



**HARSH ENVIRONMENT  
PC, DVI, HDMI, VIDEO, Component INTERFACE CONTROLLER  
FOR TFT PANEL**

**Model: HSP-1920**

Part number : 4176001XX-3 or up

**INSTRUCTIONS**

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

## Introduction

HSP-1920 is the harsh Environment version of the SP-1920. Provides full SP-1920 feature set, plus wide range operating temperature and voltage range; shock and vibration tolerance and conformal coating for extreme environment applications.

- TFT (active matrix) LCD panels of up to 1920x1200 resolutions.
- Support true 10 bits panel.
- Computer video signals of VGA, SVGA, XGA, SXGA, WXGA, UXGA, WUXGA standard.
- Support 2 x HDMI, DVI, VGA input support up to 1920x1200 60Hz input signals
- Support Component and 2 x Composite Video signals input of NTSC, PAL and SECAM standard.
- Low mass tantalum capacitors for maximum vibration and shock tolerance, conformal coating, operating temperature range from -40°C to +80°C plus calculated MTBF in excess of 100K hours.
- Overall suitability for usage in critical applications must be independently tested and verified by the user.

### Ordering information :

| Controller | Part number     | Ordering part number |
|------------|-----------------|----------------------|
| HSP-1920   | P/N 41760011X-3 | P/N 4176001XX-3      |

### HOW TO PROCEED

- Ensure you have all parts & that they are correct, refer to:
  - Connection diagram

#### Controller Solution Generator

Full web resource matching controllers & panels with **connection diagrams** for download.  
See at : <http://www.digitalview.com/controllers/csg.php>

- Connector reference (in following section)
- Assembly notes (refer to page 4 – 5)
- Check controller switch & jumper settings (errors may damage the panel)
- Prepare the PC
- 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:

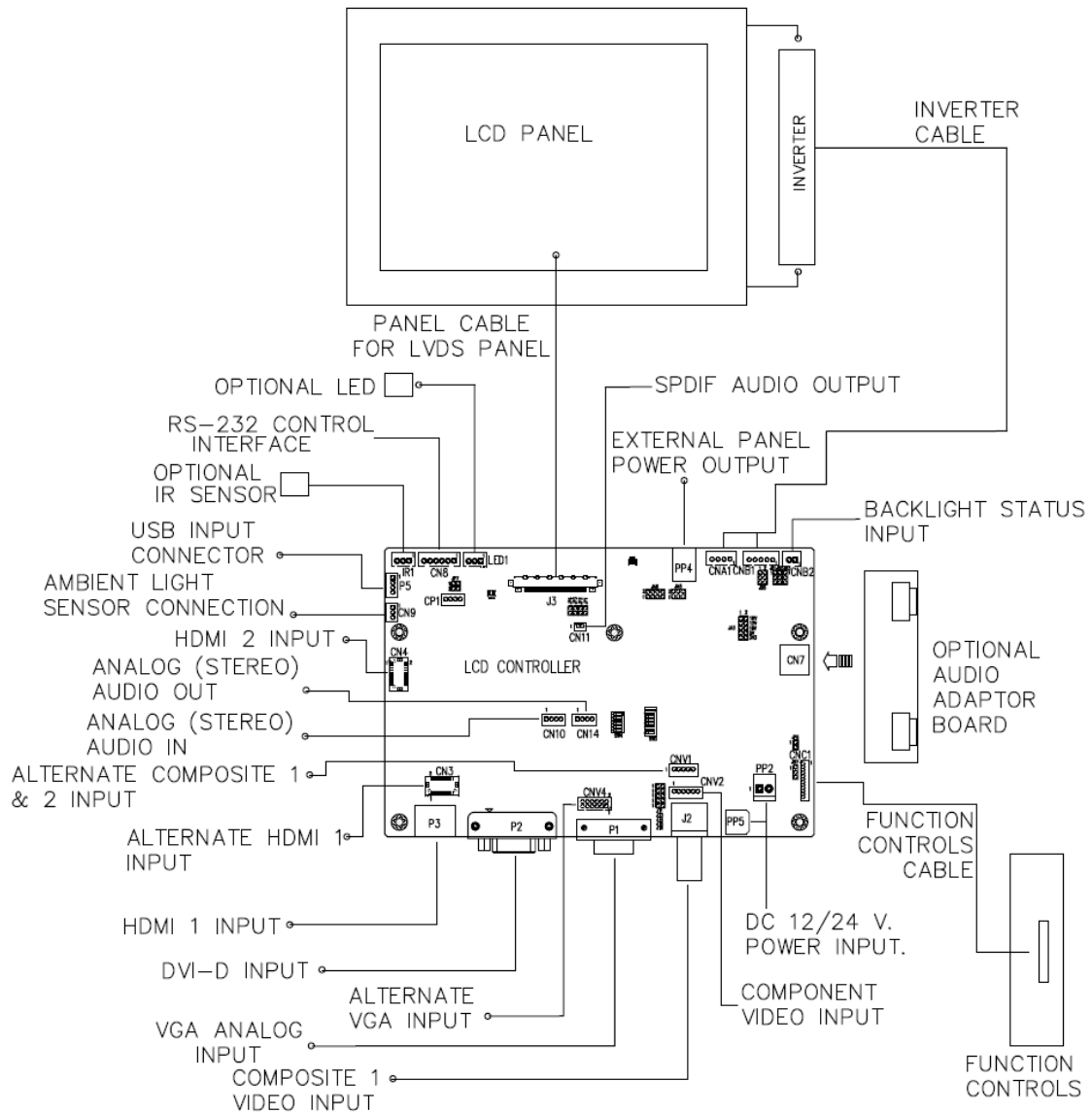
- Ensure that all necessary and appropriate safety measures are taken.
- Obtain suitable regulatory approvals as may be required.
- **Check power settings to all component parts before connection.**

### DISCLAIMER

There is no implied or expressed warranty regarding this material.

## SYSTEM DESIGN

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



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## ASSEMBLY NOTES

This controller is designed for monitor and custom display projects using 1920x1200 or 1920x1080 or 1600x1200 or 1600x900 or 1680x1050 or 1440x900 or 1366x768 or 1280 x 1024 or 1280x800 or 1024 x 768 or or 1024x600 or 800x600 or 800x480 or 640x480 resolution TFT panels with a VGA, SVGA, WXGA, XGA, SXGA, UXGA or WUXGA signal 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 designed for typical LVDS interfaced panels with panel voltage 3.3V, 5V or 12V, External for 10V /12 / 18V interface. Due to the variation between manufacturers of 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 signal cable (LVDS panel):** In order to provide a clean signal it is recommended that LVDS signal cables are no longer than 46cm (18 inches). If those wire cabling is utilized 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 cable to minimize 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 page 18 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.  
The 8 momentary buttons OSD switch mount P/N 416100520-3 or OSD membrane interface P/N 416100120-3 must be used when 24VDC input.
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. See Appendix IV in details.
11. **RS-232 control interface :** Serial control via CN8 interface port.
12. **Audio add-on board P/N 416940020-3:** The audio add-on board gives the audio input and output signal connection. It is an optional part only, can be unconnected if not using audio.  
CAUTION : The Audio Add-on Board P/N 416940020-3 can only operate with 12VDC power input environment.
13. **VGA Input Cable:** Plug the VGA cable to the connector P1 / CNV4 (for VGA ) on the controller board. As this may affect regulatory emission test results and the quality of the signal to the controller a suitably shielded cable should be utilized.
14. **DVI-D input cable :** Plug the DVI cable to the connector P2 on the controller board.
15. **HDMI 1 input :** Support HDMI 1.4(ARC) standard. Plug the HDMI cable to the connector P3 on the controller board This port is not supported when CN3 is connected. CN3 is the alternate HDMI 1 input for internal connection.
16. **HDMI 2 input :** Support HDMI 1.4(ARC) standard. Plug the HDMI cable to the connector CN4 on the controller board.
17. **Composite video 1 input :** BNC coaxial cables to the connector J2 can be used. Reasonable quality cable should be used to avoid image quality degradation.
18. **Alternate composite 1 & composite 2 :** Plug the video input cable P/N 426308000-3 on CNV1 connector
19. **Component video input :** Plug the component video input cable P/N 426000600-3 on CNV2 connector

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Specifications subject to change without notice

**20. Power Input:** 12V/24VDC 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.

**21. External panel power input :** Allow to supply external power to the panel separately for max 3.3V (7A) or 5V (7A) or 10V (6A) or 12V (5A) or 18V (3.5A) via PP4 power input connector.

**22. SPDIF Audio output :** This port support SPDIF audio output from the HDMI audio source inputted.

**23. Ambient light sensor connection :** 3 ways connector provides interface for ambient light sensor kit (KIT 70220-3) connection.(No function now)

**24. Backlight status input :** 2 ways connector provides interface for connection with panel which support the panel with backlight status monitoring function.

**25. USB input connector :** For media file playback (h.264) for failover function or firmware upgrade purpose.

- **Power output:** Note the controller has an overall 3Amp current limit and the current available from the auxiliary power output will be dependent on the power input and other system requirements.
- **Power Safety:** Note that although only 12V / 24VDC 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. Also the choice of external Controller to PC signal cable can affect the result.
- **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.
- **PC Graphics Output:** A few guidelines:
  - Signal quality is very important, if there is noise or instability in the PC graphics output this may result in visible noise on the display.
  - Refer to graphics modes table in specifications section for supported modes.
  - Non-interlaced & interlaced video input is acceptable.

**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.  
**LVDS type panels:** The controller board has the built-in LVDS transmitter driver. Plug the LVDS cable to J3. Insert the panel end of the cable the LCD panel connector.
2. **Inverter & Controller:** Plug the inverter cable to CNB1 and CNA1 (if necessary). Plug another end to the connector on the inverter.
3. **Function switch & Controller:** Plug the OSD switch mount cable to CNC1 on the controller board and another to the OSD switch mount.
4. **LED & Controller:** Plug in a 3-way with dual colour LED to connector LED1 on the controller board.
4. **IR & Controller:** Plug in a 3-way with IR sensor to connector IR1 on the controller board.
6. **Jumpers & Switches:** Check all jumpers and switches (SW3, SW4) are set correctly. Details referring the connection diagram (a separate document) or the jumpers and switches setting table (in the following section).
7. **Jumpers & Inverter & Panel voltage:** Particularly pay attention to the settings of JA3, JA5, JA6, 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 & JA6 is used for panel voltage input (read panel specification and information on the jumper table to define the correct settings).
8. **Input signal cable & Controller:** Plug the corresponding signal input to the connector on the controller board.
9. **Power supply & Controller:** Plug the DC 12V/24V power in to the connector PP5 or PP2. You can consider to use DigitalView mating power cable P/N 426013800-3, 160mm for PP5 connection.
11. **External panel power input :** Plug power cable : P/N 426013700-3 for external panel power input (3.3 (max 7A) / 5V (max 7A) / 12V (max 5A) / 18V (max3.5))
12. **Power on:** Switch on the controller board and panel by using the OSD switch mount.

LED status (LED1 / LED1A) :

| Backlight status | LED color |
|------------------|-----------|
| Backlight OFF    | RED       |
| Backlight ON     | GREEN     |

LED status (LED5A1) :

|                     | LED color |
|---------------------|-----------|
| Controller power ON | Green     |

LED status (LED6) :

| Panel power output status          | LED color |
|------------------------------------|-----------|
| 10V / 12V / 18V panel power output | GREEN     |
| 3.3V / 5V panel power output       | RED       |

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.

### PC SETTINGS

The controller has been designed to take a very wide range of input signals however to optimize the PC's graphics performance we recommend choosing 60Hz vertical refresh rate – this will not cause screen flicker.

### OPERATION

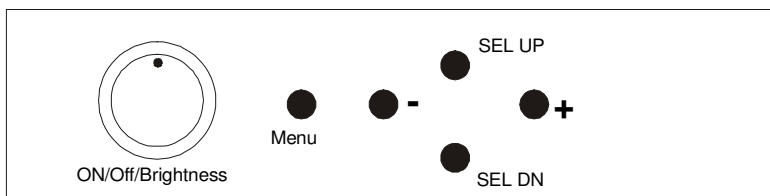
Once the system has been connected and switched on there are a number of functions available to adjust the display image as summarized in the following sections. The settings chosen will be saved for each mode independently.

**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):

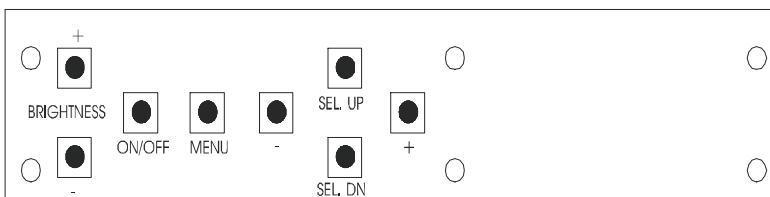
| Controls  | Analog VR type   | Digital type   |
|---|--|--|
| On/Off – turns controller board power on  | VR toggle switch   | On/Off button  |
| Brightness – controls backlight brightness  | Rotary VR  | Brightness +/- buttons   |
| Menu<br>– Turns OSD menu On or Off (it will auto time off)<br>– Back to top of OSD sub-menu page                | Menu button  | Menu button  |
| Select down<br>– Moves the selector to the next function (down)   | SEL DN   | SEL DN   |
| Select up<br>– Moves the selector to the previous function (up)   | SEL UP   | SEL UP   |
| +<br>– Increase the OSD parameter values<br>– Go into the sub-menu page<br>– Confirm to select the OSD function | +  | +  |
| -<br>– Decrease the OSD parameter values  | -  | -  |
| Reset to Factory Defaults   | Press and hold SEL DN button, then power on the controller                 | Press and hold SEL DN button, then power on the controller                 |
| Soft power off and on <sup>(1)</sup>  | Hold Menu button for 3-4 seconds<br><br>Press Menu button to turn back on. | Hold Menu button for 3-4 seconds<br><br>Press Menu button to turn back on. |

<sup>(1)</sup> Effective on V1.05.00.00 firmware or up revision.



Analog VR type

**12V / 24VDC power input :**  
Analog 10K VR Type OSD switch mount uses  
P/N 410680550-3 or up



Digital type

**12V / 24VDC power input :**  
Digital 10K Type OSD switch mount uses  
P/N 416100520-3 or up



## Picture :

### Picture Setting ▶

Contrast [0~100] Default 50 : Increase/decrease panel contrast level, total: 100 steps  
Black Level [0~100] Default 50 : Increase/decrease panel brightness level, total: 100 steps  
Sharpness\* [0~100] Default 50 : Increase/decrease sharpness, total: 100 steps  
Hue [0~100] Default 50 : Increase/decrease Hue level, total: 100 steps  
Saturation [0~100] Default 50 : Increase/decrease saturation, total: 100 steps

### Color Temperature ▶

5000K  
6500K  
7500K (Default)  
9300K

### User ▶

R [0~255] : Red Gain  
G [0~255] : Green Gain  
B [0~255] : Blue Gain

### Advance# ▶

H-Pos [0~100] : Move the image position horizontally  
V-Pos [0~100] : Move the image position vertically  
Clock [0~100] : Adjust the image horizontal size  
Phase [0~100] : Fine tune the data sampling position (adjust image quality)  
Auto Picture Setup : Auto adjust the image position, phase and size

### Aspect / Size ▶

4:3 : scaling format in 4:3  
Fill Screen : Default Enable full screen expansion for lower resolution Image  
16:9 : scaling format in 16:9  
1:1 : Display the exact image resolution on the screen without image expansion.

Brightness [0~100] : Default 100 : Backlight brightness adjustment

### Input Source ▶ Select the input video signal

Composite1  
Composite2  
Component  
HDMI1  
HDMI2  
DVI  
VGA

Auto Color Gain\*\* : Auto Color Calibration

\* Function in Video mode only

\*\* Function in VGA & Component mode only

# Function in VGA mode only





#### Utilities :

Menu language<sup>(1)</sup> : English / French / Spanish

#### Setup<sup>(1)</sup> ▶

Auto power<sup>(1)</sup> : OFF / ON

ON – Enable soft power off function if absence of input signals  
OFF – Disable soft power function

Auto Source Seek : On/Off (Default On) : Select Auto source select enable or disable.

Image Orientation ▶ Set the image orientation on screen

Normal

H-Flip

V-Flip

HV-Flip

Video Standard<sup>(1)</sup> : Auto / PAL / NTSC / SECAM / NTSC 4.43 / PAL M / PAL N / PAL 60

Gamma<sup>(1)</sup> : 1.8 / 2.0 / 2.2 / 2.4 / 2.6 (Default 2.2)

FailOver On/Off (Default OFF) - See Appendix V in details.

#### OSD<sup>(1)</sup> ▶

OSD Time Out : ON / 5 Sec / 15 Sec / 30 Sec (Default) / 45 Sec / 60 Sec : Adjust the OSD menu timeout period

Transparent : 0% / 25% (Default) / 50% / 75% / 100% : Set OSD transparency

Reset to Factory Defaults ▶ Restore back to factory default values.

Are you sure ? Yes / No

Software Update (USB) : Firmware upgrade

#### Hotkey<sup>(1)</sup> ▶

Hotkey 1 : Volume / Black Level / Contrast / Input Source / Aspect/Size / Saturation / Image Orientation / Brightness / Auto Picture Setup / Off

Hotkey 2 : Volume / Black Level / Contrast / Input Source / Aspect/Size / Saturation / Image Orientation / Brightness / Auto Picture Setup / Off

#### Brightness Setup :

Invert : OFF / ON : Invert for the backlight brightness

Control : D/A / PWM : Selection for voltage level dimming control / PWM dimming control

Frequency(Hz) : 100 ~ 440Hz in a step of 20

Min Level : 0 ~ 50% : Default the minimum backlight adjustment.



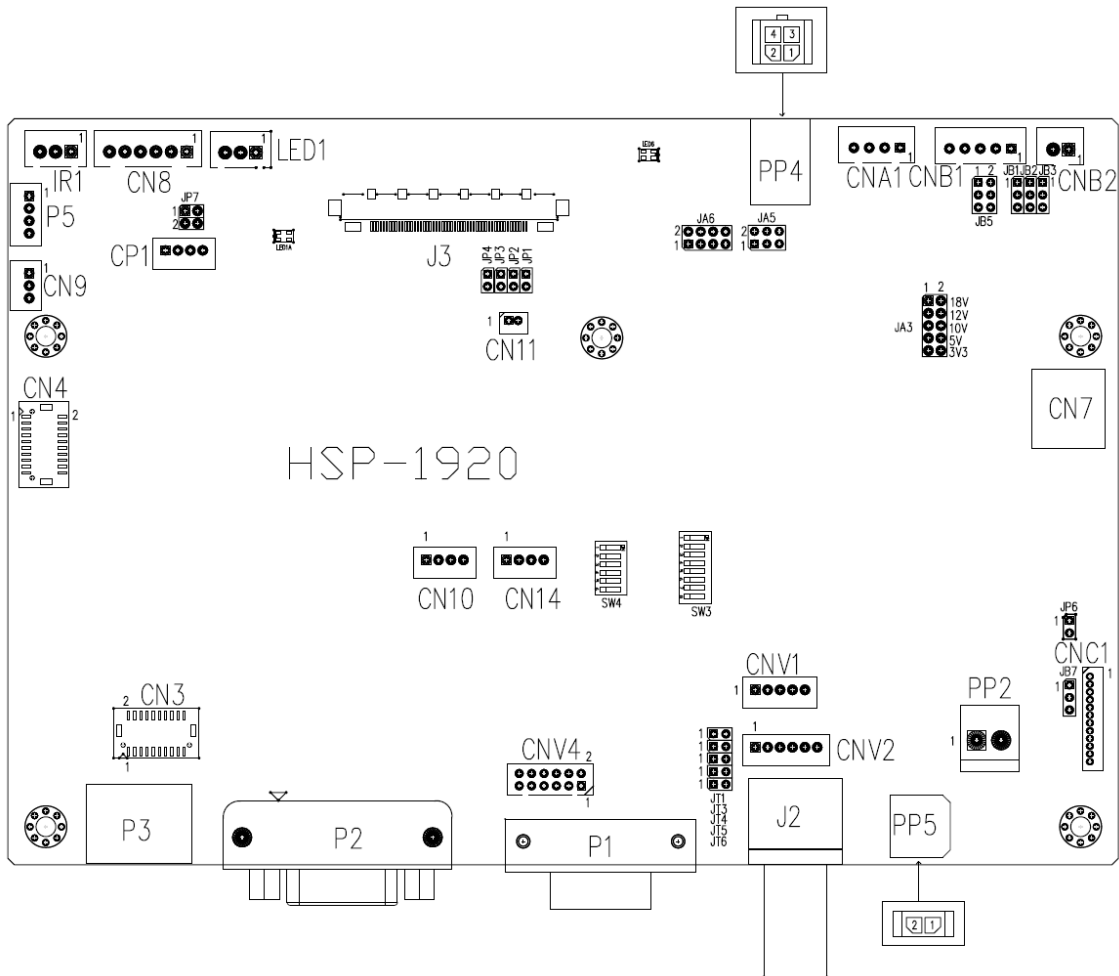
#### Audio :

Volume [0~100] : Default 50 : Increase/decrease volume level, total: 100 steps

<sup>(1)</sup> Effective on Firmware V1.05.00.00 or up

## CONNECTORS, PINOUTS & JUMPERS

The various connectors are:



### Summary: Connectors

| Ref  | Purpose  | Description  |
|------|--|--|
| CN3  | Alternate HDMI 1 connector                     | JST BM20B-SRDS compatible (Matching type : SHDR-20V-S-B)<br>(Matching extend cable P/N 426301800-3)  |
| CN4  | HDMI 2 connector                               | JST BM20B-SRDS compatible (Matching type : SHDR-20V-S-B)<br>(Matching extend cable P/N 426301800-3)  |
| CN7  | Audio board connector                          | DIL socket header 5x2 right angle<br>(Matching audio Add-on Board P/N 416940020-3)   |
| CN8  | RS-232 serial control                          | JST 6-way, B6B-XH-A compatible (Matching type : XHP-6)   |
| CN9  | Ambient light sensor connector                 | JST 3-way, B3B-PH-K compatible (Matching type : PHR-3)   |
| CN10 | Analog audio (Stereo) in                       | JST 4 way, B4B-PH-K compatible (Matching type : PHR-4)   |
| CN11 | SPDIF Audio output                             | JST B2B-ZR compatible (Matching type : ZHR-2)<br>(Matching extend cable P/N 426007400-3)   |
| CN14 | Analog audio (Stereo) out                      | JST 4 way, B4B-PH-K compatible (Matching type : PHR-4)   |
| CNA1 | Auxiliary power output                         | JST 4-way, B4B-XH-A compatible (Matching type : XHP-4)<br>(Matching cable P/N 426040200-3)   |
| CNB1 | Backlight inverter                             | JST 5-way, B5B-XH-A compatible (Matching type : XHP-5)   |
| CNB2 | Backlight status input connector               | JST 2 way, B2B-XH-A compatible (Matching type : XHP-2)   |
| CNC1 | OSD controls                                   | Hirose DF13-12P-1.25H compatible (Mating type : DF13-12S-1.25C)<br>(Matching OSD switch mount cable P/N 426122200-3 (150mm) or<br>426122210-3 (250mm)) |
| CNV1 | Alternate video in (Composite 1 & Composite 2) | JST 5-way, B5B-PH-K compatible (Matching type : PHR-5)<br>(Matching video cable P/N 426308000-3)   |
| CNV2 | Component video input connector:               | JST 6-way, B6B-PH-K compatible (Matching type : XHP-6)<br>(Matching video cable P/N 426000600-3)   |
| CNV4 | Alternate VGA input connector                  | Hirose 12-pin, DF11-12DP-2DSA compatible<br>(Matching type : DF11-12DS-2C)   |

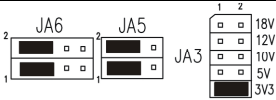
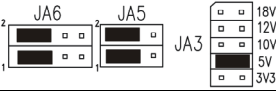
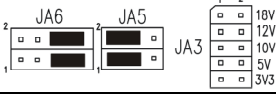
Specifications subject to change without notice

|      |                             |  |
|------|-----------------------------|--|
| IR1  | Infra-Red sensor connector  | JST 3-way, B3B-XH-A compatible (Matching type : XHP-3)   |
| J2   | Composite video 1 in        | BNC connector  |
| J3   | Panel signal for LVDS panel | JAE FI-RE51S-HF compatible (Matching type : FI-RE51HL)   |
| LED1 | Dual color LED connector    | JST B3B-XH-A compatible (Matching type : XHP-3)  |
| P1   | VGA analog input            | DB-15 way high density 3 row   |
| P2   | DVI-D                       | DVI-D connector  |
| P3   | HDMI 1 input connector      | HDMI connector   |
| P5   | USB connector               | JST B4B-PH-K compatible (Matching type : PHR-4)  |
| PP2  | Power input (alternative)   | DC power Molex 2 pin 0.156" pitch  |
| PP4  | External panel power input  | Molex 43045-0400 compatible<br>(Matching connector type : Molex 43025-0400 compatible)<br>(Matching power cable : P/N 426013700-3) |
| PP5  | Power input                 | Molex 43650-0200 compatible<br>(Matching connector type : Molex 43645-0200 compatible)<br>(Matching power cable : P/N 426013800-3) |

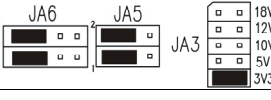
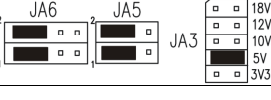
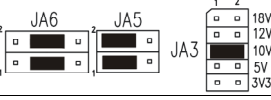
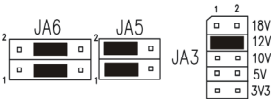
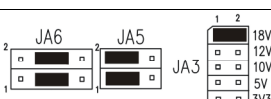
**Summary: Jumpers setting**

| Ref | Purpose   | Note   |
|-----|---|--|
| JA3 | Panel power voltage select<br><b>CAUTION:</b> Incorrect setting can damage panel        | See panel voltage setting table 1  |
| JA5 | Panel power voltage select<br><b>CAUTION:</b> Incorrect setting will cause panel damage | See panel voltage setting table 1  |
| JA6 | Panel power voltage select<br><b>CAUTION:</b> Incorrect setting will cause panel damage | See panel voltage setting table 1  |
| JB1 | Backlight brightness voltage range  | 1-2 closed = 5V max<br>2-3 closed = 3.3V max   |
| JB2 | Backlight inverter on/off control – signal level  | 2-3 = On/Off control signal 'High' = +5V<br>1-2 = On/Off control signal 'High' = +3.3V<br>Open = On/Off control signal 'High' = Open collector<br><b>CAUTION:</b> Incorrect setting can damage inverter. |
| JB3 | Backlight inverter on/off control – polarity  | 1-2 = control signal 'high' = CCFT ON<br>2-3 = control signal 'low' = CCFT ON  |
| JB5 | Backlight control type selection  | 1-2 = VR/Digital switch mount control<br>3-4 = Analog backlight brightness - voltage range 0~5V<br>5-6 = Reserved  |
| JB7 | Backlight control voltage on CNB1 pin 4<br><br>(Function when JB5 sets 1-2 closed)      | Open = For OSD switch mount control (Default)<br>1-2 = 0V<br>2-3 = 3.3V / 5V controlled by JB1   |
| JP1 | GPIO pins enable  | Open : Enable J3 – pin 16 (OP1) to 3.3V<br>Closed : Enable J3 – pin 16 (OP1) to Ground   |
| JP2 | GPIO pins enable  | Open : Enable J3 – pin 17 (OP2) to 3.3V<br>Closed : Enable J3 – pin 17 (OP2) to Ground   |
| JP3 | GPIO pins enable  | Open : Enable J3 – pin 18 (OP3) to 3.3V<br>Closed : Enable J3 – pin 18 (OP3) to Ground   |
| JP4 | GPIO pins enable  | Open : Enable J3 – pin 19 (OP4) to 3.3V<br>Closed : Enable J3 – pin 19 (OP4) to Ground   |
| JP6 | Input power control   | Short = External switch control<br>Open = Switch mount control   |
| JP7 | Internal programming use  | Default 1-3 & 2-4 closed   |
| JT1 | Composite 2 video-in terminator enable  | Open = composite video 2 input is not terminated<br>Close = composite video 2 input is terminated with 75Ω   |
| JT2 | Reserved  | Reserved   |
| JT3 | Composite 1 video-in terminator enable  | Open = composite video 1 input is not terminated<br>Close = composite video 1 input is terminated with 75Ω   |
| JT4 | Component luma-in terminator enable   | Open = Component luma input is not terminated<br>Close = Component luma input is terminated with 75Ω   |
| JT5 | Component Cb/Pb-in terminator enable  | Open = Component Cb/Pb input is not terminated<br>Close = Component Cb/Pb input is terminated with 75Ω   |
| JT6 | Component Cr/Pr-in terminator enable  | Open = Component Cr/Pr input is not terminated<br>Close = composite Cr/Pr input is terminated with 75Ω   |
| SW3 | Panel & function selection  | See table 2  |
| SW4 | Panel & function selection  | See table 3  |

**Table 1 : Panel voltage setting table :**

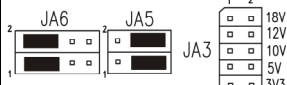

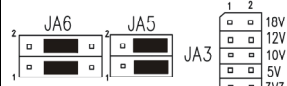
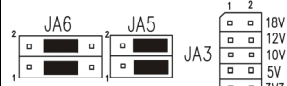
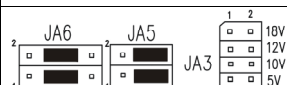
| Input voltage via PP2, PP5 | Panel Voltage | JA3        | JA5       | JA6       | Jumper on board  |
|----------------------------|---------------|------------|-----------|-----------|--|
| 12VDC                      | 3.3V          | 3V3 closed | 1-3 & 2-4 | 1-3 & 2-4 |  |
|                            | 5V            | 5V closed  | 1-3 & 2-4 | 1-3 & 2-4 |  |
|                            | 12V           | OPEN       | 1-3 & 2-4 | 5-7 & 6-8 |  |

**CAUTION: Incorrect setting can damage panel & controller**

| Input voltage via PP2, PP5 | Panel Voltage | JA3        | JA5       | JA6       | Jumper on board  |
|----------------------------|---------------|------------|-----------|-----------|--|
| 24VDC**                    | 3.3V          | 3V3 closed | 1-3 & 2-4 | 1-3 & 2-4 |    |
|                            | 5V            | 5V closed  | 1-3 & 2-4 | 1-3 & 2-4 |    |
|                            | 10V           | 10V closed | 1-3 & 2-4 | 3-5 & 4-6 |   |
|                            | 12V           | 12V closed | 1-3 & 2-4 | 3-5 & 4-6 |  |
|                            | 18V           | 18V closed | 1-3 & 2-4 | 3-5 & 4-6 |  |

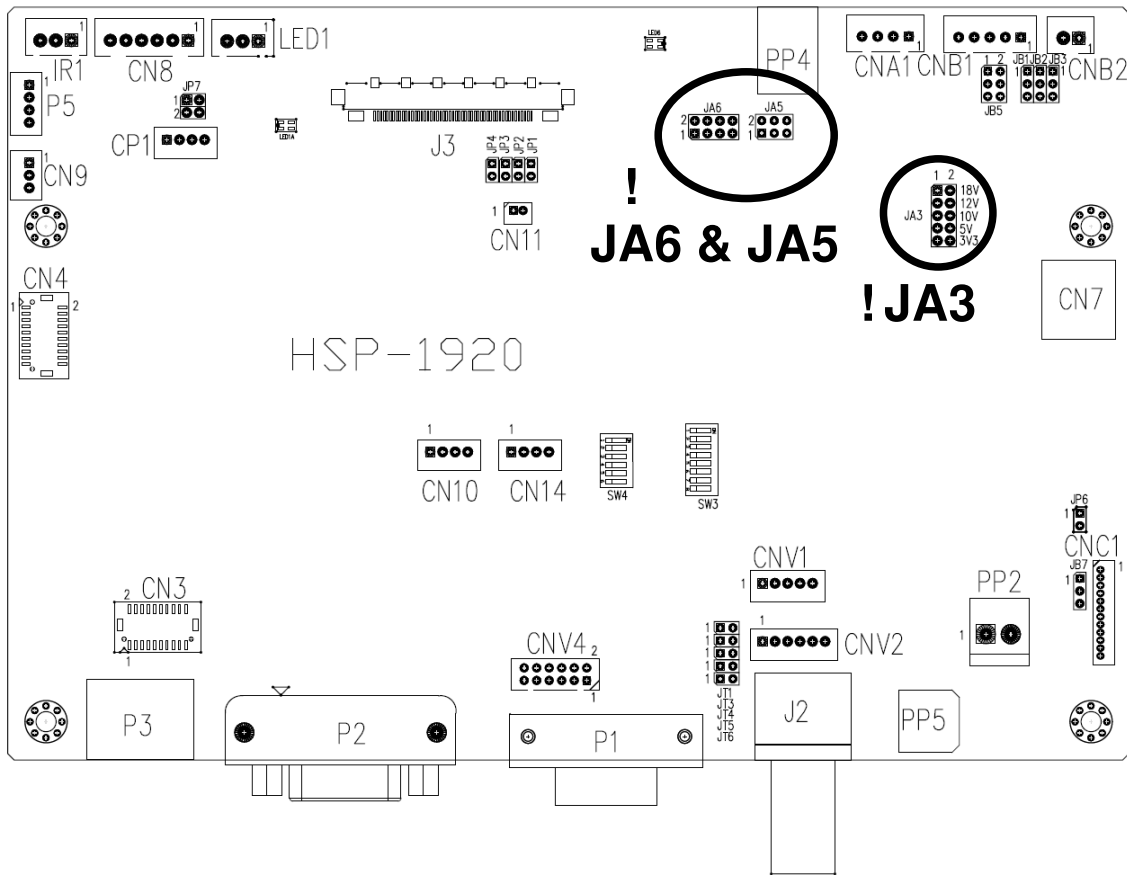
**CAUTION: Incorrect setting can damage panel & controller**

**\*\* Ensure that the backlight inverter supports 24V operation prior to connecting a 24VDC input. Because CNA1 pin 1 and CNB1 pin 2 will output 24VDC if input 24VDC via PP2/PP3 or PP5.**

| Input voltage via PP4      | Input voltage via PP2 / PP5 | Panel Voltage | JA3  | JA5       | JA6       | Jumper on board   |
|----------------------------|-----------------------------|---------------|------|-----------|-----------|---|
| 3.3 / 5 / 10 / 12 / 18VDC* | 12V / 24VDC                 | 3.3V          | OPEN | 3-5 & 4-6 | 1-3 & 2-4 |  |
|                            |                             | 5V            | OPEN | 3-5 & 4-6 | 1-3 & 2-4 |  |
|                            |                             | 10V           | OPEN | 3-5 & 4-6 | 3-5 & 4-6 |  |
|                            |                             | 12V           | OPEN | 3-5 & 4-6 | 3-5 & 4-6 |  |
|                            |                             | 18V           | OPEN | 3-5 & 4-6 | 3-5 & 4-6 |  |
|                            |                             |               |      |           |           |   |

\* Maximum current for 3.3V, 5V = 7A, Maximum current for 12V = 5A, Maximum current for 18V = 3.5A

JA3, JA5 & JA6 location on board : (Please pay attention to the jumper settings on JA3, JA5 & JA6 which are red in color)



**Table 2 : DIP Switch selection – SW3**

| Pos #1                  | Pos #2 | Pos #3 | Pos.#4 | Description  | Panel resolution     |
|-------------------------|--------|--------|--------|--|----------------------|
| <b>For WUXGA panels</b> |        |        |        |  |                      |
| OFF                     | ON     | ON     | OFF    | LG LM260WU1-SLB1                                     | 1920x1200            |
| ON                      | ON     | ON     | OFF    | LG LM240WU2-SLA1                                     | 1920x1200            |
| OFF                     | OFF    | OFF    | OFF    | Sharp LQ445D3LZ19                                    | 1920x1080            |
| ON                      | OFF    | OFF    | OFF    | Samsung LTA460H2-L02                                 | 1920x1080            |
| OFF                     | ON     | OFF    | OFF    | Sharp LQ170M1LZ04                                    | 1920x1200            |
| ON                      | ON     | OFF    | OFF    | Samsung LTA700HH-LH1 (1 <sup>st</sup> trial testing) | 1920x1080            |
| OFF                     | OFF    | ON     | OFF    | Samsung LTA700HH-LH1 (2 <sup>nd</sup> trial testing) | 1920x1080            |
| OFF                     | OFF    | ON     | ON     | AU Optronics P645HW03 V0 (1920x1080)                 | 1920x1080            |
| OFF                     | OFF    | ON     | ON     | AU Optronics P645HW03 V0                             | 1920x1080            |
| <b>For UXGA panels</b>  |        |        |        |  |                      |
| OFF                     | OFF    | OFF    | OFF    | Fujitsu FLC59UXC8V-02A                               | 1600x1200            |
| ON                      | OFF    | OFF    | OFF    | Samsung LTM213U6-L01                                 | 1600x1200            |
| <b>For WXGA panels</b>  |        |        |        |  |                      |
| OFF                     | OFF    | OFF    | OFF    | LG LC420W02-A4                                       | 1366x768             |
| ON                      | OFF    | OFF    | OFF    | Sharp LQ315T3LZ24                                    | 1366x768             |
| ON                      | ON     | OFF    | OFF    | Samsung LTA320W2-L01 / LTA230W1-L02                  | 1366x768             |
| ON                      | ON     | ON     | ON     | NEC NL12876BC26-21 / Samsung LTM170W1-L01            | 1280x768             |
| OFF                     | ON     | ON     | ON     | CHI MEI N154I4-L01                                   | 1280x800             |
| OFF                     | OFF    | ON     | OFF    | AU Optronics M190PW01                                | 1440x900             |
| OFF                     | OFF    | ON     | ON     | Sharp LQ072K1LA03                                    | 1280x768             |
| <b>For SXGA panel</b>   |        |        |        |  |                      |
| OFF                     | OFF    | OFF    | OFF    | Sharp LQ181E1LW31                                    | 1280x1024            |
| ON                      | OFF    | OFF    | OFF    | AU Optronics M170EN05                                | 1280x1024            |
| <b>For XGA panel</b>    |        |        |        |  |                      |
| OFF                     | OFF    | OFF    | OFF    | Sharp LQ150X1LGN2A<br>Sharp LQ150X1LGB1              | 1024x768<br>1024x768 |
| <b>For SVGA panel</b>   |        |        |        |  |                      |
| OFF                     | OFF    | OFF    | OFF    | Sharp LQ121S1DG11/41<br>Toshiba LTM08C351            | 800x600<br>800x600   |
| <b>For WVGA panel</b>   |        |        |        |  |                      |
| OFF                     | OFF    | OFF    | OFF    | NEC NL8048BC24-01                                    | 800x480              |
| ON                      | OFF    | OFF    | OFF    | Kyocera TCG085WV1AB-G00                              | 800x480              |
| ON                      | OFF    | ON     | OFF    | Sharp LQ070Y3LG4A                                    | 800x480              |
| <b>For VGA panel</b>    |        |        |        |  |                      |
| OFF                     | OFF    | OFF    | OFF    | Sharp LQ104V1DG51<br>Sharp LQ104V1DG21               | 640x480<br>640x480   |
| ON                      | OFF    | ON     | OFF    | Kyocera TCG075VG2AC-G00                              | 640x480              |
| <b>Others</b>           |        |        |        |  |                      |
| OFF                     | ON     | OFF    | OFF    | AU Optronics M201EW02 V8                             | 1680x1050            |
| ON                      | OFF    | OFF    | ON     | Samsung LTM201M1-L01                                 | 1680x1050            |

**Remark : The above panel timings are generated based on the panel specification. Some of the panel timings settings may not exactly to match the panel model we specified in this table.**

| Pos #5 | Pos #6 | Pos #7 | Description   |
|--------|--------|--------|---------------|
| OFF    | OFF    | OFF    | WUXGA         |
| ON     | OFF    | OFF    | UXGA          |
| OFF    | ON     | OFF    | SXGA          |
| ON     | ON     | OFF    | WXGA          |
| OFF    | OFF    | ON     | XGA           |
| ON     | OFF    | ON     | SVGA          |
| OFF    | ON     | ON     | VGA           |
| ON     | ON     | ON     | WVGA / Others |

|         |          |
|---------|----------|
| Pos. #8 | Reserved |
|---------|----------|

**Table 3 : DIP switch selection – SW4**

| Pos. # | Function                                       | Description  |
|--------|--|--|
| 1      | Reserved                                       | Reserved   |
| 2      | Panel pixel format                             | OFF : Double Pixel<br>ON : Single Pixel  |
| 3      | Panel selection                                | Default ON : Single / Double pixel LVDS panel (controlled by SW4 position 2)   |
| 4      | LVDS data mapping select<br>(Refer to Table 2) | If SW4 position 5 = OFF (8 bit)<br>OFF : Mapping B<br>ON : Mapping A<br>Please adjust to get the correct picture. See as Appendix I for details of mapping of A and B.<br>If SW4 position 5 = ON (10 bit)<br>OFF : JEIDA (LVDS panel)<br>ON : VESA (LVDS panel)<br>Please adjust to get the correct picture. See as Appendix I for details of mapping of VESA and JEIDA. |
| 5      | Output LVDS display mode selection             | OFF : 8 bit<br>ON : 10 bit   |
| 6      | Reserved                                       | Reserved   |

**Support "Resolution default by EDID" for different resolution panel.**

The controller will set the preferred timing based off the dip switch setting (SW3 position 1-7) selection, but also be able to go higher to 1920x1200. For example, if the panel is a 1024x768 and the dip switch setting are set for 1024x768. The preferred EDID resolution should be 1024x768. It should also have the capability to set the max resolution to 1920x1200.

\* This function is only effective on V1.05.00.00 or later firmware revision.



**CN3 - Alternate HDMI 1 connector : JST BM20B-SRDS compatible (Matching type : SHDR-20V-S-B)**

| PIN | SYMBOL    | DESCRIPTION                           |
|-----|-----------|---------------------------------------|
| 1   | GND       | Ground                                |
| 2   | GND       | Ground                                |
| 3   | RXC+      | TMDS Data C+                          |
| 4   | RXC-      | TMDS Data C-                          |
| 5   | RX0+      | TMDS Data 0+                          |
| 6   | RX0-      | TMDS Data 0-                          |
| 7   | RX1+      | TMDS Data 1+                          |
| 8   | RX1-      | TMDS Data 1-                          |
| 9   | RX2+      | TMDS Data 2+                          |
| 10  | RX2-      | TMDS Data 2-                          |
| 11  | GND       | Ground                                |
| 12  | GND       | Ground                                |
| 13  | MSTR2_SCL | Reserved                              |
| 14  | MSTR2_SDA | Reserved                              |
| 15  | DDC_5V    | +5V power supply for DDC (optional)   |
| 16  | HPD       | Hot plug detection                    |
| 17  | DDC_SCL   | DDC serial clock                      |
| 18  | DDC_SDA   | DDC Data                              |
| 19  | CEC       | Consumer Electronics Control(CEC) pin |
| 20  | VCC2      | VCC 5V output                         |

**CN4 - HDMI 2 connector : JST BM20B-SRDS compatible (Matching type : SHDR-20V-S-B)**

| PIN | SYMBOL    | DESCRIPTION                           |
|-----|-----------|---------------------------------------|
| 1   | GND       | Ground                                |
| 2   | GND       | Ground                                |
| 3   | RXC+      | TMDS Data C+                          |
| 4   | RXC-      | TMDS Data C-                          |
| 5   | RX0+      | TMDS Data 0+                          |
| 6   | RX0-      | TMDS Data 0-                          |
| 7   | RX1+      | TMDS Data 1+                          |
| 8   | RX1-      | TMDS Data 1-                          |
| 9   | RX2+      | TMDS Data 2+                          |
| 10  | RX2-      | TMDS Data 2-                          |
| 11  | GND       | Ground                                |
| 12  | GND       | Ground                                |
| 13  | MSTR2_SCL | Reserved                              |
| 14  | MSTR2_SDA | Reserved                              |
| 15  | DDC_5V    | +5V power supply for DDC (optional)   |
| 16  | HPD       | Hot plug detection                    |
| 17  | DDC_SCL   | DDC serial clock                      |
| 18  | DDC_SDA   | DDC Data                              |
| 19  | CEC       | Consumer Electronics Control(CEC) pin |
| 20  | VCC2      | VCC 5V output                         |

**CN7 - Audio connector: DIL socket header 5x2 right angle [OPERATE UNDER 12VDC POWER INPUT ENVIRONMENT]**

| PIN | SYMBOL      | DESCRIPTION                           |
|-----|-------------|---------------------------------------|
| 1   | VCC         | Audio board logic power supply, +5V   |
| 2   | VOLSEL0     | Reserved                              |
| 3   | VOLSEL1     | Reversed                              |
| 4   | TUNAUDSEL   | Reserved                              |
| 5   | CLK/CNT     | Reserved                              |
| 6   | GND         | Ground                                |
| 7   | +12V / +24V | Audio board power supply, +12V / +24V |
| 8   | NC          | No connection                         |
| 9   | NC          | No connection                         |
| 10  | GND         | Ground                                |

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

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

**CN9 – Ambient light sensor connector : JST B3B-PH-K compatible (Matching type : PHR-3)**

| PIN | SYMBOL | DESCRIPTION                    |
|-----|--------|--------------------------------|
| 1   | GND    | Ground                         |
| 2   | VCC_5V | VCC 5V                         |
| 3   | ALSF   | Ambient light sensing feedback |

**CN10 –Analog (Stereo) audio in connector: JST B4B-PH-K compatible (Matching type : PHR-4)**

| PIN | SYMBOL    | DESCRIPTION   |
|-----|-----------|---------------|
| 1   | GND       | GND           |
| 2   | AUDIO LIN | HDMI LEFT IN  |
| 3   | GND       | GND           |
| 4   | AUDIO RIN | HDMI RIGHT IN |

**CN14 –Analog (Stereo) audio out connector: JST B4B-PH-K compatible (Matching type : PHR-4)**

| PIN | SYMBOL    | DESCRIPTION    |
|-----|-----------|----------------|
| 1   | GND       | GND            |
| 2   | AUDIO LOU | HDMI LEFT OUT  |
| 3   | GND       | GND            |
| 4   | AUDIO ROU | HDMI RIGHT OUT |

**CN11 – SPDIF audio output connector : JST B3B-PH-K compatible (Matching type : PHR-3)**

| PIN | SYMBOL | DESCRIPTION                |
|-----|--------|----------------------------|
| 1   | SPDIF  | SPDIF Digital audio output |
| 2   | GND    | Ground                     |

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

| PIN | SYMBOL  | DESCRIPTION                             |
|-----|---------|---|
| 1   | GND     | Ground                                  |
| 2   | VBKL    | +12V / +24V DC, backlight power supply  |
| 3   | BLCTRL  | On/Off control (enable) – see JB2 & JB3 |
| 4   | BVR_WIP | Brightness VR – WIP                     |
| 5   | BVR_A   | Brightness VR A                         |

**CNB2 – Backlight status input inverter connector: JST B2B-XH-A compatible (Matching type : XHP-2)**

| PIN | SYMBOL    | DESCRIPTION                      |
|-----|-----------|----------------------------------|
| 1   | BL_STATUS | Backlight status (Normal = High) |
| 2   | GND       | Ground                           |

**CNC1 – OSD switch mount control, Hirose DF13-12P-1.25H compatible (Mating type : DF13-12S-1.25C)**

| PIN | SYMBOL   | DESCRIPTION   |
|-----|----------|---|
| 1   | PSWIN    | Power Button A = ON/OFF Button in                           |
| 2   | SW_ON    | Power Button B = ON/OFF Button out                          |
| 3   | BVR_A    | Backlight Brightness VR pin A                               |
| 4   | BVR_WIP  | Backlight Brightness R pin WIP                              |
| 5   | BVR_B    | Backlight Brightness VR pin B (470 ohm resistor to +5V Vcc) |
| 6   | GND      | Ground  |
| 7   | MENU     | OSD menu  |
| 8   | -/LEFT   | OSD -/Left  |
| 9   | + /RIGHT | OSD +/Right   |
| 10  | SEL_DN   | OSD Select down   |
| 11  | SEL_UP   | OSD Select up   |
| 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 compatible (Matching type : PHR-5)**

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

**CNV2 – Component (YPbPr) video input connector: JST 6-way, B6B-PH-K compatible (Matching type : XHP-6)**

| PIN | SYMBOL | DESCRIPTION        |
|-----|--------|--------------------|
| 1   | A_Y1   | Luma in / Green in |
| 2   | GND    | Ground             |
| 3   | A_Pb1  | Pb in / Blue in    |
| 4   | GND    | Ground             |
| 5   | A_Pr1  | Pr in / Red in     |
| 6   | GND    | Ground             |

**CNV4 - Alternate VGA input : HIROSE DF11-12DP-2DSA compatible**

| PIN | SYMBOL  | DESCRIPTION                              |
|-----|---------|--|
| 1   | R       | Red, analog                              |
| 2   | DDC_5V  | +5V power supply for DDC (optional)      |
| 3   | G       | Green, analog                            |
| 4   | GND     | Ground                                   |
| 5   | B       | Blue, analog                             |
| 6   | GND     | Ground                                   |
| 7   | HS      | Horizontal sync or composite sync, input |
| 8   | GND     | Ground                                   |
| 9   | VS      | Vertical sync, input                     |
| 10  | DDC_SCL | DDC serial clock                         |
| 11  | NC      | No connection                            |
| 12  | DDC_SDA | DDC serial data                          |

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

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

**J3 – LVDS output connector: JAE FI-RE51S-HF compatible (Matching type : JAE FI-RE51HL)**

| PIN | SYMBOL        | DESCRIPTION  |
|-----|---------------|--|
| 1   | VLCD HV       | Panel power supply (+10V / 12V / 18V) (selected by JA3, JA5 & JA6) |
| 2   | VLCD HV       | Panel power supply (+10V / 12V / 18V) (selected by JA3, JA5 & JA6) |
| 3   | VLCD HV       | Panel power supply (+10V / 12V / 18V) (selected by JA3, JA5 & JA6) |
| 4   | VLCD HV       | Panel power supply (+10V / 12V / 18V) (selected by JA3, JA5 & JA6) |
| 5   | VLCD HV       | Panel power supply (+10V / 12V / 18V) (selected by JA3, JA5 & JA6) |
| 6   | VLCD LV       | Panel power supply (3,3V/5V) (selected by JA3, JA5 & JA6)          |
| 7   | VLCD LV       | Panel power supply (3,3V/5V) (selected by JA3, JA5 & JA6)          |
| 8   | VLCD LV       | Panel power supply (3,3V/5V) (selected by JA3, JA5 & JA6)          |
| 9   | VLCD LV       | Panel power supply (3,3V/5V) (selected by JA3, JA5 & JA6)          |
| 10  | VLCD LV       | Panel power supply (3,3V/5V) (selected by JA3, JA5 & JA6)          |
| 11  | GND           | Ground   |
| 12  | GND           | Ground   |
| 13  | GND           | Ground   |
| 14  | GND           | Ground   |
| 15  | GND           | Ground   |
| 16  | OP1           | -  |
| 17  | OP2           | -  |
| 18  | OP3           | -  |
| 19  | OP4           | -  |
| 20  | GND           | Ground   |
| 21  | GND           | Ground   |
| 22  | LVDS_OUT1_A4+ | Positive differential LVDS data bit A4                             |
| 23  | LVDS_OUT1_A4- | Negative differential LVDS data bit A4                             |
| 24  | LVDS_OUT1_A3+ | Positive differential LVDS data bit A3                             |
| 25  | LVDS_OUT1_A3- | Negative differential LVDS data bit A3                             |
| 26  | GND           | Ground   |
| 27  | LVDS_OUT1_AC+ | Positive LVDS clock for A channel                                  |
| 28  | LVDS_OUT1_AC- | Negative LVDS clock for A channel                                  |
| 29  | GND           | Ground   |
| 30  | LVDS_OUT1_A2+ | Positive differential LVDS data bit A2                             |
| 31  | LVDS_OUT1_A2- | Negative differential LVDS data bit A2                             |
| 32  | LVDS_OUT1_A1+ | Positive differential LVDS data bit A1                             |
| 33  | LVDS_OUT1_A1- | Negative differential LVDS data bit A1                             |
| 34  | LVDS_OUT1_A0+ | Positive differential LVDS data bit A0                             |
| 35  | LVDS_OUT1_A0- | Negative differential LVDS data bit A0                             |
| 36  | GND           | Ground   |
| 37  | LVDS_OUT1_B4+ | Positive differential LVDS data bit B4                             |
| 38  | LVDS_OUT1_B4- | Negative differential LVDS data bit B4                             |
| 39  | LVDS_OUT1_B3+ | Positive differential LVDS data bit B3                             |
| 40  | LVDS_OUT1_B3- | Negative differential LVDS data bit B3                             |
| 41  | GND           | Ground   |
| 42  | LVDS_OUT1_BC+ | Positive LVDS clock for B channel                                  |
| 43  | LVDS_OUT1_BC- | Negative LVDS clock for B channel                                  |
| 44  | GND           | Ground   |
| 45  | LVDS_OUT1_B2+ | Positive differential LVDS data bit B2                             |
| 46  | LVDS_OUT1_B2- | Negative differential LVDS data bit B2                             |
| 47  | LVDS_OUT1_B1+ | Positive differential LVDS data bit B1                             |
| 48  | LVDS_OUT1_B1- | Negative differential LVDS data bit B1                             |
| 49  | LVDS_OUT1_B0+ | Positive differential LVDS data bit B0                             |
| 50  | LVDS_OUT1_B0- | Negative differential LVDS data bit B0                             |
| 51  | GND           | Ground   |

**LED1 – Status LED connector: JST 3-way, B3B-XH-A compatible (Mating type : XHP-3 or compatible)**

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

**P1 - Analog VGA in - 15 way connector**

| PIN | SYMBOL  | DESCRIPTION                              |
|-----|---------|--|
| 1   | PCR     | Red, analog                              |
| 2   | PCG     | Green, analog                            |
| 3   | PCB     | Blue analog                              |
| 4   | ID2     | Reserved for monitor ID bit 2 (grounded) |
| 5   | DGND    | Digital ground                           |
| 6   | AGND    | Analog ground red                        |
| 7   | AGND    | Analog ground green                      |
| 8   | AGND    | Analog ground blue                       |
| 9   | DDC_5V  | +5V power supply for DDC (optional)      |
| 10  | DGND    | Digital ground                           |
| 11  | ID0     | Reserved for monitor ID bit 0 (grounded) |
| 12  | DDC_SDA | DDC serial data                          |
| 13  | HS_IN   | Horizontal sync or composite sync, input |
| 14  | VS_IN   | Vertical sync, input                     |
| 15  | DDC_SCL | DDC serial clock                         |

**P2 – DVI-D input**

| PIN | SYMBOL  | DESCRIPTION                         |
|-----|---------|-------------------------------------|
| 1   | /RX2    | TMDS Data 2-                        |
| 2   | RX2     | TMDS Data 2+                        |
| 3   | GND     | Digital Ground                      |
| 4   | NC      | No connection                       |
| 5   | NC      | No connection                       |
| 6   | DDC_CLK | DDC Clock                           |
| 7   | DDC_DAT | DDC Data                            |
| 8   | VS_IN   | Analog vertical Sync                |
| 9   | /RX1    | TMDS Data 1-                        |
| 10  | RX1     | TMDS Data 1+                        |
| 11  | GND     | Digital Ground                      |
| 12  | NC      | No connection                       |
| 13  | NC      | No connection                       |
| 14  | DDC_5V  | +5V power supply for DDC (optional) |
| 15  | GND     | Ground (+5, Analog H/V Sync)        |
| 16  | HPD     | Hot Plug Detect                     |
| 17  | /RX0    | TMDS Data 0-                        |
| 18  | RX0     | TMDS Data 0+                        |
| 19  | GND     | Digital Ground                      |
| 20  | NC      | No connection                       |
| 21  | NC      | No connection                       |
| 22  | GND     | Digital Ground                      |
| 23  | RXC     | TMDS Clock+                         |
| 24  | /RXC    | TMDS Clock-                         |
| C1  | R       | Red                                 |
| C2  | G       | Green                               |
| C3  | B       | Blue                                |
| C4  | HS_IN   | Analog horizontal sync              |
| C5  | GND     | Ground                              |
| C6  | NC      | No connection                       |

**P3 – HDMI 1 connector**

| PIN | SYMBOL  | DESCRIPTION                                     |
|-----|---------|---|
| 1   | DATA2+  | TMDS Data2+                                     |
| 2   | DATA2S  | TMDS Data2 Shield                               |
| 3   | DATA2-  | TMDS Data2-                                     |
| 4   | DATA1+  | TMDS Data1+                                     |
| 5   | DATA1S  | TMDS Data1 Shield                               |
| 6   | DATA1-  | TMDS Data1-                                     |
| 7   | DATA0+  | TMDS Data0+                                     |
| 8   | DATA0S  | TMDS Data0 Shield                               |
| 9   | DATA0-  | TMDS Data0-                                     |
| 10  | CLK+    | TMDS Clock+                                     |
| 11  | CLK@    | TMDS Clock Shield                               |
| 12  | CLK-    | TMDS Clock-                                     |
| 13  | CEC     | CEC   |
| 14  | NC      | No connection                                   |
| 15  | SCL     | SCL (I <sup>2</sup> C Serial Clock for DDC)     |
| 16  | SDA     | SDA (I <sup>2</sup> C Serial Data Line for DDC) |
| 17  | CEC/GND | Ground  |
| 18  | +5V     | +5 V Power (max 50 mA)                          |
| 19  | HPDET   | Hot Plug Detect                                 |

**P5 – USB connector: JST B4B-PH-K compatible (Matching type : PHR-4)**

| PIN | DESCRIPTION |
|-----|-------------|
| 1   | +5V         |
| 2   | USB Data -  |
| 3   | USB Data +  |
| 4   | Ground      |

**PP2 – Alternate 12V/24VDC input power supply - DC power Molex 2 pin 0.156" pitch compatible**

| PIN | DESCRIPTION        |
|-----|--------------------|
| 1   | +12VDC / +24VDC in |
| 2   | Ground             |

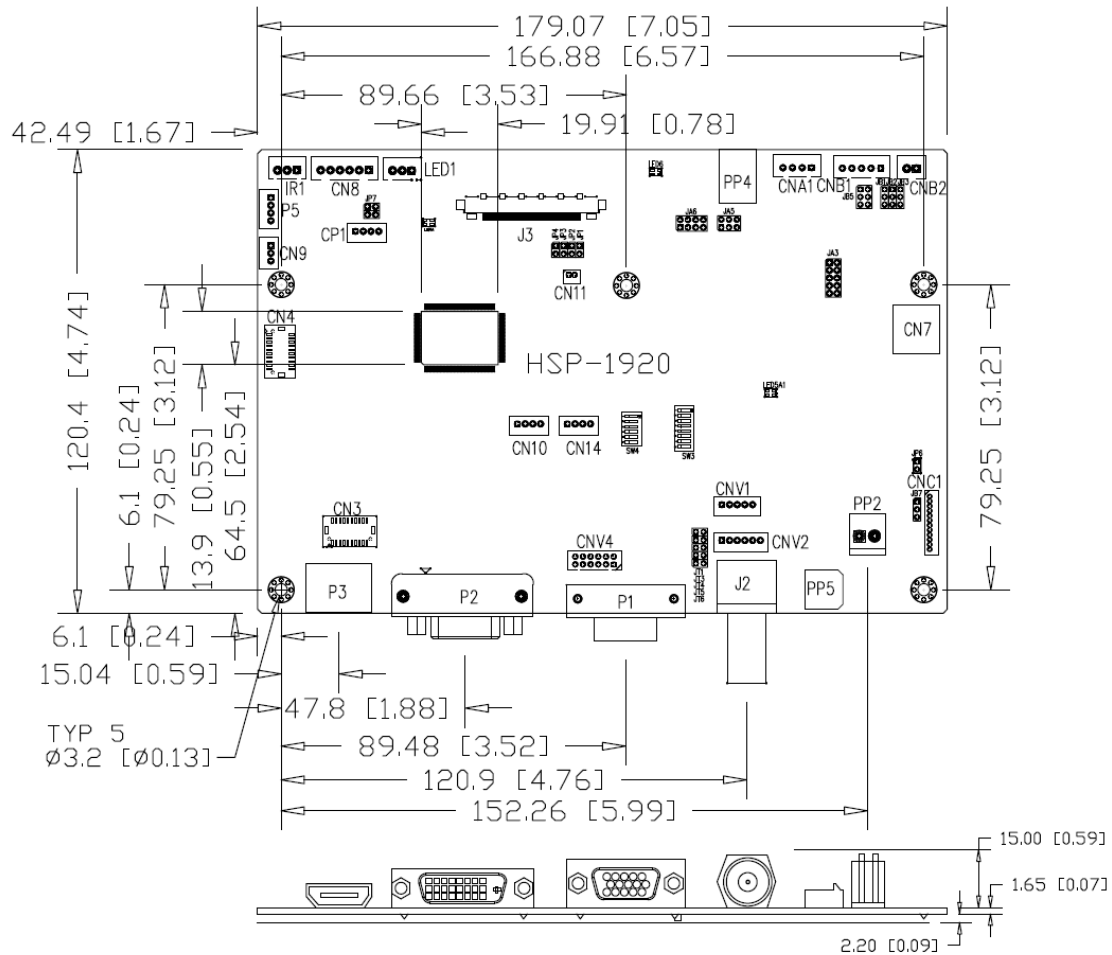
**PP4 – External panel power input- Molex 43045-0400 compatible (Mating type : Molex 43025-0400 or compatible)**

| PIN | DESCRIPTION          |
|-----|----------------------|
| 1   | External panel power |
| 2   | Ground               |
| 3   | External panel power |
| 4   | Ground               |

**PP5 – 12V/24VDC input power supply - Molex 43650-0200 compatible (Mating type : Molex 43645-0200 or compatible)**

| PIN | DESCRIPTION   |
|-----|---------------|
| 1   | +12V / +24VDC |
| 2   | Ground        |

## CONTROLLER DIMENSIONS



**Ready-made 3D Pro-E (SLDPRT) drawing files** - Save time and effort for your system volumetric analysis design. Includes jpg file previews. Please go to download at <http://www.digitalview.com/products/hsp-1920-lcd-controller>

The maximum thickness of the controller is 18.9 mm with or without video add-on board (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.
- Short JP6 jumper to default power on the board once connected to the power.
- 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/24V DC. This should be matched with the inverter specification: see table.

#### CNB1

| PIN | DESCRIPTION |
|-----|-------------|
| 1   | Ground      |
| 2   | +12V/+24VDC |

Remark: For higher power inverter, more current (for 12V/24V) 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 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 = 3.3VV, 2-3 H = 5V (Vcc), OPEN H = open collector |
| JB3 | Inverter control        | 1-2 H = On, 2-3 L = On                                   |

**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 control 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.

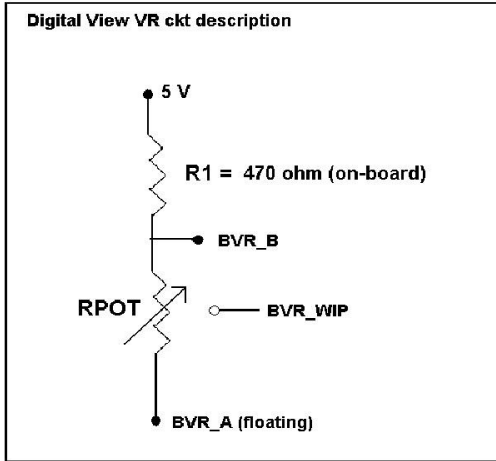
#### CNC1

| PIN | DESCRIPTION |
|-----|-------------|
| 3   | VR A        |
| 4   | VR WIP      |

Specifications subject to change without notice



**Design Guideline for making VR circuitry :**



**Signal description / Notes :**

- 1) R1 : 470ohm on board
- 2) RPOT is an external potentiometer (in-line dip style) that can be plugged directly into CNC1 pins 3,4,5. RPOT must be supplied / installed by user.
- 3) BVR\_B : Voltage tapped from “top” of potentiometer, the node of R1 and RPOT.
- 4) BVR\_WIP : Voltage tapped from wiper arm of RPOT.
- 5) BVR\_A : Voltage tapped from “bottom” of RPOT.

**Note : BVR\_A voltage is left floating on the controller board. To use this circuit, you need to tie this point to a potential (usually GND, available at CNC1 pin 6).**

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

| PIN | SYMBOL  | DESCRIPTION                             |
|-----|---------|---|
| 1   | GND     | Ground                                  |
| 2   | VBKL    | +12V/24VDC, 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 – Control switch, JST B12B-XH-A (Matching type : XHP-12)**

| PIN | SYMBOL   | DESCRIPTION   |
|-----|----------|---|
| 1   | PSWIN    | Power button A  |
| 2   | SW_ON    | Power button B  |
| 3   | BVR_A    | Backlight Brightness VR pin A                               |
| 4   | BVR_WIP  | Backlight Brightness R pin WIP                              |
| 5   | BVR_B    | Backlight Brightness VR pin B (470 ohm resistor to +5V Vcc) |
| 6   | GND      | Ground  |
| 7   | MENU     | OSD menu  |
| 8   | -/LEFT   | OSD -/Left  |
| 9   | + /RIGHT | OSD +/Right   |
| 10  | SEL_DN   | OSD Select down   |
| 11  | SEL_UP   | OSD Select up   |
| 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.

**Example for circuit design :**

- 1.) Choose RPOT = 10K
- 2.) Tie BVR\_A to GND
- 3.) Circuit analysis gives BVR\_WIP as the following (see Figure 1)

$$BVR\_WIP = 5 \times (Rbc/10.47)$$

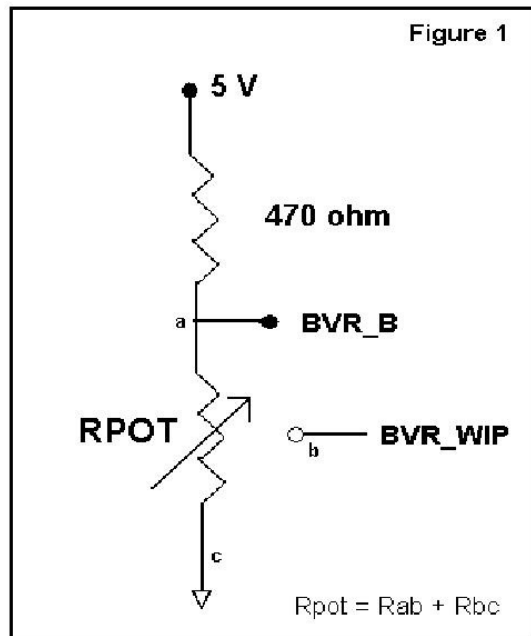
where BVR\_WIP is in Volts.  
And Rbc is the resistance from the wiper arm to bottom of pot in Kohms.

To evaluate, plug in different values of Rbc :

| Rbc   | BVR_WIP |
|-------|---------|
| 0     | 0 V     |
| 2.5 K | 1.2 V   |
| 5 K   | 2.4 V   |
| 7.5 K | 3.6 V   |
| 10 K  | 4.8 V   |

So this circuit could provide Brightness adjust voltage ranging from 0V to 5V

Specifications subject to change without notice



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## 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, PC settings)
- Panel (controller, cabling, connection, panel, PC settings)
- Backlight (inverter, cabling, backlight tubes)
- Cabling
- Computer system (display settings, operating system)

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 or incorrect graphic card settings.

### Image position:

If it is impossible to position the image correctly, i.e. the image adjustment controls will not move the image far enough, then test using another graphics card. This situation can occur with a custom graphics card that is not close to standard timings or if something is in the graphics line that may be affecting the signal such as a signal splitter (please note that normally a signal splitter will not have any adverse effect).

### Image appearance:

- A faulty panel can have blank lines, failed sections, flickering or flashing display
- Incorrect graphics card refresh rate, resolution or interlaced mode will probably cause the image to be the wrong size, to scroll, flicker badly or possibly even no image.
- 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.
- Found "Loading" message displayed on screen message at DVI input indicates the unstable DVI source detected (especially connected to DVI splitter) causing flashing image.
- No image found when non-matching video system signal input.

### 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 1920x1200, 1920x1080, 1680x1050, 1600x1200, 1440x900 1366x768, 1280x1024, 1024x768, 800x600 & 640x480 resolutions of TFT LCD panels.<br><br>A specified BIOS and some factory adjustment may be required for individual panel timings.  |
| No. of colours                        | Up to 3 x 10 bit providing 1.06 billion colors.   |
| Panel power                           | DC 3.3V, 5V, 10V, 12V, 18V  |
| Panel signal                          | LVDS  |
| Vertical refresh rate                 | 60Hz at 1920x1200, 60Hz at 1920x1080, 60Hz at UXGA and up to 75Hz other lower resolution  |
| Display clock maximum                 | 165MHz  |
| ADC clock maximum                     | 195 MHz   |
| DVI differential input clock maximum  | 165MHz  |
| Graphics formats                      | Standard VESA VGA, SVGA, XGA, SXGA, WXGA, UXGA, WUXGA<br>Other special formats through specified BIOS and factory adjustment.   |
| Graphics auto mode detect             | VGA, SVGA, XGA, SXGA, WXGA, UXGA & WUXGA interlaced and non-interlaced  |
| Standard input at source (analog RGB) | VGA analog (15 pin) standard with automatic detection of:<br>Digital Separate Sync;<br>Composite Sync<br>Sync On Green.   |
| Video formats                         | PAL, NTSC & SECAM   |
| Video inputs                          | VGA<br>DVI-D<br>HDMI 1<br>HDMI 2<br>HD/SD Component video<br>Composite video 1<br>Composite video 2   |
| Functions display                     | On screen display (OSD) of functions  |
| OSD menu functions                    | Image controls:<br>Contrast, Black level, Sharpness, Hue, Saturation, Color temperature.<br>Other features:<br>Image position, Clock, Phase, Auto Picture Setup, Aspect/Size, Backlight brightness adjustment, Input source select, Auto Color Gain, OSD menu transparency, OSD time out, Reset to Factory Defaults, Image orientation, Software update(USB), Auto Source Seek, Failover, Backlight Invert, Backlight control (D/A or PWM), Backlight Frequency, Minimum backlight level adjustment, Volume control, Menu language, Auto power, video standard, gamma, OSD transparent, Hotkey 1&2, |
| OSD menu controls available           | Power On/Off<br>Backlight brightness (for voltage control backlight driver only)<br>OSD Menu<br>OSD Select up<br>OSD Select down<br>Setting +<br>Setting -  |
| Control interface                     | Buttons, RS-232, Remote control   |
| Settings memory                       | Settings are stored in non volatile memory  |
| PC Connectivity                       | VGA / SVGA / XGA / SXGA / UXGA / WUXGA analog or digital  |
| Controller dimensions                 | 179mm x 120.4mm (7." x 4.74")   |
| Power consumption                     | 10w approx. (not including panel power consumption)   |
| Power load maximum                    | The controller has an overall 3Amp current limit.   |
| Input voltage                         | 12V/24VDC +/- 25%**   |
| Power protection                      | Fuse fitted (Resettable)  |
| Storage temperature limits            | -40°C to +85°C  |
| Operating temperature limits          | -40°C to +80°C**  |
| Coating                               | Silicone resin conformal coating. (MOD) DEF-STAN 59/47 Issue 4 & UL QMJU2 compliant.  |
| Use of memory on board                | - 1 pc SRAM - MCU & RAM (MSD8220LB) on U11, 128Mbytes which is a volatile memory : SRAM for OSD and RAM for frame buffer.<br>- 1 pc Flash - (GD25Q64) on U3, 64Mbits which is a non-volatile memory for system program.<br>- 1 pc EEPROM - (24C02N) on U23, 2KBits which is a non-volatile memory for VGA EDID.<br>- 1 pc EEPROM- (24C128C) on U14, 128Kbits which is a non-volatile memory for System Setting Storage.   |

\*\* Overall suitability for usage in critical applications must be independently tested and verified by the user.

Specifications subject to change without notice

**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 – SIGNAL SUPPORT MODE TABLE

### VGA PORT :

| Resolution                           | Sync Mode             |
|--------------------------------------|-----------------------|
| 640x480 60Hz                         | Digital Separate Sync |
| 640x480 72Hz                         | Digital Separate Sync |
| 640x480 75Hz                         | Digital Separate Sync |
| 800x600 56Hz                         | Digital Separate Sync |
| 800x600 60Hz                         | Digital Separate Sync |
| 800x600 72Hz                         | Digital Separate Sync |
| 800x600 75Hz                         | Digital Separate Sync |
| 1024x768 60Hz                        | Digital Separate Sync |
| 1024x768 70Hz                        | Digital Separate Sync |
| 1024x768 75Hz                        | Digital Separate Sync |
| 1280x768 60Hz                        | Digital Separate Sync |
| 1280x768 75Hz                        | Digital Separate Sync |
| 1280x800 60Hz                        | Digital Separate Sync |
| 1280x1024 60Hz                       | Digital Separate Sync |
| 1280x1024 75Hz                       | Digital Separate Sync |
| 1360x768 60Hz                        | Digital Separate Sync |
| 1440x900 60Hz                        | Digital Separate Sync |
| 1440x900 75Hz                        | Digital Separate Sync |
| 1600x1200 60Hz                       | Digital Separate Sync |
| 1600x1200 65Hz                       | Digital Separate Sync |
| 1600x1200 70Hz                       | Digital Separate Sync |
| 1600x1200 75Hz                       | Digital Separate Sync |
| 1680x1050 60Hz                       | Digital Separate Sync |
| 1920x1080 60Hz                       | Digital Separate Sync |
| 1920x1080 60Hz<br>(Reduced blanking) | Digital Separate Sync |
| 1920x1200 60Hz                       | Digital Separate Sync |

#### Remark :

The controller has been designed to take a very wide range of input signals however to optimize the PC's graphics performance we recommend choosing 60Hz vertical refresh rate. To support on higher refresh rate over 60Hz, the LCD panel may not support.

**HDMI PORT :**

| Resolution     |
|----------------|
| 640x480 60Hz   |
| 640x480 72Hz   |
| 640x480 75Hz   |
| 800x600 56Hz   |
| 800x600 60Hz   |
| 800x600 72Hz   |
| 800x600 75Hz   |
| 1024x768 60Hz  |
| 1024x768 70Hz  |
| 1024x768 75Hz  |
| 1280x768 60Hz  |
| 1280x768 75Hz  |
| 1280x800 60Hz  |
| 1280x800 75Hz  |
| 1280x1024 60Hz |
| 1280x1024 75Hz |
| 1360x768 60Hz  |
| 1366x768 60Hz  |
| 1440x900 60Hz  |
| 1440x900 75Hz  |
| 1600x1200 60Hz |
| 1600x1200 65Hz |
| 1600x1200 70Hz |
| 1600x1200 75Hz |
| 1680x1050 60Hz |
| 1680x1050 75Hz |
| 1920x1080 60Hz |
| 1920x1200 60Hz |

| Resolution  |
|-------------|
| 480i30      |
| 480p60      |
| 480p59.94   |
| 576i25      |
| 576p50      |
| 720p60      |
| 720p59.94   |
| 720p50      |
| 720p30      |
| 720p29.97   |
| 720p25      |
| 720p24      |
| 720p23.976  |
| 1080i30     |
| 1080i29.97  |
| 1080i25     |
| 1080p60     |
| 1080p59.94  |
| 1080p50     |
| 1080p30     |
| 1080p29.97  |
| 1080p25     |
| 1080p24     |
| 1080p23.976 |

**COMPOSITE INPUT PORT :**

| Mode      |
|-----------|
| NTSC-M    |
| NTSC-J    |
| NTSC-4.43 |
| PAL-BDGI  |
| PAL-M     |
| PAL-N     |
| PAL-60    |

**DVI PORT :**

| Resolution     |
|----------------|
| 640x480 60Hz   |
| 640x480 72Hz   |
| 640x480 75Hz   |
| 800x600 56Hz   |
| 800x600 60Hz   |
| 800x600 72Hz   |
| 800x600 75Hz   |
| 1024x768 60Hz  |
| 1024x768 70Hz  |
| 1024x768 75Hz  |
| 1280x768 60Hz  |
| 1280x768 75Hz  |
| 1280x800 60Hz  |
| 1280x800 75Hz  |
| 1280x1024 60Hz |
| 1280x1024 75Hz |
| 1360x768 60Hz  |
| 1366x768 60Hz  |
| 1440x900 60Hz  |
| 1440x900 75Hz  |
| 1600x1200 60Hz |
| 1600x1200 65Hz |
| 1600x1200 70Hz |
| 1600x1200 75Hz |
| 1680x1050 60Hz |
| 1680x1050 75Hz |
| 1920x1080 60Hz |
| 1920x1200 60Hz |

**COMPONENT PORT :**

| Mode        |
|-------------|
| NTSC        |
| PAL         |
| 576p50      |
| 480p60      |
| 480p59.94   |
| 720p60      |
| 720p59.94   |
| 720p50      |
| 1080p30     |
| 1080p29.97  |
| 1080p60     |
| 1080p59.94  |
| 1080p50     |
| 1080p30     |
| 1080p29.97  |
| 1080p25     |
| 1080p24     |
| 1080p23.976 |
| 1080i60     |
| 1080i59.94  |
| 1080i50     |

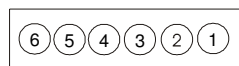
## Appendix II – RS-232 control protocols

### RS-232 Serial control (Baud rate 2400, 8 bits, 1 stop bit and no parity)

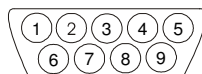
Physical connection :

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

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



Mating face of CN8



Mating face of RS-232 DB9 Male

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

| 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.

The RS-232 program can be custom-made to fit for application or it can be used the serial control program, like Accessport, Telix or Serial Utility program developed by DigitalView. Please contact your local support for information.

#### 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 - Left & right channel | 0x80, "a"   "A",<br>nn   "+"   "-"  <br>"="  <br>"r"   "R"  <br>"?"                      | Set audio (L+R) volume =<br>value/increment/decrement<br>Display OSD indicator<br>Reset<br>Query  | volume  |
| Volume control - on/off (mute)        | 0x80, "m"   "M",<br>"0"  <br>"1"  <br>"r"   "R"  <br>"O"  <br>"?"                        | Disable audio output.<br>Enable audio output.<br>Reset<br>Disable audio output without<br>"Mute" symbol<br>Query  | "0" - audio off (muted).<br>"1" - audio on.<br>"O" - audio off (without mute<br>symbol)                                   |
| Back level control                    | 0x81,<br>nn   "+"   "-"  <br>"r"   "R"  <br>"?"<br>"m"<br>"n"<br>"i", ss, nn<br>"o", ss, | Set brightness =<br>value/increment/decrement<br>Reset<br>Query Current Source<br>Maximum query<br>Minimum query<br>Set, Source, value<br>Query, Source | Brightness.<br><br><br><br><br>ss - reference by Input main<br>select(0x98)<br>Range : "0""0"- "6""4"<br>Default : "3""2" |

Specifications subject to change without notice



|                                 |   |  |  |
|---------------------------------|---|--|--|
| Contrast control - all channels | 0x82, "a"   "A",<br>nn   "+"   "-"  <br>"r"   "R"  <br>"?"<br>"m"<br>"n"<br>"i", ss, nn<br>"o", ss, | Set all contrast =<br>value/increment/decrement<br>Reset<br>Query<br>Maximum query<br>Minimum query<br>Set, Source, value<br>Query, Source | Contrast All.<br><br>ss - reference by Input main<br>select(0x98)<br>Range : "0"0"-6"4"<br>Default : "3"2" |
| Color control                   | 0x83,<br>nn   "+"   "-"  <br>"r"   "R"  <br>"?"<br>"m"<br>"n"<br>"i", ss, nn<br>"o", ss,            | Set color =<br>value/increment/decrement<br>Reset<br>Query<br>Maximum query<br>Minimum query<br>Set, Source, value<br>Query, Source        | ss - reference by Input main<br>select(0x98)<br>Range : "0"0"-6"4"<br>Default : "3"2"                      |
| Tint control                    | 0x84,<br>nn   "+"   "-"  <br>"r"   "R"  <br>"?"<br>"m"<br>"n"<br>"i", ss, nn<br>"o", ss,            | Set tint =<br>value/increment/decrement<br>Reset<br>Query<br>Maximum query<br>Minimum query<br>Set, Source, value<br>Query, Source         | ss - reference by Input main<br>select(0x98)<br>Range : "0"0"-6"4"<br>Default : "3"2"                      |
| Phase (tuning) control          | 0x85,<br>nn   "+"   "-"  <br>"?"  | Set dot clock phase =<br>value/increment/decrement<br>Query  | Dot clock phase.<br>(In PC mode only)  |
| Image H position                | 0x86,<br>nnnn   "+"   "-"  <br>"?"  | Set img_hpos =<br>value/increment/decrement<br>Query   | Image horizontal position.<br>(In PC mode only)  |
| Image V position                | 0x87,<br>nnnn   "+"   "-"  <br>"?"  | Set img_vpos =<br>value/increment/decrement<br>Query   | Image vertical position.<br>(In PC mode only)  |
| Sharpness                       | 0x8a,<br>n   "+"   "-"  <br>"r"   "R"  <br>"?"  | Set sharpness =<br>value/increment/decrement<br>Reset<br>Query   | Sharpness.<br>(HDMI and Composite Only )<br><br>Range : "0"0"-6"4"<br>Default : "3"2"                      |
| Frequency                       | 0x8b,<br>nnnn   "+"   "-"  <br>"?"  | Set frequency =<br>Value/increment/decrement<br>Query  | Graphic mode H active size (in pixels)   |
| Scaling Mode                    | 0x8c,<br>"0"   "1"   "9"   "A"  <br>"r"   "R"  <br>"?"  | Set graphic image scaling mode<br>= value<br>Reset<br>Query  | Image expansion on/off.<br>"0" – 1:1<br>"1" – fill screen<br>"9" – 4:3<br>"A" – 16:9                       |
| Set display orientation         | 0x8e,<br>n  | Set display orientation =<br>value/increment/decrement   | "0" – Normal.<br>"1" – Vertical Flip.  |

Specifications subject to change without notice

|  |   |  |  |
|--|---|--|--|
|  | "r"   "R"  <br>"?"  | Reset<br>Query   | "2" – Horizontal Flip.<br>"3" – Horizontal & Vertical Flip.  |
| OSD<br>Transparency <sup>(1)</sup>                       | 0x92,<br>n   "+"   "-"  <br>"r"   "R"  <br>"?"                        | Set OSD transparency =<br>value/increment/decrement<br>Reset<br>Query            | OSD transparency<br>"0"- 0%<br>"1"- 25%<br>"2"- 50%<br>"3"- 75%<br>"4"- 100%   |
| OSD menu<br>timeout                                      | 0x93,<br>nn   "+"   "-"  <br>"r"   "R"  <br>"?"                       | Select menu timeout =<br>value/increment/decrement<br>Reset<br>Query             | OSD menu timeout value.<br>"0""0" – ON.<br>"0""5" - 5 secs<br>"0""F" - 15 secs<br>"1""E" - 30 secs<br>"2""D" - 45 secs<br>"3""C" - 60 secs   |
| Select OSD<br>language <sup>(1)</sup>                    | 0x95,<br>n  <br>"r"   "R"  <br>"?"                                    | Select language =<br>English, French, Spanish<br>Reset<br>Query                  | "0" – English.<br>"2" – French.<br>"3" – Spanish.  |
| Input main select  | 0x98,<br>nn   "+"   "-"  <br>"r"   "R"  <br>"?"                       | Select input main =<br>PC or VIDEO or next available<br>Reset<br>Query           | Main selected.<br>"0x41,0x31" VGA<br>"0x42,0x31" Composite1<br>"0x42,0x32" Composite2<br>"0x44,0x31" Component<br>"0x46,0x31" DVI<br>"0x48,0x31" HDMI1<br>"0x48,0x32" HDMI2  |
| Auto Source Seek   | 0x99,<br>"0"   "1"  <br>"?"   | Disable/ Enable<br>Query   | "0" – Disable<br>"1" – Enable  |
| Failover off/on<br>selection <sup>(1)</sup>              | 0x99,<br>nn ,<br>"0"   "1"  <br>"?"                                   | Set FailOver enable<br>Source<br>Disable/ Enable<br>Query                        | "nn" = "0x59,0x31" FailOver  |
| Video System <sup>(1)</sup><br>(Composite video<br>only) | 0x9b,<br>"0"   "1"   "2"   "3"  <br>"r"   "R"  <br>"S"   "s"  <br>"?" | Set video system =<br>Auto/NTSC/PAL/SECAM<br>Reset<br>Video State Query<br>Query | Query:<br>"0" – Auto.<br>"1" – NTSC_M_358<br>"2" – PAL_N_443<br>"3" – SECAM<br>"4" – NTSC_M_443<br>"5" - PAL_M_358<br>"7" – PAL_M_443<br>"9" – PAL_N_358   |
| Gamma value<br>select <sup>(1)</sup>                     | 0x9d,<br>n  <br>"r"   "R"  <br>"?"                                    | Select GAMMA value =<br>Value<br>Reset<br>Query                                  | GAMMA value:<br>"5" – 1.8, "7" – 2.0,<br>"2" – 2.2, "A" – 2.4,<br>"C" – 2.6  |
| Auto power off <sup>(1)</sup>                            | 0x9f,<br>"0"   "1"  <br>"r"   "R"  <br>"?"                            | Set power down option =<br>On/Off<br>Reset<br>Query                              | "0" – Off.<br>"1" – On.  |
| Hotkey 1 <sup>(1)</sup>                                  | 0xa0, "1",<br>n  <br>"r"   "R"  <br>"?"                               | Set Hotkey 1=<br>Value<br>Reset<br>Query   | "1" – Volume.<br>"2" – Back Level.<br>"3" – Contrast.<br>"4" – Saturation.<br>"5" – Input source.<br>"B" – No function<br>"E" – Aspect/Size<br>"F" – Image Orientation<br>"H" – Brightness<br>"I" – Auto Picture Setup |

Specifications subject to change without notice

|   |  |   |   |
|---|--|---|---|
| Hotkey 2 <sup>(1)</sup>                     | 0xa0, "2",<br>n  <br>"r"   "R"  <br>"?"                  | Set Hotkey 2=<br>Value<br>Reset<br>Query  | "1" – Volume.<br>"2" – Back Level.<br>"3" – Contrast.<br>"4" – Saturation.<br>"5" – Input source.<br>"B" – No function<br>"E" – Aspect/Size<br>"F" – Image Orientation<br>"H" – Brightness<br>"I" – Auto Picture Setup                              |
| Runtime counter                             | 0xa1,<br>nnnnn  <br>"r"   "R"  <br>"?"                   | runtime counter value =<br>nnnnn (* 0.5 hour)<br>Reset<br>Query   | Runtime = nnnnn.  |
| Colour temperature select                   | 0xb3,<br>n  <br>"r"   "R"  <br>"?"                       | Select colour temperature =<br>value<br>Reset<br>Query  | Main selected.<br><br>"2" – 6500K.<br>"3" – 5000K.<br>"4" – user defined RGB values<br>"5" – 9300K<br>"6" – 7500K.(Default)   |
| Red level for selected colour temperature   | 0xb4,<br><br>nn   "+"   "-"  <br>"r"   "R"  <br>"?"      | Set the level of the red channel for the selected colour temp. =<br>value/increment/decrement<br>Reset<br>Query   | Red level for selected colour temperature.<br><br>Range: "0"0"-F"0"<br>Default: "8"0"   |
| Green level for selected colour temperature | 0xb5,<br><br>nn   "+"   "-"  <br>"r"   "R"  <br>"?"      | Set the level of the green channel for the selected colour temp. =<br>value/increment/decrement<br>Reset<br>Query | Green level for selected colour temperature.<br><br>Range: "0"0"-F"0"<br>Default: "8"0"   |
| Blue level for selected colour temperature  | 0xb6,<br><br>nn   "+"   "-"  <br>"r"   "R"  <br>"?"      | Set the level of the blue channel for the selected colour temp. =<br>value/increment/decrement<br>Reset<br>Query  | Blue level for selected colour temperature.<br><br>Range: "0"0"-F"0"<br>Default: "8"0"  |
| 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 and 1 char   | "nnnc" = vertical frequency<br>nnn = 3 digit hex<br>c= "i" or "p"<br>interlace or Progressive   |
| OSD turn off                                | 0xbd   | Turn off the OSD.   | "0" – fail.<br>"1" – successful.  |
| Backlight control                           | 0xe0,<br>nn   "+"   "-"  <br>"="  <br>"R"   "r"  <br>"?" | Set Backlight =<br>value/increment/decrement<br>Display OSD indicator<br>Reset<br>Query                           | Backlight.<br>Range:<br>D/A : "0"0" ~ "6"4"<br>100Hz : "0"0" ~ "6"4"<br>120Hz : "0"0" ~ "6"4"<br>140Hz : "0"0" ~ "6"4"<br>160Hz : "0"0" ~ "6"4"<br>180Hz : "0"0" ~ "6"4"<br>200Hz : "0"0" ~ "6"4"<br>220Hz : "0"0" ~ "6"4"<br>240Hz : "0"0" ~ "6"4" |

Specifications subject to change without notice

|                         |  |   |  |
|-------------------------|--|---|--|
|                         |  |   | 260Hz : "0" "0" ~ "6" "4"<br>280Hz : "0" "0" ~ "6" "4"<br>300Hz : "0" "0" ~ "6" "4"<br>320Hz : "0" "0" ~ "6" "4"<br>340Hz : "0" "0" ~ "6" "4"<br>360Hz : "0" "0" ~ "6" "4"<br>380Hz : "0" "0" ~ "6" "4"<br>400Hz : "0" "0" ~ "6" "4"<br>420Hz : "0" "0" ~ "6" "4"<br>440Hz : "0" "0" ~ "6" "4"   |
| Backlight D/A / PWM     | 0xe5<br>"0"   "1"  <br>"R"   "r"<br>"?"                | Set : PWM or D/A<br><br>Reset<br>Query  | "0" – PWM<br>"1" – D/A (Default)   |
| OSD turn off            | 0xbd   | Turn off the OSD.   | "0" – fail.<br>"1" – successful.   |
| Backlight PWM Frequency | 0xe6,<br>nnn   "+"   "-"  <br>"R"   "r"  <br>"?"       | Set Backlight PWM Frequency = value/increment/decrement<br>Reset<br>Query     | +/- 20Hz<br>Value<br>100Hz : "0", "6", "4"<br>120Hz : "0", "7", "8"<br>140Hz : "0", "8", "C"<br>160Hz : "0", "A", "0" (Default)<br>180Hz : "0", "B", "4"<br>200Hz : "0", "C", "8"<br>220Hz : "0", "D", "C"<br>240Hz : "0", "F", "0"<br>260Hz : "1", "0", "4"<br>280Hz : "1", "1", "8"<br>300Hz : "1", "2", "C"<br>320Hz : "1", "4", "0"<br>340Hz : "1", "5", "4"<br>360Hz : "1", "6", "8"<br>380Hz : "1", "7", "C"<br>400Hz : "1", "9", "0"<br>420Hz : "1", "A", "4"<br>440Hz : "1", "B", "8"  |
| Backlight Invert        | 0xe7<br>"0"   "1"  <br>"R"   "r"<br>"?"                | Set On or Off<br><br>Reset<br>Query   | "0" – Off<br>"1" – On  |
| Minimum Backlight Value | 0xee, "0x5C"<br>nn   "+"   "-"  <br>"R"   "r"  <br>"?" | Set Minimum Backlight value = value / increment / decrement<br>Reset<br>Query | Minimum Backlight value/<br>Range :<br>D/A : "0" "0" ~ "3" "2"<br>100Hz : "0" "0" ~ "3" "2"<br>120Hz : "0" "0" ~ "3" "2"<br>140Hz : "0" "0" ~ "3" "2"<br>160Hz : "0" "0" ~ "3" "2"<br>180Hz : "0" "0" ~ "3" "2"<br>200Hz : "0" "0" ~ "3" "2"<br>220Hz : "0" "0" ~ "3" "2"<br>240Hz : "0" "0" ~ "3" "2"<br>260Hz : "0" "0" ~ "3" "2"<br>280Hz : "0" "0" ~ "3" "2"<br>300Hz : "0" "0" ~ "3" "2"<br>320Hz : "0" "0" ~ "3" "2"<br>340Hz : "0" "0" ~ "3" "0"<br>360Hz : "0" "0" ~ "3" "0"<br>380Hz : "0" "0" ~ "3" "0"<br>400Hz : "0" "0" ~ "3" "1"<br>420Hz : "0" "0" ~ "3" "1"<br>440Hz : "0" "0" ~ "3" "1" |

Specifications subject to change without notice

### 3. Other control

| Function                                    | Command                     | Description   | Acknowledge (if enabled)  |
|---|-----------------------------|---|---|
| Select RS-232 acknowledge                   | 0xc1, "0"   "1"             | Disable/enable command acknowledge.                       | "0" – acknowledge disabled.<br>"1" – acknowledge enabled.   |
| Auto-setup                                  | 0xc3                        | Start auto-setup of current vmode.                        | "0" – fail.<br>"1" – successful.  |
| Command availability                        | 0xc4, n                     | Check whether a command is available.                     | "0" – not available.<br>"1" – available.  |
| Auto-calibration                            | 0xc5                        | Start auto-calibration of gain of the RGB amplifier.      | "0" – fail.<br>"1" – successful.  |
| Soft Power On/Off                           | 0xc8,<br>"0"   "1"  <br>"?" | Soft power off/on query                                   | "0" - Soft power off<br>"1" - Soft power on   |
| Query video input status                    | 0xc9                        | Query the status of the primary & pip status              | "nn,nn" = input status<br>"nn,xx" digit = primary status:<br>"0","0" : invalid<br>"A","1" VGA<br>"B","1" Composite 1<br>"B","2" Composite 2<br>"D","1" Component<br>"F","1" DVI<br>"H","1" HDMI 1<br>"H","2" HDMI 2<br><br>"xx,nn"= PIP input status:<br>"0","0": invalid |
| Query BIOS version                          | 0xcb, "0"                   | Read BIOS version   | BIOS version "VV.YY.ZZ"<br>VV = V0 or E0,<br>V0 = Release version<br>E0 = Engineering Sample<br><br>YY= Version Number<br><br>ZZ= Customer Number   |
| Query PCBA number                           | 0xcb, "1"                   | Read PCBA number  | "nnnnn" = PCBA number<br>SP-1920= "41760"   |
| Reset to Factory Defaults                   | 0xce                        | Reset all parameters to default value                     | "1" – successful.   |
| Reset to Factory Defaults with (color temp) | 0xcf                        | Reset all parameters for all video modes to default value | "1" - successful.   |

(1) Effective on Firmware V1.05.00.00 or up

**The RS-232 command strings sent in one time can support up to 380 bytes via CN8 port  
The RS-232 command string sent in one time can support up to 50 bytes via CN1 or J1 port.**

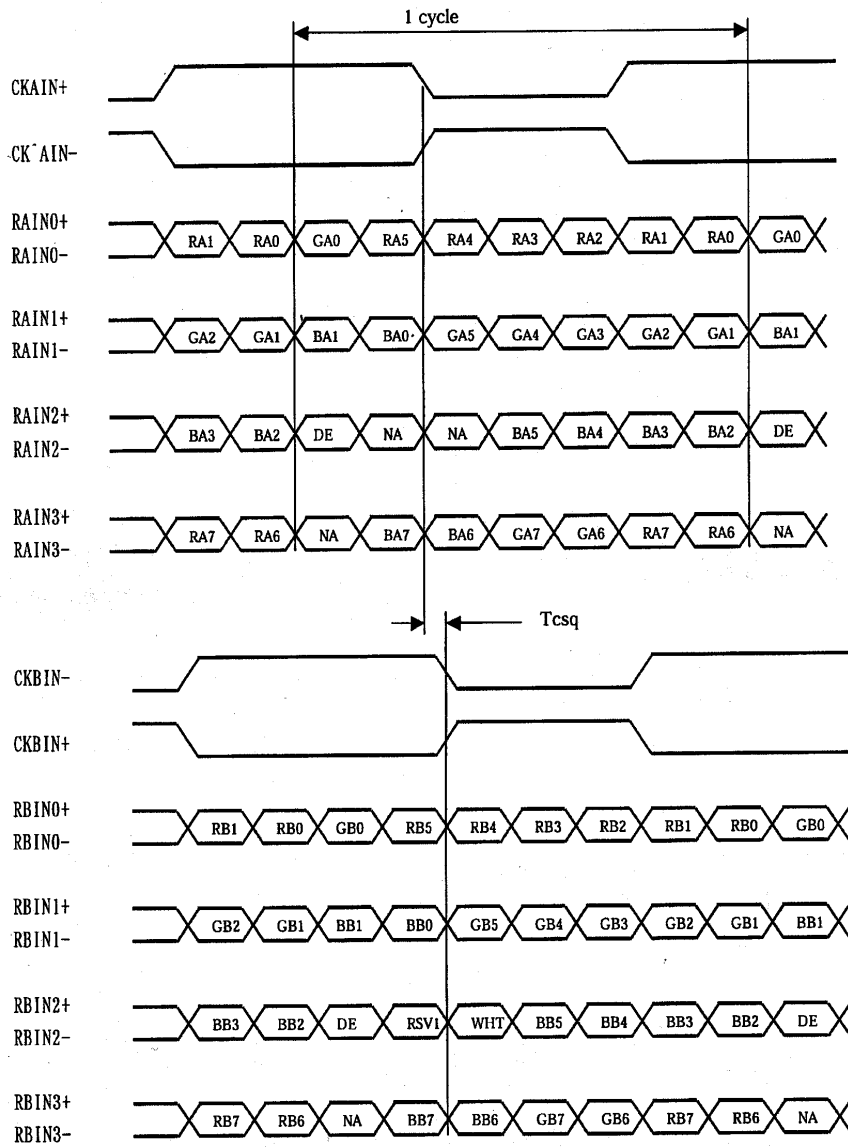
**n = 1-byte ascii-coded hex number, e.g., parameter value of 0x1 is represented by "1" (0x31).  
mn or nn = 2-byte ascii-coded hex number, e.g., parameter value of 0x1e is represented by "1", "e" | "E" (0x31, 0x6e|0x4e). Please refer to the ASCII to Hex convert table below.**

### Hex to ASCII conversion table

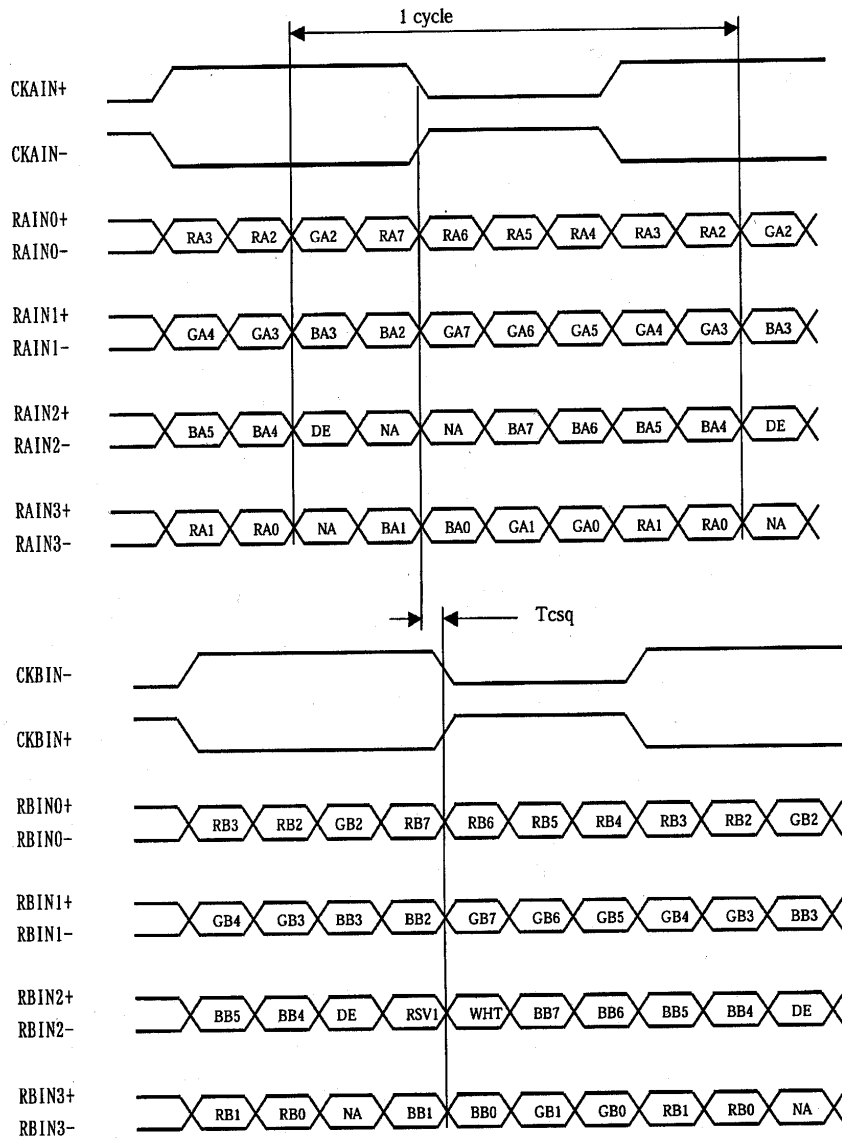
| Hex  | ASCII | Hex  | ASCII | Hex  | ASCII | Hex  | ASCII |
|------|-------|------|-------|------|-------|------|-------|
| 0x30 | 0     | 0x41 | A     | 0x61 | a     | 0x2B | +     |
| 0x31 | 1     | 0x42 | B     | 0x62 | b     | 0x2D | -     |
| 0x32 | 2     | 0x43 | C     | 0x63 | c     | 0x3F | ?     |
| 0x33 | 3     | 0x44 | D     | 0x64 | d     |      |       |
| 0x34 | 4     | 0x45 | E     | 0x65 | e     |      |       |
| 0x35 | 5     | 0x46 | F     | 0x66 | f     |      |       |
| 0x36 | 6     | 0x47 | G     | 0x67 | g     |      |       |
| 0x37 | 7     | 0x48 | H     | 0x68 | h     |      |       |
| 0x38 | 8     | 0x49 | I     | 0x69 | i     |      |       |
| 0x39 | 9     | 0x4A | J     | 0x6A | j     |      |       |
|      |       | 0x4B | K     | 0x6B | k     |      |       |
|      |       | 0x4C | L     | 0x6C | l     |      |       |
|      |       | 0x4D | M     | 0x6D | m     |      |       |
|      |       | 0x4E | N     | 0x6E | n     |      |       |
|      |       | 0x4F | O     | 0x6F | o     |      |       |
|      |       | 0x50 | P     | 0x70 | p     |      |       |
|      |       | 0x51 | Q     | 0x71 | q     |      |       |
|      |       | 0x52 | R     | 0x72 | r     |      |       |
|      |       | 0x53 | S     | 0x73 | s     |      |       |
|      |       | 0x54 | T     | 0x74 | t     |      |       |
|      |       | 0x55 | U     | 0x75 | u     |      |       |
|      |       | 0x56 | V     | 0x76 | v     |      |       |
|      |       | 0x57 | W     | 0x77 | w     |      |       |
|      |       | 0x58 | X     | 0x78 | x     |      |       |
|      |       | 0x59 | Y     | 0x79 | y     |      |       |
|      |       | 0x5A | Z     | 0x7A | z     |      |       |

## Appendix III – Mapping definition

- Definition of Mapping A :



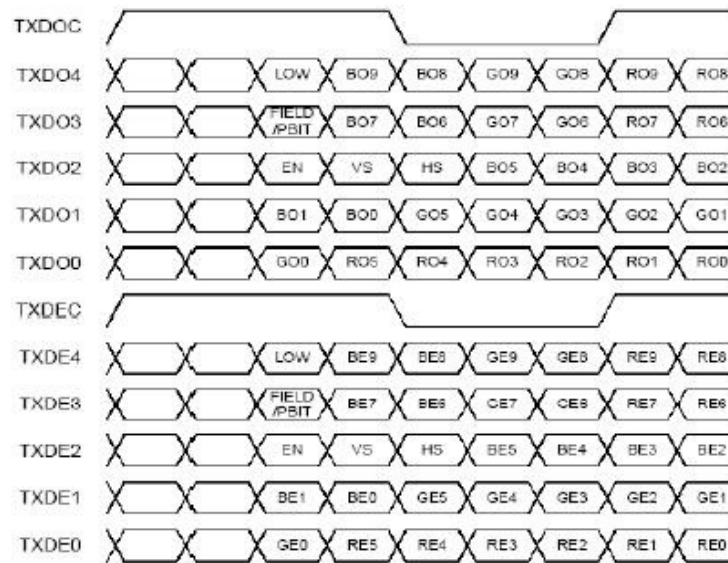
- Definition of Mapping B :





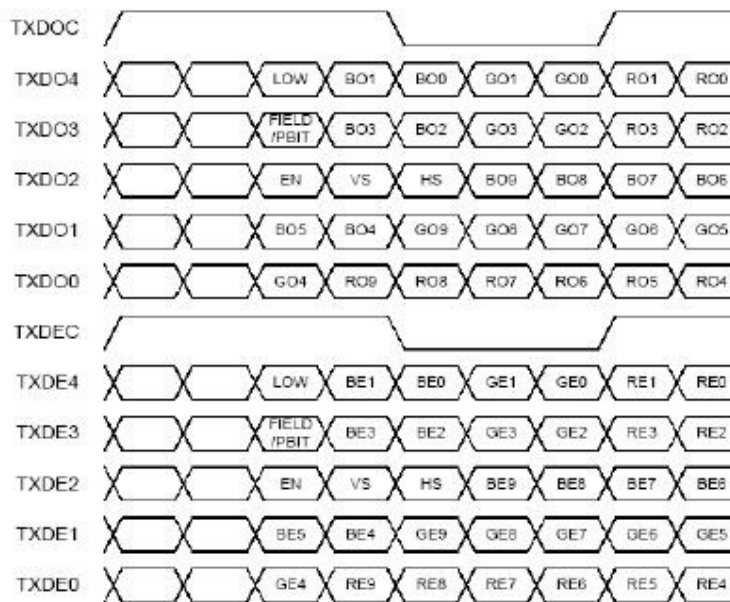
- Definition of VESA :

| DPort Output Pair | Bit 6     | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|-------------------|-----------|-------|-------|-------|-------|-------|-------|
| DB[7:6] / TXDEC   |           |       |       |       |       |       |       |
| DB[3:2] / TXDE0   | GE0       | RE5   | RE4   | RE3   | RE2   | RE1   | RE0   |
| DB[5:4] / TXDE1   | BE1       | BE0   | GE5   | GE4   | GE3   | GE2   | GE1   |
| DB[9:8] / TXDE2   | EN        | VS    | HS    | BE5   | BE4   | BE3   | BE2   |
| DG[3:2] / TXDE3   | field/prg | BE7   | BE6   | GE7   | GE6   | RE7   | RE6   |
| DG[5:4] / TXDE4   | low       | BE9   | BE8   | GE9   | GE8   | RE9   | RE8   |
| DG[7:6] / TXDO0   | GO0       | RO5   | RO4   | RO3   | RO2   | RO1   | RO0   |
| DG[9:8] / TXDO1   | BO1       | BO0   | GO5   | GO4   | GO3   | GO2   | GO1   |
| DR[5:4] / TXDO2   | EN        | VS    | HS    | BO5   | BO4   | BO3   | BO2   |
| DR[7:6] / TXDO3   | field/prg | BO7   | BO6   | GO7   | GO6   | RO7   | RO6   |
| DR[9:8] / TXDO4   | low       | BO9   | BO8   | GO9   | GO8   | RO9   | RO8   |
| DR[3:2] / TXDOC   |           |       |       |       |       |       |       |



- Definition of JEIDA :

| DPort Output Pair | Bit 6     | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|-------------------|-----------|-------|-------|-------|-------|-------|-------|
| DB[7:6] / TXDEC   |           |       |       |       |       |       |       |
| DB[3:2] / TXDE0   | GE4       | RE9   | RE8   | RE7   | RE6   | RE5   | RE4   |
| DB[5:4] / TXDE1   | BE5       | BE4   | GE9   | GE8   | GE7   | GE6   | GE5   |
| DB[9:8] / TXDE2   | EN        | VS    | HS    | BE9   | BE8   | BE7   | BE6   |
| DG[3:2] / TXDE3   | field/prg | BE3   | BE2   | GE3   | GE2   | RE3   | RE2   |
| DG[5:4] / TXDE4   | low       | BE1   | BE0   | GE1   | GE0   | RE1   | RE0   |
| DG[7:6] / TXDO0   | GO4       | RO9   | RO8   | RO7   | RO6   | RO5   | RO4   |
| DG[9:8] / TXDO1   | BO5       | BO4   | GO9   | GO8   | GO7   | GO6   | GO5   |
| DR[5:4] / TXDO2   | EN        | VS    | HS    | BO9   | BO8   | BO7   | BO6   |
| DR[7:6] / TXDO3   | field/prg | BO3   | BO2   | GO3   | GO2   | RO3   | RO2   |
| DR[9:8] / TXDO4   | low       | BO1   | BO0   | GO1   | GO0   | RO1   | RO0   |
| DR[3:2] / TXDOC   |           |       |       |       |       |       |       |






## Appendix IV – DV remote control unit work for HSP-1920

**P/N 559000106-3 :**  
DigitalView remote control unit  
(without DV logo silk screen  
printing)

**P/N 559000105-3 :**  
DigitalView remote control unit  
(with DigitalView logo silk screen  
printing)

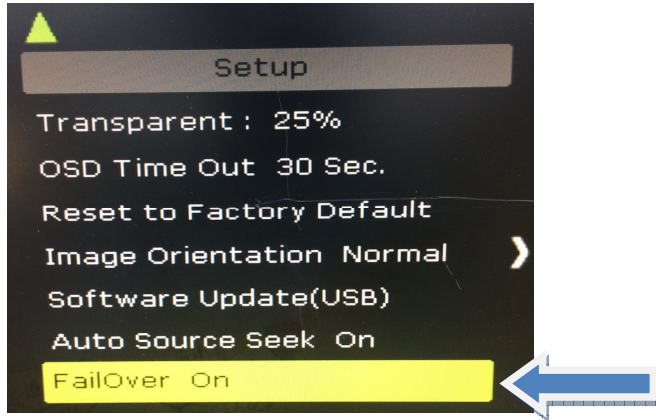


| BUTTON  | FUNCTION   |
|---|--|
| POWER BUTTON  | Soft power ON/OFF button.  |
| MUTE BUTTON (  )   | Switch to mute on/off mode.  |
| SEL UP (  ) / SEL DN (  ) | In OSD menu, pressing this button to select the items.                           |
| + / - BUTTON  | In OSD menu, pressing this button to adjust the settings.                        |
| OSD BACK BUTTON   | Use to display the OSD menu and go to the previous OSD screen.                   |
| OSD NEXT BUTTON   | Use to display the OSD menu and go to the next OSD screen.                       |
| AV/TV BUTTON  | Use to select the input source. (VGA/DVI/..)                                     |
| VOLUME (-/+) BUTTON   | Press the "+" button to increase the volume and the "-" to decrease the volume.  |
| PLAY (YPbPr) BUTTON   | Press this button in the non OSD menu display mode to select Component source.   |
| STOP (VGA) BUTTON   | Press this button in the non OSD menu display mode to select VGA source.         |
| DVI BUTTON  | Press this button in the non OSD menu display mode to select DVI source.         |
| HDMI  | Press this button in the non OSD menu display mode to select HDMI 1 source.      |
| Composite 1   | Press this button in the non OSD menu display mode to select Composite 1 source. |
| Composite 2   | Press this button in the non OSD menu display mode to select Composite 2 source. |

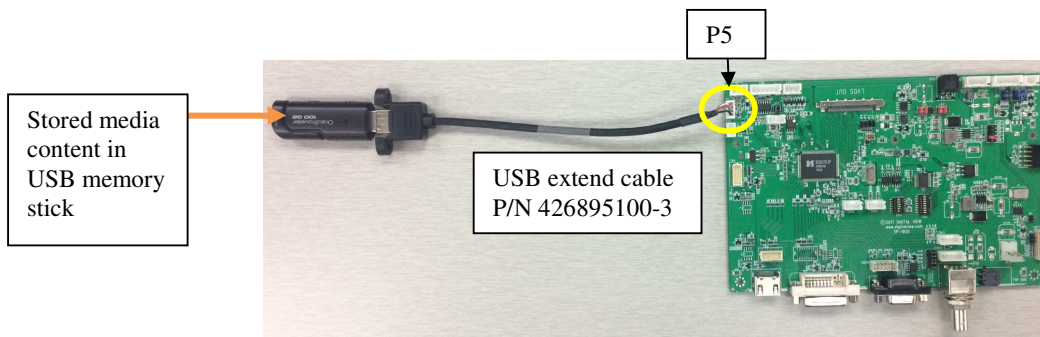
## Appendix V – Media Failover Function

HSP-1920 has a capability to play media file via USB that this feature called 'Media failover' option. It means when the video input source is no signal / loss of sync on a designated input, the built-in media player display the video content stored in the USB memory stick on the display automatically.

**STEP 1 :** To enable the Media Failover function on the OSD menu under 'Setup' page > 'Fail Over' to 'ON' as shown below :



**STEP 2 :** Stored the media content in the following format in the USB memory stick and



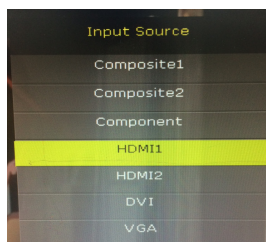
Supported media format file : "MP4"

**STEP 3 :** The built-in media player will run and display the video content stored in the USB memory stick automatically if the video input source is no signal / loss of sync on a designated input.

### Failover recovery :

The controller will go back to previous input source and check if it has valid signal exists after playing one media file. It will go back play the media file if no signal exists. But it will display the previous input source if it has valid signal detected.

Or press 'MENU' button on the OSD switch mount force to trigger the input source selection menu displayed on screen as shown below. Then select the input source you want to jump back. Or just power cycle the controller to switch back.



Specifications subject to change without notice

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## **WARRANTY**

The products are warranted against defects in workmanship and material for a period of three (3) year from the date of purchase provided no modifications are made to it and it is operated under normal conditions and in compliance with the instruction manual.

The warranty does not apply to:

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

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

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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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## **LIMITATION OF LIABILITY**

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

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## **TRADEMARKS**

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- Digital View
- HSP-1920

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## Revision History

| Date         | Rev No. | Page     | Summary  |
|--------------|---------|----------|--|
| 29 Sept 2017 | 1.00    | All      | First issued   |
| 15 Dec 2017  | 1.01    | 34<br>43 | Revised Color temperature RS-232 command<br>Revised the supported media format file to "MP4" only. |
|              |         |          |  |
|              |         |          |  |
|              |         |          |  |