LCD Display Kits
AD Board
Engineer Specification V4.0

Mode Name	AD-0073		
Edited by		Release Date	2017/10/23
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Approved by			

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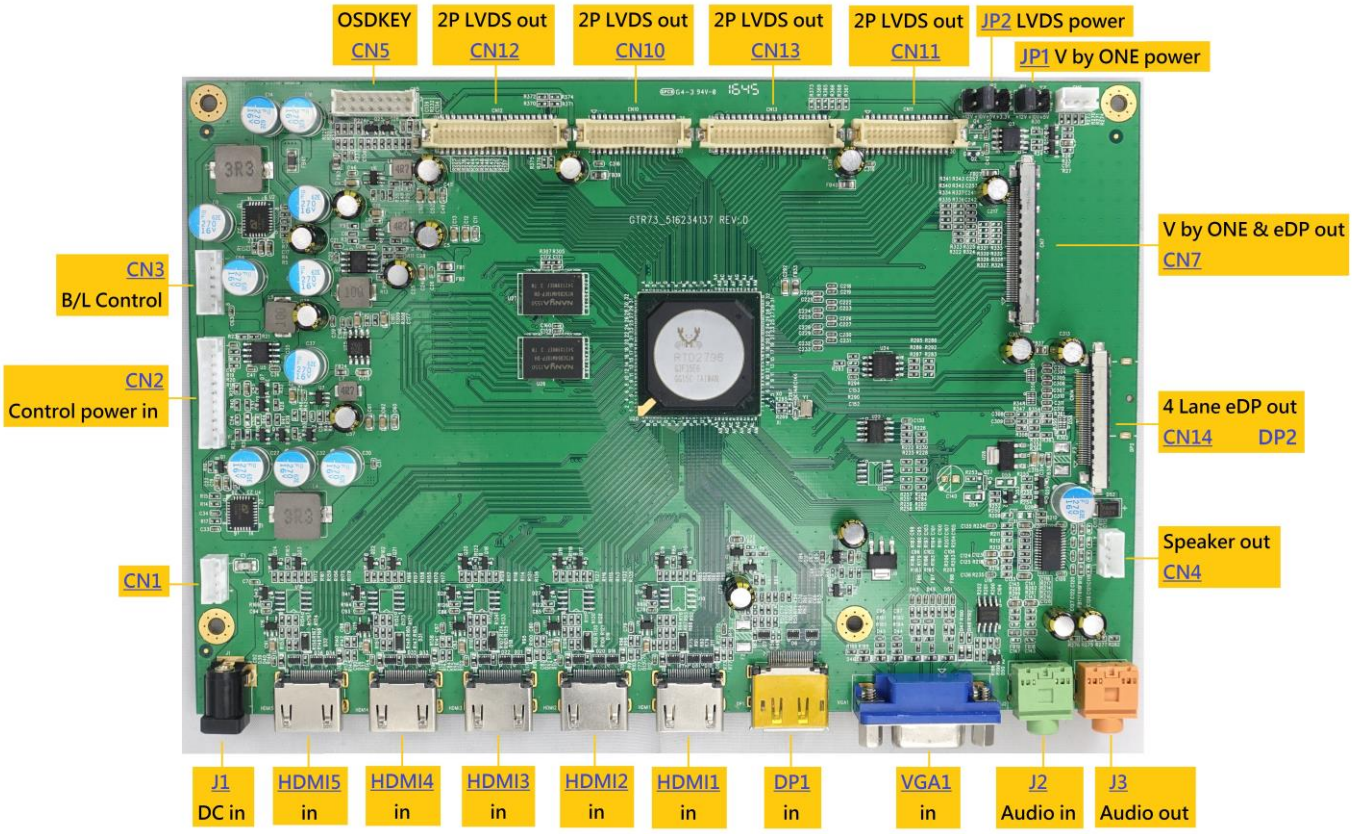
1. General Function

A. Large size TFT-LCD module drive board resolution up to 4096x2160
B. VGA input
C. DisplayPort1.2 input
D. Five HDMI input (One HDMI 2.0 and Four HDMI 1.4/MHL2.0)
E. Support non-linear scaling from 4:3 to 16:9 or 16:9 to 4;3
F. Support 90 180 270 degree image rotation
G. Support PIP/PBP even supports 4p function
H. Support DisplayPort 1.2 Multi-Stream or 4-lane e-DP panel
I. Support 4096x2160/60HZ 8-lane e-DP panel
J. Support 4096x2160/60HZ8-lane V-bye-one panel
K. Support 4096x2160 8-port LVDS panel
L. OSD(On Screen Display) control Menu
M. 10W+10W Class D Audio Amplifier (at 8 ohm)
N. Audio output
O. IR receiver (option)
P. Light sensor control (option)
Q. Standby mode(DPMS) less than 0.5W

2. Specification

Panel Type	8-laneLVDS/ 8laneV-by-one/8 lane e-DP
Maximum Resolution	4096x2160
Vertical Refresh Rate	Max 75Hz
Input Source	VGA analog (15 pin D-Sub) , DisplayPort HDMI x5 DC jack
Audio Input	3.5 mm Earphone (1Vrms)
Audio AMP Output	10W+10W at 8Ohm SPK
Dot Clock Maximum (pixel clock)	VGA/210Mhz Display port/5.4G Hz HDMI/6G Hz
User Controls	Power On/Off, Menu Key, Exit Key Right Key, Left Key, (Up Key, Down Key option)
Output Signal	Audio
Control Signal	IR(Option)
Board Dimension	210 mm x 140 mm
Power Consumption at normal mode (Not included panel consumption and MHL charger)	5W Max
Voltage for LCD Panel	3.3V/5V/10V/12V DC
Input Voltage	DC12V,(external power) 12V/5V,5V-StabdBy(internal power)
Storage Temperature Limits	Temperature –40℃~+70℃
Operation Temperature Limits	Temperature 0℃~+50℃ Humidity：Less than 85%

3. Connect Function



J1	DC jack Input **:** *12V(external power)*
J2	Audio Input **:** *VGA Signal Audio Intput*
J3	Audio Output **:** *Audio Signal Output*
VGA1	VGA Input **:** *VGA Signal Input*
DP1	Display Port **:** DisplayPort Signal Input (DP1.2)
HDMI1	HDMI Input **:** HDMI Signal Input (HDMI 2.0)
HDMI2	HDMI Input **:** HDMI Signal Input (HDMI1.4)
HDMI3	HDMI Input **:** HDMI Signal Input (HDMI1.4)
HDMI4	HDMI Input **:** HDMI Signal Input (HDMI1.4)
HDMI5	HDMI Input **:** HDMI Signal Input (HDMI1.4)
CN2	Power Input **:** 12V, 5V, 5V-StandBy Power Input and Control Signal
CN3	Backlight Control **:** Backlight Power and Control Signal
CN5	OSD Key Input **:** OSD Key, LED and IR Control Input
CN10	LVDS Output **:** Two Port LVDS Output
CN11	LVDS Output **:** Two Port LVDS Output
CN12	LVDS Output **:** Two Port LVDS Output
CN13	LVDS Output **:** Two Port LVDS Output
JP1	Panel Power Select **:** LVDS Panel Power Select
JP2	Panel Power Select **:** V-By-One and e-DP Panel Power Select
CN7	V-By-One & 8 Lane eDP Output **:** V-By-One Signal & 8 Lane e-DP Output
CN14	4 Lane e-DP Output **:** 4 Lane eDP Signal Output(Option)
DP2	Displayport Output **:** DP MST Daisy-Chain Output(Option)
CN4	Speak Output **:** Speak Output

4. Signals Input Connection

4-1 VGA Signal Input

Location VGA1 - 15 pin 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	GND	9	PC 5V	14	SYNC. V
5	GND	10	DET	15	SCL DDC

4-2 Audio Input (VGA_ Audio Input 1Vrms)

Location J2 - SCJ349D00US0G04G 5P Green or equiv

Pin Assign and Definition

Pin No.	SYMBOL
1,2	R-CH Input
3,4	Audio L-CH Input
5	GND

4-3 Audio Output (VGA_ Audio Output)

Location J3 - SCJ349D00US0G04G 5P Orange or equiv

Pin Assign and Definition

Pin No.	SYMBOL
1,2	Audio R-CH Output
3,4	Audio L-CH Output
5	GND

4-4 Display Port Input (support DP1.2)

Location DP1 - 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 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		

4-5 HDMI Input (support HDMI2.0)

Location HDMI1 - 19 pin HDMI Connector

Pin Assign and Definition

Pin No.	SYMBOL	Pin No.	SYMBOL	Pin No.	SYMBOL
1	HDMI1 DATA2+	8	GND	15	HDMI1 DDC_SCL
2	GND	9	HDMI1 DATA0-	16	HDMI1 DDC_SDA
3	HDMI1 DATA2-	10	HDMI1 CLK+	17	GND
4	HDMI1 DATA1+	11	GND	18	HDMI1_5V
5	GND	12	HDMI1 CLK-	19	HDMI1 HPD
6	HDMI1 DATA1-	13	NC		
7	HDMI1 DATA0+	14	NC		

4-6 HDMI Input (support HDMI1.4)

Location HDMI2 - 19 pin HDMI Connector

Pin Assign and Definition

Pin No.	SYMBOL	Pin No.	SYMBOL	Pin No.	SYMBOL
1	HDMI2 DATA2+	8	GND	15	HDMI2 DDC_SCL
2	GND	9	HDMI2 DATA0-	16	HDMI2 DDC_SDA
3	HDMI2 DATA2-	10	HDMI2 CLK+	17	GND
4	HDMI2 DATA1+	11	GND	18	HDMI2_5V
5	GND	12	HDMI2 CLK-	19	HDMI2 HPD
6	HDMI2 DATA1-	13	NC		
7	HDMI2 DATA0+	14	NC		

4-7 HDMI Input (support HDMI1.4)

Location HDMI3 - 19 pin HDMI Connector

Pin Assign and Definition

Pin No.	SYMBOL	Pin No.	SYMBOL	Pin No.	SYMBOL
1	HDMI2 DATA2+	8	GND	15	HDMI2 DDC_SCL
2	GND	9	HDMI2 DATA0-	16	HDMI2 DDC_SDA
3	HDMI2 DATA2-	10	HDMI2 CLK+	17	GND
4	HDMI2 DATA1+	11	GND	18	HDMI2_5V
5	GND	12	HDMI2 CLK-	19	HDMI2 HPD
6	HDMI2 DATA1-	13	NC		
7	HDMI2 DATA0+	14	NC		

4-8 HDMI Input (support HDMI1.4)
Location HDMI4 - 19 pin HDMI Connector
Pin Assign and Definition

Pin No.	SYMBOL	Pin No.	SYMBOL	Pin No.	SYMBOL
1	HDMI2 DATA2+	8	GND	15	HDMI2 DDC_SCL
2	GND	9	HDMI2 DATA0-	16	HDMI2 DDC_SDA
3	HDMI2 DATA2-	10	HDMI2 CLK+	17	GND
4	HDMI2 DATA1+	11	GND	18	HDMI2_5V
5	GND	12	HDMI2 CLK-	19	HDMI2 HPD
6	HDMI2 DATA1-	13	NC		
7	HDMI2 DATA0+	14	NC		

4-9 HDMI Input (support HDMI1.4)
Location HDMI5 - 19 pin HDMI Connector
Pin Assign and Definition

Pin No.	SYMBOL	Pin No.	SYMBOL	Pin No.	SYMBOL
1	HDMI2 DATA2+	8	GND	15	HDMI2 DDC_SCL
2	GND	9	HDMI2 DATA0-	16	HDMI2 DDC_SDA
3	HDMI2 DATA2-	10	HDMI2 CLK+	17	GND
4	HDMI2 DATA1+	11	GND	18	HDMI2_5V
5	GND	12	HDMI2 CLK-	19	HDMI2 HPD
6	HDMI2 DATA1-	13	NC		
7	HDMI2 DATA0+	14	NC		

4-10 Power Input (external power)

Location J1 - DC JACK DC=2.5mm, 12V DC Input

4-11 Location CN1 - 4 Pin wafer pitch 2.0mm
Pin assign and definition

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

4-12 Power Input (internal power)

Location CN2 - 11 PIN WAFER PITCH 2.0mm

Pin Assign and Definition

Pin No.	SYMBOL	Pin No.	SYMBOL	Pin No.	SYMBOL
1	12V Normal IN	5	5V Normal IN	9	Backlight ON/OFF Control Hi => ON Low => OFF
2	12V Normal IN	6	5V Normal IN	10	Backlight Adjust 0~5V or PWM
3	GND	7	GND	11	12V Normal and 5V Normal ON/OFF Hi => ON Low => OFF
4	GND	8	5V Standby IN		

4-13 Backlight Connector

Location CN3 - 6 PIN WAFER PITCH 2.0mm

Pin assign and definition

Pin No.	SYMBOL	Pin No.	SYMBOL
1	GND	4	Backlight ON / OFF Hi => ON Low => OFF
2	GND	5	12V
3	Backlight Adjust 0~5V or PWM Output	6	12V

4-14 LVDS Output

Location CN10 - 2 x 15 PIN, PITCH 1.25mm (connector: MDS240315)

Pin Assign and Definition

Pin No.	SYMBOL	Pin No.	SYMBOL	Pin No.	SYMBOL
1	Panel Vcc	15	TXC3N	29	TXC4N
2	Panel Vcc	16	TXC3P	30	TXC4P
3	Panel Vcc	17	TXD0N		
4	GND	18	TXD0P		
5	GND	19	TXD1N		
6	GND	20	TXD1P		
7	TXC0N	21	TXD2N		

8	TXC0P	22	TXD2P		
9	TXC1N	23	TXDCN		
10	TXC1P	24	TXDCP		
11	TXC2N	25	TXD3N		
12	TXC2P	26	TXD3P		
13	TXCCN	27	TXD4N		
14	TXCCP	28	TXD4P		

Location CN11 - 2 x 15 PIN, PITCH 1.25mm (connector: MDS240315)
Pin Assign and Definition

Pin No.	SYMBOL	Pin No.	SYMBOL	Pin No.	SYMBOL
1	Panel Vcc	15	TXG3N	29	TXG4N
2	Panel Vcc	16	TXG3P	30	TXG4P
3	Panel Vcc	17	TXH0N		
4	GND	18	TXH0P		
5	GND	19	TXH1N		
6	GND	20	TXH1P		
7	TXG0N	21	TXH2N		
8	TXG0P	22	THX2P		
9	TXG1N	23	THXCN		
10	TXG1P	24	THXCP		
11	TXG2N	25	THX3N		
12	TXG2P	26	THX3P		
13	TXGCN	27	THX4N		
14	TXGCP	28	THX4P		

Location CN12 - 2 x 20 PIN, PITCH 21.25mm (connector: MDS240320)
Pin Assign and Definition

Pin No.	SYMBOL	Pin No.	SYMBOL	Pin No.	SYMBOL
1	N.C	15	GND	29	TXA2N
2	N.C	16	GND	30	TXA2P
3	N.C	17	TXB2N	31	TXA1N

4	N.C	18	TXB2P	32	TXA1P
5	GND	19	TXB1N	33	TXA0N
6	GND	20	TXB1P	34	TXA0P
7	TXA4N	21	TXB0N	35	GND
8	TXA4P	22	TXB0P	36	GND
9	TXB4N	23	TXA3N	37	Panel Vcc
10	TXB4P	24	TXA3P	38	GND
11	TXB3N	25	TXACN	39	Panel Vcc
12	TXB3P	26	TXACP	40	Panel Vcc
13	TXBCN	27	GND		
14	TXBCP	28	GND		

Location CN13 - 2 x 20 PIN, PITCH 1.25mm (connector: MDS240320)
Pin Assign and Definition

Pin No.	SYMBOL	Pin No.	SYMBOL	Pin No.	SYMBOL
1	N.C	15	GND	29	TXE2N
2	N.C	16	GND	30	TXE2P
3	N.C	17	TXF2N	31	TXE1N
4	N.C	18	TXF2P	32	TXE1P
5	GND	19	TXF1N	33	TXE0N
6	GND	20	TXF1P	34	TXE0P
7	TXE4N	21	TXF0N	35	GND
8	TXE4P	22	TXF0P	36	GND
9	TXF4N	23	TXE3N	37	Panel Vcc
10	TXF4P	24	TXE3P	38	GND
11	TXF3N	25	TXECN	39	Panel Vcc
12	TXF3P	26	TXECP	40	Panel Vcc
13	TXFCN	27	GND		
14	TXFCP	28	GND		

4-15 Key Output Connector

Location CN5 - 2 x 8 16PIN WAFER PITCH 2.0mm

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

16 Pin assign and definition

Pin No.	SYMBOL	Pin No.	SYMBOL	Pin No.	SYMBOL
1	VCC3.3V	7	LS_SCL	13	RIGHT KEY
2	IR_IN	8	LS_SDA	14	LEFT KEY
3	GND	9	POWER KEY	15	NC
4	GND	10	MENU KEY	16	NC
5	LED_G	11	EXIT KEY		
6	LED_O	12	NC		

4-16 Panel Power Select for LVDS panel

Location JP2 - 2 x 4 PIN, PITCH 2.5mm

Pin assign and definition

Pin No.	Define
PIN1, PIN2 Short	Panel Power = 3.3V
PIN3, PIN4 Short	Panel Power = 5V
PIN5, PIN6 Short	Panel Power = 10V
PIN7, PIN8 Short	Panel Power = 12V

4-17 Panel Power Select for V_BY_ONE panel and eDP panel

Location JP1 - 2 x 3 PIN, PITCH 2.5mm

Pin assign and definition

Pin No.	Define
PIN1, PIN2 Short	Panel Power = 5V
PIN3, PIN4 Short	Panel Power = 10V
PIN5, PIN6 Short	Panel Power = 12V

4-18 Speaker Output

Location CN4 - 4 PIN WAFER PITCH 2.0mm

Pin assign and definition

Pin No.	SYMBOL
1	SPK_L+
2	SPK_L_
3	SPK _R_
4	SPK_R+

4-19 V-by-one output

Location CN7

Pin assign and definition (connector FI-RE51S-HF)

Pin	Name	Description
51	Vin	Power input (+12V)
50	Vin	Power input (+12V)
49	Vin	Power input (+12V)
48	Vin	Power input (+12V)
47	Vin	Power input (+12V)
46	Vin	Power input (+12V)
45	Vin	Power input (+12V)
44	Vin	Power input (+12V)
43	N.C.	No Connection
42	GND	Ground
41	GND	Ground
40	GND	Ground
39	GND	Gronnd
38	GND	Ground
37	N.C.	
36	N.C.	
35	N.C.	
34	SDA	I2C Data
33	SCL	I2C Serial Clock
32	N.C	
31	N.C.	
30	N.C.	
29	N.C	
28	N.C	

27	HTPDN	Hot plug detect output,
26	LOCKN	Lock detect output,
25	GND	Ground
24	RX0N	1st Pixel Negative V by One differential data input Lan 0.
23	RX0P	1st Pixel Positive V by One differential data input Lan 0.
22	GND	Ground
21	RX1N	2nd Pixel Negative V by One differential data input Lan 1.
20	RX1P	2nd Pixel Positive V by One differential data input Lan 1.
19	GND	Ground
18	RX2N	3rd Pixel Negative V by One differential data input Lan 2.
17	RX2P	3rd Pixel Positive V by One differential data input Lan 2.
16	GND	Ground
15	RX3N	4th Pixel Negative V by One differential data input Lan 3.
14	RX3P	4th Pixel Positive V by One differential data input Lan 3.
13	GND	Ground
12	RX4N	5th Pixel Negative V by One differential data input Lan 4.
11	RX4P	5th Pixel Positive V by One differential data input Lan 4.
10	GND	Ground
9	RX5N	6th Pixel Negative V by One differential data input Lan 5.
8	RX5P	6th Pixel Positive V by One differential data input Lan 5.
7	GND	Ground
6	RX6N	7th Pixel Negative V by One differential data input Lan 6.
5	RX6P	7th Pixel Positive V by One differential data input Lan 6.
4	GND	Ground
3	RX7N	8th Pixel Negative V by One differential data input Lan 7.
2	RX7P	8th Pixel Positive V by One differential data input Lan 7.
1	GND	Ground

4-20 eDP output

Location CN7

Pin assign and definition (connector FI-RE51-HF)

Pin	Name	Description
51	Vin	Power input (+12V)
50	Vin	Power input (+12V)
49	Vin	Power input (+12V)
48	Vin	Power input (+12V)
47	Vin	Power input (+12V)
46	Vin	Power input (+12V)
45	Vin	Power input (+12V)
44	Vin	Power input (+12V)

43	N.C.	No Connection
42	GND	Ground
41	GND	Ground
40	GND	Ground
39	GND	Gronnd
38	GND	Ground
37	2nd AUX_CH_P	
36	2st AUX_CH_N	
35	N.C	
34	N.C	
33	N.C	
32	1st AUX_CH_P	
31	1st AUX_CH_N	
30	N.C	
29	N.C	
28	N.C	
27	1st HPD	Hot plug detection
26	2nd HPD	Hot plug detection
25	GND	Ground
24	2nd Lane0_N	Negative eDP differential data input
23	2nd Lane0_P	Positive eDP differential data input
22	GND	Ground
21	2nd Lane1_N	Negative eDP differential data input
20	2nd Lane1_P	Positive eDP differential data input
19	GND	Ground
18	2nd Lane2_N	Negative eDP differential data input
17	2nd Lane2_P	Positive eDP differential data input
16	GND	Ground
15	2nd Lane3_N	Negative eDP differential data input
14	2nd Lane3_P	Positive eDP differential data input
13	GND	Ground
12	1st Lane0_N	Negative eDP differential data input
11	1st Lane0_P	Positive eDP differential data input
10	GND	Ground
9	1st Lane1_N	Negative eDP differential data inpu
8	1st Lane1_P	Positive eDP differential data inpu
7	GND	Ground
6	1st Lane2_N	Negative eDP differential data inpu
5	1st Lane2_P	Positive eDP differential data input
4	GND	Ground

3	1st Lane3_N	Negative eDP differential data inpu
2	1st Lane3_P	Positive eDP differential data input
1	GND	Ground

4-21 4-lane eDP output (option)

Location CN14

Pin assign and definition (connector FI-RE41-HF)

PIN#	Symbol	Description	Remark
41	Lane0_P	Positive eDP differential data input	
40	GND	Ground	
39	Lane0_N	Negative eDP differential data input	
38	Lane1_P	Positive eDP differential data input	
37	GND	Ground	
36	Lane1_N	Negative eDP differential data input	
35	Lane2_P	Positive eDP differential data input	
34	GND	Ground	
33	Lane2_N	Negative eDP differential data input	
32	Lane3_P	Positive eDP differential data input	
31	GND	Ground	
30	Lane3_N	Negative eDP differential data input	
29	N.C		
28	N.C		
27	AUX_CH_P	Positive AUX Channel differential data input	
26	GND		
25	AUX_CH_N	Negative AUX Channel differential data input	
24	HPD	Hot plug detection	
23	N.C		
22	N.C		
21	Panel Vcc	Panel Power	
20	Panel Vcc	Panel Power	
19	Panel Vcc	Panel Power	
18	Panel Vcc	Panel Power	
17	Panel Vcc	Panel Power	
16	GND	Ground	
15	GND	Ground	
14	GND	Ground	
13	GND	Ground	
12	GND	Ground	
11	GND	Ground	

10	GND	Ground	
9	GND	Ground	
8	LED_EN	LED drive enable	
7	LED_PWM	LED PWN contral	
6	N.C		
5	LED_VCC	Power +12V	
4	LED_VCC	Power +12V	
3	LED_VCC	Power +12V	
2	LED_VCC	Power +12V	
1	LED_VCC	Power +12V	

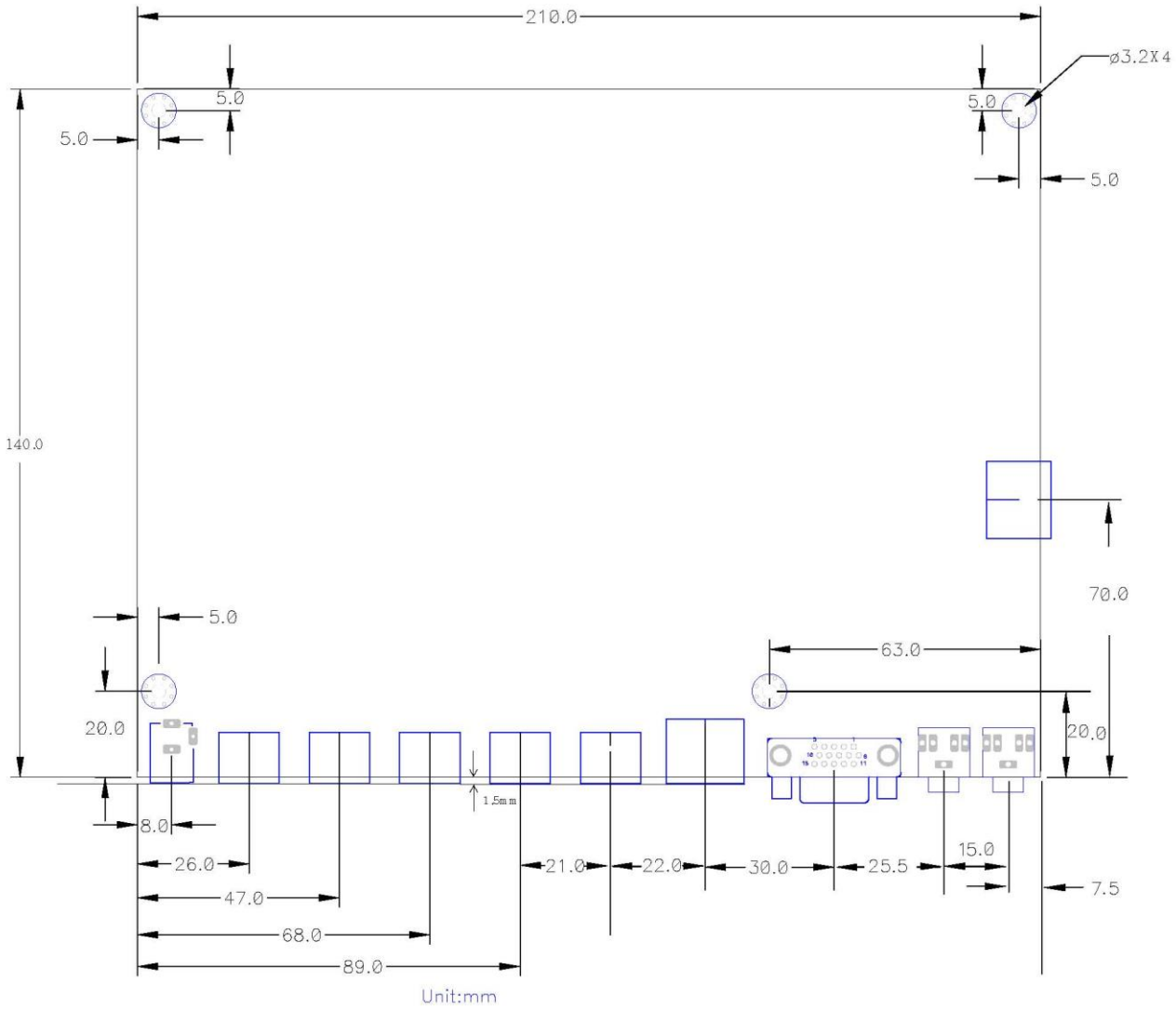
4-22 Display Port Output (Daisy-Chain) (option)

Location DP2 - 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 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. PCB Dimension



6. AD-0073 Demo Machine