

## 10GBASE-LR-AO

Enterasys® 10GBASE-LR Compatible TAA 10GBase-LR XENPAK Transceiver (SMF, 1310nm, 10km, SC, DOM)

### Features

- INF-8474 Compliance
- Duplex SC Connector
- Commercial Temperature 0 to 70 Celsius
- Single-mode Fiber
- Hot Pluggable
- Excellent ESD Protection
- Metal with Lower EMI
- RoHS Compliant and Lead Free



### Applications

- 8x/10x Fibre Channel
- 10GBase-LR Ethernet
- Access, Datacenter and Enterprise
- Mobile Fronthaul CPRI/OBSAI

### Product Description

This Enterasys® 10GBASE-LR compatible XENPAK transceiver provides 10GBase-LR throughput up to 10km over single-mode fiber (SMF) using a wavelength of 1310nm via an SC connector. It can operate at temperatures between 0 and 70C. Our transceiver is built to meet or exceed OEM specifications and is guaranteed to be 100% compatible with Enterasys®. It has been programmed, uniquely serialized, and tested for data-traffic and application to ensure that it will initialize and perform identically. All of our transceivers comply with Multi-Source Agreement (MSA) standards to provide seamless network integration. Additional product features include Digital Optical Monitoring (DOM) support which allows access to real-time operating parameters. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

AddOn's transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S.-made or designated country end products.")



## Absolute Maximum Ratings

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Storage Ambient Temperature Range		Tstg	-40		+85	°C	
Powered Case Temperature Range					+70	°C	
Supply Voltage APS		Vaps			1.5	V	
Supply Voltage Range @ 3.3V		Vcc3	-0.5		4.0	V	
Operating Case Temperature		Tc			+70	°C	
Power Supply Voltage		Vcc3	3.13	3.3	3.47	V	
		Vaps	1.152	1.2	1.248		
Power Dissipation		PD		3.5	4	W	
Operating Range	Single-Mode Fiber	Lop	2		10,000	m	
Data Rate	10GBASE-LR Module	DR		10.3125		Gbps	

## Electrical DC Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
1.2V CMOS (1.8V CMOS Compatible) I/O DC Characteristics (PRTAD;LASI;RESET;TX_ONOFF)							
Output High Voltage		VOH	1			V	1
Output Low Voltage		VOL			0.15	V	
Input High Voltage		VIH	0.84		1.5	V	
Input Low Voltage		VIL			0.36	V	
Input Pull-Down Current		IPD	20		120	uA	
XAUI I/O DC Characteristics (TXLANE[0..3]; RXLANE[0..3])							
Differential Input Amplitude (Pk-Pk)			220		1600	mV	4
Differential Output Amplitude (Pk-Pk)			800		1600		4
MDIO I/O DC Characteristics (MDIO; MDC)							
Output Low Voltage		VOL	-0.3		0.2	V	
Output Low Current		IOL			20	mA	
Input High Voltage		VIH	0.84		1.5	V	
Input Low Voltage		VIL	-0.3		0.36	V	

### Notes:

1. For 1.8V CMOS, VOH=1.65V (minimum), VOL=0.15V (maximum), VIH=1.17V (minimum), and VIL = 0.63V (maximum).
2. Rpull-up=10kΩ to 1.86V.
3. VIN=1.8V.
4. AC coupled.

## Electrical AC Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
XAUI Input AC Characteristics (TXLANE[0..3])						
XAUI Baud Rate	DRin		3.125		Gbps	
Differential Input Impedance	ZIN	80	100	120	Ω	
XAUI Output AC Characteristics (RXLANE[0..3])						
XAUI Baud Rate	DRout		3.125		Gbps	
XAUI Eye Mask (Far-End)	According to IEEE 802.3ae					3
Output Differential Impedance	ZO	80	100	120	Ω	
Total Jitter	TJXAUI			0.35	UI	4
Deterministic Jitter	DJXAUI			0.37	UI	4
Power-On Reset AC Characteristics						
Power-On Reset AC Characteristics	According to XENPAK MSA Issue 3.0, 2002-9-18					
MDIO I/O AC Characteristics (MDIO; MDC)						
MDIO Data Hold Time	tHOLD	10			ns	
MDIO Data Set-Up Time	tSU	10			ns	
Delay from MDC Rising Edge to MDIO Data Change	tDELAY			300	ns	2
MDC Clock Rate	fMAX			2.5	MHz	1

### Notes:

1. 100MHz to 2.5GHz.
2. At crossing point.
3. Per IEEE Std 802.3ae.
4. At near-end, no pre-equalization, 1UI = 320ps.

## Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
<b>Transmitter</b>						
Average Launch Power	Pavg	−8.2		−0.5	dBm	
Transmitter and Dispersion Penalty	TDP			3.2	dB	
Center Wavelength Range	$\lambda$	1260	1310	1355	nm	
Side-Mode Suppression Ratio	SMSR	30			dB	
Extinction Ratio	ER	4.0	6		dB	
RIN <sub>12OMA</sub>	RIN			−128	dB/Hz	
Eye Mask Definition	According to IEEE 802.3ae					1
Optical Return Loss Tolerance	ORLT			12	dB	
Average Launch Power of Off Transmitter	Poff			−30	dBm	
<b>Receiver</b>						
Stressed Receiver Sensitivity in OMA	Psen			−10.3	dBm	2
Receiver Sensitivity in OMA	Psen			−12.6	dBm	2
Power Overload	Po	0.5			dBm	
Signal Detect Assert Level	PSD			−13	dBm	
Signal Detect Hysteresis	PSD	1			dB	
Center Wavelength Range	$\lambda$	1260		1355	nm	

### Notes:

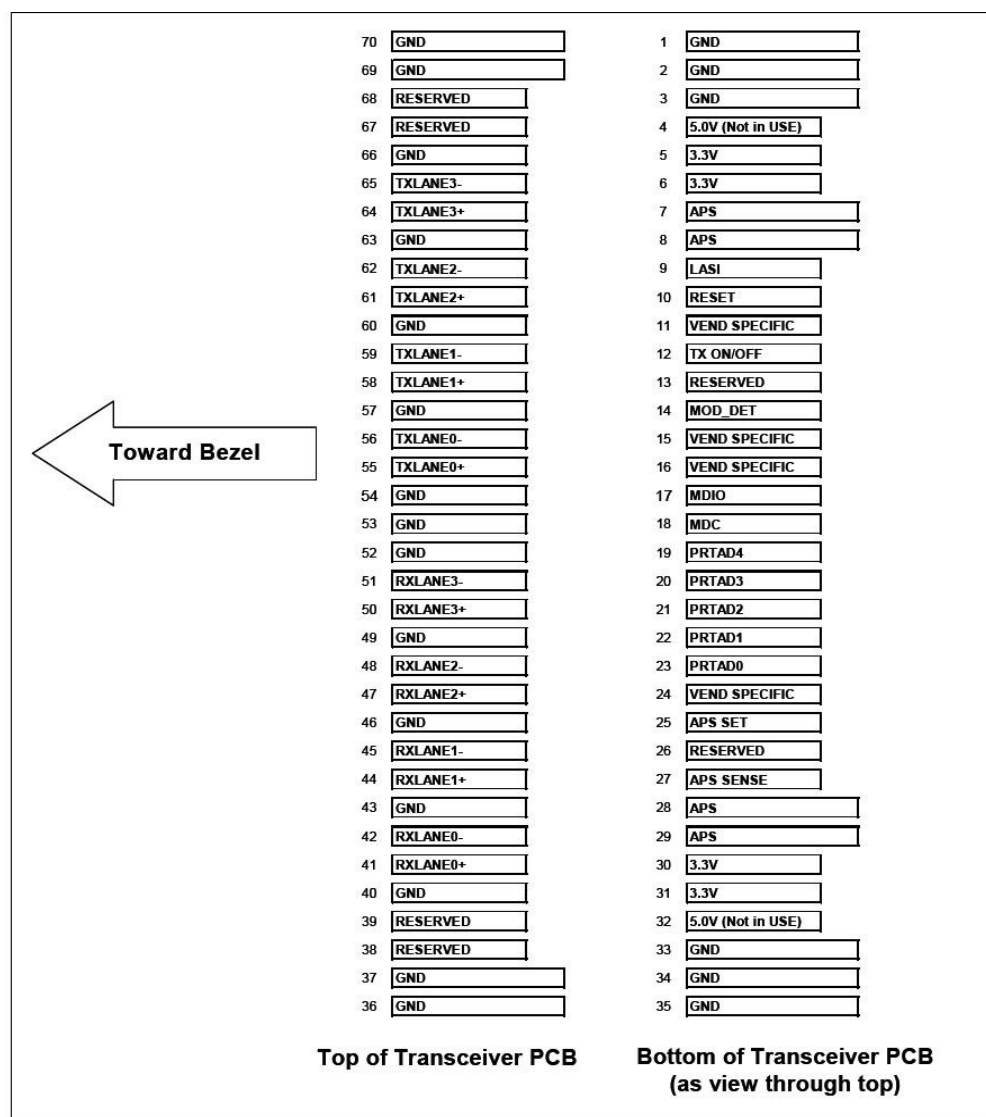
1. Conforms to IEEE triple trade-off between center wavelength, RMS spectral width, and minimum OMA.
2. Receiver sensitivity, which is defined for an ideal input signal, is informative only.

## Pin Descriptions







































































Item #	Signal Name	Level	I/O	Pin	Name/Description
1	GND			1, 2, 3, 33, 34, 35, 36, 37, 40, 43, 46, 49, 52, 53, 54, 57, 60, 63, 66, 69, 70	Ground connection for signal ground on the module.
2	APS	+1.2V		7, 8, 28, 29	Input from Adaptive Power Supply.
3	APS SENSE	+1.2V		27	APS Sense Output. Connected to the APS sense output. Connected to the APS input from APS.
4	APS SET			25	Feedback Input from APS. Connected to the GND through a 1.18kΩ resistor inside the transponder.
5	3.3V	+3.3 V DC		5, 6, 30, 31	DC Power Input,+5.0V DC, Nominal.
6	Reserved			25	Reserved for APD.
7	Reserved			13	Reserved.
8	MDIO	Open Drain	I/O	17	Management Data I/O. Requires external 10-22kΩ pull-up to the APS on the host.
9	MDC	1.2V CMOS	I	18	Management Data Clock Input.
10	PRTAD4	1.2V CMOS	I	19	Port Address Input Bit 4.
11	PRTAD3	1.2V CMOS	I	20	Port Address Input Bit 3.
12	PRTAD2	1.2V CMOS	I	21	Port Address Input Bit 2.
13	PRTAD1	1.2V CMOS	I	22	Port Address Input Bit 1.
14	PRTAD0	1.2V CMOS	I	23	Port Address Input Bit 0.
15	LASI	Open Drain	O	9	Link Alarm Status Interrupt Output. Open drain compatible output with 10 - 20kΩ pull-up on the host. Logic high = normal operation. Logic low = status flag triggered.
16	RESET	Open Drain	I	10	Reset Input. Open drain compatible input with 22kΩ pull-up to APS internal to the transponder. Logic high = normal operation. Logic low = reset.
17	Vendor-Specific			11, 15, 16, 24	Vendor-Specific Pins. Leave unconnected when not used.
18	TX ON/OFF	Open Drain	I	12	TX ON/OFF Input. Open drain compatible input with 22kΩ pull-up to APS internal to the transponder. Logic high = transmitter on. Logic low = transmitter off.
19	MOD DETECT		O	14	Pulled low inside the transponder through a 1kΩ resistor to the ground.
20	Reserved		I	67, 68, 38, 39	Reserved for future use.
21	TX LANE 3– TX LANE 3+		I	65 64	Module XAUI Input Lane 3– Module XAUI Input Lane 3+
22	TX LANE 2– TX LANE 2+		I	62 61	Module XAUI Input Lane 2– Module XAUI Input Lane 2+
23	TX LANE 1– TX LANE 1+		I	59 58	Module XAUI Input Lane 1– Module XAUI Input Lane 1+

24	TX LANE 0– TX LANE 0+		I	56 55	Module XAUI Input Lane 0– Module XAUI Input Lane 0+
25	RX LANE 0+ RX LANE 0–		O	41 42	Module XAUI Output Lane 0+ Module XAUI Output Lane 0–
26	RX LANE 1+ RX LANE 1–		O	44 45	Module XAUI Output Lane 1+ Module XAUI Output Lane 1–
27	RX LANE 2+ RX LANE 2–		O	47 48	Module XAUI Output Lane 2+ Module XAUI Output Lane 2–
28	RX LANE 3+ RX LANE 3–		O	50 51	Module XAUI Output Lane 3+ Module XAUI Output Lane 3–

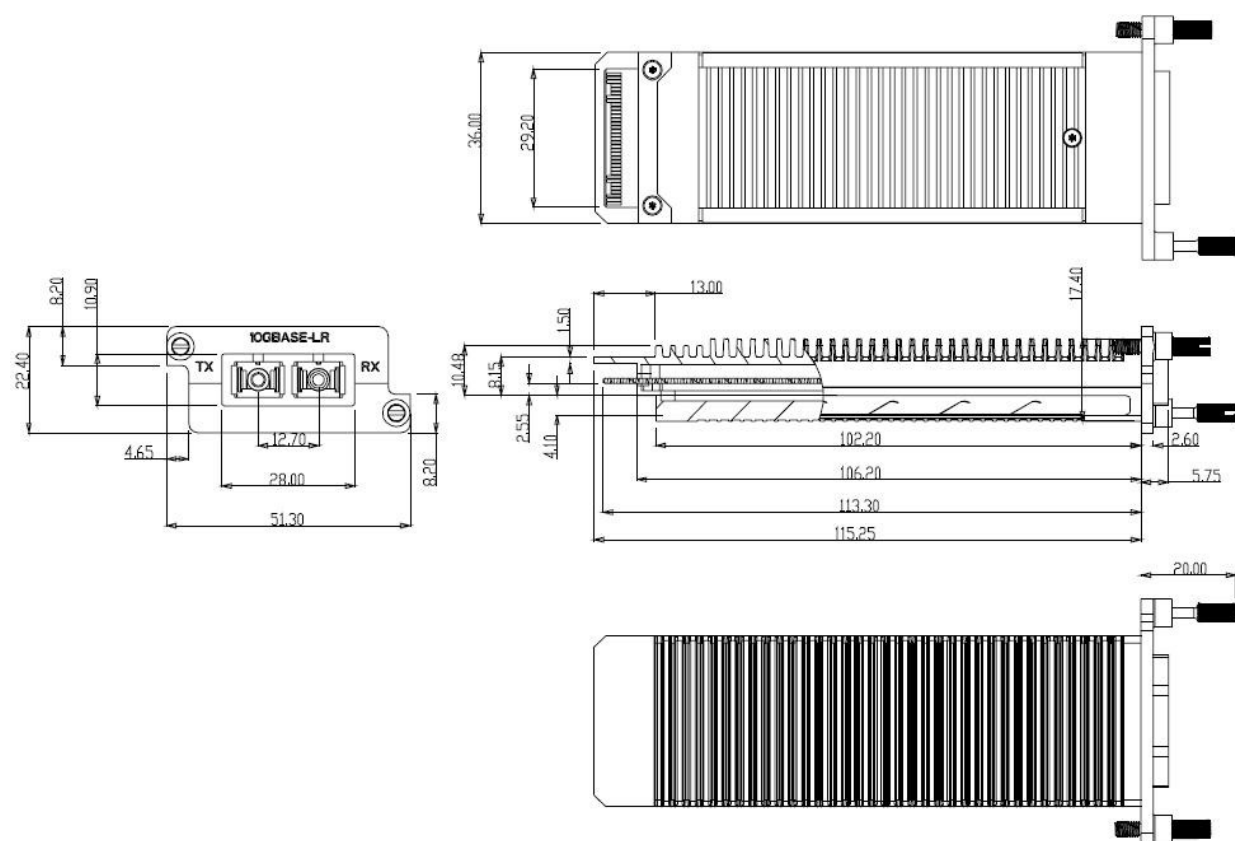
## Electrical Pad Layout



## Host PCB Xenpak Pin-Out

1	 GND	GND 	70
2	 GND	GND 	69
3	 GND	RESERVED 	68
4	 5.0V (Not in USE)	RESERVED 	67
5	 3.3V	GND 	66
6	 3.3V	TXLANE3- 	65
7	 APS	TXLANE3+ 	64
8	 APS	GND 	63
9	 LASI	TXLANE2- 	62
10	 RESET	TXLANE2+ 	61
11	 VEND SPECIFIC	GND 	60
12	 TX ON/OFF	TXLANE1- 	59
13	 RESERVED	TXLANE1+ 	58
14	 MOD_DET	GND 	57
15	 VEND SPECIFIC	TXLANE0- 	56
16	 VEND SPECIFIC	TXLANE0+ 	55
17	 MDIO	GND 	54
18	 MDC	GND 	53
19	 PRTAD4	GND 	52
20	 PRTAD3	RXLANE3- 	51
21	 PRTAD2	RXLANE3+ 	50
22	 PRTAD1	GND 	49
23	 PRTAD0	RXLANE2- 	48
24	 VEND SPECIFIC	RXLANE2+ 	47
25	 APS SET	GND 	46
26	 RESERVED	RXLANE1- 	45
27	 APS SENSE	RXLANE1+ 	44
28	 APS	GND 	43
29	 APS	RXLANE0- 	42
30	 3.3V	RXLANE0+ 	41
31	 3.3V	GND 	40
32	 5.0V (Not in USE)	RESERVED 	39
33	 GND	RESERVED 	38
34	 GND	GND 	37
35	 GND	GND 	36

## Mechanical Specifications





## About AddOn Networks

In 1999, AddOn Networks entered the market with a single product. Our founders fulfilled a severe shortage for compatible, cost-effective optical transceivers that compete at the same performance levels as leading OEM manufacturers. Adhering to the idea of redefining service and product quality not previously had in the fiber optic networking industry, AddOn invested resources in solution design, production, fulfillment, and global support.

Combining one of the most extensive and stringent testing processes in the industry, an exceptional free tech support center, and a consistent roll-out of innovative technologies, AddOn has continually set industry standards of quality and reliability throughout its history.

Reliability is the cornerstone of any optical fiber network and is ingrained in AddOn's DNA. It has played a key role in nurturing the long-term relationships developed over the years with customers. AddOn remains committed to exceeding industry standards with certifications from ranging from NEBS Level 3 to ISO 9001:2005 with every new development while maintaining the signature reliability of its products.



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