



Soldering a P7500 to a Nexus DDR Component Interposer

Introduction

This document shows an example of how to solder P7500 tips to the oscilloscope version of a Nexus DDR Component Interposer board. The oscilloscope interposers feature embedded 100Ω resistors located very close to each BGA ball of the memory device, to isolate the analog signal integrity impact of the interposer channel. New TriMode™ solder tips (020-3022-00) are available to match the P7500 Series probes to the Nexus interposers.

Suggested Equipment List:

- Soldering iron with a fine tip
- Lead free solder
- Magnifying glass or microscope
- Fine tip tweezers
- Wire cutters
- Anti-static tape

Instructions:

The goal is to solder five tips to five signals of interest. Figure 1 shows the locations of the signal vias.

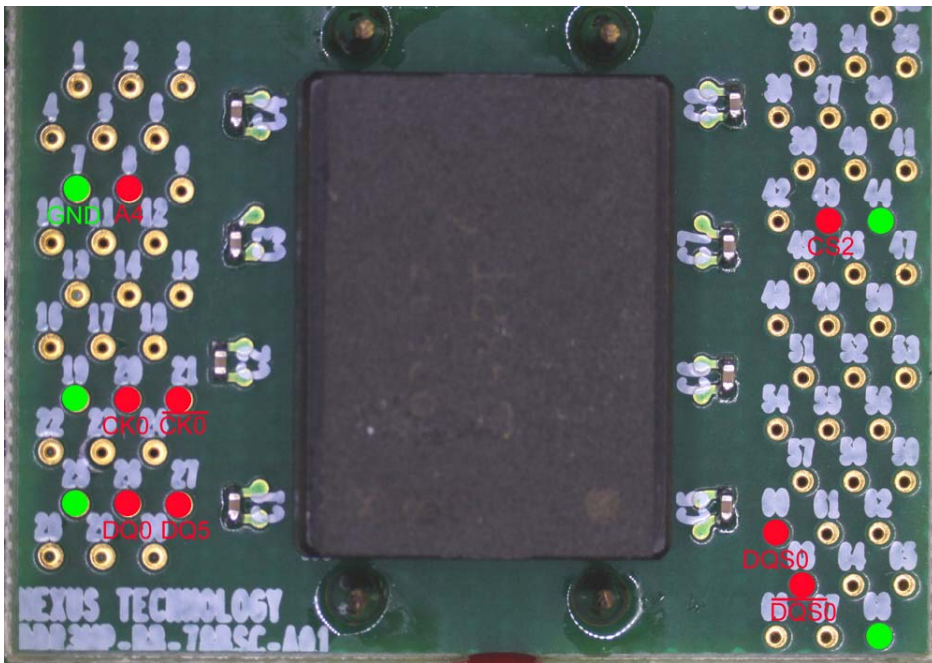


Figure 1. Signals to be soldered

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When soldering multiple tips in a small area, it is useful to take some time to plan the layout and order of soldering the tips. For this particular case, a tip will be first be soldered to A4, then CK0, and then DQ0. Proceeding in this order will make it easier to solder and secure the tips. On the right side of the board solder CS2 first and DQS0 second.

The TriMode solder tip comes standard with 4 wires attached to the tip. The two middle wires are for the signals and the two outside wires are for ground. Depending on the signal, it is not necessary to solder all the wires to the interposer. Unsolder the unnecessary wires from the board (Figure 2A). For the best signal fidelity, cut the wires as short as possible (Figure 2B). Do not cut the wires shorter than 0.05" (1.27mm) because the tips become difficult to reliably solder to the test points. There are metal pads on the top and bottom of the tip (Figure 2C), so it is recommended to wrap the tip in anti-static tape to prevent shorting the tip to one of the many vias on the interposer (Figure 2D).

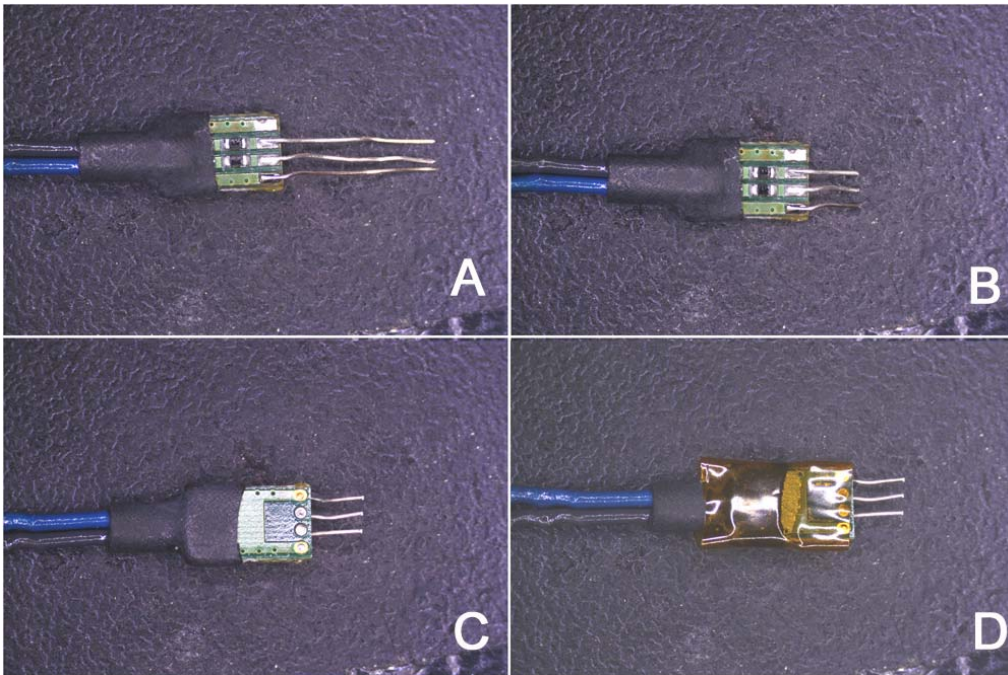


Figure 2. A: Tip with long wires, one wire unsoldered from tip. B: Wires cut short. C: Back side of tip. D: Tip covered with anti-static tape

The wire on the probe tip should fit in the via holes, but there can be plating thickness variations that prevent the wire from fitting in the hole. In these cases, it is easiest to add solder to the signal vias first and then to solder the wires to the vias. Figure 3A shows solder added to via holes 7, 8, and 9. Via 7 is ground, via 8 is A4, and via 9 is A1. A1 and A4 are single-ended signals. The TriMode capability of the P7500 Probes enables a single probe tip to measure two different single-ended signals. By connecting the two signals to the inputs of the probe and making a ground connection, the signals can be measured on an oscilloscope by choosing either the A or B mode of the P7500 probes. The probe can only measure one of the signals at a time so this method is not appropriate for signals that need to be displayed on the oscilloscope simultaneously.

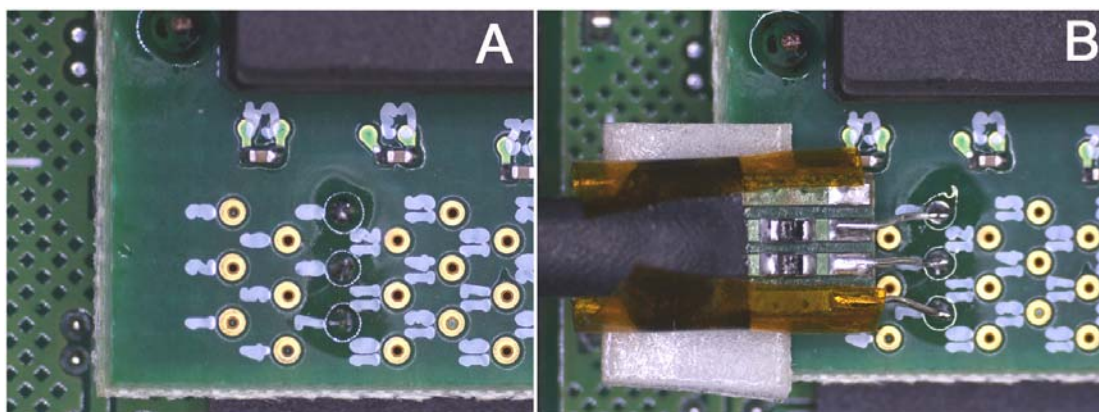


Figure 3. A: Solder placed on signal vias. B: Tip soldered to vias and secured using foam tape.

The tip is secured in place using double-sided foam tape that comes with the probe (Figure 3B). It is a good idea to secure the probe tips to the circuit board to protect the solder joints. The foam tape works well for parts that will experience light usage. If the tips will be plugged into a probe many times, it might be appropriate to use a stronger attach method like hot glue, silicone, or epoxy. Hot glue is recommended because it holds the tips well, but is possible to remove if necessary.

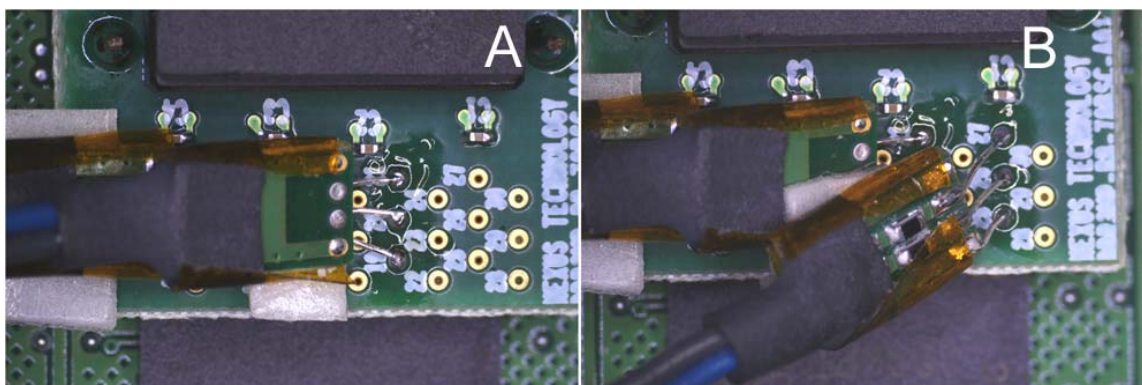


Figure 4. A: Second tip soldered into place. B: Third tip soldered into place.

The second tip was prepared similar to the first. In Figure 4A, the tip was soldered into place upside down. This was done so that the black colored coax side could be easily be soldered to CK0 (Via 20). The blue colored coax was soldered to the complementary signal. This TriMode tip does not have a polarized connector, so it is a good idea to consistently solder the same side of the tip to the active signal or positive signal of a differential pair. Soldering to the complimentary signals and ground allows the differential signal to be characterized using the TriMode capabilities of the P7500 Series probes.

The third tip was also soldered and held in place with foam tape. This tip was also soldered to two different single-ended signals, DQ0 and DQ5. The anti-static tape on the tips is not required for performance, but does help prevent accidental shorting of signals.

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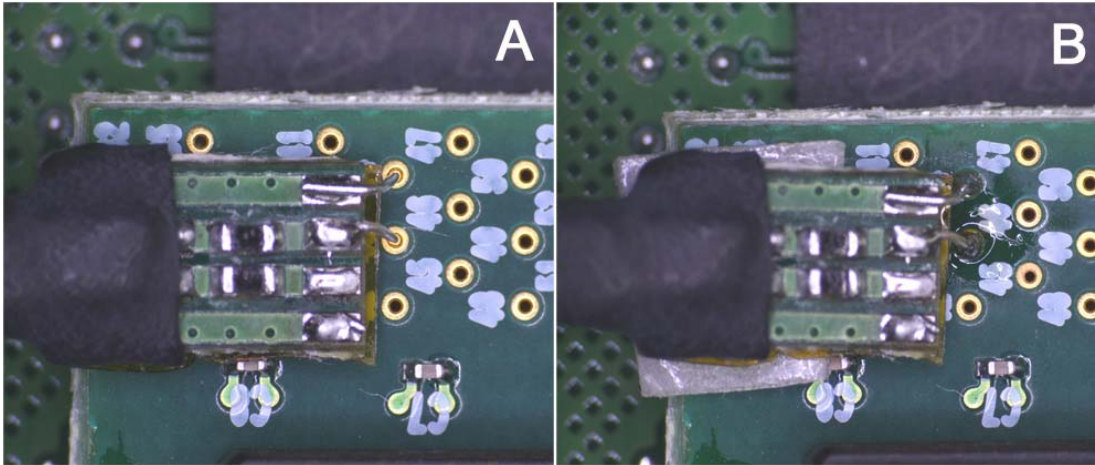


Figure 5. A: Tip wires in via and ready for soldering. B: Tip soldered to board.

For the next tip, there is only one signal of interest, CS2, therefore only two wires were kept on the tip. This fourth tip shows an example of soldering the tip to the board by first putting the wires into the vias. Putting the wires into the vias will create a stronger mechanical connection to the board, but may be more difficult to solder to board.

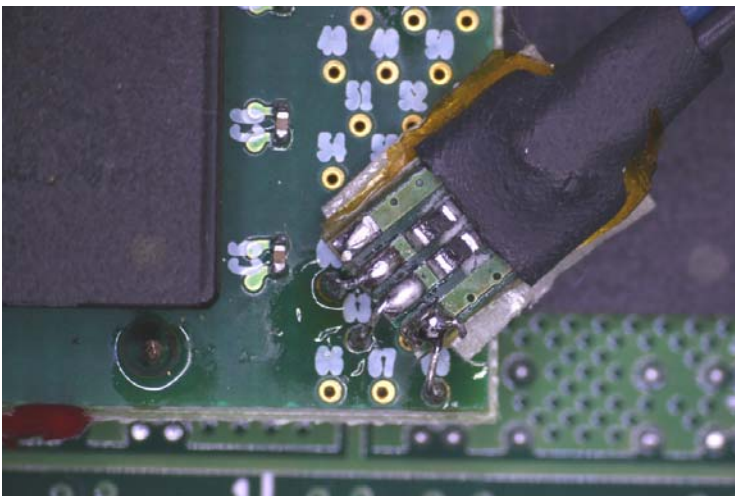


Figure 6. Fifth tip soldered to interposer.

The fifth and final tip was soldered to a differential strobe signal, DQS0. Unlike the other signal test points, these signals are offset slightly. To get the best signal fidelity, a ground via was chosen that was closest to the tip ground pad.



Figure 7. All tips soldered to DDR Component Interposer

This document shows one example of soldering probe tips to the Nexus DDR Component Interposer. With a little planning, it is possible to solder even more tips to this interposer board. With this setup it is easy to plug and unplug the probe and move between the different signals, even while the DIMM is powered.

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