Passive Voltage Probes

Introduction

FEATURES

Passive Voltage Probes

- Every Scope Needs at Least a Pair of General Purpose Probes

APPLICATIONS

Engineering and Designs
Service
Manufacturing

Tips on Selecting Probes

Nearly all general purpose and laboratory oscilloscopes use probes to make a direct, flexible and convenient connection to a device-under-test (DUT). Of all the different types of measurements, voltage measurements top the list by a wide margin. The ideal probe/oscilloscope combination should acquire the signal and truly represent it on the display without changing the signal source.

Consider Your Scope's . . .

Bandwidth - Select a probe with equal or better bandwidth.
Input capacitance - Select a probe with a compensation range covering the scope's nominal input capacitance.
Readout feature support - Select a probe

that provides automatic coding for scale factor.
Input loading - Standard passive probes support 1 megaohm inputs. 50 Ohm probes are also available in passive and active (FET) styles.

Consider Your Application . . .

Engineering and design - High frequency, specialty, non-absolute measurements.
Service - Mixture of high and low frequency, specialty and general purpose, absolute and relative measurements.
Manufacturing - Low frequency, general purpose, relative measurements.

Consider Your Measurements . . .

How will probe loading affect your measurements? High resistance probes (10 megaohm) give minimum amplitude error; however, any significant tip capacitance will degrade the leading edge.
What is the waveform rise time? Passive probes work in conjunction with the scope's input circuitry to provide a system bandwidth.
What is the peak voltage? Passive probes typically have 420 V peaks. High voltage probes can handle 1.5 kV to 40 kV.
What is the waveform amplitude? Maximum input voltage for a passive probe is stated as DC plus peak AC. This is also the maximum safe input before electrical damage occurs.

Consider Your Mechanical Requirements . . .

Probe size - Small probes are easier to handle and attach to test points. Larger probes are more durable.
Tip type - Probe tip durability is affected by materials and design. Tektronix' most durable configuration for passive voltage probes is the miniature type which is supported by a wide variety of tip accessories for test point connection. The compact probe configuration offers improved electrical performance. Subminiature probe types are useful for probing high density circuitry where several probes have to be attached in close proximity.
Environmental conditions - Probes are

expected to be exposed to harsh conditions in the field, but often overlooked are the rigors of daily use and abuse that general purpose probes are most likely to experience.

Passive voltage probes are the most commonly used oscilloscope probe. Other specialty probes expand the range and functionality of an oscilloscope as a measurement system, but a general purpose, passive voltage probe is the working end of the oscilloscope, a tool used and abused every day without concern by engineers and technicians. The probe's utility is often taken for granted... that is, until it doesn't work. Then it's a scramble just to complete the simplest task.