MAINTENANCE DATA TRANSMITTER SD-28111-01

DESCRIPTION

NO. 5 CROSSBAR OFFICES ARRANGED FOR ATA

1. GENERAL

1.01 This section provides a description of the Maintenance Data Transmitter.

1.02 Whenever this section is reissued, the reason for reissue will be listed in this paragraph.

1.03 The Maintenance Data Transmitter (MDT) (Fig. 1) is the trouble data collection device for No. 5 Crossbar offices using the Automatic Trouble Analysis (ATA) system. It collects the trouble data presently punched on trouble record cards and forwards the information via data link to a central computer for analysis. Identification of the probable or actual equipment faults determined by the computer is returned to the central office via the MDT and printed out on the MDT keyboard printer for use by maintenance personnel.

2. UNIT DESCRIPTION

A. Physical

2.01 The MDT is comprised of a programmable controller (procon), a programmable scanner distributor (PSD), and an ATA interface circuit (Fig. 1). The MDT requires approximately 22 inches of mounting space on a standard relay rack.

B. Functional

2.02 The procon is a microcontroller containing a read only memory (ROM) encoded with the MDT control program. This unit directs all functions of the MDT.

2.03 The PSD provides the following:

(a) A control and trouble indicating panel.

(b) Power supplies for procon and PSD logic circuitry.

(c) A 160-point scan point matrix which provides an interface between the central office and the procon logic.

(d) A 24-point distribute point matrix which provides contact closures to the central office under control of procon logic.

(e) A random access memory which is used as a scratch pad memory for buffering trouble data and keyboard messages and for status words and pointers.

(f) Three input/output ports which provide a means for the procon to control a keyboard printer, a dedicated line data set, and an optional switched network backup data set.

2.04 The ATA interface circuit is a small auxiliary unit which provides the following:

(a) Office alarm connections.

(b) Lamps which indicate make busy and alarm.

(c) Make busy functions, isolation of the distribute points, and restoration of trouble recorder connections to the office which are split when the MDT is in service.

(d) Reinitialization of the MDT ROM program.

(e) Disabling of the alarms presently associated with trouble recorder usage, except when a trouble card is to be punched.

2.05 Operation of the PSD is controlled by the procon, which executes a program stored in a read only memory. Program instructions cause data to be transferred between the procon and PSD over data buses. If the procon experiences a failure, a lamp is lighted on the control panel and an office alarm is generated.

2.06 The scanner/distributor allows the PSD to read the state of individual scan points in the office and to alter the state of distribute points. The presence of –48 volts or 0 volts is converted into a binary zero or one. A binary one in the output data causes an appropriate pair of relay contacts to close, while a zero causes an open pair of contacts.

2.07 The random access memory (RAM) in the PSD is provided for applications where the rate of data collection exceeds the rate of data transmission. The RAM is used as a scratch pad memory for buffering trouble data and keybord messages.

2.08 Data collected by the PSD is transmitted to a data set via the I/O ports.

2.09 The trouble recorder accesses trouble data through the master test frame connector (MTFC) by sequentially operating nine sets of scan relays as a trouble card is punched (Fig. 2). The operation of each set of scan relays connects the 124 trouble recorder data leads to the MTFC, and corresponds to the information punched in one row of a trouble card. An MDT scan point is connected to monitor each of these data leads, and MDT distribute points control the associated scanning relays. The start leads from the MTFC to the trouble recorder are split through the MDT (Fig. 2), so MDT scan points monitor the start leads toward the MTFC and MDT distribute points control the start leads to the trouble recorder.

2.10 When a user circuit bids for the trouble recorder and the procon logic directs a card image to be sent, the MDT operates the scan relays sequentially and reads the trouble data into a buffer before relaying the start signal to the recorder. Following this prescan, the procon logic decides if a trouble card is to be punched. If a card is not to be punched, the MDT sends a trouble record complete signal to release the trouble recorder user circuit. The card image in the random access memory buffer is then formatted and transmitted to the ATA central computer for analysis.

2.11 If the MDT decides to punch a trouble record card, it signals the recorder to start. When the card has been punched, the recorder signals trouble record complete through the MTFC to release the trouble recorder user circuit.

3. CONTROLS AND INDICATORS

3.01 Controls and indicators are provided on the control panel. Their functions are described below.

(a) The FA (fuse alarm) lamp is lighted when a PSD fuse fails. It is also lighted when the ALM lamp on the converter is lighted to indicate excessive or low voltage or excessive output current.

(b) The CONT (controller) lamp is lighted when the procon fails an instruction word parity check or sanity timer time-out.

(c) The S/D (scanner/distributor) lamp is lighted when a failure to access the scanner/distributor occurs.

(d) The I/O (input/output) lamp is lighted when a failure occurs in one of the data ports.

(e) The CONTROL lamps indicate various trouble conditions in the PSD.

(f) The MEM lamp indicates a RAM parity failure.

(g) The PWR switch applies -48 Volt office battery to the converter.

(h) The TEST pushbutton illuminates all lamps on the control panel.

(i) The INIT (initialize) pushbutton causes the procon ROM program to restart.

(j) The EX (execute) pushbutton causes the PSD to run maintenance tasks.

(k) The CONTROL switches are used to set up maintenance tasks for the PSD.

4. OPERATING MODES

4.01 Office trouble records are classified in the MDT program as express and nonexpress. Express trouble cards and/or trouble card images are those which result from test calls, either manually or automatically originated in the central office, and cards or card images which are collected by the MDT and/or punched by the recorder while the special scan point of the MDT is connected to ground. This special scan point is for use by the operating company and is connected to a selected call progress or trouble data point in the MTFC to force the dropping and/or sending of trouble records under conditions predetermined by the operating company. The nonexpress category includes the trouble records which occur because of failures while processing service calls.

4.02 Command messages from the SCC direct the MDT to punch and/or send either, neither, or both classes of trouble records. The MDT program response to a request for a trouble record is thus determined by the operating mode, class of trouble, and the availability of a trouble record buffer. The MDT can be operated in any combination of punch express, punch nonexpress, send express, and send nonexpress trouble records as determined by a command from the SCC.

5. TELEPRINTER LINK

5.01 The MDT provides a communications link between the central computer and an on-site teleprinter. Keyboard input from the teleprinter is sent to the computer over the same data link as trouble card data. The MDT provides buffering so that typed characters are not lost if a trouble card transmission is in progress. Keyboard characters inhibit the transmission of data from the computer while an input from the teleprinter is being typed. Data from the computer is printed at the on-site teleprinter.

6. ALARMS

6.01 Both major and minor alarms can be originated by the SCC in response to the office trouble data. Major alarms can also be activated by troubles within the PSD.

6.02 When alarms are originated by the SCC, the ATA interface circuit connects a battery alarm signal to the office alarm aisle pilot lamp unit for the aisle in which the teleprinter is located and lights the report alarm (RAL) lamp located near the teleprinter.

6.03 When troubles within the PSD cause a major alarm, the ATA interface circuit connects a battery alarm signal to the office alarm aisle pilot lamp unit for the aisle in which the MDT is located and lights the alarm (ALM) lamp on the MDT.

6.04 The ATA interface circuit provides an alarm release (AR) key for alarms resulting from transient conditions, and an alarm cut-off (ACO) key to silence the audible alarm and extinguish the aisle lamps when a trouble condition cannot be corrected immediately. When the ACO key is operated, an ACO lamp is lighted at the master test frame while the alarm condition exists.
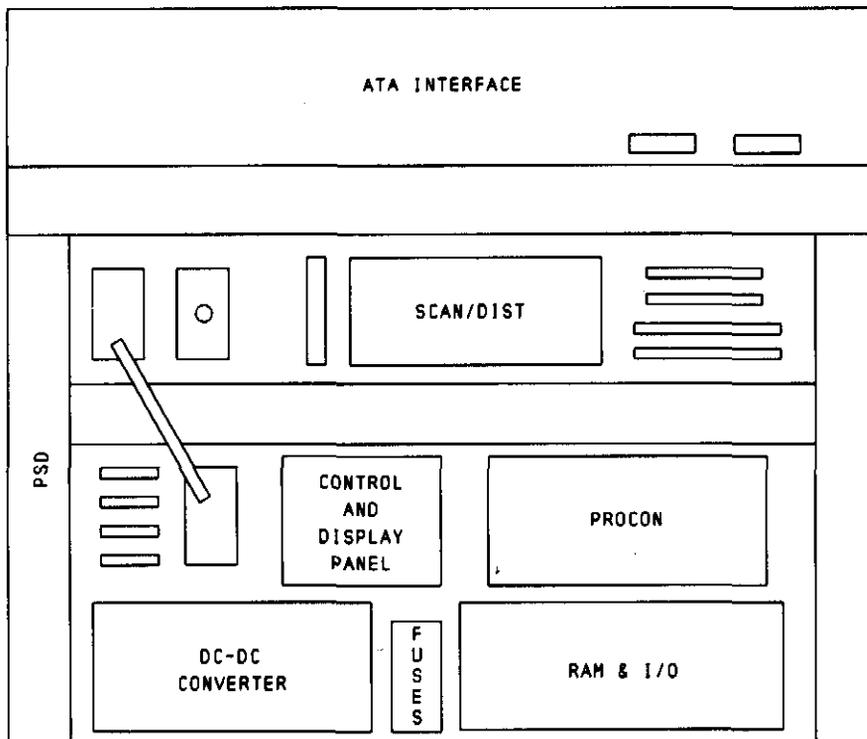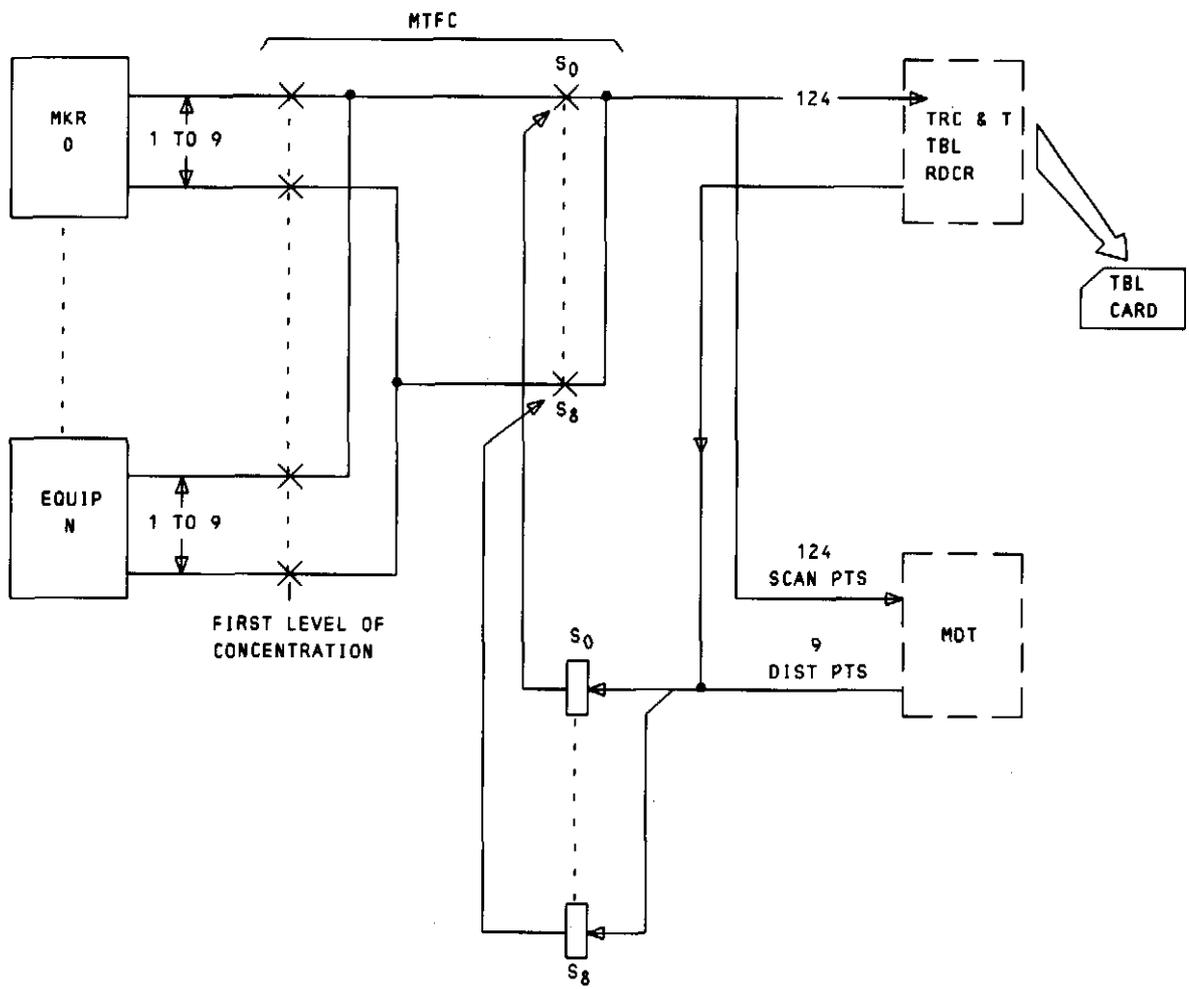
Fig. 1—Maintenance Data Transmitter

Fig. 2—MDT Office Connections