Probe De-skew and Calibration

Calibrating the InfiniiMax probes (1168A, 1169A, 1130A, 1131A, 1132A, 1134A), the 1156A probe, the 1157A probe, or the 1158A probe is done using the E2655B Deskew and Calibration Kit. The kit contains the following parts:

- SMA (male) to SMA (male) adaptor
- SMA (male) to BNC (female) adaptor
- BNC (male) to SMA (male) adaptor
- 50 Ω SMA Terminator
- De-skew Fixture

This document contains procedures showing vertical and skew calibration for the InfiniiMax (1160A series and 1130A series probes) solder-in differential probe head and the differential browser probe head. However, the procedures also apply to all of the different InfiniiMax probe configurations and for the 1150A series active probe configurations.

Calibration for the Solder-in and Socketed Probe Heads

Calibration of the solder-in and socketed probe heads consists of a vertical calibration and a skew calibration. The vertical calibration should be performed before the skew calibration. Both calibrations should be performed for best probe measurement performance.

Before calibrating the probe, verify that the Infiniium oscilloscope has been calibrated recently and that the calibration Δ temperature is within ±5 °C. If this is not the case, calibrate the oscilloscope before calibrating the probe. This information is found in the Infiniium Calibration dialog box.

Connecting the Probe for Calibration

The calibration procedure requires the following parts.

- BNC (male) to SMA (male) adaptor
- Deskew fixture
- 50 Ω SMA terminator

For the following procedure, refer to Figure 1.

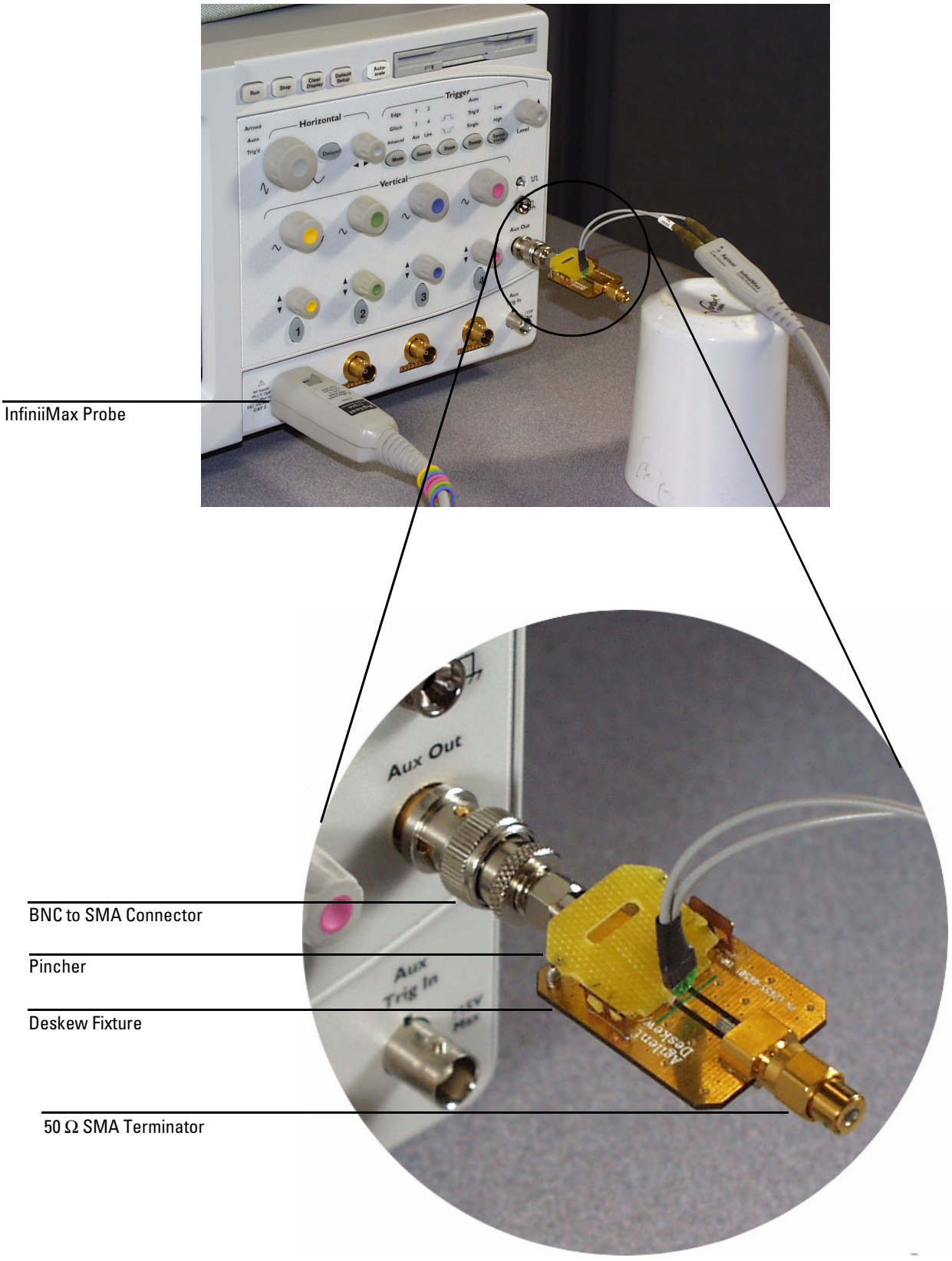
1. Connect BNC (male) to SMA (male) adaptor to the deskew fixture on the connector closest to the yellow pincher.
2. Connect the 50 Ω SMA terminator to the connector farthest from the yellow pincher.
3. Connect the BNC side of the deskew fixture to the Aux Out BNC of the Infiniium oscilloscope.
4. Connect the probe to an oscilloscope channel.
5. To minimize the wear and tear on the probe head, the probe head should be placed on a support to relieve the strain on the probe head cables.
6. Push down on the back side of the yellow pincher. Insert the probe head resistor lead underneath the center of the yellow pincher and over the center conductor of the deskew fixture. The negative probe head resistor lead or ground lead must be underneath the yellow pincher and over one of the outside copper conductors (ground) of the deskew fixture. Make sure that the probe head is approximately perpendicular to the deskew fixture.

   For the socketed probe head, insert two properly trimmed 82 Ω resistors into the sockets.

7. Release the yellow pincher.

   To insure contact, pull up on the back side of the yellow pincher to insure good contact between resistor leads and the deskew fixture.

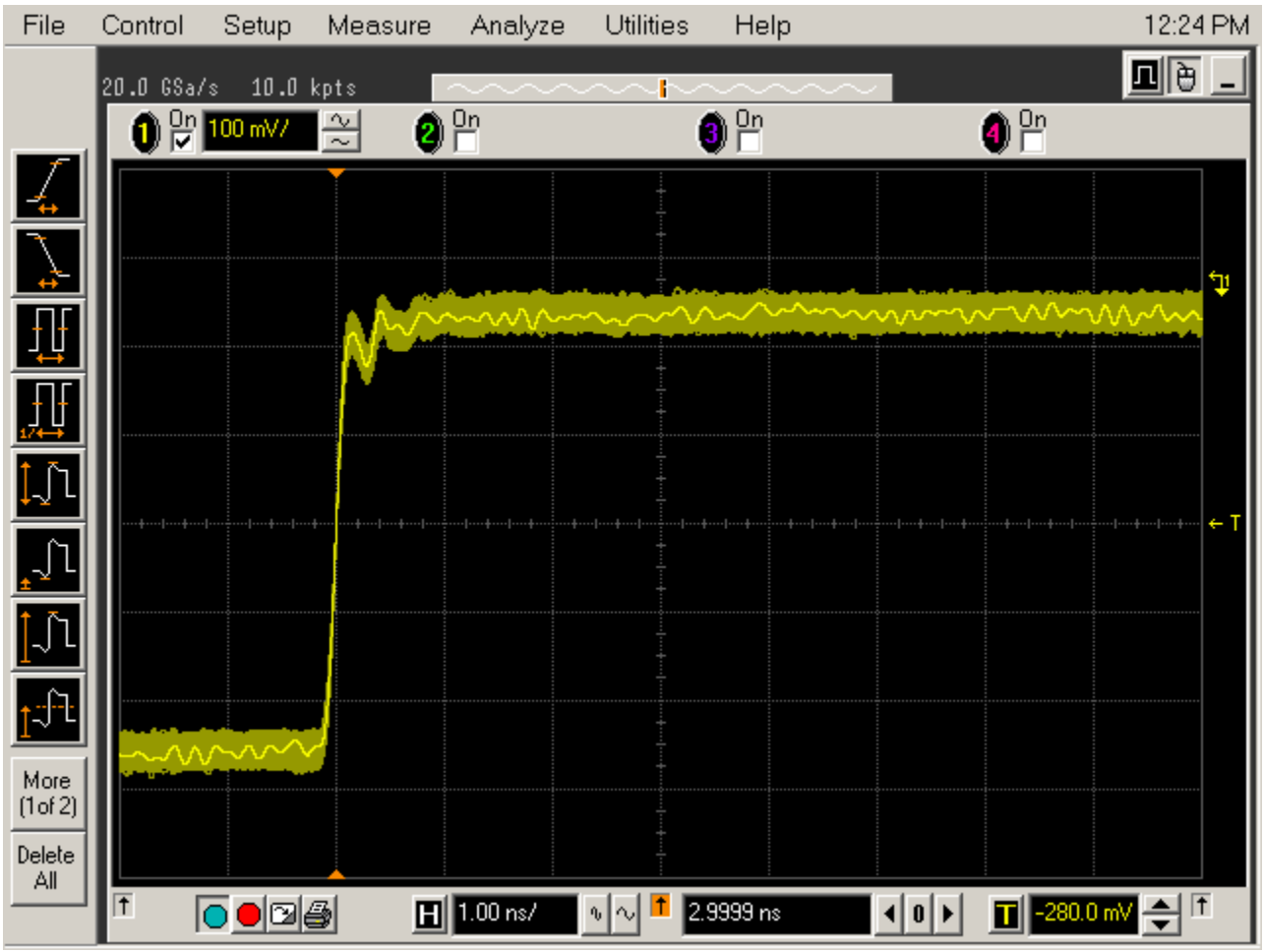
Figure 1


InfiniiMax Probe
BNC to SMA Connector
Pincher
Deskew Fixture
50 Ω SMA Terminator
Aux Out
Aux Trig In
Horizontal
Vertical
Trigger

Verifying the Connection

1. On the Infiniium oscilloscope, press the autoscale button on the front panel.
2. Set the volts per division to 100 mV/div.
3. Set the horizontal scale to 1.00 ns/div.
4. Set the horizontal position to approximately 3 ns. You should see a waveform similar to that in Figure 2.

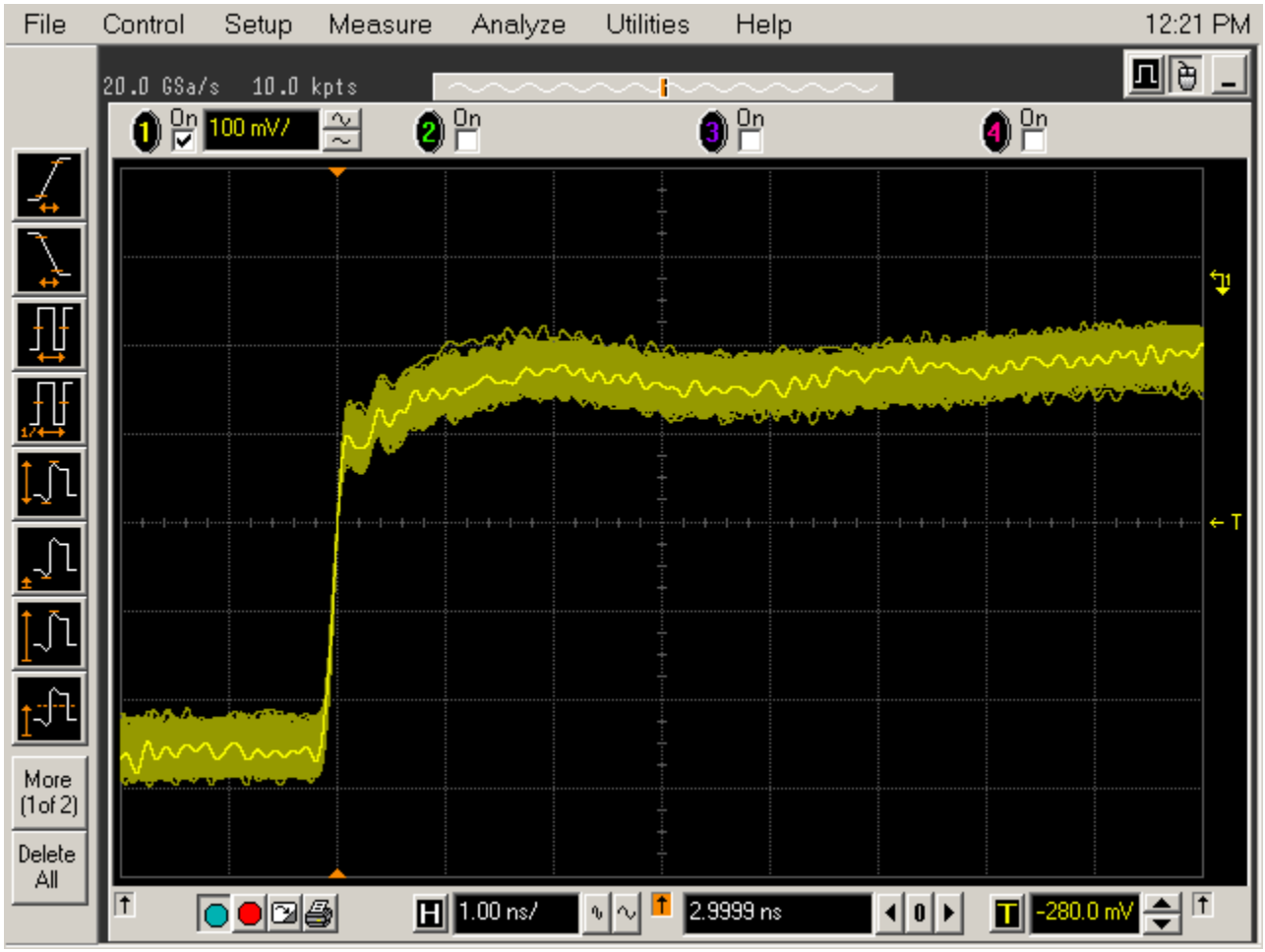
Figure 2



Good Connection

If you see a waveform similar to that of Figure 3 then you have a bad connection and should check all of your probe connections.

Figure 3



Bad Connection

Running the Probe Calibration and Deskew

1. On the Infiniium oscilloscope in the Setup menu, select the channel connected to the probe.
2. In the Channel Setup dialog box select the Probes... button.
3. In the Probe Setup dialog box select the Calibrate Probe... button.
4. In the Probe Cal dialog box select the Calibrated Atten/Offset radio button.
5. Select the Start Atten/Offset Calibration... button and follow the on-screen instructions for the vertical calibration procedure.
6. Once the vertical calibration has successfully completed, select the Calibrated Skew... button.
7. Select the Start Skew Calibration... button and follow the on-screen instructions for the skew calibration.

   At the end of each calibration the oscilloscope will inform you if the calibration was or was not successful.

Verifying the Probe Calibration

If you have just successfully calibrated the probe, it is not necessary to perform this verification. However, if want to verify the probe was properly calibrated, the following procedure will help you verify the calibration.

The calibration procedure requires the following parts.

- BNC (male) to SMA (male) adaptor
- SMA (male) to BNC (female) adaptor
- BNC (male) to BNC (male) 12 inch cable such as the Agilent 8120-1838 (not included in this kit)
- Agilent 54855-61620 calibration cable (Infiniium oscilloscopes with bandwidths of 6 GHz and greater only)
- Agilent 54855-67604 precision 3.5 mm adaptors (Infiniium oscilloscopes with bandwidths of 6 GHz and greater only)
- Deskew fixture

For the following procedure, refer to Figure 1.

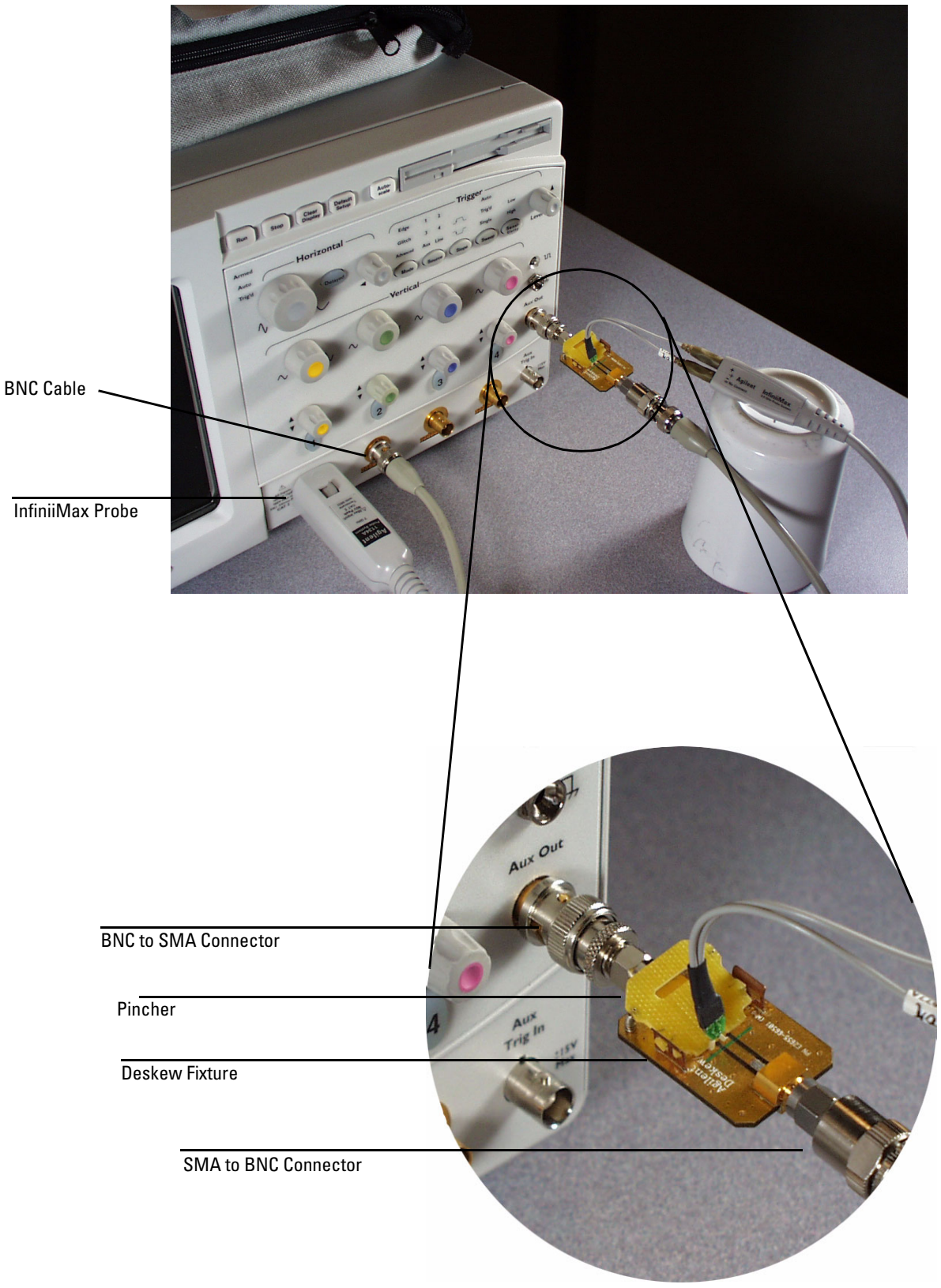
1. Connect BNC (male) to SMA (male) adaptor to the deskew fixture on the connector closest to the yellow pincher.
2. Connect the SMA (male) to BNC (female) to the connector farthest from the yellow pincher.
3. Connect the BNC (male) to BNC (male) cable to the BNC connector on the deskew fixture to one of the unused oscilloscope channels. For Infiniium oscilloscopes with bandwidths of 6 GHz and greater, use the 54855-61620 calibration cable and the two 54855-67604 precision 3.5 mm adaptors.
4. Connect the BNC side of the deskew fixture to the Aux Out BNC of the Infiniium oscilloscope.
5. Connect the probe to an oscilloscope channel.
6. To minimize the wear and tear on the probe head, the probe head should be placed on a support to relieve the strain on the probe head cables.
7. Push down on the back side of the yellow pincher. Insert the probe head resistor lead underneath the center of the yellow pincher and over the center conductor of the deskew fixture. The negative probe head resistor lead or ground lead must be underneath the yellow pincher and over one of the outside copper conductors (ground) of the deskew fixture. Make sure that the probe head is approximately perpendicular to the deskew fixture.

   For the socketed probe head, insert two properly trimmed 82 Ω resistors into the sockets.

8. Release the yellow pincher.

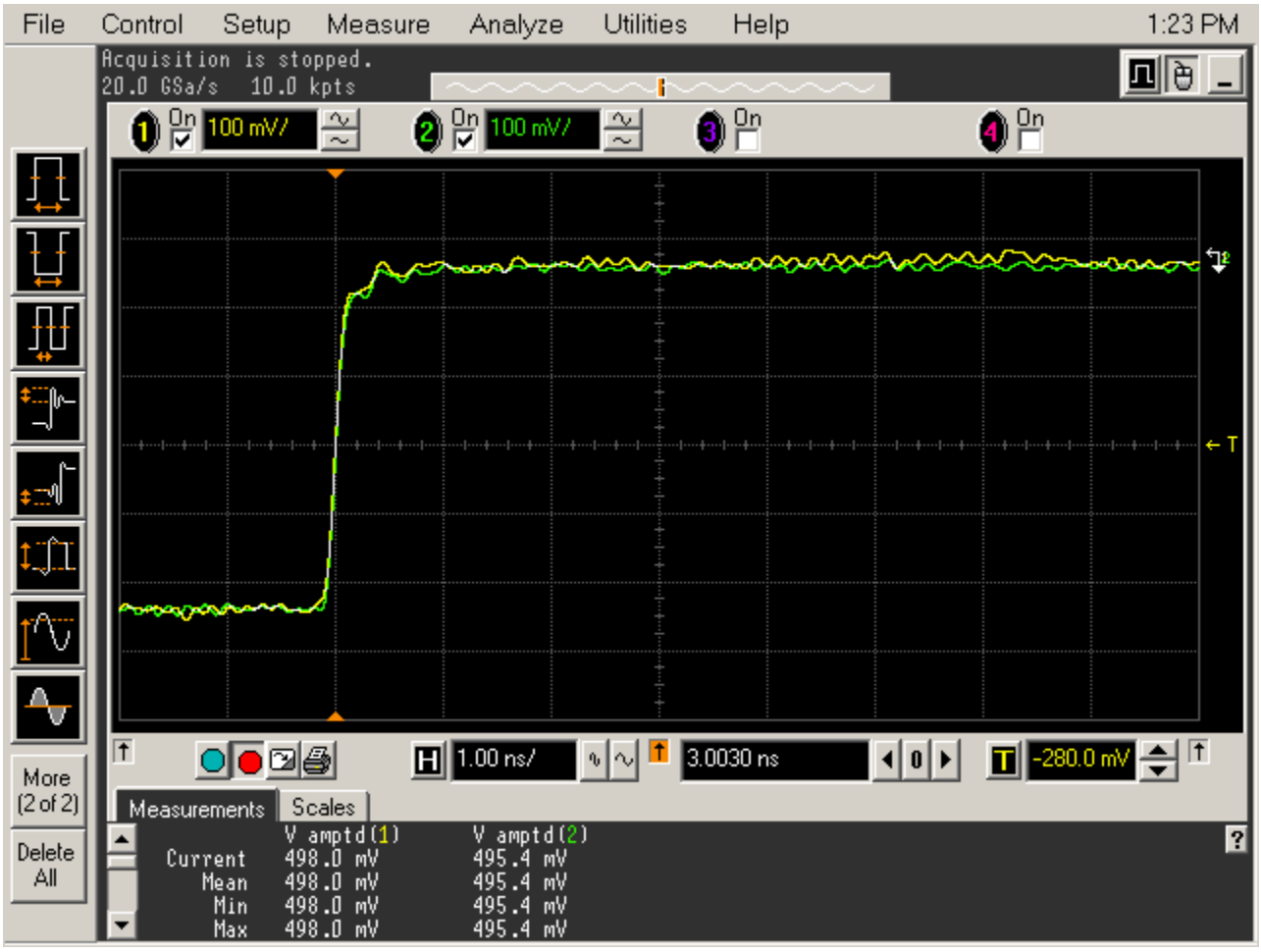
   To insure contact, pull up on the back side of the yellow pincher to insure good contact between resistor leads and the deskew fixture.

Figure 4


BNC Cable
InfiniiMax Probe
BNC to SMA Connector
Pincher
Deskew Fixture
SMA to BNC Connector
Aux Out
Aux Trig In

9 On the oscilloscope, press the autoscale button on the front panel.
10 Select Setup menu and choose the channel connected to the BNC cable from the pull-down menu.
11 Select the Probes... button.
12 Select the Configure Probe System button.
13 Select User Defined Probe from the pull-down menu.
14 Select the Calibrate Probe... button.
15 Select the Calibrated Skew radio button.
16 Once the skew calibration is completed, close all dialog boxes.
17 Select the Start Skew Calibration... button and follow the on-screen instructions.
18 Set the vertical scale for the displayed channels to 100 mV/div.
19 Set the horizontal range to 1.00 ns/div.
20 Set the horizontal position to approximately 3 ns.
21 Change the vertical position knobs of both channels until the waveforms overlap each other.
22 Select the Setup menu choose Acquisition... from the pull-down menu.
23 In the Acquisition Setup dialog box enable averaging. When you close the dialog box, you should see waveforms similar to that in Figure 5.

Figure 5



Overlapping Waveforms

Calibration for Hand-held Browser Probe Heads

Calibration of the hand-held browser probe heads consists of a vertical calibration and a skew calibration. The vertical calibration should be performed before the skew calibration. Both calibrations should be performed for best probe measurement performance.

Before calibrating the probe, verify that the Infiniium oscilloscope has been calibrated recently and that the calibration Δ temperature is within ±5 °C. If this is not the case, calibrate the oscilloscope before calibrating the probe. This information is found in Infiniium Calibration dialog box.

Calibration Setup

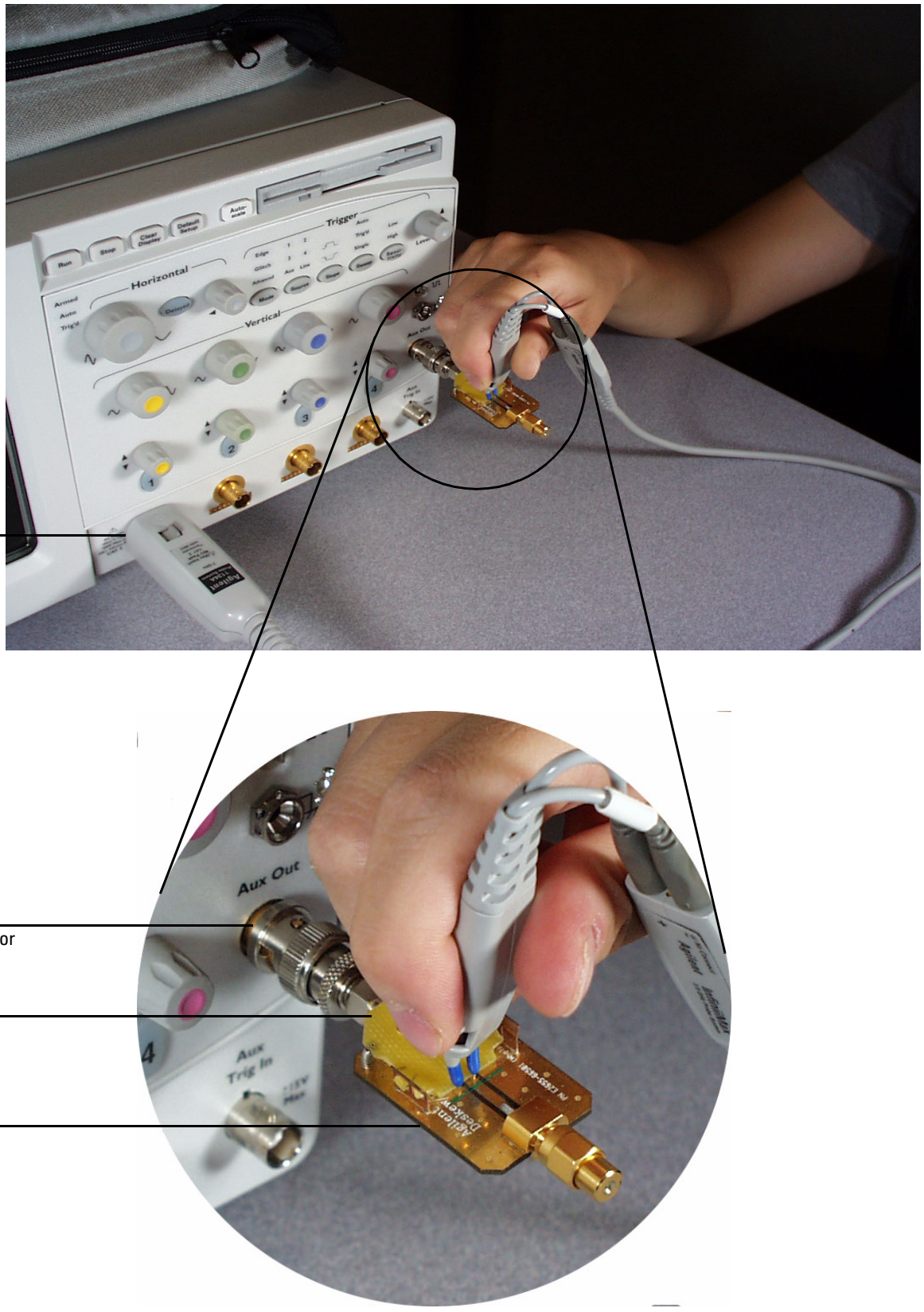
The calibration procedure requires the following parts.

- BNC (male) to SMA (male) adaptor
- Deskew fixture
- 50 Ω SMA terminator

For the following procedure, refer to Figure 6.

1. Connect BNC (male) to SMA (male) adaptor to the deskew fixture on the connector closest to the yellow pincher.
2. Connect the 50 Ω SMA terminator to the connector farthest from the yellow pincher.
3. Connect the BNC side of the deskew fixture to the Aux Out of the Infiniium oscilloscope.
4. Connect the probe to an oscilloscope channel.
5. Place the positive resistor tip of the browser on the center conductor of the deskew fixture between the green line and front end of the yellow pincher. The negative resistor tip or ground pin of the browser must be on either of the two outside conductors (ground) of the deskew fixture.
6. On the Infiniium oscilloscope in the Setup menu, select the channel connected to the probe.
7. In the Channel Setup dialog box select the Probes... button.
8. In the Probe Setup dialog box select the Calibrate Probe... button.
9. In the Probe Cal dialog box select the Calibrated Atten/Offset radio button.
10. Select the Start Atten/Offset Calibration... button and follow the on-screen instructions for the vertical calibration procedure.
11. Once the vertical calibration has successfully completed, select the Calibrated Skew... button.
12. Select the Start Skew Calibration... button and follow the on-screen instructions for the skew calibration.

Figure 6


InfiniiMax Probe
BNC to SMA Connector
Pincher
Deskew Fixture
Horizontal
Vertical
Trigger
Aux Out
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Agilent Technologies

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