



CMSDI-1616S

16×16 3G-SDI Hybrid Modular Matrix



Operation Manual

DISCLAIMERS

The information in this manual has been carefully checked and is believed to be accurate. Cypress Technology assumes no responsibility for any infringements of patents or other rights of third parties which may result from its use.

Cypress Technology assumes no responsibility for any inaccuracies that may be contained in this document. Cypress also makes no commitment to update or to keep current the information contained in this document.

Cypress Technology reserves the right to make improvements to this document and/or product at any time and without notice.

COPYRIGHT NOTICE

No part of this document may be reproduced, transmitted, transcribed, stored in a retrieval system, or any of its part translated into any language or computer file, in any form or by any means—electronic, mechanical, magnetic, optical, chemical, manual, or otherwise—without express written permission and consent from Cypress Technology.

© Copyright 2011 by Cypress Technology.

All Rights Reserved.

Version 1.1 August 2011

TRADEMARK ACKNOWLEDGMENTS

All products or service names mentioned in this document may be trademarks of the companies with which they are associated.





SAFETY PRECAUTIONS

Please read all instructions before attempting to unpack, install or operate this equipment and before connecting the power supply.

Please keep the following in mind as you unpack and install this equipment:

Always follow basic safety precautions to reduce the risk of fire, electrical shock and injury to persons.

To prevent fire or shock hazard, do not expose the unit to rain, moisture or install this product near water.

Never spill liquid of any kind on or into this product.

Never push an object of any kind into this product through any openings or empty slots in the unit, as you may damage parts inside the unit.

Do not attach the power supply cabling to building surfaces.

Use only the supplied power supply unit (PSU). Do not use the PSU if it is damaged.

Do not allow anything to rest on the power cabling or allow any weight to be placed upon it or any person walk on it.

To protect the unit from overheating, do not block any vents or openings in the unit housing that provide ventilation and allow for sufficient space for air to circulate around the unit.

REVISION HISTORY

VERSION NO.	DATE DD/MM/YY	SUMMARY OF CHANGE
VR0	21/01/13	Preliminary Release
VS1	11/03/13	Updated format/diagrams



CONTENTS

- 1. Introduction..... 1**
- 2. Applications..... 1**
- 3. Package Contents 1**
- 4. System Requirements..... 1**
- 5. Features 2**
- 6. Operation Controls and Functions..... 3**
 - 6.1 Front Panel3
 - 6.2 Rear Panel.....5
 - 6.3. Remote Control.....6
 - 6.4 RS-232 Protocols7
 - 6.5 Assign IP Address7
 - 6.6 RS-232/Telnet Commands.....8
 - 6.7 Telnet Control9
 - 6.8 Web GUI Control 11
- 7. Specifications 12**
- 8. Connection Diagram 15**
- 9. Acronyms 17**



1. INTRODUCTION

This 16×16 3G-SDI Hybrid Modular Matrix can switch and distribute up to sixteen SDI sources to any sixteen SDI sinks, providing bandwidth up to 2.970Gb/s for 3G-SDI video support. In addition, this matrix also features IP control allowing users to access and control the matrix remotely.

2. APPLICATIONS

- Video broadcasting system switching and display
- Professional video editing suite switching and display
- Film studio program monitoring
- Airport or industrial security monitoring system

3. PACKAGE CONTENTS

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

4. SYSTEM REQUIREMENTS

SDI source equipment such as an SDI camera and output SDI monitor or recording device with recommended SDI connection cables.

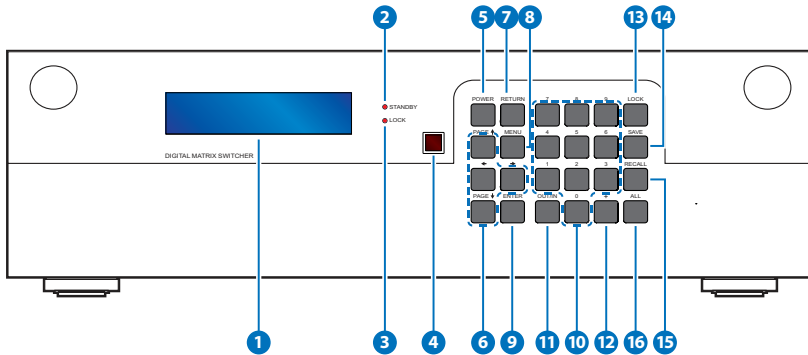
5. FEATURES

- Supports operation at 2.970 Gb/s, 2.970/1.001 Gb/s, 1.485 Gb/s, 1.485/1.001 Gb/s, and 270 Mb/s
- Supports SDI input/output modes:
 - SD-SDI (SMPTE 259M-C, at bitrates of 270 Mbit/s)
 - HD-SDI (SMPTE 292M, at bitrates of 1.485 Gbit/s and 1.485/1.001 Gbit/s)
 - 3G-SDI (SMPTE 424M/425M-A and B, at bitrates of 2.970 Gbit/s and 2.970/1.001 Gbit/s)
- Signal equalized and re-clocked to improve signal transmission distances
- Supports signal input and output distances of up to 250 m for SD signals, 200 m for HD signals and 100 m for 3G signals
- Supports audio sampling rate at 48 kHz
- Connects with other units to extend your signal over longer distances
- 3U rack mountable design

Note: The unit was tested with Belden 1694A cable, results may vary with cables of a different specification.

6. OPERATION CONTROLS AND FUNCTIONS

6.1 Front Panel



- 1 LCM:** Displays the Menu and the setting information of each input and output selection.
- 2 STANDBY LED:** This LED will illuminate when unit is in 'Stand-by Mode'.
- 3 LOCK LED:** This LED will illuminate when the key lock function is active.
- 4 IR Window:** IR Receiver window (accepts the remote control signal of this device only).
- 5 POWER:** Press this button to power the device on/off.
- 6 PAGE ▲◀▶▶▲:** Use these buttons to display the current Input/ Output settings status or to navigate the settings menu.
- 7 RETURN:** Press this button to go back/exit the current selection.

8 MENU: Press this button to enter the settings menu. There are total of 9 functions available.

- Firmware version
- IP Address: Use this address for logging into Telnet and the Web GUI
- DHCP/AUTO IP ON/OFF (ON: DHCP enable, OFF: Static IP enable)
- STATIC IP
- STATIC NETMASK Setting
- STATIC GATEWAY Setting
- In Slot Info.
- Out Slot Info.
- Exit

9 ENTER: Press to confirm the setting or selection.

10 0~9: Press to select the input or output ports.

11 OUT/IN: Press this button to select the which source (Input) to show on which display (Output). Press 'OUT/IN', then select the desired output using the number buttons (use the '+' button to add further outputs if required or 'ALL' to assign all outputs to the same source), then press 'OUT/IN' again to then select which source you wish assign.

Note: Only a single source can be selected at any one time but multiple outputs can be assigned to a source.

12 +: Press this button when selecting more than one output for a source. (This button is only functional in when in Input/Output entry mode)

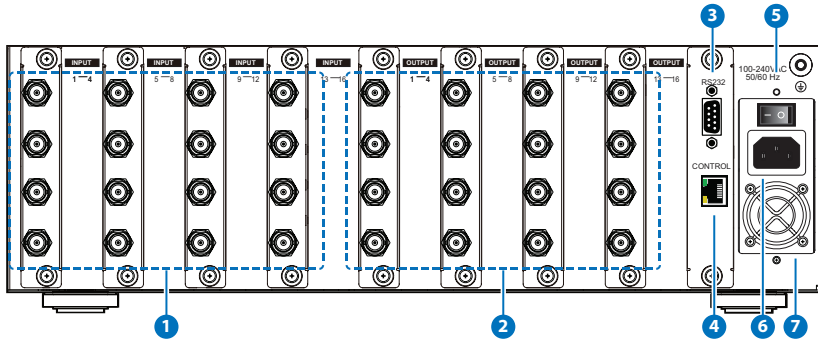
13 LOCK: Press and hold this button for 3 seconds to lock all the front panel buttons to prevent accidental button presses. The Lock LED will illuminate, to unlock press and hold the button again for 3 seconds.

14 SAVE: Press this button to save the present Input/Output settings. There are 10 sets available for saving.

15 RECALL: Press this button to recall the saved Input/Output settings (1~10).

16 ALL: Press this button to directly assign all outputs to the same input.

6.2 Rear Panel

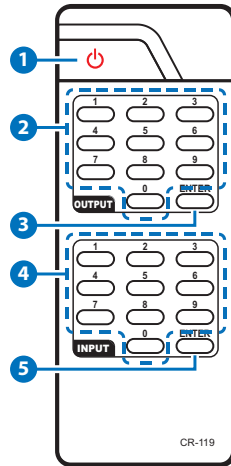


- 1 **INPUT 1~16:** Connect up to 16 SDI equipped source devices such as digital cameras or video players with SDI cables.
- 2 **OUTPUT 1~16:** Connect up to 16 SDI equipped sink devices such as displays (TV/monitors) or broadcast video recorders with SDI cables.
- 3 **RS-232:** Connect to a PC or RS-232 control system with D-Sub 9-pin cable to control the unit with RS-232 commands (See Section 6.6 for RS-232 commands).
- 4 **CONTROL:** This port is the link for Telnet and Web GUI controls, connect to an active Ethernet link with an RJ45 terminated cable (for further details, please refer to sections 6.7 and 6.8).
- 5 **POWER Switch:** Use this switch to power the device ON(I) or OFF(O), when the power is switched ON the device will automatically power up.
- 6 **Power Supply:** Plug the power cord to an AC wall outlet for power supply.
- 7 **Ventilation Fan:** This fan will automatically activate when the device is switched ON. Do not block or cover this port. Please allow adequate space around the unit for air to circulate.

6.3 Remote Control

- 1 **POWER:** Press this button to switch the device on or to put it into standby mode.
- 2 **OUTPUT 0~9:** Press the appropriate combination of buttons to select the required output setting and press enter.
- 3 **OUTPUT ENTER:** Press to confirm the output selection.
- 4 **INPUT 0~9:** Press the appropriate combination of buttons to select the required input setting and press enter.
- 5 **INPUT ENTER:** Press to confirm the input selection.

Note: On the remote, only a single output can be selected per input selection. Use the front panel to select multiple outputs.



6.4 RS-232 Protocols

CMSDI-1616S		▶ ◀	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 Assign IP Address

There are 2 ways to assign an IP address, automatically via DHCP or by manually setting a static address.

1. To obtain an IP address automatically via DHCP, select function 3 (HDCEP/AUTO IP ON/OFF) from the settings menu. Select "ON" to have the unit be assigned an IP address via DHCP. Select Menu Function 2 to display the IP address. Note that the IP address may change periodically.
2. To set a static IP address, select function 3 (HDCEP/AUTO IP ON/OFF) from the settings menu. Select "OFF" to enter the STATIC IP option and key in the IP address that you wish to use, then select menu function 2 to see if the IP address (Menu 4/5/6) is the same as the address entered. Use this IP address to access the 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 n	n: 0→Off n:1→On
POWER ON	Power 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: RS-232 commands will not execute unless followed by a carriage return and LF. Commands are not case-sensitive.

6.7 Telnet Control

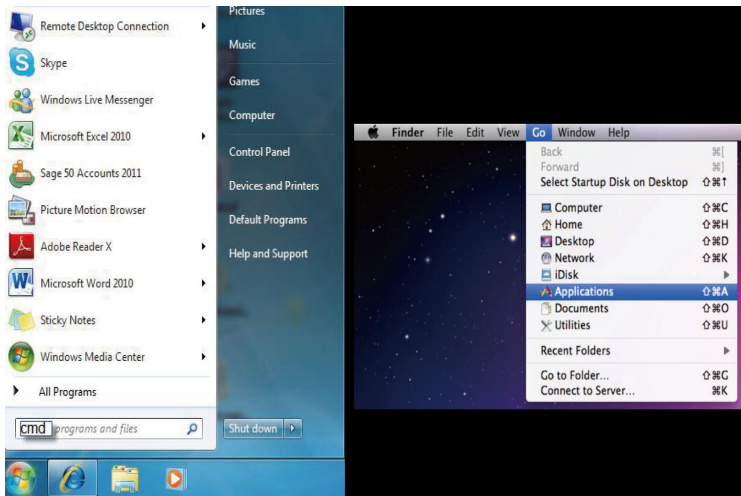
Before attempting to use the Telnet control, please ensure that both the Matrix (via the 'LAN /CONTROL' port) and the PC/Laptop are connected to the same active network.

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.

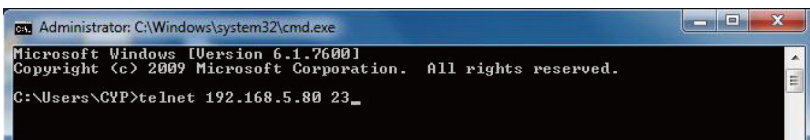
Under Mac OS X, go to Go→Applications→Utilities→Terminal

See below for reference.

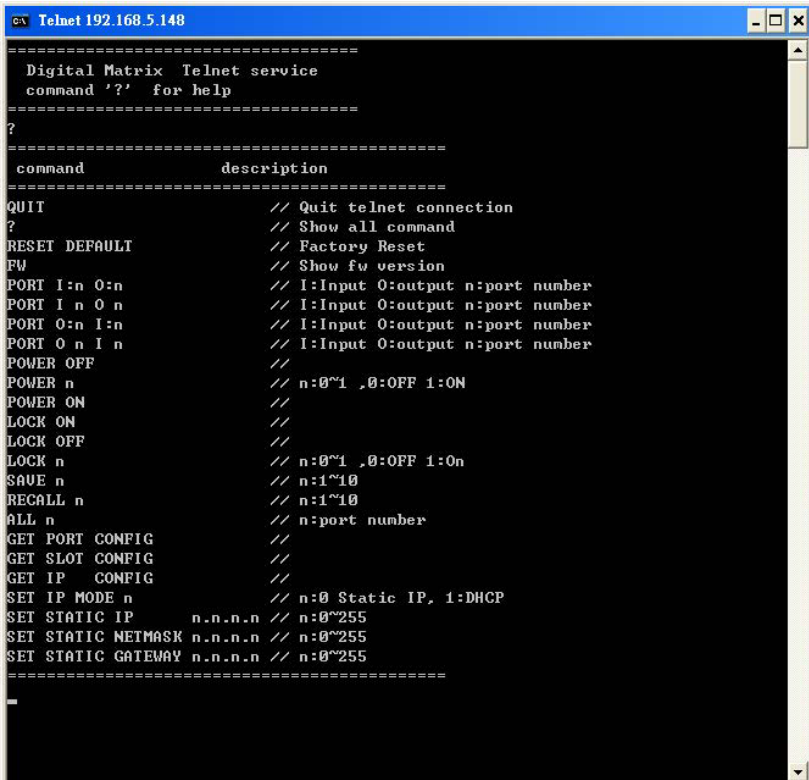


Once in the command line interface (CLI) type "telnet", a space, then the IP address of the unit you wish to control, a space and "23", then press enter.

Note: The IP address of the device can be found by entering the Settings Menu and selecting Option No. 2.



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



```

=====
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
=====
-

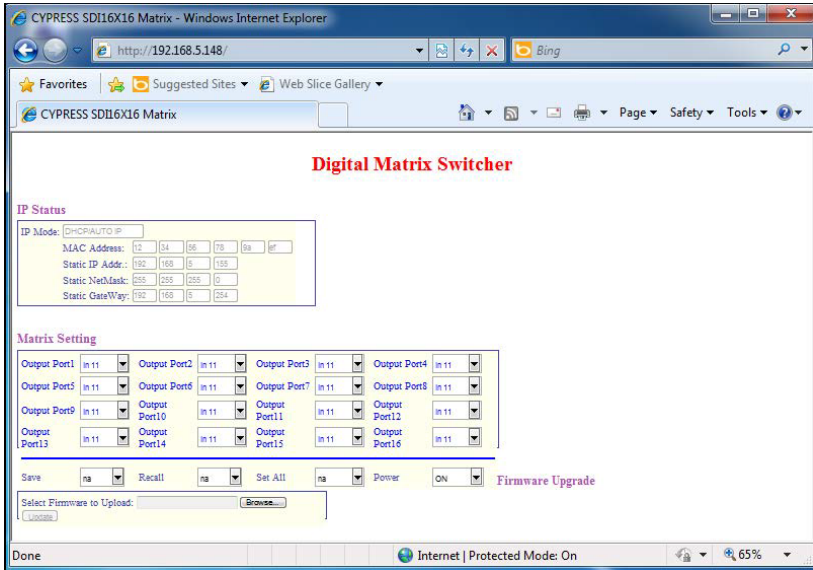
```

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: Commands will not be executed unless followed by a carriage return and LF. Commands are not case-sensitive. 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 the 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) drop down menu to select the input port and the device will immediately switch to that selection.

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

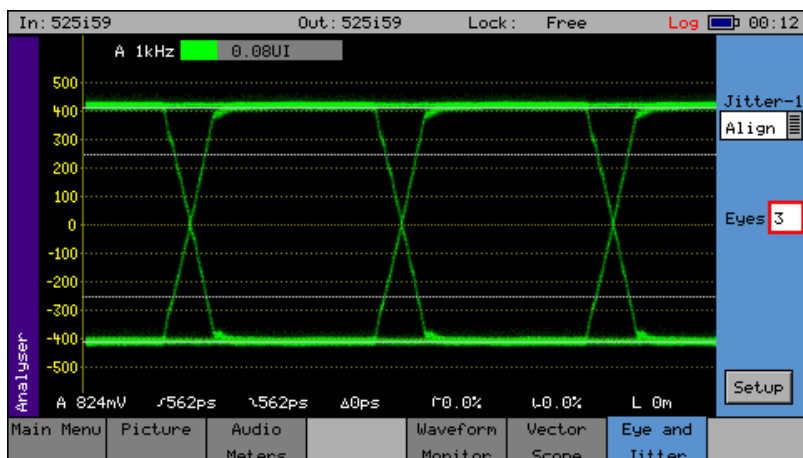
Firmware updates can be easily done from the Web GUI.

7. SPECIFICATIONS

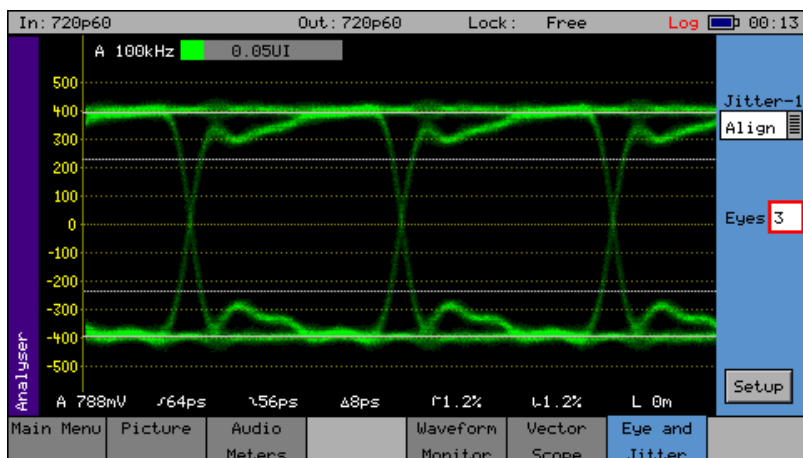
SMPT E Standard	425M-A & B, 424M, 292M, and 259M-C
Transmission Bitrates	2.970 Gbps and 2.970/1.001 Gbps, 1.485Gbps, 1.485/1.001 Gbps and 270 Mbps
Input Ports	16×BNC (SD/HD/3G-SDI)
Output Ports	16×BNC (SD/HD/3G-SDI)
Supported HDMI Resolutions	480i/576i, 720p@50/59.94/60, 1080i@50/59.94/60, 1080p@23.98/24/25/29.97/30/50/59.94/60, 1080PsF@23.98/24/25/29.97/30
Supported SDI Video Formats	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
SDI Cable Distance	SD-SDI up to 250m HD-SDI up to 200m 3G-SDI up to 100m
Audio Sampling Rate	48 kHz
ESD Protection	Human-body Model: ± 8 kV (air-gap discharge) ± 4 kV (contact discharge)
Power Supply	100~240 V AC@50/60 Hz, 150 Watts, Internal
Dimensions	482 mm (W)×315 mm (D)×143.5 mm (H) (includes handles/rack ears/jacks/foot pads)
Weight	8,500 g
Chassis Material	Metal
Silkscreen Color	Black
Operating Temperature	0°C ~ 40°C/32°F ~ 104°F
Storage Temperature	-20°C ~ 60°C/-4°F ~ 140°F
Relative Humidity	20 ~ 90 ss% RH (non-condensing)
Power Consumption	41.8 W

SD/HD/3G Eye Diagram

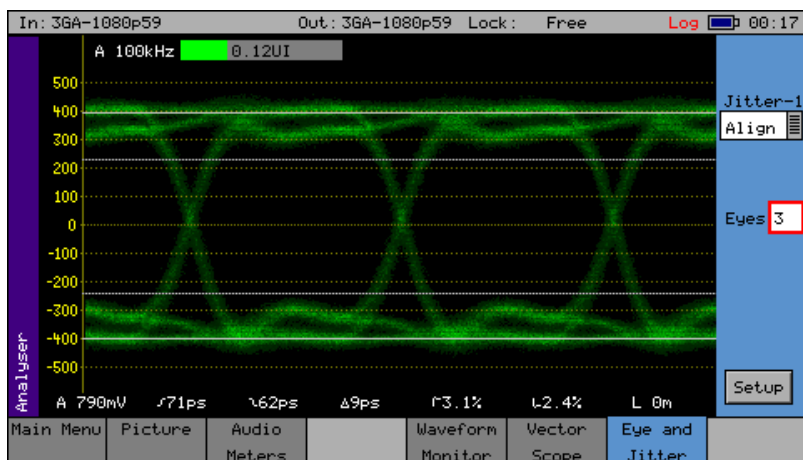
- SD-576i



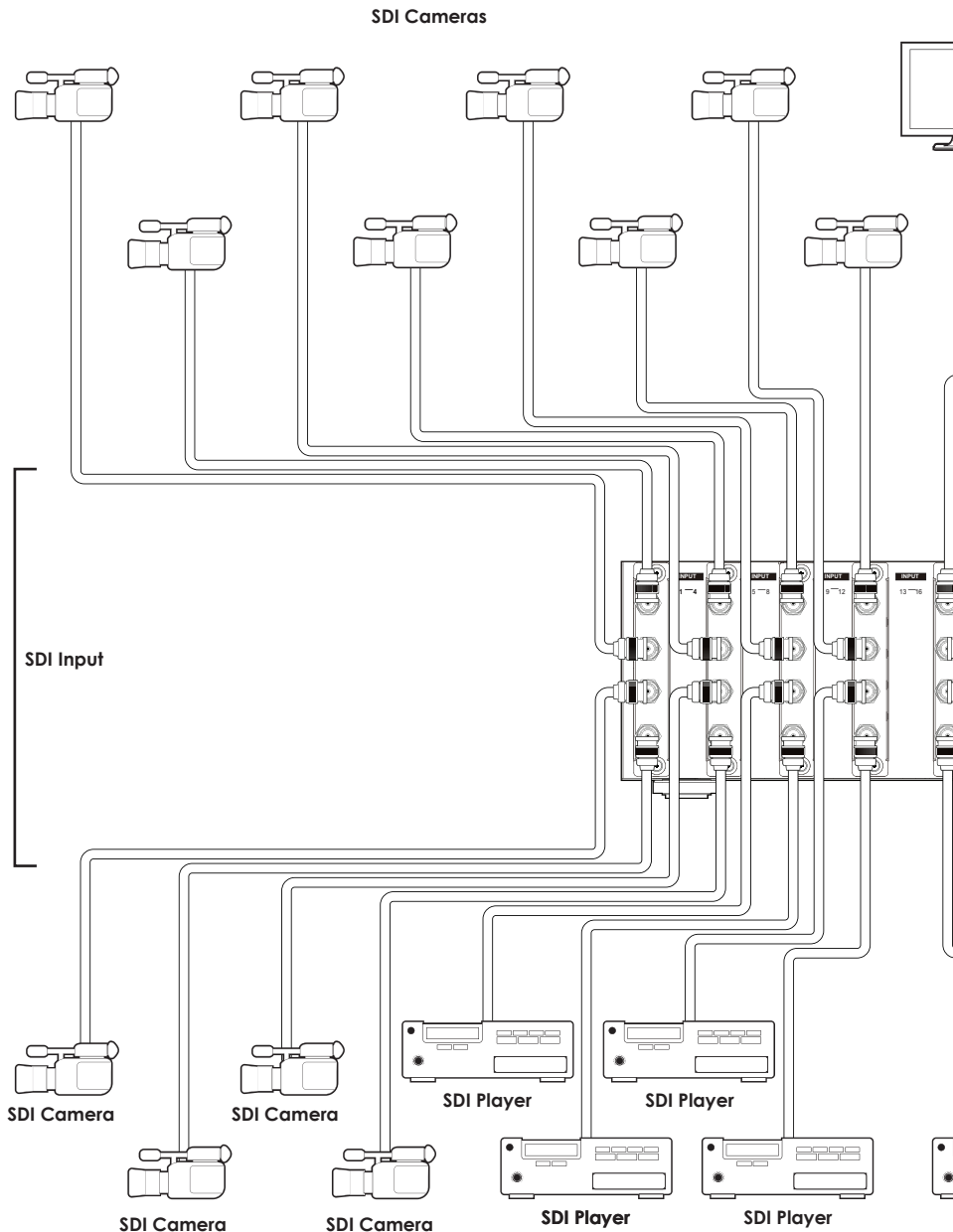
- HD-720p

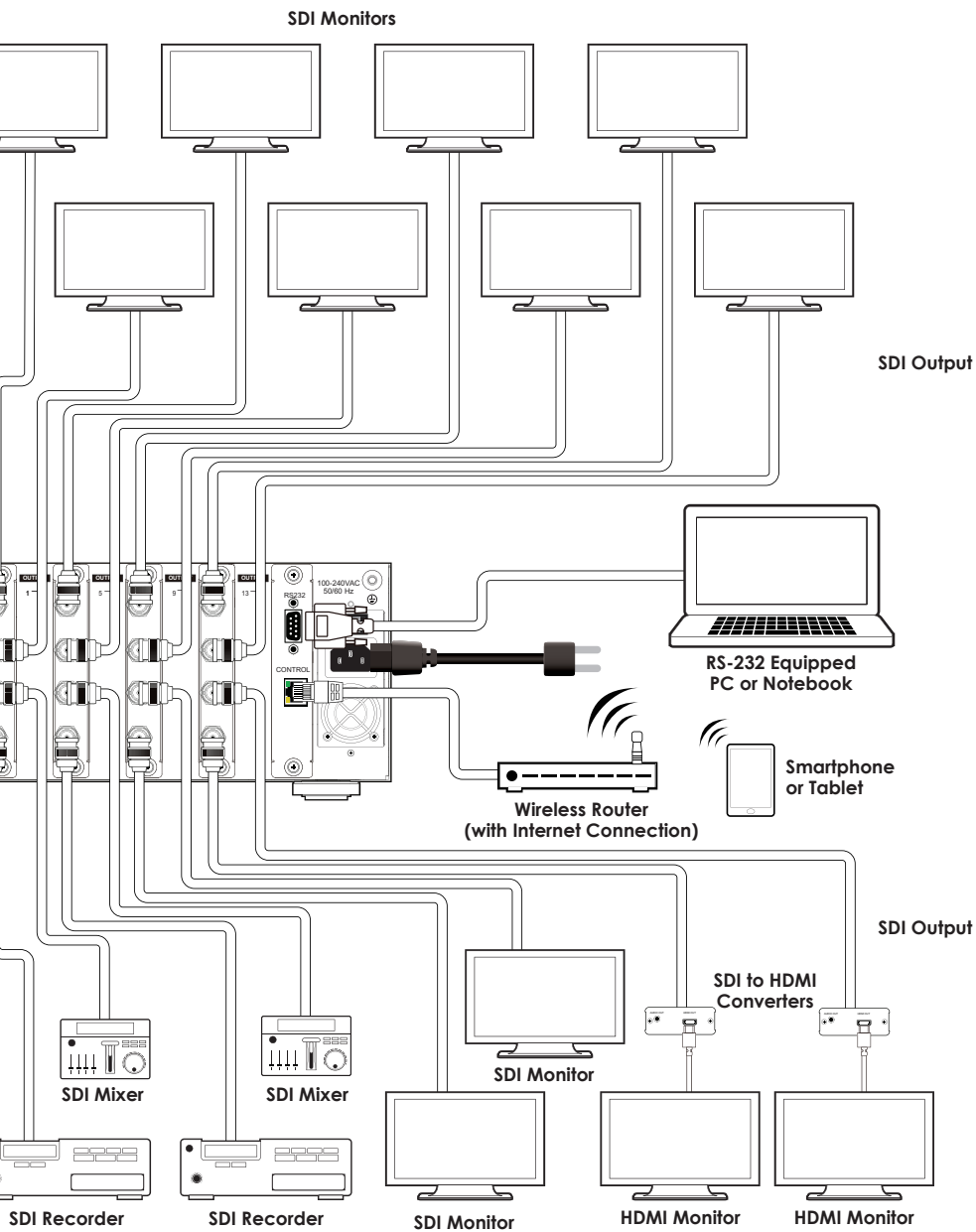


- 3G-1080p



8. CONNECTION DIAGRAM







9. ACRONYMS

ACRONYM	COMPLETE TERM
BNC	Bayonet Neill-Concelman
DHCP	Dynamic Host Configuration Protocol
HDCP	High-bandwidth Digital Content Protection
HDMI	High-Definition Multimedia Interface
IR	Infrared
SDI	Serial Digital Interface



CYPRESS TECHNOLOGY CO., LTD

Home page: <http://www.cypress.com.tw>

20120620 MPM-CMSDI1616