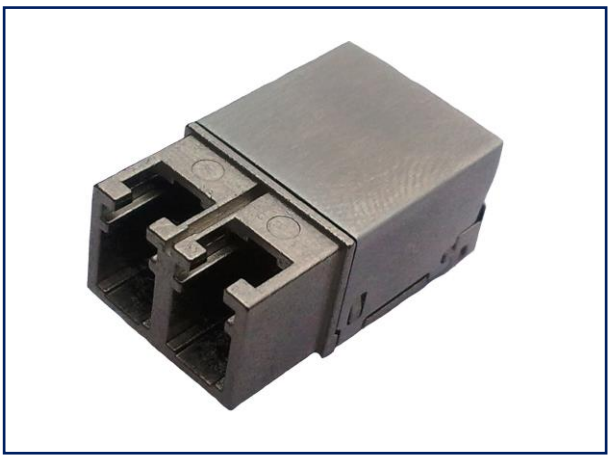
Features:

- 1.25Gb/s duplex data links
- 1310nm Defocused FP Transmitter and PIN Receiver
- Class 1 Laser Int. Safety Std. IEC-60825-1 compliant
- 1 x 10 surface mount connector
- Metal LC connector receptacle with secure optical elements
- -40°C to +85°C operating temperature
- Single +3.3V power supply
- AC-Coupled Transmitter and Receiver Data
- Conformal coated for harsh environment use
- Tested over the operating temperature range



The RJ-1G-DX is ideal for harsh environment connectivity because of its low cost, availability, and wide operating parameters

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Note
Maximum Supply Voltage	V_{CC}	-0.5	4.5	V	
Storage Temperature	T_{sto}	-55	100	°C	
Case Operating Temperature	T_{OP}	-40	85	°C	
Relative Humidity	RH	0	85	%	Based on conformal coating
Hand Lead Soldering Temperature			260	°C	10 seconds leads only, Note 3
Conformal Coating		0.8	1.2	mil	See ruggedization notes

NOTES:

1) RJ transceivers may be water washed. The process must be followed by an 80°C bake for one hour to ensure drying of any water inside the shell.
2) The components should not undergo Reflow Soldering under any circumstances.

General Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Data Rate	BR		1.25		Gbps	8b10b standard encoding

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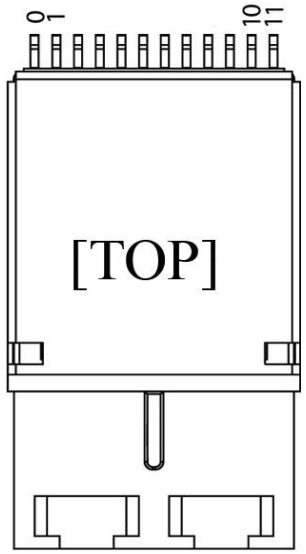
Electrical Specifications (T_{OP} = -40 to 85˚C, V_{CC} = 3.14 to 3.47 Volts)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Supply Voltage	V_{CC}	3.135	3.3	3.465	V	
Total Module Power Dissipation	P_{DISS}			1.25	W	
Transmitter						
Supply Current	I_{CC}			200	mA	
Input differential impedance	R_{in}		100		Ω	CML
Tx Differential Input Voltage	V_{TX}	200		2400	mV	CML
Transmit Disable Voltage	V_D	2.0		V_{CC}	V	LVTTL
Transmit Enable Voltage	V_{EN}	V_{EE}		V_{EE} +0.8	V	LVTTL
Receiver						
Supply Current	I_{CC}			160	mA	
Rx Single-Ended Output Voltage	V_{RX}	300		470	mV	
Signal Detect Assert	SD_{norm}	2.0		V_{CC}	V	LVTTL
Signal Detect De-assert	SD_{fault}	V_{EE}		V_{EE} +0.8	V	LVTTL

Pin Configuration



PIN #	Symbol	Description	Logic Family
0	SCL	2-Wire Interface Clock	I2C
1	TD+	Transmitter DATA In +	CML
2	V_{EET}	Transmitter Signal Ground	N/A
3	TD-	Transmitter DATA In -	CML
4	V_{CCT}	Transmitter Power Supply	N/A
5	SD	Signal Detect output Satisfactory Optical Input: Logic “1” Output Fault Condition: Logic “0” Output	LVTTL
6	T_{DIS}	Transmit Disable input Logic 1 = Disable Optical Output Logic 0 = Enable Optical Output	LVTTL
7	RD+	Receiver DATA Out +	CML
8	V_{CCR}	Receiver Power Supply	N/A
9	RD-	Receiver DATA Out -	CML
10	V_{EER}	Receiver Signal Ground	N/A
11	SDA	2-Wire Interface Data	I2C

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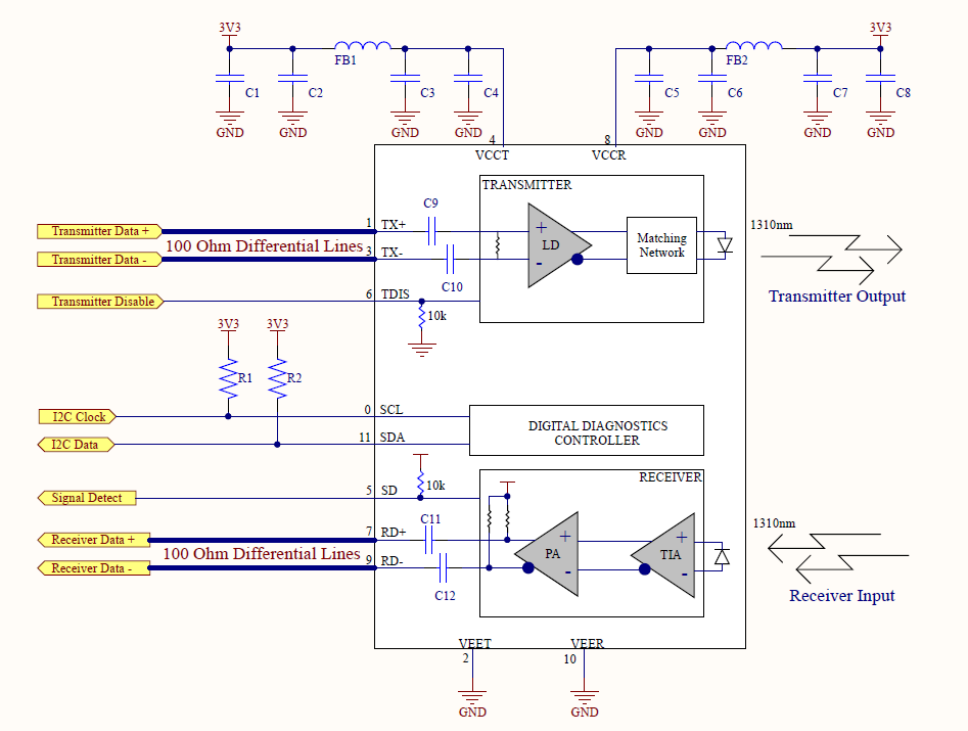
Optical Characteristics (T_{OP} = -40 to 85˚C, V_{CC} = 3.14 to 3.47 Volts)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Optical Output Power	P_{OUT}	-6.5		-3.0	dBm	62.5 MMF
Optical Center Wavelength	λ	1270	1310	1355	nm	
Spectral Width	$\Delta\lambda_{FWHM}$			1	nm	
Extinction Ratio:	ER	9			dB	
Optical Rise/Fall Time	t_r/t_f			300	ps	20%-80%
Receiver						
Receiver Sensitivity	RX_{SENS}			-21	dBm	PRBS 2^7-1, BER = $1E^{-12}$
Receiver Overload	P_{OL}	0				
Receiver Wavelength Range	λ	1200	1310	1620	nm	1310nm center wavelength
Return Loss	RL	12			dB	
Signal Detect Assert	P_A			-19	dBm	
Signal Detect De-Assert	P_D	-30			dBm	
Signal Detect Hysteresis	SD_{HYS}	1		5	dB	

Application Schematics

Host Board Application Schematic



Notes:

- Recommend host routes separate supply voltages and filtering for RJ-module transmitter and receiver as shown in the schematic above:
  - FB1/FB2 ferrite bead for power supply noise suppresion; Murata BLM18KG601SN1, 0603, 600Ω @ 100MHz, 1300mA .
  - C1/C4/C5/C8 bulk capacitance; Murata GRM21BR61C106KE15L, 0805, 10µF, 16V.
  - C2/C3/C6/C7 de-coupling capacitors; Murata GRM155R71C104KA88D, 0402, 0.1µF, 16V.
- R1/R2 2-wire bus pull-up resistors required on host for implementing optional digital diagnostics; 4.7kΩ to 10kΩ.
- Screw or solder posts are not internally connected to signal ground. Recommend screw or solder posts be connected to chassis ground if available, otherwise they should be tied to local signal ground.
- For host with LVPECL electrical interface contact COTSWORKS' applications engineering.

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Address A0h Data Fields

A0h Address (dec)	# Bytes	Name	Description	Value (hex)
Base ID Fields				
00	1	Identifier	Type of transceiver	02
01	1	Ext. Identifier	Extended identifier of type of transceiver	04
02	1	Connector	Code for connector type	07
03	8	Transceiver	Code for electronic or optical compatibility	04
04				00
05				00
06				12
07				22
08				00
09				0C
10				01
11	1	Encoding	Code for high speed serial encoding algorithm	01
12	1	BR, Nominal	Nominal signalling rate, units of 100 MBd	0C
13	1	Rate Identifier	Type of rate select functionality	00
14	1	Length (SMF, km)	Link length supported for single mode fiber, units of km	00
15	1	Length (SMF)	Link length supported for single mode fiber, units of 100 m	00
16	1	Length (50um)	Link length supported for 50 um OM2 fiber, units of 10 m	37
17	1	Length (62.5um)	Link length supported for 62.5 um OM1 fiber, units of 10 m	1C
18	1	Length (OM4 or copper cable)	Link length supported for 50um OM4 fiber, units of 10m. Alternatively copper or direct attach cable, units of m	64
19	1	Length (OM3)	Link length supported for 50 um OM3 fiber, units of 10 m	37
20	16	Vendor Name	SFP vendor name (ASCII)	43
21				4F
22				54
23				53
24				57
25				4F
26				52
27				4B
28				53
29				20
30				20
31				20
32				20
33				20
34				20
35				20
36	1	Transceiver	Code for electronic or optical compatibility	00
37	3	Vendor OUI	SFP vendor IEEE company ID	00
38				00
39				00
40	16	Vendor PN	Part number provided by SFP vendor (ASCII)	52
41				4A
42				02

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43				47
44				44
45				58
46				XX
47				XX
48				XX
49				XX
50				XX
51				XX
52				XX
53				XX
54				XX
55				XX
56	4	Vendor rev	Revision level for part number provided by vendor (ASCII)	30
57				30
58				30
59				30
60	2	Wavelength	Laser wavelength	05
61				1E
62	1	Unallocated		00
63	1	CC_BASE	Check code for Base ID Fields (addresses 0 to 62)	XX
Extended ID Fields				
64	2	Options	Indicates which optional transceiver signals are implemented	10
65				14
66	1	BR, max	Upper bit rate margin, units of %	00
67	1	BR, min	Lower bit rate margin, units of %	00
68	16	Vendor SN	Serial number provided by vendor (ASCII)	XX
69				XX
70				XX
71				XX
72				XX
73				XX
74				XX
75				XX
76				XX
77				XX
78				XX
79				XX
80				XX
81				XX
82				XX
83				XX
84	8	Date code	Vendor's manufacturing date code	XX
85				XX
86				XX
87				XX
88				XX
89				XX
90				20
91				20
92	1	Diagnostic Monitoring Type	Indicates which type of diagnostic monitoring is implemented (if any) in the transceiver	68
93	1	Enhanced Options	Indicates which optional enhanced features are implemented (if any) in the transceiver	70

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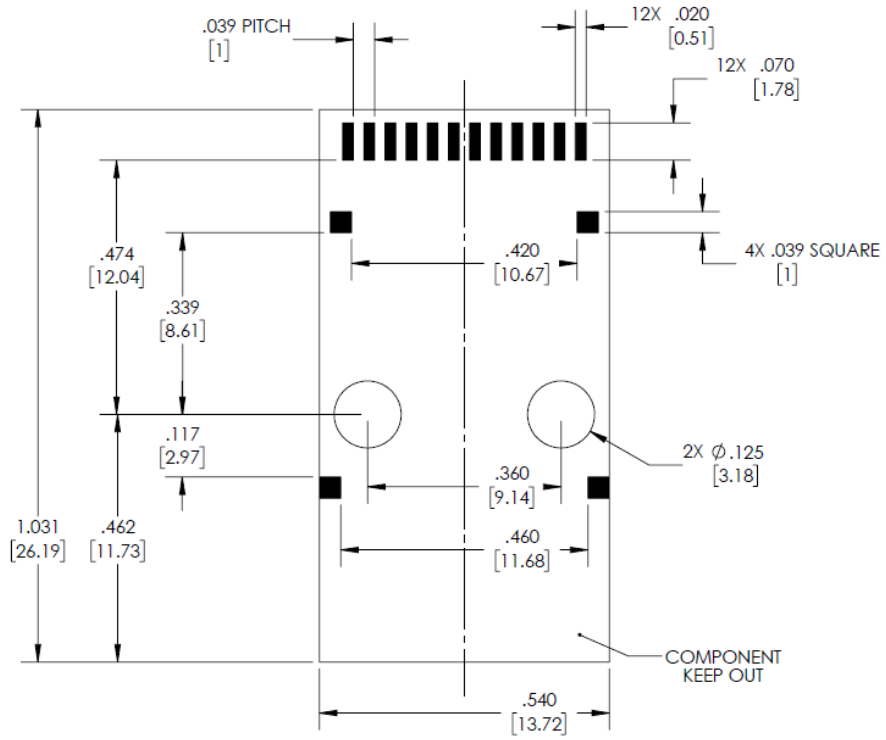
94	1	SFF-8472 Compliance	Indicates which revision of SFF-8472 the transceiver complies with	08
95	1	CC_EXT	Check code for the Extended ID Fields (addresses 64 to 94)	XX

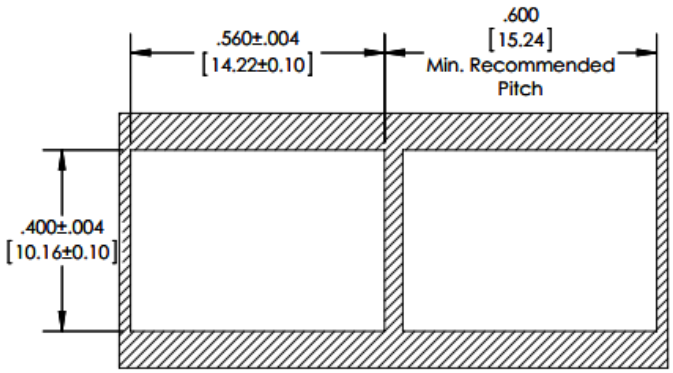
PCB Design Guidelines



Notes:

1) Pads 0 and 11 are optional pins that are only required for the digital diagnostics option.
2) Pads 1-10 need to be designed in for every COTSWORKS RJ transceiver.

Panel Cutout



Minimum recommended pitch is 0.600"

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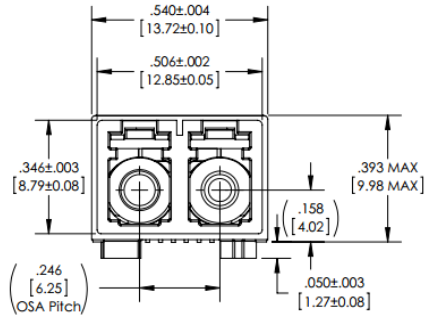
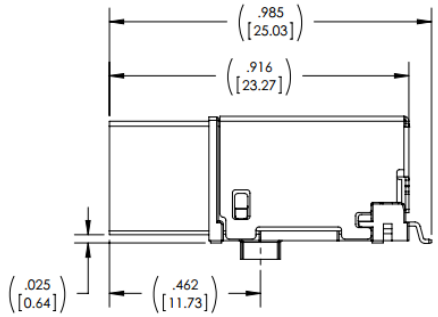
Screw Post Mechanical Dimensions

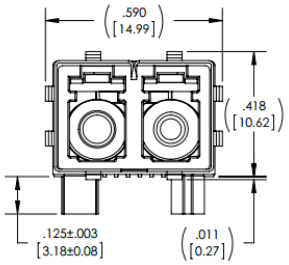


Front View, dimensions in mm (inches)

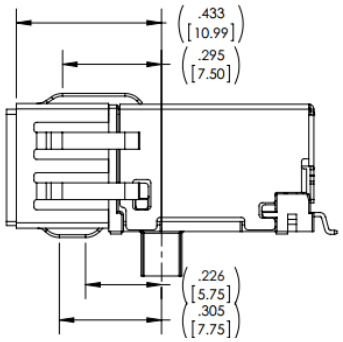


Side View, dimensions in mm (inches)

Solder Post Mechanical Dimensions

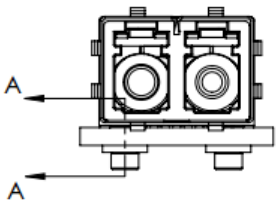


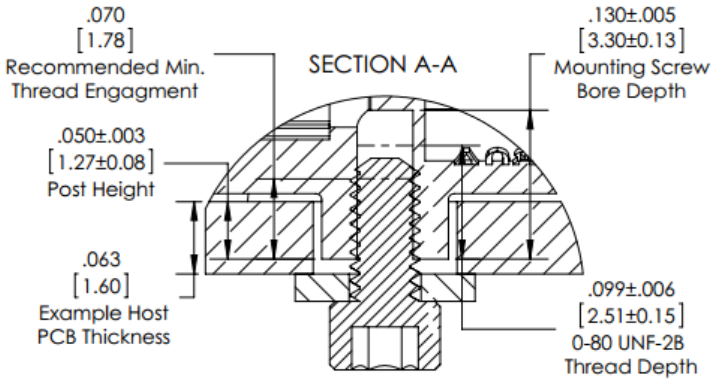
Front View, dimensions in mm (inches)



Side View, dimensions in mm (inches)

Mounting Hardware Guidelines





Notes:

1. An example illustrating a possible hardware combination to secure RJ-155M-FX to host PCB
2. For further mounting hardware options and support contact COTSWORKS Application Engineering
3. When installing the RJ module
   - i. install the washers and partially tighten the screws,
   - ii. solder the leads, and
   - iii. tighten the screws

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Ruggedization Notes

- Parylene C coating can be used for conformal coating with a 1.0 mil ± 0.2 mil thickness through a deposition process. It has a 5600 VPM rating, withstands temperatures of 350°F, and is extremely resistant to oil/dirt, and object impact.
- This part can come in a pigtail fiber optic version.
- Contact COTSWORKS for all MSDS, case composition, and burn analysis.

Reference Information

1) IEEE Standard 802.3, 2002 Edition
2) Directive 2002/95/EC of the European Council Parliament and of the Council, "on the restriction of the use of certain hazardous substances in electrical and electronic equipment." January 27, 2003

Regulatory Compliance

- COTSWORKS transceivers are Class 1 Laser Products and comply with US FDA regulations.
- These products are designed to comply with TÜV and Class 1 eye safety requirements of EN (IEC) 60825 and the electrical safety requirements of EN (IEC) 60950.
- This part has an option for compliance with Directive 2002/95/EC covering restriction on certain hazardous substances (RoHS). It invokes item 5 of the Annex which allows "Pb in the glass of cathode ray tubes, electronic components, and fluorescent tubes." This part may contain Pb for components such as lenses, windows, isolators, and other electronic components

Warnings:

Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended.

Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

Ordering Information

RJ-1G-DX	-x	-DPLX-xx	-x	-x	-x	-x	-x	-x
RJ Form Factor	**Pins & Diagnostics**	**Receptacle Type**	**Ruggedized Coating**	**Operating Temp (°C)**	**EMI Shield?**	**RoHS Level**	**Mounting**	**ATEX & IECEx Cert.**
1.25 Gbps Max Data Rate	(): *1x10 No DDMI*	LC: *LC Receptacle*	(): *Non-coated*	A: -40 *to 85*	(): No *Shield*	(): Lvl *5*	(): *Imperial*	T: *Certified*
(MMF)	*D*: *1x12 DDMI*	LX: *ARINC-801 Receptacle*	R: *Parylene*		E: *Shield*	6 *Lvl 6*	U: *Metric* P: *Solder Posts*	(): *Not Certified*

Example part number: RJ-1G-DX-DPLX-LC-R-A
[1G RJ Form Factor Transceiver, 1310nm, digital diagnostics, Duplex LC connectors, Parylene-coated, industrial operating temp range, Imperial Screw Posts**]**

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