

# IEEE 802.3 EFM OPTICAL NETWORK TERMINALS

Enablence is a market leader in optical device technology and, its Systems Division is a driving force in Fiber-To-The-Premises (FTTP) optical access technology. We have successfully deployed our FTTP systems to customers on six continents, including one of the largest installed bases of triple-play Optical Network Terminals (ONTs) in North America.



## BENEFITS

- Broadest selection of ONTs available to service single-family residential units, multi-dwelling units, and businesses

## FEATURES

- Aesthetic Indoor & Hardened Outdoor Models
- Triple-Play Data (10/100/1000BASE-T), Voice (POTS & VoIP), & Video (IP & RF with Integrated Return) Services
- USDA Rural Development Listed

## APPLICATIONS

- Single Family Unit (SFU), Multiple Dwelling Unit (MDU), and Business

## OPTICAL NETWORK TERMINAL SELECTION

Enableness sets the standard with the broadest selection of ONTs available to service single-family residential units, multi-dwelling units, and businesses. Our suite of IEEE 802.3 EFM (GE-PON and Point-to-Point) ONTs includes the ONT-E1800i, ONT-E221, ONT-E1321, and ONT-E888 series. Each of these ONTs features unique port configurations that optimize service delivery for particular subscriber modalities, thereby maximizing the network's penetration and revenue potential.

## UNPARALLELED PERFORMANCE

Enableness's EFM ONTs comply with industry standard optics and data protocols while providing symmetrical bandwidth, dedicated or on-demand, of up to 1 Gbps. In addition, our ONTs offer standards-based features beyond the 802.3 EFM specification, including:

- 128 bit Advanced Encryption Standard (AES) for all traffic over the ODN
- 802.1x port based network access control for MAC-based authentication
- IETF RFC 2236 support for IGMP multicast snooping
- 802.1Q VLANs
- 802.1p traffic class expediting

## TRIPLE PLAY SERVICES

Our EFM ONTs support VoIP service delivery via standard MGCP, NCS, and SIP signalling for interoperation with back office softswitches, IPDTs, or media gateways.

Our EFM ONTs also are the ideal solution for multicast IP video delivery through IGMP. The large amount of bandwidth supported by these ONTs enables them to transport all video encoding standards transparently, including MPEG-2 and MPEG-4. For example, each ONT can support over 256 multicast MPEG-2 video channels simultaneously, with unicast MPEG-2 video streams support being virtually unlimited.

## TRUE RF VIDEO SERVICES

Unlike other solutions that focus only on IP video, Enableness provides for both IP and RF video, including the industry's only integrated SCTE 55-1, SCTE 55-2, and DOCSIS RF return. Our patented technology enables delivery of both IP and RF video, including RF return, over the same single fiber as all other services without additional wavelengths.

Our unique approach to RF video also provides superior immunity to stimulated Raman scattering (SRS) and idle-code interference. These innovations allow for interoperation with industry standard 1550 nm optical components for superior video performance. Furthermore, the RF Automatic Gain Control implementation in the ONTs decreases deployment costs through total plug-and-play deployment.

## POWERING FLEXIBILITY

Enableness recognizes that equipment powering methods differ among network operators. We offer a broad range of powering solutions with or without battery backup. The ONTs can also be powered through a meter ring converter installed in the power utility meter, which also can work with or without battery backup. Enableness's ONTs may even be powered through the network via an optional network power adapter.

## INDOOR ONTS

The ONT-E1800i includes a market-leading eight (8) 10/100BASE-T ports and one (1) 10/100/1000BASE-T port. Standard on the ONT-E1800i is Enablence's per-port Quality of Service (QoS) feature, which allows data to be managed on a per-port basis, thereby providing a powerful mechanism through which network operators may glean additional revenue through differentiated services. Multiple ports provide subscribers the option of dedicated ports for IP video, VoIP services, or multiple computers without the need for a separate hub or router inside the residence.



**ONT-E1800i**

## OUTDOOR ONTS

The ONT-E221 provides one (1) 10/100BASE-T port with per-port QoS, two (2) POTS ports, and one (1) RF port for native support of both analog and QAM video with integrated RF return. Suitable for residential, SOHO, and small business applications, this ONT is field hardened, and does not require an environmentally controlled enclosure. A snap feature on the cover ensures a water resistant electronics compartment while individual self-sealing ports prevent water and insects from entering. The ONT-E221 is designed to operate in temperatures ranging from -40° to +60° C, has dimensions of 10.9" H x 8.9" W x 2.9" D, and weighs 5.6 pounds.

The ONT-E1321 offers all the same features and uses the same field hardened housing as the ONT-E221, but it provides one (1) 10/100/1000BASE-T port, three (3) 10/100BASE-T ports, two (2) POTS ports, and one (1) RF port.

The ONT-E888 is designed to deliver a suite of advanced services to as many as eight subscribers via eight (8) 10/100BASE-T ports with per-port QoS, eight (8) POTS ports, and eight (8) RF ports with integrated RF return. This ONT is environmentally hardened, designed for -40° to +60° C operation, and can be pole or wall mounted. The ONT-E888 is 15.5" H x 11.75" W x 8.5" D and weighs 21.6 pounds.



**ONT-E221**

## 802.3 EFM ONT SPECIFICATIONS

	Units	ONT-E1800iX	ONT-E221X	ONT-E1321X	ONT-E1321iX	ONT-E888X
<b>Network Interface</b>						
<b>Optical Interface</b>		SC/APC	SC/APC	SC/APC	SC/APC	SC/APC
<b>Fiber Type</b>		Single-mode	Single-mode	Single-mode	Single-mode	Single-mode
<b>Transmit Wavelength</b>	nm	1310	1310	1310	1310	1310
<b>Mean Launch Power</b>	dBm	+1 to +4	+1 to +4	+1 to +4	+1 to +4	+1 to +4
<b>Receive Wavelength (Data)</b>	nm	1490	1490	1490	1490	1490
<b>Receive Wavelength (RF Video)</b>	nm	1550	1550	1550	1550	1550
<b>Receive Sensitivity @1310nm</b>	dBm	-27	-26	-26	-26	-26
<b>Receive Sensitivity @ 1550nm (48 dB CNR, 3 EDFA Cascade, 78 Analog Cable TV channels)</b>	dBm	NA	-5	-5	-5	-5
<b>Receive Overload @ 1490nm</b>	dBm	-3	-3	-3	-3	-3
<b>Receive Overload @ 1550nm</b>	dBm	NA	>+1	>+1	>+1	>+1
<b>Narrowcast Data Rate</b>	Mbps	1250	1250	1250	1250	1250
<b>Narrowcast Line Code</b>		8B10B	8B10B	8B10B	8B10B	8B10B
<b>Telephony</b>						
<b>Analog POTS Lines</b>		0	2	2	2	8
<b>REN</b>		NA	5	5	5	5
<b>Inside Wiring (Maximum)</b>	ft.	300	300	300	300	300
<b>Data</b>						
<b>Ethernet Ports (Physical Connector)</b>		(1) 1000BASE-T (8) 10/100BASE-T (RJ-45)	(1) 10/100BASE-T (RJ-45)	(1) 1000BASE-T (3) 10/100BASE-T (RJ-45)	(1) 1000BASE-T (3) 10/100BASE-T (RJ-45)	(8) 10/100BASE-T (RJ-45)
<b>Aggregate Data Throughput</b>	Mbps	1000	100	1000	1000	800
<b>RF Video</b>						
<b>RF Video Ports (Physical Connector)</b>		0	0 or 1 (Female F-type)	0 or 1 (Female F-type)	0 or 1 (Female F-type)	0 or 8 (Female F-type)
<b>RF Video Output Bandwidth</b>	MHz	NA	54 - 1000	54 - 1000	54 - 1000	54 - 1000
<b>RF Output Level (@ 870 MHz, 3.5% OMI)</b>	dBmV	NA	+17 +/- 3	+17 +/- 3	+17 +/- 3	+17 +/- 3
<b>RF Output Tilt (Nominal, 54-870 MHz)</b>	dB	NA	+3	+3	+3	+3
<b>Optional RF Return</b>		NA	SCTE 55-1, SCTE 55-2, DOCSIS	SCTE 55-1, SCTE 55-2, DOCSIS	SCTE 55-1, SCTE 55-2, DOCSIS	SCTE 55-1, SCTE 55-2, DOCSIS
<b>Physical Characteristics</b>						
<b>Dimensions (W x H x D)</b>	in.	9 x 1.7 x 6.4	8.9 x 10.9 x 2.9	9.4 x 1.8 x 7.8	8.9 x 10.9 x 2.9	11.75 x 15.5 x 8.5
	mm	229 x 45 x 163	226 x 277 x 74	239 x 46 x 198	226 x 277 x 74	298 x 394 x 216
<b>Weight</b>	lbs.	1	5.6	5.6	1.1	21.6
	kg	.45	2.5	2.5	0.5	9.8
<b>Operating Temperature</b>	F	+32 to +113	-40 to +140	-40 to +140	-40 to +140	-40 to +140
	C	0 to +45	-40 to +60	-40 to +60	-40 to +60	-40 to +60
<b>Power</b>						
<b>Input Voltage</b>	VDC	12	12	12	12	-48
<b>Input Voltage with Optional Network Power Adapter</b>	VDC	NA	-48	-48	-48	NA
<b>Maximum Power Consumption</b>	W	5	11.5	13	13	36
<b>Standby Power Consumption</b>	W	NA	<7	<7	<7	NA
<b>Reliability</b>						
<b>MTBF</b>	hrs.	>200k	>200k	>200k	>200k	>200k
<b>Availability</b>	%	99.99	99.99	99.99	99.99	99.99

## STANDARDS & COMPLIANCES

CFR21, FDA Part 1040, Laser Class 1	CAN / CSA-22.2 No. 60950-1-03	RFC 2236
IEC 60825-1:2001-08, Edition 1.2	CFR47, FCC Part 15, Class B	IEEE 802.3ah-2004
IEC Pub. No. 60950-1 / EN 60950-1 for Safety of ITE	EN 55022, Radiated & Conducted Emission for ITE	IEEE 802.1D-2004
ANSI / UL 60950-1	EN 55024, Immunity for ITE	IEEE 802.3-2000
	IEEE 802.3Q-2004	

## ORDERING INFORMATION

Model Number	Description
ONT-E1800iX	Indoor, 1 x 1000BASE-T, 8 x 10/100BASE-T, SC/APC, PX20 Optics
ONT-E220	Environmentally Hardened, 1 x 10/100BASE-T, 2 x POTS, SC/APC, PX10 Optics
ONT-E220X	Environmentally Hardened, 1 x 10/100BASE-T, 2 x POTS, SC/APC, PX20 Optics
ONT-E221	Environmentally Hardened, 1 x 10/100BASE-T, 2 x POTS, 1 x RF (Analog & QAM), SC/APC, PX10 Optics
ONT-E221X	Environmentally Hardened, 1 x 10/100BASE-T, 2 x POTS, 1 x RF (Analog & QAM), SC/APC, PX20 Optics
ONT-E221X-RTN	Environmentally Hardened, 1 x 10/100BASE-T, 2 x POTS, 1 x RF (Analog & QAM) with RF return, SC/APC, PX20 Optics
ONT-E1320X	Environmentally Hardened, 1 x 1000BASE-T, 3 x 10/100BASE-T, 2 x POTS, SC/APC, PX20 Optics
ONT-E1321X-RTN	Environmentally Hardened, 1 x 1000BASE-T, 3 x 10/100BASE-T, 2 x POTS, 1 x RF (Analog & QAM) with RF return, SC/APC, PX20 Optics
ONT-E1320iX	Indoor, 1 x 1000BASE-T, 3 x 10/100BASE-T, 2 x POTS, SC/APC, PX20 Optics
ONT-E1321i	Indoor, 1 x 1000BASE-T, 3 x 10/100BASE-T, 2 x POTS, 1 x RF (Analog & QAM), SC/APC, PX10 Optics
ONT-E1321iX	Indoor, 1 x 1000BASE-T, 3 x 10/100BASE-T, 2 x POTS, 1 x RF (Analog & QAM), SC/APC, PX20 Optics
ONT-E1321iX-RTN	Indoor, 1 x 1000BASE-T, 3 x 10/100BASE-T, 2 x POTS, 1 x RF (Analog & QAM) with RF return, SC/APC, PX20 Optics
ONT-E880X	Environmentally Hardened, 8 x 10/100BASE-T, 8 x POTS, SC/APC, PX20 Optics
ONT-E888X-RTN	Environmentally Hardened, 8 x 10/100BASE-T, 8 x POTS, 8 x RF (Analog & QAM) with RF return, SC/APC, PX20 Optics

For more information  
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