1818A Description

The 1818A Time Domain Reflectometer plug-in with a 180 series mainframe gives you a completely integrated wide band system for testing of transmission lines, strip lines, cables, connectors, and many other devices in high frequency systems. The easy-to-use controls provide accurate direct distance calibrated displays of up to 300 meters or 1000 feet with dielectric materials from $\varepsilon = 1.0$ (air) to $\varepsilon = 4.0$. This allows you to quickly determine the magnitude and nature of each resistive or reactive discontinuity in coaxial components such as attenuators, cables, connectors, and delay lines in microwave or pulse circuits. You can also locate and identify faults such as shorts, opens, loose connectors, defective tap offs, splices, and mismatches with measurement resolution as close as 2.54 cm.

A convenient Time/Distance switch allows you to select direct reading of ns/dec/div, ft/div, or meter/div. The Time mode provides a reflection coefficient $\rho$ versus nanoseconds operation which gives a reading of the time a step takes to reach a discontinuity and return to the sampler. In the meters or feet per division mode, a display of $\rho$ versus distance is provided with round trip time automatically taken into account for direct reading of distance. The accuracy in the distance mode can be set by selecting Air or Var and adjusting the variable dielectric for proper display calibration.

Model 1818A may also be used in a transmission mode to determine the transmission quality of a passive element. In this mode of operation, the 50 ps step generator signal source is applied to the device under test and the output is detected by the plug-in sampling section. This allows a waveform to be examined for rise time, delay, and pulse top aberrations introduced by the circuit under test.

1818A Specifications

System (in reflectometer configuration)
Rise time: <170 ps.
Overshoot: \( \leq 5\% \) overshoot and ringing (down to \( \frac{1}{2}\% \) in 3 ns).
Internal reflections: \( \leq 10\% \) (does not limit resolution).
Reflectometer sensitivity: reflection coefficients as small as 0.001 can be observed.

Signal channel
Rise time: approx. 150 ps.
Reflection coefficient: 0.5/div to 0.005/div in a 1, 2, 5 sequence.
Input: 50 ohms, feedthrough type.
Noise and internal pickup, peak: 0.1% of step (terminated in 50 ohms).
Dynamic range: \( \pm 0.5 \) volt.
External signal level: up to 1 V peak may be safely applied to the Sampler output connector.
Attenuator accuracy: \( \pm 3\% \).
Step generator
Amplitude: approx. 0.25 V into 50 ohms (0.5 V into open circuit).
Rise time: approx. 50 ps.
Output impedance: 50 ohms \( \pm 1 \) ohm (dc-coupled).
Droop: \( \leq 1\% \) in 1 \( \mu \)s.

Distance/time
Distance scale: 3 meters/div and 30 meters/div; 10 ft/div and 100 ft/div. Accuracy, \( \pm 3\% \).
Variable dielectric: $\varepsilon = 1$ to $\varepsilon = 4$.
Time scale: 10 ns/div and 100 ns/div. Accuracy, \( \pm 3\% \).
Magnification: X1 to X100 in a 1, 2, 5 sequence provides time scales down to 0.1 ns/div and distance scales to 0.03 meters/div or 0.1 ft/div. Accuracy of the basic sweep is maintained at all magnifier settings.
Delay control: 0 to 10 div of unmagnified sweep. Accuracy, \( \pm 3\% \).
Jitter: \( \leq 20 \) ps.

General
Recorder outputs
Vertical: approx. 1 V vertical output signal is provided at the rear panel of 180 series mainframes.
Horizontal: approx. 1 V horizontal output signal is provided at the rear panel of a 180, 181, 182, or 184 mainframe.
Operating environment: temperature, 0 to +35°C (35°F to 95°F) with small increase in system rise time; humidity, to 95% relative humidity at 40°C (104°F); altitude, to 4.6 km (15 000 ft); vibration, vibration in three planes for 15 min. each with 0.254 mm (0.010 in.) excursion, 10 to 55 Hz.
Weight: net, 1.4 kg (3 lb); shipping, 3.2 kg (7 lb).
Accessories supplied: Type N connector assembly. One 50 ohm load with Type N male connector. One Operating and Service Manual.

1818A Time Domain Reflectometer

$1240