



# LCD Display Controller Board Specification V1.2

Model Name	<b>STI-IDB04-K V1.2</b>
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# Contents

1. Features.....	2
2. Specifications.....	3
3. Function Layout.....	4
4. Interface Definition.....	5
5. Mechanical Dimensions.....	10
6. Configuration and Precautions.....	11
7. Key Materials List.....	12

## Revision History

Revision	Date	Page	Summary	Author
1.0	2020.12.29	All	First release.	George
1.1	2021.1.19	4	Update photograph	George

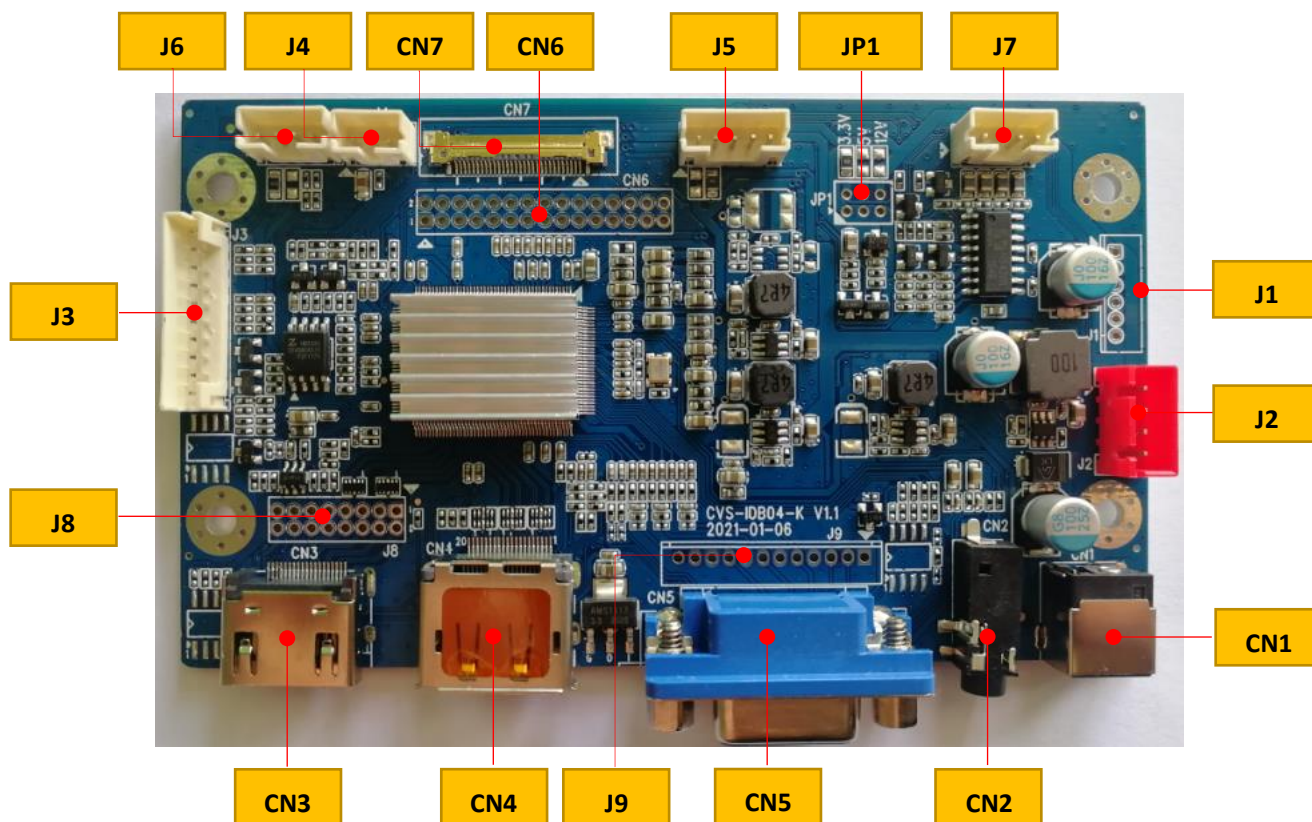
## 1. Features

- ✦ Resolution up to 1920x1080@60Hz
- ✦ Support 1-lane/2-lane/4-lane eDP HBR panel
- ✦ Support 3.3V/5V/12V panel voltage
- ✦ 1\*VGA input
- ✦ 1\*HDMI1.4 input
- ✦ 1\*DisplayPort 1.2 input
- ✦ Build-in 2x3W@4Ω Class-D AMP
- ✦ Support Headphones output
- ✦ Support Keypad (5Key/6Key/7Key)
- ✦ Support IR Remote Controlling (NEC Code)
- ✦ 12V DC power input
- ✦ Standby mode power consumption less than 0.5W
- ✦ Support DDC/CI/2B protocol
- ✦ Support UART protocol (TTL-Level)
- ✦ Support external sensor controlling (via I2C or GPIO)

## 2. Specifications

Chipset	RTD25xx	
Target Market	Industrial Display	
OSD Language	English、 Simplified Chinese	
Panel	Type	LED/LCD
	Voltage	3.3V/5V/12V
	Interface	1-lane/2-lane/4-lane eDP HBR
	Max. Resolution	1920x1080@60Hz
LED Backlight	Dimming	PWM/DC (Default is PWM)
Video Input	VGA	15P D-Sub, Max. resolution is 1920x1080@60Hz
		PH2.0mm 12P, Max. resolution is 1920x1080@60Hz
	HDMI 1.4	19P Type-A, Max. resolution is 1920x1080@60Hz
	DisplayPort 1.2	20P, Max. resolution is 1920x1080@60Hz
Power	Power Input	DC 12V
	Normal Consumption	Max. 5W (Board Only)
	Standby Consumption	< 0.5W (Board Only)
User Key Function	Power、 Menu、 Right、 Left、 Exit、 Auto (Default)	

### 3. Function Layout

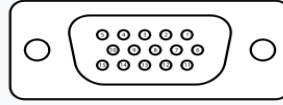


J1	Backlight Control	PH2.0mm 6P (optional)
J2	Internal Power Input	XH2.54mm 4P
J3	Keypad	PH2.0mm 10P
J4	IR Receiver	PH2.0mm 3P
J5	External Sensor Control	PH2.0mm 5P
J6	UART	PH2.0mm 4P
J7	Speaker	PH2.0mm 4P
J8	Internal HDMI input	2x8Pin 2.0mm pitch (optional)
J9	Internal VGA input	PH2.0mm 12P (optional)
CN7	2-lane eDP Output	I-PEX FPC 20455-030E-76
CN6	4-lane eDP Output	2x15Pin 2.0mm pitch (optional)
CN5	VGA Signal Input	D-Sub 15P
CN4	DisplayPort Signal Input	DisplayPort 20P
CN3	HDMI Signal Input	HDMI Type-A 19P
CN2	Headphone Output	3.5mm phone jack
CN1	External Power Input	2.0 DC Jack
JP1	Panel Voltage Select	2x3Pin 2.0mm pitch (optional)

## 4. Interface Definition

### 4.1 VGA Signal Input

Location - CN5: 15P Female D-Sub

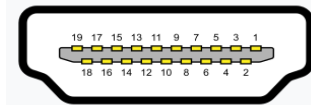


Pin assignment and definition:

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 HDMI Signal Input

Location - CN3: 19P Type-A

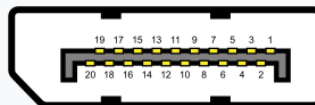


Pin assignment and definition:

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 detection
10	Clock+	TMDS clock+			

### 4.3 DisplayPort Signal Input

Location - CN4: 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 detection
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

#### 4.4 Power Input (External) Connector

Location - CN1: DC2.0 JACK (5.5\*2.1mm)



#### 4.5 Power Input (Internal) Connector

Location - J2: 4P wafer pitch = 2.54mm

Pin assignment and definition:

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	12V	DC +12V power input	3	GND	Ground
2	12V	DC +12V power input	4	GND	Ground

#### 4.6 Backlight Control Connector

Location - J1: 6P wafer pitch = 2.0mm

Pin assignment and definition:

Pin No.	Symbol	Description	Parameter
1	12V	Power supply for backlight	+12V DC power supply
2	12V	Power supply for backlight	+12V DC power supply
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	

#### 4.7 Speaker Connector

Location - J7: 4P wafer pitch = 2.0mm

Pin assignment and definition:

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

#### 4.8 Sensor Control Connector

Location - J5: 5P wafer pitch = 2.0mm

Pin assignment and definition:

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	VCC	DC +5V (or +3.3V) power supply	4	SCL	IIC Clock
2	GND	Ground	5	SDA	IIC Data
3	GPIO	GPIO port			

#### 4.9 UART Connector

Location - J6: 4P wafer pitch = 2.0mm

Pin assignment and definition:

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	VCC	DC +5V (or +3.3V) power supply	3	TX	UART Rx
2	RX	UART Rx	4	GND	Ground

#### 4.10 IR Receiver Connector

Location - J4: 3P wafer pitch = 2.0mm

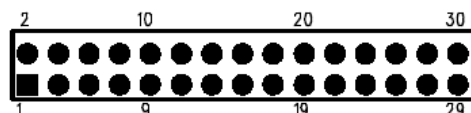
Pin assignment and definition:

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	5V	DC +5V power supply	3	IR	IR signal input
2	GND	Ground			

#### 4.11 4-lane eDP Interface Connector

Location - CN6: 2x15P pitch = 2.0mm

Pin assignment and definition:



Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	3.3V	3.3V power supply	16	GND	Ground
2	3.3V	3.3V power supply	17	LANE2+	Signal Link Positive Lane2
3	VCC	Power supply for panel	18	LANE2-	Signal Link Negative Lane2



4	VCC	Power supply for panel	19	GND	Ground
5	VCC	Power supply for panel	20	GND	Ground
6	VCC	Power supply for panel	21	LANE3+	Signal Link Positive Lane3
7	GND	Ground	22	LANE3-	Signal Link Negative Lane3
8	GND	Ground	23	GND	Ground
9	LANE0+	Signal Link Positive Lane0	24	GND	Ground
10	LANE0-	Signal Link Negative Lane0	25	AUX+	Signal Aux Positive Ch.
11	GND	Ground	26	AUX-	Signal Aux Negative Ch.
12	GND	Ground	27	GND	Ground
13	LANE1+	Signal Link Positive Lane1	28	GND	Ground
14	LANE1-	Signal Link Negative Lane1	29	GND	Ground
15	GND	Ground	30	HPD	Hot plug detection

#### 4.12 2-lane eDP Interface Connector

Location - CN7: FPC 30P pitch = 0.5mm

Pin assignment and definition:

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	NC	No connection	16	GND	Ground
2	GND	Ground	17	HPD	Hot plug detection
3	LANE1-	Signal Link Negative Lane1	18	GND	Ground
4	LANE1+	Signal Link Positive Lane1	19	GND	Ground
5	GND	Ground	20	GND	Ground
6	LANE0-	Signal Link Negative Lane0	21	GND	Ground
7	LANE0+	Signal Link Positive Lane0	22	BL_EN	LED Backlight Control
8	GND	Ground	23	BL_PWM	PWM signal for dimming
9	AUX+	Signal Aux Positive Ch.	24	NC	No connection
10	AUX-	Signal Aux Negative Ch.	25	NC	No connection
11	GND	Ground	26	VLED	LED backlight power
12	VCC	Power supply for panel	27	VLED	LED backlight power
13	VCC	Power supply for panel	28	VLED	LED backlight power
14	NC	No connection	29	VLED	LED backlight power
15	GND	Ground	30	NC	No connection

#### 4.13 Keypad Connector

Location - J3: 10P wafer pitch = 2.0mm

Pin assignment and definition:

Pin No.	Symbol	Description	Default	Pin No.	Symbol	Description	Default
1	K0	Key0 input	On/Off	6	K2	Key2 input	Left
2	LEDR	Red LED ctrl.	Red LED	7	K3	Key3 input	Auto
3	LEDG	Green LED ctrl.	Green LED	8	K4	Key4 input	Menu
4	GND	Ground	Ground	9	K5	Key5 input	Exit
5	K1	Key1 input	Right	10	K6	Key6 input	N/A

#### 4.14 Internal VGA Signal Input

Location - J9: 12P pitch = 2.0mm

Pin assignment and definition:

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	GND	Ground	7	G	Green Video
2	VS	Vertical sync	8	GND	Ground
3	HS	Horizontal sync	9	B	Blue Video
4	GND	Ground	10	GND	Ground
5	R	Red Video	11	SDA	IIC serial data
6	GND	Ground	12	SCL	IIC serial clock

#### 4.15 Internal HDMI Signal Input

Location - J8: 2x8P pitch = 2.0mm

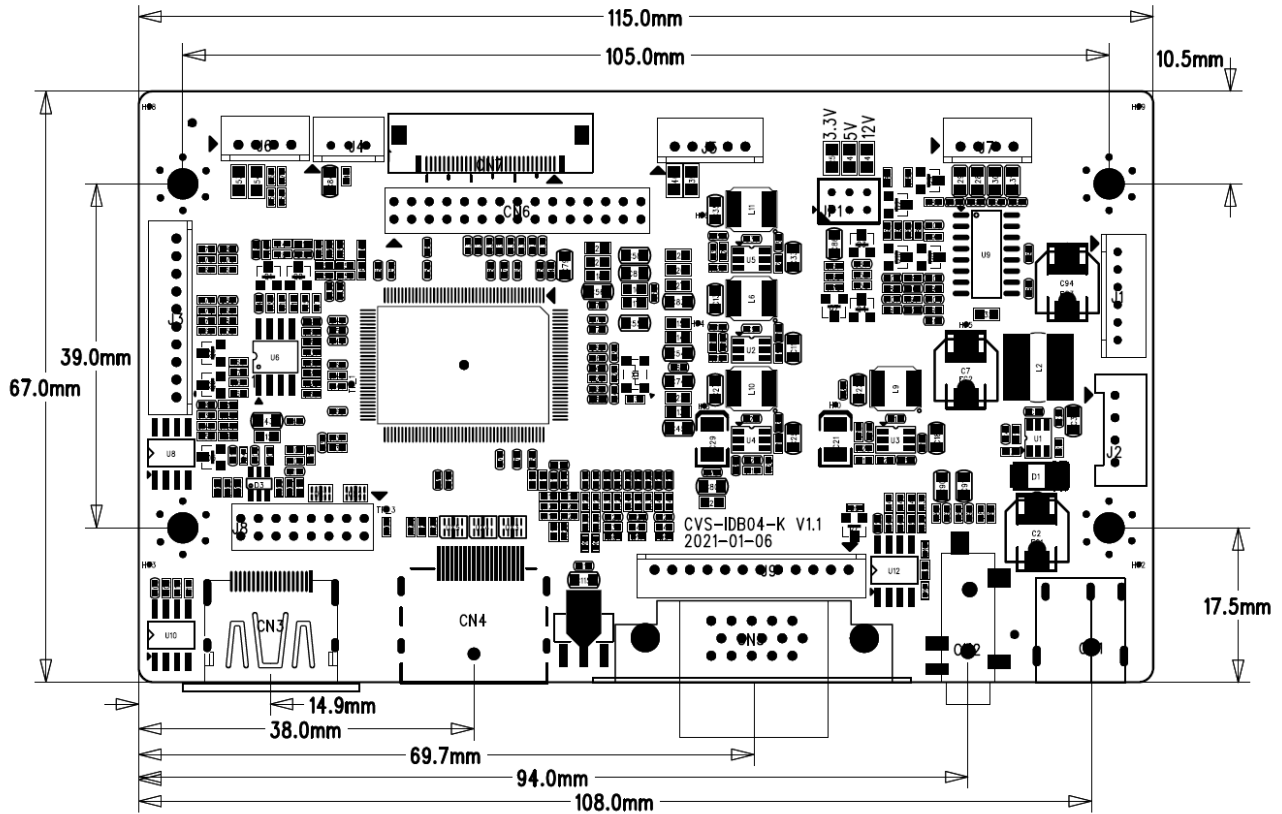
Pin assignment and definition:

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	RX2N	TMDS data2-	9	GND	Ground
2	RX2P	TMDS data2+	10	GND	Ground
3	RX1N	TMDS data1-	11	SDA	IIC serial data
4	RX1P	TMDS data1+	12	SCL	IIC serial clock
5	RX0N	TMDS data0-	13	DET	HDMI cable detection
6	RX0P	TMDS data0+	14	HPD	Hot plug detection
7	RXCN	TMDS clock-	15	GND	Ground
8	RXCP	TMDS clock+	16	5V	HDMI 5V






#### 4.16 Panel Voltage Select

Location - JP1: 2x3P pitch = 2.0mm Jumper

## 5. Mechanical Dimensions





### PCB Dimensions

-  PCB Length = 115.0mm
-  PCB Width = 67.0mm
-  PCB Thickness = 1.6mm
-  PCBA (PCB + Component) Thickness  $\leq 15.0$ mm
-  Screw Hole Diameter = 3.5mm


## 6. Configuration and Precautions


### 6.1 Temperature

 Storage: -20°C~+70°C


 Operation: 0°C~+40°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	FR8205	DC-DC	Fitipower
3	SY8105	DC-DC	Silergy
4	ZB25VQ80	SPI flash	Zbit
5	NS4205	Class-D AMP	Nsiway
6	X32251431818MSB4SI	SMD Crystal	YXC
7	OVZ101M1E/CTR	Solid Capacitor	Lelon
8	PCB	1.6mm FR-4 E=4.2 ±10% 2-Layers 1.0oz 115.0x67.0mm	JLC