

# 6251 SSN Trunk Module

## contents

section 1	general description	page 1
section 2	application	page 1
section 3	installation	page 2
section 4	circuit description	page 3
section 5	block diagram	page 6
section 6	specifications	page 5
section 7	testing and troubleshooting	page 5

## 1. general description

1.01 The 6251 SSN Trunk module (figure 1) provides loop-to-E&M conversion for one-way trunk service between a Common Control Switching Arrangement (CCSA) Switched Service Network (SSN) trunk facility and a central-office (DDD) line circuit. Specifically, the 6251 provides conversion between Type I or Type II E&M signaling interface and a loop-start or a ground-start CO line circuit. While primarily intended to provide one-way service with regular local and toll completion capabilities for the SSN user, the 6251 may be used to accommodate two-way seizure in some applications.

1.02 This Practice section is reissued to cover the Issue 2 version of the 6251 module (part number 826251), which adds dial tone detection for loop-start applications and for ground-start applications in which dial tone (rather than tip-ground) service-request response is provided.

1.03 Features, functions, and options of the 6251 include incoming ground-start seizure; wink-start dial supervision for either tip-ground operation or dial tone recognition; immediate repetition of answer supervision, if provided, or timed answer supervision; two-way repetition of disconnect supervision; and provision for an optional 9901 Pulse Corrector subassembly. When used with a terminating set or repeat coil, the 6251 provides idle-line termination toward the local termination. When used with the Tellabs 6101 SF Transceiver, the 6251 controls the 6101's transmit-path-cut functions.

1.04 The 6251 operates on  $-44$  to  $-56$ Vdc filtered input. This power supply voltage must be within 5 volts of the central-office line circuit voltage. Current requirement for the 6251 is 28mA idle, 60mA busy (plus M-lead current).

1.05 A front-panel *busy* LED lights to indicate a circuit-busy condition (i.e., E lead at ground potential).

1.06 The 6251 mounts in one position of the Tellabs Type 10 Mounting Shelf, versions of which are available for relay-rack and apparatus-case installation. In relay-rack applications, up to 12 modules can be mounted across a 19-inch rack, while up to 14 modules can be mounted across a 23-inch

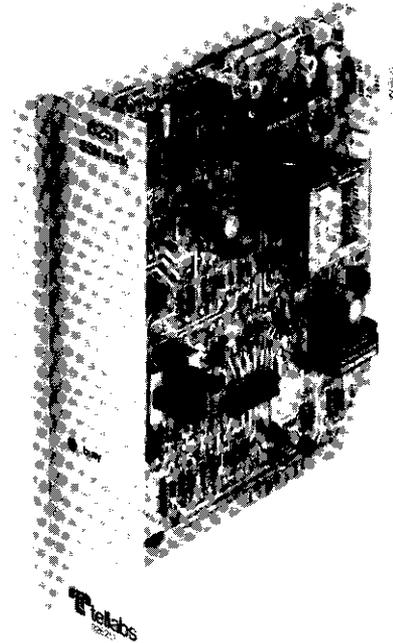


figure 1. 6251 SSN Trunk Module

rack. In either case, 6 inches of vertical rack space is used. The 6251 also mounts in one position of a Tellabs 260 or 261 Signaling and Terminating System Assembly.

## 2. application

2.01 The 6251 SSN Trunk module is applied to a trunk facility between a CO (step-by-step, Crossbar-type, or electronic) and the CCSA switching equipment of an SSN. The 6251 converts E&M facility-side signaling to loop signaling toward a central-office line circuit. Service is normally one-way (incoming to the CO line circuit), but if the switching equipment at the SSN is capable of recognizing continuous seizure as an incoming call, two-way service can also be effected (when the module is optioned to disable the dial tone detector). Table 1 shows the various operational modes and the required options for each.

2.02 The 6251 can be used on either loop-start or ground-start circuits. The module provides both an M-lead start-dial and M-lead stop-dial indication to the SSN. When used in ground-start applications, the module can be optioned either to use standard CO tip-ground start-dial signaling or to detect dial tone from the CO as a start-dial indication. In loop-start applications, dial-tone detection is required, as no CO tip-ground is provided.

mode of operation	S2 (D.T. DET) setting	two-way seizure
ground-start with tip-ground supervision	DIS	yes
ground-start with dial-tone detection (tip-ground supervision not provided)	EN	no
loop-start with dial-tone detection	EN	no

table 1. 6251 operational modes

2.03 When reverse-battery supervision is provided by the CO as a stop-dial signal, the 6251 repeats this supervision toward the SSN. When such answer supervision is not provided, the 6251 provides timed answer supervision upon detection of 1.2 seconds of a continuous E-lead ground (on-hook) condition. This answer supervision is used by CCSA switching machines for transmission and control purposes.

2.04 The 6251 is normally located at the central office, but may also be located at the CCSA or at any intermediate point consistent with the CO signaling range. In determining CO range, the 650 ohm internal loop resistance of the 6251 must be considered. Thus, with a 1200-ohm office, the module can be located up to 550 ohms away from the line circuit.

2.05 On the facility side, the 6251 interfaces an associated E&M signaling device to accommodate facility signaling. The 6251 provides Type I or Type II E&M signaling interface. (Type I is typically used with electromechanical switching systems. Type II is used with electronic systems.) The facility-side signaling device might be an SF transceiver (Tellabs 6101), a DX signaling set (Tellabs 600X), or a carrier channel. A 4wire line amplifier (Tellabs 400X) may be required to set facility-side levels.

2.06 On the CO side, the 6251 makes connection to the line circuit via the tip, ring, A, and B leads of an associated transmission device – usually a terminating set (Tellabs 420X) or repeat coil (Tellabs 442X). Figure 2 shows a typical arrangement.

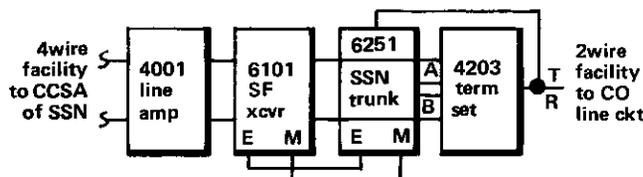


figure 2. Typical SF application, 4wire to 2wire

2.07 While most applications involve a 4wire facility, a 2wire facility toward the CCSA can also be interfaced. In 4wire applications, a terminating set provides transmission-lead continuity, while in 2wire applications, a repeat coil provides this continuity. In figure 3, the repeat coil is provided as part of the 6002 DX signaling set. Idle-line termination is provided to the term set or repeat coil by the 6251.

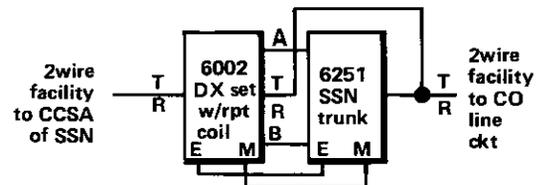


figure 3. Typical DX application, 2wire

2.08 When the 6251 is not located in a CO and interfaces a 4wire loop on the CO side, a 440X Pad/Transformer module is used to provide transmission lead continuity to the circuit and signaling interface for the 6251. At the CO, a term set then converts the 4wire facility to 2wire. Figure 4 shows this application.

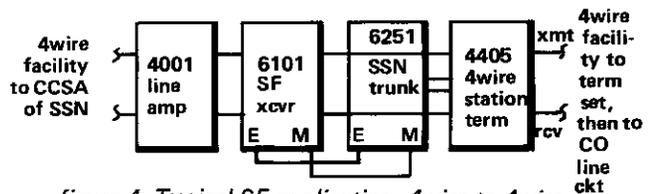


figure 4. Typical SF application, 4wire to 4wire

2.09 To ensure proper operation, power applied to the 6251 must be within 5 volts of the voltage supplied to the CO line circuit.

2.10 An optional 9901 Pulse Corrector plug-on subassembly can be used to correct incoming dial pulses to the 6251 module. Because dial pulses from the CCSA are generated electronically by a sender, pulse correction is often not required. This, of course, depends upon the pulse distortion of the facility and the capabilities of the CO equipment. When the 6251 SSN Trunk is used in association with a 6101 SF Transceiver, a Pulse Corrector should always be used.

### 3. installation inspection

3.01 The 6251 SSN Trunk 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 The 6251 module mounts in one position of the Tellabs Type 10 Mounting Shelf, which is available in configurations for both relay-rack and apparatus-case installation. The module plugs physically and electrically into a 56-pin connector at the rear of the Type 10 Shelf. The 6251 also mounts in position 3 of a Tellabs 260 or 261 System Assembly.

### installer connections

3.03 Before making any connections to the mounting shelf, make sure that power is off and modules are removed. Modules should be put into place only after they are properly optioned and after wiring has been completed.

3.04 Table 2 lists connections to the 6251 SSN Trunk module. All connections are made via wire wrapping at the 56-pin connector at the rear of the module's mounting shelf position. Pin numbers are found on the body of the 56-pin connector.

connect:	to pin:
E LEAD (to carrier or signaling eqpt.)	29 or 5
SG LEAD (Type II interface)	15
M LEAD (to carrier or signaling eqpt.)	21 or 31
SB LEAD (Type II interface)	19
CT (cut-and-terminate, SF signaling only)	27
A LEAD (to transmission device)	43 or 25
B LEAD (to transmission device)	45 or 23
TIP (to transmission device)	51 or 49
RING (to transmission device)	55 or 53
-BATT (-48Vdc nominal)	33 or 35
GND (ground)	17

table 2. Connections to the 6251 module

### options and alignment

3.05 Three two-position slide switches must be set before the 6251 is put into service. Locations of these option switches on the module's printed circuit board are shown in figure 5. The switches and their functions are described in paragraphs 3.06 through 3.08.

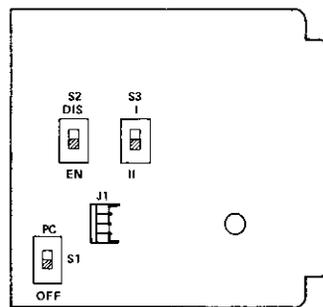


figure 5. 6251 option switch locations

3.06 Switch S1 conditions the 6251 for use with a 9901 Pulse Corrector subassembly. Set S1 to the PC position when using the 9901. (The 9901 plugs into a four-pin receptacle on the circuit board.) Set S1 to the OFF position if the 9901 is not used.

3.07 Switch S2 labeled D.T. DET, options the module for dial-tone detection. Set S2 to the EN (detection enabled) position when dial-tone is used as a start-dial signal. Set S2 to the DIS (detection disabled) position when tip-ground from the CO is used as a start-dial signal.

3.08 Switch S3 selects the type of E&M signaling interface. Set S3 to the I position when Type I E&M signaling interface is used. Set S3 to the // position when Type II (looped) signaling interface is used.

3.09 No alignment of the 6251 is necessary. However, any associated level-control devices should be aligned before they and the 6251 are placed into service.

## 4. circuit description

4.01 In lieu of a conventional circuit description, sequence charts (figures 6 through 9) that illustrate sequential operation of the 6251 SSN Trunk module are presented. Horizontal paths identify events occurring simultaneously, and vertical paths denote sequential events. Dotted lines indicate elapsed time. These charts can be used to determine

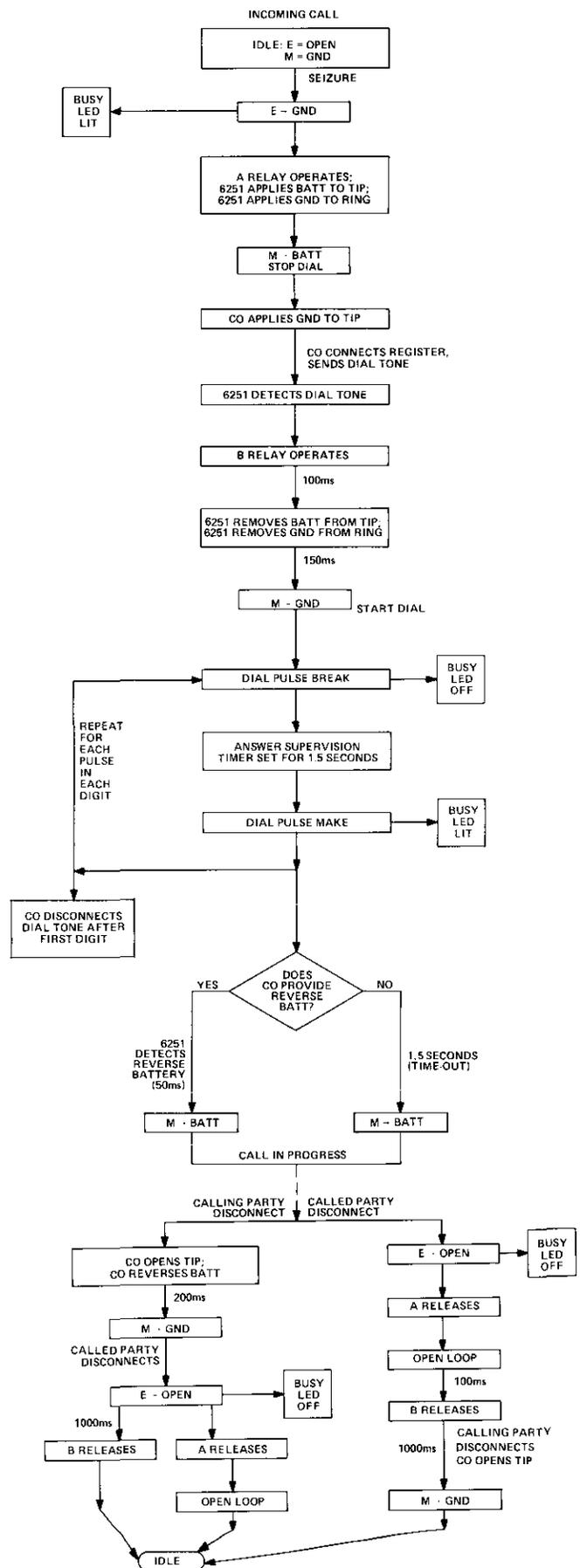


figure 6. Function sequence chart, incoming call, ground-start (dial-tone detection) operation

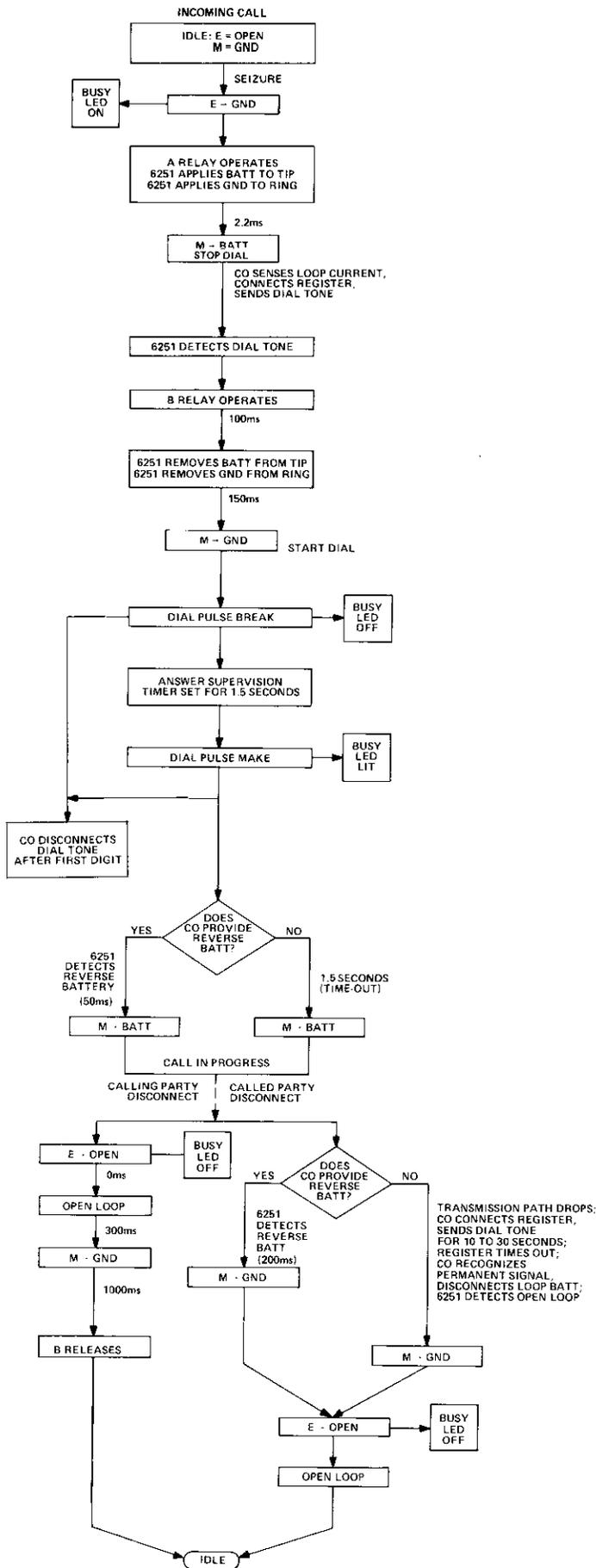


figure 7. Function sequence chart, incoming call, loop-start (dial-tone detection) operation

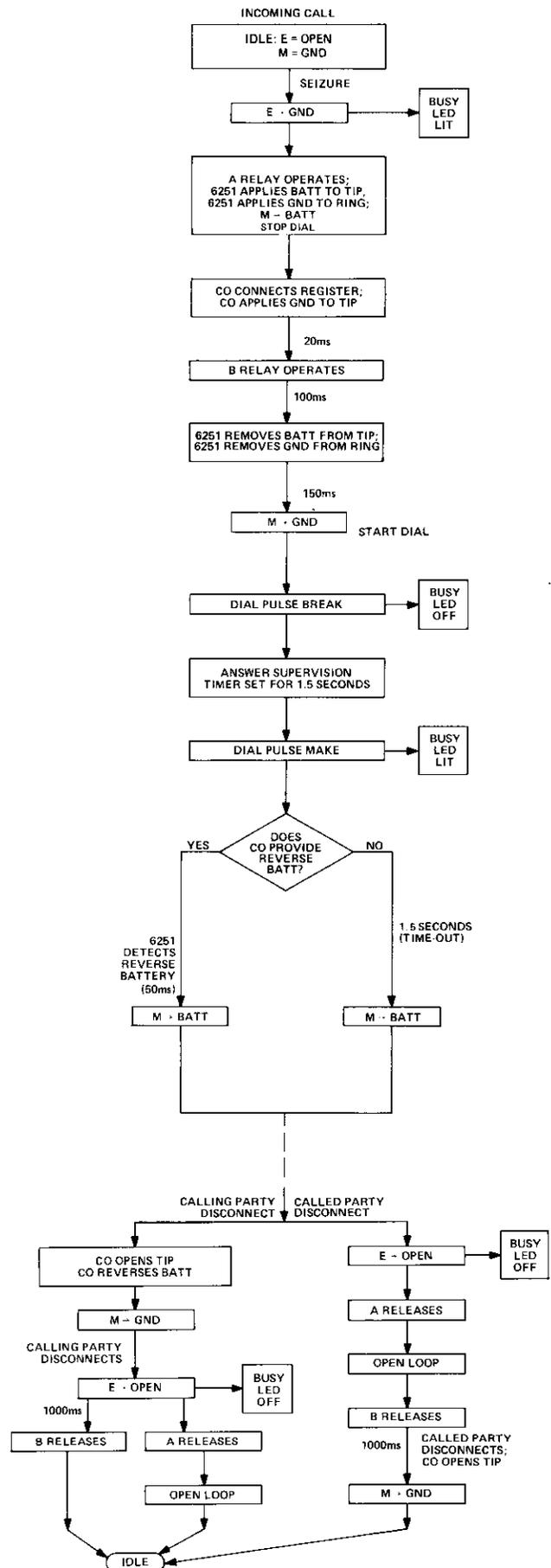


figure 8. Function sequence chart, incoming call, ground-start operation

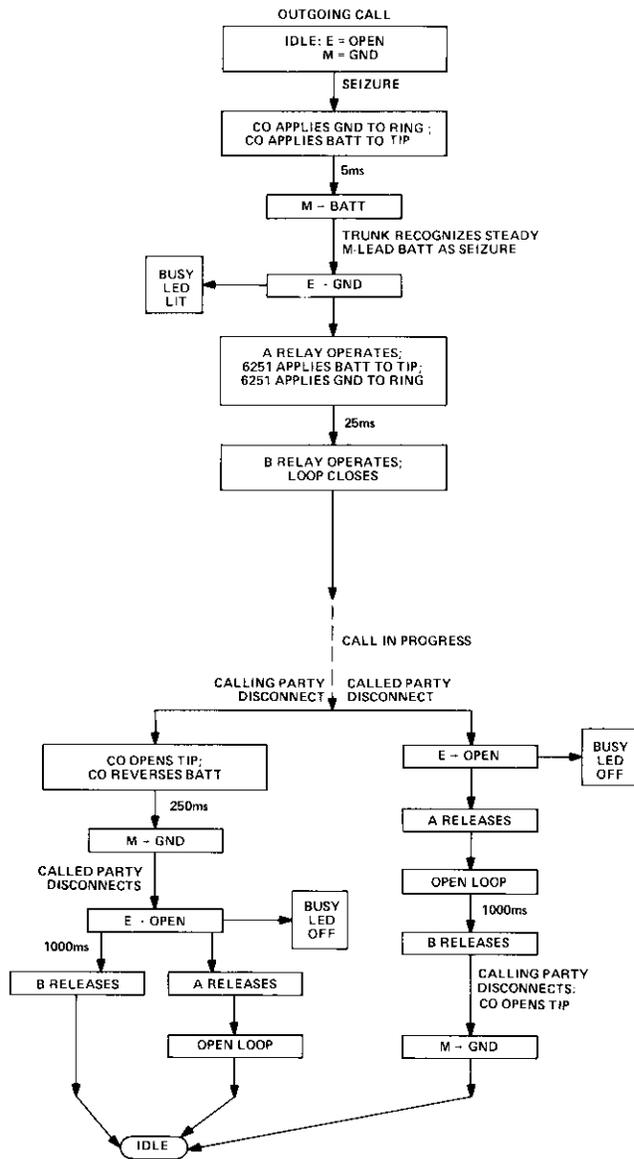


figure 9. Function sequence chart, outgoing call, ground-start operation

whether a module is performing normally by observing the module's response and comparing it to that shown in the chart. Reference to the 6251's functional block diagram, section 5 of this Practice, will aid in understanding the sequence charts.

## 6. specifications

*dial-tone detection threshold*

-27 ±4dBm at 440Hz

*dial-tone detection bandwidth*

300 to 700Hz

*wink start (loop-start or ground-start)*

150ms minimum

*answer-supervision operate delay*

1.5 ±.26 second after continuous E-lead ground, or 50ms after loop current reversal

*loop resistance*

650 ohms maximum internal resistance

*idle-line termination*

900 ohms + 2 microfarads

*dial pulse distortion*

5% maximum from E-lead input (without 9901 Pulse Corrector)

*dial pulse correction (with 9901 Pulse Corrector)*

input 8 to 12pps, 30 to 70% break is corrected to 58 ±2% break

input 14pps, 40 to 65% break is corrected to 57 ±3% break

*M-lead states*

idle: ground

busy: resistance battery (100mA maximum)

*longitudinal balance*

60dB minimum

*input power*

-44 to -56Vdc, 28mA idle, 60mA busy (plus M-lead current)

Note: power supply voltage applied to 6251 must be ±5 volts of the voltage supplied to the central-office line circuit

*operating environment*

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

*weight*

6251: 8 ounces (227 grams)

*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; also mounts in one position of Tellabs 260 or 261 System Assembly

## 7. testing and troubleshooting

7.01 The Testing Guide Checklist in this section may be used to assist in the installation, testing, or troubleshooting of the 6251 SSN Trunk module. The Checklist is intended as an aid in the localization of trouble to a specific module. If a module is suspected of being defective, a new one 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. We strongly recommend that no internal (component-level) testing or repairs be attempted on the 6251 module. Unauthorized testing or repairs may void the module's warranty.

7.02 If a situation arises that is not covered in the Checklist, contact Tellabs Customer Service at your Tellabs Regional Office or at our Lisle, Illinois, or Mississauga, Ontario, Headquarters. Telephone numbers are as follows:

US central region: (312) 969-8800

US northeast region: (412) 787-7860

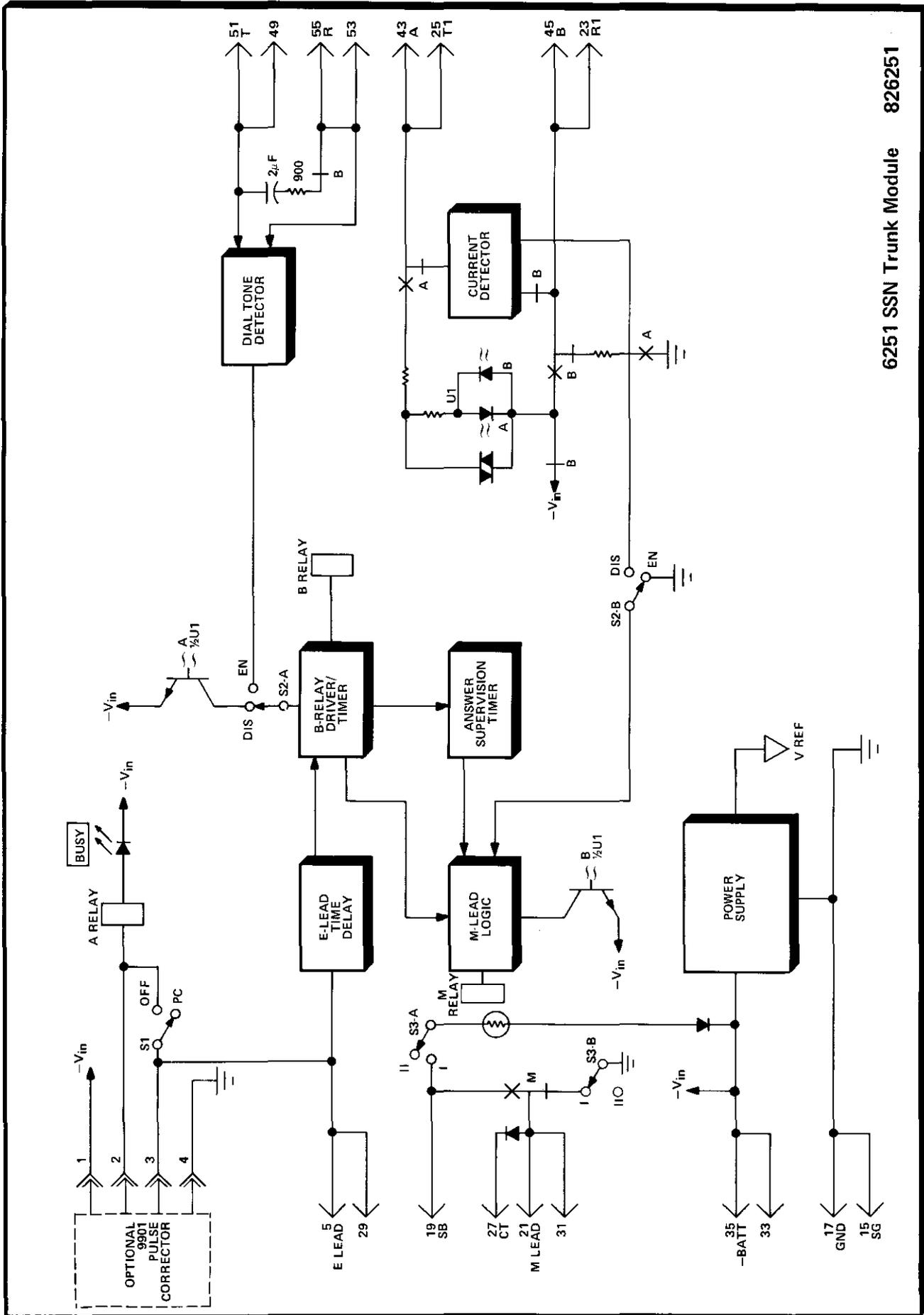
US southeast region: (305) 645-5888

US western region: (213) 595-7071

Lisle Headquarters: (312) 969-8800

Mississauga Headquarters: (416) 624-0052

7.03 If a 6251 is diagnosed as defective, the situation may be remedied by either *replacement* or *repair and return*. Because it is more expedient,



6251 SSN Trunk Module 826251

5. block diagram

the *replacement* procedure should be followed whenever time is a critical factor (e.g., service outages, etc.).

**replacement**

7.04 To obtain a replacement 6251 module, notify Tellabs via letter (see addresses below), telephone (see numbers above), or twx (910-695-3530 in the USA, 610-492-4387 in Canada). Be sure to provide all relevant information, including the 8X 6251 part number that indicates the issue of the module in question. Upon notification, we shall ship a replacement module to you. If the module in question is in warranty, the replacement will be shipped at no charge. Pack the defective 6251 in the replacement module's carton, sign the packing slip 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 module prepaid to Tellabs.

**repair and return**

7.05 Return the defective 6251 module, shipment prepaid, to Tellabs (attn: repair and return).

in the USA: Tellabs Incorporated  
4951 Indiana Avenue  
Lisle, Illinois 60532

in Canada: Tellabs Communications Canada, Ltd.  
1200 Aerowood Drive, Unit 11  
Mississauga, Ontario, Canada L4W 2S7

Enclose an explanation of the module's malfunction. Follow your company's standard procedure with regard 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 and troubleshooting**

*Note: This testing guide assumes ground start operation with Type I E&M signaling interface. Tests should be performed in sequence. Refer to figures 7 and 8 to determine if your module is operating normally for dial tone detection operation.*

test	test procedure	normal conditions	if normal conditions are not met, verify:
outgoing seizure	Apply tip-ground toward 6251 from switching-side loop. Use VOM (50V scale) to measure potential between ground (+) and M lead (-).	M lead at battery (approx. -48Vdc) when tip-ground applied <input type="checkbox"/> .	Option switches set correctly <input type="checkbox"/> . Power <input type="checkbox"/> . Replace 6251 and retest <input type="checkbox"/> .
incoming seizure	Ground E lead. Use VOM to measure potential between ground (-) and ring lead (+).	Ring lead at ground (approx. 0Vdc) <input type="checkbox"/> .	Wiring <input type="checkbox"/> . Power <input type="checkbox"/> . Replace 6251 and retest <input type="checkbox"/> .
	Measure potential between ground (+) and tip lead (-).	Tip lead at battery (approx. -48Vdc) <input type="checkbox"/> .	Same as above <input type="checkbox"/> .
	Measure potential between ground (+) and M lead (-).	M lead at battery (approx. -48Vdc) <input type="checkbox"/> .	Same as above <input type="checkbox"/> .
	Ground tip lead. Use VOM to measure potential between ground (-) and M lead (+).	M lead at ground (approx. 0Vdc); after approx. 1.5 seconds M lead at battery (approx. -48Vdc) <input type="checkbox"/> .	Same as above <input type="checkbox"/> .



*Tellabs Incorporated*

*4951 Indiana Avenue, Lisle, Illinois 60532  
telephone (312) 969-8800 twx 910-695-3530*