

# FRO0AxAR

## RedLink® Fiber Optic Analogue Receiver



### Datasheet



#### DESCRIPTION

The Firecomms Analogue Receiver is based on a highly reliable photodiode which generates a current proportional to the fiber coupled incident light. It is encapsulated in a clear plastic over-mold which forms a lens suitable for coupling to 1mm Plastic Optic Fiber (POF). The receiver is housed in a blue plastic housing which is UL rated flame retardant (UL 94 V-0).

The housing is compatible with the Versatile Link style fiber plug, and is ideal for use with POF.

The receiver operates over the industrial temperature range of -40 °C to +85 °C supporting many industrial applications where reliable command, control and sensing response is required in electrically harsh environments.

The receiver can be used as a simple light sensing device or as part of a communications link by combining the output with an external transimpedance amplifier. The frequency response allows it to be used in application from DC to 250 Mbps (125 MHz, Min UI 4 ns).



#### FEATURES

- Silicon Photodiode
- Industrial temperature range -40 °C to +85 °C
- RoHS compliant and flame retardant (UL 94 V-0) connector housings
- Detects DC to 250 Mbps
- Horizontal, Vertical and 30° Tilted options available
- Compatible with Versatile Link cables and connectors

#### AVAILABLE OPTIONS

Package Type	Part Number
RedLink® Analogue Receiver, Horizontal Package	FRO0AHAR
RedLink® Analogue Receiver, Vertical Package	FRO0AVAR
RedLink® Analogue Receiver, Tilted Package	FRO0AWAR

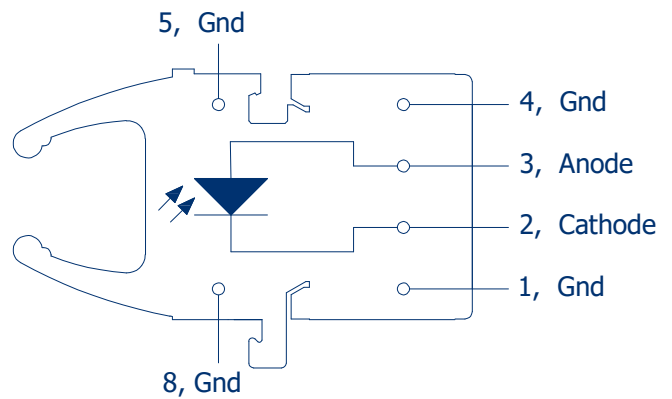
#### APPLICATIONS

<b>Application</b>	Motor Control, Voltage Isolation, Drives, Inverters, Industrial Control, Gaming, Medical Sensing
<b>Standard</b>	Low-speed serial RS232, RS485, CAN Bus, Modbus, Profibus
<b>Distance</b>	Application specific, contact Firecomms technical support for link design consultation
<b>Speed</b>	DC to 250 MBd (NRZ)

## SPECIFICATIONS

**Table 3**  
**RECEIVER PIN DESCRIPTION**

Pin	Name	Symbol
1	Not Connected internally / Gnd	GND
2	PD CATHODE	RD -
3	PD ANODE	RD +
4	Not Connected internally / Gnd	GND
5	Retaining Pin	GND
8	Retaining Pin	GND



**FIGURE 1**  
Receiver pin-out, top view

**NOTE:** Pins 5 and 8 are used for mounting and retaining purposes. It is recommended that pins 5 and 8 be connected to ground.

**Table 4**  
**REGULATORY COMPLIANCE**

Parameter	Symbol	Standard	Level
Electrostatic Discharge, Human Body Model (contact ESD)	HBM	Mil-STD-883	Level 2 (4 kV)
UL Certification	UL	60950-1	File No. E362227
Storage Compliance	MSL	J-STD-020	2a (4-week floor life)
Restriction of Hazardous Substances Directive	RoHS	Directive 2011/65/EU	Certified compliant

## SPECIFICATIONS

**Table 5**  
**ABSOLUTE MAXIMUM RATINGS**

*These are the absolute maximum ratings at or beyond which the FOT can be expected to be damaged*

*Notes:*

1. 260 °C for 10 seconds, one time only, at least 2.2 mm away from lead root

Parameter	Symbol	Minimum	Maximum	Unit
Storage Temperature	T <sub>stg</sub>	-40	+85	°C
Operating Temperature	T <sub>op</sub>	-40	+85	°C
Soldering Temperature [1]	T <sub>slid</sub>		+260 <sup>[1]</sup>	°C
Storage Compliance	MSL		2a	J-STD-020
Reverse Voltage	V <sub>R</sub>		+25	V
Electrical Power Dissipation	P <sub>tot</sub>		100	mW

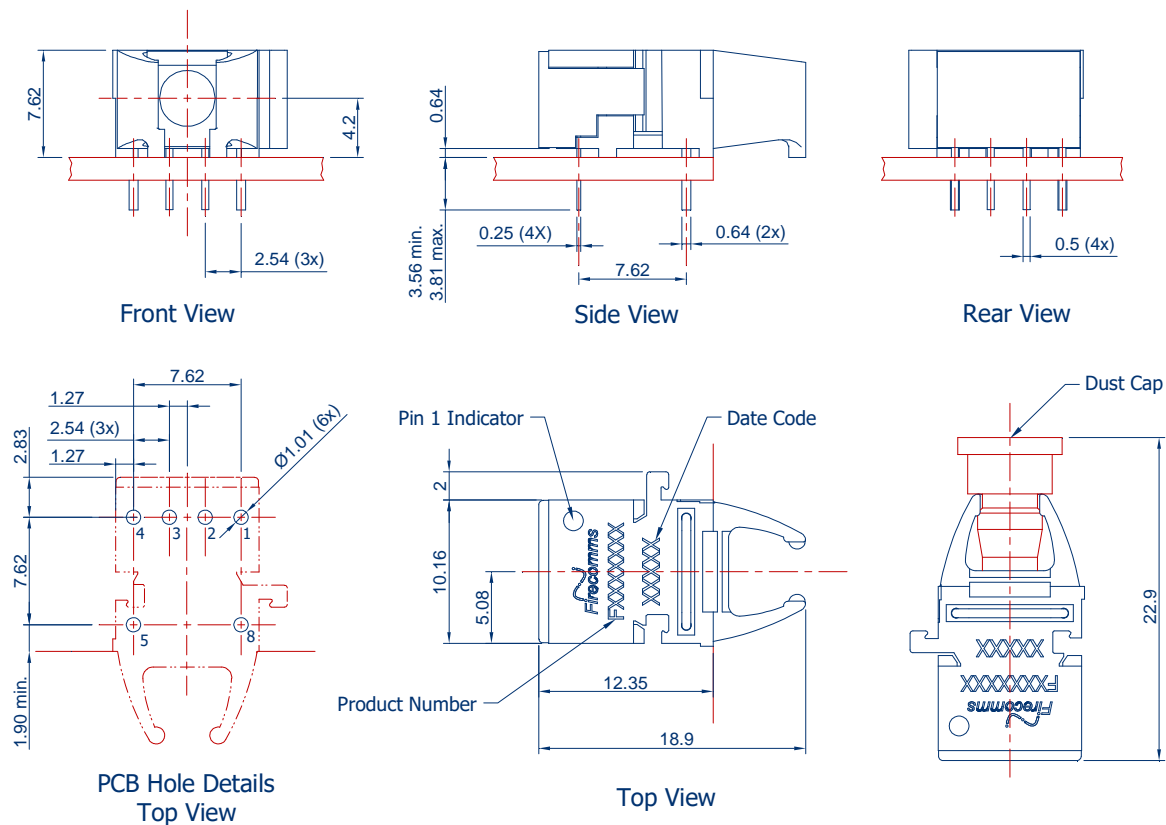
**Table 6**  
**RECEIVER ELECTRICAL AND OPTICAL CHARACTERISTICS**

*Test Conditions:*

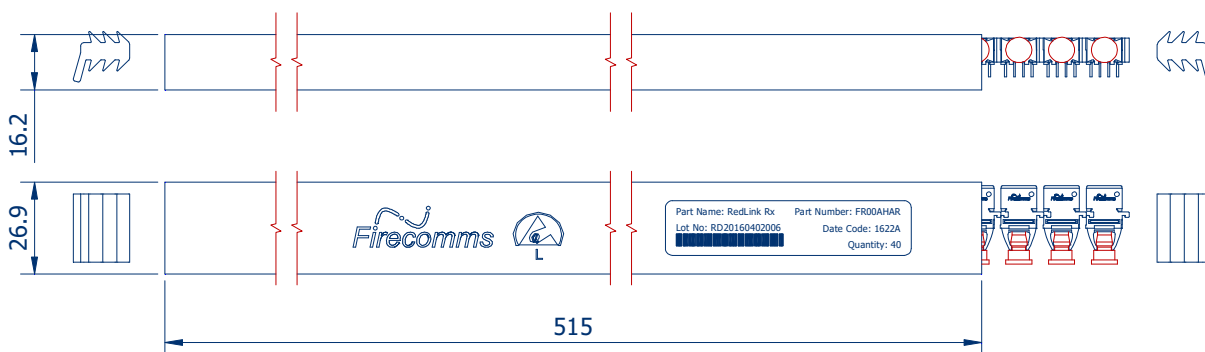
1. Test data was validated over the full temperature range of -40 °C to +85 °C, unless otherwise noted.  
Typical data are at +25 °C
2. Input power levels are for peak (not average) optical input levels. For 50 % duty cycle data, peak optical power is twice the average optical power. Optical power for POF is measured when coupled into 0.5 m of a 1 mm diameter 0.5 NA POF and a large area detector
3. Responsivity R = Photocurrent/POF emitted optical power (A/W)

Parameter	Symbol	Min	Typical	Max	Unit	Test Condition
Responsivity Spectral Range	$\lambda$	400	650	1000	nm	Responsivity (R) > 10 % of R <sub>MAX</sub>
Responsivity	R		0.3	0.42	A/W	$\lambda = 650 \text{ nm}$
Dark Current	IR			0.2	nA	Testing at 5 V at 25 °C
Noise Spectral Density			6		fA/√Hz	
Rise time (20 % - 80 %)	t <sub>r</sub>		1	4	ns	V <sub>r</sub> = 3.5V to 5V, 25 °C, R <sub>L</sub> = 50 Ω
Fall time (80 % - 20 %)	t <sub>f</sub>		1		ns	V <sub>r</sub> = 3.5V to 5V, 25 °C, R <sub>L</sub> = 50 Ω
Capacitance	C <sub>0</sub>		2		pF	

## MECHANICAL DATA, HORIZONTAL



**FIGURE 2**  
Mechanical dimensions of the horizontal connectors and PCB footprint, which is a top view  
General dimensional tolerance is  $\pm 0.2$  mm



**FIGURE 3**  
Packing tube for Firecomms Horizontal RedLink® Receivers

## MECHANICAL DATA, VERTICAL

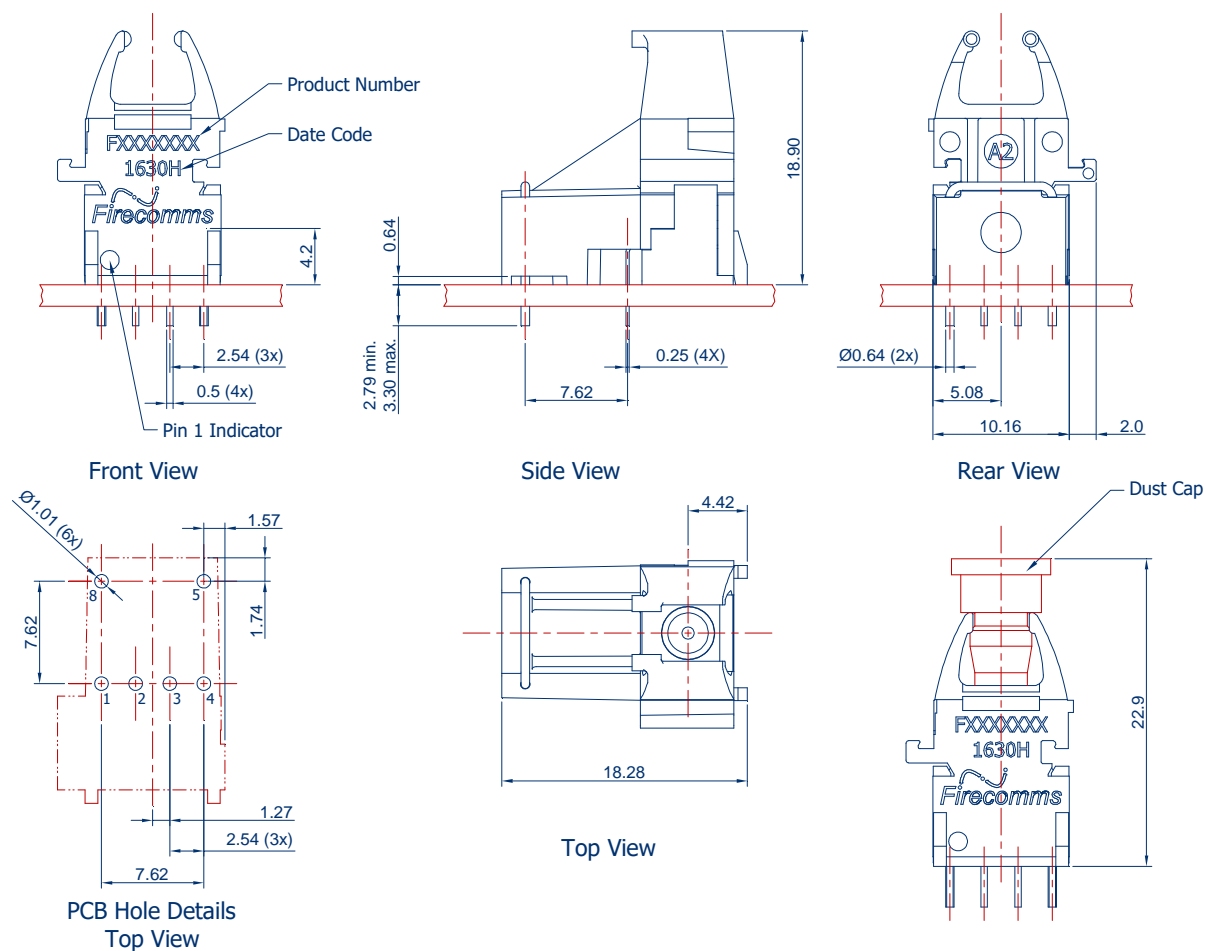


FIGURE 4  
Mechanical dimensions of the vertical receivers and PCB footprint, which is a top view  
General dimensional tolerance is  $\pm 0.2$  mm

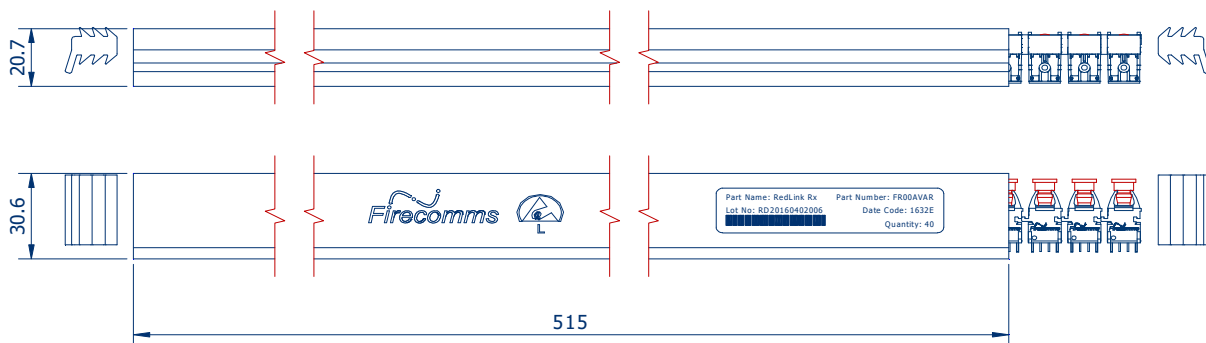


FIGURE 5  
Packing tube for Firecomms Vertical RedLink® Receivers

### MECHANICAL DATA, 30° TILTED

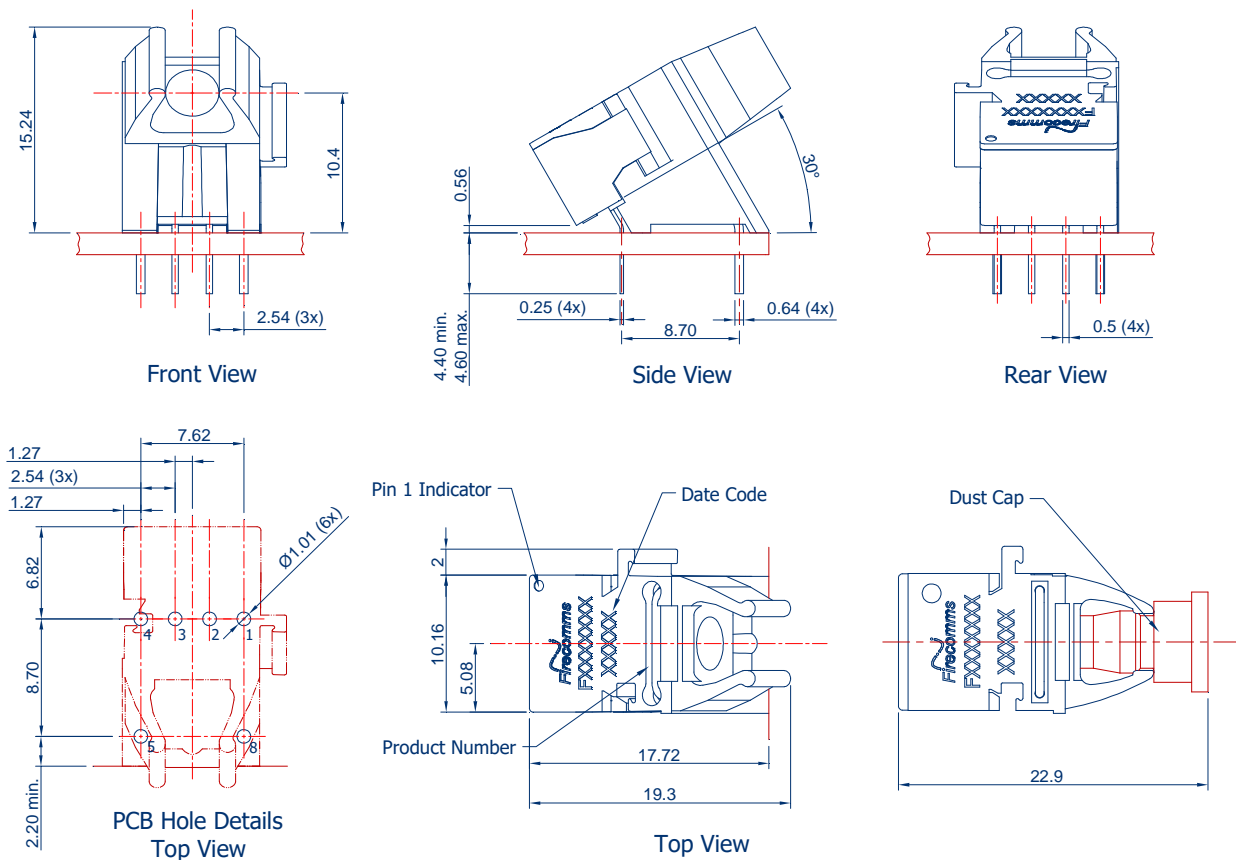


FIGURE 6  
Mechanical dimensions of the tilted receiver connectors and PCB footprint, which is a top view  
General dimensional tolerance is  $\pm 0.2$  mm

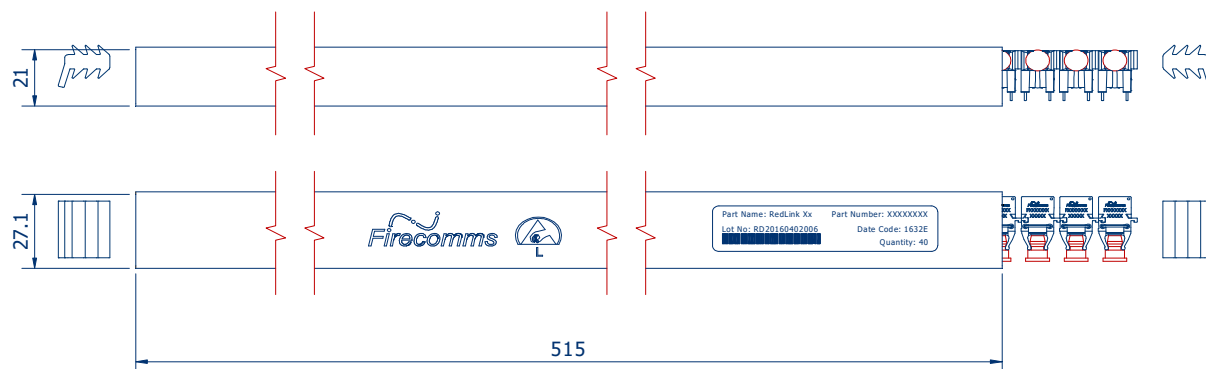


FIGURE 7  
Packing tube for Firecomms Tilted RedLink® Receiver

## **PART HANDLING**

The Firecomms analogue RedLink® receiver devices are color coded blue. They are auto-insertable. They are tested for handling in static-controlled assembly processes (HBM). Cleaning, degreasing and post solder washing should be carried out using standard solutions compatible with both plastics and the environment. For example, recommended solutions for degreasing are alcohols (methyl, isopropyl and isobutyl). Acetone, ethyl acetate, phenol or similar solution based products are not permitted.

In the soldering process, non-halogenated water soluble fluxes are recommended. These parts are not suitable for use in reflow solder processes (infrared/vapor-phase reflow). The dust plug should remain in place during soldering, washing and drying processes to avoid contamination of the active optical area of each part.

The Moisture Sensitivity Level (MSL) classification of this device is 2a according to JEDEC J-STD-020. The shelf life of an unopened MBB (Moisture Barrier Bag) is 24 months at < 40 °C and < 90 % R.H. Once the Moisture Barrier Bag is opened the devices can be either

- a) Stored in normal factory conditions < 30 °C and < 60 % R.H. for a maximum of 672 hours (4 Weeks) prior to soldering
- b) Stored at < 10 % R.H. (Dry Cabinet)

## PACKING INFORMATION

Components are packed in PVC anti-static tubes in moisture barrier bags. Bags should be opened only in static-controlled locations, and standard procedures should be followed for handling moisture sensitive components.

**Table 7**  
**PACKING INFORMATION**

	Horizontal	Vertical	Tilted
Components per Tube	40	40	40
Tube Length	515 mm	515 mm	515 mm
Tube Height	16.2 mm	20.7 mm	21 mm
Tube Depth	26.9 mm	30.6 mm	27.1 mm
Tubes per Bag	5	5	5
Bags per Inner Carton	1	1	1
Inner Carton Length	630 mm	630 mm	630 mm
Inner Carton Width	70 mm	70 mm	70 mm
Inner Carton Height	105 mm	105 mm	105 mm
Weight per Inner Carton, Complete	0.77 kg	0.92 kg	0.92 kg
Components per Inner Carton	200	200	200
Inner Cartons per Outer Carton	10	10	10
Outer Carton Length	650 mm	650 mm	650 mm
Outer Carton Width	235 mm	235 mm	235 mm
Outer Carton Height	376 mm	376 mm	376 mm
Weight per Outer Carton, Complete	8.13 kg	9.60 kg	9.60 kg
Components per Outer Carton	2,000	2,000	2,000

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