



***Cornwall House, Cornwall Terrace,
Bradford, West Yorkshire, BD8 7JS UK***

Telephone: +44 1274-394125

Fax: +44 1274-730960

E-mail: sales@calibreuk.com

PremierView 6 Technical Manual

Issue 1.4



Welcome to the Calibre PremierView Display Driver Manual

If you have any queries relating to this or any other product supplied by Calibre please visit our web site www.calibreuk.com.

For support or further information please contact a sales representative at.

Cornwall House, Cornwall Terrace
Bradford, BD8 7JS. UK.
Tel: (+44) (0)1274 394125.
Fax: (+44) (0)1274 730 960
E-mail: sales@calibreuk.com
Web site www.calibreuk.com
All World-wide Rights Reserved
08/06/10

Issue 1.4

All trade marks acknowledged

Calibre operates a policy of continued product improvement, therefore specifications are subject to change without notice as products are updated or revised.
E&OE.

PRODUCT DESCRIPTION	1
1.1. Product Overview	1
1.2. System Requirements	2
1.3. Product Architecture	2
1.4. User Control Panel	3
1.5. Firmware Update	3
1.6. Communication with PremierView 6 Scaler	3
PRODUCT PERFORMANCE	4
2.1. Input Signal Compatibility	4
2.1.1. Video Inputs	4
2.1.2. Computer (VGA, DVI and HDMI) Inputs	5
2.1.3. SDI and HD-SDI Input	5
2.1.4. DVI Input	5
2.1.5. HDMI Input	5
2.1.6. Component Video Input	6
2.2. Output Signal Compatibility	6
2.3. Power Requirements	6
2.4. Interface panel	7
2.5. User control Panel	9
INTERCONNECTION AND CONFIGURATION INFORMATION	10
3.1. Input Signal and Power Connection Details	10
3.1.1. Computer Video Input – SK2 or PL19	10
3.1.2. CVBS (Composite) Video Input – SK5 and PL20	11
3.1.3. S-Video (Y/C) Video Input – SK13 and PL21	11
3.1.4. SDI (HD and SD) Video Input – SK1	11
3.1.5. DVI Video Input – SK12 and SK15	11
3.1.6. HDMI Video Input – SK11	12
3.1.7. Component Video Input – PL17 and SK6, 8, 9 & 10	13
3.1.8. Power Input Connector SK3, SK14 and PL18	14
3.1.9. SPDIF Connector (SK7)	14
3.1.10. Keypad Connector PL13	15
3.1.11. Keypad Connector (Vantage) PL12	15
3.1.12. Host Connector (UART1) PL8	15
3.1.13. Host Connector (UART 0) PL9	16
3.1.14. USB Connector SK4	16
3.2. Display Panel Connection Details	17
3.2.1. Inverter Control Connector PL6	17



CREATING TECHNOLOGY

3.2.2.	Power Input / Inverter brightness Connector – PL7	17
3.2.3.	Auxiliary Power Input Connector for Driver – PL16	17
3.2.4.	Aux LVDS Power connector PL5	18
3.2.5.	LVDS adapter output connections (PL1,2,3 & 4)	19
3.3.	Option Link Settings	20
OPERATION		21
4.1.	Normal Operation	21
4.2.	User Interface Buttons	21
4.2.1.	Basic Keypad	21
4.2.2.	Extended Keypad	22
4.3.	User Controls.	23
4.3.1.	Direct Brightness Adjustment	23
4.3.2.	Displayed Input Select	23
4.3.3.	Menu Select	23
4.3.4.	Keypad Unlock	23
4.4.	OSD Menu	24
4.4.1.	Brightness	24
4.4.2.	Contrast	24
4.4.3.	The Colour Menu	25
4.4.4.	The Geometry Menu	26
4.4.5.	The PiP Menu	28
4.4.6.	The Enhancement Menu	29
4.4.7.	The System Menu	31
REGULATORY APPROVALS		36
5.1.	EMC Approvals	36
5.2.	EMC Installation Guidelines	36
ENVIRONMENTAL AND SAFETY		37
6.1.	Operating	37
6.2.	Storage	37
6.3.	Safety Issues	37
ABBREVIATIONS		38



PRODUCT DESCRIPTION

1.1. Product Overview

The driver is designed to accept the following input signals:

- Composite video (PAL, NTSC or SECAM), 1 external connector & 1 optional internal connector for DVB board.
- S-Video (PAL, NTSC or SECAM), 1 external connector & 1 optional internal connector for DVB board.
- YPbPr and RGB(S) component video SD, ED & HD, 484i, 576i, 480p, 576p HD 720p, 1035i, 1080i at 50, 59.94 & 60Hz and 1080p formats at 24, 25 & 30Hz. 1 external connector and 1 optional internal connector DVB board or PVR/Disc player codec connection.
- SD-SDI and HD-SDI YCbCr serial digital component video in 484i, 576i, 720p, 1080i, 1080p & 1080psf single-link formats
- VGA analog computer-style computer interface
- DVI (DVI-I receptacle, only DVI digital implemented on board)
- DVI/HDMI1.3 internal connection (PCB connector, e.g.for optical module, codec connection or media server connection)
- HDMI1.3

These signals can be all displayed on the panel and all signals can be displayed full screen or at native aspect ratio. Extremely high quality scaling and de-interlacing with motion adaptive algorithms and inverse 3:2/2:2 pulldown for HD & SDTV signal means that the output signal is scaled with minimal loss of quality or image resolution irrespective of the resolution of the incoming signal.

Picture in Picture (PIP) supports video window over video and computer graphics or vice versa.

The make and model of the panel to be driven is factory pre-configured from one of the following:

- WUXGA (1920 x 1200)
- UXGA (1600 x 1200)
- HDTV (1920 x 1080)
- SXGA (1280 x 1024)
- XGA (1024 x 768)
- SVGA (800 x 600)
- VGA (640 x 480)
- WXGA 1366x768 or 1280x768
- Other modes can be provided as custom options

If you are unsure as to whether the driver is configured correctly for your panel please contact a sales representative at sales@calibreuk.com quoting the Calibre order number, the driver model number and the make and model of the panel you wish to drive.



Several versions of the driver board are available, providing different options of interface for video and computer inputs to 8- or 10-bit digital panels through single or dual channel LVDS. Note: PV6 must be pre-configured to suit your panel type, this is not user configurable.

Factory defaults have been carefully chosen such that most users will not need to make any adjustments. A simple user interface (supplied) with On Screen Display allows the user to adjust a wide variety of parameters if necessary. Once the parameters are set they can be stored in non-volatile memory, which ensures the set-up is retained when power to the unit is switched off.

The resolution of input signals that can be displayed is governed by the size of the panel. See section 2 for details.

1.2. System Requirements

The interface requires the following parts to create a functioning video monitor:

- 1) A suitable DC supply (see para. 2.3)
- 2) A colour display panel with a eight or 10 bit RGB digital interface through a single or dual LVDS interface.
- 3) A backlight inverter to suit the panel used; may have a control input to facilitate user control of backlight dimming.
- 4) A suitable interconnection cable to connect the output signal from the driver interface to the display panel.
- 5) Optional keypad for user controls (see para. 4.2)

1.3. Product Architecture

The interface PCB can be supplied to accept interlaced or non-interlaced video and computer signals with either separate sync, composite sync or sync on green (as detailed below). In most cases, functions can be supplied or omitted to suit the customer's requirements. Available input channels are:

- 1) Composite video via BNC or 0.1" PCB connector depending on model
- 2) S-Video via 4-pin MiniDIN or 0.1" PCB connector depending on model
- 3) First channel YPbPr/RGB(S) analogue component video, SDTV, EDTV or HDTV via BNC or Cinch connectors.
- 4) Second channel YPbPr/RGB(S) analogue component video, SDTV, EDTV or HDTV via 0.1" PCB connector. Either the first or the second channel connector or both are assembled dependent on model.
- 5) HDSDI via BNC, supports SDTV or HDTV
- 6) VGA analog computer-style computer interface via 15HDD socket or 0.1" PCB connector depending on model.
- 7) DVI (Digital Visual Interface) via DVI-D connector.
- 8) DVI or HDMI via PCB connector
- 9) HDMI via HDMI connector

The interface automatically detects the incoming standard and can adjust itself accordingly. After processing input signals the interface supplies the appropriate display data, timing/control and clock signals to drive a colour panel.

The digital output is via a single/dual 10 bit LVDS interface. LVDS connection is via 0.1" connectors.



An on-screen display is provided for adjustment of set-up parameters; access is via the user controls.

In addition the interface provides a control output to affect backlight brightness via inverter control input.

On certain models, computer analogue graphics, DVI inputs and HDMI input have an associated EEPROM which are factory programmed to give the plug-and-play function of a monitor.

A potential audio sample packet on the HDMI input stream is decoded by the interface and output on the SPDIF connector of the PV6 board.

1.4. User Control Panel

The PV6 board can be supplied with a user control panel. The function of these buttons is described below.

The user control panel is a small PCB which contains five push buttons. It connects to the Interface Board via a simple 10-way ribbon cable and may be located a short distance (up to 300mm) away from the interface.

The MENU button invokes the OSD (on-screen display); when the OSD appears, pressing the button will cycle through the top level of OSD menu, which may be an individual function or the title of a sub-menu. The BR± buttons are dual-function: when OSD is not displayed they adjust the inverter brightness, and when in OSD mode they are used to move the menu selector highlight or alter the value of the parameter selected.

1.5. Firmware Update

A USB 1.1 port is available to make a connection to a PC for firmware updates in the field. This USB port is for such updates only. A PC Tool is provided to download new firmware binaries into the board. This control software runs under Windows2000 and XP.

The interface board has to be put in a dedicated update mode in order to communicate with the PC tool. This is achieved by pressing the menu key when powering up the board.

1.6. Communication with PremierView 6 Scaler

When a PremierView 6 powered LCD monitor is driven through a PremierView 6 Scaler the systems exchange information to automatically set-up both devices, and processing tasks are distributed to each of the devices, such that the LCD monitor and Scaler combination give the best image quality and lowest latency. E.g. the PremierView 6 LCD monitor is programmed to switch off filters, they are applied in the PremierView 6 Scaler and the PremierView 6 Scaler is programmed to drive the LCD monitor with the natural resolution of the panel, thus the PremierView 6 LCD driver board does not have to apply double scaling. Also, 36 bit colour resolution is used on the digital link no matter which one of the HDMI or DVI input port of PremierView 6 is used.

PRODUCT PERFORMANCE

2.1. Input Signal Compatibility

The resolution of input signals that can be displayed is not limited by the size of the panel if a typical range of panels from VGA to WUXGA is to be supported. The following restriction may make sense though to achieve a good viewing result. Note that Groups 1-6 refer to the group descriptions in para. 2.1.2.

Input (See below and para. 2.1.2)	Panel Resolution							
	VGA	SVGA	XGA	WXGA	SXGA	1080p	UXGA	WUXGA
PAL Video	•	•	•	•	•	•	•	•
SECAM Video	•	•	•	•	•	•	•	•
NTSC Video	•	•	•	•	•	•	•	•
SD and EDTV	•	•	•	•	•	•	•	•
HDTV			•	•	•	•	•	•
Group 1	•	•	•	•	•	•	•	•
Group 2	•	•	•	•	•	•	•	•
Group 3	•	•	•	•	•	•	•	•
Group 4		•	•	•	•	•	•	•
Group 5			•	•	•	•	•	•
Group 6				•	•	•	•	•

Table 1 Displayable Inputs

2.1.1. Video Inputs

Signal formats	Composite (CVBS), S-Video (Y/C), SDI
Video standards	NTSC, PAL, SECAM
Composite (CVBS) input level	1V p-p nominal inc. sync
Luminance (Y) input level	1V p-p nominal inc. sync
Chrominance (C) input level	0.6V p-p nominal
Input Impedance (all inputs)	75 Ohms

2.1.2. Computer (VGA, DVI and HDMI) Inputs

Signal formats:	Group 1.	DOS	720 x 400 70Hz
	Group 2	VGA	640 x 480 50Hz to 75Hz inclusive
	Group 3	MAC I	640 x 480 67Hz
		SVGA	800 x 600 50Hz to 75Hz inclusive
	Group 4	MAC II	832 x 624 74.7Hz
		XGA	1024 x 768 50Hz to 75Hz inclusive
	Group 5	MAC 2	1152 x 870 75Hz
		SXGA	1152 x 900 50Hz to 75Hz inclusive
		SXGA	1280 x 1024 50Hz to 75Hz inclusive
	Group 6	HDTV	1920 x 1080p 50 and 60Hz
		UXGA	1600 x 1200 50Hz to 60Hz inclusive
		WUXGA	1920 x 1200 50Hz to 60Hz inclusive reduced blanking
	VGA video level	0.7V - 1.0V	
	VGA input impedance	75 Ohms	
	Sync formats	<ol style="list-style-type: none"> 1. Separate H & V sync at TTL levels. 2. Composite -ve sync at TTL levels. 3. Sync on green (an extra 0.3V -ve on the 0.7V 75 Ohm Green video signal) 	

2.1.3. SDI and HD-SDI Input

Format: Serial video data in YCbCr format
Input impedance: 75 ohms.

2.1.4. DVI Input

DVI input consists of three colours and a pixel clock connected via a 24-way DVI-D connector. Maximum pixel rate is 165MHz.

All above listed computer signal formats are supported as well as 720(1440)x480i and 576i (SD in double-rate formats), 480p/576p (ED), 720p, 1080i 50/59.94/60Hz and 1080p 24/25/30/50/59.94/60Hz (HD).

2.1.5. HDMI Input

HDMI input consists of three colours and a pixel clock connected via a Type A HDMI connector. Maximum pixel rate is 225MHz.

All above listed computer signal formats are supported as well as 720(1440)x480i and 576i (SD in double-rate formats), 480p/576p (ED), 720p, 1080i 50/59.94/60Hz and 1080p 24/25/30/50/59.94/60Hz (HD).

2.1.6. Component Video Input

Component Video Input may be RGB with sync-on-green or YUV with sync-on-Y. RGB(S) is also supported for SDTV signals only – this is to provide compatibility with component video signals from SCART connectors on domestic European equipment.

Notes:

1. The maximum refresh rate may be limited on certain VGA and SVGA panels. Additionally, UXGA inputs are limited to 60Hz max refresh rate.
2. A wide range of display adjustment is possible with the user controls, which makes the interface very tolerant of the incoming video standard. Any signal with any number of lines between 350 and the maximum displayable by the panel can be displayed, with frame rates from 50Hz to 75Hz. For convenience, the interface categorises the signal into groups as above, but wide deviations from the normal standards are allowable.
3. Input channels are selected through the user interface OSD. A “No Input” screen is shown when no active signal is present on the selected input channel.

2.2. Output Signal Compatibility

Internally, the display interface processes data at a full ten bits per colour. On models for 24-bit panels the output stage is optimised to drive 8 bits per colour, and the two least significant bits for each of R,G,B are disabled. A resolution of ten bits per colour is provided for 30-bit panels. The output resolution is that of the panel irrespective of the input video signal format. As well as data, the interface generates all the necessary control signals to drive the panel. Power is fed to the panel at 3.3V, 5V or 12V from an onboard regulator or by passing through the voltage supplied to the PV6 board. The PV6 can only be set to the 12V regulated output, if the voltage supplied to the PV6 board is higher than 12V. Custom panel power voltages can also be provided as a factory configured option

The interface is custom programmed during manufacture for the particular make and model of panel - contact Calibre for option availability. Certain large or high-resolution panels may require more power than is available from the on-board regulator, in these situations an external power regulator may be required for the LCD panel.

The interface provides a control signal to effect backlight dimming via the Lamp Illumination user control. This has to be connected to the control input of the inverter used. Its format and action are determined by the build version of the panel to suit different manufacturers' products.

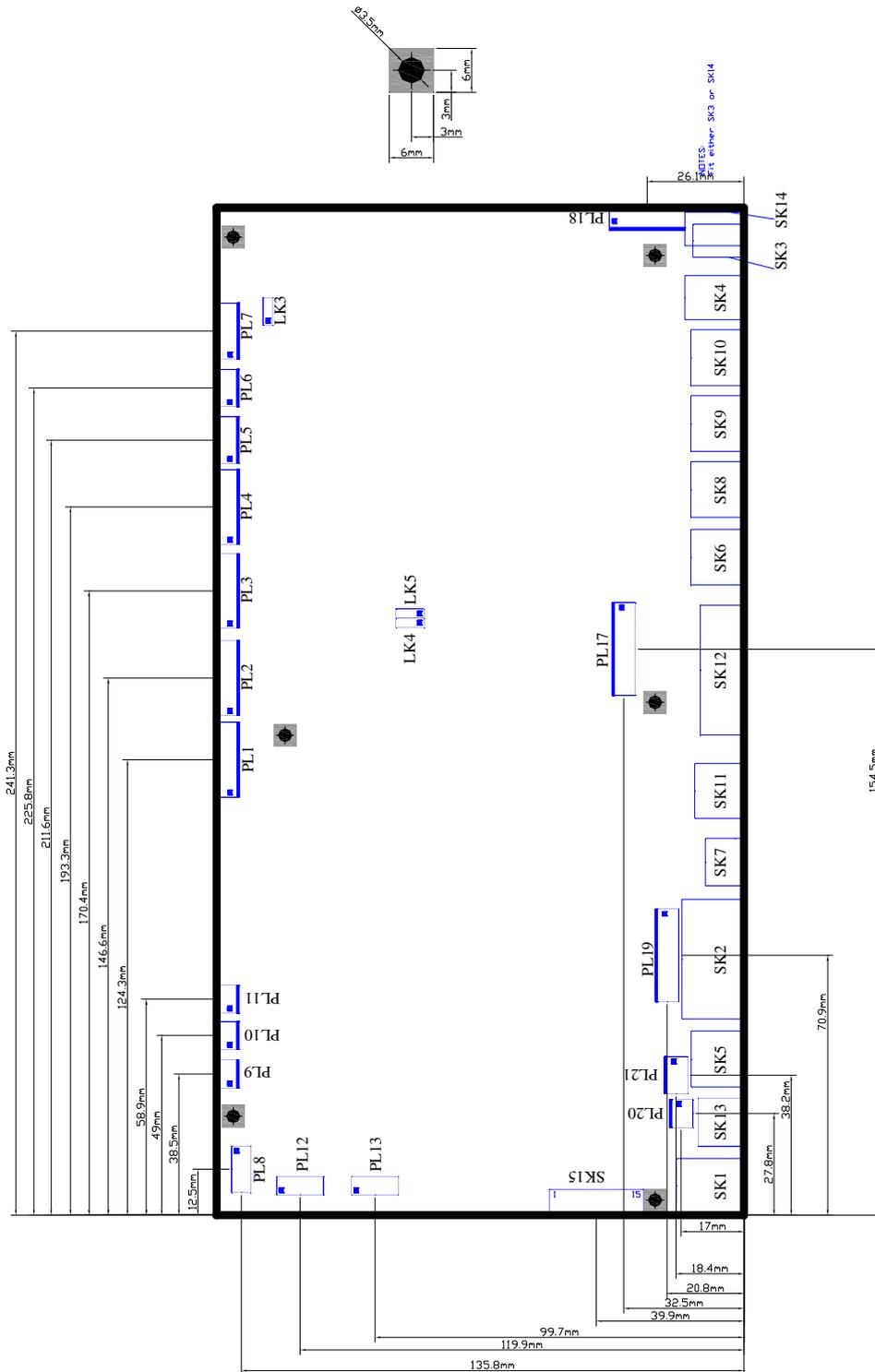
2.3. Power Requirements

Input voltage	Nominal range is 12-24VDC +/-10% (i.e. 10.8V-26.4V) Intended input power is 12V or 24V
Current consumption	1 amp at 12V input typical, interface only (PLUS current consumption of display panel and backlight).

Notes:

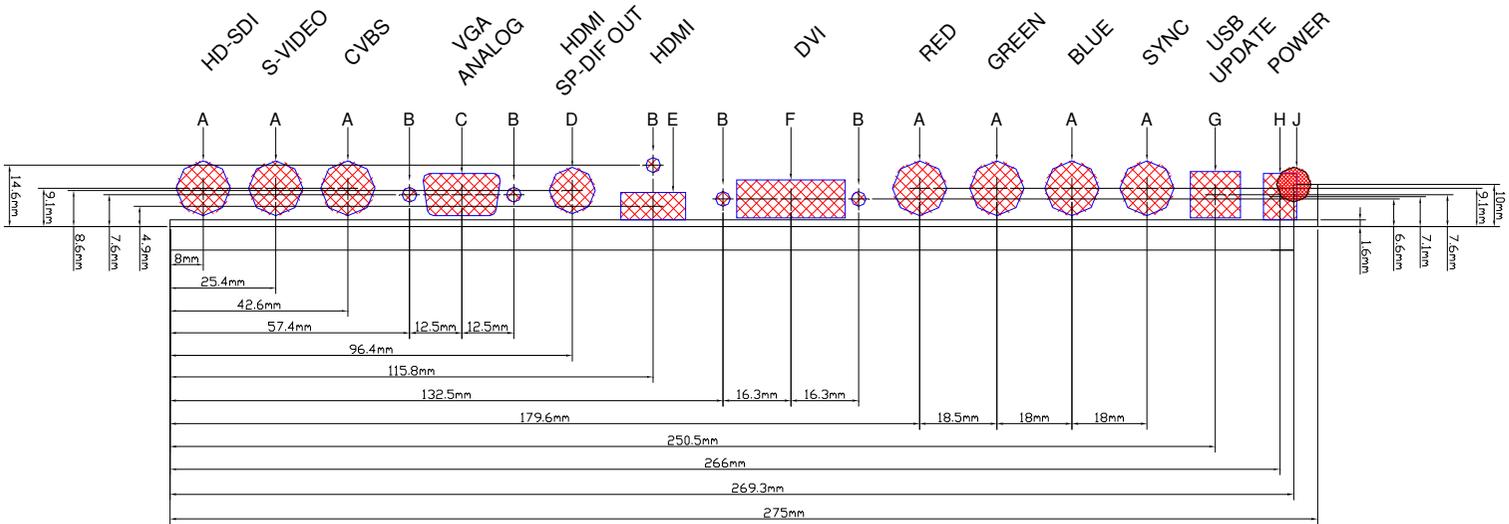
1. **The current consumption given above does not include any current passed to the panel and backlight - this must be added to make an overall figure.**
2. **Most backlight inverters require a +12V or +24V supply depending upon model used. It is not recommended to connect inverter power through PV6 if the current taken by PV6 exceeds 8A, or 2A per power connection wire.**

2.4. Interface panel



All dimensions are in mm unless otherwise stated.

All dimensions are in mm unless otherwise stated.



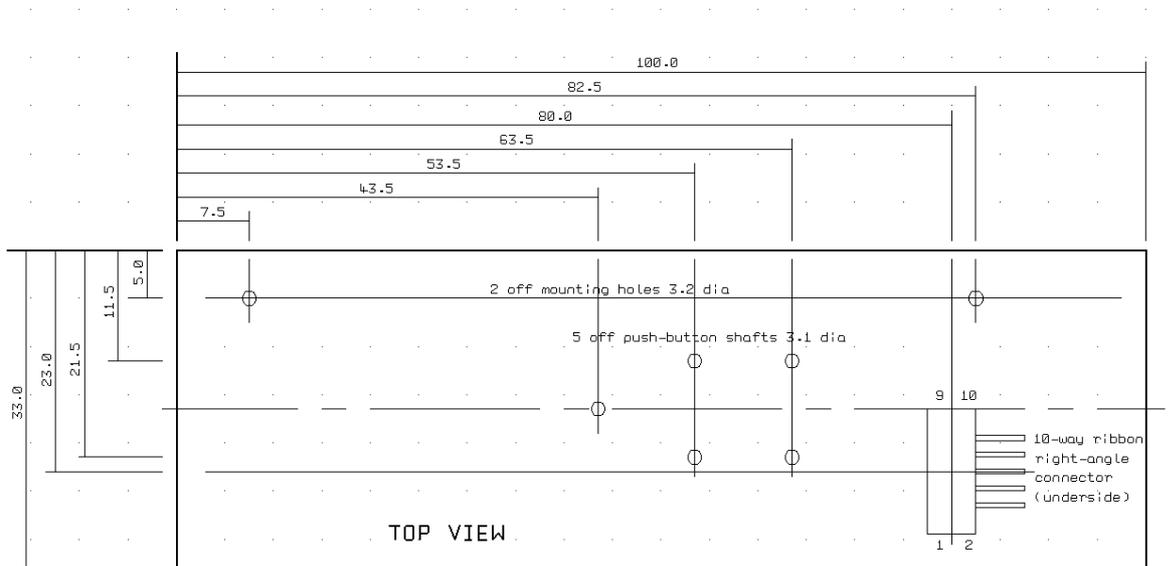
Details		
Detail	Description	Qty
A	13mm Ø HOLE	7
B	3.5mm Ø HOLE	5
C	9 WAY D-TYPE CUT-OUT	1
D	11mm Ø HOLE	1
E	15.5mm X 6.5mm CUT-OUT	1
F	26mm X 9mm CUT-OUT	1
G	12mm X 11mm CUT-OUT	1
H	8mm X 11mm CUT-OUT	1
J	8.3mm Ø HOLE	1

NOTES:

1. Feature H or J must be chosen.
2. Feature H is a non locking power connector.
3. Feature J is a locking power connector.

2.5. User control Panel

User control panel dimensions are 100mm x 33mm x 15mm overall height



All dimensions are in mm

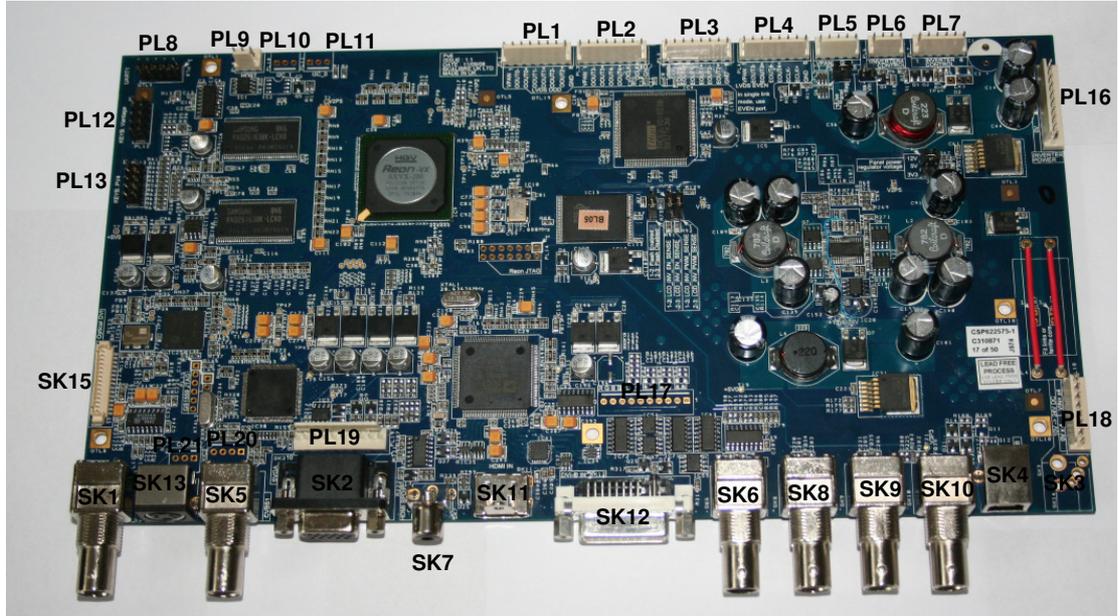
NOTE

In certain applications may not possible to use a standard control panel. A schematic for the control panel is detailed in section 4.2.1 to allow installers to manufacture their own control panels.

INTERCONNECTION AND CONFIGURATION INFORMATION

3.1. Input Signal and Power Connection Details

To locate the sockets (SK) and plugs (PL) described in the following paragraphs use the following picture of the interface board with references.



3.1.1. Computer Video Input – SK2 or PL19

Connector type - 15-way high density 'D' socket, mating type 15-way high density 'D' plug or via 10-way 0.1" male, mating type 10-way 0.1" female.

15 way Pin	10 way pin	Signal name	Function
1	1	RIN	Red Video Input
2	3	GIN	Green Video Input
3	5	BIN	Blue Video Input
4	-	N/C	-
5	-	GND	Gnd
6	2	GND	Red Gnd
7	4	GND	Green Gnd
8	6	GND	Blue Gnd
9	-	P&P_5V0	DDC +5V input
10	8, 10	GND	Sync Gnd
11	-	N/C	-
12	-	VGASDA	DDC data
13	7	HSIN	Horizontal/ Comp Sync In
14	9	VSIN	Vertical Sync Input
15	-	VGASCL	DDC clock

Table 2 Computer Input Connections

3.1.2. CVBS (Composite) Video Input – SK5 and PL20

Connector type - BNC Socket, mating type BNC Plug or via 3-way 0.1" male, mating type 3-way 0.1" female

BNC Pin	3 way Pin	Signal name	Function
Inner	2	COMPIN	Composite (CVBS) Video I/P
Outer	1	GND	
	3	GND	

Table 3 CVBS Input Connections

NOTE SK5 and PL20 are two independent inputs.

3.1.3. S-Video (Y/C) Video Input – SK13 and PL21

Connector type - 4-way mini DIN Socket, mating type 4 way mini DIN Plug or via 4-way 0.1" male, mating type 4-way 0.1" female

DIN Pin	4 way Pin	Signal name	Function
1	2	GND	
2	3	GND	
3	1	LUMA IN	Luma (Y) Video Input
4	4	CHROMA IN	Chroma (C) Video Input

Table 4 S-Video Input Connections

NOTE SK13 and PL21 are two independent inputs.

3.1.4. SDI (HD and SD) Video Input – SK1

Connector type - BNC Socket, mating type BNC Plug.

BNC Pin	Signal name	Function
Inner	SDI IN	SDI Video I/P
Outer	GND	Ground

Table 5 HD-SDI Input Connections

3.1.5. DVI Video Input – SK12 and SK15

Connector type - 29-way special DVI socket, mating type 24 or 29 way DVI Plug e.g. Molex 88741 series and 15-way 1,24mm header type Molex 53398-1571, mating plug type e.g. Molex 51021 series.

DVI Pin	15 way Pin	Signal name	Function
1	9	RED-	} Red video data...
2	10	RED+	}...balanced pair
3		GND	Shield for RED
4		N/C	-
5		N/C	-
6	12	SCLDVI	I2C clock line for DVI
7	13	SDADVI	I2C data line for DVI
8		N/C	-
9	7	GRN-	} Green video data...
10	8	GRN+	}...balanced pair
11		GND	Shield for Green
12		N/C	-
13		N/C	-
14	11	IN_+5V	+5V input for DVI
15	1	GND	Ground

16	14	HP	Hot-plugging control
17	5	BLU-	} Blue video data...
18	6	BLU+	}...balanced pair
19		GND	Shield for Blue
20		N/C	-
21		N/C	-
22	1	GND	Ground
23	3	CLK+	} Pixel clock...
24	2	CLK-	}...balanced pair
C1 – C5		-	n.c.
	15	+5V	+5V supply voltage (from PV6)

Table 6 DVI Input Connections

NOTE SK12 and SK15 are two independent inputs.

NOTE A 29-way DVI-I socket is assembled instead of the 24-way DVI-D socket although this is a digital interface only. This makes the use of all DVI cable assemblies possible rather than for a digital connection only.

3.1.6. HDMI Video Input – SK11

Connector type A 19-way HDMI socket, mating HDMI plug e.g. Molex 68767 series.

HDMI Pin	Signal name	Function
1	RED+	} Red video data...
2	GND	Shield for RED
3	RED-	}...balanced pair
4	GRN+	} Green video data...
5	GND	Shield for GREEN
6	GRN-	}...balanced pair
7	BLU+	} Blue video data...
8	GND	Shield for Blue
9	BLU-	}...balanced pair
10	CLK+	} Pixel clock...
11	GND	Shield for Clock
12	CLK-	}...balanced pair
13	CEC	Consumer Electronics Control line (not supported)
14	-	n.c.
15	SCLHDMI	I2C clock line for HDMI
16	SDAHDMI	I2C data line for HDMI
17	GND	Ground
18	IN +5V	+5V input for HDMI
19	HP	Hot-plugging control

Table 7 HDMI Input Connections

3.1.7. Component Video Input – PL17 and SK6, 8, 9 & 10

Connector type - 10-way 0.1" male, mating type 10-way 0.1" female.

Pin	Signal name	Function
1	REDIN	Red/Pr signal input
2	GND	Red/Pr signal ground
3	GRNIN	Green/Y signal input
4	GND	Green/Y signal ground
5	BLUIN	Blue/Pb signal input
6	GND	Blue/Pb signal ground
7	SYNCIN	Composite sync input (SDTV signals ONLY)
8	GND	Sync ground
9	N/C	-
10	GND	Ground

Table 8a Component Video Input Connections, PL17

Connector type – BNC or Cinch Socket, mating type BNC or Cinch Plug.

Pin	Signal name	Socket	Function
1	REDIN	SK6	Red/Pr signal input
2	GND	SK6	Red/Pr signal ground
1	GRNIN	SK8	Green/Y signal input
2	GND	SK8	Green/Y signal ground
1	BLUIN	SK9	Blue/Pb signal input
2	GND	SK9	Blue/Pb signal ground
1	SYNCIN	SK10	Composite sync input (SDTV signals ONLY)
2	GND	SK10	Sync ground

(Pin 1 = inner, Pin 2 = outer)

Table 8b Component Video Input Connections, SK6, 8, 9 and 10

NOTE SK6, 8, 9 & 10 and PL17 are two independent inputs. Either BNC or Cinch sockets will be fitted.

3.1.8. Power Input Connector SK3, SK14 and PL18

NOTE Either SK3 or SK14 or neither one will be fitted.

Connector type – 2.5mm coaxial power jack. Mating connector – 2.5mm i/d, 5mm o/d socket

Pin	Signal name	Socket	Function
1	VIN	SK3	Power Input for Driver – see section 2.3 for details
2	GND	SK3	Ground

(Pin 1 = inner, Pin 2 = outer)

Table 9a Power Input Connections

Connector type – 2.5mm locking coaxial power jack (Switchcraft 712RA). Mating connector – 2.5mm i/d, 5mm o/d socket

Pin	Signal name	Socket	Function
1	VIN	SK14	Power Input for Driver – see section 2.3 for details
2	GND	SK14	Ground

Table 9b Power Input Connections

Connector type - 8-way 0.1" male, mating type 8-way 0.1" female.

Pin	Signal name	Function
1	VIN	Power Input for Driver – see section 2.3 for details
2	VIN	Power Input for Driver – see section 2.3 for details
3	VIN	Power Input for Driver – see section 2.3 for details
4	VIN	Power Input for Driver – see section 2.3 for details
5	GND	Ground
6	GND	Ground
7	GND	Ground
8	GND	Ground

Table 9c Power Input Connections

3.1.9. SPDIF Connector (SK7)

Connector type – Female Phono socket, mating type Male Phono socket.

Pin	Signal name	Function
1	Signal	SPDIF signal
2	Shield	Ground

Table 10 Power Input Connections

3.1.10. Keypad Connector PL13

Connector type - 10-way IDC male, mating type 10-way IDC female.

Pin	Signal name	Function
1	GND	Ground
2	GND	Ground
3	+5V	Power
4	N/C	-
5	Menu	Invokes OSD, thereafter takes user down one menu level
6	N/C	-
7	Con-	See section 4.3
8	Con+	See section 4.3
9	Br+	Brightness increase, also increment value in current selection
10	Br-	Brightness decrease, also decrement value in current selection

Table 11 Standard Keypad Connector

3.1.11. Keypad Connector (Vantage) PL12

Connector type - 10-way IDC male, mating type 10-way IDC female.

Pin	Signal name	Function
1	STDBY_KEY	Force into/out of standby mode
2	KEY_INFRA	Data from Infrared remote control
3	N/C	-
4	N/C	-
5	KEY_IRQ	Invokes OSD, thereafter takes user down one menu level
6	N/C	-
7	I2C1_SCL	I2C1 SCL
8	I2C1_SDA	I2C1 SDA
9	+5V	Power
10	GND	Ground

Table 12 Vantage Keypad Connector

3.1.12. Host Connector (UART1) PL8

Connector type - 10-way IDC male, mating type 10-way IDC female.

Pin	Signal name	Function
1	Power	3V3 or 5V0 Power (selected at board manufacture)
2	N/C	-
3	RS232_Tx2	RS232 levels, Tx (to the keypad)
4	RESET	-
5	RS232_Rx2	RS232 levels, Rx (from the keypad)
6	N/C	-
7	SCL	I2C1 SCL
8	SDA	I2C1 SDA
9	GND	Ground
10	N/C	-

Table 13 Host UART 1 Connector

3.1.13. Host Connector (UART 0) PL9

Connector type - 3-way 0.1" male, mating type 3-way 0.1" female.

Pin	Signal name	Function
1	RS232_Rx1	RS232 levels, Rx (PV6 Scaler reads data from HOST PC)
2	RS232_Tx1	RS232 levels, Tx (PV6 Scaler sends data to the HOST PC)
3	GND	Ground

Table 14 Host UART 0 Connector

NOTE

This RS232 port is available for remote control of the functions of the interface board. The details of the protocol are described in the Remote Control API document.

3.1.14. USB Connector SK4

Connector type USB-B receptacle, mating type USB-B plug.

Pin	Signal name	Function
1	VBus	+5V
2	D-	Differential Signalling Data -
3	D+	Differential Signalling Data +
4	GND	Ground

Table 15 USB Connector

3.2. Display Panel Connection Details

Warning

Before wiring up to the panel, read the section on EMC Compliance and check the setting of J1 (Display Power Voltage).

3.2.1. Inverter Control Connector PL6

Connector type - 4-way 0.1" male, mating type 4-way 0.1" female.

Pin	Signal name	Function
1	LCD_INV_EN	Backlight inverter enable (see note 4)
2	INV_BRI	Backlight intensity control. PWM or analogue voltage (note 1, 2 & 3).
3	+5V	Supply voltage
4	GND	

Table 16 Inverter Control Connections

3.2.2. Power Input / Inverter brightness Connector – PL7

Connector type - 6-way 0.1" male, mating type 6-way 0.1" female.

Pin	Signal name	Function
1	LCD_INV_EN	Backlight Inverter enable (see note 4)
2	INV_BRI	Backlight Intensity Control (see note 1, 2 & 3)
3	VFILT	Power Input for Driver – (see note 5) see section 2.3 for details
4	VFILT	Power Input for Driver – (see note 5) see section 2.3 for details
5	GND	Ground for Driver
6	GND	Ground for Driver

Table 17 Inverter Control Connections

3.2.3. Auxiliary Power Input Connector for Driver – PL16

Connector type - 10-way 0.1" male, mating type 10-way 0.1" female.

Pin	Signal name	Function
1	VFILT	Power Input for Driver – (see note 5) see section 2.3 for details
2	VFILT	Power Input for Driver – (see note 5) see section 2.3 for details
3	VFILT	Power Input for Driver – (see note 5) see section 2.3 for details
4	VFILT	Power Input for Driver – (see note 5) see section 2.3 for details
5	VFILT	Power Input for Driver – (see note 5) see section 2.3 for details
6	GND	Ground for Driver
7	GND	Ground for Driver
8	GND	Ground for Driver
9	GND	Ground for Driver
10	GND	Ground for Driver

Table 18 Inverter Power Connections

3.2.4. Aux LVDS Power connector PL5

Connector type - 5-way 0.1" male, mating type 5-way 0.1" female.

Pin	Signal name	Function
1	VPAN	Switched Panel Power (see note 5)
2	VPAN	Switched Panel Power (see note 5)
3	GND	Ground
4	GND	Ground
5	GND	Ground

Table 19 Aux LVDS Power Connections

NOTES

VFILT is the filtered version of the power connected to the PV6 board.

VPAN can either be 3.3V, 5V, 12V or VFILT depending on jumper settings (J1, LK1 and LK2). Either LK1 or LK2 must be fitted to enable VPAN or VFILT. J1 selects 3V3, 5V or 12V.

VFILT must not be selected if the input voltage to PV6 exceeds 18VDC +/- 10% or damage to PV6 will result. VFILT must be selected to run a 12V panel when PV6 itself is running from 12V.

Maximum VPAN current must not exceed 5A. For higher currents an external power regulator and switch must be used.

1. Most inverters require only one connection to control the backlight brightness. Pin 2 (INV_BRI) should be connected to the "dimming" pin on the inverter.
2. It is possible to invert the INV_BRI control signal so that decreasing the control voltage increases the brightness. (LK5 – table 20 refers)
3. Some inverters require a INV_BRI range 0V to 5V others require a 0V to 1V range, LK3 selects between these two options
4. LCD_INV_EN Inverter enable: Normally +5V = On, 0V = Off. It is possible to change this to 0V on and +5V Off (LK4 – table 20 refers)
5. Some panels consume more current than the main unit can supply. When this option is used, remove the jumper link from LK1 and LK2 and apply VPAN/VFILT directly from the external PSU.

3.2.5. LVDS adapter output connections (PL1,2,3 & 4)

Connector type - 8-way 0.1" male, mating type 8-way 0.1" female.

Pin	Signal name	Header	Function
1	VPAN	PL1	Panel Power
2	OOUT0-	PL1	ODD 0-
3	OOUT0+	PL1	ODD 0+
4	OOUT1-	PL1	ODD 1-
5	OOUT1+	PL1	ODD 1+
6	OOUT2-	PL1	ODD 2-
7	OOUT2+	PL1	ODD 2+
8	GND	PL1	Ground
1	VPAN	PL2	Panel Power
2	OOUT3-	PL2	ODD 3-
3	OOUT3+	PL2	ODD 3+
4	OOUT3-	PL2	ODD 4-
5	OOUT3+	PL2	ODD 4+
6	OCLK-	PL2	ODD CLK-
7	OCLK+	PL2	ODD CLK+
8	GND	PL2	Ground

Pin	Signal name	Header	Function
1	VPAN	PL3	Panel Power
2	EOUT0-	PL3	EVEN 0-
3	EOUT0+	PL3	EVEN 0+
4	EOUT1-	PL3	EVEN 1-
5	EOUT1+	PL3	EVEN 1+
6	EOUT2-	PL3	EVEN 2-
7	EOUT2+	PL3	EVEN 2+
8	GND	PL3	Ground
1	VPAN	PL4	Panel Power
2	EOUT3-	PL4	EVEN 3-
3	EOUT3+	PL4	EVEN 3+
4	EOUT3-	PL4	EVEN 4-
5	EOUT3+	PL4	EVEN 4+
6	ECLK-	PL4	EVEN CLK-
7	ECLK+	PL4	EVEN CLK+
8	GND	PL4	Ground

Table 20 Single/Dual LVDS Interconnect to Display

Notes:

1. For SINGLE PORT operation, use the EVEN channel.
2. For DUAL PORT operation, the EVEN channel is the first pixel, the ODD port is the second pixel.
3. Calibre UK Ltd recommend using proper LVDS cable for all LVDS interconnects.
4. PL1 and PL2 will only be fitted for Dual Port panels.
5. Virtually all SXGA and UXGA display panels have a dual port interface in order to keep the data transfer rate (dot clock) down to a reasonable level. In this system two pixels of data are presented simultaneously to the panel, and are then clocked in together using DCLK. The standard programming of the SXGA and higher resolution output driver assumes this dual port arrangement, although it is possible to program the driver to use just PL3/4 at the full data transfer rate.

3.3. Option Link Settings

Link	Function
LK1, LK2	Panel Power Selection. Fit either link. Omit both links to use external VPAN. LK1: use Panel Power Regulator LK2: use VIN (from PL18/SK3/SK4) Note: DO NOT FIT LK1 and LK2 at the same time. This will permanently damage your PV6 board.
LK3	1-2: INV_BRI 0-1V jumper to the left 2-3: INV_BRI 0-5V jumper to the right or not fit
LK4	1-2: Inverter Enable sense, active high 2-3: Inverter Enable sense, active low
LK5	1-2: Inverter PWM sense, active high 2-3: Inverter PWM sense, active low
LK6	Factory set DO NOT CHANGE
LK7,8,9	Factory set DO NOT CHANGE
J1	Panel Power Regulator Voltage 1-2: 12V. 3-4: 5V. 5-6: 3V3.

Table 21 Option Links

OPERATION

4.1. Normal Operation

Normal operation of the interface consists of little more than connecting up the power supply, video and computer signals and switching on. When the display is switched on the driver looks for a signal on the selected channel. If this is connected then it is displayed, if the input is not connected a “No Input” screen shows up.

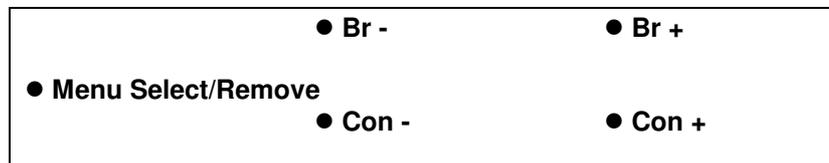
4.2. User Interface Buttons

The PV6 board features two dedicated keypad connectors to attach optional of-the-shelf keyboards. A basic switch type keypad and a more elaborate keypad (Vantage type) communicating through a two wire interface bus and an interrupt line for IR remote control with the interface board are available.

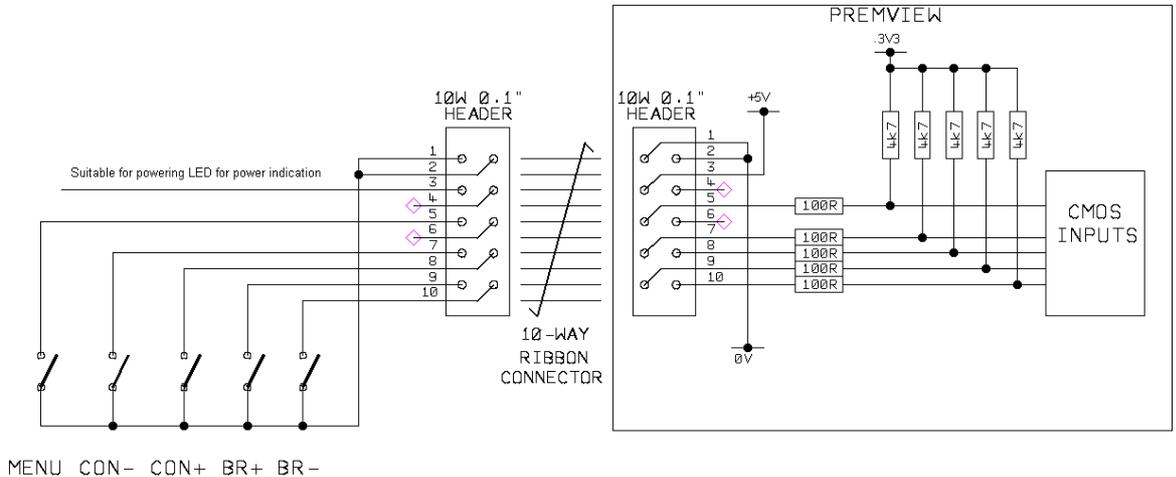
4.2.1. Basic Keypad

The physical user control panel consists of five push buttons. One of these is dedicated to invoking the OSD Menu while the other four are dual purpose, as listed below:

- Menu: invokes OSD or next function level (equivalent to “enter” key on a PC)
- Con+ and Con -: Increase and decrease the video image contrast setting, also see section 4.3 below
- BR+: Direct backlight increase, also used to increment selected parameter
- BR-: Direct backlight decrease, also used to decrement selected parameter

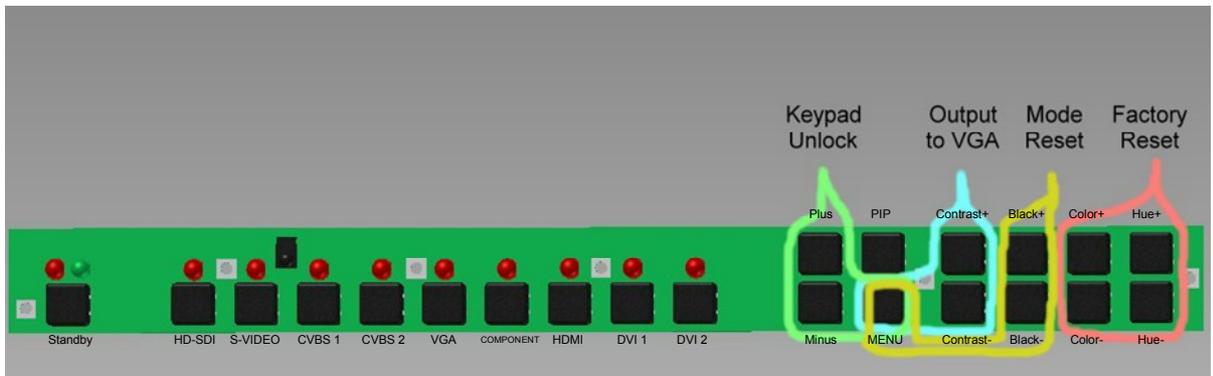


The OSD keypad can be supplied as an option, but in case users wish to design their own OSD controller, the schematic for the supplied keypad is shown below.



4.2.2. Extended Keypad

The PV6 board also supports an extended keypad with buttons for direct input channel selection, a control element with 2 directional keys Plus/Minus and a Menu button which activates the menu system and is also used to select items, and buttons for direct Contrast, Black Level, Color Saturation and hue change. Furthermore, the extended keypad has a dedicated Standby button and PIP button to switch Picture-in-Picture on and off.



Multiple key presses as per the indicated combinations are used to unlock the keypad - once it was locked through the menu system - and to reset modes only or the total board to factory default settings. Also a key press combination to set the output to VGA mode is provided. When the PV6 scaler was set to an output mode, which cannot be displayed by the attached monitor, obviously it cannot be set back through the menu system, but by the given key press combination to VGA, which almost all monitors should accept.

4.3. User Controls.

4.3.1. Direct Brightness Adjustment

Pressing the Br+ or BR- button controls the intensity of the backlight. After adjustment, the new Brightness value is displayed on the screen until the OSD timeout period expires. The new setting is then stored and the display returns to normal.

NOTE pressing Br+ and Br- at the same time turns the backlight off pressing any button turns it back on.

4.3.2. Displayed Input Select

Via the system menu the user can select the input channel. When the menu is off the Con- button is used to toggle between the Video and Data Source. Within a group the Con+ is used to switch though the source.

When the PV6 is switched on the last input displayed is selected as input channel.

4.3.3. Menu Select

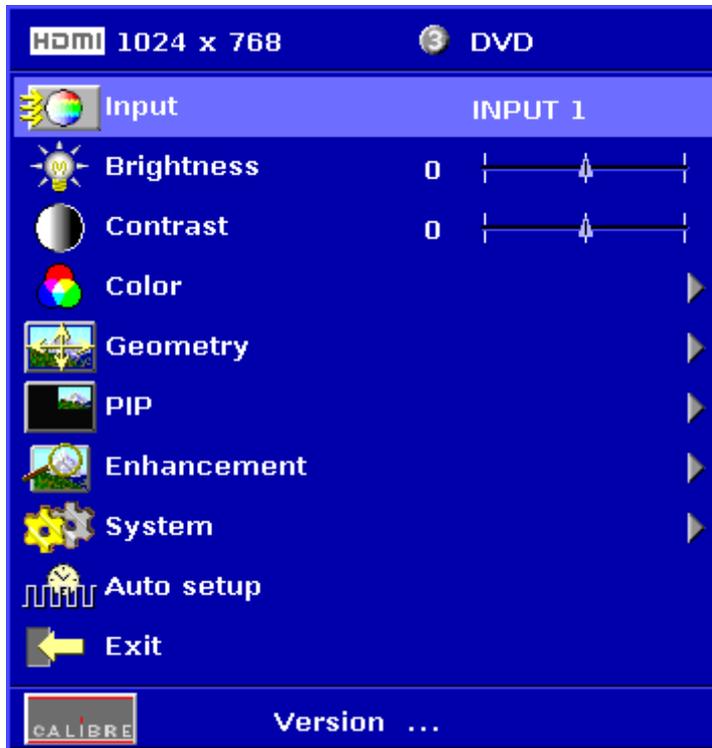
Pressing this button displays picture identification information together with a menu of icons. To access lower-level functions, press Br+ or Br- to toggle through the menus available for the currently displayed signal type, then press MENU again to select that function. The MENU button has a similar function to the ENTER key on a computer keyboard. Exit from a menu is by selecting EXIT which returns to the previous level and eventually switches off the menu.

4.3.4. Keypad Unlock

When the keypad is locked by pressing Menu, Br+ and Br- at the same time the keypad is unlocked again.

4.4. OSD Menu

At the top of the menu is a line which identifies the type of signal currently displayed by indicating the input channel and the resolution. At the bottom of the menu the firmware revision is displayed in live operation (here 3 dots are shown as placeholder).



The Auto Setup feature is only available when analogue graphics is displayed. Auto setup will search for the optimum clock value and phase for sampling the signal.

4.4.1. Brightness

These perform the same functions as the direct brightness adjust button operations in para. 4.3.1 above.

4.4.2. Contrast

Allows adjustment of the contrast (video gain) of the picture. This can be made for all types of input individually, so that if the input type changes, the contrast adjustment will change with it.

4.4.3. The Colour Menu

The contrast (video gain) and black level (video offset or brightness) parameters, also colour saturation and hue can be accessed from this menu. Colour temperature allows the user to select from pre-configured colour temperatures. Input gamma allows to de-gamma video signals with pre-configured gamma values.



The gain and black level of each RGB channel can be adjusted individually through the RGB values menu.



4.4.4. The Geometry Menu

Geometry adjustments can be made for all types of input. For video inputs Edge Control and Phase/ Clock/ Auto setup are not available. For DVI inputs Horizontal/Vertical Position and Phase/ Clock/ Auto setup are not available.



Horizontal and vertical position controls shift the image left/ right, up/ down. For graphic modes also the edges can be shifted individually within available limits. The image is scaled accordingly.

Note that the maximum available shift depends on the incoming mode and the display panel type, and may be restricted vertically. This provides very flexible and easy to use image size and position control.



Clock (Analogue Graphics only) sets the total number of input pixels per line to correspond with the input source, and will normally require adjustment only for unusual signals.

Phase (Analogue Graphics only) adjusts the internal clock to sample each pixel as near as possible to the centre. Phase will normally require adjustment for unusual types of signal.

Picture Format allows a user to select the displayed aspect ratio where the signal input is at variance with the display panel's natural aspect ratio. The format may be adjusted to either "Standard", "Full Screen", "Crop" or "Anamorphic". Standard preserves the aspect ratio of the incoming image and scales the image to fit into the size of the panel. Dependant on the aspect ratio of the panel the image is either bordered by the right/left side or bottom/top of the panel. Non-used areas of the panel are displayed black (letterboxed). Full Screen scales the image to the size of the panel without preservation of the aspect ratio. Crop preserves the aspect ratio and scales the image to fit the screen. Dependant on the aspect ratio of the panel either the top/bottom or right/left areas of the image are cropped. Anamorphic scales the input image such that it is displayed with an 16:9 aspect ratio when displayed on the panel no matter of the actual aspect ratio of the panel. The image is further scaled to fit into the size of the panel. Dependant on the aspect ratio of the panel the image is then either bordered by the right/left side or bottom/top of the panel. Non-used areas of the panel are displayed black (letterboxed). Not all settings give different results under certain conditions, e.g. when a 16:9 image is displayed on a 16:9 panel all settings give an identical full screen image.

Overscan is used to slightly zoom into the image. Thus, the border area of an image is no longer displayed on the panel. This cuts off unwanted features at the top or bottom from e.g. video images.

4.4.5. The PiP Menu

This menu enables and controls the Picture in Picture functions of the driver board. With PiP Mode Off no PiP is displayed. This is the board default setting. Three other PiP modes can be invoked “PiP”, “PaP” and “PoP”. PiP displays a second channel within the main image. PaP displays both picture side by side scaled to the vertical size of the panel. PoP displays both pictures side by side with aspect ratio preservation. The unused areas of the panel are displayed in black.

The PiP Input Menu selects the second channel input. PiP Size changes the size of the second channel image between “Small”, “Medium” and “Large”. Pip Position changes the position of the PiP between “Top Left”, “Top Right”, “Bottom Left” and “Bottom Right”.



4.4.6. The Enhancement Menu

This menu allows the user to digitally enhance the image. Sharpness is a peaking filter to increase high frequency luminance information. Detail effectively sharpens the image by removing low frequency image components.



The video filters menu allows to change the level of various filters. The LTI filter enhances the sharpness of the luminance component. The CTI filter enhances the color sharpness of the chrominance signal by increasing the steepness of color edges.

TRNR (Temporal Recursive Noise Reduction) and MNR (Mosquito Noise Reduction) are available for SD input signals only. These filters reduce spatial and temporal noise as well as block artifacts.

CCS (Cross Color Suppression) is a filter to reduce luminance to chrominance cross talk of composite video signals which appears as a coarse rainbow pattern or random colors in regions of fine details. The filter can be switched "Off" and "On".



4.4.7. The System Menu

This selection contains functions which are more applicable to system operation than to picture adjustment. Some of them are further collected in the “Menu Settings” sub-menu.

Under the menu item “User” a predefined setting stored under a user name can be selected.



The “Display Mode” can be set to either “Low Latency” mode or “Best Picture” mode. In “Best Picture” mode optimum image processing is applied, whereas in “Low Latency” mode the lowest latency is achieved. The flicker of interlaced video is not suppressed totally for the latter setting. Thus it has the disadvantage of conventional CRT TVs, but also their advantage of almost no delay in response, which is important for applications such as gaming, simulation or imaging in medical treatment.

In the system menu the component interface of the driver board is configured through the menu item “Component Type” to cope with either “RGB” or “YPbPr” color space. The sync signal can be stripped from the Green or Y channel with the setting “3 Wire” or from the separate sync line with the setting “4 Wire”. The “Auto” setting will automatically detect a sync signal and set-up the driver board accordingly. This is set under the menu item “Component Type”.

The “Factory Defaults” menu let the user restore all settings to the default values and thus, provide a means to get back to a known (good) system state. A requestor will come up and ask to confirm prior to actual restore.



The sub-menu “Menu Settings” provide items to change the menu position and menu display time, i.e. the time after which the OSD is switched off again with no user interaction.



The menu language can be altered and the keypad can be locked. To unlock the keypad a combination of keys has to be pressed at the same time. This is by pressing Menu, Br- and Br+ for the standard keyboard.

The locking of the keyboard is accompanied by the message:

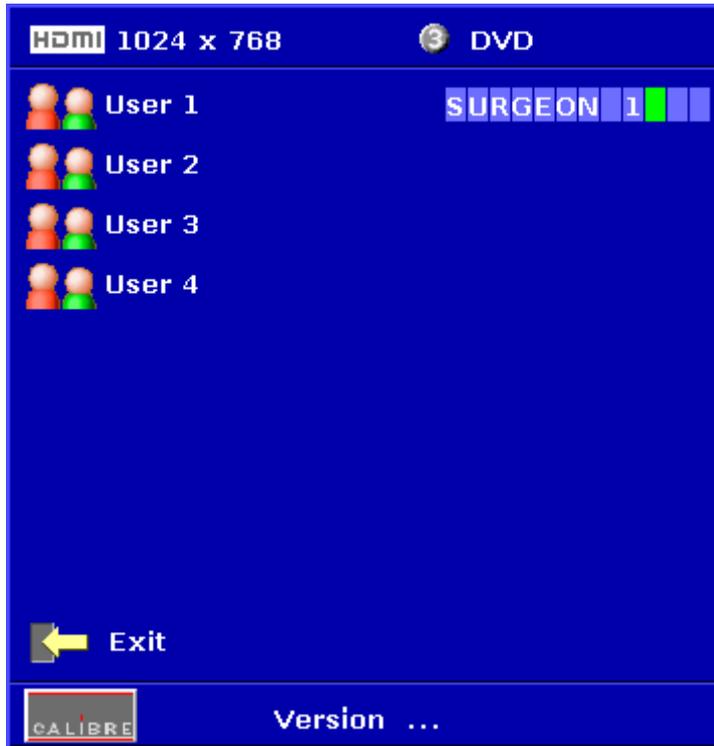


When successfully unlocking the keypad the following message shows up:



Several settings of the driver board can be stored under a user name. Thus, different users can store their preferred board settings and recall these profiles by picking up their user name from this menu.

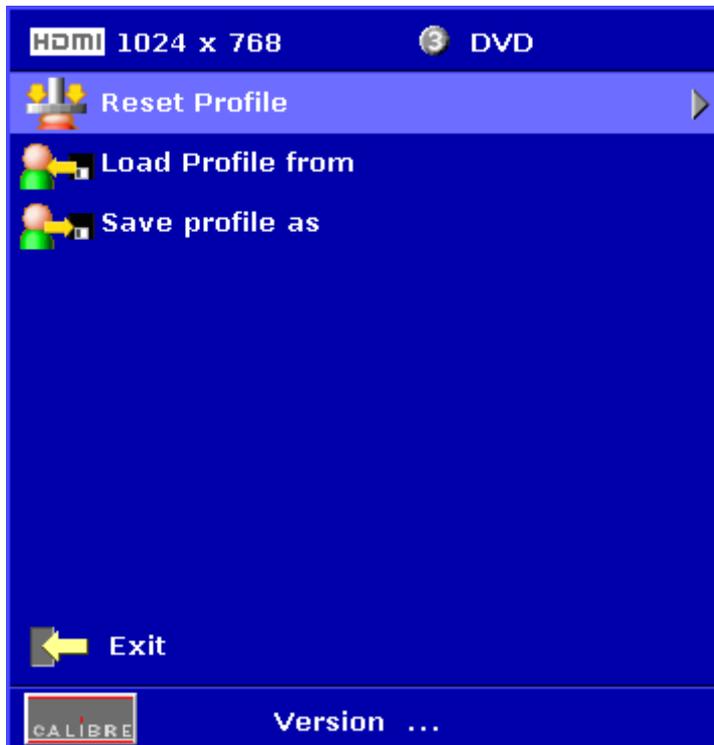
Four different sets of board configuration can be stored under the default user names "USER 1", "USER 2", "USER 3" and "USER 4". In the User Name menu this generic names can be changed to any other word with a maximum of 12 alpha numeric characters with a value range of 0-9, A-Z and blank.



The input channel name shown in the top line of the menu can be changed in the "Input Name" menu, e.g. the HDMI input may be connected to a DVD player and thus, could be named so.



The "Profiles menu" allows the user to store profiles under a certain user name. It also allows to copy user profiles by loading a profile stored under one user name and save it under another user name. "Reset Profile" allows to restore default driver settings for the currently selected user.





REGULATORY APPROVALS

5.1. EMC Approvals

Whilst the interface sold as a component and as such compliance to EN89/336/EEC is not mandatory, it is appreciated that many customers will be using the interface as part of a system which will have to be CE marked. The interface has been carefully designed to maximise its EMC performance in terms of both emissions and susceptibility. When correctly installed and interfaced to a compliant display panel, conformance to EN55022 part A is achievable. System integration should be done by an EMC competent person, following the advice in the next section.

5.2. EMC Installation Guidelines

If you are unsure about your ability to design with EMC in mind then please ASK US FOR ADVICE NOW - EMC compliance is much easier to design in than to retrofit.

The multi-way cables between the interface and the display panel carry high speed digital signals and as such are potentially major EMC emitters. Keep these as short as possible and make sure there is a substantial earth between the interface and display panel. If the final assembly is to be housed in a plastic rather than metal enclosure this is doubly important and the use of screened cables should be considered.

If a plastic case is being used consider the use of either internal metal-spraying or a tinplate screening can to cover the interconnect to the display panel.

Make sure there is a substantial GND connection between the interface and the chassis plate (the mounting screws do well) and the chassis plate and the display panel.

Keep any signal leads to the outside world (such as the CVBS, Computer input and power supply wires) as short as possible and DO NOT bundle or tie-wrap them to each other or any other wires carrying digital signals. It may be beneficial to put ferrite snubber rings or cylinders around the wires of digital panel interconnects.

ENVIRONMENTAL AND SAFETY

6.1. Operating

Temperature	0°C to 50°C
Humidity (non condensing)	0% to 95%

6.2. Storage

Temperature	-25°C to 85°C
Humidity (non condensing)	0% to 95%

6.3. Safety Issues

The display interface and keyboard are low voltage devices which do not generate any hazardous voltages. However, when designing an installation, bear the following points in mind:

Any mains operated power supply should comply with safety and EMC legislation in the country of operation. Any mains wiring should comply with the safety standards applicable in the country of operation.

The backlight inverter in most display panels generates potentially lethal voltages. Ensure that the installation offers adequate protection to the operator from this hazard.

ABBREVIATIONS

This section expands abbreviations peculiar to video applications which may be used in this manual. Signal-name mnemonics are not included.

CVBS	Composite Video Baseband Signal (alternatively Chroma, Video, Blanking and Sync)
DDC	Data Display Channel
DVI	Digital Visual Interface
EDID	Extended display identification data
HDMI	High Definition Multimedia Interface
LVDS	Low-voltage differential signalling
NTSC	National Television Systems Committee (USA, Canada, Japan TV standard)
PAL	Phase Alternating Line
RGB	Red, Green, Blue analogue video
SDI	Serial Digital Interface
SECAM	Systeme Electronique Couleur Avec Memoire - TV broadcast standard used in France, Middle East and most of Eastern Europe.
SMPTE	Society of Motion Picture Television Engineers
SOG	Sync on Green
SVGA	Super VGA – 800x600 pixels
SXGA	Super XGA – 1280x1024 pixels
TMDS	Transition-minimised differential signalling
UXGA	Ultra XGA – 1600x1200 pixels
VGA	Video graphics array – 640x480 pixels
XGA	Extended graphics array – 1024x768 pixels
Y/C	Luminance (Y) and Chrominance (C), also called S-video

IMPORTANT NOTES

- 1. PLEASE CONFIRM WITH CALIBRE THAT THE INTERFACE AND INTERCONNECT ARE SUITABLE FOR THE PANEL YOU INTEND TO USE. IN GENERAL MOST MANUFACTURERS ARE CONSISTENT WITH PINOUTS ETC. ACROSS THEIR RANGE BUT THIS IS NOT ALWAYS THE CASE.**
- 2. THE INTERFACE IS SPECIALLY CONFIGURED FOR USE WITH SPECIFIC MANUFACTURERS PANELS. THIS IS DUE TO THE VARIOUS DIFFERENCES IN CONTROL SIGNALS, TIMING PARAMETERS AND INVERTER CONTROL CONNECTIONS. CALIBRE UK LTD ACCEPTS NO RESPONSIBILITY FOR INCORRECTLY MATCHED INTERFACES AND PANELS IF CALIBRE UK LTD ARE NOT NOTIFIED IN ADVANCE OF THE INTENDED USE. IF IN DOUBT - CHECK!**
- 3. CALIBRE UK LTD ACCEPT NO LIABILITY FOR DAMAGE TO DISPLAY PANELS DUE TO INCORRECT CONNECTION WHEN THE CUSTOMER USES AN INTERCONNECTION CABLE OF HIS OWN, OR A THIRD PARTY'S, DESIGN.**
- 4. THE INTERFACE IS SELECTABLE VIA J1 TO DRIVE 12V, 5V OR 3.3V DISPLAY PANELS. CALIBRE UK LTD ACCEPTS NO LIABILITY FOR DAMAGE TO PANELS WHEN J1 IS INCORRECTLY SET.**