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**ANALOG INTERFACE CONTROLLER
FOR SXGA, XGA, SVGA, VGA RESOLUTION TFT LVDS LCD**

Model: AL-1280
(Part number: 4169300-1X or up)

INSTRUCTIONS

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It is essential that the sections on Assembly Notes and Connectors, Pinouts & Jumpers is read and understood before connecting or powering up this controller.

INTRODUCTION

Designed for LCD monitor and other flat panel display applications, the AL-1280 controller provides easy to use interface controller for:

- **TFT (active matrix) LCDs with LVDS interface of 1280x1024, 1024x768, 800x600, 640x480 resolution;**
- **Computer video signals of SXGA, XGA, SVGA, VGA standard**
- **Internal built-in LVDS Tx chips to support LVDS panel without using LVDS adaptor board**

HOW TO PROCEED

- Ensure you have all parts and that they are correct, refer to:
 - ◆ Connection diagram (separate document for each panel)
 - ◆ Connector reference (in following section)
 - ◆ Assembly notes
- Check controller switch and 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:

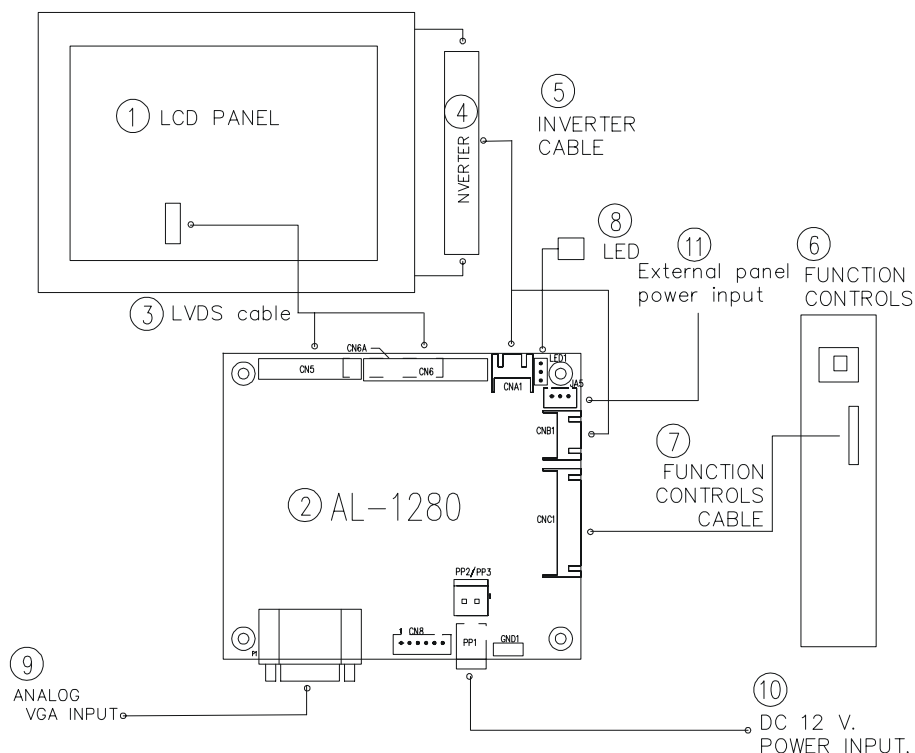
- Ensure that all necessary and appropriate safety measures are taken.
- Obtain suitable regulatory approvals as may be required.
- Check power settings to all component parts before connection.
- Understand the operation and connectivity requirements of this controller.

DISCLAIMER

There is no implied or expressed warranty regarding this material.

SYSTEM DESIGN

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



Summary:

1. LCD panel
2. LCD controller card, AL-1280
3. LVDS cable (for connection with LVDS panel)
4. Inverter for CCFT backlight (if not built into LCD)
5. Inverter cable
6. Function controls
7. Function controls cable
8. Status LED
9. PC VGA (analog) in
10. Power input (12VDC)
11. External panel power input (for 12V~18V panel power panel only)

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 1280x1024, 1024x768, 800x600, 640x480 resolution TFT LVDS LCD's support. The following provides some guidelines for installation and preparation of finished display solution.

- **Preparation:** Before proceeding it is important to familiarize yourself with the parts making up a 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.
- **LCD Panel:** This controller is designed for typical LVDS interface TFT panels with panel voltage 3.3V or 5V or 12V, External for 12V~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)**
- **Controller card:** Handle the controller card with care as static charge may damage electronic components.
- **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.
- **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 13 for the Application notes "Inverter connection section for more informations.
- **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.
- **Function Controls:** The following section 'Operation' discusses the controls required and the section 'Connectors, jumpers & pinouts' provides the detail. The controls are minimal for ease of use: On/Off, Brightness (depends on inverter), OSD (5 momentary buttons).
- **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 metre (3 feet) should be acceptable.
- **Status LED:** The pin direction of the LED should be corrected for right colour indication. Red colour stands for standby. Green colour stands for signal on. It is an optional part only, can be unconnected.
- **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.
- **Power Input:** 12V 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.
- **Power Safety:** Note that although only 12VDC 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 and power supply can affect the result.
- **Ground:** The various PCB mounting holes are connected to the ground plane.
- **Servicing:** The controller 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 interface.
 - ◆ 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.
 - ◆ Vertical refresh rate should be set to 60Hz preferable.
 - ◆ Non-interlaced is required.

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

CONNECTION & OPERATION

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

CONNECTION

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

1. **LCD panel & Inverter:** Connect the inverter (if it is not built-in the panel) to the CCFT lead connector of the LCD panel.
LVDS type panels: Plug the LVDS signal cable direct to CN5, CN6 / CN6A (if necessary). Insert the panel end of the cable the LCD panel connector.
2. **Inverter & Controller:** Plug the inverter cable to CNB1 and CNA1 (if necessary). Plug another end to the connector on the inverter.
3. **Function switch & Controller:** Plug the OSD switch mount cable to CNC1 on the controller board and another to the OSD switch mount.
4. **LED & Controller:** Plug in a 3-way with dual colour LED to connector LED1 on the controller board.
5. **Jumpers :** Check all jumpers are set correctly. Details referring the connection diagram at <http://www.digitalview.com/controllers/csg.php>
6. **Jumpers & Inverter & Panel voltage:** Particularly pay attention to the settings of JA3, JB2, JB3, JA5. JB2 & JB3 are used for inverter control (read inverter specification and information on the jumper table to define the correct settings). JA3 & JA5 are used for panel voltage input (read panel specification and information on the jumper table to define the correct settings).
7. **VGA cable & Controller:** Plug the VGA cable to the connector P1 on the controller board.
8. **Power supply & Controller:** Plug the DC 12V power in to the connector PP1 or PP2/PP3
9. **Power on:** Switch on the controller board and panel by using the OSD switch mount.

The red LED will light up when power on with the presence of input signal. The LED will change to green.

General:

- If you are using supplied cables & connectors, 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, "Connector, 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.

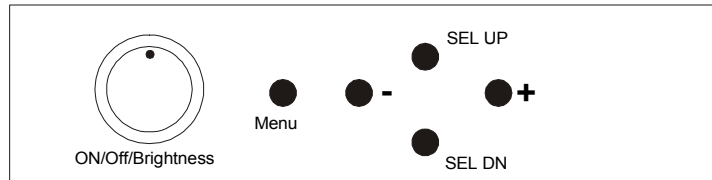
OPERATION

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.

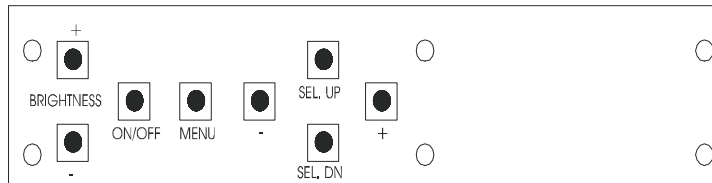
LCD DISPLAY SYSTEM SETTINGS

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) | Menu button | Menu button |
| Select – Select function / Confirm | SEL DN | SEL DN |
| Move up to select individual RGB color level OSD page | SEL UP | SEL UP |
| + – increase the setting / moves the selector to the next function | + | + |
| -- decrease the setting / moves the selector to the previous function | - | - |





















Analog VR type



Digital type

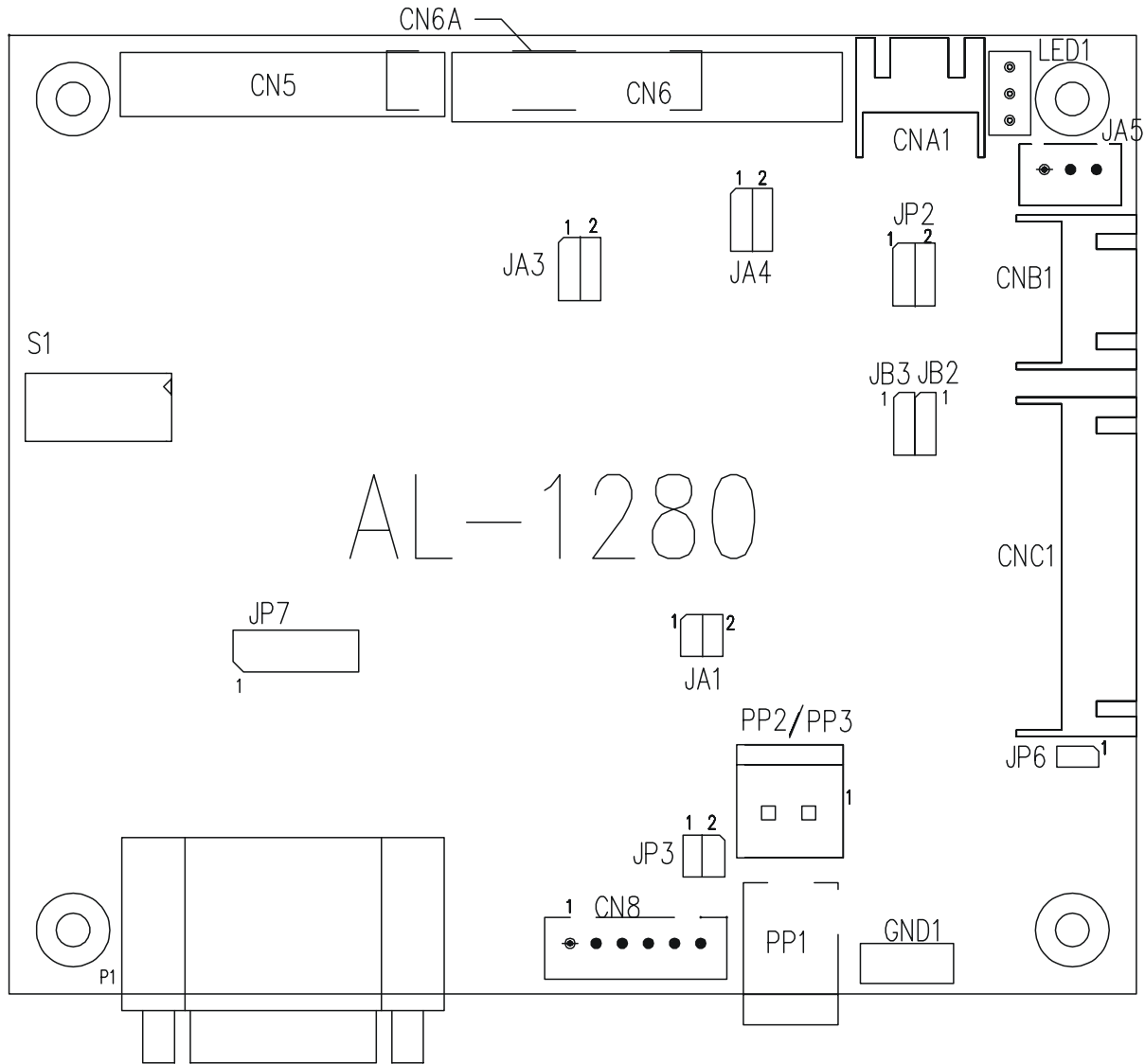
OSD Functions

| Brightness and Contrast | |
|-------------------------|---|
| | Brightness Increase/decrease brightness level. Press – or + (- <input type="text"/> +) |
| | Contrast Increase/decrease panel contrast level. Press – or + (- <input type="text"/> +) |
| | Backlight Increase/decrease inverter backlight level. Press – or + (- <input type="text"/> +) |
| | Exit Exit the OSD menu and save the settings |
| Color | |
| | Auto RGB Calibration <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| | Color Temperature Reset Reset the color temperature to the default values <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| | Color Temperature ▶ (Adjust the warmth of the image displayed. The higher temperature the coolest image looks like. The lower temperature the warmest image looks like.) Adjust red color level Press – or + (- <input type="text"/> +) Adjust green color level Press – or + (- <input type="text"/> +) Adjust blue color level Press – or + (- <input type="text"/> +) Press SEL UP/DN button to select item |
| | 4200K Set the color temperature to 4200K |
| | 5000K Set the color temperature to 5000K |
| | 6500K Set the color temperature to 6500K |
| | 7500K Set the color temperature to 7500K |
| | 9300K Set the color temperature to 9300K |
| | Exit Exit the OSD menu and save the settings |

| | | | |
|---|---|--|--|
|  Position | | | |
|  |  Autosetup | Auto adjust the positions, phase, frequency <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | |
| |  Frequency | Adjust the image horizontal size | |
| |  Phase | Fine tune the data sampling position (adjust image quality) | |
| |  Image Horizontal Position | Use +/- to move the image horizontally Press - or + (- <input type="text"/> +) | |
| |  Image Vertical Position | Use +/- to move the image vertically Press - or + (- <input type="text"/> +) | |
| |  Exit | Exit the OSD menu | |
|  Utilities | | | |
|  |  OSD setting ▶ | | |
| |  OSD Timeout | OSD Timeout : 3 / 6 / 10 / 15 / 18 / 25 / 30 seconds Press - or + (- <input type="text"/> +) | |
| |  OSD menu horizontal position | Press - or + (- <input type="text"/> +) | |
| |  OSD menu vertical position | Press - or + (- <input type="text"/> +) | |
| |  Load Factory Default | Initialize the setting stored in non-volatile memory | |
| |  Sharpness | Adjust sharpness level Press - or + (- <input type="text"/> +) | |
| |  Exit | Exit the OSD menu | |
|  Exit the OSD menu | | | |

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 |
|---------|----------------------------|--|
| CN5 | LVDS panel signal | Hirose 20-pin, DF14-20P-1.25H |
| CN6 | LVDS panel signal | Hirose 25-pin, DF14-25P-1.25H |
| CN6A | LVDS panel signal | Hirose 20-pin, DF14-20P-1.25H |
| CN8 | Serial control | JST 6-way, B6B-XH-A (Matching type : XHP-6) |
| CNA1 | Auxiliary power output | JST 4-way, B4B-XH-A (Mating type : XHP-4) |
| CNB1 | Backlight inverter | JST 5-way, B5B-XH-A (Mating type : XHP-5) |
| CNC1 | Function controls | JST 12-way, B12B-XH-A (Mating type : XHP-12) |
| JA5 | External panel power input | JST 3-way, B3B-XH-A (Matching type : XHP-3) |
| LED1 | Dual color LED connector | Header pin 3x1 |
| P1 | VGA analog input | DB15-way DDC version (blue colour) |
| PP1 | DC power in | DC power jack, 2.5mm contact pin diameter positive |
| PP2/PP3 | DC power in (Alternate) | DC power Molex 2 pin 0.156" pitch |

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 | 1-3 & 2-4 = +3.3V panel voltage supply 3-5 & 4-6 = +5V panel voltage supply CAUTION: Incorrect setting will cause panel damage |
| JA4 | LVDS power select (Use for connection with LVDS panel only) | 1-3 & 2-4 = +12V LVDS power (The voltage depends on JA5 setting) 3-5 & 4-6 = +3.3V / +5V (The voltage depends on JA3 setting) |
| JA5 | +12V Panel power voltage select | Open = Disable +12V panel power 1-2 = +12V safe panel power on CN3 pin 3 2-3 = External panel power input CAUTION: Incorrect setting will cause panel damage |
| JB2 | Backlight inverter on/off control – signal level | 1-2 = On/Off control signal 'High' = +12V 2-3 = On/Off control signal 'High' = +5V Open = On/Off control signal 'High' = Open collector CAUTION: Incorrect setting can damage inverter. |
| JB3 | Backlight inverter on/off control – polarity | 1-2 = control signal 'high' = CCFT ON 2-3 = control signal 'low' = CCFT ON |
| JP2 | Backlight control type selection | 1-2 = VR/Digital switch mount control 3-4 = Inverter backlight control by OSD menu. 5-6 = PWM inverter backlight control |
| JP3 | Reserved for internal use | Factory set to 1-3 & 2-4 |
| JP6 | Input power control | Short = External switch control Open = Switch mount control |
| JP7 | Reserved | Reserved for internal use |
| S1 | Panel selection | See table below |

S1: Panel and function selection

| Pos. # | Function | Description |
|--------|--|---|
| 1-6 | Panel selection | Refer to table 1 – Panel selection |
| 7 | Panel pixel format | OFF : Single Pixel ON : Double Pixel |
| 8 | LVDS data mapping select (Refer to Table 2) | Mapping A : OFF Mapping B : ON |
| 9 | Reserved | Reserved for future use |
| 10 | Inverter backlight control by OSD menu – Brightness Increase/Decrease switch | Normal : ON Reverse : OFF |

Table 1 - Panel selection

| S1-Pos.#1 | S1-Pos.#2 | S1-Pos.#3 | S1-Pos.#4 | S1-Pos.#5 | S1-Pos.#6 | Description |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------------------------------|
| ON | ON | ON | ON | ON | ON | VGA (AU)* |
| ON | ON | ON | ON | OFF | ON | SVGA (AU, Unipac) |
| ON | OFF | ON | ON | OFF | ON | SVGA (Sharp)** |
| OFF | ON | ON | ON | OFF | ON | SVGA (Samsung)** |
| ON | ON | ON | ON | ON | OFF | XGA (Fujitsu, LG, Samsung, Sharp) |
| OFF | ON | ON | ON | ON | OFF | XGA (NEC)* |
| ON | ON | ON | ON | OFF | OFF | SXGA (Fujitsu, Sharp) |

* The panel support apply on P/N 4169300-11 or up version.

** The panel support apply on P/N 4169300-12 or up version.

Table 2 – S1 Position 8 - LVDS data mapping select

| | |
|-----------------------------------|---|
| Panel model support for mapping A | Panels using LVDS board P/N 4162138-10, P/N 4162140-10, P/N 4162122-00 For example : - LG LM150X06 XGA - Samsung LTM150XH-L01 XGA - Samsung LTM170E6-L04 SXGA |
| Panel model support for mapping B | Panel using LVDS board P/N 4162150-00, P/N 4164702-10, P/N 4162135-10 For example : - Fujitsu FLC48SXC8V/10V SXGA - Sharp LQ181E1LW31 SXGA - Unipac UB084S01 SVGA |

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

PINOUTS

CN5 – LVDS panel connector: HIROSE 20-pin, DF14-20P-1.25H

| PIN | SYMBOL | DESCRIPTION |
|------------|---------------|------------------------------------|
| 1 | NC | No connection |
| 2 | GND | Ground |
| 3 | OUT03 | Positive differential LVDS data 03 |
| 4 | /OUT03 | Negative differential LVDS data 03 |
| 5 | GND | Ground |
| 6 | CLKOUT0 | Positive LVDS clock |
| 7 | /CLKOUT0 | Negative LVDS clock |
| 8 | GND | Ground |
| 9 | OUT02 | Positive differential LVDS data 02 |
| 10 | /OUT02 | Negative differential LVDS data 02 |
| 11 | GND | Ground |
| 12 | OUT01 | Positive differential LVDS data 01 |
| 13 | /OUT01 | Negative differential LVDS data 01 |
| 14 | GND | Ground |
| 15 | OUT00 | Positive differential LVDS data 00 |
| 16 | /OUT00 | Negative differential LVDS data 00 |
| 17 | GND | Ground |
| 18 | GND | Ground |
| 19 | VLCD | Panel power supply |
| 20 | VLCD | Panel power supply |

CN6 – LVDS panel connector: HIROSE 25-pin, DF14-25P-1.25H

| PIN | SYMBOL | DESCRIPTION |
|------------|---------------|---|
| 1 | VLCD | Panel power supply |
| 2 | VLCD | Panel power supply |
| 3 | VLCD | Panel power supply |
| 4 | GND | Ground |
| 5 | GND | Ground |
| 6 | GND | Ground |
| 7 | GND | Ground |
| 8 | OUTE03 | Positive differential LVDS even data bit 03 |
| 9 | /OUTE03 | Negative differential LVDS even data bit 03 |
| 10 | GND | Ground |
| 11 | CLKOUTE | Positive even LVDS clock |
| 12 | /CLKOUTE | Negative even LVDS clock |
| 13 | GND | Ground |
| 14 | OUTE02 | Positive differential LVDS even data bit 02 |
| 15 | /OUTE02 | Negative differential LVDS even data bit 02 |
| 16 | GND | Ground |
| 17 | OUTE01 | Positive differential LVDS even data bit 01 |
| 18 | /OUTE01 | Negative differential LVDS even data bit 01 |
| 19 | GND | Ground |
| 20 | OUTE00 | Positive differential LVDS even data bit 00 |
| 21 | /OUTE00 | Negative differential LVDS even data bit 00 |
| 22 | GND | Ground |
| 23 | GND | Ground |
| 24 | NC | No connection |
| 25 | NC | No connection |

CN6A – LVDS panel connector: HIROSE 20-pin, DF14-20P-1.25H

| PIN | SYMBOL | DESCRIPTION |
|-----|----------|---|
| 1 | NC | No connection |
| 2 | GND | Ground |
| 3 | OUTE03 | Positive differential LVDS even data bit 03 |
| 4 | /OUTE03 | Negative differential LVDS even data bit 03 |
| 5 | GND | Ground |
| 6 | CLKOUTE | Positive even LVDS clock |
| 7 | /CLKOUTE | Negative even LVDS clock |
| 8 | GND | Ground |
| 9 | OUTE02 | Positive differential LVDS even data bit 02 |
| 10 | /OUTE02 | Negative differential LVDS even data bit 02 |
| 11 | GND | Ground |
| 12 | OUTE01 | Positive differential LVDS even data bit 01 |
| 13 | /OUTE01 | Negative differential LVDS even data bit 01 |
| 14 | GND | Ground |
| 15 | OUTE00 | Positive differential LVDS even data bit 00 |
| 16 | /OUTE00 | Negative differential LVDS even data bit 00 |
| 17 | GND | Ground |
| 18 | GND | Ground |
| 19 | VLCD | Panel power supply |
| 20 | VLCD | Panel power supply |

CN8 – Serial Control In, JST B6B-XH-A (Reserved for factory use)

| PIN | SYMBOL | DESCRIPTION |
|-----|--------|--------------------------------------|
| 1 | SDATA | Reserved |
| 2 | SCLK | Reserved |
| 3 | Vcc | +5V |
| 4 | TXD | RS-232 Tx Data (for programming use) |
| 5 | GND | Ground |
| 7 | RXD | RS-232 Rx Data (for programming use) |

CNA1 - Auxiliary power output, JST B4B-XH-A

| PIN | SYMBOL | DESCRIPTION |
|-----|---------|---------------------|
| 1 | AUX_12V | +12V DC, 500mA max. |
| 2 | AUX_GND | Ground |
| 3 | AUX_GND | Ground |
| 4 | AUX_Vcc | +5V DC, 500mA max |

CNB1 - To backlight inverter, JST B5B-XH-A

| PIN | SYMBOL | DESCRIPTION |
|-----|---------|--|
| 1 | GND | Ground |
| 2 | VBKL | Backlight power supply, +12VDC (switched) |
| 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 |

CNC1 – Control switch, JST B12B-XH-A

| 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 |

JA5 - Auxiliary power output, JST B4B-XH-A

| PIN | SYMBOL | DESCRIPTION |
|-----|--------------------|---|
| 1 | PANEL_PWR_12V | Internal +12V panel power |
| 2 | PANEL_PWR_External | Panel power (12V~18 V use external power input cable) |
| 3 | GND | Ground (External power ground) |

LED1 – Status LED connector: 3-pin header

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

P1 - ANALOG VGA INPUT - 15 way connector

| PIN | SYMBOL | DESCRIPTION |
|-----|----------|--|
| 1 | PCR | Red, analog |
| 2 | PCG | Green, analog |
| 3 | PCB | Blue analog |
| 4 | ID2 | Reserved for monitor ID bit 2 (grounded) |
| 5 | AGND | Analog 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 | AGND | Analog ground |
| 11 | ID0 | Reserved for monitor ID bit 0 (grounded) |
| 12 | DDC_SDA | DDC serial data |
| 13 | CS/HS_IN | Horizontal sync input |
| 14 | VS_IN | Vertical sync, input |
| 15 | DDC_SCL | DDC serial clock |

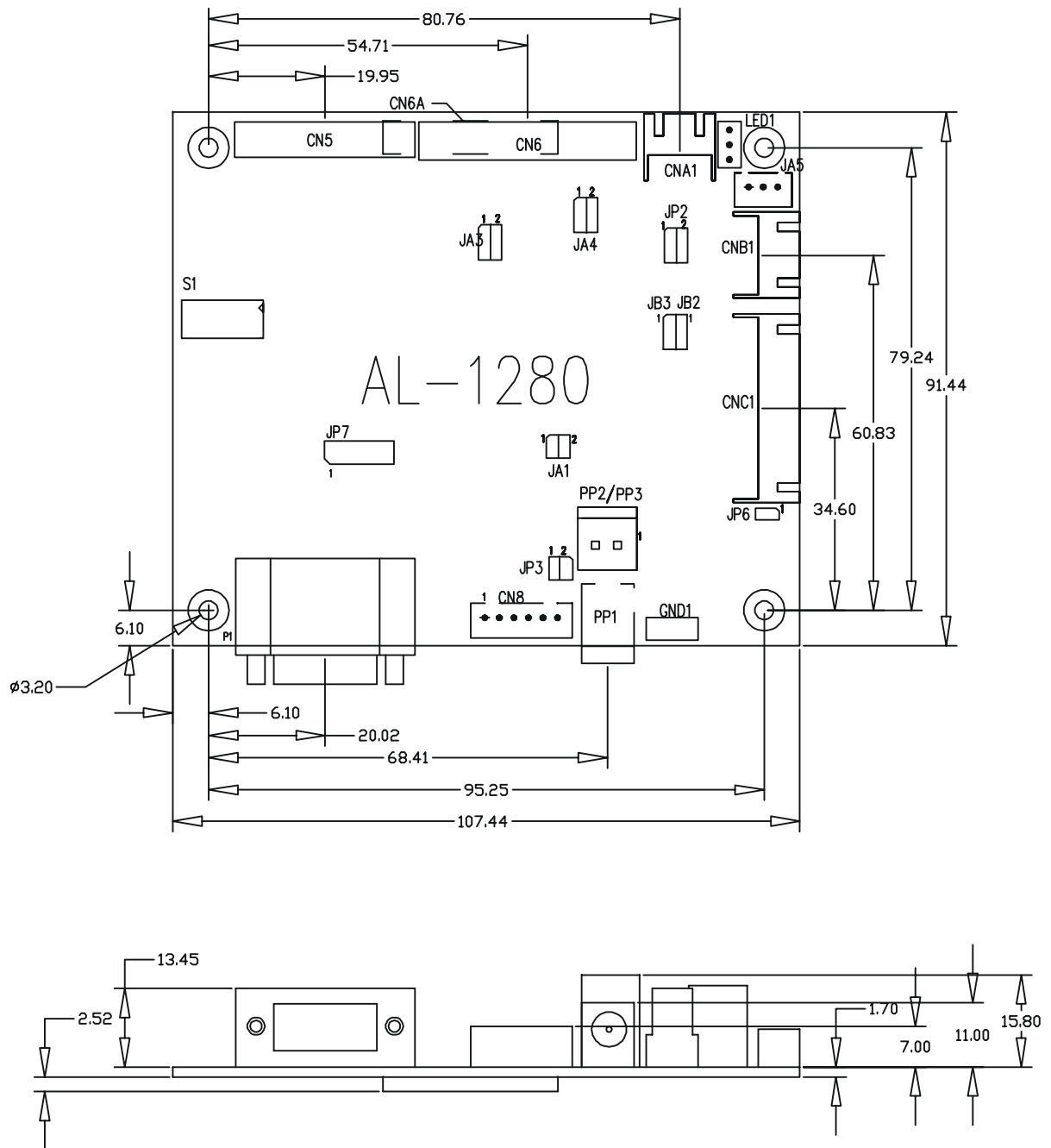
PP1 - 12VDC power supply - input

| PIN | DESCRIPTION |
|-----|----------------------|
| 1 | +12VDC in center pin |
| 2 | Ground |

PP2/3 – Alternate 12VDC power supply - input

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

CONTROLLER DIMENSIONS



The maximum thickness of the controller is 16 mm (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. Other holes are used for mounting inverters supplied as fitted options.

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 SWITCHES ATTACHED

This is very straightforward:

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

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

INVERTER CONNECTION

There are potentially 3 issues to consider with inverter connection:

1. Power
2. Enable
3. Brightness

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

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

CNB1

| PIN | DESCRIPTION |
|-----|-------------|
| 1 | ground |
| 2 | +12VDC |

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=12V, 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:

1. Brightness can controlled by using a VR.
2. Brightness controlled adding a circuit such as PWM (Pulse Width Modulation).
3. 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 CNB1 pins 3 & 4: see table.

CNB1

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

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, 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 bad 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 | 1280x1024, 1024 x 768, 800x600, 640x480 TFT LVDS LCD's support. |
| No. of colours | Up to 3 x 8 bit providing 16.7 million colours. |
| Vertical refresh rate | SXGA resolution up to 60Hz, XGA resolution up to 75Hz, SVGA resolution up to 75Hz. VGA resolution up to 75Hz |
| Dot clock (pixel clock) maximum | 120 MHz |
| Graphics formats | Standard SXGA, XGA, SVGA, VGA |
| Standard input at source | VGA analog (15-pin) standard with automatic detection of : Digital Separate Sync Sync-On-Green Composite Sync |
| Controls available | - On/Off - Brightness (inverter) - OSD menu, - OSD select - OSD setting + - OSD setting - |
| Control interface | - Buttons |
| 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, +12~+18V (External voltage supply) |
| Input voltage | 12VDC |
| Controller power consumption | Approx 4W (controller logic only, no panel and inverter are involved) |
| Controller dimensions | 107mm x 92mm x 21mm |
| Storage temperature limits | -40°C to +70°C |
| Operating temperature limits | 0°C to +65°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.

Graphic Mode Support Table

| Mode | Resolution | Clk [MHz] | Horizontal freq [KHz] | Vertical freq [Hz] | Sync Mode |
|-------|------------------|-----------|-----------------------|--------------------|-----------------------|
| E1_70 | 640x350 70Hz | 25.175 | 31.469 | 70.087 | Digital Separate Sync |
| E2_70 | 640x400 70Hz | 25.175 | 31.469 | 70.087 | Digital Separate Sync |
| T_70 | 720x400 70Hz | 28.322 | 31.469 | 70.087 | Digital Separate Sync |
| T_70 | 720x400 70Hz | 28.322 | 31.469 | 70.087 | Sync On Green |
| V_60 | 640x480 60Hz | 25.175 | 31.469 | 59.940 | Digital Separate Sync |
| V_60 | 640x480 60Hz | 25.175 | 31.469 | 59.940 | Sync On Green |
| V_60 | 640x480 60Hz | 25.175 | 31.469 | 59.940 | Composite Sync |
| V_72 | 640x480 72Hz | 31.500 | 37.861 | 72.809 | Digital Separate Sync |
| V_72 | 640x480 72Hz | 31.500 | 37.861 | 72.809 | Sync On Green |
| V_72 | 640x480 72Hz | 31.500 | 37.861 | 72.809 | Composite Sync |
| V_75 | 640x480 75Hz | 31.500 | 37.500 | 75.000 | Digital Separate Sync |
| V_75 | 640x480 75Hz | 31.500 | 37.500 | 75.000 | Sync On Green |
| V_75 | 640x480 75Hz | 31.500 | 37.500 | 75.000 | Composite Sync |
| SV_56 | 800x600 56Hz | 36.000 | 35.156 | 56.250 | Digital Separate Sync |
| SV_56 | 800x600 56Hz | 36.000 | 35.156 | 56.250 | Sync On Green |
| SV_56 | 800x600 56Hz | 36.000 | 35.156 | 56.250 | Composite Sync |
| SV_60 | 800x600 60Hz | 40.000 | 37.879 | 60.317 | Digital Separate Sync |
| SV_60 | 800x600 60Hz | 40.000 | 37.879 | 60.317 | Sync On Green |
| SV_60 | 800x600 60Hz | 40.000 | 37.879 | 60.317 | Composite Sync |
| SV_72 | 800x600 72Hz | 50.000 | 48.077 | 72.188 | Digital Separate Sync |
| SV_72 | 800x600 72Hz | 50.000 | 48.077 | 72.188 | Sync On Green |
| SV_72 | 800x600 72Hz | 50.000 | 48.077 | 72.188 | Composite Sync |
| SV_75 | 800x600 75Hz | 49.500 | 46.875 | 75.000 | Digital Separate Sync |
| SV_75 | 800x600 75Hz | 49.500 | 46.875 | 75.000 | Sync On Green |
| SV_75 | 800x600 75Hz | 49.500 | 46.875 | 75.000 | Composite Sync |
| X_60 | 1024x768 60Hz | 65.000 | 48.363 | 60.004 | Digital Separate Sync |
| X_60 | 1024x768 60Hz | 65.000 | 48.363 | 60.004 | Sync On Green |

| | | | | | |
|-------|-------------------|--------|--------|--------|-----------------------|
| X_60 | 1024x768 60Hz | 65.000 | 48.363 | 60.004 | Composite Sync |
| X_70 | 1024x768 70Hz | 75.000 | 56.476 | 70.069 | Digital Separate Sync |
| X_70 | 1024x768 70Hz | 75.000 | 56.476 | 70.069 | Sync On Green |
| X_70 | 1024x768 70Hz | 75.000 | 56.476 | 70.069 | Composite Sync |
| X_75 | 1024x768 75Hz | 78.750 | 60.023 | 75.029 | Digital Separate Sync |
| X_75 | 1024x768 75Hz | 78.750 | 60.023 | 75.029 | Sync On Green |
| X_75 | 1024x768 75Hz | 78.750 | 60.023 | 75.029 | Composite Sync |
| SX_60 | 1280x1024 60Hz | 108 | 63.81 | 60.020 | Digital Separate Sync |
| SX_60 | 1280x1024 60Hz | 108 | 63.81 | 60.020 | Sync On Green |
| SX_60 | 1280x1024 60Hz | 108 | 63.81 | 60.020 | Composite Sync |

Remark :

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

WARRANTY

The products are warranted against defects in workmanship and material for a period of one (1) year from the date of purchase provided no modifications are made to it and it is operated under normal conditions and in compliance with the instruction manual.

The warranty does not apply to:

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

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

CAUTION

Whilst care has been taken to provide as much detail as possible for use of this product these instructions 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.

TRADEMARKS

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CONTACT DETAILS

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

ASIA

Digital View Ltd
19 th Floor, Tai Tung Building
8 Fleming Road, Wanchai
Hong Kong
Kwun Tong, Kowloon, Hong Kong
Tel: (852) 2861 3615 **Fax:** (852) 2520 2987
Sales: hksales@digitalview.com

EUROPE

Digital View Ltd
36 Mortimer Street
London W1W 7RG
UK
Tel: (44) (0)20 7631 2150 **Fax:** (44) (0) 20 7436 1299
Sales: uksales@digitalview.com

USA

Digital View Inc.
18440 Technology Drive, Building 130
Morgan Hill, California, 95037
USA
Tel: (1) 408-782 7773 **Fax:** (1) 408-782 7883
Sales: ussales@digitalview.com

WEBSITE

www.digitalview.com