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NEC Electronics Inc.

NEOLINK 3501
FIBER-OPTIC TRANSMISSION LINK

October 1985

Description

The NEOLINK 3501 is an 850 nm optical data link for transmission over optical fibers with high-noise immunity. A complete NEOLINK is composed of an ODN-3501T transmitter module, an ODN-3501R receiver module, and an OD9478 series optical fiber cord with simplex snap-on optical connectors.

Features

- ☐ Standard TTL interface
- ☐ DC to 35 Mbits/s (NRZ)
- ☐ EMI/RFI noise immunity
- ☐ Complete electrical isolation
- ☐ Miniature package can be mounted in existing subsystems
- ☐ Easy connection to optical connectors
- ☐ Light-weight, flexible, small-diameter fiber-optic cord
- ☐ +5 V DC power supply

Applications

- Local area network
- Remote control line
- Digital audio transmission

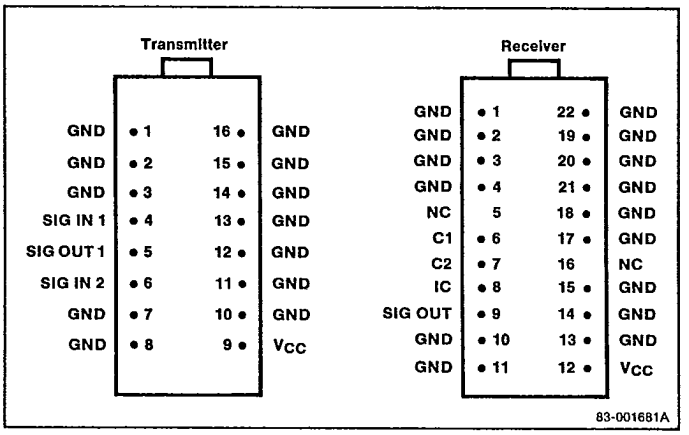
Receiver Pin Identification

No.	Name	Function
1-4	GND	Ground
5	NC	No connection
6	C1	Capacitor terminal
7	C2	Capacitor terminal
8	IC	Internally connected
9	SIG OUT	Signal output
10, 11	GND	Ground
12	V_{CC}	+5 V ±5% power supply
13-15	GND	Ground
16	NC	No connection
17-22	GND	Ground

Note:

Do not connect any signal to pin 8, IC.

Pin Configuration



Transmitter Pin Identification

No.	Name	Function
1-3	GND	Ground
4	SIG IN 1	Signal input 1
5	SIG OUT 1	Signal output 1
6	SIG IN 2	Signal input 2
7, 8	GND	Ground
9	V_{CC}	+5 V ±5% dc power supply
10-16	GND	Ground

Pin Functions

SIG IN 1, SIG IN 2, SIG OUT 1 [Signal Inputs 1 and 2, Signal Output 1]

For normal operation, SIG IN 2 is the transmitter's signal input terminal. SIG IN 1 and SIG OUT 1 should be unconnected. For inverted operation, use SIG IN 1 as the transmitter's input terminal and connect SIG IN 2 to SIG OUT 1. In inverted operation, the output signal has its polarity reversed from the input signal.

SIG OUT [Signal Output]

SIG OUT is the receiver's signal output.

C1, C2 [Capacitor Terminals 1 and 2]

C1 and C2 are terminals for additional capacitance for low bit rate operation. When the receiver is operated at a bit rate lower than 100 kbits/s NRZ (non-return to zero), that is, when a high or low state lasts for more than 100 μs, a pair of 10 μF, 16 V capacitors should be connected between C1 and C2 and ground. This creates a stable AGC (automatic gain control) circuit increasing the time constant of the rectifier. See figure 1.

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Block Diagram

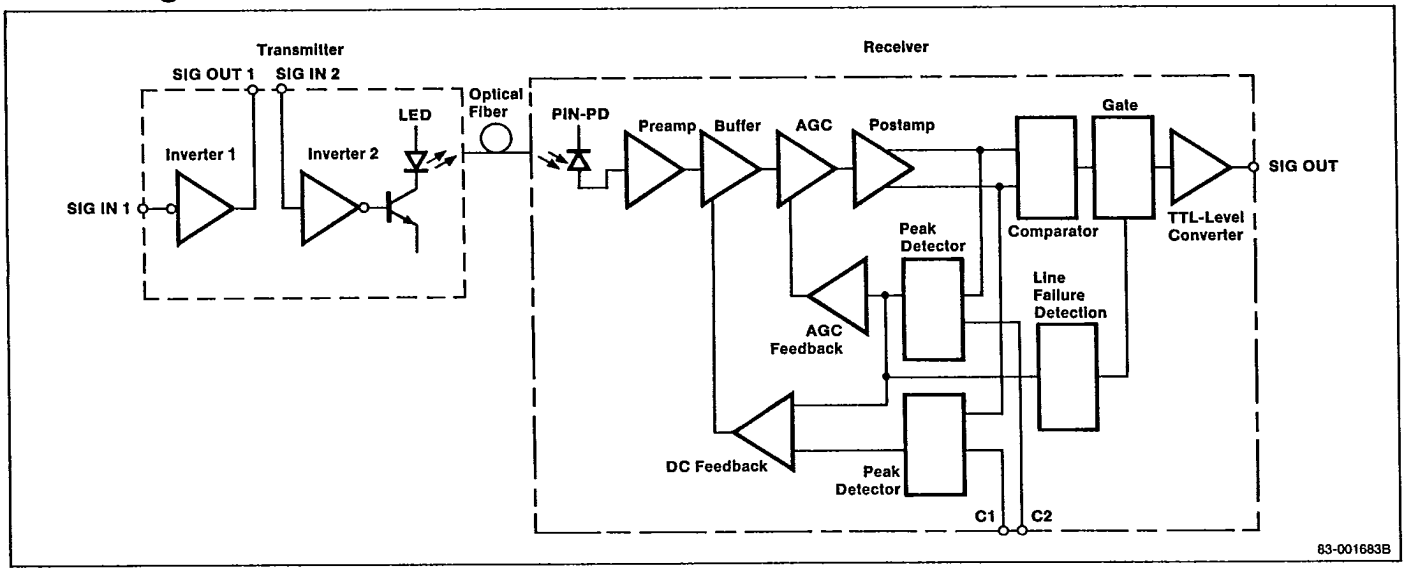
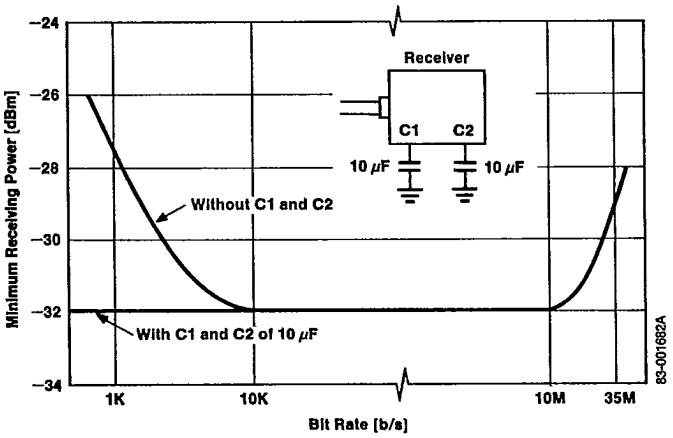


Figure 1. Effect of C1 and C2 on Minimum Receiving Power



Ambient Conditions

Item	Condition
Storage temperature	−40°C to +80°C
Operating temperature	+10°C to +70°C
Storage humidity	30% RH to 90% RH (noncondensing)
Operating humidity	40% RH to 80% RH (noncondensing)
Optical connector type	OD9498 receptacle (mates with OD9478 plug)

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Performance

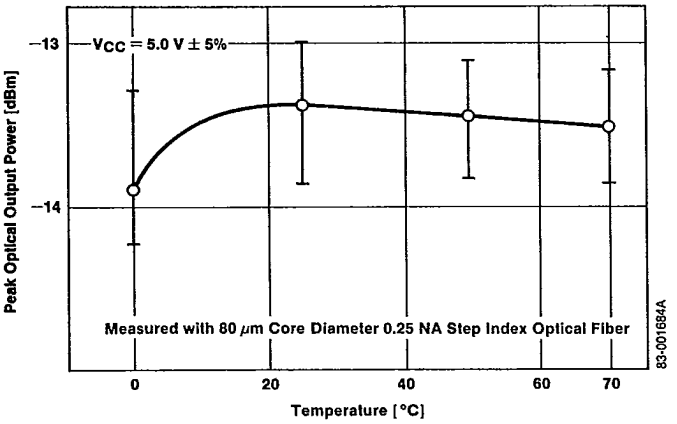
Item	Performance
Transmitter (ODN-3501T)	
Bit rate	DC to 35 Mbits/s (NRZ)
Fiber coupled power	−18 dBm (peak) with GI 50 μm fiber (note 1)
Light source	850 nm AlGaAs LED
High-level input current	50 μA max (+5.25 V supply voltage)
Low-level input current	−2 mA max (+5.25 V supply voltage)
Power supply voltage	+5 V ±5% DC
Power supply current	120 mA max
Receiver (ODN-3501R)	
Bit rate	DC to 35 Mbits/s (NRZ)
Photodetector	Si PIN-PD
High-level output current	−50 μA max (+5.25 V power supply)
Low-level output current	2 mA max (+5.25 V power supply)
Power supply voltage	+5 V +5% DC
Power supply current	100 mA max
Receiver sensitivity	−12 to −30 dBm (10 kbits/s to 10 Mbits/s) (bit error rate ≤ 10^{-9})
	−14 to −23 dBm (10.1 Mbits/s to 35 Mbits/s) (bit error rate ≤ 10^{-9})
Signal rise/fall time	10 ns typical

Note:

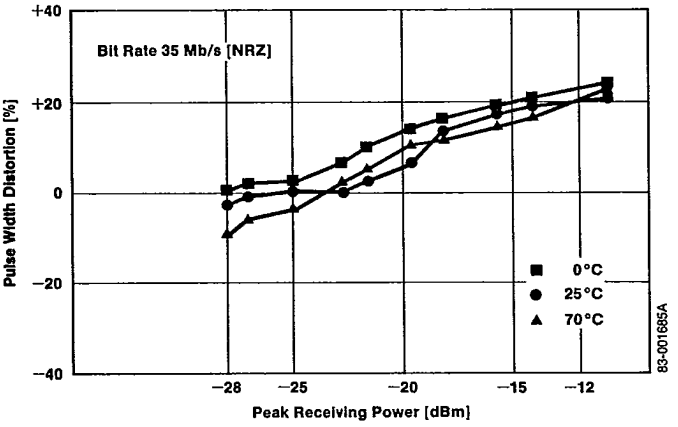
(1) NEOLINK 3501 can be used with different types of fibers. Fiber coupled power depends on the core diameter, numerical aperature, and fiber profile. The following table shows the minimum fiber coupled power for different cables:

Core Diameter (μm)	NA	Profile	Min Fiber Coupled Power (dBm)
50	0.20	GI	−18
62.5	0.29	GI	−15
85	0.26	GI	−13
100	0.29	GI	−12

Optical Output Power vs Temperature



Pulse Width Distortion vs Peak Receiving Power



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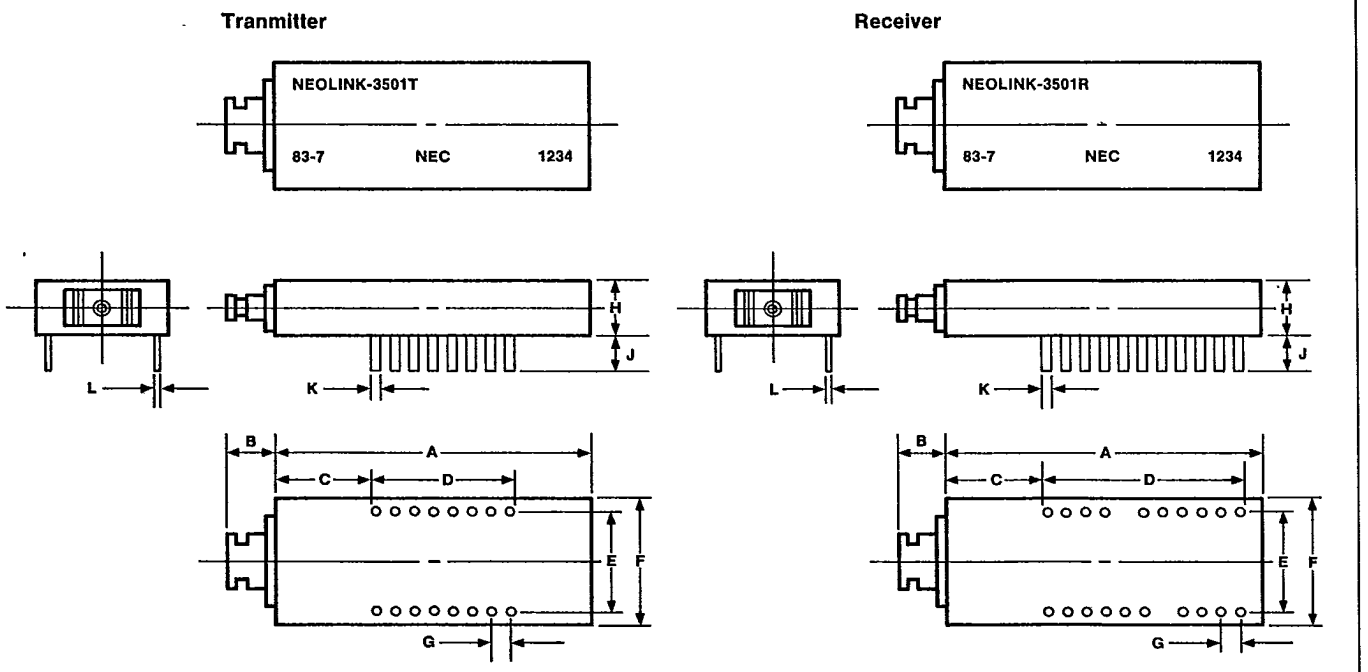
Packaging Information

Fiber-Optic Transmitter and Receiver



Item	Millimeters	Inches
A	45 ± 1.2	1.8 ± .05
B	7 ± 1.5	.3 ± .06
C	16	.6
D [Transmitter]	17.78	.700
D [Receiver]	25.4	1.00
E	15.24	.600
F	18.5 ± 1.2	.73 ± .05

Item	Millimeters	Inches
G	2.54	.100
H	8.1 ± 1.0	.32 ± .04
I	4.31 max	.170 max
J	3.5 min	.13 min
K	.5	.02
L	.3	.012

83-001679C

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NEC Electronics Inc.
CORPORATE HEADQUARTERS
401 Ellis Street
P.O. Box 7241
Mountain View, CA 94039
TEL 415-960-6000
TWX 910-379-6985

NECEL-000428-1085
STOCK NO. 832730