



LCD Display Controller Board Engineer Specification V1.0

Model Name	KEC-MDB-1A1D1H1DP
Release Date	2018-12-20
Release Version	V1.0

Prepared by	Checked by	Approved by
Joe Lee	Jason Zeng	Tim Zhang

Shenzhen Ke Chuang Xian Electronic Technology Co., Ltd.

Address: 511, Building B, Zao'an Business Center, No.4003, Shigu Road, Nanshan District, Shenzhen

Tel: +86-13480128872

E-mail: 13480128872@139.com

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Revision History

Revision	Date	Page	Description Of Updated	Author
1.0	2018.12.20	All	First issued.	Joe Lee

1. Features

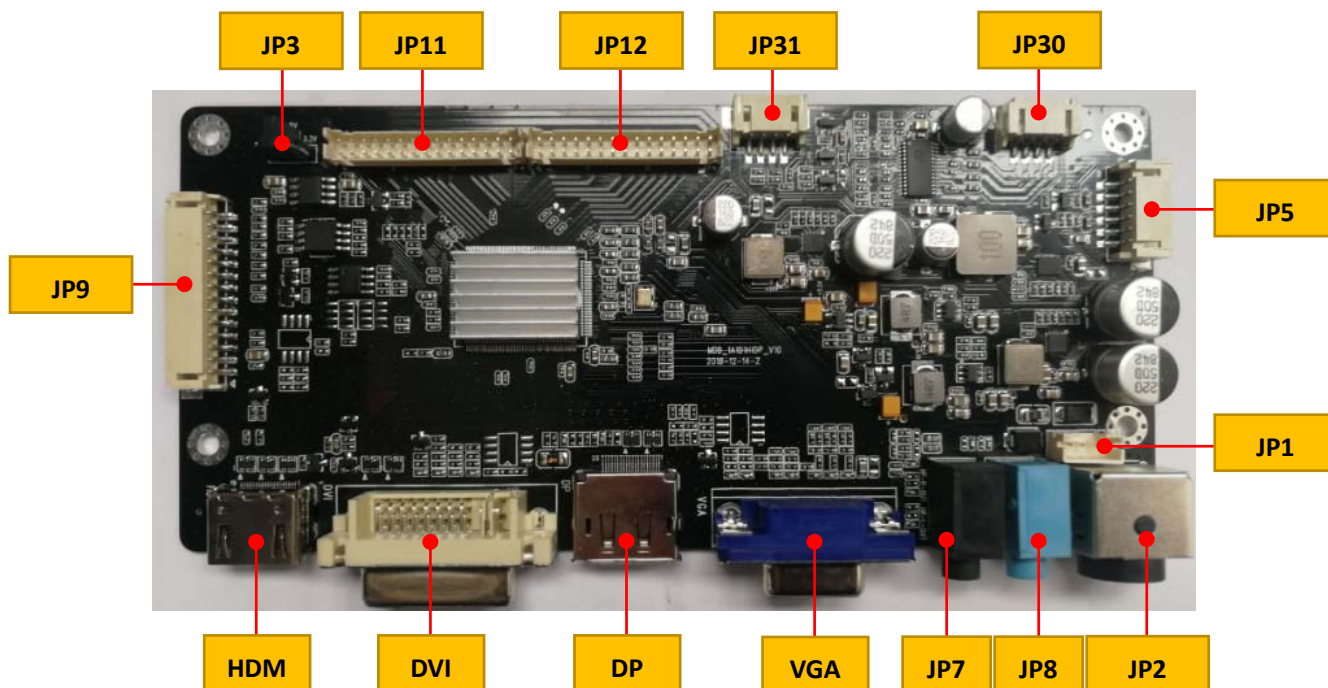
- ✚ Resolution up to 2560x1440/60Hz
- ✚ Support 1-ch/2-ch/4-ch 6-bit/8-bit LVDS panel
- ✚ Support 3.3V/5V/12V/20V panel voltage(*)
- ✚ 1*VGA input
- ✚ 1*DVI-SL input
- ✚ 1*HDMI1.4 input
- ✚ 1*DisplayPort1.2 input
- ✚ 2x10W Class-D AMP at 8ohm
- ✚ PC audio input
- ✚ Headphones output
- ✚ Keypad & IR receiver(option)
- ✚ 12V~24V DC input
- ✚ Standby mode power consumption less than 0.5W
- ✚ Support DDC/CI/2B protocol

*: Hardware reserved for other panel voltage.

2. Specifications

Chipset	Realtek			
Target Market	Medical Display(1MP/2MP/3MP/4MP)、Industrial Display			
OSD Language	English、Simplified Chinese			
Panel	Voltage	3.3V/5V/12V/20V/others		
	Interface	1-ch/2-ch/4-ch 6-bit/8-bit LVDS		
	Resolution	2560x1440/60Hz		
Video Input	VGA	15P D-Sub, Max. resolution is 1920x1080/60Hz		
	DVI	24+5P Sing-Link, Max. resolution is 1920x1200/60Hz		
	HDMI 1.4	19P Type-A, Max. resolution is 3840x2160/30Hz		
	DisplayPort 1.2	20P, Max. resolution is 3840x2160/30Hz		
Audio Input	3.5mm phone-Jack	PC audio 1Vrms		
Audio Output	3.5mm phone-Jack	Headphones		
	Class-D AMP	2x10W(8ohm) THDN<10%@1KHz		
Power	Power Input	12V~24V DC		
	Normal Consumption	Max. 3W(not include panel consumption)		
	Standby Consumption	< 0.5W		
User Key Function	Power、Menu、Right、Left、Exit			
Special Function	Chip	10-bits video processor	Color processing	
		12-bits LUT	Grayscale processing	
		FRC+RTC		
		180 degree Video Rotate		
	Software	Support DICOM	DICOM3.0 Part14(GSDF)	
		Support Color Temp. Cal.	Default 2-groups	
		Support Gamma Cal.	Default 7-groups	
		Support Gamut Cal.	sRGB/Adobe RGB/DCI-P3	
		Support BLT function	Option(Need Light Sensor)	
	Support 一键灯箱	Option		

3. Function Layout



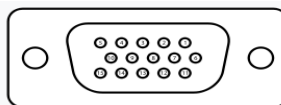
JP9	Keypad & IR Receiver	OSD menu control, LED & IR control
JP3	Panel Voltage Selector	3.3V/5V/12V/20V panel voltage
JP11	LVDS Output	A/B port
JP12	LVDS Output	C/D port
JP31	I2C Control	I2C control for external device
JP30	Speaker Output	2x10W at 8ohm speaker
JP5	Backlight Control	Backlight power and control
JP1	Power Input	12V~24V DC input
JP2	DC Jack Input	12V~24V DC input
JP8	PC Audio Input	3.5mm phone jack
JP7	Headphones Output	3.5mm phone jack
VGA	VGA Signal Input	Support 210MHz ADC
DP	DP Signal Input	Support DP 1.2
DVI	DVI Signal Input	Support DVI single-link
HDMI	HDMI Signal Input	Support HDMI 1.4

4. Interface Definition

4.1 VGA Signal Input

Location - VGA: 15P Female D-Sub

Pin assignment and definition:

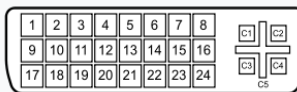


Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	VGA_R+	RED video	9	VGA5V	VGA 5V
2	VGA_G+	GREEN video	10	GND	Ground
3	VGA_B+	BLUE video	11	GND	Ground
4	GND	Ground	12	DDC SDA	IIC serial data
5	GND	Ground	13	HSIN	Horizontal sync
6	VGA_R-	RED return	14	VSIN	Vertical sync
7	VGA_G-	GREEN return	15	DDC SCL	IIC serial clock
8	VGA_B-	BLUE return			

4.2 DVI Signal Input

Location - DVI: 24+5P DVI-I Single-Link

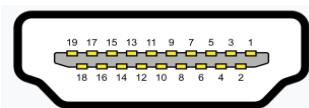
Pin assignment and definition:



Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	Data 2-	Digital red- (link 1)	16	HPD	Hot plug detect
2	Data 2+	Digital red+ (link 1)	17	Data 0-	Digital blue- (link 1)
3	GND	Ground	18	Data 0+	Digital blue+ (link 1)
4	NC		19	GND	Ground
5	NC		20	NC	
6	DDC SCL	IIC serial clock	21	NC	
7	DDC SDA	IIC serial data	22	GND	Ground
8	NC		23	Clock+	Digital clock+ (link 1/2)
9	Data 1-	Digital green- (link 1)	24	Clock-	Digital clock- (link 1/2)
10	Data 1+	Digital green+ (link 1)	C1	NC	
11	GND	Ground	C2	NC	
12	NC		C3	NC	
13	NC		C4	NC	
14	+5V	Power for monitor	C5	NC	
15	GND	Ground			

4.3 HDMI Signal Input

Location - HDMI: 19P Type-A

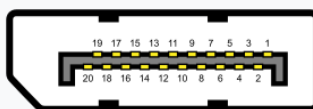


Pin assignment and definition:

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	Data2+	TMDS data2+	11	GND	Ground
2	GND	Ground	12	Clock-	TMDS clock-
3	Data2-	TMDS data2-	13	CEC	CEC
4	Data1+	TMDS data1+	14	NC	NC
5	GND	Ground	15	DDC SCL	IIC serial clock
6	Data1-	TMDS data1-	16	DDC SDA	IIC serial data
7	Data0+	TMDS data0+	17	GND	Ground
8	GND	Ground	18	+5V	+5V
9	Data0-	TMDS data0-	19	HPD	Hot plug detect
10	Clock+	TMDS clock+			

4.4 DisplayPort Signal Input

Location - DP: 20P



Pin assignment and definition:

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	ML_Lane 3 (n)	Lane 3 (negative)	11	GND	Ground
2	GND	Ground	12	ML_Lane 0 (p)	Lane 0 (positive)
3	ML_Lane 3 (p)	Lane 3 (positive)	13	CONFIG1	Connected to ground
4	ML_Lane 2 (n)	Lane 2 (negative)	14	CONFIG2	Connected to ground
5	GND	Ground	15	AUX CH (p)	Auxiliary CH (positive)
6	ML_Lane 2 (p)	Lane 2 (positive)	16	GND	Ground
7	ML_Lane 1 (n)	Lane 1 (negative)	17	AUX CH (n)	Auxiliary CH (negative)
8	GND	Ground	18	Hot Plug	Hot plug detect
9	ML_Lane 1 (p)	Lane 1 (positive)	19	Return	Return for power
10	ML_Lane 0 (n)	Lane 0 (negative)	20	DP_PWR	Power for connector

4.5 Keypad & IR Connector

Location - JP9: 14P wafer pitch = 2.0mm



Pin assignment and definition:

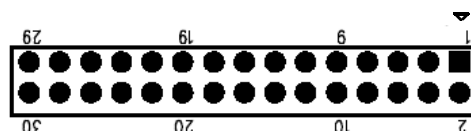
Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	3.3V	3.3V power for IR	8	K1	Key1 input

2	IR	IR input	9	K2	Key2 input
3	GND	Ground	10	K3	Key3 input
4	K0	Key0 input	11	K4	Key4 input
5	R-L	Red LED control	12	K5	Key5 input
6	G-L	Green LED control	13	K6	Key6 input
7	GND	Ground	14	K7	Key7 input

4.6 LVDS Interface Connector

Location - JP11/JP12: 2x15P pitch = 2.0mm

Pin assignment and definition:

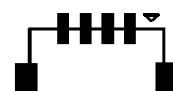


Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	VCC	Power supply for panel	16	TXOC+	LVDS odd clock channel+
2	VCC	Power supply for panel	17	TXO3-	LVDS odd channel 3-
3	VCC	Power supply for panel	18	TXO3+	LVDS odd channel 3+
4	GND	Ground	19	TXE0-	LVDS even channel 0-
5	GND	Ground	20	TXE0+	LVDS even channel 0+
6	GND	Ground	21	TXE1-	LVDS even channel 1-
7	TXO0-	LVDS odd channel 0-	22	TXE1+	LVDS even channel 1+
8	TXO0+	LVDS odd channel 0+	23	TXE2-	LVDS even channel 2-
9	TXO1-	LVDS odd channel 1-	24	TXE2+	LVDS even channel 2+
10	TXO1+	LVDS odd channel 1+	25	GND	Ground
11	TXO2-	LVDS odd channel 2-	26	GND	Ground
12	TXO2+	LVDS odd channel 2+	27	TXEC-	LVDS even clock channel-
13	GND	Ground	28	TXEC+	LVDS even clock channel+
14	GND	Ground	29	TXE3-	LVDS even channel 3-
15	TXOC-	LVDS odd clock channel-	30	TXE3+	LVDS even channel 3+

4.7 I2C Control Connector

Location - JP31: 4P wafer pitch = 2.0mm

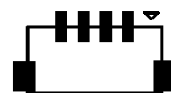
Pin assignment and definition:



Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	+5V	5V power output	3	SCL	IIC serial clock
2	SDA	IIC serial data	4	GND	Ground

4.8 Speaker Output Connector

Location - JP30: 4P wafer pitch = 2.0mm



Pin assignment and definition:

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	L-OUT+	Speaker output left ch+	3	R-OUT+	Speaker output right ch+
2	L-OUT-	Speaker output left ch-	4	R-OUT-	Speaker output right ch-

4.9 Backlight Control Connector

Location - JP5: 6P wafer pitch = 2.0mm

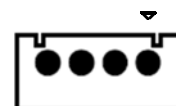


Pin assignment and definition:

Pin No.	Symbol	Description	Parameter
1	BL-VCC	Power output for backlight	DC 12V/24V
2	BL-VCC	Power output for backlight	DC 12V/24V
3	EN	Backlight on/off control	High: > 4V, Low: < 1V
4	ADJ	PWM signal for dimming	DC 0~5V
5	GND	Ground	
6	GND	Ground	

4.10 Power Input(Internal) Connector

Location - JP1: 4P wafer pitch = 2.0mm

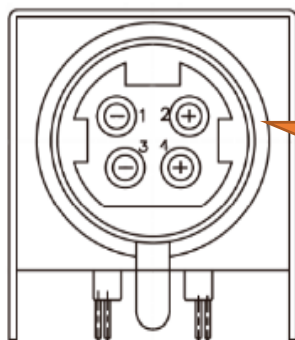


Pin assignment and definition:

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	GND	Ground	3	VIN	12V~24V DC input
2	GND	Ground	4	VIN	12V~24V DC input

4.11 Power Input(External) Connector

Location - JP2: DIN-422A 4P



Warning
Please confirm the VCC
and GND pin definition!

Pin assignment and definition:

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	GND	Ground	3	GND	Ground
2	VIN	12V~24V DC input	4	VIN	12V~24V DC input

4.12 PC Audio Input

Location - JP8: 5P PJ-325 blue

Pin assignment and definition:

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	LINE_INL+	Line in left channel+	4	LINE_INR+	Line in right channel+
2	LINE_INL-	Line in left channel-	5	GND	Ground
3	LINE_INR-	Line in right channel-			

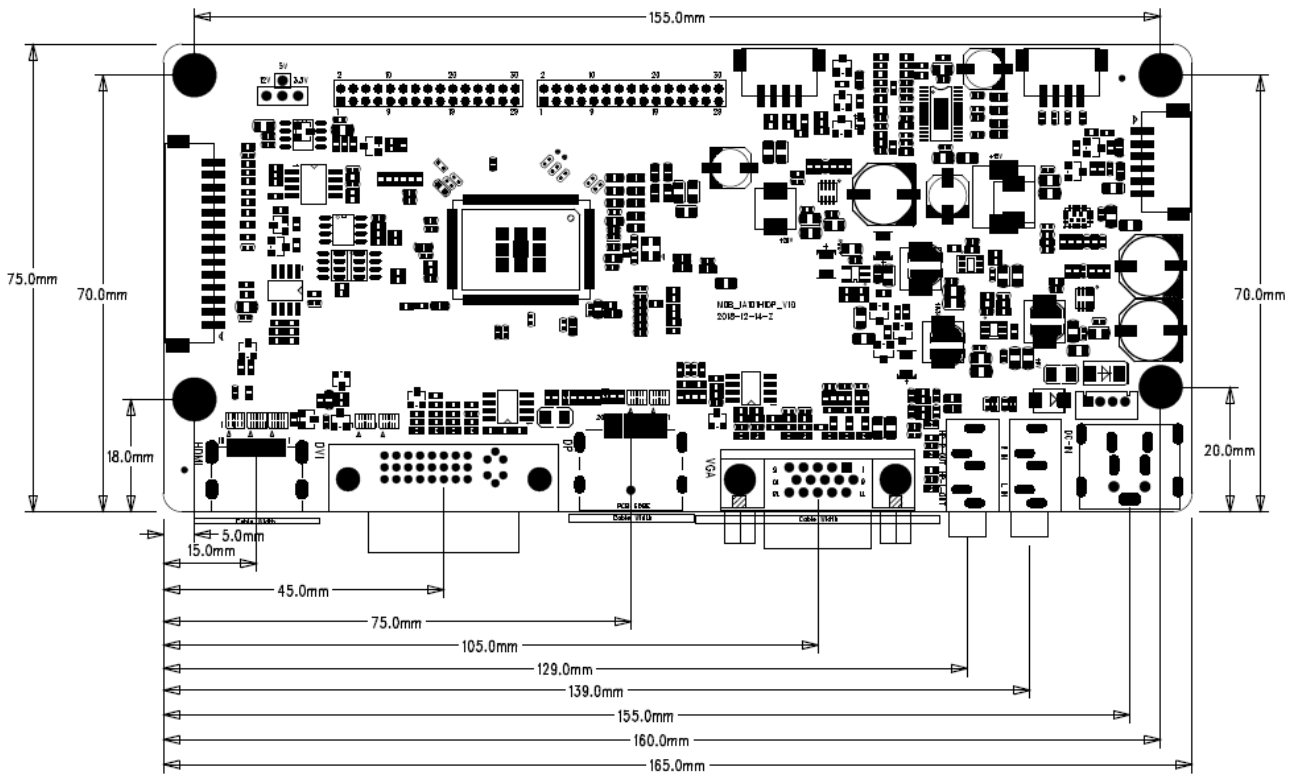
4.13 Headphones Output

Location - JP7: 5P PJ-325 black






Pin assignment and definition:

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	HP_OUT_L	HP left channel output	4	HP_OUT_R	HP right channel output
2	HP_DET	HP plug detection	5	GND	Ground
3	NC				

5. Mechanical Dimension



PCB Dimension

-  PCB Length = 165.0mm
-  PCB Width = 75.0mm
-  PCB Thickness = 1.6mm
-  PCBA(PCB + Component) Thickness ≤ 17.0mm
-  Screw Hole Diameter = 3.5mm

6. Configuration and Precautions

6.1 Temperature

✚ Storage: $-10^{\circ}\text{C}\sim+60^{\circ}\text{C}$

✚ Operation: $0^{\circ}\text{C}\sim+40^{\circ}\text{C}$

6.2 Humidity

✚ Storage: 5%~95%(non-condensing)

✚ Operation: 10%~90%(non-condensing)

6.3 Altitude

✚ Storage: 20000ft(Max.)

✚ Operation: 10000ft(Max.)

7. Key Materials List

No.	Part Number	Function Description	Vendor
1	RTD25xx	Scaler	Realtek
2	MP9943AGQ-Z	DC-DC	MPS
3	MP9447GL-Z	DC-DC	MPS
4	APW8825CI	DC-DC	ANPEC
5	APL5325BI-TRG	LDO	ANPEC
6	W25Q16JVSSIQ	SPI flash	Winbond
7	CAT24C16WI-GT3	System EEPROM	ON
8	7U14318E20UCG	SMD Crystal	SJK
9	AD52068	Class-D AMP	ESMT
10	PCB	1.6mm FR-4 E=4.2 ±10% 2-Layers 1.0oz 165.0x75.0mm	DAPE