

System 10000 TVRO L-Band and C-Band Fiber-Optic Links



Features

- 950 MHz—2050 MHz, 3.625 GHz—4.2 GHz
- Coax cable replacement up to 40 km
- Plug-ins, 19 in. rack-mount chassis
- C/L band version combines two polarizations on one fiber
- Redundant power supply
- Alarms:
 - Transmitter: laser power low, laser temperature high
 - Receiver: photodiode current low

Model Numbers

- L-band:
 - 10008A, 950 MHz—2050 MHz fiber-optic link
 - 10028A, 950 MHz—2050 MHz high-performance fiber-optic link
- C-band:
 - 10015A, 3.625 GHz— 4.2 GHz fiber-optic link
 - 10035A, 3.625 GHz—4.2 GHz high-performance fiber-optic link
- C-/L-band:
 - 10016A, C-/L-band fiber-optic link
 - 10036A, high-performance C-/L-band fiber-optic link

Description

The System 10000 TVRO L-band and C-band fiber-optic links provide a simple and extremely reliable connection between a receive-only earth station antenna site and the associated satellite receivers at a remote location using standard single-mode optical fiber. They are primarily used in cable television headends and broadcast television facilities. Standard versions allow for cable lengths of up to 15 km, while the high-performance models can be used at up to 40 km distance.

For each LNA or LNB output, the entire polarization is converted to an optical signal by direct modulation of a semiconductor laser diode, and is then converted back to an RF signal by a PIN photodiode at the other end of the fiber. The link is format-independent due to its inherently low phase noise, so it may be used with either FM or QPSK modulated signals. Fiber-optic cable is compact, flexible, and lightweight, and provides electrical isolation and immunity from electromagnetic interference.

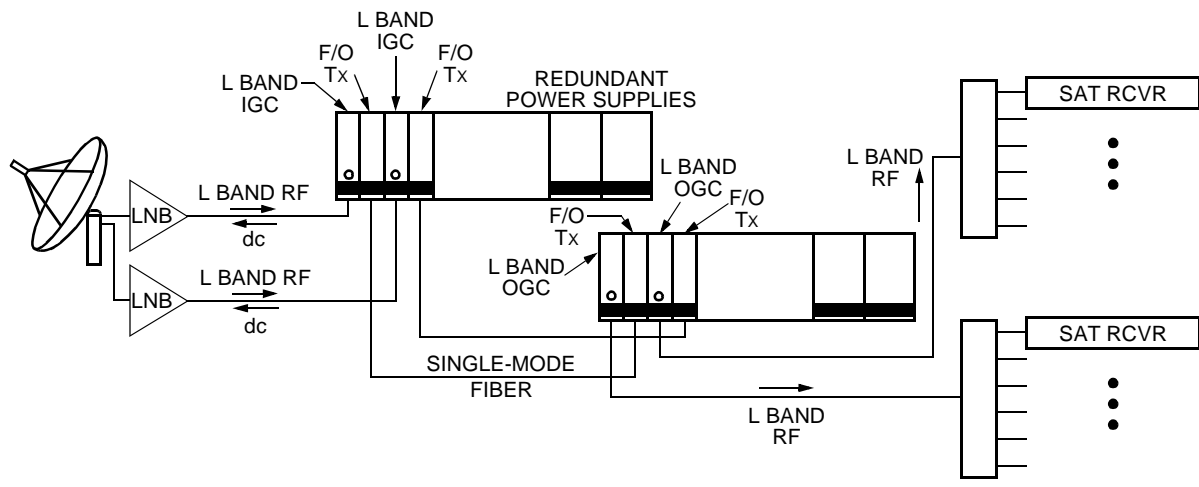
The System 10000 product family includes a complete selection of fiber-optic transmitters, receivers, input and output gain controls, and ac power supplies in 3U high, rack-mount plug-ins. Both L-band and C-band versions are available and may be used in a unique L-/C-band configuration that carries two polarizations on one fiber. Input gain controls offset conversion and optical losses to ensure adequate signal at the satellite receiver. Each 19 in. wide rack chassis has the capacity for up to four polarizations plus two redundant power supplies, and all plug-ins are hot swappable.

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	Min	Max	Unit
Operating Temperature: Standard System High-Performance System	TOP	0 0	50 50	°C °C
Storage Temperature Range: Standard System High-Performance System	Tstg	-45 -45	85 85	°C °C

Application Diagram



1-1196(F)

Figure 1. The 10008A and 100028A Pass Standard L-Band Configuration
(The L-Band IGC can supply dc Power to the LNB.)

Characteristics

Table 1. Standard System 10000 Link Specifications

Parameter	L-Band Path Models 10008A and 10016A			C-Band Path Models 10015A and 10016A			Unit
	Min	Typ	Max	Min	Typ	Max	
Frequency Range:							
10008A	950	—	2050	—	—	—	MHz
10016A	950	—	1750	—	—	—	MHz
10015A, 10016A	—	—	—	3.625	—	4.2	GHz
Link Gain at 0 dB Optical Loss ¹	1	—	23	20	—	21	dB
Input Gain Range	15	—	37	20	—	40	dB
Link Noise Figure at 6 dB Optical Loss (gain)	50	—	27	43	—	23	dB
Output Gain Range	—	29 Fixed	—	3	—	23	dB
Input Third Order Intercept (max. input gain)	—	—	-15	—	—	-25	dBm
Input/Output RF Connector	75 Ω F Type, 50 Ω SMA, Option 002, 50 Ω N Type, Option 003			50 Ω N Type			— — —
Input/Output VSWR	—	2.0:1	—	—	1.5:1	—	—
Flatness:							
Any 500 MHz	—	±2.0	—	—	±2.0	—	dB
Any 40 MHz	—	±0.5	—	—	±0.5	—	dB

1. Subtract 2 x optical loss for >0 dB.

Characteristics (continued)

Table 2. High-Performance System 10000 Link Specifications

Parameter	L-Band Path Models 10028A and 10036A			C-Band Path Models 10035A and 10036A			Unit
	Min	Typ	Max	Min	Typ	Max	
Frequency Range:							
10028A	950	—	2050	—	—	—	MHz
10036A	950	—	1750	—	—	—	MHz
10035A, 10036A	—	—	—	3.625	—	4.2	GHz
Link Gain at 6 dB Optical Loss ^{1, 2}	2	—	24	-19	—	24	dB
Input Gain Range	15	—	37	20	—	40	dB
Link Noise Figure:							
At 6 dB Optical Loss	42	—	20	36	—	16	dB
At 18 dB Optical Loss	60	—	40	53	—	33	dB
Output Gain Range	—	29 Fixed	—	3	—	-15	—
Input Third Order Intercept (max. input gain)	—	-15	—	—	-25	—	dBm
Input/Output RF Connector	75 Ω F Type, 50 Ω SMA, Option 002, 50 Ω N Type, Option 003			50 Ω N Type			—
Input/Output VSWR	—	2.0:1	—	—	1.5:1	—	—
Flatness:							
Any 500 MHz	—	±2.0	—	—	±2.0	—	dB
Any 40 MHz	—	±0.5	—	—	±0.5	—	dB

1. Subtract 2 x optical loss for >0 dB.

2. Minimum 6 dB loss required for 10028A, 10036A, 10035A.

Table 3. Optical Characteristics

Parameter	Specification	Unit
Wavelength	1310 ± 30	nm
Output Power, Typical:		
Standard	1	mW
High-Performance	6	mW
Connector	FC/APC Tight Fit (compatible with Seikoh Giken)	—
Fiber	Single-mode	—

Table 4. Electrical Characteristics

Parameter	Min	Typ	Max	Unit
Chassis	85	—	265	Vac
	50	—	60	Hz
IGC Plus Transmitter Plug-ins	—	20	—	W
OGC Plus Receiver Plug-ins	—	5	—	W

Characteristics (continued)

Table 5. Mechanical Characteristics

Parameter	Specification	Unit
Dimensions: Chassis	5.25 H x 19 W x 11.8 D	in.
Plug-in	5.25 H x 1.39 W x 9.12 D	in.
Weight: Chassis with One Polarization	12.7	lbs.
Each Additional Polarization	Add 3.5	lbs.

Characteristic Curves

Predicted Performance of a Typical System 10000 Application

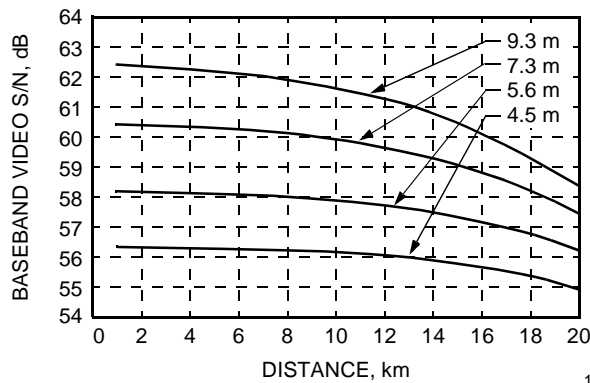


Figure 2. L-Band, 10008 and 100016

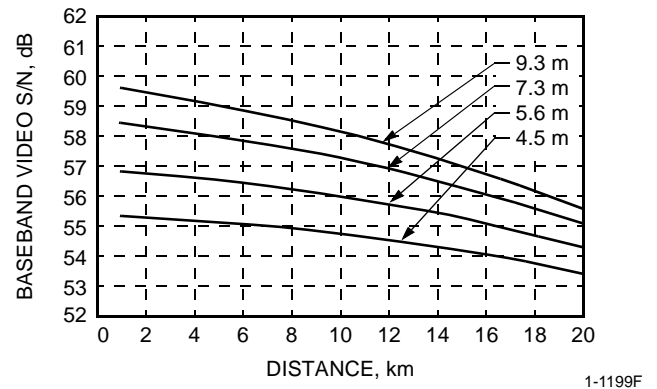


Figure 4. C-Band, 10015 and 10016

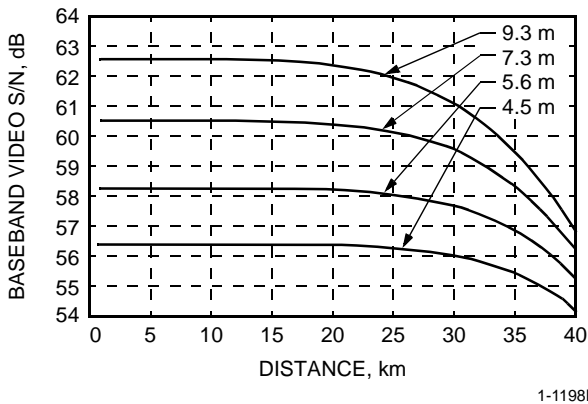


Figure 3. L-Band, 10028 and 10036

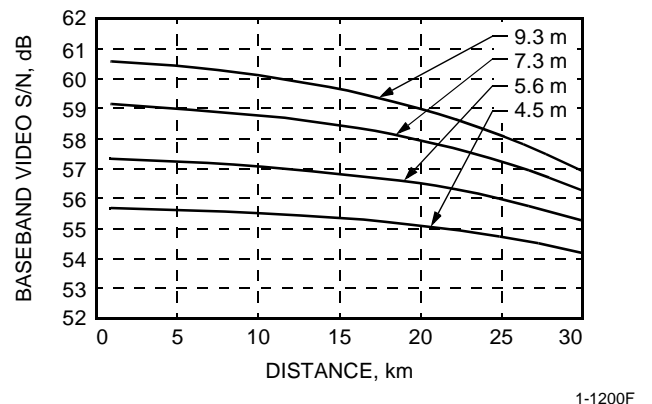


Figure 5. C-Band, 10035 and 10036

System 10000 TVRO Fiber-Optic Links

10008A L-Band TVRO Link

(one for each polarization)

10308A—Fiber-optic Transmitter Plug-in
10108A—Input Gain Control Plug-in
10408A—Fiber-optic Receiver Plug-in
10208A—Output Gain Control Plug-in

10028A High-Performance L-Band TVRO Link

(one for each polarization)

10328A—Fiber-optic Transmitter Plug-in
10108A—Input Gain Control Plug-in
10408A—Fiber-optic Receiver Plug-in
10208A—Output Gain Control Plug-in

10015A C-Band TVRO Link

(one for each polarization)

10311A—Fiber-optic Transmitter Plug-in
10115A—Input Gain Control Plug-in
10411A—Fiber-optic Receiver Plug-in
10215A—Output Gain Control Plug-in

10035A High Performance C-Band TVRO Links

(one for each polarization)

10331A—Fiber-optic Transmitter Plug-in
10115A—Input Gain Control Plug-in
10411A—Fiber-optic Receiver Plug-in
10215A—Output Gain Control Plug-in

10016A C- and L-Band TVRO Links

(one for each polarization)

10312A—Fiber-optic Transmitter Plug-in
10108A—Input Gain Control Plug-in
10115A—Input Gain Control Plug-in
10412A—Fiber-optic Receiver Plug-in
10208A—Output Gain Control Plug-in
10215A —Output Gain Control Plug-in

10036A High Performance C- and L-Band TVRO Links

(one for each polarization)

10332A—Fiber-optic Transmitter Plug-in
10108A—Input Gain Control Plug-in
10115A—Input Gain Control Plug-in
10412A—Fiber-optic Receiver Plug-in
10208A—Output Gain Control Plug-in
10215A—Output Gain Control Plug-in

System Components

The following components are common to all transmitters and receivers:

10901A—Power Supply Plug-in
10901B—Auxiliary Power Supply Plug-in
10990A—Rack Mount Chassis
10209C—1:1 Redundancy Switch

System 10000 TVRO Fiber-Optic Links (continued)

An accessory kit is also available, which includes a kit for cleaning optical connectors, RF adapters, optical jumpers, adjustment tools, fuse, etc. The kit comes in a compact rugged carrying case..

Table 6. Model Numbers

Model Number	Description
10008A/B/C/D	L-Band TVRO Fiber-optic Link; 1/2/3/4 Polarizations
10015A/B/C/D	C-Band TVRO Fiber-optic Link; 1/2/3/4 Polarizations
10016A/B	C- and L-Band TVRO Fiber-optic Link; 1/2 Antennas
10028A/B/C/D	L-Band High-performance TVRO Fiber-optic Link; 1/2/3/4 Polarizations
10035A/B/C/D	L-Band High-performance TVRO Fiber-optic Link; 1/2/3/4 Polarizations
10036A/B	C- and L-Band High-performance TVRO Fiber-optic Link; 1/2 Antennas

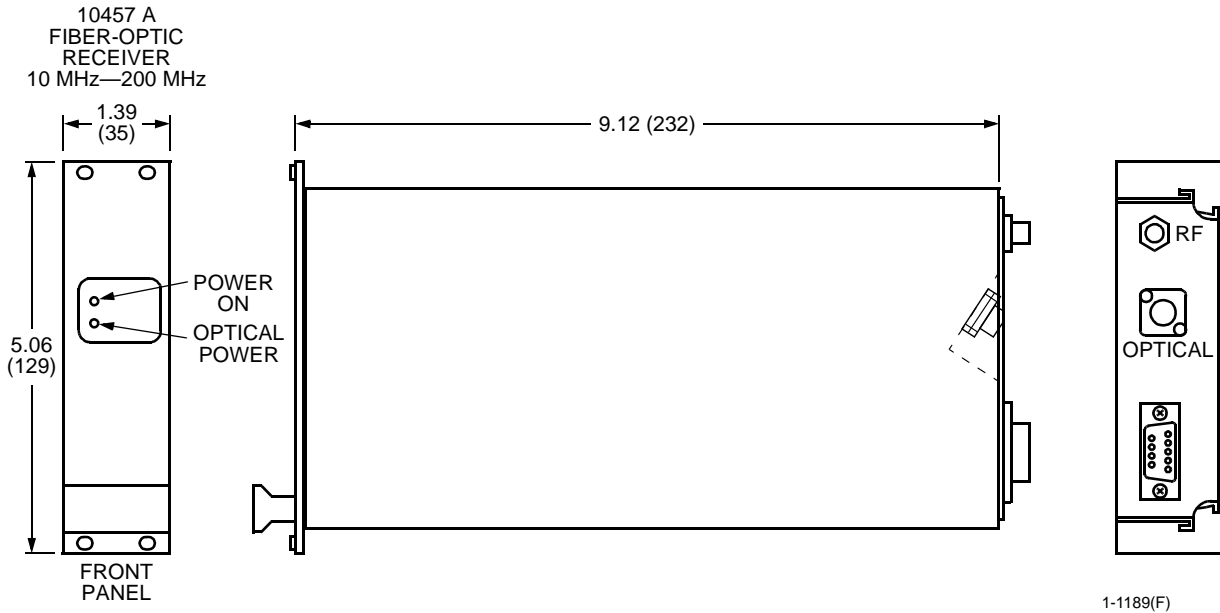
Table 7. Accessory Kits

Model-Option Number	Description
1137-001	Accessory Kit for 10008A
1137-002	Accessory Kit for 10015A, 10016A, 10028A, 10035A, 10036A
1137-003	Same as 1137-002, but Includes 5 dB Optical Loss

Outline Drawings

Dimension are in inches and (millimeters).

10457A Fiber-Optic Receiver



Laser Safety Information

Class IIIb Laser Product

FDA/CDRH Class IIIb laser product. All L-band and C-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.

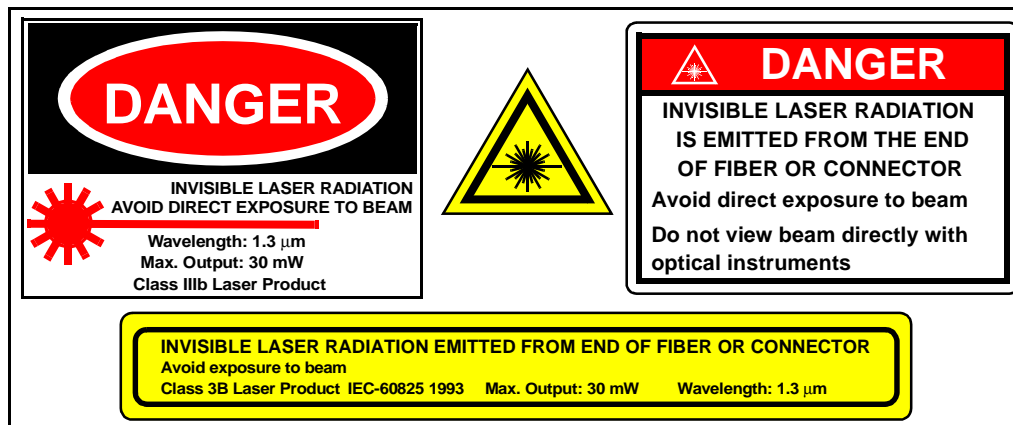
This product complies with 21 CFR 1040.10 and 1040.11.

Wavelength = 1300 nm

Maximum power = 30 mW

Product is not shipped with power supply.

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



Ordering Information

For ordering information, please contact an account manager at Agere Systems Inc., OPTO West, 1-800-362-3891 (for sales staff, please press option 2).

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