

6006 Signaling Converter

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1. general description

1.01 The 6006 Signaling Converter module (figure 1) provides three modes of signaling conversion – E and M to ringing (20Hz), SG-lead to E and M, or SG-lead to ringing (20Hz) – on either 2wire or 4wire voice-frequency transmission facilities.

1.02 In the E and M to ringing mode (D1B), E-lead inputs are converted to metallic-facility ringing, and ringing input is converted to M-lead output signaling.

1.03 In the SG-lead to E and M mode (D0B), SG-lead input signals are converted to M-lead outputs, and E-lead input is converted to SG-lead output signaling.

1.04 In the SG-lead to ringing mode (10D), SG-lead input signals are converted to metallic-facility ringing output, and ringing input is converted to SG-lead output signals.

1.05 In 2wire operation, the 6006 module terminates the transmission facility during metallic ringing.

1.06 Both the signaling conversion mode and the choice of 2wire or 4wire operation are selected by means of slide switches on the module's printed circuit board.

1.07 M-lead current-limiting circuitry is provided to protect the module and external equipment from inadvertent overloads.

1.08 As a Type 10 module, the 6006 mounts in one position of a Tellabs Type 10 Mounting Shelf, versions of which are available for relay rack and KTU apparatus case installation. In relay rack applications, a maximum of 12 modules may be mounted across a 19 inch rack, and up to 14 modules may be mounted across a 23 inch rack. In either case, 6 inches of vertical rack space is utilized.

2. application

2.01 The 6006 Signaling Converter module is most commonly used in metallic-facility ringdown networks or to interface a metallic facility with E- and M-lead signaling derived from carrier facilities. The specific mode of operation (D1B, D0B or 10D) and adaptation to either 2wire or 4wire application are accomplished by means of switches on the 6006

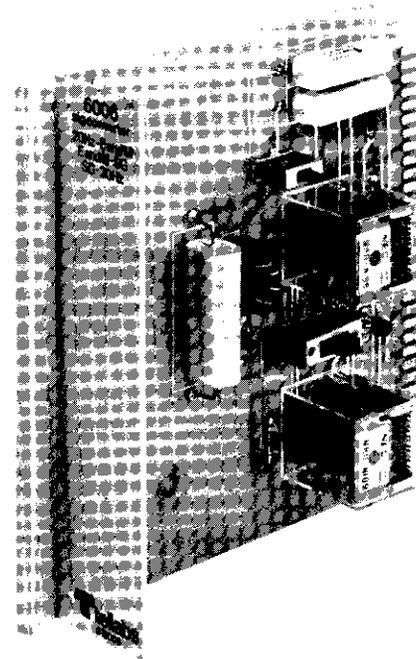


figure 1. 6006 Signaling Converter

module. (The terms *D1B*, *D0B* and *10D*, incidentally, are Bell System nomenclature for the modes of operation described in paragraphs 1.02, 1.03 and 1.04.)

2.02 Whereas E and M and metallic-facility ringdown signaling are familiar modes of operation, SG-lead signaling may be somewhat less familiar. The SG-lead signaling mode provides a simple means of interconnection between multiple ringdown facilities. A single lead, the SG-lead, is used for half-duplex signaling. Battery input on the SG-lead operates the outgoing signaling circuit, and incoming signals cause the 6006 to apply battery to the outgoing SG-lead. Therefore, SG-lead interconnection of two or more facility-connected 6006 modules provides half-duplex signaling between each facility.

2.03 Figure 2 shows a typical application in which five 6006 modules using SG-lead and E- and M-lead signaling are involved. Any station may signal all other stations by **applying ringing-voltage signaling to the facility**. The ringing voltage is applied at the station by means of a manual key.

2.04 The 6006 may also be used to provide special signaling functions. For example, in a non-powered mode, the 6006's ring-detection circuitry will operate and provide relay contact closure when ringing voltage is applied to the facility terminals of the module.

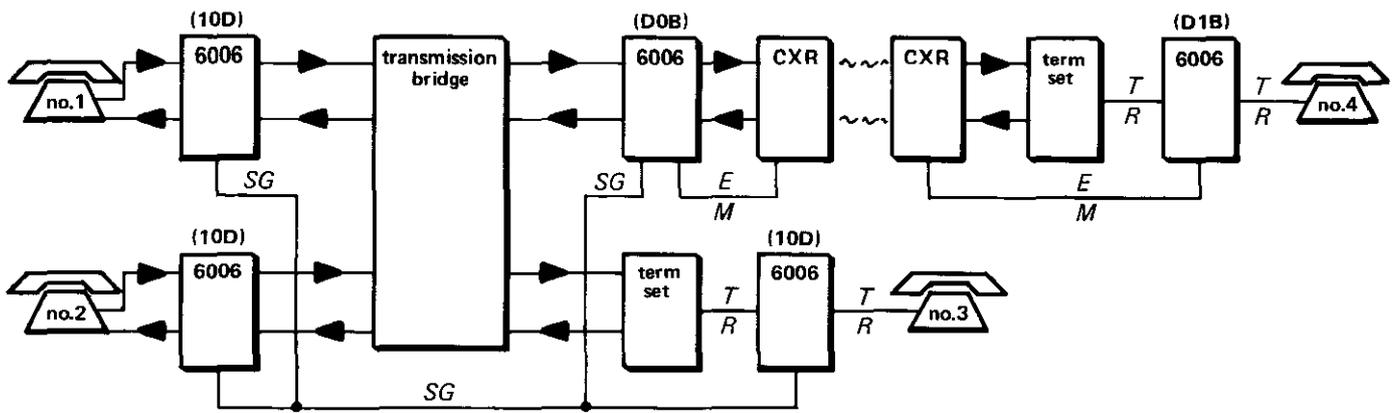


figure 2. Typical application of 6006's

2.05 The normal signaling states of the 6006 are as follows:

E-lead: ground (idle) or open (signaling)

M-lead: resistance battery (idle) or ground (signaling)

SG-lead: resistance ground or open (idle) or battery (outgoing or incoming signaling)

3. installation

inspection

3.01 The 6006 Signaling Converter module should be visually inspected upon arrival in order to find possible damage incurred during shipment. If damage is noted, a claim should immediately be filed with the carrier. If stored, the module should be visually inspected again prior to installation.

mounting

3.02 Each 6006 module mounts in one position of the Tellabs Type 10 Mounting Shelf, variations of which permit relay rack or apparatus case installation. The module plugs physically and electrically into a 56-pin connector at the rear of the Type 10 Shelf.

installer connections

3.03 Before making any connections to the Mounting Shelf ensure that power is **off** and modules are **removed**. Modules should be put into place only **after** properly optioned and **after** wiring has been completed.

3.04 Table 1 lists connections to the 6006 module. All connections are made via wire wrap at the 56-pin connector at the rear of each module's mounting shelf position. Pin numbers are found on the body of the connector.

option selection

3.05 The module's two option switches must be set before it is placed into service. Locations of these switches on the module's printed circuit board are shown in figure 3.

3.06 Switch *S1* is used to select the mode of signaling conversion. Set *S1*

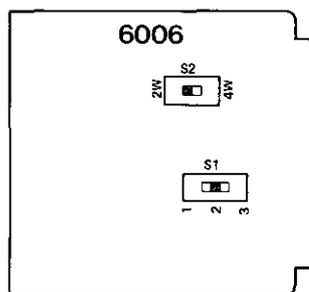


figure 3. Switch locations

as follows: to position 1 for the SG-lead to ringing mode (10D); to position 2 for the E-and-M-lead to ringing mode (D1B); to position 3 for the SG-lead to E-and-M-lead mode (DOB).

| connect: | to pin: |
|--|---------|
| 2W STATION OR 4W RCV STATION TIP | 41 |
| 2W STATION OR 4W RCV STATION RING | 49 |
| 4W RCV FACILITY TIP | 55 |
| 4W RCV FACILITY RING | 53 |
| 4W XMT STATION and FACILITY TIP or 2W FACILITY TIP | 51 |
| 4W XMT STATION and FACILITY RING or 2W FACILITY RING | 33 |
| GND (ground) | 17 |
| BATT (-48Vdc battery in) | 35 |
| N.C. (ringdown relay, normally closed, break contact) | 7 |
| N.O. (ringdown relay, normally open, make contact) | 1 |
| COM. (ringdown relay, common, swinger) | 3 |
| E LEAD (signaling) | 21 |
| M LEAD (signaling) | 5 |
| SG LEAD (signaling) | 29 |
| RING GEN | 11 |
| RING GEN | 45 |

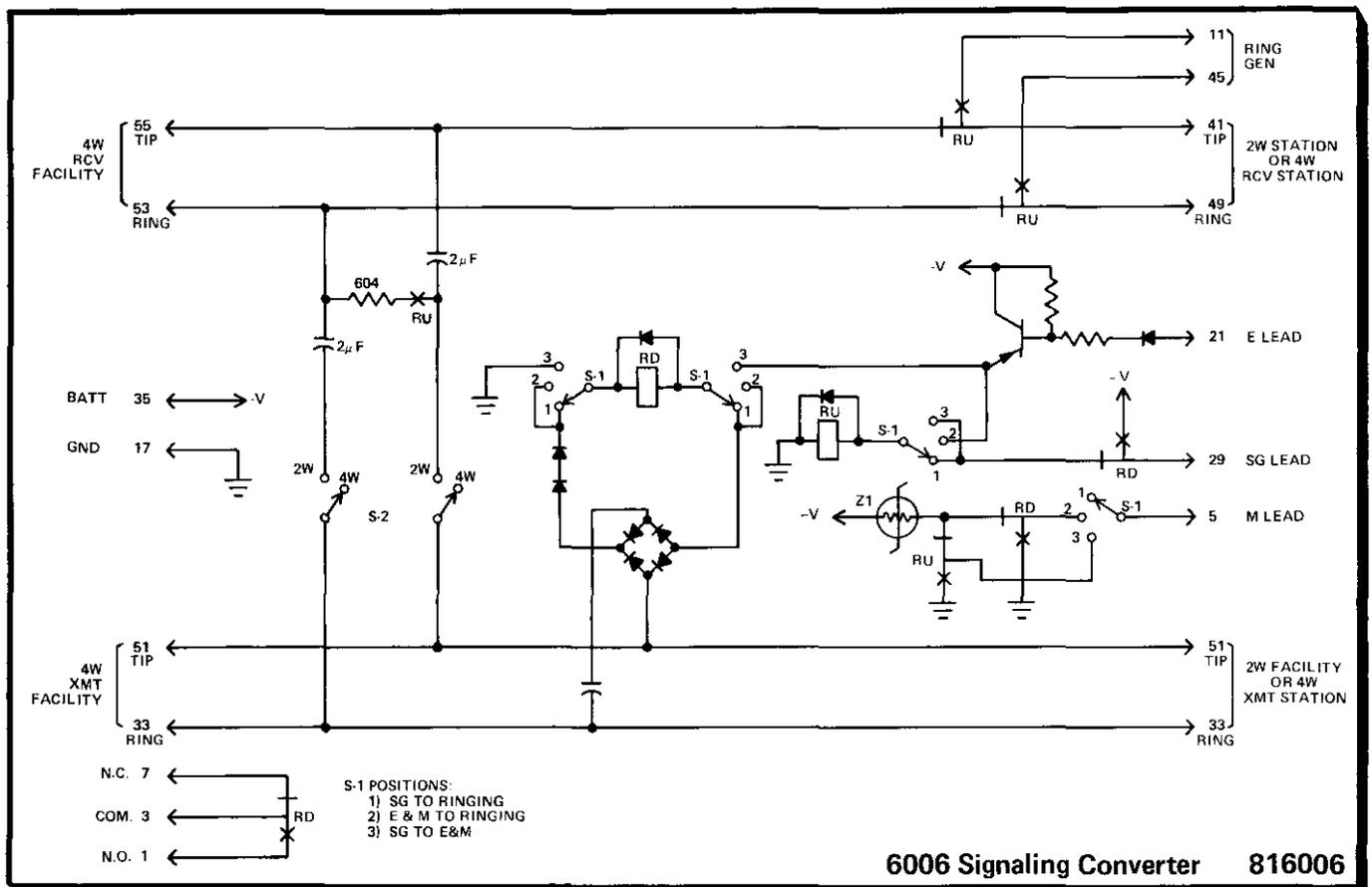
table 1. External connections to 6006

3.07 Switch *S2* is used to select 2wire or 4wire operation. Set *S2* to the *2W* position for 2wire operation or to the *4W* position for 4wire operation.

4. circuit description

Note: Please refer to the associated functional schematic (section 5) as an aid in understanding the following circuit description. This circuit description and the functional schematic are presented only for better understanding of the 6006. They are **not** intended to provide information for testing or internal troubleshooting of the 6006 module. Testing and troubleshooting should be limited to those procedures prescribed in section 7 of this Practice.

4.01 In the SG-lead to ringing mode (10D), the 6006 Signaling Converter's bridge rectifier, upon detecting incoming ringing, operates the RD (ringdown) relay. When the RD relay operates, battery is applied to the SG-lead. If battery is applied to the SG-lead from an external source, the RD relay operates, applying ring generator to the station.



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5. functional schematic

4.02 In the E-and-M-lead to ringing mode (D1B), the bridge rectifier, upon detecting incoming ringing, operates the RD relay. This changes the M-lead state from normal resistance battery to ground. Outgoing signaling is effected via removal of ground from the E-lead, which causes the E-lead transistor to operate the RU (ring-up) relay, applying ring generator to the station.

4.03 In the SG-lead to E-and-M-lead mode (D0B), for E-lead to SG-lead (incoming) signaling conversion, removal of E-lead ground causes the E-lead transistor to operate the RD relay. This causes battery to be applied to the SG-lead. For SG-lead to M-lead (outgoing) signaling conversion, application of battery to the SG-lead from an external source operates the RU relay, which, in turn, changes the M-lead state from normal resistance battery to ground.

4.04 M-lead current limiting is provided by a positive-temperature-coefficient thermistor.

6. specifications

operational modes

- E and M to Ringing (D1B)
- SG-lead to E and M (D0B)
- SG-lead to Ringing (10D)

signaling states

- E-lead: idle=gnd., signaling=open
- M-lead: idle=res. battery, signaling=gnd.
- SG-lead: idle=res. gnd., signaling=battery

input ringing detection

60Vac minimum, 16 to 67Hz

SG-lead input current

25mA maximum

M-lead current

ground: 1 ampere

resistance battery: 100mA protected, 10mA after overload

relay contact rating

1 ampere, maximum

input power

42 to 56Vdc, 35mA maximum

operating environment

20° to 130° F (-7° to 54° C), humidity to 95% (no condensation)

weight

8.5 ounces (0.241kg)

dimensions

- 5.58 inches (14.17cm) high
- 1.42 inches (3.61cm) wide
- 5.96 inches (15.14cm) deep

mounting

relay rack or apparatus case via one position of Tellabs Type 10 Mounting Shelf

7. testing and troubleshooting

7.01 This Testing Guide may be used to assist in the installation, testing, or troubleshooting of the 6006 Signaling Converter module. The Guide is

intended as an aid in the localization of trouble to a specific module. If a module is suspected of being defective, a new module should be substituted and the test conducted again. If the substitute module operates correctly, the original module should be considered defective and returned to Tellabs for repair or replacement. It is strongly recommended that no internal (component level) testing or repairs be attempted on the 6006 module. Unauthorized testing or repairs may void the module's warranty.

7.02 If a situation arises that is not covered in the Testing Guide, contact Tellabs Customer Service at (312) 969-8800 for further assistance.

7.03 If a 6006 is diagnosed as defective, the situation may be remedied by either *replacement* or *repair and return*. Because it is the more expedient method, the *replacement* procedure should be followed whenever time is a critical factor (e.g., service outages, etc.).

replacement

7.04 If a defective 6006 is encountered, notify Tellabs via telephone [(312) 969-8800], letter [see below] or twx [910-695-3530]. Notification should

include all relevant information, including the 8X6006 part number (from which we can determine the issue of the module in question). Upon notification, we shall ship a replacement module to you. If the warranty period of the defective module has not elapsed, the replacement module will be shipped at no charge. Package the defective module in the replacement module's carton; sign the packing list included with the replacement module and enclose it with the defective module (this is your return authorization); affix the preaddressed label provided with the replacement module to the carton being returned; and ship the equipment prepaid to Tellabs.

repair and return

7.05 Return the defective 6006 module, shipment prepaid to: Tellabs Incorporated
4951 Indiana Avenue
Lisle, Illinois 60532
Attn: repair and return dept.

Enclose an explanation of the module's malfunction. Follow your company's standard procedure with respect to administrative paperwork. Tellabs will repair the module and ship it back to you. If the module is in warranty, no invoice will be issued.

testing guide checklist

| test | test procedure | normal result | if normal conditions are not met, verify: |
|--------------------------------------|--|---|---|
| SG-lead to ringing (20Hz) conversion | Outgoing: Apply battery to SG-lead (pin 29). | Ringing applied to pins 41 and 49 <input type="checkbox"/> . | Option switches properly set <input type="checkbox"/> Wiring correct <input type="checkbox"/> . Replace module and retest <input type="checkbox"/> . |
| | Incoming: Apply ringing to pins 51 and 33. | SG-lead (pin 29) at battery <input type="checkbox"/> . | Same as above. |
| Ringing (20Hz) to E and M conversion | Outgoing: Remove ground from E-lead (pin 21). | Ringing applied to pins 41 and 49 <input type="checkbox"/> . | Same as above. |
| | Incoming: Apply ringing to pins 51 and 33. | M-lead (pin 5) at ground during ringing and at resistance battery otherwise <input type="checkbox"/> . | Same as above. |
| SG-lead to E and M conversion | Outgoing: Apply battery to SG-lead (pin 29). | M-lead (pin 5) at ground when SG-lead is at battery <input type="checkbox"/> ; M-lead at resistance battery when SG-lead is open <input type="checkbox"/> . | Same as above. |
| | Incoming: Apply ground and then open to E-lead (pin 21). | SG-lead (pin 29) at resistance ground or open when E-lead is grounded; SG-lead at battery when E-lead is open <input type="checkbox"/> . | Same as above. |