CHASSIS PLANS®
Systems Engineered to Perform®

CPX-15
CPX-17
CPX-19

Rugged Military Grade
8U Rack Mount
LCD Display

15” XGA TRANSFLECTIVE LCD
17” or 19” SXGA LCD

Technical Reference

22010100B
Revision B
October 8, 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

Trademarks

Liability Disclaimer

This manual is as complete and factual as possible at the time of printing; however, the information in this manual may have been updated since that time. Chassis Plans reserves the right to change the functions, features or specifications of their products at any time, without notice.

E-mail: Support@chassisplans.com
Web: www.chassisplans.com

CAUTION: The lighting flash with arrowhead symbol inside an equilateral triangle is intended to alert the user to the presence of uninsulated, dangerous voltage which may be of sufficient magnitude to constitute a risk of electric shock

WARNING: The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and servicing instructions in the literature accompanying the appliance.

WARNING: If you are unsure that you can lift the equipment safely, no not try to move it without help.

WARNING: Before you connect any cables or install the CPX monitor, refer to the supplied safety and installation instructions.

WARNING: For your safety, always connect equipment to a three-prong, grounded wall outlet. Always use a power cord with a properly grounded plug, such as the one provided with the equipment, or one in compliance with your national safety standards. This equipment can be disconnected from the power by removing the power cord from the power outlet. This means the equipment must be located close to an easily accessible power outlet

NOTE: This equipment is designed to meet harsh environmental conditions of military environments as per MIL-STD-810G, MIL STD-461F and DO-160F

WARNING: Changes or modifications not expressly approved by Chassis Plans will void the system warranty and could possibly damage the equipment.

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Chapter 1 - Introduction

Description

The military grade CPX family – comprised of 8U TFT LCD's, offer rugged military rack mount or panel mount LCD displays. Whether seeking a 15", 17" or 19" display, these military touch screen monitors are designed to perform and engineered to last. Meeting military standards 901D and 810G, the CPX family's 5052-H32 aluminum construction and locking stainless steel hardware are inherently rugged and reliable. All electrical components are selected for strength, integrity, and reliable operation. Rack mount ears are securely screwed to the sides of the display body and can be removed, allowing the monitor to be used with a VESA mount, panel mount or bulkhead mount.

The 17" and 19" displays are high performance, long life TFT LCD's offering a maximum native resolution of 1280x1024. The displays offer optional optically bonded 3mm Dura Block 90 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 Dura Block 90 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 3mm 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 15-inch display offers 1024x768 resolution, transflective TFT technology and an LED backlight and is intended for high bright installations such as outdoors. The other two models offer either 17-inch or 19-inch LCDs with LED backlights. All other features of the systems are identical including dimensions, input signal options and LCD controllers.

	CPX-15 15" LCD	**CPX-17 17" LCD**	**CPX-19 19" LCD**
Contrast Ratio	1000:1	1000:1	1000:1
Viewing Angle (L/R/U/D)	80º	80º	80º
Response Time	17ms	30ms	5ms
Brightness	950 cd/m^2	350 cd/m^2	350 cd/m^2
Backlight	LED	LED	LED
Native Resolution	1024 x 768	1280 x 1024	1280 x 1024
Aspect Ratio	4:3	5:4	5:4

Table 1 – Display Specifications

Dura Block 90 is a two surface treatment. The front surface is an oleophobic anti-reflective coating resistant to fingerprints. The inner surface is treated with an infrared resistant coating to reduce heat loading on the LCD display from exposure to sunlight.

The displays offer 16.7 million colors (True Color). The displays provide multiple signal input options including aRGB, DVI-D, DVI-I, 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. The Standard Controller offers DVI-D and VGA (aRGB) inputs. The Advanced Controller offers DVI-D, VGA (aRGB), HDMI, NTSC, S-Video and CVS with an option for Component (YCbCr) input. In addition, the Advanced Controller supports Picture-In-Picture (PIP) and Picture-By-Picture. 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.

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.

CPX Part Number Matrix

Product Family	Head Unit	Controller Option	Power Input
CPX1 = CP Panel Extreme	**151A** = 15” LCD with EMI Shield	**A1** = Advanced Controller	**A** = AC 110V
	151B = 15” LCD	**C1** = Standard Controller	**B** = 12VDC
	151C = 15” LCD with 3mm cover glass		**C** = 28VDC
	151E = 15” LDC with USB Rhino Touch, Touch Screen		**D** = 48VDC
	171A = 17” LCD with EMI Shield		
	171B = 17” LCD		
	171C = 17” LCD with 3mm cover glass		
	171E = 17” LDC with USB Rhino Touch, Touch Screen		
	191A = 19” LCD with EMI Shield		
	191B = 19” LCD		
	191C = 19” LCD with 3mm cover glass		
	191E = 19” LDC with USB Rhino Touch, Touch Screen		

Table 2 – CPX Part Number Matrix

Part Number Scheme CPX1-XXXXXX-A
Example: **CPX1 -171CA1-A**
CPX1 = CP Panel Extreme
171C = 17” LCD with 3mm cover glass
A1 = Advanced Controller
A = AC 110V

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 AR 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.

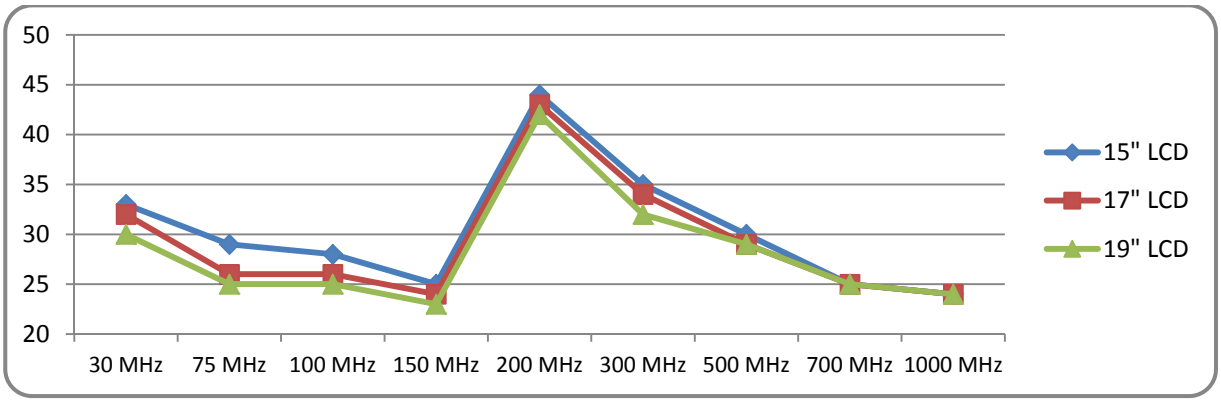


Figure 1 – EMI Shielding Effectiveness of ITO Coating

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.

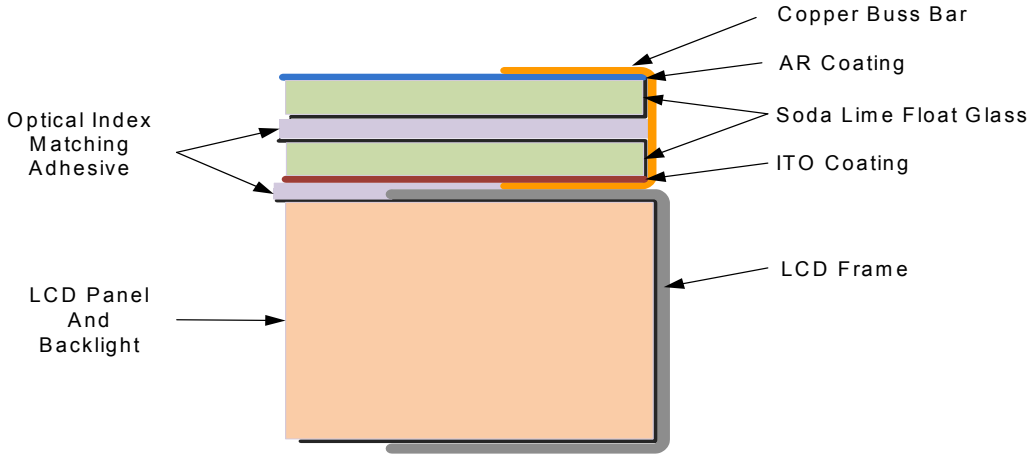


Figure 2 – Optical Stack on LCD

The second layer of glass is coated with a Dura Block 90 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.

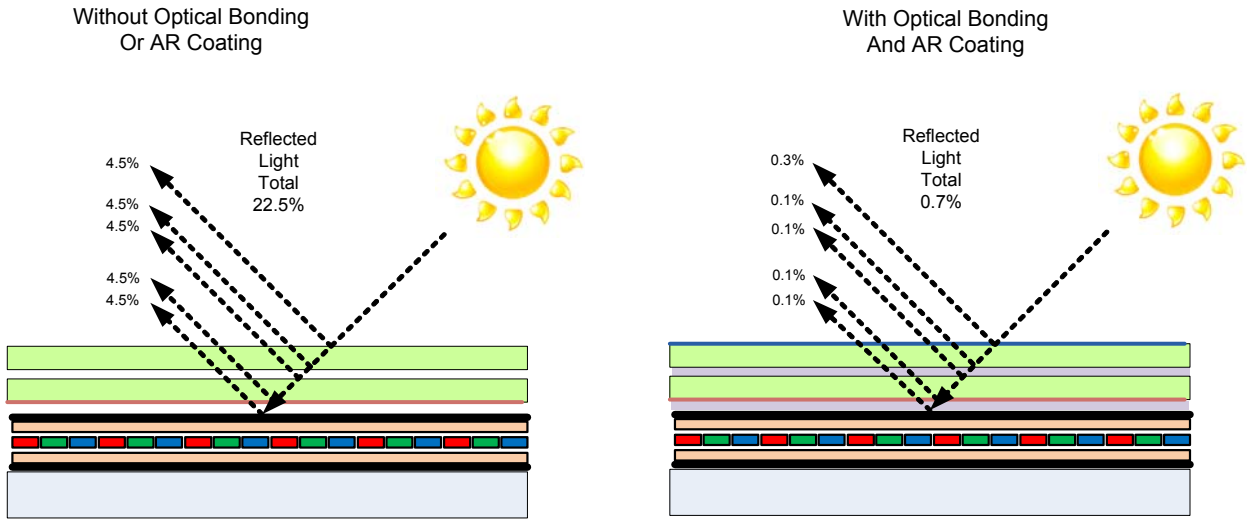


Figure 3 – Comparison of Reflections with and without Optical Bonding

The resulting structure 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 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 1600x1200 (Advanced Controller) scaled to 1280x1024 native panel resolution. Refresh rates of 60Hz for UXGA and SXGA with higher refresh rates for lower resolutions available. Computer input signals of VGA, SVGA, XGA, SXGA, WXGA and UXGA are supported. Video inputs of NTSC, PAL and SECAM are optionally available. DVI inputs supports up to 1600x1200 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.

The Standard Controller provides up scaling while the Advanced Controller provides up and down scaling. This allows input scaling of virtually any input signal to scale the image to the 1280x1024 native LCD panel resolution. They provide for PC, Apple and Sun input resolutions.

The Standard Controller and Advanced Controller provide DVI-D inputs.

Photos

Front View

Rear Panel I/O – Standard Controller

Rear Panel I/O – Advanced Controller

Specifications

Enclosure
- 8U (13.97") x 3.2" deep
- Construction: 5052 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: 19.5-20.5lbs (depending on model & features)

15" Display
- 17" TFT LCD 1024x768
- Display Colors: 16.7 Million
- Response Time: 17ms Typical
- Viewing Angle: 80 deg
- Contrast Ratio: 1000:1 typical native
- Brightness: 950cd/m2 typical
- Pixel Pitch: 0.264mm x 0.264mm
- Pixel Arrangement: R.G.B Stripe
- Operating Temperature: -30 to + 70 Deg C
- Storage Temperature: -40 to +80 Deg C

17" Display
- 17" TFT LCD 1280x1024
- Display Colors: 16.7 Million
- Response Time: 30ms Typical
- Viewing Angle: 80 deg
- Contrast Ratio: 1000:1 typical native
- Brightness: 350cd/m2 typical
- Pixel Pitch: 0.264mm x 0.264mm
- Pixel Arrangement: R.G.B Stripe
- Operating Temperature: -20 to + 70 Deg C
- Storage Temperature: -30 to +80 Deg C

19" Display
- 19" TFT LCD 1280x1024
- Display Colors: 16.7 Million
- Response Time: 5ms
- Viewing Angle: 80 deg
- Contrast Ratio: 1000:1 typical native
- Brightness: 350cd/m2 typical
- Pixel Pitch: 0.297mm x 0.297mm
- Pixel Arrangement: R.G.B. Stripe
- Operating Temperature: 0 to + 50 Deg C
- Storage Temperature: -20 to +60 Deg C

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.

Display Enhancement Options
- Using 3mm smudge-resistant AR coated soda lime float glass, bonded to the LCD panel with optical index matched adhesive
- Using a laminate of 1.1mm smudge-resistant AR 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

Table 3 – Specifications

Environmental Designed to meet or exceed MIL-STD-810G to the below specifications.	
ALTITUDE 10,000 ft. Operational, 30,000 ft. Storage MIL-STD-810, Method 500.5 **HIGH TEMPERATURE** 70°C Operational, 80°C Storage MIL-STD-810, Method 501.5 **LOW TEMPERATURE** -20°C Operational, -30°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

Table 4 – Environmental Specifications

Standard Controller DVI-D/VGA Input Features:	**Advanced Controller Multi- Input Features:**
Inputs:	Inputs:
Analog RGB: 60Hz at SXGA, WXGA, XGA, SVGA, VGA With auto detect of Digital Separate Sync, Sync-On-Green & Composite Sync. Auto detects VGA ~SXGA interlaced & noninterlaced.	Analog RGB: 60Hz @ UXGA 75Hz @ SXGA, WXGA, SVGA, VGA 1152 x 900 @ 66Hz (SUN) 1152 x 900 @ 76Hz (SUN) 1280 x 1024 @ 76Hz (SUN) With auto detect of Digital Separate Sync, Sync-On-Green & Composite Sync. Auto detects VGA ~UXGA interlaced & non-interlaced.
DVI-D: 60Hz at SXGA, WXGA, XGA, SVGA, VGA	DVI-D: 60Hz @ WUXGA 60Hz @ UXGA 75Hz @ SXGA, WXGA, XGA, SVGA, VGA
Image Scaling: Up scaling to fit input to panel resolution.	HDMI: 60Hz @ WUXGA 60Hz @ UXGA 75Hz @ SXGA, WXGA, XGA, SVGA, VGA
Image Control: Brightness, Contrast, Saturation, Hue, Frequency, Phase, Color temperature, Image position, Hue, Gamma.	Video: NTSC / PAL / SECAM (Interlaced) Composite Video HD Component YPbPr SD Component YCbCr RGB Video SD Component (YCbCr) (Optional)
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.	Features: Image Up-Scaling Image Down-Scaling Picture In Picture Picture By Picture Memory Buffer Sync On Green/Composite DV RS-232 Serial Protocol Ethernet Command Protocol Text Overlay Function Variable Aspect Freeze & Zoom Function Programmable Hot Keys
	Image Control: Auto configuration, Brightness, Contrast, Clock, Phase, Color temperature, Image position, Saturation, Hue, Gamma.
	Other Features: System Information, OSD position, Scaling to fill screen and fill to aspect ratio, OSD timeout, Factory reset, OSD menu transparency, Horizontal & Vertical image inversion, Picture in Picture.

Table 5 – LCD Controllers Specifications

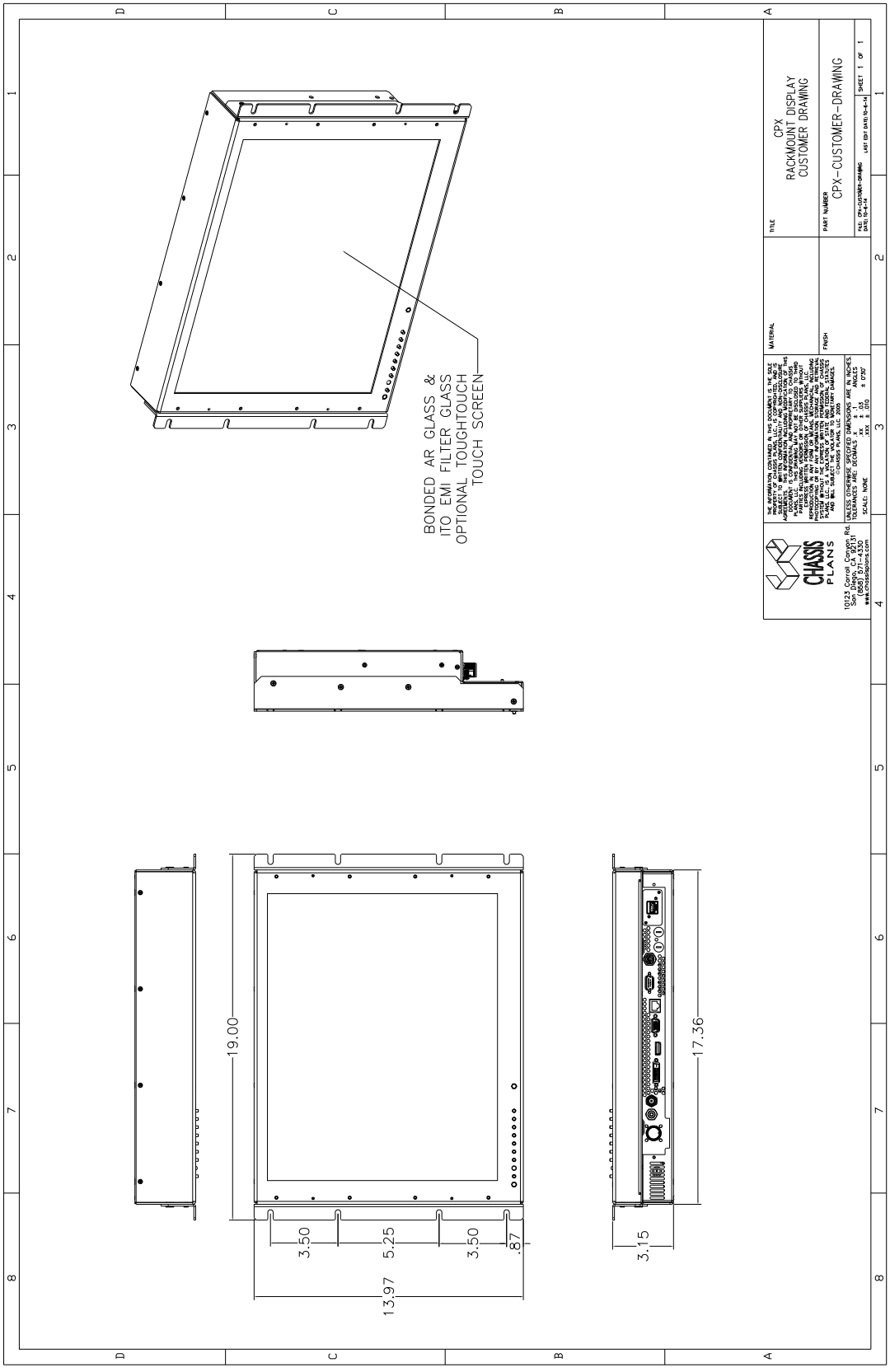


Figure 5 - CPX Outline Drawing

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 CPX. 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	100-240VAC	Operating Temperature	0 to 50°C
Current	2.0A @ 100VAC	Storage Temperature	-40 to +85°C
Frequency	50-60Hz		
Input Connector	3-Pin IEC 320 Receptacle	**SAFETY**	
		cTUVus	
OUTPUT		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	
		Class I	
Over Voltage Protection	Built-in		
Over Current Protection	Built-in	**EMI/EMC**	
Short Circuit Protection	Pulsing mode, auto recovery	Emissions	CISPR11 and FCC Part 15, Class B EN61000-3-2, -3
		Immunity	EN61000-4-2, -3, -4, -5, -6, -9, -11
SIZE			
L X W X H	5.07” X 3.06” X 1.35”		
Weight	1.2 lbs		

Table 6 - AC Input Supply Specifications

Photo 1 - AC Power Supply

12VDC Input Transient Filter

The CPX family 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 DC Input Converter

The xx Mil-Std-704/1275 DC Input Converter provides true 704/1275 input specifications allowing reliable operation from nominal 28VDC input mains in a military environment. Amil grade DC to DC Converter is provided in a rack mountable case with military grade circular connectors. This supply meets Mil-Std-704A and Mil-Std-1275A (100V for 50mS).

Operating Specifications	
Input Voltage	18-36VDC
Output Voltage	12.0VDC
Output Current	5A
Output Power	75W
Electrical Specifications	
Efficiency	81%
Isolation	200VDC, Input to Output and Input to Case
EMI Filtering	Mil-Std-461E, CD101 and CE102 on the input
Operating Temperature	-40°C to +85°C
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

Environmental Specifications	
Pressure-Altitude	Per MIL-STD-810F, Method 500.4, Procedure I and II
High Temperature	Per MIL-STD-810F, Method 501.4, Procedure I and II
Low Temperature	Per MIL-STD-810F, Method 502.4, Procedure I
Humidity	Per MIL-STD-810F, Method 507.4, Procedure I
Fungus	Per Mil-Std-810F, Method 508.5, Procedure I
Salt Fog	Per Mil-Std-810F, Method 509.4, Procedure I
Sand and Dust	Per Mil-Std-810F, Method 510.4, Procedure I and II
Explosive Atmosphere	Per Mil-Std-810F, Method 511.4, Procedure I
Acceleration	Per MIL-STD-810F, Method 513.5, Procedure I and II
Vibration	Per MIL-STD-810F, Method 514.5, Procedure I, Category 1, 4, 7 thru 14 and 16 thru 21
Shock	Per MIL-STD-810F, Method 516.5, Procedure I, IV

Table 7 - 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		
Output Power	120W	EMI Filtering	Mil-Std-461E, CD101 and CE102 on the input
Connectors		Operating Temperature	-40°C to +85°C
Input Connector	MS3102A-14SL-7P (MIL-C-5015)	Storage Temperature	-55°C to +125°C
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 8- 48VDC Power Supply Specifications

Chapter 3 – Installation

Product Contents

Please verify all the following parts are included in the packaging from Chassis Plans. Confirm all parts have not been damaged during shipment. If there are any missing parts or damage during shipment, places call Chassis Plans Customer Service at (858) 571-4330.

- CPX Rack mount Display
- Mounting Hardware
- DVD – User Manual / Drivers (Touch Screen)
- Power Supply and cable assembly
- VGA and DVI cable
- USB Cable (Touch screen option only)
- HDMI Cable (Advanced controller only)

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 CPX 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 ½" apart. One very common problem is trying to install into the wrong holes. The display requires 8U or 14-inches of open rack space.

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.

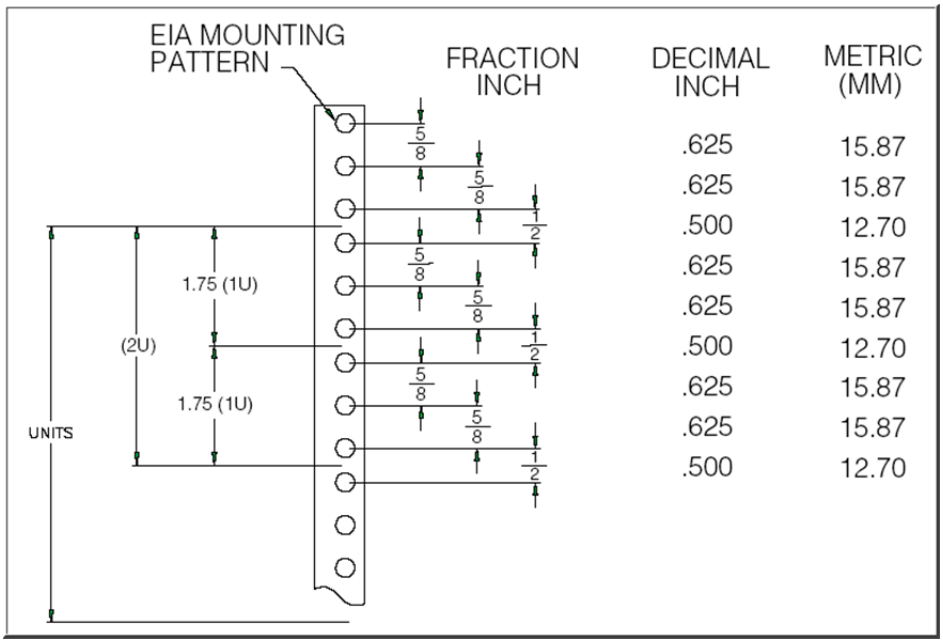


Figure 6 - Rack Mounting Hole Spacing

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 CPX-15. -17, -19 provide for two controllers, standard and advanced, 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 a Circular Mil connector for power connection. There is also an RS-232 port for remote control of the display and a USB connector for optional touch screen output.

The Standard Controller offers the following features:

Inputs:
- Analog RGB: 60Hz at SXGA, WXGA, XGA, SVGA, VGA With auto detect of Digital Separate Sync, Sync-On-Green & Composite Sync. Auto detects VGA ~SXGA interlaced & noninterlaced.
- DVI-D: 60Hz at SXGA, WXGA, XGA, SVGA, VGA

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

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.

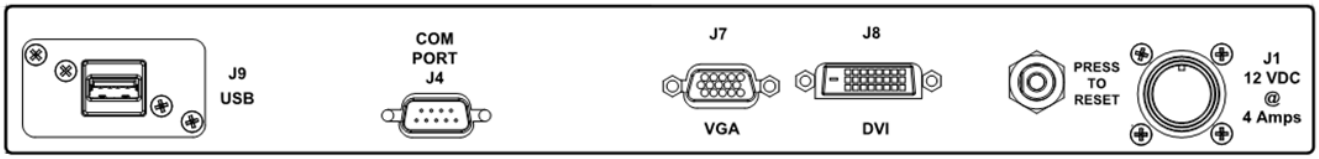


Figure 7 - Standard Controller Rear Panel I/O

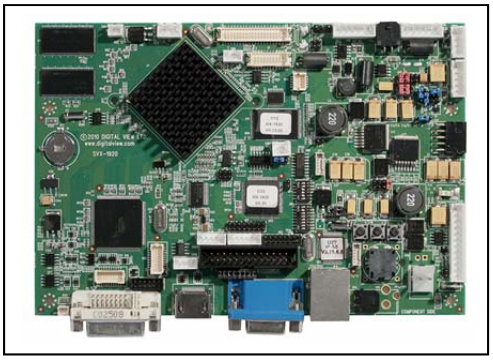
	Legend	Function	Connector
J1	12VDC Power	Input Power, 12VDC +/-5%	Circular Mil N/S 3102A-10SL-3P
J4	RS232 Control – Note 1	Remote RS232 Control Port	DB25 Male
J7	VGA Input	VGA Video Input	HD15 Female
J8	DVI-D Input	DVI-D Video Input	DVI-D Connector
J9	USB Output	Touch Screen USB Output	USB Type ‘A’

Table 9 - Rear Panel Connections – Standard Controller

Note:
1. The Standard Controller offers remote serial port control through the RS232 Control Port. See Appendix A for details on port pin-out assignment and commands.

Advanced Controller Rear Panel Connections

The Advanced Controller provides for VGA analog, DVI-D, HDMI, 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. In addition, the rear of the display provides for a Circular Mil connector for power connection, RS-232 and Ethernet ports for remote control of the display and a USB output for an optional touch screen.



The Advanced Controller offers the following features:

Inputs:

Analog RGB: 60Hz @ UXGA
75Hz @ SXGA, WXGA, SVGA, VGA
1152 x 900 @ 66Hz (SUN)
1152 x 900 @ 76Hz (SUN)
1280 x 1024 @ 76Hz (SUN)
With auto detect of Digital Separate Sync, Sync-On-Green & Composite Sync. Auto detects VGA ~UXGA interlaced & non-interlaced.

DVI-D: 60Hz @ WUXGA
60Hz @ UXGA
75Hz @ SXGA, WXGA, XGA, SVGA, VGA

HDMI: 60Hz @ WUXGA
60Hz @ UXGA
75Hz @ SXGA, WXGA, XGA, SVGA, VGA

Video: NTSC / PAL / SECAM (Interlaced)
Composite Video
HD Component YPbPr
SD Component YCbCr
RGB Video SD Component (YCbCr) (Optional)

Features: Image Up-Scaling
Image Down-Scaling
Picture In Picture
Picture By Picture
Memory Buffer
Sync On Green/Composite
DV RS-232 Serial Protocol
Ethernet Command Protocol
Text Overlay Function
Variable Aspect
Freeze & Zoom Function
Programmable Hot Keys

Image Control: Auto configuration, Brightness, Contrast, Clock, Phase, Color temperature, Image position, Saturation, Hue, Gamma.

Other Features: System Information, OSD position, Scaling to fill screen and fill to aspect ratio, OSD timeout, Factory reset, OSD menu transparency, Horizontal & Vertical image inversion, Picture in Picture.

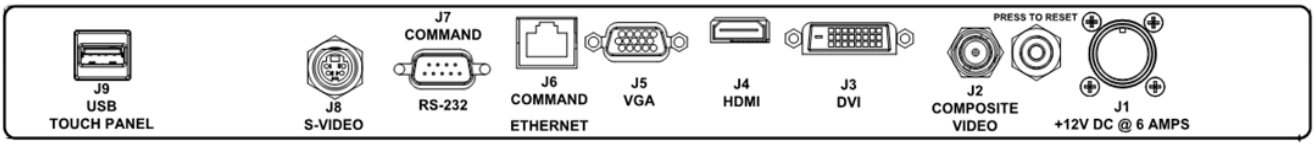


Figure 8 - Advanced Controller Rear Panel I/O

	Legend	Function	Connector
J1	12VDC Power	Input Power, 12VDC +/-5%	Circular Mil N/S 3102A-10SL-3P
J2	Composite Video	Composite Video Input	BNC
J3	DVI-D Input	DVI-D Video Input	DVI-D Connector
J4	HDMI Input	HDMI Video Input	HDMI Connector
J5	VGA Input	VGA Video Input	HD15 Female
J6	Ethernet Control – Note 2	Remote Ethernet Control Port	RJ45 Ethernet Port
J7	RS232 Control – Note 1	Remote RS232 Control Port	DB25 Male
J8	S-Video	S-Video Input	4-Pin Mini Din
J9	USB Output	Touch Screen USB Output	USB Type ‘A’

Table 10 - Rear Panel Connections – Advanced Controller

Note:

1. The Advanced Controller offers remote serial port control throughJ7, the RS232 Control Port. See Appendix A for details on port pin out assignment and commands.
2. The Advanced Controller offers remote Ethernet port control through the J6, the Ethernet Control Port. See Appendix D for details on function and commands.

Chapter 4 – 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
Amber	Scanning for valid input signal
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 an auto display adjustment when in VGA (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 11 - Front Panel Controls

Standard Controller OSD Menus

Select input source			
		Input source 1	Select input source to Analog RGB
		Input source 2	Select input source to DVI
	Auto	**Auto Source Seek**	ON – Auto source select always enable OFF – Disable auto source select function
	1280 1366	**Wide screen mode information display***	Select the input mode (1280 / 1360 / 1366 / 1368) to recognize and display the correct input signal information display on the OSD menu. 1280 : 1280x768 1360 : 1360x768 1366 :1366x768 1368 : 1368x768
		Exit	Exit the OSD menu and save the settings
Brightness and Contrast			
		Brightness	Increase/decrease brightness level. Press – or + (- +) Total : 256 steps
		Contrast	Increase/decrease panel contrast level. Press – or + (- +) Total : 192 steps
		Exit	Exit the OSD menu and save the settings
Color			
	Auto	**Auto RGB Calibration***	Yes No (Auto Color Calibration [See appendix IV])
		Color Temperature	(Adjust the warmness 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 + (- +) Total :128 steps Adjust green color level Press – or + (- +) Total : 128 steps Adjust blue color level Press – or + (- +) Total : 128 steps 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
		Gamma adjustment	Adjust Gamma settings (0.4 / 0.6 / 1.0 / 1.6 / 2.2)
		0.4	Select Gamma to 0.4
		0.6	Select Gamma to 0.6
		1.0	Select Gamma to 1.0
		1.6	Select Gamma to 1.6
		2.2	Select Gamma to 2.2
		Exit	Exit the OSD menu and save the settings

Table 8 - Standard Controller OSD Menus (cont)

	Position		
	Auto	**Autosetup***	Auto adjust the positions, phase, frequency Yes 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 + (- +)
		Image Vertical Position*	Use +/- to move the image vertically Press – or + (- +)
		Exit	Exit the OSD menu
	Utilities		
		OSD setting ▸	
			OSD Timeout : 0 / 10 / 20 / 30 / 40 / 50 / 60 seconds (Always on when set to 0) Press – or + (- +)
			OSD menu horizontal position Press – or + (- +)
			OSD menu vertical position Press – or + (- +)
		Load Factory Default	Initialize the setting stored in non-volatile memory
		Sharpness	Adjust sharpness level Press – or + (- +) Total : 7 steps
		Exit	Exit the OSD menu
	Exit the OSD menu		

Table 12 - Standard Controller OSD Menus

Advanced Controller OSD Menus

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

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

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

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#### :

Overscan
Normal
Custom ▸

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 VIDEO ADD-ON BOARD CONNECTED
: DISPLAY IN VIDEO / HD/SD SDI 1 / HD/SD SDI 2 MODE ONLY

Input : Select the input video signal

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

: Press "-" key to activate the "Auto Picture Setup" function.

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

PIP Size : Off / Small / Medium / Large / PBP
4 possible input groups that can be mixed for PIP :
a) VGA
b) DVI
c) HD-SDI
d) Composite/S-Video/SD-component
It can not allow to select signal source from the same group for PIP.

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 Swap : Swap between the main window and PIP window

PIP Auto off : 

: 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

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

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

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

De-interlacing Mode* ▸
AFM : Auto Film Mode
TNR : Temporal Noise Reduction
MADI : Motion Adaptive De-interlacing
LADI : Low Angled De-interlacing

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

Video Standard (SD)* : Auto / NTSC / NTSC 4.43 / PAL / PAL M / SECAM
Image Orientation : Normal / Horizontal flip / Vertical flip / Rotate
Gamma : 1.0 / 1.6 / 2.2

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.
Language : English / Chinese : Select OSD menu language display
Transparency : ON / OFF : Set OSD transparency

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
Reset to Defaults : Restore to default values
Note : Freeze state will be cleared when you using zoom function.

Color Temperature ▸

5000K

R Gain : 

G Gain : 

B Gain : 

Reset to Defaults : Resume to the default values

6500K

R Gain : 

G Gain : 

B Gain : 

Reset to Defaults : Resume to the default values

8000K

R Gain : 

G Gain : 

B Gain : 

Reset to Defaults : Resume to the default values

9300K

R Gain : 

G Gain : 

B Gain : 

Reset to Defaults : Resume to the default values

User setting :

R Gain : 

G Gain : 

B Gain : 

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 / Input / Aspect / Zoom / Freeze / PIP Size / PIP Swap / Image Orientation / Saturation / Hue / Backlight / Auto Picture Setup

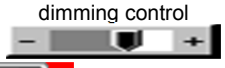
Hot key 2 : Volume / Brightness / Contrast / Input / Aspect / Zoom / Freeze / PIP Size / PIP Swap / Image Orientation / Saturation / Hue / Backlight / Auto Picture Setup

Monochrome Mode ▸

- Color
- Red Monochrome
- Green Monochrome
- Blue Monochrome

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

Reset to Factory Defaults

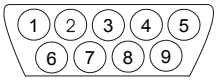
* : DISPLAY IN VIDEO MODE ONLY
\# : DISPLAY IN ARGB MODE ONLY
: DISPLAY IN ARGB_MODE ONLY

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 Advanced 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

Standard 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.

Table 13 - 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 14 - Standard Controller Parameter Setting - Immediate, Relative, Reset and Query

Function	Command	Description	Acknowledge (if enabled)
Brightness control	0x81, nn | "+" | "-" | "r" | "R" | "?"	Set brightness = value/increment/decrement Reset Query	Brightness. Range: "0""0"-"F""F" Default: "8""0"
Contrast control	0x82, "a" | "A", nn | "+" | "-" | "r" | "R" | "?"	Set all contrast = value/increment/decrement Reset Query	Contrast. Range: "4""0"-"F""F" Default: "8""0"
Phase #	0x85, nn | "+" | "-" | "?"	Set dot clock phase = value/increment/decrement Query	Dot clock phase. (In ARGB mode only)
Image H position #	0x86, nnnn | "+" | "-" | "?"	Set img_hpos = value/increment/decrement Query	Image horizontal position. (In ARGB mode only)
Image V position #	0x87, nnnn | "+" | "-" | "?"	Set img_vpos = value/increment/decrement Query	Image vertical position. (In ARGB mode only)
Frequency #	0x8b, nnnn | "+" | "-" | "?"	Set H active size = value/increment/decrement Query	Frequency adjustment (In ARGB mode only)
Input main select * Function in valid mode only	0x98, nn | "+" | "-" | "r" | "R" | "?"	Select input main = PC or video or next available Reset Query	Main selected. "0x41,0x31" ARGB (Default) "0x46,0x31" DVI
Colour temperature select	0xb3, n | "r" | "R" | "?"	Select colour temperature = value Reset Query	Main selected. "0" – user defined RGB values. "1" – 4200K. "2" – 5000K. "3" – 6500K. "4" – 7500K. (Default) "5" – 9300K.
Red level for selected colour temperature	0xb4, nn | "+" | "-" | "r" | "R" | "?"	Set the level of the red channel for the selected colour temp. = value/increment/decrement Reset Query	Red level for selected colour temperature. Range: "8""0"-"F""F" Default: "F""F"

Green level for selected colour temperature	0xb5, nn | "+" | "-" | "r" | "R" | "?"	Set the level of the green channel for the selected colour temp. = value/increment/decrement Reset Query	Green level for selected colour temperature. Range: "8""0"-"F""F" Default: "F""F"
Blue level for selected colour temperature	0xb6, nn | "+" | "-" | "r" | "R" | "?"	Set the level of the blue channel for the selected colour temp. = value/increment/decrement Reset Query	Blue level for selected colour temperature. Range: "8""0"-"F""F" Default: "F""F"
OSD turn off	0xbd	Turn off the OSD	"1" - successful
Backlight brightness control	0xe0, nn | "+" | "-" | "r" | "R" | "?"	Set backlight brightness = value/increment/decrement Reset Query	Backlight brightness. Range: "0""0"-"F""F" Default: "F""F" e.g "1""0" → 0xe0 0x31 0x30 * This control can only function when JP2 sets 3-4 closed * Apply for inverter control voltage in range of 0~5V. Each step interval is in 1
Backlight on/off control	0xe1, "0" | "1" | "r" | "R" | "?"	Set backlight brightness = Disable backlight Enable backlight Reset Query Backlight working status	Backlight on/off. "1" = normal (Default)
OSD menu Lock (Functon available in V1.80.00 or later revision)	0xf6, n | "0" | "1" | "r" | "R" | "?"	OSD menu Lock Off/ On Reset Query	"0" – OSD Lock Off "1" – OSD Lock On

- Function in ARGB mode only

Table 15 - Standard Controller Other Control

Function	Command	Description	Acknowledge (if enabled)
Select RS-232 acknowledge	0xc1, “0” | “1”	Disable/enable command acknowledge.	“0” – acknowledge disabled. “1” – acknowledge enabled.
Auto-setup#	0xc3	Start auto-setup of current mode.	“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.
Query BIOS version	0xcb, “0”	Read BIOS version	“nnnn” = BIOS ver. “nn.nn”
Query PCBA number	0xcb, “1”	Read PCBA number	“nnnn” = PCBA number ALR-1400=”41710”
Load factory defaults	0xce	Reset all parameters to factory default value	“1” – successful.

Advanced Controller Serial Control Functions

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

Table 16 - Advanced Controller Commands to Implement Switch Mount Control Buttons

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

Table 17 - Advanced 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” | “?”	Set brightness = value/increment/decrement Reset Query	Brightness. Range : “4””E”-“B””2” Default : “8””0”
Contrast control - all channels	0x82, “a” | “A”, nn | “+” | “-” | “r” | “R” | “?”	Set all contrast = value/increment/decrement Reset Query	Contrast Range : “1””C”-“E””4” Default : “8””0”
Saturation control	0x83, nn | “+” | “-” | “r” | “R” | “?”	Set saturation = value/increment/decrement Reset Query	PAL/NTSC color (In video mode only) Range : “0””1”-“F””F” Default : “8””0”
Hue control	0x84, nn | “+” | “-” | “r” | “R” | “?”	Set hue = value/increment/decrement Reset Query	NTSC tint (In NTSC mode only) Range : “5””3”-“9””F” Default : “7””9”

Phase (tuning) control	0x85, nn | “+” | “-” | “?”	Set dot clock phase = value/increment/decrement Query	Dot clock phase. (In PC mode only)
Image H position	0x86, nnnn | “+” | “-” | “?”	Set img_hpos = value/increment/decrement Query	Image horizontal position. (In PC mode only)
Image V position	0x87, nnnn | “+” | “-” | “?”	Set img_vpos = value/increment/decrement Query	Image vertical position. (In PC mode only)
Sharpness	0x8a, nn | “+” | “-” | “r” | “R” | “?”	Set sharpness = value/increment/decrement Reset Query	Sharpness. (Video Mode Source only) Range : “F””1”-“0””F” 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
Set display orientation	0x8e, n | “r” | “R” | “?”	Set display orientation = value/increment/decrement Reset Query	“0” – normal. “1” – vertical inverse. “2” – horizontal inverse. “3” – inverted.
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 tranparency. “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. “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 0x43, 0x31 : S-video 0x44, 0x31 : SD Component 0x45, 0x31 : HDSDI 0x46, 0x31 : DVI 0x47, 0x31 : HD Component 0x42, 0x32 : Composite 2 0x43, 0x32 : S-video 2 0x44, 0x32 : SD Component 2 0x45, 0x32 : HDSDI 2 (Source sequence : S-Video → SD component → HD/SD SDI1 → HD/SD SDI2 → ARGB → DVI → Composite → Composite 2 → S-Video)
Auto Source Seek	0x99, “0” | “1” | “r” | “R” | “?”	Set Auto source seek = OFF/ON Reset Query	“0” – OFF “1” – ON

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 “6” – NTSC_N_358 “7” – PAL_M_443 “8” – NTSC_N_443 “9” – PAL_N_358 Video State Query “0” – No video. “1” – NTSC “2” – PAL “3” – SECAM
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
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” – color. “5” – input source. “7” – zoom “8” – freeze “9” – PIP “D” – PIPSwap “E” – Aspect “F” – Orientation “G” – Hue “H” – Backlight
Hotkey 2	0xa0, “2”, n | “r” | “R” | “?”	Set Hotkey 2 = value Reset Query	“1” – volume. “2” – brightness. “3” – contrast. “4” – color. “5” – input source. “7” – zoom “8” – freeze “9” – PIP “D” – PIPSwap “E” – Aspect

			“F” – Orientation “G” – Hue “H” – Backlight
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. “0””0” - PIP off (Default) “0””1” - PIP small “0””2” - PIP medium “0””3” - PIP large “0””4” - PBP
PIP source select	0xa7, n | “r” | “R” | “?”	Select input main = Video source value Reset Query	Main selected. 0x41, 0x31 : ARGB 0x42, 0x31 : Composite 0x43, 0x31 : S-video 0x44, 0x31 : SD Component 0x45, 0x31 : HDSDI 0x46, 0x31 : DVI 0x47, 0x31 : HD Component 0x42, 0x32 : Composite 2 0x43, 0x32 : S-video 2 0x44, 0x32 : SD Component 2 0x45, 0x32 : HDSDI 2

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 | “+” | “-” | “r” | “R” | “?”	Set the level of the red channel for the selected colour temp. = value/increment/decrement Reset Query	Red level for selected colour temperature. Range : “9””C”-“F””F” Default : “E””C”
Green level for selected colour temperature	0xb5, nn | “+” | “-” | “r” | “R” | “?”	Set the level of the green channel for the selected colour temp. = value/increment/decrement Reset Query	Green level for selected colour temperature. Range : “9””C”-“F””F” Default : “E””C”
Blue level for selected colour temperature	0xb6, nn | “+” | “-” | “r” | “R” | “?”	Set the level of the blue channel for the selected colour temp. = value/increment/decrement Reset Query	Blue level for selected colour temperature. Range : “9””C”-“F””F” Default : “E””C”
Graphic horizontal resolution enquiry	0xb7	Horizontal resolution (in pixels) in 3 digit hex number	“nnn” = horizontal resolution
Graphic vertical resolution enquiry	0xb8	Vertical resolution (in lines) in 3 digit hex number	“nnn” = vertical resolution
Graphic horizontal sync frequency enquiry	0xb9	Horizontal sync frequency (in units of 100Hz) in 3 digit hex number	“nnn” = horizontal frequency

Graphic vertical sync frequency enquiry	0xba	Vertical sync frequency (in units of Hz) in 3 digit hex number and 1 char	“nnnc” = 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
OSD turn off	0xbd	Turn off the OSD.	“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
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/ GreenMono/	“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” 320Hz : “1”,”4”,”0” 340Hz : “1”,”5”,”4” 360Hz : “1”,”6”,”8” 380Hz : “1”,”7”,”C” 400Hz : “1”,”9”,”0” 420Hz : “1”,”A”,”4” 440Hz : “1”,”B”,”8”
Backlight Invert	0xe7 “0” | “1” | “R” | “r” ”?”	Set On or Off Reset Query	“0” – Off “1” – On
Red Offset for selected colour temperature	0xe8, nn | “+” | “-” | “r” | “R” | “?”	Set the Offset of the red channel for the selected colour temp. = value/increment/decrement Reset Query	Red Offset for selected colour temperature.

Green Offset for selected colour temperature	0xe9, nn | "+" | "-" | "r" | "R" | "?"	Set the Offset of the green channel for the selected colour temp. = value/increment/decrement Reset Query	Green Offset for selected colour temperature.
Blue Offset for selected colour temperature	0xea, nn | "+" | "-" | "r" | "R" | "?"	Set the Offset of the blue channel for the selected colour temp. = value/increment/decrement Reset Query	Blue Offset for selected colour temperature.
PIP Window Auto Off	"0xee", "0x41" "0" |"1" "?"	Auto Off / Auto On Query	"0"- Off "1"- On
Custom Sizing	0xef, "0" | "1" | "2" "?"	Custom sizing selection : Overscan / Normal / Custom Query	"0" – Overscan "1" – Custom "2" – Normal

Table 18 - Advanced Controller Other Control

Function	Command	Description	Acknowledge (if enabled)
Select RS-232 acknowledge	0xc1, "0" | "1"	Disable/enable command acknowledge.	"0" – acknowledge disabled. "1" – acknowledge enabled.
Auto-setup	0xc3	Start auto-setup of current vmode.	"0" – fail. "1" – successful.
Command availability	0xc4, n	Check whether a command is available.	"0" – not available. "1" – available.
Auto-calibration	0xc5	Start auto-calibration of gain of the RGB amplifier.	"0" – fail. "1" – successful.
Freeze frame	0xc6, "0" | "1"	Unfreeze / freeze frame	"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” Composite2 “C”,”1” S-video “C”,”2” S-video2 “D”,”1” SD Component “D”,”2” SD Component2 “E”,”1” HDSDI “E”,”2” HDSDI2 “F”,”1” DVI “xx,nn”= PIP input status: “0”,”0”: invalid “A”,”1” ARGB “B”,”1” Composite “B”,”2” Composite2 “C”,”1” S-video “C”,”2” S-video2 “D”,”1” SD Component “D”,”2” SD Component2 “E”,”1” HDSDI “E”,”2” HDSDI2 “F”,”1” DVI
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 “6” ”1”- enable LADI “6” ”0”- disable LADI
Query BIOS version	0xcb, “0”	Read BIOS version	BIOS version “VV.YY.ZZ” VV = V0 or E0, V0 = Release version E0 = Engineering Sample YY= Version Number ZZ= Customer Number
Query PCBA number	0xcb, “1”	Read PCBA number	“nnnnn” = PCBA number SVH-1920= “41696”
Reset parameter	0xce	Reset all parameters to default value	“1” – successful.
Wide Screen Mode Selection	0xd9, “0” | “1”| “2” “r” | “R” “?”	Wide Screen Mode Reset Query	“0” – Normal Mode “1” – 1280x768 “2” – 1366x768

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 19 - 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.

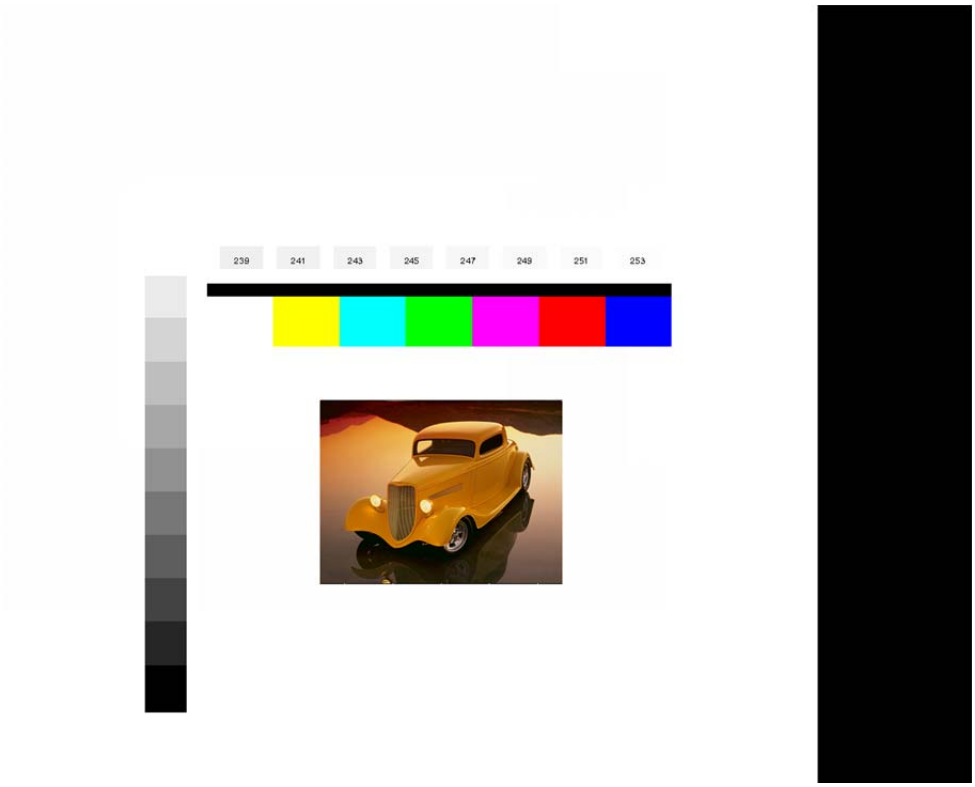


Image B-1 – Auto Color Gain Example

The reference pattern can be downloaded at :
http://www.chassis-plans.com/Rackmount-Keyboard-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.
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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).

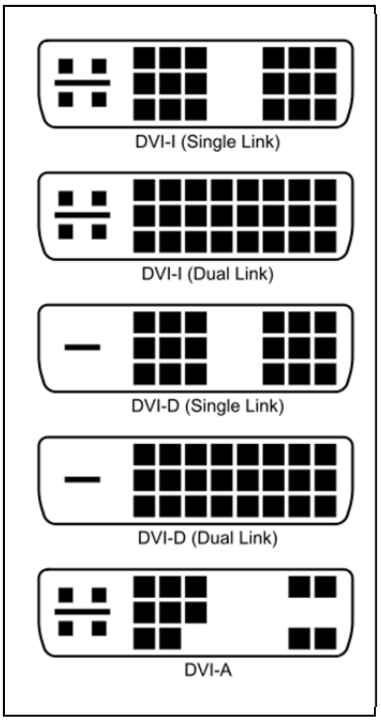
The LCD controllers offered with the CPX keyboards offer DVI-D and DVI-I, depending on which controller is selected. This discussion is presented to help clarify the difference between the various flavors of DVI.

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 CPX Family 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 CPX Family

Connect the CPX Family 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 CPX Family automatically obtains its IP address from that server.

- DHCP services must be available on the server.
- If the CPX Family 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 CPX Family. 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 CPX Family connected to the local network within same subnet. If you don't know the IP address of your CPX Family, the IP Locator program can help you to find the IP address allocated to your CPX Family. 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*)*

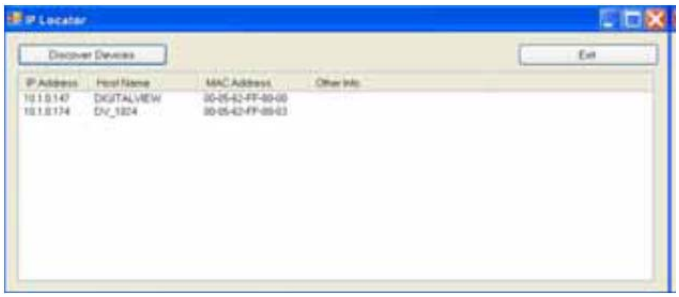


Image D-1 – IP Locator Screen Shot

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 CPX Family
- 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

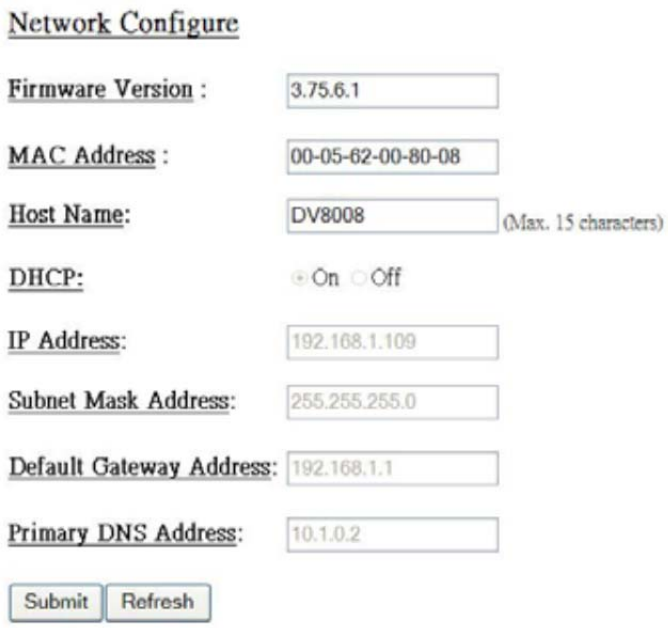


Image D-3 – Network Configure Settings

In cases where the CPX Family 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 CPX Family

- Connect the CPX Family to a router using Cat-5 cable.

- It is suggested to use “DMZ” function on the router. The standard ports required by the CPX Family 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 CPX Family. (e.g. 192.168.1.2)

Image D-4 – IP Address Locator

***Step 3*:** Assign the internal IP of the CPX Family to DMZ function and enable it.

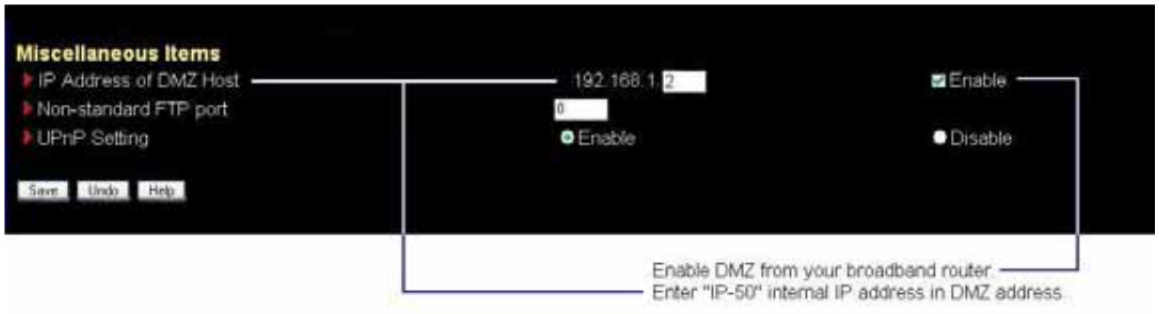


Image D-5 – IP Address Setting and Enable

In the above example, we can just type **http://148.xxx.27.15** to enter web server of the CPX Family.

Connect to multiple CPX Family

If more than one CPX Family 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 CPX Familydisplays 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 CPX Family. (e.g. 192.168.1.2 and 192.168.1.3)

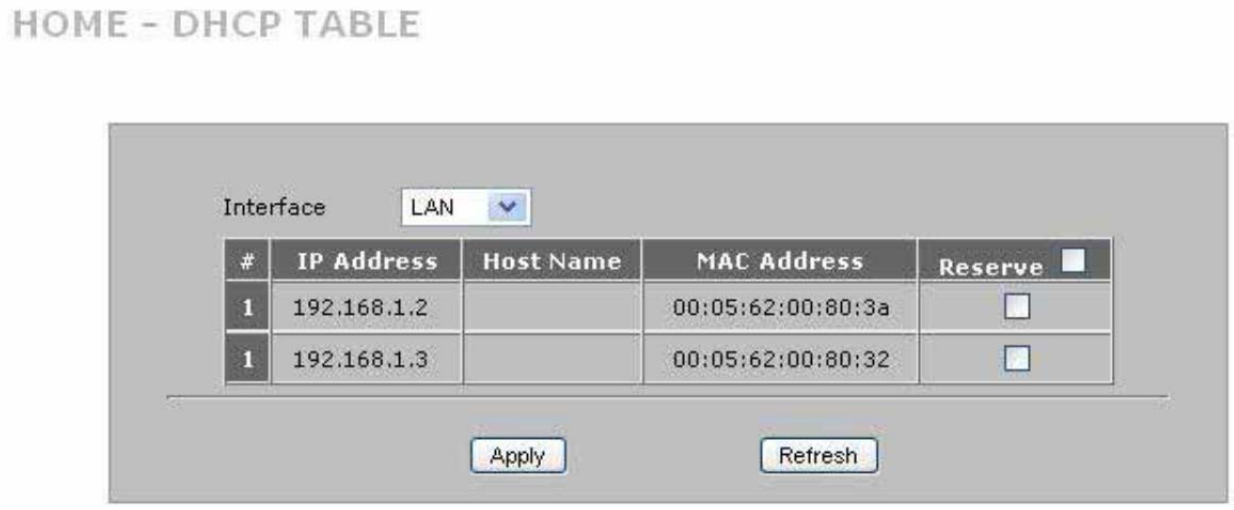


Image D-6 – DHCP Table Screenshot

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

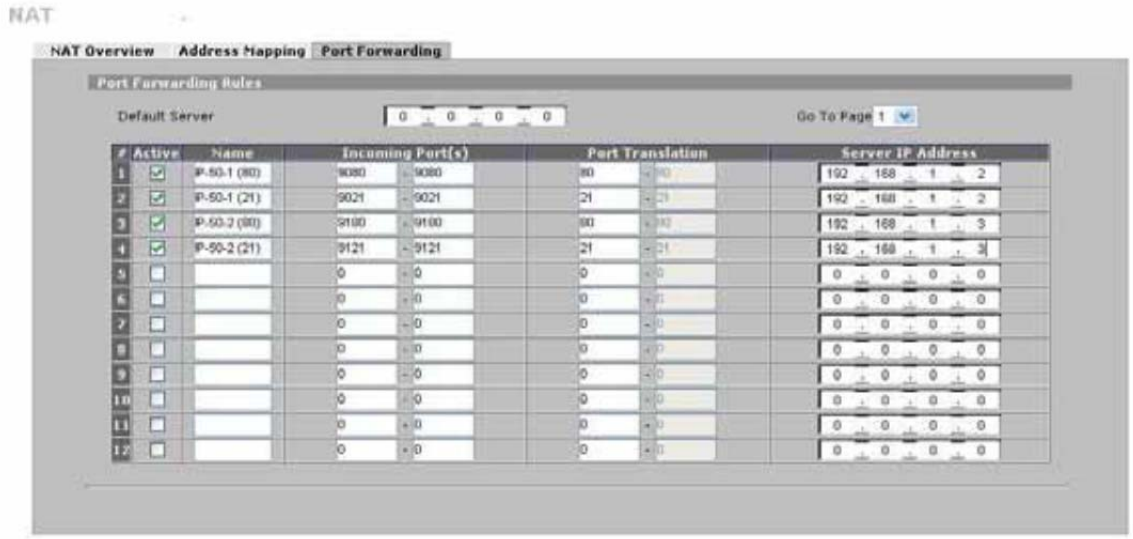


Image D-7 – NAT Fowarding Screenshot

In the above example, we have to enter
http://148.xxx.27.15:9080 to access CPX Family-1 at 192.168.1.2
FTP://148.xxx.27.15:9021 to FTP CPX Family-1 at 192.168.1.2

http://148.xxx.27.15:9180 to access CPX Family-2 at 192.168.1.3
FTP://148.xxx.27.15.9121 to FTP CPX Family-2 at 192.168.1.3

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