CIRCUIT DESCRIPTION

CD-28111-01 ISSUE 2AR APPENDIX 2A DWG ISSUE 6A DISTN CODE 1C02

CROSSBAR SYSTEMS NO. 5 MAINTENANCE DATA TRANSMITTER CIRCUIT

CHANGES

B. Changes in Apparatus

B.01 Added

MBl Diode 426F

MB1 Network 185A

#### D. Description of Changes

D.01 The connecting information for the program controlled Data Acquisition Interface Circuit, SD-27165-01, is corrected to agree with WE drawings.

D.02 Information Note 306 is added to caution that the MDT cannot be used in ETS offices.

D.03 A diode is added in lead MBL to the master test frame. This is to prevent

a ground feedback from that circuit when alarms are transforred.

D.04 Lead AAC is added to provide a means of silencing the alarm associated with the trouble recorder when the MDT transmits a trouble card image and no card is punched. This lead replaces leads AEl and AE2. This change avoids masking TASC and alarm sending alarms.

D.05 Information Note 304 is revised and 307 added to indicate the suitability of the teletypewriter model 43 keyboard printer and the specifications for same.

D.06 Sequence charts are added.

D.07 The contact numbering of the ACO and AR keys is revised in FS1 to correct a drafting error.

CD-28111-01 ISSUE 2AR APPENDIX 1B DWG ISSUE 5B DISTN CODE 1C02

CROSSBAR SYSTEMS NO. 5 MAINTENANCE DATA TRANSMITTER CIRCUIT

CHANGES

D. Description of Changes

D.1 Connecting information for leads LK and BAT is revised to allow use of this circuit with the Alarm Surveillance and Control System (ASC).

D.2 Options X, Y, and Z, formerly service (strap) options, are redefined as manufactured feature options. This has been done to facilitate installation.

D.03 Information Notes 306 and 307 are added.

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D.4 Provision is made for a No. 5 crossbar major alarm in addition to the present unique alarm indication via lead BAT to the Interface and Control Circuit - SD-28075-01.

 (a) This is done for conformity with the current Alarm Surveillance and Control Systems trouble indications.

(b) This feature is required in offices equipped with the TASC alarm system.The new wiring is shown as Standard feature option R.

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# CIRCUIT DESCRIPTION

CD-28111-01 ISSUE 2AR DWG ISSUE 4AR DISTN CODE 1C02

CROSSBAR SYSTEMS NO. 5 MAINTENANCE DATA TRANSMITTER CIRCUIT

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# SECTION I - GENERAL DESCRIPTION

#### 1. PURPOSE OF CIRCUIT

1.01 The Maintenance Data Transmitter (MDT) is a trouble data collection device for No. 5 crossbar offices using the Automatic Trouble Analysis (ATA) System. It is designed to collect the trouble data presently punched in trouble record cards and forward this 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 No. 5 crossbar office via the MDT and reported on a keyboard printer for use by the maintenance personnel. The ATA system is intended to supplement the present trouble recorder and manual analysis of trouble cards.

#### 2. GENERAL DESCRIPTION OF OPERATION

2.01 The MDT is composed of three major components: a programmable controller, a programmable scanner distributor, and an ATA interface circuit.\* This section provides a brief description of these components followed by a generalized description of their operation.

2.02 The programmable controller (PROCON) is a 16-bit nonself-checking microprocessor containing a 2048 word read only memory (ROM) encoded with the MDT control program. This unit directs all functions of the MDT. The program can be changed only by replacing the ROM circuit packs.

2.03 The programmable scanner distributor (PSD) is a unit which is controlled by the PROCON and provides:

(a) A control and trouble indicating panel.

(b) Power supplies for the PSD logic and associated PROCON. (Input to the power converter is -48 volts.)

(c) A 160-point scan point matrix. Scan points are high-impedance devices which provide an interface between the electromechanical office and the 5-volt logic circuits of the PROCON.

(d) A 24-point distribute point matrix. The distribute points provide an interface to the PROCON and provide contact closures to the central office under control of the 5-volt logic in the PROCON.

\* The SD- drawing for this auxiliary relay circuit is titled "Maintenance Data Transmitter Circuit". To avoid confusion, in this document, this unit will be referenced by "ATA Interface", and "MDT" will refer to the three components described above, collectively. recorder.

(e) A 1024 by 8-bit word random access memory (RAM). The RAM is used as a scratch pad memory for buffering trouble data and keyboard messages, and for status words and pointers.

(f) Three input/output (I/O) ports. This interface circuitry uses EIA RS-232-C conventions and provides means for the PROCON to control a keyboard printer, a dedicated line data set, and an optional switched network data set (for backup).

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

(a) Office alarm connections, alarm release, and alarm cutoff.

(b) Lamps indicating make busy, alarm, alarm cutoff, and exception report received.

(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. In response to a trouble closure from the PSD hardware, the ATA interface changes PSD lead conditions to force the PROCON to restart the ROM program.

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

The trouble recorder presently accesses 2.05 trouble data through the master test frame connector (MTFC) by sequentially operating nine sets of scan relays as a trouble card is punched. The operation of each set of scan relays connects the 124 trouble recorder data leads, BW- leads, through to the MTFC, and corresponds to the information punched in two rows of a trouble card. An MDT scan point is connected to monitor each of these data leads and MDT distribute points are connected to control the associated scanning relays. Also, the start lead from the MTFC to the trouble recorder are split when and MDT is in service, so that MDT scan points monitor these leads toward the MTFC and MDT distribute points control the start leads to the trouble recorder. Similarly, the MDT monitors the trouble record complete (TRC) lead from the recorder and controls it toward the connector.

2.06 When a user circuit bids for the trouble recorder and the PROCON logic directs a card image to be sent, the MDT responds by operating the scan relays sequentially and reading the trouble data into a buffer before relaying the start signal to the

2.07 Following this prescan (with respect to the recorder scan) the PROCON logic decides if a trouble record card is to be punched. If the trouble data is not to be punched into a card, the MDT sends trouble record complete to release the trouble recorder user circuit. The card image in the RAM buffer is then formatted and transmitted via data link to the Switching Control Center (SCC) for analysis.

2.08 If the MDT program decision is to punch

a trouble record, the MDT 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.

### SECTION II - DETAILED DESCRIPTION

# 1. CONTROL AND TROUBLE INDICATING PANEL

1.01 The power switch, four other locking and three nonlocking switches, and nine light-emitting diodes (LEDs) are located on the PSD control panel. These allow control and provide trouble displays as described below.

1.02 The four switches labled CONTROL 1-4

are 2-position toggles which appear to the PROCON as a control register. Operating the nonlocking switch labeled EX (execute) will cause the MDT program to read this control register and run maintenance routines determined by the CONTROL switch positions. Three maintenance routines in the MDT program can be activated by these switches and are described below.

 (a) Routine 0 extinguishes any LEDs which may be lighted. This routine is started by placing all control switches in the lower position and momentarily operating the EX switch. This routine is used to clear all trouble displays.

(b) Routine 1 tests the sanity timer by forcing a time out. Routine 1 is started by placing only control switch 1 in the raised position and operating the EX switch. If the timer is functioning properly all control LEDs will be lighted following the test.

(c) Routine 2 is a scan point verification test. This routine is started by placing only control switch 2 in the raised position and operating the EX switch. This routine will transmit the state of all data scan points to the SCC each time the EX switch is operated. As the scanning relays are not operated during this task, the scan points are isolated and may be manually connected to grounds as directed by a test person at the SCC during these tests. Discrepancies between the requested and observed scan point states will indicate any scan point failures.

(d) Routine 3 provides a quick check that the MDT program is functioning normally.
This routine is started by placing only control switch 3 in the raised position and operating the EX switch. If the program is operating normally, control LEDs 1,2,3, and 4 will then flash in sequence at 100 millisecond intervals. Each flash is a verification that all tasks of the program have successfully executed 18 times.

(e) Routine 4 is for use during installation testing. This routine is started by placing control switch 4 in the raised position and operating the EX switch. The function is to disable the SCC system response feature to allow tests prior to connection to a SCC.

1.03 Above the control switches are two nonlocking switches designated TEST and INIT. The TEST switch lights all LEDs on the control panel while it is operated and is used to verify all LEDs are operational. The INIT switch when operated will force the MDT program to ROM location zero and thus cause all initialization instructions to be executed. This switch may be used to start the MDT initially or following maintenance.

1.04 The five remaining LEDs on the panel are trouble indicators which have designations suggesting their functions. The failure conditions are described below.

(a) The fuse alarm (FA) LED indicates a failure of any of the PSD fuses (the +5 volt, +16 volt, -16 volt converter outputs and the 48-volt converter supply fuse). In addition to the FA LED will be lighted by trouble detection circuitry in

the converter when excessive or low-output voltage, excessive output current, or lowinput voltage conditions occur. For these conditions, (ie, converter detected troubles) an FA LED on the converter will also be lighted.

(b) The controller (CONT) LED indicates a controller failure (failure of instruction word parity check or sanity timer time out). This LED is extinguished during the reinitialization which is normally attempted automatically in response to a controller failure. Thus, should the CONT LED remain lighted, both a controller failure and a failure to reinitialize have occurred. If an automatic reinitialization is successful following a controller failure, all control LEDs will be lighted and remain lit until cleared by manually starting maintenance task 0 (see 1.02).

(c) The scanner distributor (S/D) LED indicates a failure to access the scanner distributor unit has occurred. If control LED l is also lighted, the initialization program check of the make-busy distribute point has failed. This could occur because of scanner distributor failure or a circuit trouble in the operate or check path of the MB relay.

(d) The input/output LED indicates a failure in one of the three data ports provided for the primary and back-up data sets and the keyboard printer. This indication is multiplied by displays on the CONT LEDs to indicate the following conditions:

LED Disp	Lay	Trouble Condition
Control 1	L 	Neither of the I/O boards for the data set ports (0 and 1) is functional.
Control 1 and 2		Defective UART (Universal Asynchronous Receiver/ Transmitter) unit as- sociated with I/O port 0.
Control 2	2	Defective UART unit as- sociated with I/O port 1.
Control	3	Defective UART unit as- sociated with I/O port 1.
Control : and 3	Ĺ	Carrier failure, I/O port 0.

LED Display Control 2 and 3	Trouble Condition Carrier failure, I/O port 1.	the master test frame connector. The non- express (or regular) category includes only those trouble records which occur because of failures while processing service calls.
Control 1,2, and 3	<pre>I/O port 0 EIA status bit CC failure (clear to send and data set ready bits, respectively).</pre>	2.02 Command messages from the SCC are used to set the MDT operating mode, that is, to 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
CONCION 4	CC failure.	operating mode, the class of trouble, (regu- lar or express), and also the availability
Control 3	I/O port 2 is not func-	of a trouble record buffer. The MDT can be
and 4	tional.	operated in any mode, that is, any combi-
		nation of punch express, punch regular, send
Control 2,3,	An SCC system response	express, send regular trouble records as
and 4	failure has occurred (no	determined by a command from the SCC.
	ASC11 null character re-	
	ceived from the SCC within	2.03 Under two conditions of MDT detected
	a three-minute interval).	troubles the MDT will make itself busy
	In this case the I/O LED	and revert to normal trouble recorder oper-
•	will be flashing until the	ation. This will occur if either no carrier
	SCC transmits a null charac-	signal is present on either data link to the
	ter, at which time the MDT	SCC, or if an ASC11 null character is not
	will reinitialize and the	received from the SCC within any three-
	I/O LED may or may not re-	minute interval. The ASC11 mull characters
	main lighted.	are generated by the SCC at nominal one-
		minute intervals and their absence is an
Control 1	A random access memory	indication of a central system failure.
and MEM	parity check has failed.	Trouble displays for these conditions are
		described in Section II, 1.04. When a
Control 3	A controller address veri-	carrier and an ASC11 null character are again
and CONT	fication failure has oc-	received, the MDT will automatically re-
	currea.	initialize in the send-all, punch-all mode.
(e) The I/O LED	will flash at 120 IPM to	3. PROCESSING TROUBLE DATA
indicato ca	rriar is not present on	

either data link port 0 or data link port 1.

# 2. OPERATING MODES

2.01 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 in response to a trouble recorder start signal on lead STRA. These are records of test calls, either manually or automatically originated in the No. 5 office. Also included in the express class are cards or card images which are collected by the MDT and/or punched by the recorder while the special (SPL) scan point of the MDT is connected to ground. This scan point is for use by the operating company and may be con-nected to selected trouble data points in 3.01 A trouble recorder user circuit signals a trouble record request to the MDT by connecting ground to lead STR (service call trouble record) or lead STRA (test call record). These leads connect to similarly designated scan points which are continuously monitored by the MDT program. When a start signal (ground) is received on either, the program first checks the state of the SPL scan point (see 2.) and then decides if the trouble card image is to be transmitted to the SCC. This decision is determined by the operational mode of the MDT (see 2.), the availability of a trouble data buffer, whether the SPL scan point is set, and whether the start signal indicates the recorder request is for a service or test call.

3.02 If the program logic decides a trouble record is to be sent to the SCC, the MDT will prescan (with respect to the recorder

scan) the trouble data and read it into one of four trouble data buffers. This prescan is accomplished by sequentially closing the distribute points S0 through S8 momentarily to operate the trouble recorder scanning relays of the master test frame connector circuit over leads S0 through S8. The sets of scanning relays are operated in reverse order (S8 operated first), each set reading the 124 trouble data points in the master test frame connector, collecting the information corresponding to two lines of a trouble record card. Operating voltage is maintained on each set of scan relays for at least 32 milliseconds before the data line is read. This allows time for the scan relay contacts to stabilize and insures that data is not mutilated by contact chatter. A 6.4 millisecond interval is inserted between the release of a scan relay and the operation of the subsequent scan relay. This timing is to provide for the flat spring scan relays in older versions of the master test frame connector which may have release times greater than their operate times. The start signal is monitored during this prescan and, if it is prematurely removed, the program will send a message to the SCC indicating this trouble condition. In this case, the incomplete trouble card image in the trouble data buffer will not be sent. Instead the program will mark the partially filled trouble buffer empty and the next trouble record will overwrite the partial trouble card iamge.

3.03 Each of the four trouble data buffers can contain the image of one trouble card, ie, all the data presently punched in a single trouble record card. Data buffering is necessary because a card image is read in nominally 300 milliseconds, but 7 seconds are required for transmission of each trouble record (at the initial standard transmission rate of 300 baud). The response rate to trouble record requests for records that are to be transmitted is thus limited by the transmission rate to a maximum average rate of eight records per minute, however, buffering allows collection of four records within an interval of 1.2 seconds (send only mode) or 6 seconds (send and punch mode) during a one-minute period. Transmission rate does not, however, limit the rate at which trouble cards can be punched. When the MDT mode indicates cards are to be punched, while trouble data buffers are full, the MDT immediately relays the recorder start signals and cards can be punched at a rate limited only by the trouble recorder.

3.04 After the prescan is completed and a card image has been read into a trouble data buffer, or immediately following an initial decision not to send a card image, the program logic determines if the card is to be punched by the trouble recorder. This decision is also based on the class of the trouble record (express or nonexpress), the current operating mode of the MDT, and also whether the recorder is out of service (indicated by ground on recorder lead RDS).

3.05 If a card is to be punched, the MDT program closes the appropriate distribute point, STR or STRA, to connect ground to the recorder start lead requesting a service call record or test call record, respectively.

3.06 During the card punch interval, nominally one second, the program times and monitors recorder lead TRC (trouble record complete) for a ground signal indicating the recorder has completed a cycle. The TRC signal is connected through the master test frame connector to the circuit requesting a trouble record, and serves both as a release signal to the current user circuit and a recorder-busy signal to other user circuits. If the MDT detects the TRC signal within three seconds after starting the recorder, the program will maintain this ground for 500 milliseconds while monitoring the start lead (STR or STRA) from the master test frame connector to check for false ground on a start lead. The program extends the TRC ground as a recorder-busy signal to prevent a new trouble record request while the recorder motor is coasting. This is necessary after each recorder usage to prevent multilation of a subsequent card which would otherwise occur should the MDT prescan before the recorder motor had stopped.

3.07 If program logic determines a trouble record card is not to be punched, the MDT connects ground to lead TRC to release the trouble recorder user circuit. This ground is maintained until the start signal ground is removed from lead STR or STRA indicating the release of the user circuit, or until a 3-second software work timer times out.

3.08 The circuit checks and trouble responses made by the program during the trouble data collection are summarized as follows:

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(a) Lead TRC is checked for false ground immediately following a trouble record start signal from the MTFC, or following the prescan operation if the card image is to be transmitted. The program response to a failure of this check is to send a message to the SCC indicating the trouble condition.

(b) Leads STR and STRA are checked during the prescan for a premature removal of the start signal. This trouble condition could cause incomplete trouble records. The program response to a failure of this check is to send a message informing the SCC of the trouble occurrence.

(c) Lead TRC is checked for the ground signal from the recorder which indicates punching is complete and the recorder has returned to its home position. The interval allowed for this check is three seconds and timing begins when the MDT connects ground to lead STR or STRA to start the trouble recorder. If the 3-second software timer times out, the program closes the TRC distribute point connecting ground to lead TRC to release the trouble recorder user circuit. The MDT then transmits messages to the SCC indicating the trouble condition.

(d) The STR and STRA leads are checked for removal of the ground start signal after ground has been connected to lead TRC by either the recorder or the MDT. Three seconds are allowed for the removal of the start lead ground which normally occurs with the release of the recorder user circuit. Program response to a failure of this check is to send a trouble message to the SCC describing the trouble condition.

3.09 The MDT program is arranged in functional groups of code corresponding to each of the tasks necessary for the collection and transmission of trouble data, eg, scanning and buffering data, sending and receiving information to/from data sets and the keyboard printer, checking circuit operations, and formatting trouble data. The program is designed to execute each of its major functions every 6.4 milliseconds. Thus, while the information in any flll trouble data buffers is being formatted and transmitted, new trouble data may be scanned and read into other buffers in a continuous process.

#### SECTION III - REFERENCE DATA

#### 1. WORKING LIMITS

1.01 The telephone line for the dedicated channel shall be an unconditioned2-wire data link facility suitable for a 300-baud transmission rate.

1.02 Operating temperature range is from
0 to 50°C ambient.

# 2. FUNCTIONAL DESIGNATIONS

2.01 Distribute Points

esignations	Meaning
ARLK	Automatic Reset Lock
СМЈ	Central (SCC) Originated Major Alarm
CMN	Central (SCC) Originated Minor Alarm
MB	Make Busy
S-	Scan (Relays 0 through 8)
STR	Start (Regular Call)
STRA	Start Auxiliary (Test Call)
TRC	Trouble Record Complete

2.02 <u>Relays</u> Designations

ACO	Alarm Cutoff	
СМЈ	Central (Originated) Major Alarm	
CMN	Central (Originated) Major Alarm	
LMJ	Local (Originated) Major Alarm	
LMJA	Local (Originated) Major Alarm Auxiliary	
MB	Make Busy	
MB1	Make Busy (First Auxiliary)	
STR	Start (Regular Call)	

Meaning

	2.03 <u>Scan Points</u>		3.04 Provide means to automatically re-		
	Designation	Meaning	force zero)	the PROCON to reset to program location in response to a PSD detected error.	
	BWX0-BWX3	Connected to Corresponding Data Leads of Trouble Re- corder	3.05	To provide means for releasing an alarm condition.	
	MB	Make Busy	3.06	To provide a lamp indication that an exception report has been received.	
	ROS	Recorder Out of Service			
	SPL	Special (Test Card)	3.07	To provide means to cut off the office alarm signals during maintenance.	
	STR	Start (Lead - Regular)	3.08	To provide make-busy and alarm cut- off indications at the master test	
	STRA	Start (Lead) Auxiliary	frame	•	
	TRC	Trouble Record Complete	3.09	To disable the alarms associated with the trouble recorder user circuits	
		Scan points having numerical	except when a trouble card is punched. 4. CONNECTING CIRCUITS		
		the corresponding BW leads			
		of the trouble recorder con- trol and test circuit.	4.01	When the MDT is listed on a keysheet, the connection information thereon is	
•	2.04 Keys		to be	followed:	
	Designation	Meaning	(a)	Jack, Lamp, and Key Circuit - SD-25762-01.	
	ACO	Alarm Cutoff	(1-)		
	AR	Alarm Release	(d)	Circuit - SD-94844-01.	
	2.05 Lamps		(c)	Trouble Recorder Control and Test Circuit - SD-25572-01.	
	Designation	Meaning	(8)	No. 5 Crossbar Office Alarm Circuit -	
	ALM	Alarm	(u)	SD-25671-01.	
	MB	Make Busy	(e)	Interface and Control Circuit - SD-28075-01.	
	RAL	Report Alarm			
	3. FUNCTIONS		(f)	Trouble Recorder Circuit - SD-25735-01, (Mfr Disc.).	
	3.01 To send (trouble	maintenance trouble data card images) to a switching	(g)	Interface Circuit for Program Con- trolled Data Acquisition - SD-27165-01.	

(trouble card images) to a switching control center.

3.02 Provide alarm signals to the office alarm circuit in response to selfdetected central (SCC) originated major and minor alarms.

3.03 Provide means to isolate distribute points when the MDT is made busy either locally (from the MTF jack lamp and key circuit) or by a command from central (scc).

6.01 The MDT has circuitry that requires major and minor central office alarms. 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.

5. MANUFACTURING TESTING REQUIREMENTS

5.01 None.

6. ALARM INFORMATION

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6.02 When alarms are originated by the SCC, the ATA interface circuit will connect an 800-ohm battery alarm signal to the office alarm aisle pilot lamp unit for the aisle in which the keyboard printer is located, and will also light a report alarm (RAL) lamp above the keyboard printer. The office major or minor main and aisle pilots and the RAL lamp will direct the craft to the keyboard printer where a description of the trouble condition will be printed. Depending on the trouble, the SCC may also make the MDT unit busy.

6.03 When major alarms result because of troubles within the PSD unit, the ATA interface circuit connects 800-ohm battery to the office alarm aisle pilot unit for the aisle in which the MDT is located and also lights an alarm lamp on the MDT unit. The trouble causing an alarm can be localized within the MDT by examining the trouble display LEDs on the PSD control panel. These are described in SECTION II, 1.

Self-detected software troubles within 6.04 the PSD will cause the operation of relay LMJ. Relay LMJ operating operates relay MB to remove the MDT from service, and also reversed the ground and open circuit conditions of PSD leads RSTB1 and RSTO. This reversal will cause PSD hardware to reset the MDT program to location zero to reinitialize. If a reinitialization is successful, relay LMJ is released and releases relay MB returning the MDT to service. Relay LMJ also operates relay LMJA and the latter locks under control of the alarm sending circuit and or the MDT alarm release key to serve as a memory of the alarm condition.

6.05 The ATA interface circuit provides an alarm release key (nonlocking) for alarms resulting from transient conditions, and an alarm cutoff key (locking) to silence the office audible alarm and extinguish the aisle pilots for use when a trouble condition cannot be immediately corrected. When the alarm cutoff key is operated and ACO guard lamp is lighted at the master test frame while the alarm condition persists.

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6.06 Connections may be provided to the CSACS interface and control circuit or an optional basis. If this connection is made, a spare alarm category must be assigned by Telco for MDT alarms.

# 7. TAKING EQUIPMENT OUT OF SERVICE

7.01 A make-busy jack is provided at the master test frame for removing the MDT from service for maintenance. The MDT can also be made busy by a command from the SCC via the data link. When the MDT is made busy, relays MB and MB1 of the ATA interface circuit operate and open all leads to distribute points, and connect the recorder start leads, STR and STRA through to the master test frame connector circuit to allow operation of the trouble recorder. Relay MB locks to off-normal recorder ground so the MDT cannot be returned to service while a trouble record card is being punched. The MB lamps located on the ATA interface circuit and also at the master test frame remain lighted until the MDT is restored to service. When the MDT is made busy, only the trouble data collection function is inhibited. The keyboard, maintenance routines, and all other functions remain enabled.

## SECTION IV - REASONS FOR REISSUE

B. Changes in Apparatus

B.1 The ROM program PK-AA31 is replaced with program PK-AA32. This requires replacement of ROM boards designated PSU1 and PSU2 per ED-4C058-30(G3).

### D. Description of Changes

D.1 Note 204 and CAD 7 are added to indicate the -48 volt battery required for the PSD unit may be talk or signal battery and is provided from the PRTD frame.

D.2 Sheet Note 6 of sheet B2 is corrected to specify locations of distribute bits 2 through 5.