050-412

PRODUCT BRIEF

50 MHZ TO 6 GHZ
PRINTED CIRCUIT BOARD (PCB) MOUNTED
RF-OVER-FIBER RECEIVER
LOW-NOISE CONFIGURATION
SMALL & COMPACT WITH RUGGED CONSTRUCTION FOR HARSH ENVIRONMENTS

20U2-xxxx

050-412 Product Brief
PCB Mount RF-over-Fiber Receiver
50 MHz – 6 GHz

For reference only

Glenair 050-412 is a compact low noise PCB Mount "RF-over-Fiber" Receiver that has useful RF bandwidth from 50 MHz to 6 GHz with excellent Spurious Free Dynamic Range (SFDR) performance when used in conjunction with 050-411 RF-over-Fiber Transmitter. The 050-412 mechanical design is suited to the harsh temperature and vibration environments found in Military, Aerospace, Railway, Oil and Gas, and Industrial applications. The device is an optical to RF converter that resides in an enclosed, EMI shielded package which interfaces with a host board through a high speed electrical PCB Mount connector. The Optical to RF receiver includes a high speed PIN photodiode and Low Noise RF amplifiers.

APC fiber optic contact is standard. Other connector options are available.

KEY FEATURES/BENEFITS

- Rugged PCB Mount design
- 50 MHz to 6 GHz Bandwidth
- Low Noise
- High Spurious Free Dynamic Range (SFDR) link in conjunction with 050-411
- PCB mount module is securely mounted with screws to ensure excellent shock and vibration performance
- Captive screws to simplify manufacturing logistics and assembly
- High-Speed electrical plug-in connector eliminates the need for soldering or coax cable interfaces, and enables ease of servicing
- -40°C to +85°C Operating Case Temperature
- Evaluation fixture available

APPLICATIONS

- Harsh Environments such as: Airborne, Tactical, Railway, Industrial, Oil and Gas, and Shipboard applications

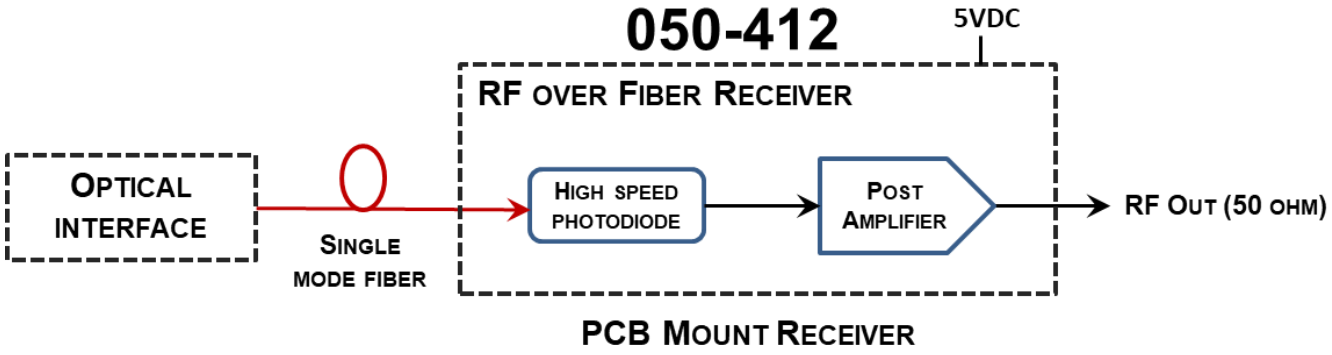
HOW TO ORDER Table 1 Part Number Options

Part Number	Fiber Pigtail Modifier	Fiber Length
050-412 Receiver	Blank = SMF Fiber pigtail (0.5m-2m), SC/APC -GHD = Glenair High Density, APC Contact (181-047-1255C), SMF pigtail	Blank (0.5m-2m) -xxxx Order in increments of 0.5” Example: 0185 = 18.5” See tolerances

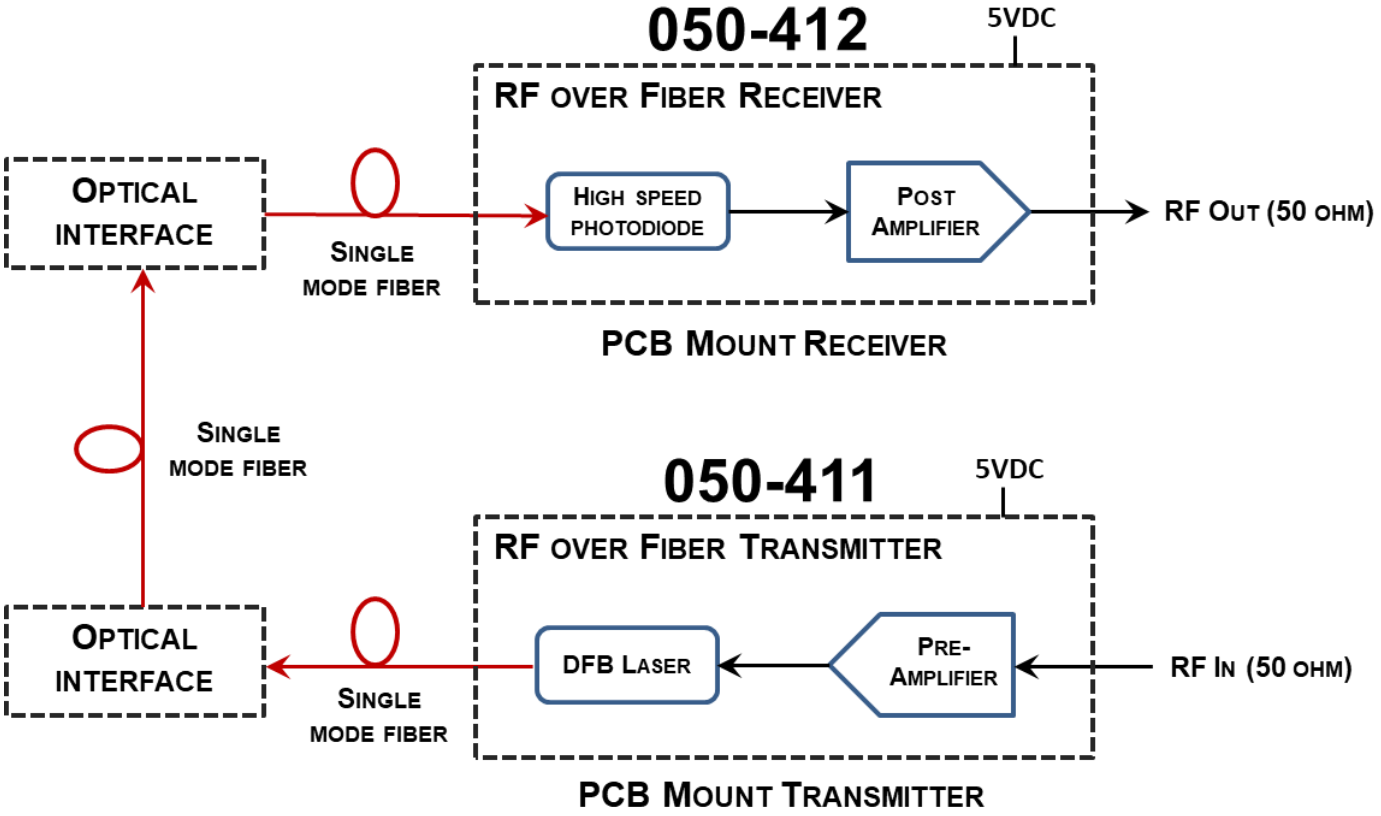
Example PNs:
050-412 = Receiver, SC/APC, 0.5m to 2m SMF pigtail length
050-412-GHD-0185 = Receiver, GHD APC Contacts, 18.5” SMF pigtail length

Standard Tolerances for Fiber Pigtail	
Length	**Tolerance**
4” to 12”	+0.5 inches to -0 inches
12” to 24”	+1 inches to -0 inches
24’ to 35”	+3 inches to -0 inches

Functional Block Diagram



RF Over Fiber Link:



 REV: 1 US Cage Code 06324 Printed in USA

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Ratings and Specifications:

TABLE 2 ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Typ.	Max	Units	Notes
Storage Temperature	T_S	-55	--	+85	°C	
Supply Voltage	V_{CC}	4.5	--	5.5	V	
Maximum Optical Input Power	P_{OPT}_Max	--	--	+10	dBm	

TABLE 3 OPERATING CONDITIONS

Parameter	Symbol	Min	Typ.	Max	Units	Notes
Operating Temperature, Case	T_{OP}	-40	--	+85	°C	
Supply Voltage	V_{CC}	4.95	5.0	5.05	V	
Supply Current	I_{CC}	--	98	150	mA	

TABLE 4 RF LINK CHARACTERISTICS - 050-411 Transmitter and 050-412 Receiver with Optical Power = 5.5 dBm at 25°C

Parameter	Symbol	Min	Typ.	Max	Units	Notes
RF Link Gain	G	-2	0	2	dB	At 25°C measured with 050-411 (Transmitter)
Frequency Response	FR	--	±2.5	--	dB	At 25°C measured with 050-411 (Transmitter)
High Frequency Cutoff	HFC	--	6000	--	MHz	At 25°C measured with 050-411 (Transmitter)
Low Frequency Cutoff	LFC	30	50	--	MHz	At 25°C measured with 050-411 (Transmitter)
Input Third-Order Intercept @ 1 GHz	IIP3	--	20	--	dBm	-10 dBm/tone, at 25°C measured with 050-411 (Transmitter)
Input Third-Order Intercept @ 6 GHz	IIP3	--	10	--	dBm	-10 dBm/tone, at 25°C measured with 050-411 (Transmitter)
Noise Figure @ 1 GHz	NF	--	20	--	dB	At 25°C measured with 050-411 (Transmitter)
Noise Figure @ 6 GHz	NF	--	28	--	dB	At 25°C measured with 050-411 (Transmitter)
3rd Order Spurious-Free Dynamic Range @ 1 GHz	SFDR	--	115	--	$dB/Hz^{2/3}$	-10 dBm/tone, at 25°C measured with 050-411 (Transmitter)
3rd Order Spurious-Free Dynamic Range @ 6 GHz	SFDR	--	104	--	$dB/Hz^{2/3}$	-10 dBm/tone, at 25°C measured with 050-411 (Transmitter)

TABLE 5 ELECTRO-OPTICAL CHARACTERISTICS – RECEIVER (T_{OP} UNLESS NOTED OTHERWISE)

Parameter	Symbol	Min	Typ.	Max	Units	Notes
Optical Input Power	Pin	--	--	5	dBm	
Detection Wavelength	λ	1100	--	1650	nm	
Receiver Output Impedance	Zout	--	50	--	Ohms	AC coupled Internally
Output Return Loss	RL	--	10	--		

Ratings and Specifications: (Continued)

TABLE 6 COMPLIANCE SPECIFICATIONS (TO BE CONFIRMED)

CHARACTERISTIC	Standard	Condition	Notes
Mechanical Shock	MIL-STD-810	Para. 516.6, proc. I, 650g	0.9 ms Operating
Mechanical Vibration	MIL-STD-810	Para. 514.6, 40g rms	Random, Operating
ESD	MIL-STD-883		1000V HBM
Flame Resistance	MIL-STD-1344	Method 1012, Cond. B	30 Seconds
Altitude	RTCA DO160G		
Altitude, 25Kft		Section 4.6.1 Category B1	Operating Altitude, 25,000 ft
Altitude, 70Kft		Section 4.6.1 Category E1	Operating Altitude, 70,000 ft
Decompression		Section 4.6.2 Category A2	Operating Altitude, 45,000 ft
Overpressure		Section 4.6.3 Category A1	28 Psi
Damp Heat	RTCA DO160G MIL-STD-1344	Section 6 Category A Method 1002.2, Cond. B	48 Hours, Non-Operational 10 Cycles, 24 Hours, Operational
Eye Safety	IEC 60825-1:2007/ EN 60825-1:2007	Class 1M Laser Product	

TABLE 7 J1: PIN ASSIGNMENTS
CONNECTOR: SAMTEC LSS-110-01-L-DV-A

See datasheet for details

FIGURE 1 - OUTLINE DRAWING

See datasheet for details

Table 8 Two-Wire interface ID: Data Fields – Address A2h

Byte # Decimal	Data Notes
0-95	Reserved
96	Temperature MSB (Note 1)
97	Temperature LSB (Note 1)
98	Vcc MSB (Note 2)
99	Vcc LSB (Note 2)
104	Rx Pavg MSB (Note 5)
105	Rx Pavg LSB (Note 5)
105-255	Reserved

Notes:
1. Temperature (Temp) is decoded as a 16 bit signed twos compliment integer in increments of 1/256 °C.
2. Supply voltage (V_{CC}) is decoded as a 16 bit unsigned integer in increments of 100 µV.
4. Transmitted average optical power (Tx Pwr) is decoded as a 16 bit unsigned integer in increments of 0.1 µW.
5. Received average optical power (Rx Pwr) is decoded as a 16 bit unsigned integer in increments of 0.1 µW.

TABLE 9 DIGITAL DIAGNOSTIC MONITOR CHARACTERISTICS (WHEN APPLICABLE)

PARAMETER	SYMBOL	MIN.	UNITS	NOTES
Receiver Internal Temperature Accuracy	TINT	±3.0	°C	Temperature is measured internal to the module and is valid from -40°C to +85 °C case temperature
Receiver Internal Supply Voltage accuracy	VINT	±0.1	V	Supply voltage is measured internal to the module and can, with less accuracy, be correlated to the voltage at the Vcc pin. Valid over 5V ±5%

FIGURE 1 - OUTLINE DRAWING CONTINUED (MARKING)

LABELING:

Each unit will be shipped in an antistatic bag. The label on the antistatic bag shall be at a minimum Arial size 10 black font and contain at a minimum the following information:

ANTISTATIC BAG LABEL:
Glenair
Cage Code (06324)
Part Number (PN 050-412 as required)
Date Code (DC xxxx)
Serial Number (SN 123456)

Each unit will be marked, either with a label or laser engraving, as follows:

- Marking font to be Arial, greater than .08 inches in height.
- Marking:
  FIRST LINE OF TEXT
  - Glenair
  - Serial Number (6 digits)

  SECOND LINE OF TEXT:
  - Part number

Example:

GLENAIR SN123456
050-412

ACCESSORIES

PCB Mount Threaded Insert Fasteners, PN 050-00XX

EVALUATION Board, PN 050-404-EVALBOARD

Includes:

- Assembled circuit board with mating connector to mount module
  - SMA connector for RF port access
  - DC Power & I2C connection test points
  - Status LED's
- SC/APC to SC/APC Adapter to connect to Transmitter