# DIGITAL **VIEW**®

## HDMI, VIDEO INTERFACE CONTROLLER
## FOR eDP PANEL

# Model: DT-1920-HDMI-EDPT

Part number : 41766001X-3 or up

# INSTRUCTIONS

## CONTENTS

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

## Introduction

**Designed for LCD monitor and other flat panel display applications, the DT-1920-HDMI-EDPT is a feature rich interface controller for :**

➢ **TFT (active matrix) LCD panels of 1920x1080 resolutions in 60Hz with eDP panel interface.**
➢ **Support true 8 bits panel**
➢ **Support HDMI input.**

### HOW TO PROCEED
➢ Ensure you have all parts & that they are correct, refer to:
   • Connection diagram

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

   • Connector reference (in following section)
   • Assembly notes
➢ Check controller switch & jumper settings (errors may damage the panel)
➢ Prepare the signal sources
➢ Connect the parts
➢ Understand the operation & functions

### IMPORTANT USAGE NOTE
This equipment is for use by developers and integrators, the manufacturer accepts no liability for damage or injury caused by the use of this product. It is the responsibility of the developer, integrators or other user of this product to:
• Ensure that all necessary and appropriate safety measures are taken.
• Obtain suitable regulatory approvals as may be required.
• **Check power settings to all component parts before connection.**

### DISCLAIMER
There is no implied or expressed warranty regarding this material.

## SYSTEM DESIGN

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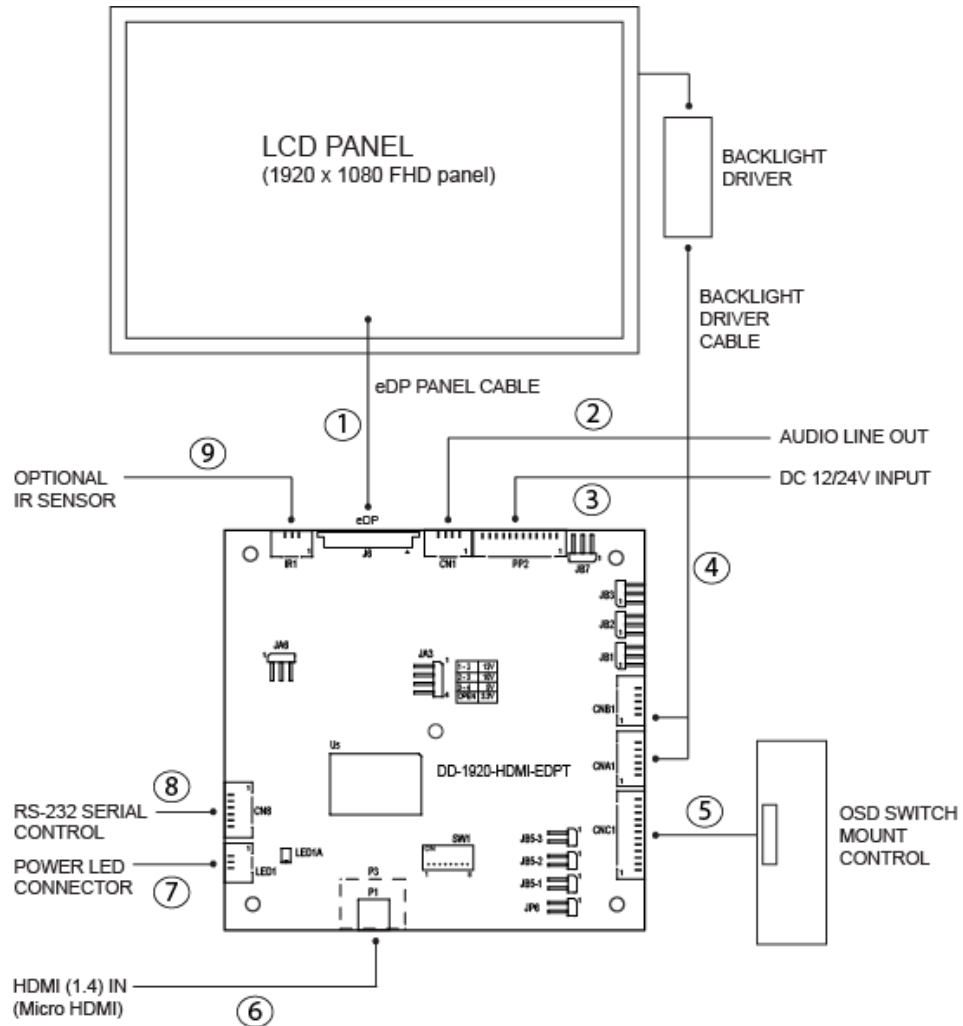


Cable requires for connection:

1. eDP cable : Custom made
2. Audio line out cable : 426454900-3, 300mm
3. Power in cable : 426019600-3, 300mm
4. Backlight driver cable : Custom made
5. OSD switch mount cable : 426122900-3, 300mm
6. HDMI cable (Micro HDMI to Standard HDMI) : N/A
7. Power LED cable : 426032100-3, 300mm
8. CN8 extend cable : 426092400-3, 100mm
9. IR extend cable : 426032100-3, 300mm

## ASSEMBLY NOTES

This controller is designed for monitor and custom display projects using 1920x1080 resolution with eDP interface panels. 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 eDP interfaced panels with panel voltage 3.3V(4A), 5V(4A), 10V(4A) or 12V(4A). Due to the variation between manufacturers of panels signal timing and other panel characteristics, factory setup and confirmation should be obtained before connecting to a panel. **(NOTE: Check panel power jumper settings before connection)**

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

3.  **Panel cable**: In order to provide a clean signal it is recommended that all eDP panel cables supplied by Digital View. Care should be taken when placing the cables to avoid signal interference.

4.  **Inverter/Backlight driver**: This will be required for the backlight of an LCD, some LCD panels have an inverter/backlight driver built in. As LCD panels may have 1 or more backlight tubes and the power requirements for different panel backlights may vary it is important to match the inverter/backlight driver in order to obtain optimum performance. See Application notes page 19 for more information on connection.

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

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

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

8.  **Optional LED**: The pin direction of the LED should be corrected for right color indication. Red color stands for standby. Green colors stands for signal on. The status LED is an optional part only, can be unconnected.

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

10. **RS-232 control interface :** Serial control via this interface port.

11. **External panel power output** : User for specific panel model.

12. **Panel control signal :** Use for specific panel model.

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

14. **Micro HDMI input :** Plug the HDMI cable to the Micro HDMI connector P1 on the controller board. (Standard HDMI (Type A) connector P3 is a built option on request.)

15. **Power Input**: 12V/24VDC is required, this should be a regulated supply. It allows 12V (5A) or 24V (5A) via PP2 power input connector. The power rating is depending on the panel and inverter used. Although the controller provides power regulation for the LCD power, this does not relate to the power supplied to the backlight driver/inverter.
    If an unregulated power supply is provided to an backlight driver/inverter, any fluctuations in power may affect operation, performance and lifetime of the inverter and or backlight tubes.

*   **Power output**: Note the controller has an overall 3Amp current limit and the current available from the auxiliary power output will be dependent on the power input and other system requirements.

*   **Power Safety**: Note that although only 12V / 24VDC is required as 'power-in' a backlight inverter for panel backlighting produces significantly higher voltages (the inverter does not connect to the ground plane). We strongly advise appropriate insulation for all circuitry.

*   **EMI**: Shielding will be required for passing certain regulatory emissions tests. Also the choice of external Controller to PC signal cable can affect the result.

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

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

Specifications subject to change without notice

- **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 & backlight driver:** Connect the inverter/Backlight driver (if it is not built-in the panel) to the inverter/backlight connector of the LCD panel.
2. **eDP interface panels:** The controller board supports eDP interface FHD panel. Plug the eDP cable to J6. And make sure the matching panel timings and correct jumper settings (JA3 & JA6) by referring to the panel support table and jumper settings table in page 12-14.
3. **Inverter/Backlight driver:** Plug the inverter/backlight cable to CNB1 and CNA1 (if necessary). Plug another end to the connector on the inverter/backlight of panel side.
4. **Function switch & Controller:** Plug the OSD switch mount cable to CNC1 on the controller board and another to the OSD switch mount.
5. **LED & Controller:** Plug in a 3-way with dual color LED to connector LED1 on the controller board.
6. **IR & Controller:** Plug in a 3-way with IR sensor to connector IR1 on the controller board.
7. **Jumpers & Inverter & Panel voltage:** Particularly pay attention to the settings of JA3, JA6, JB2 and JB3. JB2 & JB3 are used for inverter control (read inverter specification and information on the jumper table to define the correct settings). JA3 & JA6 is used for panel voltage input (read panel specification and information on the jumper table to define the correct settings).
8. **Input signal cable & Controller:** Plug the corresponding signal input to the connector on the controller board.
9. **Power supply & Controller:** Plug the DC 12V/24V power in to the connector PP2.
10. **Power on:** Switch on the controller board and panel by using the OSD switch mount.

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

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

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

**LCD DISPLAY SYSTEM SETTINGS**

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

| Controls | Analog VR type | Digital type |
|---|---|---|
| On/Off – turns controller board power on | VR toggle switch | On/Off button |
| Brightness – controls backlight brightness | Rotary VR | Brightness +/- buttons |
| Menu<br>• Turns OSD menu On or Off (it will auto time off) | Menu button | Menu button |
| Select up<br>• Moves the selector to the previous level function (up) | SEL UP | SEL UP |
| Select down<br>• Moves the selector to the next level function (down)<br>• Confirm the OSD selection | SEL DN | SEL DN |
| +<br>• Increase the OSD parameter values<br>• Moves the selector to next function (forward) | + | + |
| -<br>• Decrease the OSD parameter values<br>• Moves the selector to previous function (backward) | - | - |
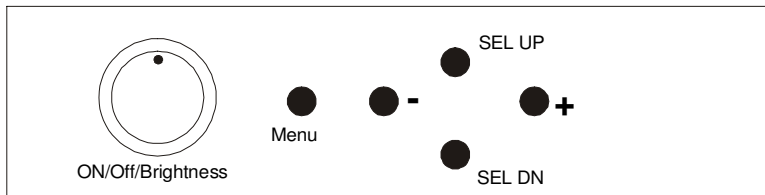


Analog VR type

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

OSD cable: P/N 416122900-3
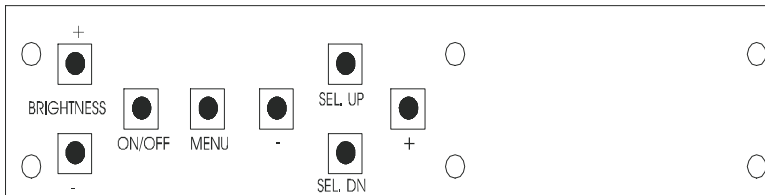


Digital type

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

OSD cable: P/N 416122900-3

OSD functions

| | Picture: |
|---|---|
| **Picture** (icon) | **Brightness**      **Brightness:**  [0-100]     [Default 50]<br>                  **Invert:**     OFF      [Default]<br>                              ON<br><br>                  **D/A / PWM:**  PWM  [Default]<br>                                    D/A<br><br>                  **Frequency:**  [100Hz - 440Hz]   [Default 240Hz]<br><br><br>**Black level**   [0-100]     [Default 50]<br>**Contrast**     [0-100]     [Default 50]<br>**Sharpness**    [0-4]       [Default 2] |
| **Color** (icon) | **Color:**<br><br>**Gamma :**  1.8<br>            2.0<br>            2.2   [Default]<br>            2.4<br>            2.6<br><br>**Temperature:** 9300<br>                  7500<br>                  6500   [Default]<br>                  5000<br>               **sRGB**<br>               **User : R** [0-255]<br>                        **G** [0-255]<br>                        **B** [0-255]<br><br>**Hue:**       [0-100]     [Default 50]<br>**Saturation**  [0-100]     [Default 50] |
| **Advanced** (icon) | **Advanced:**<br><br>**Aspect Ratio: Full**    [Default]<br>                16:9<br>                4:3<br>                5:4<br><br>**Default Power: OFF**<br>                    ON   [Default] |
| **Audio** (icon) | **Audio:**<br><br>**Volume**  [0-100]    [Default 50]<br><br>**Mute: ON**<br>       OFF        [Default] |
| **Other** (icon) | **Other:**<br><br>**Reset**<br><br>**Menu Time**  [0 (Always On), 10-60]     [Default 10]<br><br>**OSD H Position**  [0-100]    [Default 50]<br><br>**OSD V Position**  [0-100]    [Default 50]<br><br>**Language**                [English/French*/Spanish*]    [Default English]<br><br>**Transparency**  [0-255]     [Default 0]<br><br>**Rotate: 0**                [Default 0]<br>         90<br>        270<br>        180 |

Specifications subject to change without notice

| | |
|---|---|
| Information | **Information:**<br><br>D1: HDMI<br>1920x1080@60.0Hz<br>H: 67.5KHz   PCLK: 148.6MHz<br>HDCP Disabled |

**Remark :**
**\* - Only effective on V1.02.00 or up version.**
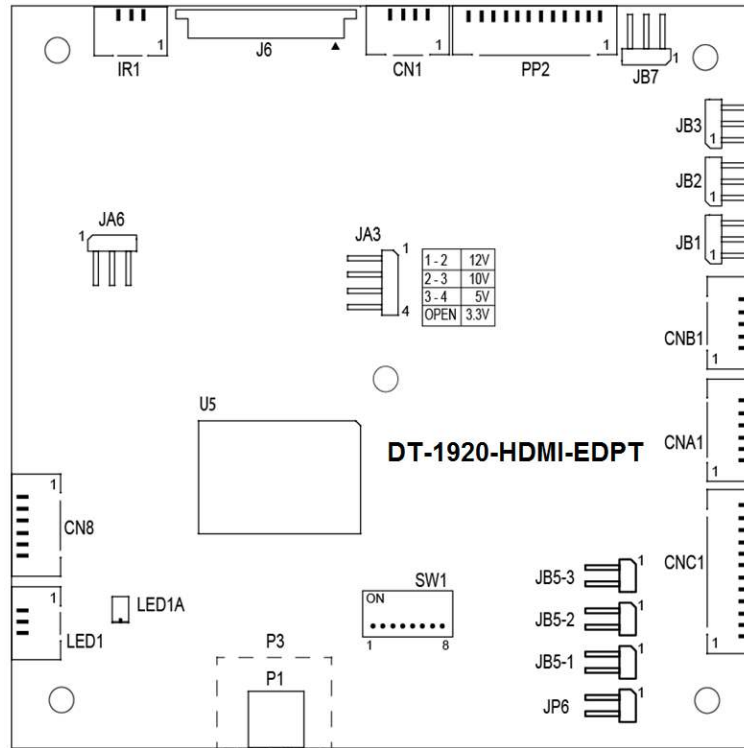
## CONNECTORS, PINOUTS & JUMPERS

The various connectors are:



**Summary: Connectors**

| Ref | Purpose | Description |
|---|---|---|
| CN1 | Audio outut (Stereo) from HDMI | 12513WR-04 or compatible    (Matching type : Molex 51146-0400 or compatible) <br> (Matching audio out cable P/N 426454900-3 (300mm)) |
| CN8 | RS-232 serial control | 12513WR-06 or compatible    (Matching type : Molex 51146-0600 or compatible) <br> (Matching RS-232 extend cable P/N 426092400-3 (100mm)) |
| CNA1 | Auxiliary power output | 12513WR-06 or compatible    (Matching type : Molex 51146-0600 or compatible) <br> (Matching extend cable P/N 426092400-3 (100mm)) |
| CNB1 | Backlight inverter | 12513WR-05 or compatible    (Matching type : Molex 51146-0500 or compatible) <br> (Matching reference cable P/N 426065400-3 (300mm)) |
| CNC1 | OSD control | 12513WR-12 or compatible    (Matching type : Molex 51146-1200 or compatible) <br> (Matching OSD switch mount cable P/N 426122900-3 (300mm)) |
| IR1 | Infra-red sensor connector | 12513WR-03 or compatible    (Matching type : Molex 51146-0300 or compatible) <br> (Matching IR extend cable P/N 426032100-3 (300mm)) |
| J6 | eDP connector | I-PEX 20455-030E-12    (Matching type : I-PEX 20454-030T) |
| LED1 | Power LED connector | 12513WR-03 or compatible    (Matching type : Molex 51146-0300 or compatible) <br> (Matching LED extend cable P/N 426032100-3 (300mm)) |
| P1 | HDMI in | Micro HDMI connector (Type D) |
| P3 | HDMI in (Build option) | Standard HDMI connector (Type A) |
| PP2 | Power input | 12513WR-12 or compatible    (Matching type : Molex 51146-1200 or compatible) <br> (Matching power extend cable P/N 426019600-3 (300mm)) |
| SW1 | Panel selection | 8-way DIP Switch |

**Summary: Jumpers setting**

| Ref | Purpose | Note |
|---|---|---|
| JA3 | Panel power voltage select<br>**CAUTION**: Incorrect setting can damage panel | See panel voltage setting table 1 |
| JA6 | Panel power voltage select<br>**CAUTION:** Incorrect setting will cause panel damage | See panel voltage setting table 1 |
| JB1 | Backlight brightness voltage range | 1-2 = 3.3V max<br>2-3 = 5V max |
| JB2 | Backlight inverter on/off control – signal level | 2-3 = On/Off control signal 'High' = +5V<br>1-2 = On/Off control signal 'High' = +3.3V<br>Open = On/Off control signal 'High' = Open collector<br>**CAUTION**: 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 | JB5-1 = VR/Digital switch mount control<br>JB5-2 = Analog backlight brightness - voltage range 0~5V<br>JB5-3 = PWM (Pulse Width Modulation) brightness |
| JB7 | Backlight control voltage on CNB1 pin4 (Function when JB5-1 sets closed) | Open = For OSD switch mount control (Default)<br>1-2    = 0V<br>2-3    = 3.3V/5V controlled by JB1 |
| JP6 | Input power control | Short = External switch control and fix the board ON<br>Open = Switch mount control |
| SW1 | 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 | OPEN | 1-2 | |
| | 5V | 3-4 | 1-2 | |
| | 10V | 2-3 | 1-2 | |
| | 12V | 1-2 | 2-3 | |

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

| Input voltage via PP2 | Panel Voltage | JA3 | JA6 | Jumper on board |
|---|---|---|---|---|
| 24VDC** | 3.3V | OPEN | 1-2 | |
| | 5V | 3-4 | 1-2 | |
| | 10V | 2-3 | 1-2 | |
| | 12V | 1-2 | 1-2 | |

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

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

JA3, JA6 location on board : (Please pay attention to the jumper settings on JA3, JA5 & JA6 which are red in color)
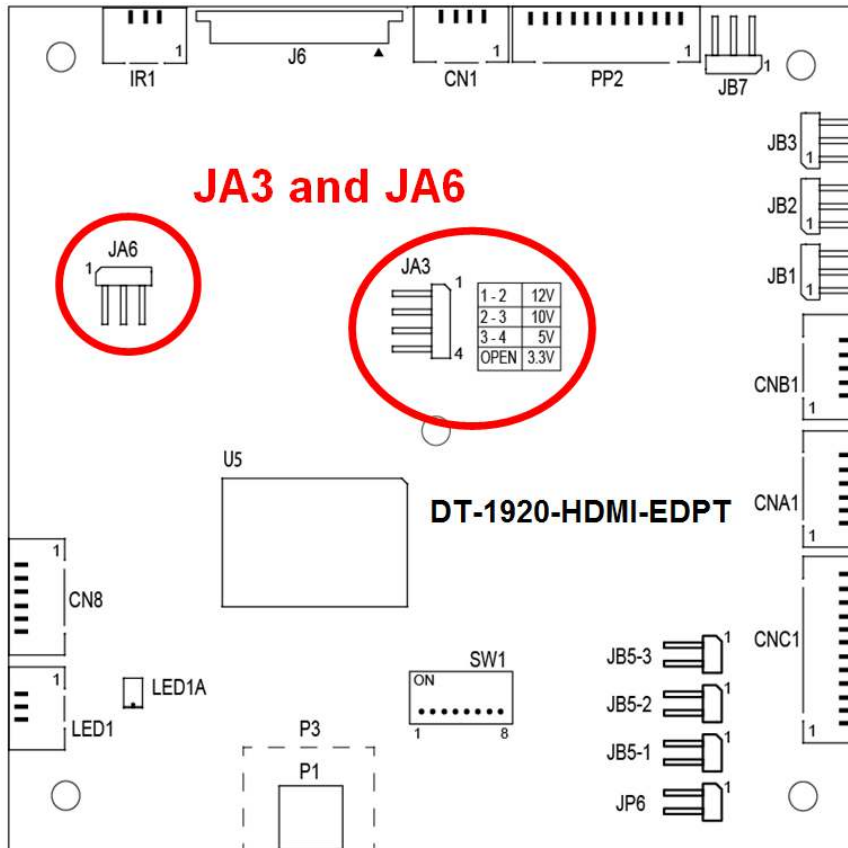
**Table 2 : DIP Switch selection – SW1**

| Pos #1 | Pos #2 | Pos #3 | Pos.#4 | Description | Panel resolution |
|--------|--------|--------|--------|-------------|------------------|
| For WUXGA panels | | | | |
| OFF | OFF | OFF | OFF | Innolux N173HGE-E11 | 1920x1080 |
| | | | | NLT NL192108BC18-06F | 1920x1080 |
| | | | | AUO G156HAB01.0 | 1920x1080 |
| OFF | ON | OFF | OFF | AUO G101UAN01.0 | 1920x1200 |

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

| Pos #5 | Pos #6 | Pos #7 | Description |
|--------|--------|--------|-------------|
| OFF | OFF | OFF | WUXGA (1920 x 1200 / 1080) |
| ON | OFF | OFF | UXGA |
| OFF | ON | OFF | SXGA |
| ON | ON | OFF | WXGA (1366 x 768) |
| OFF | OFF | ON | XGA |
| ON | OFF | ON | SVGA |
| OFF | ON | ON | VGA / WVGA |
| ON | ON | ON | Others |

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

**CN1 – Audio output (Stereo) from HDMI: YEONHO 12513WR-04 compatible   (Matching type : Molex 51146-0400 or compatible)**

| 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 channel (Positive) |

**CN8 – RS-232 serial control: YEONHO 12513WR-06 compatible            (Matching type : Molex 51146-0600 or compatible)**

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

**CNA1 -  Auxiliary power output: YEONHO 12513WR-06 compatible           (Matching type : Molex 51146-0600 or compatible)**

| PIN | SYMBOL | DESCRIPTION |
|---|---|---|
| 1 | AUX 12V / 24V | +12V / +24V DC |
| 2 | AUX 12V / 24V | +12V / +24V DC |
| 3 | AUX 12V / 24V | +12V / +24V DC |
| 4 | GND | Ground |
| 5 | GND | Ground |
| 6 | AUX 5V | +5V DC, 500mA max. |

**CNB1 – Backlight inverter connector: YEONHO 12513WR-05 compatible     (Matching type : Molex 51146-0500 or compatible)**

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

**CNC1 – OSD switch mount control: YEONHO 12513WR-12 compatible        (Matching type : Molex 51146-1200 or compatible)**

| 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.

**IR1 – Infra-Red sensor connector: YEONHO 12513WR-03 compatible        (Matching type : Molex 51146-0300 or compatible)**

| PIN | SYMBOL | DESCRIPTION |
|---|---|---|
| 1 | GND | Ground |
| 2 | VCC | +3.3V |
| 3 | IR Data | IR data |

**J6 – eDP connector: I-PEX 20455-030E-12   (Matching type : I-PEX 20454-030T)**

| PIN | SYMBOL | DESCRIPTION |
|---|---|---|
| 1 | GND | Ground |
| 2 | GND | Ground |
| 3 | GND | Ground |
| 4 | GND | Ground |
| 5 | PANEL_VCC | Panel power |
| 6 | PANEL_VCC | Panel power |
| 7 | PANEL_VCC | Panel power |
| 8 | PANEL_VCC | Panel power |
| 9 | PANEL_VCC | Panel power |
| 10 | DP_TX_33V | Power for connector (3.3V 500mA) |
| 11 | GND | Ground |
| 12 | DPTX_HPD | Hot Plug Detect |
| 13 | DPTX_AUX_N | Auxiliary Channel (negative) |
| 14 | GND | Ground |
| 15 | DPTX_AUX_P | Auxiliary Channel (positive) |
| 16 | GND | Connected to Ground (100K) |
| 17 | GND | Connected to Ground (100K) |
| 18 | DPTX_L3N | Lane 3 (negative) |
| 19 | GND | Ground |
| 20 | DPTX_L3P | Lane 3 (positive) |
| 21 | DPTX_L2N | Lane 2 (negative) |
| 22 | GND | Ground |
| 23 | DPTX_L2P | Lane 2 (positive) |
| 24 | DPTX_L1N | Lane 1 (negative) |
| 25 | GND | Ground |
| 26 | DPTX_L1P | Lane 1 (positive) |
| 27 | DPTX_L0N | Lane 0 (negative) |
| 28 | GND | Ground |
| 29 | DPTX_L0P | Lane 0 (positive) |
| 30 | GND | Ground |

**LED1 – Status LED connector: YEONHO 12513WR-03 compatible          (Matching type : Molex 51146-0300 or compatible)**

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

**P1 – HDMI (1.4) Micro HDMI connector (Type D)**

| PIN | SYMBOL | DESCRIPTION |
|---|---|---|
| 1 | HPDET | Hot Plug Detect |
| 2 | UTILITY | N.C. on device |
| 3 | DATA2+ | TMDS Data2+ |
| 4 | DATA2S | TMDS Data2 Shield |
| 5 | DATA2- | TMDS Data2− |
| 6 | DATA1+ | TMDS Data1+ |
| 7 | DATA1S | TMDS Data1 Shield |
| 8 | DATA1- | TMDS Data1− |
| 9 | DATA0+ | TMDS Data0+ |
| 10 | DATA0S | TMDS Data0 Shield |
| 11 | DATA0- | TMDS Data0− |
| 12 | CLK+ | TMDS Clock+ |
| 13 | CLKS | TMDS Clock Shield |
| 14 | CLK- | TMDS Clock− |
| 15 | CEC | CEC control |
| 16 | DDC/CEC GND | DDC/CEC Ground |
| 17 | SCL | SCL (I²C Serial Clock for DDC) |
| 18 | SDA | SDA (I²C Serial Data Line for DDC) |
| 19 | +5V | +5V Power (max 50mA) EDID/DDC |

**P3 – HDMI (1.4) Standard HDMI connector (Type A) – Build option**

| 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 | NC | No connection |
| 14 | NC | No connection |
| 15 | SCL | SCL (I²C Serial Clock for DDC) |
| 16 | SDA | SDA (I²C Serial Data Line for DDC) |
| 17 | GND | Ground |
| 18 | +5V | +5 V Power (max 50 mA) |
| 19 | HPDET | Hot Plug Detect |

**PP2 – Power supply: YEONHO 12513WR-12**

| PIN | SYMBOL | DESCRIPTION |
|---|---|---|
| 1 | VDD (+12V/24V) | +12V / +24V in |
| 2 | VDD (+12V/24V) | +12V / +24V in |
| 3 | VDD (+12V/24V) | +12V / +24V in |
| 4 | VDD (+12V/24V) | +12V / +24V in |
| 5 | VDD (+12V/24V) | +12V / +24V in |
| 6 | VDD (+12V/24V) | +12V / +24V in |
| 7 | GND | Ground |
| 8 | GND | Ground |
| 9 | GND | Ground |
| 10 | GND | Ground |
| 11 | GND | Ground |
| 12 | GND | Ground |

## CONTROLLER DIMENSIONS
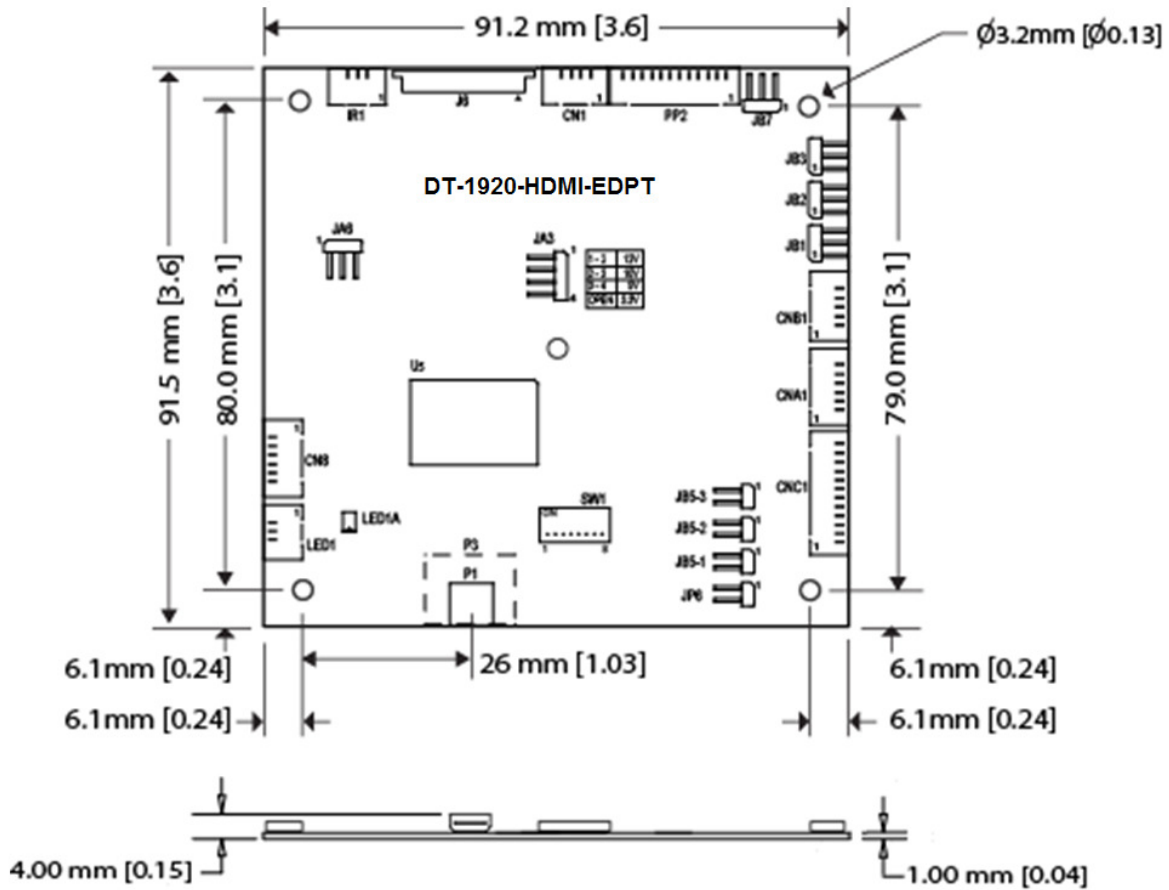


**Ready-made 3D Pro-E (SLDPRT) drawing files -** Save time and effort for your system volumetric analysis design. Includes jpg file previews. Please go to download at http://www.digitalview.com/products/DT-1920-HDMI-EDPT-lcd-controller

**The maximum thickness of the controller is 4mm** (measured from bottom of PCB to top of components, including any underside components & leads).  We recommend clearances of:
* 5mm from bottom of PCB - if mounting on a metal plate we also recommend a layer of suitable insulation material is added to the mounting plate surface.
* 10mm above the components
* 3~5mm around the edges

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

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

## APPLICATION NOTES

**USING THE CONTROLLER WITHOUT BUTTONS ATTACHED**
This is very straightforward:
• Firstly setup the controller/display system with the buttons. With controls attached and display system active make any settings for color, tint and image position as required then switch everything off.
• Remove the control switches, the 12-way (CNC1) cable.
• Use a jumper or similar to connect pins 1 & 2 on JP6, this will fix the board On.
• Refer to inverter specifications for details as to fixing brightness to a desired level, this may require a resistor, an open circuit or closed circuit depending on inverter.

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

**INVERTER CONNECTION**
There are potentially 3 issues to consider with inverter connection:
• Power
• Enable
• Brightness
Please read the following sections for a guide to these issues.

**Inverter Power**: As per the table for CNB1 pin 1 is ground and pin 2 provides 12V/24V DC. This should be matched with the inverter specification: see table.

**CNB1**

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

Remark: For higher power inverter, more current (for 12V/24V) can be taken from CNA1 pin 1.

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

**CNB1**

| PIN | DESCRIPTION |
|-----|-------------|
| 3 | Enable |

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

| Ref | Purpose | Note |
|-----|---------|------|
| JB2 | Inverter enable voltage | 1-2 H = 3.3V, 2-3 H = 5V, OPEN H = open collector |
| JB3 | Inverter control | 1-2 H = On, 2-3 L = On |

**Brightness**: There are various methods for brightness control and it is important to consider the specifications for the inverter to be used. Generally the situation is:
• Brightness can control by using a resistor or VR (Variable Resistor).
• Brightness controlled by adding a circuit such as PWM (Pulse Width Modulation).
• No adjustment of brightness is possible.
CNB1 pins 4 & 5 are available for connecting to an inverter or circuit where VR control is supported.

**CNB1**

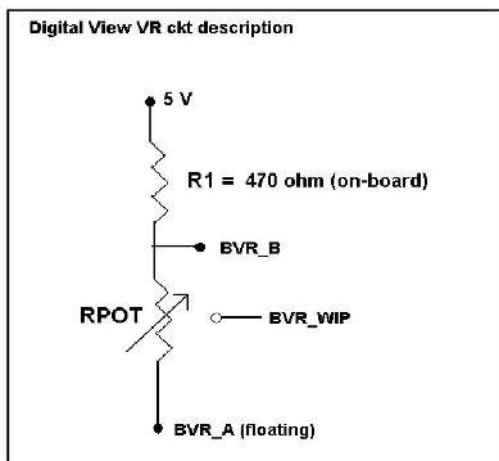| PIN | DESCRIPTION |
|-----|-------------|
| 4 | VR WIP |
| 5 | VR A |

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

**CNC1**

| PIN | DESCRIPTION |
|-----|-------------|
| 3 | VR A |
| 4 | VR WIP |
| 5 | VR B |

**Design Guideline for making VR circuitry :**



Digital View VR ckt description

**Signal description / Notes :**
1) R1 : 470ohm on board
2) RPOT is an external potentiometer (in-line dip style) that can be plugged directly into CNC1 pins 3,4,5. RPOT must be supplied / installed by user.
3) BVR_B : Voltage tapped from "top" of potentiometer, the node of R1 and RPOT.
4) BVR_WIP : Voltage tapped from wiper arm of RPOT.
5) BVR_A : Voltage tapped from "bottom" of RPOT.

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

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

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

**CNC1 – 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 |

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

**Example for circuit design :**

1.)Choose RPOT = 10K
2.) Tie BVR_A to GND
3.) Circuit analysis gives BVR_WIP as the following (see Figure 1)
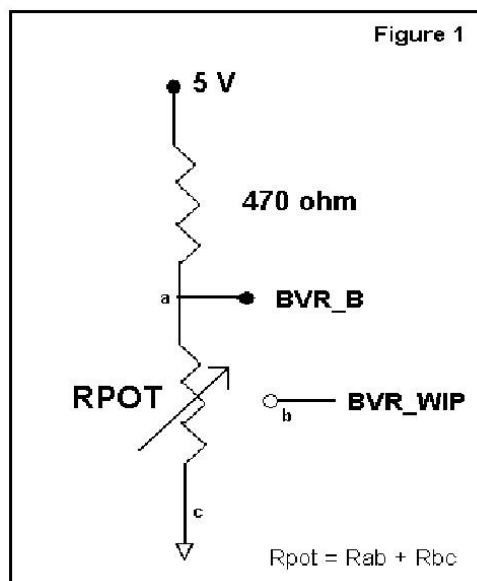
$$BVR\_WIP = 5 \times (Rbc/10.47)$$

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

To evaluate, plug in different values of Rbc :

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

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



Figure 1

## TROUBLESHOOTING

**General**
A general guide to troubleshooting a flat panel display system it is worth considering the system as separate elements, such as:
➢ Controller (jumpers, PC settings)
➢ Panel (controller, cabling, connection, panel, PC settings)
➢ Backlight (inverter, cabling, backlight tubes)
➢ Cabling
➢ Computer system (display settings, operating system)
Through step by step cross checking with instruction manuals and a process of elimination to isolate the problem it is usually possible to clearly identify the problem area.

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

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

**Image appearance:**
➢ A faulty panel can have blank lines, failed sections, flickering or flashing display
➢ Incorrect graphics card refresh rate, resolution or interlaced mode will probably cause the image to be the wrong size, to scroll, flicker badly or possibly even no image.
➢ Incorrect jumper settings on the controller may cause everything from total failure to incorrect image. CAUTION: Do not set the panel power input incorrectly.
➢ Sparkling on the display: faulty panel signal cable.

**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.

The following are some of LED indicators onboard that can help to know the health status of the controller board:

*LED1A*
- Green : Valid video signal received on the selected input port.
- Red : No video signal received on the selected input port.
- Green + Red : The board is fail to boot up. Suggest to send it back to factory for check.
- Off : The board is not powered on.

## SPECIFICATIONS

| | |
|---|---|
| Panel compatibility | Compatible with 1920x1200 resolutions of TFT LCD panels with eDP panel interface.<br><br>A specified BIOS and some factory adjustment is required for individual panel timings. |
| No. of colors | Up to 3 x 8 bit providing 16.7 million colors. |
| Panel power | DC 3.3V, 5V, 10V, 12V |
| Panel signal | eDP |
| Video inputs | HDMI 1.4 |
| Functions display | On screen display (OSD) of functions |
| OSD menu functions | Image controls:<br>Panel brightness/contrast, Saturation, Hue, Color temperature, Sharpness, Aspect ratio, Rotate, Gamma, PIP/PBP. |
| OSD menu controls available | Power On/Off<br>OSD Menu<br>OSD Select up<br>OSD Select down<br>Setting +<br>Setting – |
| Control interface | Buttons, RS-232, IR Remote control |
| Audio | Digital audio line out (from header) with OSD volume control. (not amplified) |
| Settings memory | Settings are stored in non volatile memory |
| PC Connectivity | VGA / SVGA / XGA / SXGA / UXGA / WUXGA  analog or digital |
| Controller dimensions | 91.4mm x 91.4mm (3.6" x 3.6") |
| Power consumption | 10W approx. (not including panel power consumption) |
| Power load maximum | The controller has an overall 3Amp current limit. |
| Input voltage | 12V/24VDC +/- 5% |
| On board battery lifetime | 3 years at storage (without applying power to the unit). The battery is not rechargeable. |
| Power protection | Fuse fitted (Resettable) |
| DC Power handling | Reverse power polarity protection is equipped on the board |
| Storage temperature limits | -40$^{o}$C to +70$^{o}$C |
| Operating temperature limits | 0$^{o}$C to +60$^{o}$C |
| Use of memory on board | Volatile memory<br>- 30KB SRAM (OSD)<br><br>Non-Volatile memory<br>- 32Mb Flash (System program)<br>- 16Kb EEPROM (System settings) |

**NOTES**

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

**APPENDIX I – SIGNAL SUPPORT MODE TABLE**

**HDMI 1.4 input port (P1 and P3) :**

| Resolution |
| --- |
| 640x480 60Hz |
| 640x480 72Hz |
| 640x480 75Hz |
| 800x600 56Hz |
| 800x600 60Hz |
| 800x600 72Hz |
| 800x600 75Hz |
| 1024x768 60Hz |
| 1024x768 70Hz |
| 1024x768 75Hz |
| 1280x720 50Hz |
| 1280x720 60Hz |
| 1280x768 60Hz |
| 1280x768 75Hz |
| 1280x800 60Hz |
| 1280x800 75Hz |
| 1280x1024 60Hz |
| 1280x1024 75Hz |
| 1360x768 60Hz |
| 1366x768 60Hz |
| 1440x900 75Hz |
| 1600x1200 75Hz |
| 1680x1050 60Hz |
| 1680x1050 75Hz |
| 1920x1080 60Hz |
| 1920x1200 60Hz |

| Resolution |
| --- |
| 480p60Hz |
| 480p59.94Hz |
| 576p50Hz |
| 720p60Hz |
| 720p59.94Hz |
| 720p50Hz |
| 1080p60Hz |
| 1080p59.94Hz |
| 1080p50Hz |

## Appendix II – RS-232 control protocols and command set

**RS-232 Serial control (Baud rate 9600), 8 bits, 1 stop bit and no parity**

*Physical connection :*

Controller side
Connector interface : CN8
Mating connector : Molex 51146-0600

Computer side
Connector interface : Serial port
Mating connector : DB9 Female
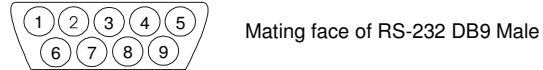
| 6 | 5 | 4 | 3 | 2 | 1 | Mating face of CN8 |

| 1 2 3 4 5 | |
| 6 7 8 9 | Mating face of RS-232 DB9 Male |

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

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

Remark :
(1) : CN8 extend cable (P/N 426092400-3) can be ordered separately for connection.

*Software connection :*

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

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

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

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

| Function | Command | Description | Acknowledge (if enabled) |
|---|---|---|---|
| Volume control - left+right channel | 0x80, "a" \| "A", nn \| "+" \| "-" \| "r" \| "R" \| "?" | Set audio (L+R) volume = value/increment/decrement<br>Reset<br>Query | nn = 0x00~ 0x64 (0~100%)<br><br>Default: 0x32 (50%) |
| Volume control - on/off (mute) | 0x80, "m" \| "M", "0" \| "1" \| "r" \| "R" \| "?" | Disable audio output.<br>Enable audio output.<br>Reset<br>Query | "0" - audio off (mute).<br>"1" - audio on. (Default) |
| Brightness control | 0x81, nn \| "+" \| "-" \| "r" \| "R" \| "?" "m" "n" | Set brightness = value/increment/decrement<br>Reset<br>Query Current Source<br>Maximum query<br>Minimum query | nn = 0x00~ 0x64 (0~100%)<br><br>Default: 0x32 (50%) |
| Contrast control | 0x82, "a" \| "A", nn \| "+" \| "-" \| "r" \| "R" \| "?" "m" "n" | Set contrast = value/increment/decrement<br>Reset<br>Query<br>Maximum query<br>Minimum query | nn = 0x00~ 0x64 (0~100%)<br><br>Default: 0x32 (50%) |
| Color saturation control | 0x83, nn \| "+" \| "-" \| "r" \| "R" \| "?" "m" "n" | Set color saturation = value/increment/decrement<br>Reset<br>Query<br>Maximum query<br>Minimum query | nn = 0x00~ 0x64 (0~100%)<br><br>Default: 0x32 (50%) |
| Hue control | 0x84, nn \| "+" \| "-" \| "r" \| "R" \| "?" "m" "n" | Set tint = value/increment/decrement<br>Reset<br>Query<br>Maximum query<br>Minimum query | nn = 0x00~ 0x64 (0~100%)<br><br>Default: 0x32 (50%) |
| Sharpness | 0x8a, nn \| "+" \| "-" \| "r" \| "R" \| "?" | Set sharpness = value/increment/decrement<br>Reset<br>Query | nn = 0x00~ 0x04<br><br>Default: 0x02 |
| Aspect Ratio | 0x8c, "1" \| "9" \| "A" \| "F" "r" \| "R" \| "?" | Set video aspect ratio= Value<br>Reset<br>Query | "1" – fill screen (Default)<br>"9" – 4:3<br>"A" – 16:9<br>"F" – 5:4 |
| Rotate OSD | 0x8f, "0" \| "1" \| "2" \| "3" \| "?" | Normal OSD rotate<br>rotated 90<br>rotated 180<br>rotated 270<br>Query | "0" – normal OSD. (Default)<br>"1" – rotated 90 OSD.<br>"2" – rotated 180 OSD.<br>"3" – rotated 270 OSD. |

| | | | |
|---|---|---|---|
| OSD H position | 0x90,<br>nn \| "+" \| "-" \|<br><br>"r" \| "R" \|<br>"?" | Set OSD horizontal position =<br> value/increment/decrement<br><br>Reset<br>Query | nn = 0x00~ 0x64 (left ~ right)<br><br>Default: 0x32 (middle) |
| OSD V position | 0x91,<br>nn \| "+" \| "-" \|<br><br>"r" \| "R" \|<br>"?" | Set OSD vertical position =<br> value/increment/decrement<br><br>Reset<br>Query | nn = 0x00~ 0x64 (top ~ bottom)<br><br>Default: 0x32 (middle) |
| OSD transparency | 0x92,<br>nn \| "+" \| "-" \|<br><br>"r" \| "R" \|<br>"?" | Set OSD transparency =<br> value/increment/decrement<br><br>Reset<br>Query | nn = 0x00~ 0x64 (0~100%)<br><br>Default: 0x00 (No transparency) |
| OSD menu timeout | 0x93,<br>nn \| "+" \| "-" \|<br><br><br>"r" \| "R" \|<br>"?" | Select menu timeout =<br>value/increment/decrement<br><br><br>Reset<br>Query | OSD menu timeout value.<br>nn = 0x00 – Always on<br>nn = 0x0A - 0x3C (10~60sec)<br>Default: 0x0A (10sec) |
| Select OSD language* | 0x95,<br>n \|<br>"r" \| "R" \|<br>"?" | Select language =<br>English, Chinese,…<br>Reset<br>Query | "0" – English (Default)<br>"2" - French<br>"3" – Spanish |
| GAMMA value select | 0x9d,<br>n \|<br>"r" \| "R"<br>"?" | Select GAMMA value =<br>Value<br>Reset<br>Query | "n":<br>"5" – 1.8,<br>"7" – 2.0,<br>"2" – 2.2,   (Default)<br>"A" – 2.4<br>"C" – 2.6 |
| Runtime counter | 0xa1,<br>nnnnn \|<br>"r" \| "R" \|<br>"?" | Set runtime counter value =<br> nnnnn (* 0.5 hour)<br>Reset to zero<br>Query | Runtime  = nnnnn.<br>Max. input = 0x1fffe  (0x1fffe * 0.5 hour = 65535 hours)<br>Runtime counter counts when backlight is on |
| Colour temperature select | 0xb3,<br>n \|<br>"r" \| "R" \|<br>"?" | Select colour temperature =<br> value<br>Reset<br>Query | "n" =<br>"2" – 6500K. (Default)<br>"4" – User<br>"5" – 9300K<br>"6" – 7500K<br>"7" – 5800K<br>"8" – sRGB |
| Red level of User colour temperature | 0xb4,<br><br>nn \| "+" \| "-" \|<br>"r" \| "R" \|<br>"?"<br>"m"<br>"n" | Set the level of the red channel for the user colour temp. =<br> value/increment/decrement<br>Reset<br>Query<br>Maximum query<br>Minimum  query | nn: 0x00~ 0xff  (0~255)<br><br><br>Default: 0x80 |
| Green level of User colour temperature | 0xb5,<br><br>nn \| "+" \| "-" \|<br>"r" \| "R" \|<br>"?"<br>"m"<br>"n" | Set the level of the green channel for the user colour temp.<br>=<br> value/increment/decrement<br>Reset<br>Query<br>Maximum query<br>Minimum  query | nn: 0x00~ 0xff  (0~255)<br><br><br>Default: 0x80 |
| Blue level of User colour temperature | 0xb6,<br><br>nn \| "+" \| "-" \|<br>"r" \| "R" \|<br>"?"<br>"m"<br>"n" | Set the level of the blue channel for the user colour temp. =<br> value/increment/decrement<br>Reset<br>Query<br>Maximum query<br>Minimum  query | nn: 0x00~ 0xff  (0~255)<br><br><br>Default: 0x80 |

| | | | |
|---|---|---|---|
| Video horizontal resolution enquiry | 0xb7 | Horizontal resolution (in pixels) in 3 to 4 digit hex number | |
| Video vertical resolution enquiry | 0xb8 | Vertical resolution (in lines) in 3 digit hex number | |
| Video horizontal sync frequency | 0xb9 | Horizontal sync frequency (in units of 100Hz) in 3 digit hex number | |
| Video vertical sync frequency | 0xba | Vertical sync frequency (in units of Hz) in 3 digit hex number and 1 char | "nnnc" = vertical frequency<br>nnn = 3 digit hex<br>c= "i" (interlace) or "p" (progressive) |
| OSD status enquiry | 0xbb | Status of OSD | "0" – OSD turned off<br>"1" – OSD turned on |
| OSD turn off | 0xbd | Turn off the OSD. | "0" – fail.<br>"1" – successful. |
| Backlight control | 0xe0,<br>nn \| "+" \| "-" \|<br>"R" \| "r" \|<br>"?" | Set Backlight level = value/increment/decrement<br>Reset<br>Query | nn = 0x00~ 0x64 (0~100%)<br><br>Default: 0x64 (100%) |
| Backlight On/Off | 0xe1,<br>"0" \| "1" \|<br>"R" \| "r"<br>"?" | Backlight Off  / Backlight On<br>Reset<br>Query | "0" – Backlight Off<br>"1" – Backlight On. (Default) |
| Backlight DA/PWM | 0xe5<br>"0" \| "1" \|<br>"R" \| "r"<br>"?" | Set backlight control method: PWM / DA<br>Reset<br>Query | "1" – PWM  (Default)<br>"0" – D/A |
| Backlight PWM frequency | 0xe6,<br>nnn \| "+" \| "-" \|<br>"R" \| "r" \|<br>"?" | Set backlight PWM frequency = value/increase 20Hz/decrease 20Hz<br>Reset<br>Query | Value<br>100Hz : "0","6","4"<br>120Hz : "0","7","8"<br>140Hz : "0","8","C"<br>160Hz : "0","A","0"  (Default)<br>180Hz : "0","B","4"<br>200Hz : "0","C","8"<br>220Hz : "0","D","C"<br>240Hz : "0","F","0"<br>260Hz : "1","0","4"<br>280Hz : "1","1","8"<br>300Hz : "1","2","C"<br>320Hz : "1","4","0"<br>340Hz : "1","5","4"<br>360Hz : "1","6","8"<br>380Hz : "1","7","C"<br>400Hz : "1","9","0"<br>420Hz : "1",'A","4"<br>440Hz : "1","B","8" |
| Backlight Invert | 0xe7<br>"0" \| "1" \|<br>"R" \| "r"<br>"?" | Set  invert backlight level :<br> Off / On<br><br>Reset<br>Query | "0" – Off  (Default)<br>"1" – On |
| OSD switch mount Lock | "0xee", "0x62"<br>"0" \|"1"<br>"?" | Unlock / Lock<br>Query | "0"- Unlock (Default)<br>"1"- Lock, no response to OSD switch mount keys |
| Default Power | "0xee", "0x6B",<br>"0x50"<br>"0"\|<br>"1"\|<br>"?" | Default power state after supplying power to controller<br>Off<br>On<br>Query | "0" - default power off<br>"1" - default power on |

### 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. (Default) |
| Command availability | 0xc4, nn / nnnn | Check whether a command is available. | "0" – not available.<br>"1" – available.<br><br>e.g "0x81" command<br>send<br>"0xc4 0x38 0x31"<br>feedback<br>"0xc4 0x38 0x31 0x31"<br><br>e.g "0xee 0x5c" command<br>send<br>"0xc4 0x45 0x45 0x35 0x43"<br>feedback<br>"0xc4 0x45 0x45 0x35 0x43 0x31" |
| Power On/Off | 0xc8,<br>"0" \| "1" \|<br>"?" | Soft power on/off<br>off/on<br>query | "0" – soft power off.<br>"1" – soft power on. |
| Query video input status | 0xc9 | Query the status of the displaying video windows source | Input status nn nn:<br>"0","0" : no video source / disabled<br>"H","1" D1: HDMI<br><br>Feedback 4 video windows status in form of:<br>nn nn  (P1) |
| Query BIOS version | 0xcb, "0" | Read BIOS version | BIOS version "VV.YY.ZZ"<br>VV = Vx or Ex, (x is version digit)<br>V = Release version<br>E = Engineering Sample<br><br>YY= Version Number<br><br>ZZ= Customer Number |
| Query PCBA number | 0xcb, "1" | Read PCBA number | "nnnnn" = PCBA number<br>DT-1920-HDMI-EDPT = "41766" |
| Query Revision Number | 0xcb, "3" | Read Revision Number | "nn" = Revision number AA in firmware version no. "VV.YY.ZZ.AA" |
| Reset parameters | 0xce | Reset all parameters to default value | "1" – successful. |

**Remark :**
**\* - Only effective on V1.02.00 or up version.**

n = 1-byte ascii-coded hex number, e.g., parameter value of 0x1 is represented by "1" (0x31).
mn or nn = 2-byte ascii-coded hex number, e.g., parameter value of 0x1e is represented by "1", "e" | "E" (0x31, 0x6e|0x4e).

n = 1-byte ascii-coded hex number, e.g., parameter value of 0x1 is represented by "1" (0x31).
mn or nn = 2-byte ascii-coded hex number, e.g., parameter value of 0x1e is represented by "1", "e" | "E" (0x31, 0x6e|0x4e).

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

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

**Hex to ASCII conversion table**

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

**Appendix III – DV remote control unit work for DT-1920-HDMI-EDPT**



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

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

| BUTTON | FUNCTION |
|---|---|
| POWER BUTTON | Soft power ON/OFF button. |
| SEL UP (∧) / SEL DN (∨) | 1. In OSD menu, pressing "SEL UP" button to move previous level of selection.<br>2. In OSD menu, pressing "SEL DN" button to move next level of selection or to CONFIRM the selection. |
| + BUTTON | When OSD menu displayed, press this button to select functions (forward) or increase the values. |
| - BUTTON | When OSD menu displayed, press this button to select functions (backward) or decrease the values. |
| OSD NEXT BUTTON | Use to turn on/off the OSD menu. |
| OSD BACK | Turn off the OSD menu. |
| Mute | Mute / Un-mute audio |

## 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.

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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.


## 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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**Revision History**

| Date | Rev No. | Page | Summary |
|---|---|---|---|
| 10 September 2018 | 1.0 | All | First issued. |
| 11 October 2018 | 1.1 | 3, 14 | Diagram, SW1 settings |
| 29 March 2019 | 1.2 | 8, 26 | Add French & Spanish language support on OSD menu and RS-232 command. |
| 18 Sept 2019 | 1.3 | 10 | Add matching cables for the connectors |
| 7 Nov 2019 | 1.4 | 1,2,18,28, 30,31 | Change the controller name from 'DD-1920-HDMI-EDPT' to 'DT-1920-HDMI-EDPT' |
| 7 May 2020 | 1.5 | 11 | Revised the JB1 (Backlight brightness voltage range) definition to JB1 : 1-2 closed = 3.3V max, 2-3 closed = 5V max. |