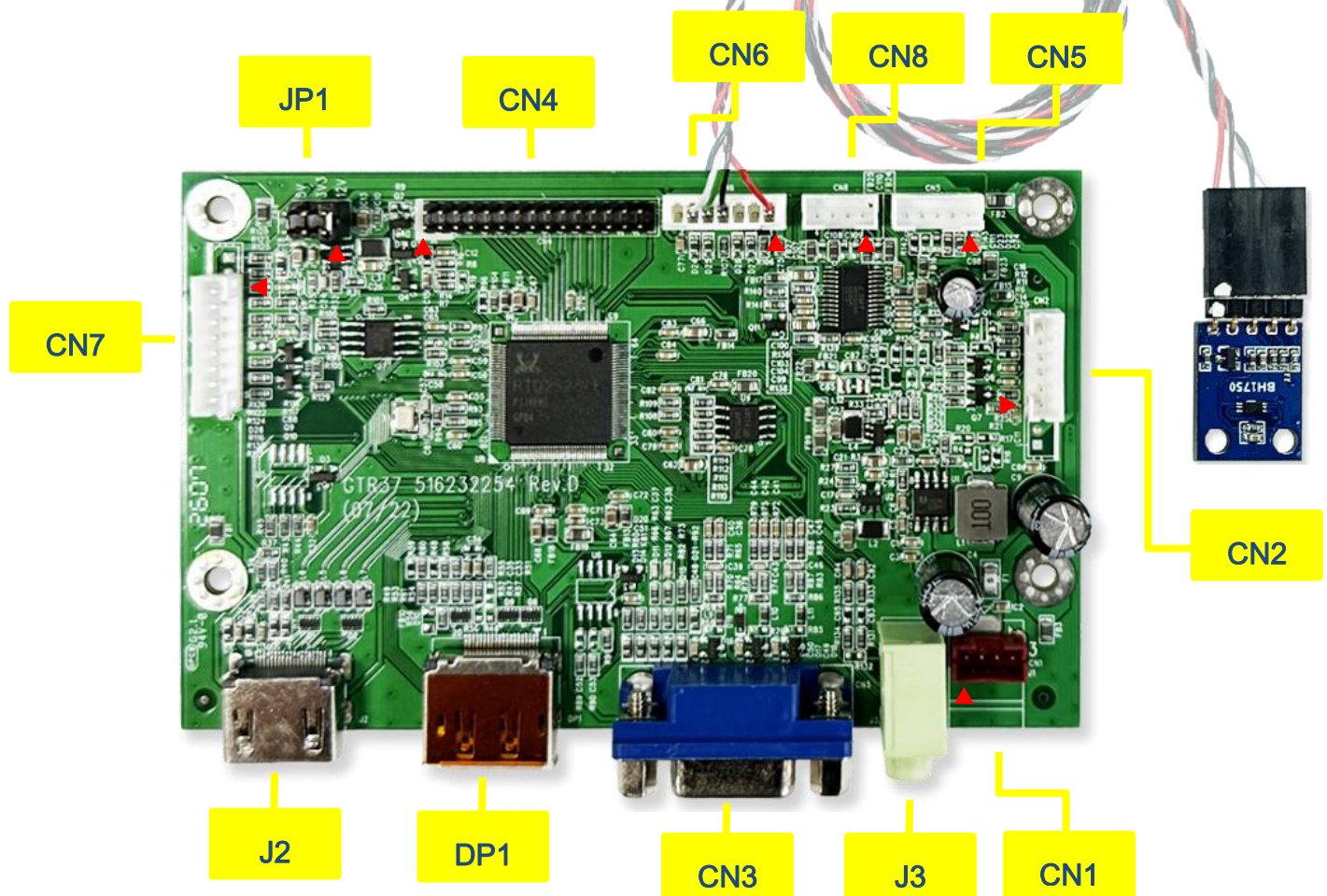
Parameter		Min.	Typ.	Max.	Unit
DC Input Voltage	ADB_Vin	10.8	12.0	13.2	V
DC Input Current	ADB_Iin	---	---	5	A
Output Voltage	Vout	---	---	---	V
Power Consumption (without panel)	With Signal input	---	0.96	---	W
	Vin Current	---	0.08	---	A
	Power Saving	---	0.16	---	W
	Vin Current	---	0.0133	---	A

Note

Note : Depend on panel type by JP1 jumper setting 3.3V , 5V , 12V

4. INPUT TERMINAL PIN ASSIGNMENT

4.1. INTERFACE



- JP1 : Panel Power Voltage Selector
- J2 : HDMI Connect (HDMI Signal Input)
- J3 : Audio Signal Input (Phone Jack) for VGA Mode only
- DP1 : Display Port Connect (Display Port Signal Input)
- CN1 : Power Input (DC 12V)
- CN2 : Backlight Control
- CN3 : VGA Connect (VGA Signal Input)
- CN4 : LVDS Signal Output
- CN5 : IR and Reserve Control (Optional)
- CN6 : I2C (Digital Light Sensor) Control and UART RX/TX (Optional)
- CN7 : OSD Key Control Connect
- CN8 : Audio Speaker Signal Output

4.2. SIGNAL INPUT CONNECTIONS

- Panel Power Voltage Selector

Location – JP1 : 2x3pin pitch 2.54mm (with Jumper)

Pin1, Pin2 Short Panel Power 12V

Pin3, Pin4 Short Panel Power 3.3V

Pin5, Pin6 Short Panel Power 5V

Note : Depend on panel type

- 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	-----	-----

- Audio Signal Input (Phone Jack)

Location – J3 : SCJ368R0NXS0G04G 3P Green or equivalent

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

- Display Port Connect (Display Port Signal Input)

Location – DP1 : 20pin Display Port Connector

Pin Assign and Definition

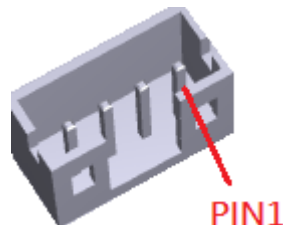
Pin No.	SYMBOL	Pin No.	SYMBOL	Pin No.	SYMBOL
1	DP_LANE3-	8	GND	15	DP_AUX_CH+
2	GND	9	DP_LANE1+	16	DP_Cable_DET
3	DP_LANE3+	10	DP_LANE0-	17	DP_AUX_CH-
4	DP_LANE2-	11	GND	18	DP_HPD
5	GND	12	DP_LANE0+	19	RETURN
6	DP_LANE2+	13	GND	20	DP_5V
7	DP_LANE1-	14	GND	-----	-----

- Power Input for 12V DC Input

Location – CN1 : 4pin wafer pitch 2.0mm STM M24264 or equivalent

Pin Assign and Definition

Pin No.	SYMBOL
1	+12V
2	+12V
3	GND
4	GND



- 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

Note 1 : Dimming : PWM Ratio 100% (LED Current Max) to PWM Ratio 5% (LED Current Min)

Note 2 : Backlight Enable : 5V (ON) or 0V (OFF)

- 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	NC
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

- 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 RXO 3+

- 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	---	-----

- I2C (Digital Light Sensor) Control and UART RX/TX (Optional)

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	TX	6	SDA (Digital LS)
3	RX	7	+5V
4	GND	---	-----

Note 1 : RX/TX Signal for RS232 Level Shift Use

Note 2 : 5V/500mA Max. , 3.3V/200mA Max. (Optional)

- 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	---	-----

- Audio Speaker Signal Output

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

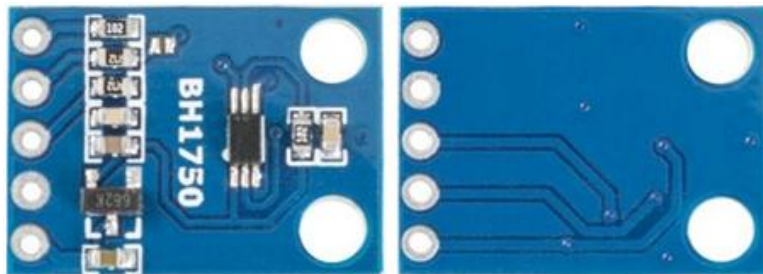
Audio Speaker Signal Output 1.4W + 1.4W at 8 Ohm

Pin assign and definition

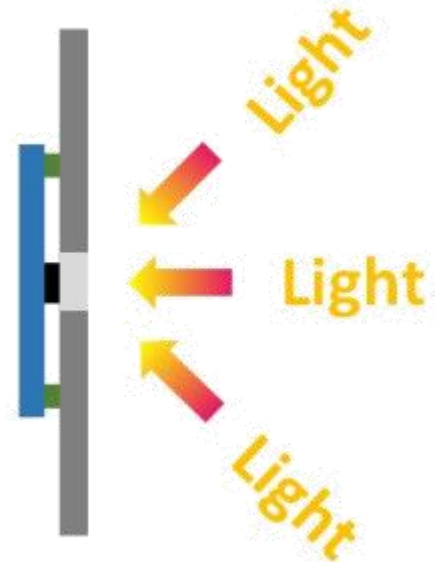
Pin No.	Signal
1	SPK_R -
2	SPK_R +
3	SPK_L +
4	SPK_L -

5. THE CONDITION OF AUTO DIMMING FOR REFERENCE (Digital Light Sensor)

5.1. RECOMMENDED INSTALLATION LOCATION FOR AUTO DIMMING



- Sensor Board 1.6mm
- Digital Light Sensor 1.0mm
- Front Case 2.1mm
- Sensor Hole 4 Φ
- GAP 1.0mm



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

5.2. 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
	5%	50	0~30
Semi-Outdoor Panel 700~800nits	100%	700	4501~UP
	80%	560	901~4500
	60%	420	151~900
	40%	280	31~150
	5%	35	0~30
Indoor Panel 300~500nits	100%	300	801~UP
	80%	240	351~800
	60%	180	101~350
	40%	120	31~100
	5%	15	0~30

Note : Brightness depend on panel type.

5.3. WEAK & POOR SENSITIVITY & VALUE

5.3.1. Light Sensor Setting -> Follow Specification Definition Diagram

Ambient light level (lux)	Light Sensor Stages	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	5%	15 nits

5.3.2. Light Sensor Setting -> Weak Sensitivity

Ambient light level (lux)	Light Sensor Stages	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	5%	15 nits
31~100			
0~30			

5.3.3. Light Sensor Setting -> Poor Sensitivity

Ambient light level (lux)	Light Sensor Stages	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	5%	15 nits
351~800			
101~350			
31~100			
0~30			

6. RELIABILITY TEST ITEMS

Test Item		Condition
1	High temperature/Humidity Bias	85°C, 85% 24hrs
2	High temperature storage test	85°C, 24hrs
3	Low temperature storage test	-40°C, 24hrs
4	High temperature operation test	85°C, 24hrs
5	Low temperature operation test	-30°C, 24hrs
6	Thermal Cycle operation test	-30°C~85°C, 6cycles, 24hrs

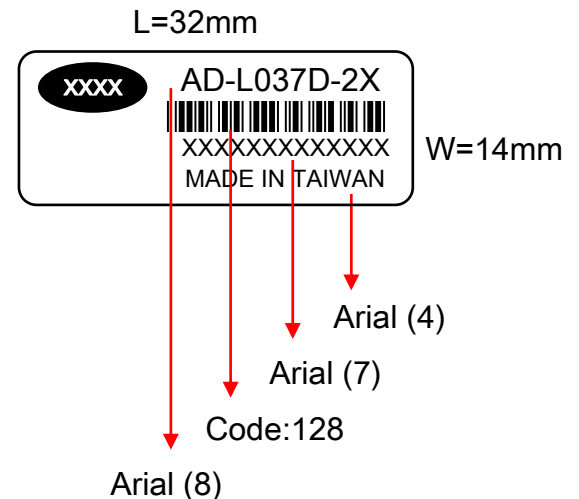
7. LABEL

Model NO. **AD-L037D-2X**

條碼

SN 1D Z 20 2 21 0 XXX1

code 1,2 Production location
code 3 Production code
code 4,5 Production year
code 6 Production month
code 7,8 Production day
code 9 Production code
code 10,11,12,13 Serial number



8. MECHANICAL CHARACTERISTICS

Item		Dimension	Unit	Note
Outline Dimension	Horizontal	120.00	mm	AD Board : AD-L037D-2x
	Vertical	74.00	mm	
	Depth (min.)	14.50	mm	
	USER Hole	Ø3.20*4	mm	
Weight		55.5	g	

9. ENGINEERING DRAWING

USER HOLD : 3.2mm x4

