

---

# Fiber Optic "Light to Logic"™ Receiver

## Technical Data

---

### RCV1201D-622

---

#### Features

- **Light to Logic 28-pin DIP Receiver Offers ECL Compatibility**
- **High Sensitivity at Bit Rates up to 622 Mbit/s**
- **Hermetically Sealed Package**
- **Overload >-7 dBm**

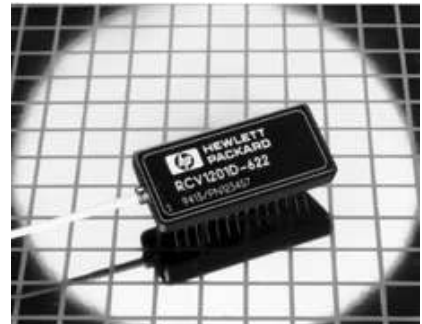
#### Applications

- **Telecommunications Networks**
- **SONET OC12 Compatible**
- **SDH STM4**
- **Local Area and Metropolitan Area Networks**
- **ATM Single Mode Public Network**
- **Digital Cable TV Networks**

#### Description

The RCV1201D-622 is a high speed member of the RCV1200 family. It converts 1200 to 1600 nanometer wavelength lightwave information into an electrical signal for rates up to 622 Mbit/s.

The receiver includes an InGaAsP PIN photodiode and a HEMT transimpedance amplifier ac coupled to supporting integrated circuit electronics to provide ECL - compatible complementary outputs.



## Functional Description

### Design

The RCV1201D-622 receiver contains an InGaAsP photodetector, HEMT transimpedance amplifier and interface amplifier circuit. The receiver is designed with a 50/125 micron fiber pigtail to allow maximum flexibility in connector options.

The interface amplifier is capacitively coupled to the preamplifier circuit. The coupling capacitor values are large enough that no sensitivity degradation will occur with data containing a frequency content down to 50 KHz.

### Noise Immunity

The RCV1201D-622 receiver has internal components to filter power supply noise from the gain circuits. To obtain maximum performance, it is highly recommended that external filter networks be utilized as well. The photodiode bias pin is especially sensitive to extraneous noise. A voltage supply for the PIN diode is provided on pin 3.

This can be directly connected to the photodiode pin 1 or via a current monitor circuit for optical power monitoring. This current drain on pin 1 is directly proportional to the incoming optical signal. This current will range from approximately 500 nA on a small optical signal to 200  $\mu$ A on a large optical signal.

As a practical consideration the majority of current drawn from the positive supply is used in the preamplifier IC. The interface amplifier draws the majority of the current from the negative supply. The series RC networks attached to each pin are intended to ensure maximum stability.

### Terminating the Outputs

The data outputs of the RCV1201D-622 are 10 KH ECL compatible. Care should be taken to match termination impedances to the interconnect to minimize reflection effects. More information on ECL interconnection, biasing and termination can be found in most ECL manufacturers' data books.

### Circuit Layout

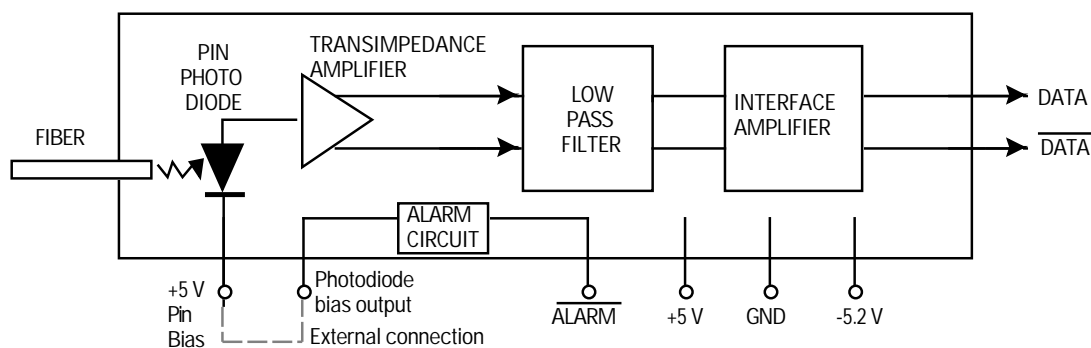
The RCV1201D-622 uses very high bandwidth circuitry to achieve its high level of performance. Care must be taken to ensure stable operation. The use of ground planes and transmission line interconnects is required. The use of a standard evaluation board is highly recommended for those users who are not familiar with these techniques. Evaluation boards for the RCV1201D-622 are available. Please contact your local representative for details.

### Manufacturing

The RCV1201D-622 is a fully hermetically sealed component. The fiber pigtail on the device requires normal fiber handling considerations. Care should be taken to avoid tight bends as well as excessive tension on the fiber pigtail.

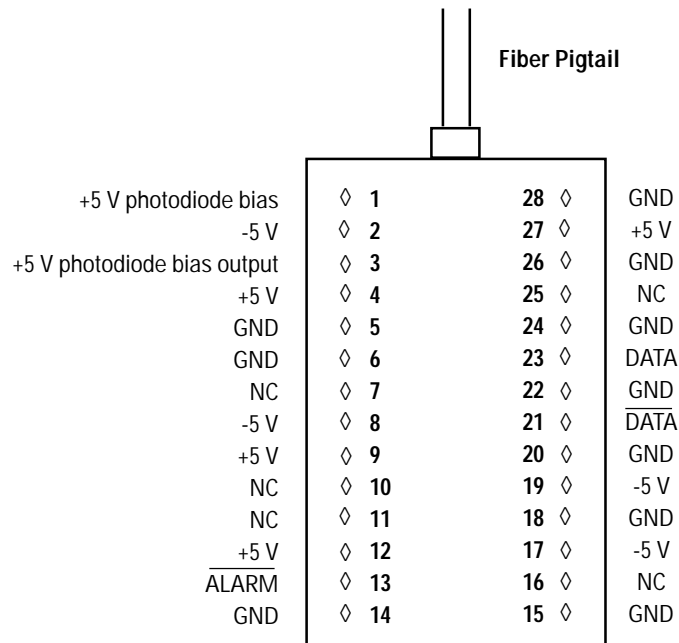
The allowable temperature range for the RCV1201D-622 is limited by the material used in the pigtail. Exposure to temperatures over 85°C is not recommended. Low profile sockets or hand soldering is recommended for this part.

**Figure 1 - Block Diagram**



## Connection Diagram

### Top View



## Pin Descriptions

### Pin 1 Photodiode Bias:

This pin is connected to the PIN photodiode cathode. It is normally reverse biased with +5 Volts through an appropriate decoupling network. Current drawn will be directly proportional to input optical signal level.

### Pin 3 Photodiode Bias Output:

This pin provides a +5 Volt decoupled output for use as a photodiode bias. It can be connected to PIN 1 directly or via an external current monitoring circuit for optical power monitoring. It is necessary to use this output, if the loss of light alarm function is required. If an external current monitoring circuit is used then it should comply with the recommendations given in our application note.

### Pins 2, 8, 17, 19 -5 Volt Supply:

These pins are connected to the -5 Volt supply. Each pin should be decoupled with a 100 nF capacitor.

### Pins 4, 9, 12, 27 +5 Volt Supply:

These pins are connected to the +5 Volt supply. Each pin should be decoupled with a 100 nF capacitor.

### Pins 5, 6, 14, 15, 18, 20, 22, 24, 26, 28 GND:

These pins are connected to the circuit board ground plane.

### Pins 7, 10, 11, 16, 25 NC:

These pins are not used in the present RCV1201D-622 design. They should be left as an open circuit.

### Pin 13 $\overline{\text{ALARM}}$ :

This pin provides a TTL output loss of light Alarm. This should be connected to Vdd using a 4 K, 7  $\Omega$  resistor.

### Pin 21 $\overline{\text{DATA OUTPUT}}$ :

This pin is the inverted data output. It is at ECL Logic LOW during an input optical pulse. It must be correctly terminated even if it is not used.

### Pin 23 DATA OUTPUT:

This pin is the data output. It is at ECL Logic HIGH during an input optical pulse. It must be correctly terminated even if it is not used.

## Performance Specifications

### Absolute Limiting Ratings

Parameter	Symbol	Minimum	Maximum	Units	Note
Case Operating Temperature	-	-40	+85	°C	-
Storage Temperature	-	-40	+85	°C	-
Supply Voltage	+V	-0.5	7.0	V	-
	-V	-7.0	0.5	V	-
Axial Fiber Pull	-		10	N	-
Fiber Bend Radius	-	32	-	mm	-
Humidity		95% non condensing			-

### Electrical Parameters

Parameter	Minimum	Typical	Maximum	Units	Note
Digital Output	-	10 K ECL	-	-	-
Power Requirements					
	-5.0 V	90	-	mA	1
5.0 V	-	55	-	mA	1
MTTF (at 40°C Case Temperature)	-	500,000	-	Hrs	-
Supply Voltage (Vdd)	4.75	5.00	5.25	V	-
Supply Voltage (Vee)	-4.95	-5.20	-5.45	V	-
Power Dissipation	-	740	-	mW	-
Alarm Output Level OFF	4	-	Vcc	V	-
Alarm Output Level ON	0	-	0.4	V	-
Alarm Response Time	-	-	0.35	mS	5

### Optical Parameters [2]

Parameter	Minimum	Typical	Maximum	Units	Note
Wavelength Range	1200	-	1600	µm	-
Receiver Sensitivity 622 Mbit/s	-	-	-33	dBm	3
Maximum I/P Power 622 Mbit/s	-7.0	-	-	dBm	4
Fiber Specifications	50/125 µm core/cladding (multi mode) 900 µm OD silicone/nylon tight jacket				-
Fiber Length	400		1000	mm	-
Alarm ON	-40.5	-	-33.5	dBm	-
Alarm Hysteresis	0.5	-	3.0	dB	-

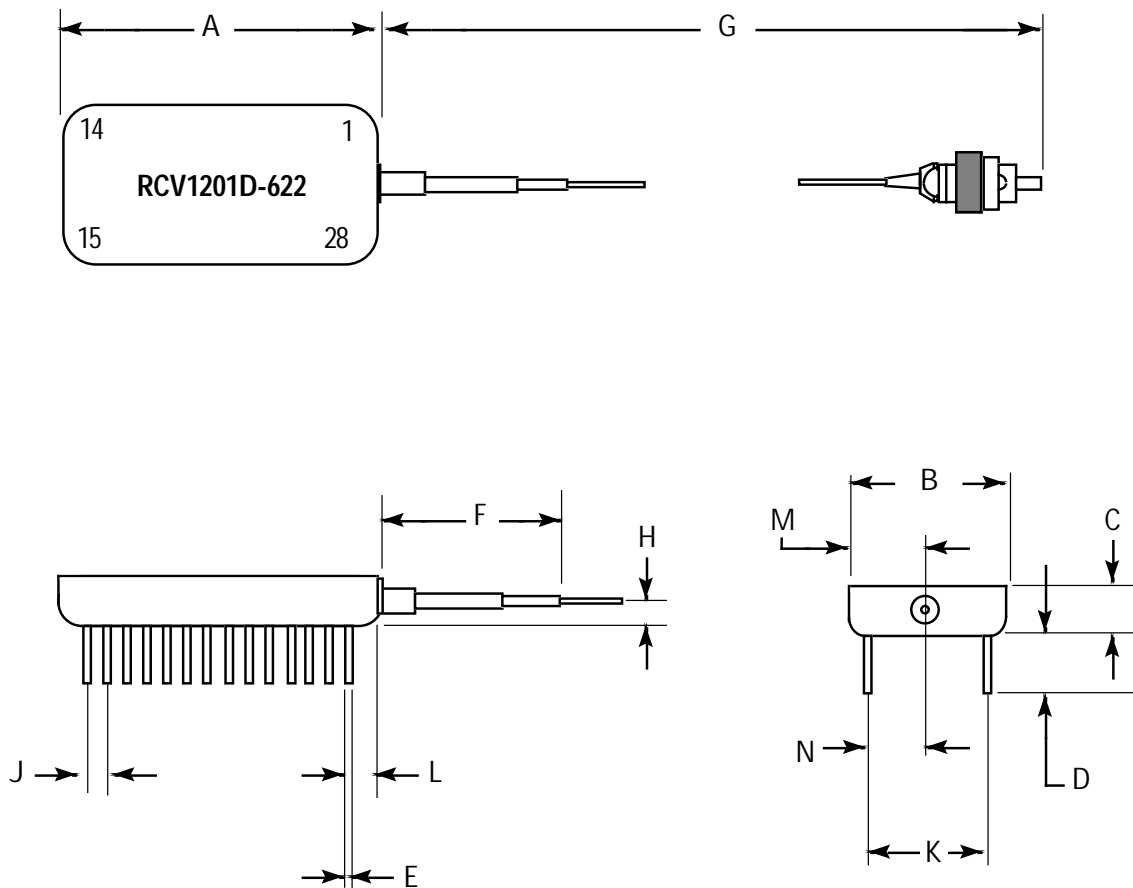
#### Notes:

1. With outputs terminated.
2. Over operating temperature range unless noted otherwise..
3. At 1300 µm wavelength; NRZ; 10<sup>-10</sup> BER; 100% modulation depth; 2<sup>23</sup>-1 pseudo-random pattern.
4. For 10<sup>-10</sup> BER.
5. Time from removal of optical input signal to the time alarm output falls below 0.8 V when Pin 1 is connected to Pin 3, with no additional connections.

## Drawing Dimensions

DIM	MIN	NOM	MAX
A	42.90	-	43.20
B	19.50	-	19.80
C	5.90	-	6.60
D	5.10	-	-
E	-	0.44	-
F	-	30.0	-
G	400	-	1000
H	3.20	-	3.64
J	-	2.54	-
K	-	15.20	-
L	-	5.00	-
M	-	9.80	-
N	-	7.60	-

All dimensions in mm



## Ordering Information

RCV1201D-XXX-XX

Optical Connector: (Optional)  
FP = FC/PC Polish  
ST = ST®  
SC = SC  
DN = DN

Specified Data Rate:  
622 = 622.08 Mbit/s

Model Name:  
RCV1201D

### Allowable Part Numbers

RCV1201D-622-FP  
RCV1201D-622-ST  
RCV1201D-622-SC  
RCV1201D-622-DN

### For more Information:

\*United States:

\*Europe:

Far East/Australasia: (65) 290-6305

Canada: (416) 206-4725

Japan: (81) 3 3331 6111

\*Call your local HP sales office listed in  
your telephone directory and ask for a  
Components representative.

Data subject to change  
Copyright ©1995 Hewlett-Packard Co.