The Extron Fiber Matrix 6400 is a high performance, modular fiber optic matrix switcher for systems requiring complete, end-to-end digital A/V signal transmission and routing over fiber optic cable. Using a modular, card cage design, the matrix is expandable from 8x8 up to 64x64, and provides digital switching for data rates up to 4.25 Gbps. With hot-swappable input/output boards and fully redundant power supplies, as well as real-time system monitoring, the Fiber Matrix 6400 is ideal for mission-critical environments requiring 24-hour reliability and continuous operation.
The Extron Fiber Matrix 6400 is a high performance, modular fiber optic matrix switcher for complete, end-to-end digital A/V signal transmission and routing over fiber optic cable. The Fiber Matrix 6400 is expandable in sizes from 8x8 up to 64x64, and is fully compatible with the FOX Series of fiber optic transmitters and receivers. Supporting rates up to 4.25 Gbps, it accepts and routes standard definition video, high resolution computer-video, DVI-D, and multi-rate SDI. Equipped with the integration-friendly features common to Extron matrix switchers, together with hot-swappable I/O boards, real-time system monitoring, and redundant, hot-swappable power supplies, the Fiber Matrix 6400 delivers highly reliable, enterprise-wide switching of fiber optic A/V and control signals for any mission-critical environment.

Fiber Matrix Architecture
The Fiber Matrix 6400 is a modular design featuring eight board slots. Each slot accepts a Fiber Matrix I/O Board having eight ports populated with LC-type fiber optic connectors. Two versions of the board are available. The Fiber Matrix I/O Board - MM supports multimode fiber at 850 nm, which is typically used within buildings or facilities with moderate-range transmission distances. The Fiber Matrix I/O Board - SM supports singlemode as well as multimode fiber at 1310 nm. Singlemode fiber offers long-range transmission capability over extreme distances of several kilometers or miles.

The Fiber Matrix 6400 can be configured with all or some of the board slots occupied. The I/O boards are hot-swappable and may be added at any time in the field for easy and quick upgradeability or expansion. The Fiber Matrix 6400 also accommodates any combination of singlemode or multimode I/O boards. This can allow, for example, a multimode fiber link input to the matrix switcher from a multimode transmitter, and a singlemode output from the switcher for transmission over extreme distances to a singlemode receiver.

I/O Configuration and Virtualization
Each fiber optic port comprises two individual fiber links. In the standard I/O configuration for the Fiber Matrix 6400, these links are defined as a separate input and a separate output. Therefore, up to 64 single fiber link inputs and 64 single fiber link outputs are possible when configuring and controlling the matrix switcher with the Extron control software. However, each fiber optic connection can also be defined as a “linked” input or output, with the two fiber optic links supporting bi-directional capabilities for a FOX Series product.

Any group of linked connections, anywhere on the rear panel can be defined as inputs or outputs, enabling the creation of a virtualized, custom I/O configuration. For example, a Fiber Matrix 6400, populated with two I/O boards and 16 available linked connections, may be virtualized as a 12x4 switcher. In the standard I/O configuration, these same two boards would support 16x16 switching with single fiber link inputs and outputs. For added flexibility, the Fiber Matrix 6400 may be virtualized and configured with a combination of linked and single fiber link inputs and outputs.

Multi-Rate SDI Signal Switching and Distribution
The Fiber Matrix 6400 3G HD-SDI Board is available as an option for the Fiber Matrix 6400, and enables connection to local multi-rate SDI-equipped devices. This board offers an 8x8 configuration for switching and distribution of multi-rate SDI signals up to 2.97 Gbps, including SDI, HD-SDI, and 3G-SDI. With this board, the Fiber Matrix 6400 can be configured as a fully dedicated multi-rate SDI matrix switcher up to 64x64, or a combination of multi-rate SDI and fiber optic matrix switching. The Fiber Matrix 6400 3G HD-SDI Board is compliant with SMPTE 259M, 292M, 424M, and ITU digital video standards. The board is hot-swappable, and each input and output is individually buffered to maximize performance with virtually no crosstalk. To optimize SDI signal transmission to and from the board, input signals are automatically equalized, and output signals are re clocked.

The Fiber Matrix 6400 3G HD-SDI Board enables a local BNC connection to the FOX HD-SDI Fiber Optic Extender for Multi-Rate SDI. Incoming multi-rate SDI signals from the FOX HD-SDI can then be routed to the board’s BNC outputs, or through the fiber optic outputs to remote FOX HD-SDI units. Similarly, incoming fiber optic signals from the FOX HD-SDI can be output on fiber or BNC. In broadcast and production applications, a multi-rate SDI-equipped Fiber Matrix 6400, together with several FOX HD-SDI units, offers expanded opportunities for system integration. For example, the Fiber Matrix 6400 can be used to route signals to and from local editing equipment, while also providing the capability to receive or transmit multi-rate SDI signals very long distances to devices in remote locations, such as cameras and production monitors.
DESCRIPTION (Cont.)

Self-Monitoring and Hot-Swappable
The Fiber Matrix 6400 is designed for optimum performance and reliability in applications requiring continuous operations 24 hours a day, 7 days a week, such as in government, military, and medical installations. A real-time monitoring system continuously provides self-diagnostics of the I/O boards, fiber links, power supplies, internal fans, and general functions of the switcher. LED indicators on each I/O board provide a quick verification of input signal presence as well as the status of fiber links with the transmitters and receivers. The Fiber Matrix 6400 can be configured to trigger an external control system or generate e-mail alerts when a fiber link has been lost.

Each I/O board is hot-swappable so that the matrix switcher can be serviced or reconfigured without interrupting all signal routing by powering down the unit. The Fiber Matrix 6400 also features dual redundant and hot-swappable power supplies to ensure continuous, uninterrupted power.

Control
The Fiber Matrix 6400 offers convenient user control through the standard front panel controller. Remote system access for configuration, I/O virtualization, operation, and monitoring is available through the front and rear panel RS-232 serial control ports and IP Link Ethernet control. The Fiber Matrix 6400 is also compatible with the MKP 3000 X-Y Remote Control Panel that provides a convenient user interface to the matrix switcher from remote locations.

FEATURES (Cont.)

- Multimode and singlemode I/O boards available – The Fiber Matrix 6400 is configurable with a mix of multimode and singlemode versions of the Fiber Matrix I/O Boards, so that both short and long haul transmission can be supported.

- Multi-Rate SDI I/O Board available – The Fiber Matrix 6400 can be configured with the Fiber Matrix 6400 3G HD-SDI Board for local connection to multi-rate SDI-equipped devices. This board provides 8x8 routing of multi-rate SDI signals up to 2.97 Gbps, including SDI, HD-SDI, and 3G-SDI. The Fiber Matrix 6400 can be configured as a fully dedicated multi-rate SDI matrix switcher, or a combination of multi-rate SDI and fiber optic matrix switching. The Fiber Matrix 6400 3G HD-SDI Board is compliant with SMPTE 259M, 292M, 424M, and ITU digital video standards.

- Modular, field-upgradeable and hot-swappable design – The Fiber Matrix 6400 provides substantial flexibility, expandability, and affordability by allowing users to select the configuration required for their systems. Additional input and output boards may be added at any time for easy and quick upgradeability or expansion. Hot-swappable components allow the user to replace an I/O board or power supply at any time—no need to power down the switcher. This is especially useful for mission-critical applications that require continuous operation of the Fiber Matrix 6400.

- Dual redundant, and hot-swappable power supplies – Primary and back-up power supplies provide added reliability for critical applications.

- Advanced computer-aided diagnostics – Provides 24-hour self-diagnostics of input/output boards, primary and redundant power supply voltages, fiber links, and overall functional status of the matrix. Using the IP Link Ethernet or RS-232/RS-422 communications port, status monitoring is possible for off-site or unmanned locations, such as government, military, medical, or any other sensitive, 24 hour a day, 7 day a week environments.

FEATURES

- I/O sizes from 8x8 to 64x64

- High speed digital switching up to 4.25 Gbps – The Fiber Matrix 6400 offers up to 4.25 Gbps digital switching capability for routing audio, control, and video signals in multiple formats with uncompressed, pixel-for-pixel throughput. This level of performance assures compatibility from standard definition video to the highest source resolutions, including RGB computer-video, DVI, and multi-rate SDI signals.
- **Input video signal detection** – The Fiber Matrix 6400 verifies active light sources by polling all connections for input reception and output transmission. The resulting information is viewable within the internal Web pages, and is easily obtained by third party control systems.

- **Status LED indicators for fiber link status** – LEDs on each I/O board verify active fiber links with the transmitters and receivers.

- **Alarm notification for fiber link loss** – The Fiber Matrix 6400 can be set up to trigger an external control system or generate e-mail alerts for immediate notification when a fiber link has been lost.

- **Two AC power inputs** – For added power reliability, some 24-hour environments offer two separate AC power sources, one as the primary source and the second for redundancy. The Fiber Matrix 6400 offers two AC power inputs for continuous connection to both power sources.

- **IP Link Ethernet monitoring and control** – Engineered to meet the needs of professional A/V environments, IP Link enables the Fiber Matrix 6400 to be proactively monitored and managed over a LAN, WAN, or the Internet, using standard TCP/IP protocols. IP Link provides for remote selection of input and output ties, system set-up and configuration, and advanced system diagnostics.

- **QS-FPC - QuickSwitch Front Panel Controller with tri-color backlit buttons** – Provides a discrete button for each input and output, allowing for simple, intuitive operation. Buttons can be custom labeled for easy identification. The buttons illuminate red, green, or amber, depending on function, for ease of use in low-light environments.

- **View I/O mode** – Users can easily view which inputs and outputs are actively connected, from the front panel, RS-232 or RS-422 serial port, or IP Link Ethernet port.

- **I/O grouping** – Allows the matrix switcher to be virtually divided into smaller sub-switchers, making installation and control easier. I/O grouping allows specific outputs, like those designated for a specific video format, to be grouped together.

- **Rooming** – The Fiber Matrix 6400 can be configured to group selected outputs into specific “rooms,” each with its own set of unique presets. A total of 10 rooms, with 10 presets per room, are available.

- **Global presets** – Frequently used I/O configurations may be saved and recalled from the QS-FPC - QuickSwitch Front Panel Controller, IP Link, or serial control. This time-saving feature allows I/O configurations to be set up and stored in memory for future use.

- **Front panel security lockout** – Prevents unauthorized use in non-secure environments. In lockout mode, a special button combination is required to operate the switcher from the front panel controller.

- **Extron control software** – For serial or Ethernet remote control from a PC, the included Windows®-based control software features a graphical, drag-and-drop interface to make I/O configuration and other customization functions simple and convenient. This software also offers an emulation mode for configuration of an offsite matrix switcher; the I/O configuration may then be saved for future downloading to the matrix switcher.

- **Input video signal detection** – The Fiber Matrix 6400 verifies active light sources by polling all connections for input reception and output transmission. The resulting information is viewable within the internal Web pages, and is easily obtained by third party control systems.

- **Status LED indicators for fiber link status** – LEDs on each I/O board verify active fiber links with the transmitters and receivers.

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- **Two AC power inputs** – For added power reliability, some 24-hour environments offer two separate AC power sources, one as the primary source and the second for redundancy. The Fiber Matrix 6400 offers two AC power inputs for continuous connection to both power sources.

- **Industry standard LC connectors provide reliable physical connectivity and precise fiber core alignment**

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**SPECIFICATIONS**

- **NOTE:** The Fiber Matrix 6400 I/O cards are class 1 laser products. They meet the safety regulations of IEC-60825, FDA 21, CFR 1040.10, and FDA 21 CFR 1040.11. Optical specifications are subject to change without notice.

**Number/type**
- 8 singlemode or 8 multimode fiber optic inputs and outputs per I/O card

**Connectors**
- 8 LC connectors per I/O card

**Operating distance**
- Singlemode: 30 km (18.75 miles) with singlemode (SM) cables with an Extron singlemode Tx/Rx unit
- Multimode: 300 m (984’)(SM) cables with an Extron multimode Tx/Rx unit

**Multimode**
- 1 km (3280’) with 50 µm multimode (MM) cables with an Extron multimode Tx/Rx unit
- 2 km (6561’) with 50 µm 2000 MHz bandwidth multimode cable with an Extron multimode Tx/Rx unit

**NOTE:** Operating distance is approximate. These are typical maximum distances that may vary depending on factors such as fiber type, fiber bandwidth, connector splicing, losses, modal or chromatic dispersion, environmental factors, and kinks.

**Nominal peak wavelength**
- 850 nm for multimode (MM), 1310 nm for singlemode (SM)

**Transmission power**
- Singlemode: -5 dBm, typical
- Multimode: -5 dBm, typical

**Maximum receiver sensitivity**
- Singlemode: -18 dBm, typical
- Multimode: -12 dBm, typical

**Optical loss budget**
- Singlemode: 13 dB, maximum
- Multimode: 7 dB, maximum

**Maximum channel data rate**
- 4.25 Gbps

**VIDEO**

**Routing**
- 8 x 8 up to 64 x 64 unidirectional (Tx) matrix or 4 x 4 up to 32 x 32 bidirectional (Tx/Rx) matrix

**Gain**
- Unity

**VIDEO/AUDIO INPUT**

**Number/signal type**
- 8 to 64 fiber optic signals

**Connectors**
- 8 LC connectors per I/O card

**VIDEO/AUDIO OUTPUT**

**Number/signal type**
- 8 to 64 fiber optic signals

**Connectors**
- 8 LC connectors per I/O card

**DIGITAL VIDEO — 3G HD-SDI I/O board (multi-rate SDI)**

**Number/signal type**
- 8 single link SDI, HD-SDI, or 3 Gbps HD-SDI

**Connectors**
- 8 female BNC.

**Nominal level**
- 0.80 Vp-p ±10%

**Return loss**
- < -15 dB @ 1 MHz to 1.5 GHz

**Equalization**
- Automatic

**Input cable equalization distance**
- HD-SDI: Extron SHR, Belden 1694A cable 492’ (150 m)
- Extron HR, Belden 1503A cable 328’ (100 m)

**SDI**
- Extron SHR, Belden 1694A cable 984’ (300 m)
- Extron HR, Belden 1503A cable 656’ (200 m)

**NOTE:** The transmission distance varies depending on the signal resolution and on the type of cable, graphic card, and display in the system.

**DIGITAL VIDEO OUTPUT — 3G HD-SDI I/O board (multi-rate SDI)**

**Number/signal type**
- 8 single link SDI, HD-SDI, or 3 Gbps HD-SDI

**Connectors**
- 8 female BNC.

**Nominal level**
- 0.80 Vp-p ±10%

**Return loss**
- < -15 dB @ 1 Hz to 1.5 GHz

**DC offset**
- ± 0.5 V with input at 0 offset

**Re-clocking**
- Automatic, or use available bypass mode for nonstandard rates

**Jitter**
- < 0.2 V

**Rise/fall time (20%-80%)**
- SDI: 700 ps ±100 ps
- HD-SDI: 250 ps ±100 ps

**CONTROL/REMOTE — SWITCHER**

**Serial control port**
- 1 bidirectional RS-232 or RS-422, 9-pin female D connector (rear panel)

**Baud rate and protocol**
- 8 data bits, 1 stop bit, no parity

**Serial control pin configurations**
- 9-pin female D connector: 2 = Tx+, 3 = Rx, 5 = GND
- 2 = Tx, 3 = Rx, 5 = GND, 7 = Rx+, 8 = Tx+

**Mini stereo jack**
- RS-232: tip = Tx, ring = Rx, sleeve = GND

**Ethernet control port**
- 1 RJ-45 female connector

**Ethernet data rate**
- 10/100Base-T, half/full duplex with autodetect

**Ethernet protocol**
- ARP, DHCP, ICMP, ping, TCP/IP, UDP, Telnet, HTTP, SMTP

**Default settings**
- Link speed and duplex level = autodetected
- IP address = 192.168.254.254
- Subnet mask = 255.255.0.0
- Gateway = 0.0.0.0
- DHCP = off

**Web server**
- Up to 200 simultaneous sessions

**Program control**
- Extron’s control/configuration program for Windows
- Extron’s Simple Instruction Set (SIS™)
- Microsoft® Internet Explorer ver. 6 or higher, Telnet

**GENERAL**

**Power**
- 2 (positive-negative), 100 VAC to 240 VAC, 50-60 Hz; internal
- Enclosure without cards: 35 watts at 115 VAC, 60 Hz
- Enclosure fully loaded with 8 cards: 115 watts at 115 VAC, 60 Hz

**Warranty**
- 3 years parts and labor

**NOTE:** All nominal levels are at ±10%.

**Model**
- Fiber Matrix 6400 Frame
- Model Version Description
- Part Number
- 60-878-01

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