VIN8028-BSC
WUXGA TFT LCD Controller
VGA, DVI and Sensing
User Manual

CONTENTS

Revision History

Date	Rev.	Paragraph	Description
May 9, 2016	0	NA	Initial Realise
December 4, 2019	1	2.12	External Temperature to Internal Temperature
December 4, 2019	1	4.1	J12 pin 8 NC

1. Description

The VIN8028-BSC is a highly integrated board that interfaces digital DVI and Analog RGB video inputs in virtually any format to a flat-panel display.

The VIN8028-BSCis optimized for high-performances, value line, flat-panel monitors.

The VIN8028-BSCis equipped with the latest generation of highly integrated Image Processor with an internal HDMI, 10-bit ADC, video decoder and an external memory interface to support more advanced windowing capabilities and high-resolution displays.
Features include full 10-bit data processing, high-quality, motion-adaptive deinterlacing up to 1080i with enhanced low-angle processing, frame-rate conversion, Picture-in-Picture (PIP), Picture-off-Picture (POP), and high quality advanced scaling

Computer, from VGA to WUXGA (1920X1200), and Video images can be resized to fit on a target display device with any resolution, up to WUXGA.

Optimization circuitry. This creates sharp and clear images, centered on the screen, without user intervention.

The DVI input is HDCP (High-bandwidth Digital Content Protection) compliant.

The VIN8028-BSC include light sensor for automatic backlight control and temperature sensor for programmable fan control

2. General Specification

2.1 Chip Set
- STDP8028

2.2 Panel Connectivity
- All LCD TFT Panels up to 1920X1200 - 4 :3 and 16:9

2.3 Graphic Digital (DVI) Interface
- Digital Single Link DVI Connector
- Support integrated HDCP 1.1
- TMDS Receiver compliant with DDWG DVI 1.0 Specification
- Supports data transfer rates up to 162 MPixels/S input rate
- Scalable bandwidth from VGA to WUXGA 1920X1200@60Hz
- High inter-pair skew tolerance up to one full clock cycle

2.4 Graphic Analog Interface
- 1 15-pin, Standard VESA DSUB Connector (Standard assembly)
- 1 Molex 50-37-5103 10pin Connector (Optional assembly)
- Up to 205MHz conversion rate
- Supports Analog input up to WUXGA 1920X1200@60Hz
- 500 MHz Maximum analog bandwidth
- .5 ~ 1.0V Analog input range 75 Ohm terminated
- Offset and Gain adjustment
- Interlaced or progressive inputs
- Supports Separate H/V Sync , Composite H/V Sync (TTL Levels) and Sync-on-Green (SOG)

2.5 Video Graphic Modes Compatibility
- All standard video graphic modes up to WUXGA 1920X120@60Hz
- Horizontal Frequency 15Khz to 85Khz (Max 205MHz Clock rate)
- Vertical Frequency 50 to 120Hz

2.6 Image Control by On-Screen Display (OSD)
- Brightness
- Contrast
- Sharpness
- Colour Temperature
- Phase and Frequency
- Horizontal and Vertical position
- Auto Adjustments
- PIP / POP
- Aspect

2.7 Control Modes
- Seven push-buttons
- Infrared (Optional)
- Two Serial RS232

2.8 Analog and Digital I/O
- 1 Analog in 0-5V 10-KOhm
- 2 TTL in 10-KOhm P.U.
- 2 LVTTL out 25mA T.P.

2.9 Output Panel Signal
- 18/24bit Single or Dual LVDS

2.10 Panel Power Supply
- 3,3 – 5 – 12 VDC / 3A Max

2.11 Inverter Support
- 12/24 VDC Power
- Enable pin signal
- Dimmer Adjust pin Analog signal 0 – 3.3 VDC or Digital PWM

2.12 Measurement
- Internal temperature -55°C to 125°C
- Ambient Light Dark to 10.000lux (Relative measure)

2.13 Fan Control
- 1 line setup via OSD 12-24VDC 2A

2.14 Power requirements
- 12 –24VDC Max 6W

3. Environmental and Reliability

3.1 Operating Conditions

- Temperature : 0°~ 50°
- Humidity : 10% ~ 80%, non-condensing
- Altitude : maximum 3,000m

3.2 Transportation Conditions

- Temperature : -20°~ 60°
- Humidity : 5% ~ 95%, non-condensing
- Altitude : maximum 15,000m

3.3 Storage Conditions

- Temperature : -20°~ 80°
- Humidity : 5% ~ 95%, non-condensing
- Altitude : maximum 3,000m

3.4 Reliability Specifications

- MTBF : more than 100,000 hours at 90% confidence level, excluding LCD panel.

4. Electrical Specification

4.1 Connectors Pin Assignment

- P1 - DVI-I Digital & Analog RGB Input

Model	Pin n.	Function	Pin n.	Function
Molex 74320-1004	1	TMDS Data2-	2	TMDS Data2+
	3	TMDS Data2 Shield	4	N.C.
	5	N.C.	6	DDC Clocck
	7	DDC Data	8	Analog VSync
	9	TMDS Data1-	10	TMDS Data1+
	11	TMDS Data1/3 Shield	12	TMDS Data3-
	13	TMDS Data3+	14	+5 Power
	15	GND Return +5,H,V	16	Hot Plug Detect
	17	TMDS Data0-	18	TMDS Data0+
	19	TMDS Data0 Shield	20	NC
	21	NC	22	TMDS Clock Shield
	23	TMDS Clock+	24	TMDS Clock-
	C1	Analog Red	C2	Analog Green
	C3	Analog Blue	C4	Analog HSync
	C5	Analog GND Return for R,G,B		

- P2 - RGB Analog Input

Model	Pin n.	Function
DB15-HD	1	RED
	2	GREEN
	3	BLUE
	4	GND
	5	GND (DDC RETURN)
	6	GND-RED
	7	GND-GREEN
	8	GND-BLUE
	9	NC
	10	GND-SYNC
	11	GND
	12	DDC DATA
	13	HOR. OR COMPOSITE
	14	VERTICAL SYNC
	15	DDC CLOCK

- J9 - DC Input

Model	Pin n.	Function
DC—Plug	1	VCC (12-24V/5A)
	2	GND
	3	GND

- J8 - Auxiliary DC Input

Model	Pin n.	Function
Molex 50-37-5043	1	VCC (12-24V/5A)
	2	VCC (12-24V/5A)
	3	GND
	4	GND

- J3 - OSD Key Control

Model	Pin n.	Function
Molex 51021-1200	1	SOURCE
	2	RESINC
	3	PLUS
	4	MINUS
	5	DOWN
	6	UP
	7	MENU
	8	STAND-BY
	9	5/3,3V
	10	LED
	11	IR RECEIVER
	12	GND

- J16 - Front Panel Board

Model	Pin n.	Function
Molex 51021-0610	1	5/3,3VDC OUT (100mA)
	2	LED
	3	IR RECEIVER
	4	GND
	5	GND
	6	LIGHT SENSOR

- J17 - Fans Connector

Model	Pin n.	Function
Molex 51021-0810	1	12-24 VDC
	2	12-24 VDC
	3	12-24 VDC
	4	12-24 VDC
	5	GND
	6	GND
	7	GND
	8	GND

- J10 - Output to Inverter

Model	Pin n.	Function
Molex 51021-1400	1	GND
	2	Brightness_Control 0/5V
	3	GND
	4	ON (5V)- OFF (0V)
	5	GND
	6	GND
	7	GND
	8	GND
	9	GND
	10	12/-4V*
	11	12-24V*
	12	12-24V*
	13	12-24V*
	14	12-24V

- J11 - Auxiliary LCD Panel Power Supply

Model	Pin n.	Function
Molex 51021-0600	1	LCD_Power_Supply *
	2	LCD_Power_Supply *
	3	LCD_Power_Supply *
	4	GND
	5	GND
	6	GND

Use this connector for large current LCD Panel *See Table 1

- J4 - Serial Com1

Model	Pin n.	Function
Molex 51021-0400	1	RX (RS232 Level)
	2	TX (RS232 Level)
	3	GND
	4	GND

- J5 - Serial Com2

Model	Pin n.	Function
Molex 51021-0400	1	RX (RS232 Level)
	2	TX (RS232 Level)
	3	GND
	4	GND

- J12 - Analog and Digital I/O

Model	Pin n.	Function
Molex 51021-1210	1	3.3VDC OUT (50mA)
	2	GND
	3	5VDC OUT (200mA)
	4	TTL OUT1
	5	TTL OUT2
	6	TTL IN1
	7	TTL IN2
	8	NC
	9	NC
	10	GND

- J7 - Output to Panel Data (LVDS)

Model	Pin n.	Function
Hirose DF19-30S-1C	1	GND
	2	TXE3+
	3	TXE3-
	4	TXEClk+
	5	TXEClk-
	6	TXE2+
	7	TXE2-
	8	TXE1+
	9	TXE1-
	10	TXE0+
	11	TXE0-
	12	GND
	13	GND
	14	LCD_Power_Supply *
	15	LCD_Power_Supply *
	16	LCD_Power_Supply *
	17	LCD_Power_Supply *
	18	LCD_Power_Supply *
	19	GND
	20	TXO3+
	21	TXO3-
	22	TXOClk+
	23	TXOClk-
	24	TXO2+
	25	TXO2-
	26	TXO1+
	27	TXO1-
	28	TXO0+
	29	TXO0-
	30	GND

* See Table 1

For single LVDS channel LCD panel use E (Even) connection

- 4.2 Connectors Position

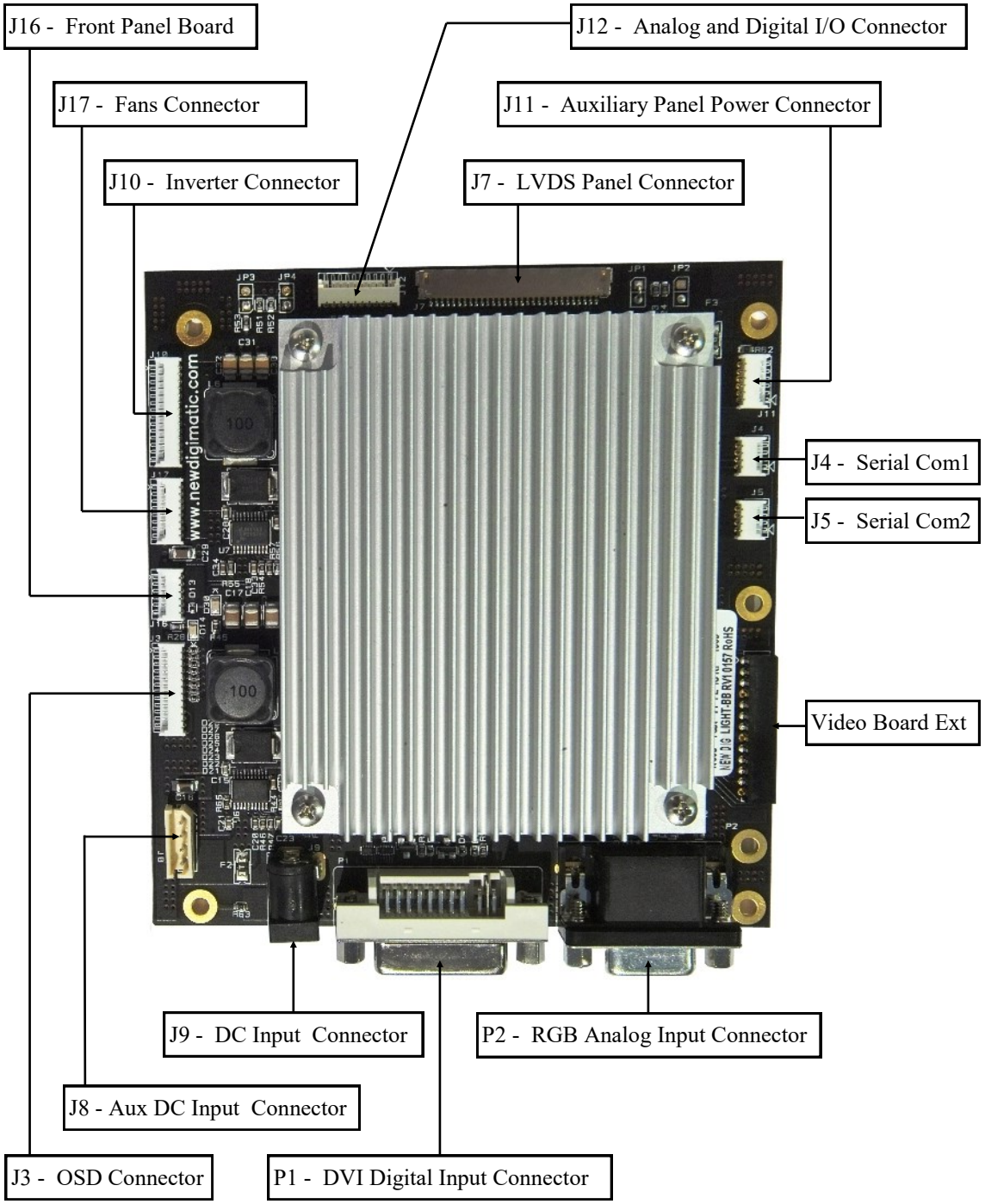
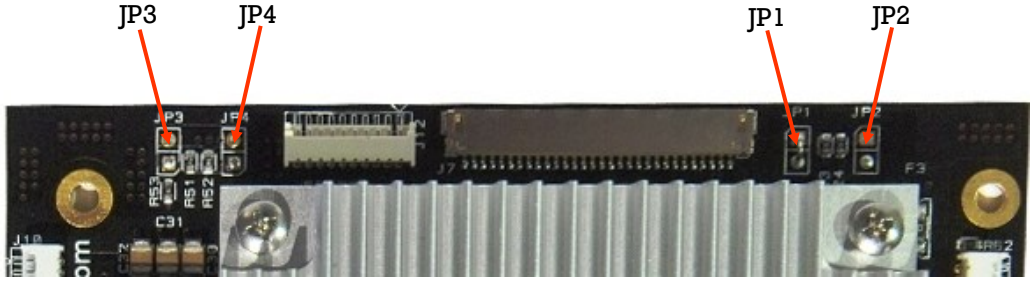


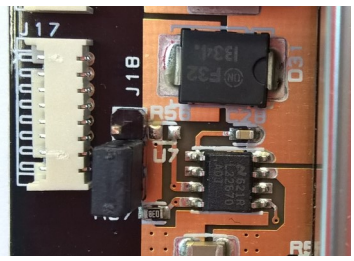
Table 1 : VIN8028-BSC Jumper setting

Inverter Voltage Enable	JP1	JP2
3,3VDC	CUT	SOLDERING
5VDC (Default)	SOLDERING	CUT

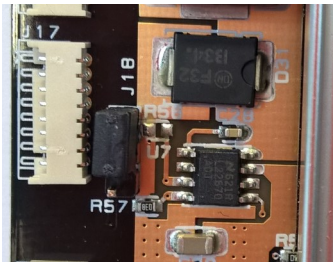


LCD Power Supply	JP3	JP4
3,3VDC (Default)	SOLDERING	SOLDERING
5VDC	CUT	SOLDERING
12VDC	CUT	CUT

J18 Backlight Dimmung
Digital PWM

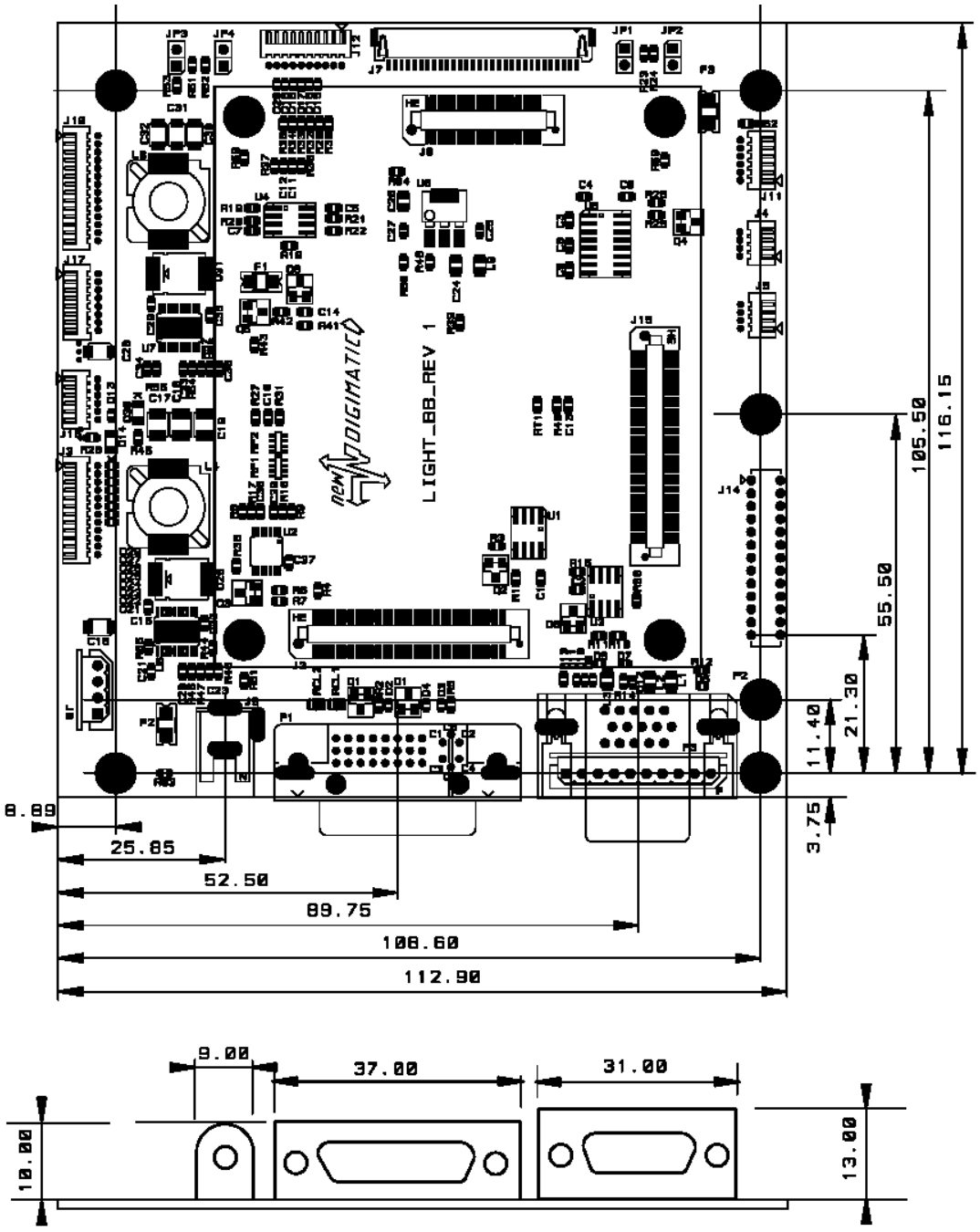


J18 Backlight Dimmung
Analog 0-3.3VDC

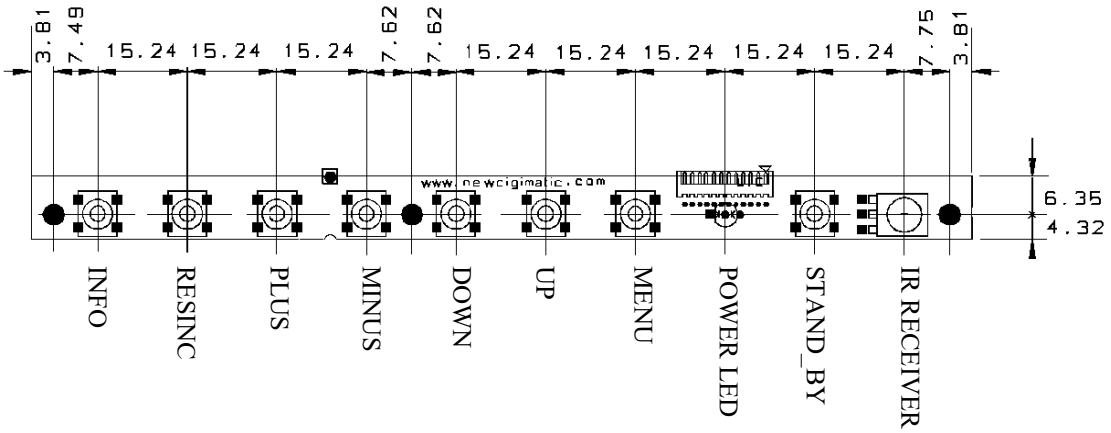


5. Mechanical Specification

- 5.1 Main Board Dimension



- 5.2 OSD Keyboard Dimension and Function



6. Operation Guide

- 6.1 OSD Adjustment

VIN131_R4 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

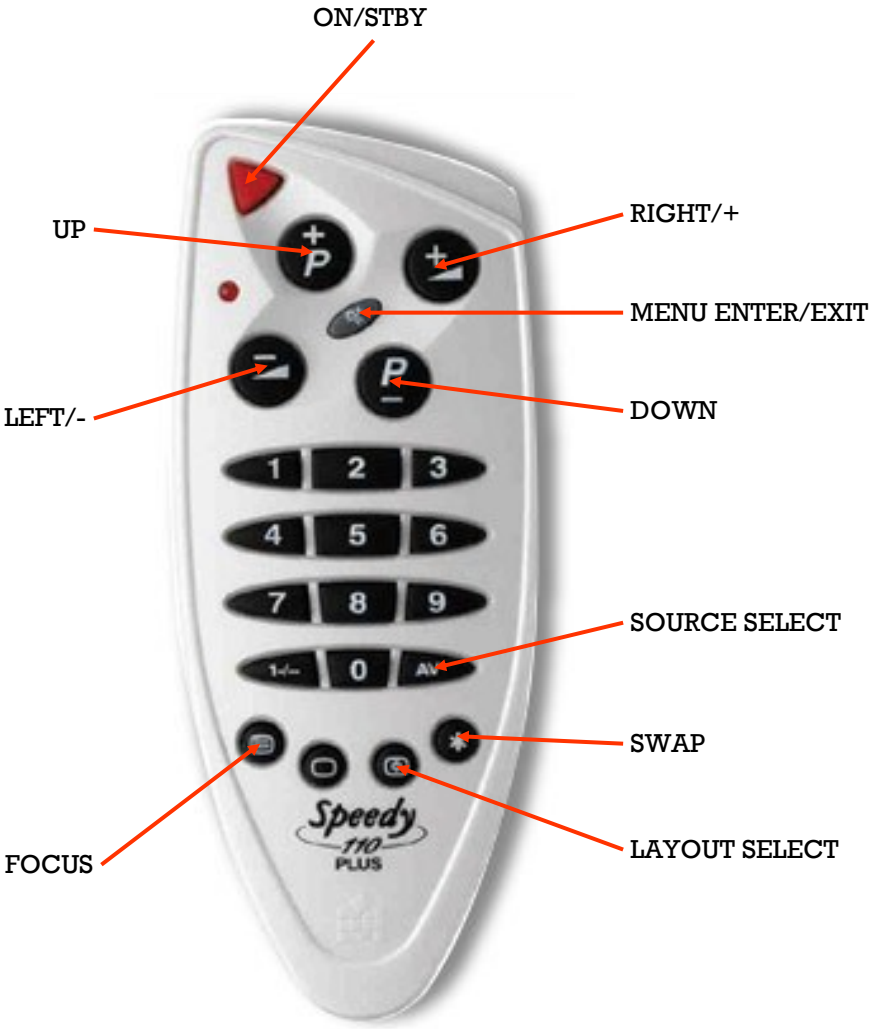
KEY NAME	DESCRIPTION
STAND_BY	Turns ON/STAND_BY the system
MENU	Activates the OSD menu or goes to previous menu
UP	Moves the highlight icon up to the function that user wants
DOWN	Moves the highlight icon down to the function that user wants
MINUS	Decreases the adjustment of the selected function
PLUS	Increases the adjustment of the selected function
RESINC	Performs "Auto-adjustment" function *
INFO	Analog input video information
IR	Receives the signal from Remote Control (Optional)

*"Auto-adjustment" allows the monitor to self-adjust to the incoming video signal. The values of phase, frequency and position are adjusted automatically.

- 6.3 Accessing the menu system by keyboard

1. With the OSD off, push the **Menu** button to activate the main OSD menu
2. Use the **Up** or **Down** buttons to move from one function to another. As you move from one icon toanother, the function name changes to reflect the function or group of functions represented by that icon.
3. Press the **Menu** button once to activate the highlighted function, use the **Up** or **Down** buttons to select thefunction.
4. After selecting a function, use the **Minus** or **Plus** buttons 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** button once to return to the main menu to select another function or press twice to exit from the OSD.

- 6.4 IR Remote Control Keys Function



7. Appendix

- 7.1 Information Technology Video Timing Chart

VIN8028-BSC IT Video Format Supported						
Pixel Format	Refresh Rate	Hor. Frequency	Pixel Frequency	ReferenceStandard	VGA In	DVI In
640 x 350	85 Hz	37.9 kHz	31.500 MHz	VESA Standard	O	O
640 x 400	85 Hz	37.9 kHz	31.500 MHz	VESA Standard	O	O
720 x 400	85 Hz	37.9 kHz	35.500 MHz	VESA Standard	O	O
640 x 480	60 Hz	31.5 kHz	25.175 MHz	Industry Standard	O	O
	72 Hz	37.9 kHz	31.500 MHz	VESA Standard	O	O
	75 Hz	37.5 kHz	31.500 MHz	VESA Standard	O	O
	85 Hz	43.3 kHz	36.000 MHz	VESA Standard	O	O
800 x 600	56 Hz	35.2 kHz	36.000 MHz	VESA Guidelines	O	O
	60 Hz	37.9 kHz	40.000 MHz	VESA Guidelines	O	O
	72 Hz	48.1 kHz	50.000 MHz	VESA Standard	O	O
	75 Hz	46.9 kHz	49.500 MHz	VESA Standard	O	O
	85 Hz	53.7 kHz	56.250 MHz	VESA Standard	O	O
848 x 480	60 Hz	31.0 kHz	33.750 MHz	VESA Standard	O	O
1024 x 768	43 Hz (Int.)	35.5 kHz	44.900 MHz	Industry Standard	O	O
	60 Hz	48.4 kHz	65.000 MHz	VESA Guidelines	O	O
	70 Hz	56.5 kHz	75.000 MHz	VESA Standard	O	O
	75 Hz	60.0 kHz	78.750 MHz	VESA Standard	O	O
	85 Hz	68.7 kHz	94.500 MHz	VESA Standard	O	O
1152 x 864	75 Hz	67.5 kHz	108.000 MHz	VESA Standard	O	O
1280 x 768	60 Hz(RB)	47.4 kHz	68.250 MHz	CVT Red. Blanking	O	O
	60 Hz	47.8 kHz	79.500 MHz	CVT	O	O
	75 Hz	60.3 kHz	102.250 MHz	CVT	O	O
	85 Hz	68.6 kHz	117.500 MHz	CVT	O	O
1280 x 800	60 Hz(RB)	49.3 kHz	71.000 MHz	CVT Red. Blanking	O	O
	60 Hz	49.7 kHz	83.500 MHz	CVT	O	O
	75 Hz	62.8 kHz	106.500 MHz	CVT	O	O
	85 Hz	71.6 kHz	122.500 MHz	CVT	O	O
1280 x 960	60 Hz	60.0 kHz	108.000 MHz	VESA Standard	O	O
	85 Hz	85.9 kHz	148.500 MHz	VESA Standard	O	O
1280 x 1024	60 Hz	64.0 kHz	108.000 MHz	VESA Standard	O	O
	75 Hz	80.0 kHz	135.000 MHz	VESA Standard	O	O
	85 Hz	91.1 kHz	157.500 MHz	VESA Standard	O	O
1360 x 768	60 Hz	47.7 kHz	85.500 MHz	VESA Standard	O	O
1400 x 1050	60 Hz(RB)	64.7 kHz	101.000 MHz	CVT Red. Blanking	O	O
	60 Hz	65.3 kHz	121.750 MHz	CVT	O	O
	75 Hz	82.3 kHz	156.000 MHz	CVT	O	O
	85 Hz	93.9 kHz	179.500 MHz	CVT	O	X
1440 x 900	60 Hz(RB)	55.5 kHz	88.750 MHz	CVT Red. Blanking	O	O
	60 Hz	55.9 kHz	106.500 MHz	CVT	O	O
	75 Hz	70.6 kHz	136.750 MHz	CVT	O	O
	85 Hz	80.4 kHz	157.000 MHz	CVT	O	O
1600 x 1200	60 Hz	75.0 kHz	162.000 MHz	VESA Standard	O	O
	65 Hz	81.3 kHz	175.500 MHz	VESA Standard	O	X
	70 Hz	87.5 kHz	189.000 MHz	VESA Standard	O	X
	75 Hz	93.8 kHz	202.500 MHz	VESA Standard	O	X
1680 x 1050	60 Hz(RB)	64.7 kHz	119.000 MHz	CVT Red. Blanking	O	O
	60 Hz	65.3 kHz	146.250 MHz	CVT	O	O
	75 Hz	82.3 kHz	187.000 MHz	CVT	O	X
1920 x 1200	60 Hz(RB)	74.0 kHz	154.000 MHz	CVT Red. Blanking	O	O
	60 Hz	74.6 kHz	193.250 MHz	CVT	O	X

- 7.2 Consumer Electronic Video Timing Chart

VIN8028-BSC CE Video Format Supported						
Pixel Format	Refresh Rate	Hor. Frequency	Pixel Frequency	ReferenceStandard	VGA In	HDMI In
640 x 480	59,940 Hz	31,469 kHz	25,175 MHz	VESA DMT	O	O
720 x 480	59,940 Hz	31,469 kHz	27,000 MHz	CEA-770.2-D	O	O
720 x 576	50,080 Hz	31,250 kHz	27,000 MHz	ITU-R BT.1358	O	O
1280 x 720	24.000 Hz	18.000 kHz	59.400 MHz	SMPTE 296M	O	O
	25.000 Hz	18.750 kHz	74.250 MHz	SMPTE 296M	O	O
	30.000 Hz	22.500 kHz	74.250 MHz	SMPTE 296M	O	O
	50,000 Hz	37,500 kHz	74,250 MHz	SMPTE 296M	O	O
	60,000 Hz	45,000 kHz	74,250 MHz	CEA-770.3-C	O	O
1920 x 1080	24.000 Hz	27.000 kHz	74.250 MHz	SMPTE 274M	O	O
	25.000 Hz	28.125 kHz	74.250 MHz	SMPTE 274M	O	O
	30.000 Hz	33.750 kHz	74.250 MHz	SMPTE 274M	O	O
	50,000 Hz (Int.)	31,250 kHz	72,000 MHz	AS 4933.1-2005	O	O
	50,000 Hz (Int.)	28,125 kHz	74,250 MHz	SMPTE 274M	O	O
	50,000 Hz	56,250 kHz	148,500 MHz	SMPTE 274M	O	O
	60,000 Hz (Int.)	33,750 kHz	74,250 MHz	CEA-770.3-C	O	O
	60,000 Hz	67,500 kHz	148,500 MHz	SMPTE 274M	O	O

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.