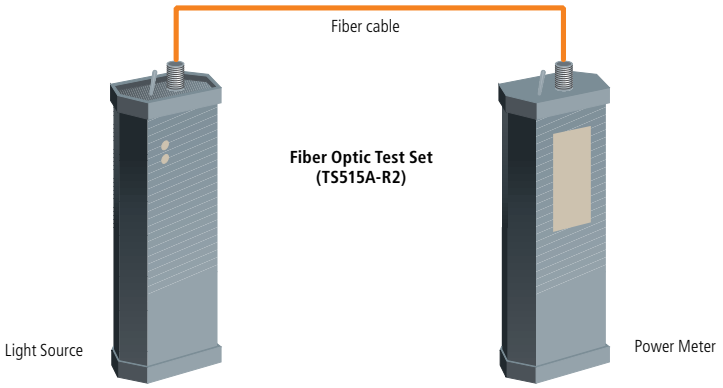
Fiber Optic Test Sets and Laser Sources

# Everything you need to accurately test fiber optic cable in the field.

## FEATURES

- Isolate cable faults.
- Choose a test set that includes a meter and an LED or light source, or use your own meter with a laser source or a Visible Light Laser Source.
- Testers are made of aluminum for extra durability.
- Provides broad testing ranges with high resolution.
- Operates via battery or power supply.

Use a power meter and LED or light source to test power levels in a short-wavelength (850-nm) optical fiber cable.




## OVERVIEW

The fiber optic power meters and LED or light source help you test your fiber optic cable during installation and maintenance. These error-proof devices decipher the toughest cabling problems.

Test sets are available with 850-nm, 850-/1300-nm, or 1300-/1550-nm operation. And LED, laser, or light sources are available.

The TS515A-R2's meter measures power levels in an optical fiber cable. Since it operates at 850-nm, the meter's ideal for short-wavelength fiber testing. It features a 55-dB testing range. A high-contrast LCD display pinpoints test results within 0.1 dB resolution.

The TS515A-R2's light source provides a stable output light that enables a technician to test loss when used with the power meter. The amount of light launched by the light source compared to the amount of light exiting the meter determines the amount of loss in that fiber link.

A single cartridge-loaded 9-volt battery powers the meter and the source. The meter's battery life is approximately 80 hours, and the source's battery life is 14 hours. Both units also have a low battery indicator. The rugged test sets are made of aluminum, not plastic.

Like the TS515A-R2, the TS520A-R2 is used to measure power in an optical fiber. But it features dual-wavelength operation: It measures fiber loss at 850- and 1300-nm wavelengths. This provides power or loss measurements for most LAN fiber testing requirements.

The Dual Laser Source, 1310-nm/1550-nm (TS525A or TS525AE), when used with a power meter, allows technicians to perform precise optical loss measurements in the field. The source provides the stable light output required by optical power meters to determine power loss in fiber, connectors, attenuators, or other passive optical components. The source has one ST® connector. The TS525A runs on four AA alkaline batteries (not included) or a 120-VAC, 60-Hz wall pack with four AA nickel-cadmium batteries (included). The TS525AE runs on four AA alkaline batteries (not included) or a 230-VAC, 50-Hz wall pack with four AA nickel-cadmium batteries (included). Each TS525A or TS525AE source features a one-hour quick charge.

The Fiber Optic Power Meter and LED Source Kit (TS1300A) measures power loss in fiber optic components in the field. The meter, which is calibrated at four wavelengths, measures power levels from +3 to -60 dBm or +8 to -55 dBm, with a resolution of 0.01 dBm. The meter stores up to 999 test results per wavelength.

The LED source supplies output wavelengths of 850 nm and 1300 nm, selectable via a toggle switch. The switch has three positions: 850, 1300, and Off.

The Visible Light Laser Source (TS510A-R2) isolates light leaks or breaks in single-mode or multimode fiber optic cable. It also comes in a a rugged aluminum enclosure and operates up to 14 hours on one 9-volt alkaline battery. The source connects to the fiber cable to be tested via its built-in ST connector.

## TECH SPECS

***TS515A-R2:***
**Fiber Size (Maximum)** — 100/140
**Meter Accuracy** — ±0.3 dB
**Meter Detector** — Si
**Meter Range** — 0 to -50 dBm
**Meter Resolution** — 0.1 dB
**Source Bandwidth** — 35 nm
**Source Pmin** — -20 dBm
**Source Stability** — ±0.05 dB/8 hr.
**Typical Battery Life** — Source: 14 hours;
Meter: 80 hours
**Wavelength** — 850 nm
**Connectors** — (1) ST®
**Indicator** — Source and Meter: (1) Low battery LED
**Temperature Tolerance** — Operating: 32 to 122°F (0 to 50°C);
Storage: 14 to 140°F (-10 to +60°C)
**Humidity** — 10 to 90%, noncondensing
**Power** — (1) 9-volt alkaline battery (included)
**Size** — 7.5"H x 3.8"W x 1.5"D (19.1 x 9.5 x 3.8 cm)
**Weight** — 1.1 lb. (0.5 kg)

***TS520A-R2:***
**Fiber Size (Maximum)** — 100/140
**Meter Accuracy** — ±0.3 dB
**Meter Detector** — Ge
**Meter Range** — 0 to -50 dBm
**Meter Resolution** — 0.1 dBm
**Source Bandwidth** — 35/170 nm
**Source Pmin** — -20 dBm
**Source Stability** — ±0.05, 0.08 dB/8 hr.
**Typical Battery Life** — Source: 14 hours;
Meter: 80 hours
**Wavelength** — 850/1300 nm
**Connectors** — (1) ST
**Temperature Tolerance** — Operating: 32 to 122°F (0 to 50°C);
Storage: 14 to 140°F (-10 to +60°C)
**Humidity** — 10 to 90%, noncondensing
**Power** — (1) 9-volt alkaline battery (included)
**Size** — 7.5"H x 3.8"W x 1.5"D (19.1 x 9.5 x 3.8 cm)
**Weight** — 1.1 lb. (0.5 kg)

***TS525A, TS525AE:***
**Laser Source:**
**Bandwidth** — 5 nm
**Battery Life** — 10 hours
**Emitter** — Laser
**Modulation** — 30 Hz, 500 Hz, 2 kHz
**Pout (Minimum)** — -7 dBm
**Quick Charge** — 1 hour
**Stability** — ±10
**Trickle Charge** — 12–14 hours
**Wavelength** — 1310-/1550-nm
**Connectors** — (1) pair of ST
**Temperature Tolerance** — Operating: 23 to 113°F (-5 to +45°C);
Storage: 14 to 154°F (-10 to +68°C)
**Humidity** — 10 to 90%, noncondensing
**Power** — TS525A: (4) AA alkaline batteries (not included) or 120-VAC, 60-Hz wall pack with (4) AA nickel-cadmium batteries (included);
TS525AE: (4) AA alkaline batteries (not included) or 230-VAC, 50-Hz wall pack with (4) AA nickel-cadmium batteries (included)
**Size** — 6.8"H x 2.3"W x 1.5"D (17.1 x 5.7 x 3.8 cm)
**Weight** — 0.6 lb. (0.3 kg)

***TS1300A:***
**Meter:**
**Battery Life** — 10 hours
**Charge** —Trickle: 12–14 hours;
Quick: 1 hour
**Detector** — Germanium
**Display:**
**Maximum Number of Stored Test Results** — 999 per wavelength
**Range** — 1300–1550 nm: +3 to -60 dBm;
850 nm: +8 to -55 dBm
**Resolution** — 0.01 dBm
**Source Power** — ±0.25 dB
**Wavelength** — 850 nm, 1300 nm, 1310 nm, 1550 nm
**Connectors** — (1) ST
**Indicators** — (4) Wavelength LEDs: 850, 1300, 1310, 1550;
(4) Power LEDs: On, Slow Charge, Fast Charge, Low Battery
**Temperature Tolerance** — Operating: 23 to 113°F (-5 to +45°C);
Storage: 14 to 154°F (-10 to +68°C)
**Humidity** — 10 to 90%, noncondensing
**Power** — (4) AA alkaline batteries (not included) or 120-VAC, 60-Hz wall pack with (4) AA nickel-cadmium batteries (included)
**Size** — 7.5"H x 3.75"W x 1.5"D (19.1 x 9.5 x 3.8 cm)
**Weight** — 1.1 lb. (0.5 kg)
**LED Source:**
**Bandwidth** — 35/170
**Battery Life** — 10 hours
**Emitter** — LED
**Modulation** — 30 Hz, 500 Hz, 2 kHz
**Pout** — -17 dBm minimum
**Stability** — ±0.05/0.08 dB/8 hours
**User Controls** — (1) 3-position switch: 850, 1300, Off
**Wavelength** — 850/1300 nm
**Connectors** — (1) pair of ST
**Indicators** — (2) LEDs: (1) Power On, (1) Low Batt
**Temperature Tolerance** — Operating: 23 to 113°F (-5 to +45°C);
Storage: 14 to 154°F (-10 to +68°C)
**Humidity** — 10 to 90%, noncondensing
**Power** — (1) 9-volt alkaline battery (included)
**Size** — 6.75"H x 2.25"W x 1.5"D (17.1 x 5.7 x 3.8 cm)
**Weight** — 0.6 lb (0.3 kg)

***TS510A:***
**Laser Source:**
**Battery Life** — 14 hours
**Fiber Size** — 9/125 µm–1000 µm
**Pmin** — -5
**Connectors** — (1) ST
**Temperature Tolerance** — Operating: 32 to 122°F (0 to 50°C);
Storage: 14 to 154°F (-10 to +68°C)
**Humidity** — 10 to 90%, noncondensing
**Power** — (1) 9-volt alkaline battery (included)
**Size** — 6.75"H x 2.25"W x 1.5"D (17.1 x 5.7 x 3.8 cm)
**Weight** — 0.6 lb. (0.3 kg)

## Technically Speaking

**Fiber optic cable construction.**

Fiber optic cable consists of a core, cladding, coating, strengthening fibers, and cable jacket.

**Core**

This is the physical medium that transports optical data signals from an attached light source to a receiving device. The core is a single continuous strand of glass or plastic that's measured (in microns) by the size of its outer diameter. The larger the core, the more light the cable can carry.

All fiber optic cable is sized according to its core's outer diameter.

The three multimode sizes most commonly available are 50, 62.5, and 100 microns (μ). Single-mode cores are generally less than 9 microns.

**Cladding**

This is a thin layer that surrounds the fiber core and serves as a boundary that contains the light waves and causes the refraction, enabling data to travel throughout the length of the fiber segment.

**Coating**

This is a layer of plastic that surrounds the core and cladding to reinforce the fiber core, help absorb shocks, and provide extra protection against excessive cable bends. These buffer coatings are measured in microns and can range from 250 to 900 microns.

**Strengthening fibers**

These components help protect the core against crushing forces and excessive tension during installation.

The materials can range from Kevlar® to wire strands to gel-filled sleeves.

**Cable jacket**

This is the outer layer of any cable. Most fiber optic cables have an orange jacket, although some types can have black or yellow jackets.

## Technically Speaking

**Quality-made fiber cable is the key to mechanical splices.**

Mechanical splices are now reliable and low-cost for your fiber applications, thanks in large part to cable manufacturers.

During production, manufacturers' equipment can measure a cable's outside diameter—as well as its concentricity, ovality, and centering—to within less than one micron. For example, core and cladding diameters can be measured to 0.05 microns and core/cladding concentricity to less than 0.04 microns. With equipment capable of calculating such accurate measurements, manufacturers are able to produce today's high-quality cables—and this makes it easy for mechanical splices to splice multimode or single-mode fibers.

## What's included

**TS515A-R2, TS520A-R2:**

- Power meter
- LED light source
- 9-volt alkaline battery
- Waterproof carrying case
- ST adapter (TS520A-R2 only)
- Users' manual

**TS525A, TS525AE:**

- Dual laser source
- 120-VAC, 60-Hz or 230-VAC, 50-Hz wall pack with (4) AA nickel-cadmium batteries
- ST adapter
- Users' manual

**TS1300A:**

- Power meter
- 120-VAC, 60-Hz wall pack with (4) AA nickel-cadmium batteries for power meter
- LED source
- 9-volt alkaline battery for LED source
- Users' manual

**TS510A-R2:**

- Visible Light Laser Source
- 9-volt alkaline battery
- Users' manual


## Technically Speaking

Multimode vs. single-mode fiber.

Multimode, 50- and 62.5-micron cable.

Multimode cable has a large-diameter core and multiple pathways of light. It comes in two core sizes: 50-micron and 62.5-micron.

Multimode fiber optic cable can be used for most general data and voice fiber applications, such as bringing fiber to the desktop, adding segments to an existing network, and in smaller applications such as alarm systems. Both 50- and 62.5-micron cable feature the same cladding diameter of 125 microns, but 50-micron fiber cable features a smaller core (the light-carrying portion of the fiber).

Although both can be used in the same way, 50-micron cable is recommended for premise applications (backbone, horizontal, and intrabuilding connections) and should be considered for any new construction and installations. Both also use either LED or laser light sources. The big difference between the two is that 50-micron cable provides longer link lengths and/or higher speeds, particularly in the 850-nm wavelength.

Single-mode, 8–10-micron cable.

Single-mode cable has a small, 8–10-micron glass core and only one pathway of light. With only a single wavelength of light passing through its core, single-mode cable realigns the light toward the center of the core instead of simply bouncing it off the edge of the core as multimode does.

Single-mode cable provides 50 times more distance than multimode cable. Consequently, single-mode cable is typically used in long-haul network connections spread out over extended areas, including cable television and campus backbone applications. Telcos use it for connections between switching offices. Single-mode cable also provides higher bandwidth, so you can use a pair of single-mode fiber strands full-duplex for up to twice the throughput of multimode fiber.

Specification comparison:

50-/125-Micron Multimode Fiber

**850-nm Wavelength:**
Bandwidth: 500 MHz/km;
Attenuation: 3.5 dB/km;
Distance: 550 m

**1300-nm Wavelength:**
Bandwidth: 500 MHz/km;
Attenuation: 1.5 dB/km;
Distance: 550 m

62.5-/125-Miron Multimode Fiber

**850-nm Wavelength:**
Bandwidth: 160 MHz/km;
Attenuation: 3.5 dB/km;
Distance: 220 m

**1300-nm Wavelength:**
Bandwidth: 500 MHz/km;
Attenuation: 1.5 dB/km;
Distance: 500 m

8–10-Micron Single-Mode Fiber

**Premise Application:**
Wavelength: 1310 nm and 1550 nm;
Attenuation: 1.0 dB/km

**Outside Plant Application:**
Wavelength: 1310 nm and 1550 nm;
Attenuation: 0.1 dB/km

| Item | Code |
|---|---|
| Fiber Optic Test Sets | |
| 850 nm, Multimode | **TS515A-R2** |
| 850/1300 nm, Multimode | **TS520A-R2** |
| Laser Source, Dual 1310/1550 nm | |
| 120-VAC | **TS525A** |
| 230-VAC | **TS525AE** |
| Fiber Optic Power Meter and LED Source Kit | **TS1300A** |
| Visible Light Laser Source | **TS510A-R2** |