NASA TECH BRIEF

Logic Circuitry Used to Automatically Test Shielded Cables

The problem:

In assembling multiple shielded conductors, a conductor is sometimes connected to a pin to which the conductor shield should be connected and vice versa. Additionally, a conductor in one shield may be connected to a pin to which another conductor in another shield should have been connected. After the connector assemblies have been properly potted, normal cable checking procedures do not reveal such errors.

The solution:

An automatic cable tester that uses logic circuitry to sequentially test all conductors and their shields to reveal any connection error in a GO–NO GO test.

How it's done:

An audio frequency (600 cps) generator is connected between an isolated common and any conductor in the cable with a logic indication of the specific conductor. A signal sensor, with an input impedance greater than one megohm, is connected between the common and any conductor except the one that the signal generator is connected to. A logic indication shows which conductor the sensor is connected to and the sensor gives a logic GO–NO GO indication to show receipt or nonreceipt of the 600 cps signal. A ground is used to connect the common to any shield, and logic indication shows which shield is contacted. Logic circuitry is used to connect the signal generator, sensor, and ground sequentially to each shielded conductor assembly until the entire cable is tested. The logic uses three solenoid driven stepping switches to operate a panel of indicator lamps that show which conductors and shields are connected and whether or not the sensor is receiving the 600 cps signal.

The sensor receives a signal if:

1. The signal generator and sensor are connected to conductors that are both in the same shield, no matter what shield is connected to common.
2. The signal generator and sensor are connected to conductors that are in different shields and common is not connected to either of the shields concerned.

Note:

Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
Headquarters
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Washington, D.C. 20546.
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Patent status:

No patent action is contemplated by NASA.

Source: George Dibb
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Category 01