

# EBF-xRJ-xxVx

## Stratos 10/100BT FE Media Converter, for use with HMA Expanded Beam Optical Connector

Single or Dual Fast Ethernet (125 Mbps),  
RJ45 Interface, 1310nm Multimode,  
Up to 2km Link Distance

**PRELIMINARY**

### FEATURES

- Fast Ethernet Converter for Tactical Environments
- Single or Dual Ethernet Channels (2 or 4 fiber)
- HMA Optical Connector Interface (100BFX)
- RJ45 Electrical Interface (10/100BT, autonegotiate)
- 3.3V, 12V, 24V DC Power options, 2W max
- Backshell LEDs for Power and Link status
- Industrial Temp Range, Vibration tolerant design
- Compliant with IEEE 802.3 10/100BT and 100BFX
- EN-60825/ IEC-825 / CDRH Class 1 Compliant
- Optional Parylene C Conformal Coating

### APPLICATIONS

The EBF-xRJ-xxVx multimode optical media converter provide ruggedized stand alone conversion solutions for Fast Ethernet multimode links. The device accepts IEEE 802.3u electrical 10/100BT signals using standard RJ45 connection, and converts to 100BFX optical signals. The optical interface allows direct connection to any HMA Expanded Beam fiber cable.

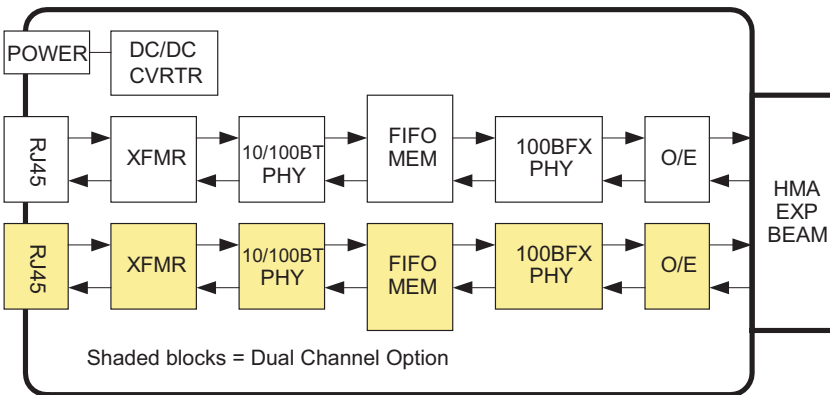
### DESCRIPTION

The EBF-xRJ-xxVx optical media converter performs all functions necessary to convert 10/100BT electrical signals to/from 100BFX optical signals. The electrical signals are transformer coupled into a Physical Layer device (PHY), buffered, and then regenerated into 100BFX compliant data stream. The 100BFX data stream is then routed to an internal optical transceiver to create a 1310nm optical signal. The optical signal is routed into the HMA Expanded Beam compliant connector interface for direct connection to tactical multimode fiber cable.

The media conversion process is fully compliant to the IEEE 802.3u specifications for Ethernet 10/100BT and 100BFX. The 10/100BT electrical connection supports Auto-negotiation for negotiating to 100BT with 10/100BT multirate interfaces. The 100BT connection also supports auto-cross to automatically support both crossed and un-crossed Ethernet CAT5 cables.

Power is presented to the unit through a latching power connector. An internal DC/DC converter regulates the 3V, 12V or 24V input into voltages used by the converter. The 12V and 24V DC converter option is tolerant to a wide range of input voltages and noise spikes typical for vehicle bus power. The input power is reverse polarity protected to prevent damage in case the power is accidentally reversed.

### BLOCK DIAGRAM



### ORDERING INFORMATION

**E B F - X R J - XX V X**

Product Family	Application	Interface	Power	Operating Temperature
EB= Stratos Media Converter for HMA Exp Beam	F= Fast Ethernet 1310 nm Multimode	1RJ= 1xRJ45 (Single channel)	3V= 3.3 VDC (3.0 -3.6V)	H= -40 to 85 C, No Coating
		2RJ= 2xRJ45 (Dual channel)	12V= 12 VDC (5-18V)	
			28V= 28 VDC (18-32V)	M= -40 to 85 C, Conformal Coating

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## PRELIMINARY

### ABSOLUTE MAXIMUM RATINGS

Absolute maximum limits mean that no catastrophic damage will occur if the product is subjected to these ratings for short periods, provided each limiting parameter is in isolation and all other parameters have values within the performance specification. It should not be assumed that limiting values of more than one parameter can be applied to the product at the same time.

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Storage Temperature	$T_s$	-55	-	+100	°C
Absolute Operating Temperature <sup>1</sup>	$T_{OPA}$	-55	-	+100	°C
Supply Voltage <sup>2</sup>	V				V
+3.3V Option		-3.6		+3.6	
+12V Option		-18		+18	
+24V Option		-32		+32	

- Survivability, performance not guaranteed.
- Reverse Polarity protected.

### RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Operating Temperature Limit, case	$T_c$	-40		+85	°C
Supply Voltage <sup>1</sup>	$V_s$				V
+3.3V Option		+3.0	+3.3	+3.6	
+12V Option		+5	+12	+18	
+24V Option		+18	+24	+32	
Supply Current Draw	$P_s$	-			W
Single Channel Option			1.5	2.0	
Dual Channel Option			2.0	3.0	

### OPTICAL PERFORMANCE

Fiber Type = 62.5/125  $\mu\text{m}$ ,  $T_c$  = Operating Temperature Range

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Output Power <sup>1</sup>	$P_o$	-15	-11	-8	dBm
Output Center Wavelength	$\lambda_{OUT}$	1275	1310	1352	nm
Output Spectral Width	$\Delta\lambda_{RMS}$ $\Delta\lambda_{FWHM}$	-	-	2 4	nm nm
Transmit Extinction Ratio	ER	9	12		dB
Transmit Rise / Fall Time (10 - 90%)	$t_R$	-	-	3.0	ns
Receive Sensitivity <sup>2</sup>	$P_I$	-32	-34	-8	dBm
Receive Wavelength	$\lambda_{IN}$	1220	-	1380	nm

- Output Power measured @ 125 Mbps, PRBS 2<sup>7</sup>-1, NRZ
- Receive Sensitivity at BER=10<sup>-12</sup> @ 125 Mbps, PRBS 2<sup>7</sup>-1, NRZ

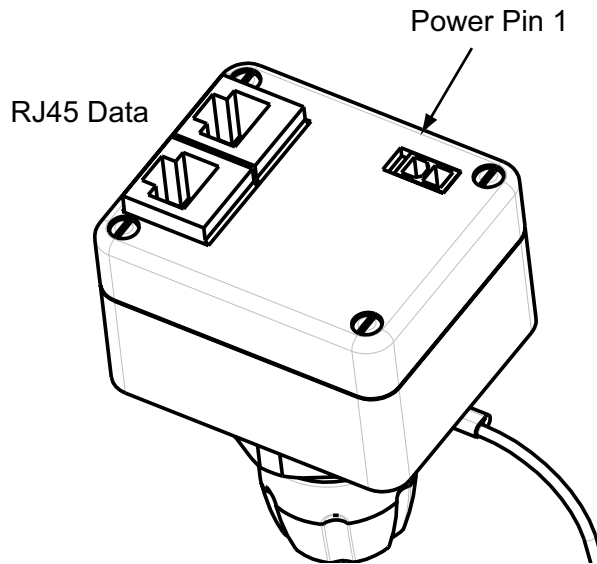


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**PRELIMINARY**



## 2-PIN POWER CONNECTOR

Use mating connector and crimp pins Stratos P/N AB-2PWR-KIT, included with each unit

Pin	Symbol	Type <sup>1</sup>	Signal Description
1	GND	P	<b>Power Return.</b> Connect to Power Ground.
2	VDCIN	P	<b>+3.3V Option:</b> 3.0 to 3.6 VDC Power (3.3V Nominal) <b>+12V Option:</b> +5V to +18 VDC Power <b>+24V Option:</b> +18 to +32 VDC Power

## RJ45 ETHERNET CONNECTOR (Ethernet Hub pinout), Auto-Cross Compliant

Pin	Symbol	Type <sup>1</sup>	Signal Description
1	RX+	I	<b>Receive Positive.</b> IEEE 802.3u 10/100BT signal
2	RX-	I	<b>Receive Negative.</b> IEEE 802.3u 10/100BT signal
3	TX+	O	<b>Transmit Positive.</b> IEEE 802.3u 10/100BT signal
4	NC	-	<b>No Connect</b>
5	NC	-	<b>No Connect</b>
6	TX-	O	<b>Transmit Negative.</b> IEEE 802.3u 10/100BT signal
7	NC	-	<b>No Connect</b>
8	NC	-	<b>No Connect</b>

Notes:

1. Signal Type P= Power, O = Output (from Bulkhead Media Converter, I = Input (to Bulkhead Media Converter)
2. Auto-Cross allows MDI or MDI-X configuration to allow use of crossed or un-crossed Ethernet cables.

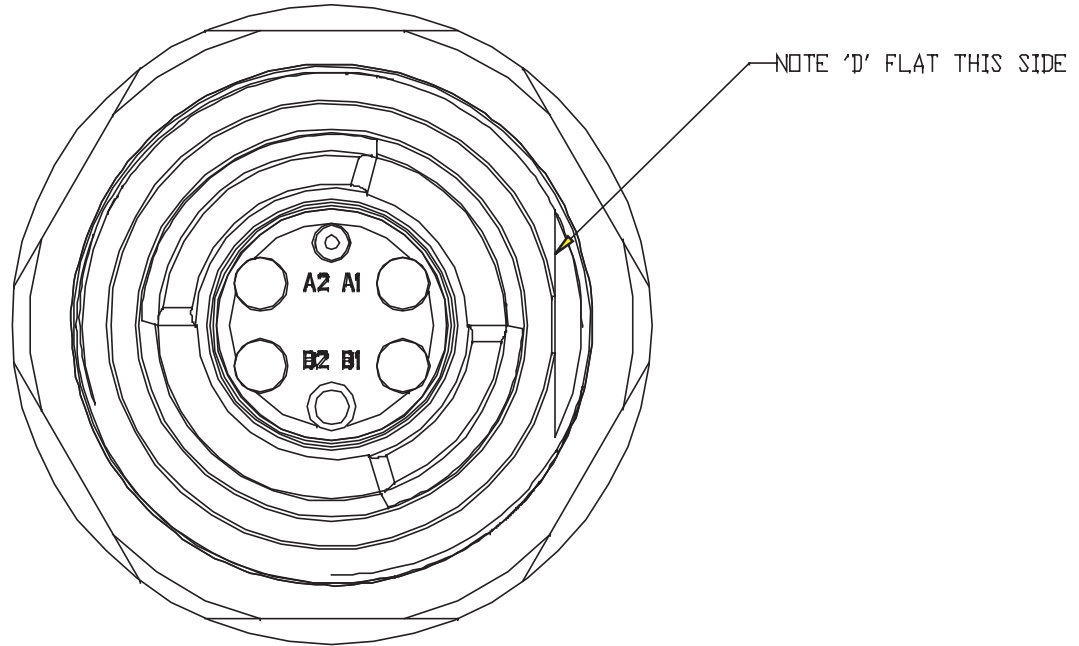


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## HMA EXPANDED BEAM OPTICAL CONNECTOR

Pin	Symbol	Type <sup>1</sup>	Signal Description
B1	TX1	O	<b>Optical Transmit Chan 1</b> IEEE 802.3u 100BFX output from bulkhead
A1	RX1	I	<b>Optical Receive Chan 1.</b> IEEE 802.3u 100BFX input in bulkhead
B2	TX2 <sup>2</sup>	O	<b>Optical Transmit Chan 2</b> IEEE 802.3u 100BFX output from bulkhead
A2	RX2 <sup>2</sup>	I	<b>Optical Receive Chan 2.</b> IEEE 802.3u 100BFX input in bulkhead

Notes:

1. Signal Type P= Power, O = Output (from Bulkhead Media Converter, I = Input (to Bulkhead Media Converter)
2. Channel 2 signals only on the Dual Channel version, otherwise the A2/B2 optical ports are not connected.

Mating HMA Expanded Beam connector can be found on the Stratos website at:

<http://www.stratoslightwave.com/PDF/347-HMA.pdf>

## LED STATUS INDICATORS

LED Label	Description
POWER	Solid Green -- indicates unit is powered.
CHAN1	TBD
CHAN2	TBD



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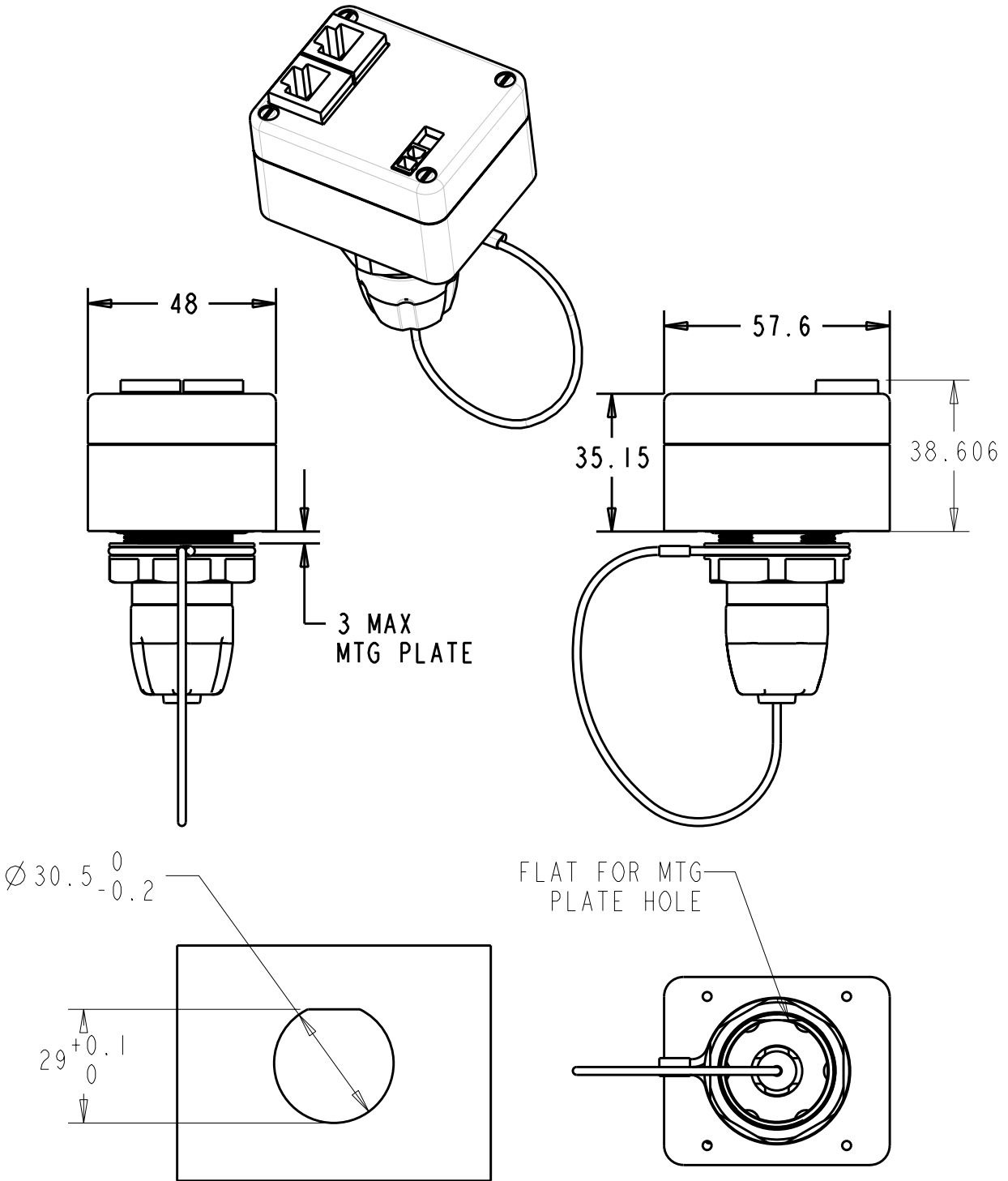
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## BULKHEAD MECHANICAL DIMENSIONS

Dimensions in millimeters

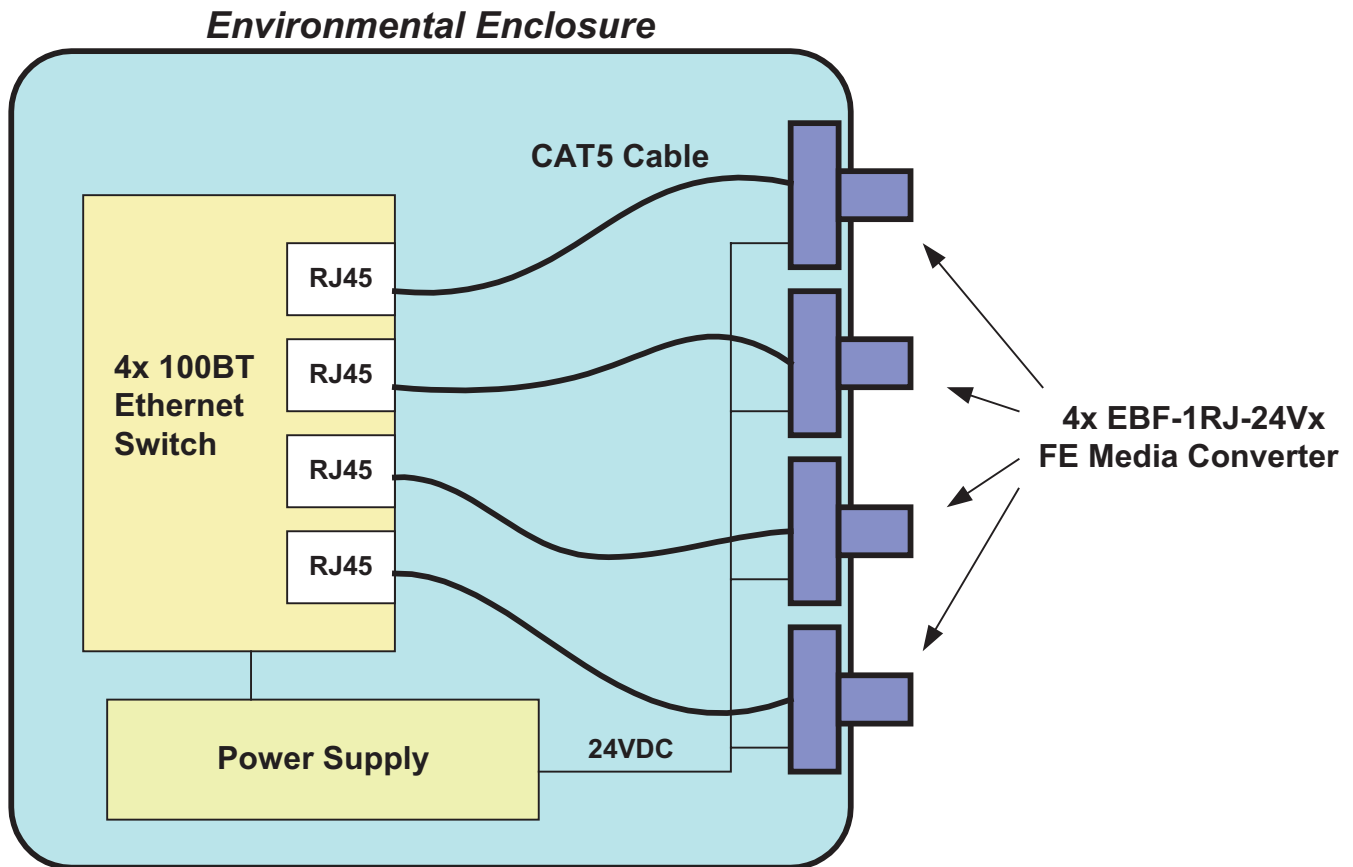


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**PRELIMINARY**

## APPLICATION EXAMPLE



### **Harsh Environment 4 Port Fast Ethernet Switch**

#### **Harsh environment Ethernet Switch**

This application uses a standard Ethernet Switch enclosed in an environmental chassis along with a Power Supply. The Stratos Converter assemblies are mounted through the environmental chassis, and are connected to the Switch using standard CAT5 RJ45 modular jack cabling. The Bulkhead units are powered using Bus Power ranging from 18V to 32V.

The Stratos Media Converter bulkhead assemblies offer 1310nm multimode connectivity for Fast Ethernet, supporting link distances up to 2 kilometers per link. The Stratos Media Converter bulkhead contains all the circuitry necessary to convert the 10/100BT signal from the Ethernet Switch to the optical domain. The Stratos Media Converter bulkhead assembly is designed to support Harsh Environments for the portion of the bulkhead that protrudes through the D-Hole panel.



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## CONFORMAL COATING OPTION

Parameter	Value
Specification	MIL-I-46058C, Type XY
Coating:	Parylene type C
Deposition:	Vacuum deposited
Film Thickness:	1 MIL +/- 0.0002

## ENVIRONMENTAL COMPLIANCE

Category	Standard	Conditions
Thermal Cycle	MIL-STD-883E, section 1010.7	1000 cycles, -40C to +85C
Thermal Shock	MIL-STD-883E, section 1011.9	20 cycles, 0C to 100C
High Temp Oper Life	MIL-STD-202G, section 108A	2000 hours at 85C
Vibration	MIL-STD-810F, section 514.5	16.9grms, 3 axis, 1 hour per axis
Shock	MIL-STD-883E, section 2002	1500g peak, 0.5ms
Humidity	MIL-STD-202G, section 103B	85%/85C, 500 hours
Altitude	MIL-STD-810D, section 500.2	15,000 feet
Immersion <sup>1</sup>	MIL-STD-810D, section 512.2	2 hrs at 1.0m depth
MTBF	MIL-HDBK-217FN2	2.8M hours, 30C GB environment

Notes:

1. Immersion rating is for Optical Connector side only, mounted in panel with either Dust Plug or mating HMA cable installed.

## REGULATORY COMPLIANCE

Requirement	Feature	Condition	Notes
MIL-STD-883-3015.7	ESD	Class II	2200V
IEC-801-2	ESD	Human Body Model	25KV
IEC-801-3	EMI	Immunity	10V/M
FCC	EMI	Class B	>20dB
EN 55022 (CISPR 22A)	EMI	Class B	10V/M
IEC-825 Issue 1993-11	Eye Safety	Class 1	TUV Certificate Number Pending
FDA CDRH 21-CFR 1040	Eye Safety	Class 1	CDRH Accession Number Pending

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