

# THOR Fiber



## F-M1SDI-2ET

### HD-SDI Optical Tx-Rx Kit with RS485 and 2x 10/100 Fast Ethernet

User Manual

2017

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# Chapter 1. Introduction

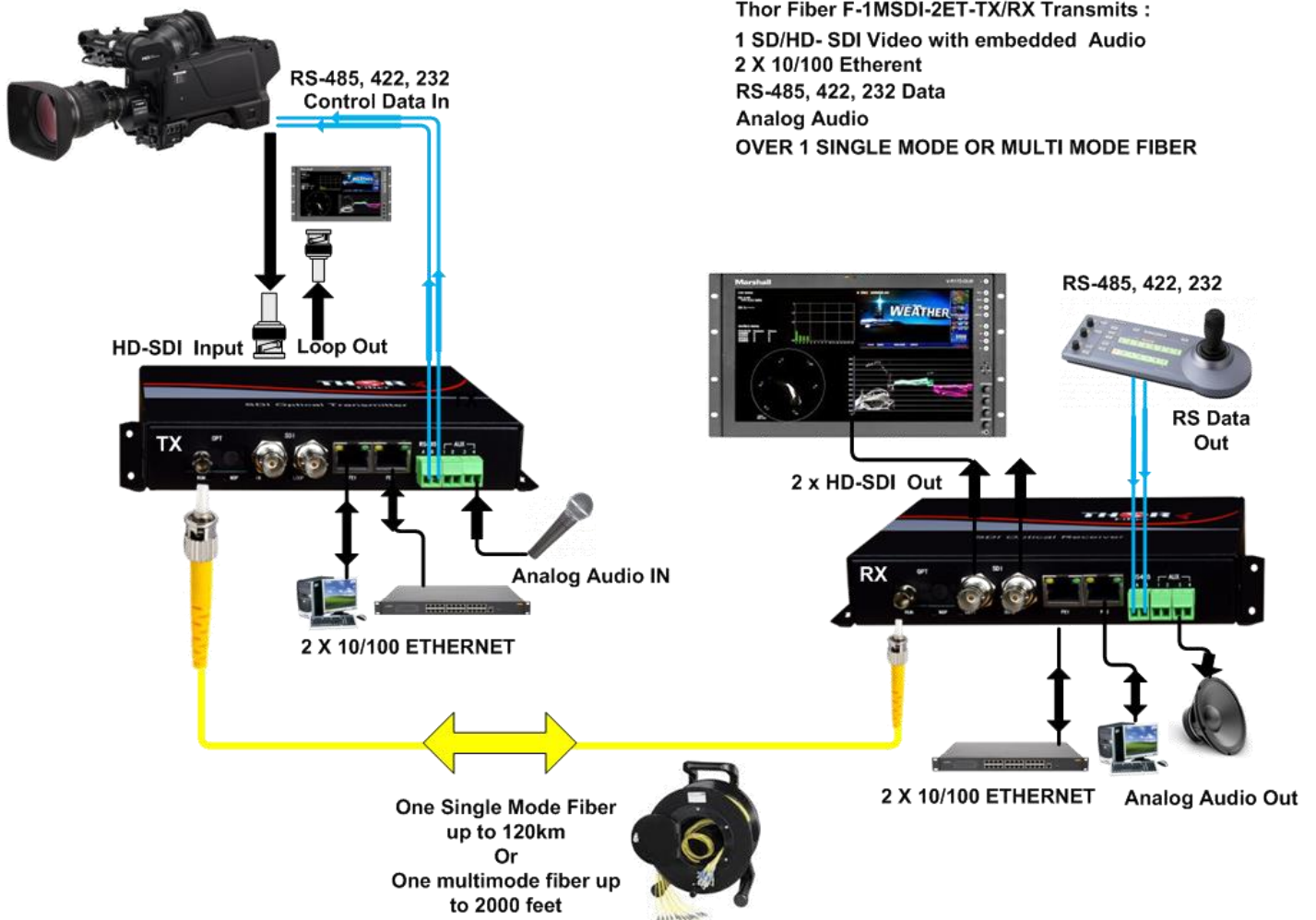
## 1.1 Overview

The Thor Fiber F-M1SDI-2ET is a compact power house that will allow any user to transport one single channel of 1.485Gbps HD-SDI Serial Data Interface uni-directionally while simultaneously transmitting two fast Ethernet 10/100Mb/s data. Furthermore this Thor Fiber Kit of Transmitter and Receiver will send RS485 in reverse for easy control over the kit. This sturdy unit creates an easy drop environment for users that require [HD-SDI and Dual Fast Ethernet](#) across any application and even allows additional AUX Cards which can allow a plethora of other options such as RS232 and RS422, and even capable of carrying external analog audio instead of the SDI embedded audio. Thor Fiber has an excellent reputation for high quality and low cost products to help complete your project on time, in a loss free high quality kit that will ensure you stay under budget. Commonly used in security applications, live performance environments, video surveillance, SDI distribution and control in any environment.

## 1.2 Features

- SMPTE-292M HD-SDI standard, supports 1.485Gb/s
- Transmitter: one SD/HD-SDI input (BNC), one looping SD/ HD-SDI output(BNC) and two fast Ethernet interfaces(shared 100M bandwidth, supports port-based VLAN)
- Receiver: two SD/HD-SDI output (BNC) and two fast Ethernet interfaces(shared 100M bandwidth, supports port-based VLAN)
- One auxiliary channel, which can be 1-channel bi-directional audio, or two-channel unidirectional audio, or 2-channel contact closure input/output, or 1-channel bi-directional RS422/RS232 channel
- One bi-directional RS485 channel, half duplex, up to 115.2Kb/s baud rate
- Supports 1080P@29.97, 23.98、1080I@59.94、720P@59.94, 29.97, 23.98 format,
- Integrated cable equalizer
- Embedded ESD and surge protection circuit to prevent damage from static and thunder
- NOP (No optical signal) alarm indications, output status indicator and input lock indicator
- APC circuit for stable optical power

### 1.3 Application Drawing



## Chapter 2. F-M1SDI-2ET Panels

### 2.1 Front Panel



Figure 2-1 F-M1SDI-2ET Front Panel

Table 2-1-1 Interface on F-M1SDI-TR-ET Front Panel

Name	Description	
OPT	Optical interface, bi-directional, ST/PC Connector	
SDI	IN	HD-SDI input
	LOOP	Looping SD/HD SDI output (Tx Only)
	OUT	HD-SDI output (Mirrored BNC Connectors on RX)
FE	Copper Fast Ethernet port, RJ45 connector, uses CAT-5 cross-over or straight-through cable.	
	LINK/ACT	Ethernet link indicator, green. ON: Normal link but no data transmit or receive; Blink: Normal link and there are data transmitting and receiving; OFF: No link or the interface is damaged
	SPD	FE speed indicator, yellow. ON: operating with 100M; OFF: operating with 10M
RS485	RS485 interface, adopts PHOENIX connector	
	A	RS485 differential signal A
	B	RS485 differential signal B
AUX	One auxiliary channel, which can be 2-channel bi-directional audio, or 2-channel unidirectional audio, or 1-channel bi-directional RS422 or 2-channel RS232 channel. Refer to table 2-1-3 for more. <b>Note: if the auxiliary channel is used as the audio channel, the embedded audio channel in the HD-SDI signal will be unavailable.</b>	

Table 2-1-2 Indicators on F-M1SDI-2ET

Name	Description
NOP	Optical signal loss alarm indicator, red. ON: Optical signal loss is detected at the port. OFF: the optical port receive normal signal.
RUN	Running indicator, green. Normal blink: works normally OFF: Abnormal.
IN	The HD-SDI input lock indicator, green. ON: video input normally. OFF: video input abnormally.
OUT	The HD-SDI output status indicator, green. ON: output normally. OFF: output abnormally.
ACT	RS485 link indicator, green. Blink: There are data transmitting and receiving; OFF: No data transmit or receive;

Table 2-1-3 AUX interface

AUX interface	No.	Name	Description
2-channel unidirectional audio output AUX207	1	AOUT1	Audio channel -1 output
	2	AOUT2	Audio channel -2 output
	3	G	Ground
	4	--	--
2-channel unidirectional audio input AUX208	1	AIN1	Audio channel -1 input
	2	AIN1	Audio channel -2 input
	3	G	Ground
	4	--	--
1-channel bi-directional audio AUX206	1	AOUT1	Audio channel output
	2	--	--
	3	G	Ground
	4	AIN1	Audio channel input
2-channel contact closure output AUX200	1	NC0	The first channel contact closure output No alarm: the contact is normally-closed (NC) Alarm: the contact is open
	2	COM0	Command contact of the first channel contact closure
	3	NC1	The second channel contact closure output No alarm: the contact is normally-closed (NC) Alarm: the contact is open
	4	COM1	Command contact of the second channel contact closure

2-channel contact closure input AUX201	1	K0	The first channel contact closure input
	2	COM0	Command contact of the first channel contact closure
	3	K1	The second channel contact closure input
	4	COM1	Command contact of the second channel contact closure
1-channel bi-directional RS422/ 2-channel bi-directional RS485 AUX204(T side)	1	TXA(T/ RXA1)	RS422 differential signal A output/ RS485 channel-1 differential signal A
	2	TXB(T/ RXB1)	RS422 differential signal B output/ RS485 channel-1 differential signal B
	3	RXA(T/ RXA2)	RS422 differential signal A input/ RS485 channel-2 differential signal A
	4	RXB(T/ RXB2)	RS422 differential signal B input/ RS485 channel-2 differential signal B
1-channel bi-directional RS422/ 2-channel bi-directional RS485 AUX204(R side)	1	RXA(T/ RXA1)	RS422 differential signal A input/ RS485 channel-1 differential signal A
	2	RXB(T/ RXB1)	RS422 differential signal B input/ RS485 channel-1 differential signal B
	3	TXA(T/ RXA2)	RS422 differential signal A output/ RS485 channel-2 differential signal A
	4	TXB(T/ RXB2)	RS422 differential signal B output/ RS485 channel-2 differential signal B
1-channel bi-directional RS232 AUX205	1	TX1	RS232 signal output
	2	RX1	RS232 signal input
	3	G	Ground
	4	--	--

## 2.2 Rear Panel



Figure 2-2-1 F-M1SDI-2ET Rear Panel

Table 2-2-1 F-M1SDI-TR-ET Rear Panel

Name	Description
DC12V	DC 12V power input interface Adopts AC220V/DC12V power adapter, provides 12V power supply
⊕	Protective Ground (PGND) screw, connect with the chassis.



## Chapter 3. Technical Specifications

Table 3-1 Technical Specification

Item	Typical value
<b>Video Interface</b>	
Connector	BNC
Bit rate	1.485Gb/s
Impedance	75Ω
Return loss	>15dB
Output level	800mVp-p ± 10%
Rise and fall time (HD-SDI)	≤270ps
HD-SDI Alignment jitter (100KHz)	≤0.2UI
HD-SDI Timing jitter (10Hz)	<1.0UI
Standard	Comply to SMPTE-292M HD-SDI standard
<b>Audio Interface (Optional)</b>	
Connector	PHOENIX connector
Impedance	Input high-impedance, output 600Ω
Quantization grade	20 bits
Sample frequency	48KHz
Audio input/output voltage	2VP-P
Bandwidth	20Hz~20KHz
Total Harmonic Distortion	0.1%
Impedance	600Ω
<b>FE Interface</b>	
Connector	RJ45
Frame length	From 64 bytes to 1552/1536 bytes
Working mode	Auto-negation by default
Bit rate	10/100Mb/s
Duplex	Half/full duplex
Flow Control	Default settings: open
Standard	IEEE802.3u 100Base-TX/ IEEE802.3 10Base-T
<b>RS485 Interface</b>	
Connector	PHOENIX connector
Baud rate	0~115.2Kb/s
Bit error ratio	<10 <sup>-9</sup>
Duplex	Half-duplex
<b>CONSOLE Interface</b>	
Connector	RJ45
Baud rate	19200

bits	8
Stop bit	1
parity check	None
<b>EMU/EMU-EX Interface</b>	
Connector	RJ45
Bit rate	10Mb/s or 100Mb/s auto adaptive
<b>Power and Consumption</b>	
Power supply	DC 12V
DC input voltage range	8V~14V
Power consumption	3W±10%
<b>Environment Requirements</b>	
Working temperature	-30~60℃
Relative Humidity	≤95%, no condensation
Storage temperature	-40~85℃
<b>Equipment dimension</b>	
equipment dimension	180mm x 123mm x 30mm

Note: The optical module is optional for users, the default is 20Km on single mode fiber, other long distance needs to be declared when ordering.

## Chapter 4 Serial Management Interface

Table A-1 Pin description of CONSOLE interface

Pin	Definition	Remarks
PIN1	-	Null
PIN2	-	Null
PIN3	-	Null
PIN4	-	Null
PIN5	-	Null
PIN6	GND	Ground
PIN7	RSNM-IN	Serial network management channel input
PIN8	RSNM-OUT	Serial network management channel output

The CONSOLE cable adopts RJ45 connector at one end to connect the front panel of equipment, and DB9 connector at the other end to connect PC, the diagram is as Fig. A-1-1, Fig.A-1-2 shows:



Figure A-1-1 RJ45 connector

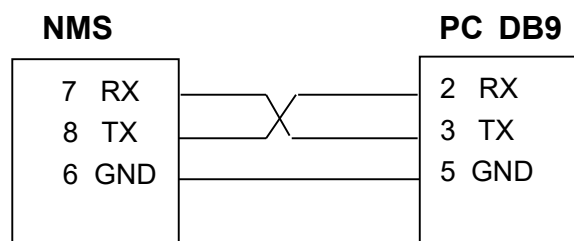


Figure A-1-2 Connection

## Chapter 5 Rack Mount Chassis

Rack mounting chassis is 19 inch width, 4U height, with 16 1-channel HD-SDI optical receive cards F-1MSDI-2ET-RK and 1 management card. In addition the rack mount chassis has 3 fans and 2 power modules, because it supports redundant power protection.

Table 3-1 Card list of rack mounting chassis

Name	Module	Description	Slot	Remote
1-channel HD-SDI optical receive card	F-1MSDI-2ET-RK	Two HD-SDI output interface, two FE interface, one RS485 interface and one auxiliary channel.	1-16	F-1MSDI-2ET-T
Management card	-	One Ethernet management interface(EMU), one cascade management interface (EMU-EX), and one serial management interface (CONSOLE). It supports CLI command line and SNMP_V1&V2 protocol, which is used to manage Ethernet port VLAN, temperature control of FAN, and various alarm and performance control.	17	-
-48V DC power card	-	-48V DC power input, +12V power output. The power consumption is 100W, supports power management control.	Specific power card slot	-
220V AC power card	-	~220VAC power input, +12V power output. The power consumption is 100W, supports power management control.		-

Note: The HD-SDI optical receive card supports hot-pluggable, which won't affect other working cards .

### 3.1 F-1MSDI-2ET-RK panel



Figure 3-1-1 F-1MSDI-2ET-RK panel

### 3.2 NMS card Panel

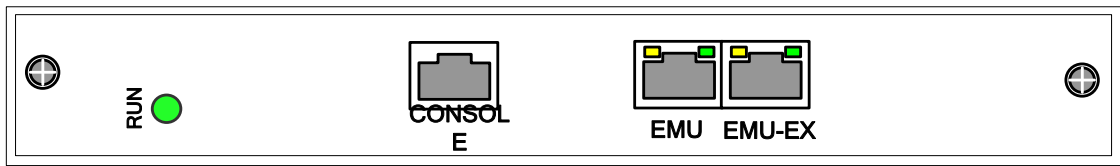


Figure 3-2-1 NMS card Panel


Table 3-2-1 NMS Card Panel Description

Name	Description	
RUN	Running indicator, green. Normal blink: Device works normally (blink cycle is 0.3s). Quickly blink: Device is initializing (blink cycle is 0.1s). Slowly blink: Data is transferring from ARM to FLASH (blink cycle is 1.2s). Other status: Abnormal.	
CONSOLE	RS232 serial management interface (RJ-45), for CLI management. Refer to appendix 6 for the cable definition	
EMU	Ethernet management interface, adopts RJ45 connector, supports auto MDI/MDX function.	
	LINK/ACT	EMU link indicator, green. ON: Normal link but no data transmitted or received. Blink: Normal link and there are data transmitting and receiving. OFF: No link or the interface is not used.
	SPD	EMU work speed indicator, yellow ON: work in 100M; OFF: work in 10M.
EMU-EX	Ethernet cascade management interface, adopts RJ45 connector, supports auto MDI/MDX function.	
	LINK/ACT	EMU-EX link indicator, green. ON: Normal link but no data transmitted or received. Blink: Normal link and there are data transmitting and receiving. OFF: No link or the interface is not used.
	SPD	EMU-EX work speed indicator, yellow ON: work in 100M; OFF: work in 10M.

### 3.3 Rack Mount Chassis



Figure 3-2-1 Rack Mount Chassis

Name	Description
-48VIN	-48VDC power interface, the voltage range: -36~-72V。
PGND	Protective ground (PGND) screw, connect with the chassis.
GND	-48V power ground
220VIN	~220V AC power interface, the voltage range:176~264V
Power switch	“ON”: Power On; “OFF”: Power Off.
	Protective ground (PGND) screw, connect with the chassis.



### 3.4 Rackmount Chassis Application Drawing

