



## **PC, HDMI, DISPLAY PORT INTERFACE CONTROLLER FOR TFT PANEL**

**Model: ALR-1920**

Part number : 41727001X/2X-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 ALR-1920 controller provides easy to use interface controller for:

- TFT (active matrix) LCDs with LVDS interface of 1920x1200, 1920x1080, 1920x480, 1680x1050, 1600x1200, 1400x1050, 1440x900, 1366x768, 1280x1024, 1280x800, 1280x768, 1024x768, 1024x600, 960x960, 800x600, 800x480, 640x480 resolution
- Computer video signals of WUXGA, UXGA, SXGA, XGA, SVGA, VGA standard
- Support HDMI, VGA, Display port input
- Support LVDS interface panel
- Support DDC/CI at ARGB, HDMI & Display port.

### Ordering information :

| Controller | Part number     | Ordering part number |
|------------|-----------------|----------------------|
| ALR-1920   | P/N 41727002X-3 | P/N 4172100XX-3      |

## HOW TO PROCEED

- Ensure you have all parts & that they are correct, refer to:
  - Connection diagram (separate document for each panel)

### Controller Solution Generator

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

- Connector reference (in following section)
- Assembly notes
- Check controller switch & jumper settings (errors may damage the panel)
- Prepare the PC
- Connect the parts
- Understand the operation and functions (in following section)

## IMPORTANT USAGE NOTE

This product is for use by system 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:

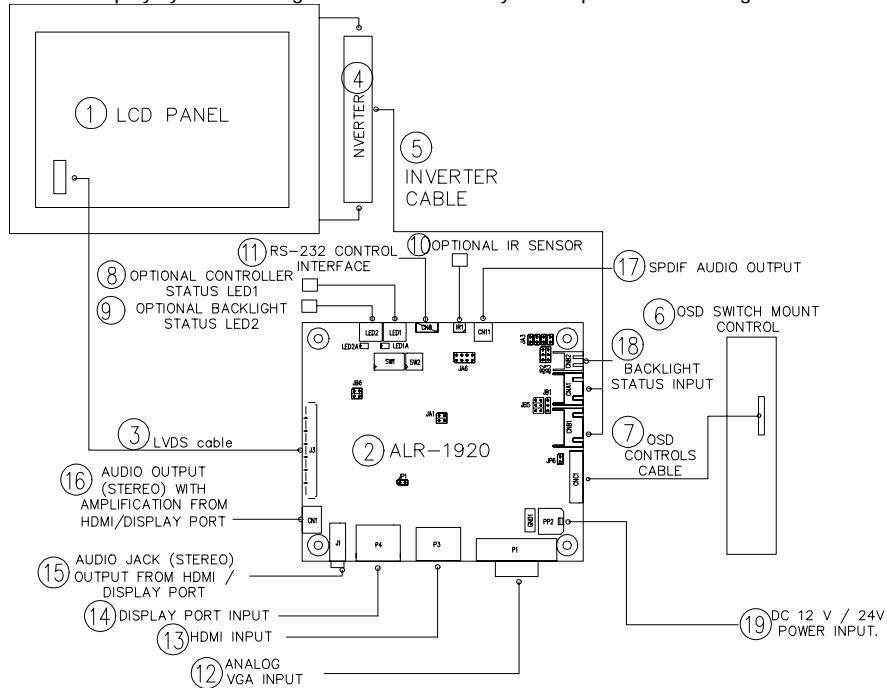
- Ensure that all necessary and appropriate safety measures are taken.
- Obtain suitable regulatory approvals as may be required.
- Check power settings to all component parts before connection.
- Understand the operation and connectivity requirements of this controller.

## DISCLAIMER

There is no implied or expressed warranty regarding this material.

## SYSTEM DESIGN

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



### Summary:

1. LCD panel
2. LCD controller card, ALR-1920
3. LVDS cable (for connection with LVDS panel)
4. Inverter for backlight (if not built into LCD)
5. Inverter cable
6. OSD switch mount control
7. OSD controls cable
8. Optional Controller status LED1
9. Optional Backlight status LED2
10. Optional IR sensor
11. RS-232 control port
12. Analog VGA input
13. HDMI input
14. Display Port Input
15. Audio Jack (Stereo) output from HDMI / Display Port
16. Audio output (Stereo) with amplification from HDMI / Display Port
17. SPDIF Audio output
18. Backlight status Input
19. Power input (12VDC / 24VDC)

Digital View offers a range of accessories such as listed above, to make up complete display solution.

## ASSEMBLY NOTES

This controller is designed for monitor and custom display projects using 1920 x 1200, 1920 x 1080, 1920x480, 1680x1050, 1600x1200, 1400x1050, 1440x900, 1366x768, 1280x1024, 1280x800, 1280x768, 1024x768, 1024x600, 800x600, 800x480, 640x480 resolution TFT panels with a VGA, SVGA, XGA, SXGA, UXGA, 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 interface TFT panels with panel voltage 3.3V or 5V or 12V or 18V LVDS interface. Due to the variation between manufacturers of 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 card:** Handle the controller card with care as static charge may damage electronic components.
- 3. LVDS signal cable :** In order to provide a clean signal it is recommended that LVDS signal cables are no longer than 46cm (18 inches). If loose 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 cables to minimize signal noise.
- 4. Inverter:** This will be required for the backlight of an LCD, some LCD panels have an inverter built in. As panels may have 1 or more backlight tubes and the power requirements for different panel models backlights may vary it is important to match the inverter in order to obtain optimum performance. See page 15 for the Application notes "Inverter connection section for more informations.
- 5. Inverter Cables:** Different inverter models require different cables and different pin assignment. Make sure correct cable pin out to match the inverter. Using wrong cable pin out may damage the inverter.
- 6. OSD switch mount 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.
- 7. OSD switch mount 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 metre (3 feet) should be acceptable.
- 8. Controller status LED (Optional) :** This LED indicates the controller status. 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.

Controller LED status (LED1) :

| State                      | LED color |
|----------------------------|-----------|
| No signal & backlight off  | RED       |
| No signal & backlight on   | ORANGE    |
| With signal & backlight on | GREEN     |

- 9. Backlight status LED (Optional) :** This LED indicates the backlight status. This function is only available when CNB2 are properly connected and the panel is support the backlight status function.

Backlight LED status (LED2) :

| State            | LED color |
|------------------|-----------|
| Backlight fault  | RED       |
| Backlight normal | GREEN     |

- 10. IR sensor:** It is an optional part only, can be unconnected if not using IR remote control. See Appendix VI for button definition.
- 11. RS-232 control interface :** Firmware upgrade and serial control via this interface port. See Appendix II for the RS-232 serial control protocols.
- 12. Analog VGA Input Cable:** As this may affect regulatory emission test results and the quality of the signal to the controller, a suitably shielded cable should be utilized. This port support DDC/CI (See Appendix III in details).
- 13. HDMI input :** Support HDMI 1.3 input up to 1080p/WUXGA resolution. Plug the HDMI cable to the connector P3 on the controller board. This port support DDC/CI (See Appendix III in details).
- 14. Display Port Cable :** Support single-link Display Port 1.1a. Plug the Display Port cable to the connector P4 on the controller board. This port support DDC/CI (See Appendix III in details).
- 15. Audio Jack (Stereo) output from HDMI / Display Port :** This port support Stereo audio output from the HDMI / Display Port audio source inputted. This port has the same audio path output from CN1. It requires to select the audio port "Speakers" via OSD menu under "Sound" > "Output" OSD menu page.

**16. Audio output (Stereo) with amplication from HDMI / Display Port :** This port support Stereo audio output from the HDMI / Display Port audio source inputted. This port has the same audio path output from J1. It requires to select the audio port "Speakers" via OSD menu under "Sound" > "Output" OSD menu page. Start from P/N 417270020-3 or up version, the board supports disable speaker out(CN1) while stereo jack(J1) being plugged.

**17. SPDIF Audio output :** This port support SPDIF audio output from the HDMI / Display Port audio source inputted. It requires to select the audio port "SPDIF" via OSD menu under "Sound" > "Output" OSD menu page.

**18. Backlight status input :** It only functions when connecting with the panel which support backlight status detection pin.

**19. Power Input:** 12V / 24V DC is required, this should be a regulated supply. 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. 24VDC input is required when the panel output voltage is 18VDC. Please refer to page 11-12 for proper jumper settings.

- **Power Safety:** Note that although only 12VDC / 24VDC is supplied as 'power-in' a backlight inverter for panel backlighting produces significantly higher voltages (the inverter does not connect to the ground plane). We strongly advise appropriate insulation for all circuitry.
- **EMI:** Shielding will be required for passing certain regulatory emissions tests. Also the choice of external Controller to PC signal cable can affect the result.
- **Ground:** The various PCB mounting holes are connected to the ground plane.
- **Servicing:** The board is not user serviceable or repairable. Warranty does not cover user error in connecting up to the controller and is invalidated by unauthorized modification or repairs.
- **Controller Mounting:** It is recommended that a clearance of at least 10mm is provided above and 5mm below the controller when mounted. Additionally consideration should be given to:
  - Electrical insulation.
  - Grounding.
  - EMI shielding.
  - Cable management. Note: It is important to keep panel signal cables apart from the inverter & backlight cables to prevent signal interference.
  - Heat & Ventilation: Heat generated from other sources, for example the backlight of a very high brightness panel may generate significant heat which could adversely affect the controller.
  - Other issues that may affect safety or performance.
- **PC Graphics Output:** A few guidelines:
  - Signal quality is very important, if there is noise or instability in the PC graphics output this may result in visible noise on the display.
  - Refer to graphics modes table in specifications section for supported modes.
  - Non-interlaced & interlaced video input is acceptable.

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

## CONNECTION & OPERATION

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

### CONNECTION

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

1. **LCD panel & Inverter:** Connect the inverter (if it is not built-in the panel) to the CCFT lead connector of the LCD panel.
2. **LVDS type panels:** Plug the LVDS signal cable direct to J3 (if necessary). Insert the panel end of the cable to the LCD panel connector.
3. **Inverter & Controller:** Plug the inverter cable to CNB1 and CNA1 (if necessary). Plug another end to the connector on the inverter.
4. **Function switch & Controller:** Plug the OSD switch mount cable to CNC1 on the controller board and another to the OSD switch mount.
5. **LED 1 :** Plug in a 3-way with dual colour LED to connector LED1 on the controller board for indicating the controller status.
6. **LED 2 :** Plug in a 3-way with dual color LED to connector LED2 on the controller board for indicating the backlight status. This function is only available when CNB2 are proper connected and the panel is support the backlight status function.
7. **IR & Controller:** Plug in a 3-way with IR sensor to connector IR1 on the controller board.
8. **Jumpers :** Check all jumpers are set correctly. Details referring the connection diagram at <http://www.digitalview.com/controllers/csg.php>
9. **Jumpers & Inverter & Panel voltage:** Particularly pay attention to the settings of JA3, JA6, JB2, JB3. JB2 & JB3 are used for inverter control (read inverter specification and information on the jumper table to define the correct settings). JA3 & JA6 are used for panel voltage input (read panel specification and information on the jumper table to define the correct settings).
10. **HDMI cable :** Plug the HDMI cable to the connector P3 on the controller board.
11. **VGA cable :** Plug the VGA cable to the connector P1 on the controller board.
12. **Display port cable :** Plug the Display port cable to connector P4 on the controller board.
13. **Audio output jack / SPDIF audio connector :** audio output ports CN1 & J1 support audio output (stereo) from the HDMI / Display Port and CN11 support audio SPDIF audio output from HDMI / Display Port audio source inputted. It requires to select the audio port "Speakers" / "SPDIF" via OSD menu under "Sound" > "Output" OSD menu page. Start from P/N 417270020-3 or up version, the board supports disable speaker out(CN1) while stereo jack(J1) being plugged.
14. **Power supply & Controller:** Plug the DC 12V / 24V power in to the connector PP2. You can consider to use DigitalView mating power cable P/N 426013800-3, 160mm. Please read the jumper table in page 11-12 to define the correct settings. Otherwise it may break down the panel.
15. **Power on:** Switch on the controller board and panel by using the OSD switch mount.

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

Controller LED status (LED1 & LED1A) :

| State                      | LED color |
|----------------------------|-----------|
| No signal & backlight off  | RED       |
| No signal & backlight on   | ORANGE    |
| With signal & backlight on | GREEN     |

Backlight LED status (LED2 & LED2A) :

| State            | LED color |
|------------------|-----------|
| Backlight fault  | RED       |
| Backlight normal | 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.

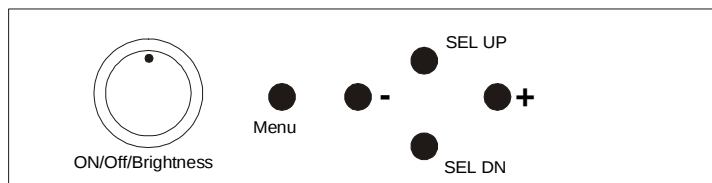
### OPERATION

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

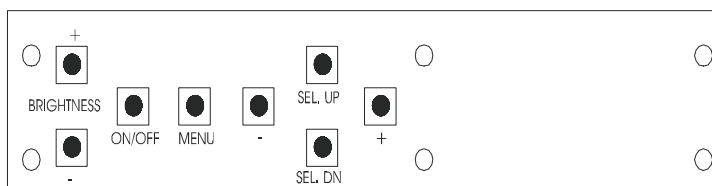
NOTE: By way of explanation the following refers to a set of sample buttons that may be obtained as an option. In addition to power on/off and connection for backlight brightness the controller provides an On Screen Display of certain functions which are controlled by 5 momentary type buttons (analog 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)<br>(Function with signal input only)        | Menu button                                                | Menu button                                                |
| Select – Select function / Confirm<br>(under OSD menu on state)                                     | SEL DN                                                     | SEL DN                                                     |
| Move up to select individual RGB color level OSD page<br>(under OSD menu on state)                  | SEL UP                                                     | SEL UP                                                     |
| + – increase the setting / moves the selector to the next function<br>(under OSD menu on state)     | +                                                          | +                                                          |
| - - decrease the setting / moves the selector to the previous function<br>(under OSD menu on state) | -                                                          | -                                                          |
| 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 |
| Switch to next input source<br>(under OSD menu off state)                                           | +                                                          | +                                                          |
| Volume adjustment<br>(under OSD menu off state)                                                     | SEL UP / SEL DN                                            | SEL UP / SEL DN                                            |



Analog VR type

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

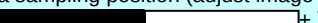
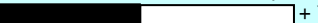


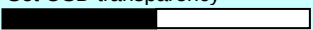
Digital type

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

**12VDC power input :**  
Digital 10K Type OSD  
switch mount uses  
P/N 416100510-3

## OSD Functions

|                                                                                     |                                                                                     |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <b>Image</b>                                                                        |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                     |    | <b>Brightness</b>                                                                   | Increase/decrease brightness level.<br>Press – or + ( -  + ) Total : 100 steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                                                     |    | <b>Contrast</b>                                                                     | Increase/decrease contrast level.<br>Press – or + ( -  + ) Total : 100 steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                                                                     |    | <b>Sharpness</b>                                                                    | Increase/decrease sharpness level.<br>Press – or + ( -  + ) Total : 8 steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                                                                     |    | <b>Color</b>                                                                        | Auto : Auto RGB Calibration ([See appendix V] in details)<br>(Function in ARGB mode only)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                                                     |                                                                                     |                                                                                     | Color temp ▶ (Adjust the warmness of the image displayed. The higher temperature the coolest image looks like. The lower temperature the warmest image looks like.)<br>4200k<br>5000k<br>6500k<br>7500k<br>9300k<br>User ▶<br>R Press – or + ( -  + ) Total : 100 steps<br>G Press – or + ( -  + ) Total : 100 steps<br>B Press – or + ( -  + ) Total : 100 steps<br> Reset<br>Gamma (0.4/0.6/1.0/1.6/2.2) |
|    | <b>Display</b> (Function in ARGB mode only)                                         |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                     |   | <b>Auto Adjust</b>                                                                  | Auto adjust the positions, phase, frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                                                                     |  | <b>Phase</b>                                                                        | Fine tune the data sampling position (adjust image quality)<br>Press – or + ( -  + ) Total : 100 steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                                                                     |  | <b>Clock</b>                                                                        | Adjust the image horizontal size<br>Press – or + ( -  + ) Total : 100 steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                     |  | <b>Display Position</b>                                                             | Adjust image position                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                                                     |  | <b>Backlight** ▶</b>                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                     |                                                                                     | <b>Invert</b>                                                                       | B/L Invert : Invert for the backlight brightness                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                                                     |                                                                                     | <b>Control</b>                                                                      | D/A / PWM : Selection for voltage level dimming control / PWM dimming control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                                                                     |                                                                                     | <b>Frequency</b>                                                                    | Backlight frequency 100 ~ 440Hz in a step of 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                     |                                                                                     | <b>B/L</b>                                                                          | Backlight brightness adjustment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|  | <b>Sound</b> (Function when HDMI and Display Port connected and selected)           |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                     |  | <b>Volume</b>                                                                       | Increase/decrease volume level, total: 100 steps<br>Press – or + ( -  + ) Total : 100 steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                     |  | <b>Mute</b>                                                                         | Mute                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                                                                                     |  | <b>Output</b>                                                                       | Select audio output port<br>Speakers : via CN1 & J1 connector<br>SPDIF : via CN11 connector                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|  |  | <b>System ▶</b>                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                     |  |  | Input : Select the input video signal<br>Display Port<br>VGA<br>DVI/HDMI<br>Autoscan : Enable the Auto source seek function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                                                                     |                                                                                     |  | Timer : OSD Timeout in seconds<br>Press – or + ( -  + ) From ON, 5 to 60 (Total : 13 steps, ON standard for Always ON)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

|  |                                                                                          |                                                                                           |                                                                                                                                                                 |
|--|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  |                                                                                          | <br>MENU | Rotation : OSD menu rotation in degree<br>0<br>90<br>180<br>270                                                                                                 |
|  |                                                                                          | <br>MENU | Position : Adjust OSD menu position                                                                                                                             |
|  |                                                                                          | <br>MENU | Transparency : Set OSD transparency<br>Press – or + (-  + ) Total : 100 steps |
|  | <br>DEL |                                                                                           | Reset : Load factory default settings.<br>Press down on OSD keypad to factory reset                                                                             |

[Firmware version : V1.16.00 or up]

Remark :

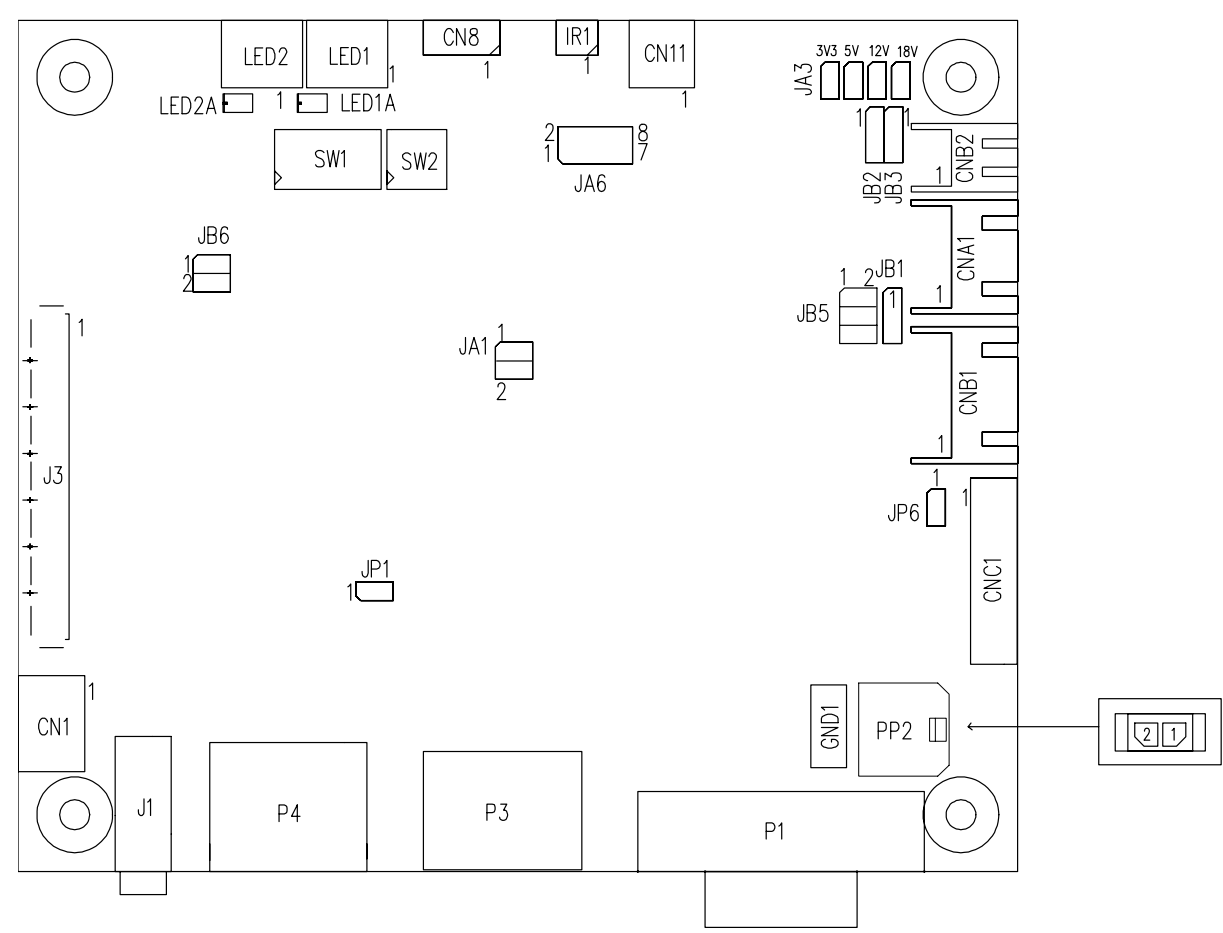
\*\* - Only effective on V1.10.00 or up version.

Items marked ▶ have sub menus.

Exit the OSD menu to save the setting chosen

## CONNECTORS, PINOUTS & JUMPERS

The various connectors are:



| Summary: Connectors |  |
|---------------------|--|
|                     |  |

| Ref  | Purpose                                                         | Description                                                                                                                               |
|------|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| CN1  | Audio output (Stereo) with amplication from HDMI / Display port | JST 4-way, S4B-ZR-SM4A (Mating type : ZHR-4)<br>(Matching connection cable P/N 426685400-3)                                               |
| CN8  | Serial control                                                  | Molex 53261-0671, 6 ways 1.25mm pitch<br>(Mating type : Molex 51021-0600)<br>(Matching connection cable P/N 426171800-3)                  |
| CN11 | SPDIF Audio Output                                              | JST 2-way, S2B-ZR-SM4A (Mating type : ZHR-2)<br>(Matching connection cable P/N 426007400-3)                                               |
| CNA1 | Auxiliary power output                                          | JST 4-way, S4B-XH-A (Mating type : XHP-4)<br>(Matching cable P/N 426040200-3)                                                             |
| CNB1 | Backlight inverter                                              | JST 5-way, S5B-XH-A (Mating type : XHP-5)<br>(Matching cable P/N 426058300-3)                                                             |
| CNB2 | Backlight status input                                          | JST 2-way, S2B-XH-A (Mating type : XHP-2)<br>(Matching cable P/N 426020800-3)                                                             |
| CNC1 | OSD controls                                                    | Hirose DF13A-12P-1.25H (Mating type : DF13-12S-1.25C)<br>(Matching OSD switch mount cable P/N 426122200-3 (150mm) or 426122210-3 (250mm)) |
| IR1  | Infra-Red sensor connector                                      | Molex 53261-0371, 3 way 1.25mm pitch (Mating type : 51021-0300)<br>(Matching connection cable P/N 426031500-3)                            |
| LED1 | Dual color LED connector for controller status                  | JST 3-way, S3B-ZR-SM4A (Mating type : ZHR-3)<br>(Matching connection cable P/N 426031400-3)                                               |
| LED2 | Dual color LED connector for backlight status                   | JST 3-way, S3B-ZR-SM4A (Mating type : ZHR-3)<br>(Matching connection cable P/N 426031400-3)                                               |
| J1   | Audio jack (Stereo) output from HDMI / Display Port             | 3.5mm PHONE JACK                                                                                                                          |
| J3   | LVDS panel signal                                               | JAE FI-RE51S-HF (Mating type : JAE FI-RE51HL)                                                                                             |
| P1   | ARGB signal input                                               | DB-15 way high density 3 row                                                                                                              |
| P3   | HDMI signal input                                               | HDMI connector (Type A)                                                                                                                   |
| P4   | Display Port input                                              | Display port connector                                                                                                                    |
| PP2  | Power input                                                     | Molex 43650-0200 compatible (Mating type : Molex 43645-0200 compatible)<br>(Matching power cable : P/N 426013800-3, 160mm)                |

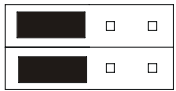
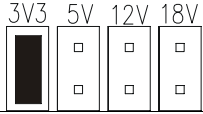
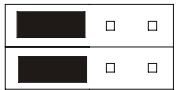
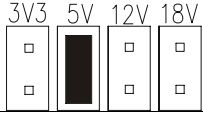
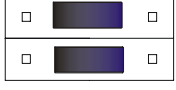
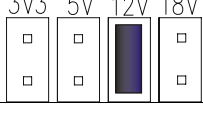
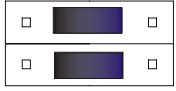
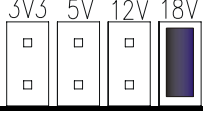
Summary: Jumpers setting

| Ref | Purpose                                          | Note                                                                                                                                                                                                     |
|-----|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| JA1 | On board +5V logic power enable                  | 1-3 & 2-4 closed, factory set, do not remove                                                                                                                                                             |
| JA3 | Panel power voltage select                       | See panel voltage setting table 1<br><b>CAUTION:</b> Incorrect setting will cause panel damage                                                                                                           |
| JA6 | Panel power voltage select                       | See panel voltage setting table 1<br><b>CAUTION:</b> Incorrect setting will cause panel damage                                                                                                           |
| JB1 | Backlight brightness voltage range               | 1-2 closed = 3.3V max<br>2-3 closed = 5V max                                                                                                                                                             |
| JB2 | Backlight inverter on/off control – signal level | 1-2 = On/Off control signal 'High' = +3.3V<br>2-3 = On/Off control signal 'High' = +5V<br>Open = On/Off control signal 'High' = Open collector<br><b>CAUTION:</b> Incorrect setting can damage inverter. |
| JB3 | Backlight inverter on/off control – polarity     | 1-2 = control signal 'high' = CCFT ON<br>2-3 = control signal 'low' = CCFT ON                                                                                                                            |
| JB5 | Backlight control type selection                 | 1-2 = VR/Digital switch mount control<br>3-4 = Analog backlight brightness control via RS-232 command (0xe0) – voltage range 0~5V<br>5-6 = PWM (Pulse Width Modulation) brightness                       |
| JB6 | Backlight status                                 | 1-2, 3-4 closed = Backlight status Low – Normal<br>1-3, 2-4 closed = Backlight status High - Normal<br>Open = Backlight status not used                                                                  |
| JP1 | Reserved                                         | Reserved for internal programming use (Always 1-2 closed)                                                                                                                                                |
| JP6 | Input power control                              | Short = External switch control<br>Open = Switch mount control                                                                                                                                           |
| SW1 | Panel selection                                  | See table below                                                                                                                                                                                          |
| SW2 | Panel selection                                  | See table below                                                                                                                                                                                          |

Table 1 : Panel voltage setting table :

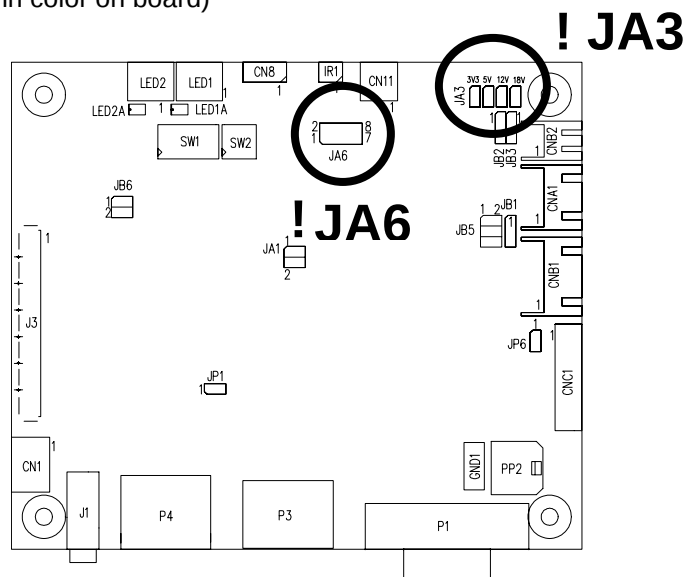
| Input voltage via PP2 | Panel Voltage | JA3        | JA6       | Jumper on board |
|-----------------------|---------------|------------|-----------|-----------------|
| 12VDC                 | 3.3V          | 3V3 closed | 1-3 & 2-4 |                 |
|                       | 5V            | 5V closed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

CAUTION: Incorrect setting can damage panel & controller

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

**\*\* Please make sure the backlight inverter must support 24V supply. Because CNA1 pin 1 and CNB1 pin 2 will output 24VDC if input 24VDC via PP2.**

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



**DIP Switch selection – SW1**

| Pos #1                 | Pos #2 | Pos #3 | Pos.#4 | Description                                                                         | Panel resolution                         |
|------------------------|--------|--------|--------|-------------------------------------------------------------------------------------|------------------------------------------|
| <b>For WUXGA panel</b> |        |        |        |                                                                                     |                                          |
| OFF                    | OFF    | OFF    | OFF    | Samsung LTM220CS01 (Tested)<br>AU Optronics B170UW02 V0                             | 1920x1200<br>1920x1200                   |
| ON                     | OFF    | OFF    | OFF    | AU Optronics M215HW01 (Tested)<br>Samsung LTM230HT01                                | 1920x1080<br>1920x1080                   |
| OFF                    | ON     | OFF    | OFF    | Samsung LTI400HA01 <sup>(1)</sup> (Tested)                                          | 1920x1080                                |
| ON                     | ON     | OFF    | OFF    | LG LP156WF4 <sup>(2)</sup> (Tested)                                                 | 1920x1080                                |
| OFF                    | OFF    | ON     | OFF    | AU Optronics G173HW01 V0 <sup>(2)</sup> (Tested)                                    | 1920x1080                                |
| <b>For UXGA panel</b>  |        |        |        |                                                                                     |                                          |
| ON                     | OFF    | OFF    | OFF    | NEC NL160120BC27-14                                                                 | 1600x1200                                |
| <b>For WXGA panel</b>  |        |        |        |                                                                                     |                                          |
| ON                     | OFF    | OFF    | OFF    | Samsung LTA260W2-L01                                                                | 1366x768                                 |
| ON                     | ON     | OFF    | OFF    | Samsung LTA460WS-L03                                                                | 1366x768                                 |
| OFF                    | OFF    | ON     | OFF    | Sharp LQ315T3LZ24 /<br>AU Optronics M156XW01 V0                                     | 1366x768                                 |
| ON                     | OFF    | ON     | OFF    | LG LC420W02-A4                                                                      | 1366x768                                 |
| OFF                    | ON     | ON     | OFF    | NEC NL12880BC20-02D                                                                 | 1280x800                                 |
| OFF                    | ON     | OFF    | OFF    | NEC NL12876BC26-21                                                                  | 1280x768                                 |
| <b>For SXGA panels</b> |        |        |        |                                                                                     |                                          |
| ON                     | OFF    | OFF    | ON     | NEC NL128102BC29-01B                                                                | 1280x1024                                |
| ON                     | ON     | ON     | OFF    | Fujitsu FLC48SXC8V                                                                  | 1280x1024                                |
| OFF                    | ON     | OFF    | ON     | Sharp LQ181E1LW31                                                                   | 1280x1024                                |
| ON                     | ON     | OFF    | ON     | Samsung LTM170ET01                                                                  | 1280x1024                                |
| OFF                    | OFF    | ON     | ON     | AU Optronics M190EG01                                                               | 1280x1024                                |
| <b>For XGA panel</b>   |        |        |        |                                                                                     |                                          |
| OFF                    | OFF    | ON     | ON     | AUO M150XN07 V2 (Tested)                                                            | 1024x768                                 |
| OFF                    | ON     | ON     | OFF    | LG LM151X2                                                                          | 1024x768                                 |
| ON                     | ON     | OFF    | ON     | Sharp LQ150X1LGB1<br>Sharp LQ150X1LGN2A                                             | 1024x768<br>1024x768                     |
| ON                     | OFF    | ON     | ON     | NEC NL10276BC12-02                                                                  | 1024x768                                 |
| OFF                    | ON     | ON     | ON     | NEC NL10276BC13-01C                                                                 | 1024x768                                 |
| ON                     | ON     | ON     | ON     | NEC NL10276BC30-18/ 30-18C<br>NEC NL10276BC20-08                                    | 1024x768<br>1024x768                     |
| <b>For SVGA panel</b>  |        |        |        |                                                                                     |                                          |
| OFF                    | OFF    | ON     | OFF    | PrimeView PD104SL5H2<br>Sharp LQ121S1DG11<br>Sharp LQ104S1DG21<br>Sharp LQ121S1DG41 | 800x600<br>800x600<br>800x600<br>800x600 |
| ON                     | OFF    | ON     | OFF    | Toshiba LTM12C289                                                                   | 800x600                                  |
| OFF                    | ON     | ON     | OFF    | Sharp LQ084S3DG01                                                                   | 800x600                                  |
| ON                     | ON     | OFF    | OFF    | Sharp LQ121S1LG41<br>NEC NL8060BC21-02                                              | 800x600<br>800x600                       |
| ON                     | ON     | ON     | OFF    | Sharp LQ104S1DG21                                                                   | 800x600                                  |
| OFF                    | OFF    | OFF    | ON     | PrimeView PD104SL5                                                                  | 800x600                                  |
| ON                     | OFF    | OFF    | ON     | NEC NL8060BH18-02 <sup>(1)*</sup> (Tested)                                          | 800x600                                  |
| <b>For WVGA panel</b>  |        |        |        |                                                                                     |                                          |
| ON                     | OFF    | ON     | OFF    | NEC NL8048BC19-02                                                                   | 800x480                                  |
| ON                     | OFF    | OFF    | ON     | Sharp LQ070Y3LG4A                                                                   | 800x480                                  |
| <b>Others</b>          |        |        |        |                                                                                     |                                          |
| ON                     | OFF    | OFF    | ON     | Samsung LTI430LA01 <sup>(1)</sup> (Tested)                                          | 1920x480                                 |
| OFF                    | OFF    | OFF    | ON     | AU Optronics M220EW01 <sup>(1)</sup> (Tested)                                       | 1680x1050                                |
| ON                     | ON     | ON     | OFF    | AU Optronics M200RW01 V1 (Tested)                                                   | 1600x900                                 |
| ON                     | OFF    | OFF    | OFF    | Sharp LQ150F1LH22                                                                   | 1400x1050                                |
| ON                     | ON     | OFF    | OFF    | Samsung LTM190M2-L31                                                                | 1440x900                                 |
| ON                     | OFF    | ON     | OFF    | LG LM171WX3-TLA1                                                                    | 1440x900                                 |
| OFF                    | ON     | ON     | OFF    | LG LM171WX3 (Tested)                                                                | 1440x900                                 |
| ON                     | ON     | OFF    | ON     | Shanghai AVIC TM070JDHP01 <sup>(2)</sup> (Tested)                                   | 1280x800                                 |
| OFF                    | OFF    | ON     | OFF    | CPT CLAA102NA0ACW                                                                   | 1024x600                                 |
| OFF                    | ON     | OFF    | ON     | Samsung LTI216XM01 <sup>(2)</sup> (Tested)                                          | 960x960                                  |

For additional and recent added panels, see ALR-1920 panel support table at <http://www.digitalview.com/controllers/csq.php>

Remark :

(1) Only effective on V1.08.00 or up version.

(2) Only effective on V1.16.00 or up version.

\* HDMI & Display port DDC (U12 & U20) firmware will be updated to set 1600x600 60Hz as preferred timing after perform the load factory defaults when selecting this panel dip switch setting.

| 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 / WVGA  |
| ON     | ON     | ON     | Others      |

SW1 Pos 8 = Reserved.

#### DIP switch selection – SW2

| Pos. # | Function                 | Description                                                                                                                                                 |
|--------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1      | Panel pixel format       | OFF : Double Pixel<br>ON : Single Pixel                                                                                                                     |
| 2      | LVDS data mapping select | ON : Mapping A (LVDS panel)<br>OFF : Mapping B (LVDS panel)<br>Please adjust to get the correct picture. See as Appendix IV for details of mapping A and B. |
| 3      | Reserved                 | Reserved                                                                                                                                                    |
| 4      | Operating mode selection | OFF : General application<br>ON : Work with RM-DN5 (firmware version E1.12.10a) from HDMI port <sup>#</sup>                                                 |

The most current list can be found the controller solution generator at <http://www.digitalview.com/controllers/csq.php>

Remark :

# Assign SW2 position 4 to ON for connection to RM-DN5 (Firmware version : E1.12.10a) from HDMI port with the following changes :

- Add "Loading..." message on screen while startup and stay until the valid signal.
- Changed the default Auto Source Seek to Off
- Changed the IR key from "Display" key to "OSD Next" key for menu function
- Extend longer delay time approx. (4 secs) to detect signal for "No Signal" state
- Only HDMI input and disabled all other "Source" selections in OSD, IR hotkeys & RS-232 for RM-DN5 mode

**CN1 – Audio output (Stereo) with amplication from HDMI / Display port : JST 4-way, S4B-ZR-SM4A**

(Mating type : ZHR-4)

| PIN | SYMBOL | DESCRIPTION                    |
|-----|--------|--------------------------------|
| 1   | AMP L- | Audio Left channel (Negative)  |
| 2   | AMP L+ | Audio Left channel (Positive)  |
| 3   | AMP R- | Audio Right channel (Negative) |
| 4   | AMP R+ | Audio Right (Positive)         |

**CN8 – RS-232 serial control: Molex 53261-0671, 6 ways 1.25mm pitch (Matching type : Molex 51021-0600)**

| 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 |

**CN11 – SPDIF Audio Output JST 2-way, S2B-ZR-SM4A**

(Mating type : JST ZHR-2)

| PIN | SYMBOL    | DESCRIPTION     |
|-----|-----------|-----------------|
| 1   | SPDIF_OUT | SPDIF audio out |
| 2   | GND       | Ground          |

**CNA1 - Auxiliary power output: JST S4B-XH-A**

(Matching type : XHP-4)

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

**CNB1 – Backlight inverter connector: JST S5B-XH-A**

(Matching type : XHP-5)

| PIN | SYMBOL  | DESCRIPTION                                          |
|-----|---------|------------------------------------------------------|
| 1   | GND     | Ground                                               |
| 2   | VBKL    | Backlight power supply, +12VDC / +24V DC, 3A max     |
| 3   | BLCTRL  | Backlight On/Off control signal (refer to JB2 & JB3) |
| 4   | BVR_WIP | Backlight brightness VR pin WIP                      |
| 5   | BVR_A   | Backlight brightness VR pin A                        |

**CNB2 – Backlight status connector : JST B2B-XH-A**

(Matching type : XHP-2)

| PIN | SYMBOL | DESCRIPTION             |
|-----|--------|-------------------------|
| 1   | BL_S   | Backlight status signal |
| 2   | GND    | Ground                  |

**CNC1 – OSD switch mount control, Hirose DF13A-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                                               |

**IR1 – Infra-Red sensor connector: Molex 53261-0371, 3 way 1.25mm pitch (Matching type : Molex 51021-0300)**

| 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   | VDD (+12V/18V) | Panel power supply (+12V / 18V) (selected by JA3 & JA6) |
| 2   | VDD (+12V/18V) | Panel power supply (+12V / 18V) (selected by JA3 & JA6) |
| 3   | VDD (+12V/18V) | Panel power supply (+12V / 18V) (selected by JA3 & JA6) |
| 4   | VDD (+12V/18V) | Panel power supply (+12V / 18V) (selected by JA3 & JA6) |
| 5   | VDD (+12V/18V) | Panel power supply (+12V / 18V) (selected by JA3 & JA6) |
| 6   | VDD (3,3V/5V)  | Panel power supply (3,3V/5V) (selected by JA3 & JA6)    |
| 7   | VDD (3,3V/5V)  | Panel power supply (3,3V/5V) (selected by JA3 & JA6)    |
| 8   | VDD (3,3V/5V)  | Panel power supply (3,3V/5V) (selected by JA3 & JA6)    |
| 9   | VDD (3,3V/5V)  | Panel power supply (3,3V/5V) (selected by JA3 & JA6)    |
| 10  | VDD (3,3V/5V)  | Panel power supply (3,3V/5V) (selected by JA3 & JA6)    |
| 11  | GND            | Ground                                                  |
| 12  | GND            | Ground                                                  |
| 13  | GND            | Ground                                                  |
| 14  | GND            | Ground                                                  |
| 15  | GND            | Ground                                                  |
| 16  | NC             | No connection                                           |
| 17  | NC             | No connection                                           |
| 18  | NC             | No connection                                           |
| 19  | NC             | No connection                                           |
| 20  | GND            | Ground                                                  |
| 21  | GND            | Ground                                                  |
| 22  | NC             | No connection                                           |
| 23  | NC             | No connection                                           |
| 24  | TXA3+          | Positive differential LVDS data bit A3                  |
| 25  | TXA3-          | Negative differential LVDS data bit A3                  |
| 26  | GND            | Ground                                                  |
| 27  | TXAC+          | Positive LVDS clock for A channel                       |
| 28  | TXAC-          | Negative LVDS clock for A channel                       |
| 29  | GND            | Ground                                                  |
| 30  | TXA2+          | Positive differential LVDS data bit A2                  |
| 31  | TXA2-          | Negative differential LVDS data bit A2                  |
| 32  | TXA1+          | Positive differential LVDS data bit A1                  |
| 33  | TXA1-          | Negative differential LVDS data bit A1                  |
| 34  | TXA0+          | Positive differential LVDS data bit A0                  |
| 35  | TXA0-          | Negative differential LVDS data bit A0                  |
| 36  | GND            | Ground                                                  |
| 37  | NC             | No connection                                           |
| 38  | NC             | No connection                                           |
| 39  | TXB3+          | Positive differential LVDS data bit B3                  |
| 40  | TXB3-          | Negative differential LVDS data bit B3                  |
| 41  | GND            | Ground                                                  |
| 42  | TXBC+          | Positive LVDS clock for B channel                       |
| 43  | TXBC-          | Negative LVDS clock for B channel                       |
| 44  | GND            | Ground                                                  |
| 45  | TXB2+          | Positive differential LVDS data bit B2                  |
| 46  | TXB2-          | Negative differential LVDS data bit B2                  |
| 47  | TXB1+          | Positive differential LVDS data bit B1                  |
| 48  | TXB1-          | Negative differential LVDS data bit B1                  |
| 49  | TXB0+          | Positive differential LVDS data bit B0                  |
| 50  | TXB0-          | Negative differential LVDS data bit B0                  |
| 51  | GND            | Ground                                                  |

**LED1 – Dual color LED connector for controller status, JST 3-way, S3B-ZR-SM4A (Mating type : JST ZHR-3)**

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

**LED2 – Dual color LED connector for backlight status, JST 3-way, S3B-ZR-SM4A (Mating type : JST ZHR-3)**

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

**P1 - Analog VGA input – DB-15 way high density 3 row**

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

**P3 – HDMI connector**

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

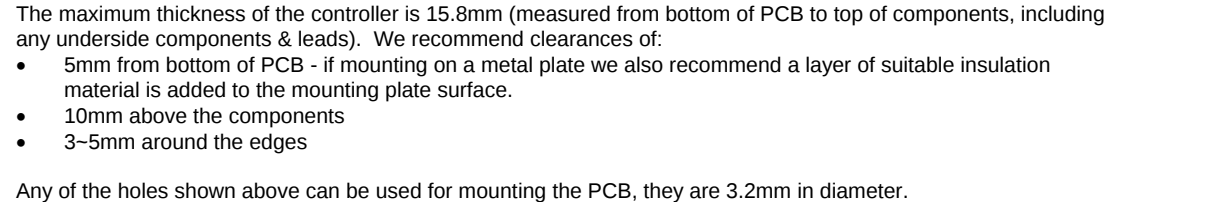
**P4 – Display Port input**

| PIN | SYMBOL        | DESCRIPTION                        |
|-----|---------------|------------------------------------|
| 1   | ML_Lane 0 (p) | Lane 0 (positive)                  |
| 2   | GND           | Ground                             |
| 3   | ML_Lane 0 (n) | Lane 0 (negative)                  |
| 4   | ML_Lane 1 (p) | Lane 1 (positive)                  |
| 5   | GND           | Ground                             |
| 6   | ML_Lane 1 (n) | Lane 1 (negative)                  |
| 7   | ML_Lane 2 (p) | Lane 2 (positive)                  |
| 8   | GND           | Ground                             |
| 9   | ML_Lane 2 (n) | Lane 2 (negative)                  |
| 10  | ML_Lane 3 (p) | Lane 3 (positive)                  |
| 11  | GND           | Ground                             |
| 12  | ML_Lane 3 (n) | Lane 3 (negative)                  |
| 13  | CONFIG1       | connected to Ground <sup>1)</sup>  |
| 14  | CONFIG2       | connected to Ground <sup>1)</sup>  |
| 15  | AUX CH (p)    | Auxiliary Channel (positive)       |
| 16  | GND           | Ground                             |
| 17  | AUX CH (n)    | Auxiliary Channel (negative)       |
| 18  | Hot Plug      | Hot Plug Detect                    |
| 19  | GND           | Ground                             |
| 20  | DP_PWR        | Power for connector (3.3 V 500 mA) |

**PP2 - Power supply****(Mating type : Molex 43645-0200 compatible)**

| PIN | DESCRIPTION                   |
|-----|-------------------------------|
| 1   | +12VDC 5A max / +24VDC 5A max |
| 2   | Ground                        |

## CONTROLLER DIMENSIONS



**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 by following the steps below :

- Firstly setup the controller/display system with the buttons. With controls attached and display system active make any settings for colour and image position as required then switch everything off.
- Use a jumper to close JP6 jumper, 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.

### 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 DC12V/ 24V DC . This should be matched with the inverter specification: see table.

#### CNB1

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

Remark: For higher power inverter, more current (for 12V / 24V) can be taken from CNA1 pin 1. Maximum current drawn on CNA1 pin 1 and CNB1 pin 2 is 3A (24V) / 3A(12V)

**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 = 3.3V, 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 controlled by using a resistor or VR (Variable Resistor).
- Brightness controlled by adding a circuit such as PWM (Pulse Width Modulation).
- No adjustment of brightness is possible.

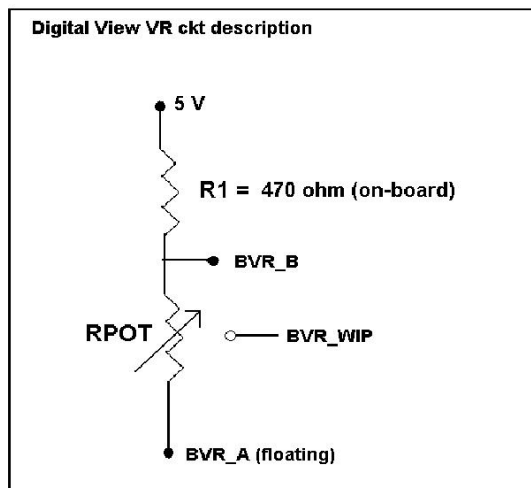
CNB1 pins 4 & 5 are available for connecting to an inverter or circuit where VR control is supported.

#### CNB1

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

This can then be matched with function controls (OSD switch mount) pins 3 & 4: see cable design below .

## 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    | +12VDC / 24VDC, backlight power supply (selected by JA3 & JA6) |
| 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)

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

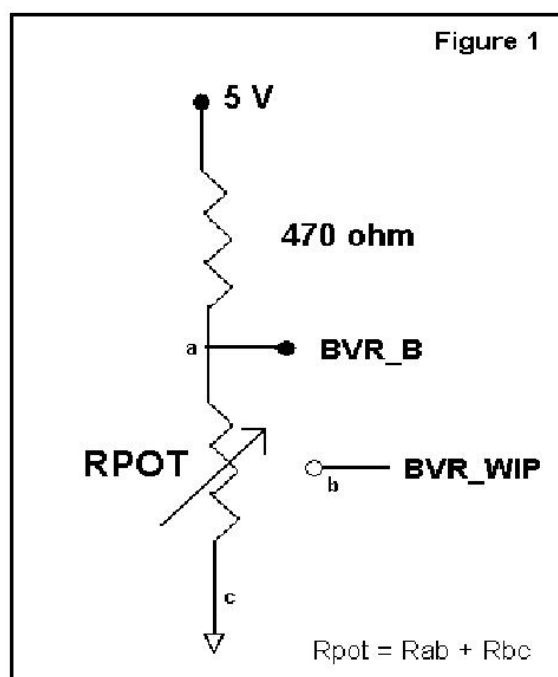
where BVR\_WIP is in Volts.

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.



---

## 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, ie 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.

### 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                                                                    | 1920x1200, 1920x1080, 1920x480, 1680x1050, 1600x1200, 1400x1050, 1440x900, 1366x768, 1280x1024, 1280x800, 1280x768, 1024x768, 1024x600, 960x960, 800x600, 800x480, 640x480 resolution TFT LVDS LCD's support. |
| No. of colours                                                                         | Up to 3 x 8 bit providing 16.7 million colours.                                                                                                                                                               |
| Vertical refresh rate                                                                  | WUXGA, UXGA, WXGA, SXGA, XGA, SVGA, VGA resolution up to 60Hz.                                                                                                                                                |
| Dot clock (pixel clock) maximum                                                        | 165 MHz                                                                                                                                                                                                       |
| Graphics formats                                                                       | Standard WUXGA, UXGA, SXGA, XGA, SVGA, VGA                                                                                                                                                                    |
| Standard input at source                                                               | - VGA analog (15-pin) standard with automatic detection of :<br>Digital Separate Sync<br>Sync-On-Green<br>Composite Sync<br>- HDMI (v1.3)<br>- Display Port (1.1a)                                            |
| Controls available                                                                     | - On/Off<br>- Brightness (inverter)<br>- OSD menu<br>- OSD select<br>- OSD setting +<br>- OSD setting -                                                                                                       |
| Control interface                                                                      | - Buttons, RS-232, IR remote control, DDC/CI.                                                                                                                                                                 |
| Settings memory                                                                        | Settings are stored in non volatile memory                                                                                                                                                                    |
| Language OSD support                                                                   | Graphics OSD icons                                                                                                                                                                                            |
| VESA DPMS implementation                                                               | Yes                                                                                                                                                                                                           |
| Plug & Play                                                                            | VESA DDC 1, 2/b compatible                                                                                                                                                                                    |
| Voltage output for LCD                                                                 | +3.3V , +5V, +12V, +18V<br>The current drawn for 18V panel from 24VDC power input is limited to 2A.<br>The current drawn for 3.3V, 5V or 12V panel from 12V/24VDC power input is limited to 3A.               |
| Output power from CN1 -Audio output (Stereo) with amplication from HDMI / Display port | 2W x 2 channels (V=5v, RL=4ohm)                                                                                                                                                                               |
| Output power from J1 - Audio jack (Stereo) output from HDMI / Display Port             | 70mW x 2 channels (RL=32ohm)                                                                                                                                                                                  |
| Input voltage                                                                          | 12VDC , 5A max / 24VDC 5A max +/- 5%                                                                                                                                                                          |
| Controller power consumption                                                           | Approx 4W (controller logic only, no panel and inverter are involved)                                                                                                                                         |
| Controller dimensions                                                                  | 107mm x 92mm x 16.65mm                                                                                                                                                                                        |
| Storage temperature limits                                                             | -40°C to +70°C                                                                                                                                                                                                |
| Operating temperature limits                                                           | 0°C to +50°C                                                                                                                                                                                                  |

### NOTES

Please note the following:

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

## Appendix I – Mode Support Table

### ARGB (P1) port :

| Mode                  | Resolution        | Clk [MHz] | Horizontal freq [KHz] | Vertical freq [Hz] | Sync Mode             |
|-----------------------|-------------------|-----------|-----------------------|--------------------|-----------------------|
| T_70                  | 720x400<br>70Hz   | 28.322    | 31.469                | 70.087             | Digital Separate Sync |
| T_70                  | 720x400<br>70Hz   | 28.322    | 31.469                | 70.087             | Sync On Green         |
| V_60                  | 640x480<br>60Hz   | 25.175    | 31.469                | 59.940             | Digital Separate Sync |
| V_60                  | 640x480<br>60Hz   | 25.175    | 31.469                | 59.940             | Sync On Green         |
| V_60                  | 640x480<br>60Hz   | 25.175    | 31.469                | 59.940             | Composite Sync        |
| SV_60                 | 800x600<br>60Hz   | 40.000    | 37.879                | 60.317             | Digital Separate Sync |
| SV_60                 | 800x600<br>60Hz   | 40.000    | 37.879                | 60.317             | Sync On Green         |
| SV_60                 | 800x600<br>60Hz   | 40.000    | 37.879                | 60.317             | Composite Sync        |
| X_60                  | 1024x768<br>60Hz  | 65.000    | 48.363                | 60.004             | Digital Separate Sync |
| X_60                  | 1024x768<br>60Hz  | 65.000    | 48.363                | 60.004             | Sync On Green         |
| X_60                  | 1024x768<br>60Hz  | 65.000    | 48.363                | 60.004             | Composite Sync        |
| SX_60                 | 1280x1024<br>60Hz | 108       | 63.81                 | 60.020             | Digital Separate Sync |
| SX_60                 | 1280x1024<br>60Hz | 108       | 63.81                 | 60.020             | Sync On Green         |
| SX_60                 | 1280x1024<br>60Hz | 108       | 63.81                 | 60.020             | Composite Sync        |
| 1600x600 <sup>#</sup> | 1600x600<br>60Hz  | 76.5      | 37.3                  | 60                 | Digital Separate Sync |
| UX_60                 | 1600x1200<br>60Hz | 162       | 75.000                | 60                 | Digital Separate Sync |
| UX_60                 | 1600x1200<br>60Hz | 162       | 75.000                | 60                 | Sync On Green         |
| UX_60                 | 1600x1200<br>60Hz | 162       | 75.000                | 60                 | Composite Sync        |
| WUX_60                | 1920x1080<br>60Hz | 172.8     | 67.5                  | 60                 | Digital Separate Sync |
| WUX_60                | 1920x1080<br>60Hz | 172.8     | 67.5                  | 60                 | Sync On Green         |
| WUX_60                | 1920x1080<br>60Hz | 172.8     | 67.5                  | 60                 | Composite Sync        |
| WUX_60                | 1920x1200<br>60Hz | 193.2     | 74.5                  | 60                 | Digital Separate Sync |
| WUX_60                | 1920x1200<br>60Hz | 193.2     | 74.5                  | 60                 | Sync On Green         |
| WUX_60                | 1920x1200<br>60Hz | 193.2     | 74.5                  | 60                 | Composite Sync        |

**HDMI (P3) port :**

| Mode     | Resolution      | Clk [MHz] | Horizontal freq [KHz] | Vertical freq [Hz] |
|----------|-----------------|-----------|-----------------------|--------------------|
| T_70     | 720x400 70Hz    | 28.322    | 31.469                | 70.087             |
| V_60     | 640x480 60Hz    | 25.175    | 31.469                | 59.940             |
| SV_60    | 800x600 60Hz    | 40.000    | 37.879                | 60.317             |
| X_60     | 1024x768 60Hz   | 65.000    | 48.363                | 60.004             |
| SX_60    | 1280x1024 60Hz  | 108       | 63.81                 | 60.020             |
| UX_60    | 1600x1200 60Hz  | 162       | 75.000                | 60                 |
| WUX_60   | 1920x1080 60Hz  | 172.8     | 67.5                  | 60                 |
| WUX_60   | 1920x1200 60Hz  | 193.2     | 74.5                  | 60                 |
| 1080p60  | 1920x1080p 60Hz | 135       | 67.5                  | 60                 |
| 1080i60  | 1920x1080i 60Hz | 74.14     | 33.7                  | 60                 |
| 1080i50  | 1920x1080i 50Hz | 74.184    | 28.1                  | 50                 |
| 720p60   | 1280x720P 60Hz  | 74.25     | 45                    | 60                 |
| 576p50   | 720x576P 50Hz   | 26.9568   | 31.2                  | 50                 |
| 480p60   | 720x480P 60Hz   | 26.9568   | 31.4                  | 60                 |
| 960x960* | 960x960 60Hz    | 75.5MHz   | 59.731                | 59.971             |

**Display Port (P4) port :**

| Mode     | Resolution      | Clk [MHz] | Horizontal freq [KHz] | Vertical freq [Hz] |
|----------|-----------------|-----------|-----------------------|--------------------|
| T_70     | 720x400 70Hz    | 28.322    | 31.469                | 70.087             |
| V_60     | 640x480 60Hz    | 25.175    | 31.469                | 59.940             |
| SV_60    | 800x600 60Hz    | 40.000    | 37.879                | 60.317             |
| X_60     | 1024x768 60Hz   | 65.000    | 48.363                | 60.004             |
| SX_60    | 1280x1024 60Hz  | 108       | 63.81                 | 60.020             |
| UX_60    | 1600x1200 60Hz  | 162       | 75.000                | 60                 |
| WUX_60   | 1920x1080 60Hz  | 172.8     | 67.5                  | 60                 |
| WUX_60   | 1920x1200 60Hz  | 193.2     | 74.5                  | 60                 |
| 1080p60  | 1920x1080p 60Hz | 135       | 67.5                  | 60                 |
| 1080i60  | 1920x1080i 60Hz | 74.14     | 33.7                  | 60                 |
| 1080i50  | 1920x1080i 50Hz | 74.184    | 28.1                  | 50                 |
| 720p60   | 1280x720P 60Hz  | 74.25     | 45                    | 60                 |
| 576p50   | 720x576P 50Hz   | 26.9568   | 31.2                  | 50                 |
| 480p60   | 720x480P 60Hz   | 26.9568   | 31.4                  | 60                 |
| 960x960* | 960x960 60Hz    | 75.5MHz   | 59.731                | 59.971             |

Remark :

\* Apply on V1.16.00 or up firmware version. It requires to perform the load factory default when setting the Samsung LT1216XM01 panel timings (SW1=0101 1110, SW2=1000) on board. (1 = ON, 0 = OFF), Checksum 1st 128byte = 0x1C; 2nd 128byte = 0xEA.

# Support start from V1.08.00 or up firmware version.

## Appendix II – RS-232 control protocols

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

Physical connection :

Controller side

Connector interface : CN8

Mating connector : Molex 51021-0600

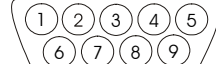


| PIN# | Description    |
|------|----------------|
| 4    | RS-232 Tx Data |
| 5    | Ground         |
| 6    | RS-232 Rx Data |

Computer side

Connector interface : Serial port

Mating connector : DB9 Female



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

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 program provided by Digitalview on request. Please contact your local sales for informations.

#### 1. Commands to implement switch mount control buttons

| Function           | Command | Description                | Acknowledge (if enabled) |
|--------------------|---------|----------------------------|--------------------------|
| Menu               | 0xf7    | Menu button pressed        | Button equivalent        |
| Select-down button | 0xfa    | Select down button pressed | Button equivalent        |
| Select-up button   | 0xfb    | Select up button pressed   | Button equivalent        |
| Right/+ button     | 0xfc    | Right/+button pressed      | Button equivalent        |
| Left/- button      | 0xfd    | Left/- button pressed      | Button equivalent        |

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

| Function                              | Command                                                    | Description                                                             | Acknowledge (if enabled)                                    |
|---------------------------------------|------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------|
| Volume control - left + right channel | 0x80, "a"   "A",<br>nn   "+"   "-"  <br>"r"   "R"  <br>"?" | Set audio (L+R) volume =<br>value/increment/decrement<br>Reset<br>Query | Volume left + right                                         |
| Volume control - on/off (mute)        | 0x80, "m"   "M",<br>"0"  <br>"1"  <br>"r"   "R"  <br>"?"   | Disable audio output<br>Enable audio output<br>Reset<br>Query           | "0" – audio off (muted)<br>"1" – audio on                   |
| Volume control - Audio Output         | 0x80, "s"   "S",<br>"0"  <br>"1"  <br>"r"   "R"  <br>"?"   | Enable SPDIF output<br>Enable Speaker output<br>Reset<br>Query          | "0" – SPDIF<br>"1" – Speaker                                |
| Brightness control                    | 0x81,<br>nn   "+"   "-"  <br>"r"   "R"  <br>"?"            | Set brightness =<br>value/increment/decrement<br>Reset<br>Query         | Brightness.<br><br>Range: "0""0"- "6""4"<br>Default: "3""2" |
| Contrast control                      | 0x82, "a"   "A",<br>nn   "+"   "-"  <br>"r"   "R"  <br>"?" | Set all contrast =<br>value/increment/decrement<br>Reset<br>Query       | Contrast.<br><br>Range: "4""0"- "6""4"<br>Default: "3""2"   |
| Phase <sup>#</sup>                    | 0x85,<br>nn   "+"   "-"  <br>"?"                           | Set dot clock phase =<br>value/increment/decrement<br>Query             | Dot clock phase.<br>(In ARGB mode only)                     |
| Image H position <sup>#</sup>         | 0x86,<br>nnnn   "+"   "-"  <br>"?"                         | Set img_hpos =<br>value/increment/decrement<br>Query                    | Image horizontal position.<br>(In ARGB mode only)           |
| Image V position <sup>#</sup>         | 0x87,<br>nnnn   "+"   "-"  <br>"?"                         | Set img_vpos =<br>value/increment/decrement<br>Query                    | Image vertical position.<br>(In ARGB mode only)             |

|                                                           |                                                        |                                                                                                                         |                                                                                                                                                                           |
|-----------------------------------------------------------|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sharpness                                                 | 0x8a,<br>nn   "+"   "-"   "r"   "R"<br> <br>"?"        | Set sharpness=<br>value/increment/decrement<br>Reset<br>Query                                                           | Sharpness<br><br>Range: "F""C"- "0""4"<br>Default: "0""0"                                                                                                                 |
| Frequency #                                               | 0x8b,<br>nnnn   "+"   "-"  <br>"?"                     | Frequency =<br>value/increment/decrement<br>Query                                                                       | Frequency adjustment<br>(In ARGB mode only)                                                                                                                               |
| OSD Rotation                                              | 0x8f,<br>"0"   "1"   "2"   "3"  <br>"r"   "R"  <br>"?" | Set OSD rotate=<br>0/90/180/270<br>Reset<br>Query                                                                       | OSD rotation Query:<br>"0" – 0 (Default)<br>"1" – 90<br>"2" – 180<br>"3" – 270                                                                                            |
| OSD H position                                            | 0x90,<br>nnn   "+"   "-"   "r"  <br>"R"   "?"          | Set osd_hpos =<br>value/increment/decrement<br>Reset<br>Query                                                           | OSD horizontal position<br><br>Range: "0""0""0"- "3""E""8"<br>Default: "1""F""4"                                                                                          |
| OSD V position                                            | 0x91,<br>nnn   "+"   "-"   "r"  <br>"R"   "?"          | Set osd_vpos =<br>value/increment/decrement<br>Reset<br>Query                                                           | OSD vertical position<br><br>Range: "0""0""0"- "3""E""8"<br>Default: "1""F""4"                                                                                            |
| Select menu<br>timeout***                                 | 0x93,<br>nn   "+"   "-"   "r"  <br>"R"   "?"           | Select menu timeout =<br>value/increment/decrement<br>Reset<br>Query                                                    | OSD menu timeout value.<br>Value<br>If value > max available step, set<br>it to the max available step.<br>Range: "0""5"- "3""C"<br>Always on : "0""0"<br>Default: "0""A" |
| Input main select<br><br>* Function in Valid<br>mode only | 0x98,<br>nn   "+"   "-"   "r"  <br>"R"   "?"           | Select input main =<br>PC or video or next available<br>Reset<br>Query                                                  | Main selected.<br>"0x41,0x31" ARGB (Default)<br>"0x48,0x31" HDMI<br>"0x50,0x31" Display Port                                                                              |
| Auto Source Seek                                          | 0x99,<br>"0"   "1"  <br>"?"                            | Disable/ Enable<br>Query                                                                                                | "0" – Disable<br>"1" – Enable                                                                                                                                             |
| GAMMA value<br>select                                     | 0x9d,<br>n  <br>"r"   "R"  <br>"?"                     | Select GAMMA value =<br>Value<br>Reset<br>Query                                                                         | GAMMA value:<br>"0" – 0.4,<br>"1" – 0.6<br>"2" – 1.0 (Default),<br>"3" – 1.6<br>"4" – 2.2                                                                                 |
| Colour<br>temperature select                              | 0xb3,<br>n  <br>"r"   "R"  <br>"?"                     | Select colour temperature =<br>value<br>Reset<br>Query                                                                  | Main selected.<br>"0" – user defined RGB values.<br>"1" – 4200K.<br>"2" – 5000K.<br>"3" – 6500K.<br>"4" – 7500K. (Default)<br>"5" – 9300K.                                |
| Red level for<br>selected colour<br>temperature           | 0xb4,<br><br>nn   "+"   "-"  <br>"r"   "R"  <br>"?"    | Set the level of the red channel<br>for the selected colour temp. =<br>value/increment/decrement<br>Reset<br>Query      | Red level for selected colour<br>temperature.<br><br>Range: "0""0"- "6""4"<br>Default: "6""4"                                                                             |
| Green level for<br>selected colour<br>temperature         | 0xb5,<br><br>nn   "+"   "-"  <br>"r"   "R"  <br>"?"    | Set the level of the green<br>channel for the selected colour<br>temp. =<br>value/increment/decrement<br>Reset<br>Query | Green level for selected colour<br>temperature.<br><br>Range: "0""0"- "6""4"<br>Default: "6""4"                                                                           |
| Blue level for<br>selected colour<br>temperature          | 0xb6,<br><br>nn   "+"   "-"  <br>"r"   "R"             | Set the level of the blue channel<br>for the selected colour temp. =<br>value/increment/decrement<br>Reset              | Blue level for selected colour<br>temperature.<br><br>Range: "0""0"- "6""4"                                                                                               |

|                              |                                                  |                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------|--------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                              | "?"                                              | Query                                                                                 | Default: "6"4"                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| OSD status enquiry           | 0xbb                                             | Status of OSD                                                                         | "0" – OSD turned off<br>"1" – OSD turned on                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Backlight brightness control | 0xe0,<br>nn   "+"   "-"  <br>"r"   "R"  <br>"?"  | Set backlight brightness =<br>value/increment/decrement<br>Reset<br>Query             | Backlight brightness.<br><br>Range: "0"0"- "6"4"<br>Default: "6"4"<br><br>e.g "1"0" → 0xe0 0x31 0x30<br>* This control can only function when JB5 sets 3-4 closed<br><br>* Apply for inverter control voltage in range of 0~5V. Each step interval is in 1                                                                                                                                                                                                                          |
| Backlight on/off control     | 0xe1,<br>"0"  <br>"1"  <br>"r"   "R"  <br>"?"    | Set backlight brightness =<br>Disable backlight<br>Enable backlight<br>Reset<br>Query | Backlight on/off.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Backlight PWM**              | 0xe5,<br>"0"   "1"  <br>"r"   "R"  <br>"?"       | Set backlight type<br>D/A or PWM<br>Reset<br>Query                                    | "1" – PWM<br>"0" – D/A                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Backlight PWM Frequency**    | 0xe6,<br>nnn   "+"   "-"  <br>"r"   "R"  <br>"?" | Set Backlight PWM Frequency =<br>Value/ increment/ decrement<br>Reset<br>Query        | +/- 20Hz<br>Value<br>100Hz : "0", "6", "4"<br>120Hz : "0", "7", "8"<br>140Hz : "0", "8", "C"<br>160Hz : "0", "A", "0"<br>180Hz : "0", "B", "4"<br>200Hz : "0", "C", "8"<br>220Hz : "0", "D", "C"<br>240Hz : "0", "F", "0"<br>260Hz : "1", "0", "4"<br>280Hz : "1", "1", "8"<br>300Hz : "1", "2", "C"<br>320Hz : "1", "4", "0"<br>340Hz : "1", "5", "4"<br>360Hz : "1", "6", "8"<br>380Hz : "1", "7", "C"<br>400Hz : "1", "9", "0"<br>420Hz : "1", "A", "4"<br>440Hz : "1", "B", "8" |
| Backlight Invert**           | 0xe7,<br>0"   "1"  <br>"r"   "R"  <br>"?"        | Set backlight invert<br>Normal or Invert<br>Reset<br>Query                            | "1" – Invert<br>"0" – Normal                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| OSD menu lock                | 0xf6,<br>n   "0"   "1"  <br>"r"   "R"  <br>"?"   | OSD menu lock Off/ On<br><br>Reset<br>Query                                           | "0" – OSD menu lock Off<br>"1" – OSD menu lock On                                                                                                                                                                                                                                                                                                                                                                                                                                   |

# - Function in ARGB mode only

\*\* - Only effective on V1.10.00 or up firmware version.

\*\*\* - Only effective on V1.16.00 or up firmware version.

### 3. Other control

| Function                      | Command                     | Description                                          | Acknowledge (if enabled)                                  |
|-------------------------------|-----------------------------|------------------------------------------------------|-----------------------------------------------------------|
| Select RS-232 acknowledge     | 0xc1, "0"   "1"             | Disable/enable command acknowledge.                  | "0" – acknowledge disabled.<br>"1" – acknowledge enabled. |
| Auto-setup <sup>#</sup>       | 0xc3                        | Start auto-setup of current vmode.                   | "0" – fail.<br>"1" – successful.                          |
| Command availability          | 0xc4, n                     | Check whether a command is available.                | "0" – not available.<br>"1" – available.                  |
| Auto-calibration <sup>#</sup> | 0xc5                        | Start auto-calibration of gain of the RGB amplifier. | "0" – fail.<br>"1" – successful.                          |
| Soft Power On/Off             | 0xc8,<br>"0"   "1"  <br>"?" | Soft power On/off query                              | "0" – soft power off.<br>"1" – soft power on.             |
| Query BIOS version            | 0xcb, "0"                   | Read BIOS version                                    | "nnnn" = BIOS ver. "nn.nn"                                |
| Query PCBA number             | 0xcb, "1"                   | Read PCBA number                                     | "nnnn" = PCBA number<br>ALR-1920="41727"                  |
| Load factory defaults         | 0xce                        | Reset all parameters to factory default value        | "1" – successful.                                         |

<sup>#</sup> - Function in ARGB mode only

**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     |      |       |

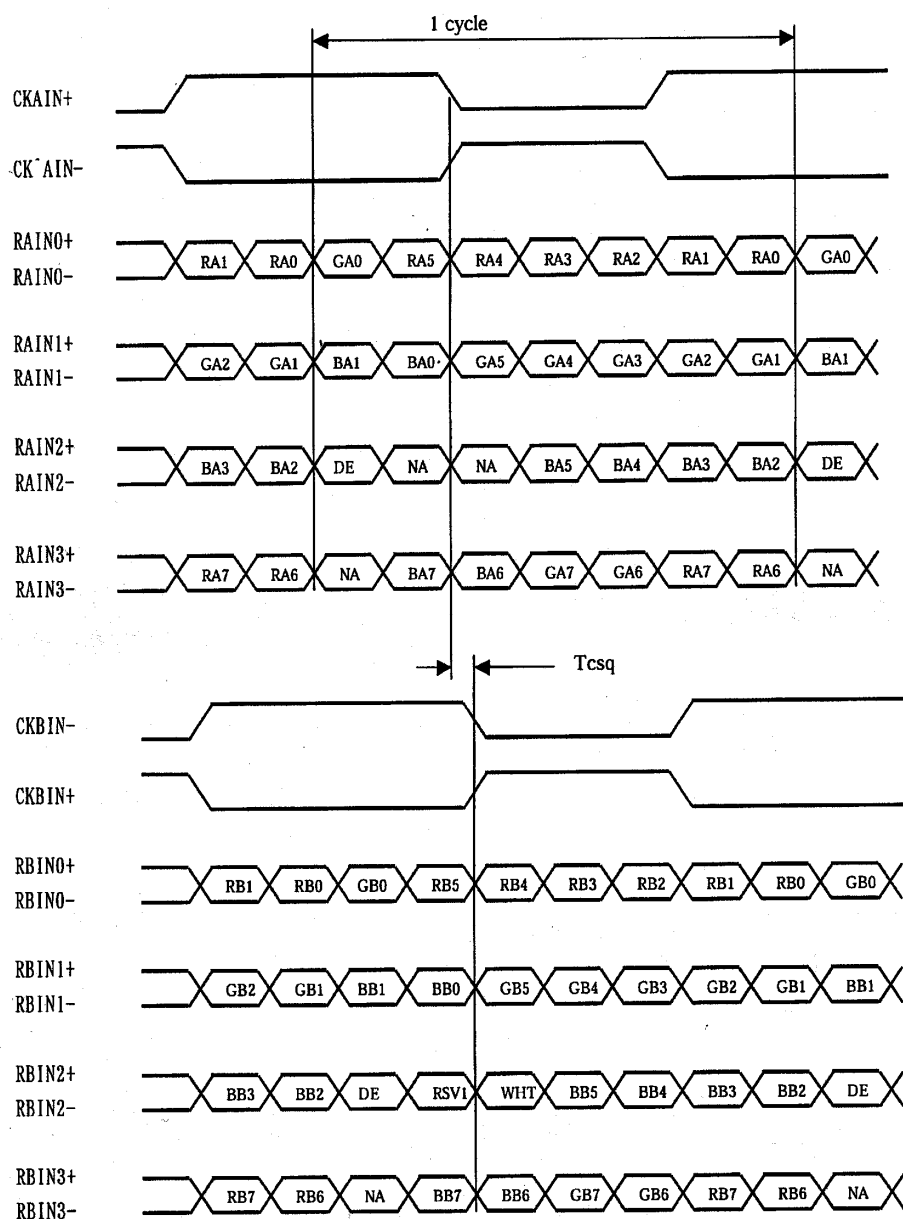
## Appendix III – DDC/CI support at ARGB, HDMI & Display port

This controller (start from V1.08.00 or later firmware revision) supports the following DDC/CI commands at ARGB, HDMI & Display port :

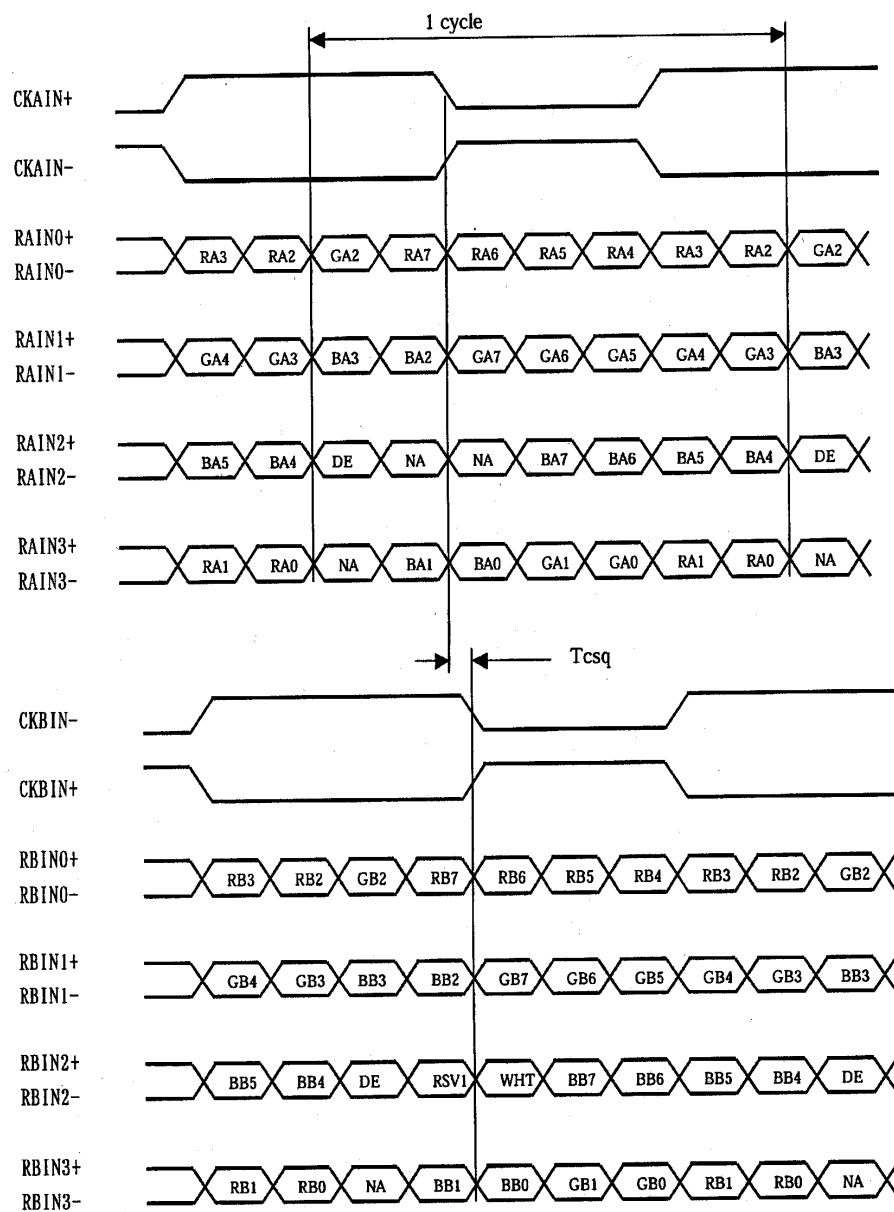
- Brightness
- Contrast
- RGB Color
- Input Source (VGA, HDMI & Displayport)
- Power States (On, Standby, Sleep)
  - On mode: Always on. Display No sync message and never goes off when no signal
  - Standby mode: Off backlight & Off panel power when no signal
  - Reduced power off / Sleep mode: Screen saver on = Always On; Screen saver off = Backlight off. Display "No sync" message for 10sec, then off backlight

## Appendix IV – Mapping definition

- Definition of Mapping A :



- Definition of Mapping B :



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## Appendix V – Auto Color Gain

The Auto Color Gain function is supported in the ARGB 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.



**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 VI – DV remote control unit work for ALR-1920

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

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



| BUTTON                  | FUNCTION                                                                                                                                              |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| POWER BUTTON            | Soft power ON/OFF button.                                                                                                                             |
| ATTENTION BUTTON        | Use combined with digit keys to enable/disable the IR function.<br>ALR-1920 : "Attention" + "1"                                                       |
| MUTE BUTTON (M)         | Switch to mute on/off mode.                                                                                                                           |
| SEL UP (▲) / SEL DN (▼) | Press this button to select the items in the OSD menu.                                                                                                |
| VOLUME (+/-) BUTTON     | Press the "+" button to increase the volume and the "-" to decrease the volume.                                                                       |
| + / - BUTTON            | Use "+" button to direct control the hotkey function for switching to next input source.<br>In OSD menu, pressing this button to adjust the settings. |
| DISPLAY BUTTON          | Activate the OSD menu display on screen.                                                                                                              |
| STOP (VGA) BUTTON       | Press this button in the non OSD menu display mode to select VGA source.                                                                              |
| HDMI BUTTON             | Press this button in the non OSD menu display mode to select DVI source.                                                                              |

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## **WARRANTY**

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

The warranty does not apply to:

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

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

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## **CAUTION**

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

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## **LIMITATION OF LIABILITY**

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

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- ALR-1920

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Specifications subject to change without notice

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