FOM-9010, FOM-9011 and FOM-9012

UNI-DIRECTIONAL CONTROL SIGNAL AND CONTACT CLOSURE

Description

The FOM-9010, FOM-9011 and FOM-9012 fiber optic isolator\modem cards provide uni-directional transport of low-level control or contact status signals. The status of all signals is shown on front panel indicators in addition to power supply and optical link status for each card. The FOM-9011 and FOM-9012 have the option to send RX optical status only back to the FOM-9010.

Applications

The user can achieve complete electrical isolation for control and status signal in areas of high electrical noise or in/out of RF shielded enclosures (SCIF). The fiber optic cable is not susceptible to induced impulse noise and since signal ground is not carried over the link, the signal is not affected by elevated ground potential from lightning or other sources. The fiber optic cable enhances privacy of communications. A typical link consists of a FOM-9010 at one end and a FOM-9011 or FOM-9012 at the opposite end.

The FOM-9010 can be used with dry contact closure sense or voltage inputs. The voltage input mode will accept polarity sensitive TIA-232, TTL, or TIA-422 state indications as well as sensing AC or DC voltages for simple presence. Each of the 12 input channels can be configured individually. Note that while the unit accepts certain electrical data standards, these units are not suitable for data use. Any data activity is simply viewed as an AC voltage and will be identified as being 'on'

The FOM-9011 has all 8 channels fixed as Form C solid state contacts. The NC contact will short to the C contact when the FOM powered off or loses the fiber link.

The FOM-9012 supports Form A or Form B solid state contacts on the output channels. Each of the 12 channels can be configured individually and the contacts revert to their switch-selected state upon loss of power or fiber link.

Control and Alarm

Voltage sense, open collector, or contact inputs

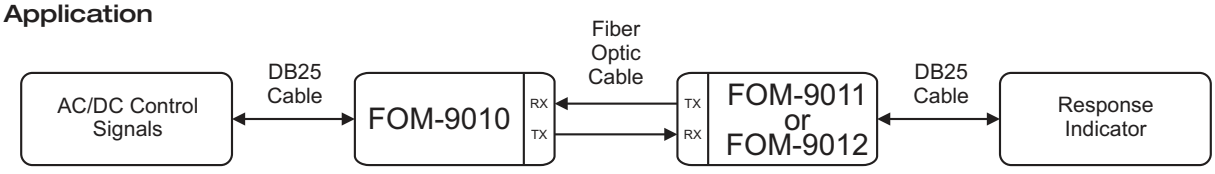
Features:

FOM-9010:
12 Voltage Sense, Open Collector, or Dry Contact Inputs. State Detection for TIA-232, TIA-422, and TTL Signals.

FOM-9011:
8 SPDT Form C Contact Closures

FOM-9012:
12 SPST Form A (Normally Open) or Form B (Normally Closed) Contact Closures
Each channel can be individually programmed as Form A or Form B

Typical Application



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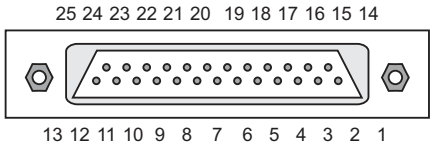
UNI-DIRECTIONAL CONTROL SIGNAL AND CONTACT CLOSURE

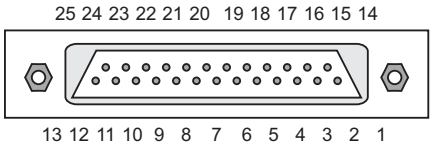
FOM-9010 Connections



DB-25 Male pinout

Channel	Lead	Pin
12	A	13
	B	25
11	A	12
	B	24
10	A	11
	B	23
9	A	10
	B	22
8	A	9
	B	21
7	A	8
	B	20
6	A	7
	B	19
5	A	6
	B	18
4	A	5
	B	17
3	A	4
	B	16
2	A	3
	B	15
1	A	2
	B	14
Chassis Ground (optional cable shield connection)		1

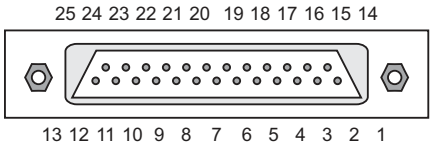
FOM-9011 Connections



DB-25 Male pinout

Channel	Contact	Pin
8	N.O.	13
	Common	25
	N.C.	12
7	N.C.	24
	Common	11
	N.O.	23
6	N.O.	10
	Common	22
	N.C.	9
5	N.C.	21
	Common	8
	N.O.	20
4	N.O.	7
	Common	19
	N.C.	6
3	N.C.	18
	Common	5
	N.O.	17
2	N.O.	4
	Common	16
	N.C.	3
1	N.C.	15
	Common	2
	N.O.	14
Chassis Ground (optional cable shield connection)		1

FOM-9012 Connections



DB-25 Male pinout

Channel	Type	Pin
12	Contact	13
	Contact	25
11	Contact	12
	Contact	24
10	Contact	11
	Contact	23
9	Contact	10
	Contact	22
8	Contact	9
	Contact	21
7	Contact	8
	Contact	20
6	Contact	7
	Contact	19
5	Contact	6
	Contact	18
4	Contact	5
	Contact	17
3	Contact	4
	Contact	16
2	Contact	3
	Contact	15
1	Contact	2
	Contact	14
Chassis Ground (optional cable shield connection)		1

FOM-9010, FOM-9011 and FOM-9012

UNI-DIRECTIONAL CONTROL SIGNAL AND CONTACT CLOSURE

FOM-9010 Switch Settings

Switches in three groups of 8, marked S13, S14, and S15
(all defaults are off)

S13.1: Polarity Sense Mode, Channel 1
S13.2: Polarity Sense Mode, Channel 2
S13.3: Polarity Sense Mode, Channel 3
S13.4: Polarity Sense Mode, Channel 4
S13.5: Polarity Sense Mode, Channel 5
S13.6: Polarity Sense Mode, Channel 6
S13.7: Polarity Sense Mode, Channel 7
S13.8: Polarity Sense Mode, Channel 8

S14.1: Polarity Sense Mode, Channel 9	
S14.2: Polarity Sense Mode, Channel 10	
S14.3: Polarity Sense Mode, Channel 11	
S14.4: Polarity Sense Mode, Channel 12	
Selects whether the input is polarity sensitive or not. This only applies if the Detection Mode switch is set for 'Voltage'. If the Detection Mode switch is set for 'dry Contacts / Open Collector' then this switch has no function.	
OFF	Voltage detection is not polarity sensitive.
ON	Voltage detection is polarity sensitive. 'B' lead must be positive with respect to 'A' lead for 'on'.

S14.5 through S14.8: No Function

S15.1 through S15.5: No Function

S15.6: Optical TX Only	
Enables or Disables the local RX optics operation. Power must be cycled after changing this setting.	
OFF	RX optics are active in bidirectional optical link allowing the FOM-9010 to display the status of the FOM-9011 or FOM-9012 local RX optical signal.
ON	Unit is TX only. The OPTICS led will not light, as there is no expected signal at the local RX optical connector. If there is a signal present the OPTICS led will flash red, indicating that there is a signal attached to the FOM-9010 when one was not expected. When the link is in this mode, there is no reporting of the signal status from the far end.

S15.7: No Function

S15.8: Display Test	
This setting will cause the front panel display to flash each of the indicators an alternating red and green for verification purposes. The unit continues to function normally - only the display is affected.	
OFF	Normal indicator operation
ON	All indicators alternately flash red or green.

FOM-9010 Switch Settings

Switches in 4 x 3 group of twelve

SW1:	Detection Mode Select Channel 1
SW2:	Detection Mode Select Channel 2
SW3:	Detection Mode Select Channel 3
SW4:	Detection Mode Select Channel 4
SW5:	Detection Mode Select Channel 5
SW6:	Detection Mode Select Channel 6
SW7:	Detection Mode Select Channel 7
SW8:	Detection Mode Select Channel 8
SW9:	Detection Mode Select Channel 9
SW10:	Detection Mode Select Channel 10
SW11:	Detection Mode Select Channel 11
SW12:	Detection Mode Select Channel 12
Detection Mode switches. Selects Voltage Sense Mode or Contact Closure / Open Collector Mode for corresponding channel	
UP	Channel is in Contact Closure / Open Collector Mode
DOWN	Channel is in Voltage Sense Mode. See S1 / S2 settings for further control in this mode.

FOM-9011/FOM-9012 Switch Settings

Switches in three groups of 8, marked S13, S14, and S15
(all defaults are off)

S13.1 through S13.8: No Function

S14.1 through S14.8: No Function

S15.1 through S15.5: No Function

S15.6: Optical RX Only	
Controls the local TX optics for bidirectional or one-way operation.	
OFF	TX optics are active in bidirectional optical link.
ON	Unit is RX only. No TX data is sent out of optics. The local OPTICS led will only indicate the status of the local optical RX. When the link is in this mode, there is no reporting of the optical signal status back to the transmitting end.

S15.7: No Function

S15.8: Display Test	
This setting will cause the front panel display to flash each of the indicators and alternating red and green for verification purposes. The unit continues to function normally - only the display is affected	
OFF	Normal indicator operation ON
ON	All indicators alternately flash red or green

FOM-9012 Switch Settings

Switches in 4 x 3 group of twelve

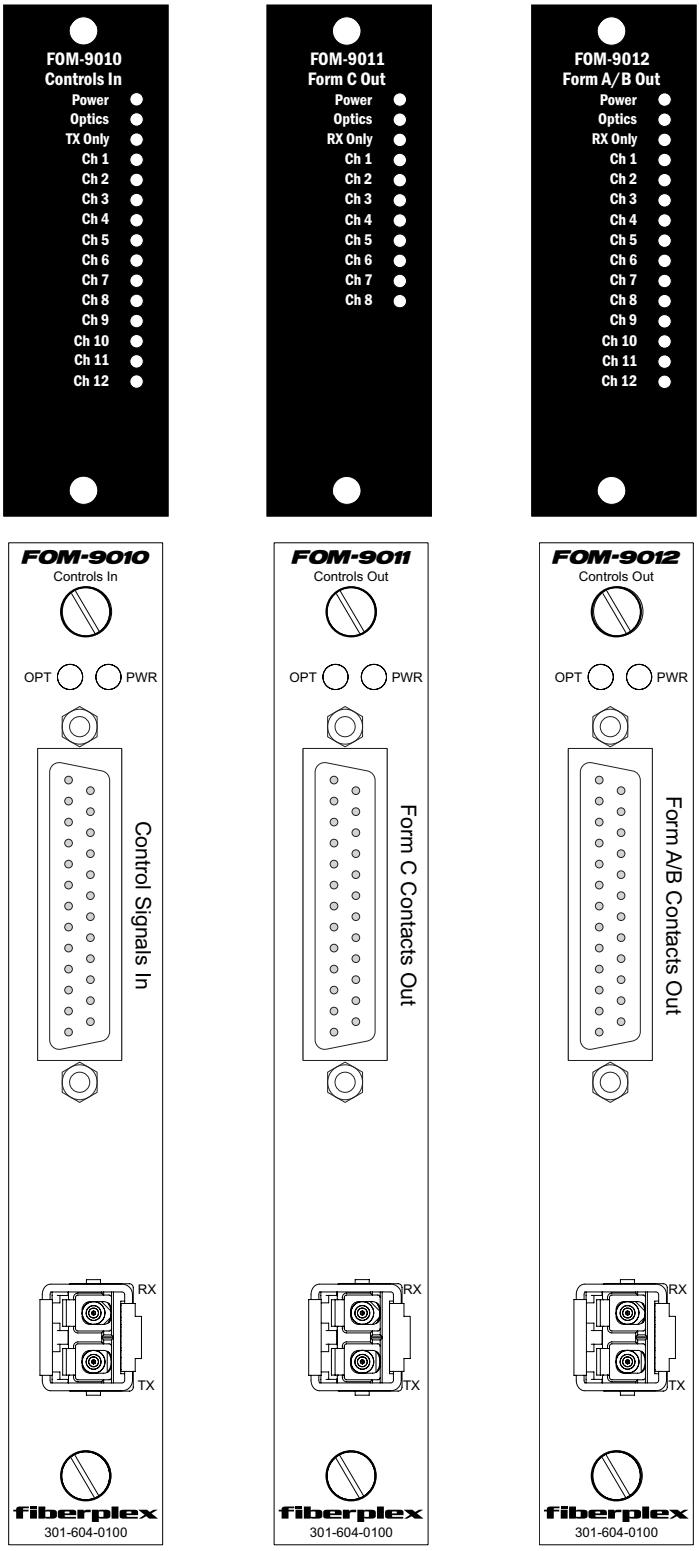
SW1:	Form A / Form B Select Channel 1
SW2:	Form A / Form B Select Channel 2
SW3:	Form A / Form B Select Channel 3
SW4:	Form A / Form B Select Channel 4
SW5:	Form A / Form B Select Channel 5
SW6:	Form A / Form B Select Channel 6
SW7:	Form A / Form B Select Channel 7
SW8:	Form A / Form B Select Channel 8
SW9:	Form A / Form B Select Channel 9
SW10:	Form A / Form B Select Channel 10
SW11:	Form A / Form B Select Channel 11
SW12:	Form A / Form B Select Channel 12
Selects Form A or Form B contacts out for corresponding Channel	
UP	Form B (Normally Closed) contacts out
DOWN	Form A (Normally Open) contacts out

FOM-9010, FOM-9011 and FOM-9012

UNI-DIRECTIONAL CONTROL SIGNAL AND CONTACT CLOSURE

FOM-9010/9011/9012 Displays

Power	Steady Green	Card power supply normal operation
	Steady Red	Card power supply failure or in over-current protection
	Off	Card failure / No power
Optics	Steady Green	Optics in sync at each end of link
	Flashing Green	LOCAL optical RX is receiving errors
	Flashing Yellow	LOCAL optical RX signal present, but no sync
	Flashing Orange	Sub-sync error - possible card type mismatch
	Steady Red	No LOCAL optical RX signal
	Steady Yellow	REMOTE optical RX error (no signal / sync or receiving errors)
	Flashing Red	FOM-9010 set for TX only, but optical signal detected at RX optic
	Off	Card is TX only / Card failure / No power
TX Only	Steady Green	FOM set for optical TX only (FOM-9010 only)
	Off	Bi-directional operation for status reporting from receiving end
RX Only	Steady Green	FOM set for optical RX only (FOM-901 1 or FOM-9012 only)
	Off	Bi-directional operation for status reporting to transmitting end
CH 1	Yellow	Corresponding Control signal in On state
CH 2	Off	Corresponding Control signal in Off state
CH 3		
CH 4		
CH 5		
CH 6		
CH 7		
CH 8		Note: FOM-901 1 only supports the first 8 channels
CH 9		
CH 10		
CH 11		
CH 12		



FOM-9010, FOM-9011 and FOM-9012

UNI-DIRECTIONAL CONTROL SIGNAL AND CONTACT CLOSURE

Electrical Specifications

		Min	Typ	Max
Power Requirement	Voltage Range (V)	20	24	34
	Supply Current (mA)	-	250	-

FOM-9010		**Min**	**Typ**	**Max**
Voltage Sense or Polarity Sensitive State detection mode (Channels are isolated in this mode)	Switching Rate (ms)	0	-	63 ms (approx.) - faster rates are sensed as a steady 'ON'
	Sampling Jitter (%)	0	-	10
	Input Voltage Range (VDC)	3	-	65
Contact Sense or Open Collector detection mode (Channels have common Signal Ground)	**A Lead:** Sources 10-12 VDC @ 4.5 ma for relay contact connection or open collector driver input			
	B Lead: Signal Ground for relay contact connection or ground reference for open collector driver			

FOM-9011 and FOM-9012		**Min**	**Typ**	**Max**
On Resistance (Ω)		-	-	15
Off Resistance (MΩ)	Form A Contacts	350	-	-
	Form B Contacts	-	-	100
Maximum Voltage (VDC or Peak VAC)		0	-	200
Maximum Current (mA)		0	-	200
Form C Break-Before-Make Time (ms)		3	-	5
Environmental	Storage Temperature (°C)	-40	-	85
	Operating Temperature (°C)	0	-	70
	Storage Humidity % Non Condensing	10		90
	Operating Humidity % Non-Condensing	10		90

Interface Connector	All	DB-25 Male

Physical Specifications

	Length	**Width**	**Height**	**Weight**
Card Dimensions	11 in (279 mm)	0.825 in (21 mm)	5..25 in (133 mm)	10 oz (0.3 kg)

Optical Characteristics - All

Order Suffix	**Fiber**	**Fiber Type***	**Max Dist (km)**	**λ (nm)**	**Bandwidth Typ (dB)**	**Loss (dB)**	**Connector**
T12	Multimode	OM2	1.88	850	15.5	10.14	ST
L12	Multimode	OM2	1.88	850	14.5	10.14	LC
T5B	Singlemode	OS1, OS2	20	1310	20	12.5	ST
L5B	Singlemode	OS1, OS2	20	1310	13.5	12.5	LC
C	SFP Cage with no Optical Module Installed						

* Specs obtained assuming fiber is as described in 'Fiber Type' with a 266MB Data Rate

Optical Information

850 nm multimode	
Output Level	-9.5 dBm min; -4 dBm max; -7 dBm typical
Input Level	-17 dBm min; -3 dBm max
Loss Budget	7.5 dBm min; 10 dBm typical
Typ. Max Link 62.5 micron	2km
Typ. Max Link 50 micron	2.5km
1310nm singlemode	
Nominal Output Level	-11 dBm min; -3 dBm max
Input Level	-20 dBm min; +2 dBm max
Loss Budget	9.0 dBm min
Typ. Max Link 8.5 micron	5km
1550 nm singlemode	
Nominal Output Level	-11 dBm min; -3 dBm max
Input Level	-20 dBm min; +2 dBm max
Loss Budget	9.0 dBm min
Typ. Max Link 8.5 micron	60km

Accessories

RMC-5000	16 slot, 7.5" high (5U), 19" wide rack mount chassis Includes one PSM-5000 AC power supply
RMC-5000D	16 slot, 7.5" high (5U), 19" wide rack mount chassis Includes one PSM-5048 DC power supply
PSM-5000	RMC-5000 AC redundant power supply, 90-250 VAC input, 250W
PSM-5048	RMC-5000 DC redundant power supply, 35-56 VDC input, 250W
SAC-1AC	Single slot stand-alone chassis, 90-250 VAC or 120-370 VDC input, 15W
SAC-1DC	Single slot stand-alone chassis, DC input

Ordering Information

FOM - 9010 -

Optical Interface:
T12 = multimode, 850nm, 2km, ST
L12 = multimode, 850nm, 2km, LC
T5B = singlemode, 1300nm, 20km, ST
L5B = singlemode, 1300nm, 20km, LC
C = SFP cage, no optical module

Other Optical interfaces available on our custom Catalog

Model:
9010 = 12 input channels
9011 = 8 Form C contact channels outputs
9012 = 12 Form A or B contact channels outputs