

E2A TELEMETRY

CABLE PRESSURE MONITORING SYSTEM (CPMS)

DESCRIPTION

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1. INTRODUCTION

1.01 This section describes the application of the E2A Telemetry System to the Cable Pressure Monitoring System (CPMS).

1.02 The CPMS is a computerized scanning and reporting system developed for use in the automatic surveillance of pneumatic monitoring devices associated with the pressurized cable plant. In CPMS, a central terminal can access alarm and status information from a multiplicity of remote terminals in wire centers and disseminate this information to cable maintenance centers. Transmission between the central terminal and the remotes is accomplished via the direct distance dialing (DDD) network using DATA-PHONE[®] service and the E2A Telemetry System.

1.03 E2A is a standard Bell System telemetry system which is tailored to a number of applications. In the CPMS application, E2A functions as a subsystem to establish communication between the CPMS central and its remote terminals.

2. PHYSICAL DESCRIPTION

2.01 The E2A equipment consists of a number of J92621E telemetry-to-computer translators (TCTs) and J92621A E2A remotes. The TCT is contained in a 10-1/2 by 10-1/2 by 6-1/2 inch cabinet located at the CPMS central (Fig. 1). The TCT circuitry is on eight removable circuit packs located inside the cabinet and powered by 105 to 130 Vac @ 60 Hz. An alarm cutoff switch is provided on the front panel for silencing office alarms. Three connectors are provided on the back of the cabinet for connection to the CPMS central terminal, 202S data set, and office alarms.

2.02 The CPMS central equipment also provides cabinet space for housing the 202S data set(s) and 801 automatic calling unit(s) (ACU). Power for these units is supplied by the equipment in the cabinet.

2.03 The E2A remote is contained in a 10- by 6- by 8-inch module mounted on a 6- by 23-inch panel in the CPMS remote terminal bay (Fig. 2). The remote circuitry is on seven removable circuit packs within the module. Power for the E2A remote is provided by the CPMS remote terminal equipment.

2.04 A slot exists in the E2A remote frame for mounting a 202S data set. Power connections for the data set are provided by the E2A remote. The connection of the E2A remote to the data set and the CPMS equipment is via connectorized cables.

3. FUNCTIONAL DESCRIPTION

A. General

3.01 Figure 3 is a block diagram of the CPMS system. The E2A telemetry equipment consists of a TCT and one or more remotes on each data facility controlled by CPMS. The central consists of the central terminal equipment and the

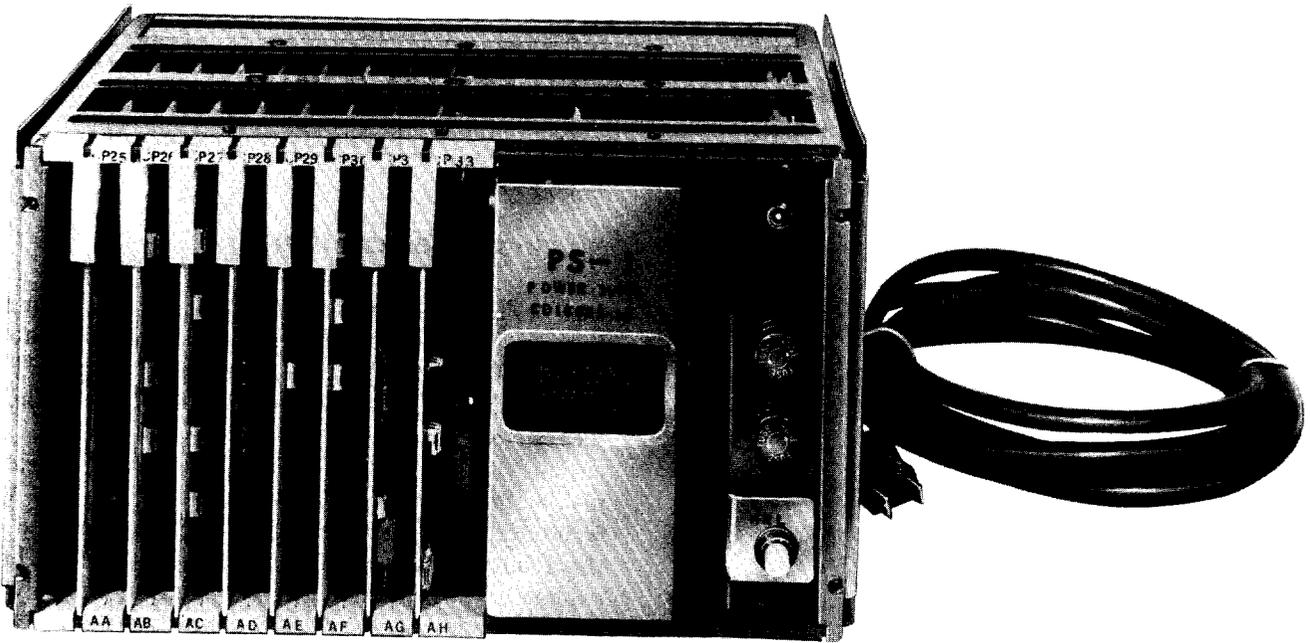


Fig. 1—Telemetry-to-Computer Translator (TCT)

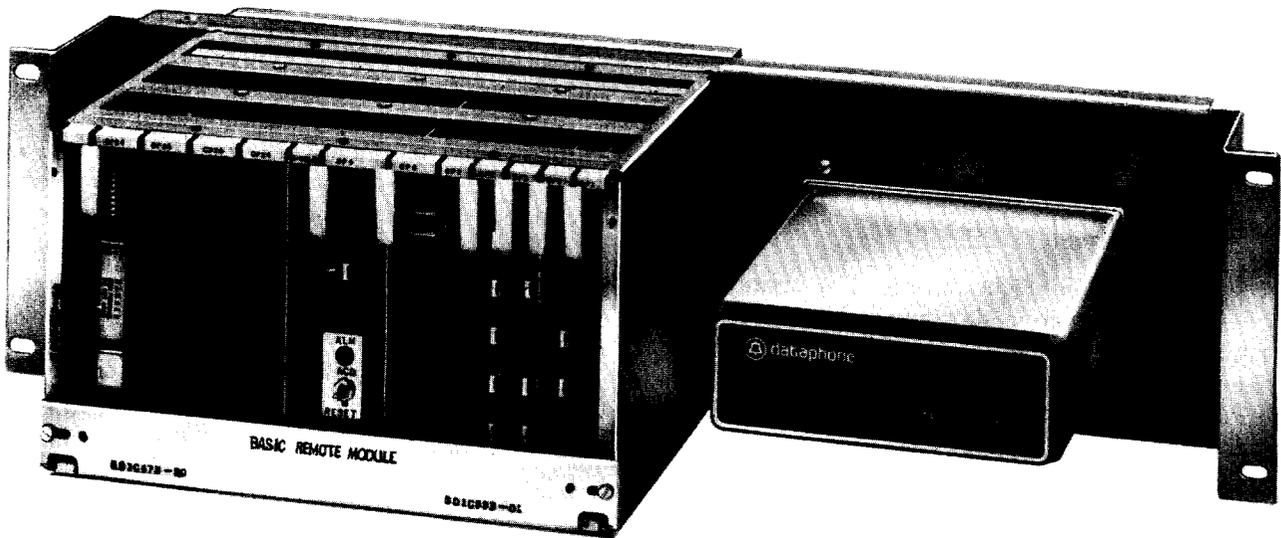


Fig. 2—E2A Remote Within the CPMS Remote Equipment Bay

TCT(s). Each remote consists of the remote terminal equipment and an E2A remote.

3.02 The TCT provides an interface between the CPMS central terminal equipment and the

data set. During the transmit mode, its purpose is to translate the data from the central terminal into the E2A word format (Fig. 4). This format provides for synchronization of the receiving E2A remotes on the data facility and, via the parity

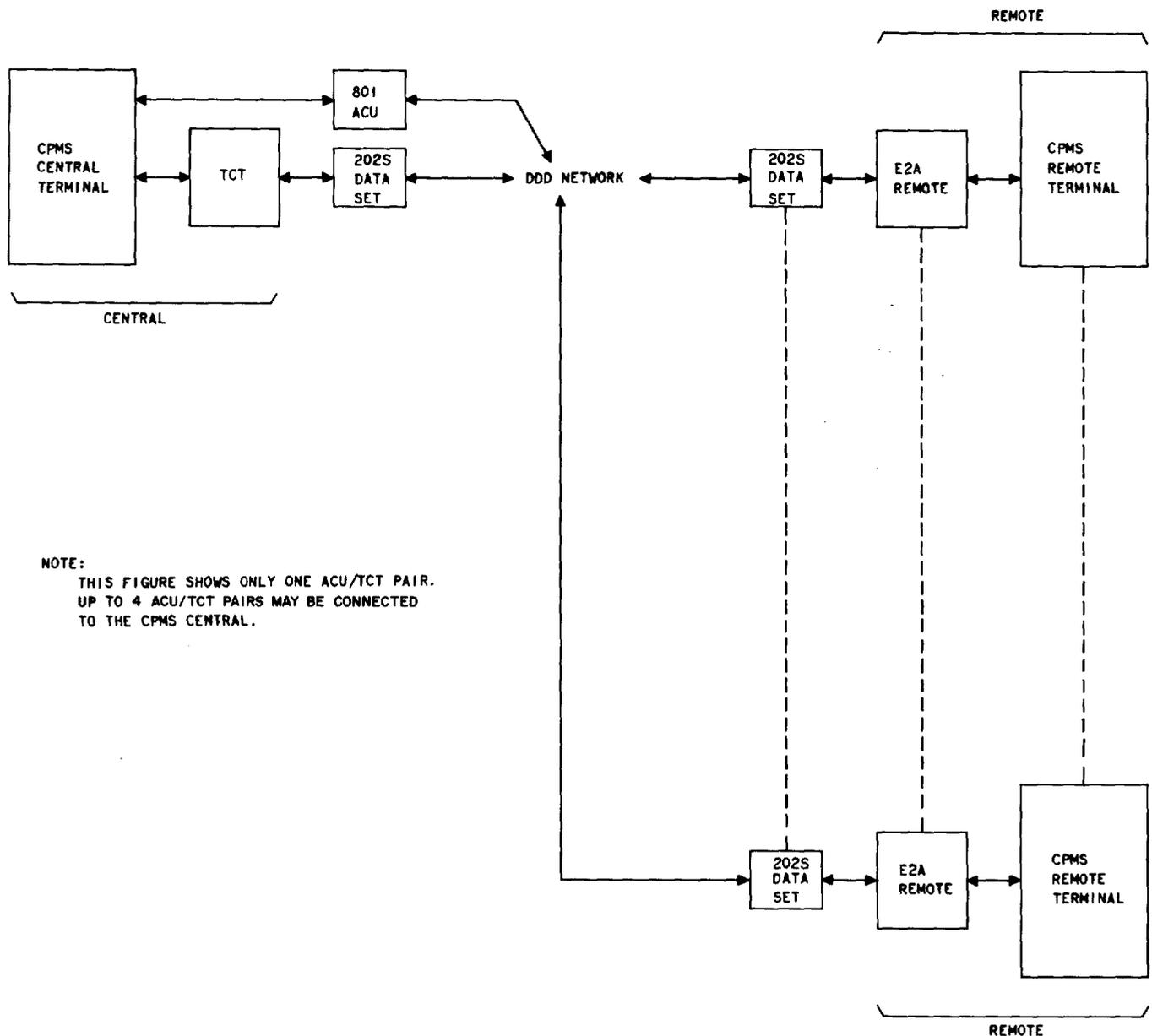


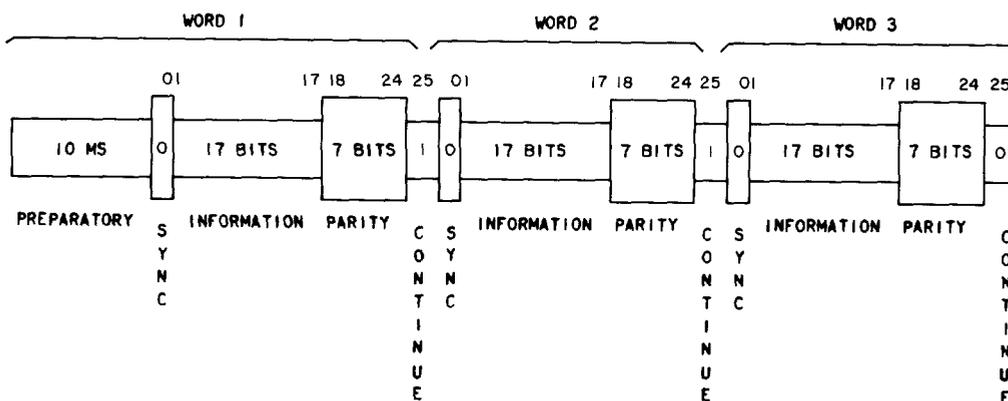
Fig. 3—Block Diagram of CPMS

bits, detection of errors in the information field. When receiving, the TCT will check the information field with the parity field for errors. If the word is received correctly, the information field will be transferred to the central terminal equipment. If a parity error is detected in reception, the TCT will notify the central terminal.

3.03 The data facility, which is not part of E2A, consists of a DDD network and type 202S data sets. A data set, designed to operate at 1200 bits per second, is located with each TCT and each

remote. In the transmit mode, the data set receives digital information in the form of positive and negative pulses from the E2A equipment and converts them to a frequency-shift-keyed (FSK) signal which is transmitted over the data network. In the receive mode, the data set will convert the received FSK signal to positive and negative pulses and transfer them to the connected E2A equipment.

3.04 An 801 automatic calling unit is provided at the central for each data network. This unit has the capability of automatically dialing a



NOTE:

THIS DRAWING SHOWS THREE WORDS IN THE BASIC E2A FORMAT. ALL TRANSMISSIONS ON THE DATA NETWORK MUST BE IN THIS FORMAT. THE BEGINNING OF TRANSMISSION IS INITIATED BY THE 10 MS PREPARATORY SEQUENCE (ALL LOGIC 1S). THE SYNC BIT (LOGIC 0) SYNCHRONIZES THE RECEIVING E2A EQUIPMENT FOR RECEPTION OF THE INFORMATION FIELD AND THE ERROR DETECTING PARITY FIELD. IF MORE THAN ONE WORD IS TO BE TRANSMITTED IN SUCCESSION, THE CONTINUE BIT MUST BE A LOGIC 1 FOR EVERY WORD EXCEPT THE LAST, IN WHICH CASE IT IS LOGIC 0

Fig. 4—Basic E2A Word Format

particular remote. The ACU is controlled by the central terminal equipment and is not part of E2A.

3.05 The E2A remote receives the signal from the data set and checks for errors. If received correctly, an E2A remote can, on command, transfer 16 bits of data to the CPMS remote terminal equipment. This operation is initiated via the DATA OUTPUT command. Also, the E2A remote can return 16 bits of information (contained in one STATUS REPLY word) to the central. This operation is initiated via the GROUP REPORT command. The TCT and the E2A remote receive and transmit signals in the basic E2A word format shown in Fig. 4.

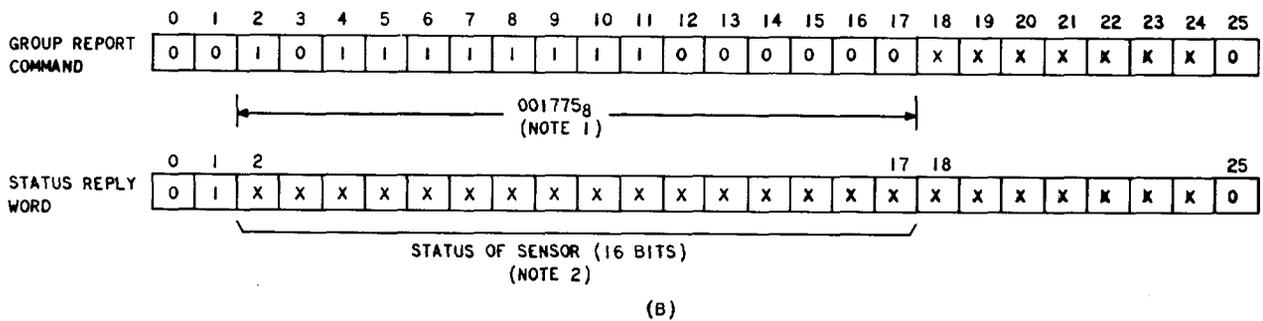
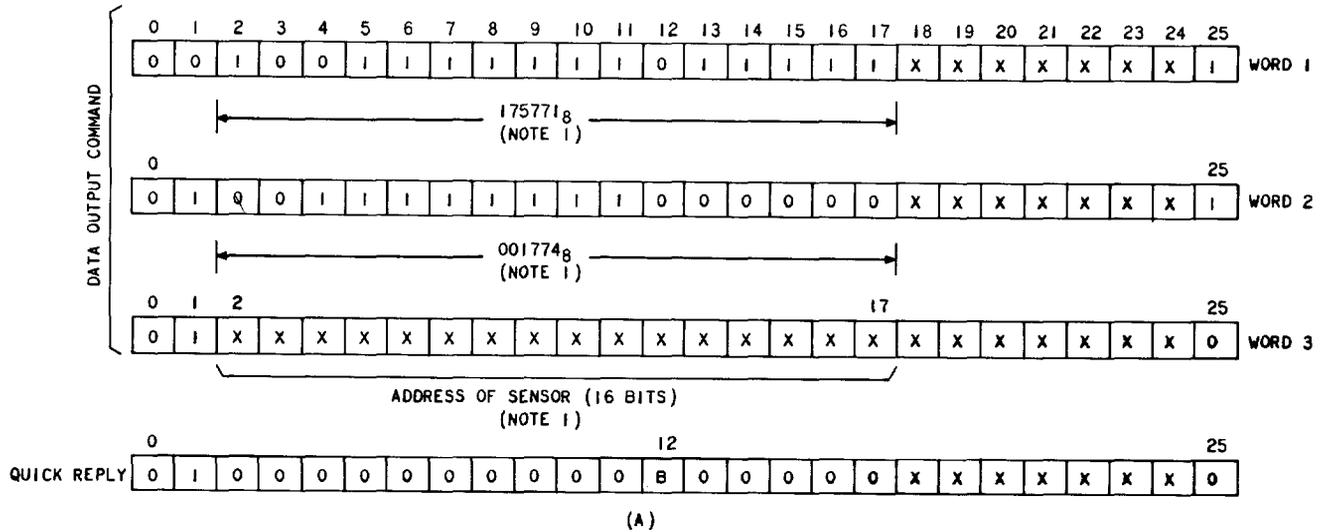
B. Detailed

3.06 The CPMS scans the sensors in the cable plant as follows. First, the central terminal equipment dials a particular remote on the data network via the ACU. The TCT then receives a request from the central terminal to transmit the 3-word DATA OUTPUT command (Fig. 5) to the E2A remote. If received correctly, the command will cause the E2A remote to output the third word to the CPMS remote terminal equipment. The remote terminal will then set up its switching matrix to scan the sensor address via that 16-bit word.

3.07 If these three words are received without error, the remote will immediately transmit a QUICK REPLY word (Fig. 5) to the central terminal. If, however, the words were received with error, the remote will not output the address of the sensor contained in the third word of the DATA OUTPUT command and will not respond with a QUICK REPLY. If the CPMS remote terminal is busy during the DATA OUTPUT transmission, a logic 1 will be set in bit 12 of the QUICK REPLY from the remote. Otherwise, the QUICK REPLY information field will be all logic 0s. Upon receiving a QUICK REPLY with bit 12 equal to 0, the central will respond (via the TCT) with a GROUP REPORT command. A QUICK REPLY with a logic 1 set in bit 12 will cause the central to repeat the DATA OUTPUT command.

3.08 The state of the scanned sensor is stored by the remote terminal equipment in a 16-bit word which is connected to the E2A remote. These 16-bits, represented in a STATUS REPLY word, are sent to the central upon reception of a valid GROUP REPORT command (Fig. 5). If this command is received with parity errors, the E2A remote will not respond with the STATUS REPLY word. This will, in turn, result in a retransmission of the GROUP REPORT command.

3.09 This operation, in which the central first initiates a DATA OUTPUT command in order to select the sensor and then obtains the



LEGEND:

- 0 = LOGIC 0
- 1 = LOGIC 1
- X = EITHER LOGIC 0 OR 1
- B = BUSY BIT. LOGIC 1 IF BUSY, LOGIC 0 IF NOT BUSY (SEE 3.07)

NOTES:

1. DATA SUPPLIED TO THE TCT FROM THE CPMS CENTRAL TERMINAL. THE REMAINING BITS ARE CONTROL AND PARITY BITS PROVIDED BY THE E-TELEMETRY.
2. DATA SUPPLIED TO THE E2A REMOTE FROM THE CPMS REMOTE TERMINAL. THE REMAINING BITS ARE CONTROL AND PARITY BITS PROVIDED BY THE E-TELEMETRY.

Fig. 5—DATA OUTPUT Command (a) and GROUP REPORT Command (b)

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status of the sensor via the GROUP REPORT command, is continued until all the sensors monitored by the remote have been scanned. This operation, starting as described in 3.06, is then repeated at each of the other remotes in turn. When the last remote has been interrogated, the operation is reinitiated from the first to the last remote in a cyclic manner.

4. MAINTENANCE CONSIDERATIONS

4.01 A spare TCT is provided with each CPMS central. If a TCT malfunctions, it is replaced with the spare. The defective TCT is then sent to Western Electric for repair.

4.02 In the event of a failure of the E2A remote, it is expected that the problem can be isolated to a circuit pack(s) using the E-telemetry station test set (KS-20937). The defective circuit packs can then be replaced by the spares provided. The defective circuit packs are then sent to Western Electric for repair.

5. REFERENCES

5.01 The following BSPs, CDs, and SDs provide further information on the E2A telemetry application to CPMS.

SECTION	TITLE
201-653-503	E2A Application to CPMS—Maintenance
592-028-100	Data Set 202S
637-600-050	CPMS—Description and Operation

DRAWING	TITLE
CD/SD-1C538-01	CPMS Application Schematic
CD/SD-1C542-01	TCT Application Schematic