

Medallion 5000 Series 1550 nm Externally Modulated Transmitter



Applications

- High performance supertrunking links
- High power distribution networks
- Redundant ring architectures
- FTTx networks

Features

- Single or Dual Optical Outputs
- Dual Power Supplies, Redundant & Hot Swappable
- Front Panel RF Test Point
- SNMP Control Interface
- Vacuum Fluorescent Status Display
- OMI / RF Gain Adjustment
- AGC Select: CW, Video, Manual (No AGC)
- Industry Leading Field Adjustable SBS Suppression
- Field Adjustable Electronic Dispersion Compensation (EDC)

The D-type/S-type/H-type/F-type Medallion 5000 series product line is a family of state-of-the-art high performance 1550 nm externally modulated CATV fiber optic transmitters. Packaged in a convenient 1RU housing, this line of transmitters couples high optical output powers, up to 11.0 dBm, with low optical linewidth resulting in unmatched performance. The characteristics of this transmitter design exhibit high CNR when coupled with one or more EDFAs over 100km, or used stand alone up to 80km. The optical modulator, combined with the proprietary predistortion circuit, provides superior CTB and CSO performance with SBS suppression levels of greater than 20 dBm. Advanced features such as built in field adjustable SBS control and electronic dispersion compensation allows these transmitters to be quickly optimized in the field for any link or application without the need to procure specifically tuned transmitters. This affords the system designer a level of flexibility previously unknown in the CATV market place. All of these characteristics together provide a line of high quality; industry-leading transmitters that have the versatility needed to support HFC and FTTx networks far into the 21st century.

The D-type series are designed as a low cost, high performance solution for applications where the required fiber length is in the range of 20 to 50 kilometers. Advanced, high power, DFB laser technology allows these transmitters to be fielded without the use of expensive and performance degrading EDFAs. This unique externally modulated transmitter technology allows the D-type series of transmitters to be used in many novel HFC applications and architectures.

The S-type series transmitters are designed to be the most versatile model within the Medallion 5000 series family. They can easily be configured to meet most HFC network solutions requiring link lengths in the range of 50 to 70 kilometers with one EDFA as well as links utilizing multiple EDFA's. In addition, they will perform optimally in systems that require multiple optical splits and fiber branching incorporating unequal fiber lengths.

The H-type series transmitters are optimized for single EDFA fiber links in the 70 to 90 kilometer range. These transmitters take advantage of our advanced fiber dispersion compensation circuitry to provide exceptional CATV performance. The H-type series of transmitters provide a cost efficient, transport solution for medium to long distance applications.

The F-type series transmitters are intended for use in FTTx architecture designs requiring high quality transmission over varying transmission lengths and EDFA output powers. These transmitters successfully support very high optical launch powers while controlling the detrimental effects of Stimulated Brillouin Scattering (SBS), group velocity dispersion (GVD), and self phase modulation (SPM) that normally limit performance in conventional externally modulated products.

Optical / Electrical Characteristics

D-Type

PROPERTY	UNITS	MODELS				COMMENTS
		5000-D01	5000-D02	5000-D03	5000-D04	
PERFORMANCE (note 1,2,3,4)						
Specified Link Length	L (km)	40	40	40	40	
Channel Plan		NTSC 80-Ch	PAL 60-Ch	NTSC 110-ch	PAL 89-Ch	
Output Power	Po (dBm)	11.0	11.0	11.0	11.0	Min.
Noise Bandwidth	BW (MHz)	4	5	4	5	
SBS Suppression	(dBm)	> 12.0	>12.0	>12.0	>12.0	Min.
Carrier to Noise Ratio	CNR (dB)	54.0	54.0	51.0	51.0	Min.
Composite Second Order	CSO (dBc)	-65	-65	-65	-65	Max.
Composite Triple Beat	CTB (dBc)	-65	-65	-65	-65	Max. @ +25°C
Composite Triple Beat	CTB (dBc)	-64	-64	-64	-64	Max. @ 0°C to 50°C

S-Type

PROPERTY	UNITS	MODELS					COMMENTS
		5000-SA1	5000-SA2	5000-SA3	5000-SA4	5000-SA5	
PERFORMANCE (note 1,2,3,4)							
Specified Link Length	L (km)	65	65	65	65	65	
Channel Plan		NTSC 80	PAL 60	NTSC 110	PAL 89	42 CENELEC	
Output Power	Po (dBm)	7.0/ 7.0	7.0/ 7.0	7.0/ 7.0	7.0/ 7.0	7.0/ 7.0	Min. - Higher Powers Available See Chart
Noise Bandwidth	BW (MHz)	4	5	4	5	5	
SBS Suppression	(dBm)	16.0	16.0	16.0	16.0	16.0	Min.
Carrier to Noise Ratio	CNR (dB)	53.0/ 53.0	53.0/ 53.0	50.0/ 50.0	50.0/ 50.0	53.0/ 53.0	Min.
Composite Second Order	CSO (dBc)	-65/ -65	-65/ -65	-65/ -65	-65/ -65	-65/ -65	Max.
Composite Triple Beat	CTB (dBc)	-65	-65	-65	-65	-65	Max. @ +25°C
Composite Triple Beat	CTB (dBc)	-64	-64	-64	-64	-64	Max. @ 0°C to 50°C

H-Type

PROPERTY	UNITS	MODELS		COMMENTS
		5000-H01	5000-H02	
PERFORMANCE (note 1,2,3,4)				
Specified Link Length	L (km)	80	80	
Channel Plan		NTSC 80-Ch	PAL 60-Ch	
Output Power	Po (dBm)	7.0/ 7.0	7.0/ 7.0	Min.
Noise Bandwidth	BW (MHz)	4	5	
SBS Suppression	(dBm)	18.0	18.0	Min.
Carrier to Noise Ratio	CNR (dB)	52.0/ 52.0	52.0/ 52.0	Min.
Composite Second Order	CSO (dBc)	-65/ -65	-65/ -65	Max.
Composite Triple Beat	CTB (dBc)	-65	-65	Max. @ +25°C
Composite Triple Beat	CTB (dBc)	-64	-64	Max. @ 0°C to 50°C

F-Type

PROPERTY	Units	MODELS				COMMENTS
		5000-F01	5000-F02	5000-F03	5000-F04	
PERFORMANCE (note 1,2,3,4)						
Specified Link Length	L (km)	20	20	20	20	
Channel Plan		NTSC 80-Ch	PAL 60-Ch	NTSC 110-ch	PAL 89-Ch	
Output Power	Po (dBm)	7.0/ 7.0	7.0/ 7.0	7.0/ 7.0	7.0/ 7.0	Min.
Noise Bandwidth	BW (MHz)	4	5	4	5	
SBS Suppression	(dBm)	20.0	20.0	20.0	20.0	Min.
Carrier to Noise Ratio	CNR (dB)	48.0	48.0	45.0	45.0	Min.
Composite Second Order	CSO (dBc)	-58	-58	-58	-58	Max.
Composite Triple Beat	CTB (dBc)	-58	-58	-58	-58	Max.



Notes:

1. Unless stated otherwise all specifications apply over full temperature range with no digital loading.
2. Unless stated otherwise specifications apply for nominal RF input level as defined below, after 30 minute stabilization period.
3. Specifications separated by a slash are port1 / port 2.
4. Units are tested per the Test / Link Configuration Table
5. Noise figure for the EDFA = 4.5 ~ 5.5 dB
6. Corning SMF-28 single mode fiber
7. Receiver responsivity is 0.95 mA/mW, Equivalent noise current is 7 pA/(Hz)^{1/2}

General and Mechanical Specifications

PROPERTY	REQUIREMENT	COMMENTS
Wavelength	1555 +/-5 nm	ITU-grid available
Channel Plan		Custom channel plans available
Optical Connector	SC/APC	Other styles available
Monitoring Interfaces	100 Base-T Ethernet (SNMP) Rear Panel RS-232 interface VFD Screen Front Panel Controls	VFD- (Vacuum Fluorescent Display)
Operating Temperature	0°C to 50°C	
Storage Temperature	-20°C to 70°C	
Power Consumption	65W max	
Agency Listings	EMI: FCC: Subpart B. Part 15, class "A" Unintentional Radiators CE: EN50083-2:2006	Safety: EN50083-1:2006 EN60950-1
Transportation Vibration	GR-2853-CORE	In Shipping package
Transportation Shock	GR-2853-CORE	In Shipping package
Operating Humidity	20% to 85%	Non-condensing
Supply Range	(VAC) 90 to 265 VAC, 50/60 Hz (VDC) +/- (36 – 72) VDC	
Dimensions	19.0"W x 18.965"D x 1.72"H	(width includes front panel ears, depth includes fans & front panel) – see drawing

PROPERTY	REQUIREMENT	COMMENTS
Input Power Range	17 +/-1 dBmV/ch 80 NTSC channels	Manual mode
	15 +/-1 dBmV/ch 110 NTSC channels	Manual mode
	18 +/-1 dBmV/ch 60 PAL channels	Manual mode
	16 +/-1 dBmV/ch 89 PAL channels	Manual mode
Input Power Range	19 +/-2 dBmV/ch 80 NTSC channels	CW mode
	17 +/-2 dBmV/ch 110 NTSC channels	CW mode
	20 +/-2 dBmV/ch 60 PAL channels	CW mode
	18 +/-2 dBmV/ch 89 PAL channels	CW mode
Front Panel RF Gain / OMI Adjustment Range	+2 / -4 dB from nominal setting	CATV Performance can vary slightly
Frequency Range	45MHz – 1003 MHz	
Flatness	+/- 0.50 dB	45MHz - 550MHz
	+/- 0.75 dB	45MHz – 1003 MHz
Input impedance	75Ω	
Input Return Loss	16dB min	45MHz – 1003 MHz
Front Panel RF Tap	-20 +/- 1 dB down from RF input	
Front Panel RF Tap Flatness	+/- 1 dB	45MHz – 1003 MHz



EMCORE Broadband

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Test/Link Configuration

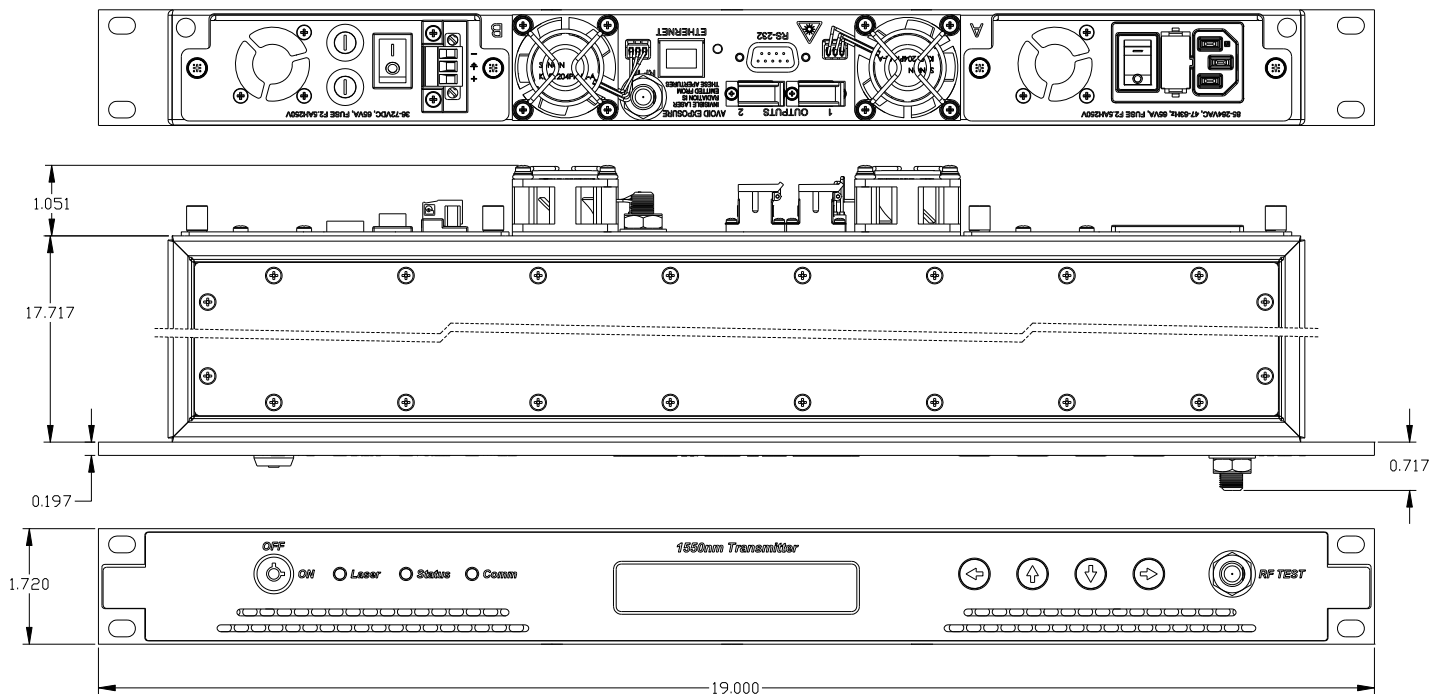
PROPERTY	EDFA	LINK ¹	RECEIVED POWER ²
D-Type	None	40 Km	0.0 dBm at the receiver
S-Type	16 dBm	65 Km	0.0 dBm at the receiver
H-Type	18 dBm	80 Km	0.0 dBm at the receiver
F-Type	20 dBm	20 Km	-5.5 dBm at the receiver

Notes:

1. Corning SMF-28 single mode fiber (0.2dB/km loss assumed)
2. Receiver responsivity is 0.95 mA/mW, Equivalent noise current is 7 pA/(Hz)^{1/2}

Outline Drawing

Dimensions are in inches.



European Union "RoHS Directive" Compliance

Except for the exemption claimed herein for lead used in solder for network infrastructure equipment, all homogenous materials contained in the product contain less than the maximum concentration levels for lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls and polybrominated biphenyl ethers permitted under the European Union Directive 2002/95/EC (the "RoHS Directive").



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Model Number Information (note 1)



Logo	Link type	Pout (dBm min)	Loading Type	Optics	Wavelength (nm)	Power Supply
0 – No Logo	D – 40 km	0 – for D, H, and F types	1 – NTSC (80-ch)	1 – SC/APC	00 – standard 1555+/- 5.0nm	1 – AC primary, no secondary
1 – Emcore Logo	S – 65 km	A – 7.0/7.0 for S-type	2 – PAL (60-ch)	2 – FC/APC	xx – ITU Channel +/- 0.1nm ^{Note 2}	2 – DC primary, no secondary
	H – 80 km	B – 8.0/8.0 for S Type	3 – NTSC (110-ch)	3 – E2000/A PC		3 – AC primary, AC secondary
	F – FTTx SBS 20 dBm	C – 10.0 for S Type	4 – PAL (89-ch)	4 – SC/UPC ^{Note 3}		4 – AC primary, DC secondary
		D – 9.5/9.5 for S Type ^{Note 4}	5 – CENELEC (42-ch) ^{Note 5}	5 – FC/UPC ^{Note 3}		5 – DC primary, DC secondary

Note 1: Not all configurations are available, contact factory.

Note 2: ITU grid wavelengths can be specified from channel 18 to 40.

Note 3: Not recommended. Contact Factory.

Note 4: Available for D and S Links. CSO port 2 degraded by 1dB for Channel Loads 1 and 2, CSO port 2 degraded by 2dB for Channel Loads 3 and 4.

Note 5: Contact Factory for D,H and F Types

Additional kits

- Replaceable AC power supply modules
- Replaceable DC power supply modules
- Replaceable fans
- Middle mounting brackets for 19" and 23" racks
- Front mounting brackets for 23" rack

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