



5100 Series IF and L-Band Fiber Optic Links

The 5100-Series fiber-optic inter-facility links (IFLs) are a high-performance, cost-effective alternative to coaxial cable for 10 MHz to 200 MHz IF and 950 MHz to 2050 MHz L-Band satellite communications applications.

Ortel's fiber-optic IFL's, function as a transparent link between a satellite antenna and Network Operations Center (NOC). These IFLs eliminate the limitations of copper systems by enabling longer transmission distance while retaining the highest level of signal quality

In addition, Ortel's fiber optics provide several other significant network advantages, including simplified network design, ease of installation, and immunity from EMI/RFI and lightning. They are available either in a flange-mount package for outdoor applications or as a plug-in for integration with Ortel's System 10000 rack-mount chassis.

Applications

- TVRO
- Broadcast
- Earth Stations
- Headends
- VSAT
- GPS
- Radios

Features

- 10 MHz – 200 MHz
- 950 MHz – 2050 MHz
- Up to eight plug-in cards per 3u chassis
- Up to four flange-mount modules per 1u chassis
- Affordable replacement for coaxial systems

Performance Highlights

	Min	Typical	Max	Units
Wavelength	1290	-	1340	nm
Optical Output Power	-	1	-	mW
Link Gain @ 1 dB optical loss (IF)				
Standard	-	0	-	dB
High	-	15	-	dB
Link Gain @ 1 dB optical loss (L-band)				
Standard	-	-4	-	dB
High	-	13	-	dB
Temperature Range				
Flange Mount	-40	-	+65	°C
Rack Mount	0	-	+50	°C
Frequency Range				
IF	5	-	200	MHz
L-Band	950	-	2050	MHz

See following pages for complete specifications and conditions.

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

Parameter	Symbol	Condition	Min	Max	Units
Operating Temperature Range	T _{OP}	-	-40	+65	°C
Flange-mount					
Rack-mount			0	+50	°C
Storage Temperature	T _{STG}	-	-40	+85	°C
Flange-mount					
Rack-mount			-40	+85	°C
DC Voltage	-	-	-	24	VDC
DC Current (Transmitter)	-	+8 VDC	250	-	mA
DC Current (Receiver)	-	+8 VDC	200	-	mA

Electrical/Optical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Wavelength (Transmitter)	-	-	1290	-	1340	nm
Optical Output Power (Transmitter)	-	-	-	1	-	mW
dc Responsivity (Receiver)	-	-	0.75	-	-	A/W
Fiber	-	Single-mode, 9μm / 125μm, (Corning SMF-28 or equivalent)	-	-	-	-
Connector	-	FC/APC Tight Fit (Seikoh Giken or equivalent)	-	-	-	-
Connector Return Loss	-	-	60	-	-	dB

Frequency and Package Options

Frequency Range	Transmitters		Receivers	
	Flange Mount	Plug-In	Flange Mount	Plug-In
IF: 10 MHz – 200 MHz	3120A	10357A	4120A	10457A
L-Band:				
950 MHz – 1450 MHz	3110A	10346A	4110A	10446A
950 MHz – 1750 MHz	3111A	10346B	4111A	10446B
950 MHz – 2050 MHz	3112A	10347A	4112A	10447A

RF Characteristics: IF (For complete link of Tx, Rx, 1dB optical loss, and >60 dB optical return loss)

Parameter	IF Performance				
Tx Gain Option	-	Std.	-102 (low)	-102 (low)	Std
Rx gain option	-	Std.	-102 (high)	Std	-102 (high)
Gain (At 25° C), min.	-	0 dB	0 dB	-15.0 dB	+15.0 dB
Amplitude flatness	10-200 MHz any 40 MHz	± 0.5 dB ± 0.25 dB	± 0.5 dB ± 0.25 dB	± 0.5 dB ± 0.25 dB	± 0.5 dB ± 0.25 dB
Noise figure, max	-	28 dB	43 dB	43 dB	28 dB
Output IP3, min.	-	0 dBm	9 dBm	9 dBm	0 dBm
Output 1 dB compression, min.	-	-10 dBm	0 dBm	0 dBm	-10 dBm
VSWR, in and out	-	1.5:1	1.5:1	1.5:1	1.5:1
Max. RF input (Tx)	-	-8 dBm	+7 dBm	+7 dBm	-8 dBm
In/Out Impedance	-	75 Ohm BNC, female (50 Ohm BNC, option -101)			

RF Characteristics: L-Band

(For complete link of Tx, Rx, 1dB optical loss, and >60 dB optical return loss)

Parameter	L-Band Performance				
Tx gain option	-	Std.	-002 (high)	Std	-002 (high)
Rx gain option	-	Std.	-002 (low)	-002 (low)	Std.
Gain (at 25° C), min.	-	-4.0 dB	-4.0 dB	-21.0 dB	+13.0 dB
Amplitude flatness	any 500 MHz any 40 MHz	± 1.5 dB ± 0.35 dB	± 1.5 dB ± 0.35 dB	± 1.5 dB ± 0.35 dB	± 1.5 dB ± 0.35 dB
Noise figure, max	-	45 dB	28 dB	45 dB	28 dB
Input IP3, min.	Tx to -20° C Tx to -40° C	+7.5 dBm +4.5 dBm	-9.5 dBm -12.5 dBm	+7.5 dBm +4.5 dBm	-9.5 dBm -12.5 dBm
Input 1 dB compression (typ.)	Tx to -20° C Tx to -40° C	≥ 0 dBm ≥ -3 dBm	≥ -17 dBm ≥ -20 dBm	≥ 0 dBm ≥ -3 dBm	≥ -17 dBm ≥ -20 dBm
Gain vs. temp. (typ.)	Tx Rx	0.09 dB/°C 0.06 dB/°C	0.12 dB/°C 0.03 dB/°C	0.09 dB/°C 0.03 dB/°C	0.12 dB/°C 0.06 dB/°C
VSWR	Tx (input) Rx (output)	2.0:1 1.8:1	2.0:1 1.8:1	2.0:1 1.8:1	2.0:1 1.8:1
Max RF input (Tx)	-	+3 dBm	-14 dBm	+3 dBm	-14 dBm
In/out impedance	-	75 Ohm F-type, female (50 Ohm SMA, option -001)			

Device Resistance and Voltage for Rx Optical Power and DC Electrical Power Monitor Outputs

(See Figures 1 and 2)

Version	Voltage	Resistance
L-Band Tx/Rx	5V	333Ω
IF Rx	10V	825Ω
IF Tx	6.5	432Ω

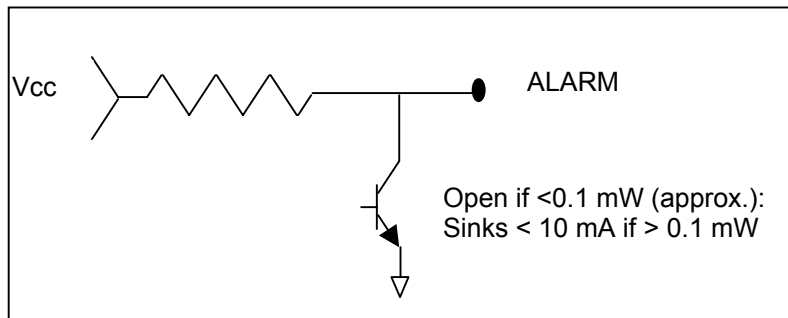


Figure 1. Receiver Electrical Schematic for Power Alarm

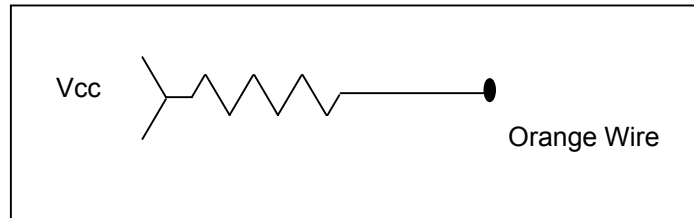


Figure 2. Schematic for DC Power Monitor (Flange Mount Units Only)

Voltage versus Current ¹

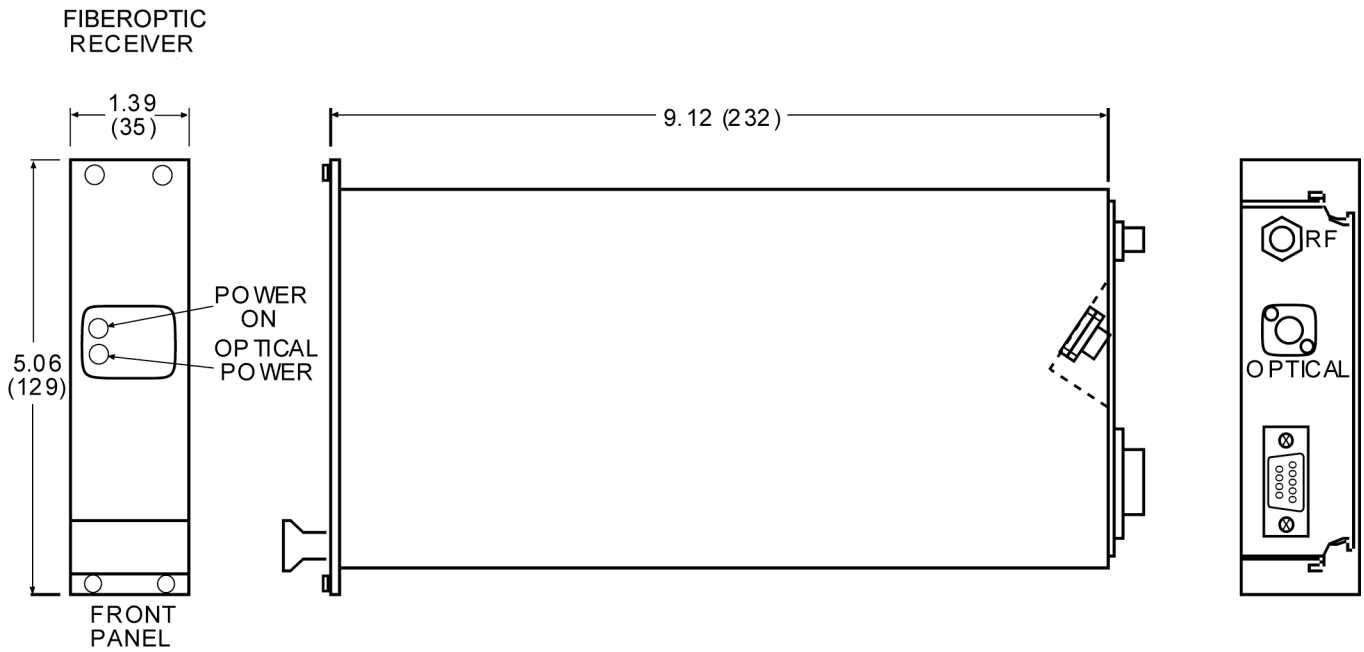
(Applies to All Versions Except -003)

Input voltage	8 V (L-Band)	12 V	15 V ²	18 V	24 V
Tx	250 mA	170 mA	135 mA	115 mA	85 mA
Rx	200 mA	150 mA	120 mA	100 mA	75 mA

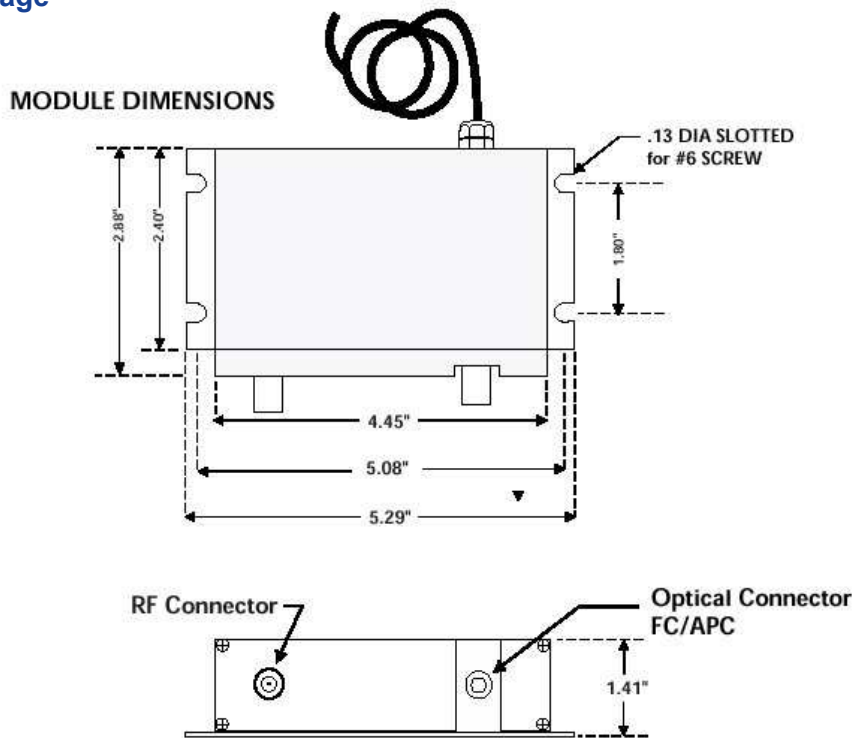
1. Ripple and noise: 100 mVp-p >100 kHz; 200 mVp-p <100 kHz
 2. 15 V may be from model 10901A or B power supplies.

Rack Mount Package

Receiver package depicted below. Transmitter plug-in has only "Power On" indicator LED.



Flange Mount Package



Pin Information

Rack Mount Package

(Used with the 10990A 3u Rack Mount Chassis)

Plug-in D-sub	Tx Plug-in IF-Band	Tx, Plug-in L-band	Rx, Plug-in IF or L-Band
1*	DC INPUT	DC INPUT	DC INPUT
2*	nc	nc	nc
3*	nc	nc	nc
4*	GND	GND	GND
5**	GND	GND	GND
6**	nc	nc	Photodiode current Monitor. (1 V/mA)
7**	nc	nc	Low optical power alarm
8**	nc	Same as pin 1. Can be jumpered to pin 9.	nc
9**	nc	Connects to RF center pin for powering LNB	nc

* Powered from 10901A, 10901B, or equivalent power supply

** Accessible via connector on back panel of 10990A chassis

Flange Mount Package

Lead Color	IF-Band		L-Band	
	Tx	Rx	Tx	RX
Red	+12 to +24 volts	+12 to +24 volts	+8 to +24 volts	+8 to +24 volts
Brown	Not used	Low optical power alarm	Not used	Low optical power alarm
Orange	DC power monitor	DC power monitor	DC power monitor	DC power monitor
Yellow	Not Used	Photodiode current monitor 1 V/mA	Not used	Photodiode current monitor 1 V/mA
Black	GND	GND	GND	GND

Laser Safety

Class IIIb Laser Product

FDA/CDRH Class IIIb laser product. All IF and L-band transmitter versions are Class IIIb laser products per CDRH, 21 CFR 1040 Laser Safety requirements. All versions are Class 3B laser products per *IEC*® 60825-1:1993. The device has been classified with the FDA under an accession number to be determined.

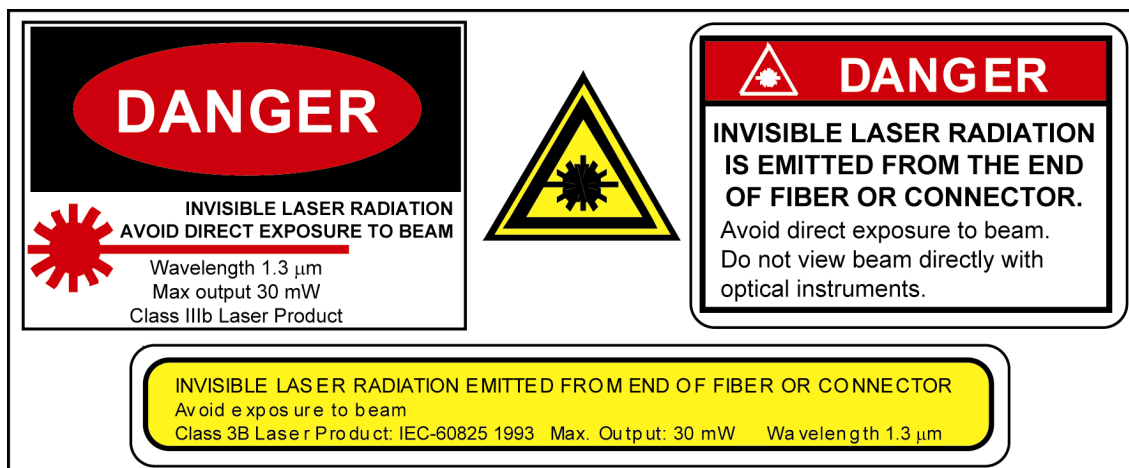
This product complies with 21 CFR 1040.10 and 1040.11.

Wavelength = 1310 nm

Maximum power = 30 mW

Product is not shipped with a power supply.

Caution: Use of controls, adjustments, and procedures other than those specified herein may result in hazardous laser radiation exposure



Ordering Code Definitions

IF

Option	Option availability		Option Description	Standard Configuration
	Flange Mount	Plug-in		
-101	X	X	50 Ω BNC, female	75 Ω BNC, female
-102	X	X	For higher signal input Tx: Single stage amp. Rx: Two-stage amp.	Tx: Single stage amp. Rx: Two-stage amp.

L-Band

Option	Option availability		Option Description	Standard Configuration
	Flange Mount	Plug-in		
-101	X	X	50 Ω SMA, female	75 Ω F-type connector, female
-102	X	X	Tx: Two-stage amp. Rx: Single stage amp.	Tx: Single stage amp. Rx: Two-stage amp.
-003	X		Unit to run from + 5.0 V \pm 0.2V No internal DC regulator	Internal DC regulator operates from +8V to +24 V input
-004	X		RF connector is AC coupled; no DC on center pin	Flange-mount Tx & Rx: RF connector is DC coupled; DC on center pin Tx Plug-in: DC voltage can be coupled on RF connector with field-configurable jumper RX Plug in: RF connector is ac coupled
-006		x	75 Ω CANARE BNC, female	75 Ω F-type connector, female

Mounting Options

Part Number/Model	Description	Capacity
1260-001-001	NEMA enclosure (12" x 12" x4")	Up to 2 flange-mount modules
1261-001-001	1U 19" rack mount chassis (1.75" x19" x 18")	Up to 4 flange-mount modules
1261-002-001	1U 19" rack mount chassis & internal power supply	Up to 4 flange-mount modules
10990A 10901A 10901B	3U 19" rack mount chassis 3U, plug-in power supply (90-260 VAC input) 3U, auxiliary plug-in power supply (90-260 VAC input)	Up to 8 plug-in modules

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