



PC, DVI, VIDEO, HD Component INTERFACE CONTROLLER FOR TFT PANEL

Model: SVH-1920v2

Part number : 4175200XX-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

Designed for LCD monitor and other flat panel display applications, the SVH-1920v2 is a feature rich interface controller for :

- TFT (active matrix) LCD panels of 1920x1200, 1920x1080, 1920x480, 1600x1200, 1600x900, 1680x1050, 1440x900, 1366x768, 1280x1024, 1280x800, 1280x768 1024x768, 1024x600, 800x600, 800x480 and 640x480 resolutions.
- Computer video signals of VGA, SVGA, XGA, SXGA, WXGA, UXGA, WUXGA standard.
- Video signals of NTSC, PAL and SECAM standard.
- DVI input support up to 1920x1200 60Hz input signals
- HD-SDI input support by using optional HD-SDI adaptor board (Kit P/N 546013410-3 / P/N 546013310-3)

Ordering information :

| Controller | Part number | Ordering part number |
|------------|-----------------|----------------------|
| SVH-1920v2 | P/N 41752003X-3 | P/N 4175200XX-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:

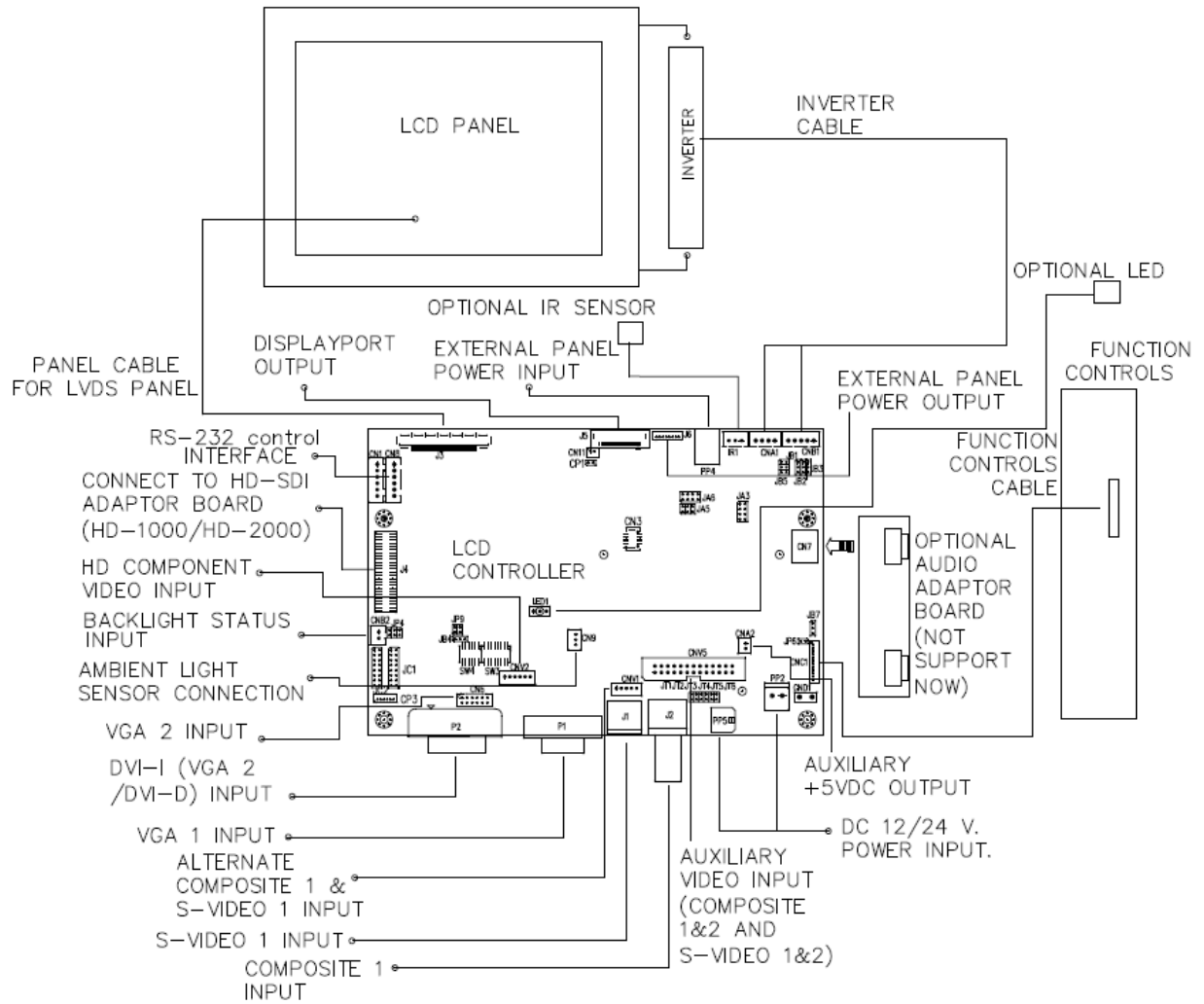
- Ensure that all necessary and appropriate safety measures are taken.
- Obtain suitable regulatory approvals as may be required.
- **Check power settings to all component parts before connection.**

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:



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 12V~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 V in details.
11. **RS-232 control interface :** Firmware upgrade and 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.
13. **VGA Input Cable:** Plug the VGA cable to the connector P1 (for VGA 1) or P2 / CN6 (for VGA 2) 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. **Composite video input :** Standard Composite cables can be used. Reasonable quality cable should be used to avoid image quality degradation.
16. **S-Video input :** Standard S-video cables can be used. Reasonable quality cable should be used to avoid image quality degradation.
17. **Alternate composite 1 and S-video 1 input :** Plug the video input cable P/N 426000500-3 on CNV1 connector
18. **HD component video input :** Plug the component video input cable P/N 426000600-3 on CNV2 connector

20. Interface for connecting to HD-SDI adaptor board

| | |
|--------------------------------------------------------------------------|------------------------|
| HD-SDI (1-in-1-out) adaptor board, Kit number P/N 546013410-3 includes : | |
| HD-1000 adaptor (1-in-1-out) | P/N 416013410-3 |
| Ribbon cable | P/N 426171120-3, 180mm |

| | |
|--------------------------------------------------------------------------|------------------------|
| HD-SDI (2-in-2-out) adaptor board, Kit number P/N 546013310-3 includes : | |
| HD-2000 adaptor (2-in-2-out) | P/N 416013310-3 |
| Ribbon cable | P/N 426171120-3, 180mm |

21. 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.

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

23. Auxiliary video input : This port provides Composite video 1 & 2, S-video 1 & 2. The video input selection can be switched via RS-232 command (0x98).

24. Auxiliary +5VDC output : 2 ways connector provides +5VDC output.

25. Ambient light sensor connection : 3 ways connector provides interface for ambient light sensor connection.

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

- **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):

- 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.
- Inverter & Controller:** Plug the inverter cable to CNB1 and CNA1 (if necessary). Plug another end to the connector on the inverter.
- Function switch & Controller:** Plug the OSD switch mount cable to CNC1 on the controller board and another to the OSD switch mount.
- LED & Controller:** Plug in a 3-way with dual colour LED to connector LED1 on the controller board.
- IR & Controller:** Plug in a 3-way with IR sensor to connector IR1 on the controller board.
- 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).
- 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).
- VGA cable & Controller:** Plug the VGA cable to the connector P1 on the controller board. VGA 2 is supported via P2 (DVI-I) or CN6 connector.
- DVI cable & Controller :** Plug the DVI cable to the connector P2 on the controller board.
- 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.
- 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))
- Power on:** Switch on the controller board and panel by using the OSD switch mount.

LED status (LED1) :

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

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.

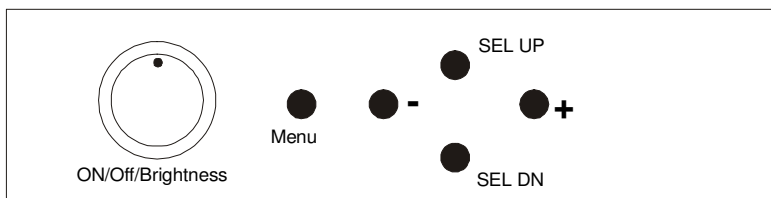
OPERATION

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

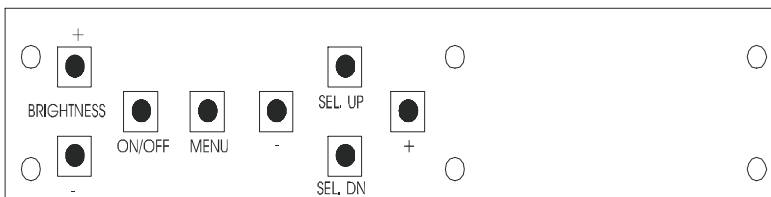
NOTE: By way of explanation the following refers to a set of sample buttons that may be obtained as an option. In addition to power on/off and connection for backlight brightness the controller provides an On Screen Display of certain functions which are controlled by 5 momentary type buttons (analog 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 – Turns OSD menu On or Off (it will auto time off) – Back to previous OSD menu page | Menu button | Menu button |
| Select down – Moves the selector to the next function (down) | SEL DN | SEL DN |
| Select up – Moves the selector to the previous function (up) | SEL UP | SEL UP |
| + – Increase the OSD parameter values – Go into the sub-menu page from the top – Confirm to select the OSD function | + | + |
| - – Decrease the OSD parameter values – Go into the sub-menu page from the bottom | - | - |
| 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 |
| Access "Programming Mode" | Press and hold MENU button, then power on the controller | Press and hold MENU button, then power on the controller |



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 :

- Volume###  Increase/decrease volume level, total: 100 steps
- Brightness  Increase/decrease panel brightness level, total: 100 steps
- Contrast  Increase/decrease panel contrast level, total: 100 steps
- Saturation  Increase/decrease saturation, total: 100 steps
- Hue **  Increase/decrease Hue level, total: 100 steps
- Sharpness  Increase/decrease sharpness, total: 30 steps
- Backlight  Backlight brightness adjustment (Functions when light detector sets OFF)

Position##



Move the image position upward



Move the image position downward



Move the image position to the left



Move the image position to the right

Aspect / Size ▶

- Fill Screen : Enable full screen expansion for lower resolution Image
- Fill to Aspect Ratio: Enable fill screen expansion for lower resolution image according to aspect ratio
- 4 : 3 : scaling format in 4:3
- 16 : 9 : scaling format in 16:9
- 16 : 10 : scaling format in 16:10
- 2.35 : 1 : scaling format in 2.35:1
- 2 : 1 : scaling format in 2:1
- 1 : 1 : Display the exact image resolution on the screen without image expansion.

** : FUNCTION IN ARGB/ DVI / VIDEO NTSC MODE ONLY

: FUNCTION IN ARGB MODE ONLY

: DISPLAY WHEN AUDIO ADD-ON BOARD CONNECTED



Source : Select the input video signal

Main Port Change ▸

- VGA 1
- VGA 2
- DVI
- Composite 1
- Composite 2
- S-Video 1
- S-Video 2
- Component 1
- HD/SD SDI 1⁺⁺
- HD/SD SDI 2⁺⁺

PIP Port change ▸

PIP Off / VGA 1 / VGA 2 / DVI / Composite 1 / Composite 2 / S-Video 1 / S-Video 2 / Component 1 / HD/SD SDI 1 / HD/SD SDI 2

PIP Size ▸ : Off / PIP Size 1~18 / Size by Size / Size by Size Tall

The PIP capability on display input sources refer to Appendix VII – PIP mix table

PIP Position :



Move the PIP position upward



Move the PIP position downward



Move the PIP position to the left



Move the PIP position to the right

PIP Blend Level : 6.25% ~ 100% : PIP Transparency

PIP Swap : Swap between the main window and PIP window

PIP Auto Turn off : OFF ON : OFF / ON

ON : When PIP is no signal input after 30 seconds, the PIP window will turn off automatically.

OFF : PIP window keeps on

++ DISPLAY WHEN HD-1000/-2000 CONNECTED



Utilities :

Setup ▸

Auto Picture Setup[#] : Auto adjust the image position, phase and size

Auto Color Gain⁺ ▸ : Auto Color Calibration (See appendix IV)

- Return
- Execute

Wide Screen Mode Selection[#] ▸ : Recognize the wide screen mode coming from ARGB port

- Group 1
 - 1024x768
 - 1280x768
 - 1360x768
 - 1366x768
- Group 2
 - 1440x900
 - 1600x900

Manual Clock[#] : Adjust the image horizontal size

Manual Phase[#] : Fine tune the data sampling position (adjust image quality)

Auto Source Seek :











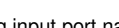
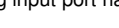

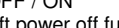
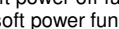

- Auto : OFF ON : OFF / ON

ON – Auto source select always enable


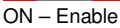
OFF – Disable auto source select function

- Setup ▸ Selection for the corresponding input sources detection

VGA 1 OFF ON

- VGA 2  
- DVI  
- Composite 1  
- Composite 2  
- S-Video 1  
- S-Video 2  
- HD/SD SDI 1**  
- HD/SD SDI 2**  


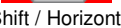
The corresponding input port name display on OSD menu will disappear once setting "OFF".

Auto Power :   OFF / ON
 ON – Enable soft power off function if absence of input signals
 OFF – Disable soft power function

Video Standard (SD)*** ▶

- AUTO
- NTSC*
- NTSC 4.43*
- PAL*
- PAL M*
- SECAM*
- (* - No image found when non-matching video system signal input)

Anti Image Retention :

Anti Image Retention :  
 Method : Flash / Pixel Shift / Horizontal Pan / Vertical Pan
 Flash : Flashing the screen
 Pixel Shift : Image shift pixel by pixel around the screen
 Horizontal Pan : Display a pattern moving horizontally on screen.
 Vertical Pan : Display a pattern moving horizontally on screen.

Horizontal Pan Setting :

- Height > Panel Height : ÷2 / ÷4 / ÷6 / ÷8 : Configure the pattern height
- Width > Panel Width : ÷2 / ÷4 / ÷6 / ÷8 : Configure the pattern width
- Pattern : Black / White : Configure the pattern color
- Pass : 1 ~ 100 : Configure the pattern moving cycle

Vertical Pan Setting :

- Height > Panel Height : ÷2 / ÷4 / ÷6 / ÷8 : Configure the pattern height
- Width > Panel Width : ÷2 / ÷4 / ÷6 / ÷8 : Configure the pattern width
- Pattern : Black / White : Configure the pattern color
- Pass : 1 ~ 100 : Configure the pattern moving cycle

Flash Setting :

Timer : 1 ~ 100s : Configure the flashing duration
 Flash Period : 1 ~ 100 : Configure the flashing cycle
 Note : Anti Image retention state will be cleared once you press the MENU button.

Gamma : 0.6 / 0.7 / 0.8 / 0.9 / 1.0 / 1.1 / 1.2 / 1.3 / 1.4 / 1.5 / 1.6 / 1.7 / 1.8 / 1.9 / 2.0 / 2.1 / 2.2 / 2.3 / 2.4 / 2.5 / 2.6 (Effective on V1.18.00.00 or later firmware revision)

Image Orientation** ▶

- Normal
- Horizontal Flip
- Vertical Flip
- Rotate

OSD ▶

OSD position :



Move the OSD menu image position upward



Move the OSD menu position downward



Move the OSD menu position to the left



Move the OSD menu position to the right

OSD Timeout (sec) : ON – 60 : Adjust the OSD menu timeout period in a step of 5

seconds (max 60 seconds)
ON = Continuous to display OSD menu.
60 = 60 seconds later will turn off the OSD menu.


Language : English / Spanish / French / German / Chinese :Select OSD menu language display

Display Input :  OFF / ON : Display input source info after switching source.

IR Remote control : IR Remote Enable : Set enable on IR remote control
IR Remote Disable : Set disable on IR remote control

Freeze : Freeze the image (use "+" button)

Zoom ▶

Zoom level :  : Enable the zoom in function on the image displayed.
Use "+" button to zoom in the image
Use "-" button to decrease the zoomed image

Horizontal pan :  : Pan the image horizontally

Vertical pan :  : Pan the image vertically

Factory Reset

Note : Freeze state will be cleared when you using zoom function.

Color Temperature ▶

5000K

Red Gain : 

Green Gain : 

Blue Gain : 

Red Offset : 

Green Offset : 

Blue Offset : 

Reset to Defaults : Resume to the default values

6500K

Red Gain : 

Green Gain : 

Blue Gain : 

Red Offset : 

Green Offset : 

Blue Offset : 

Reset to Defaults : Resume to the default values

8000K

Red Gain : 

Green Gain : 

Blue Gain : 

Red Offset : 

Green Offset : 

Blue Offset : 

Reset to Defaults : Resume to the default values

9300K

Red Gain : 

Green Gain : 

Blue Gain : 

Red Offset : 

Green Offset : 

Blue Offset : 

Reset to Defaults : Resume to the default values

User setting :

Red Gain : 

Green Gain : 

Blue Gain : 

Red Offset : 
 Green Offset : 
 Blue Offset : 

Reset to Defaults : Resume to the default values




Reset All to Defaults : Resume all color temperature settings to the default values.

Hot Key ▶

Hot key 1 : Brightness / Contrast / Inputs / Aspect Ratio/ Zoom / Freeze / PIP Size / PIP Swap / PIP ON/OFF / Saturation / Hue / Backlight / Auto Picture Setup / No Function

Hot key 2 : Brightness / Contrast / Inputs / Aspect Ratio/ Zoom / Freeze / PIP Size / PIP Swap / PIP ON/OFF / Saturation / Hue / Backlight / Auto Picture Setup / No Function

Backlight Setup ▶

- B/L Invert :  : Invert for the backlight brightness
- B/L Control : D/A / PWM : Selection for voltage level dimming control / PWM dimming control
- Backlight Frequency :  100 ~ 440Hz in a step of 20
- Light Detector :  : Enable ambient light detector function by using KIT 70220-3
- Min Backlight Level : 0 ~ 50% : Default the minimum backlight adjustment.

Default Setting ▶

- Reset to Factory Defaults ▶ (Activate when JC1 position 4 sets open)
Are you sure ? Yes/No
- Reset to Factory Defaults with (Color Temp.) ▶ (Activate when JC1 position 4 sets open)
Are you sure ? Yes/No
- Save Current Settings as Calibrated Values ▶ (Activate when JC1 position 2 sets closed)
Are you sure ? Yes/No
- Recall Stored Calibrated Values ▶
Are you sure ? Yes/No

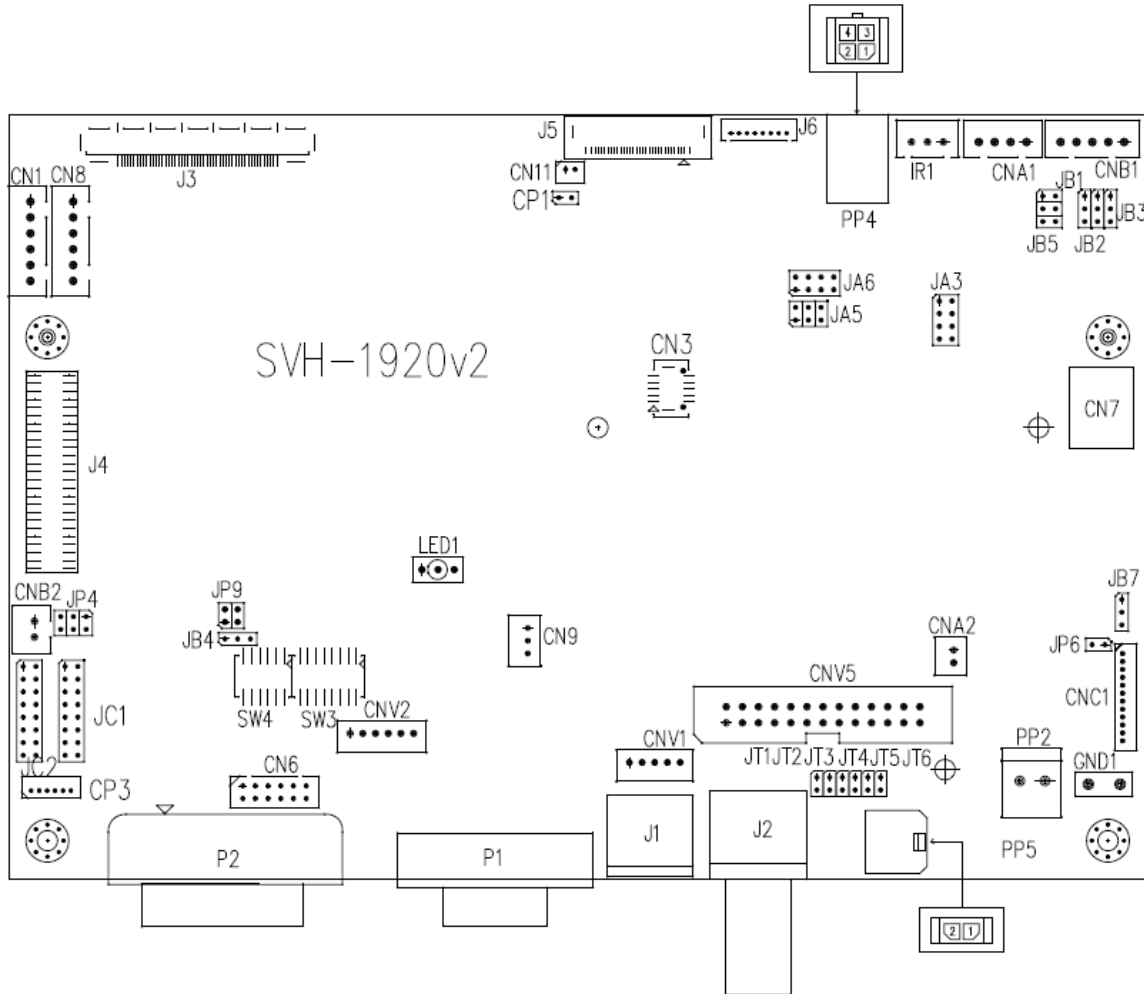
: DISPLAY IN ARGB MODE ONLY
 + DISPLAY IN ARGB & COMPONENT MODE ONLY
 ++ DISPLAY WHEN HD-1000/-2000 CONNECTED
 +++ DISPLAY IN COMPOSITE & S-VIDEO MODE ONLY

- ** The image orientation function is not support under the following conditions :
- PIP
 - Component 1 (via CNV2 connector) input.
 - Driving with 1366x768 panel
 - Zoom

Firmware V1.18.00.00 or up

CONNECTORS, PINOUTS & JUMPERS

The various connectors are:



Summary: Connectors

| Ref | Purpose | Description |
|------|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| CN1 | Second RS-232 serial control | JST 6-way, B6B-XH-A (Matching type : XHP-6) |
| CN3 | Panel connector | HIROSE DF20G-10DP-1V (Matching type : DF20A-10DS-1C) |
| CN6 | VGA 2 input connector | Hirose 12-pin, DF11-12DP-2DSA (Matching type : DF11-12DS-2C) |
| CN7 | Audio board connector | DIL socket header 5x2 right angle (Matching audio Add-on Board P/N 416940020-3) |
| CN8 | RS-232 serial control | JST 6-way, B6B-XH-A (Matching type : XHP-6) |
| CN9 | Ambient light sensor connector | JST 3-way, B3B-PH-K (Matching type : PHR-3) |
| CNA1 | Auxiliary power output | JST 4-way, B4B-XH-A (Matching type : XHP-4) |
| CNA2 | Auxiliary +5VDC output | JST 2 way, B2B-PH-K (Matching type : XHP-2) |
| CNB1 | Backlight inverter | JST 5-way, B5B-XH-A (Matching type : XHP-5) |
| CNB2 | Backlight status input connector | JST 2 way, B2B-XH-A (Matching type : XHP-2) |
| CNC1 | OSD controls | Hirose DF13-12P-1.25H (Mating type : DF13-12S-1.25C) (Matching OSD switch mount cable P/N 426122200-3 (150mm) or 426122210-3 (250mm)) |
| CNV1 | Alternate video in (Composite 1 & S-Video 2) | JST 5-way, B5B-PH-K (Matching type : PHR-5) (Matching video cable P/N 426000500-3) |
| CNV2 | Component (YPbPr) video input connector: | JST 6-way, B6B-PH-K (Matching type : PHR-6) |
| CNV5 | Auxiliary video input (Composite 1&2, S-Video 1&2) | Header pin 13x2 (Matching video cable P/N 426000800-3) |
| J1 | S-video 1 in | Mini din 4-way |
| J2 | Composite video 1 in | BNC connector |
| J3 | Panel signal for LVDS panel | JAЕ FI-RE51S-HF (Matching type : FI-RE51HL) |

Specifications subject to change without notice

| | | |
|------|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| J4 | HD-SDI adaptor board interface connector | 2 x 25 ways, 2.54x1.27 header (Matching connector type : DF13-40DS-1.25C) (Matching ribbon cable : P/N 426171100-3) |
| J5 | Display port output for panel connection | I-PEX 20455-030E-12 (Matching type : I-PEX 20454-030T) |
| J6 | Panel power output for Disport port interface panel use. | JS-1147A-08 Top 1.25mm (Matching type : Molex 51021-0800) |
| IR1 | Infra-Red sensor connector | JST 3-way, B3B-XH-A (Matching type : XHP-3) |
| LED1 | Dual color LED connector | Header pin 3x1 |
| P1 | VGA analog input | DB-15 way high density 3 row |
| P2 | DVI-I (DVI-D or VGA 2) input | DVI-I connector |
| PP2 | Power input (alternative) | DC power Molex 2 pin 0.156" pitch |
| PP4 | External panel power input | Molex 43045-0400 compatible (Matching connector type : Molex 43025-0400 compatible) (Matching power cable : P/N 426013700-3) |
| PP5 | Power input | Molex 43650-0200 compatible (Matching connector type : Molex 43645-0200 compatible) (Matching power cable : P/N 426013800-3) |

Summary: Jumpers setting

| Ref | Purpose | Note |
|-----|-----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| JA3 | Panel power voltage select CAUTION: Incorrect setting can damage panel | See panel voltage setting table 1 |
| JA5 | Panel power voltage select CAUTION: Incorrect setting will cause panel damage | See panel voltage setting table 1 |
| JA6 | Panel power voltage select CAUTION: Incorrect setting will cause panel damage | See panel voltage setting table 1 |
| JB1 | Backlight brightness voltage range | 1-2 closed = 5V max 2-3 closed = 3.3V max |
| JB2 | Backlight inverter on/off control – signal level | 2-3 = On/Off control signal 'High' = +5V 1-2 = On/Off control signal 'High' = +3.3V Open = On/Off control signal 'High' = Open collector CAUTION: Incorrect setting can damage inverter. |
| JB3 | Backlight inverter on/off control – polarity | 1-2 = control signal 'high' = CCFT ON 2-3 = control signal 'low' = CCFT ON |
| JB4 | GPIO pins voltage selection | 1-2 = 3.3V 2-3 = 5V |
| JB5 | Backlight control type selection | 1-2 = VR/Digital switch mount control 3-4 = Analog backlight brightness - voltage range 0~5V 5-6 = PWM (Pulse Width Modulation) brightness |
| JB7 | Backlight control voltage on CNB1 pin 4 (Function when JB5 sets 1-2 closed) | Open = For OSD switch mount control (Default) 1-2 = 0V 2-3 = 3.3V / 5V controlled by JB1 |
| JC1 | Custom configuration | Position 1 : Closed = Disable B/L setup menu Position 2 : Closed = Enable save Current Settings as Calibrated Values on OSD menu Position 3 : Closed = Enable baud rate selection function in programming mode Position 4 : Closed = Hide "Reset to Factory Defaults" and "Reset to Factory Defaults with (Color Temp.)" from OSD menu. Position 7 : Closed = Enable for selection of the "RM-DN5 Assembly" menu on Programming mode. |
| JC2 | Custom configuration | Position 1 : Enable J3 – pin 16 (OP1) controlled by JB4 Position 2 : Enable J3 – pin 17 (OP2) controlled by JB4 |
| JP4 | Custom configuration | 1-2 closed = Reserved 3-4 closed = On-board programming 5-6 closed = Reserved |
| JP6 | Input power control | Short = External switch control Open = Switch mount control |
| JP9 | Factory use | Default Open |

Specifications subject to change without notice

| | | |
|-----|--------------------------------------|------------------------------------------------------------------------------------------------------------|
| JT1 | Composite video-in terminator enable | Open = composite video 1 input is not terminated Close = composite video 1 input is terminated with 75Ω |
| JT2 | S-Video luma-in terminator enable | Open = S-video 1 luma input is not terminated Close = S-video 1 luma input is terminated with 75Ω |
| JT3 | S-Video chroma-in terminator enable | Open = S-video 1 chroma input is not terminated Close = S-video 1 chroma input is terminated with 75Ω |
| JT4 | Component luma-in terminator enable | Open = S-video 2 luma input is not terminated Close = S-video 2 luma input is terminated with 75Ω |
| JT5 | Component Cr-in terminator enable | Open = S-video 2 chroma input is not terminated Close = S-video 2 chroma input is terminated with 75Ω |
| JT6 | Component Cb-in terminator enable | Open = composite video 2 input is not terminated Close = composite video 2 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 | |
| | 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 | Panel Voltage | JA3 | JA5 | JA6 | Jumper on board |
|-----------------------|---------------|------|-----------|-----------|-----------------|
| 3.3 / 5 / 12 / 18VDC* | 3.3V | OPEN | 3-5 & 4-6 | 1-3 & 2-4 | |
| | 5V | OPEN | 3-5 & 4-6 | 1-3 & 2-4 | |
| | 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)

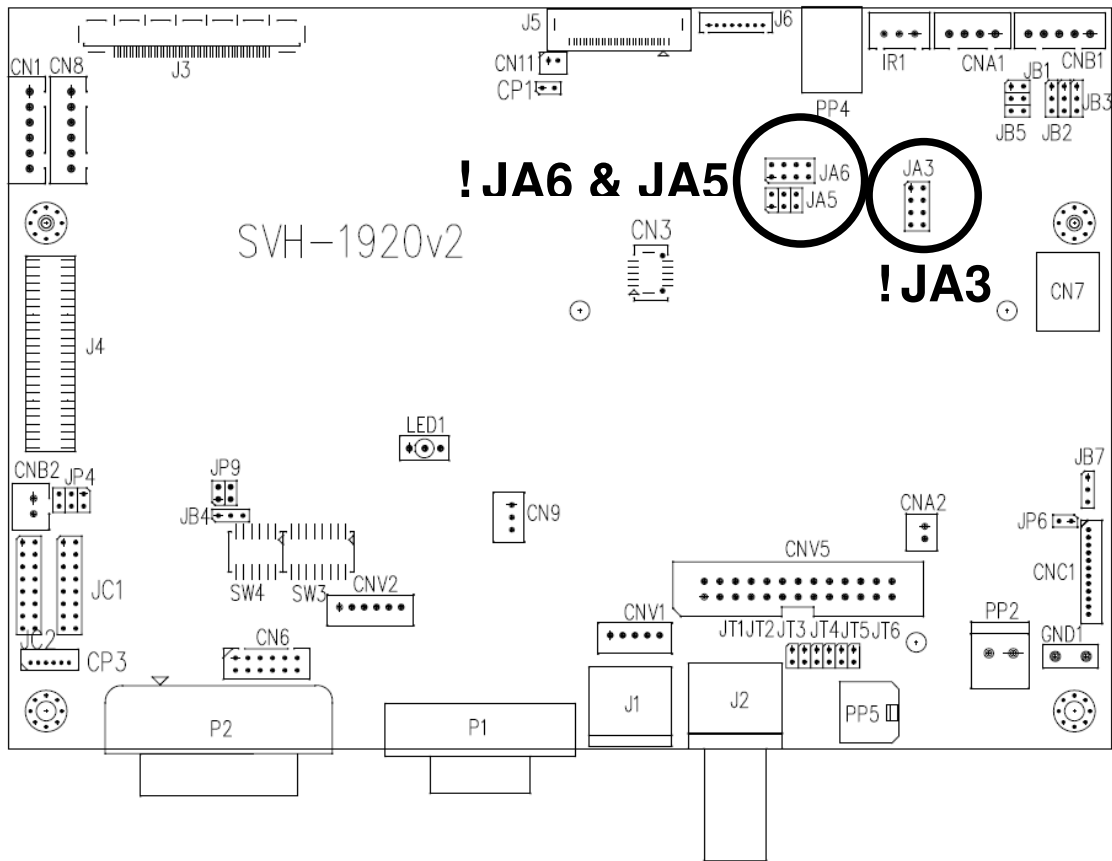


Table 2 : DIP Switch selection – SW3

| Pos #1 | Pos #2 | Pos #3 | Pos.#4 | Description | Panel resolution |
|-------------------------|--------|--------|--------|------------------------------------------------------|----------------------|
| For WUXGA panels | | | | | |
| 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 st trial testing) | 1920x1080 |
| OFF | OFF | ON | OFF | Samsung LTA700HH-LH1 (2 nd trial testing) | 1920x1080 |
| OFF | OFF | ON | ON | AU Optronics P645HW03 V0 (1920x1080) | 1920x1080 |
| OFF | OFF | ON | ON | AU Optronics P645HW03 V0 | 1920x1080 |
| For UXGA panels | | | | | |
| OFF | OFF | OFF | OFF | Fujitsu FLC59UXC8V-02A | 1600x1200 |
| ON | OFF | OFF | OFF | Samsung LTM213U6-L01 | 1600x1200 |
| For WXGA panels | | | | | |
| 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 |
| For SXGA panel | | | | | |
| OFF | OFF | OFF | OFF | Sharp LQ181E1LW31 | 1280x1024 |
| ON | OFF | OFF | OFF | AU Optronics M170EN05 | 1280x1024 |
| For XGA panel | | | | | |
| OFF | OFF | OFF | OFF | Sharp LQ150X1LGN2A Sharp LQ150X1LGB1 | 1024x768 1024x768 |
| For SVGA panel | | | | | |
| OFF | OFF | OFF | OFF | Sharp LQ121S1DG11/41 Toshiba LTM08C351 | 800x600 800x600 |
| For WVGA panel | | | | | |
| OFF | OFF | OFF | OFF | NEC NL8048BC24-01 | 800x480 |
| ON | OFF | OFF | OFF | Kyocera TCG085WV1AB-G00 | 800x480 |
| ON | OFF | ON | OFF | Sharp LQ070Y3LG4A | 800x480 |
| For VGA panel | | | | | |
| OFF | OFF | OFF | OFF | Sharp LQ104V1DG51 | 640x480 |
| ON | OFF | OFF | OFF | Sharp LQ104V1DG21 Kyocera TCG075VG2AC-G00 | 640x480 640x480 |
| Others | | | | | |
| OFF | ON | OFF | OFF | AU Optronics M201EW02 V8 | 1680x1050 |
| ON | OFF | OFF | ON | Samsung LTM201M1-L01 | 1680x1050 |
| OFF | OFF | ON | OFF | Samsung LT1430LA01 | 1920x480 |
| OFF | ON | ON | OFF | NEC NL10260BC19-01D | 1024x600 |
| ON | ON | ON | OFF | AU Optronics M200RW01 Samsung LTM200KP01 | 1600x900 1600x900 |

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 | Video lock | ON – Disable : Always fix the output be 60Hz. OFF – Enable : The output refresh rate locks to the input for 50Hz / 60Hz mode (other resolution lock the output be 60Hz.) |
|---------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Table 3 : DIP switch selection – SW4

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

CN1 – Slave RS-232 serial control: JST B6B-XH-A (Matching type : XHP-6)

| PIN | SYMBOL | DESCRIPTION |
|-----|---------------|----------------|
| 1 | EXT_MSTR2_SCL | Reserved |
| 2 | EXT_MSTR2_SDA | Reserved |
| 3 | VCC | +5V |
| 4 | TXD | RS-232 Tx data |
| 5 | GND | Ground |
| 6 | RXD | RS-232 Rx data |

CN3 – Panel connector: HIROSE DF20G-10DP-1V (Matching type : DF20A-10DS-1C)

| PIN | SYMBOL | DESCRIPTION |
|-----|---------------|-------------|
| 1 | OP1 | Reserved |
| 2 | OP2 | Reserved |
| 3 | OP3 | Reserved |
| 4 | OP4 | Reserved |
| 5 | IP1 | Reserved |
| 6 | IP2 | Reserved |
| 7 | IP3 | Reserved |
| 8 | IP4 | Reserved |
| 9 | EXT_MSTR2_SDA | Reserved |
| 10 | EXT_MSTR2_SCL | Reserved |

CN6 - VGA 2 input connector : Hirose 12-pin, DF11-12DP-2DSA (Matching type : DF11-12DS-2C)

| 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 |

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

| PIN | SYMBOL | DESCRIPTION |
|-----|-----------|-------------------------------------|
| 1 | VCC | Audio board logic power supply, +5V |
| 2 | VOLSEL0 | Reserved |
| 3 | VOLSEL1 | Reversed |
| 4 | TUNAUSEL | 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 (Matching type : XHP-6)

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

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

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

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

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

Specifications subject to change without notice

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

| PIN | SYMBOL | DESCRIPTION |
|-----|---------------|-------------------|
| 1 | AUX 12V / 24V | +12V / +24V DC |
| 2 | GND | Ground |
| 3 | GND | Ground |
| 4 | AUX 5V | +5V DC, 500mA max |

CNA2 - Auxiliary power output: JST B2B-PH-K (Matching type : XHP-2)

| PIN | SYMBOL | DESCRIPTION |
|-----|--------|-----------------------------|
| 1 | Vcc 5V | +5V DC, 500mA max with fuse |
| 2 | GND | Ground |

CNB1 – Backlight inverter connector: JST B5B-XH-A (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 (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 (Mating type : DF13-12S-1.25C)

| 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.

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

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

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

CNV5 – Auxiliary Video input connector, DIL socket header 13x2

| PIN | DESCRIPTION |
|-----|-----------------------|
| 1 | S-Video : Chroma in |
| 2 | Ground |
| 3 | S-Video : Luma in |
| 4 | Ground |
| 5 | Composite video in |
| 6 | Ground |
| 7 | No connection |
| 8 | Ground |
| 9 | No connection |
| 10 | Ground |
| 11 | No connection |
| 12 | Ground |
| 13 | S-Video_2 : Chroma in |
| 14 | Ground |
| 15 | S-Video_2 : Luma in |
| 16 | Ground |
| 17 | Composite video in_2 |
| 18 | Ground |
| 19 | No connection |
| 20 | Ground |
| 21 | No connection |
| 22 | Ground |
| 23 | No connection |
| 24 | Ground |
| 25 | No connection |
| 26 | Ground |

IR1 – Infra-Red sensor connector: JST B3B-XH-A (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 (Matching type : JAE FI-RE51HL)

| PIN | SYMBOL | DESCRIPTION |
|-----|---------------|--------------------------------------------------------------|
| 1 | VLCD HV | Panel power supply (+12V / 18V) (selected by JA3, JA5 & JA6) |
| 2 | VLCD HV | Panel power supply (+12V / 18V) (selected by JA3, JA5 & JA6) |
| 3 | VLCD HV | Panel power supply (+12V / 18V) (selected by JA3, JA5 & JA6) |
| 4 | VLCD HV | Panel power supply (+12V / 18V) (selected by JA3, JA5 & JA6) |
| 5 | VLCD HV | Panel power supply (+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 | NC | No function |
| 19 | NC | No function |
| 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 |

Specifications subject to change without notice

| | | |
|----|---------------|----------------------------------------|
| 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 |

J4 – HD-SDI adaptor board interface connector: 2 x 25 ways, 2.54x1.27 header
(Matching ribbon cable : P/N 426171100-3)

| PIN | SYMBOL | DESCRIPTION |
|-----|--------------------------|--------------------------|
| 1 | GND | Ground |
| 2 | GND | Ground |
| 3 | CbCr0 (Input) | CbCr0 (Input) |
| 4 | Y0 (Input) | Y0 (Input) |
| 5 | CbCr1 (Input) | CbCr1 (Input) |
| 6 | Y1 (Input) | Y1 (Input) |
| 7 | CbCr2 (Input) | CbCr2 (Input) |
| 8 | Y2 (Input) | Y2 (Input) |
| 9 | CbCr3 (Input) | CbCr3 (Input) |
| 10 | Y3 (Input) | Y3 (Input) |
| 11 | CbCr4 (Input) | CbCr4 (Input) |
| 12 | Y4 (Input) | Y4 (Input) |
| 13 | CbCr5 (Input) | CbCr5 (Input) |
| 14 | Y5 (Input) | Y5 (Input) |
| 15 | CbCr6 (Input) | CbCr6 (Input) |
| 16 | Y6 (Input) | Y6 (Input) |
| 17 | CbCr7 (Input) | CbCr7 (Input) |
| 18 | Y7 (Input) | Y7 (Input) |
| 19 | CbCr8 (Input) | CbCr8 (Input) |
| 20 | Y8 (Input) | Y8 (Input) |
| 21 | CbCr9 (Input) | CbCr9 (Input) |
| 22 | Y9 (Input) | Y9 (Input) |
| 23 | N.C | No connection |
| 24 | N.C | No connection |
| 25 | VCC(5V) | VCC(5V) |
| 26 | VCC (5V) | VCC (5V) |
| 27 | CLOCK (Input) | CLOCK (Input) |
| 28 | SCLK_TCK(control pin) | SCLK_TCK(control pin) |
| 29 | GND | Ground |
| 30 | SDIN_TDI(control pin) | SDIN_TDI(control pin) |
| 31 | Field (Input) | Field (Input) |
| 32 | SDOUT_TDO(control pin) | SDOUT_TDO(control pin) |
| 33 | V sync (Input) | V sync (Input) |
| 34 | CS_TMS(control pin) | CS_TMS(control pin) |
| 35 | H sync (Input) | H sync (Input) |
| 36 | GND | Ground |
| 37 | DE (Input) | DE (Input) |
| 38 | N.C | No connection |
| 39 | N.C | No connection |
| 40 | N.C | No connection |
| 41 | HSDSI_LOCK (control pin) | HSDSI_LOCK (control pin) |
| 42 | N.C | No connection |
| 43 | GND | Ground |
| 44 | GND | Ground |
| 45 | N.C | No connection |
| 46 | N.C | No connection |

Specifications subject to change without notice

| | | |
|----|----------------------------|---------------------------|
| 47 | N.C | No connection |
| 48 | HDSDI_IPSEL (control pin) | HDSDI_IPSEL (control pin) |
| 49 | Videomux_CAB (control pin) | Video mux detected pin |
| 50 | HDSDI_CAB (control pin) | HDSDI_CAB (control pin) |

J5 – Display port output for panel connector: I-PEX 20455-030E-12 (Matching type : I-PEX 20454-030T)

| PIN | SYMBOL | DESCRIPTION |
|-----|---------------|-----------------------------------------------------------|
| 1 | GND | Ground |
| 2 | GND | Ground |
| 3 | GND | Ground |
| 4 | GND | Ground |
| 5 | VLCD_LV | Panel power supply (3,3V/5V) (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 | NC | No connection |
| 10 | DP_PWR | Power for connector (3.3 V 500 mA) |
| 11 | Return | Return for Power |
| 12 | Hot Plug | Hot Plug Detect |
| 13 | AUX CH (n) | Auxiliary Channel (negative) |
| 14 | GND | Ground |
| 15 | AUX CH (p) | Auxiliary Channel (positive) |
| 16 | CONFIG2 | connected to Ground |
| 17 | CONFIG1 | connected to Ground |
| 18 | ML_Lane 3 (n) | Lane 3 (negative) |
| 19 | GND | Ground |
| 20 | ML_Lane 3 (p) | Lane 3 (positive) |
| 21 | ML_Lane 2 (n) | Lane 2 (negative) |
| 22 | GND | Ground |
| 23 | ML_Lane 2 (p) | Lane 2 (positive) |
| 24 | ML_Lane 1 (n) | Lane 1 (negative) |
| 25 | GND | Ground |
| 26 | ML_Lane 1 (p) | Lane 1 (positive) |
| 27 | ML_Lane 0 (n) | Lane 0 (negative) |
| 28 | GND | Ground |
| 29 | ML_Lane 0 (p) | Lane 0 (positive) |
| 30 | GND | Ground |

J6 – Panel power output: JS-1147A-08 Top 1.25mm (Matching type : Molex 51021-0800)

| PIN | SYMBOL | DESCRIPTION |
|-----|----------------------|--------------------------------------------------------------|
| 1 | PVLCD_Low (3,3V/5V) | Panel power supply (3,3V/5V) (selected by JA3, JA5 & JA6) |
| 2 | PVLCD_Low (3,3V/5V) | Panel power supply (3,3V/5V) (selected by JA3, JA5 & JA6) |
| 3 | GND | Ground |
| 4 | GND | Ground |
| 5 | GND | Ground |
| 6 | PVLCD_High (12V/18V) | Panel power supply (+12V / 18V) (selected by JA3, JA5 & JA6) |
| 7 | PVLCD_High (12V/18V) | Panel power supply (+12V / 18V) (selected by JA3, JA5 & JA6) |
| 8 | PVLCD_High (12V/18V) | Panel power supply (+12V / 18V) (selected by JA3, JA5 & JA6) |

LED1 – Status LED connector: 3-pin header

| 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 |

Specifications subject to change without notice

| | | |
|----|---------|------------------------------------------|
| 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-I 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 |

PP2 – Alternate 12V/24VDC input power supply

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

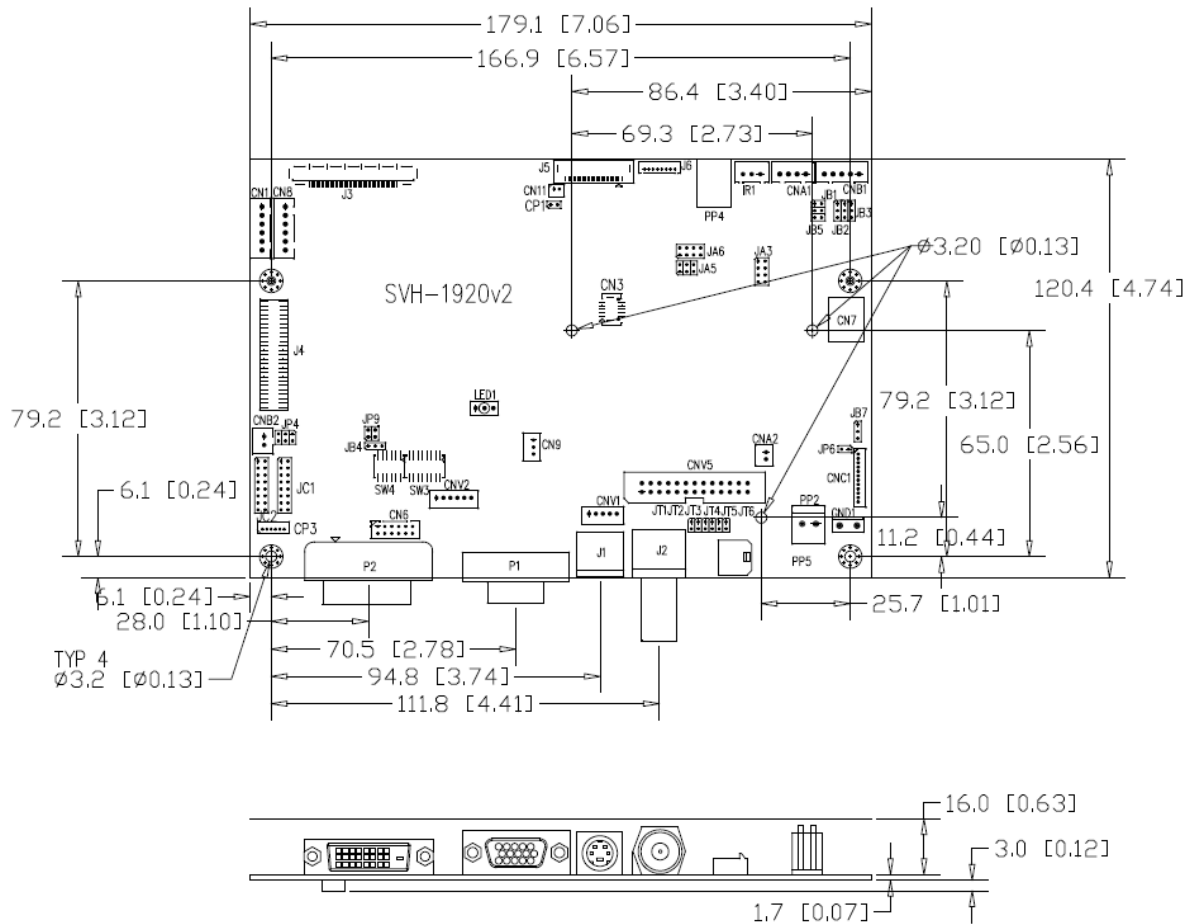
PP4 – External panel power input

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

PP5 – 12V/24VDC input power supply

| 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/svh-1920v2-lcd-controller>

The maximum thickness of the controller is 20.7mm 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.
- Use a jumper or similar to connect pins 1 & 2 on CNC1, this will fix the board On.
- Refer to inverter specifications for details as to fixing brightness to a desired level, this may require a resistor, an open circuit or closed circuit depending on inverter.

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

INVERTER CONNECTION

There are potentially 3 issues to consider with inverter connection:

- Power
- Enable
- Brightness

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

Inverter Power: As per the table for CNB1 pin 1 is ground and pin 2 provides 12V/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.

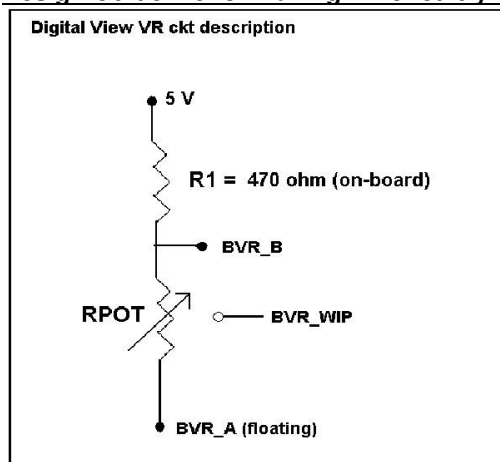
| CNB1 | |
|------|-------------|
| PIN | DESCRIPTION |
| 4 | VR WIP |
| 5 | VR A |

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 |
| 5 | VR B |

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)

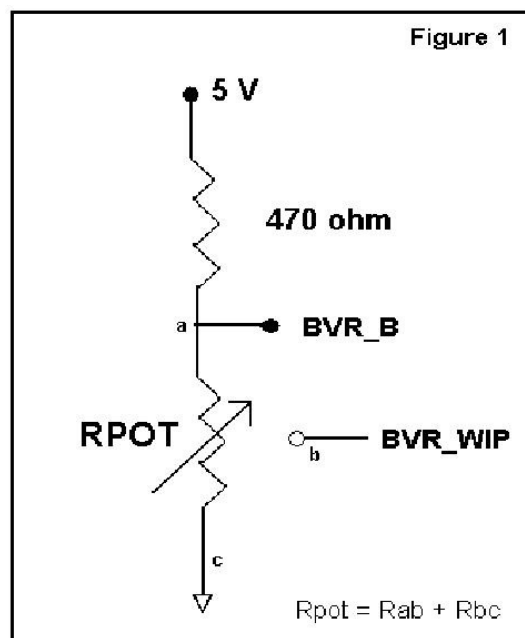
$$BVR_WIP = 5 \times (R_{bc}/10.47)$$

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

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. For example, the condition of setting NTSC video system (under OSD menu > Video System (SD)) and input PAL signal.

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. A specified BIOS and some factory adjustment may be required for individual panel timings. |
| No. of colours | Up to 3 x 8 bit providing 16.7 million colours. |
| Panel power | DC 3.3V, 5V, 12V, 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 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: Digital Separate Sync; Composite Sync Sync On Green. |
| Video formats | PAL, NTSC & SECAM |
| Video inputs | VGA 1 DVI-I (DVI-D + VGA 2) HD Component video Composite video 1 Composite video 2 S-Video S-Video 2 HD-SDI 1 (via HD-1000/2000) HD-SDI 2 (via HD-2000) |
| Functions display | On screen display (OSD) of functions |
| OSD menu functions | Image controls: Panel brightness/contrast, Saturation, Hue, Color temperature, Sharpness, Video Scaling, PIP, OSD position, OSD timeout, Image orientation, Auto Source Seek, etc. |
| OSD menu controls available | Power On/Off Backlight brightness OSD Menu OSD Select up OSD Select down Setting + 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 (7.1" 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 +/- 5% |
| Power protection | Fuse fitted (Resettable) |
| DC Power handling | Reverse power polarity protection is equipped on the board |
| Storage temperature limits | -40°C to +70°C |
| Operating temperature limits | 0°C to +60°C |
| Use of memory on board | - 2pcs DDR3-1600 1Gbit which is a volatile memory for system processing and frame buffer - 1pc flash 32Mbit which is a non-volatile(NVRAM) memory for system program - 2pcs EEPROM 2Kbit which is a non-volatile(NVRAM) memory for DDC information. - 1pc EEPROM 512Kbit which is a non-volatile(NVRAM) for system and user settings |

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.

Specifications subject to change without notice

APPENDIX I – SIGNAL SUPPORT MODE TABLE

VGA PORT :

| Mode | Resolution | Clk [MHz] | Horizontal freq [KHz] | Vertical freq [Hz] | Sync Mode |
|-------|------------------|-----------|-----------------------|--------------------|-----------------------|
| V_60 | 640x480 60Hz | 25.175 | 31.469 | 59.940 | Digital Separate Sync |
| V_60 | 640x480 60Hz | 25.175 | 31.469 | 59.940 | Composite Sync |
| V_72 | 640x480 72Hz | 31.500 | 37.861 | 72.809 | Digital Separate Sync |
| V_72 | 640x480 72Hz | 31.500 | 37.861 | 72.809 | Sync On Green |
| V_72 | 640x480 72Hz | 31.500 | 37.861 | 72.809 | Composite Sync |
| V_75 | 640x480 75Hz | 31.500 | 37.500 | 75.000 | Digital Separate Sync |
| V_75 | 640x480 75Hz | 31.500 | 37.500 | 75.000 | Sync On Green |
| V_75 | 640x480 75Hz | 31.500 | 37.500 | 75.000 | Composite Sync |
| SV_56 | 800x600 56Hz | 36.000 | 35.156 | 56.250 | Digital Separate Sync |
| SV_56 | 800x600 56Hz | 36.000 | 35.156 | 56.250 | Composite Sync |
| SV_60 | 800x600 60Hz | 40.000 | 37.879 | 60.317 | Digital Separate Sync |
| SV_60 | 800x600 60Hz | 40.000 | 37.879 | 60.317 | Sync On Green |
| SV_60 | 800x600 60Hz | 40.000 | 37.879 | 60.317 | Composite Sync |
| SV_72 | 800x600 72Hz | 50.000 | 48.077 | 72.188 | Digital Separate Sync |
| SV_72 | 800x600 72Hz | 50.000 | 48.077 | 72.188 | Sync On Green |
| SV_72 | 800x600 72Hz | 50.000 | 48.077 | 72.188 | Composite Sync |
| SV_75 | 800x600 75Hz | 49.500 | 46.875 | 75.000 | Digital Separate Sync |
| SV_75 | 800x600 75Hz | 49.500 | 46.875 | 75.000 | Sync On Green |
| SV_75 | 800x600 75Hz | 49.500 | 46.875 | 75.000 | Composite Sync |
| X_60 | 1024x768 60Hz | 65.000 | 48.363 | 60.004 | Digital Separate Sync |
| X_60 | 1024x768 60Hz | 65.000 | 48.363 | 60.004 | Sync On Green |
| X_60 | 1024x768 60Hz | 65.000 | 48.363 | 60.004 | Composite Sync |
| X_70 | 1024x768 70Hz | 75.000 | 56.476 | 70.069 | Digital Separate Sync |
| X_70 | 1024x768 70Hz | 75.000 | 56.476 | 70.069 | Sync On Green |

Specifications subject to change without notice

| | | | | | |
|--------|-------------------|--------|--------|--------|-----------------------|
| X_70 | 1024x768 70Hz | 75.000 | 56.476 | 70.069 | Composite Sync |
| X_75 | 1024x768 75Hz | 78.750 | 60.023 | 75.029 | Digital Separate Sync |
| X_75 | 1024x768 75Hz | 78.750 | 60.023 | 75.029 | Sync On Green |
| X_75 | 1024x768 75Hz | 78.750 | 60.023 | 75.029 | Composite Sync |
| SX_60 | 1280x1024 60Hz | 108 | 63.81 | 60.020 | Digital Separate Sync |
| SX_60 | 1280x1024 60Hz | 108 | 63.81 | 60.020 | Sync On Green |
| SX_60 | 1280x1024 60Hz | 108 | 63.81 | 60.020 | Composite Sync |
| SX_75 | 1280x1024 75Hz | 135 | 79.976 | 75 | Digital Separate Sync |
| SX_75 | 1280x1024 75Hz | 135 | 79.976 | 75 | Sync On Green |
| SX_75 | 1280x1024 75Hz | 135 | 79.976 | 75 | Composite Sync |
| WUX_60 | 1920x1080 60Hz | 172.8 | 67.5 | 60 | Digital Separate Sync |
| WUX_60 | 1920x1080 60Hz | 172.8 | 67.5 | 60 | Sync On Green |
| WUX_60 | 1920x1080 60Hz | 172.8 | 67.5 | 60 | Composite 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.

DVI input port :

| Mode | Resolution | Clk [MHz] | Horizontal freq [KHz] | Vertical freq [Hz] |
|---------|-----------------|-----------|-----------------------|--------------------|
| V_60 | 640x480 60Hz | 25.175 | 31.469 | 59.940 |
| V_67 | 640x480 67Hz | 31.5 | 37.5 | 67 |
| V_75 | 640x480 75Hz | 31.5 | 37.5 | 75 |
| SV_56 | 800x600 56Hz | 36 | 35.156 | 56 |
| SV_60 | 800x600 60Hz | 40.000 | 37.879 | 60.317 |
| SV_72 | 800x600 72Hz | 50 | 48.077 | 72 |
| SV_75 | 800x600 75Hz | 49.5 | 46.875 | 75 |
| X_60 | 1024x768 60Hz | 65.000 | 48.363 | 60.004 |
| X_70 | 1024x768 70Hz | 75 | 56.476 | 70 |
| X_75 | 1024x768 75Hz | 78.75 | 60.023 | 75 |
| SX_60 | 1280x1024 60Hz | 108 | 63.81 | 60.020 |
| SX_75 | 1280x1024 75Hz | 135 | 79.976 | 75 |
| UX_60 | 1600x1200 60Hz | 162 | 75.000 | 60 |
| WUX_60 | 1920x1080 60Hz | 172.8 | 67.5 | 60 |
| 1080p60 | 1920x1080p 60Hz | 135 | 67.5 | 60 |
| 1080p59 | 1920x1080 59Hz | 148.35 | 67.433 | 60 |
| 1080p50 | 1920x1080 50Hz | 149 | 62.75 | 50 |
| 720p60 | 1280x720P 60Hz | 74.25 | 45 | 60 |
| 576p50 | 720x576P 50Hz | 26.9568 | 31.2 | 50 |
| 480p60 | 720x480P 60Hz | 26.9568 | 31.4 | 60 |

HD-COMPONENT PORT :

| Mode |
|------------|
| 720p60 |
| 720p59.94 |
| 720p50 |
| 720p30 |
| 720p29.97 |
| 1080p30 |
| 1080p29.97 |
| 1080p25 |
| 1080p24 |
| 1080p23.98 |
| 1080i60 |
| 1080i59.94 |
| 1080i50 |
| 1080p60 |
| 1080p59.94 |
| 1080p50 |

COMPOSITE, S-VIDEO INPUT PORT :

| System | Resolution | Horizontal freq [KHz] | Vertical freq [Hz] |
|-----------|------------|-----------------------|--------------------|
| NTSC | 720x480i | 15.7 | 60 |
| NTSC 4.43 | 720x480i | 15.7 | 60 |
| PAL | 720x576i | 15.6 | 50 |
| PAL M | 720x576i | 15.6 | 50 |
| SECAM | 720x576i | 15.6 | 50 |

Specifications subject to change without notice

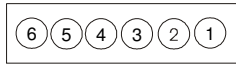
Appendix II – RS-232 control protocols

RS-232 Serial control (Baud rate 2400/4800/9600/14400/19200/38400/57600/115200, 8 bits, 1 stop bit and no parity)

Please refer to Appendix VIII for the procedure how to select different baud rate to be used.

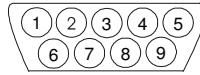
Physical connection :

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



Mating face of CN8

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



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) |
|------------------------------------|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Brightness control | 0x81, nn "+" "-" "r" "R" "?" "m" "n" "i", ss, nn "o", ss, | Set brightness = value/increment/decrement Reset Query Current Source Maximum query *1 Minimum query *1 Set, Source, value *1 Query, Source *1 | Brightness. Range : "4" "E" - "B" "2" Default : "8" "0" ss - reference by Input main select(0x98) |
| Contrast control - all channels | 0x82, "a" "A", nn "+" "-" "r" "R" "?" "m" "n" "i", ss, nn "o", ss, | Set all contrast = value/increment/decrement Reset Query Maximum query *1 Minimum query *1 Set, Source, value *1 Query, Source *1 | Contrast Range : "1" "C" - "E" "4" Default : "8" "0" ss - reference by Input main select(0x98) |
| Saturation control | 0x83, nn "+" "-" "r" "R" "?" "m" "n" "i", ss, nn "o", ss, | Set color = value/increment/decrement Reset Query Maximum query *1 Minimum query *1 Set, Source, value *1 Query, Source *1 | PAL/NTSC color (In video mode only) Range : "0" "1" - "F" "F" Default : "8" "0" ss - reference by Input main select(0x98) |
| Hue control | 0x84, nn "+" "-" "r" "R" "?" "m" "n" "i", ss, nn "o", ss, | Set tint = value/increment/decrement Reset Query Maximum query *1 Minimum query *1 Set, Source, value *1 Query, Source *1 | NTSC tint (In NTSC mode only) Range : "0" "1" - "F" "F" Default : "8" "0" ss - reference by Input main select(0x98) |
| Phase (tuning) control | 0x85, nn "+" "-" "?" | Set dot clock phase = value/increment/decrement Query | Dot clock phase. (In PC mode only) |
| Image H position | 0x86, nnnn "+" "-" "?" | Set img_hpos = value/increment/decrement Query | Image horizontal position. (In PC mode only) |
| Image V position | 0x87, nnnn "+" "-" "?" | Set img_vpos = value/increment/decrement Query | Image vertical position. (In PC mode only) |
| Sharpness | 0x8a, nn "+" "-" "r" "R" "?" | Set sharpness = value/increment/decrement Reset Query | Sharpness. (Video Mode Source only) Default : "0" "C" |
| Frequency | 0x8b, | Set frequency = | Graphic mode H active size (in |

Specifications subject to change without notice

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| | nnnn "+" "-" "?" | Value/increment/decrement Query | pixels) |
| Scaling Mode | 0x8c, "0" "1" "2" "3" "9" "A" "B" "C" "D" "r" "R" "?" | Set graphic image scaling mode = value Reset Query | Image expansion on/off. "0" – 1:1 "1" – fill screen "2" – fill to aspect ratio "9" – 4:3 "A" – 16:9 "B" – 16:10 "C" – 2.35:1 "D" – 2:1 |
| Set display orientation | 0x8e, n "r" "R" "?" | Set display orientation = value/increment/decrement Reset Query | "0" – Normal. "1" – Vertical Flip. "2" – Horizontal Flip. "3" – Rotate. |
| OSD H position | 0x90, nnn "+" "-" "r" "R" "?" | Set osd_hpos = value/increment/decrement Reset Query | OSD horizontal position. |
| OSD V position | 0x91, nnn "+" "-" "r" "R" "?" | Set osd_vpos = value/increment/decrement Reset Query | OSD vertical position. |
| OSD menu timeout | 0x93, nn "+" "-" "r" "R" "?" | Select menu timeout = value/increment/decrement Reset Query | OSD menu timeout value. "0""0" – Continuous. value – Round up to nearest available step. if value > max available step, set it to the max available step. |
| Select OSD language | 0x95, n "r" "R" "?" | Select language = English, Chinese,... Reset Query | "0" – English. "2" - French "3" – Spanish "6" - German "8" – Chinese |
| Input main select | 0x98, nn "+" "-" "r" "R" "?" | Select input main = PC or VIDEO or next available Reset Query | Main selected. "0x41,0x31" VGA 1 "0x41,0x32" VGA 2 "0x42,0x31" Composite 1 "0x42,0x32" Composite 2 "0x43,0x31" S-video 1 "0x43,0x32" S-video 2 "0x44,0x31" HD/SD Component "0x45,0x31" HDSDI 1 ⁺⁺ "0x45,0x32" HDSDI 2 ⁺⁺ "0x46,0x31" DVI |
| Auto Source Seek | 0x99, nn , "0" "1" "?" "o" | Set Auto source enable = *1 Source Disable/ Enable Query Valid Source query | "nn" = "0x41,0x31" VGA 1 "0x41,0x32" VGA 2 "0x42,0x31" Composite 1 "0x42,0x32" Composite 2 "0x43,0x31" S-video 1 "0x43,0x32" S-video 2 "0x44,0x31" HD/SD Component "0x45,0x31" HDSDI 1 ⁺⁺ "0x45,0x32" HDSDI 2 ⁺⁺ "0x46,0x31" DVI |
| Source Layout | 0x9a, n "r" "R" "?" | Select source layout = Single, PIP, PBP, PBPT Reset, Query | Query: "0"- Single "1"- Picture in Picture (PIP) "2"- Picture by Picture (PBP) "3"- Picture by Picture Tall |

Specifications subject to change without notice

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| | | | (PBPT) "F" – Turn ON PIP Window *** |
| Gamma value select (Effective on V1.18.00.00 or later firmware revision) | 0x9d, n "r" "R" "?" | Select GAMMA value = Value Reset Query | GAMMA value: "0" – 1.0, "1" – 1.6 "2" – 2.2, "4" – 1.7, "5" – 1.8, "6" – 1.9, "7" – 2.0, "8" – 2.1, "9" – 2.3, "A" – 2.4, "B" – 2.5, "C" – 2.6, "D" – 0.6, "E" – 0.7, "F" – 0.8, "G" – 0.9, "H" – 1.1, "I" – 1.2, "J" – 1.3, "K" – 1.4, "L" – 1.5 |
| Auto power off | 0x9f, "0" "1" "r" "R" "?" | Set power down option = On/Off Reset Query | "0" – Off. "1" – On. |
| Hotkey 1 | 0xa0, "1", n "r" "R" "?" | Set Hotkey 1= Value Reset Query | "2" – brightness.(Default) "3" – contrast. "4" – colour. "5" – input source. "7" – zoom "8" – freeze "9" - PIP "B" – No function "D" - PIP Swap "E" – Aspect Ratio "G" – Hue "H" – Backlight "I" – Auto Picture Setup "K" - PIP ON/OFF |
| Hotkey 2 | 0xa0, "2", n "r" "R" "?" | Set Hotkey 2 = value Reset Query | "2" – brightness. "3" – contrast. (Default) "4" – colour. "5" – input source. "7" – zoom "8" – freeze "9" - PIP "B" – No function "D" - PIP Swap "E" – Aspect Ratio "G" – Hue "H" – Backlight "I" – Auto Picture Setup "K" - PIP ON/OFF |
| Runtime counter | 0xa1, nnnnn "r" "R" "?" | runtime counter value = nnnnn (* 0.5 hour) Reset Query | Runtime = nnnnn. |
| PIP H position | 0xa4, nnn "+" "-" "r" "R" "?" | Set PIP_hpos = value/increment/decrement Reset Query | PIP window horizontal position. "0" "0" "0" ~ "0" "6" "4" Default : "0" "5" "5" |
| PIP V position | 0xa5, nnn "+" "-" "r" "R" "?" | Set PIP_vpos = value/increment/decrement Reset Query | PIP window vertical position. "0" "0" "0" ~ "0" "6" "4" Default : "0" "1" "4" |
| PIP window size select | 0xa6, nn "r" "R" | Select PIP window size = PIP window size value Reset | Main selected. PIP off if "nn" = "0" "0" "0" "0" ~ "1" "2" |

Specifications subject to change without notice

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| | "?" | Query | "1"9" : Size by Size "1"A" : Size by Size Tall Default : "0"0" |
| PIP source select | 0xa7, n "r" "R" "?" | Select input main = Video source value Reset Query | Main selected. "0x41,0x31" VGA 1 "0x41,0x32" VGA 2 "0x42,0x31" Composite 1 "0x42,0x32" Composite 2 "0x43,0x31" S-video 1 "0x43,0x32" S-video 2 "0x44,0x31" HD/SD Component "0x45,0x31" HDSDI 1** "0x45,0x32" HDSDI 2** "0x46,0x31" DVI |
| Zoom level | 0xa8, nnnn "+" "-" "r" "R" "?" | Set Zoom level = value/increment/decrement Reset Query | Zoom level. |
| Zoom H position | 0xa9, nnnn "+" "-" "r" "R" "?" | Set Zoom_hpos = value/increment/decrement Reset Query | Zoom window horizontal position. Default : 0x30 0x30 0x30 0x30 The min and max values will change depends on input resolution. |
| Zoom V position | 0xaa, nnnn "+" "-" "r" "R" "?" | Set Zoom_vpos = value/increment/decrement Reset Query | Zoom window vertical position. Default : 0x30 0x30 0x30 0x30 The min and max values will change depends on input resolution. |
| Colour temperature select | 0xb3, n "r" "R" "?" | Select colour temperature = value Reset Query | Main selected. "0" – 9300K. "1" – 8000K.(Default) "2" – 6500K. "3" – 5000K "4" - User |
| Red level for selected colour temperature | 0xb4, nn "+" "-" "r" "R" "?" "m" "n" "i", ss, c, nn "o", ss, c | Set the level of the red channel for the selected colour temp. = value/increment/decrement Reset Query Maximum query *1 Minimum query *1 Set, Source, Temperature Group, value *1 Query, Source *1 | Red level for selected colour temperature. Range : "9"C"-F"F" Default : "E"3" for 8000K c – reference by Color Temperature ss - reference by Input main select(0x98) |
| Green level for selected colour temperature | 0xb5, nn "+" "-" "r" "R" "?" "m" "n" "i", ss, c, nn "o", ss, c | Set the level of the green channel for the selected colour temp. = value/increment/decrement Reset Query Maximum query *1 Minimum query *1 Set, Source, Temperature Group, value *1 Query, Source *1 | Green level for selected colour temperature Range : "9"C"-F"F" Default : "E"3" for 8000K c – reference by Color Temperature ss - reference by Input main select(0x98). |
| Blue level for selected colour temperature | 0xb6, nn "+" "-" "r" "R" | Set the level of the blue channel for the selected colour temp. = value/increment/decrement Reset | Blue level for selected colour temperature. Range : "9"C"-F"F" |

Specifications subject to change without notice

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|-------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | “?” “m” “n” “i”, ss, c, nn “o”, ss, c | Query Maximum query *1 Minimum query *1 Set, Source, Temperature Group, value *1 Query, Source *1 | Default : “E””3” for 8000K c – reference by Color Temperature ss - reference by Input main select(0x98). |
| 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 enquiry | 0xb9 | Horizontal sync frequency (in units of 100Hz) in 3 digit hex number | “nnn” = horizontal frequency |
| Graphic vertical sync frequency enquiry | 0xba | Vertical sync frequency (in units of Hz) in 3 digit hex number and 1 char | “nnnn” = vertical frequency nnn = 3 digit hex c= “i” or “p” interlace or Progressive 0xba added the interlace(i) or Progressive(p) feedback. |
| OSD status enquiry | 0xbb | Status of OSD | “0” – OSD turned off “1” – OSD turned on |
| Display Video Source Select | 0xbc, “?” “0” “1” | Display Video source select Query Name of video source not displayed. After switching to a new video source, the name of the video source is displayed for 5 seconds. | “0” – Disabled. “1” – Enabled. |
| OSD turn off | 0xbd | Turn off the OSD. | “0” – fail. “1” – successful. |
| Query External Memory | 0xcb, “2” | Check External Memory 24c256 | “0” – Not Installed “1” – Installed “?” – Not Support |
| Query Revision Number | 0xcb, “3” | Read Revision Number | “nn” = Revision number |
| Backlight control | 0xe0, nn “+” “-” “=” “R” “r” “?” | Set Backlight = value/increment/decrement Display OSD indicator Reset Query | Backlight. Range: D/A : “0””0” ~ “5””2” 100Hz : “0””0” ~ “8””3” 120Hz : “0””0” ~ “6””D” 140Hz : “0””0” ~ “5””D” 160Hz : “0””0” ~ “5””2” 180Hz : “0””0” ~ “4””8” 200Hz : “0””0” ~ “4””2” 220Hz : “0””0” ~ “3””B” 240Hz : “0””0” ~ “3””6” 260Hz : “0””0” ~ “3””2” 280Hz : “0””0” ~ “2””E” 300Hz : “0””0” ~ “2””B” 320Hz : “0””0” ~ “2””8” 340Hz : “0””0” ~ “2””6” 360Hz : “0””0” ~ “2””4” 380Hz : “0””0” ~ “2””2” 400Hz : “0””0” ~ “2””0” 420Hz : “0””0” ~ “1””E” 440Hz : “0””0” ~ “1””D” |
| Backlight On/Off | 0xe1, “0” “1” | Backlight Off / Backlight On /Status | “0” – Backlight Off “1” – Backlight On.(Default) |

Specifications subject to change without notice

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| | "R" "r" "?" | | "?" – Backlight On/Off Query |
| Backlight D/A / PWM | 0xe5 "0" "1" "R" "r" "?" | Set : PWM or D/A Reset Query | "0" – PWM "1" – D/A (Default) |
| Backlight PWM Frequency | 0xe6, nnn "+" "-" "R" "r" "?" | Set Backlight PWM Frequency = value/increment/decrement Reset Query | +/- 20Hz Value 100Hz : "0","6","4" 120Hz : "0","7","8" 140Hz : "0","8","C" 160Hz : "0","A","0" (Default) 180Hz : "0","B","4" 200Hz : "0","C","8" 220Hz : "0","D","C" 240Hz : "0","F","0" 260Hz : "1","0","4" 280Hz : "1","1","8" 300Hz : "1","2","C" 320Hz : "1","4","0" 340Hz : "1","5","4" 360Hz : "1","6","8" 380Hz : "1","7","C" 400Hz : "1","9","0" 420Hz : "1","A","4" 440Hz : "1","B","8" |
| Backlight Invert | 0xe7 "0" "1" "R" "r" "?" | Set On or Off Reset Query | "0" – Off "1" – On |
| Red Offset for selected colour temperature | 0xe8, nn "+" "-" "r" "R" "?" "m" "n" "i", ss, c, nn "o", ss, c | Set the Offset of the red channel for the selected colour temp. = value/increment/decrement Reset Query Maximum query *1 Minimum query *1 Set, Source, Temperature Group, value *1 Query, Source *1 | Red Offset for selected colour temperature. Range : "8"0"-7"0" F Default : "0"0" c – reference by Color Temperature ss - reference by Input main select(0x98) |
| Green Offset for selected colour temperature | 0xe9, nn "+" "-" "r" "R" "?" "m" "n" "i", ss, c, nn "o", ss, c | Set the Offset of the green channel for the selected colour temp. = value/increment/decrement Reset Query Maximum query *1 Minimum query *1 Set, Source, Temperature Group, value *1 Query, Source *1 | Green Offset for selected colour temperature. Range : "8"0"-7"0" F Default : "0"0" c – reference by Color Temperature ss - reference by Input main select(0x98) |
| Blue Offset for selected colour temperature | 0xea, nn "+" "-" "r" "R" "?" "m" "n" "i", ss, c, nn "o", ss, c | Set the Offset of the blue channel for the selected colour temp. = value/increment/decrement Reset Query Maximum query *1 Minimum query *1 Set, Source, Temperature Group, value *1 | Blue Offset for selected colour temperature. Range : "8"0"-7"0" F Default : "0"0" c – reference by Color Temperature ss - reference by Input main |

Specifications subject to change without notice

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|-----------------------------------------|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PIP Window Blend Level | 0xed, nn "+" "-" "R" "r" "?" | Query, Source *1 Select PIP Transparency Level PIP Transparency value Reset Query | select(0x98) PIP Transparency "0"F" = 6.25% "0"E" = 12.5% "0"D" = 18.75% "0"C" = 25% "0"B" = 31.25% "0"A" = 37.5% "0"9" = 43.75% "0"8" = 50% "0"7" = 56.25% "0"6" = 62.5% "0"5" = 68.75% "0"4" = 75% "0"3" = 81.25% "0"2" = 87.5% "0"1" = 93.75% "0"0" = 100%. |
| Light Detector | "0xee", "0x4A" "0" "1" "R" "r" "?" "S" "s" | Light Detector Off / Light Detector On Light Detector On/Off Query Light Detector Value Query | "0" –Light Detector Off (Default) "1" –Light Detector On. "?" – Light Detector On/Off Query "S" "s" –Light Detector Value Query 0x00~0xFF |
| Access Programming Mode | "0xee", "0x59" "0" "1" "2" "?" | Cancel Access / Set Access Run Smart ISP programming Query | "0" - Cancel Access "1" - Set next start up to access the programming mode. |
| Minimum Backlight Value | 0xee, "0x5C" nn "+" "-" "R" "r" "?" | Set Minimum Backlight value = value / increment / decrement Reset Query | Minimum Backlight value/ Range : D/A : "0"0" ~ "3"2" 100Hz : "0"0" ~ "3"2" 120Hz : "0"0" ~ "3"2" 140Hz : "0"0" ~ "3"2" 160Hz : "0"0" ~ "3"2" 180Hz : "0"0" ~ "3"2" 200Hz : "0"0" ~ "3"2" 220Hz : "0"0" ~ "3"2" 240Hz : "0"0" ~ "3"2" 260Hz : "0"0" ~ "3"2" 280Hz : "0"0" ~ "3"2" 300Hz : "0"0" ~ "3"2" 320Hz : "0"0" ~ "3"2" 340Hz : "0"0" ~ "3"0" 360Hz : "0"0" ~ "3"0" 380Hz : "0"0" ~ "3"0" 400Hz : "0"0" ~ "3"1" 420Hz : "0"0" ~ "3"1" 440Hz : "0"0" ~ "3"1" |
| OSD Switch Mount Lock | "0xee", "0x62" "0" "1" "?" | Unlock / Lock Query | "0" - Unlock "1" - Lock |
| Anti image retention | "0xee", "0x6C" "E", "1" "0" | Anti image retention On / Off | |
| Anti image retention Method | "0xee", "0x6C" "M", "0" "1" "2" "3" | Run Anti image retention Method Horizontal Pan Vertical Pan Flash Pixel Shift | |
| Anti image retention Pixel Shift Manual | "0xee", "0x6C" "P", "H" "V" "nn" "+" "-" "R" "r" "?" | Anti image retention Pixel Shift Manual Horizontal / Vertical Shift value/increment/decrement Reset Query | |

Specifications subject to change without notice

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Remark :

++ - Support when HD-1000/-2000/-3000S connected.

3. Other control

| Function | Command | Description | Acknowledge (if enabled) |
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| Select RS-232 acknowledge | 0xc1, "0" "1" | Disable/enable command acknowledge. | "0" – acknowledge disabled. "1" – acknowledge enabled. |
| Auto-setup | 0xc3 | Start auto-setup of current vmode. | "0" – fail. "1" – successful. |
| Command availability | 0xc4, n | Check whether a command is available. | "0" – not available. "1" – available. |
| Auto-calibration | 0xc5 | Start auto-calibration of gain of the RGB amplifier. | "0" – fail. "1" – successful. |
| Freeze frame | 0xc6, "0" "1" "=" | Unfreeze / freeze frame Display OSD indicator | "0" – unfreeze. "1" – freeze. |
| Soft Power On/Off | 0xc8, "0" "1" "?" | Soft power off/on query | "0" - Soft power off "1" - Soft power on |
| Query video input status | 0xc9 | Query the status of the primary & pip status | "nn,nn" = input status "nn,xx" digit = primary status: "0", "0" : invalid "A", "1" VGA 1 "A", "2" VGA 2 "B", "1" Composite 1 "B", "2" Composite 2 "C", "1" S-video 1 "C", "2" S-video 2 "D", "1" Component 1 (via CNV2) "E", "1" HDSDI 1 ⁺⁺ "E", "2" HDSDI 2 ⁺⁺ "F", "1" DVI "xx,nn" = PIP input status: "0", "0" : invalid "A", "1" VGA 1 "A", "2" VGA 2 "B", "1" Composite 1 "B", "2" Composite 2 "C", "1" S-video 1 "C", "2" S-video 2 "D", "1" Component 1 (via CNV2) "E", "1" HDSDI 1 ⁺⁺ "E", "2" HDSDI 2 ⁺⁺ "F", "1" DVI |
| Query BIOS version | 0xcb, "0" | Read BIOS version | BIOS version "VV.YY.ZZ" VV = V0 or E0, V0 = Release version E0 = Engineering Sample YY= Version Number ZZ= Customer Number |
| Query PCBA number | 0xcb, "1" | Read PCBA number | "nnnnn" = PCBA number SVH-1920v2= "41752" |
| Reset to Factory Defaults | 0xce | Reset all parameters to default value | "1" – successful. |
| Reset to Factory | 0xcf | Reset all parameters for all | "1" - successful. |

Specifications subject to change without notice

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| Defaults with (color temp) | | video modes to default value | |
| Saved Calibrated default | 0xd7 | Saving all parameters to user default value | "1" - successful. |
| Load Calibrated default | 0xd8 | Loading all parameters to user default value | "1" - successful. "0" - not successful "E" – Checksum Error |
| Wide Screen Mode Selection | 0xd9, "n""n" "r" "R" "?" | Wide Screen Mode Reset Query | "n,n" = input status "n,x" digit = Group 1 mode select: "0" – 1024x768 (Default) "1" – 1280x768 "2" – 1366x768 "3" - 1360x768 "x,n" = :Group 2 mode select "4" - 1440x900 (Default) "5" - 1600x900 |

The following commands for sending texts by using RS-232 command.

| Function | Command | Description | Acknowledge (if enabled) |
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| Send Line | 0xF0, "S" "LL" "TEXT" "0x0A" Return "1" | "S" = "0x53 or 0x73" Send command ----- - "LL" = "0x30,0x31~0x30,0x34" Line number (Rang 0~4 lines) ----- - "Text"= ASCII code, "0x20~0x7E" Character(Rang 0~34) ----- - 0x0A = End of line | "S" – Send Command "LL" – Line Number "Text" – Character "0x0A" – End of Line "1" - successful. |
| e.g Display "Send Text" message on screen: RS232 Code:"0xF0 0x53 0x30 0x31 0x53 0x65 0x6E 0x64 0x20 0x54 0x65 0x78 0x74 0x0A" Return Code: "0xF0 0x53 0x30 0x31 0x53 0x65 0x6E 0x64 0x20 0x54 0x65 0x78 0x74 0x0A 0x31" | | | |
| Clear Line | 0xF0, "C" "LL" Return "nn" | "C" = "0x43 or 0x63" Clear command ----- - "LL" = "0x30,0x31~0x30,0x34" Line number (Rang 0~4 lines) | "C" – Clear command "LL" – Line Number "nn" – Return Line number |
| e.g Clear Line 1 RS232 Code: "0xF0 0x43 0x30 0x31" Return Code: "0xF0 0x43 0x30 0x31 0x30 0x31" | | | |
| Text Window Horizontal Position | 0xF0, "H" "ss" Return "nn" | "H" = "0x48 or 0x68" ----- --"nn" = "0x30,0x30~0x46,0x46" | "H" – Horizontal Position command "ss" – Set Horizontal Position number "nn" – Return Position number |

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| e.g Set Text Window Horizontal Position RS232 Code: "0xF0 0x48 0x30 0x31" Return Code: "0xF0 0x48 0x30 0x31 0x30 0x31" | | | |
| Text Window Vertical Position | 0xF0, "V" "ss" Return "nn" | "V" = "0x56 or 0x76" ----- --"nn" = "0x30,0x30~0x46,0x46" | "V" – Vertical Position command "ss" – Set Vertical Position number "nn" – Return Position number |
| e.g Set Text Window Vertical Position RS232 Code: "0xF0 0x56 0x30 0x31" Return Code: "0xF0 0x56 0x30 0x31 0x30 0x31" | | | |

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Left offset | 0xF0, "O" "SSS" Return "nnn" | "O" = "0x4F or 0x6F" Set Left Offset command ----- - "SSS" = "0x30,0x30,0x30~ 0x33,0x46,0x46" Offset Value (Rang 000~3ff) | "O" – Left Offset Command "SSS"- Offset Value (pixels) "nnn"- Return Value(pixels) |
| e.g Set Left Offset = 100 pixels (0x64 (HEX)) RS232 Code: "0xF0 0x4F 0x30 0x36 0x34" Return Code: "0xF0 0x4F 0x30 0x36 0x34 0x30 0x36 0x34" | | | |
| Text Window Horizontal Size | 0xF0, "X" "SSS" Return "nnn" | "X" = "0x58" Set Horizontal Size command ----- - "SSS" = "0x31,0x45,0x30~ 0x37,0x38,0x30" Horizontal Size Value (Rang 000~3ff) | "X" –Horizontal Size "SSS"- Size Value (pixels) "nnn"- Return Value(pixels) |
| e.g Set Text Window Horizontal Size = 640 pixels (0x280 (HEX)) RS232 Code: "0xF0 0x58 0x32 0x38 0x30" Return Code: "0xF0 0x58 0x32 0x38 0x30 0x32 0x38 0x30" | | | |
| Background Transparency | 0xF0, "B" "N" Return "n" | "B" = "0x42 or 0x62" Set Transparency command ----- "N" = "0x30~0x46" Transparency Value (Rang 00~0F) | "B" - Transparency command "N" – Transparency Value "n"- Return Value 0x00 =opaque |
| Set background Transparency value is 8 RS232 Code: "0xF0 0x42 0x38" Return Code: "0xF0 0x42 0x38 0x38" | | | |
| Text Overlay Background On or Off | 0xF0, "Q" "N" Return "n" | "Q" = "0x51 or 0x71" Set Background Enable or Disable ----- "N" = "0x30~0x31" | "B" - command "1" Turn On Text Overlay Background "0" Turn Off Text Overlay Background "n"- Return Value |

Set background Transparency value is 8
RS232 Code: "0xF0 0x51 0x31"
Return Code: "0xF0 0x51 0x31 0x31"

Please set the "Background Transparency" and "Left offset" commands before the "Send Line" command.

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).

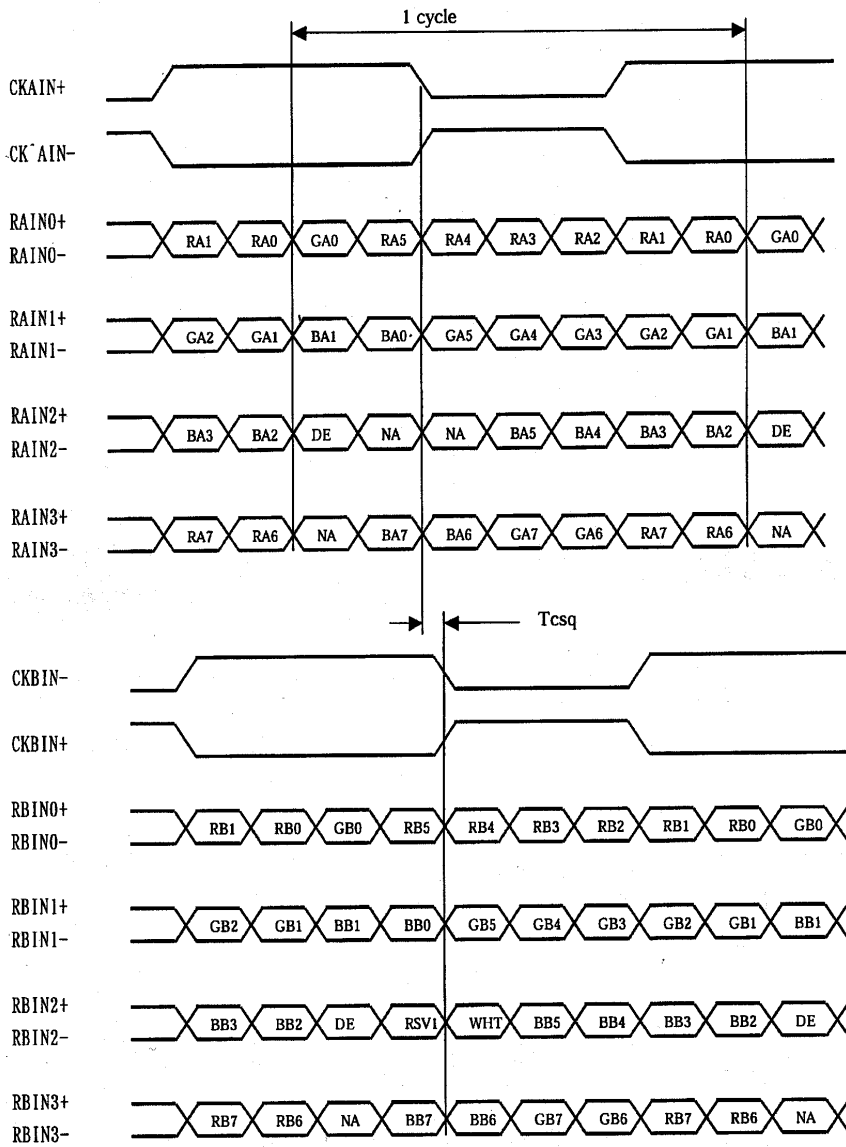
Please refer to the ASCII to Hex convert table below.

Hex to ASCII conversion table

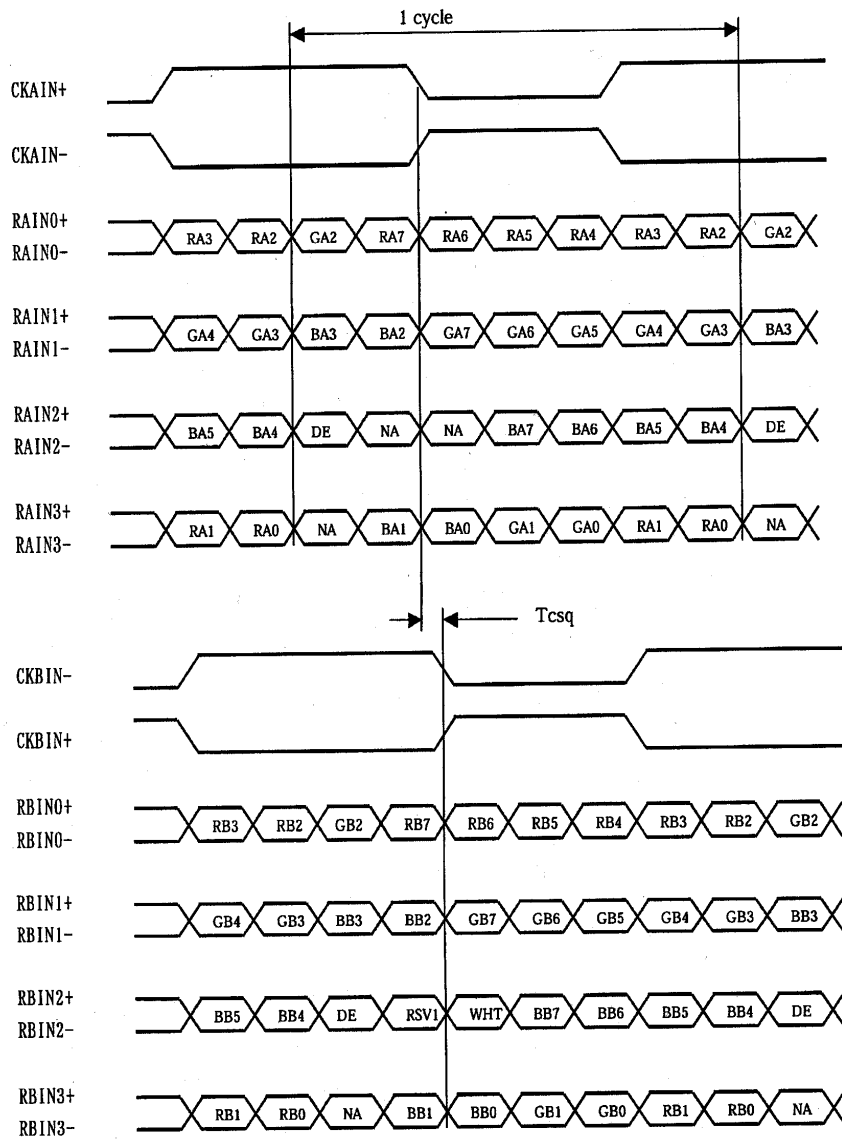
| Hex | ASCII | Hex | ASCII | Hex | ASCII | Hex | ASCII |
|------|-------|------|-------|------|-------|------|-------|
| 0x30 | 0 | 0x41 | A | 0x61 | a | 0x2B | + |
| 0x31 | 1 | 0x42 | B | 0x62 | b | 0x2D | - |
| 0x32 | 2 | 0x43 | C | 0x63 | c | 0x3F | ? |
| 0x33 | 3 | 0x44 | D | 0x64 | d | | |
| 0x34 | 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 :

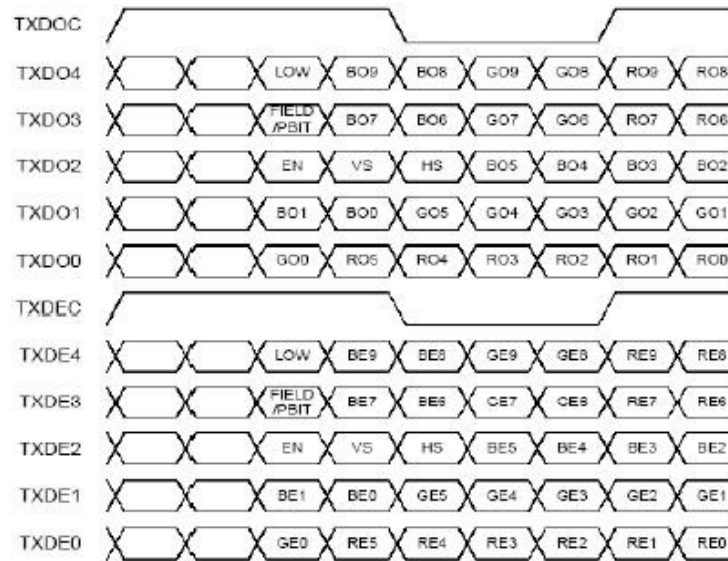


- Definition of Mapping B :



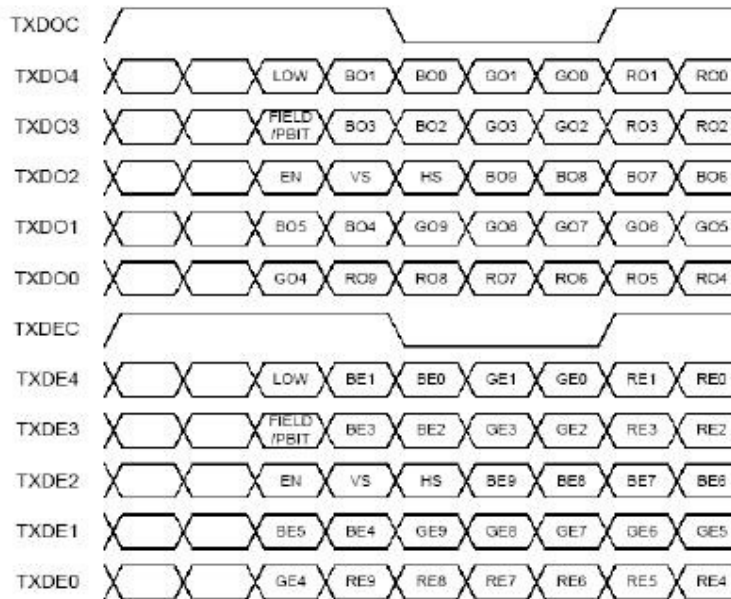
- Definition of VESA :

| 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 | | | | | | | |



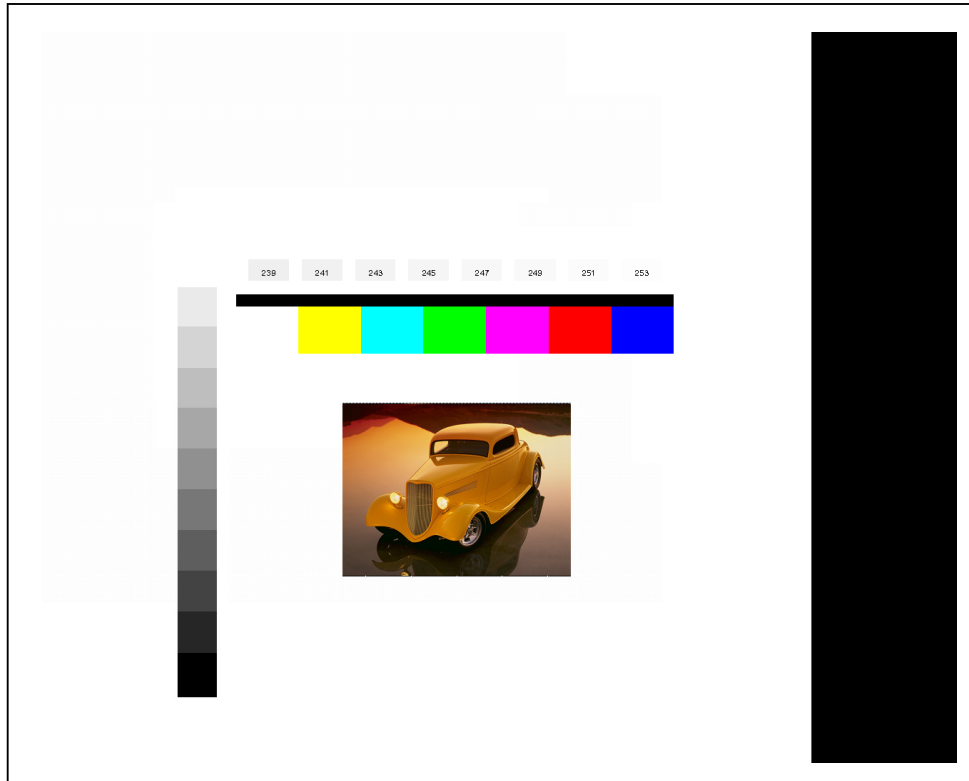
- Definition of JEIDA :

| 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 – Auto Color Gain

The Auto Color Gain function is supported in the VGA mode only and is designed to calibrate the controller to the incoming video signal. In order to calibrate correctly, the display must be displaying an image containing both black and white data (see illustration below) when the function is used. The internal processor of the video controller chip will then execute a process to adjust the relative values of the RGB signals to achieve the best performance. The parameters of the corrected RGB values are then stored in the controller and are unaffected by the Reset Factory Defaults function.



The reference pattern can be downloaded at :

http://www.digitalview.com/support/downloads/TestPattern_1280.BMP

This reference pattern is for 1280x1024 resolution and it needs to set your VGA input source to 1280x1024 resolution before performing the Auto Color Gain function. The position of the black vertical bar in the pattern at the right side is important. It will affect the calibration result if you are setting the VGA input to other resolution.

Warning - If the Auto Color Gain is executed without an appropriate image being displayed, then the process will set incorrect values and the display colors will be distorted. If this occurs, then it can either be corrected by performing the process correctly or if this is not possible then the Reset Color Gain function can be used. This function will reset the stored RGB values to a set of approximate values.

Appendix V – DV remote control unit work for SVH-1920v2

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. |
| SEL UP (∧) / SEL DN (∨) | Use this button to direct control the hotkey function. Press the "SEL UP" button to increase the pre-set hotkey parameter value and the "SEL DN" button to decrease the pre-set hotkey parameter value. In OSD menu, pressing this button to select the items. |
| + / - BUTTON | Use this button to direct control the hotkey function. Press the "+" button to increase the pre-set hotkey parameter value and the "-" button to decrease the pre-set hotkey parameter value. 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. |
| DISPLAY BUTTON | Use to view an on-screen information. When OSD menu displayed, press this button to turn it off. |
| AV/TV BUTTON | Use to select the input source. (VGA/DVI/..) |
| SOUND (ZOOM) BUTTON | Use to display the zoom menu. Press the "+" to zoom in the picture and the "-" to zoom out the picture. |
| PLAY (YPbPr) BUTTON | Press this button in the non OSD menu display mode to select Component 1 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. |

Appendix VI – PIP mix table

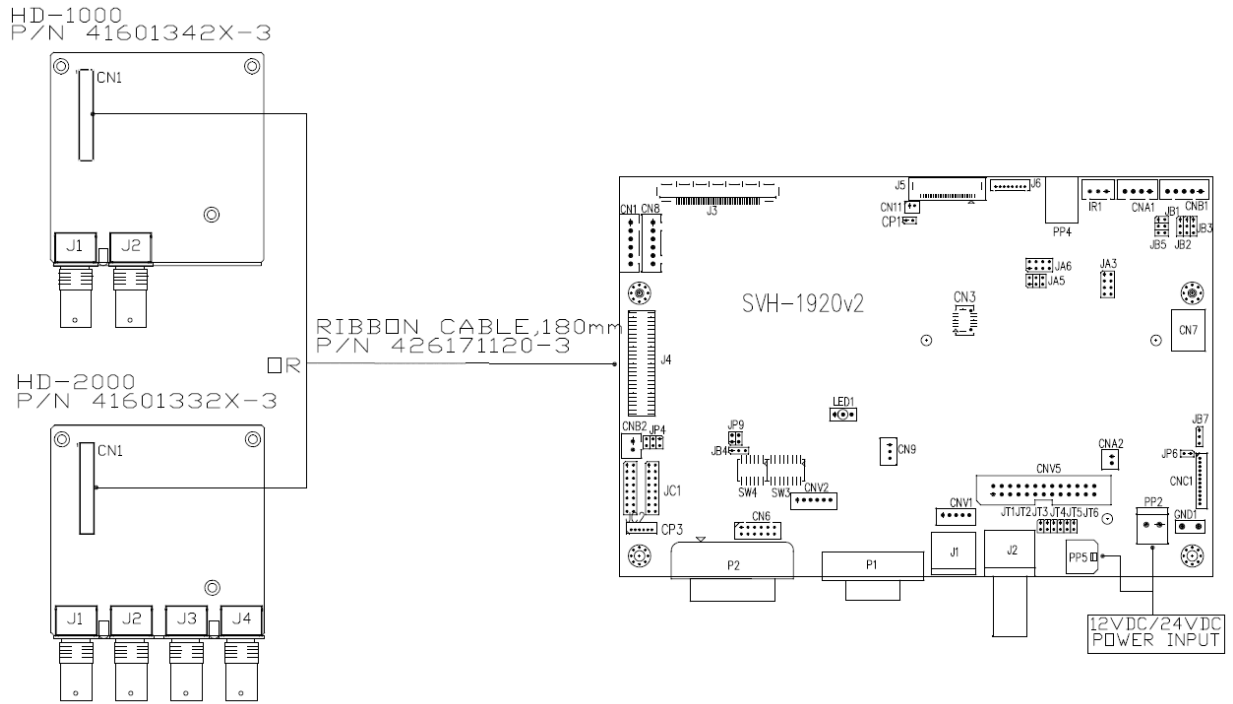
| | VGA 1 (P1) | VGA 2 (P2/CN6) | DVI (P2) | Composite 1 (J2/CNV1/CNV5) | Composite 2 (CNV5) | S-Video 1 (J1/CNV1/CNV5) | S-Video 2 (CNV5) | HD Component 1 (CNV2) | HD-SDI 1** | HD-SDI 2## |
|-------------------------------|---------------|-------------------|-------------|-------------------------------|-----------------------|-----------------------------|---------------------|--------------------------|------------|------------|
| VGA 1 (P1) | X | X | ✓ | ✓ | ✓ | ✓ | ✓ | X | ✓ | ✓ |
| VGA 2 (P2/CN6) | X | X | ✓ | ✓ | ✓ | ✓ | ✓ | X | ✓ | ✓ |
| DVI (P2) | ✓ | ✓ | X | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Composite 1 (J2/CNV2/CNV5) | ✓ | ✓ | ✓ | X | X | X | X | ✓ | ✓ | ✓ |
| Composite 2 (CNV5) | ✓ | ✓ | ✓ | X | X | X | X | ✓ | ✓ | ✓ |
| S-Video 1 (J1/CNV1/CNV5) | ✓ | ✓ | ✓ | X | X | X | X | ✓ | ✓ | ✓ |
| S-Video 2 (CNV5) | ✓ | ✓ | ✓ | X | X | X | X | ✓ | ✓ | ✓ |
| HD-Component 1 (CNV2) | X | X | ✓ | X | X | X | X | X | ✓ | ✓ |
| HD-SDI 1** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | X | X |
| HD-SDI 2## | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | X | X |

** - via HD-1000/HD-2000

- via HD-2000

Appendix VII – HD-1000 / HD-2000 connection

SVH-1920v2 & HD-1000 / HD-2000 connection :



Appendix VIII – Procedure for showing how to select the baud rate

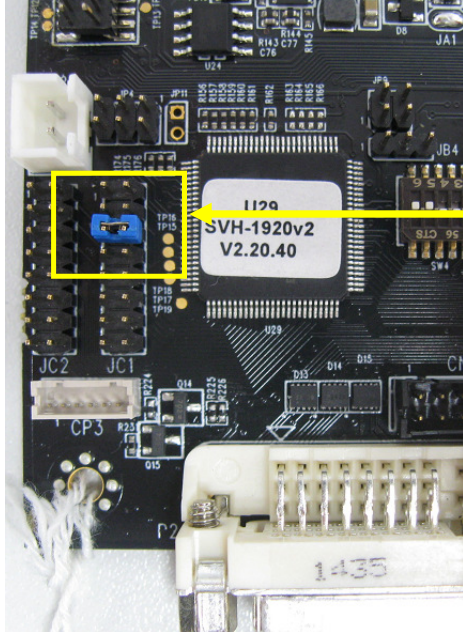
Jumper function :

JC1-3 = Closed : Enable the baud rate selection function

JC1-3 = Open : Disable the baud rate selection function and default set as 2400.

STEP 1 :

Set JC1-3 = closed.

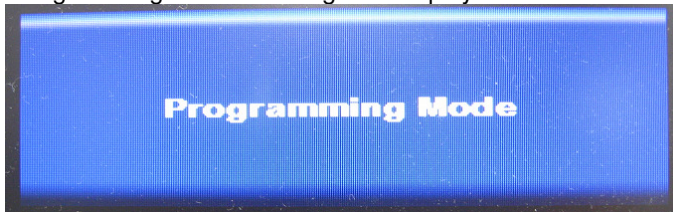


JC1-3 closed to enable the baud rate selection function

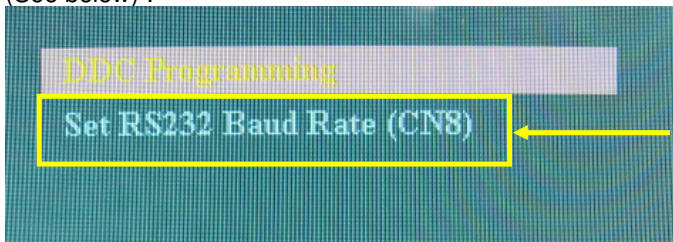
STEP 2 :

Press and hold “MENU” button on the OSD switch mount and turn on the controller to enter the “Programming mode”.

“Programming mode” wordings will display on screen on the target programming board. (See below) :

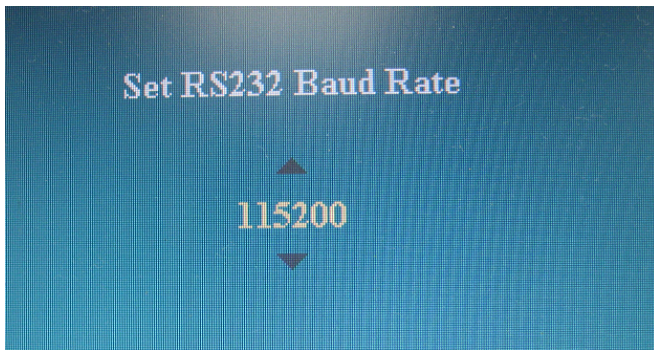
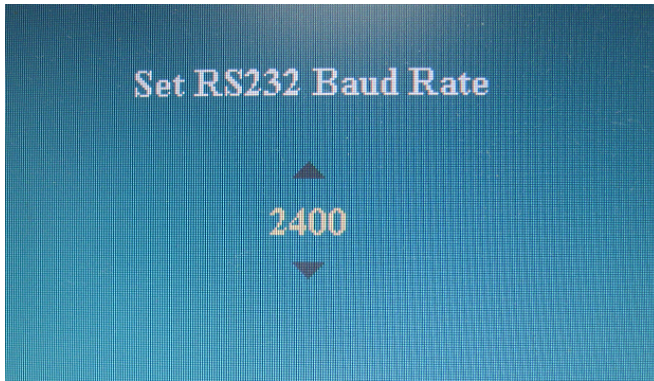


Step 3 : Press “MENU” key to go into the “DDC Programming” & “Set RS232 Baud Rate (CN8)” page. (See below) :



Step 4 : Select “Set RS232 Baud Rate(CN8)” setting, then press “+” to enter the sub menu page.

Step 5 : Choose the appropriate baud rate settings (2400 / 4800 / 9600 / 14400 / 19200 / 38400 / 57600 / 115200).



Step 5 : Press "MENU" key to return previous menu.

Step 6 : Shut off the controller

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.

CAUTION

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

LIMITATION OF LIABILITY

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

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- SVH-1920v2

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Revision History

| Date | Rev No. | Page | Summary |
|-------------|---------|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 30 Oct 2015 | 1.00 | All | First issued |
| 10 Feb 2016 | 2.00 | 8 12 19 22 31 44-45 | <ul style="list-style-type: none"> Add "Volume" adjustment function on OSD menu page. Add a remark to state the limitation of the image orientation function. Add the definition of SW3 position 8 for video lock function. - Correct typo for the definition of CNV2 pin 3 is Pb and pin 4 is Pr - Add "Use of memory on board" section in the Specification table. - Add text overlay function RS-232 commands. |
| 29 Apr 2016 | 3.00 | 24-25 38 | <ul style="list-style-type: none"> - Revised J4 pin definition - Add default value and range for PIP H position (0xa4) & PIP V position (0xa5) RS-232 command and default PIP size. |
| 15 Aug 2016 | 4.00 | 10, 38 19 26 | <ul style="list-style-type: none"> - Add standard Gamma selection (0.6~2.6) support on OSD menu and RS-232 command (0x9d) start effective from V1.18.00.00 firmware version. - Add SVGA & VGA panel timings selection in table 2. - Revised DVI connector (P2) pin 16 to "Hot Plug Detect" pin. |
| 15 Aug 2016 | 5.00 | 13 & 22 | - Revised matching CNV2 connector to 'PHR-6' |