

Keysight N2830A-Series Differential InfiniiMax III+ Probes

Handling
Guide

Notices

© Keysight Technologies, Inc. 2014

No part of this manual may be reproduced in any form or by any means (including electronic storage and retrieval or translation into a foreign language) without prior agreement and written consent from Keysight Technologies, Inc. as governed by United States and international copyright laws.

Manual Part Number

N2830-97001

Edition

April 2014

Printed in USA

Keysight Technologies, Inc.
1900 Garden of the Gods Rd.
Colorado Springs, CO 80907 USA

Warranty

The material contained in this document is provided “as is,” and is subject to being changed, without notice, in future editions. Further, to the maximum extent permitted by applicable law, Keysight disclaims all warranties, either express or implied, with regard to this manual and any information contained herein, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Keysight shall not be liable for errors or for incidental or consequential damages in connection with the furnishing, use, or performance of this document or of any information contained herein. Should Keysight and the user have a separate written agreement with warranty terms covering the material in this document that conflict with these terms, the warranty terms in the separate agreement shall control.

Technology Licenses

The hardware and/or software described in this document are furnished under a license and may be used or copied only in accordance with the terms of such license.

Restricted Rights Legend

If software is for use in the performance of a U.S. Government prime contract or subcontract, Software is delivered and licensed as “Commercial computer software” as defined in DFAR 252.227-7014 (June 1995), or as a “commercial item” as defined in FAR 2.101(a) or as “Restricted computer software” as defined in FAR 52.227-19 (June 1987) or any equivalent agency regulation or contract clause. Use, duplication or disclosure of Software is subject to Keysight Technologies’ standard commercial license terms, and non-DOD Departments and Agencies of the U.S. Government will receive no greater than Restricted Rights as defined in FAR 52.227-19(c)(1-2) (June 1987). U.S. Government users will receive no greater than Limited Rights as defined in FAR 52.227-14 (June 1987) or DFAR 252.227-7015 (b)(2) (November 1995), as applicable in any technical data.

Safety Notices

CAUTION. A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

WARNING. A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a **WARNING** notice until the indicated conditions are fully understood and met.

Proper Handling Techniques

- Use a Static-Safe Work Station 4
- Safely Connecting the Probe to an Oscilloscope 6
- Safely Disconnecting the Probe from an Oscilloscope 8
- Probing a DUT 9

In this guide, you'll learn how to properly handle the probe to prevent damage and maintain high performance. For more safe-handling information, go to www.keysight.com and search for *InfiniiMax III ESD Best Practices demo video*.

CAUTION

InfiniiMax I and II probe heads cannot be used with Infiniimax III+ probe amplifiers and InfiniiMax III+ probe heads cannot be used with InfiniiMax I and II amplifiers.

Use a Static-Safe Work Station

InfiniiMax probes and accessories are ESD sensitive devices and should be treated with care. Before using or handling the probe or accessories, always wear a grounded ESD wrist strap and ensure that cables and probe heads are discharged before being connected. All work, including connecting probe amplifiers to the oscilloscope, should be performed at a static-safe work station as shown in **Figure 1**.

CAUTION

Electrostatic discharge (ESD) can quickly and imperceptibly damage or destroy high-performance probes, resulting in costly repairs. Always wear a wrist strap when handling probe components.

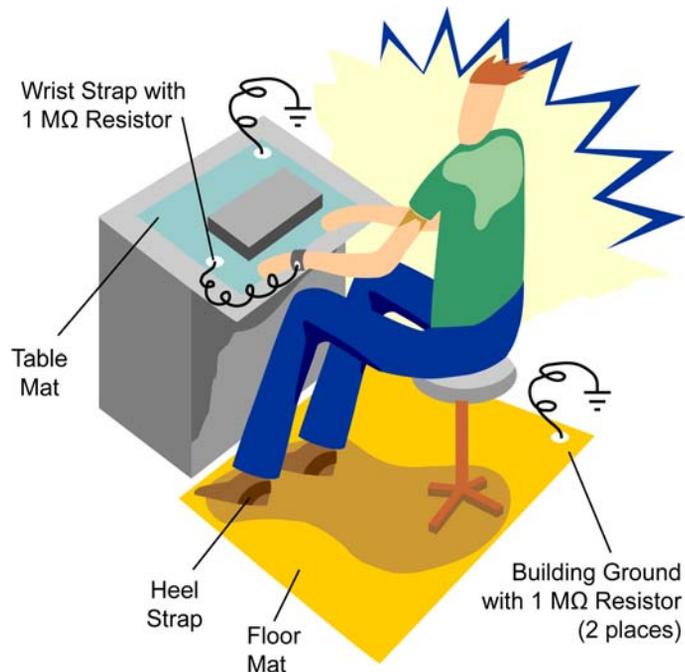


Figure 1 Static-Safe Work Station

Many scopes including Keysight's 90000X series have a front-panel ground socket. You can plug the wrist strap into the ground socket as seen in the following picture.

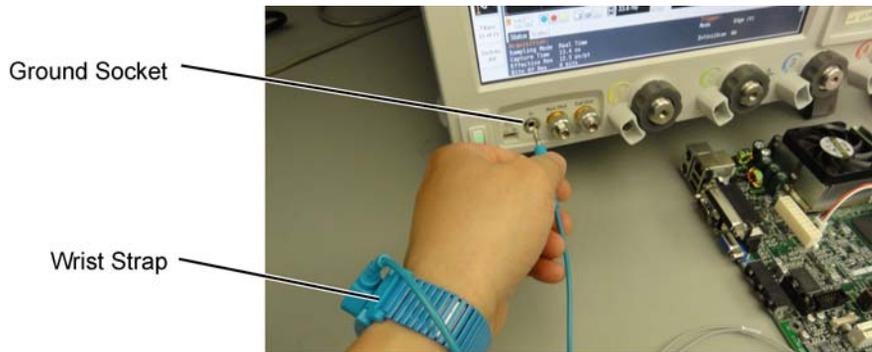


Figure 2 Wrist Strap Connected to Oscilloscope Ground Socket

The static-safe work station shown in [Figure 1](#) uses two types of ESD protection:

- Conductive table-mat and wrist-strap combination.
- Conductive floor-mat and heel-strap combination.

Both types, when used together, provide a significant level of ESD protection. Of the two, only the table-mat and wrist-strap combination provides adequate ESD protection when used alone. To ensure user safety, the static-safe accessories must provide at least 1 M Ω of isolation from ground. Purchase acceptable ESD accessories from your local supplier.

WARNING

These techniques for a static-safe work station should not be used when working on circuitry with a voltage potential greater than 500 volts.

Safely Connecting the Probe to an Oscilloscope

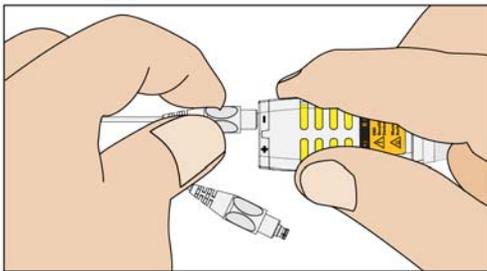
To protect against ESD damage, always use the four steps shown in **Figure 4** on page 7 when connecting your probe to the oscilloscope.

CAUTION Avoid damaging the probe amplifier connection pins. As shown in **Figure 3**, never bend the probe head in order to “pop” it loose from the amplifier. Do not wiggle the probe head up and down or twist it to remove the connectors from the sockets.

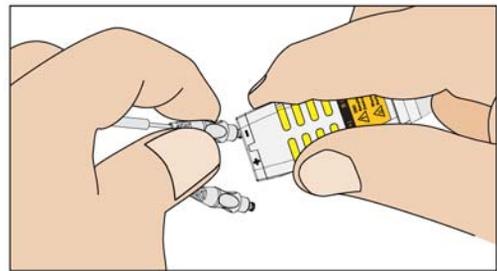
CAUTION Never allow the probe head to be connected to the probe amplifier, if the probe amplifier is *not* connected to the oscilloscope channel.

CAUTION Always disconnect an N2836A or N5441A solder-in probe head from the probe amplifier before un-soldering, moving to a new position, and re-soldering the head.

To connect a probe head to the probe amplifier, push the connections straight in.



Correct: Pull Probe Head Straight Out



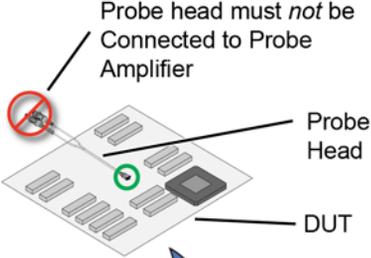
Incorrect: Do not Bend, Wiggle, or Twist

Figure 3 Disconnecting the Probe Head From the Amplifier

To connect the probe to the oscilloscope...

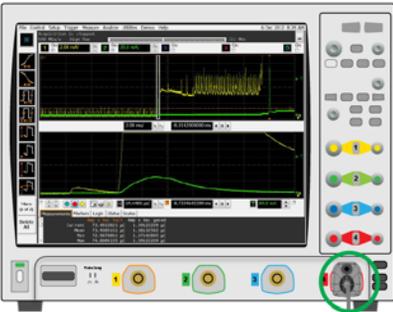
1 If the DUT is not grounded to the oscilloscope via the AC mains ground, connect the DUT ground to the oscilloscope ground. An example of a floating ground is a battery powered DUT.

2 Connect the probe head to the DUT. The probe amplifier must not be connected to the oscilloscope or the probe head.



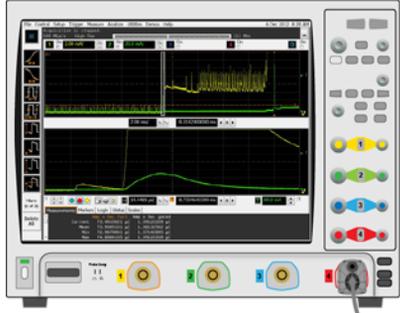
3 Connect the probe amplifier to the oscilloscope.

Probe head must *not* be Connected to Probe Amplifier



Probe Amplifier

4 Connect the probe head to the probe amplifier.



When probing, you can move the probing site without breaking the head-to-amplifier connection. EXCEPTION: break the connection before moving an N2836A or N5441A solder-in probe head.

Figure 4 Connecting the Probe to the Oscilloscope

Safely Disconnecting the Probe from an Oscilloscope

Always disconnect the probe head from the probe amplifier before:

- disconnecting the probe amplifier from the oscilloscope.
- moving the probe amplifier from one oscilloscope channel to another.

CAUTION

Never allow the probe head to be connected to the probe amplifier, if the probe amplifier is *not* connected to the oscilloscope channel.

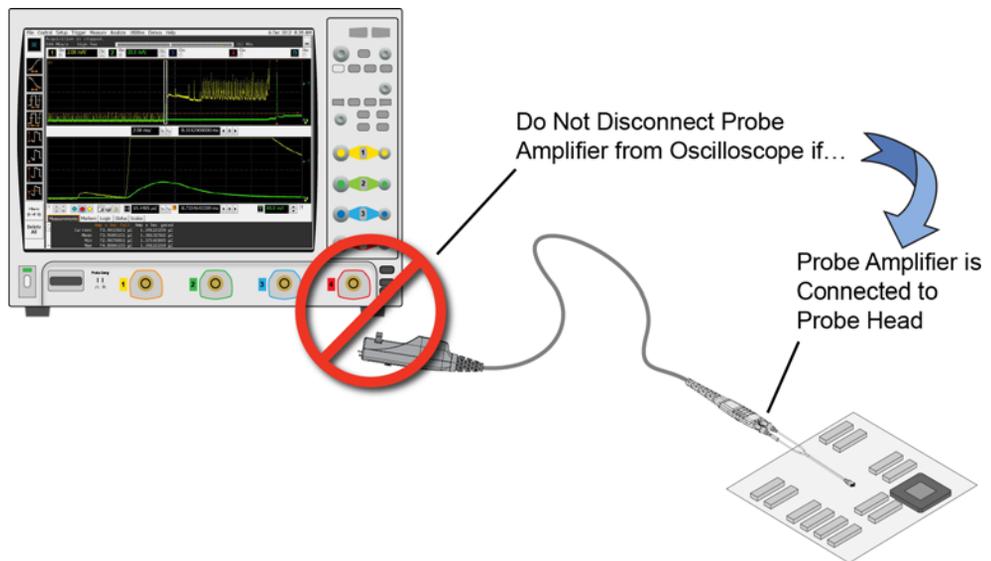


Figure 5 Probe Improperly Disconnected from Oscilloscope While Probe Head is Connected to the Probe Amplifier

Probing a DUT

The probe has been designed to withstand a moderate amount of physical and electrical stress. However, with an active probe, the technologies necessary to achieve high performance do not allow the probe to be unbreakable. Treat the probe with care. It can be damaged if excessive force is applied to the probe tip. This damage is considered to be abuse and will void the warranty when verified by Keysight Technologies service professionals.

When the probe amplifier is not in use, store it in the probe case. Coil the probe cable with these tips in mind:

- Keep the coil's radius fairly large so as not to induce kinking or bending. Use a similar technique as when coiling an extension cord.
- Avoid twisting the cable when coiling by introducing a very slight twist with each coil. This allows the cable rotations to lie flat against each other and will eliminate the net twisting of the cable in the end.

CAUTION

Probes are sensitive devices and should be treated with care. Do not bend or kink the probe amplifier cable. Do not drop heavy objects on the probe, drop the probe from large heights, spill liquids on the probe, etc. Any of these examples can significantly degrade the performance of the probe.

CAUTION

Do not replace or repair the N2849A QuickTip's resistor or ground leads. Attempting to do so will damage the ability of the tip to mate with the N2848A probe head.

CAUTION

Always mechanically strain-relieve the N2848A QuickTip head and N5439A ZIF head *before* using to protect both your probe accessories and DUT from damage.

CAUTION

Using the N2787A 3D probe positioner with the N5445A browser probe head reduces the chance of breaking the browser tips and ensures that the tips maintain solid contact.

Moving the Probe to Different Locations

When making your measurements, you'll often need to probe different locations on the DUT. You can safely move any of the following three probe heads without having to first break the amplifier-to-head connection:

- N5445A differential browser head
- N5439A ZIF head,
- N5444A 2.92 mm/3.5 mm/SMA head.

The only exception is when the DUT is not grounded to the oscilloscope via the AC mains ground. In this case, connect the DUT ground to the oscilloscope ground before moving the probe. An example of a device having a floating ground would be a battery-powered DUT.

CAUTION

Always disconnect an N2836A or N5441A solder-in probe head from the probe amplifier before un-soldering, moving to a new position, and re-soldering the head. This is needed as some soldering-iron tips can hold a charge which can damage the probe amplifier.

Strain Relieving the Probe Heads

High-performance probes have small physical geometries to ensure the lowest possible loading and best electrical response. Because of their small size, probing accessories are often delicate. It is important to mechanically secure your probes to protect both your equipment and designs from damage. Although tack putty and low-temperature hot glue are recommended, you can also use other methods such as tape or hook-and-loop strain relief. Keep in mind that different accessories have different cable stiffness. You should choose a strain relief method appropriate for the cable stiffness. For instance, it is best to secure the stiffer N5439A near the SMP connectors and form the cable to the optimal location.

CAUTION

Do not kink cables. Do not crush cables. Do not use aggressive adhesives or high temperatures

Tack-Putty

Keysight recommends the use of tack putty for securing both probe heads and amplifiers. Tack putty can be ordered using part number N5439-65201. Wrap a small amount of tack-putty around your probe head cables, taking care to not pinch them. The mass can then be secured to a rigid body near your DUT.

Similar techniques can be used to secure probe amplifiers where you apply some tack-putty to the underside of the probe amplifier body and attach it to a rigid body near your DUT.

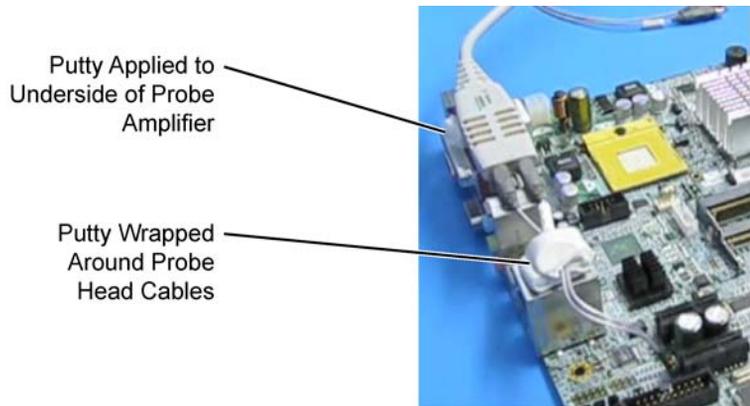


Figure 6 Probe Secured Using Tack Putty

You can also use putty with a positioner, such as the N2787A as shown in the following figure.

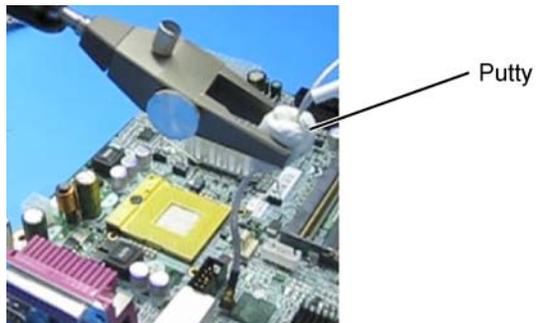


Figure 7 Using Putty With the N2787A 3D Probe Positioner

The same positioner can also be used to support your probe amplifier.

Low-temperature Hot Glue

You can also use low-temperature hot glue to secure cables.

CAUTION

Only use *low-temperature* hot glue. To remove the hot glue, warm it with a heat gun set on low. Only heat the hot glue enough to remove it.

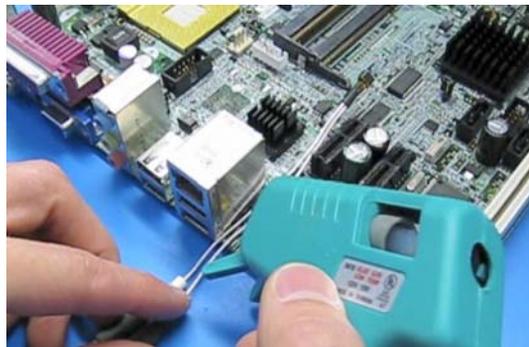


Figure 8 Probe Secured Using Low-Temperature Hot Glue

Manual Part Number
N2830-97001



Keysight Technologies
Printed in USA, April 2014