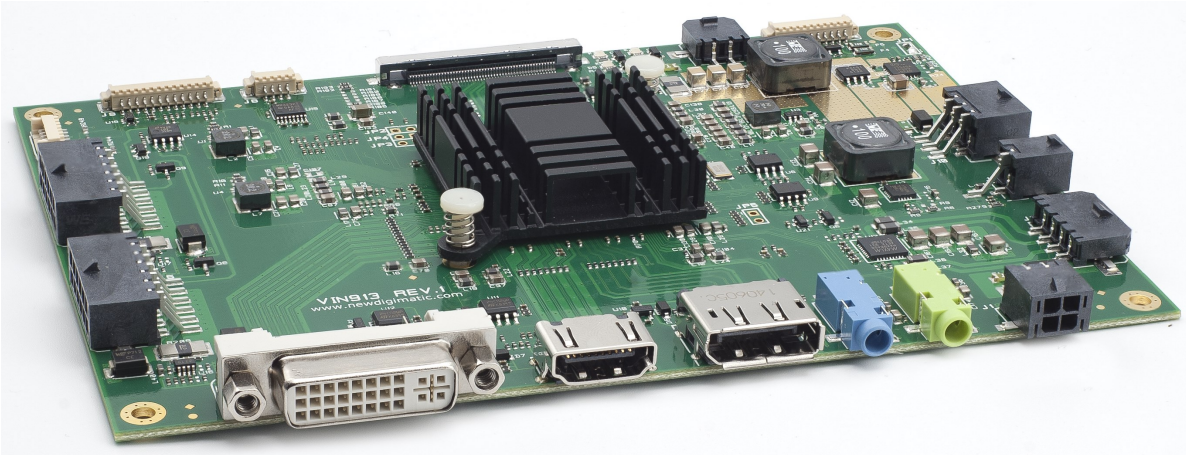
VIN913
UHD TFT LCD Controller HDMI, DP, DVI and Diagnostic User Manual



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Revision History

Date	Rev.	Paragraph	Description
December 16, 2018	0	NA	Initial Release
April 23, 2020	1	4.1	Page 11, J3 Speaker Connector

1. Description

The VIN913 is a highly integrated board that interfaces digital HDMI, DisplayPort and DVI video inputs in virtually any format to a flat-panel display.

The VIN913 is optimized for high-performances, value line, flat-panel monitors and is equipped with advanced highly integrated Image Processor with an internal HDMI2.0 an DP1.2 HBR2 and an DVI/HDMI1.4

The all inputs are HDCP (High-bandwidth Digital Content Protection) compliant.

Computer, from VGA to DCI 4K (4096x2160@60Hz), and Video images can be resized to fit on a target display device with any resolution, up to 4096x2160@60Hz .

Optimization circuitry: this creates sharp and clear images, centred on the screen, without user intervention.

The VIN913 includes light sensor for automatic backlight control, temperature sensor for programmable fan control and stereo amplifier up to 20+20W@8-Ohm.

The VIN913 has innovative abilities to self-diagnosis with capability to communicate its state via RS232
The use of the VIN913 increases the reliability of the monitor and reduces drastically the down-time .

2. General Specification

2.1 Chip Set
- MST9U13Q1

2.2 Panel Connectivity
- All LCD TFT Panels up to 4096x2160@60Hz - 4:3 and 16:9

2.3 Digital Input (HDMI) Interface
- 1 HMDI Standard Connector
- HMDI 2.0 compliant Rx
- Supports resolutions up to DCI 4K (4096x2160@60Hz)
- Deep color and wide gamut support: 8/10/12-bit at YCC 4:4:4
- Supports integrated HDCP 2.2

2.4 Digital Input (DisplayPort) Interface
- 1 DisplayPort Standard Connector
- 4-lane DP1.2 HBR2 compliant Rx
- One auxiliary channel
- Supports SST with resolution up to DCI 4K (4096x2160@60Hz)
- Supports integrated HDCP 2.2

2.5 Digital Input (DVI) Interface
- 1 DVI-I Dual Link Standard Connector
- One DVI Compliant Input Ports
- Operates up to 165MHz Single link up to 1920X1200@60Hz
- Operates up to 165MHz Dual link up to 2560X1600@60Hz
- Supports integrated HDCP 1.4

2.6 Pages Control by On-Screen Display (OSD)
- Input Source
- Brightness and Contrast
- Color Format
- Color Setting
- Picture Quality
- Display Setting
- Audio Setting
- Other Setting

2.7 Control Modes

- Seven push-Keys
- Infrared
- One Serial RS232

2.8 Digital I/O

- 3.3Vor 5V (Default) I2C-Bus
- 2 TTL in 10-KOhm P.U.
- 2 Open Drain 24V 400mA Inductive Load

2.9 Output Panel Interface

- Supports 8-ch V-by-One compliant transmitter
- Supports eDP compliant transmitter up to 8 lanes

2.10 Panel Power Supply

- 5 – 12 VDC / 5A Max

2.11 Inverter Support

- 12/24 VDC Power
- Enable pin signal
- Analog Dimmer adjust 0 – 3.3VDC or Digital PWM pin signal

2.12 Measurement

- Inverter 1 Current 0-15 ADC Max
- Inverter 1 Voltage 0-26 VDC Max
- Inverter 2 Current 0-15 ADC Max
- Inverter 2 Voltage 0-26 VDC Max
- Panel Current 0-5 ADC Max
- Panel Voltage 0-12 VDC Max
- On board temperature -40°C to 85°C
- External temperature -40°C to 85°C
- Ambient Light Dark to 10.000 Lux (Relative measure)

2.13 Fan Control

- 1 line setup via RS-232 protocol 12-24VDC 2A

2.14 Power requirements

- 12 –24VDC Max 5W Only VIN913 Control Board

3. Environmental and Reliability

3.1 Operating Conditions

- Temperature : 0°~ 60°
- Humidity : 10% ~ 90%, non-condensing
- Altitude : maximum 3,000m

3.2 Transportation Conditions

- Temperature : -25°~ 85°
- Humidity : 5% ~ 95%, non-condensing
- Altitude : maximum 15,000m

3.3 Storage Conditions

- Temperature : -25°~ 85°
- Humidity : 5% ~ 95%, non-condensing
- Altitude : maximum 3,000m

3.4 Reliability Specifications

- MTBF : more than 200,000 hours at 90% confidence level,

4. Electrical Specification

4.1 Connectors Pin Assignment

- P2

Display Port Input Connector		
PIN	**SIGNAL**	**DESCRIPTION**
1	ML_Lane 3+	Lane 3 Positive
2	GND	Ground
3	ML_Lane 3-	Lane 3 Negative
4	ML_Lane 2+	Lane 2 Positive
5	GND	Ground
6	ML_Lane 2-	Lane 2 Negative
7	ML_Lane 1+	Lane 1 Positive
8	GND	Ground
9	ML_Lane 1-	Lane 1 Negative
10	ML_Lane 0+	Lane 0 Positive
11	GND	Ground
12	ML_Lane 0-	Lane 0 Negative
13	CONFIG1	Connected to Ground
14	CONFIG2	Connected to Ground
15	AUX CH+	Auxiliary Channel Positive
16	GND	Ground
17	AUX CH-	Auxiliary channel Negative
18	HPD	Hot Plug Detect
19	RTN	Return for Power
20	DP_PWR	DP Power (3.3 V @ 500 mA)

- P2

HDMI Input Connector		
PIN	**SIGNAL**	**DESCRIPTION**
1	RX 2+	TMDS Data 2+
2	GND	TMDS Data 2 Shield
3	RX 2-	TMDS Data 2−
4	RX 1+	TMDS Data 1+
5	GND	TMDS Data1 Shield
6	RX 1-	TMDS Data 1−
7	RX 0+	TMDS Data 0+
8	GND	TMDS Data 0 Shield
9	RX 0-	TMDS Data 0−
10	RX CLK+	TMDS Clock+
11	GND	TMDS Clock Shield
12	RX CLK-	TMDS Clock−
13	CEC	Consumer Electronics Control
14	NC	Not Connected Reserved
15	SCL	Serial Clock for DDC
16	SDA	Serial Data for DDC
17	GND	Ground for DDC CEC
18	5VDC	5V for EDID (Un-powered Monitor)
19	HPD	Hot Plug Detect

- P3

DVI-D Dual Link Input Connector		
PIN	**SIGNAL**	**DESCRIPTION**
1	TMDS 2-	Digital Red− (Link 1)
2	TMDS 2+	Digital Red+ (Link 1)
3	GND	TMDS Data 2/4 Shield
4	TMDS 4-	Digital Green− (Link 2)
5	TMDS 4+	Digital Green+ (Link 2)
6	DDC_CLK	DDC Clock
7	DDC_DAT	DDC Data
8	NC	Not Connetted
9	TMDS 1-	Digital Green− (Link 1)
10	TMDS 1+	Digital Green+ (Link 1)
11	GND	TMDS Data 1/3 Shield
12	TMDS 3-	Digital Blue− (Link 2)
13	TMDS 3+	Digital Blue+ (Link 2)
14	DDC_5V	Power Supply for DDC
15	GND	Ground
16	HPD	Hot Plug Detect
17	TMDS 0-	Digital Blue− (Link 1)
18	TMDS 0+	Digital Blue+ (Link 1)
19	GND	TMDS Data 0/5 Shield
20	TMDS 5-	Digital Red− (Link 2)
21	TMDS 5+	Digital Red+ (Link 2)
22	GND	TMDS Clock Shield
23	CLOCK+	Digital Clock+ (Links 1 and 2)
24	CLOCK-	Digital Clock− (Links 1 and 2

- P4

Audio Out Connector SJ-3524-SMT-TR-GR (Matching: TRS Jack 3,5mm)		
PIN	**SIGNAL**	**DESCRIPTION**
1	L_TIP	Left Channel Stereo Audio Output
2	R_RING	Right Channel Stereo Audio Output
3	GND_SLEEVE	Ground

- P5

Audio In Connector SJ-3524-SMT-TR-BE (Matching: TRS Jack 3,5mm)		
PIN	**SIGNAL**	**DESCRIPTION**
1	L_TIP	Left Channel Stereo Audio Input
2	R_RING	Right Channel Stereo Audio Input
3	GND_SLEEVE	Ground

- J1

Power Supply Connector Molex 43045-0409 (Matching: Molex 43025-04XX)		
PIN	**SIGNAL**	**DESCRIPTION**
1	GND	Ground
2	GND	Ground
3	VIN	Input Power Supply 12/24VDC @ 3A Max per pin
4	VIN	Input Power Supply 12/24VDC @ 3A Max per pin

- J2

Opt. Power Panel Connector Molex 43650-0212 (Matching: Molex 43645-02XX)		
PIN	**SIGNAL**	**DESCRIPTION**
1	VLCD	Panel Power Supply 12/5VDC @ 5A Max
2	GND	Ground

- J3

Speaker Connector Molex 43650-0412 (Matching: Molex 43645-04XX)		
PIN	**SIGNAL**	**DESCRIPTION**
1	SPKL+	Speaker Out Left+ @ 4/8-Ohm Max 20W
2	SPKL-	Speaker Out Left- @ 4/8-Ohm Max 20W
3	SPKR-	Speaker Out Right- @ 4/8-Ohm Max 20W
4	SPKR+	Speaker Out Right+ @ 4/8-Ohm Max 20W

- J4

V-by-One! Output LCD Connector JAE FI-RE51S-HF (Matching : JAE FI-RE51HL)		
PIN	**SIGNAL**	**DESCRIPTION**
1	GND	Ground
2	TX 7+	V-by-One HS Data Lane 7+
3	TX 7-	V-by-One HS Data Lane 7-
4	GND	Ground
5	TX 6+	V-by-One HS Data Lane 6+
6	TX 6-	V-by-One HS Data Lane 6-
7	GND	Ground
8	TX 5+	V-by-One HS Data Lane 5+
9	TX 5-	V-by-One HS Data Lane 5-
10	GND	Ground
11	TX 4+	V-by-One HS Data Lane 4+
12	TX 4-	V-by-One HS Data Lane 4-
13	GND	Ground
14	TX 3+	V-by-One HS Data Lane 3+
15	TX 3-	V-by-One HS Data Lane 3-
16	GND	Ground
17	TX 2+	V-by-One HS Data Lane 2+
18	TX 2-	V-by-One HS Data Lane 2-
19	GND	Ground
20	TX 1+	V-by-One HS Data Lane 1+
21	TX 1-	V-by-One HS Data Lane 1-
22	GND	Ground
23	TX 0+	V-by-One HS Data Lane 0+
24	TX 0-	V-by-One HS Data Lane 0-
25	GND	Ground
26	LOCKN	V-by-One HS Lock Detect
27	HTPDN	(V-by-One HS Hot Plug Detec
28	UO11	User Option NC/Hight/Low (Default NC)
29	UO10	User Option NC/Hight/Low (Default Low)
30	LD_EN	Local Dimming Enable SW Define (Default Low)
31	Bit_SEL	H = 10bit L = 8bit SW Define (Default Hight)
32	UO9	User Option NC/Low (Default NC)
33	UO8	User Option NC/SCL (Default NC)
34	UO7	User Option NC/SDA (Default NC)
35	UO6	User Option NC/Low (Default NC)
36	UO5	User Option NC/Low (Default NC)
37	UO4	User Option NC/Low (Default Low)
38	UO3	User Option NC/Hight/Low (Default NC)
39	UO2	User Option NC/Hight/Low (Default NC)
40	UO1	User Option NC/Low (Default Low)

V-by-One! Output LCD Connector JAE FI-RE51S-HF (Matching : JAE FI-RE51HL)		
PIN	**SIGNAL**	**DESCRIPTION**
41	GND	Ground
42	GND	Ground
43	NC	No Connection
44	VLCD	Panel Power Supply 12/5VDC @ 5A Max
45	VLCD	Panel Power Supply 12/5VDC @ 5A Max
46	VLCD	Panel Power Supply 12/5VDC @ 5A Max
47	VLCD	Panel Power Supply 12/5VDC @ 5A Max
48	VLCD	Panel Power Supply 12/5VDC @ 5A Max
49	VLCD	Panel Power Supply 12/5VDC @ 5A Max
50	VLCD	Panel Power Supply 12/5VDC @ 5A Max
51	VLCD	Panel Power Supply 12/5VDC @ 5A Max

- J5

Backlight 1 Connector Molex 430451209 (Matching: Molex 430251200)		
PIN	**SIGNAL**	**DESCRIPTION**
1	BKL_LOAD	12/24VDC to Backlight
2	BKL_LOAD	12/24VDC to Backlight
3	BKL_LOAD	12/24VDC to Backlight
4	BKL_LOAD	12/24VDC to Backlight
5	BKL_LOAD	12/24VDC to Backlight
6	BKL-ON/OFF	Backlight ON/OFF
7	BKL_SOURCE	12/24VDC from Power Supply
8	BKL_SOURCE	12/24VDC from Power Supply
9	BKL_SOURCE	12/24VDC from Power Supply
10	BKL_SOURCE	12/24VDC from Power Supply
11	BKL_SOURCE	12/24VDC from Power Supply
12	BKL_DIM	Backlight Dimming Analog or Digital PWM (Default)
Note:Max Current from Source to Load 15A		

- J6

Backlight 2 Connector Molex 430451209 (Matching: Molex 430251200)		
PIN	**SIGNAL**	**DESCRIPTION**
1	BKL_LOAD	12/24VDC to Backlight
2	BKL_LOAD	12/24VDC to Backlight
3	BKL_LOAD	12/24VDC to Backlight
4	BKL_LOAD	12/24VDC to Backlight
5	BKL_LOAD	12/24VDC to Backlight
6	BKL-ON/OFF	Backlight ON/OFF
7	BKL_SOURCE	12/24VDC from Power Supply
8	BKL_SOURCE	12/24VDC from Power Supply
9	BKL_SOURCE	12/24VDC from Power Supply
10	BKL_SOURCE	12/24VDC from Power Supply
11	BKL_SOURCE	12/24VDC from Power Supply
12	BKL_DIM	Backlight Dimming Analog or Digital PWM (Default)
Note:Max Current from Source to Load 15A		

- J7

IR-FR Connector Molex 53261-0671 (Matching: Molex 51021-0600)		
PIN	**SIGNAL**	**DESCRIPTION**
1	PWR	3.3VDC
2	LED_G/R	LED Green/Red (ON/Stand-by)
3	IR	IR Receiver Input
4	GND	Ground
5	GND	Ground
6	FR	Light Sensor Analog 0-3.3V

- J8

RS-232 Serial Connector Molex 53261-0471 (Matching: Molex 51021-0400)		
PIN	**SIGNAL**	**DESCRIPTION**
1	RX	RS-232 Receiver
2	TX	RS-232 Trasmitter
3	GND	Ground
4	GND	Ground

- J12

External NTCConnector Molex 43045-0209 (Matching: Molex 43025-02XX		
PIN	**SIGNAL**	**DESCRIPTION**
1	NTC1	Pin1 External NTC 10K@25°C
2	NTC2	Pin2 External NTC 10K@25°C

- J9

OSD Keyboard Connector Molex 53261-1271 (Matching: Molex 51021-1200)		
PIN	**SIGNAL**	**DESCRIPTION**
1	HK1	OSD Hot Key 1 (TBD)
2	HK2	OSD Hot Key 2 (TBD)
3	HK3	OSD Hot Key 3 (TBD)
4	EXIT	OSD EXIT Key
5	DOWN	OSD DOWN / Value - Key
6	UP	OSD UP / Value + Key
7	MENU	OSD MENU Key
8	ON/STB	OSD ON/Stand-by Key
9	PWR	3.3VDC
10	LED_G/R	LED Green/Red (ON/Stand-by)
11	IR	IR Receiver Input
12	GND	Ground

- J10

FAN Connector Molex 43045-0609 (Matching: Molex 43025-06XX)		
PIN	**SIGNAL**	**DESCRIPTION**
1	VFAN	FAN Power Supply 12/24VDC @ 2A Max
2	VFAN	FAN Power Supply 12/24VDC @ 2A Max
3	VFAN	FAN Power Supply 12/24VDC @ 2A Max
4	GND	Ground
5	GND	Ground
6	GND	Ground

- J11

I/O Connector Molex 53261-1071 (Matching: Molex 51021-1000)		
PIN	**SIGNAL**	**DESCRIPTION**
1	PWR	5VDC @ 200mA Max
2	GND	Ground
3	PWR1	3,3VDC @ 200mA Max
4	OD1	Open Drain 24VDC @ 400mA Max also Inductive Load
5	OD2	Open Drain 24VDC @ 400mA Max also Inductive Load
6	IN1	TTL Input 4,7-Kohm P.U.
7	SCL	I2C SCL 3,3/5V (Default)
8	SDA	I2C SDA 3,3/5V (Default)
9	IN2	TTL Input 4,7-Kohm P.U.
10	GND	Ground

- 4.2 Connectors Position

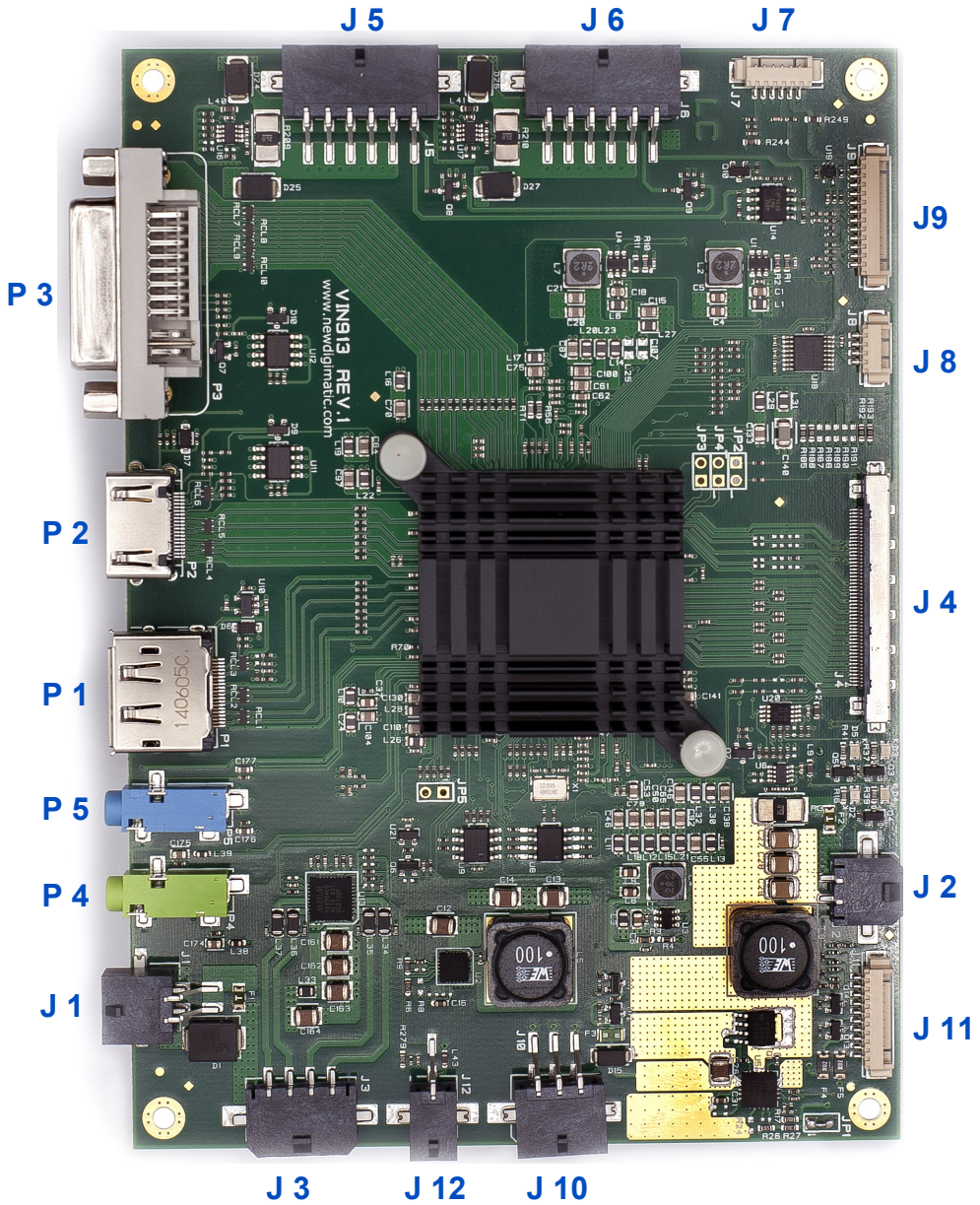
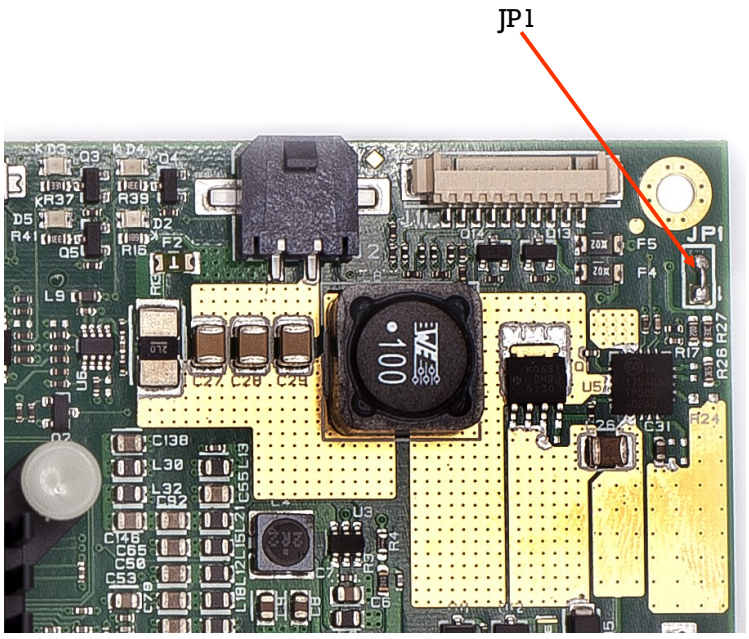


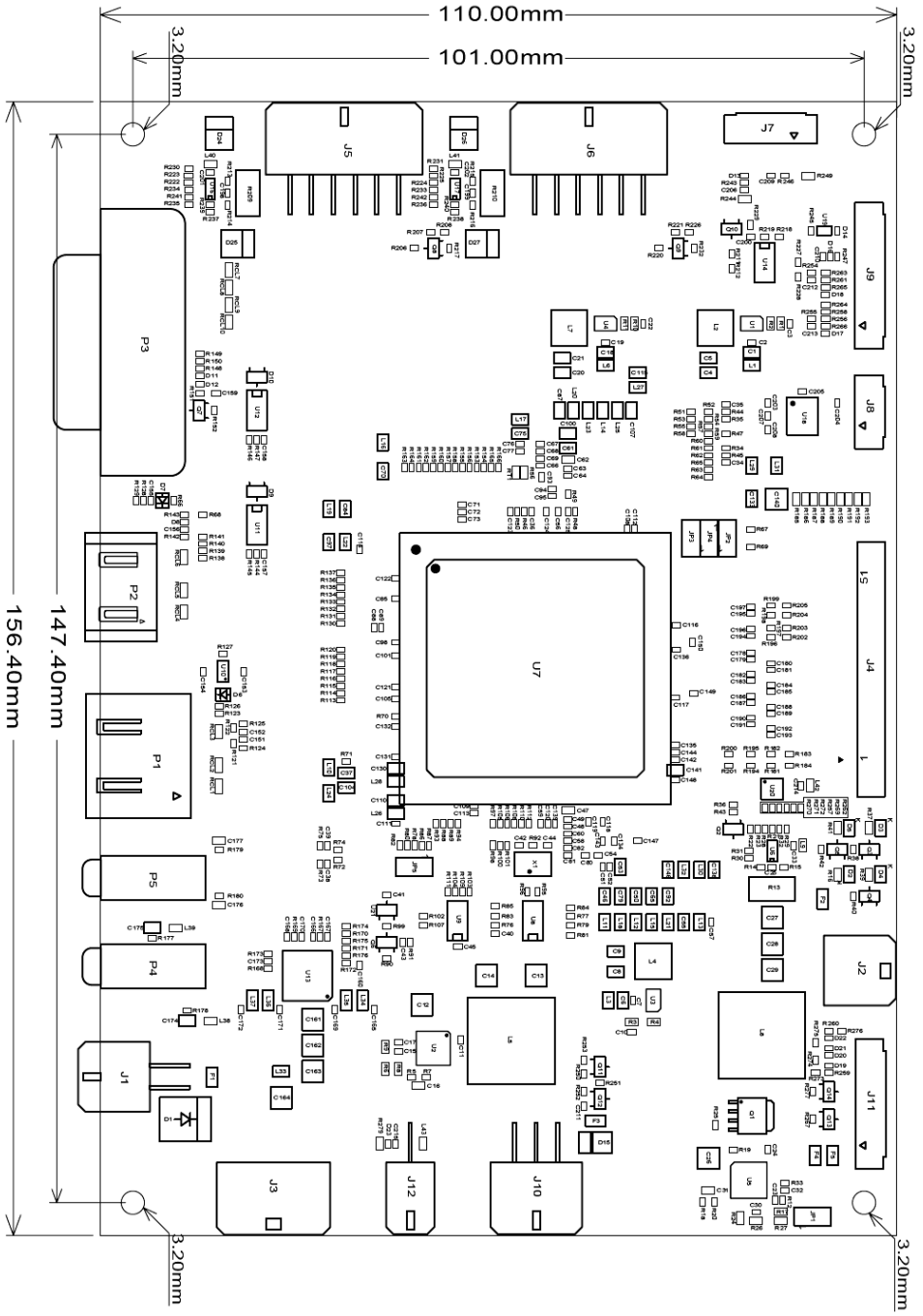
Table 1 : LCD_Power_Supply

LCD Power Supply	JP1
12VDC (Default)	SOLDERING
5VDC	CUT

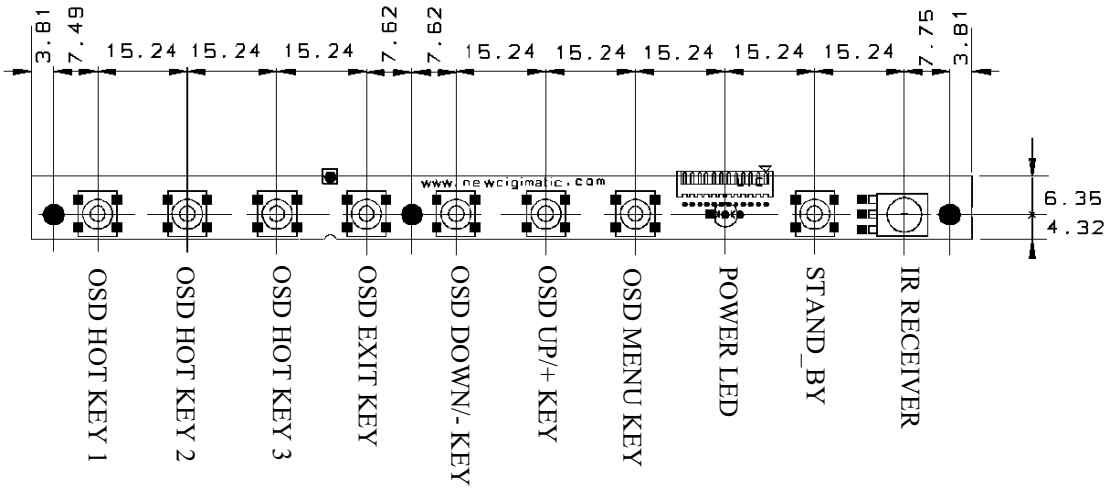


5. Mechanical Specification

- 5.1 Main Board Dimension



- 5.3 OSD Keyboard Dimension and Functions



6. Operation Guide

- 6.1 OSD Adjustment

VIN913 gives various and very easy graphic user interface. User can easily access to the function that user wants. Be sure that your system power and LED is turned on (Green) before operating key board.

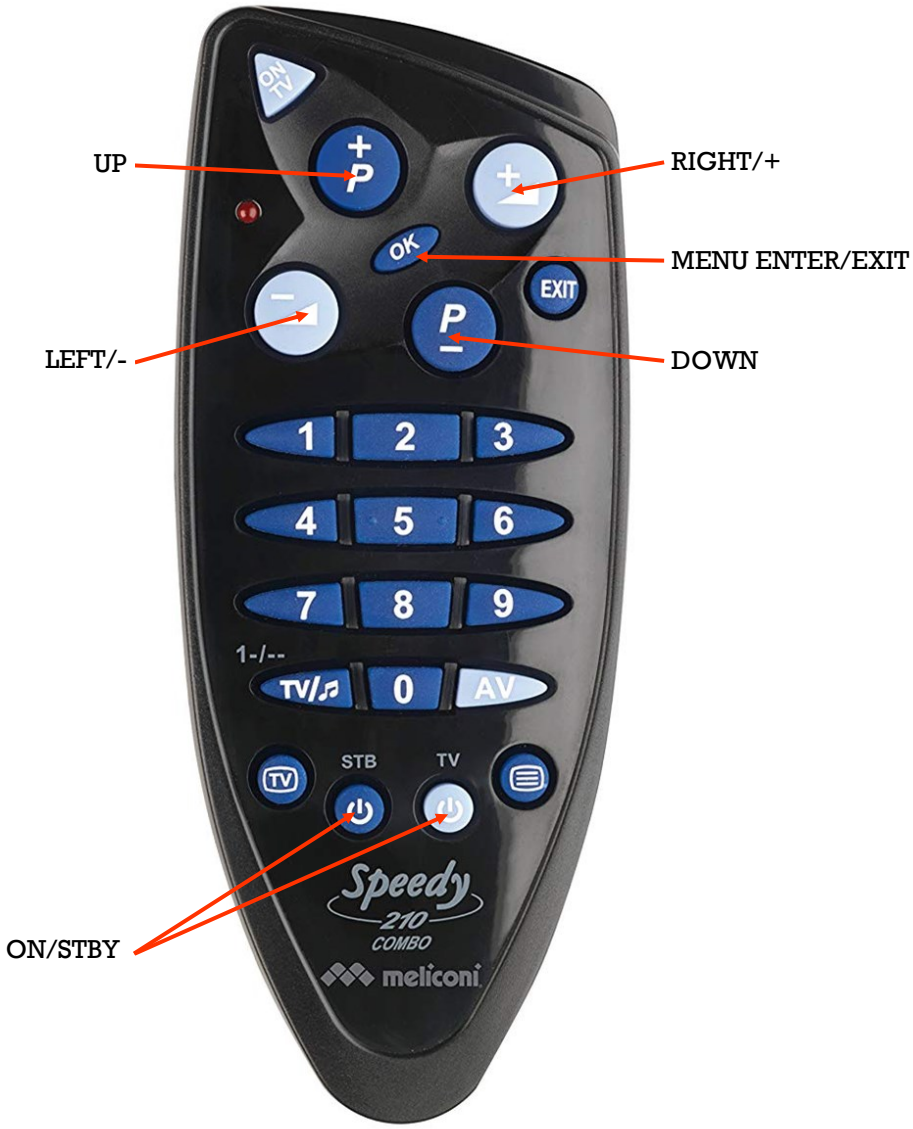
- 6.2 Key Name and Function

KEY NAME	DESCRIPTION
STAND_BY	Turns ON/STAND_BY the system
MENU	Activates the OSD menu or goes to next menu
UP/+	Moves the highlight icon up to the function that user wants and increases the adjustment of the selected function
DOWN/-	Moves the highlight icon down to the function that user wants and decreases the adjustment of the selected function
EXIT	Exit menu or goes to previous menu
HOT KEY 3	Direct Function (TBD)
HOT KEY 2	Direct Function (TBD)
HOT KEY 1	Direct Function (TBD)

- 6.3 Accessing the menu system by keyboard

1. With the OSD off, push the **Menu** Key to activate the main OSD menu
2. Use the **Up** or **Down** Keys to move from one page menu to another. As you move from one page menu to another the function is highlighted.
3. Press the **Menu** Key once to activate the highlighted page, use the **Up** or **Down** Keys to select the function.
4. After selecting a function, use the **Minus** or **Plus** Keys to make optimum adjustments. The setting bar moves and the numeric value indicator changes to reflect your adjustments.(Note : the numeric value indicator is provided as a point of reference only and has nothing to do with a real measurement.)
5. Press the **Menu** Key once to return to the main menu to select another function or press **Exit** to exit from the OSD.
6. Press the **Source Select** Key to select the Video Input.
7. Press the **Display Mode** Key to select the Display Mode type.

- 6.4 IR Remote Control Keys Function



- 6.5 Accessing the menu system by IR Remote Control

1. With the OSD off, push the **Menu** Key to activate the main OSD menu
2. Use the **Up** or **Down** Keys to move from one page menu to another. As you move from one page menu to another the function is highlighted.
3. Press the **Right** Key once to activate the highlighted page menu , use the **Up** or **Down** Keys to select the function.
4. After selecting a function, use the **Minus** or **Plus** Keys to make optimum adjustments. The setting bar moves and the numeric value indicator changes to reflect your adjustments.(Note : the numeric value indicator is provided as a point of reference only and has nothing to do with a real measurement.)
5. Press the **Menu** Key once to return to the main menu to select another function or press twice to exit from the OSD.

7. Appendix

- Supported Standard Video Input Format

Supported Input Formats				
MODE	**RESOLUTION**	**HDMI 2.0**	**DP 1,2**	**DVI-D DL**
VGA	640x350 @85Hz	X	X	X
VGA	720x400 @85Hz	X	X	X
VGA	640x480 @60Hz	X	X	X
VGA	640x480 @72Hz	X	X	X
VGA	640x480 @75Hz	X	X	X
VGA	640x480 @85Hz	X	X	X
SVGA	800x600 @56Hz	X	X	X
SVGA	800x600 @60Hz	X	X	X
SVGA	800x600 @72Hz	X	X	X
SVGA	800x600 @75Hz	X	X	X
SVGA	800x600 @85Hz	X	X	X
XGA	1024x768 @60Hz	X	X	X
XGA	1024x768 @70Hz	X	X	X
XGA	1024x768 @75Hz	X	X	X
XGA	1024x768 @85Hz	X	X	X
SXGA	1280x1024 @60Hz	X	X	X
SXGA	1280x1024 @75Hz	X	X	X
SXGA	1280x1024 @85Hz	X	X	X
WXGA	1366x768 @60Hz	X	X	X
WSXGA	1440x900 @60Hz	X	X	X
WSXGA	1440x900 @75Hz	X	X	X
WSXGA	1440x900 @85Hz	X	X	X
WSXGA+	1680x1050 @60Hz	X	X	X
UXGA	1600x1200 @60Hz	X	X	X
FHD	1920x1080 @60Hz	X	X	X
WUXGA	1920x1200 @60Hz	X	X	X
WQXGA	2560x1600 @60Hz	X	X	X
QHD	3840x2160 @30Hz	X	X	X
QHD	3840x2160 @60Hz	X	X	
UHD	4096x2160 @60Hz	X	X	

8. Warranty

The products are warranted against defects in workmanship and material for a period of one (1) year from the date of purchase provided no modifications are made to it and it is operated under normal conditions and in compliance with the instruction manual.
The warranty does not apply to:

- Product that has been installed incorrectly, this specifically includes but is not limited to cases where electrical short circuit is caused.
- Product that has been altered or repaired except by the manufacturer (or with the manufacturer's consent).
- Product that has subjected to misuse, accidents, abuse, negligence or unusual stress whether physical or electrical.
- Ordinary wear and tear.

Except for the above express warranties, the manufacturer disclaims all warranties on products furnished hereunder, including all implied warranties of merchantability and fitness for a particular application or purpose. The stated express warranties are in lieu of all obligations or liabilities on the part of the manufacturer for damages, including but not limited to special, indirect consequential damages arising out of or in connection with the use of or performance of the products.

Caution

Whilst care has been taken to provide as much detail as possible for use of this product it cannot be relied upon as an exhaustive source of information. This product is for use by suitably qualified persons who understand the nature of the work they are doing and are able to take suitable precautions and design and produce a product that is safe and meets regulatory requirements.

Limitation of Liability

The manufacturer's liability for damages to customer or others resulting from the use of any product supplied hereunder shall in no event exceed the purchase price of said product.