



SCRUB-R - MAINTENANCE AND CLEANING GUIDE

1. Purpose:

- 1.1. The purpose of this procedure is to recommend intervals and procedures for the maintenance of Socket Assemblies using Scrub-R contacts, as well as ensure a clean connection to the mating surface before reinsertion.

2. Scope:

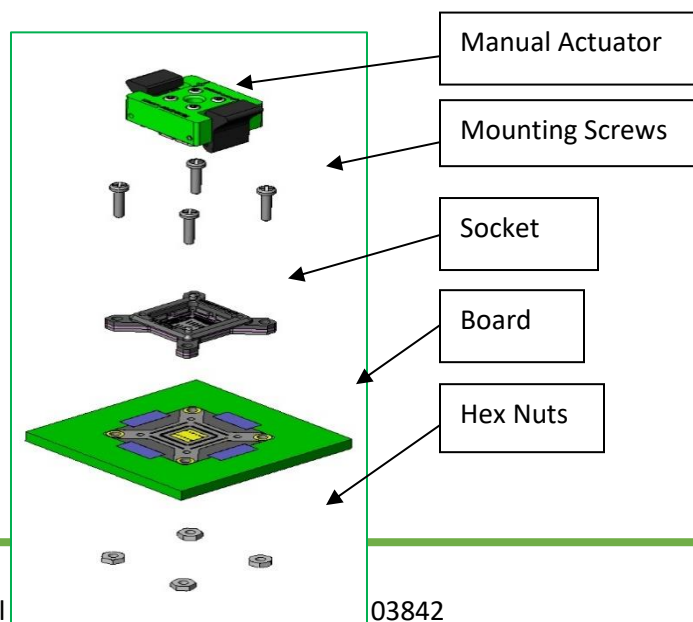
- 2.1. This procedure is applied to all socket assemblies using Ardent Concepts' RC Scrub-R technology.
- 2.2. This document contains Ardent's *recommended* maintenance and cleaning schedule. Ardent understands that these schedules are not optimal for some of our customers and can be adjusted to best fit our customers' needs.

3. Responsibilities:

- 3.1. It is the responsibility of anyone involved in the maintenance and use of Scrub-R socket assemblies to ensure this process is followed while handling the products described in Section 2.1.

4. References:

- 4.1. General Socket Anatomy



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4.2. Types of Maintenance

4.2.1. *Light Cleaning* – To be done in installed state with pressurized, dry air at an easily executable interval.

4.2.2. *Complete Cleaning* (Medium Duty)- Done when the socket can be easily removed from the test board.

4.2.2.1. Required when contaminants cannot be removed with pressurized air alone or when known damage, contamination, or failure has occurred.

4.2.3. *Repair* – When a complete cleaning will not restore functionality.

5. Procedure:

5.1. Maintenance Notes:

5.1.1. Clean, dry compressed air can be used to remove debris from the inside of the socket every 10,000 insertions, or when the handler is stopped to change out trays. This can be done without removing the socket from the board. This will remove non-organic debris. (See 5.3)

5.1.2. If there are oils present from handling the socket or from the handler, the socket can be cleaned in an ultrasonic bath for 1/2 an hour with 99% isopropyl alcohol. The socket must be dried thoroughly before reuse. This should preferably be done by forced air or by putting the socket through one heat cycle. If you do not use heat, and use pressurized air only, the socket must be inspected under magnification to be sure there is no trapped alcohol in the cavities. (See 5.8)

5.1.3. Contact replacement should be done when the cleaning steps mentioned above no longer restore the contact resistance values to acceptable levels.

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5.1.4. When contacts are replaced, a quick inspection of the board pads can also be done to look for debris or wear. The guides on the socket can also be carefully inspected at this point for premature wear.

5.1.5. Be sure the socket area on the test board is completely free of debris and oils before installing the socket. The board pads should be hard gold plated, and free of solder. There should be no solder mask in the socket area.

5.2. Preparation

5.2.1. Clean work area

5.2.1.1. Before any maintenance of the socket assembly, work area must be clean – no debris from solder work, no contaminants from electrical tape, epoxy or other adhesives, and no solder paste residue, for example.

5.2.2. Gather tools

5.2.2.1. Stereo Microscope, Ultrasonic bath, isopropyl alcohol, and short haired brushes.



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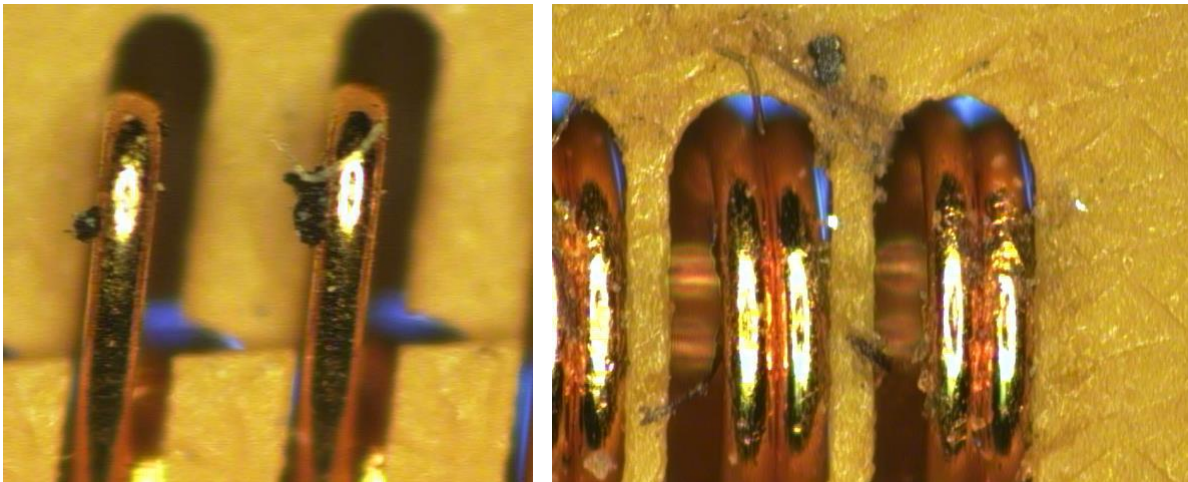
5.3. Light Cleaning

5.3.1. Use compressed air.

5.3.1.1. Many common airborne particles can cause opens, such as clothes fibers, skin flakes, and a variety of other contaminants that come with devices from the factory. Pictures below shows some of these particles. These can be removed from the socket with clean, dry, pressurized air as frequently as necessary.

5.3.1.2. If air is readily available, it is good practice to do this before every insertion. If not, cleaning every 500 (approximately) insertions is sufficient. This kind of simple cleaning should be done with the socket still installed on the PCB.

5.3.1.3. The air supply must be free of moisture and oil particles.



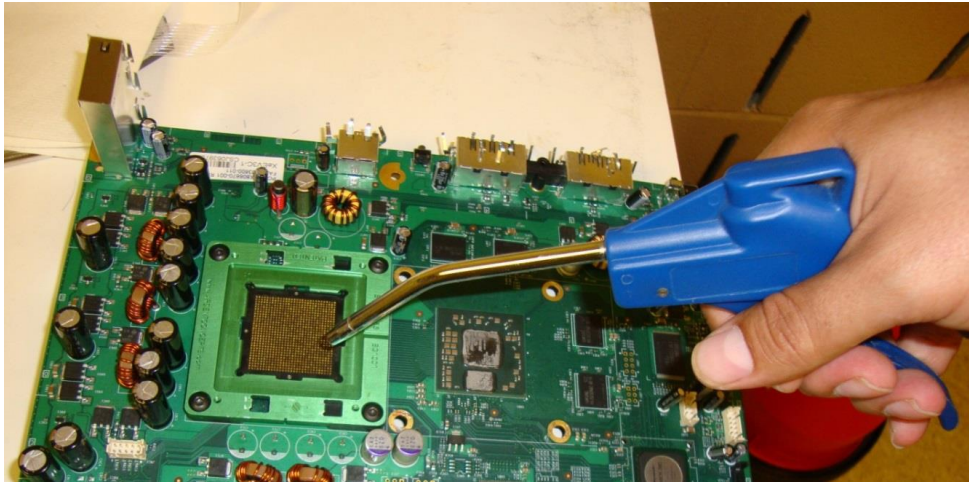
5.3.1.1: Particles that cling to the Scrub-R contact can be removed with light cleaning.

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5.3.1.2: Socket being blown off while installed on PCB (not Scrub-R socket)

5.4. Medium Duty Cleaning

5.4.1.1. There are a few contaminants that will stick to the Scrub-R contact and to the top and bottom socket surfaces that cannot be readily removed with pressurized air alone. Examples are finger oils, skin lotion, solder flux resin, heat transfer paste, solder mask particles, and plastic wear debris. This kind of cleaning requires that the socket be removed from the board and should be performed as needed, or (approximately) every 1,000 insertions .

5.4.1.2. While the socket is off the board, this is also a good time to check for more serious problems with the socket: such as bent or burnt pins, molten plastic, or shorts between the board and the socket fasteners.

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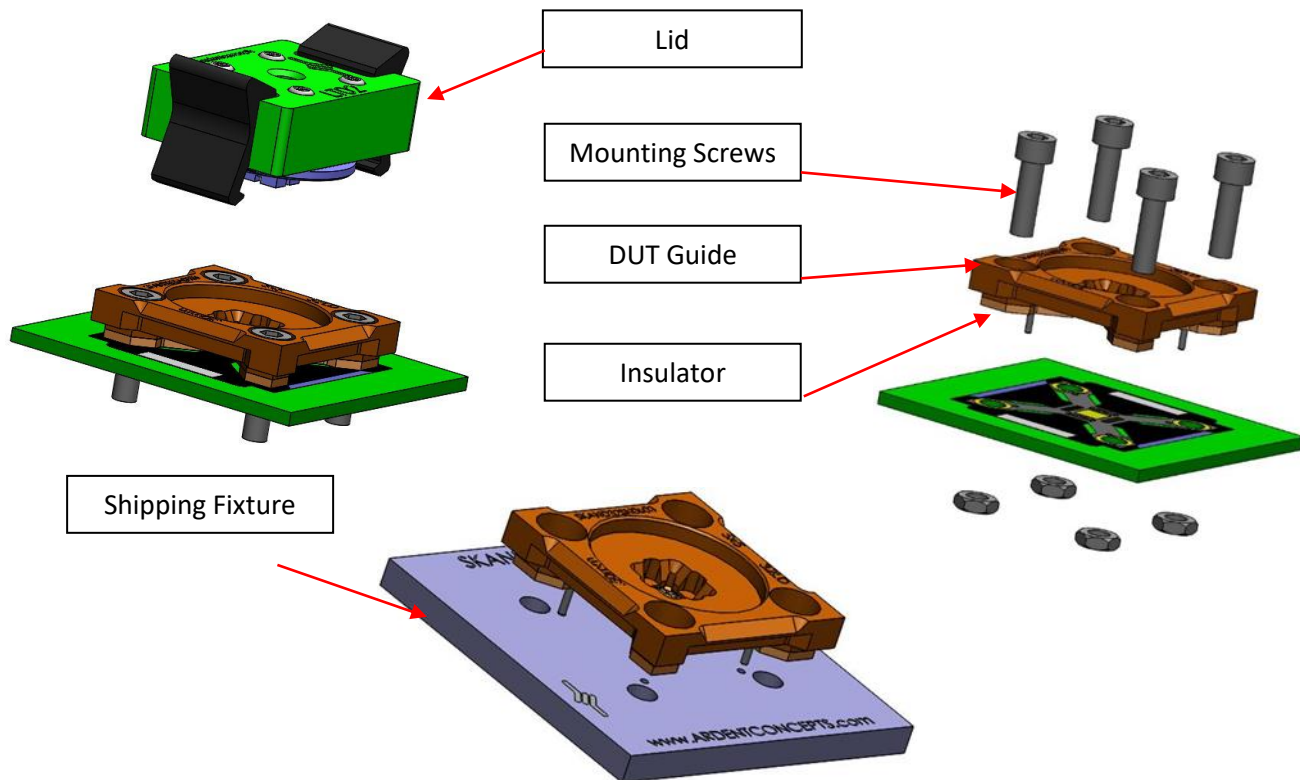
5.4.2. Detach Socket from Board

5.4.2.1. If using a lid, lift the lid off the socket.

5.4.2.2. Support the board and/or stiffener while the mounting screws are removed from the top of the socket.

5.4.2.3. Set the mounting screws and lid aside.

5.4.2.4. Remove the socket from the board and mount it on its shipping cover. Do not touch the pin field of the socket.



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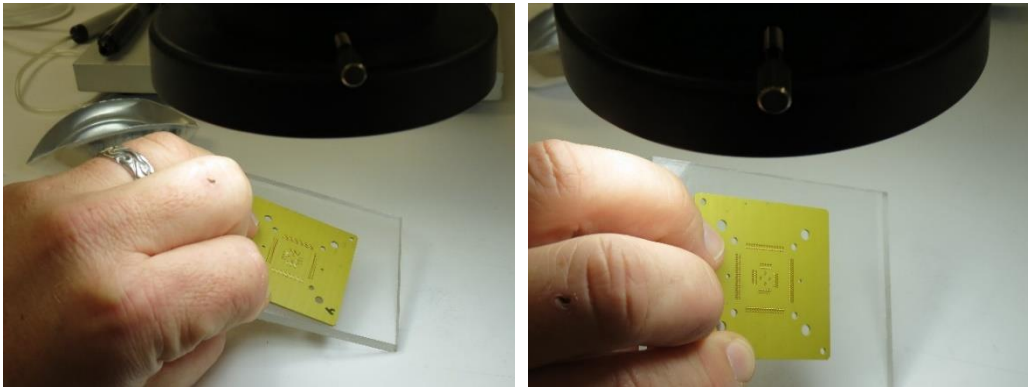


5.5. Inspect for Contamination

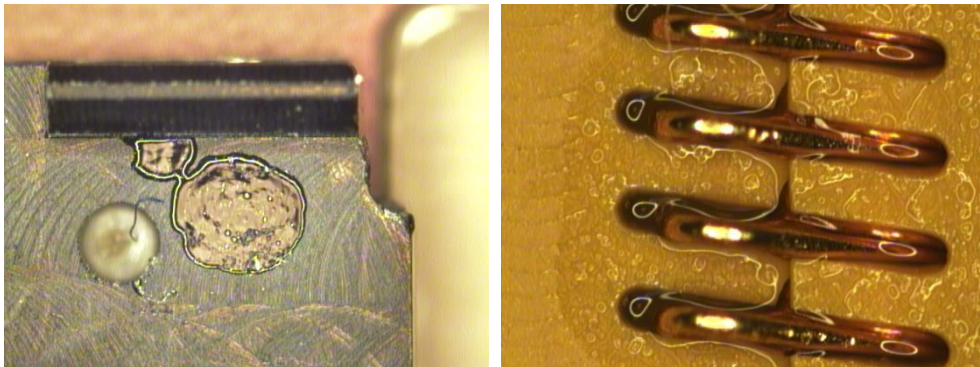
5.5.1. Under at least 7x magnification, at an angle with plenty of light, inspect the entire contact field for signs of contamination.

5.5.1.1. Make note of any heavily soiled areas so that cleaning can be concentrated there.

5.5.2. Take the socket off its fixture, turn it upside down, and place it on shipping fixture or piece of clean Lexan. Check again under magnification for contamination.



5.5.1: Socket being inspected under microscope with light on and at an angle.



Pictures of substances that stick to the socket parts that will not come off with pressurized air alone.

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5.6. Check for Damage

5.6.1. Mount the socket on its shipping fixture and inspect once more under the microscope, at an angle, and with plenty of light.

5.6.1.1. Check for bent pins or signs of heat damage or excessive wear.

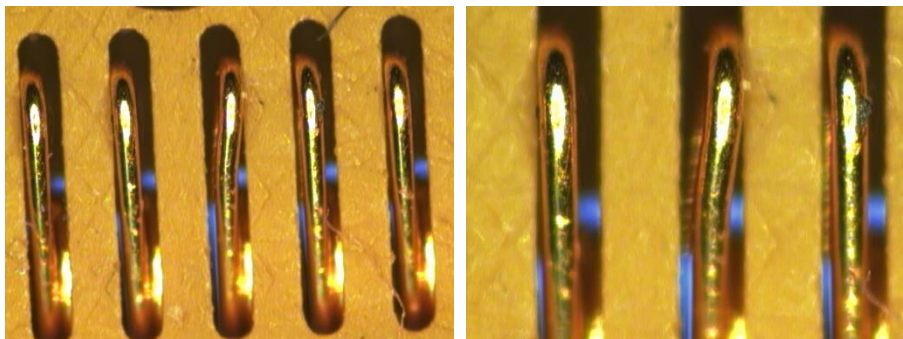
5.6.2. Take the socket off its fixture, turn it upside down, and place it on a clean bench top.

5.6.3. If there are no signs of damage, the socket can be cleaned.

5.6.4. If any damage to insulator or guide plate is found, stop work and contact the factory to initiate a repair (RMA).

5.6.4.1. Use the following pictures as examples of bent contacts, low contacts, and excessive wear.

5.6.4.2. Also, please see *Appendix* for correlating examples of worn SCs.

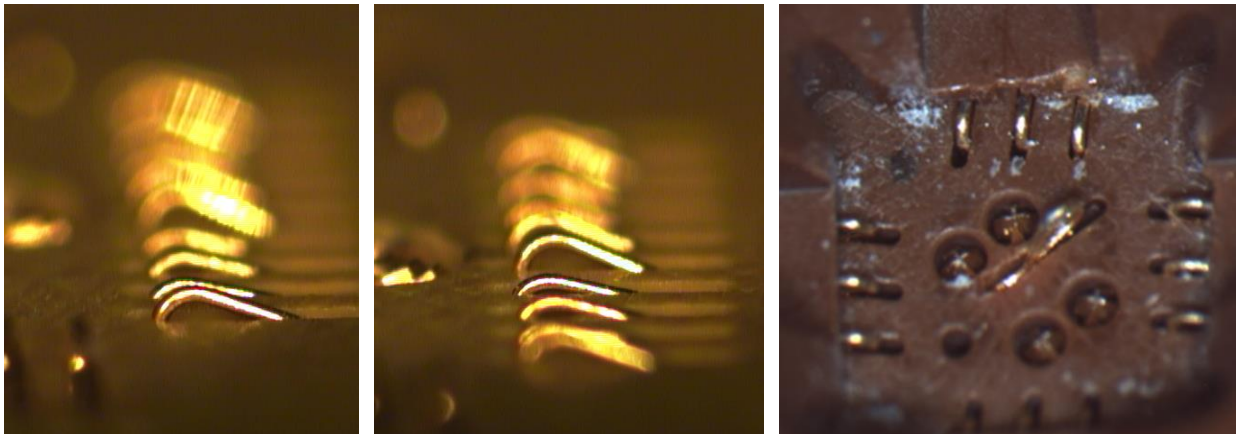
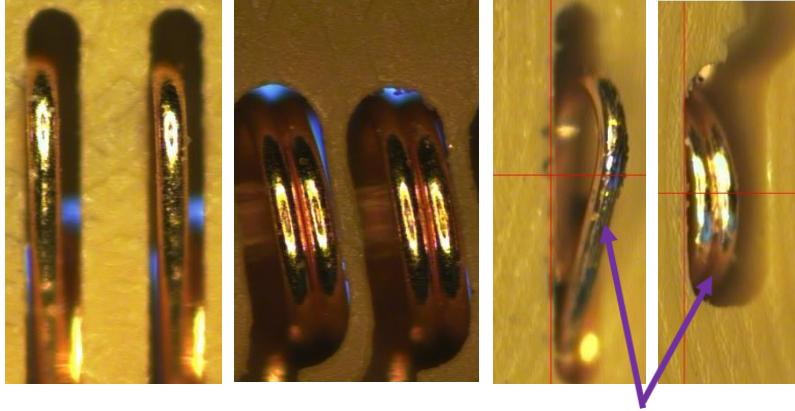


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5.6.4.1:

The top two pictures show a bent SC.

The second row of pictures shows SCs that have plating worn off and/or contaminate that may impede performance (note discoloration in two right photos).

The last row shows low SCs that need replacement and a damaged socket.

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5.7. Cleaning

5.7.1. Remount the socket on the shipping fixture and place the socket and fixture on a clean, sturdy surface.

5.7.2. Dip the bristles of a short-haired acid brush into a dish of isopropyl alcohol and firmly scrub the DUT side of the socket in a side-to-side motion.

5.7.2.1. Special attention should be paid to heavily soiled areas.

5.7.3. Use clean, dry, pressurized air to blow off any residual alcohol.

5.7.4. Remove the socket from its assembly fixture and blow off the board side of the socket as well being careful not to touch the pin field with the tip of the air gun.

5.7.4.1. The board and DUT side of the socket may need to be blown off repeatedly in alternating fashion to completely remove any alcohol that may have seeped into the pin cavities.

5.7.5. When the socket is dry, place the socket back on its assembly fixture and inspect once more under at least 7x magnification.

5.7.5.1. Check the heavily soiled areas in particular to ensure the contacts are now cleaned.

5.7.6. Repeat the process as necessary.

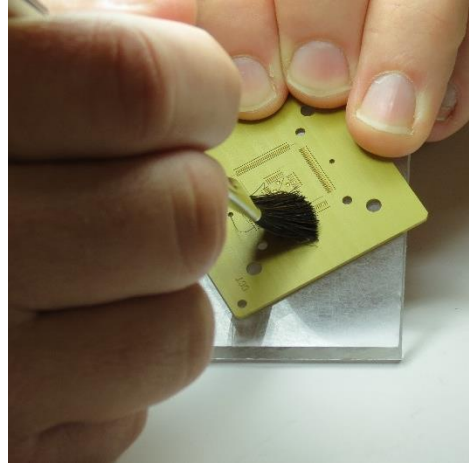
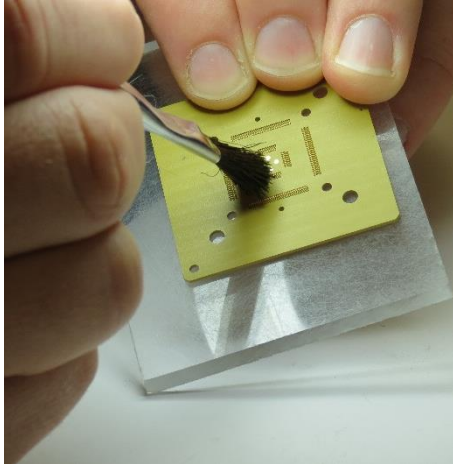
5.7.7. Once clean and dry, install the socket as before.

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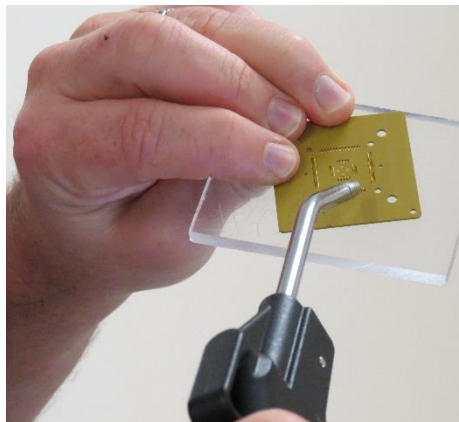
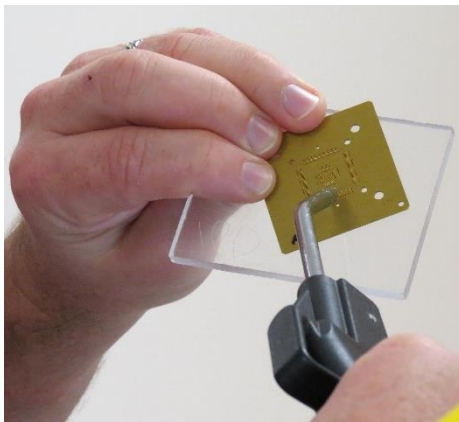
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Interposer top and bottom sides being cleaned with brush and alcohol



Interposer top and bottom sides being blown off with compressed air.

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5.8. Extreme Condition Assessment

5.8.1. After long-term exposure to temperatures above 50°C or below 10°C for hours or days at a time, intended or accidental high current use (greater than 3 amps), exposure to moisture from condensation or water leaks, or every 10,000 insertions, the socket needs to be removed from use and thoroughly inspected for damage.

5.8.1.1. Scrub-R contacts and guides may also start to show wear from device insertion.

5.8.1.2. Condensation may leave discolored stains on the socket plastic parts and on the contacts.

5.8.1.2.1. If there is any evidence of exposure to moisture, contact the factory to initiate a Return (RMA) for socket and/or lid.

5.8.1.3. Anodized and plated surfaces also begin to wear.

5.8.1.4. Any such damage observed on the socket will most likely appear on the board as well.

5.8.1.5. Inspect the board under at least 7X magnification, at an angle, and with plenty of light.

5.8.1.6. Thoroughly clean the board as described before (see page 5.7), or per established procedures.

5.8.2. Inspect Socket

5.8.2.1. Remove lid, if necessary (See 5.4.2)

5.8.2.1.1. Do not touch pin field

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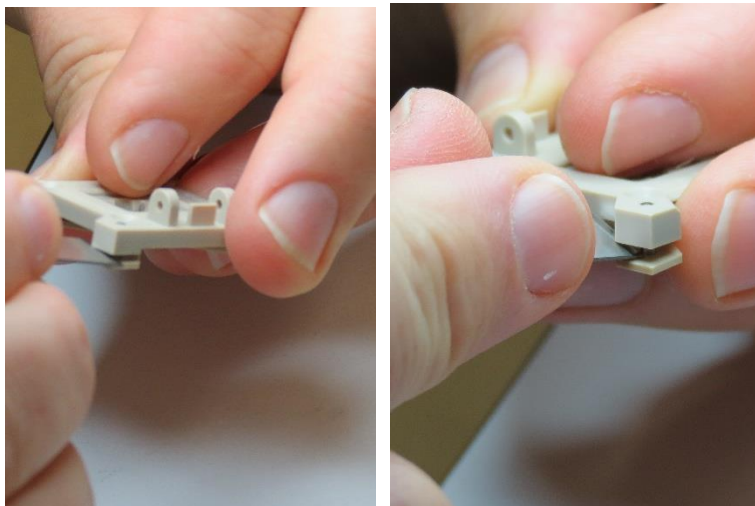


5.8.2.2. Remove DUT guide from Insulator (See 5.4.2)

5.8.2.2.1. Detach the interposer subassembly from the DUT guide and set the DUT guide and screws aside.

5.8.2.2.2. The Interposer and DUT Guide may be mated with dowel pins between press fit holes on both parts. This requires using a pry tool to separate the two components. (A #17 Chisel Style X-Acto Blade is recommended)

5.8.2.2.3. Do not touch pin field



5.8.2.2

5.8.2.3. Inspect for Contamination (See 5.5)

5.8.2.3.1. Under magnification look for bent pins, heat damage, debris, or staining.

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5.8.3. Clean Insulator

5.8.3.1. Clean in 99% Isopropyl Alcohol in Ultrasonic Bath to remove any residues, staining, or excessive debris.

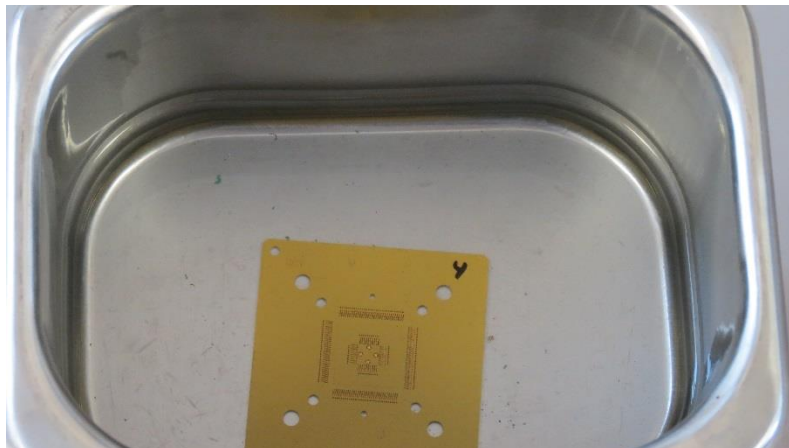
5.8.3.1.1. Fully immerse the interposer, device side up, into an isopropyl ultrasonic bath to soak the interposer thoroughly.

5.8.3.1.2. Remove the interposer from the bath and use a clean, short haired acid brush to firmly scrub the DUT side of the interposer while holding the interposer along its edges with one hand and brushing side-to-side with the other.

5.8.3.1.3. Repeat on the board side.

5.8.3.1.4. Return the brushed socket to the bath and clean for an hour minimum.

5.8.3.1.5. Care must be taken not to allow the pins on the DUT side of the interposer to touch anything in the bath.



5.8.2.4: Interposer inside ultrasonic bath.

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5.8.3.1.6. Remove the interposer from the bath and blow dry it with clean, dry, pressurized air blowing on DUT and board side in alternating fashion. It may take several repetitions to remove all the alcohol since the pin cavities trap liquid easily.

5.8.3.1.7. Once dry, place the interposer, board-side-down, on its assembly fixture.

5.8.3.1.8. Under at least 7X magnification, at an angle, and with plenty of light verify that the cleaning has succeeded.

5.8.3.1.9. Tin oxide will most likely still be present. Other, more troublesome residues should now be removed.

5.8.4. Extreme Wear

5.8.4.1. When regular cleaning is not enough to restore the socket, a more serious approach is needed. At this point, the socket should be taken out of service and thoroughly examined as described in 5.8.1 & 5.8.2 above.

5.8.4.2. Signs of gross damage to any and all socket parts should be noted.

5.8.4.2.1. These include deformation of the plastic plates that make up the interposer assembly, signs of excessive wear on guide walls and on rubbing surfaces where air and water lids mount, loss of spring tension in die springs that go into the lids, and dulling of contacts' finish.

5.8.4.3. If these are observed, contact the factory to initiate a return (RMA).

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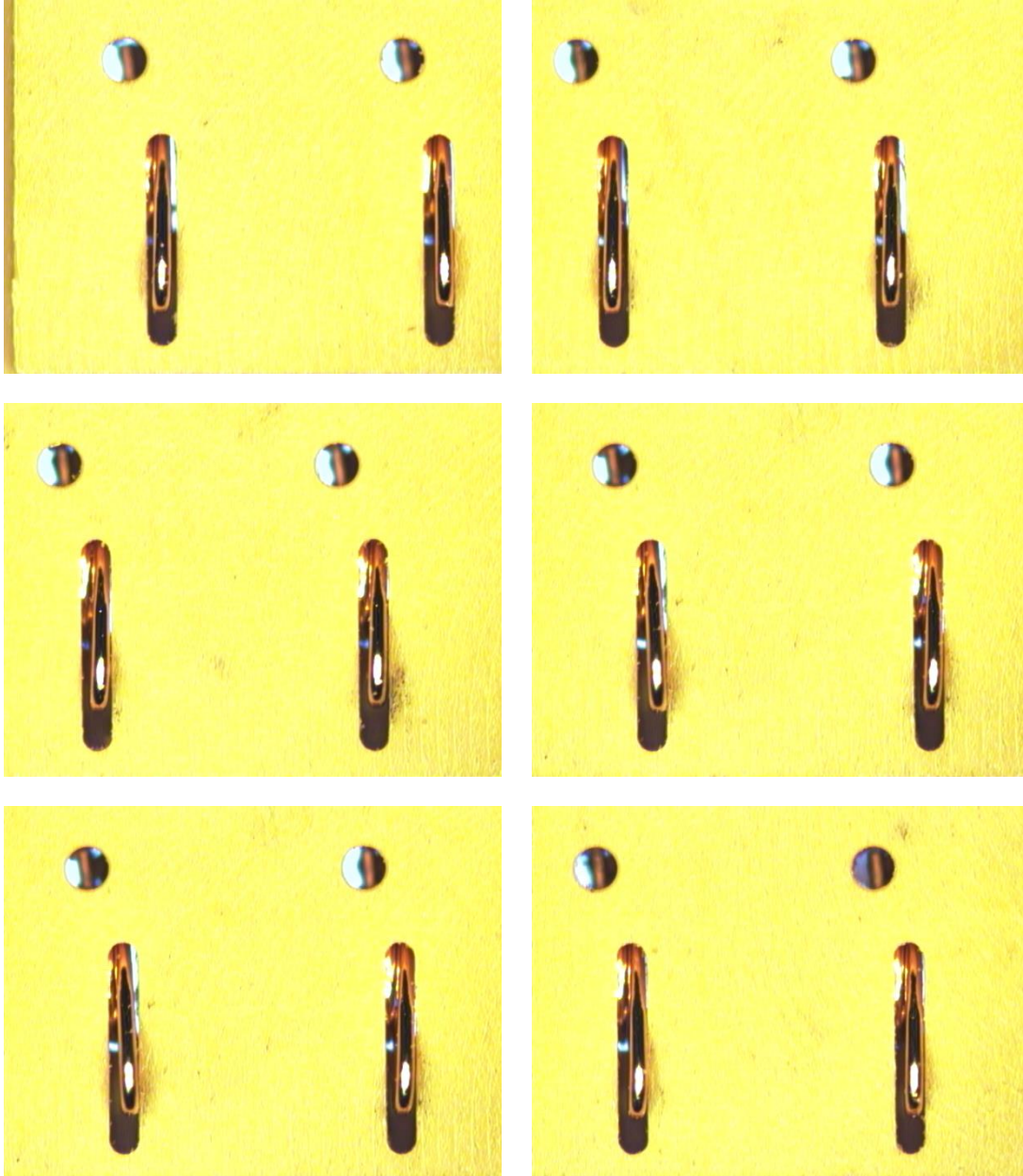
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Appendix

New SCs in Insulator (DUT Side)



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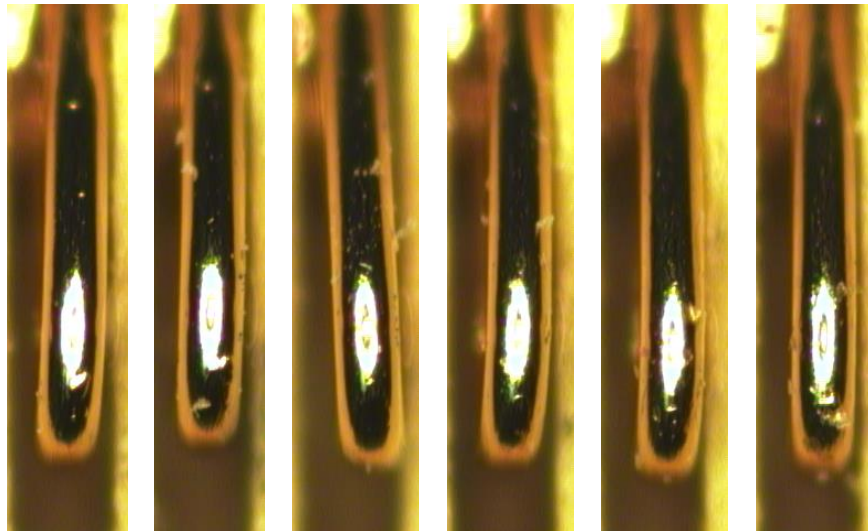
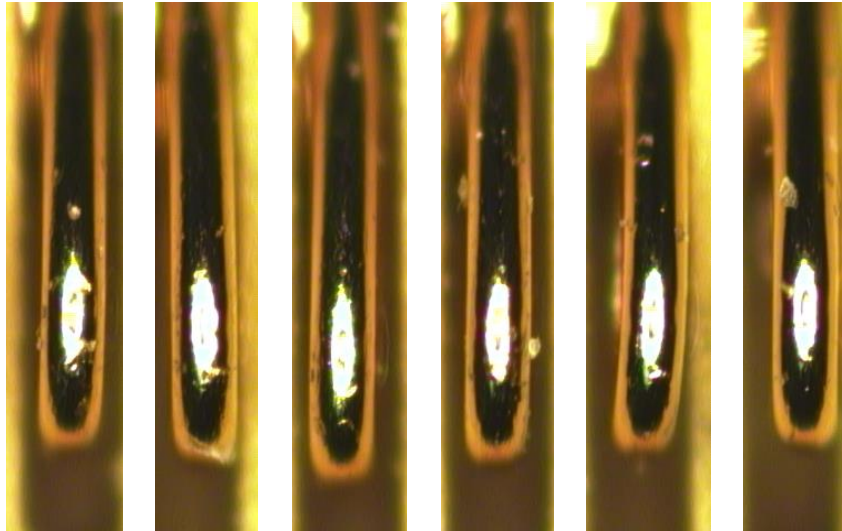
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New SCs in Insulator Close View (DUT Side)



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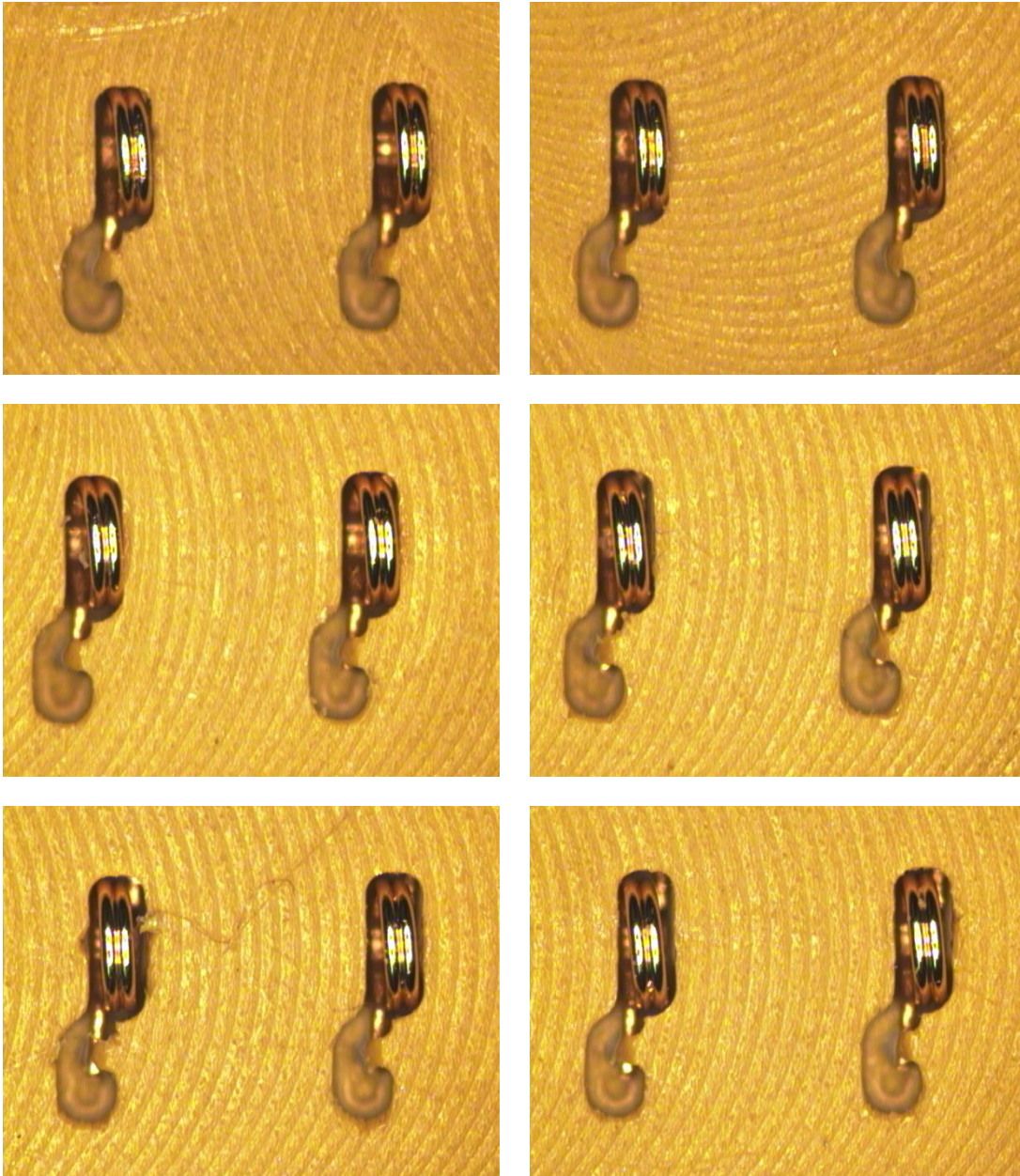
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New SCs in Insulator (Board Side)



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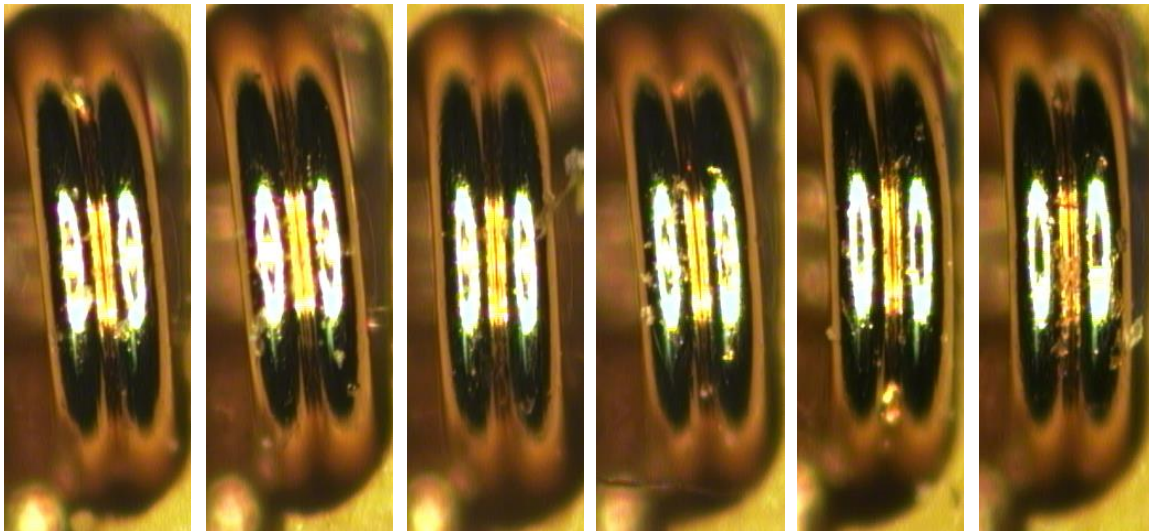
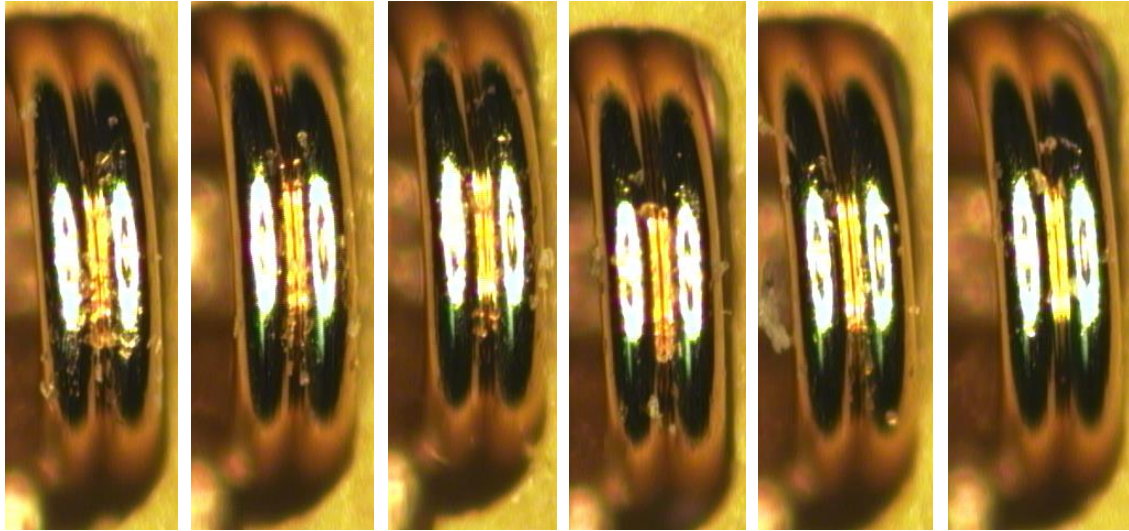
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New SCs in Insulator Close View (Board Side)



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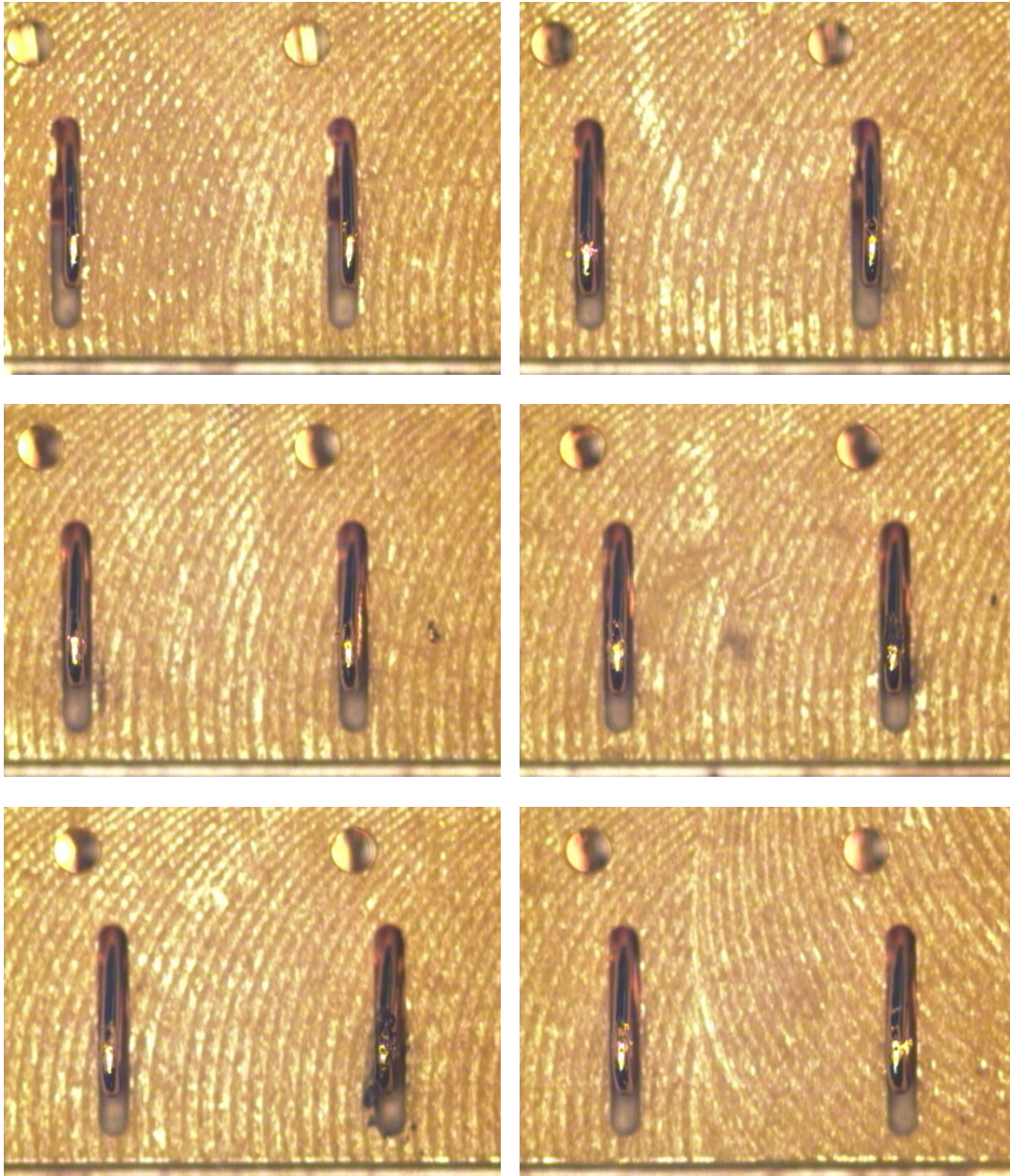
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Used SCs in Insulator (DUT Side)



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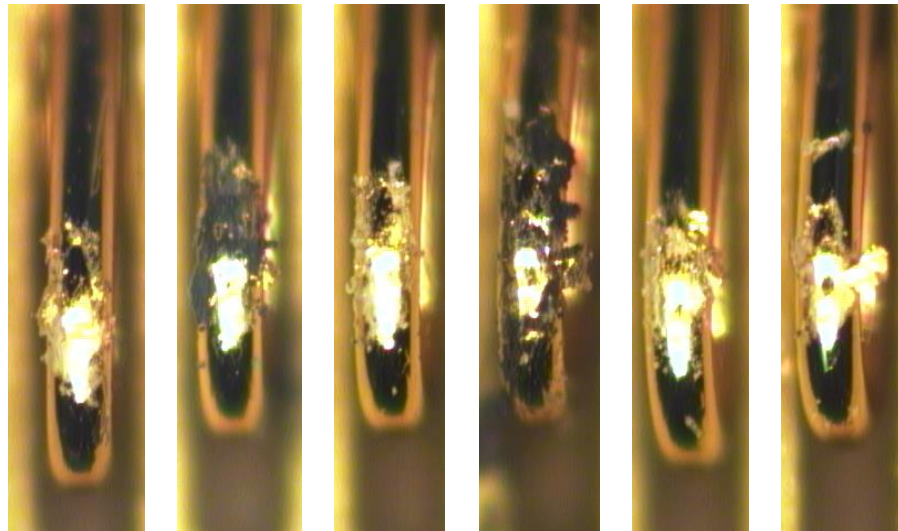
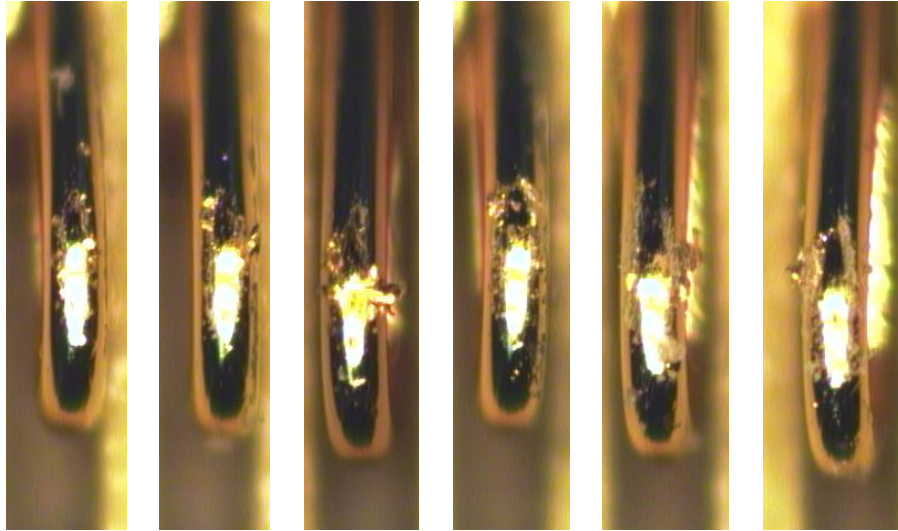
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Used SCs in Insulator Close View (DUT Side)



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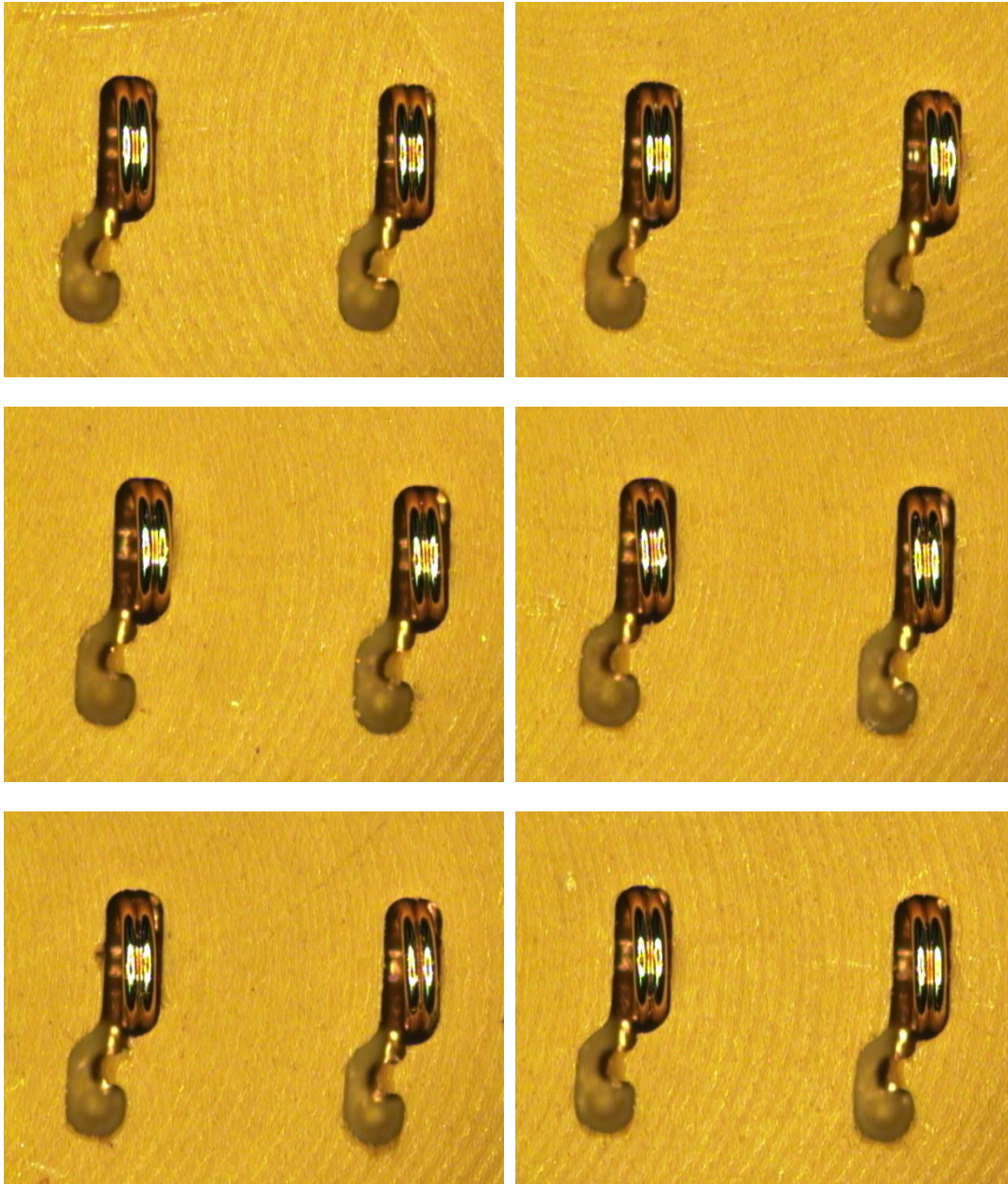
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Used SCs in Insulator (Board Side)



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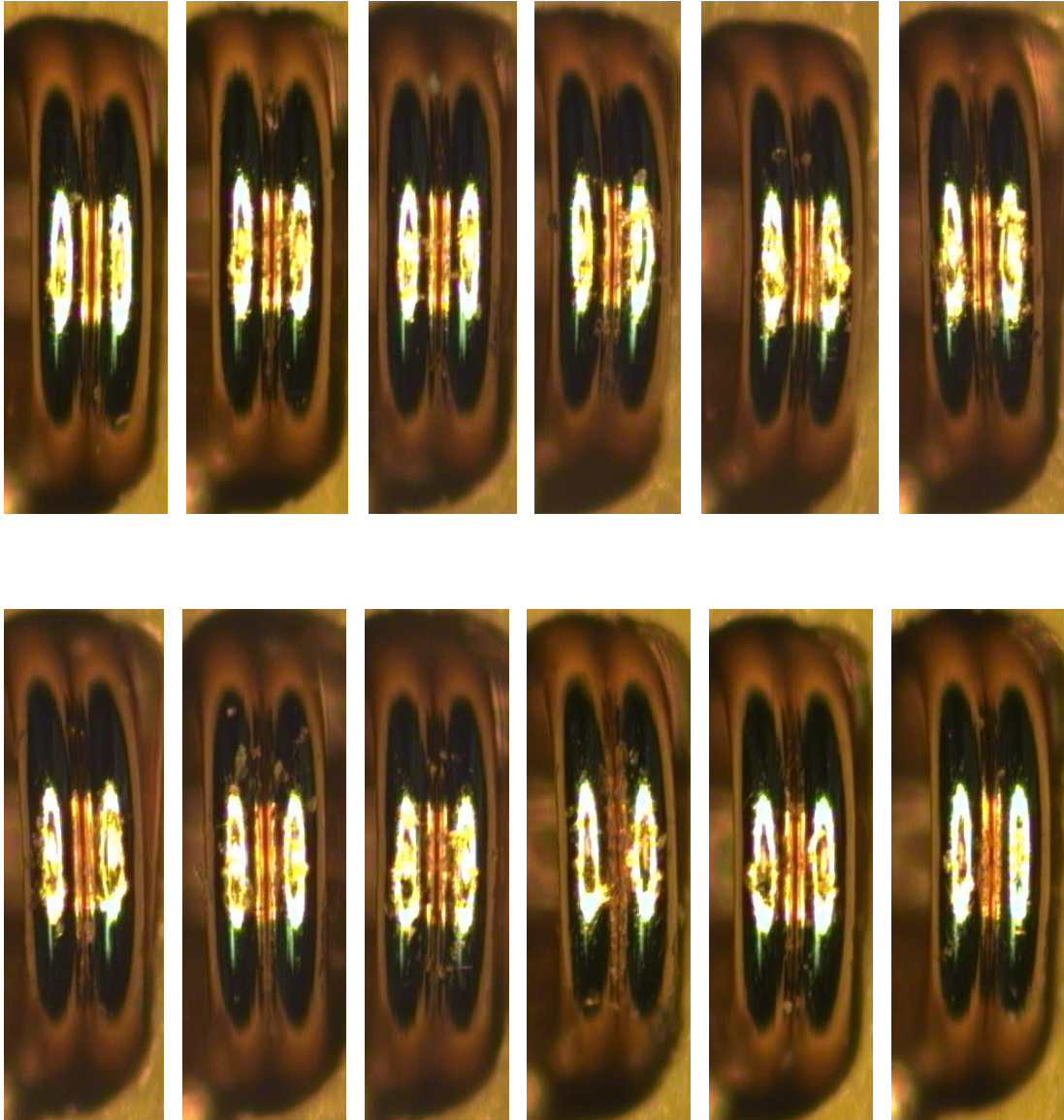
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Used SCs in Insulator Close View (Board Side)



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Who Is Ardent Concepts?

Ardent Concepts, Inc. is a leading designer and manufacturer of high performance multicoax and coaxial assemblies, connectors, and sockets used in the development of next generation semiconductors and electronics systems. Our core technology is the smallest, fastest, most electrically efficient compression mount connector technology worldwide. As data rate requirements increase and devices and systems shrink, Ardent's products deliver superior signal integrity in a dense footprint that can be reusable across programs to maximize cost savings.

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