STILETTO SERIES

PCB MOUNTED OPTICAL DUAL TRANSMITTER, 10 G BASE-SR, 10 GIGABIT ETHERNET APPLICATIONS, MULTIMODE, 850 nM

Stiletto series optical fiber transmitters consist of optoelectronic transmitter functions integrated into a pluggable Duplex LC compliant receptacle connector. The optical transmitters are 850 nM 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.

Stiletto series optical fiber transmitters support the 2-wire serial communication protocol as defined in SFF-8472, offering end user access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power and transmitter supply voltage. It also defines alarm and warning flags, to alert end users when particular operating parameters are outside of a factory defined normal range.

The electrical interface to the Stiletto optical transceivers is a Samtec SMT connector with a 20 position footprint.

MOOG

STILETTO SERIES SMT / PCB MOUNTED OPTICAL TRANSMITTER, 10 GBE, 10GBASE-SR / SFI OR sFPDP APPLICATIONS, MULTIMODE, 850 NM VCSELS

Duplex Optical Transmitter Unit
Dual TX Channel Operating at 10.125 Gbps

FEATURES

• Compliant with 10 Gigabit Ethernet - 10GBase-SR

• Compliant SFF-8472 digital diagnostic

• Optical fiber link distances up to 300 meters (50 / 125μ 2,000 MHz*Km MMF - OM3)

• Maximum optical channel bit error rate less than 1×10^{-12}

• Operating temperature range from -40° to +85° C

• Nickel plated brass shell meets stringent corrosion performance requirements

• Die cast housings are strong, durable and light weight

• Duplex LC compliant optical fiber connector interface

• Threaded PCB retention features provide secure mounting in high shock and vibration environments

APPLICATIONS

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

• 10 Gigabit Ethernet switches and peripheral

• sFPDP data links

• Video displays

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

ORDERING INFORMATION	
Application	Part Number
Dual Transmitters @ 10.125 Gbps	R45N-2T1K

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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

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Operating Temperature	T_A	-40		+85	°C
Power Supply Voltage	V_{CC}	+3.135		+3.465	V
Power Supply Noise (p-p)	N_P			200	mV
TX Differential Input Voltage (p-p)	V_D	0.25		2.2	V

ENVIRONMENTAL OPERATING CONDITIONS

Requirement	Feature	Condition	Notes
RTCA / D0-160E	ESD	HBM	2200 V
RTCA / D0-160E	Damp Heat	10 Cycles	24 Hours
EIA-455-25	Mating Durability	500 Cycles	< 0.5 dB Change
FDA / CDRH / IEC-825-1	Eye Safety	Class 1	No Safety Interlocks Required

MATERIALS

Item	Detail	Notes
Metal Shell	Nickel Plated Brass	
Die Cast Body	Zamak 5	
Connector Pins	Brass	
Connector Pin Plating	Gold Over Nickel	
Alignment Sleeves	Composite Polymer	
Printed Circuits	Polyimide / FR-4	
PCB Conformal Coating	Type AR	
Threaded Mounting Posts	Stainless Steel	

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OPTICAL TRANSMITTERS T_A = OPERATING TEMPERATURE RANGE, V_{CC} = 3.135 V TO 3.465 V					
Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Output Power (BER < 10^{-12})	P_O	-5.0		-1.0	dBm
Optical Output Wavelength	λ_{OUT}	840	850	860	nM
Spectral Width	$\Delta\lambda_{RMS}$			0.45	nM
Extinction Ratio	ER	3.0	5.5		dB

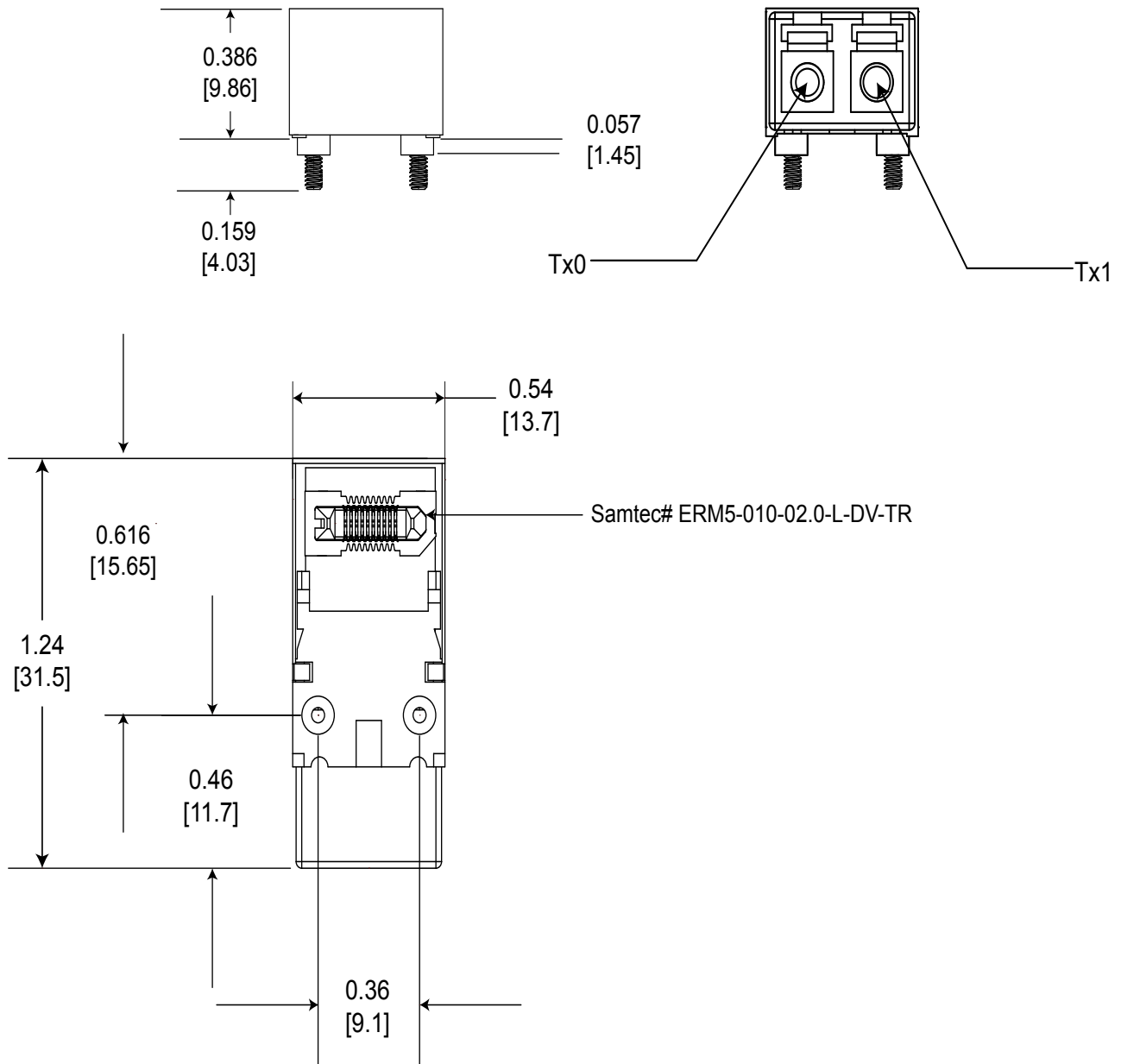| POWER SUPPLY CURRENT T_A = OPERATING TEMPERATURE RANGE, V_{CC} = 3.135 V TO 3.465 V					
Parameter	Symbol	Minimum	Typical	Maximum	Unit
Supply Current Per Port	I_{CCT}		300	400	mA

OPTICAL FIBER LINK DISTANCES					
Cable Type	62.5 / 125μ 160 MHz*Km	62.5 / 125μ 200 MHz*Km	50 / 125μ 400 MHz*Km	50 / 125μ 500 MHz*Km	50 / 125μ 2,000 MHz*Km
Maximum Supported Link Distance - Meters	26	33	66	82	300

STILETTO SERIES SMT / PCB MOUNTED OPTICAL TRANSMITTER, 10 GBE, 10GBASE-SR / SFI OR sFPDP APPLICATIONS, MULTIMODE, 850 NM VCSELS
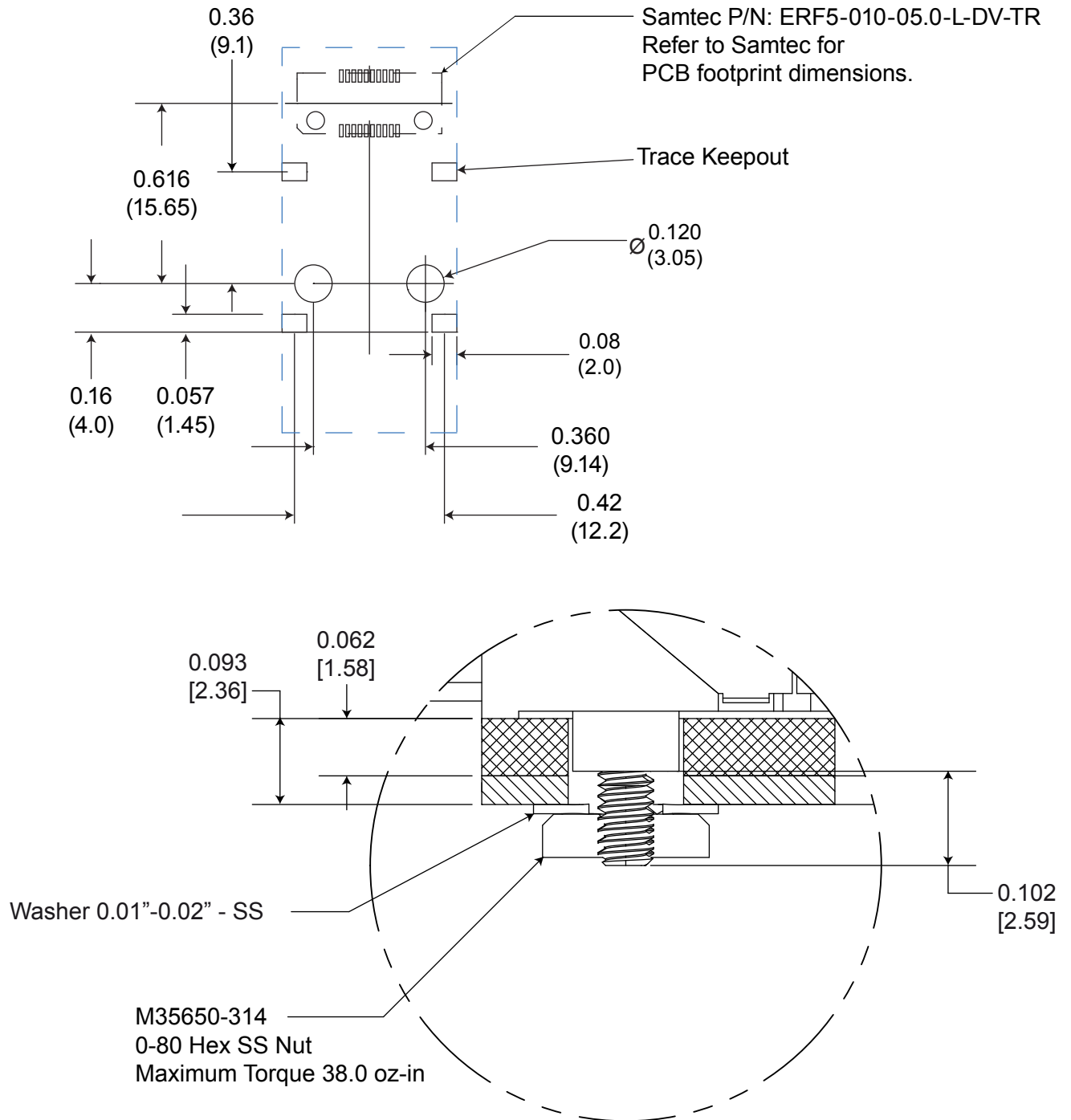
0.386
[9.86]

0.057
[1.45]

0.159
[4.03]

Tx0

Tx1

0.54
[13.7]

Samtec# ERM5-010-02.0-L-DV-TR

0.616
[15.65]

1.24
[31.5]

0.46
[11.7]

0.36
[9.1]

Dimensions are shown as: inches [mm]

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PRINTED CIRCUIT BOARD FOOTPRINT

0.36
(9.1)

Samtec P/N: ERF5-010-05.0-L-DV-TR
Refer to Samtec for
PCB footprint dimensions.

Trace Keepout

0.616
(15.65)

Ø 0.120
(3.05)

0.08
(2.0)

0.16
(4.0)

0.057
(1.45)

0.360
(9.14)

0.42
(12.2)

0.093
[2.36]

0.062
[1.58]

0.102
[2.59]

Washer 0.01"-0.02" - SS

M35650-314
0-80 Hex SS Nut
Maximum Torque 38.0 oz-in

Dimensions are shown as: inches (mm)

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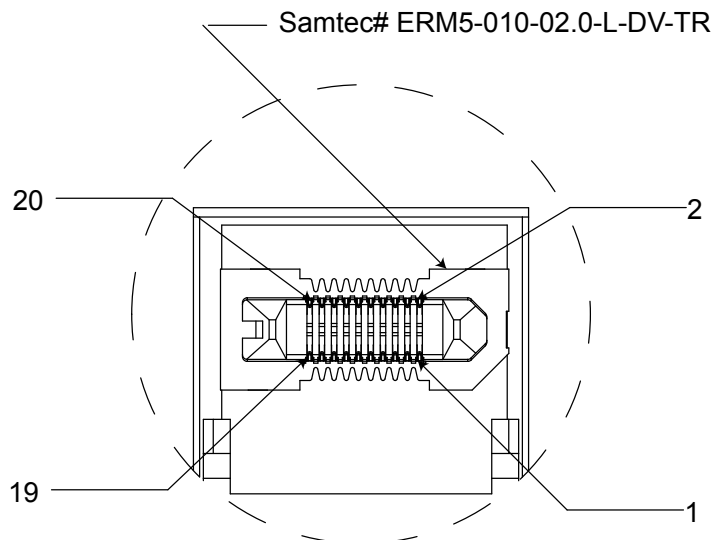
ELECTRICAL PIN FUNCTIONS - COMPONENT BOTTOM VIEW INDICATED

Samtec# ERM5-010-02.0-L-DV-TR

CONNECTOR VIEW

Pin Number	Symbol	Port	Description	Logic Family
1	TX-	0	Transmitter DATA In -	CML
2	TX_Fault	0	Transmitter Fault Indicator	General Purpose Output - 3.3 V / 5 mA
3	TX+	0	Transmitter DATA In +	CML
4*	TX_Fault	1	Transmitter Fault Indicator	General Purpose Output - 3.3 V / 5 mA
5**	SCL	All	2-wire Serial Interface Clock	I2C
6	GND	All	Ground - Isolated from Case	N/A
7	SDA	All	2-wire Serial Interface Data	I2C
8	TX_DIS	0	Transmitter Disable	CMOS Internal 50 KΩ Pull-up
9	VCC	All	Power Supply	N/A
10	GND	All	Ground - Isolated from Case	N/A
11	GND	All	Ground - Isolated from Case	N/A
12	TX_Dis	1	Transmitter Disable	CMOS Internal 50 KΩ Pull-up
13	GND	All	Ground - Isolated from Case	N/A
14	GND	All	Ground - Isolated from Case	N/A
15	VCC	All	Power Supply	N/A
16	NC	—	Factory Connect Only	N/A
17	TX-	1	Transmitter Data In -	CML
18	NC	—	Factory Connector Only	N/A
19	TX+	1	Transmitter Data In +	CML
20	NC	—	Factory Connector Only	N/A

*Pin 4 - 2 Wire Serial Interface Data line (for DDM), pins are open-collector and require pullup resistors

**Pin 5 - 2 Wire Serial Interface Clock line (for DDM), pins are open-collector and require pullup resistors
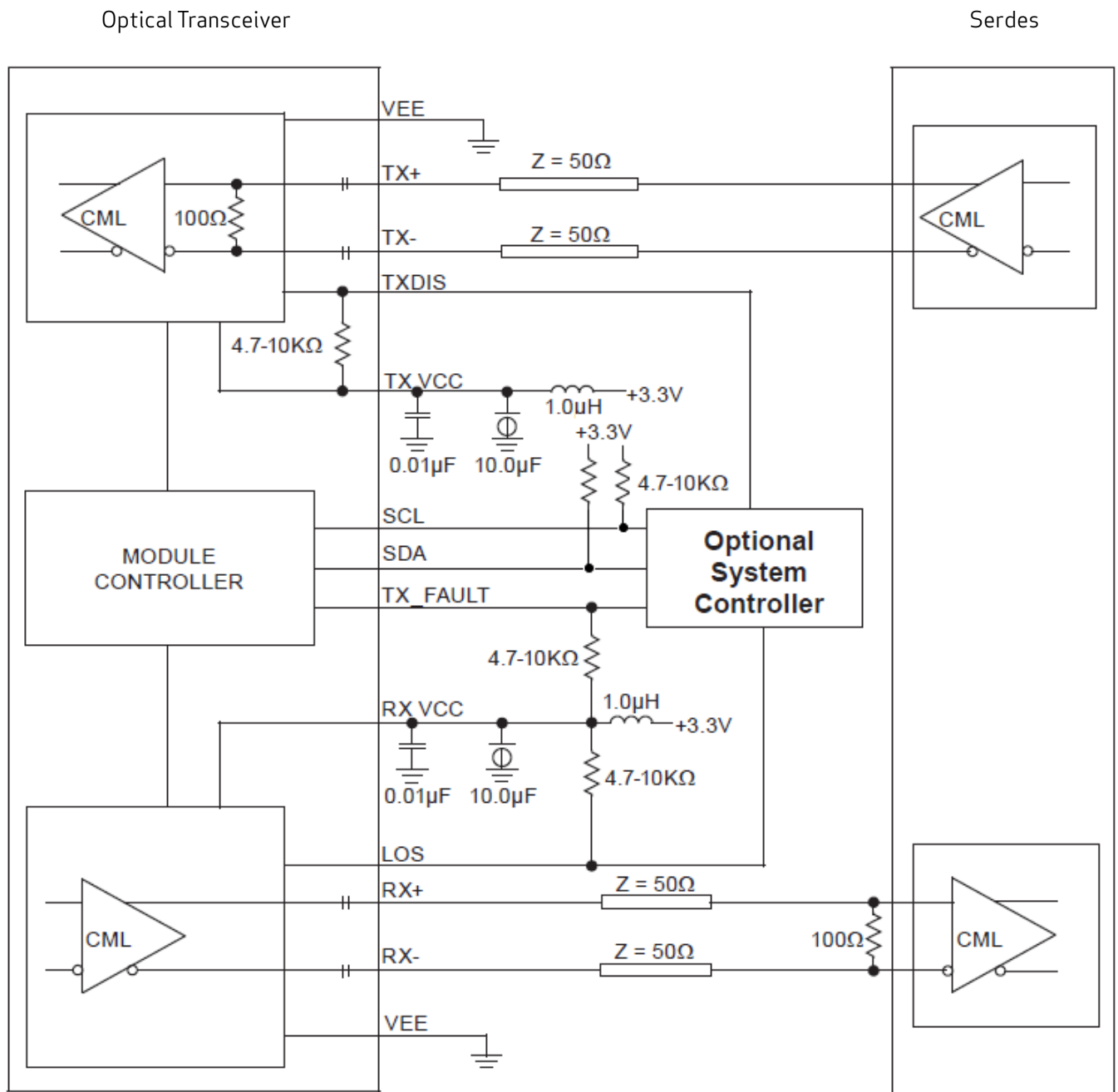
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Byte	Hex	Description	Byte	Hex	Description
		TWO-WIRE INTERFACE ID: DATA FIELDS – ADDRESS A0H			
0	03	Identifier (type)	37	D8	Vendor OUI
1	04	Extended Identifier (GPBIC/SFP Func defined)	38	EE	Vendor OUI
2	07	Connector (LC Fiber Optic Connector)	39	78	Vendor OUI
3	10	Transceiver (10G BASE-SR)	40	52	"R" Vendor PN ASCII Character
4	00		41	34	"4" Vendor PN ASCII Character
5	00		42	35	"5" Vendor PN ASCII Character
6	00		43	4E	"N" Vendor PN ASCII Character
7	00		44	2D	"-" Vendor PN ASCII Character
8	00		45	32	"2" Vendor PN ASCII Character
9	00		46	54	"T" Vendor PN ASCII Character
10	00		47	31	"1" Vendor PN ASCII Character
11	06	Encoding (64/66B encoded data)	48	4B	"K" Vendor PN ASCII Character
12	67	Signal Rate (10.3125 Gbps)	49	20	" " Vendor PN ASCII Character
13	00		50	20	" " Vendor PN ASCII Character
14	00		51	20	" " Vendor PN ASCII Character
15	00		52	20	" " Vendor PN ASCII Character
16	08	Length 50 um OM2 (80 meters)	53	20	" " Vendor PN ASCII Character
17	03	Length 62.5 um OM1 (30 meters)	54	20	" " Vendor PN ASCII Character
18	00		55	20	" " Vendor PN ASCII Character
19	1E	Length OM3 (300 meters)	56	01	" " Vendor REV ASCII Character
20	4D	"M" Vendor ASCII Character	57	00	" " Vendor REV ASCII Character
21	4F	"O" Vendor ASCII Character	58	00	" " Vendor REV ASCII Character
22	4F	"O" Vendor ASCII Character	59	00	" " Vendor REV ASCII Character
23	47	"G" Vendor ASCII Character	60	03	Hex Byte of Laser Wavelength
24	20	" " Vendor ASCII Character	61	52	Hex Byte of Laser Wavelength
25	50	"P" Vendor ASCII Character	62		RESERVED
26	52	"R" Vendor ASCII Character	63		Checksum or bytes 0 to 62
27	4F	"O" Vendor ASCII Character	64	00	
28	54	"T" Vendor ASCII Character	65	1A	Hardware TX_Disable, TX_Fault, RX_LOS
29	4F	"O" Vendor ASCII Character	66	00	
30	4B	"C" Vendor ASCII Character	67	00	
31	52	"R" Vendor ASCII Character	68 - 83		Serial Number ASCII Characters
32	41	"A" Vendor ASCII Character	84 - 91		Manufacturer Date Code ASCII Characters
33	46	"F" Vendor ASCII Character	92	68	Diagnostic Monitoring Type
34	54	"T" Vendor ASCII Character	93	F0	Enhanced Options
35	20	" " Vendor ASCII Character	94	03	SFF-8472 Rev Compliance
36	00	Code for Electronic or optical compatibility	95		Checksum for bytes 64-94
			96 - 255	00	

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APPLICATION SCHEMATIC

Optical Transceiver

Serdes

CML

100Ω

VEE

Z = 50Ω TX+

Z = 50Ω TX-

TXDIS

4.7-10KΩ

TX VCC

0.01µF   10.0µF

1.0µH   +3.3V

+3.3V

4.7-10KΩ

CML

MODULE CONTROLLER

SCL

SDA

TX_FAULT

Optional System Controller

4.7-10KΩ

RX VCC

0.01µF   10.0µF

1.0µH   +3.3V

4.7-10KΩ

LOS

CML

RX+   Z = 50Ω

RX-   Z = 50Ω

100Ω   CML

VEE

MOOG
PROTOKRAFT

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