DIGITALVIEW®

RoHS

VIDEO INTERFACE CONTROLLER
FOR 1366x768, 1280x1024, 1280x768, 1024x768, 800x600, 640x480 RESOLUTIONS
TFT PANEL display

Model: AVP-1280

Part number : 41684002X-3

INSTRUCTIONS

CONTENTS

It is essential that these instructions are read and understood before connecting or powering up this controller.

Introduction

Designed for LCD monitor and other flat panel display applications. The AVP-1280 controller provides an easy to use interface controller for :

- **TFT (active matrix) LCD panels of 1366x768, 1280x1024, 1280x768, 1024x768, 800x600 and 640x480 resolutions display.**
- **S-Video, two composite video input support**
- **Video signals of NTSC, PAL and SECAM standard.**
- **Volume control of audio (optional add-on board required)**
- **DigitalView IR remote control support**
- **Full RS-232 OSD control interface support**
- **Supports Genlock – Synchronizes the output display refresh rate to the V-Sync of the input signal.**
- **Power indicator light on board**

HOW TO PROCEED

- Ensure you have all parts & that they are correct, refer to:
  - Connection diagram (separate document for each panel)
  - Connector reference (in following section)
  - Assembly notes
- Check controller switch & jumper settings (errors may damage the panel)
- Connect the parts
- Understand the operation & functions

IMPORTANT USAGE NOTE

This equipment is for use by developers and integrators, the manufacturer accepts no liability for damage or injury caused by the use of this product. It is the responsibility of the developer, integrators or other user of this product to:

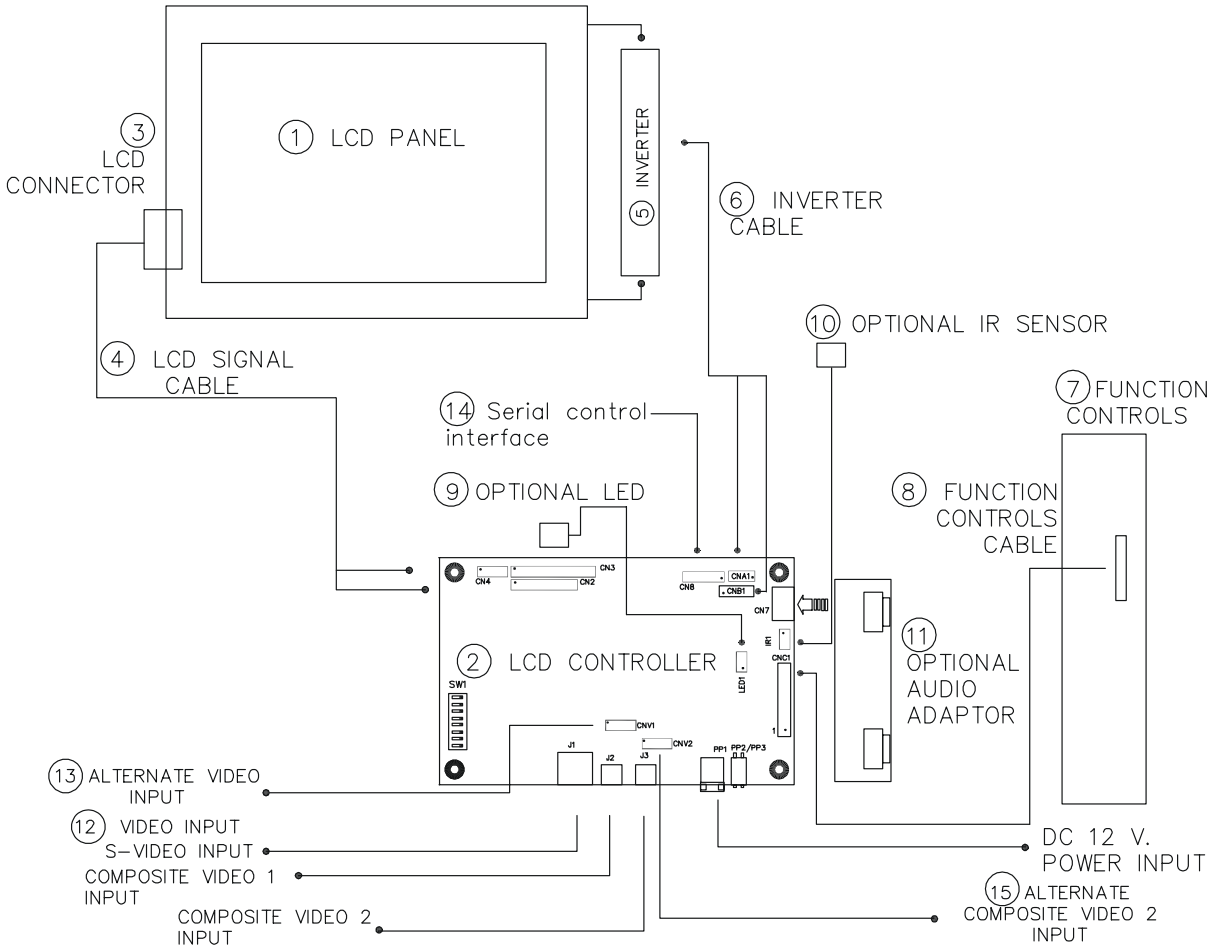
- Ensure that all necessary and appropriate safety measures are taken.
- Obtain suitable regulatory approvals as may be required.
- **Check power settings to all component parts before connection.**

DISCLAIMER

There is no implied or expressed warranty regarding this material.

SYSTEM DESIGN

A typical LCD based display system utilising this controller is likely to comprise the following:



Summary:

1. LCD panel
2. LCD controller card, AVP-1280
3. LCD panel connector board for LCD signal cable (if necessary)
4. LCD signal cables
5. Inverter for backlight (if not built into LCD)
6. Inverter cable
7. Function controls
8. Function controls cable
9. Status LED (optional)
10. IR sensor (optional)
11. Audio add-on board (optional)
12. AV cables (J1: S-video, J2: Composite video 1, J3: Composite video 2)
13. Alternate S-video or Composite video 1 input
14. Serial control interface
15. Alternate Composite video 2 input

- Power supply
- Enclosure or Mounting (not shown)

Digital View provides a range of parts, such as listed above, to make up complete display solutions.

ASSEMBLY NOTES

This controller is designed for monitor and custom display projects using 1366 x 768, 1280 x 1024 or 1280x768 x 1024 x 768 or 800 x 600 or 640 x 480 resolution TFT panels display with composite-video, S-Video video input. The following provides some guidelines for installation and preparation of a finished display solution.

Preparation: Before proceeding it is important to familiarize yourself with the parts making up the system and the various connectors, mounting holes and general layout of the controller. As much as possible connectors have been labeled. Guides to connectors and mounting holes are shown in the following relevant sections.

1. **LCD Panel**: This controller is for TFT panels with 3.3V, 5V or 12V TTL or LVDS/TMDS interface. For LVDS/TMDS a separate add-on board is required. Due to the variation between manufacturers panels signal timing and other panel characteristics, factory setup and confirmation should be obtained before connecting to a panel. **(NOTE: Check panel power jumper settings before connection)**

2. **Controller**: Handle the controller with care as static charge may damage electronic components. Make sure correct jumper and dip switches settings to match the target LCD panel.

3. **LCD connector board**: Different makes and models of LCD panel require different panel signal connectors and different pin assignments.

   WIRING NOTE: If panels of less than 3 x 8 bit are used, eg 3 x 6 bit, then connection of panel signal high value should correspond to the controllers highest bit. For example for a 6 bit panel R5 (Red data bit) on the panel should connect to R7 on the controller, in this case R1 & R0 on the controller will not be connected. Same for Green & Blue.

4. **LCD signal cables**: In order to provide a clean signal it is recommended that LCD signal cables should not longer than 33cm (13 inches). If loose wire cabling is utilised these can be made into a harness with cable ties. Care should be taken when placing the cables to avoid signal interference. Additionally it may be necessary in some systems to add ferrite cores to the cables to minimise signal noise.

5. **Inverter**: This will be required for the backlight of an LCD, some LCD panels have an inverter built in. As LCD panels may have 1 or more backlight tubes and the power requirements for different panel backlights may vary it is important to match the inverter in order to obtain optimum performance. See Application notes for more information on connection.

6. **Inverter Cables**: Different inverter models require different cables and different pin assignment. Make sure correct cable pin out to match inverter. Using wrong cable pin out may damage the inverter.

7. **Function Controls**: The following section discusses the controls required and the section on connectors provides the detail. The controls are minimal: On/Off, Backlight Brightness (depends on inverter), OSD (5 momentary buttons) analog VR type or (8 momentary buttons) digital type.

8. **Function controls cable:** The cables to the function switches should be of suitable quality and length so that impedance does not affect performance. Generally lengths up to 1 meter (3 feet) should be acceptable.

9. **Status LED**: The pin direction of the LED should be corrected for right colour indication. Red colour stands for standby. Green colours stands for signal on. The status LED is an optional part only, can be unconnected.

10. **IR sensor**: It is an optional part only, can be unconnected if not using IR remote control.

11. **Audio add-on board**: With the optional audio add-on board it is possible to control volume through the OSD menu. The audio board fits on the right hand edge of the main controller.

- **AV cables**: Standard Composite or S-video cables can be used. Reasonable quality cable should be used to avoid image quality degradation.

- **Power Input**: 12V DC is required, this should be a regulated supply. The power rating is depending on the panel and inverter used. Normally, power supply with 3.5Amp current output should enough for most of 4x CCFT panels. Although the controller provides power regulation for the LCD power this does not relate to the power supplied to the backlight inverter. If an unregulated power supply is provided to an inverter any fluctuations in power may affect operation, performance and lifetime of the inverter and or backlight tubes.

- **Power output**: Note the controller has an overall 2Amp current limit resettable fuse and the current available from the auxiliary power output (500mA maximum) will be dependent on the power input and other system requirements.

- **Power Safety**: Note that although only 12VDC is required as ‘power-in’ a backlight inverter for panel backlighting produces significantly higher voltages (the inverter does not connect to the ground plane). We strongly advise appropriate insulation for all circuitry.

- **EMI**: Shielding will be required for passing certain regulatory emissions tests.

- **Ground**: The various PCB mounting holes are connected to the ground plane.

- **Servicing**: The board is not user serviceable or repairable. Warranty does not cover user error in connecting up to the controller and is invalidated by unauthorized modification or repairs.

- **Controller Mounting**: It is recommended that a clearance of at least 10mm is provided above and 5mm below the controller when mounted. Additionally consideration should be given to:
  - Electrical insulation.
  - Grounding.
  - EMI shielding.
  - Cable management. Note: It is important to keep panel signal cables apart from the inverter & backlight cables to prevent signal interference.
  - Heat & Ventilation: Heat generated from other sources, for example the backlight of a very high brightness panel may generate significant heat which could adversely affect the controller.
  - Other issues that may affect safety or performance.

IMPORTANT: Please read the Application Notes section for more information.

CONNECTION & OPERATION

CAUTION: Never connect or disconnect parts of the display system when the system is powered up as this may cause serious damage.

CONNECTION

Connection and usage is quite straight forward (it is useful to have the relevant connection diagram available at this time):

1. **LCD panel & Inverter:** Connect the inverter (if it is not built-in the panel) to the CCFT lead connector of the LCD panel.
2. **TTL type panels:** Plug the signal cables direct to CN2, CN3 and CN4 (CN4 will not be used for 3x6-bit panel) on the controller board. Plug the other end of cables to the LCD connector board (if connector board is required, otherwise the signal can be direct plug to the LCD panel connector). Then plug the board connector to the LCD panel connector.
   LVDS/PanelLink type panels: A LVDS/PanelLink transmitter board is required. Plug the transmitter board to CN2, CN3 & CN4. Then insert the LCD signal cable with controller end to the connector on the transmitter board. Insert the panel end of the cable the LCD panel connector.
3. **Inverter & Controller:** Plug the inverter cable to CNB1 and CNA1 (if necessary). Plug another end to the connector on the inverter.
4. **Function switch & Controller:** Plug the OSD switch mount cable to CNC1 on the controller board and another to the OSD switch mount.
5. **LED & Controller:** Plug in a 3-way with dual colour LED to connector LED1 on the controller board. The red LED will light up when power on. The LED will change to green when valid video signal is detected.
6. **IR & Controller:** Plug in a 3-way with IR sensor to connector IR1 on the controller board.
7. **Jumpers & Switches:** Check all jumpers and switches (SW1) are set correctly. Details referring the connection diagram (a separate document) or the jumpers and switches setting table (in the following section).
8. **Jumpers & Inverter & Panel voltage:** Particularly pay attention to the settings of JA3, JA5, JB2 and JB3. JB2 & JB3 are used for inverter control (read inverter specification and information on the jumper table to define the correct settings). JA3 & JA5 are used for panel voltage input (read panel specification and information on the jumper table to define the correct settings).
9. **Power supply & Controller:** Plug the DC 12V power in to the connector PP1.
10. **Power on:** Switch on the controller board and panel by using the OSD switch mount.

The LED on controller board (D6) will light up when input power detected.

General:

- If you are using supplied cables & accessories, ensure they are correct for the model of panel and controller.
- If you are making your own cables & connectors refer carefully to both the panel & inverter specifications and the section in this manual, “Connectors, Pinouts & Jumpers” to ensure the correct pin to pin wiring.

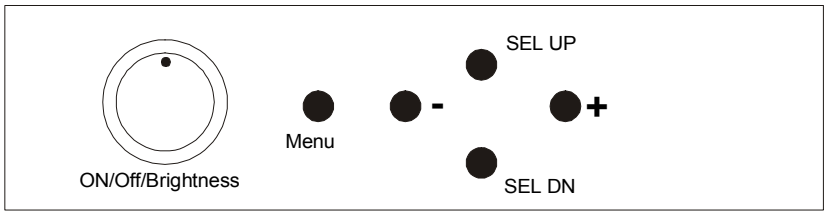
OPERATION

Once the system has been connected and switched on there are a number of functions available to adjust the display image as summarized in the following sections. The settings chosen will be saved for each mode independently.

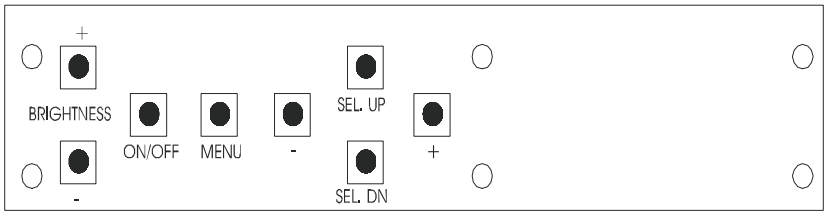
LCD DISPLAY SYSTEM SETTINGS

NOTE: By way of explanation the following refers to a set of sample buttons that may be obtained as an option. In addition to power on/off and connection for backlight brightness the controller provides an On Screen Display of certain functions which are controlled by 5 momentary type buttons (analog VR type) or 8 momentary type buttons (digital type):

Controls	Analog VR type	Digital type
On/Off – turns controller board power on	VR toggle switch	On/Off button
Brightness – controls backlight brightness	Rotary VR	Brightness +/- buttons
Menu – turns OSD menu On or Off (it will auto time off)	Menu button	Menu button
Select down – moves the selector to the next function (down)	SEL DN	SEL DN
Select up – moves the selector to the previous function (up)	SEL UP	SEL UP
+ – increase the setting/confirm the select	+	+
- – decrease setting	-	-



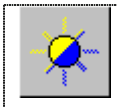
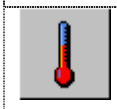
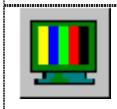
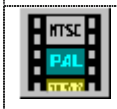
Analog VR type

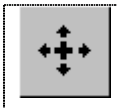
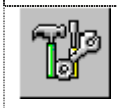


Digital type

To turn on the OSD menu: Press the MENU button
Move to next icon: Press the MENU button
Select options within icon menu: Use SEL UP/SEL DN buttons, the selected option is in yellow.
Increase/decrease setting: Use +/- buttons
Move selection left/right: Use +/- buttons, the selected option is in green
To confirm the selection: Use + button

OSD functions

	**Brightness and Contrast :** Brightness  Increase/decrease panel brightness level, total: 100 steps Contrast  Increase/decrease panel contrast level, total: 100 steps
	**Color Temperature :** 9500K / 8000K / 6500K / 5000K Adjust the warmness of the image displayed. The higher temperature the coolest image looks like. The lower temperature the warmest image looks like.
	**Video Adjustment :** Color:  adjust video color level Tint:  adjust video tint level Sharpness:  adjust video image sharpness level
	**Video System :** Select video system – AUTO / NTSC / NTSC4.43 / PAL / PAL M / SECAM AUTO : automatic detection of NTSC and PAL system and SECAM system NTSC / NTSC 4.43 : manual select NTSC system PAL / PAL M : manual select PAL system SECAM : manual select SECAM system

	**Position :** Image up/down : Use SEL UP/SEL DN to move the image vertically Image left/right : Use +/- to move the image horizontally
	**Language :** Select OSD menu language display 1. English 2. Danish 3. Chinese (Traditional Chinese)
	**Video source :** Select the input video signal Composite 1 / S-Video / Composite 2
	**Volume :**  Adjust the audio volume level (functions only if the audio add-on installed)
	**Utilities :** User Setting : User Timeout : adjust the OSD menu timeout period in a step of 5 seconds (max 50 seconds) DPMS (Desktop power management system) : Diable / Enable Disable : The panel backlight always on when no video input. Enable : The panel backlight will turn off when no video input. Display Input : Disable /Enable the input source name on screen Auto Source Select : Off - Disable auto source select function. Low - Auto source select enable ONLY in power up. High - Auto source select ALWAYS enable. Gamma : 1.0 / 1.6 / 2.2 OSD Setting : OSD Horz Position :  move the OSD menu horizontally OSD Vert Position :  move the OSD menu vertically OSD Background : Translucent / Opaque Direct Access #1: Define the hot key function (“+” and “-“) for one of the following adjustments : Brightness / Contrast / Volume / Video Source Direct Access #2: Define the hot key function (“SEL UP” and “SEL DN“) for one of the following adjustments : Brightness / Contrast / Volume/ Video Source Load Factory Defaults : Recall factory default settings. * By pressing the hot key, the source is in sequence of Composite Video/S-Video.
	**Exit menu**

The OSD settings chosen will be stored in memory. The OSD menu can be cleared from the screen by moving the selection bar to the EXIT icon pressing the + button otherwise it will automatically clear after a few seconds (time-out period) of non-use.

MANUAL & REMOTE CONTROL

The following table shows the comparison of functions available from different controls:

Operation	One for All	Sony multi remote	DV switchmount	DV digital VR switchmount	DV remote
Menu	Power	Power	Menu	Menu	OSD Back/Next
-	Mute	Mute	-	-	-
Select +	Ch+	Ch+	Select +	Select +	SEL UP
Select -	Ch-	Ch-	Select -	Select -	SEL DN
Setting +	Vol+	Vol+	Setting +	Setting +	Setting +
Setting -	Vol-	Vol-	Setting -	Setting -	Setting -

Other multi-system IR transmitters will also be suitable if they support common Sony signal timings.

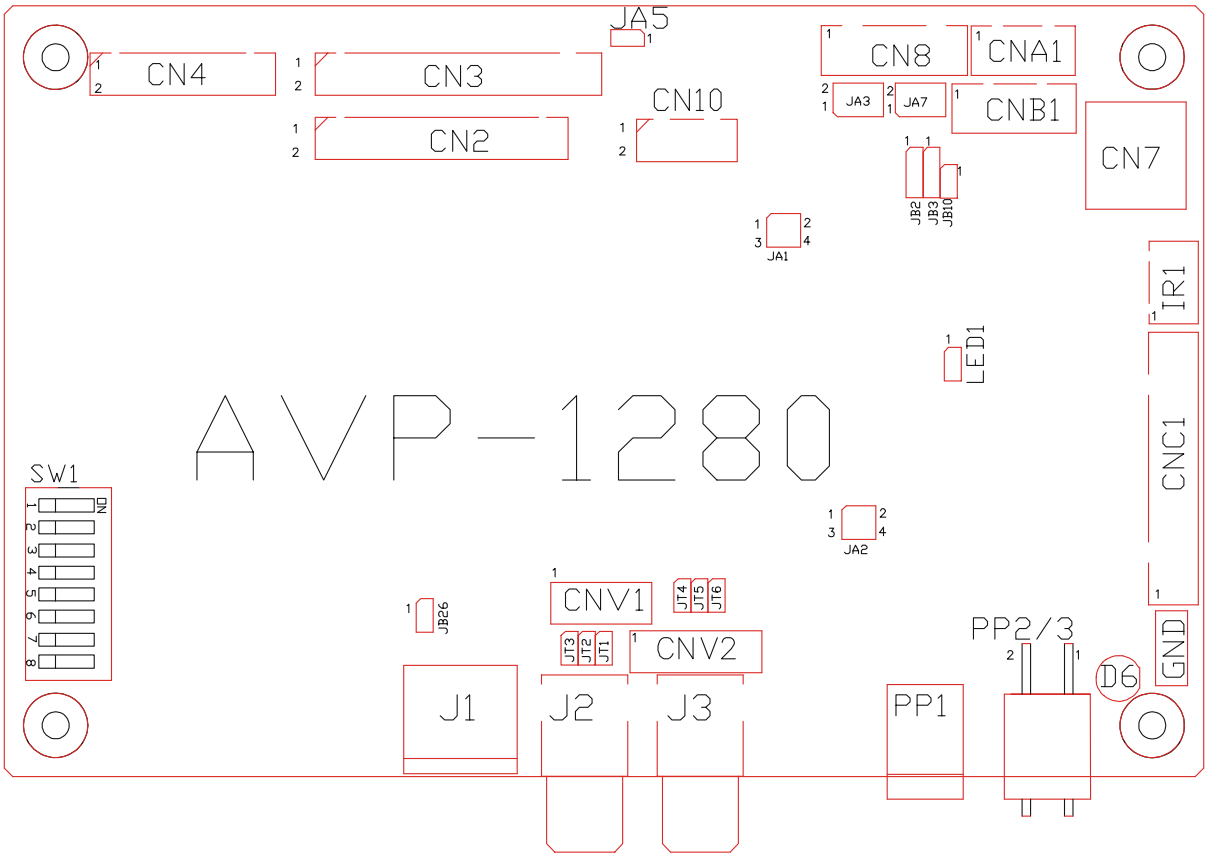
DV remote control unit

BUTTON	FUNCTION
POWER BUTTON	Power ON/OFF button. (Standby mode)
ATTENTION BUTTON	Use combined with digit keys to enable/disable the IR function. AVP-1280 : "Attention" + "1"
MUTE BUTTON	Switch to mute on/off mode.
AV/TV BUTTON	Use to select the input source. (Composite/S-Video)
UP / DN BUTTONS	Pressing these buttons to select the items in the OSD menu.
VOLUME +/- BUTTONS	Press the "+" button to increase the volume and the "-" to decrease the volume.
+ / - BUTTONS	Pressing these buttons to adjust the settings of the selected item in the OSD menu.
OSD BACK BUTTON	Use to turn on the OSD menu or go to the previous OSD screen.
OSD NEXT BUTTON	Use to turn on the OSD menu or go to the next OSD screen.
DISPLAY BUTTON	When OSD menu displayed, press this button to turn it off.
TRACK (S-Vid) BUTTON	In input source selection mode, pressing this button to select S-Video source.
TRACK (Comp) BUTTON	In input source selection mode, pressing this button to select Composite source.

Note : For details, please refer to the remote control unit manual.

CONNECTORS, PINOUTS & JUMPERS

The various connectors are:



Summary: Connectors

Ref	Purpose	Description
CN2	Panel signal	Hirose 28-pin, DF11-28DP-2DSA (Matching type : DF11-28DS-2C)
CN3	Panel signal	Hirose 32-pin, DF11-32DP-2DSA (Matching type : DF11-32DS-2C)
CN4	Panel signal	Hirose 20-pin, DF11-20DP-2DSA (Matching type : DF11-20DS-2C)
CN7	Audio board connector	DIL socket header 5x2 right angle
CN8	RS-232 serial control	JST 6-way, B6B-XH-A (Matching type : XHP-6)
CN10	Panel signal	Hirose 10-pin, DF11-10DP-2DSA (Matching type : DF11-10DS-2C)
CNA1	Auxiliary power output	JST 4-way, B4B-XH-A (Matching type : XHP-4)
CNB1	Backlight inverter	JST 5-way, B5B-XH-A (Matching type : XHP-5)
CNC1	OSD controls	JST 12-way, B12B-XH-A (Matching type : XHP-12)
CNV1	Alternate video in	JST 5-way, B5B-PH-K (Matching type : PHR-5)
CNV2	Alternate composite video in	JST 6-way, B6B-PH-K (Matching type : PHR-6)
J1	S-video in	Mini din 4-way
J2	Composite video 1 in	RCA jack (yellow)
J3	Composite video 2 in	RCA jack (yellow)
IR1	Infra-Red sensor connector	JST 3-way, B3B-XH-A (Matching type : XHP-3)
LED1	Dual color LED connector	Header pin 3x1
PP1	Main power input	DC power jack, 2.5mm contact pin diameter
PP2/3	Power input (alternative)	DC power Molex 2 pin 0.156” pitch
SW1	Panel selection	8-positions DIP Switch

Summary: Jumpers setting

Ref	Purpose	Note
JA1	On board +5V logic power enable	1-2 & 3-4 closed, factory set, do not remove
JA2	On board +3.3V logic power enable	1-2 & 3-4 closed, factory set, do not remove
JA3	Panel power voltage select **CAUTION**: Incorrect setting can damage panel	1-3 & 2-4 = +5V panel voltage 3-5 & 4-6 = +3.3V panel voltage
JA5	+12V panel power	Close = +12V panel power available on CN3 Open = +12V panel power not available on CN3
JA7	+12V power source on connector CNA1	1-3 & 2-4 = DC12V available on pin 1 of CNA1 3-5 & 4-6 = backlight 12V (controlled by JB10) available on pin 1 of CNA1 ** CNA1 provides additional +12V power pin for high current backlight driver board.
JB2	Backlight inverter on/off control – signal level **CAUTION**: Incorrect setting can damage inverter.	1-2 = On/Off control signal 'High' = +12V 2-3 = On/Off control signal 'High' = +5V Open = On/Off control signal 'High' = Open collector
JB3	Backlight inverter on/off control – polarity	1-2 = control signal 'high' = CCFT ON 2-3 = control signal 'low' = CCFT ON
JB10	Backlight power enable	Open = backlight +12V power supply is always enabled Close = backlight +12V power supply is switched off when backlight is off.
JT1	Composite video 1 in terminator enable	Open = composite video input is not terminated Close = composite video input is terminated with 75Ω
JT2	S-Video luma-in terminator enable	Open = S-video luma input is not terminated Close = S-video luma input is terminated with 75Ω
JT3	S-Video chroma-in terminator enable	Open = S-video chroma input is not terminated Close = S-video chroma input is terminated with 75Ω
JT4	Composite video 2 in terminator enable	Open = composite video input is not terminated Close = composite video input is terminated with 75Ω
JT5	Reserved	Reserved
JT6	Reserved	Reserved
SW1	Panel & function selection	See table below

SW1: Panel and function selection

Pos. #	Function	Description
1,2,5,6,7	Panel selection	Refer to table 1 – Panel selection
3	Frame lock mode selection	ON = Set the polarity of HSYNC is active high and generate the consistent number of HSYNCs per frame. OFF = Set the polarity of HSYNC is active low and generate the inconsistent number of HSYNCs per frame.
4	Reserved	
8	Clock phase	Change to obtain best image quality

Table 1 - Panel selection

SW1-Pos.#1	SW1-Pos.#2	SW1-Pos.#5	SW1-Pos.#6	SW1-Pos.#7	Description
OFF	OFF	ON	OFF	OFF	VGA
OFF	OFF	ON	OFF	ON	SVGA
OFF	OFF	ON	ON	OFF	XGA (Single pixel)
OFF	OFF	OFF	ON	OFF	XGA (dual pixel)
OFF	OFF	ON	ON	ON	SXGA
OFF	ON	ON	ON	OFF	WXGA[1] (Single pixel)
OFF	ON	OFF	ON	OFF	WXGA[1] (dual pixel)
OFF	ON	OFF	OFF	ON	WXGA [2]

Note [1] : WXGA – 1280x768 resolution

[2] : WXGA – 1366X768 resolution (Apply on P/N 4168400-12 or up version)

CN2 – Panel connector: HIROSE DF11-28DP-2DSA (Matching type : DF11-28DS-2C)

PIN	SYMBOL	DESCRIPTION
1	GND	Ground
2	GND	Ground
3	ER2	Even data bit R2
4	OR2	Odd data bit R2
5	ER3	Even data bit R3
6	OR3	Odd data bit R3
7	ER4	Even data bit R4
8	OR4	Odd data bit R4
9	ER5	Even data bit R5
10	OR5	Odd data bit R5
11	EG2	Even data bit G2
12	OG2	Odd data bit G2
13	EG3	Even data bit G3
14	OG3	Odd data bit G3
15	EG4	Even data bit G4
16	OG4	Odd data bit G4
17	EG5	Even data bit G5
18	OG5	Odd data bit G5
19	EB2	Even data bit B2
20	OB2	Odd data bit B2
21	EB3	Even data bit B3
22	OB3	Odd data bit B3
23	EB4	Even data bit B4
24	OB4	Odd data bit B4
25	EB5	Even data bit B5
26	OB5	Odd data bit B5
27	GND	Ground
28	GND	Ground

CN3 – Panel connector: HIROSE DF11-32DP-2DSA (Matching type : DF11-32DS-2C)

PIN	SYMBOL	DESCRIPTION
1	+12v	DC +12v, reserved & not normally used
2	+12v	DC +12v, reserved & not normally used
3	VLCD12	Optional +12V panel supply (selected by JA5)
4	NC	No connection
5	GND	Ground
6	GND	Ground
7	ER6	Even data bit R6
8	OR6	Odd data bit R6
9	ER7	Even data bit R7 (MSB of lower colour bit panels)
10	OR7	Odd data bit R7 (MSB of lower colour bit panels)
11	EG6	Even data bit G6
12	OG6	Odd data bit G6
13	EG7	Even data bit G7 (MSB of lower colour bit panels)
14	OG7	Odd data bit G7 (MSB of lower colour bit panels)
15	EB6	Even data bit B6
16	OB6	Odd data bit B6
17	EB7	Even data bit B7 (MSB of lower colour bit panels)
18	OB7	Odd data bit B7 (MSB of lower colour bit panels)
19	GND	Ground
20	GND	Ground
21	Vcc	DC +5v, reserved & not used normally
22	Vcc	DC +5v, reserved & not used normally
23	VS	Vertical sync
24	PWRDN	Power down control signal
25	HS	Horizontal sync
26	DE	Display enable
27	VLCD	Panel power supply (3.3V/5V configurable)
28	VLCD	Panel power supply (3.3V/5V configurable)
29	CKE	Even dot clock
30	CKO	Odd dot clock
31	GND	Ground
32	GND	Ground

CN4 – Panel connector: HIROSE DF11-20DF-2DSA (Matching type : DF11-20DS-2C)

PIN	SYMBOL	DESCRIPTION
1	GND	Ground
2	GND	Ground
3	NC	No connection
4	NC	No connection
5	ER0	Even data bit R0 (LSB)
6	OR0	Odd data bit R0 (LSB)
7	ER1	Even data bit R1
8	OR1	Odd data bit R1
9	EG0	Even data bit G0 (LSB)
10	OG0	Odd data bit G0 (LSB)
11	EG1	Even data bit G1
12	OG1	Odd data bit G1
13	EB0	Even data bit B0 (LSB)
14	OB0	Odd data bit B0 (LSB)
15	EB1	Even data bit B1
16	OB1	Odd data bit B1
17	NC	No connection
18	ODD_FIELD	Odd field (when connected to an interlace panel)
19	GND	Ground
20	GND	Ground

CN7 - Audio connector: DIL socket header 5x2 right angle

PIN	SYMBOL	DESCRIPTION
1	VCC	Audio board logic power supply, +5V
2	VOLSEL0	Volume control select signal
3	VOLSEL1	Volume control select signal
4	DATA/DN	Data for audio volume control
5	CLK	Clock for audio volume control
6	GND	Ground
7	+12V	Audio board power supply, +12V
8	LIN	Audio left channel L (re-route RCA connector to audio board)
9	RIN	Audio right channel R (re-route RCA connector to audio board)
10	AUDIO_GND	Ground for audio analog

CN8 – RS-232 serial control: JST B6B-XH-A or compatible (Matching type : XHP-6 or compatible)

PIN	SYMBOL	DESCRIPTION
1	SDATA	Reserved
2	SCLK	Reserved
3	VCC	+5V
4	TXD	RS-232 Tx data
5	GND	Ground
6	RXD	RS-232 Rx data

CN10 – Panel signal : Hirose 10-pin, DF11-10DP-2DSA (Matching type : DF11-10DS-2C)

PIN	SYMBOL	DESCRIPTION
1	PORT 0	Panel configuration port 0
2	PORT 1	Panel configuration port 1
3	PORT 2	Panel configuration port 2
4	BLON	Hpower-ENA(High voltage power enable for panel/address drivers)
5	PORT 3	Panel configuration port 3
6	Reserved	Reserved pin for internal use
7	PORT 4	Panel configuration port 4
8	NC	No connection
9	GND	Ground
10	Reserved	Reserved pin for internal use

CNA1 - Auxiliary power output: JST B4B-XH-A or compatible (Matching type : XHP-4 or compatible)

PIN	SYMBOL	DESCRIPTION
1	AUX 12V	+12V DC, 500mA max
2	GND	Ground
3	GND	Ground
4	AUX 5V	+5V DC, 500mA max

CNB1 – Backlight inverter connector: JST B5B-XH-A or compatible (Matching type : XHP-5 or compatible)

PIN	SYMBOL	DESCRIPTION
1	GND	Ground
2	VBKL	+12VDC, backlight power supply
3	BLCTRL	On/Off control (enable) – see JB2 & JB3
4	BVR_WIP	Brightness VR – WIP
5	BVR_A	Brightness VR A

CNC1 – Function controls connector: JST B12B-XH-A or compatible (Matching type : XHP-12 or compatible)

PIN	SYMBOL	DESCRIPTION
1	PSWIN	Power switch A
2	SW_ON	Power switch B
3	BVR_A	Backlight brightness VR pin A
4	BVR_WIP	Backlight brightness VR pin WIP
5	BVR_B	Backlight brightness VR pin B (470Ω resistor to +5V Vcc)
6	GND	Ground
7	MENU	OSD menu button
8	-/LEFT	OSD -/Left button
9	+/RIGHT	OSD +/Right button
10	SEL_DN	OSD Select down button
11	SEL_UP	OSD Select up button
12	NC	No connection

The VR for brightness depends on the inverter. The main power load for On/Off is handled by a relay on the controller.

CNV1 – Alternate Video in input, JST B5B-PH-K or compatible (Matching type : PHR-5 or compatible)

PIN	DESCRIPTION
1	S-Video : Chroma in
2	S-Video : Luma in
3	Ground
4	Ground
5	Composite video 1 in

CNV2 – Alternate Video in input, JST B6B-PH-K or compatible (Matching type : JST PHR-6 or compatible)

PIN	DESCRIPTION
1	Composite video 2 in
2	Ground
3	Reserved
4	Ground
5	Reserved
6	Ground

IR1 – Infra-Red sensor connector: JST B3B-XH-A or compatible (Matching type : XHP-3 or compatible)

PIN	SYMBOL	DESCRIPTION
1	GND	Ground
2	STDBY_Vcc	Stand by voltage
3	IR Data	IR data

LED1 – Status LED connector: 3-pin header

PIN	DESCRIPTION
1	Green LED pin (anode)
2	LED pin common (cathode)
3	Red LED pin (anode)

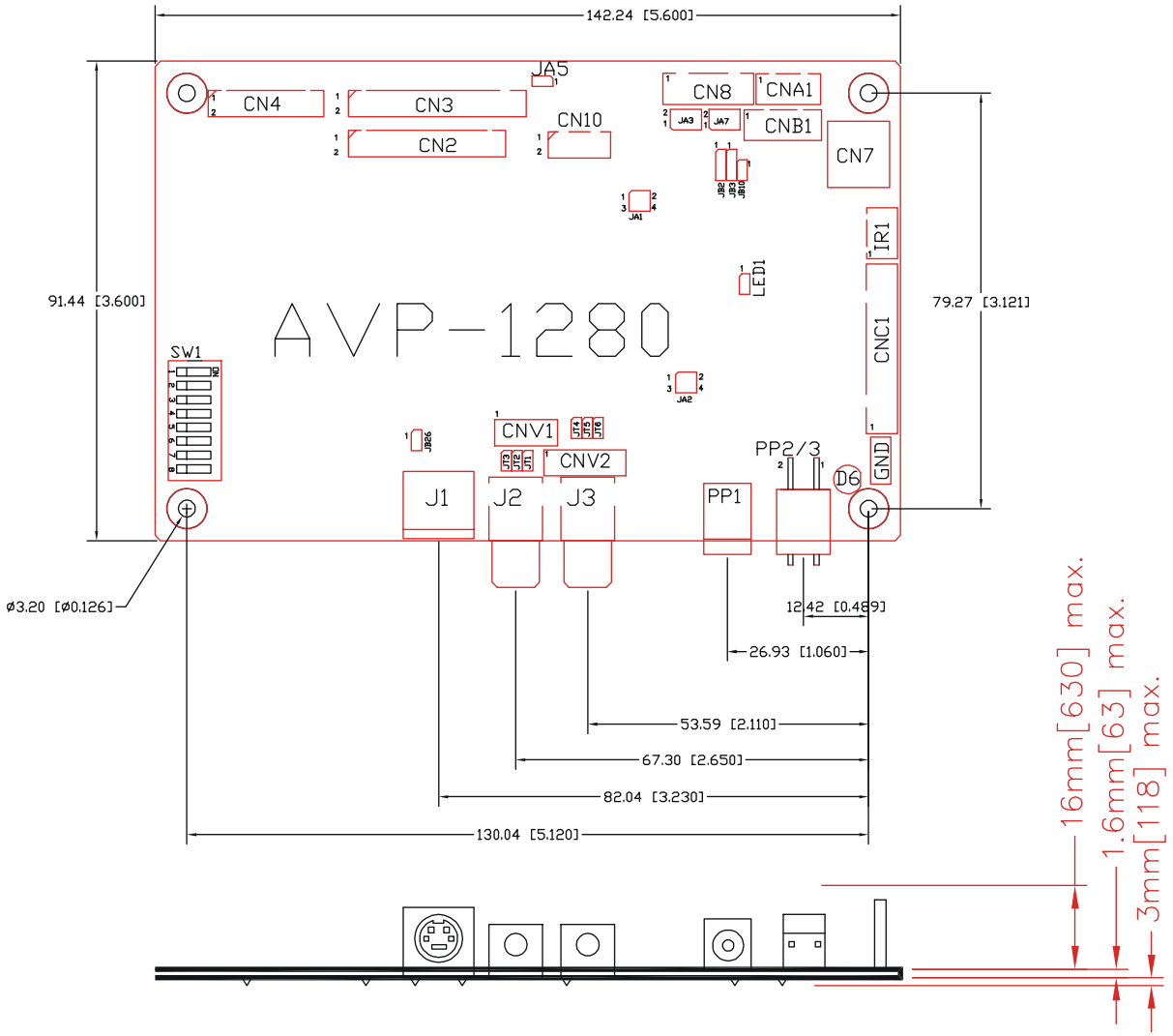
PP1 - 12VDC power supply

PIN	DESCRIPTION
1	+12VDC in middle pin
2	Ground

PP2/PP3 – Alternate 12VDC power supply

PIN	DESCRIPTION
1	+12VDC in
2	Ground

CONTROLLER DIMENSIONS



The maximum thickness of the controller is 20.6mm (measured from bottom of PCB to top of components, including any underside components & leads). We recommend clearances of:

- 5mm from bottom of PCB - if mounting on a metal plate we also recommend a layer of suitable insulation material is added to the mounting plate surface.
- 10mm above the components
- 3~5mm around the edges

Any of the holes shown above can be used for mounting the PCB, they are 3.2mm in diameter.

CAUTION: Ensure adequate insulation is provided for all areas of the PCB with special attention to high voltage parts such as the inverter.

APPLICATION NOTES

USING THE CONTROLLER WITHOUT BUTTONS ATTACHED

This is very straightforward:

- Firstly setup the controller/display system with the buttons. With controls attached and display system active make any settings for colour, tint and image position as required then switch everything off.
- Remove the control switches, the 12-way (CNC1) cable.
- Use a jumper or similar to connect pins 1 & 2 on CNC1, this will fix the board On.
- Refer to inverter specifications for details as to fixing brightness to a desired level, this may require a resistor, an open circuit or closed circuit depending on inverter.

Summary: On CNC1 the only pins that are used are for On/Off and Brightness (if controller mounted inverter is used). On CNC1 the pins are for momentary type buttons so it doesn't matter that no buttons are attached.

INVERTER CONNECTION

There are potentially 3 issues to consider with inverter connection:

- Power
- Enable
- Brightness

Please read the following sections for a guide to these issues.

Inverter Power: As per the table for CNB1 pin 1 is ground and pin 2 provides 12V DC. This should be matched with the inverter specification: see table.

CNB1

PIN	DESCRIPTION
1	Ground
2	+12VDC

Remark: For higher power inverter, more current (for 12V) can be taken from CNA1 pin 1.

Enable: This is a pin provided on some inverters for On/Off function and is used by this panel controller for VESA DPMS compliance. If the inverter does not have an enable pin or the enable pin is not used then DPMS will not be operational. Pin 3 should be matched to the inverters specification for the 'enable' or 'disable' pin.

CNB1

PIN	DESCRIPTION
3	Enable

Further, jumpers JB2 & JB3 & JB10 should be set to match the inverters specification for the enable pin power and High or Low setting: see table.

Ref	Purpose	Note
JB2	Inverter enable voltage	1-2 H = 12V, 2-3 H = 5V (Vcc), OPEN H = open collector
JB3	Inverter control	1-2 H = On, 2-3 L = On
JB10	Backlight power enable	Open = Backlight +12V power supply is always enabled Close = Backlight +12V power supply is switched off when backlight is off

Brightness: There are various methods for brightness control and it is important to consider the specifications for the inverter to be used. Generally the situation is:

- Brightness can controlled by using a resistor or VR (Variable Resistor).
- Brightness controlled by adding a circuit such as PWM (Pulse Width Modulation).
- No adjustment of brightness is possible.

CNB1 pins 4 & 5 are available for connecting to an inverter or circuit where VR control is supported.

CNB1

PIN	DESCRIPTION
4	VR WIP
5	VR A

This can then be matched with function controls connected to CNC1 pins 4 & 3 or 5: see table.

CNC1

PIN	DESCRIPTION
3	VR A
4	VR WIP
5	VR B

TROUBLESHOOTING

General
A general guide to troubleshooting a flat panel display system it is worth considering the system as separate elements, such as:
- Controller (jumpers)
- Panel
- Backlight (inverter, cabling, backlight tubes)
- Cabling
- Video Source

Through step by step cross checking with instruction manuals and a process of elimination to isolate the problem it is usually possible to clearly identify the problem area.

No image:
- If the panel backlight is not working it may still be possible to just see some image on the display.
- A lack of image is most likely to be caused by incorrect connection, lack of power, failure to provide a signal.

Image appearance:
- A faulty panel can have blank lines, failed sections, flickering or flashing display
- Incorrect jumper settings on the controller may cause everything from total failure to incorrect image. CAUTION: Do not set the panel power input incorrectly.
- Sparkling on the display: faulty panel signal cable.

Backlight:
Items to check include: Power input, Controls, Inverter and Tubes generally in this order.
If half the screen is dimmer than the other half:
- Check cabling for the inverter.
- For a specific backlight tube check the AC pins orientation (CAUTION: Never reverse any DC power pins).

Also:
- If adjusting brightness control has no effect the chances are that the VR rating or method of adjusting brightness is not compatible or correctly connected to the inverter.
- If system does not power down when there is a loss of signal

Continued failure:
If unit after unit keeps failing consider and investigate whether you are short circuiting the equipment or doing something else seriously wrong.

Generally after common sense issues have been resolved we recommend step by step substitution of known working parts to isolate the problem.

SPECIFICATIONS

Panel compatibility	Compatible with 1366x768, 1280x1024, 1280x768, 1024 x 768, 800x600, 640x480 resolutions of TFT LCD panels from manufacturers display such as: Fujitsu, LG, Mitsubishi, NEC, Samsung, Sharp, Toshiba, etc. A specified BIOS and some factory adjustment may be required for individual panel timings.
No. of colours	Up to 3 x 8 bit providing 16.7 million colours.
Panel power	DC +3.3V, +5V, +12V
Panel signal	TTL with LVDS & TMDS options (through add-on board)
Dot clock (pixel clock) maximum	108MHz
Video formats	PAL, NTSC, SECAM
Video inputs	Composite video A S-Video Composite video B
Functions display	On screen display (OSD) of functions
OSD menu functions	Image controls: Brightness, Contrast, Color Temperature, Color, Tint(NTSC-video), Sharpness, Image adjust Other features: User setting, OSD menu position, Direct Access function, Multiple language support, audio controls
OSD menu controls available	Power On/Off Backlight brightness OSD Menu OSD Select up OSD Select down Setting + Setting -
Control interface	Buttons Infra red RS-232
Settings memory	Settings are stored in non volatile memory
Controller dimensions	142.24mm x 91.44mm (5.6” x 3.6”)
Power consumption	4w approx. (controller logic only, not including panel power consumption)
Power load maximum	The controller has an overall 2Amp current limit.
Input voltage	12VDC
Power protection	Resettable Fuse fitted
DC Power handling	- An on board relay handles the power load for On/Off and power protection to the LCD. - Reverse power polarity protection is equipped on the board
Storage temperature limits	-40^{o}C to +70^{o}C
Operating temperature limits	0^{o}C to +60^{o}C

NOTES

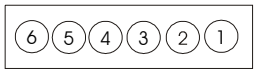
Please note the following:

- For specific panel setup a sample of an LCD may be required (this will be returned) and a copy of the full technical specifications for the panel from the manufacturer.
- Re-layout and custom development services are available.

APPENDIX I – RS-232 COMMAND PROTOCOL

RS-232 Serial control (Baud rate 2400 bps)
Physical connection :

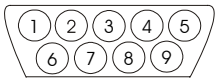
Controller side
Connector interface : CN8
Mating connector : JST XHP-6



Mating face of CN8

PIN#	Description
4	RS-232 Tx Data
5	Ground
6	RS-232 Rx Data

Computer side
Connector interface : Serial port
Mating connector : DB9 Female



Mating face of RS-232 DB9 Male

PIN#	Description
2	RS-232 Rx Data
3	RS-232 Tx Data
5	Ground

Remark :
(1) : RS-232 connection cable, 600mm P/N 4260902-00 can be ordered separately for connection.

Software connection :

The OSD function can be controlled through sending the RS-232 protocol according to the this section.

1. Commands to implement switch mount control buttons

Function	Command	Description	Remark
Menu button	0xf7	Menu button pressed	Button equivalent
Select-down button	0xfa	Select-down button pressed	Button equivalent
Select-up button	0xfb	Select-up button pressed	Button equivalent
Right/+ button	0xfc	Right/+ button pressed	Button equivalent
Left/- button	0xfd	Left/- button pressed	Button equivalent

2. Parameter setting - immediate, relative, reset and query

Function	Command	Description	Acknowledge (if enabled)
Volume control	0x80, “a” | “A”, nn | “+” | “-” | “r” | “R” | “?”	Set audio volume = value/increment/decrement Reset Query	volume
Volume control - on/off (mute)	0x80, “m” | “M”, “0” | “1” | “r” | “R” | “?”	 Disable audio output. Enable audio output. Reset Query	“0” - audio off (muted). “1” - audio on.
Brightness control	0x81, nn | “+” | “-” | “r” | “R” | “?”	Set brightness = value/increment/decrement Reset Query	Brightness.
Contrast control - all channels	0x82, “a” | “A”, nn | “+” | “-” | “r” | “R” | “?”	Set all contrast = value/increment/decrement Reset Query	Contrast red.
Color control	0x83, nn | “+” | “-” | “r” | “R” | “?”	Set color = value/increment/decrement Reset Query	PAL/NTSC color (In video mode only)
Tint control	0x84, nn | “+” | “-” | “r” | “R” | “?”	Set tint = value/increment/decrement Reset Query	NTSC tint (In NTSC mode only)

Image H position	0x86, nnnn | "+" | "-" | "r" | "R" | "?"	Set img_hpos = value/increment/decrement Reset Query	Image horizontal position.
Image V position	0x87, nnnn | "+" | "-" | "r" | "R" | "?"	Set img_vpos = value/increment/decrement Reset Query	Image vertical position.
Sharpness	0x8a, n | "+" | "-" | "r" | "R" | "?"	Set sharpness = value/increment/decrement Reset Query	Sharpness.
OSD H position	0x90, nnn | "+" | "-" | "r" | "R" | "?"	Set osd_hpos = value/increment/decrement Reset Query	OSD horizontal position.
OSD V position	0x91, nnn | "+" | "-" | "r" | "R" | "?"	Set osd_vpos = value/increment/decrement Reset Query	OSD vertical position.
OSD Transparency	0x92, n | "+" | "-" | "r" | "R" | "?"	Set OSD transparency = value/increment/decrement Reset Query	OSD tranparency.
Select menu timeout	0x93, nn | "+" | "-" | "r" | "R" | "?"	Select menu timeout = value/increment/decrement Reset Query	OSD menu timeout value. "00" – Continuous. value – Round up to nearest available step. if value > max available step, set it to the max available step.
Select OSD language	0x95, n | "r" | "R" | "?"	Select language = English, Danish…. Reset Query	"0" – English. "7" – Danish "8" – Chinese
Input main select	0x98, n | "+" | "-" | "r" | "R" | "?"	Select input main = PC or VIDEO or next available Reset Query	Main selected. "1" – Composite video 1 "2" – S-video. "3" – Composite video 2
Source Priority	0x99, "0" | "1" | "r" | "R" | "?"	Set exclusive or priority = Exclusive/Proirity Reset Query	"0" – Exclusive. "1" – Priority. "2" – Priority during power up.
Video System	0x9b, "0" | "1" | "2" | "3" | "r" | "R" | "?"	Set video system = Auto/NTSC/PAL/SECAM Reset Query	"0" – Auto. "1" – NTSC_M_358 "2" – PAL_N_443 "3" – SECAM "4" – NTSC_M_443 "5" - PAL_M_358 "6" – NTSC_N_358 "7" – PAL_M_443 "8" – NTSC_N_443 "9" – PAL_N_358
GAMMA value select	0x9d, n | "r" | "R" "?"	Select GAMMA value = Value Reset Query	GAMMA value: "0" – 1.0, "1" – 1.6 "2" – 2.2, "3" – User Defined
Power Down / DPMS Option	0x9f, "0" | "1" | "r" | "R" | "?"	Set power down option = On/Off Reset Query	"0" – Off. "1" – On.
Direct Access (Hotkeys)	0xa0, "1", n | "r" | "R" | "?"	Set Hotkey 1= value Reset Query	"1" – volume. "2" – brightness. "3" – contrast. "5" – input source. "6" – video input.
Direct Access (Hotkeys)	0xa0, "2", n | "r" | "R" | "?"	Set Hotkey 2 = value Reset Query	"1" – volume. "2" – brightness. "3" – contrast. "5" – input source. "6" – video input.

Set runtime counter	0xa1, nnnnn | “r” | “R” | “?”	Set runtime counter value = nnnnn (* 0.5 hour) Reset Query	Runtime = nnnnn.
Colour temperature select	0xb3, n | “r” | “R” | “?”	Select colour temperature = value Reset Query	Main selected. “0” – 9500K. “1” – 8000K. “2” – 6500K. “3” – 5000K.
Red level for selected colour temperature	0xb4, nn | “+” | “-” | “r” | “R” | “?”	Set the level of the red channel for the selected colour temp. = value/increment/decrement Reset Query	Red level for selected colour temperature.
Green level for selected colour temperature	0xb5, nn | “+” | “-” | “r” | “R” | “?”	Set the level of the green channel for the selected colour temp. = value/increment/decrement Reset Query	Green level for selected colour temperature.
Blue level for selected colour temperature	0xb6, nn | “+” | “-” | “r” | “R” | “?”	Set the level of the blue channel for the selected colour temp. = value/increment/decrement Reset Query	Blue level for selected colour temperature.
Graphic horizontal resolution enquiry	0xb7	Horizontal resolution (in pixels) in 3 digit hex number	“nnn” = horizontal resolution
Graphic vertical resolution enquiry	0xb8	Vertical resolution (in lines) in 3 digit hex number	“nnn” = vertical resolution
Graphic horizontal sync frequency	0xb9	Horizontal sync frequency (in units of 100Hz) in 3 digit hex number	“nnn” = horizontal frequency
Graphic vertical sync frequency	0xba	Vertical sync frequency (in units of Hz) in 3 digit hex number	“nnn” = vertical frequency
OSD status enquiry	0xbb	Status of OSD	“0” – OSD turned off “1” – OSD turned on
Display Video Source Select	0xbc, “?” | “0” | “1”	 Query Name of video source not displayed. After switching to a new video source, the name of the video source is displayed for 5 seconds.	“0” – disabled. “1” – enabled.
OSD turn off	0xbd	Turn off the OSD.	“0” – fail. “1” – successful.
Select Video Port	0xbe, ”0”, ”?” 0xbe “0” , “R” | “r” 0xbe, ”0”, n 0xbe, “1”, “?” 0xbe, “1”, “R” | “r” 0xbe, “1”, n 0xbe, “2”, “?” 0xbe, “2”, “R” | “r” 0xbe, “2”, n	Query Composite Video Port No. Set Composite Video Port No. = “0” Set Composite Video Port Number Query Svideo Port Number Set Svideo Port Number = “0” Set Svideo Port Number Query Component Video Port No. Set Component Vid. Port No. = “0” Set Component Video Port Number	“0n” – Port number
Set gamma data for user defined gamma curve	0xbf, mm, c, “?” 0xbf, “R” | “r” 0xbf, mm, c, nn	Query gamma data for color c index mm (c = 0 for color Red, c=1 for color Green, c=2 for color Blue) Set user gamma curve to linear Set gamma data for color c index mm. (If c= 3, then gamma data for red, green & blue will be set at the same time.)	“nn” = gamma data “1” “nn” = gamma data

3. Other control

Function	Command	Description	Acknowledge (if enabled)
Select RS-232 acknowledge	0xc1, “0” | “1”	Disable/enable command acknowledge.	“0” – acknowledge disabled. “1” – acknowledge enabled.
Select video mode	0xc2, nn	Current vmode = nn.	Current video mode selected.
Auto-setup	0xc3	Start auto-setup of current vmode.	“0” – fail. “1” – successful.
Command availability	0xc4, nn	Check whether a command is available.	“0” – not available. “1” – available.
Soft Power On/Off	0xc8, “0” | “1” | “?”	Soft power off/on query	“0” – soft power off. “1” – soft power on.
Query BIOS version	0xcb, “0”	Read BIOS version	“nnnn” = BIOS ver. “nn.nn”
Query PCBA number	0xcb, “1”	Read PCBA number	“nnnn” = PCBA number
Query average picture level	0xcc, “0” | “1” | “2”	Read APL for red channel Read APL for green channel Read APL for blue channel	“nn” = average picture level
Reset parameter	0xce	Reset all parameters to default value	“1” - successful.
Reset all parameter	0xcf	Reset all parameters for all video modes to default value	“1” - successful.

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.

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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.

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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.

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CONTACT DETAILS

Digital View has offices in Asia, Europe and USA also an internet site:

ASIA

Digital View Ltd
19 th Floor, Tai Tung Building
8 Fleming Road, Wanchai
Hong Kong

Tel: (852) 2861 3615 **Fax**: (852) 2520 2987

Sales: hksales@digitalview.com

EUROPE

Digital View Ltd.
6 Marylebone Passage,
London, W1W 8EX
UK

Tel: +44-(0)20-7631-2150 **Fax:** +44-(0)20-7631-2156

Sales: uksales@digitalview.com

USA

Digital View Inc.
18440 Technology Drive
Building 130
Morgan Hill,
California, 95037
USA

Tel: (1) 408-782 7773 **Fax**: (1) 408-782 7883

Sales: ussales@digitalview.com

WEBSITE

www.digitalview.com