

USER GUIDE

Oscilloscope Probe Compensator

SMB (f)-to-Probe Compensation Tab Cable

This guide describes how to use the oscilloscope probe compensator.

The oscilloscope probe compensator allows you to compensate passive probes on compatible NI oscilloscopes using traditional compensation terminals.



Compatibility

The oscilloscope probe compensator is compatible with the following oscilloscopes and PFI lines.

Module	Connector
PXIe/PXI/PCI-5105 ¹	PFI 1
PXI/PCI-5152	PFI 1
PXIe-5160	PFI 1
PXIe-5162	PFI 1
PXIe-5163	SMB PFI 0 ²
PXIe-5164	SMB PFI 0 ²

¹ Requires a probe capable of compensating high capacitance inputs and a BNC (f)-to-SMB (f) cable with sufficiently low capacitance, such as the 0.08 m SMB-100 (part number 781449-01).

² Though the PFI 0 line is also available via the AUX 0 MHDMMR connector, the probe compensation signal is available only from SMB PFI 0.

Physical

Connectors	SMB (f) Terminals: compensation signal, ground
Dimensions	8.53 cm × 2.03 cm × 0.76 cm (3.94 in. × 0.80 in. × 0.30 in.)
Weight	24 g (0.85 oz)

Compensating Passive Probes

Compensating passive probes increases the accuracy of your measurements by matching the capacitance of your probe to the capacitance of a particular oscilloscope input channel.

Before beginning this procedure, complete the following:

- Set up your oscilloscope in a compatible chassis;
- Install a version of NI-SCOPE compatible with your oscilloscope on your system; and
- Configure a panel and layout in InstrumentStudio to include your oscilloscope.



Note For more information on using InstrumentStudio, refer to the *Instrument Studio Manual* at ni.com/manuals.

The oscilloscope probe compensator can output a 1 kHz square wave that you can use to compensate passive probes.

To compensate a passive probe, complete the following steps:


1. Connect the SMB end of the oscilloscope probe compensator to the PFI line that generates the probe compensation signal on your oscilloscope.
2. Connect the BNC end of the probe to an input channel of your oscilloscope.
3. Connect the ground clip of the probe to the accessory ground terminal.
4. Contact the tip of the probe to the accessory square wave terminal.
5. Enable the probe compensation signal:

Option

Description

InstrumentStudio



In the instrument header menu () in the upper-right corner of the panel, select **Probe Compensation»Enabled**.

NI-SCOPE

Call *Probe Compensation Signal Start*.

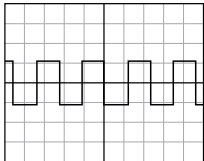
6. In InstrumentStudio, configure the settings of the input channel to which you connected the probe.
 - a) Set the channel to **On** to display the signal.
 - b) Set the **Input impedance** of the channel to **1 M Ω** .
 - c) Match the **Probe attenuation** setting to the setting on your probe.
7. Adjust the vertical range on the input channel until the signal starts to clip and then increase the vertical range by one step so that it no longer clips.

This process ensures you are using the maximum dynamic range of the ADC.

8. Examine the digitized signal and adjust the tunable capacitor on the probe.

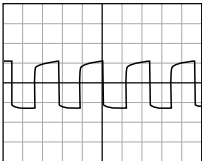
The probe is correctly compensated when the waveform appears as square as possible:

Compensated Correctly



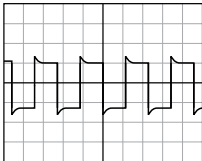
Probe Adjustment Signal

Undercompensated

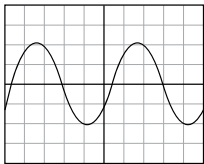


Probe Adjustment Signal

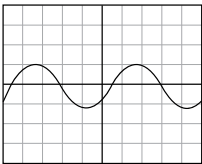
Overcompensated



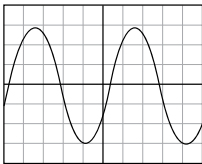
Probe Adjustment Signal



Proper Amplitude of a
1 MHz Test Signal



Reduced Amplitude of a
1 MHz Test Signal



Increased Amplitude of a
1 MHz Test Signal

Once compensated, the probe conveys signals to the input channel accurately, without artificially attenuating or amplifying frequency components of the signal.



Tip For the most accurate measurements:

- Compensate probes for each channel of the oscilloscope;
- Use a compensated probe only with the channel you used to compensate it; and
- Compensate your probes frequently.

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