

Model 755M Optical Transmitter

DWDM, up to 20 km, Low Distortion, Wideband



Applications

- Video signal distribution to HFC CATV and FTTP nodes
- Supports CATV, QAM, and DBS signal carriage
- Replacement for externally modulated transmitters

Features

- Dual redundant power supplies
- SNMP network interface
- Dual RF inputs for CATV and DBS
- Available on 100 GHz spaced ITU DWDM C-band channels
- Optimized RF integration of predistorter, amplifiers, and laser
- Complete, efficient laser bias and TEC control circuitry
- OEM/ODM opportunities available through Emcore
- RoHS

Emcore's Model 755M is a directly modulated (DM) DWDM optical transmitter specifically designed for wideband applications that require both CATV and DBS signals to be carried over up to 20 km of fiber. This facilitates networks designs that may use a single transmitter to carry multiple signals.

The 755M supports full 79-channel NTSC analog signal and or a combination of QAM, DBS with reduced channel analog CATV. The fiber length the 755M can support is up to 20km.

The 755M family of transmitter products is designed to support various CATV transmitter applications with a common platform. A 75Ω CATV RF video input supports frequencies up to 1002 MHz. Integrated within the transmitter design are Emcore's low chirp control, noise suppression circuitry, and patented predistortion technology to provide outstanding performance with any of Emcore's wide range of cooled broadband lasers. A second 75Ω RF input supports frequencies up to 2600 MHz for FTTP, L-Band satellite, and wireless applications.

Performance Highlights

	Min	Typ	Max	Units
Operating Temperature Range	0	25	50	°C
Wavelength (100 GHz ITU Options)	1530	-	1560	nm
Optical Power	10	-	-	dBm
Frequency Response (75Ω CATV Port)	47	-	1002	MHz
(75Ω L-Band Port)	950	-	2600	
CNR	51	-	-	dB
CSO	-	-	-60	dBc
CTB	-	-	-65	dBc
C/I (3 rd order, 950 – 2600 MHz)	-	-	-60	dBc
SBS Suppression Capability (Channel Option 11J & 57J only)	-	-	18	dBm

Noise and distortion performance above assumes 79 channel NTSC loading with no QAM, 0 dBm received optical power, 20 km SMF-28 fiber or equivalent. See following pages for complete specifications and operating/test conditions.

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the transmitter. These are absolute stress ratings only. Functional operation of the device is not implied or guaranteed 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
Storage Temperature (power off)	T_{stg}	-40	85	°C
75Ω CATV RF Input Level	-	-	-	dBm
		-	-10	
		-	-5	
L-Band RF Input Level	-	-	+15	dBm
AC Input Range	V_{AC}	94	250	V_{AC}
AC Input Frequency Range	f_{AC}	50	60	Hz
Power Consumption	P	-	50	W

Optical Characteristics

Parameter	Condition	Min	Typ	Max	Unit
Optical Output Power	-	10	-	-	dBm
SBS Threshold	For RF input option 11J and 57J only	-	-	18	dBm
Wavelength	-	See table			nm
Side Mode Suppression Ratio	-	30	-	-	dB
Optical Return Loss ¹	APC style connector	40	-	-	dB

1. In order to prevent reflection-induced distortion, the laser must be connected to an optical cable having a return loss of at least 55 dB for discrete reflections and 30 dB for distributed reflections.

RF Characteristics

The following specifications are reference at 25°C. The test receiver responsivity of 0.95 A/W (at 1550 nm) and an equivalent noise current of 7pA/rt(Hz). Test fiber is single mode, Corning SMF-28 (or equivalent) with 0.25 dB/km maximum loss (at 1550 nm). In order to prevent reflection-induced distortion, the transmitter subassembly must be connected to an optical cable with discrete reflections < -55 dB and distributed reflections < -30 dB.

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Temperature Range	T_{op}	-	0	-	50	°C
CATV Response Flatness	$S_{21-CATV}$	47MHz - 1002MHz, Peak to Valley	-	-	1.5	dB
Test Port Response Flatness	S_{21-TP}	Relative to 75 Ohm Input	-1	-	1	dB
CATV Input Return Loss	$S_{11-CATV}$	47 MHz – 1002 MHz, 75Ω	16	-	-	dB
Test Port Return Loss	S_{11-TP}	47 MHz – 1002 MHz, 75Ω	16	-	-	dB
RF Test Point Level	$P_{out-TP-CATV}$	Relative to 75 Ohm Input Level	-21	-20	-19	dBm
CATV RF input power detection range	-	Note 1	-20	-	-9.7	dBm
AGC Range	-	Perform to specification	-3		+3	dB
L-Band Response Flatness	$S_{21-Lband}$	950MHz – 2600 MHz, Peak to valley	-	-	3.5	dB
L-Band Return Loss	$S_{11-LBand}$	950MHz – 2600 MHz	16	-	-	dB
L-Band Input Level	$P_{in-LBand}$	-	-0.5	0	+0.5	dBm
L-Band Input C/I (3 rd Order)		F1=2000MHz, F2=2000.5MHz 2-tone @ -3dBm/tone Rx Opt Power = 0dBm CATV Input with Loading specified in CATV 75Ω Input Option	-	-	-60	dBc

1. Detects RF power of CATV input port only. The total input power is defined in section 3.10 and 3.11. The input RF power detector can handle the input power range between +5 to -10dB range from the nominal input power level.

755M, Noise and Distortion Characteristics for CATV Input

CATV 75Ω Input Option	RF Level/ch (dBmV)	Composite (dBm)	BER ⁽⁵⁾	CNR ^(1,2) (dB)	CSO ^(1,3,6) (dBc)	CTB ^(1,3,6) (dBc)
79ch NTSC ⁽⁴⁾	15	-14.77	-	51	-60	-65
79ch NTSC + 75ch QAM @ -6dB ⁽⁴⁾	79ch = 15 75ch QAM = 9	-13.84	10 ⁻⁷	49	-60	-65
110ch NTSC ⁽⁴⁾	13.57	-14.77	-	48.5	-60	-65
42ch CENELEC ⁽⁴⁾	17.75	-14.77	-	52	-60	-65
60ch PAL ⁽⁴⁾	16.2	-14.77	-	52	-60	-65
JCTEA: 57ch Analog + 40ch QAM @ -10dB ⁽⁷⁾	57ch = 16.2 40ch QAM = 6.2	-14.70	-	46	-60	-65
JCTEA: 11ch + 80ch QAM @ -10dB ⁽⁸⁾	11ch = 21.2 80ch QAM = 11.2	-14.76	-	46	-60	-65

1. Test with 3m and 20km of SMF28 fiber.
2. CNR may degrade **up** to 0.5dB over the operating temperature range.
3. CSO and CTB may degrade up to 1.5dB over the temperature range.
4. Test with 0 dBm received optical power.
5. QAM format = 256-QAM, ITU-T J.83 Annex C, Analog channels are modulated.
6. L-band input is injected with 2 tones, F1 = 2000MHz, F2 = 2000.5MHz with -3dBm/tone.
7. Test with EDFA, **-6dBm** received optical power, QAM format = 64-QAM. 2 tones, F1 = 2000MHz, F2 = 2000.5MHz, applied to L-Band port with -3dB/tone. 18dBm launch power.
8. Test with EDFA, **-8dBm** received optical power, QAM format = 64-QAM. 2 tones, F1 = 2000MHz, F2 = 2000.5MHz, applied to L-Band port with -3dB/tone. 18dBm launch power.

Package Characteristics

Parameter	Dimension	Unit
Height	1.75 (44), 1RU	Inch (mm)
Width	19 (483)	Inch (mm)
Depth	17.77 (452) with fans	Inch (mm)
Weight	9.0 (4)	Pounds (kg)

ITU Channel Numbering

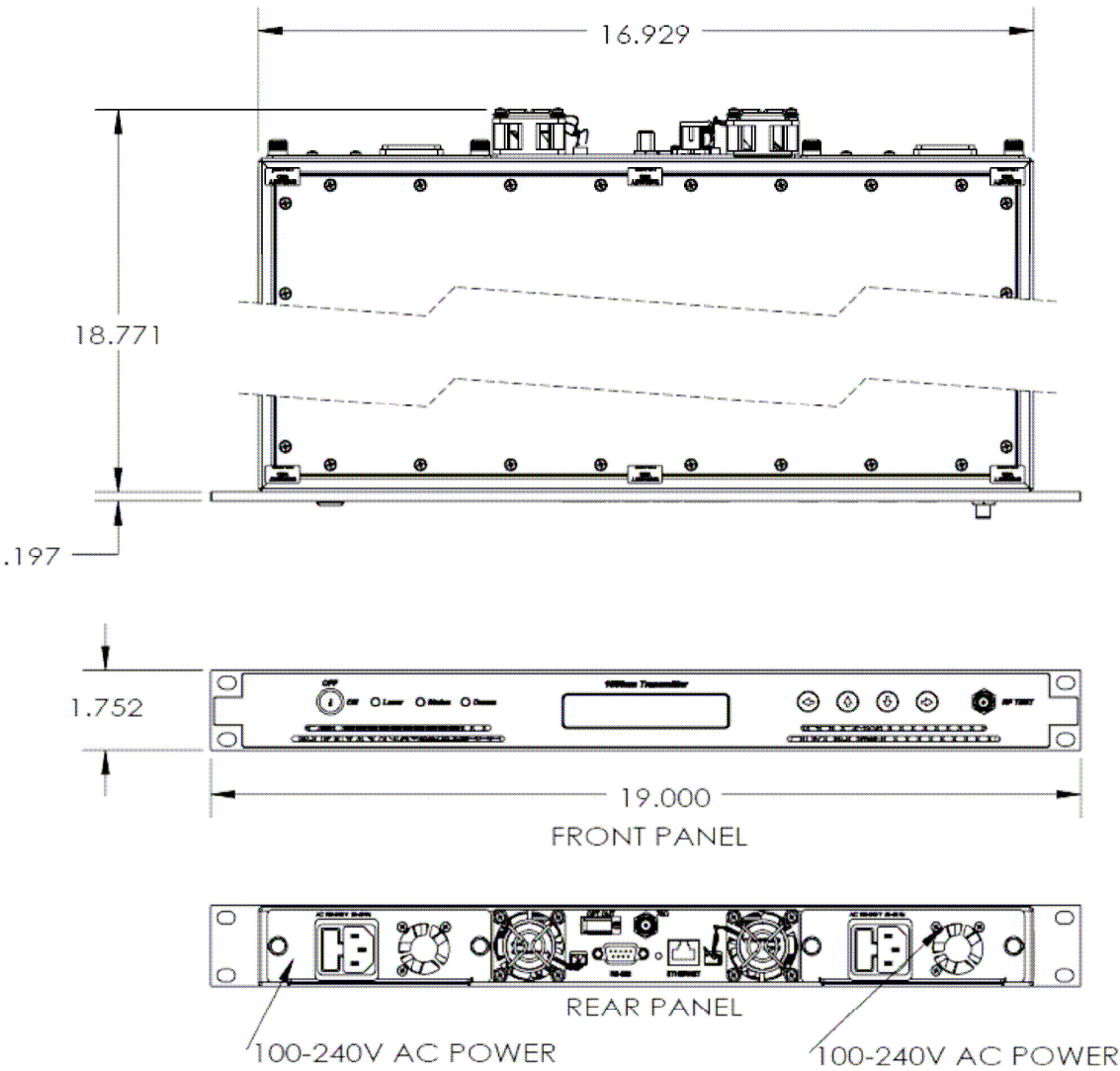
Channel	Wavelength (nm)
62	1527.99
61	1528.77
60	1529.55
59	1530.33
58	1531.12
57	1531.90
56	1532.68
55	1533.47
54	1534.25
53	1535.04
52	1535.82
51	1536.61
50	1537.40
49	1538.19
48	1538.98

Channel	Wavelength (nm)
47	1539.77
46	1540.56
45	1541.35
44	1542.14
43	1542.94
42	1543.73
41	1544.53
40	1545.32
39	1546.12
38	1546.92
37	1547.72
36	1548.51
35	1549.32
34	1550.12
33	1550.92

Channel	Wavelength (nm)
32	1551.72
31	1552.52
30	1553.33
29	1554.13
28	1554.94
27	1555.75
26	1556.56
25	1557.36
24	1558.17
23	1558.98
22	1559.79
21	1560.61
20	1561.42
19	1562.23
18	1563.05

Outline Drawing

Dimensions are in inches.



Laser Safety Information

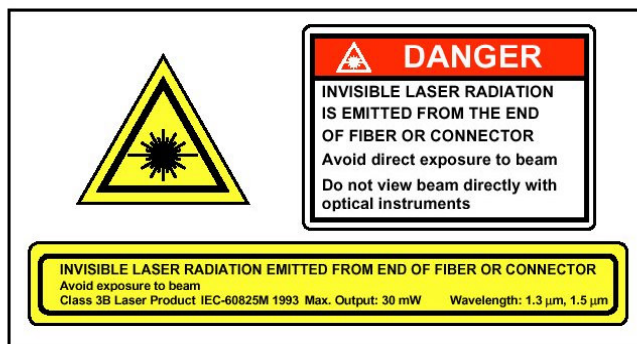
This product meets the appropriate standard in Title 21 of the Code of Federal Regulations (CFR). FDA/CDRH Class IIIb laser product. A supplemental FDA application has been filed and it is anticipated that the accession number for this product will be 0220309 since this accession number is from a similar product family.

Single-mode fiber pigtail with SC/APC connectors (standard).

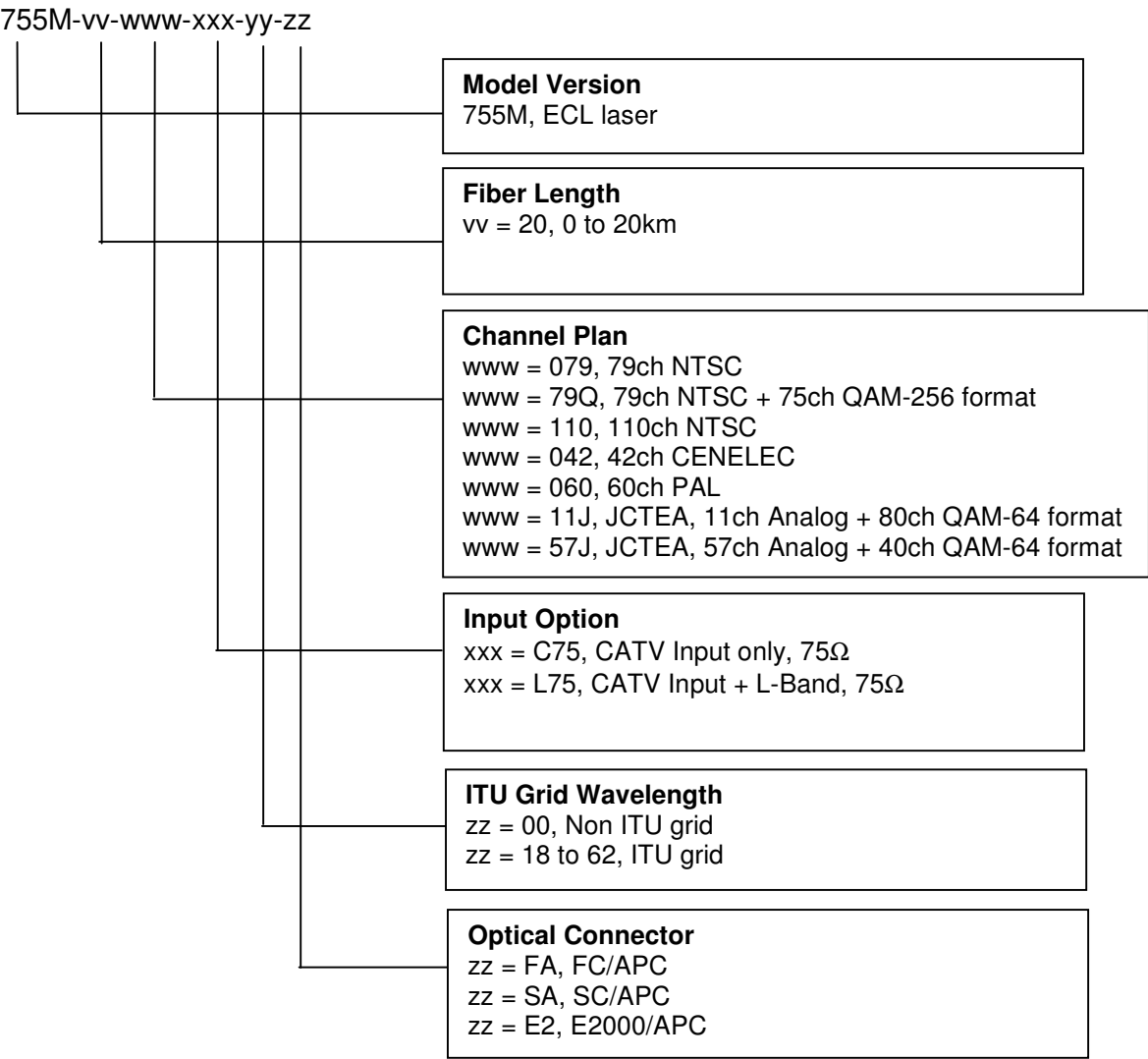
Wavelength = 1.5 μm .

Maximum power = 30 mW.

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



Ordering Information – Model Number Options



Example

755M-20-079-L75-18-SA: 755MM-M, ECL, 20km, 79 channel NTSC, CATV + 75Ω L-Band input, ITU channel 18, SC/APC optical connector.

Information contained herein is deemed to be reliable and accurate as of issue date. EMCORE reserves the right to change the design or specifications of the product at any time without notice. EMCORE and the EMCORE logo are trademarks of EMCORE Corporation.