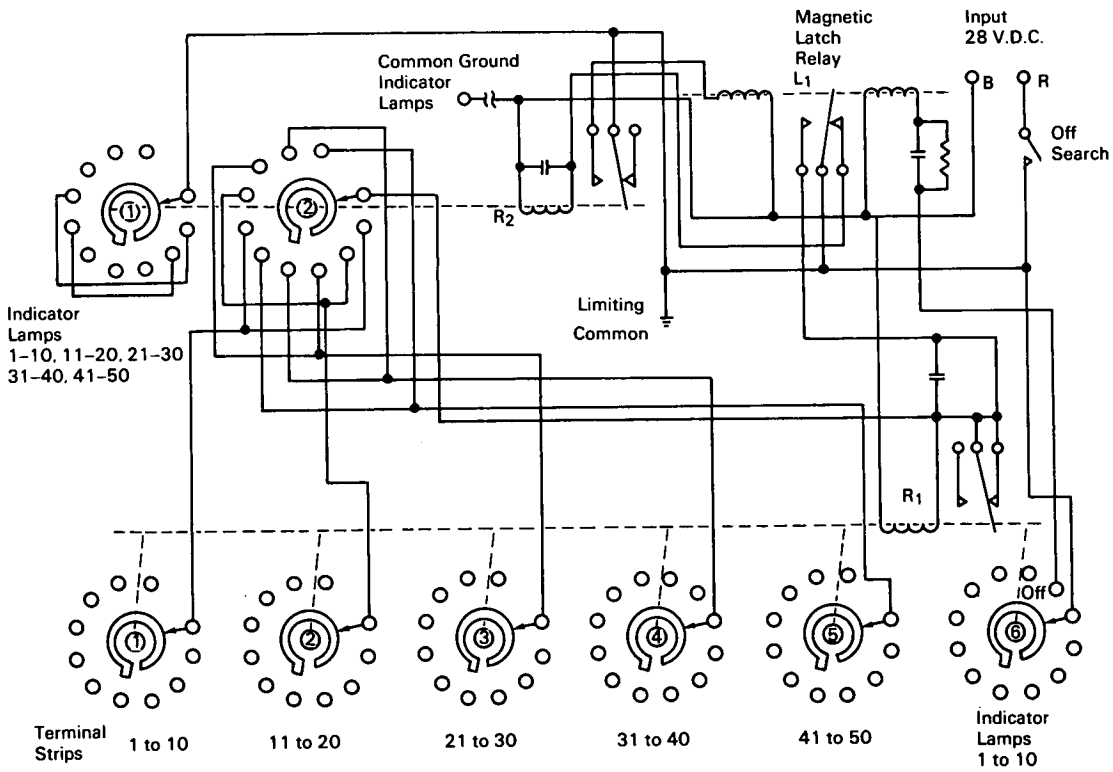
NASA TECH BRIEF

Electrical Continuity Scanner Facilitates Identification of Wires for Soldering to Connectors



AUTOMATIC ELECTRIC RELAY, 6-DECK 11-POSITION

The problem:

In the development of electronic equipment, circuits may contain from 10 to 250 wires, each of which must be correctly identified. In assembling the circuit, often the first end of each conductor, or wire, has been attached to a known "primary" terminal or pin, the wires are bundled and routed in the desired configuration, and spot tied or laced to retain the desired appearance through most of the routing. The alternate "secondary" conductor end must then be identified with its "primary" to determine its proper end terminal point. For production runs, each wire is usually

(continued overleaf)

stamped with a number or otherwise labelled to facilitate identification. For experimental work continuity is usually checked with an ohmmeter, "buzz-box," or other means of indication of continuity between two points. This method is slow, tedious, and expensive.

The solution:

A electrical continuity scanner that can scan 50 points in 2 seconds, automatically searching for continuity.

How it's done:

One known point is electrically connected to the common post of the electrical continuity scanner with a temporary jumper wire. Actuation of the switch to the search position will cause rotary relays to step, or search, until a circuit having electrical continuity is reached, or the search switch is released. This automatic stepping is accomplished through use of contacts provided on the automatic electric relay (R_1) to make it free running when desired. After 10 positions (10 wires) have been scanned, a second automatic electric relay (R_2) (not shown) is actuated 1 position by latching relay (L_1) to transfer the circuitry to the next 10 circuits. In this manner 5 decks with 10 positions may be used to accomplish scanning of 50 circuits in a fully automatic or free running manner.

When continuity is attained, a current of approximately 0.3 ampere at 28 volts dc will keep the relay held in, preventing further search, until observation of the indicator lamps indicates the number of the post providing continuity. The search switch may then be released and the known end point noted, with the post number providing continuity. The jumper wire is moved to the next known point and the search procedure is repeated until all wires in the bundle have been correlated with their respective known ends.

Notes:

1. Modifications can be made to the basic plan to provide circuitry for scanning up to 250 wires. Digital readout of numbered positions can be readily provided.
2. The wires to be tested can be used without stripping or damage to the insulation if special test leads are constructed by soldering steel phonograph needles to mini-gator clips.
3. One electrical continuity scanner has been constructed with the relays and circuitry inside a chassis box 10 inches by 6 inches by 3 1/2 inches, with terminal strips for 50 circuits, a common post, and 2 power input posts on top. Input power to drive this scanner was less than 1 ampere at 28 volts dc.
4. The scanner can also be used for the rapid fabrication of multiwire electrical cables by minimizing termination errors prevalent with prior methods of wire identification.
5. Inquiries concerning this invention may be directed to:

   Technology Utilization Officer
   Manned Spacecraft Center
   Houston, Texas 77058
   Reference: B66-10605

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

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