

# OC-48/STM-16 RECEIVER WITHOUT CLOCK RECOVERY

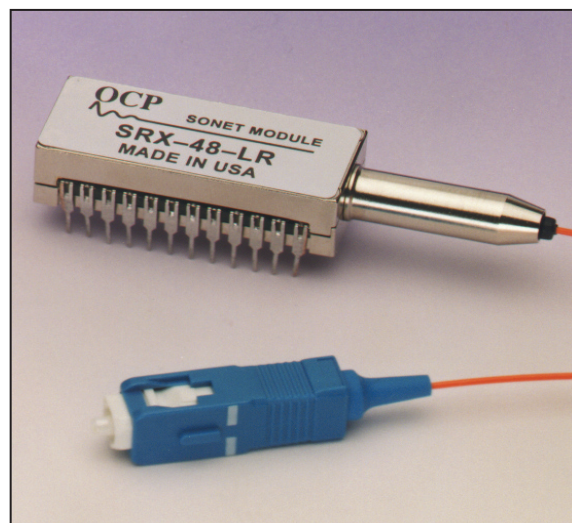
## SRX48 Series

### Product Description

The SRX48 modules are receivers designed to meet or exceed the SONET/SDH optical interface requirements at OC-48/STM-16 (2.488 Gb/s) data rate. Three performance versions are available which are fully compliant with Short Reach, Intermediate Reach and Long Reach specifications at 1300 nm or 1550 nm wavelength.

The receiver for the Short Reach and Intermediate Reach version uses PIN photodiodes. For the Long Reach version, InGaAs avalanche photodiodes (APDs) are used to achieve high sensitivity. The Long Reach receiver features a low noise GaAs transimpedance IC with AGC capability to provide an extremely wide dynamic range. The DATA outputs are differential signals designed to be AC-coupled into 50 ohm load. A TTL Signal Detect function which indicates loss of optical input and an analog Received Optical Power Monitor output are also provided.

All receiver modules can be operated with a single +5V supply. The operating temperature range is -40°C to +85°C for the Short Reach and Intermediate Reach version and 0°C to +70°C for the Long Reach version. All receivers are housed in a 24-pin dual-in-line metal package with a fiber pigtail (single mode fiber for Long Reach version and 50/125 μm multimode fiber for Short Reach and Intermediate Reach versions), which is terminated with MU, LC, ST, FC or SC connector.



### Features

- Fully compliant with SONET/SDH OC-48 (2.5 Gb/s) specifications
- Long Reach 1310 nm & 1550 nm as well as Intermediate Reach and Short Reach
- Internal temperature-compensated High Voltage APD Supply (Long Reach version)
- 40°C to +85°C Operating Temperature (Intermediate Reach and Short Reach)
- 24-pin DIP metal package
- MU, LC, FC, ST, SC-connectorized fiber pigtails
- Differential DATA interface
- Received Optical Power Monitor function
- TTL SIGNAL DETECT output
- Single +5 V supply

### Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Units
Storage Temperature	$T_{ST}$	- 40	+ 85	°C
Operating Case Temperature	"I" option ("SR" & "IR" only)	- 40	+ 85	°C
	"H" option	0	+ 70	
Maximum Optical Input Power ("LR" only)	$P_{in,max}$	-	- 5.0	dBm
Supply Voltage	$V_{CC}$	0	+ 6.0	V
Input Voltage	$V_{IN}$	0	$V_{CC}$	V
Lead Soldering Temperature & Time	-	-	260°C, 10 sec	

**Receiver Performance Characteristics** (Over Operating Case Temperature.)

Parameter		Symbol	Minimum	Typical	Maximum	Units	
Data Rate		$B$	0.1	2.488	3.0	Gb/s	
Receiver Sensitivity ( $10^{-10}$ BER) <sup>1</sup>	Short & Intermediate Reach	$P_{min}$	- 20.0	- 24.0	-	dBm	
	Long Reach		- 28.0	- 32.0	-		
Maximum Input Optical Power ( $10^{-10}$ BER) <sup>1</sup>	Short Reach (SR)	$P_{max}$	- 3.0	- 1.0	-	dBm	
	Intermediate Reach (IR)		0	2.0	-		
	Long Reach (LR)		- 8.0	-	- 6.0		
Signal Detect Thresholds	SR & IR	Increasing Light Input	$P_{sd+}$	-	-	- 20.0	dBm
		Decreasing Light Input	$P_{sd-}$	- 35.0	-	-	
	LR	Increasing Light Input	$P_{sd+}$	-	-	- 28.0	dBm
		Decreasing Light Input	$P_{sd-}$	- 42.0	-	-	
Signal Detect Hysteresis		-	0.5	1.0	-	dB	
Optical Power Monitor	LR ( $P_{in}$ from -28 dBm to -17 dBm)	$V_{PM}$	-	6.4	-	mV/ $\mu$ W	
	IR & SR ( $P_{in}$ from -20 dBm to 0 dBm)	$I_{PM}$	-	0.8	-	$\mu$ A/ $\mu$ W	
Wavelength of Operation		$\lambda$	1100	-	1600	nm	

<sup>1</sup> Specified in Average Optical Input Power and measured at 2.48832 Gb/s and 1300 nm or 1550 nm wavelength with  $2^{23}-1$  PRBS.

**Receiver Electrical Interface**

Parameter		Symbol	Minimum	Typical	Maximum	Units
Supply Voltage		$V_{CCA}, V_{CCD}$	4.75	5.0	5.25	V
Supply Current	SR & IR	$I$	-	195	250	mA
	LR		-	225	275	
Output Voltage Swing (DATA)		$V_{PP}$	0.4	0.5	1.0	V
Output HIGH Voltage (SIGNAL DETECT)		$V_{OH}$	2.7	-	$V_{CC}$	V
Output LOW Voltage (SIGNAL DETECT)		$V_{OL}$	0	-	0.7	V

**Related OC-48/STM-16 Transceiver & Receiver Modules**

STX-48	: Transmitter Module (24-pin DIP)
SRC-48	: Receiver Module with Clock Recovery (24-pin DIP)
DTR-2488-SM	: Transceiver without Clock Recovery (industry standard 1x9 package)
DTR-2488-SM2	: Transceiver without Clock Recovery (industry standard 2x9 package)
DTC-48	: Transceiver with Clock Recovery (industry standard 2x9 package)

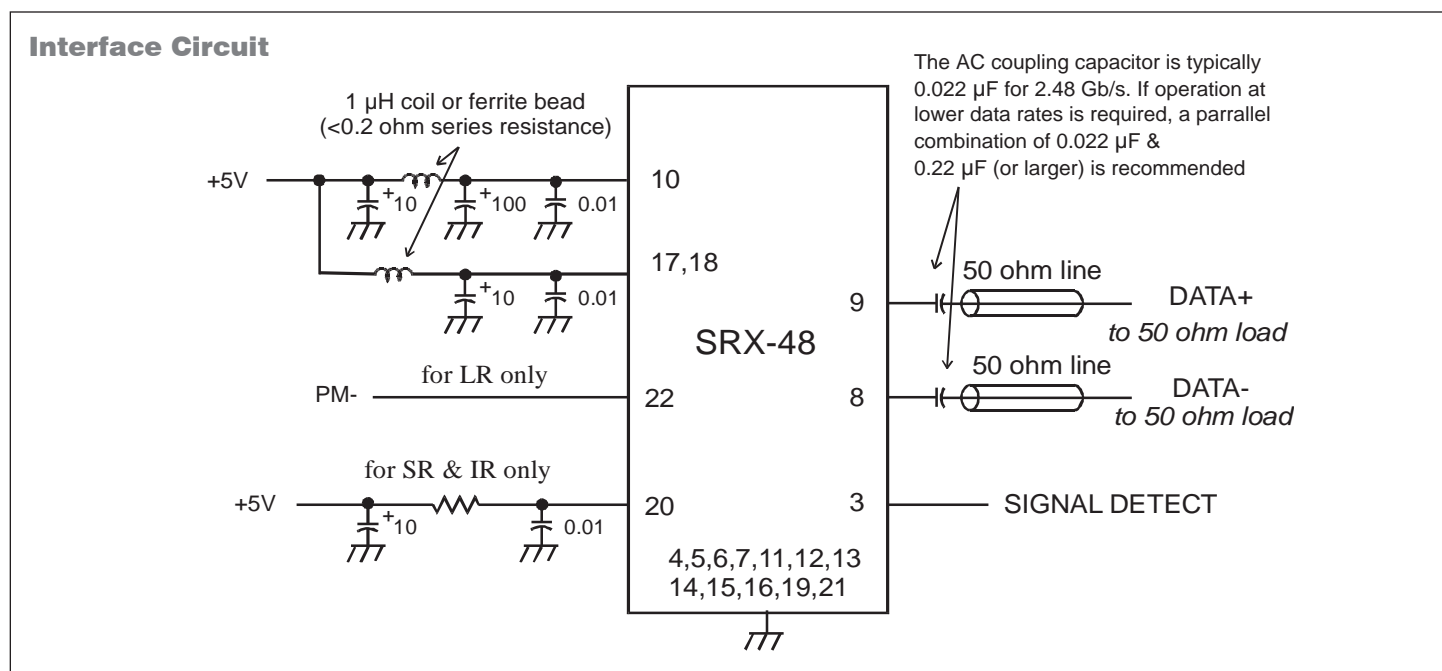
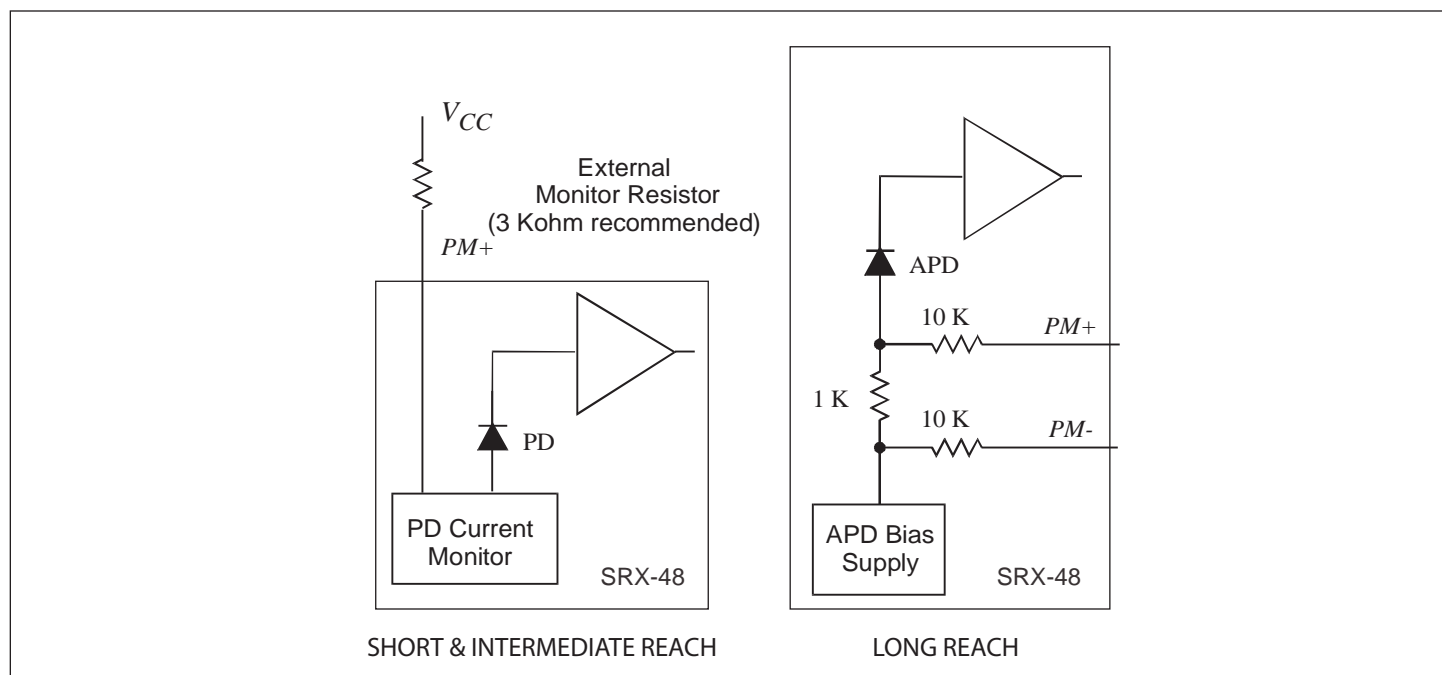
**Application Notes**

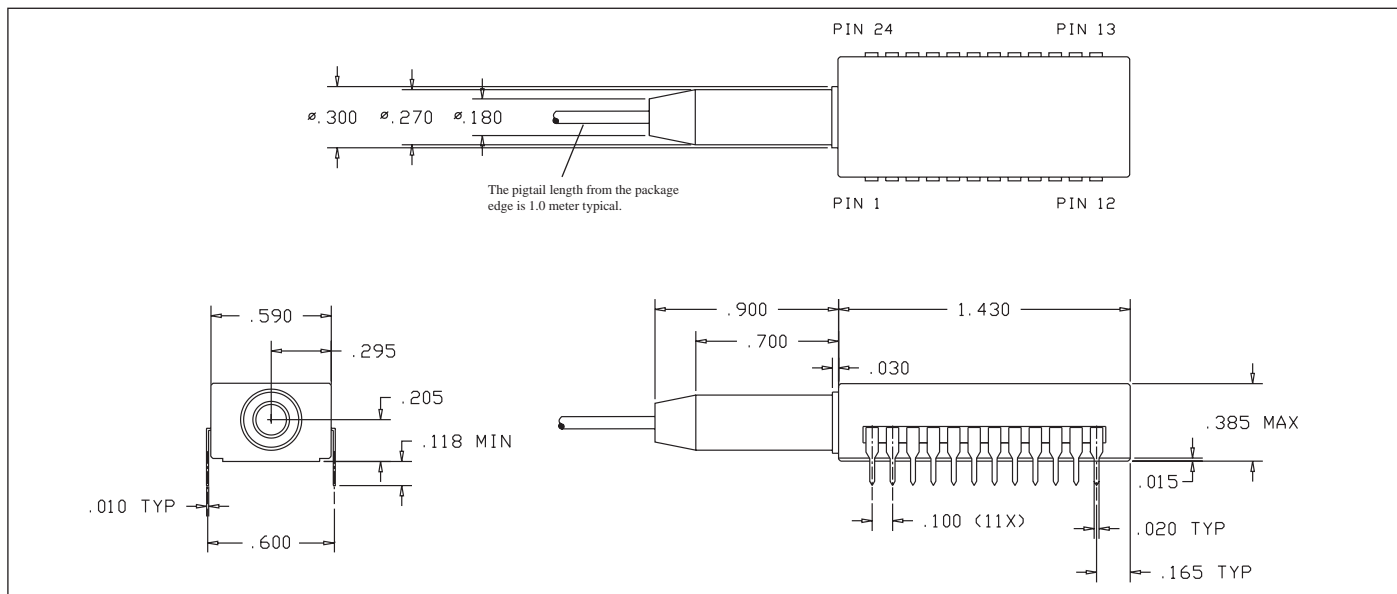
The receiver converts the incident optical power to a photocurrent via a high performance P-I-N photodiode (Short and Intermediate Reach version) or an avalanche photodiode (Long Reach version). For the Short and Intermediate Reach version, the photocurrent can be monitored via the voltage drop across an external resistor connected between PM+ and  $V_{CC}$ . For the Long Reach version, the photocurrent can be monitored via the differential voltage across the two PM+ and PM- output pins. It is important to note that the Common Mode voltage of these two monitor outputs (i.e. DC voltages at PM+ and PM-) is high (-60 V typical). The APD Bias Voltage

is temperature compensated to ensure stable operation over the entire operating temperature range.

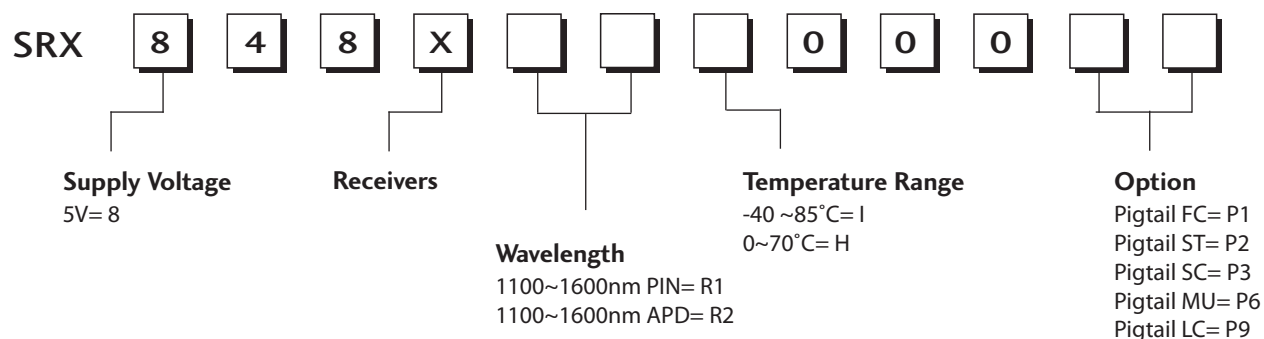
The DATA outputs are differential signals designed to be AC-coupled into 50 ohm load. Transmission lines are recommended for best performance.

The Signal Detect circuit monitors the level of the incoming optical signal and generates a TTL logic LOW signal at the SIGNAL DETECT output when insufficient photocurrent is produced. No termination resistor is required for the SIGNAL DETECT output.



**Package Outline (Dimension in inches)**

**Pinout Assignments**

PIN	FUNCTION	PIN	FUNCTION
1	N/C (NO CONNECTION)	24	N/C (NO CONNECTION)
2	N/C (NO CONNECTION)	23	N/C (NO CONNECTION)
3	SD (SIGNAL DETECT)	22	PM- (for LR), N/C (for SR & IR)
4	GND	21	GND
5	GND	20	PM+
6	GND	19	GND
7	GND	18	V <sub>CCA</sub> (V <sub>CC</sub> ANALOG)
8	DATA OUTPUT -	17	V <sub>CCA</sub> (V <sub>CC</sub> ANALOG)
9	DATA OUTPUT +	16	GND
10	V <sub>CCD</sub> (V <sub>CC</sub> DC-DC converter)	15	GND
11	GND	14	GND
12	GND (DC-DC converter)	13	GND

**Ordering Information**


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