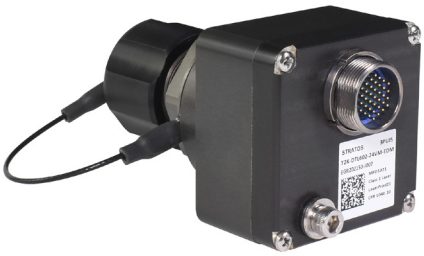
Stratos Optical Technologies

T2 DTL Series

TFOCA-II Ethernet Unmanaged Switch



Ethernet Connectivity in Rugged Environments

The Cinch Stratos T2 series ethernet switch supports 4 ethernet ports, two are copper and two are fiber. There are two variations of the product line, one set of products to support Fast Ethernet fiber and one set of products to support Gigabit Ethernet fiber.

In the case of the Fast Ethernet versions, the two copper ports support 10/100 BT ethernet and the two fiber ports support 100 BFX optical.

In the case of the Gigabit Ethernet versions, the two copper ports support 10/100/1000 BT Ethernet and the two fiber ports support 1000 BLX or 1000 BSX optical.

In all cases, the copper interface is a small circular DTL style connector and the fiber interface uses a TFOCA-II four fiber connector. The switch allows all ports to communicate with each other directly without any user set-up for configuration.

Features & Benefits

- Fast Ethernet version: 2x 10/100 BT copper plus 2x 100 BFX fiber ports
- Gigabit Ethernet version: 2 x 10/100/1000 BT copper and 2x 1000 BSX or
- 1000 BLX fiber ports
- Rugged MIL Circular Connector for electrical interface and power.
- TFOCA-II fiber interface for optical ports
- Plug and Play network solution, no configuration required
- MIL-STD-810 qualified for temperature, thermal shock, vibration, mechanical shock, humidity, and altitude.
- FCC Class A compliant with internal & external EMI sealing.
- Internal construction includes use of tin-lead Solder & Conformal Coating.
- Rugged PTFE anodized finish & all stainless-steel hardware.
- Built in the USA

Applications

- Oil & Gas
- Fire & Rescue
- Security
- Shipboard
- Tactical Communications
- Military Communications

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Ordering Information

Part Number	Ethernet Rates	Optical Rate	Optical Signal	Distance	High TX Power
T2F-DTL002-SOHO2	10/100 BT	FE (125 Mbps)	1310 nm Multimode	2 km	X
T2F-DTL002-SOHO2-A	10/100 BT	FE (125 Mbps)	1310 nm Multimode	2 km	
T2K-DTL002-SOHO2	10/100/1000 BT	GE (1.25 Gbps)	850 nm Multimode	2 km	
T2K-DTL202-SOHO2	10/100/1000 BT	GE (1.25 Gbps)	1310 nm Multimode	2 km	
T2K-DTL602-SOHO2	10/100/1000 BT	GE (1.25 Gbps)	1310 nm Singlemode	10 km	

Note:

Ethernet rates are auto-negotiated on the copper port side to 10 BT, 100 BT, or 1000 BT. The optical link rate is always fixed and does not change regardless if the copper side is auto-negotiated down to a lower rate. The Near End and Far End Optical Converters must match the optical rate, wavelength, and fiber type for proper operation.

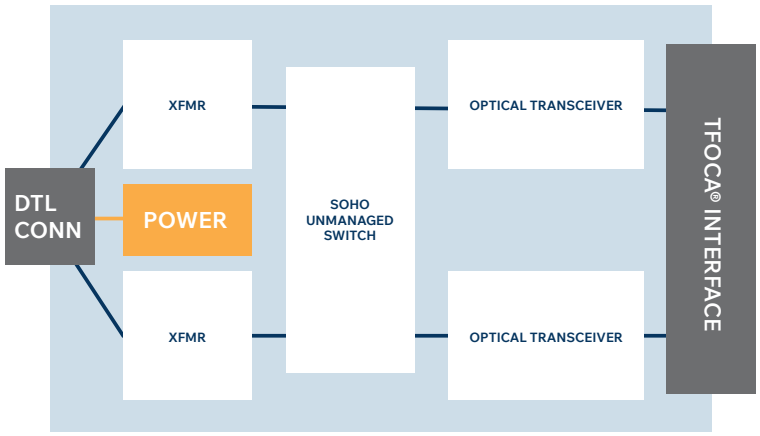
Absolute Maximum Ratings

Parameter	Symbol	Min	Typical	Max	Unit
Storage Temperature	Ts	-55		+100	°C
Supply Voltage - DTL	Vcc	0		+35	V

Recommended Operating Condition

Parameter	Symbol	Min	Typical	Max	Unit
Case Operating Temperature	Ts	-40		+71	°C
Supply Voltage - DTL	Vs	0	+24	+35	V
Power Draw	Ps		5.0	6.0	W

Block Diagram, T2 Series Ethernet Unmanaged Switch



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Block Diagram Description

The electrical signals on the copper ports are transformer coupled, received by a Physical Layer Device (PHY), and then buffered in the SOHO (Small Office Home Office) switch memory. The switch logic observes the incoming ethernet frames and learns the source MAC address. The switch logic then builds an internal MAC address table with source and destination MAC addresses. If there is not a destination address match, the switch will flood the ethernet frame to all ports, looking for a response. If a response is found, the destination MAC address is updated in the table and from that point on the frame will only go to the corresponding port. In this fashion, the MAC address learning process allows the unmanaged switch to efficiently forward traffic without manual configuration.

The copper and fiber interface is compliant to the IEEE 802.3 specifications for Fast Ethernet 100 BT and 100 BFX. The Ethernet connection supports auto-negotiation for 10/100/1000 BT interfaces. In the case of auto-negotiation to a lower ethernet rate on the copper link, the optical link is always at the fixed rate of either 125 Mbps or 1.25 Gbps. The Ethernet connection also supports auto-cross to automatically support both crossed and un-crossed ethernet cables.

DC Power is supplied to the entire converter (to both channels) through the circular DTL connector.

Optical Performance, T2F Series (Fast Ethernet), High Optical Power

Applicable part numbers: T2F-DTL002-SOHO2

Parameter	Symbol	Min	Typical	Max	Unit
Transmit Output Power	P_O	-12.0	-	-3.0	dBm
Transmit Output Center Wavelength	λ_{OUT}	1290	1310	1330	nm
Transmit Output Spectral Width	$\Delta\lambda_{RMS}$	-	-	4	nm
Transmit Extinction Ratio	ER	8	10	-	dB
Transmit Rise/Fall Time (10 ~ 90%)	t_R	-	-	3000	ps
Receive Sensitivity	P_I	-32.0	-	-3.0	dBm
Receive Center Wavelength	λ_{IN}	1260	-	1380	nm
Fiber Core Diameter	$Ø_{CORE}$	-	63	-	um

Notes:

1. *Transmit Output Power measured @ 125 Mbps, PRBS 2^7-1, NRZ*
2. *Receive Sensitvity is –32.0 dBm with TX FP Laser source (this device) at BER=1E-10 @ 125 Mbps, PRBS 2^7-1, NRZ, ER = 8.0 dB or better.*
3. *Derate Receiver Sensitivity to –31.5 dBm when interfacing to TX LED source equipment, BER=1E-10 @ 125 Mbps, PRBS 2^7-1, NRZ, ER = 8.0 dB or better.*

Optical Performance, T2F Series (Fast Ethernet), Standard (IEEE 802.3) Optical Power

Applicable part numbers: T2F-DTL002-SOHO2-A

Parameter	Symbol	Min	Typical	Max	Unit
Transmit Output Power	P_O	-14.0	-	-8.0	dBm
Transmit Output Center Wavelength	λ_{OUT}	1290	1310	1330	nm
Transmit Output Spectral Width	$\Delta\lambda_{RMS}$	-	-	4	nm
Transmit Extinction Ratio	ER	8	10	-	dB
Transmit Rise/Fall Time (10 ~ 90%)	t_R	-	-	3000	ps

Receive Sensitivity	P_I	-32.0	-	-3.0	dBm
Receive Center Wavelength	λ_{IN}	1260	-	1380	nm
Fiber Core Diameter	$Ø_{CORE}$	-	63	-	um

Notes:

1. *Transmit Output Power measured @ 125 Mbps, PRBS 2^7-1, NRZ*
2. *Receive Sensitvity is –32.0 dBm with TX FP Laser source (this device) at BER=1E-10 @ 125 Mbps, PRBS 2^7-1, NRZ, ER = 8.0 dB or better.*
3. *Derate Receiver Sensitivity to –31.5 dBm when interfacing to TX LED source equipment, BER=1E-10 @ 125 Mbps, PRBS 2^7-1, NRZ, ER = 8.0 dB or better.*

Optical Performance, T2K Series (Gigabit Ethernet), 850 nm Multimode

Applicable part numbers: T2K-DTL002-SOHO2

Parameter	Symbol	Min	Typical	Max	Unit
Transmit Output Power[1]	P_O	-9.5	-	-4.0	dBm
Transmit Output Center Wavelength	λ_{OUT}	830	850	860	nm
Transmit Output Spectral Width	$\Delta\lambda_{RMS}$	-	-	0.85	nm
Transmit Extinction Ratio	ER	9	10	-	dB
Transmit Rise/Fall Time (10 ~ 90%)	t_R	-	-	260	ps
Receive Sensitivity[1]	P_I	-20.0	-	0	dBm
Receive Center Wavelength	λ_{IN}	770	-	860	nm
Fiber Core Diameter	$Ø_{CORE}$	-	63	-	um

Note:

[1] BER=1E-12 @ 1.25 Gbps, PRBS7, NRZ, ER = 9 dB or greater

Optical Performance, T2K Series (Gigabit Ethernet), 1310 nm Multimode

Applicable part numbers: T2K-DTL202-SOHO2

Parameter	Symbol	Min	Typical	Max	Unit
Transmit Output Power[1]	P_O	-10.0	-	-4.0	dBm
Transmit Output Center Wavelength	λ_{OUT}	1285	1310	1343	nm
Transmit Output Spectral Width	$\Delta\lambda_{RMS}$	-	-	4	nm
Transmit Extinction Ratio	ER	9	10	-	dB
Transmit Rise/Fall Time (10 ~ 90%)	t_R	-	-	260	ps
Receive Sensitivity[1]	P_I	-20.0	-	-3.0	dBm
Receive Center Wavelength	λ_{IN}	1270	-	1355	nm
Fiber Core Diameter	$Ø_{CORE}$	-	63	-	um

Note:

[1] BER=1E-12 @ 1.25 Gbps, PRBS7, NRZ, ER = 9 dB or greater

Optical Performance, T2K Series (Gigabit Ethernet), 1310 nm Singlemode

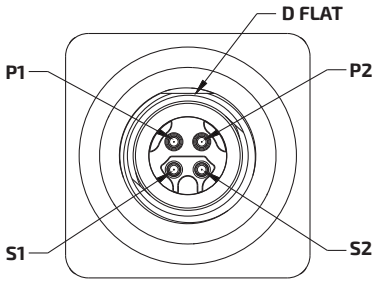
Applicable part numbers: T2K-DTL602-SOHO2

Parameter	Symbol	Min	Typical	Max	Unit
Transmit Output Power[1]	P_O	-8		-3	dBm
Transmit Output Center Wavelength	λ_{OUT}	1285	1310	1343	nm
Transmit Output Spectral Width	$\Delta\lambda_{RMS}$			4	nm
Transmit Extinction Ratio	ER	9	10		dB
Transmit Rise/Fall Time (10 ~ 90%)	t_R			260	ps
Receive Sensitivity[1]	P_I	-20		0	dBm
Receive Center Wavelength	λ_{IN}	1270		1355	nm
Fiber Core Diameter	$Ø_{CORE}$		9		um

Note:

[1] BER=1E-12 @ 1.25 Gbps, PRBS7, NRZ, ER = 9 dB or greater

Optical Pinout and Cross Options



Pin/Socket	Signal
P1	**RX1** - Channel 1 Optical Input
S1	**TX1** - Channel 1 Optical Output
P2	**RX2** - Channel 2 Optical Input
S2	**TX2** - Channel 2 Optical Output

Electrical Connector and Signal Definitions

T2F-DTL002-SOHO2,

T2F-DTL002-SOHO2-A

Glenair 800-012-07NF8-13PN
Mil Circular Connector

T2F-DTL

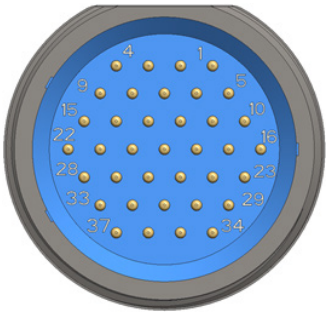
Pin	Symbol	Description
1	CH1_RX+	Channel 1, Receive Positive
2	CH1_RX-	Channel 1, Receive Negative
3	CH1_TX+	Channel 1, Transmit Positive
4	CH1_TX-	Channel 1, Transmit Negative
5	CH2_TX+	Channel 2, Transmit Positive
6	CH2_TX-	Channel 2, Transmit Negative
7	CH2_RX+	Channel 2, Receive Positive
8	CH2_RX-	Channel 2, Receive Negative
9	VCC	+9 ~ +32 VDC Input Power
10	GND	Ground
11, 12, 13	NC	No Connect

Electrical Connector and Signal Definitions

T2K-DTL002-SOHO2

T2K-DTL202-SOHO2

T2K-DTL602-SOHO2



Glenair 800-012-07MT12-37PN
Mil Circular Connector

T2K-DTL

Pin	Symbol	Description
5	CH1_TP0+	Channel 1, Twisted Pair, 0 Positive
1	CH1_TP0-	Channel 1, Twisted Pair, 0 Negative
2	CH1_TP1+	Channel 1, Twisted Pair, 1 Positive
3	CH1_TP1-	Channel 1, Twisted Pair, 1 Negative
4	CH1_TP2+	Channel 1, Twisted Pair, 2 Positive
9	CH1_TP2-	Channel 1, Twisted Pair, 2 Negative
15	CH1_TP3+	Channel 1, Twisted Pair, 3 Positive
22	CH1_TP3-	Channel 1, Twisted Pair, 3 Negative
29	CH2_TP0+	Channel 2, Twisted Pair, 0 Positive
23	CH2_TP0-	Channel 2, Twisted Pair, 0 Negative
35	CH2_TP1+	Channel 2, Twisted Pair, 1 Positive
34	CH2_TP1-	Channel 2, Twisted Pair, 1 Negative
37	CH2_TP2+	Channel 2, Twisted Pair, 2 Positive
36	CH2_TP2-	Channel 2, Twisted Pair, 2 Negative
28	CH2_TP3+	Channel 2, Twisted Pair, 3 Positive
33	CH2_TP3-	Channel 2, Twisted Pair, 3 Negative
10, 11, 16, 17, 18	VCC	+9 ~ +32 VDC Input Power
6, 12, 13, 19, 20, 25, 26	GND	Ground
7, 8, 14, 21, 24, 27, 30, 31, 32	NC	No Connect

Mechanical Properties

Plating Specification

EMI conductive seal area:
Chem film per MIL-DTL-5541 Type 1, Class 111
Color: Clear

All other areas:
Hard Coat Anodize IAW MIL-A-8625
Type III, Class 2, Polytetrafluoroethylene (PTFE) Impregnated, 0.0012 in-0.0018 in THK
Color: Black

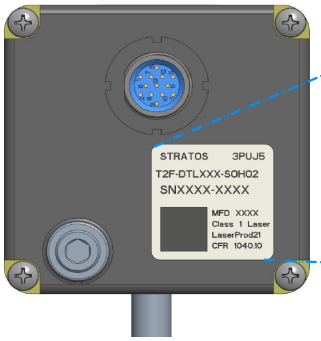
External O-Ring

Standard EMI O-Ring
Silicone Elastomer
Binder with silver aluminum conductive
Filler IAW MIL-DTL-83528G
Color: Light beige or blue (Color depending on supplier)

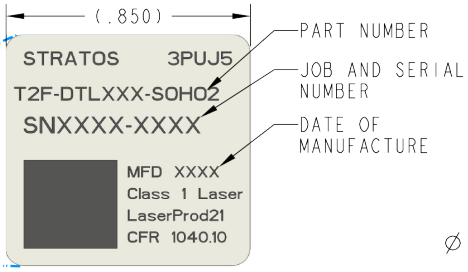
Other external O-rings (non-conductive/non-EMI available by request)

Label

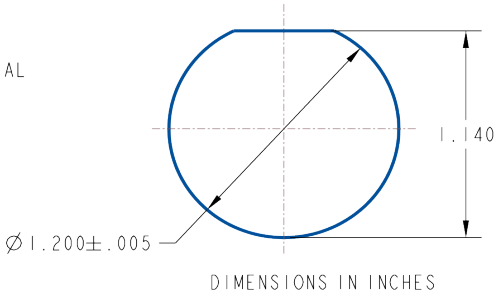
Label Position



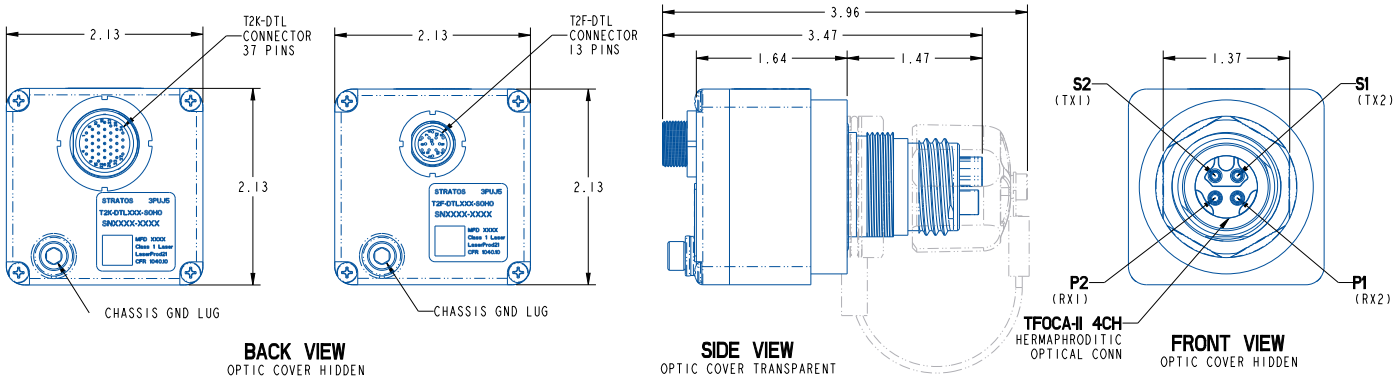
Label Detail



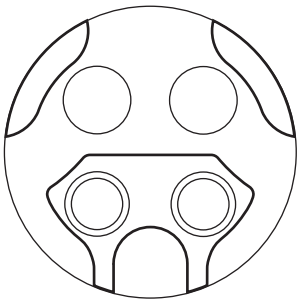
Bulkhead Cutout Dimension



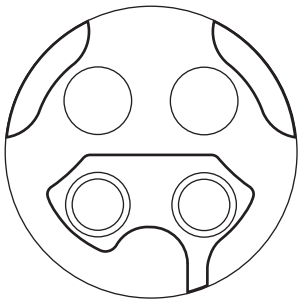
Mechanical Dimensions (inches)



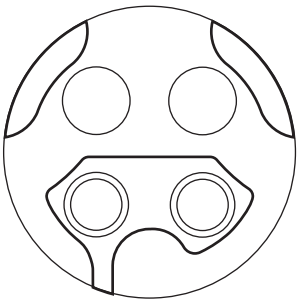
TFOCA Connector Key Options



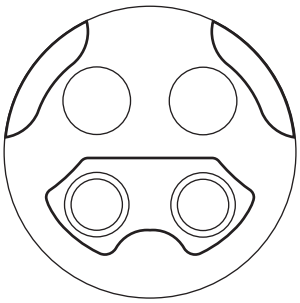
Default
(Standard Key)



Key Option K2



Key Option K3



Key Option K4
(Universal)

The T2 Series Media Converters are normally offered with the Default (Standard) Key on the TFOCA optical connector. Other Key options are available, consult the factory for alternate Key part numbers.

Environmental Compliance

Category	Standard	Conditions
Operating Temperature	MIL-STD-810, Method 501 & 502	-40°C ~ +71°C
Thermal Shock	MIL-STD-810, Method 503	-40°C ~ +71°C
High Temp Operating Life	MIL-STD-202G, Section 108A	1000 hrs @ +71°C
Vibration	MIL-STD-810, Method 514.6	16.9 GRMS, 3 Axes, 1 hr Per Axis
Mechanical Shock	MIL-STD-810, Method 516.6	20G Peak, 18 ms
Humidity	MIL-STD-810, Method 507.5	85% RH, -32°C ~ +27°C
Altitude	MIL-STD-810, Method 500	40,000 ft Transport
MTBF	MIL-HDBK-217FN2	100,000 hrs, 30°C GB Environment

Regulatory Compliance

Requirement	Feature	Condition	Notes
MIL-STD-883-3015.7	ESD	Class II	2200 V
IEC-801-2	ESD	Human Body Model	25 kV
IEC-801-3	EMI	Immunity	10 V/M
FCC	EMI	Class A	>20 dB
IEC-825 ISSUE 1993-11	Eye safety	Class 1	
FDA CDRH 21-CFR 1040	Eye safety	Class 1	

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