



CMSDI-1616S

16×16 3G-SDI Matrix



Operation Manual

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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 | 12/01/16 | Updated format/diagrams |

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1. INTRODUCTION

This 16×16 3G-SDI Matrix can switch and distribute up to sixteen SDI sources to any sixteen SDI sinks, providing bandwidth up to 2.970Gbps 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

- 1×16 by 16 3G-SDI Matrix
- 1×Remote Control (with Battery)
- 1×Power Cord
- 1×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 2.970Gbps, 2.970/1.001Gbps, 1.485Gbps, 1.485/1.001Gbps, and 270Mbps
- Supports SDI input/output modes:
 - SD-SDI: SMPTE 259M-C, at bitrates of 270Mbps
 - HD-SDI: SMPTE 292M, at bitrates of 1.485Gbps and 1.485/1.001Gbps
 - 3G-SDI: SMPTE 424M & 425M-A/B, at bitrates of 2.970Gbps and 2.970/1.001Gbps
- Signal equalized and re-clocked to improve signal transmission distances
- Supports signal input and output distances of up to 250 m for SD

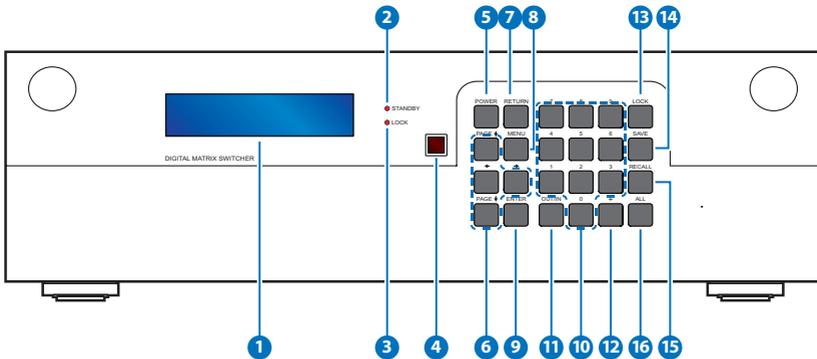
signals, 200 m for HD signals and 100 m for 3G signals

- 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 WebGUI
- 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)

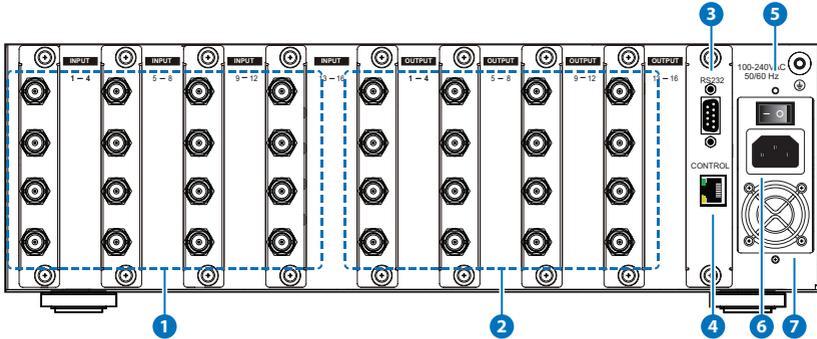
13 LOCK: Press and hold this button for 3 seconds to lock all the front panel buttons to prevent accidental button presses. The Lock LED will illuminate, to unlock press and hold the button again for 3 seconds.

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

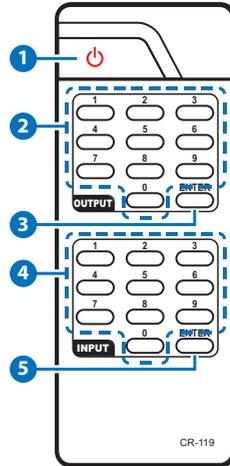


- 1 **INPUT 1~16:** Connect up to 16 SDI equipped source devices such as digital cameras or video players with SDI cables.
- 2 **OUTPUT 1~16:** Connect up to 16 SDI equipped sink devices such as displays (TV/monitors) or broadcast video recorders with SDI cables.
- 3 **RS-232:** Connect to a PC or RS-232 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 WebGUI 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 IP Address Setting

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

- 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.
- 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/ WebGUI.

6.5 RS-232 Protocols

| MATRIX | | | REMOTE CONTROL | |
|--------|------------|---|----------------|------------|
| 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

6.6 RS-232 and 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 | O=Output, I=Input, n=Port number |
| PORT O n I n | O=Output, I=Input, n=Port number |
| POWER OFF | Power off |
| POWER n | n= 0/1 (Off/On) |
| POWER ON | Power on |
| LOCK ON | Key lock on |
| LOCK OFF | Key lock off |
| LOCK n | n=0/1 (Off/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=0/1 (Static IP/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

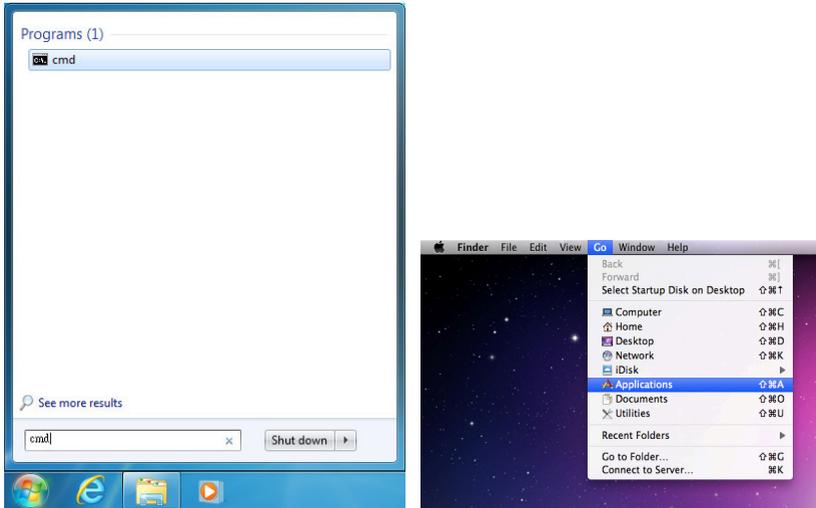
Before attempting to use the Telnet control, please ensure that both the Matrix (via the 'LAN /CONTROL' port) and the PC/Laptop are connected to the same active network.

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.

```
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\Administrator>telnet 192.168.5.80 23
```



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

```
=====
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 WebGUI 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.

IP Status

| | | | | | | | | | |
|-----------------------|-----|-----|-----|-----|----|----|--|--|--|
| IP Mode: DHCP/AUTO IP | | | | | | | | | |
| MAC Address: | 12 | 34 | 56 | 78 | 9a | ef | | | |
| Static IP Addr.: | 192 | 168 | 5 | 155 | | | | | |
| Static NetMask: | 255 | 255 | 255 | 0 | | | | | |
| Static GateWay: | 192 | 168 | 5 | 254 | | | | | |

Matrix Setting

| | | | | | | | |
|---------------|-------|---------------|-------|---------------|-------|---------------|-------|
| Output Port1 | in 11 | Output Port2 | in 11 | Output Port3 | in 11 | Output Port4 | in 11 |
| Output Port5 | in 11 | Output Port6 | in 11 | Output Port7 | in 11 | Output Port8 | in 11 |
| Output Port9 | in 11 | Output Port10 | in 11 | Output Port11 | in 11 | Output Port12 | in 11 |
| Output Port13 | in 11 | Output Port14 | in 11 | Output Port15 | in 11 | Output Port16 | in 11 |

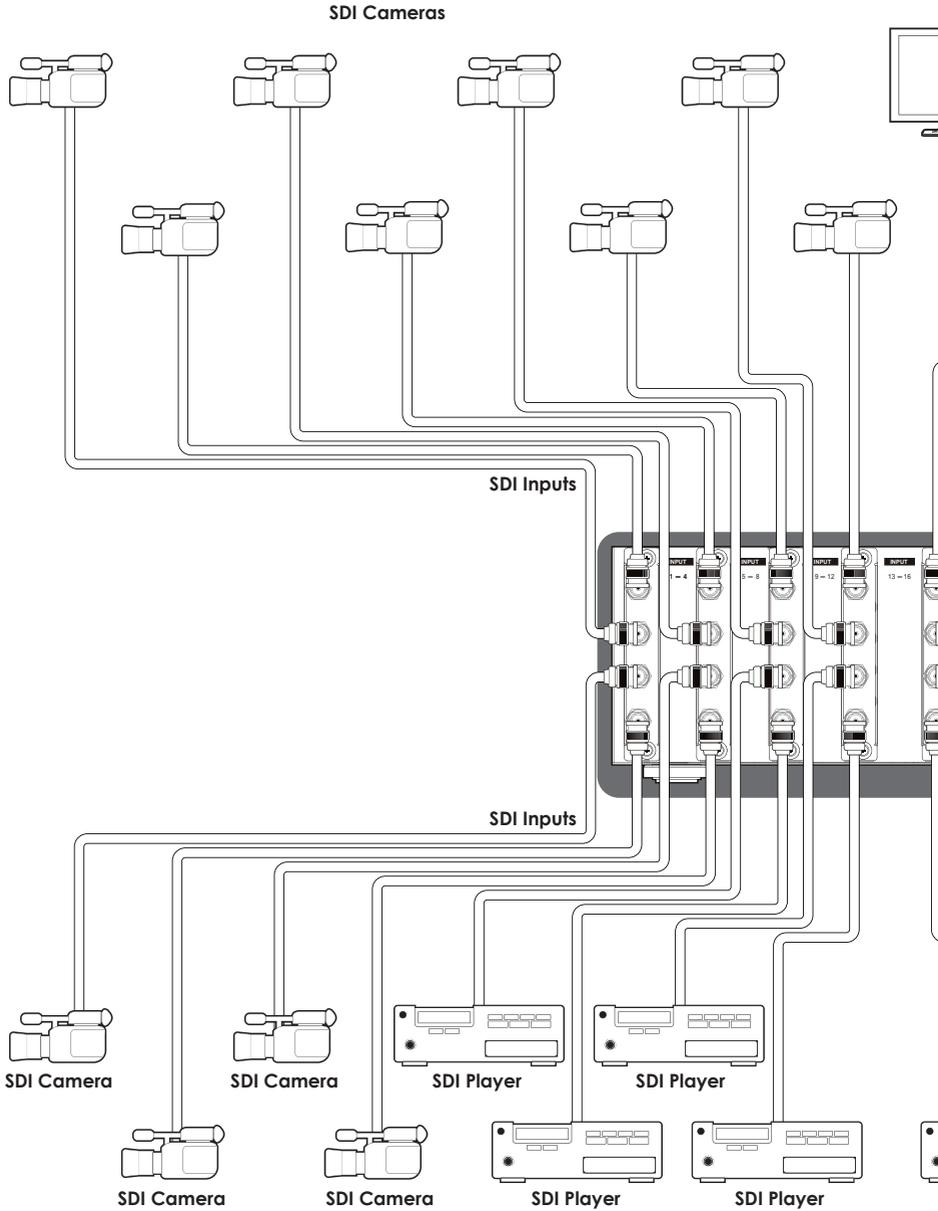
Save Recall Set All Power Firmware Upgrade

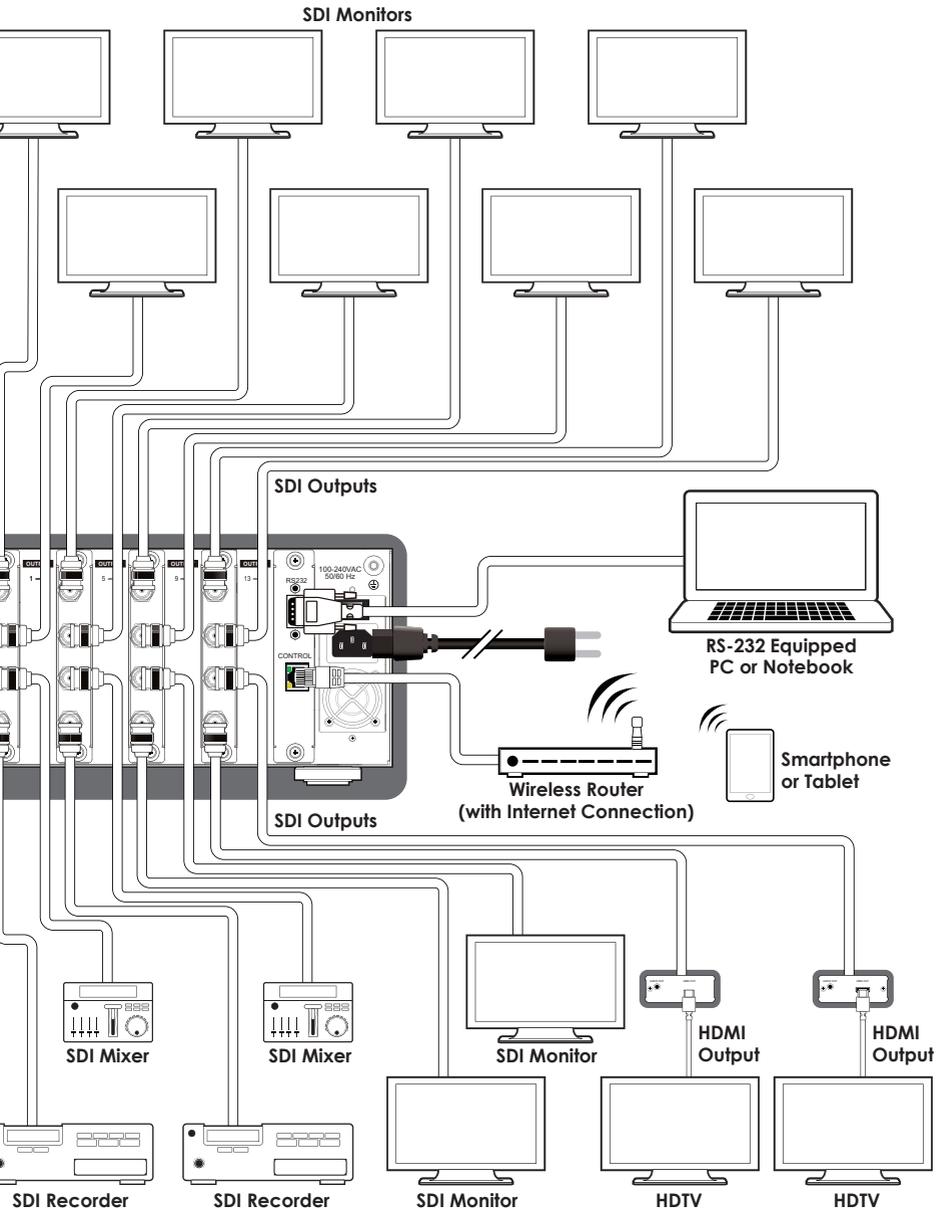
Select Firmware to Upload:

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 WebGUI.

7. CONNECTION DIAGRAM







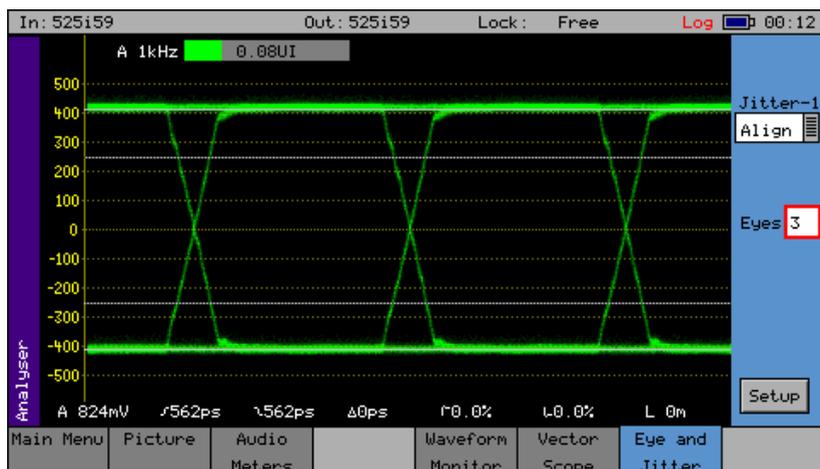
8. SPECIFICATIONS

8.1 Technical Specifications

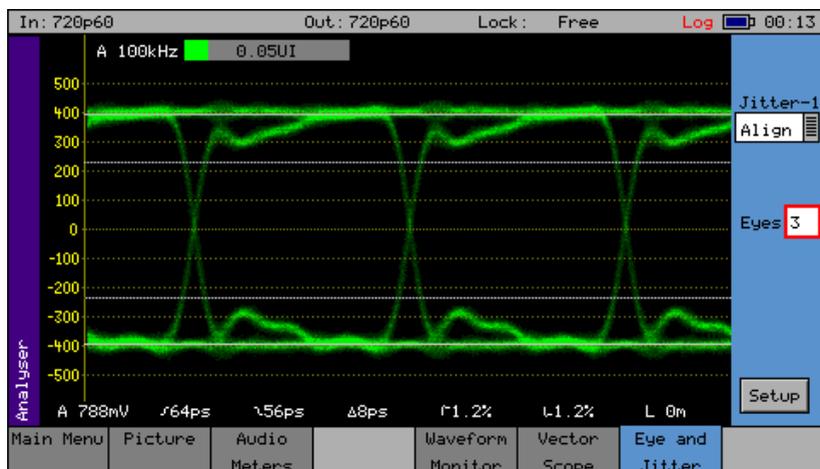
| | |
|------------------------------|--|
| SMPT E Standard | 259M-C, 292M, 424M & 425M-A/B |
| Bit Rates | 270Mbps, 1.485Gbps & 1.485/1.001Gbps 2.970Gbps & 2.970/1.001Gbps |
| Input Ports | 16×BNC (SD/HD/3G-SDI) |
| Output Ports | 16×BNC (SD/HD/3G-SDI) |
| SDI Resolutions | SMPTE 259M-C: 270Mbps; SMPTE 292M: 1.485Gbps & 1.485/1.001Gbps; SMPTE 424M/425M-AB: 2.970Gbps & 2.970/1.001Gbps |
| 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 |
| Audio Sampling Rate | 48 kHz |
| SDI Cable Distance | Up to 250m (SD-SDI), 200m (HD-SDI), 100m (3G-SDI) |
| ESD Protection | Human-body Model: ± 8 kV (air-gap discharge) ± 4 kV (contact discharge) |
| Power Supply | 100~240 V AC@50/60Hz, 150 Watts, Internal |
| Dimensions | 482 mm (W)×315 mm (D)×143.5 mm (H) |
| 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% RH (non-condensing) |
| Power Consumption | 41.8 W |

8.2 Eye Diagrams

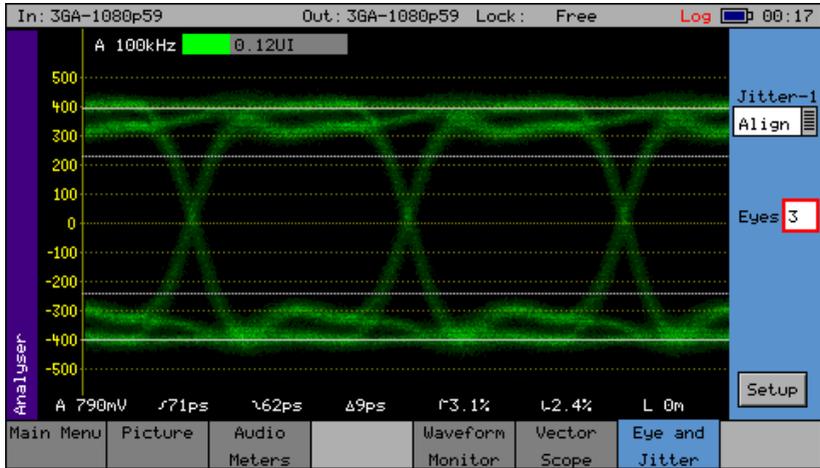
SD-576i



HD-720p



3G-1080p



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 |



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