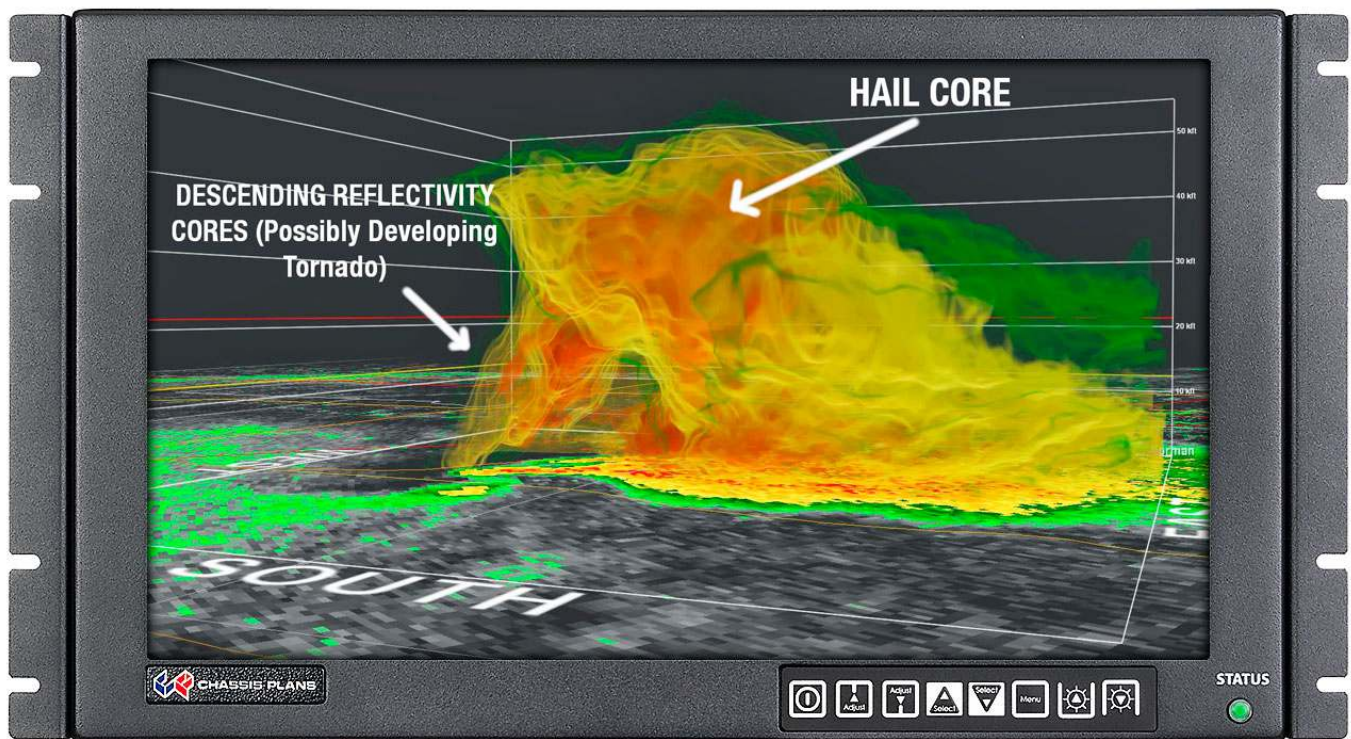


CPX2-173

**Rugged Military Grade
6U Rack Mount
17.3-Inch Wide-Screen LCD Display**



Technical Reference

22009400A
Revision Preliminary A
June 4, 2014

Warranty

The product is warranted against material and manufacturing defects for two years from date of delivery. Buyer agrees that if this product proves defective Chassis Plans' is only obligated to repair, replace or refund the purchase price of this product at Chassis Plans' discretion. The warranty is void if the product has been subjected to alteration, neglect, misuse or abuse; if any repairs have been attempted by anyone other than Chassis Plans; or if failure is caused by accident, acts of God, or her causes beyond the control of Chassis Plans. Chassis Plans reserves the right to make changes or improvements in any product without incurring any obligation to similarly alter products previously purchased.

In no event shall Chassis Plans be liable for any defect in hardware or software or loss or inadequacy of data of any kind, or for any direct, indirect, incidental or consequential damages arising out of or in connection with the performance or use of the product or information provided. Chassis Plans' liability shall in no event exceed the purchase price of the product purchased hereunder. The foregoing limitation of liability shall be equally applicable to any service provided by Chassis Plans.

Return Policy

Products returned for repair must be accompanied by a Return Material Authorization (RMA) number, obtained from Chassis Plans prior to return. Freight on all returned items must be prepaid by the customer, and the customer is responsible for any loss or damage caused by common carrier in transit. Items will be returned from Chassis Plans via Ground, unless prior arrangements are made by the customer for an alternative shipping method

To obtain an RMA number, call us at 858-571-4330. We will need the following information:

- Return company address and contact
- Model name and model # from the label on the back of the display
- Serial number from the label on the back of the display
- Description of the failure

An RMA number will be issued. Mark the RMA number clearly on the outside of each box, include a failure report for each board and return the product(s) to our San Diego, CA facility:

Chassis Plans.
10123 Carroll Canyon Road
San Diego, CA 92131
Attn: Repair Department

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Chapter 1 - Introduction

Description

The CPX2-173 is a military-grade high-performance 6U rack mount or panel mount LCD display offering 1920 x 1080 wide-screen high-definition resolution. The CPX2-173 is designed to meet Mil-Std 901D and MIL-STD-810G and includes a solid milled aluminum front panel, lightweight 5052-H32 aluminum construction and locking stainless hardware throughout. The CPX2-173 is ideal for mounting in a transit case for adverse environments that would destroy lesser displays.

Two versions offer standard brightness or hi-bright for sunlight visibility.

	CPX2-1731 Standard	CPX2-1732 Hi-Bright
Contrast Ratio	600:1	600:1
Viewing Angle (L/R/U/D)	80°	80°
Response Time	40ms	40ms
Brightness	400 cd/m ²	1000 cd/m ²
Backlight	LED	LED
Native Resolution	1920 x 1080	1920 x 1080
Aspect Ratio	16:9	16:9

Table 1 – Display Specifications

The displays are high-performance, long life TFT LCD's offering a maximum native wide-screen resolution of 1920 x 1080. The displays offer optional optically bonded anti-reflective overlay glass. In addition, an optional laminated 1.1mm soda lime glass with an ITO conductive EMI filter and an additional 1.1mm soda lime glass overlay with anti-reflective (AR) coating. Both glass components are optically bonded to each other, and to the front of the display, for superior viewing clarity and overall ruggedness. A 6mm copper bus bar surrounds the entire glass stack-up and provides consistent grounding. A contrast ratio of approximately 1300:1 is delivered with this ITO/Anti-Reflective glass stack-up. The front surface is an oleophobic anti-reflective coating resistant to fingerprints.

The displays offer 16.7 million colors (True Color). The displays provide multiple signal input options including aRGB, DVI-D, HDMI, Display Port, HD-SDI, NTSC, S-Video and Composite Video, depending on the controller.

The displays offer a choice of high quality advanced scaling controllers with a Genesis chipset. These are specifically ruggedized controllers offering as standard conformal coating with high shock/vibration and temperature extreme tolerances as well as long life product availability for assured delivery throughout multi-year programs.

The Standard Controller offers DVI-D, VGA (aRGB), HDMI, NTSC and CVS. In addition, the Standard Controller supports Picture-In-Picture (PIP) and Picture-By-Picture.

The Advanced HD-SDI Controller offers VGA (aRGB), HDMI, Display Port, HD-SDI and 3G HD-SDI.

The display is only 6U (10.47-inches) high offering significant rack space savings. It can be rack mounted, panel mounted, or mounted using a VESA adapter via the included VESA hole pattern on the rear of the unit. It is only 2.75-inches deep and power and signal cables exit down so as to not increase depth requirements.

As with all Chassis Plans products, a wide variety of custom options can be configured per customer or application specific requirements. Contact your Sales Engineer to discuss your particular requirements.

LCD Enhancements

Chassis Plans starts with Grade A Industrial Quality LCD panels selected for optical performance, high reliability and long product life cycle. In order to not only ruggedize the LCD, but to also enhance the mechanical, optical and EMI properties of the finished unit, as an option, Chassis Plans optically bonds one 3mm anti-reflective or two layers of coated 1.1 mm soda-lime float glass to the front of the LCD panel. The first layer is coated with an Indium Tin Oxide (ITO) coating with a surface resistivity of <13.5 ohms/sq. See Figure 1 for attenuation values.

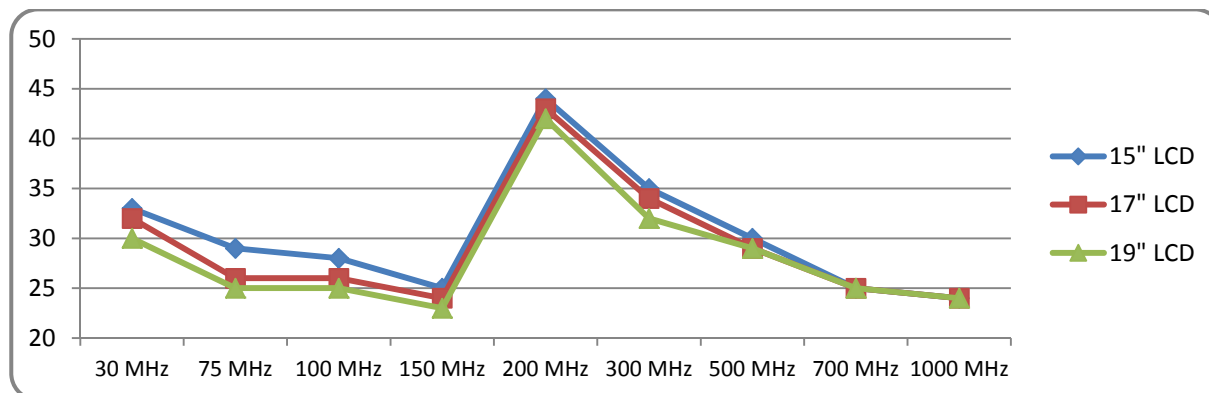


Figure 1 – EMI Shielding Effectiveness of ITO Coating

There is a Copper conductive buss bar that wraps around the edge of the glass to facilitate conduction from the ITO coating to the front surface of the laminated structure to make a complete electrical shield around the face of the LCD. See Figure 2 for details.

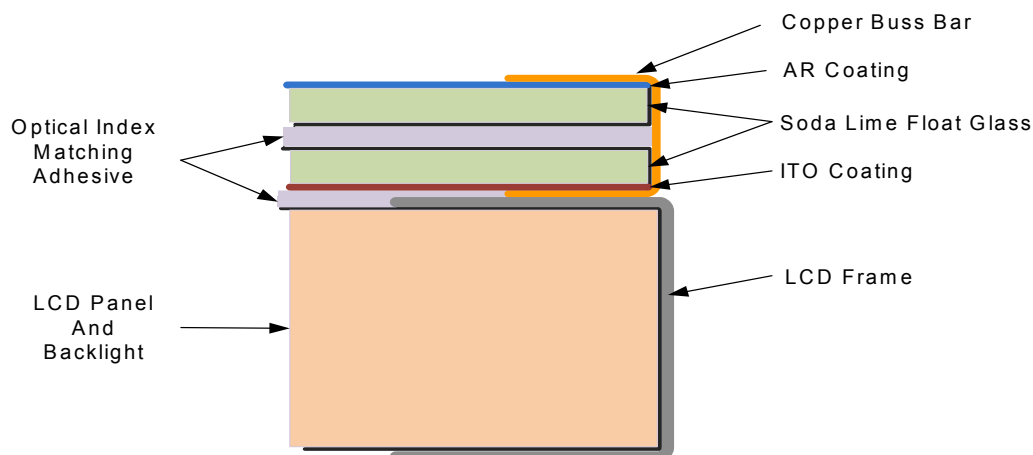


Figure 2 – Optical Stack on LCD

The second layer of glass is coated with an Oleophobic Anti-Reflective (AR) coating which matches the index of refraction of air to eliminate surface reflections. These layers of coated glass are bonded together with an index matching optical adhesive to eliminate internal reflections caused by the index of refraction mismatch between the soda lime glass and air. This eliminates over 95% of unwanted glare from the screen. Please see Figure 3 below for more details.

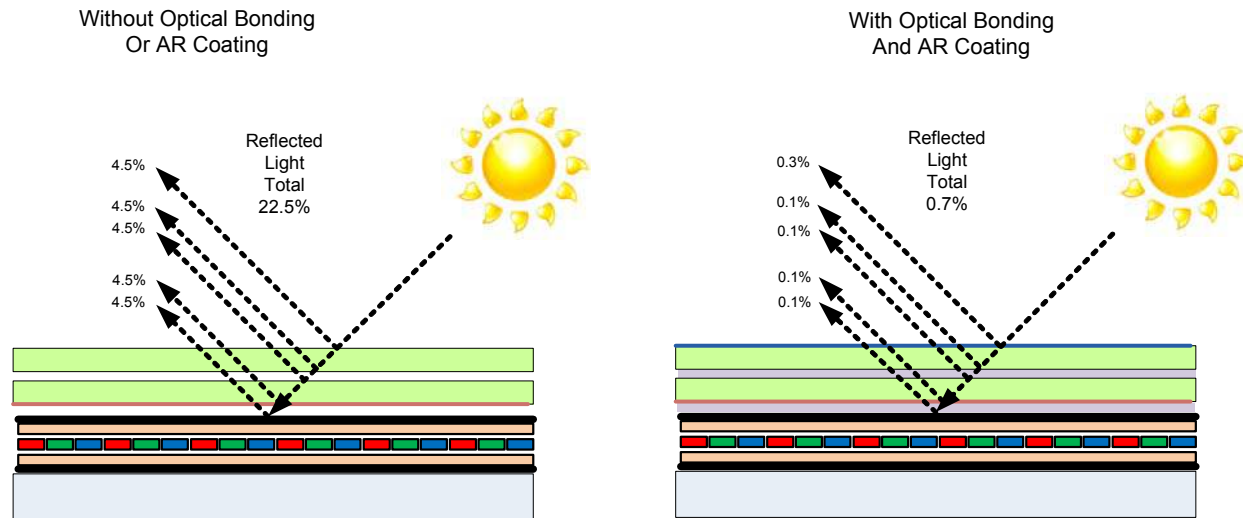


Figure 3 – Comparison of Reflections with and without Optical Bonding

The resulting structure in conjunction with the CPX2-1732 Hi-Bright 1000nit panel has greatly enhanced optical characteristics in high ambient light conditions. The optical adhesive used is a silicone RTV and offers other benefits mechanically to the LCD as well. The adhesive remains pliable and therefore acts as a shock absorbing medium for the front of the LCD. Together with the additional layers of glass provides a very rugged composite structure. Another benefit is that should breakage actually occur the shards of glass will be retained together to prevent injury to personnel. The adhesive also prevents any condensation from building up in the air gap between the layers of glass which would cause fogging of the display. Finally, the added mass bonded to the front of the LCD display adds a thermal conduction path to help dissipate the heat generated in the backlights themselves.

By eliminating the majority of reflected light, the apparent contrast improves making the display more readable in high bright situations. An alternative to improving the contrast is to increase the back light levels to overpower the reflected light. The downside to this approach is the higher power requirements and higher heat generated by the backlights.



Photo Courtesy of
GDS Clearview

Figure 4 – Comparison with and without Optical Bonding

Genesis Based LCD Controllers

The LCD Controller is a key component in any display system and no expense has been spared in specifying the Standard Controller and Advanced HD-SDI Controller Genesis controllers. These are long life revision controlled military grade components. The Genesis chip set is the current gold standard for LCD controllers.

The controllers support 3x8-bit 16.7 million colors at up to 1920 x 1200. Refresh rates of 60Hz for WUXGA and UXGA with higher refresh rates for lower resolutions available. Computer input signals of VGA, SVGA, XGA, SXGA, WXGA, UXGA and WUXGA are supported.

Video inputs of NTSC, PAL and SECAM are optionally available. DVI inputs supports up to 1920 x 1080 WUXGA 60Hz signals.

These ruggedized military grade controllers are rated for operating at -40 to +80 deg C, use low mass tantalum capacitors for maximum vibration and shock tolerance and are conformal coated for extreme ruggedness. The coating is silicone resin conformal coating.(MOD) DEF-STAN 59/47 Issue 4 & UL QMJU2 compliant

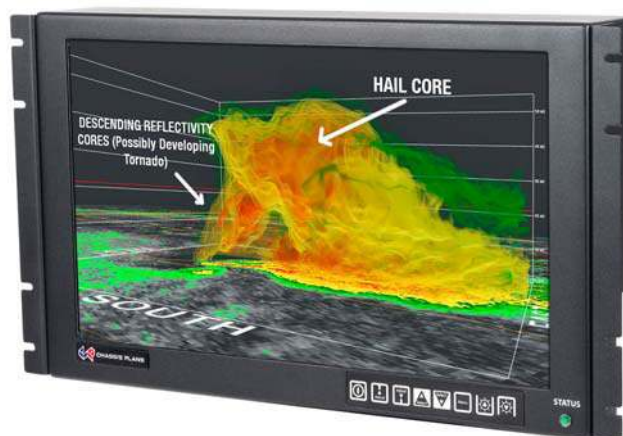
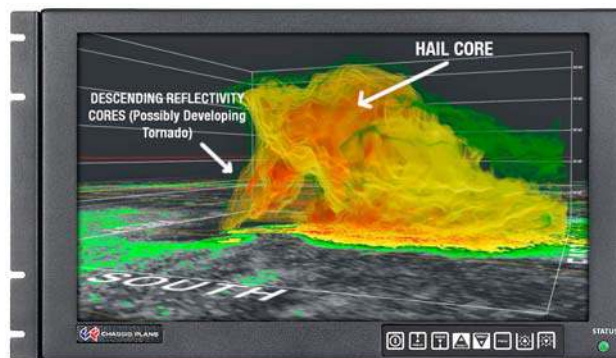
MTBF for the controllers is in excess of 150,000 to 200,000 hours.

Controller Specifications

	Standard	Advanced HD-SDI
SUPPORTED VIDEO RESOLUTION		
VGA (640 x 480)	•	•
WVGA (800 x 480)	•	•
SVGA (800 x 600)	•	•
XGA (1024 x 768)	•	•
SXGA (1280 x 1024)	•	•
WXGA (1366 x 768)	•	•
WXGA (1280 x 768, 1280 x 800, 1440 x 900)	•	•
WSXGA+ (1680 x 1050)	•	•
HD-1080 (1920 x 1080)	•	•
WUXGA (1920 x 1200)	•	•
INPUTS		
Standard		
ARGB (15 Pin VGA)	•	•
DVI-D Input	•	
PAL / NTSC / SECAM	•	
HD-SDI - SMPTE259M, 4.2.2	•	•
HDMI 1.3	•	•
Display Port		•
SDI Re-Clock Loop Output		•
Optional		
Composite Video Input	•	
HD Component YPbPr	•	
SD Component YCbCr	•	
FEATURES		
Image Up-Scaling	•	•
Image Down-Scaling	•	•
Picture In Picture	•	
Memory Buffer	•	
Sync On Green/Composite	•	•
DV RS-232 Serial Protocol	•	•
Ethernet Command Protocol	•	
Picture By Picture	•	
Text Overlay Function	•	
Variable Aspect	•	
Freeze & Zoom Function	•	
Programmable Hot Keys	•	•

Figure 5 – Controller Specifications

Photos



Connector details dependent on installed controller

Specifications

Enclosure 6U (10.47") x 3.2" deep Front Panel milled 5052 aluminum alloy Body made of 5052-H32 aluminum alloy All stainless steel hardware All self-locking pressed in fasteners where appropriate Powder coat black, medium texture, for ruggedness Other colors optionally available Designed to Mil-Spec Standards to Satisfy Military, Industrial and Commercial Requirements Compact Enclosure for Limited Depth Installation Weight: 9.7lbs (depending on model & features) Display 17.3" Wide-Screen TFT LCD 1920 x 1080 Display Colors: 16.7 Million Response Time: 40ms Typical Viewing Angle: 80 deg Contrast Ratio: 600:1 typical native Brightness: 400cd/m2 standard (CPX2-1731), 1000cd/m2 enhanced daylight visibility (CPX2-1732) Pixel Pitch: 0.1989mm x 0.1989mm Pixel Arrangement: R.G.B Stripe Display Enhancement Options 3mm smudge-resistant anti-reflective coated soda lime float glass, bonded to the LCD panel with optical index matched adhesive Laminate of 1.1mm smudge-resistant anti-reflective coated soda lime float glass panel and a 1.1 mm ITO coated glass panel(<12.5Ω/sq) grounded via a copper buss bar, bonded to the LCD panel with optical index matched adhesive Power Supply Options AC Input 100 to 260VAC, auto selecting 47-66 HZ 12VDC Input Transient Filter Line transient protection for 12VDC vehicular applications Mil-Std-1275A DC/DC Converter True 1275 compliance for military 28VDC nominal vehicle inputs 18 to 36VDC input 48VDC DC/DC Converter 36 to 75VDC Input Isolated Inputs for +/- input levels See the appropriate power supply section for complete power supply specifications.	Environmental (Designed to meet or exceed) Altitude 10,000 ft. Operational, 30,000 ft. Storage MIL-STD-810, Method 500.5 High Temperature 70°C Operational, 70°C Storage MIL-STD-810, Method 501.5 Low Temperature 0°C Operational, -20°C Storage MIL-STD-810, Method 502.5 Humidity 5-95%, Non-condensing MIL-STD-810, Method 507.5 Blowing Sand and Dust Procedures I and II MIL-STD-810, Method 510.5 Transport Vibration US Highway Truck and Air Transport MIL-STD-810, Method 514.6 Bench Handling Shock Procedure VI, 20G @ 11ms MIL-STD-810, Method 516.6
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Table 2 – Specifications

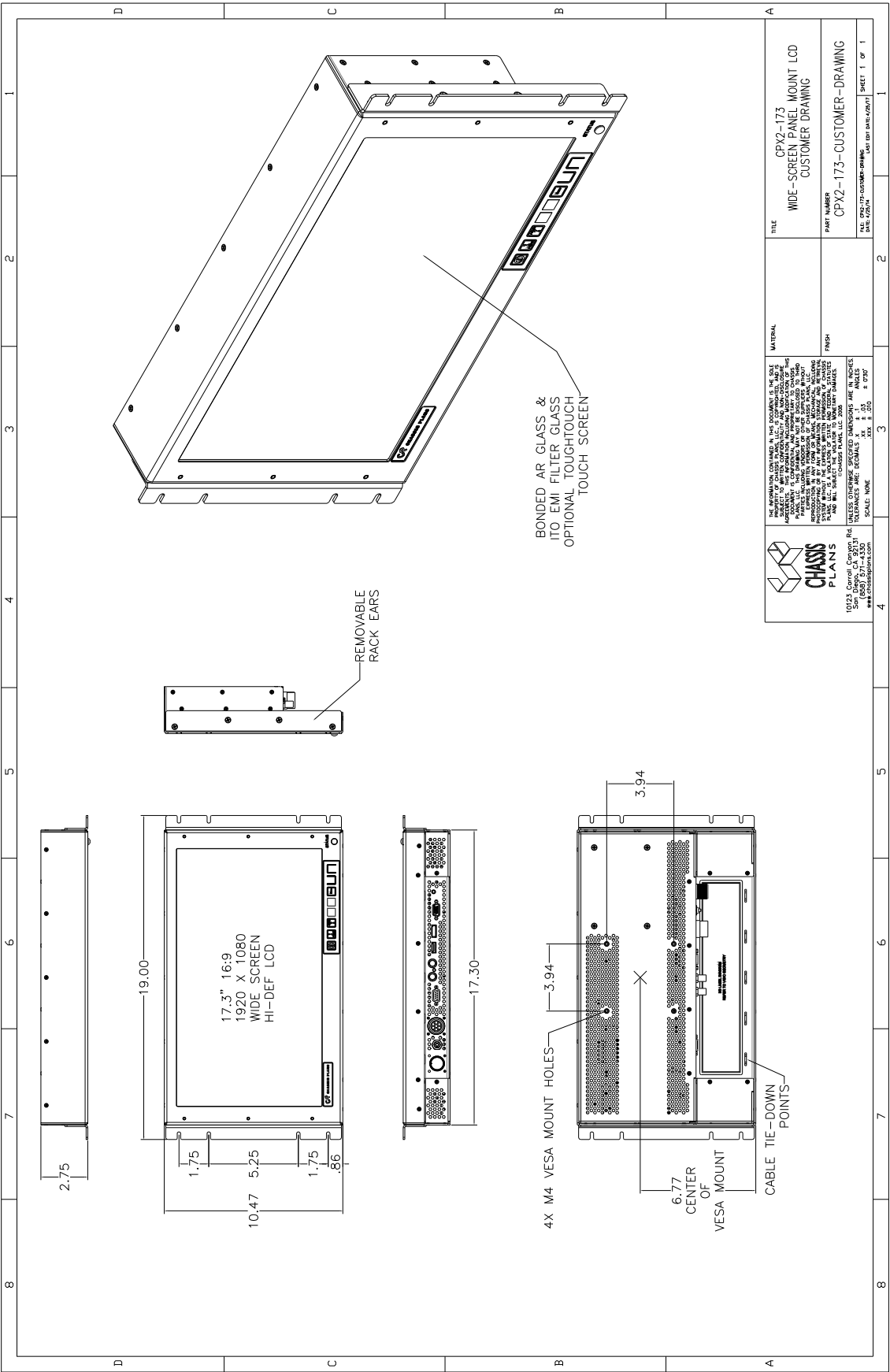


Figure 6 - CCX Outline Drawing

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Chapter 2 – Power Supply Options

AC Input Power Supply

The AC Input Power Supply is a 65W Medical Grade “Brick” style power supply. The output is provided with a circular mil connector for connecting to the LCD Keyboard Drawer. The input accepts a standard IEC 320 plug. A bracket is provided to securely mount the supply in a rack.

Alternate AC supplies are available as required by the application or environmental requirements.

INPUT		ENVIRONMENTAL	
Voltage	85-264 VAC	Operating Temperature	0 to 50°C
Current	1.4 A @ 110 VAC	Storage Temperature	-40 to +85°C
Frequency	47 – 63 Hz		
Input Connector	3-Pin IEC 320 Receptacle		
OUTPUT		SAFETY	
Voltage	12VDC	cTUVus	
Max Current	12.5A	UL 60601-1	
Total Regulation	< +/- 5%	CSA C22.2 No. 601.1-M90	
Set Point Accuracy	< +/- 3% @ 60% Load	CB per IEC 60601-1	
Hold-up Time	>12mS @ Full Load, 115VAC	CE marked to LVD	
Over Voltage Protection	Built-in	Class I	
Over Current Protection	Built-in		
Short Circuit Protection	Pulsing mode, auto recovery		
SIZE		EMI/EMC	
L X W X H	7.56" x 2.45" x 1.52"	Emissions	CISPR11 and FCC Part 15, Class B
Weight	1.55 lbs		EN61000-3-2, -3
		Immunity	EN61000-4-2, -3, -4, -5, -6, -9, -11

Table 3 - AC Input Supply Specifications



Photo 1 - AC Power Supply

12VDC Input Transient Filter

The CPX2-173 display consoles require nominal +12VDC at 40W for operation. An EMI line filter is provided to limit EMI emissions and to provide a small measure of input filtering.

For operation from unregulated 12VDC (+/-10%) such as in a vehicular or marine environment, front end transient filtering is required to suppress potentially damaging spikes from large inductive loads in the DC circuit (starters, etc.).

The xxx 12VDC Input Transient Filter provides an input Transient Protection as well as inductive and capacitive filtering to suppress large input transients. A bridge rectifier provides reverse connection protection. A circuit breaker provides for failure protection and allows the power to be disconnected.

Connectors

Input Connector	MS3102A-10SL-3P (MIL-C-5015)
Mating Input Connector	MS3106A-10SL-3S (Straight) MS3108A-10SL-3S (Right Angle)
Pinouts	Pin A – Positive Pin B – Negative Input Pin C – N/C
Output Connector	MS3102A-10SL-3S (MIL-C-5015)
Mating Output Connector	MS3106A-10SL-3S (Straight) MS3108A-10SL-3S (Right Angle)
Pinouts	Pin A – Positive Pin B – Negative Pin C – N/C

MIL-STD-704/1275 28VDC DC Input

The 'C' option 28VDC Mil-Std-704/1275 DC Input is an internal power supply providing true 704/1275 input specifications allowing reliable operation from nominal 28VDC input mains in a military environment. This supply meets Mil-Std-704A and Mil-Std-1275A (100V for 50mS).

Operating Specifications		Environmental Specifications	
Input Voltage	18-36VDC	Pressure-Altitude	Per MIL-STD-810F, Method 500.4, Procedure I and II
Output Voltage	12.0VDC	High Temperature	Per MIL-STD-810F, Method 501.4, Procedure I and II
Output Current	5A	Low Temperature	Per MIL-STD-810F, Method 502.4, Procedure I
Output Power	75W	Humidity	Per MIL-STD-810F, Method 507.4, Procedure I
Electrical Specifications		Fungus	Per Mil-Std-810F, Method 508.5, Procedure I
Efficiency	81%	Salt Fog	Per Mil-Std-810F, Method 509.4, Procedure I
Isolation	200VDC, Input to	Sand and Dust	Per Mil-Std-810F, Method 510.4, Procedure I and II
Output and Input to Case		Explosive Atmosphere	Per Mil-Std-810F, Method 511.4, Procedure I
EMI Filtering	Mil-Std-461E,	Acceleration	Per MIL-STD-810F, Method 513.5, Procedure I and II
CD101 and CE102 on the input		Vibration	Per MIL-STD-810F, Method 514.5, Procedure I, Category 1, 4, 7 thru 14 and 16 thru 21
Operating Temperature	-40°C to +85°C	Shock	Per MIL-STD-810F, Method 516.5, Procedure I, IV
Storage Temperature	-55°C to +100°C		
Connectors			
Input Connector	MS3102A-10SL-4P (MIL-C-5015)		
Mating Input Connector	MS3106A-10SL-4S (Straight) MS3108A-10SL-4S (Right Angle)		
Pinouts	Pin A – Positive Pin B – Negative Pin C –N/C		
Output Connector	MS3102A-10SL-3S (MIL-C-5015)		
Mating Output Connector	MS3106A-10SL-3S (Straight) MS3108A-10SL-3S (Right Angle)		
Pinouts	Pin A – Positive Pin B – Negative Pin C– N/C		

Table 4 - MIL-STD-704 Power Supply Specifications

+/-48VDC Power Supply

The xx 48VDC Input Converter provides universal isolated 48VDC input, either positive or negative input. Thus it can be used in a data center with centralized power of +48VDC as well as a central office with -48VDC mains. The system is provided in a rack mountable case with military grade circular connectors.

Operating Specifications		Electrical Specifications	
Input Voltage	36-75VDC	Efficiency	92%
Output Voltage	12.0VDC	Isolation	1500VDC, Input to Output and Input to Case
Output Current	10A	EMI Filtering	Mil-Std-461E, CD101 and CE102 on the input
Output Power	120W	Operating Temperature	-40°C to +85°C
Connectors		Storage Temperature	-55°C to +125°C
Input Connector	MS3102A-14SL-7P (MIL-C-5015)		
Mating Input Connector	MS3106A-14S-7S (Straight)		
	MS3108A-14S-7S (Right Angle)		
Pinouts	Pin A - Positive Pin B – Negative		
Output Connector	MS3102A-10SL-3S (MIL-C-5015)		
Mating Output Connector	MS3106A-10SL-3S (Straight)		
	MS3108A-10SL-3S (Right Angle)		
Pinouts	Pin A – Positive Pin B – Negative Pin C– N/C		

Table 5- 48VDC Power Supply Specifications

Chapter 3 – Ordering Information

Part Number Matrix

CPX2-173[M][ME][S][P]

(M) Standard or Hi-Bright Monitor

- 1 – Standard 600 cd/m²
- 2 – Hi-Bright 1,000 cd/m²

(ME) LCD Surface Enhancements

- A – Bonded EMI Filter and AR cover glass
- B – Standard w/ no screen enhancements
- C – Bonded 3mm AR coated cover glass
- E – Bonded USB Resistive touch screen

(S) Video Signal Inputs

- D4 – Includes VGA, DVI-D, HDMI, Component, Composite
- G1 – VGA, Display Port, HDMI, Component, Composite, HD-SDI

(P) Power Supply Option

- N – No supply provided. Operates from nominal 12VDC +/-5%
- A – AC input, universal 100-260VAC, 50/60Hz
- B – 12VDC Front End Transient Filter
- C – 28VDC Mil-Std-704 Military Grade
- D – 12VDC for connection to Chassis Plans Chassis Power Plug
- E – +/-48VDC, Vicor Module Military Grade
- F – AC input, universal 100-260VAC, 400Hz

Example Part Numbers

CPX2-1731BD4A – Standard brightness. No LCD enhancements. VGA/DVI/HDMI input. AC Power.

CPX2-1732CG1C – Hi-Bright display brightness. Anti-reflective LCD enhancement. Enhanced HD/SDI controller. 28VDC input power.

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Chapter 4 - Installation

Package Contents

Part Description	Quantity
LCD Keyboard Assembly	1
Power Supply	1 (if P/S spec'd in part number)
Power Supply Rack Bracket	1 (if P/S spec'd in part number)
Rack Ruler	1
Rack Slide Hardware Kit (General Devices)	1
Cable Tie, 7-9/16" Long	8
Velcro Tie, Black	6
Cage Nuts	8
Manual, LCD User, CD	1
Manual, LCD Quick Start Guide	1
Checklist	1
DVI Cable, 6-Foot	1
VGA Cable, 6-Foot	1
USB A-A Cable, 6-Foot	1
PS/2 Keyboard/Mouse Cable, 6-Foot	2

Table 6 - Package Contents

Notes:

1. **Power Cord Kit** – For the AC input supplies, a standard 6-foot North American IEC-320 power cord is provided. For the DC input supplies, a kit is provided with a mating Mil Circular connector, backshell, and pins allowing the user to fabricate an appropriate cable for the intended application. For volume orders, Chassis Plans can provide pre-fabricated power cables per the end use specifications.

Rack Installation

To mount the CPX2-173 in a rack, it is first important you identify the correct holes to mount to. Please see the following illustration. Note that a 'U' starts between the holes that are $\frac{1}{2}$ " apart. One very common problem is trying to install into the wrong holes.

Because there are multiple styles of racks, it is not possible to provide detailed instructions on mounting the equipment. However, there are general instructions at http://www.chassis-plans.com/PDF/Rack_Slide_Use.pdf for rack installation which should help.

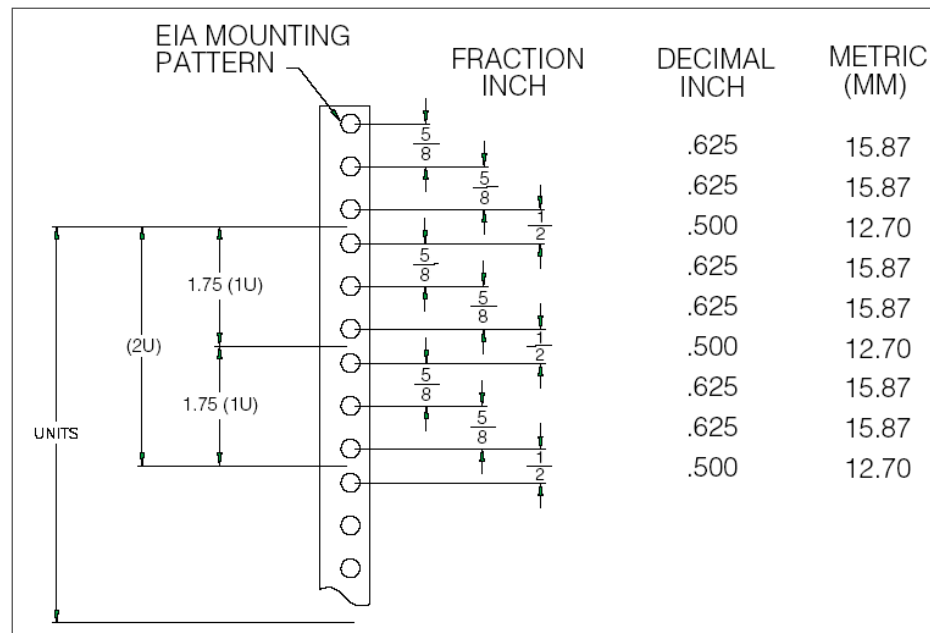


Figure 7 - Rack Mounting Hole Spacing

Chassis Plans offer free Rack Rulers to assist in installing equipment into racks. You should have received one with your order. To request more, fill out the short form at http://www.chassis-plans.com/form Rack_Ruler.html and we'll send you as many as you want. These are invaluable for installing systems into racks.

Connecting the Display

The CPX2-173 provide for two controllers with rear panel details provided below.

Standard Controller Rear Panel Connections

The Standard Controller provides for DVI and VGA inputs. In addition, the rear of the display provides for Keyboard and Pointing Device outputs plus a Circular Mil connector for power connection.

The Standard Controller offers the following features:

Inputs:

Analog RGB: 60Hz at WUXGA, UXGA
75Hz at SXGA, WXGA, XGA, SVGA, VGA

With auto detect of Digital Separate Sync, Sync-On-Green & Composite Sync. Auto detects VGA-WUXGA, interlaced & non-interlaced

DVI-D/HDMI: 60Hz at WUXGA
75Hz at SXGA, WXGA, XGA, SVGA, VGA

Image Scaling: Up / down scaling to fit input to native panel resolution of 1280x1024.

Video: NTSC /PAL/SECAM (Interlaced), Composite Video, S-video, SD Component (YCbCr), HD Component (YPbPr)

Image Control: Brightness, Contrast, Saturation, Hue, Frequency, Phase, Color temperature, Image position, Hue, Gamma.

Other Features: Auto picture setup, Auto RGB calibration, Auto source seek, OSD timeout, OSD position, Input source select, OSD menu lock, Direct key for brightness level adjustment.



* Ports Not Populated in Photo

Photo 2 – Standard Controller Rear Panel I/O

Legend	Function	Connector
VGA	aRGB Input	HD15 Female
Display Port	Display Port Input	Display Port
HDMI	HDMI Input	HDMI
SDI Input	HD/SDI Input	BNC
Reclocked SDI Output	HD/SDI Reclocked Output	BNC
RS232 Control Port	RS232 Remote Control	DB9 Female
Touch Screen	Touch Screen Output USB	USBFTV22G (Optional)
12VDC Power	Input Power, 12VDC +/-5%	Circular Mil N/S 3102A-10SL-3P
Circuit Breaker	Power Interruption	Push to reset

Table 7 - Rear Panel Connections – Standard Controller

Advanced Controller Rear Panel Connections

The Advanced Controller provides for HD/SDI, VGA analog, HDMI, Display Port Composite and S-Video video inputs. The Advanced Controller also supports Picture-In-Picture (PIP) allowing a video input (Composite or S-Video) image to be laid on top of either a VGA or DVI input.

The Advanced HD/SDI Controller offers the following features:

Inputs:

Analog RGB: 60Hz at WUXGA, UXGA, SXGA, WXGA, XGA, SVGA, VGA With auto detect of Digital Separate Sync, Sync-On-Green & Composite Sync. Auto detects VGA-WUXGA, interlaced & non-interlaced

HDMI 1.3: 60Hz at WUXGA, UXGA, SXGA, WXGA, XGA, SVGA, VGA, 1080p, 1080i, 720p, 576p, 480p
Display: 60Hz at WUXGA, UXGA, SXGA, WXGA, XGA, SVGA, VGA, 1080p, 1080i, 720p, 576p, 480p Port 1.1a

SDI: 576i50 (PAL), 480i60 (NTSC), 720p60/59.94/50 (4:2:2), 1080i60/59.94/50 (4:2:2), 1080p60/50 (4:2:2)

Features: Image Up-Scaling, Image Down-Scaling, Auto picture setup, Auto RGB calibration, Auto source seek, OSD timeout, OSD position, OSD menu rotation, OSD transparency, select input source, Volume control, On board temperature reporting

Image Control: Brightness, Contrast, Sharpness, Color, Clock, Phase, Color temperature, Image position, Gamma

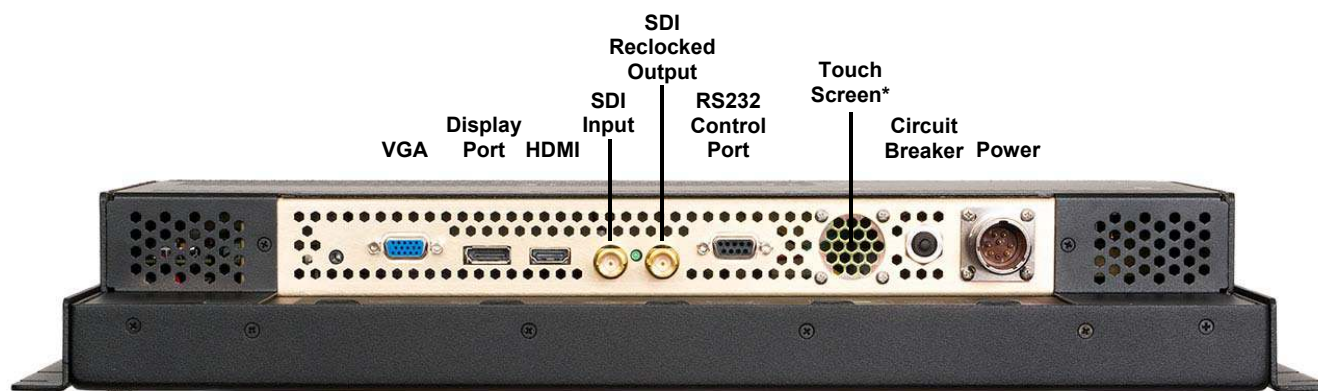
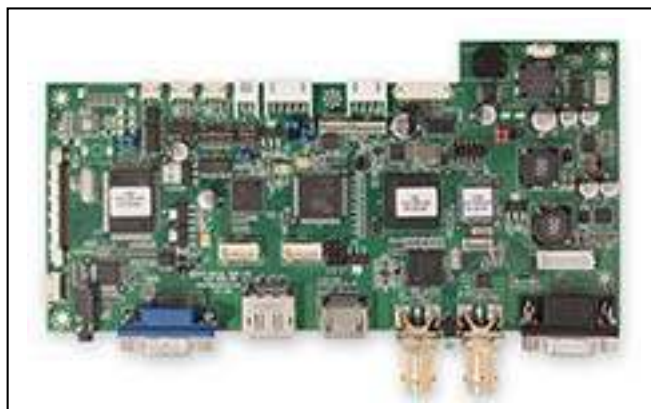


Photo 3 - Advanced HD/SDI Controller Rear Panel I/O

Legend	Function	Connector
VGA	aRGB Input	HD15 Female
Display Port	Display Port Input	Display Port
HDMI	HDMI Input	HDMI
SDI Input	HD/SDI Input	BNC
Reclocked SDI Output	HD/SDI Reclocked Output	BNC
RS232 Control Port	RS232 Remote Control	DB9 Female
Touch Screen	Touch Screen Output USB	USBFTV22G (Optional)
12VDC Power	Input Power, 12VDC +/-5%	Circular Mil N/S 3102A-10SL-3P
Circuit Breaker	Power Interruption	Push to reset

Table 8 - Rear Panel Connections – Advanced HD/SDI Controller

Chapter 5 - Operation

LCD Front Panel Controls

The On Screen Display (OSD) is adjusted as follows:

1. Press the **Menu** Button located on the front of the monitor.
2. Use the buttons described below to maneuver around the Menu.
3. Select the desired OSD Menu from the Menu Screen Shots below to make the desired adjustment(s).
4. Press the **Menu** button to exit out of the OSD Menu when complete or wait for the OSD window to automatically close as set by the OSD Time Out setting.

▪ Power: Turns the Unit On and Off ▪ Adjust ▲: - o Hot Key 1 Increase - o When the cursor is not showing in sub menus, moves selection right between top tabs. - o Cursor showing in sub menus, adjusts setting up. - o Cursor on sub-sub menu (▶ showing), enters sub-sub menu. (See Select ▲ below to escape). - o Toggles Off to On ▪ Adjust ▼: - o Hot Key 1 Decrease - o When the cursor is not showing in sub menus, moves selection left between top tabs. - o Cursor showing in sub menus, adjust setting down - o Toggles On to Off ▪ Select ▲: - o Hot Key 2 Increase - o Moves the cursor up. - o When in a sub-sub menu, repeatedly press to move to the previous menu level. (See Adjust ▲ above) ▪ Select ▼: - o Hot Key 2 Decrease. - o Moves the cursor Down. ▪ Menu - o Opens or closes the OSD menu - o See Note 1 below for additional information. ▪ Brightness ▲: - o Increases the screen brightness. ▪ Brightness ▼: - o Decreases the screen brightness. LED: ● Green-Normal Operation Green Normal Operation Red Power On but no input signal Off No power or display turned off	 Hot Keys Hot Keys are defined in the Utility/Hot Key menu and allow single button access to the defined function. Adjust ▲ and ▼ - Hot Key 1 Up and Down Select ▲ and ▼ - Hot Key 2 Up and Down Display Auto Adjust Pressing Auto/Exit will perform a auto display adjustment when in aRGB mode. This automatically adjusts the Phase and Clock for the best displayed image. To save your changes, press the front panel Menu button. Alternatively, changes are saved if no buttons are pressed and the OSD times out returning back to the display. Notes On the Menu Buttons – 1. The Menus are context sensitive in that only adjustments pertaining to the selected input will be displayed. For example, if DVI is selected for the input, then items such as Hue will not be adjustable. 2. Pressing the Menu button returns to the previously opened menu. Notes on Hot Keys - 1. Hot Keys allow single button selection of a function. 2. Definition of the Hot Keys is set in the Utility menu. Thus, for example, if the Adjust keys are set up for Input Source, pushing the Up button rolls Up through the Input Sources and pushing the Down button rolls Down through the Input Sources. 3. The Hot Keys display in the upper left of the screen when pushed. Note on Factory Default – 1. Under the Utilities Menu, a selection is available to return the board setting to the factory defaults.
--	---

Table 9 - Front Panel Controls

Standard Controller OSD Menus

OSD functions



Picture :

Volume^{###}  Increase/decrease volume level, total: 100 steps

Brightness  Increase/decrease panel brightness level, total: 100 steps

Contrast  Increase/decrease panel contrast level, total: 100 steps

Saturation  Increase/decrease saturation, total: 100 steps

Hue ^{**}  Increase/decrease Hue level, total: 100 steps

Sharpness^{*}  Increase/decrease sharpness, total: 30 steps

Backlight  Backlight brightness adjustment (Functions when light detector sets OFF)

Position^{##}

 Move the image position upward

 Move the image position downward

 Move the image position to the left

 Move the image position to the right

Aspect / Size ▶

- Fill Screen : Enable full screen expansion for lower resolution Image
- Fill to Aspect Ratio: Enable fill screen expansion for lower resolution image according to aspect ratio
- 4 : 3 : scaling format in 4:3
- 16 : 9 : scaling format in 16:9
- 16 : 10 : scaling format in 16:10
- 2.35 : 1 : scaling format in 2.35:1
- 2 : 1 : scaling format in 2:1
- 1 : 1 : Display the exact image resolution on the screen without image expansion.
- Custom Sizing^{*} : (The name will change depends on the scaling mode selected.)
 - Overscan
 - Normal
 - Custom/Underscan Sizing ▶

H Size 

V Size 

H Pan 

V Pan 

Blue Only  ON / OFF : Turn off the "Red" & "Green" channel (i.e. output all zero to Red & Green channel)
 [This function will display on OSD menu when JP4 – 5-6 closed]

^{*} : DISPLAY IN VIDEO MODE ONLY
^{**} : FUNCTION IN ARGB/ DVI / VIDEO NTSC MODE ONLY
[#] : DISPLAY IN ARGB / DVI MODE ONLY
^{##} : FUNCTION IN ARGB MODE ONLY
^{###} : DISPLAY WHEN AUDIO ADD-ON BOARD CONNECTED



Source : Select the input video signal

Main Port Change ▶

- VGA
- DVI
- HDMI⁺
- HD/SD SDI 1⁺⁺
- HD/SD SDI 2⁺⁺
- Composite 1
- Composite 2^{***}
- S-Video 1
- S-Video 2^{***}
- Component 1
- Component 2^{***}

PIP Port change ▶
 PIP Off / Composite 1 / S-Video 1 / Component 1 / DVI / HDMI⁺ / HD/SD SDI 1⁺⁺ / HD/SD SDI 2⁺⁺)

PIP Size ▶ : Off / PIP Size/ 1~18 / Size by Size / Size by Size Tall
 The PIP capability on display input sources refer to Appendix VII – PIP mix table

PIP Position :



Move the PIP position upward



Move the PIP position downward



Move the PIP position to the left



Move the PIP position to the right

PIP Blend Level : 6.25% ~ 100%

PIP Swap : Swap between the main window and PIP window

PIP Auto Turn off : OFF ON : OFF / ON

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

OFF : PIP window keeps on

*** DISPLAY WHEN SETTING ON UNDER SETUP → AUTO SOURCE SEEK
 + FUNCTION DISABLE WHEN KIT 70600-3 CONNECTED
 ++ DISPLAY WHEN KIT 70600-3 CONNECTED



Utilities :

Setup ▶

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

Auto Color Gain[#] : Auto Color Calibration (See appendix IV)

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

- Off
- 1280x768
- 1360x768
- 1366x768

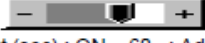
Manual Clock[#] :
-
+
 Adjust the image horizontal size

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

Auto Source Seek :

- Auto : OFF ON : OFF / ON
- ON – Auto source select always enable
- OFF – Disable auto source select function
- Setup ▶ Selection for the corresponding input sources detection

VGA	OFF	ON
DVI	OFF	ON
HDMI ⁺	OFF	ON
HD/SD SDI 1 ⁺⁺	OFF	ON
HD/SD SDI 2 ⁺⁺	OFF	ON

	Composite 1  Composite 2  S-Video 1  S-Video 2  Component 1  Component 2  The corresponding input port name display on OSD menu will disappear once setting "OFF". Auto Power :  OFF / ON ON – Enable soft power off function if absence of input signals OFF – Disable soft power function De-interlacing Mode* ▶ AFM  : Auto Film Mode TNR  : Temporal Noise Reduction MADI  : Motion Adaptive De-interlacing DCDi  : Low Angled De-interlacing [See Appendix VI for AFM, TNR, MADI, DCDi function description] Video Wall Setup ▶ Video Wall  Video Wall Size : Choose the video wall size (Number of panel for horizontal [max 4] x Number of panel for vertical [max 4]). Video Wall ID Setup : Set the matching ID number same as the ID number shown on screen. For details, please refer to the application note of the video wall setup. Bezel Compensation ▶ Bezel Compensation  Active Area (H) (mm) : Type in the active area in horizontal with reference to the panel specification Active Area (V) (mm) : Type in the active area in vertical with reference to the panel specification Bezel Opening Area (H) (mm) : Type in the bezel opening area in horizontal with reference to the panel specification. Bezel Opening Area (V) (mm) : Type in the bezel opening area in vertical with reference to the panel specification. Enable RGB SOG:  OFF / ON Video Standard (SD)* : Auto / NTSC / NTSC 4.43 / PAL / PAL M / SECAM Gamma : 0.6 / 0.7 / 0.8 / 1.0 / 1.6 / 1.8 / 1.9 / 2.0 / 2.1 / 2.2 / 2.3 / 2.4 / 2.5 / 2.6 / User Setting OSD ▶ OSD position : H POS  : Move the OSD menu image horizontally V POS  : Move the OSD menu image vertically OSD Timeout (sec) : ON – 60 : Adjust the OSD menu timeout period in a step of 5 seconds (max 60 seconds) ON = Continuous to display OSD menu. 60 = 60 seconds later will turn off the OSD menu. Screen Marker ▶ Screen Marker : On/Off Center Marker : On/Off Safe Area Enable : On/ Off Aspect Marker Enable : On/Off Safe Area Market : 80%~99% Aspect Marker : 4:3 / 16:9 Transparency Level : 0% / 25% / 50% / 75% / 100% Exit menu Language : English / Spanish / French / German / Chinese :Select OSD menu language display Transparency :  OFF / ON : Set OSD transparency Display Input :  OFF / ON : Display input source info after switching source. Real time clock ▶ show and edit the real time clock (This function is valid when "Display Input" sets ON.) DATE : DD/MM/YYYY : Date/Month/Year TIME : HH/MM/SS (AM/PM): Hour/Minute/Second SETUP ▶ Month / Day / Year Hour / Minute / AM/PM Display Clock  : Disable or enable to display the real time clock when display video source info after switching source.
--	---

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

Zoom ▶

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

Horizontal pan :  : Pan the image horizontally

Vertical pan :  : Pan the image vertically

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

Color Temperature ▶

5000K

Red Gain : 
 Green Gain : 
 Blue Gain : 
 Red Offset : 
 Green Offset : 
 Blue Offset : 
 Reset to Defaults : Resume to the default values

6500K

Red Gain : 
 Green Gain : 
 Blue Gain : 
 Red Offset : 
 Green Offset : 
 Blue Offset : 
 Reset to Defaults : Resume to the default values

8000K

Red Gain : 
 Green Gain : 
 Blue Gain : 
 Red Offset : 
 Green Offset : 
 Blue Offset : 
 Reset to Defaults : Resume to the default values

9300K

Red Gain : 
 Green Gain : 
 Blue Gain : 
 Red Offset : 
 Green Offset : 
 Blue Offset : 
 Reset to Defaults : Resume to the default values

User setting :

Red Gain : 
 Green Gain : 
 Blue Gain : 
 Red Offset : 
 Green Offset : 
 Blue Offset : 
 Reset to Defaults : Resume to the default values

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

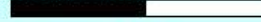
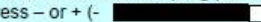
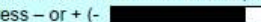
Hot Key ▶

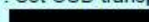
Hot key 1 : Volume / Brightness / Contrast / Inputs / Aspect Ratio/ Zoom / Freeze / PIP Size / PIP Swap / Saturation / Hue / Backlight / Auto Picture Setup / No Function

	Hot key 2 : Volume / Brightness / Contrast / Inputs / Aspect Ratio / Zoom / Freeze / PIP Size / PIP Swap / Saturation / Hue / Backlight / Auto Picture Setup / No Function Monochrome Mode ▶ - Color - Red Monochrome - Green Monochrome - Blue Monochrome - Red Only - Green Only - Blue Only Backlight Setup ▶ - B/L Invert :   : Invert for the backlight brightness - B/L Control : D/A / PWM : Selection for voltage level dimming control / PWM dimming control - Backlight Frequency :  100 ~ 440Hz in a step of 20 - Light Detector :   : Enable ambient light detector function by using KIT 70220-3 Default Setting ▶ Reset to Factory Defaults ▶ (Activate when JC1 position 4 sets open) Are you sure ? Yes/No Reset to Factory Defaults with (Color Temp.) ▶ (Activate when JC1 position 4 sets open) Are you sure ? Yes/No Save Current Settings as Calibrated Values ▶ (Activate when JC1 position 2 sets closed) Are you sure ? Yes/No Recall Stored Calibrated Values ▶ Are you sure ? Yes/No * : DISPLAY IN VIDEO MODE ONLY # : DISPLAY IN ARGB MODE ONLY + FUNCTION DISABLE WHEN KIT 70600-3 CONNECTED ++ DISPLAY WHEN KIT 70600-3 CONNECTED Firmware V0.45.00.01 or up
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Advanced HD/SDI Controller OSD Menus

OSD Functions

 Image		
	Brightness	Increase/decrease brightness level. Press – or + (-  +) Total : 100 steps
	Contrast	Increase/decrease contrast level. Press – or + (-  +) Total : 100 steps
	Sharpness	Increase/decrease sharpness level. Press – or + (-  +) Total : 8 steps
	Color	Auto : Auto RGB Calibration ([See appendix IV] in details) (Function in ARGB mode only)
	Color temp	(Adjust the warmth of the image displayed. The higher temperature the coolest image looks like. The lower temperature the warmest image looks like. Function in ARGB mode only) 4200k 5000k 6500k 7500k 9300k User ▶ R Press – or + (-  +) Total : 100 steps G Press – or + (-  +) Total : 100 steps B Press – or + (-  +) Total : 100 steps  Reset Gamma (0.4/0.6/1.0/1.6/2.2)
 Display (Function in ARGB mode only)		
	Auto Adjust	Auto adjust the positions, phase, frequency
	Phase	Fine tune the data sampling position (adjust image quality) Press – or + (-  +) Total : 100 steps
	Clock	Adjust the image horizontal size Press – or + (-  +) Total : 100 steps
	Display Position	Adjust image position
 Sound (Function when HDMI, Display Port, SDI connected and selected)		
	Volume	Increase/decrease volume level, total: 100 steps Press – or + (-  +) Total : 100 steps
	Mute	Mute
	Output	Select audio output port Speakers : via CN1 & J1 connector SPDIF : via CN11 connector
 System		
	Input source select	Input : Select the input video signal Display Port VGA DVI/HDMI SDI Autoscan : Enable the Auto source seek function
	OSD menu	
		Timer : OSD Timeout in seconds 3 sec 6 sec 12 sec Always On
		Rotation : OSD menu rotation in degree 0 90 180 270

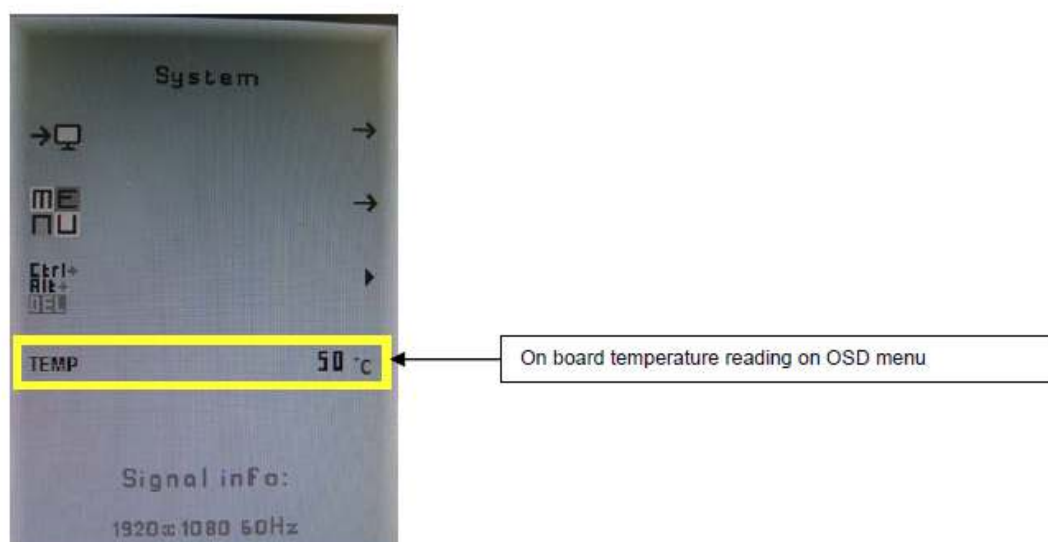
	 MENU	Position : Adjust OSD menu position
	 MENU	Transparency : Set OSD transparency Press – or + (-  +) Total : 100 steps
		Reset : Load factory default settings. Press down on OSD keypad to factory reset
TEMP		Reporting the on board temperature (°C)

[Firmware version : V1.02.00 or up]

Items marked ▶ have sub menus.
Exit the OSD menu to save the setting chosen

On board temperature reading :

This controller has a built in on board temperature sensor on U4 which can report the on board temperature reading on OSD menu. (See below) :

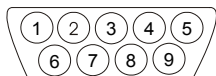


Appendix A – Display Serial Control Programming

Both LCD controllers provide for remote serial RS232 control through the rear panel Control Port as shown below. The Standard Controller also provides for control through an Ethernet port. The following command set remains the same for Ethernet control as compared to Serial control.

RS-232 Serial control

Baud rate **2400, 8 bits, 1 stop bit and no parity**



Mating face of
RS-232 DB9 Male

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

Mating connector : DB9 Female

Controller Serial Control Functions

The OSD functions are controlled through the following RS-232 commands.

The RS-232 program can be custom-tailored to fit the application or it can be used as provided by Chassis Plans on request. Please contact Chassis Plans for additional information.

Note: Not all Serial Control functions are supported in the Advanced HD/SDI controller. In the following table, functions not supported for the Advanced HD/SDI Controller are indicated with a '*' in the Function column.

Table 10 - Standard Controller Commands to Implement Switch Mount Control Buttons

Function	Command	Description	Acknowledge (if enabled)
OSD Menu Lock	0xf6	OSD menu Lock Off / OSD menu Lock On	Button equivalent
Menu	0xf7	Menu button pressed	Button equivalent
Select-down button	0xfa	Select down button pressed	Button equivalent
Select-up button	0xfb	Select up button pressed	Button equivalent
Right/+ button	0xfc	Right/+button pressed	Button equivalent
Left/- button	0xfd	Left/- button pressed	Button equivalent

Table 11 - Standard Controller 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 Reset Query	volume Range : "0"0-"1"E Default : "0"F
Volume control - on/off (mute)	0x80, "m" "M", "0" "1" "r" "R" "?"	Disable audio output. Enable audio output. Reset Query	"0" - audio off (muted). "1" - audio on.
Brightness control	0x81, nn "+" "-" "r" "R" "?" "m" "n" "i", ss, nn "o", ss,	Set brightness = value/increment/decrement Reset Query Current Source Maximum query *1 Minimum query *1 Set, Source, value *1 Query, Source *1	Brightness. Range : "4"E-"B"2 Default : "8"0 ss - reference by Input main select(0x98)
Contrast control - all channels	0x82, "a" "A", nn "+" "-" "r" "R" "?" "m" "n" "i", ss, nn "o", ss,	Set all contrast = value/increment/decrement Reset Query Maximum query *1 Minimum query *1 Set, Source, value *1 Query, Source *1	Contrast Range : "1"C-"E"4 Default : "8"0 ss - reference by Input main select(0x98)
Saturation control*	0x83, nn "+" "-" "r" "R" "?" "m" "n" "i", ss, nn "o", ss,	Set color = value/increment/decrement Reset Query Maximum query *1 Minimum query *1 Set, Source, value *1 Query, Source *1	PAL/NTSC color (In video mode only) Range : "0"1-"F"F Default : "8"0 ss - reference by Input main select(0x98)
Hue control*	0x84, nn "+" "-" "r" "R" "?" "m" "n" "i", ss, nn "o", ss,	Set tint = value/increment/decrement Reset Query Maximum query *1 Minimum query *1 Set, Source, value *1 Query, Source *1	NTSC tint (In NTSC mode only) Range : "5"3-"9"F Default : "7"9 ss - reference by Input main select(0x98)
Phase (tuning) control	0x85, nn "+" "-" "?"	Set dot clock phase = value/increment/decrement Query	Dot clock phase. (In PC mode only)
Image H position	0x86, nnnn "+" "-" "?"	Set img_hpos = value/increment/decrement Query	Image horizontal position. (In PC mode only)

- Function in ARGB mode only

* - Implemented only in standard controller. Not applicable to Advanced HD/SDI Controller.

Image V position	0x87, nnnn "+" "-" "?"	Set img_vpos = value/increment/decrement Query	Image vertical position. (In PC mode only)
Sharpness	0x8a, nn "+" "-" "r" "R" "?"	Set sharpness = value/increment/decrement Reset Query	Sharpness. (Video Mode Source only) Range : "F"4-"0"C Default : "0"0
Frequency	0x8b, nnnn "+" "-" "?"	Set frequency = Value/increment/decrement Query	Graphic mode H active size (in pixels)
Scaling Mode*	0x8c, "0" "1" "2" "3" "9" "A" "B" "C" "D" "r" "R" "?"	Set graphic image scaling mode = value Reset Query	Image expansion on/off. "0" – 1:1 "1" – fill screen "2" – fill to aspect ratio "9" – 4:3 "A" – 16:9 "B" – 16:10 "C" – 2.35:1 "D" – 2:1
OSD H position	0x90, nnn "+" "-" "r" "R" "?"	Set osd_hpos = value/increment/decrement Reset Query	OSD horizontal position. Range : "0"0-"F"F Default : "8"0
OSD V position	0x91, nnn "+" "-" "r" "R" "?"	Set osd_vpos = value/increment/decrement Reset Query	OSD vertical position. Range : "0"0-"F"F Default : "8"0
OSD Transparency*	0x92, n "+" "-" "r" "R" "?"	Set OSD transparency = value/increment/decrement Reset Query	OSD transparency. "0" – ON "1" – OFF
OSD menu timeout	0x93, nn "+" "-" "r" "R" "?"	Select menu timeout = value/increment/decrement Reset Query	OSD menu timeout value. "0"0 – Continuous. value – Round up to nearest available step. if value > max available step, set it to the max available step. Range : "0"5-"3"C Default : "0"A
Select OSD Language*	0x95, n "r" "R" "?"	Select language = English, Chinese,... Reset Query	"0" – English. "2" – French "3" – Spanish "6" – German "8" – Chinese
Input main select	0x98, nn "+" "-" "r" "R" "?"	Select input main = PC or VIDEO or next available Reset Query	Main selected. "0x41,0x31" ARGB "0x42,0x31" Composite* "0x42,0x32" Composite2* "0x43,0x31" S-video* "0x43,0x32" S-video2* "0x44,0x31" Component* "0x44,0x32" Component2* "0x45,0x31" HDSDI "0x45,0x32" HDSDI2 "0x46,0x31" DVI "0x48,0x31" HDMI "0x48,0x31" Display Port

Auto Source Seek*	0x99, nn, "0" "1" "?" "o"	Set Auto source enable = *1 Source Disable/ Enable Query Valid Source query	"nn" = "0x41,0x31"- ARGB "0x42,0x31"- Composite "0x42,0x32"- Composite 2 "0x43,0x31"- S-video "0x43,0x32"- S-video 2 "0x44,0x31"- Component "0x44,0x32"- Component 2 "0x45,0x31"- HDSOI "0x45,0x32"- HDSOI2 "0x46,0x31"- DVI "0x48,0x31" HDMI
Source Layout*	0x9a, n "r" "R" "?"	Select source layout = Single, PIP, PBP, PBPT Reset, Query	Query: "0"- Single "1"- Picture in Picture (PIP) "2"- Picture by Picture (PBP) "3"- Picture by Picture Tall (PBPT)
Video System (Composite, S- video and Component Only)*	0x9b, "0" "1" "2" "3" "r" "R" "S" "s" "?"	Set video system = Auto/NTSC/PAL/SECAM Reset Video State Query Query	Query "0" – Auto. "1" – NTSC_M_358 "2" – PAL_N_443 "3" – SECAM "4" – NTSC_M_443 "5" – PAL_M_358 "7" – PAL_M_443 "9" – PAL_N_358 <i>Video State Query</i>
GAMMA value select	0x9d, n "r" "R" "?"	Select GAMMA value = Value Reset Query	GAMMA value: "0" – 1.0, "1" – 1.6 "2" – 2.2, "3" – User Defined "4" – 1.7, "5" – 1.8, "6" – 1.9, "7" – 2.0, "8" – 2.1, "9" – 2.3, "A" – 2.4, "B" – 2.5, "C" – 2.6, "D" – 0.6, "E" – 0.7, "F" – 0.8, "G" – 0.9, "H" – 1.1, "I" – 1.2, "J" – 1.3, "K" – 1.4, "L" – 1.5
Auto power off*	0x9f, "0" "1" "r" "R" "?"	Set power down option = On/Off Reset Query	"0" – Off. "1" – On.
Hotkey 1*	0xa0, "1", n "r" "R" "?"	Set Hotkey 1= Value Reset Query	"1" – volume. "2" – brightness. "3" – contrast. "4" – colour. "5" – input source. "7" – zoom "8" – freeze "9" – PIP "B" – No function "D" – PIP Swap "E" – Aspect Ratio "G" – Hue "H" – Backlight "I" – Auto Picture Setup

Hotkey 2*	0xa0, "2", n "r" "R" "?"	Set Hotkey 2 = value Reset Query	"1" – volume. "2" – brightness. "3" – contrast. "4" – colour. "5" – input source. "7" – zoom "8" – freeze "9" – PIP "B" – No function "D" – PIP Swap "E" – Aspect Ratio "G" – Hue "H" – Backlight "I" – Auto Picture Setup
Runtime counter*	0xa1, nnnnn "r" "R" "?"	runtime counter value = nnnnn (* 0.5 hour) Reset Query	Runtime = nnnnn.
PIP brightness control*	0xa2, nn "+" "-" "r" "R" "?"	Set PIP window brightness = value/increment/decrement Reset Query	PIP window brightness. Range : "4""E"-"B""2" Default : "8""0"
PIP contrast control*	0xa3, nn "+" "-" "r" "R" "?"	Set PIP window contrast = value/increment/decrement Reset Query	PIP window contrast. Range : "1""C"-"E""4" Default : "8""0"
PIP H position*	0xa4, nnn "+" "-" "r" "R" "?"	Set PIP_hpos = value/increment/decrement Reset Query	PIP window horizontal position. Range : "0""0""0"-"0""6""4" Default : "0""5""5"
PIP V position*	0xa5, nnn "+" "-" "r" "R" "?"	Set PIP_vpos = value/increment/decrement Reset Query	PIP window vertical position. Range : "0""0""0"-"0""6""4" Default : "0""1""4"
PIP window size select*	0xa6, nn "r" "R" "?"	Select PIP window size = PIP window size value Reset Query	Main selected. PIP off if "nn" = "0""0". "0""0" ~ "1""2" "0""0" ~ "1""2" "1""9" : Size by Size "1""A" : Size by Size Tall
PIP source select*	0xa7, n "r" "R" "?"	Select input main = Video source value Reset Query	Main selected. 0x40 0x30 : PIP OFF 0x41, 0x31 : ARGB 0x42, 0x31 : Composite 0x43, 0x31 : S-video 0x44, 0x31 : Component 1 0x45, 0x31 : HDSDI 1 0x46, 0x31 : DVI 0x42, 0x32 : Composite 2 0x43, 0x32 : S-video 2 0x44, 0x32 : Component 2 0x45, 0x32 : HDSDI 2 "0x48,0x31" HDMI
Zoom level*	0xa8, nnnn "+" "-" "r" "R" "?"	Set Zoom level = value/increment/decrement Reset Query	Zoom level. Min : 0x30 0x30 0x30 0x30 (Default) Max : 0x30 0x30 0x41 0x33

Zoom H position*	0xa9, nnnn "+" "-" "r" "R" "?"	Set Zoom_hpos = value/increment/decrement Reset Query	Zoom window horizontal position. Default : 0x30 0x30 0x30 0x30 The min and max values will change depends on input resolution.
Zoom V position*	0xaa, nnnn "+" "-" "r" "R" "?"	Set Zoom_vpos = value/increment/decrement Reset Query	Zoom window vertical position. Default : 0x30 0x30 0x30 0x30 The min and max values will change depends on input resolution.
Horizontal Size*	0xad, nnn "+" "-" "r" "R" "?"	Set horizontal size for Aspect Size = value/increment/decrement Reset Query	Scalar horizontal stretch PAL(576i) / NTSC (480i) : Min : 0x30 0x30 0x30 (Default) Max : 0x30 0x46 0x30
Vertical Size*	0xb0, nnn "+" "-" "r" "R" "?"	Set Vertical Size for Aspect Size = value/increment/decrement Reset Query	Scalar vertical stretch. PAL(576i) / NTSC (480i) : Min : 0x30 0x30 0x30 (Default) Max : 0x30 0x46 0x30
Horizontal Pan*	0xb1, nnn "+" "-" "r" "R" "?"	Set horizontal pan position for Aspect Size = value/increment/decrement Reset Query	Scalar horizontal pan position PAL(576i) / NTSC (480i) : Assume max H-Size & max V-size : Min : 0x46 0x38 0x38 Max : 0x30 0x37 0x38 Default : 0x30 0x30 0x30 The min and max values will change depends on different value of H-Size, V-Size and input resolution.
Vertical Pan*	0xb2, nnn "+" "-" "r" "R" "?"	Set Vertical pan position for Aspect Size = value/increment/decrement Reset Query	Scalar vertical pan position PAL(576i) / NTSC (480i) : Assume max H-Size & max V-size : Min : 0x46 0x38 0x38 Max : 0x30 0x37 0x38 Default : 0x30 0x30 0x30 The min and max values will change depends on different value of H-Size, V-Size and input resolution.
Colour temperature select	0xb3, n "r" "R" "?"	Select colour temperature = value Reset Query	Main selected. "0" – 9500K. "1" – 8000K. "2" – 6500K. "3" – 5000K "4" - User

Red level for selected colour temperature	0xb4, nn "+" "-" "I" "R" "?" "m" "n" "i", ss, c, nn "o", ss, c	Set the level of the red channel for the selected colour temp. = value/increment/decrement Reset Query Maximum query *1 Minimum query *1 Set, Source, Temperature Group, value *1 Query, Source *1	Red level for selected colour temperature. Range : "9" "C" - "F" "F" Default : "E" "C" c – reference by Color Temperature ss - reference by Input main select(0x98)
Green level for selected colour temperature	0xb5, nn "+" "-" "I" "R" "?" "m" "n" "i", ss, c, nn "o", ss, c	Set the level of the green channel for the selected colour temp. = value/increment/decrement Reset Query Maximum query *1 Minimum query *1 Set, Source, Temperature Group, value *1 Query, Source *1	Green level for selected colour temperature Range : "9" "C" - "F" "F" Default : "E" "C" c – reference by Color Temperature ss - reference by Input main select(0x98).
Blue level for selected colour temperature	0xb6, nn "+" "-" "I" "R" "?" "m" "n" "i", ss, c, nn "o", ss, c	Set the level of the blue channel for the selected colour temp. = value/increment/decrement Reset Query Maximum query *1 Minimum query *1 Set, Source, Temperature Group, value *1 Query, Source *1	Blue level for selected colour temperature. Range : "9" "C" - "F" "F" Default : "E" "C" c – reference by Color Temperature ss - reference by Input main select(0x98).
Graphic horizontal resolution enquiry*	0xb7	Horizontal resolution (in pixels) in 3 digit hex number	"nnn" = horizontal resolution
Graphic vertical resolution*	0xb8	Vertical resolution (in lines) in 3 digit hex number	"nnn" = vertical resolution
Graphic horizontal sync frequency enquiry*	0xb9	Horizontal sync frequency (in units of 100Hz) in 3 digit hex number	"nnn" = horizontal frequency
Graphic vertical sync frequency enquiry	0xba	Vertical sync frequency (in units of Hz) in 3 digit hex number and 1 char	"nnnn" = vertical frequency nnn = 3 digit hex c= "i" or "p" interlace or Progressive 0xba added the interlace(i) or Progressive(p) feedback.
OSD status enquiry*	0xbb	Status of OSD	"0" – OSD turned off "1" – OSD turned on "2" – Text Overlay on "3" – Display Mark on "4" – Screen Marker on
Display Video Source Select*	0xbc, "?" "0" "1"	Display Video source select Query Name of video source not displayed. After switching to a new video source, the name of the video source is displayed for 5 seconds.	"0" – Disabled. "1" – Enabled.

OSD turn off*	0xbd	Turn off the OSD.	"0" – fail. "1" – successful.
Set gamma data for user defined gamma curve*	0xbf, mm, c, "?" 0xbf, "R" "r" 0xbf, mm, c, nn	Query gamma data for color c index mm (c = 0 for color Red, c=1 for color Green, c=2 for color Blue) Set user gamma curve to linear Set gamma data for color c index mm. (If c= 3, then gamma data for red, green & blue will be set at the same time.)	"nn" = gamma data "1" "nn" = gamma data
Query External Memory*	0xcb, "2"	Check External Memory 24c256	"0" – Not Installed "1" – Installed "?" – Not Support
Query Revision Number*	0xcb, "3"	Read Revision Number	"nn" = Revision number
Backlight control	0xe0, nn "+" "-" "R" "r" "?"	Set Backlight = value/increment/decrement Reset Query	Backlight. Range: D/A : "0"0" ~ "1"6" 100Hz : "0"0" ~ "8"A" 120Hz : "0"0" ~ "7"3" 140Hz : "0"0" ~ "6"3" 160Hz : "0"0" ~ "5"6" 180Hz : "0"0" ~ "4"D" 200Hz : "0"0" ~ "4"5" 220Hz : "0"0" ~ "3"E" 240Hz : "0"0" ~ "3"9" 260Hz : "0"0" ~ "3"5" 280Hz : "0"0" ~ "3"1" 300Hz : "0"0" ~ "2"E" 320Hz : "0"0" ~ "2"B" 340Hz : "0"0" ~ "2"8" 360Hz : "0"0" ~ "2"6" 380Hz : "0"0" ~ "2"4" 400Hz : "0"0" ~ "2"2" 420Hz : "0"0" ~ "2"0" 440Hz : "0"0" ~ "1"F"
Backlight On/Off	0xe1, "0" "1" "R" "r" "?" "S" "s"	Backlight Off / Backlight On /Status	"0" – Backlight Off "1" – Backlight On. "?" – Backlight On/Off Query "S" "s" – Backlight Status Query
Color Monochrome mode selection (Output Channel Select)*	0xe2 "0" "1" "2" "3" "4" "5" "6" "R" "r" "?"	Off/ Blue Only/ Red Only/ Green Only/ Blue Mono/ Red Mono/ Green Mono/	"0" – Off "1" – Blue Only "2" – Red Only "3" – Green Only "4" – Blue Mono "5" – Red Mono "6" – Green Mono
PIP Swap*	0xe3	Swap Main and PIP source	"0" - Fail. "1" - Successful.
Backlight D/A / PWM*	0xe5 "0" "1" "R" "r" "?"	Set : PWM or D/A Reset Query	"0" – PWM "1" – D/A

Backlight PWM Frequency*	0xe6, nnn "+" "-" "R" "r" "?"	Set Backlight PWM Frequency = value/increment/decrement Reset Query	+/- 20Hz Value 100Hz : "0", "6", "4" 120Hz : "0", "7", "8" 140Hz : "0", "8", "C" 160Hz : "0", "A", "0" 180Hz : "0", "B", "4" 200Hz : "0", "C", "8" 220Hz : "0", "D", "C" 240Hz : "0", "F", "0" 260Hz : "1", "0", "4" 280Hz : "1", "1", "8" 300Hz : "1", "2", "C"
Backlight Invert*	0xe7 "0" "1" "R" "r" "?"	Set On or Off Reset Query	"0" – Off "1" – On
Red Offset for selected colour temperature*	0xe8, nn "+" "-" "r" "R" "?" "m" "n" "i", ss, c, nn "o", ss, c	Set the Offset of the red channel for the selected colour temp. = value/increment/decrement Reset Query Maximum query *1 Minimum query *1 Set, Source, Temperature Group, value *1 Query, Source *1	Red Offset for selected colour temperature. c – reference by Color Temperature ss - reference by Input main select(0x98)
Green Offset for selected colour temperature*	0xe9, nn "+" "-" "r" "R" "?" "m" "n" "i", ss, c, nn "o", ss, c	Set the Offset of the green channel for the selected colour temp. = value/increment/decrement Reset Query Maximum query *1 Minimum query *1 Set, Source, Temperature Group, value *1 Query, Source *1	Green Offset for selected colour temperature. c – reference by Color Temperature ss - reference by Input main select(0x98)
Blue Offset for selected colour temperature*	0xea, nn "+" "-" "r" "R" "?" "m" "n" "i", ss, c, nn "o", ss, c	Set the Offset of the blue channel for the selected colour temp. = value/increment/decrement Reset Query Maximum query *1 Minimum query *1 Set, Source, Temperature Group, value *1 Query, Source *1	Blue Offset for selected colour temperature. c – reference by Color Temperature ss - reference by Input main select(0x98)
PIP Window Blend Level*	0xed, nn "+" "-" "R" "r" "?"	Select PIP Transparency Level PIP Transparency value Reset Query	PIP Transparency "0"F" = 6.25% "0"E" = 12.5% "0"D" = 18.75% "0"C" = 25% "0"B" = 31.25% "0"A" = 37.5% "0"9" = 43.75% "0"8" = 50% "0"7" = 56.25% "0"6" = 62.5% "0"5" = 68.75% "0"4" = 75% "0"3" = 81.25% "0"2" = 87.5% "0"1" = 93.75% "0"0" = 100%.

PIP Window Auto Off*	"0xee", "0x41" "0" "1" "?"	Auto Off / Auto On Query	"0" - Off "1" - On
ScreenMarker*	"0xee", "0x42" "0" "1"	Screen Marker Off / Screen Marker On	"0" - Off "1" - On
CenterMarker*	"0xee", "0x43" "0" "1"	Center Marker Off / Center Marker On	"0" - Off "1" - On
AspectMarker*	"0xee", "0x44" "0" "1"	Preliminary 4:3 / 16:9	"0" - 4:3 "1" - 16:9
Marker Background Transparency*	"0xee", "0x45" "0" "1" "2" "3"	Preliminary 0% / 25% / 50% / 95%	"0" - 0% "1" - 25% "2" - 50% "3" - 95%
Safe Area Marker*	"0xee", "0x47" "0x53" ~ "0x63"	Preliminary 80%~99%	"36", "33" - 99% "36", "32" - 98% "36", "31" - 97% "36", "30" - 96% "35", "46" - 95% "35", "45" - 94% "35", "44" - 93% "35", "43" - 92% "35", "42" - 91% "35", "41" - 90% "35", "39" - 89% "35", "38" - 88% "35", "37" - 87% "35", "36" - 86% "35", "35" - 85% "35", "34" - 84% "35", "33" - 83% "35", "32" - 82% "35", "31" - 81% "35", "30" - 80%
IR Lock*	"0xee", "0x48" n "0" "1" "r" "R" "?"	IR Lock Disable / IR Lock Enable Reset Query	"0" - IR Lock Disable "1" - IR Lock Enable
Light Detector*	"0xee", "0x4A" "0" "1" "R" "r" "?" "S" "s"	Light Detector Off / Light Detector On Light Detector On/Off Query Light Detector Value Query	"0" - Light Detector Off "1" - Light Detector On. "?" - Light Detector On/Off Query "S" "s" - Light Detector Value Query 0x00~0xFF
Safe Area Marker Enable*	"0xee", "0x4B" "0" "1"	Safe Area Marker Off / Safe Area Marker On	"0" - Off "1" - On
Aspect Marker Enable*	"0xee", "0x4C" "0" "1"	Aspect Marker Off / Aspect Marker On	"0" - Off "1" - On
Display real time clock**	"0xee", "0x4D" "0" "1"	Real Time Clock Display Off / Real Time Clock Display	"0" - Off "1" - On
Static IP or DHCP mode switching***	"0xee", "0x70" "A" "0" "A" "1"	Select Static IP or DHCP mode	Static IP: 0xee 0x70 0x41 0x30 DHCP : 0xee 0x70 0x41 0x31
Custom Sizing*	0xef, "0" "1" "2" "?"	Custom sizing selection : Overscan / Normal / Custom Query	"0" - Overscan "1" - Custom / Underscan "2" - Normal

Function	Command	Description	Acknowledge (if enabled)
Send Display Mark* e.g Send Display Mark RS232 Code: "0xF1 0x53"	0xF1, "S" "0x21" "0x40" "0x60" "0x7E" Return "1"	"S" = "0x53 or 0x73" ASCII "0x21,0x40,0x60,0x7E" Return "0x31"	"S" – Send Command "Text" – Character "1" - successful.
Clear Display Mark*	0xF1, "C" Return "1"	"C" = "0x43 or 0x63" Return "0x31"	"C" – Clear command "1" - successful.
e.g Clear Display Mark RS232* Code: "0xF1 0x43" Return Code: "0xF1 0x43 0x31"			
Display Mark Horizontal Position*	0xF1, "H" "ss" Return "nn"	"H" = "0x48 or 0x68" ----- "nn" = "0x30,0x30~0x46,0x46"	"H" – Horizontal Position command "ss" – Set Horizontal Position number "nn" – Return Position number
e.g Set Display Mark Horizontal Position* RS232 Code: "0xF1 0x48 0x30 0x31" Return Code: "0xF1 0x48 0x30 0x31 0x30 0x31"			
Display Mark Vertical Position*	0xF1, "V" "ss" Return "nn"	"V" = "0x56 or 0x76" ----- "nn" = "0x30,0x30~0x46,0x46"	"V" – Vertical Position command "ss" – Set Vertical Position number "nn" – Return Position number
e.g Set Display Mark Vertical Position* RS232 Code: "0xF1 0x56 0x30 0x31" Return Code: "0xF1 0x56 0x30 0x31 0x30 0x31"			
Display Mark Background Transparency*	0xF1, "B" "N" Return "n"	"B" = "0x42 or 0x62" Set Transparency command ----- "N" = "0x30~0x46" Transparency Value (Rang 00~0F)	"B" - Transparency command "N" – Transparency Value "n" - Return Value 0x00 =opaque
Set Display Mark background Transparency value is 8* RS232 Code: "0xF1 0x42 0x38" Return Code: "0xF1 0x42 0x38 0x38"			
OSD menu lock	0xf6, n "0" "1" "r"	OSD menu lock Off/ On Reset Query	"0" – OSD menu lock Off "1" – OSD menu lock On

Table 12 - Standard Controller Other Control

Function	Command	Description	Acknowledge (if enabled)
Select RS-232 acknowledge	0xc1, "0" "1" "2" "3"	Disable/enable command acknowledge.	"0" – acknowledge disabled. "1" – acknowledge enabled. "2" – serial command disabled. "3" – serial command enabled.
Auto-setup	0xc3	Start auto-setup of current vmode.	"0" – fail. "1" – successful.
Command availability	0xc4, n	Check whether a command is available.	"0" – not available. "1" – available.
Auto-calibration	0xc5	Start auto-calibration of gain of the RGB amplifier.	"0" – fail. "1" – successful.
Freeze frame*	0xc6, "0" "1"	Unfreeze / freeze frame	"0" – unfreeze. "1" – freeze.
Soft Power On/Off*	0xc8, "0" "1" "?"	Soft power off/on query	"0" – Turn off the LCD power and backlight. Turn off memory controller, Power down DVI Power down ADC, Power down Fclk PLL "1" – Turn on the unit
Query video input status*	0xc9	Query the status of the primary & pip status	"nn,nn" = input status "nn,xx" digit = primary status: "0", "0" : invalid "A", "1" ARGB "B", "1" Composite "B", "2" Composite 2 "C", "1" S-video "C", "2" S-video 2 "D", "1" Component "D", "2" Component 2 "E", "1" HDSDI "E", "2" HDSDI 2 "F", "1" DVI "H", "1" HDMI "xx,nn" = PIP input status: "0", "0": invalid "A", "1" ARGB "B", "1" Composite "B", "2" Composite 2 "C", "1" S-video "C", "2" S-video 2 "D", "1" Component "D", "2" Component 2 "E", "1" HDSDI "E", "2" HDSDI 2 "F", "1" DVI "H", "1" HDMI

Video de-interlace method*	0xca, "0" "1" "r" "R" "?"	De-interlace mode Reset Query	"3" "1"- enable AFM "3" "0"- disable AFM "4" "1"- enable TNR "4" "0"- disable TNR "5" "1"- enable MADI "5" "0"- disable MADI "7" "1"- enable DCDi "7" "0"- disable DCDi
Query BIOS version	0xcb, "0"	Read BIOS version	BIOS version "VV.YY.ZZ" VV = V0 or E0, V0 = Release version E0 = Engineering Sample YY= Version Number ZZ= Customer Number
Query PCBA number	0xcb, "1"	Read PCBA number	"nnnnn" = PCBA number SVX-1920= "41721"
Reset to Factory Defaults	0xce	Reset all parameters to default value	"1" – successful.
Reset to Factory Defaults with (color temp) *	0xcf	Reset all parameters for all video modes to default value	"1" - successful.
Saved Calibrated default*	0xd7	Saving all parameters to user default value	"1" - successful.
Load Calibrated default*	0xd8	Loading all parameters to user default value	"1" - successful. "0" - not successful "E" – Checksum Error
Wide Screen Mode Selection*	0xd9, "0" "1" "2" "r" "R" "?"	Wide Screen Mode Reset Query	"0" – Normal Mode "1" – 1280x768 "2" – 1366x768
ScreenMarker*	"0xee", "0x42" "0" "1"	Screen Marker Off / Screen Marker On	"0"- Off "1"- On
CenterMarker*	"0xee", "0x43" "0" "1"	Center Marker Off / Center Marker On	"0"- Off "1"- On
AspectMarker*	"0xee", "0x44" "0" "1"	Preliminary 4:3 /16:9	"0"- 4:3 "1"- 16:9
Marker Background Transparency	"0xee", "0x45" "0" "1" "2" "3"	Preliminary 0% /25%/50%/95%	"0"- 0% "1"- 25% "2"- 50% "3"- 95%
Safe Area Marker*	"0xee", "0x46" "0x53"~"0x63"	Preliminary 64%~98%	"36", "33"- 98% "36", "32"- 96% "36", "31"- 94% "36", "30"- 92% "35", "46"- 90% "35", "45"- 88% "35", "44"- 86% "35", "43"- 84% "35", "42"- 83% "35", "41"- 81% "35", "39"- 79% "35", "38"- 77% "35", "37"- 76% "35", "36"- 74% "35", "35"- 72% "35", "34"- 71% "35", "33"- 69% "35", "32"- 67% "35", "31"- 66% "35", "30"- 64%

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		

Table 13 - Hex to ASCII Conversion Table

Appendix B – Auto Color Gain

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

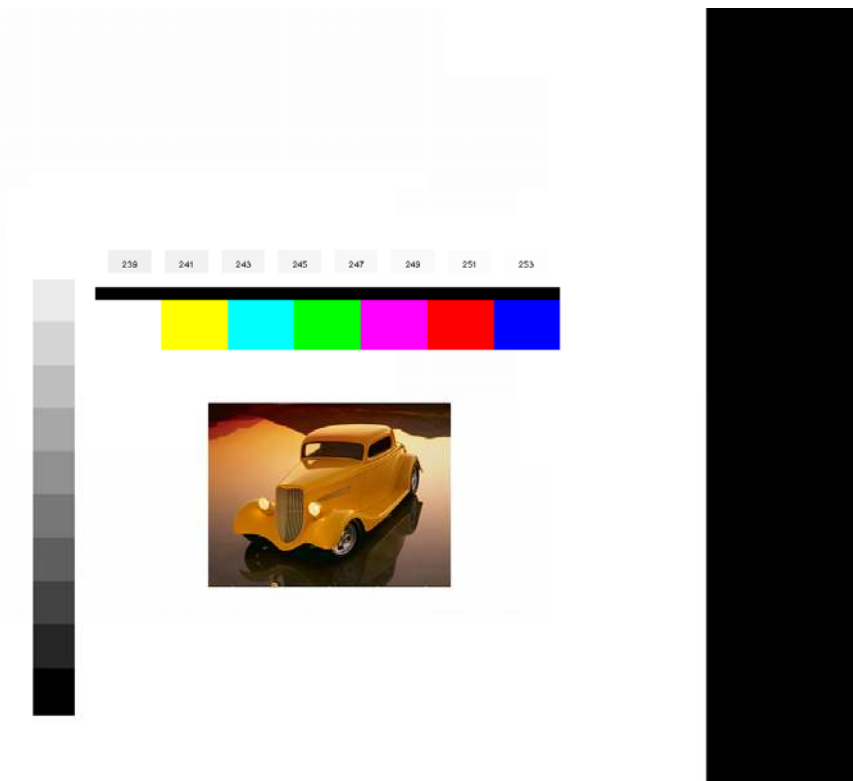


Image B-1 – Auto Color Gain Example

The reference pattern can be downloaded at :

http://www.chassis-plans.com/Rackmount-Keyboards-Displays/TestPattern_1280.bmp

This reference pattern is for 1280x1024 resolution and it needs to set your ARGB input source to 1280x1024 resolution before performing the Auto Color Gain function. The position of the black vertical bar in the pattern at the right side is important. It will affect the calibration result if you are setting the ARGB input to other resolution. This image can be used on the CPX1-124 to correctly set the Auto Color Gain.

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

Appendix C – DVI-D versus DVI-I Connectors

The Digital Visual Interface (DVI) is a video interface standard designed to provide very high visual quality on digital display devices such as flat panel LCD computer displays and digital projectors. It was developed by an industry consortium, the Digital Display Working Group (DDWG). It is designed for carrying uncompressed digital video data to a display. It is partially compatible with the High-Definition Multimedia Interface (HDMI) standard in digital mode (DVI-D), and VGA in analog mode (DVI-A).

The LCD controllers offered with the CCX keyboards offer DVI-D and DVI-I, depending on which controller is selected. This discussion is presented to help clarify the difference between the various flavors of DVI.

Overview

The DVI interface uses a digital protocol in which the desired illumination of pixels is transmitted as binary data. When the display is driven at its native resolution, it will read each number and apply that brightness to the appropriate pixel. In this way, each pixel in the output buffer of the source device corresponds directly to one pixel in the display device, whereas with an analog signal the appearance of each pixel may be affected by its adjacent pixels as well as by electrical noise and other forms of analog distortion.

Connectors

The DVI connector usually contains pins to pass the DVI-native digital video signals. In the case of dual-link systems, additional pins are provided for the second set of data signals.

As well as digital signals, the DVI connector includes pins providing the same analog signals found on a VGA connector, allowing a VGA monitor to be connected with a simple plug adapter. This feature was included in order to make DVI universal, as it allows either type of monitor (analog or digital) to be operated from the same connector.

The DVI connector on a device is therefore given one of four names, depending on which signals it implements:

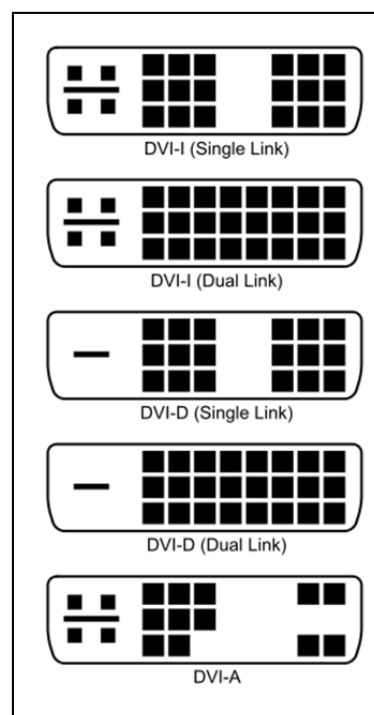
DVI-D (digital only)

DVI-I (integrated, digital & analog)

The connector also includes provision for a second data link for high resolution displays, though many devices do not implement this. In those that do, the connector is sometimes referred to as DVI-DL (dual link).

The long flat pin on a DVI-I connector is wider than the same pin on a DVI-D connector, so it is not possible to connect a male DVI-I to a female DVI-D by removing the 4 analog pins. It is possible, however, to connect a male DVI-D cable to a female DVI-I connector. Many flat panel LCD monitors have only the DVI-D connection so that a DVI-D male to DVI-D male cable will suffice when connecting the monitor to a computer's DVI-I female connector.

Essentially, DVI-D is the same as DVI-I with DVI-D missing the analog portion of the signals. A DVI-D connector and monitor can connect to a DVI-I output and function. A DVI-I monitor can connect to a DVI-D output with the caveat that no analog video will be available.



Appendix D – Ethernet Network Connection

The CPX2-173 with the Standard Controller has an RJ-45 Ethernet port for control and monitoring over a network. This appendix introduces the two user interface modes:

- Command line direct mode (this is the default mode)
- Browser based web server mode

There is also a short overview of the command set and how it is implemented in Appendix A.

QUICK GUIDE

Command line direct mode: This is relevant when a PC application is used to send and receive commands over the network port. The LCD Controller with the command line direct mode is installed as default.

The RS-232 commands available are the same as documented Appendix A and writing a control application is very similar to the RS-232 type except the commands must pass through the network. An alternative is to use an application written for RS-232 communication and use a virtual serial port program such as:

One of the software program can be download at <http://www.taltech.com/products/tcpcom.html>.

This software can create “Virtual” RS232 serial ports that are actually connections to a TCP/IP port. This allows you to use existing Windows based serial communications software to send and receive data across a TCP/IP network.

Please note this is a 3rd party program and is not warranted nor is it the responsibility of Chassis Plans.

Browser based web server mode :

For experienced users the following quick guide to trying out the network connection and functions may be useful.

- Works with a normal network with DHCP, i.e. must use a router.
- Connect the LCD to the network and ensure power is on.
- Use the IP Locator utility available at <http://www.chassis-plans.com/ip-locator.zip> (Windows only)
- Double click on the IP address in the IP Locator window, it will open the LCD Controller browser page in your default browser. Alternatively copy the IP address into your browser address line.
- Test the functions that come up on the browser.

CAUTION: Configuring TCP/IP settings are complicated and may require an experienced network administrator. For additional help or network configuration, contract your network provider.

Connecting a network port to CPX2-173

Connect the CPX2-173 to the network with a standard Cat-5 Ethernet cable. *Note: A straight RJ-45 cable should be used to connect to the network switch/hub/router.*

Get the IP address using DHCP

When in a default state and powered on, the IP controller will first try to obtain its IP address and network information, such as Subnet Mask address, Gateway address, etc., from the DHCP server. The IP controller may also be configured manually.

If you have a DHCP server on your network, the CPX2-173 automatically obtains its IP address from that server.

- DHCP services must be available on the server.
- If the CPX2-173 and DHCP server are located on different subnets, IP configuration may fail unless the routing device allows the transfer of DHCP requests between subnets.

Web Console

The Web Console is a small web server program (.bin) embedded in the CPX2-173. It provides the user nterface that can be accessed and viewed on any standard web browser. The web console provides a platform where you can inquire and control the RS-232 devices which connecting to IP controller.

IP Locator

The IP Locator is a tool to search for any available CPX2-173 connected to the local network within same subnet. If you don't know the IP address of your CPX2-173, the IP Locator program can help you to find the IP address allocated to your CPX2-173. The following example IP Locator's screen shows the devices detected, as well as the IP address, host name and MAC address. (Please copy the IP Locator from the Chassis Plans website at www.chassis-plans.com/ip-locator.zip)

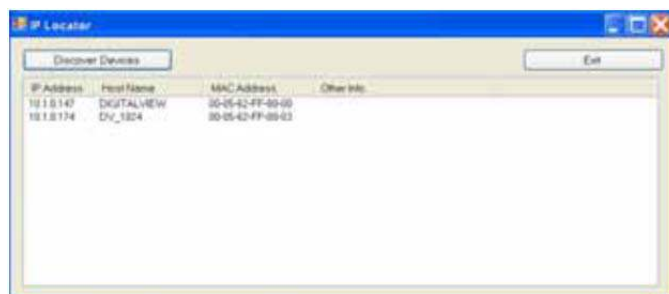


Image D-1 – IP Locator Screen Show

Pressing the Discover Devices button will re-detect the devices and update the screen.

Note: Make sure you have "Microsoft .NET Framework 2.0" already installed on your PC before using the "IP Locator".

Network configuration

To see the network configuration, click **Network** pull down menu will see the table of network settings.

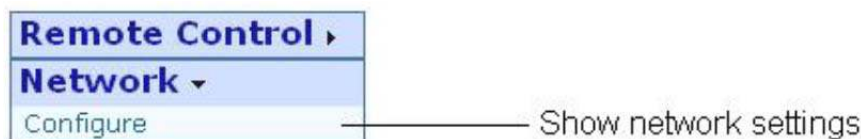


Image D-2 – Network Drop Down

Configure

- Firmware Version Firmware version of CPX2-173
- MAC Address MAC address of IP controller
- Host Name ID name without space (max. 15 character)
- DHCP DHCP client mode enable/disable
- IP Address IP address (assigned automatically if DHCP mode enable)
- Subnet Mask Address Subnet Mask Address
- Default Gateway Address Network Gateway Address
- Primary DNS Address Network DNS Address

Network Configure

Firmware Version :

MAC Address :

Host Name: (Max. 15 characters)

DHCP: ☒ On ☐ Off

IP Address:

Subnet Mask Address:

Default Gateway Address:

Primary DNS Address:

Image D-3 – Network Configure Settings

In cases where the CPX2-173 is setup behind a firewall and cable/ADSL modem. The following provides details so it can be directly accessed over internet by typing the dedicated IP address on web browser.

Connect to a single CPX2-173

- Connect the CPX2-173 to a router using Cat-5 cable.
- It is suggested to use “DMZ” function on the router. The standard ports required by the CPX2-173 is shown as below:

Port ID	Service	Function
80	HTTP	Access web server
20	FTP (Data)	Web Server program upgrade
21	FTP (Control)	

Table D-1 – Remote Control

To setup DMZ function on your router, you may refer to the following procedure for your reference. (Different routers will has its different setup methods; please refer to the user manual of your router.)

Step 1: Connect to the router and enter into its configuration page.

Step 2: Locate the internal IP address of the CPX2-173. (e.g. 192.168.1.2)



Image D-4 – IP Address Locator

Step 3: Assign the internal IP of the CPX2-173 to DMZ function and enable it.

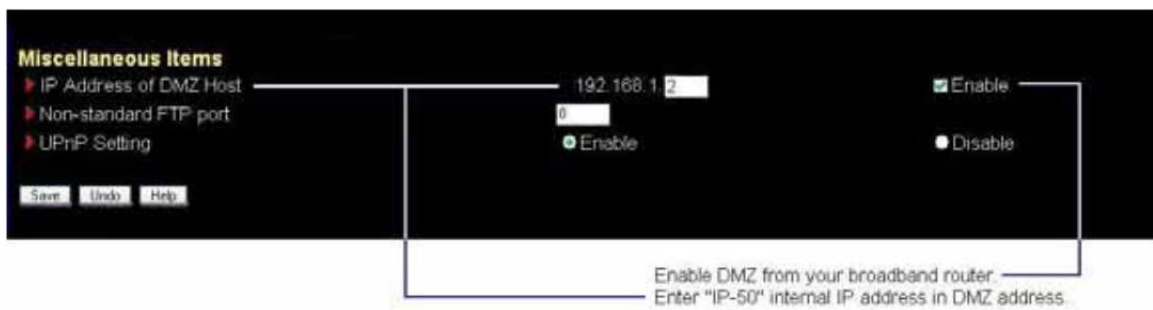


Image D-5 – IP Address Setting and Enable

In the above example, we can just type <http://148.xxx.27.15> to enter web server of the CPX2-173.

Connect to multiple CPX2-173

If more than one CPX2-173 are installed at the same location but only has a single IP address to internet, then a router with the NAT, Port forward and firewall function to map different service ports to individual CPX2-173 displays is required.

For example:

External Port	Internal Port	Service	LAN IP
9080	80	HTTP	192.168.1.2
9021	21	FTP (Control)	192.168.1.2
9180	80	HTTP	192.168.1.3
9121	21	FTP (Control)	192.168.1.3

Table D-2 – Remote Control

To setup NAT and Port forward function on your router, you may refer to the following procedure for your reference. (Different router will has its different setup method; please refer to the user manual of your router.)

Step 1: Connect to the router and enter into its configuration page.

Step 2: Locate the internal IP addresses of all CPX2-173. (e.g. 192.168.1.2 and 192.168.1.3)

HOME - DHCP TABLE

Interface LAN

#	IP Address	Host Name	MAC Address	Reserve ☐
1	192.168.1.2		00:05:62:00:80:3a	☐
1	192.168.1.3		00:05:62:00:80:32	☐

Apply Refresh

Image D-6 – DHCP Table Screenshot

Step 3: Set all ports forwarding under NAT function of router. (see the screen below for example.)

NAT

NAT Overview Address Mapping Port Forwarding

Port Forwarding Rules

Default Server 0 . 0 . 0 . 0 Go To Page 1

#	Active	Name	Incoming Port(s)	Port Translation	Server IP Address
1	☒	P-50-1 (80)	8080 - 9080	80 - 90	192 . 168 . 1 . 2
2	☒	P-50-1 (21)	9021 - 9021	21 - 21	192 . 168 . 1 . 2
3	☒	P-50-2 (80)	9180 - 9180	80 - 80	192 . 168 . 1 . 3
4	☒	P-50-2 (21)	9121 - 9121	21 - 21	192 . 168 . 1 . 3
5	☐		0 - 0	0 - 0	0 . 0 . 0 . 0
6	☐		0 - 0	0 - 0	0 . 0 . 0 . 0
7	☐		0 - 0	0 - 0	0 . 0 . 0 . 0
8	☐		0 - 0	0 - 0	0 . 0 . 0 . 0
9	☐		0 - 0	0 - 0	0 . 0 . 0 . 0
10	☐		0 - 0	0 - 0	0 . 0 . 0 . 0
11	☐		0 - 0	0 - 0	0 . 0 . 0 . 0
12	☐		0 - 0	0 - 0	0 . 0 . 0 . 0

Image D-7 – NAT Forwarding Screenshot

In the above example, we have to enter

http://148.xxx.27.15:9080 to access CPX2-173-1 at 192.168.1.2

FTP://148.xxx.27.15:9021 to FTP CPX2-173-1 at 192.168.1.2

http://148.xxx.27.15:9180 to access CPX2-173-2 at 192.168.1.3

FTP://148.xxx.27.15:9121 to FTP CPX2-173-2 at 192.168.1.3

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