Oscilloscope / Differential Probe Terminology

> **Attenuation**: Ratio of the output signal to the input signal. Attenuation should remain constant decreasing by 3dB only as the frequency increases to the maximum bandwidth.

> **Bandwidth**: The maximum -3dB frequency that can be expected.

> **Cable Length**: Length of the cable from the end of the probe to the end of the connector. It is important to use a probe with just enough cable length for your needs. Long cables increase the capacitance and propagation delay of the probe.

> **Compensation Range**: The range a probe can be compensated to match the input capacitance of the test equipment it is being used with.

> **IEC 1010**: Probes with the IEC 1010 category rating have been designed for safety.

> **Input Impedance**: The total resistance and capacitance as measured at the tip of the probe. This specification is used to define the loading effect of a probe. At frequencies under 1MHz the input resistance of the probe will have the most influence. At higher frequencies the input capacitance will have the most influence.

> **Max Input Voltage**: The maximum voltage the probe can be used at.

> **Max Differential Voltage**: The maximum differential voltage that can be measured by a differential probe

> **Readout**: Probes with this capability are compatible with readout function oscilloscopes that automatically detect and display the attenuation factor of the probe.

> **Rise Time**: The time required for the leading edge of a pulse to rise from 10% to 90% of its final value.

> **CMRR**: Common Mode Rejection Ratio. A measure of a differential probes ability to reject any signals common to both test points in a differential measurement
**FAQ OSCILOSCOPE PROBES**

Can TPI oscilloscope probes be used with Tektronix and Hewlett Packard scopes?

Yes. TPI oscilloscope probes can be used with most major brands of scopes.

Why is selecting a probe with the correct bandwidth important?

Choosing a probe with the correct bandwidth enables you to use your scope to its full potential.

Why do TPI oscilloscope probes have a compensation range?

Since the input of every oscilloscope is different our probes have a compensation adjustment so the capacitance of the probe can be adjusted to match the capacitance of the scope input. The compensation range is the range of adjustment available. Matching probe and scope capacitance is important to prevent waveform distortion.

**FAQ DIFFERENTIAL PROBES**

What can you measure with a differential probe?

With 20 MHz bandwidth, a switchable attenuation of 20:1, and 200:1 (part no. ADF25), you can measure high-voltage circuits, motor speed controls, power supply design, and high-power electronic converters.

What comes in the probe set?

You will receive one differential probe, 2 probe tips, and 2 retractable sprung probes for accessing small wires for measurements.

Why is common rejection ratio (CMRR) important for differential probes?

CMRR is a measure of how well a differential probe will reject signals common to both test points, leaving the desired signal to be displayed by the scope.

What is readout?

Readout is an activator pin that protrudes out of the BNC connector of an X10 or X100 probe that completes a circuit. There are contacts around the BNC connector on the front of the oscilloscope and the activation is automatically set. If your scope does not have contacts around the BNC connector, it does not need this feature.

What probe should I buy?

Select a probe that is at least the same bandwidth as the oscilloscope you intend to use; however, for optimum performance, select a probe with two times the bandwidth of your test instrument.

**Osciilloscope Probe Specifications**

<table>
<thead>
<tr>
<th>Model</th>
<th>Bandwidth</th>
<th>Attenuation</th>
<th>Cable Length</th>
<th>Input Impedance</th>
<th>Rise Time</th>
<th>Compensation Range</th>
<th>Readout</th>
<th>IET1010</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP250</td>
<td>250MHz</td>
<td>x1</td>
<td>1.2M</td>
<td>1.5M</td>
<td>5.8ns</td>
<td>10 ~ 30pF</td>
<td>NA</td>
<td>CAT II</td>
</tr>
<tr>
<td>SP250</td>
<td>250MHz</td>
<td>x1</td>
<td>1.2M</td>
<td>1.5M</td>
<td>5.8ns</td>
<td>10 ~ 30pF</td>
<td>NA</td>
<td>CAT II</td>
</tr>
</tbody>
</table>

**FAQ**

What is the benefit of a probe with X1 and X10 switchable attenuation?

Passive X10 probes allow you to read a signal 10 times the amplitude of that viewed with a X1 probe. Example: an eight division graticule on 500V/div setting would display a 40 V peak-to-peak signal using the X1 setting. You can view a 400 V peak-to-peak signal using the X10 setting.

What is readout?

Readout is an activator pin that protrudes out of the BNC connector of an X10 or X100 probe that completes a circuit. There are contacts around the BNC connector on the front of the oscilloscope and the activation is automatically set. If your scope does not have contacts around the BNC connector, it does not need this feature.

What probe should I buy?

Select a probe that is at least the same bandwidth as the oscilloscope you intend to use; however, for optimum performance, select a probe with two times the bandwidth of your test instrument.