Magnum Series

Size 8 Cavity Optoelectronic PCB Insert, *ELIO®, Front Release, 850nM - Arinc 818, 803 & 804 Compliant

Optical Transmitter Unit

One TX Channel Operating from 50Mbps to 5.0Gbps

FEATURES

- Compliant with Arinc 664, 818, 803 & 804
- Suitable for Fast Ethernet, Gigabit Ethernet,1x/2x/4xFibre Channel and sFPDP applications from 50Mbps to 5.0Gbps
- Maximum optical channel bit error rate less than 1×10^{-12}
- Operating temperature range from -55°C to +85°C
- Shock and vibration resistant per RTCA / D0-160E
- Arcap contact insert material meets stringent EMI / RFI / ESD & EMP performance specifications
- Six pin PCB footprint with TX_Fault and TX_Dis functions
- ELIO® 2.5mm ceramic optical fiber ferrule connector interface per EN 4531*
- Compatible with Arinc 600 and MIL-DTL-83527 size 8 (Quadrax) insert cavities

APPLICATIONS

Magnum series printed circuit board mounted optical transmitters enable high speed network communications over long distances in harsh environments.

- Fast or Gigabit Ethernet switches and peripherals
- Fibre Channel switches and peripherals
- Serial Rapid I/O (sRIO) interfaces
- PCI - Express Links
- sFPDP data links
- Video displays

This size 8 Optoelectronic cavity insert provides a rugged optical interface that is compliant with ELIO® 2.5mm ceramic optical ferrules*.

The multimode optical fiber interface supports applications where copper cable link distance, bandwidth, weight or bulk make the use of twisted pair, twinax or quadrax copper conductors unacceptable.

*ELIO® is a registered trademark of Esterline Souriau

US Pat. # 7,690,849

DESCRIPTION

Magnum series Optoelectronic size 8 cavity PCB insert transmitters consist of optoelectronic transmitter functions integrated into a printed circuit board mounted pin contact. The optical transmitters are 850nm VCSEL lasers. The transmitter input lines are driven with differential CML signals applied to the transmitter (TX+ and TX-) lines. Dual loop, temperature compensated, VCSEL drivers convert the transmitter input signals to suitable VCSEL bias and modulation currents. The TX_Fault circuit disables the optical transmitter output when the optical output power or internal current exceeds predefined limits. The fault condition is latched until reset by a toggle of TX_Dis or VCC. A CMOS fault signal is generated on the TX_Fault line upon a transmitter optical or electrical fault condition.

The optical mating interface to the Magnum series size 8 cavity insert optical transmitters is an ELIO® 2.5mm ceramic fiber optic ferrule stub per EN 4531. The ferrule stub has an integral 50/125μ multimode optical fiber enabling it to interface to either 62.5/125μ or 50/125μ optical fiber cable.

The electrical interface to the Magnum series size 8 cavity insert optical transmitters is a six position pin header suitable for thru-hole soldering to a flexible or rigid printed circuit.

Magnum series size 8 cavity insert optical transmitters are vibration isolated, environmentally hardened components designed for use in harsh environment applications.

ORDERING INFORMATION

Application	Part Number
50Mbps to 3.19Gbps	P44F-TS1E-EK
3.2Gbps to 5.0Gbps	P44F-TS1G-EK

MOOG

Magnum Series, 2.5mm Ferrule, Size 8 Cavity Insert, Optical Transmitter,
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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
Supply Voltage	V_{CC}	-0.5		+4.5	V
TX_DIS Input Voltage	V_I	-0.5		V_{CC}+ 0.5	V
Differential Input Voltage (p-p)	V_D			2.2	V

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Operating Temperature	T_A	-55		+85	°C
Power Supply Voltage	V_{CC}	+3.135		+3.465	V
TX Differential Input Voltage (p-p)	V_D	0.25		2.2	V
Power Supply Noise (p-p)	N_P			200	mV

ENVIRONMENTAL OPERATING CONDITIONS

Requirement	Feature	Condition	Notes
RTCA / D0-160E	ESD	HBM	2200V
RTCA / D0-160E	Vibration	$3.8g^2$/Hz	43G rms
RTCA / D0-160E	Shock	40.0g	6-9mS
RTCA / D0-160E	Flame Resistance		30 Seconds
RTCA / D0-160E	Damp Heat	10 Cycles	24 Hours
ARINC 801	Mating Durability	500 Cycles	<0.5dB Change
FDA / CDRH / IEC-825-1	Eye Safety	Class 1	No Safety Interlocks Required

MATERIALS

Item	Detail	Notes
Insert Shell	Arcap	
Solder Pins	Brass	
Solder Pin Plating	Gold over Nickel	
Ferrule	Ceramic	
Printed Circuits	Polyimide / FR-4	

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OPTICAL TRANSMITTERS T_A = Operating Temperature Range, V_{CC} = 3.135V to 3.465V

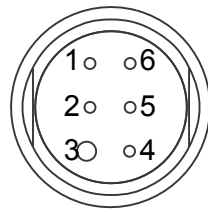| Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Output Power (BER<10^{-12})	P_o	-6.5		-1.0	dBm
Optical Output Wavelength	λ_{OUT}	830	850	860	nM
Spectral Width	$\Delta\lambda_{RMS}$			0.85	nM

Extinction Ratio
  xxxx-xx1E-xx @ 125Mbps to 1.25Gbps
  xxxx-xx1E-xx @ 2.125Gbps
  xxxx-xx1E-xx @ 2.5Gbps to 3.19Gbps
  xxxx-xx1G-xx @ 3.2Gbps to 5.0Gbps
	ER	9.0
		9.0
		6.0
		6.0
					dB

POWER SUPPLY CURRENT T_A = Operating Temperature Range, V_{CC} = 3.135V to 3.465V

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Supply Current per transmitter	I_{CCT}		80	110	mA

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OUTLINE DRAWING

Dimensions are shown as: inches (mm)
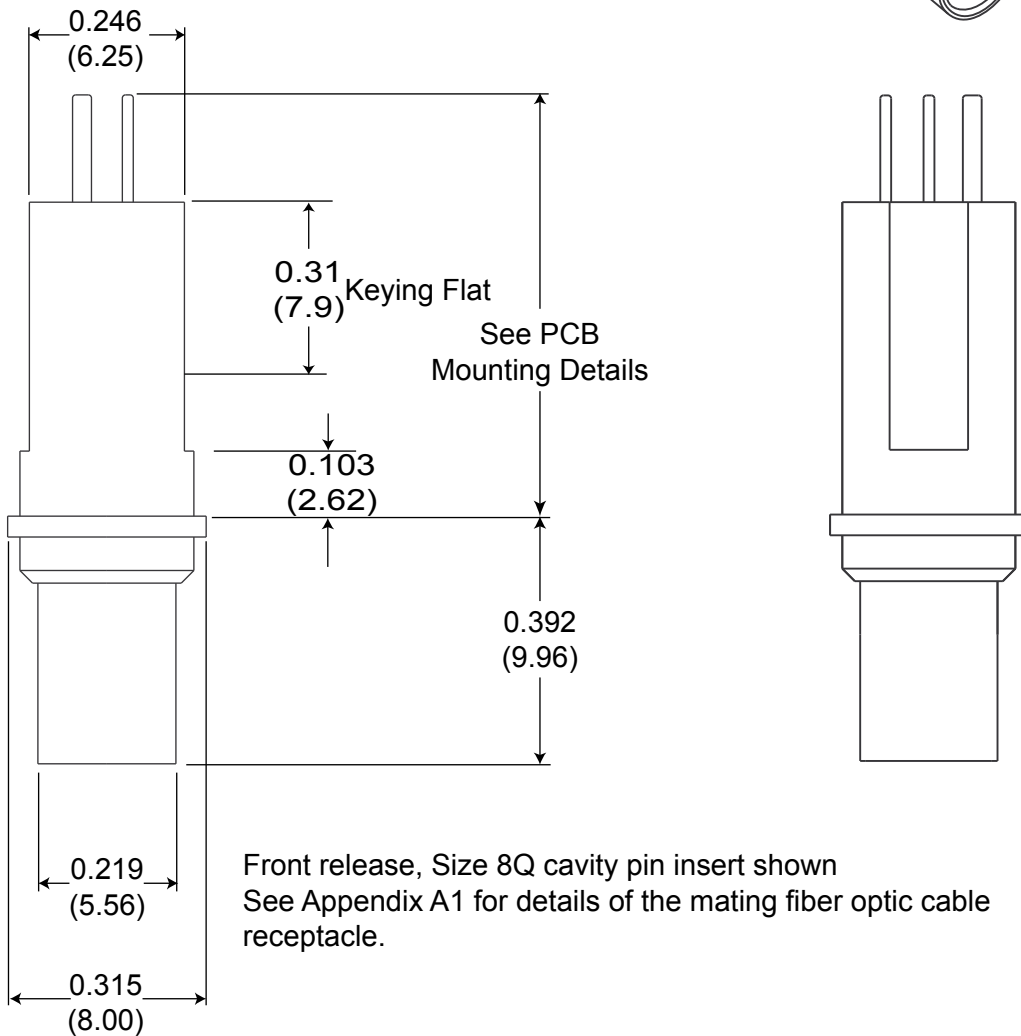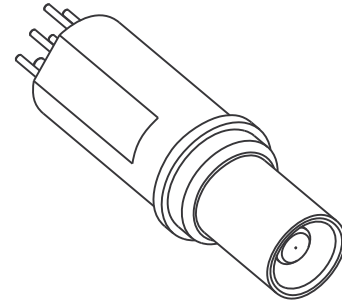
0.246
(6.25)

0.31
(7.9) Keying Flat

See PCB
Mounting Details

0.103
(2.62)

0.392
(9.96)

0.219
(5.56)

0.315
(8.00)

Front release, Size 8Q cavity pin insert shown
See Appendix A1 for details of the mating fiber optic cable receptacle.
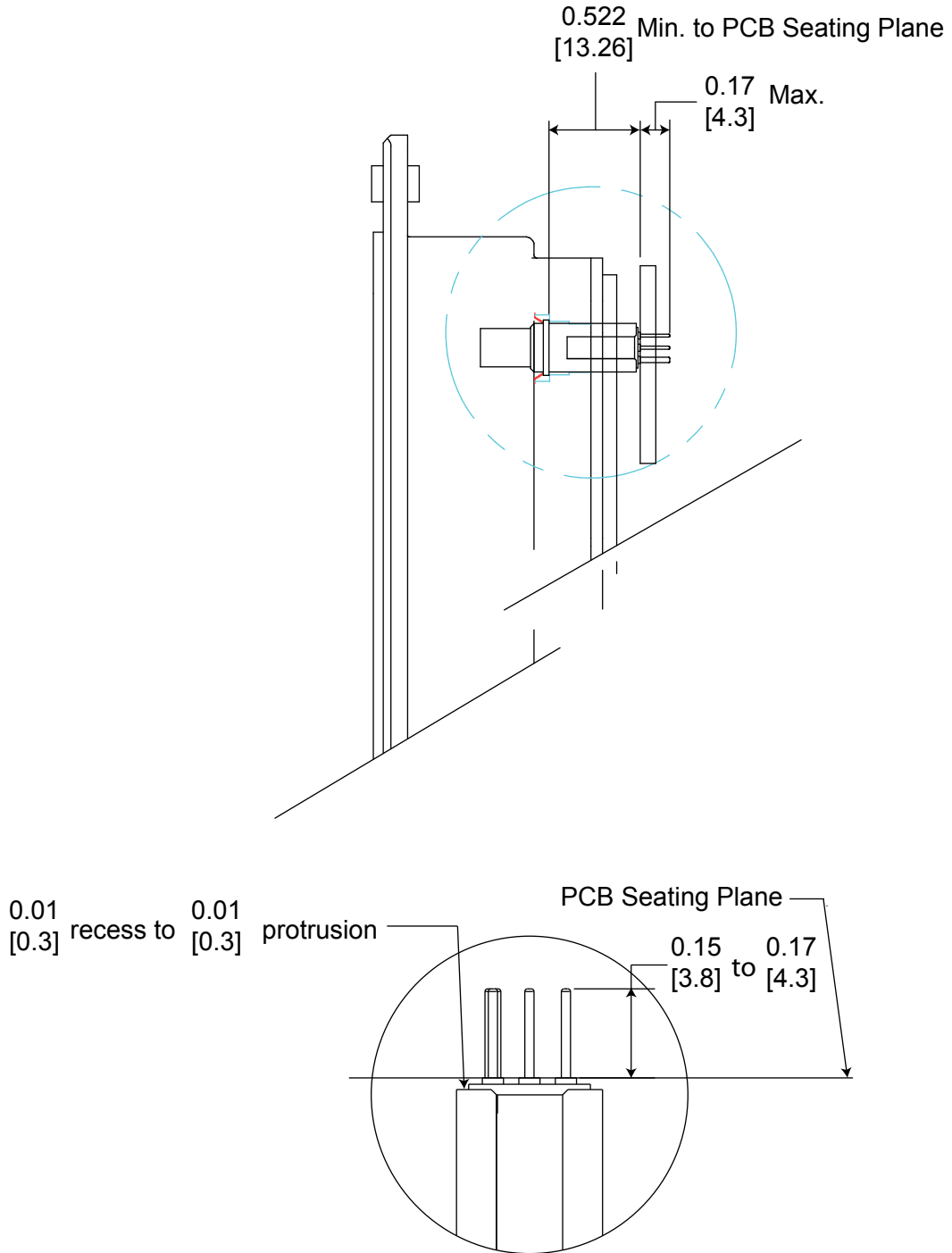
Magnum Series, 2.5mm Ferrule, Size 8 Cavity Insert, Optical Transmitter,
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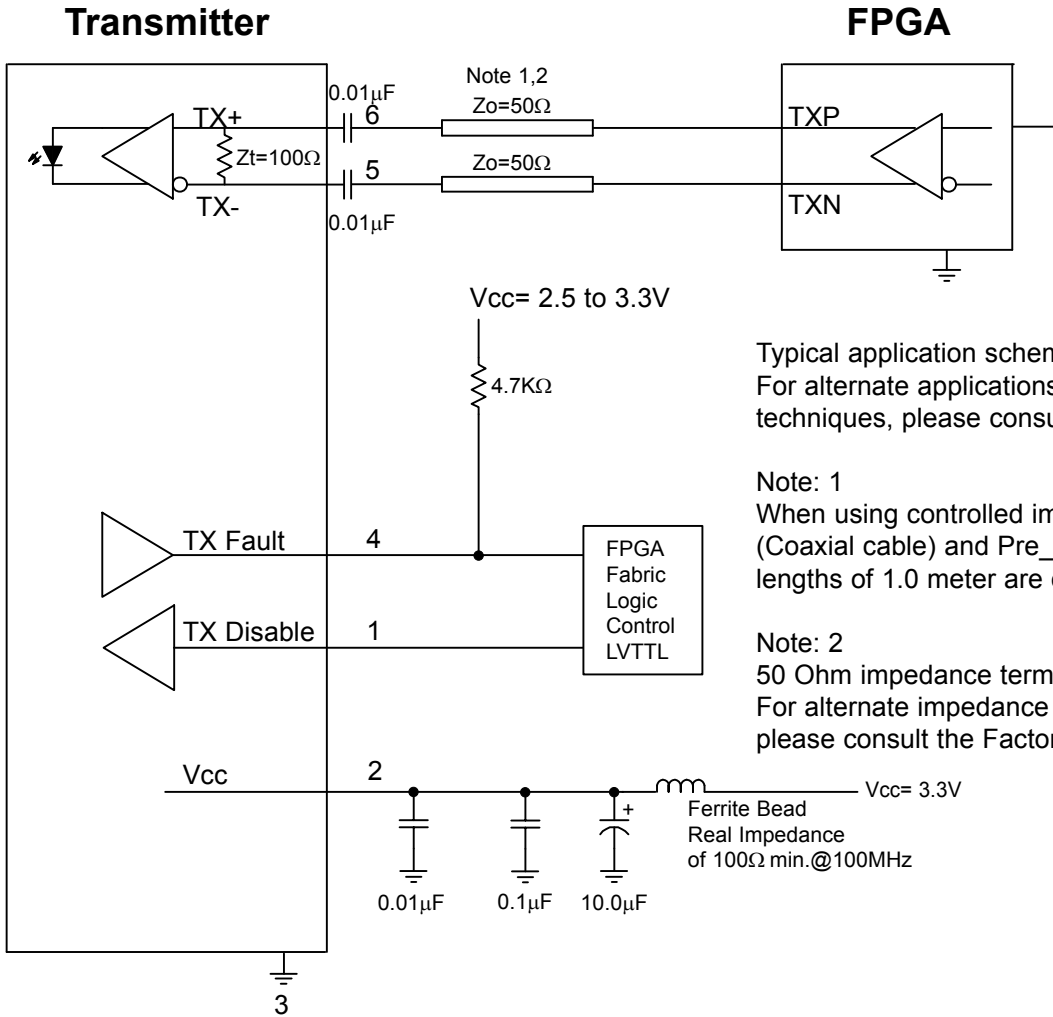## ELECTRICAL PIN ASSIGNMENTS

Pin Number	Symbol	Description	Logic Family

1	TX_DIS	Transmit Disable - Input
		  Logic 1: Disable Optical Output
		  Logic 0: Enable Optical Output
			CMOS
			Internal 4.7KΩ pulldown

2	V_{CC}	Power Supply	N/A
3	GND	Ground	N/A

4	TX_Fault	Internal TX Fault Indicator - Output
		  Satisfactory Operation: Logic "0" Output
		  Internal Fault: Logic "1" Output
			Open Drain CMOS

5	TX-	Transmitter Data Input	CML
6	TX+	Transmitter Data Input	CML

PRINTED CIRCUIT BOARD FOOTPRINT
Dimensions are shown as: inches

PCB Hole Pattern
Mounting Side View
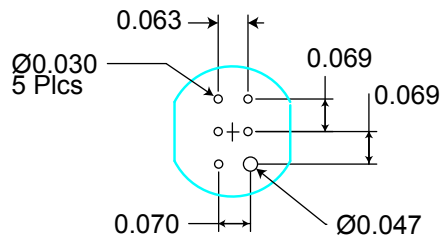
0.063

Ø0.030
5 Plcs

0.069

0.069

0.070

Ø0.047

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PCB MOUNTING DETAILS
Dimensions are shown as: inches [mm]

0.522
[13.26] Min. to PCB Seating Plane

0.17 Max.
[4.3]

0.01 recess to 0.01 protrusion
[0.3]   [0.3]

PCB Seating Plane

0.15 to 0.17
[3.8]   [4.3]

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APPLICATION SCHEMATIC
For Xilinx Rocket I/O Interfaces

Transmitter　　　　　　　　　　　　　　　　**FPGA**

TX+　　0.01µF
　　　　6　　Note 1,2　Zo=50Ω　　TXP
Zt=100Ω
　　　　5　　Zo=50Ω　　TXN
TX-
0.01µF

Vcc= 2.5 to 3.3V

4.7KΩ

TX Fault　　4　　　　　FPGA
　　　　　　　　　　　Fabric
　　　　　　　　　　　Logic
TX Disable　1　　　　Control
　　　　　　　　　　　LVTTL

Vcc　　2　　　　　　　　Vcc= 3.3V
　　　　　　　　　　　　Ferrite Bead
　　+　　　　　　　　　Real Impedance
　　　　　　　　　　　　of 100Ω min.@100MHz
0.01µF　0.1µF　10.0µF

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Typical application schematic shown
For alternate applications or termination
techniques, please consult the Factory

Note: 1
When using controlled impedance cable
(Coaxial cable) and Pre_Emphasis,
lengths of 1.0 meter are obtainable.

Note: 2
50 Ohm impedance termination shown.
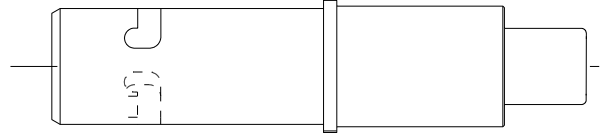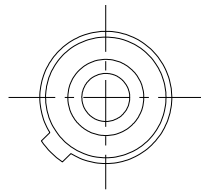For alternate impedance requirements,
please consult the Factory.

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APPENDIX A1
SOURIAU ELIO® FIBER OPTIC CABLE ADAPTERS

ELIO® 8 Adapter for Quadrax # 8 Cavity in Female Inserts
Ordering Information: ELIO AQ0S

ELIO® multimode contact Ordering information

ELIO	09N	G	L	A

Cable external diameter & Contact sealing:
09N: 0.9±0.1mm. Non waterproof
18N: from 1.5mm to 1.9mm. Non waterproof
18W: 1.8±0.1mm. Waterproof
20N: from 1.7mm to 2.1mm. Non waterproof
20W: 2.0±0.1mm. Waterproof

Fibre type:
G: ELIO® Multimode

Boot type:
L: Long boot
S: Short boot
N: No boot (non waterproof version only)

Contact version index

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