Model 400A

SDI-OVER-FIBER TRANSPORT SYSTEM

STUDIO TECHNOLOGIES INC.

The Model 400A SDI-Over-Fiber Transport System is a high-performance, cost-effective, rack-mount solution for distributing digital video signals over short and medium distances. The system is compatible with all common broadcast serial digital video formats and is suitable for use in remote trucks, live-event video distribution, and fixed links associated with broadcast and production facilities. Eight Model 400A versions are available, providing a range of input and output configurations. This document features the Model 400A-12T and Model 400A-12R units.

Model 400A General Features:

• Multi-channel electrical-to-optical (E2O) and optical-to-electrical (O2E) SDI transport

• Twelve format-independent SDI data paths over four single-mode optical fibers

• Supports 3G (SMPTE 424M), HD (SMPTE 292), and SD (SMPTE 259M) SDI, as well as DVB-ASI

• Fiber transport based on the SMPTE 297 standard

• Dual power capability: AC mains or DC; when both sources are present unit is AC mains powered and DC supply acts as a backup

• Ethernet port provides system configuration and performance monitoring using web pages

• Front-panel features include status display, navigation buttons, power switch, and LED indicators

• "1U" enclosure weighs less than 6 pounds (2.7 kg)

Model 400A-12T Features:

• Twelve SDI inputs, each with buffered loop-through output

• Four single-mode optical outputs, each transmitting three SDI signals using WDM/CWDM multiplexing

• Configurable laser on/off output control

Model 400A-12R Features:

• Four single-mode optical inputs, WDM/CWDM de-multiplexed to 12 buffered SDI signals

• Monitoring of optical receive levels

• Twelve SDI output channels, each with two independently buffered outputs

Overview

The Model 400A SDI-Over-Fiber Transport System consists of single-rack-space (1U) units that are factory configured from among eight available choices. The broad range of configurations allows the needs of specific applications to be directly supported. For example, the Model 400A-12T is a 12-channel electrical-to-optical (E2O) unit, while the Model 400A-12R is a 12-channel optical-to-electrical (O2E) unit. Another example, for "transceiver" applications the Model 400A-6T/6R provides six channels of electrical-to-optical (E2O) and six channels of optical-to-electrical (O2E) transport. The front panel of each unit features a day-/night-readable backlit display, menu navigation buttons, status LEDs, and power on/off switch. The back panels include connections for AC mains and DC power, ST optical connectors, BNC connectors, and an RJ45 jack for the Ethernet interface.

Technology

The Model 400A System uses a novel hardware implementation to transport up to 12 SDI signals over four single-mode optical fibers. The Model 400A-12T's 12 SDI inputs are arranged as four groups, with each group of three SDI signals being transported over one fiber at wavelengths of 1310, 1490, and 1550 nm. In typical applications the launch power is such that signals can be transported over a minimum distance of 10 kilometers.

SDI input signals can be SD (270 Mb/s), HD (1.485 Gb/s), or 3G (2.97 Gb/s). 3G signals can be in either Level A or Level B format. The inputs also support video signals in the DVB-ASI (270 Mb/s) format. Each of the Model 400A's SDI input channels is independent, allowing any combination of rates/formats to be transported.

Associated with each Model 400A SDI input channel is a buffered loop-through output. These can be extremely useful, allowing a signal source to be routed to another input on the Model 400A or a related piece of equipment.

Typically a Model 400A-12R receives the four single-mode fiber signals that originate in a Model 400A-12T. Each optical input is de-multiplexed into three optical channels which are converted into electrical signals. Each of these SDI signals are then re-clocked and sent to two independent SDI output drivers. As such, the Model 400A-12R has 24 (12 pairs) of BNC output connectors.

Dual Power Capability

Model 400A units allow an AC mains source of 100-240 V, 50/60 Hz to be directly connected. They can also be DC powered using a 10-18 volt source that is connected via a broadcast-standard 4-pin XLR connector.

Model 400A-12T Back Panel

Model 400A-12R Back Panel

If both AC and DC power sources are connected to a Model 400A, the unit will be powered by the AC mains supply. Only if the AC mains source fails will a load be placed on the DC source. This allows a source of DC, such as a battery pack, to serve in a backup capacity. With this arrangement normal SDI-over-fiber transport operation can continue even if AC mains power is lost.

Remote Monitoring and Configuration

The Model 400A has a management web server that allows the user to monitor system status through any web-enabled device such as a personal computer or smartphone.

The Model 400A's status screen lets a user or supervisor check for the presence of AC and DC power sources as well as individual SDI input channel status, signal rate, and whether the optical transmitters are enabled. The optical output power of each electrical-to-optical (E2O) channel is reported directly in dBm. The optical receive power (in dBm) of each optical-to-electrical (O2E) channel is also displayed. This is a particularly useful feature for remote system troubleshooting.

The web management server also provides a configuration menu, allowing a variety of monitoring parameters to be set. These include alarms for loss of AC or DC power, over-temperature, and low optical transmit and receive levels. Additional menu screens provide access to network IP address and front-panel display configurations.

Simple Installation

While the Ethernet-accessed monitoring and configuration functions enhance the utility of the Model 400A they are not necessary for SDI-over-fiber transport operation. Model 400A units will deliver reliable, high-quality performance with no other user actions except for making SDI-over-coaxial cable, fiber, and power connections. All back-panel connectors are clearly labeled for simple, fast, and intuitive use. The front-panel display provides direct access to the unit's most important status information. Updating the Model 400A's operating software can be easily performed using a standard USB flash drive.

Available configurations include:

- Model 400A-12T
- Model 400A-12R
- Model 400A-6T/6R
- Model 400A-9T/3R
- Model 400A-3T/9R
- Model 400A-6T
- Model 400A-6R
- Model 400A-3T/3R

Model 400A Specifications

Management Interface:
Type: 10/100, Ethernet (10BASE-T/100BASE-TX), auto MDI/MDI-X
Status LEDs: 2, link and activity
Supported Protocols: HTTP, DHCP, DNS

Display: vacuum fluorescent (emissive)

SDI (Digital Video) Inputs:
Quantity: up to 12, in groups of three depending on ordered configuration
Data Rate: 270 Mb/s to 2.97 Gb/s
Supported Standards: 3G-SDI (SMPTE 424M), HD-SDI (SMPTE 292), SD-SDI (SMPTE 259M), DVB-ASI (AES3 digital audio transport not supported)
Type: unbalanced
Impedance: 75 ohms

SDI (Digital Video) Loop-Through Outputs:
Quantity: one associated with each SDI input
Source: copy of input
Data Rate: 270 Mb/s to 2.97 Gb/s
Supported Standards: 3G-SDI, HD-SDI, SD-SDI, DVB-ASI
Type: unbalanced
Impedance: 75 ohms
Level: 800 mV p-p, nominal

SDI (Digital Video) Outputs:
Quantity: up to 24 (organized as 12 pairs), depending on ordered configuration
Data Rate: 270 Mb/s to 2.97 Gb/s
Supported Standards: 3G-SDI, HD-SDI, SD-SDI, DVB-ASI
Type: unbalanced
Impedance: 75 ohms
Level: 800 mV p-p, nominal

Optical Outputs:
Quantity: up to four, depending on ordered configuration
Compliance: SMPTE 297 (as applicable)
Fiber Type: single-mode
Multiplexed Wavelengths: 1310 nm (FP), 1490 nm (DFB), 1550 nm (DFB)
Launch Power: –3 dBm nominal @ 1310 and 1550 nm; –1 dBm nominal @ 1490 nm
Typical Fiber Length: 10 km minimum

Optical Inputs:
Quantity: up to four, depending on ordered configuration
Compliance: SMPTE 297 (as applicable)
Fiber Type: single-mode
Wavelengths Supported: 1310 nm, 1490 nm, and 1550 nm
Receive Sensitivity: –17 dBm, nominal @ 2.97 Gb/s
Maximum Input Power: –3 dBm, nominal

Connectors:
SDI Inputs, SDI Loop-Through, and SDI Outputs: BNC, 3G-SDI optimized, gold plating on center pin, per IEC 61169-8 Annex A
Optical Outputs: ST PC
Optical Inputs: ST PC
Management Interface: RJ45 jack
USB: type A receptacle (used only for updating firmware)
DC Input: 4-pin male XLR-type
AC Mains: 3-blade, IEC 320 C14-compatible (mates with C13)

Power Inputs:
AC Mains: 100 to 240 V, 50/60 Hz, 24 W max, varies by configuration
DC: 10 to 18 V, 1.6 A max, varies by configuration

Dimensions (Overall):
19.00 inches wide (48.3 cm)
1.72 inches high (4.4 cm)
11.50 inches deep (29.2 cm)

Mounting: one space (1U) in a standard 19-inch rack

Weight: 5.5 pounds (2.5 kg)

Specifications and information subject to change without notice.

Available Configurations

Model 400A-12T Back Panel (Order code: M400A-12T)

The Model 400A-12T provides electrical-to-optical (E2O) conversion of 12 SD/HD/3G-SDI inputs to 4 single-mode optical outputs. BNC SDI input and loop through connectors (24 total); ST optical output connectors (4 total).

Model 400A-12R Back Panel (Order code: M400A-12R)

The Model 400A-12R provides optical-to-electrical (O2E) conversion of 4 single-mode optical inputs to 12 SD/HD/3G-SDI outputs. ST optical input connectors (4 total); BNC SDI output connectors (24 total).

Model 400A-6T/6R Back Panel (Order code: M400A-6T/6R)

The Model 400A-6T/6R provides both electrical-to-optical (E2O) conversion (6 SD/HD/3G SDI inputs to 2 single-mode optical outputs) and optical-to-electrical (O2E) conversion (2 single-mode optical inputs to 6 SD/HD/3G-SDI outputs). BNC SDI input, loop through, and output connectors (24 total); ST optical input and output connectors (4 total).

Model 400A-9T/3R Back Panel (Order code: M400A-9T/3R)

The Model 400A-9T/3R provides both electrical-to-optical (E2O) conversion (9 SD/HD/3G-SDI inputs to 3 single-mode optical outputs) and optical-to-electrical (O2E) conversion (1 single-mode optical input to 3 SD/HD/3G-SDI outputs). BNC SDI input, loop through, and output connectors (24 total); ST optical output and input connectors (4 total).

Model 400A-3T/9R Back Panel (Order code: M400A-3T/9R)

The Model 400A-3T/9R provides both electrical-to-optical (E2O) conversion (3 SD/HD/3G-SDI inputs to 1 single-mode optical output) and optical-to-electrical (O2E) conversion (3 single-mode optical inputs to 9 SD/HD/3G-SDI outputs). BNC SDI input, loop through, and output connectors (24 total); ST optical output and input connectors (4 total).

Available Configurations, continued

Model 400A-6T Back Panel (Order code: M400A-6T)

The Model 400A-6T provides electrical-to-optical (E2O) conversion of 6 SD/HD/3G-SDI inputs to 2 single-mode optical outputs. BNC input and loop through connectors (12 total); ST optical output connectors (2 total).

Model 400A-6R Back Panel (Order code: M400A-6R)

The Model 400A-6R provides optical-to-electrical (O2E) conversion of 2 single-mode optical inputs to 6 SD/HD/3G-SDI outputs. ST optical input connectors (2 total); BNC SDI output connectors (12 total).

Model 400A-3T/3R Back Panel (Order code: M400A-3T/3R)

The Model 400A-3T/3R provides both electrical-to-optical (E2O) conversion (3 SD/HD/3G-SDI inputs to 1 single-mode optical output) and optical-to-electrical (O2E) conversion (1 single-mode optical input to 3 SD/HD/3G-SDI outputs). BNC SDI input, loop through, and output connectors (12 total); ST optical output and input connectors (2 total).