

EXPERIMENTER'S KIT

— TECHNICAL DATA —

Plastic Fiber Optic IR LEDs



APPLICATIONS

Household Appliances
Motor Controller Triggering
PC-to-Peripheral Links
Medical Instruments
Automotive Electronics
Audio Systems
Electronic Games
Robotics Communications

IF-E91

DESCRIPTION

The IF-E91A and IF-E91B are infrared LEDs in Industrial Fiber Optics' family of low-cost, medium-frequency, short-distance fiber optic LEDs and detectors. Each LED and detector consists of a polycarbonate (PC) housing, an internal active element such as an LED or photodetector subcomponent, and a cinch nut to hold the fiber in place. The PC housing retains the active element and the cinch nut while optimizing coupling between the active element and the jacketed 1000 μm plastic fiber.

Working with this family of fiber optics is simple: No special tools or training required. Only a sharp knife or razor blade is needed to terminate the plastic fiber. When the fiber is inserted in the LED or detector housing, tighten the cinch nut. Thereafter, the fiber can be removed simply by loosening the nut.

FEATURES

- ◆ No Optical Design Required
- ◆ Mates with Standard 1000 μm Core Jacketed Plastic Fiber Cable
- ◆ Internal Micro-Lens for Efficient Coupling
- ◆ Inexpensive Plastic Connector Housing
- ◆ Connector-Less Fiber Termination and Connection
- ◆ Interference-Free Transmission from Light-Tight Housing
- ◆ Excellent Linearity

MAXIMUM RATINGS

| | | | |
|--|--|-------------|--|
| ($T_A=25^\circ\text{C}$) | CHARACTERISTICS ($T_A=25^\circ\text{C}$) | | |
| Operating and Storage Temperature Range (T_{OP}, T_{STG}) | | 40° to 85°C | |
| Junction Temperature (T_J) | | 85°C | |
| Soldering Temperature (2 mm from case bottom) (T_S) $t \leq 5\text{s}$ | | 240°C | |
| Reverse Voltage (V_R) | | 3 V | |
| Power Dissipation (P_{TOT}) $T_A=25^\circ\text{C}$ | | 100 mW | |
| De-rate Above 25°C | | 1.33 mW/°C | |
| Forward Current, DC (I_F) | IF-E91A | 50 mA | |
| | IF-E91B | 100 mA | |
| Surge Current (I_{FSM}) $t \leq 10 \mu\text{sec}$ | IF-E91A | .2 A | |
| | IF-E91B | .2 A | |

Plastic Fiber Optic IR LEDs

IF-E91

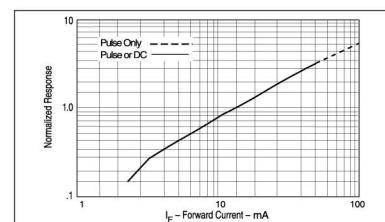


FIGURE 1. Normalized power launched versus forward current.

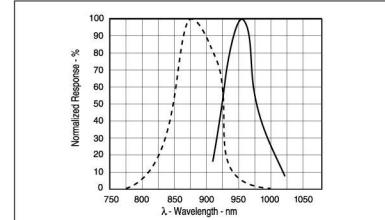


FIGURE 2. Typical spectral output vs. wavelength.

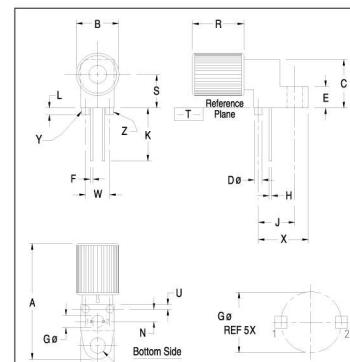


FIGURE 4. Case outline.

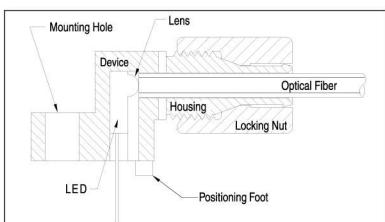


FIGURE 3. Cross-section of fiber optic device.

FIBER TERMINATION INSTRUCTIONS

1. Cut off the ends of the optical fiber with a single-edge razor blade or sharp knife. Try to obtain a precise 90-degree angle (square).
2. Insert the fiber through the locking nut and into the connector until the core tip seats against the internal micro-lens.
3. Screw the connector locking nut down to a snug fit, locking the fiber in place.

CONTENTS

| Part Number | Description |
|-------------|--|
| IF-D92 | Fiber Optic Phototransistor |
| IF-E91A | Fiber Optic Infrared LED |
| IF-C-E1000 | 1000 μm core jacketed optical fiber |

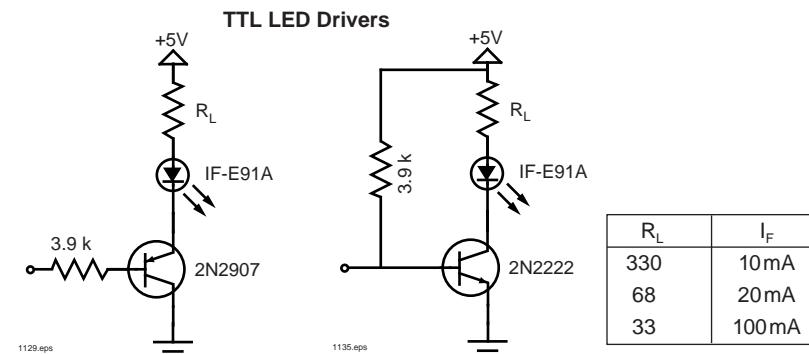
MISSING PARTS CLAIMS

Industrial Fiber Optics products are warranted against missing parts and defects in materials for 90 days. Since soldering and incorrect assembly can damage electrical components, no warranty can be made after assembly has begun. If any parts become damaged, replacements may be obtained from the distributor from whom you purchased this kit.

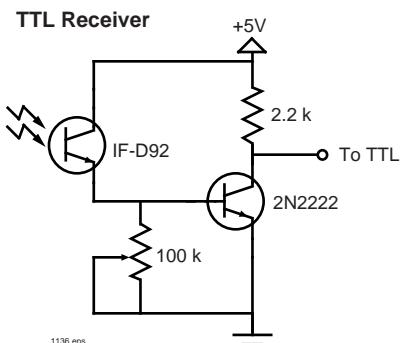
INTRODUCTION

The purpose of this kit is to provide you with an introduction to components, simple circuits and to begin applying basic fiber optic technology. This kit contains the innovative IF-E91A infrared LED and IF-D92 phototransistor, both utilizing integrated connectors which connect to 1000 μm plastic fiber with no additional components needed. Listed below are circuits and applications to try.

DIGITAL DATA TRANSMISSION

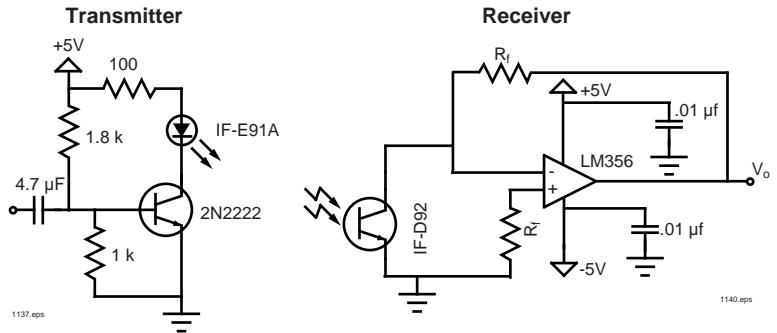


TTL Receiver

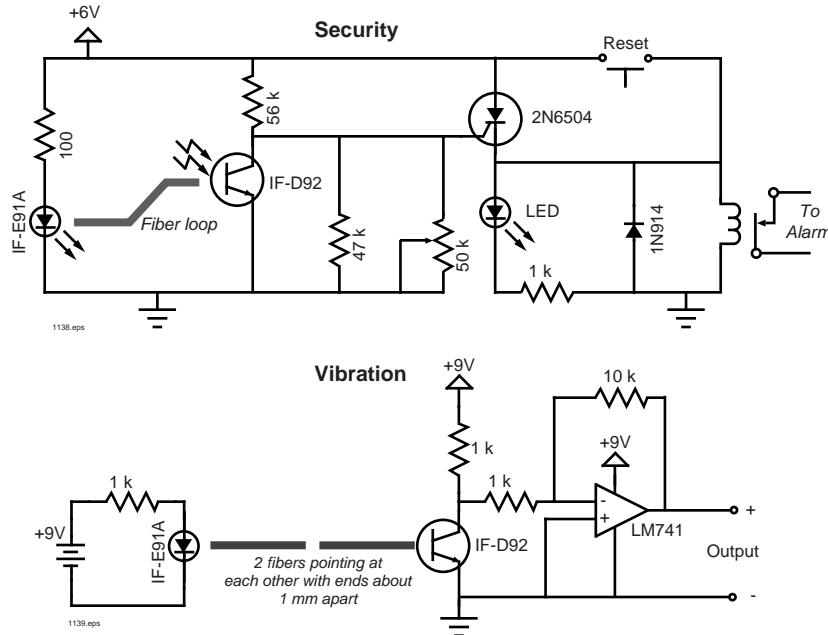


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ANALOG DATA TRANSMISSION (100kHz)



SENSORS

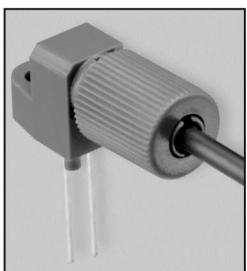


OTHER FIBER OPTIC COMPONENTS

Industrial Fiber Optics offers other fiber optic LEDs and photodetectors in addition to those found in this kit. Listed below are a few of those fiber optic components. We also have many other educational kits and optical fiber in many types and grades. If you would like a catalog or have any questions please feel to contact us.

| Part Number | Description |
|-------------|------------------------------|
| IF-D91 | Photodiode |
| IF-D93 | Photodarlington |
| IF-D95 | Photologic |
| IF-E91B | Infrared LED, 880 nm |
| IF-E92 | Blue LED, 430 and 470 nm |
| IF-E93 | Green LED, 530 nm |
| IF-E96 | Red LED, 660 nm |
| IF-E97 | Red LED, 660 nm Super-bright |

Plastic Fiber Optic Phototransistor



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FEATURES

- Excellent Linearity
- No Optical Design Required
- Mates with Standard 1000 μm Core Jacketed Plastic Fiber Cable
- Internal Micro-Lens for Efficient Coupling
- Inexpensive Plastic Connector Housing
- Connector-Less Fiber Termination and Connection
- Interference-Free Transmission from Light-Tight Housing
- Simple PWB Mounting
- Rugged Screw Attachment

MAXIMUM RATINGS (T_A=25°C)

Operating and Storage Temperature Range (T_{OP}, T_{STG}).....-40° to 85°C
Junction Temperature (T_J).....85°C
Soldering Temperature (2 mm from case bottom) (T_S) t≤5s.....240°C
Collector Emitter Voltage (V_{CEO}).....30 V
Emitter Collector Voltage (V_{ECO}).....5 V
Collector Current (I_C).....50 mA
Collector Peak Current (I_{CM}) t=1ms.....100 mA
Power Dissipation (P_{TOT}) T_A=25°C.....100 mW
De-rate Above 25°C.....1.33 mW/°C

CHARACTERISTICS (T_A=25°C)

| Parameter | Symbol | Value | Unit |
|--|---------------------------------|-----------|----------------|
| Wavelength for Maximum Photosensitivity | λ_{PEAK} | 870 | nm |
| Spectral Bandwidth (S=10% of S _{MAX}) | $\Delta\lambda$ | 400-1100 | nm |
| Switching Times (10% to 90% and 90% to 10%) (R _L =1 k, I _C =1.0 mA, V _{CE} =5 V, λ =950 nm) | t _r , t _f | 20 | μs |
| Responsivity min. @ 880 nm @ 632 nm | R | 100 50 | μA/μW μA/μW |
| Collector Dark Current (V _{CE} =15 volts) | I _{CEO} | < 100 | nA |
| Breakdown Voltage (I _C =100 μA) | BV _{CEO} | ≥ 30 | V |
| Breakdown Voltage (I _C =100 μA) | BV _{ECO} | ≥ 5 | V |
| Saturation Voltage (I _C =250 μA, H=100 μW) | V _{CE} sat | 0.15 | V |

IF-D92

Plastic Fiber Optic Phototransistor

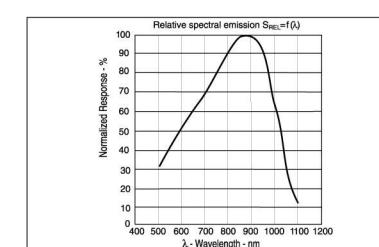


FIGURE 1. Typical detector response versus wavelength.

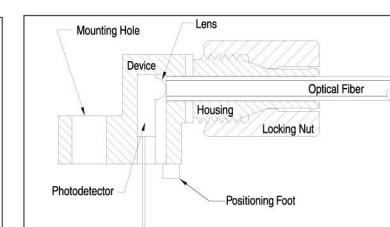


FIGURE 3. Cross-section of fiber optic device.

FIBER TERMINATION INSTRUCTIONS

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- Screw the connector locking nut down to a snug fit, locking the fiber in place.

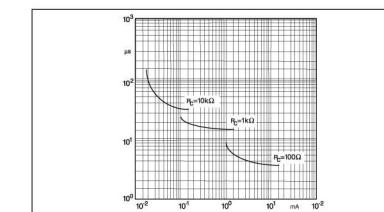


FIGURE 2. Rise and fall times of phototransistor.

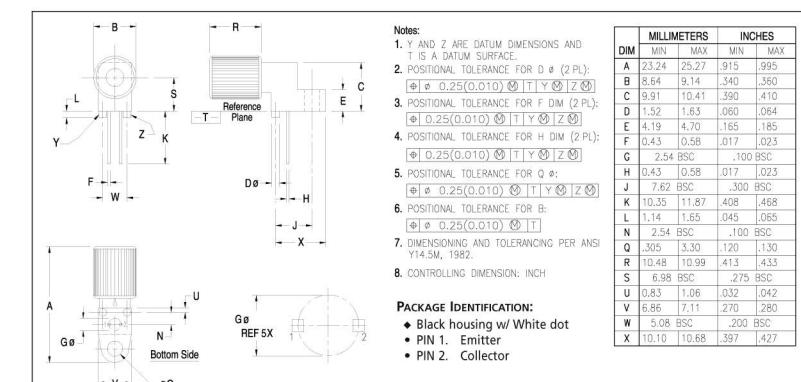


FIGURE 4. Case outline.