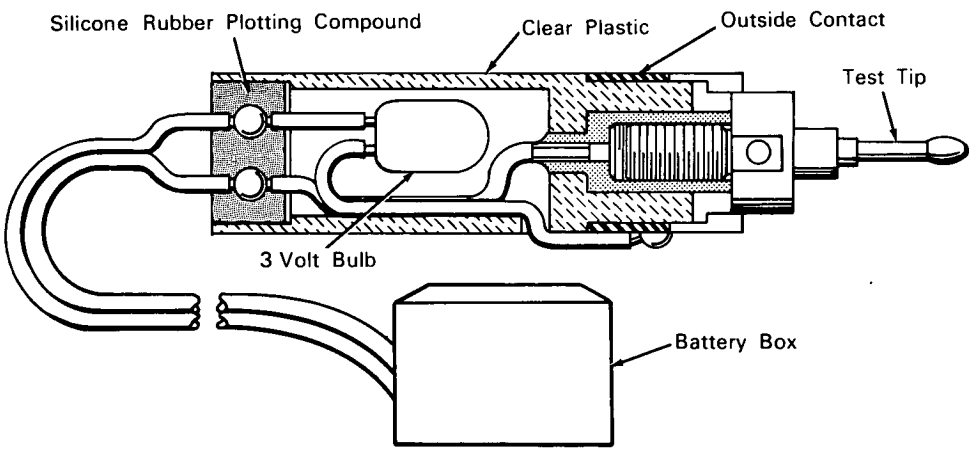
May 1964

Brief 64-10065

NASA TECH BRIEF

Continuity Tester Screens Out Faulty Socket Connections



The problem: Testing the continuity of an electrical circuit through each pin and socket of multiple connector sockets. An instrument is needed that is suitable for testing both before and after assembly. Electrical failures in spacecraft connectors have often been associated with misshapen or improperly assembled contact parts, particularly those associated with the spring-loaded contact on the connector socket. The malfunction of this contact is believed to be a principal cause of failure in multiple connection sockets.

The solution: A continuity tester having a test probe that is carefully dimensioned to make contact only in properly formed sockets and is electrically insulated from the socket except at the contact area. Both a bench tester, which will test each of the contacts in a multiple pin socket before assembly in a wiring harness, and a portable, self-powered model (shown in drawing) for testing sockets on assembled equipment, can be built.

How it's done: The test probe used with both the bench model and the portable unit is constructed so that it will provide an electrical contact with the dimple on the individual socket contact only when the dimensions are correct and the contact spring is functioning properly. Diameter of the conducting area on the probe is 0.0005 to 0.001 inch greater than the maximum height of the dimple to the opposite wall of the socket's inside diameter. Electrical insulation is provided on the probe between it and the inner surface of the connector socket, except in the area of the dimple on the contact spring.

With the portable tester, which has its own test light and battery supply, the unit can be used to test individual sockets in a connector wired into a harness without disturbing the wiring. Contact to the exterior surface of the socket is made through its exposed end to a coaxial conductive ring provided on the probe.

Construction of a bench instrument for continuity testing is accomplished by assembling a series of

(continued overleaf)

probes to simulate a mating male connector plug. By this means all the sockets in a connector can be tested simultaneously. If all the sockets and test probes are wired as a series circuit, the test would then indicate a break in continuity of any of the connections.

Notes:

1. This innovation would be useful in any industrial or test situation where multiple connection sockets must be inspected and tested.
2. Shock tests of connectors could be carried out with this device by mounting the multiple connection tester on an isolated plate and applying shock forces in two axes parallel to the mounting plate. Any discontinuity during this dynamic test would be detected by employing a chatter or discontinuity detector.
3. For further information about this innovation inquiries may be directed to:
   Technology Utilization Officer
   Jet Propulsion Laboratory
   Pasadena, California
   Reference: B64-10065

Patent status: NASA encourages commercial use of this innovation. No patent action is contemplated.

Source: George Golding
(JPL-596)