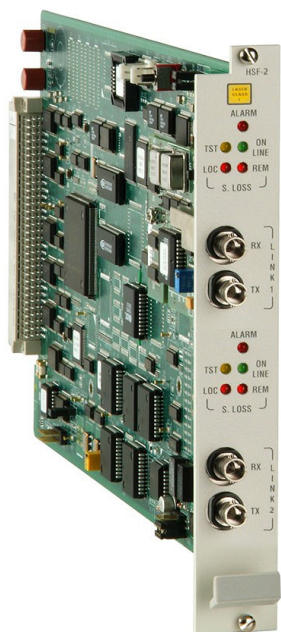


## Megaplex Modules

## HSF-1, HSF-2

## Fiber Optic Teleprotection Interface Modules



- Up to  $10 \times 64$  kbps per fiber interface port to/from teleprotection equipment
- IEEE C37.94-compliant
- Single or dual optical link with 850 nm multimode fiber interface
- Simple configuration
- HSF-2 operates in both Megaplex-2100/2104 and Megaplex-4100 chassis

The HSF-1 and HSF-2 modules comply with the IEEE C37.94 standard for up to  $10 \times 64$  kbps optical fiber interfaces, thus enabling teleprotection equipment to utilize the advanced transport capabilities offered by Megaplex.

The modules feature a single- or dual-port fiber optic interface, operating at a nominal wavelength of 850 nm. Each port is terminated in a pair of ST connectors for connection to standard multimode fiber.

The fiber optic link operates at a nominal line rate of 2.048 Mbps and uses the framing mode specified in the IEEE C37.94 standard (based on the G.732N framing for E1 links).

In accordance with the IEEE C37.94 standard, each teleprotection traffic payload channel occupies two timeslots on the HSF optical link, and is processed by the HSF module for transport in a single 64 kbps port. This increases the channel immunity to environmental disturbance and facilitates error correction. The HSF module optimizes each payload channel into a single 64-kbps timeslot over the E1/T1/SDH/SONET link, thus achieving 50% bandwidth saving over the transport network. In addition, the timeslots that do not carry the payload are suppressed and generated locally, assuring further bandwidth

optimization over the transport network.

The fiber optic interface has a wide dynamic range, which ensures that the receiver will not saturate even when using short fiber optic cables (saturation is caused when the optical power applied to the receiver exceeds its maximum allowed input power, and results in very high bit error rates).

The receive path of the HSF optical port uses the clock signal recovered from the corresponding received line signal. The transmit path timing is derived from the nodal clock used by Megaplex. The user's teleprotection equipment should be set to loopback timing, that is, its link transmit clock should be locked to the receive clock derived from the receive data of the same port.

## Specifications

### Number of Ports

1 or 2

### Payload Rate (per port)

$n \times 64$  kbps, where  $n = 1$  to 10  
(64 to 640 kbps)

### Nominal Bit Rate

2.048 Mbps

Connection to  
standard  
teleprotection  
equipment



# HSF-1, HSF-2

## Fiber Optic Teleprotection Interface Modules

### Wavelength

850 nm

### Fiber Type

62.5/125 µm multimode

### Transmitter Type

VSCEL

### Power Coupled into Fiber

-11 to 19 dBm (-15 dBm typical)

### Receiver Sensitivity

-32 dBm

### Maximum Receiver Input Power

-11 dBm

### Receiver Dynamic Range

21 dB

### Typical Range

With 6.8 dB margin: 2 km/1.25 miles

With 3.4 dB margin: 4 km/2.5 miles

### Frame

IEEE C37.94

### Connectors

Pair of ST connectors

### Timing

Internal Oscillator: ±30 ppm

### Configuration

Programmable via the Megaplex management system

### Megaplex High Speed Modules

	HS-6N/12N	HS-U	HS-703	HS-S	HSF-1, HSF-2
<b>Interface Type</b>	V.24/RS-232, V.35 or V.11/RS-422	ISDN "U"	G.703	ISDN "S"	IEEE C37.94 Fiber optic
<b>Number of Channels</b>	6/12	4/6/12	4	4	1/2
<b>Number of Connectors</b>	2/4	4	4	4	1/2
<b>Data Rate</b>	n x 64 kbps	128 kbps	64 kbps	128 kbps	up to 10x64 kbps
<b>Supported by MP-4100</b>	✓	HS-U-6, HS-U-12	✓	✓	HSF-2

### Indicators

ALARM – Lights when a fault has been detected in the module

ON LINE – Lights when the link is operating properly and is active

LOC S. LOSS – Lights when the local module link has lost frame synchronization

REM S. LOSS – Lights when a loss-of-frame synchronization indication is received by the module from the equipment connected to the remote end of the fiber optic link

TST – Reserved for future use

### Power Consumption

HSF-1: 8.0W

HSF-2: 9.0W

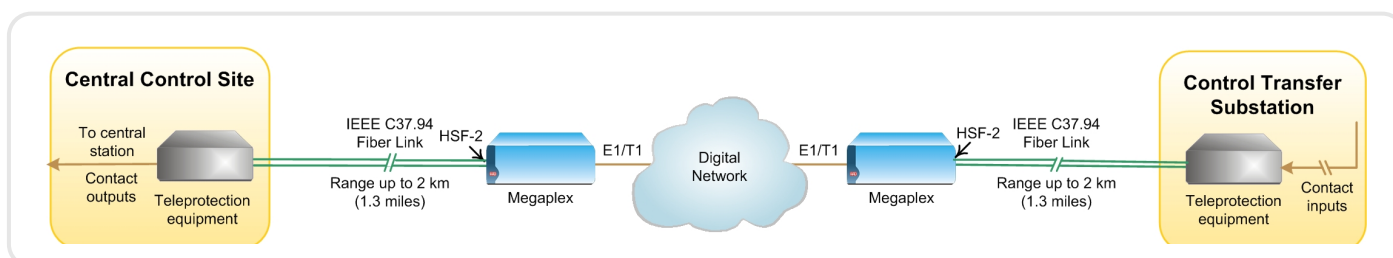
## Ordering

### MP-2100M-HSF-1/ST/85

Single-port fiber optic teleprotection interface module for the MP-2100/2104 chassis

### MP-2100M-HSF-2/ST/85

Dual-port fiber optic teleprotection interface module for the MP-2100/2104 and MP-4100 chassis



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