

## Applications

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

## Features

- Single or Dual Optical Outputs
- Front Panel RF Test Point
- RS232 Control Interface
- Electro-Fluorescence 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)

## 2100 Series 1550 nm Externally Modulated Transmitter



Ortel's DEMENT/SEMT/HEMT/FEMT 2100 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 1U 19" rack 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 the Ortel 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 19 dBm. Newly introduced features such as built in field adjustable SBS control and electronic dispersion compensation allow 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 networks far into the 21<sup>st</sup> century.

The DEMENT series transmitters are designed to be employed 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 DEMENT series of transmitters to be used in many novel HFC applications and architectures.

The SEMT series transmitters are designed to be the most versatile model within the 2100 series family of 1550nm externally modulated transmitters. 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 HEMT series transmitters are high performance, 1550nm externally modulated transmitters optimized for single EDFA fiber links in the 70 to 90 kilometer range. These transmitters take advantage of the 2100 series advanced fiber dispersion compensation circuitry to provide exceptional CATV performance. The HEMT series of transmitters provide a cost efficient, transport solution for medium to long distances

The FEMT 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.

**For more information on this and other products:**

Contact Sales at Ortel 626-293-3400, or visit [www.ortel.com](http://www.ortel.com).

## Optical / Electrical Characteristics

### DEMT

PROPERTY	UNITS	MODELS				COMMENTS
PERFORMANCE (note 1,2,3,4)		DEMT2101	DEMT2102	DEMT2103	DEMT2104	
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

### SEMT

PROPERTY	UNITS	MODELS				COMMENTS
PERFORMANCE (note 1,2,3,4)		SEMT2101	SEMT2102	SEMT2103	SEMT2104	
Specified Link Length	L (km)	65	65	65	65	
Channel Plan		NTSC 80-Ch	PAL 60-Ch	NTSC 110-ch	PAL 89-Ch	
Output Power	Po (dBm)	6.0/ 6.0	6.0/ 6.0	6.0/ 6.0	6.0/ 6.0	Min.
Noise Bandwidth	BW (MHz)	4	5	4	5	
SBS Suppression	(dBm)	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	Min.
Composite Second Order	CSO (dBc)	-65/ -65	-65/ -65	-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

### HEMT

PROPERTY	UNITS	MODELS		COMMENTS
PERFORMANCE (note 1,2,3,4)		HEMT2101	HEMT2102	
Specified Link Length	L (km)	80	80	
Channel Plan		NTSC 80-Ch	PAL 60-Ch	
Output Power	Po (dBm)	6.0/ 6.0	6.0/ 6.0	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

### FEMT

PROPERTY	Units	MODELS				COMMENTS
PERFORMANCE (note 1,2,3,4)		FEMT2101	FEMT2102	FEMT2103	FEMT2104	
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)	6.0/ 6.0	6.0/ 6.0	6.0/ 6.0	6.0/ 6.0	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	TBD	TBD	TBD	Min.
Composite Second Order	CSO (dBc)	-58	TBD	TBD	TBD	Max.
Composite Triple Beat	CTB (dBc)	-58	TBD	TBD	TBD	Max.

**Notes:**

1. Unless stated otherwise all specifications apply over full temperature range.
2. Unless stated otherwise specifications apply for nominal RF input level as defined in section 4, after 5 minute stabilization period.
3. Specifications separated by a slash are port1 / port 2.
4. Tested per Test 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)<sup>1/2</sup>

**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
Remote interface	RS-232	Custom interfaces available
Operating Temperature	0°C to 50°C	
Storage Temperature	-20°C to 70°C	
Power Consumption	50W max	
Agency Listings	FCC: Subpart B. Part 15, class "A" CE: EN50083-2	
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 – 60 VDC	Standard Optional
Enclosure	19.0"W x 15.32"D x 1.72"H	

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 – 870MHz	
Flatness	+/- 0.50 dB	45MHz - 550MHz
	+/- 0.75 dB	45MHz - 870MHz
Input impedance	75Ω	
Input Return Loss	16dB min	45MHz - 870MHz
Front Panel RF Tap	-20 +/- 1 dB down from RF input	
Front Panel RF Tap Flatness	+/- 1 dB	45MHz - 870MHz



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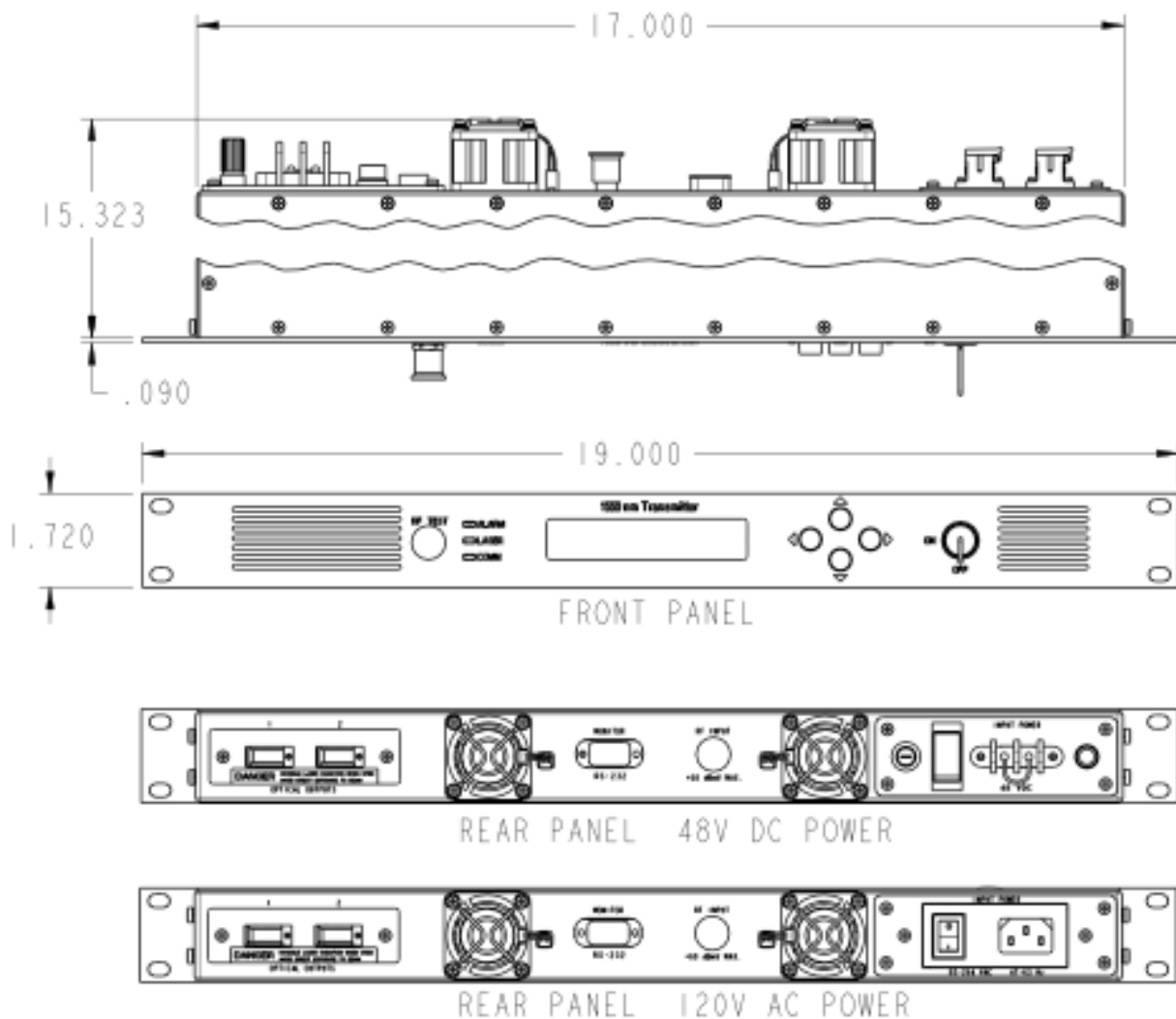
### Test/Link Configuration

PROPERTY	EDFA	LINK <sup>1</sup>	RECEIVED POWER <sup>2</sup>
DEMT	None	40 Km	0.0 dBm at the receiver
SEMT	16 dBm	65 Km	0.0 dBm at the receiver
HEMT	18 dBm	80 Km	0.0 dBm at the receiver
FEMT	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)<sup>1/2</sup>

### Outline Drawing



## Laser Safety Information

CAUTION – use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous laser exposure.

CAUTION - invisible laser energy is present at the output(s) of the optical connectors. AVOID DIRECT EXPOSURE TO THE BEAM. Laser output is invisible and eye damage may result.

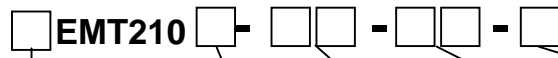
CAUTION - do not attempt to open any optical connections with the laser enabled. Laser power up to 17.5 mW at approximately 1550 nm could be accessible with optical connectors open.

One or both of the following precautionary labels can be found on the fiber optic connector bulkhead assembly located at the rear of the transmitter.

**DANGER** INVISIBLE LASER RADIATION WHEN OPEN  
AVOID DIRECT EXPOSURE TO BEAM

**CAUTION** DISCONNECTED OPTICAL CONNECTOR MAY EMIT  
INVISIBLE OPTICAL ENERGY  
DO NOT VIEW WITH OPTICAL INSTRUMENTS

## Ordering Information



<i>Model Type</i>	<i>Channel Plan</i>	<i>Wavelength</i>	<i>Connectors Option</i>	<i>Voltage Supply</i>
<b>D</b> - Short Link	<b>1</b> – NTSC 80-Ch	<b>blank</b> – 1555+/-5 nm	<b>SC</b> - SC/APC	<b>1</b> – VAC
<b>S</b> - Medium Link	<b>2</b> – PAL 60-Ch	<b>XX</b> – ITU Channel	<b>FC</b> - FC/APC	<b>2</b> – VDC
<b>H</b> - Long Link	<b>3</b> – NTSC 110-ch		<b>EC</b> - E2000/APC Diamond	
<b>F</b> - FTTx	<b>4</b> – PAL 89-Ch		<b>TC</b> - SC/UPC	
			<b>GC</b> - FC/UPC	

Example:

**SEMT2101-35-SC-1:** Medium Link transmitter with 80 NTSC channel loading, ITU 35, SC/APC optical connector, and AC power