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NASA TECH BRIEF

Marshall Space Flight Center

Improved Universal Electrical Connector

The problem:

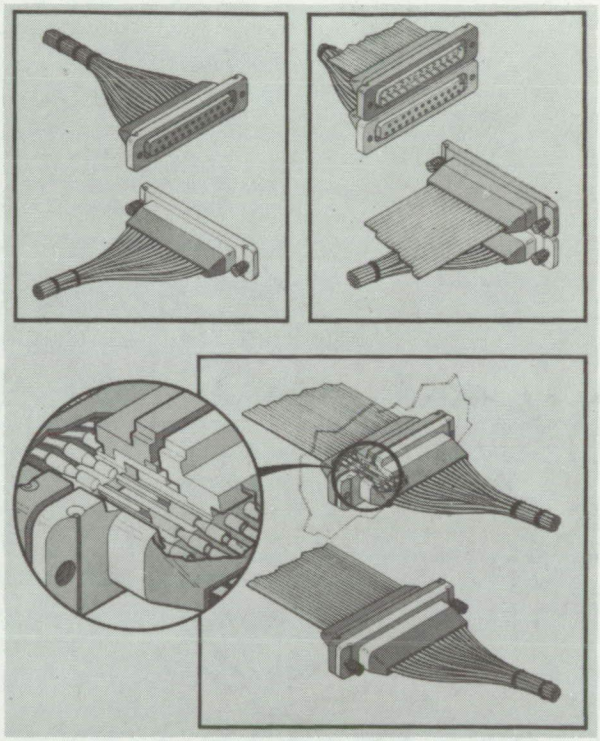
To design an improved universal electrical connector suitable for all types of cable and, with a variety of inserts and pin styles, usable over a wide range of environmental conditions.

The solution:

A novel type of rectangular connector (see figure) that can be used with both round and ribbon cables, and which can be mounted on printed circuit boards or to either face of a bulkhead. Although the connector offers a high pin density-to-size ratio, terminal connections are simple and are easily made, while hermetic sealing and potting assures a pressure-tight seal over a temperature range from 200 to 478K(−100° to 400°F). The connector provides constant electrical contact under severe vibration conditions.

How it's done:

The outer shell of the housing is constructed of anodized 6061 aluminum to provide strength for the connector and to house the contact pins and insulation. A retainer clip holds together the male and female halves of the connector over an O-ring seal, and a second O-ring seals the connector to the bulkhead. A potting boot surrounding the connector serves as a mold for epoxy resin and becomes part of the connector, acting as a hermetic shield against the environment. The contact pins may be soldered, crimped, or welded, and each may be shielded from radio frequencies with all shields connected to a common ground. The connector's flat connecting surfaces facilitate soldering when round conductors are to be connected to flat conductors. The two rows of terminals simplify soldering, welding, or crimping from either side. The gold-plated steel pins are held in contact by pressure springs and will withstand vibration loads of up to 30g.



The sealant or potting compound is a copolymer of trifluoronitrosomethane and tetrafluoroethylene cured with benzoic acid. The insert is made of a fluorocarbon polymer such as Teflon, but materials such as nylon, diallylphthalate, glass, or mineral-filled epoxy resin may be used. In experiments, the Teflon/copolymer combination has been found to be nonflammable in a 1.13 x 10^5 N/m^2 (16.5 psi) oxygen environment. Silicone rubber has been used in some versions of the connector with a bake-on primer used to obtain adhesion between the gold contact pins and the silicone insert.

The connector can be assembled in the field since the epoxy potting compound can be poured by hand.

(continued overleaf)

Notes:

1. Designers or manufacturers of electrical or electronic circuits may be interested in this innovation.
2. No additional documentation is available. Specific questions, however, may be directed to:

   Technology Utilization Officer
   Marshall Space Flight Center
   Code A&TS-TU
   Huntsville, Alabama 35812
   Reference: B72-10363

Patent status:

This is the invention of a NASA employee, and U.S. Patent No. 3568131 has been issued to him. Inquiries about obtaining license rights for its commercial development should be addressed to the inventor, Mr. Bobby W. Kennedy, NASA, George C. Marshall, Space Flight Center, Alabama 35812.

Source: B. W. Kennedy
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(MFS-14741)