

FOI-2191 and FOI-2911

FIBER OPTIC ISOLATOR



Description

The FOI-2191 and FOI-2911 both provide complete electrical isolation for RS-232 communications. For compatibility with MIL-STD-188C, the transmit and receive data (TD and RD) can be inverted through either unit by a switch. The units are transparent to all handshaking protocols and can accept data and clock signals up to a maximum rate of 128 kbps. A regeneration switch on the FOI-2191 allows users to toggle between synchronous applications that require Send Timing (ST) and asynchronous or synchronous applications that require Terminal Timing (TT).

The units can be used in areas of high electrical noise or in and out of RF shielded enclosures. The fiber optic cable is not susceptible to interference caused by impulse noise, crosstalk, or EMI. Privacy of communications is also enhanced because the fiber optic cable does not radiate any emissions. FiberPlex recommends "R" units for high security applications because they have added filtering and shielding for RFI suppression.

In addition, fiber optic cable offers much longer transmission distances than traditional RS-232 cabling. Multimode optics on the units can extend the distance to 2km, while singlemode optics can further extend the distance to 20km. A typical link consists of an FOI-2191 at the Data Communication Equipment (DCE) and an FOI-2911 at the Data Terminal Equipment (DTE) with a duplex fiber optic cable between them as shown under "TYPICAL APPLICATION".



TIA/EIA-232 (RS-232)

DC to 128 kbps

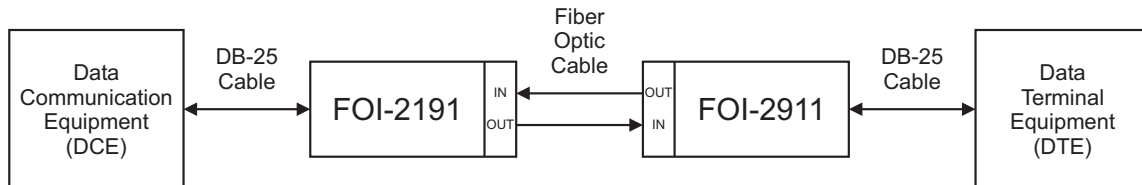
FOI-2191: To DCE

FOI-2911: To DTE

Features:

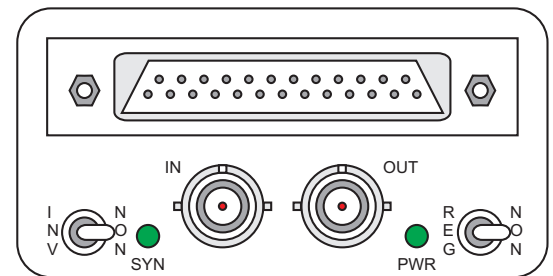
- Data Rate: DC to 128 kbps
- Compatible with:
 - MIL-STD-188C
- Supports tail circuit and null modem functions for DCE to DCE or DTE to DTE communications. Requires two of the same FOI units.
- An alternate interface (RS-422 or V.35) may be installed at the opposite end, allowing the user to create a link between two electrically incompatible interfaces without requiring a separate interface converter. For more information, please see the "OPTICAL COMPATIBILITY" table.

Typical Application

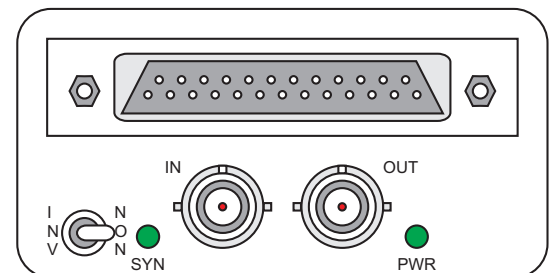


LED Indicators

Label	Color	Description
PWR	Green	Power supply in FOI unit is operating properly.
	Off	No power from the PSQ power supply or open fuse inside the FOI unit. Check that the PSQ power supply is operating properly. If the PSQ power supply is good, separate the FOI unit from the PSQ power supply for 30 seconds and then reattach so that the fuse inside the FOI unit has time to reset. If the PWR led is still off or not constant, replace the FOI unit.
SYN	Green	Optical signal in detected.
	Off	No optical signal in or optical level too low. Check that the opposite unit has power and that the fiber optic cables are properly connected. The transmit OUT optic from one end of the network should go to the receive IN optic at the opposite end as shown under "TYPICAL APPLICATION".

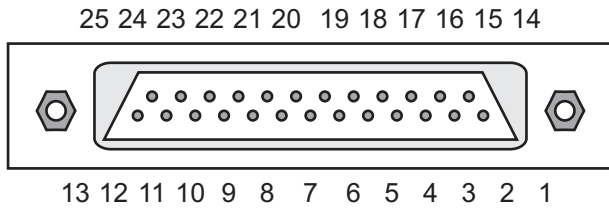


FOI-2191-ST Front View

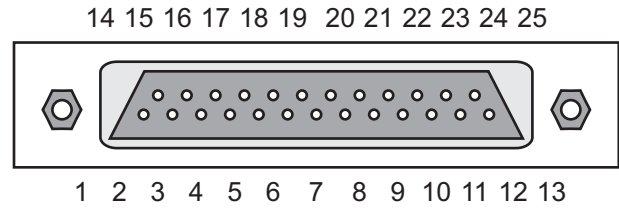


FOI-2911-ST Front View

RS-232 TO DCE



RS-232 TO DTE



FOI-2191 DB-25 Male pinout

Pin	Direction	Label	Description
1			Chassis Ground
2	Out	TD	Transmit Data
3	In	RD	Receive Data
4	Out	RTS	Request To Send
5	In	CTS	Clear To Send
6	In	DSR	Data Set Ready
7			Signal Ground
8	In	RR	Receiver Ready
9			
10			
11			
12			
13	In	S-CTS	Secondary Clear To Send
14	Out	S-SD	Secondary Send Data
15	In	ST	Send Timing
16	In	S-RD	Secondary Receive Data
17	In	RT	Receive Timing
18			
19	Out	S-RTS	Secondary Request To Send
20	Out	TR	Terminal Ready
21	In	SQ	Signal Quality
22	In	IC	Incoming Call
23			
24	Out	TT	Terminal Timing
25			

FOI-2911 DB-25 Female pinout

Pin	Direction	Label	Description
1			Chassis Ground
2	In	TD	Transmit Data
3	Out	RD	Receive Data
4	In	RTS	Request To Send
5	Out	CTS	Clear To Send
6	Out	DSR	Data Set Ready
7			Signal Ground
8	Out	RR	Receiver Ready
9			
10			
11			
12			
13	Out	S-CTS	Secondary Clear To Send
14	In	S-SD	Secondary Send Data
15	Out	ST	Send Timing
16	Out	S-RD	Secondary Receive Data
17	Out	RT	Receive Timing
18			
19	In	S-RTS	Secondary Request To Send
20	In	TR	Terminal Ready
21	Out	SQ	Signal Quality
22	Out	IC	Incoming Call
23			
24	In	TT	Terminal Timing
25			

Data and clock signals are highlighted in yellow with a maximum data rate of 128 kbps. All other signals not highlighted are control signals with a maximum data rate of 9.6 kbps.

Switches

Model	Label	Position	Description
FOI-2191 and FOI-2911	INV	Left	Invert Typically set for MIL-STD-188C operation. Transmit Data (TD) and Receive Data (RD) are inverted.
	NON	Right	Non-Invert Typically set for RS-232 operation. Transmit Data (TD) and Receive Data (RD) are passed transparently.
FOI-2191	REG	Left	Regeneration Typically set for synchronous applications requiring Send Timing (ST). This may be used to correct for timing delays over long runs of wiring between the DCE and the DTE. Transmit Data (TD) from the DTE is clocked out on the rising edge of Send Timing (ST) from the DCE.
	NON	Right	Non-Regeneration Typically set for asynchronous or synchronous applications requiring Terminal Timing (TT). Transmit Data (TD) from the DTE is passed transparently to the DCE with the addition of normal propagation delay and sampling jitter.

The REG switch position is determined by the data rate of the V.35 link and the distance between the DCE and the DTE. In some cases if the timing delays are just right, a link will function in both switch positions, NON and REG. However, in synchronous applications where the DCE requires Send Timing (ST), it would be more beneficial to use REG rather than NON because regeneration eliminates the sampling jitter from the Transmit Data (TD) to the DCE.

FOI-2191 Optical Compatibility

Model	Description	Typical Application
FOI-2191	RS-232 to DCE	RS-232 ↔ fiber ↔ RS-232 (tail circuit - DCE to DCE)
FOI-2911	RS-232 to DTE	RS-232 ↔ fiber ↔ RS-232
FOI-2951	RS-422 to DTE	RS-232 ↔ fiber ↔ RS-422
FOI-2932	V.35 to DTE	RS-232 ↔ fiber ↔ V.35

FOI-2911 Optical Compatibility

Model	Description	Typical Application
FOI-2911	RS-232 to DTE	RS-232 ↔ fiber ↔ RS-232 (null modem - DTE to DTE)
FOI-2191	RS-232 to DCE	RS-232 ↔ fiber ↔ RS-232
FOI-2591	RS-422 to DCE	RS-232 ↔ fiber ↔ RS-422
FOI-2392	V.35 to DCE	RS-232 ↔ fiber ↔ V.35

Specifications

		minimum	typical	maximum	unit
Power Requirement	Voltage Range	7	9	12	V
	Supply Current	-	250	-	mA
Data and Clock Signals	Data Rate	DC	-	128	kbps
	Sampling Jitter	0	-	15	%
	Input Resistance	3	5	7	kΩ
	Input Voltage Range	-25	-	25	V
	Output Voltage Swing	±3.7	±5	±6	V
Control Signals	Data Rate	DC	-	9.6	kbps
	Sampling Jitter	0	-	10	%
	Input Resistance	3	5	7	kΩ
	Input Voltage Range	-30	-	30	V
	Output Voltage Swing	-	±5	-	V
Environmental	Storage Temperature	-40	-	85	°C
	Operating Temperature	0	-	50	°C
Interface Connector	FOI-2191	DB-25 Male			
	FOI-2911	DB-25 Female			
Case Dimensions	Size 2	length	width	height	weight
		4.5 in (114 mm)	1.312 in (33 mm)	2.562 in (65 mm)	2 lb (0.9 kg)

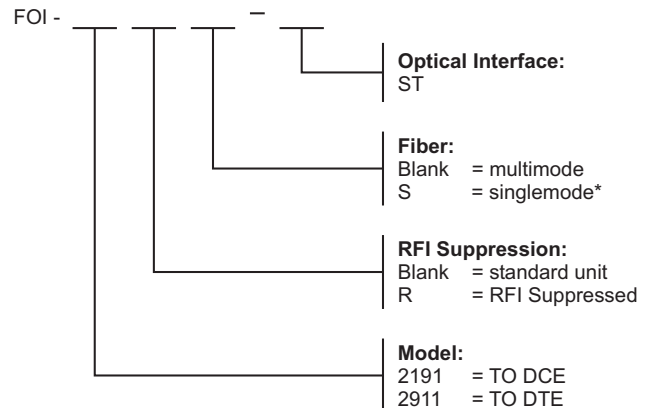
Optical Characteristics

Fiber	Size	Max Distance	Wavelength	Output Power	Receiver Sensitivity	Loss Budget
Multimode	62.5 / 125 μm	2 km	820 nm	-18 dBm	-30 dBm	12 dB
Singlemode	9 / 125 μm	20 km	1300 nm	-15 dBm	-32 dBm	17 dB

Accessories

Model	Description
CMA-2001	Chassis Mount Adapter for RMC-2101
CMA-3002	Chassis Mount Adapter for RMC-3101, RMC-3102
PSQ-2910	Power Supply for FOI-2xxx series
RMC-2101	Rack Mount Chassis, 3-1/2" H x 19"W, rear access
RMC-3101	Rack Mount Chassis, 5-1/4" H x 19"W, front access
RMC-3102	Rack Mount Chassis, 5-1/4" H x 19"W, front access with optical patch panel
WMA-2001	Wall Mount Adapter with optical patch
WMA-3002	Wall Mount Adapter

Ordering Information



* Indicates Custom Catalog Item

Standard Options:

FOI-2191-ST FOI-2911-ST
FOI-2191R-ST FOI-2911R-ST

For special applications that require custom units, please call FiberPlex for more information.