

## Cutlass Series

D38999 Size 13-02 Optical Dual Transmitter, PCB Mount, 850nm, ARINC 801, 818, 803 & 804

Dual TX, Jam Nut

### FEATURES

- Compliant with ARINC 801, 818, 803 & 804
- Suitable for 1x/2x/4xFibre Channel and sFPDP applications from 100Mbps to 5.0Gbps
- Maximum optical channel bit error rate less than  $1 \times 10^{-12}$
- Operating temperature range from  $-55^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- Shock and vibration resistant per RTCA / D0-160E
- Electroless nickel plating meets stringent corrosion performance specifications
- Twelve pin PCB footprint with TX-Dis and Tx\_Fault functions
- 1.25mm ceramic optical fiber ferrule connector interface per EN 4665 and ARINC 801
- Compatible with MIL-DTL-38999 size 13-02 connectors

### APPLICATIONS

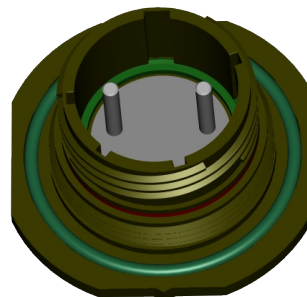
Cutlass series D38999 size 13-02 optical transmitters enable high speed network communications over long distances in harsh environments.

- Fibre Channel switches and peripherals
- ARINC 818 video interfaces
- sFPDP data links

Cutlass series D38999 size 13-02 optical dual transmitters provide a rugged optical interface that is compliant with ARINC 801 / Luxcis® 1.25mm 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 quadrx copper conductors unacceptable.

\*Luxcis® is a registered trademark of Radiall SA



Two TX Links Operating from 50Mbps to 5.0Gbps

### DESCRIPTION

Cutlass series D38999 size 13-02 optical dual transmitters consist of optoelectronic transmitter functions integrated into a wall mount D38999 optical connector with a D38999 / ARINC 801 interface.

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 optical mating interface of the Cutlass series D38999 size 13-02 optical receivers is a D38999 fiber optic cable plug per ARINC 801 / EN 4665. The electrical interface to the Cutlass series D38999 size 13-02 optical transceiver is a 12 position pin header suitable for thru-hole soldering to a flexible or rigid printed circuit.

Cutlass series D38999 size 13-02 optical receivers are vibration isolated, environmentally hardened components designed for use in harsh environment applications.

### ORDERING INFORMATION

Application	Part Number
50Mbps to 2.49 Gbps	P85J-2T1D-CF
2.5Gbps to 3.19Gbps	P85J-2T1E-CF
3.2Gbps to 5.0Gbps	P85J-2T1G-CF

See Appendix A1 for more part number options

# Facilitating Secure Communications in Harsh Environments

Cutlass Series MIL-DTL-38999 / Size 13-02 Dual Optical Transmitter,  
Multimode, 850nm, Arinc 664, 801, 818, 803 & 804 Compliant

## 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
RX Output Current	$I_o$			50	mA
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 Common Mode Voltage	$V_{CM}$			2.0	V
TX Differential Input Voltage (p-p)	$V_D$	0.25		2.2	V
Power Supply Noise (p-p)	$N_p$			200	mV

## SPECIFICATIONS COMPLIANCE

Requirement	Feature	Condition	Notes
RTCA / D0-160E	ESD	Class II	2200V
RTCA / D0-160E	Vibration	3.8g <sup>2</sup> /Hz	43G rms
RTCA / D0-160E	Shock	40.0g	6-9mS
RTCA / D0-160E	Flame Resistance	Method 1012	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
D38999 Shell	Aluminum	
D38999 Shell Plating	ZN, OD-CD or ZN-NI	QQ-P-416, QQ-N-290
D38999 Insert	Arcap	
Solder Pins	Brass	
Solder Pin Plating	Gold	
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<math>10^{-12}</math>)	$P_o$	-6.5		-1.0	dBm
Optical Output Wavelength	$\lambda_{OUT}$	830	850	860	nM
Spectral Width	$\Delta\lambda_{RMS}$			0.85	nM
Extinction Ratio	ER	6.0			dB

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

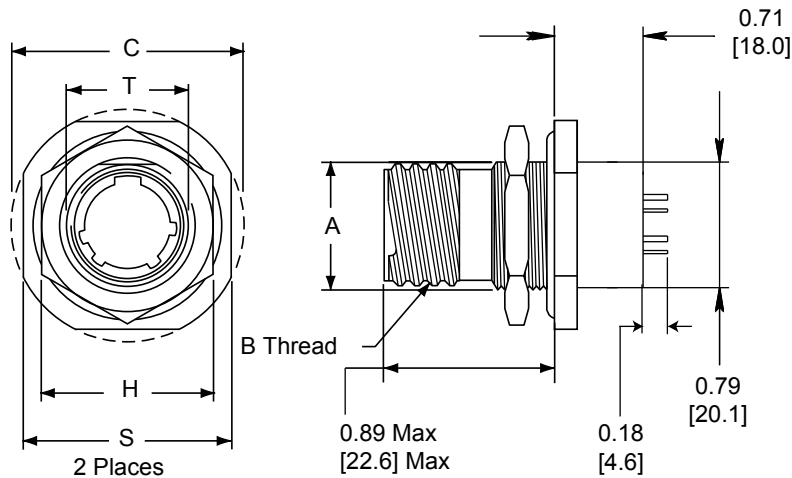
Parameter	Symbol	Minimum	Typical	Maximum	Unit
Supply Current per transmitter	$I_{CCT}$		80	110	mA

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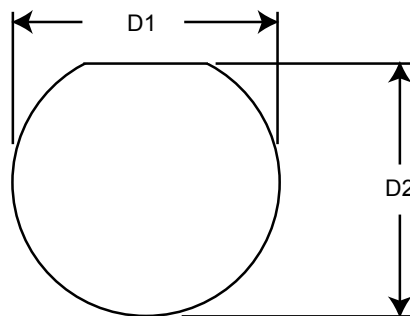
## OUTLINE DRAWING

Dimensions are shown as: inches [mm]



## Outline Dimensions

Shell Size Code	Shell Size	A +0.000 -0.010	B Thread Class 2A 0.1P-0.3L-TS (Plated)	C Max	H Hex +0.017 -0.016	S +/-0.010	T +0.010 -0.010
C	13	0.955 (24.26)	0.8750	1.511 (38.38)	1.188 (30.18)	1.375 (34.93)	1.007 (25.58)



## Panel Cutout Dimensions

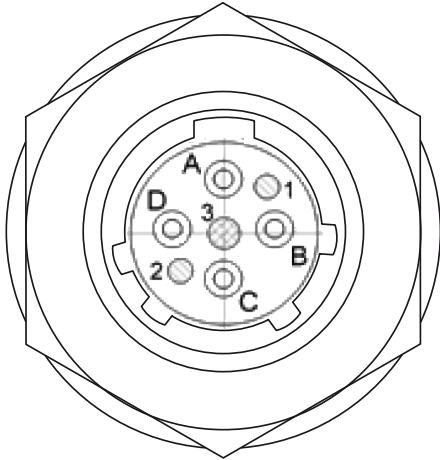
Shell Size Code	Shell Size	D1 +0.025 / -0.00	D2 +0.00 / -0.25
C	13	1.010 (25.65)	0.955 (24.26)

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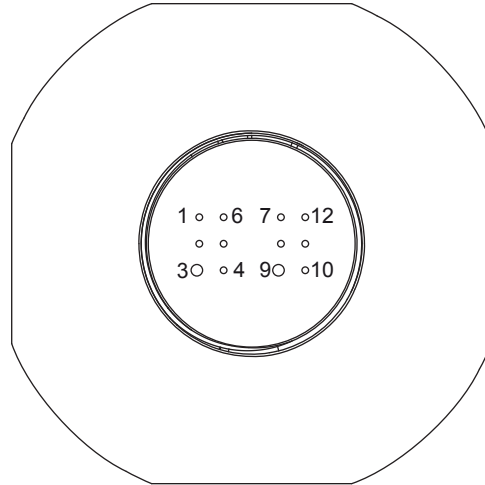
## OPTICAL DUAL TRANSMITTER INSERT ARRANGEMENT

**TOP**  
**Optical Interface**



Front face of the optical dual transmitter insert shown, fiber optic cable plug opposite - see Appendix A2 for details

**TOP**  
**Electrical Interface**



Back face of the optical dual transmitter insert shown - see Printed Circuit Board Footprint and Electrical Pin Assignment pages for details

## OPTICAL PORT ASSIGNMENTS

### ARINC 801 OPTICAL INTERFACE

PORT NUMBER	PIN NUMBER
0	B
1	D

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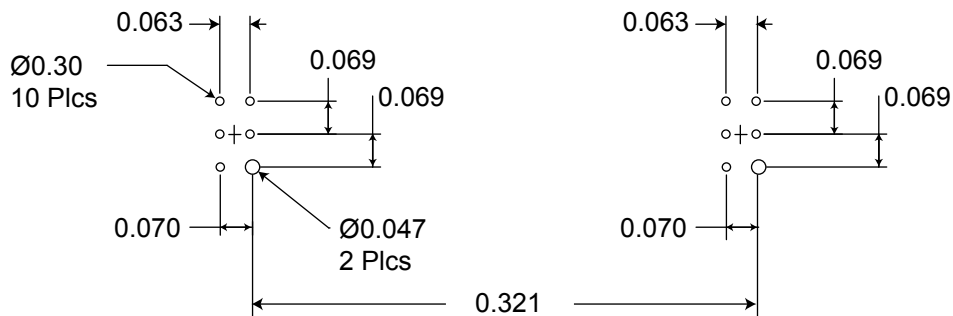
## ELECTRICAL PIN ASSIGNMENTS

Pin Number	Port Number	Symbol	Description	Logic Family
1	0	TX_DIS	Transmitt Disable - Input Logic 1: Disable Optical Output Logic 0: Enable Optical Output	CMOS Internal 4.7KΩ to 10.0KΩ pullup / pulldown
2	0	V <sub>cc</sub>	Power Supply - Input	N/A
3	0	GND	Ground	N/A
4	0	TX_Fault	Internal TX Fault Indicator - Output Satisfactory Operation: Logic "0" Output Internal Fault: Logic "1" Output	Open Drain CMOS
5	0	TX-	Transmitter Data - Input	CML
6	0	TX+	Transmitter Data - Input	CML
7	1	TX_DIS	Transmitt Disable - Input Logic 1: Disable Optical Output Logic 0: Enable Optical Output	CMOS Internal 4.7KΩ to 10.0KΩ pullup / pulldown
8	1	V <sub>cc</sub>	Power Supply - Input	N/A
9	1	GND	Ground	N/A
10	1	TX_Fault	Internal TX Fault Indicator - Output Satisfactory Operation: Logic "0" Output Internal Fault: Logic "1" Output	Open Drain CMOS
11	1	TX-	Transmitter Data - Input	CML
12	1	TX+	Transmitter Data - Input	CML

## PRINTED CIRCUIT BOARD FOOTPRINT

Dimensions are shown as: inches

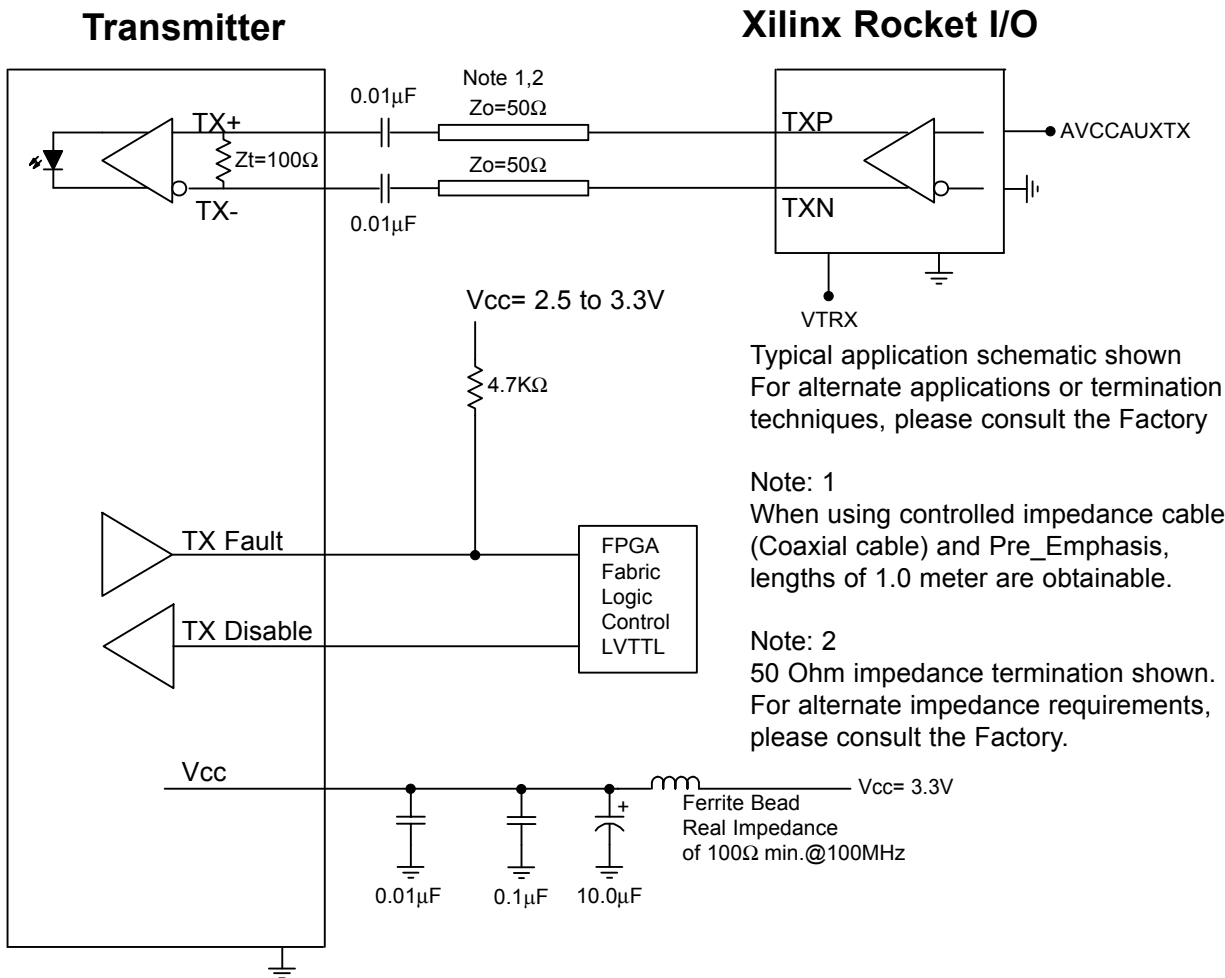
### PCB Hole Pattern Mounting Side View



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## APPLICATION SCHEMATIC For Xilinx Rocket I/O Interfaces

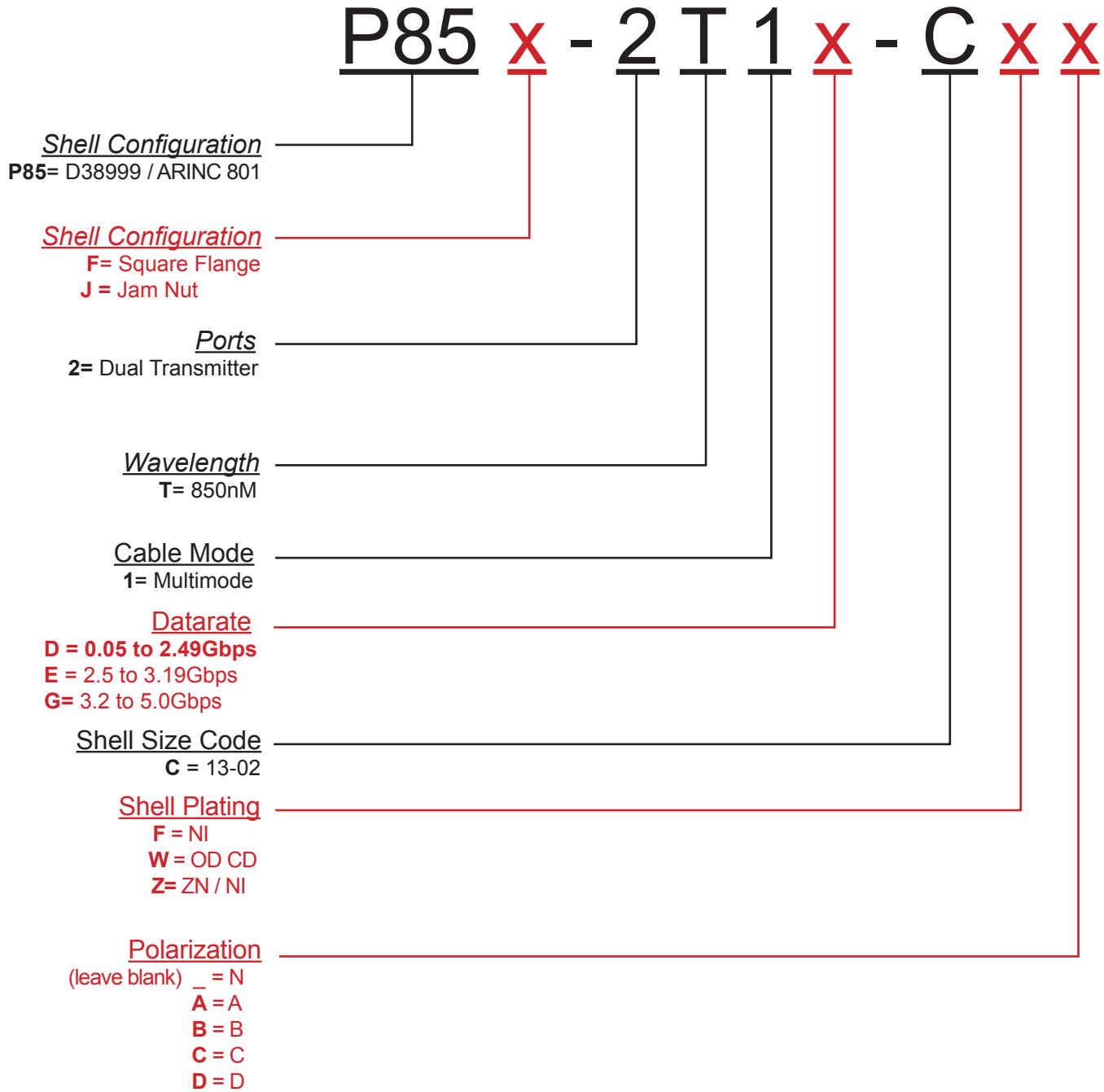


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## APPENDIX A1 PART NUMBER OPTIONS Cutlass13-02 Series



Other wavelength, mounting and port count options are available.  
Please consult the Protokraft website for alternate configurations.