

## 16 x 16 Modularized Hybrid 3G-SDI Matrix



Operation Manual

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## 1. INTRODUCTION

The 16 x 16 modularized Hybrid 3G-SDI matrix can route sixteen SDI sources to any sixteen SDI displays, providing bandwidth up to 2.970Gb/s for 3G-SDI video support. The device is of special modularized design which can maximize the flexibility of professional applications. With input and output each integrated by 4 independent plug-in modules/boards, 4 ports per module, the device allows user to adjust the amount of in-out ports freely at 4X rule for up to 16 types (4 x 4, 4 x 8, ..., 16x16) to setup the most cost-effective solution for different requirements. The management of source/sink scenarios can be handled easily through on-panel buttons, IR remote control, or RS-232 protocol.

## 2. APPLICATIONS

- Video broadcasting switching display
- Professional video program control and display
- Film studios program monitoring
- Medical environment
- Airport or industrial system utility

## 3. PACKAGE CONTENTS

- 16 x 16 Modularized Hybrid 3G-SDI Matrix
- Power Cord
- Remote Control (CR-119 with Battery)
- Operation Manual

## 4. SYSTEM REQUIREMENTS

Input SDI source equipments and output SDI monitor with suggested SDI connection cables.

## 5. FEATURES

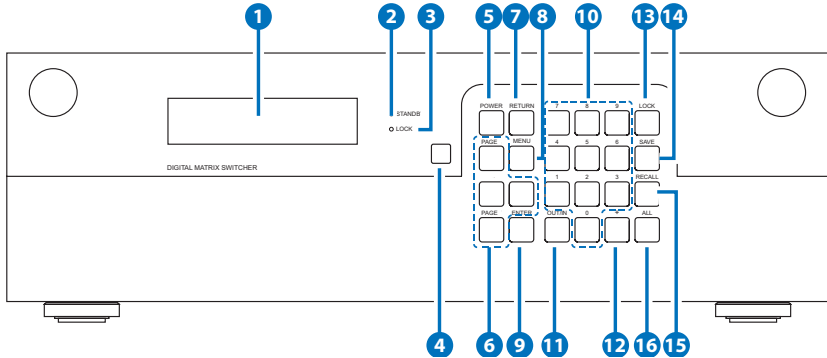
- Operation at 2.970Gb/s, 2.970/1.001Gb/s, 1.485Gb/s, 1.485/1.001Gb/s and 270Mb/s
- Supports SDI input/output modes:
- SD-SDI(SMPTE 259M-C, at bitrates of 270 Mbit/s)
- HD-SDI(SMPTE 292M, at bitrates of 1.485Gbit/s and 1.485/1.001 Gbit/S)
- 3G-SDI (SMPTE 424M/425M – AB, at bitrates of 2.970 Gbit/s and 2.970/1.001 Gbit/s)
- Supports switchable 4-port module of either SDI or HDMI interface or ...etc.
- Equalized and re-clocked
- Supports signal input and output distance of up to 250M for SD signals, 200 for HD signals and 100M for 3G signals
- Supports audio sampling rate at 48kHz
- Connect with other units to extend your signal over long distances.
- Supports combination of SDI and HDMI output modules switchable
- 3U design

### **NOTE**

*Cable tested with Belden 1694A. Operating distances may vary if used with another type of cable.*

## 6. OPERATION CONTROLS AND FUNCTIONS

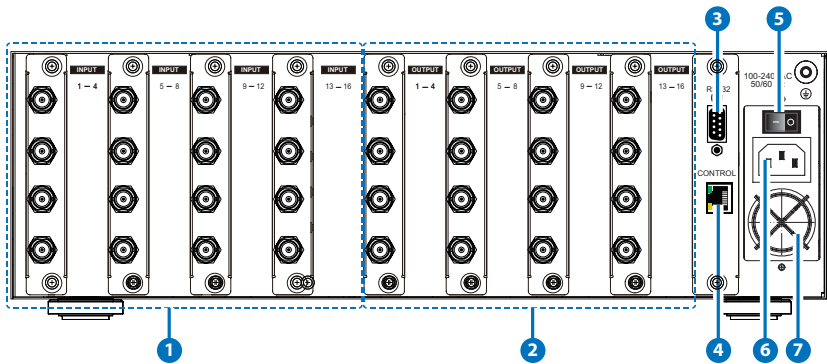
### 6.1 Front Panel



- 1 LCM:** Displays the setting information of each input and output and other setting information according to the selection.
- 2 STANDBY LED:** This LED will illuminate when the power is switched off.
- 3 LOCK LED:** This LED will illuminate when the key lock function is selected.
- 4 IR window:** This IR window receiver can receive the IR signal of the included remote control.
- 5 POWER:** Press this button to switch ON or set the device to standby mode.
- 6 PAGE ▲◀▶▲:** Use these buttons to flip the LCM's page for displaying the current I/O status or when entering into the menu for detail selection.
- 7 RETURN:** Press this button to return back/exit on the current selection.

- 8 MENU:** Press this button to enter into the menu selection. There are total 9 functions included.
1. Firmware version
  2. IP Address: This address is for login telnet and Web GUI
  3. DHCP/AUTO IP ON/OFF (ON:DHCP enable, OFF: Static IP enable)
  4. STATIC IP
  5. STATIC NETMASK Setting
  6. STATIC GATEWAY Setting
  7. In Slot Info.
  8. Out Slot Info.
  9. Exit
- 9 ENTER:** Press this button every time to confirm the setting or the selection.
- 10 0~9:** Press these numbers when selecting input output ports.
- 11 OUT/IN:** Press this button to select input source to displaying on output display. The sequence should be OUT/IN → number(s) for output source → OUT/IN → a number for input display. Output selection can be made more than one at a time but input only one at a time.
- 12 +:** Press this button when selecting more than one outputs for an input selection. (This button works only under OUT/IN function)
- 13 LOCK:** Press this button and hold for 3 seconds to lock all the function buttons on panel. The LED will illuminate, to unlock press it again for 3 seconds.
- 14 SAVE:** Press this button to save the present setting of the I/O. There are 10 sets available for saving.
- 15 RECALL:** Press this button to recall from the save settings of 1~10.
- 16 ALL:** Press this button to selection all outputs with one input.

## 6.2 Rear Panel



- 1 INPUT 1~16:** Connect source equipments such as digital camera or broadcast video recorder up to 16 sets with SDI cables.
- 2 OUTPUT 1~16:** Connect SDI display TV/monitors with SDI cables up to 16 displays.
- 3 RS-232:** Connect with D-Sub 9pin cable with PC/NB for RS-232 signal control on the device.
- 4 CONTROL:** Connect to an network line with RJ-45 cable for Telnet/ Web GUI control.
- 5 POWER Switch:** Switch ON(-) and OFF(O) the power of the device, when the power is switch to ON the device will automatically turns ON.
- 6 Power Supply:** Plug the included power cord with AC wall outlet for power supply.
- 7 Ventilation Fan:** This fan will automatically turns on when the device is switch to ON. Do not block this port of the device or cover it with any object. Please allow adequate space around the unit for air circulation.

## 6.3. Remote Control

### 1 Power:

Press this button to switch the device on or to standby mode.

### 2 OUTPUT 1~0:

Press a desire output setting port number and press enter.

### 3 OUTPUT ENTER:

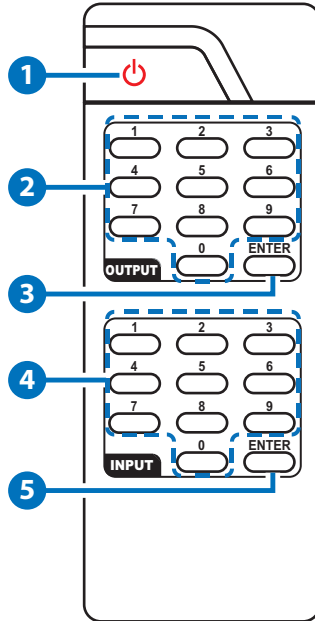
Press this button every time after a output number is selected then follow an input selection. Or after an input selection number is made followed with an output selection and press enter.

### 4 INPUT 1~0:

Press a desire input setting port number and press enter.

### 5 INPUT ENTER:

Press this button every time after a number is selected. Or after an output selection number is made followed with an input selection and press enter.



**Note:** One output corresponding with one input only per a selection.

## 6.4 RS-232 Protocols

SMR-650			Remote Controller	
PIN	Definition		PIN	Definition
1	NC		1	NC
2	RxD		2	RxD
3	TxD		3	TxD
4	NC	▶	4	NC
5	GND	◀	5	GND
6	NC		6	NC
7	NC		7	NC
8	NC		8	NC
9	NC		9	NC

Baud Rate : 19200 bps

Data Bit : 8 bits

Parity : None

Stop Bit : 1 bit

Flow Control: None

## 6.5 Get IP Address

There are 2 ways to get IP address, by auto and by static setting.

1. Get auto IP address, enter into the menu function 3, HDCP/AUTO IP ON/OFF. Select "ON" to get AUTO IP and to go menu function 2, to get the IP address.
2. Get static IP address by enter into menu function 3, HDCP/AUTO IP ON/OFF. Select "OFF" to enter into STATIC IP and key in the IP address that you wish to control, then go to menu function 2 to see if the IP address(Menu 4/5/6) is the same as the key in address. Use this IP address to enter into Telnet/web GUI.

## 6.6 RS-232/Telnet Commands

Commands	Description
QUIT	Quit telnet connection
?	Show all commands
RESET DEFAULT	Factory Reset
FW	Current Firmware version
PORT I:n O:n	I:Input O:output n:port number
PORT I n O n	I:Input O:output n:port number
PORT O:n I:n	I:Input O:output n:port number
PORT O n I n	I:Input O:output n:port number
POWER OFF	Power off
POWER ON	Power on
POWER n	n: 0 -->OFF n:1 -->ON
LOCK ON	Key lock on
LOCK OFF	Key lock off
LOCK n	n: 0 -->OFF n:1 -->ON
SAVE n	n:1~10
RECALL n	n:1~10
ALL n	n: input port number
GET PORT CONFIG	Display current I/O status
GET SLOT CONFIG	Display current slot cards status (4/SDI or 2/SDI & HDMI ports per slot)
GET IP CONFIG	Get IP Config
SET IP MODE n	n:0 Static IP, 1:DHCP
SET STATIC IP n.n.n.n	n: 0~255
SET STATIC NETMASK n.n.n.n	n:0~255
SET STATIC GATEWAY n.n.n.n	n: 0~255

**Note:** All the RS-232 command will be not executed unless followed by a carriage return and LF. Commands are case-insensitive.

## 6.7 Telnet Control

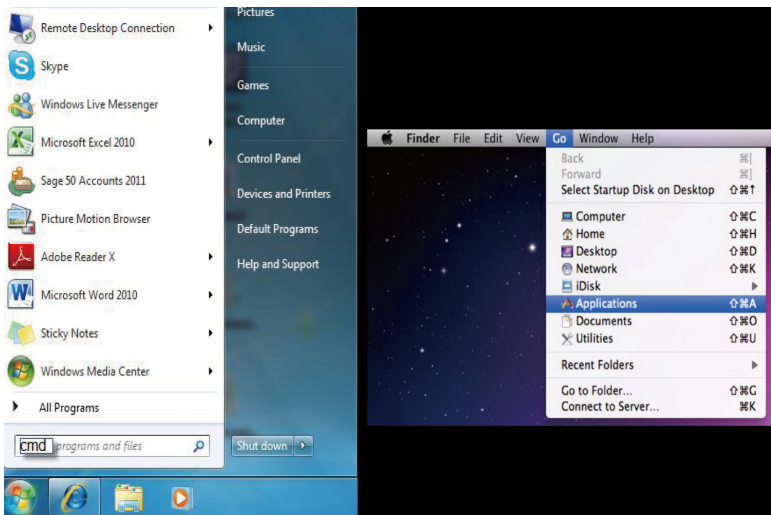
Before attempting to use the telnet control, please ensure that both the Matrix (via the 'LAN /CONTROL' port) and the PC/Laptop are connected to the active networks.

To access the telnet control in Windows 7, click on the 'Start' menu and type "cmd" in the Search field then press enter.

Under Windows XP go to the 'Start' menu and click on "Run", type "cmd" with then press enter.

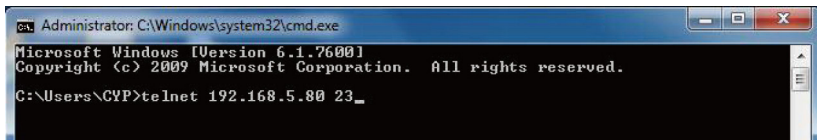
Under Mac OS X, go to Go→Applications→Utilities→Terminal

See below for reference.



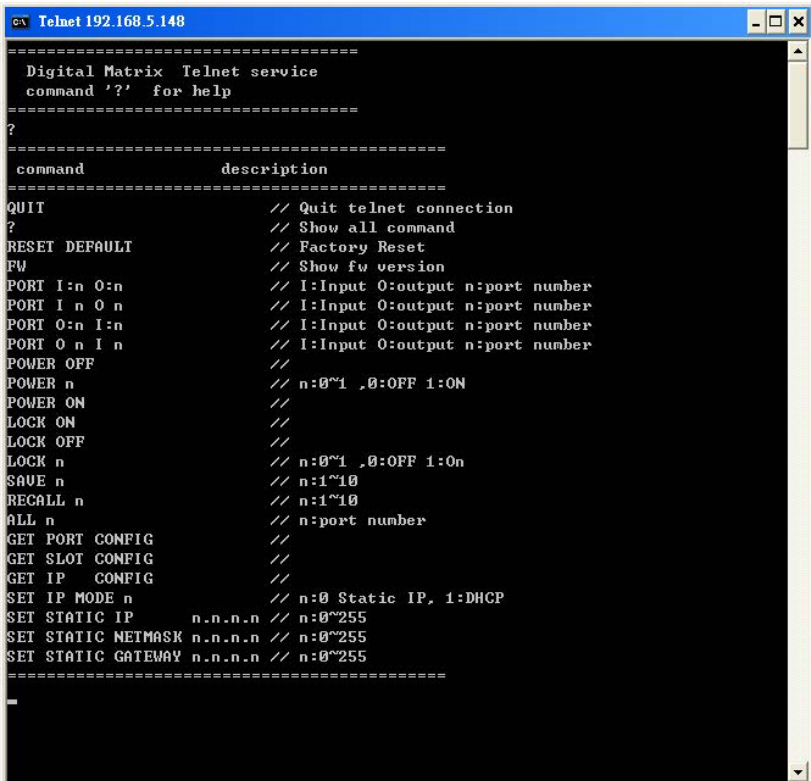
Once in the command line interface (CLI) type "telnet", the IP address of the unit you wish to control and "23", then hit enter.

Note: The IP address of the device can be found from the device's LCM monitor by entering into the Menu function no.2.



This will bring us into the device which we wish to control. Type "?" to

list the available commands.



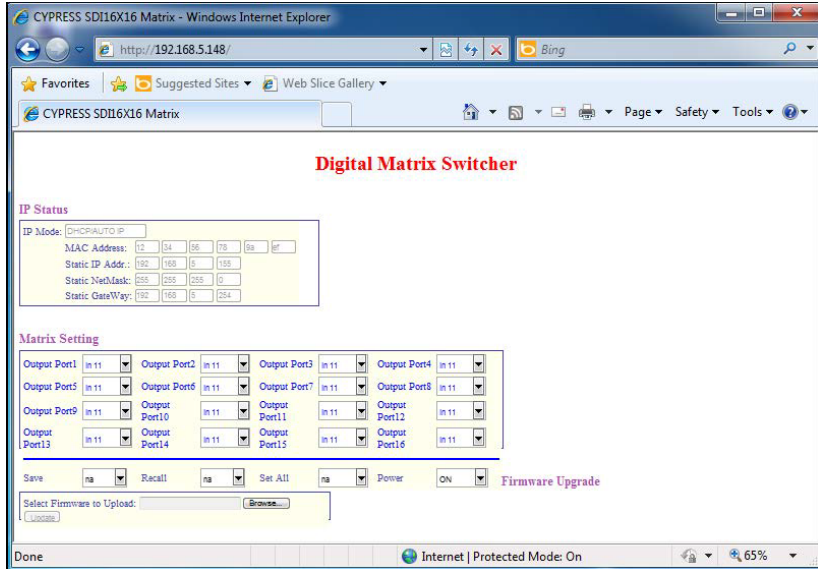
```
cx Telnet 192.168.5.148
=====
Digital Matrix Telnet service
command '?' for help
=====
?
=====
command          description
=====
QUIT             // Quit telnet connection
?               // Show all command
RESET DEFAULT   // Factory Reset
FW              // Show fw version
PORT I:n O:n    // I:Input O:output n:port number
PORT I n O n    // I:Input O:output n:port number
PORT O:n I:n    // I:Input O:output n:port number
PORT O n I n    // I:Input O:output n:port number
POWER OFF       //
POWER n         // n:0~1 ,0:OFF 1:ON
POWER ON        //
LOCK ON         //
LOCK OFF        //
LOCK n          // n:0~1 ,0:OFF 1:On
SAVE n          // n:1~10
RECALL n        // n:1~10
ALL n           // n:port number
GET PORT CONFIG //
GET SLOT CONFIG //
GET IP CONFIG   //
SET IP MODE n   // n:0 Static IP, 1:DHCP
SET STATIC IP   n.n.n.n // n:0~255
SET STATIC NETMASK n.n.n.n // n:0~255
SET STATIC GATEWAY n.n.n.n // n:0~255
=====
-
```

Type "GET IP CONFIG" To show all IP configurations. To reset the IP, type "SET IP MODE n" and to use a set static IP.

Note: Any commands will not be executed unless followed by a carriage return and LF. Commands are case-insensitive. If the IP is changed then the IP Address required for Telnet access will also change accordingly.

## 6.8 Web GUI Control

On a PC/Laptop that is connected to the same active network as the Matrix, open a web browser and type device's IP address on the web address entry bar. The browser will display the device's IP Status and Matix Setting.



Click on the Output Port 1~16 ▼ to select input port and the device will switch according to the selection immediately.

Other functions like Save, Recall, Set All and Power settings are also available.

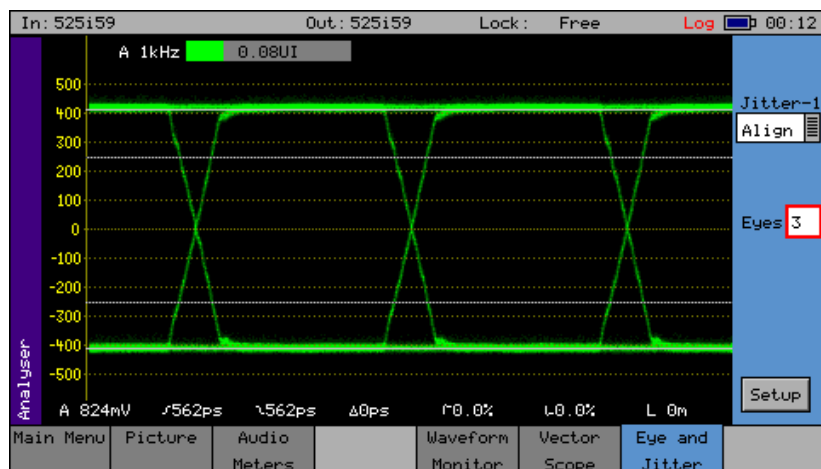
Even firmware update can be done easily.

## 7. SPECIFICATIONS

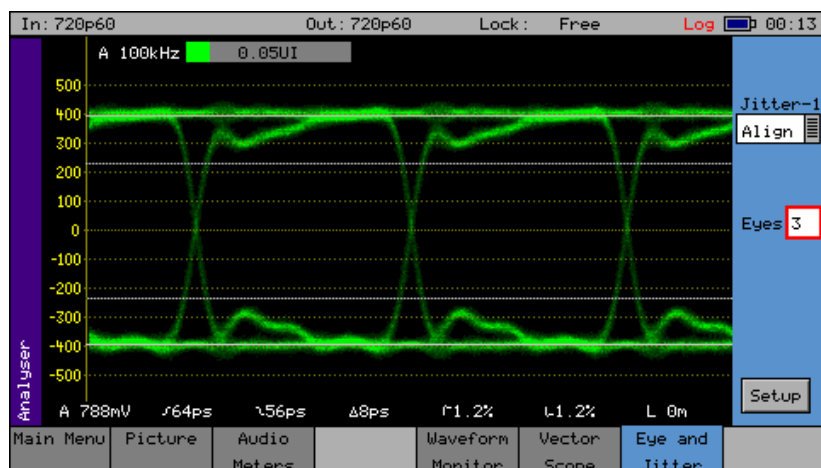
<b>SMPTE Standard</b>	425M Level A & B, 424M, 292M, 259M-C
<b>SDI Transmission Rates</b>	2.970 Gbit/s and 2.970/1.001 Gbit/s
<b>Input Ports</b>	16 x BNC (SD/HD/3G-SDI)
<b>Output Ports</b>	16 x BNC (SD/HD/3G-SDI)
<b>HDMI Support Resolution</b>	480i/576i, 720p@50/59.94/60, 1080i@50/59.94/60 1080p@23.98/24/25/29.97/30/50/59.94/60 1080PsF@23.98/24/25/29.97/30
<b>SDI Support Timing</b>	SD-SDI: SMPTE 259M-C, 270 Mbit/s HD-SDI: SMPTE 292M, 1.485 & 1.485/1.001 Gbit/s 3G-SDI: SMPTE 424M/425M-AB, 2.970 & 2.970/1.001 Gbit/s
<b>SDI Audio Sampling Rate</b>	48kHz
<b>Power</b>	100~240VAC, 50~60Hz, 150 watts, internal
<b>Dimensions (mm)</b>	482(W) x 315(D) x 143.5(H) included handle / pinna / jacks / foot pad
<b>Weight(g)</b>	8500
<b>Chassis Material</b>	Metal
<b>Silkscreen Color</b>	Black
<b>Operating Temperature</b>	0°C ~ 40°C / 32 °F ~ 104 °F
<b>Storage Temperature</b>	-20°C ~ 60°C / -4 °F ~ 140 °F
<b>Relative Humidity</b>	20 ~ 90% RH (non-condensing)
<b>Power Consumption</b>	41.8W

## SD/HD/3G Eye Diagram

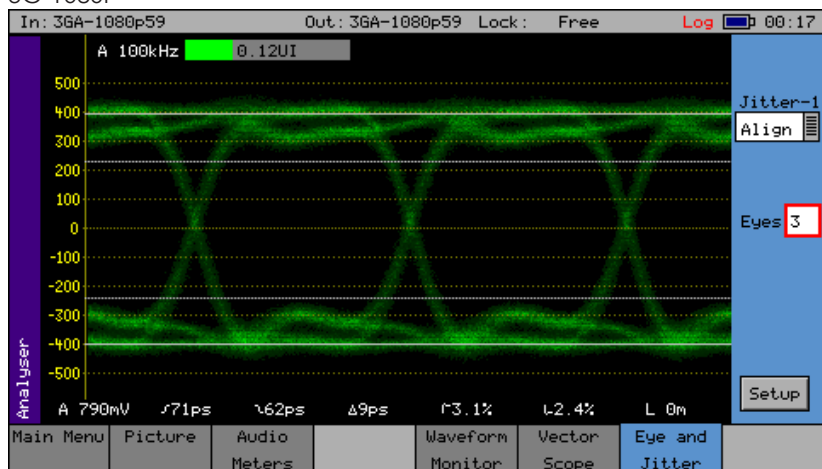
SD-576I



HD-720P



### 3G-1080P



# 8. CONNECTION AND INSTALLATION

