E2A TELEMETRY
STATUS AND COMMAND REMOTE APPLICATIONS
DESCRIPTION

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1. INTRODUCTION

1.01 This section describes the E2A telemetry equipment associated with status and command (SAC) remote applications. Systems utilizing the SAC remote include the Centralized Status, Alarm, and Control System (CSACS), the Engineering and Administrative Data Acquisition System/Network Management (EADAS/NM), the Telecommunications Alarm, Surveillance, and Control (TASC) System, Surveillance and Control of Transmission Systems (SCOTS), and the E3 Alarm System.

1.02 This section is reissued to update the maximum number of status points and relay control points available with the SAC remote. New information includes the additional uses of the power units already in the system.

1.03 The CSACS (Fig. 1) is a computerized alarm monitoring and control system designed for use with all electromechanical wire centers (such as the Step-by-Step and Crossbar Sytems) except panel systems. The purpose of CSACS is to centralize maintenance and alarm processing for up to 128 wire centers. The CSACS provides a processor and one or more teletypewriter consoles for handling alarms and information output. The CSACS is now being replaced by the TASC System (CSACS has been rated A&M only).

1.04 The EADAS/NM (Fig. 2) is a computerized system which allows centralized, real-time surveillance and control of all levels of the switching hierarchy, from regional centers to selected end offices, within predefined segments of the network. By analyzing traffic data as it is being gathered from all types of switching machines via EADAS phase one or peripheral bus computers, EADAS/NM will monitor the status of critical switching machines and trunk group functions and report immediately when potential congestion is imminent.

1.05 The TASC System (Fig. 3) is a computerized, real-time alarm and control system designed to monitor and control electromechanical switching, transmission, and power equipment. The TASC System has superseded CSACS and has the ability to provide centralization of all regional transmission plant and central office switching systems. The only portion of the TASC System that is discussed in this section is that part relating to the TCT, SAC remote, and CDO satellite remote.

1.06 The SCOTS (Fig. 4) is a computerized real-time alarm and control system designed to monitor and control broadband transmission and related systems. The SAC remote is not the primary remote for SCOTS, but it has some remote applications. The TCT is always used in SCOTS. The CDO satellite communicator panel is also used in SCOTS. The SAC remote, TCT, and CDO satellite panel are all that is described about SCOTS in this section.

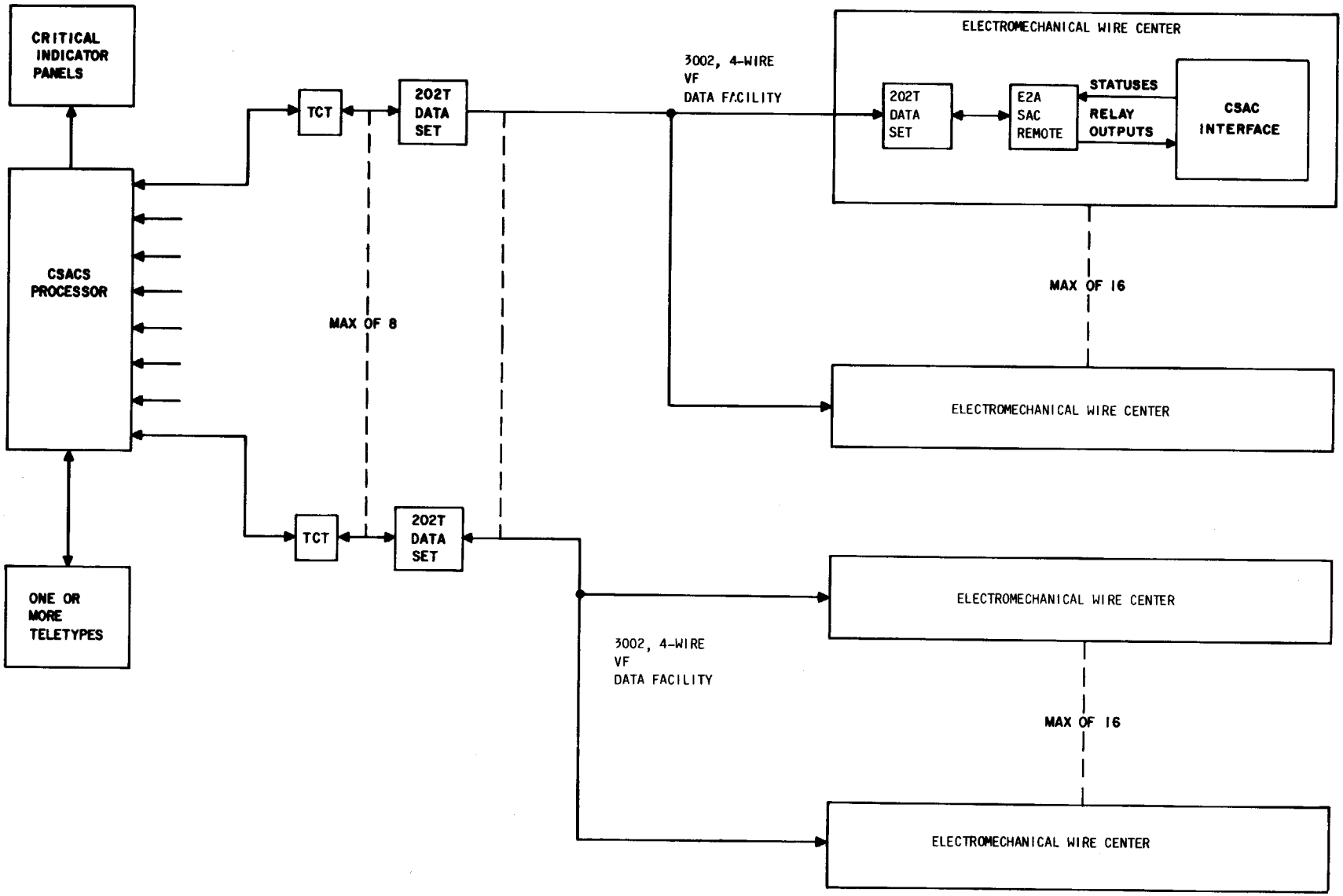


Fig. 1—Block Diagram of CSACS

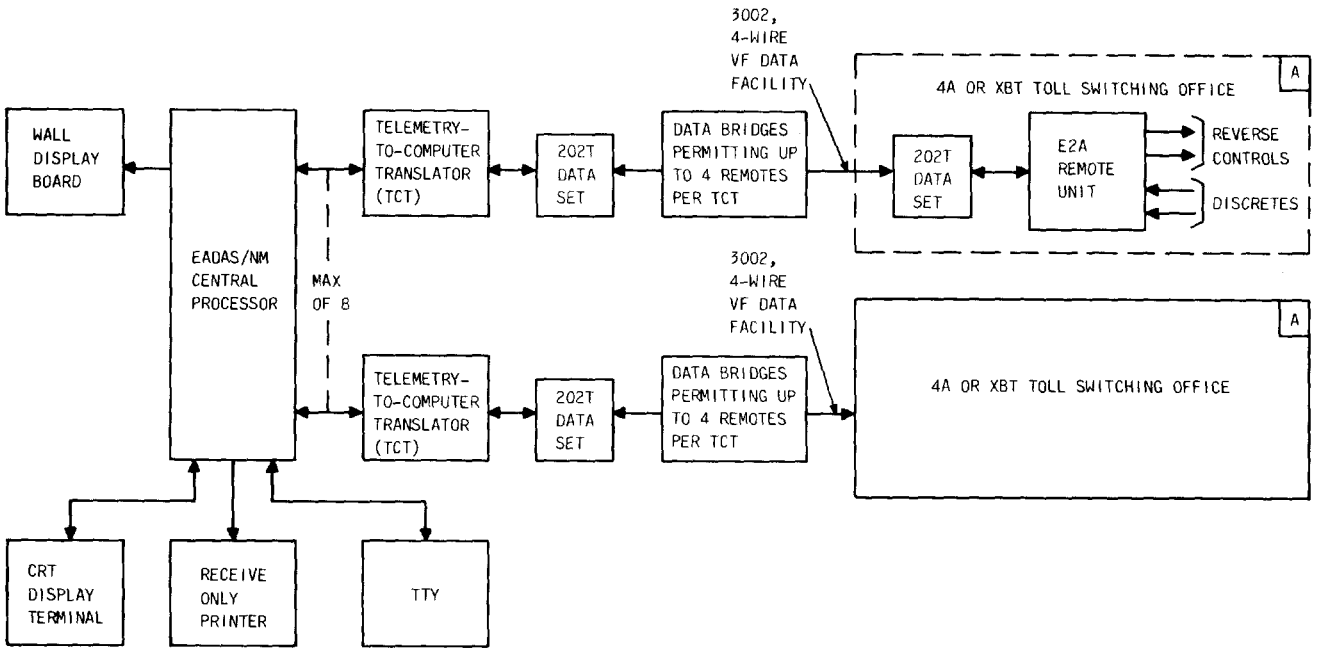


Fig. 2—Block Diagram of EADAS/NM

1.07 The E3 Alarm System (Fig. 5) is a generation of the basic E-type alarm and control system. It provides, through the use of a microprocessor, firmware, and memory, alarm and control functions associated with centralizing the monitoring of activities of a limited number of electromechanical switching systems, transmission systems, building and power, and other facilities. E3 was designed so that it would be compatible with the TASC System. This means that when the number of monitored offices become sufficient to warrant complete centralization, the TASC System could be installed in place of the E3 central with a minimal amount of engineering.

1.08 The E2A is standard Bell System telemetry equipment which can be tailored to a number of applications. The E2A is modularly expandable and is used in the CSACS, EADAS/NM, SCOTS, TASC, and E3 Systems; it provides for the monitoring of alarms and control equipment at distant wire centers.

1.09 The need for status points and relay control points is achieved by a combination of the basic remote panel (J92621F), the remote expandor (J92621G), and the CDO satellite command panel (J92621AG). Any combination of the expandor and CDO satellite panels cannot exceed four.

2. PHYSICAL DESCRIPTION

2.01 The E2A equipment consists of one or more telemetry-to-computer translators (TCT) located at the computerized central, when needed, and an E2A SAC remote located at each switching office. Note, the E3 central system does not use TCTs. The TCT (Fig. 6) is coded J92621E and is contained in a 10-1/2 by 10-1/2 by 6-1/2 inch enclosure. The TCT circuitry is on eight removable circuit packs and a power module which slide into the enclosure. An alarm cutoff switch, which protrudes through the front cover, is provided for the silencing of office alarms.

2.02 The E2A SAC remote (Fig. 7) consists of the basic remote module (J92621F) and up to four expandor panels (J92621G) or, if required, up to four CDO satellite communicator panels (J92621AG), or any combination of four panels. The basic remote module is a 23- by 10- by 10-inch panel which contains up to eleven circuit packs. The expandor unit is a 23- by 8- by 10-inch panel which contains up to nine circuit packs, eight of which can be any combination of status or control circuit packs. The number and type of circuit packs in each unit depend on the individual office configuration. The CDO satellite communicator unit is a 23- by 8- by 6-inch panel which contains

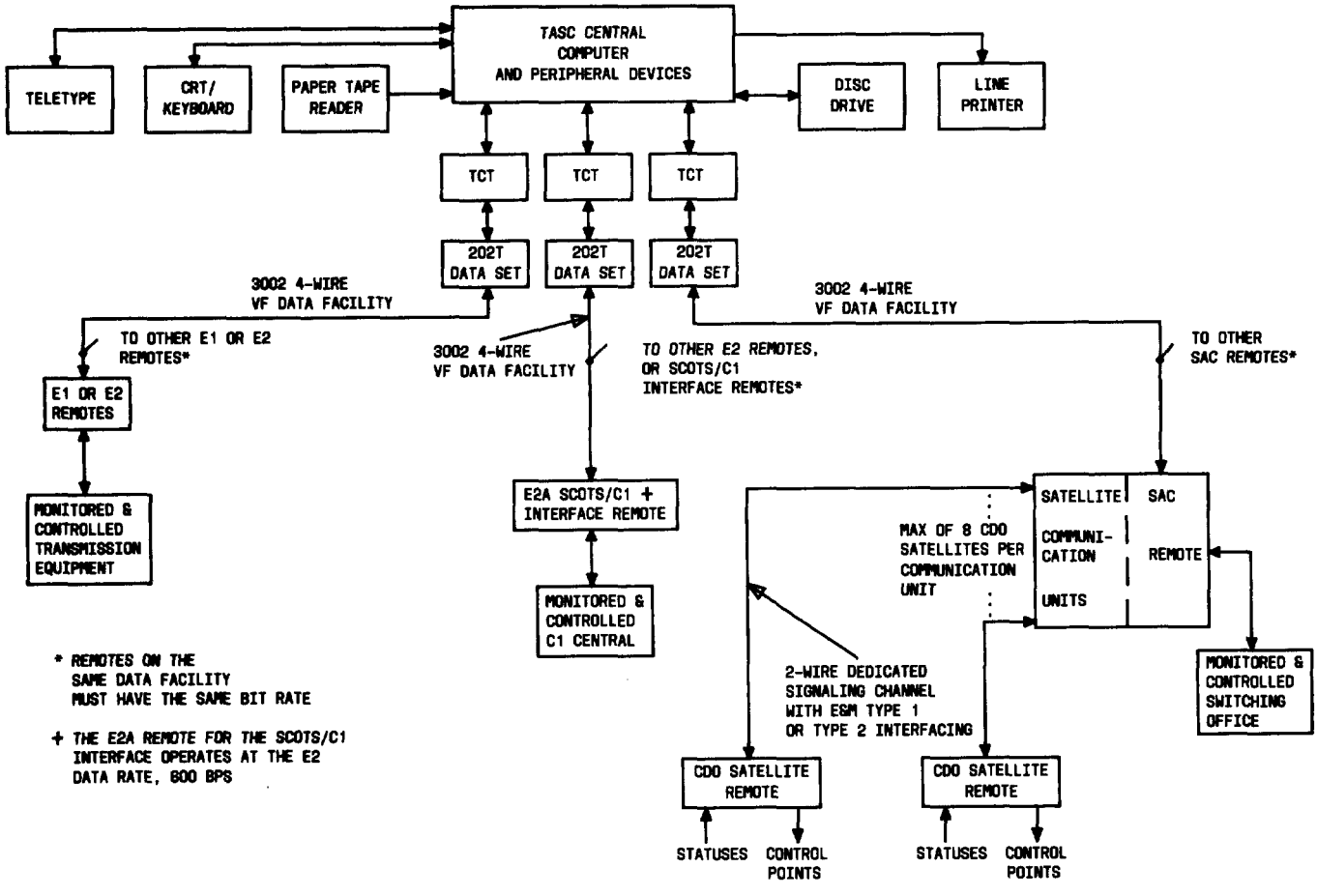


Fig. 3—Block Diagram of the TASC System

up to 10 circuit packs, two basic circuit packs, and one dedicated circuit pack for each CDO remote hubbed to the SAC remote.

2.03 A power source panel (J92621L) is used when additional power is needed. This panel supplies power to the expandor panels and CDO satellite panels.

2.04 On new SAC remote panels and power expandor panels a CP SRV/NORM switch is provided that permits removal of the circuit pack without removing fuses. The switch has NORM and CP SRV settings. The CP SRV setting will remove the power supply to the circuit packs for inserting and removing the circuit packs from the basic remote panel or any expandor panel powered by the basic remote. If the expandor panels use a power expandor panel, the switch on the power panel should be in CP SRV setting also. If the basic remote panel, or the power expandor panel, does not have the CP SRV switch, the fuses must be removed. The switch is available for old remote panels and power expandor panels.

3. FUNCTIONAL DESCRIPTION

A. General

3.01 The functional description is divided into two parts. The first part deals with the operation of the TCT, 202T data set, and the data network. The second part deals with the operation of the SAC remote.

3.02 The TCT used in SCOTS, SCCS, and TASC System incorporates a computer-controlled central. The TCT in the transmit mode takes the parallel 16-bit data word from the computer and changes it to conform to the E2A data format (Fig.

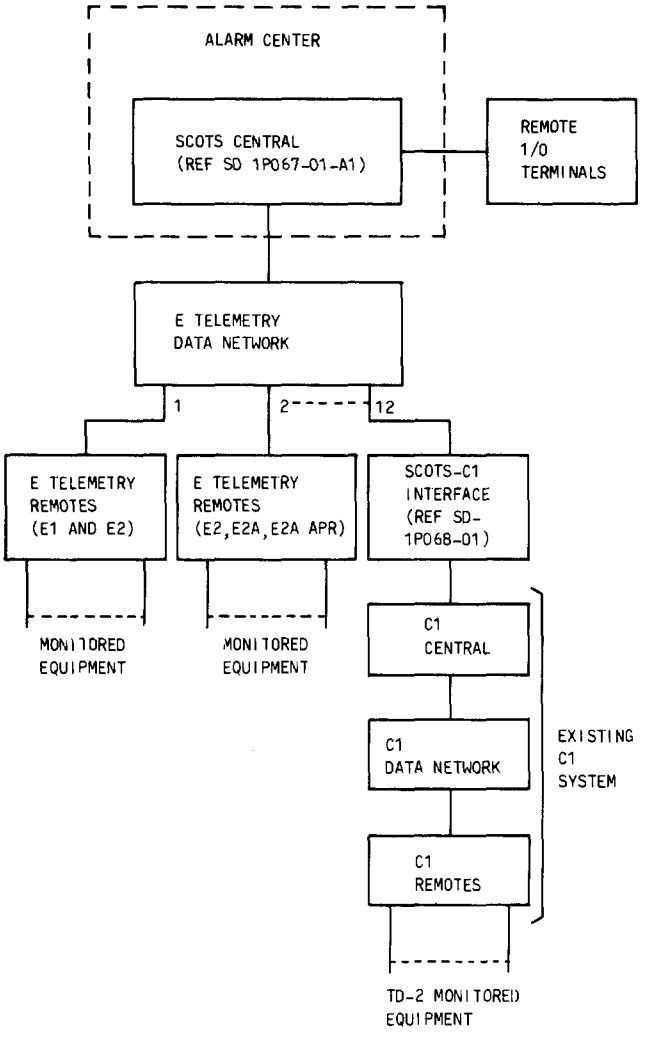


Fig. 4—Block Diagram of SCOTS

8). This encompasses adding a start sequence derived from the data sequence. The word is sent in serial form to the 202T data set for transmission to the remote. In the receive mode, the TCT receives the serial word from the 202T data set in the form of serial binary information. The TCT takes the start sequence off the word and checks the data bits against the parity bits. It then sends the information (16-bits) in parallel to the computer for analysis. When an error is detected by the TCT, the data is sent to the computer with a flag pulse showing that there is an error with the data.

3.03 The 202T data set in the transmit mode takes the serial binary information from the TCT or E2A equipment and converts the pulses into frequency-shift-keyed (FSK) signals and transmits them at 1200 or 600 (available in remote strapping) bits per second. In the receive mode, the preceding process is reversed. The FSK signals are converted to serial binary information and then sent to either the TCT or SAC remote.

3.04 Communication between the central and the SAC remote is accomplished by a 3002 4-wire voice-frequency (VF) data facility. The SAC remotes are available in several equipment configurations. A remote always contains the basic module (J92621G) and may contain G or AG expandor panels in any combination of four, and power expandor panels when needed.

B. Remote Configurations

3.05 The SAC remote panel provides control for receiving and transmitting words in the E2A format. The basic remote may contain a maximum of 64 status points and 32 relay controls. If additional capacity is required, an expandor panel is required.

3.06 The SAC expandor panel contains one common card and up to eight circuit packs (status point cards or control cards) which provide additional status point monitoring and relay control. The additional capacity is determined by the choice of circuit packs. A fully equipped SAC remote with four G expandor packs may monitor 1024 status points while controlling 64 relay points, or control 224 relay points and monitor 704 status points, or a lesser combination. The configuration in some situations will not permit use of all available status or control points.

3.07 The CDO satellite communicator panel consists of two common control circuit packs and up to eight satellite control circuit packs; therefore, a maximum of eight CDO satellite remotes can be hubbed into one communicator panel. Four AG panels, or a maximum of 32 satellite remotes (with no G panel), can be hubbed to a SAC remote. Each CDO satellite remote will provide 15 usable status points and 4 control points, two of which are latching, and two are momentary.

C. Operation

3.08 During normal operation, the central will, in a continuous and cyclic manner, interrogate

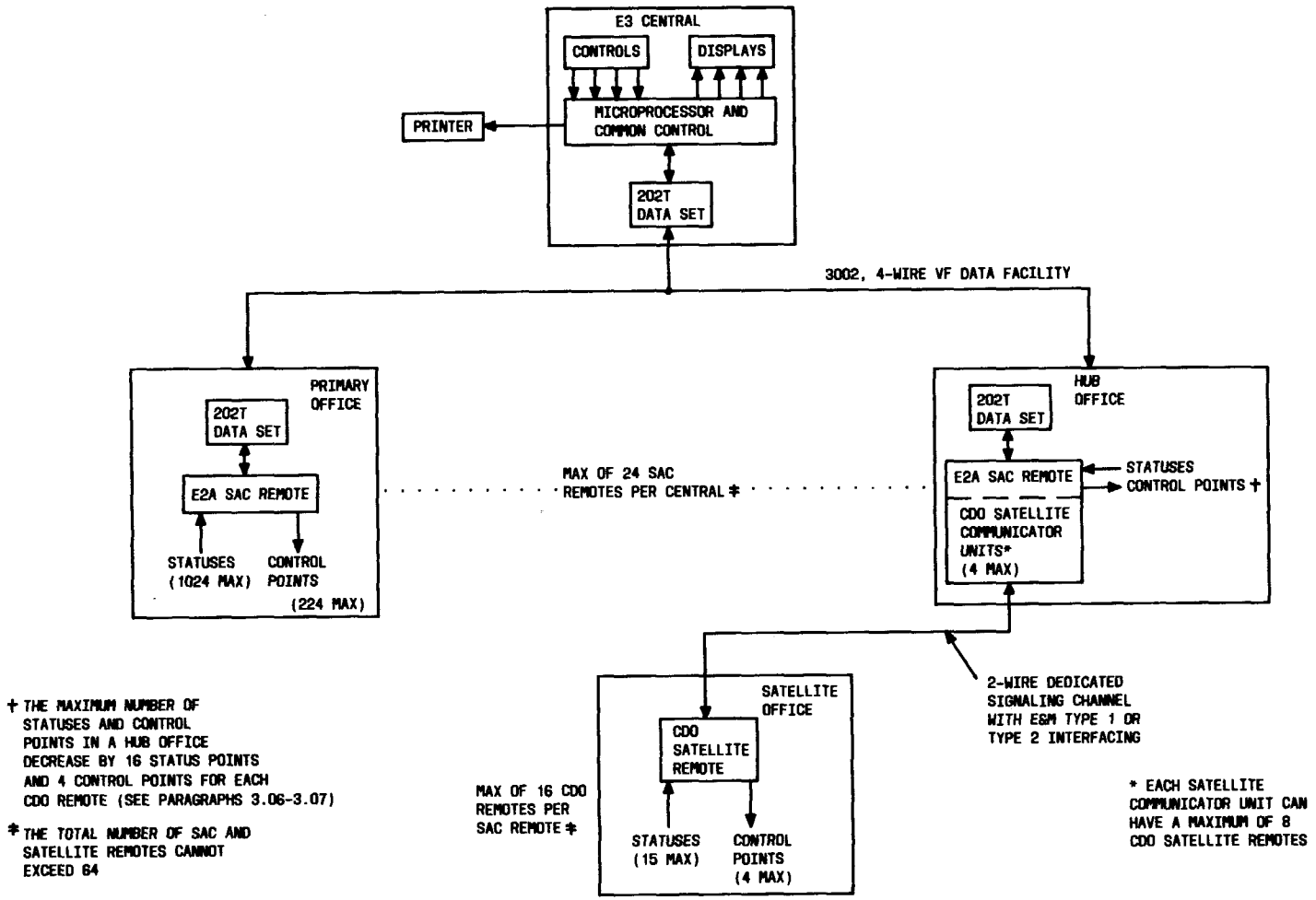


Fig. 5—Block Diagram of the E3 System

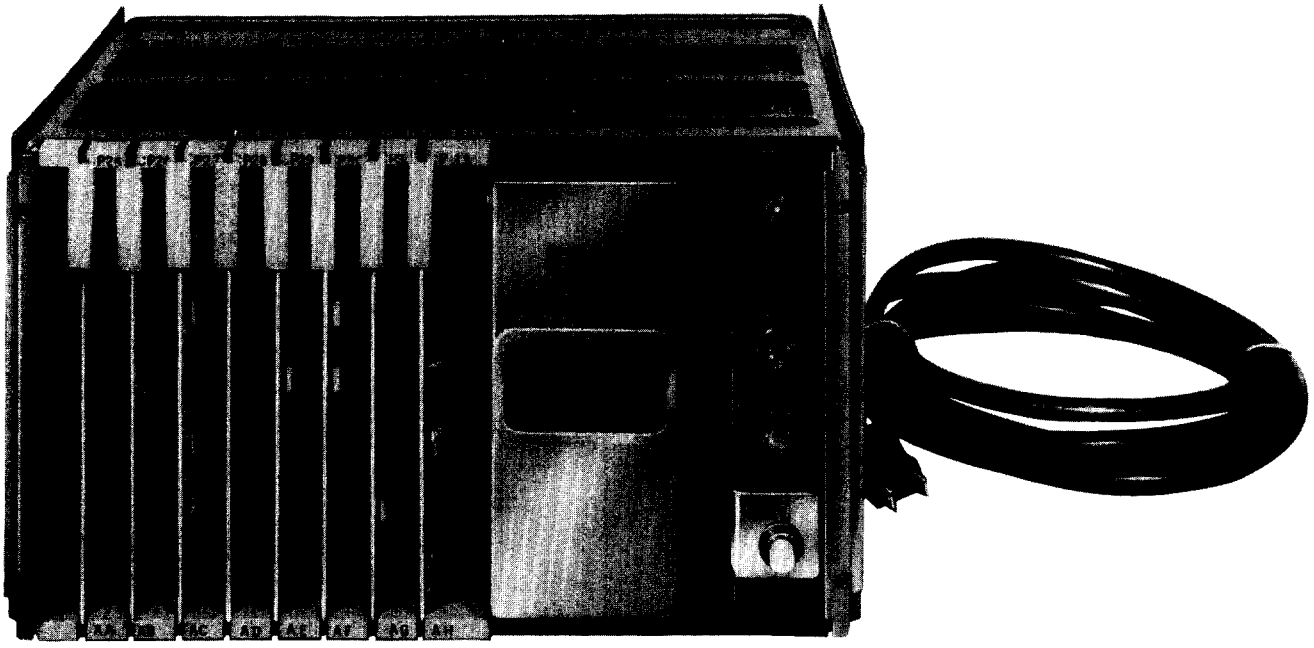


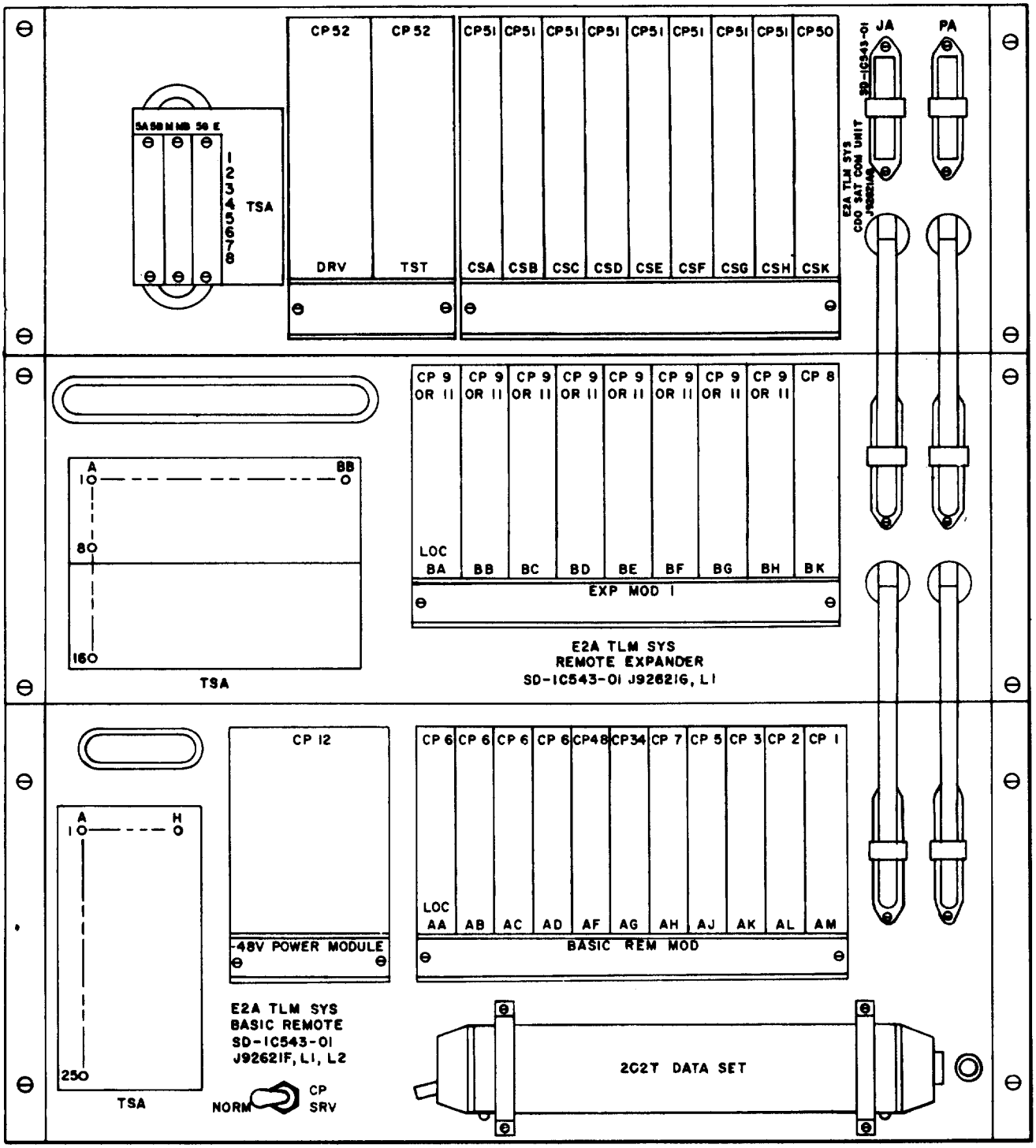
Fig. 6—Telemetry-to-Computer Translator (TCT)

each remote with group report commands. When an alarm condition is reported, the central will perform a prescribed sequence of operations which may include a request to the remote for a RELAY OUTPUT command and/or a printout on a teletypewriter.

3.09 The status points monitored are arranged in groups with each group containing up to 16 subgroups. Each subgroup (scan) represents the state of up to 16 status points. In order to monitor these statuses, the central must initiate a GROUP REPORT command [Fig. 9(a)]. This is a 1-word command which contains the group number (bits 14 through 17) of the statuses to be returned and the address of the remote (bits 4 through 11). Upon receiving the GROUP REPORT command, the remote will check for parity errors. If no errors are detected, the remote will respond with from 1 to 16 STATUS REPLY words [Fig. 9(b)], each representing one subgroup.

3.10 The E2A-provided relay contacts are activated when an operation is performed in the monitored office. When a contact closure is requested, the central transmits a RELAY OUTPUT command [Fig. 10(a)]. This 3-word command contains the address of the central (bits 4 through 11), and the type of command (bits 2 and 3) in the first word. The second word has the remote address (bits 6 through 14). The relay address (bits 6 through 14) is in the third word, and an operate-release bit (bit 2) is also contained in the third word. A logic 1 transmitted in this position will cause the addressed relay to operate, and a logic Ø transmitted will cause the addressed relay to release (only in CDO satellite panel). When a RELAY OUTPUT command is received, the control circuit in the remote will operate the relay and return a QUICK REPLY [Fig. 10(b)] to the central. This reply indicates to the central that the remote received the RELAY OUTPUT command without error.

3.11 The central may send the first and second words of the relay commands and should send one relay command (word three) at a time. The central may send as many relay commands (word three) as necessary. The remote will operate or release all relay commands but will give only one QUICK REPLY for all. If a QUICK REPLY is not received, the relay that failed to operate or release is unknown. When a parity error is detected in the reception of a command, the remote will not respond with a QUICK REPLY or STATUS REPLY. If the central receives no reply or an erroneous



NOTE:
THE CP SRV/NORM SWITCH IS NOT ON ALL REMOTE AND POWER PANELS

Fig. 7—Typical E2A Remote at a Wire Center With Satellite Communicator Unit

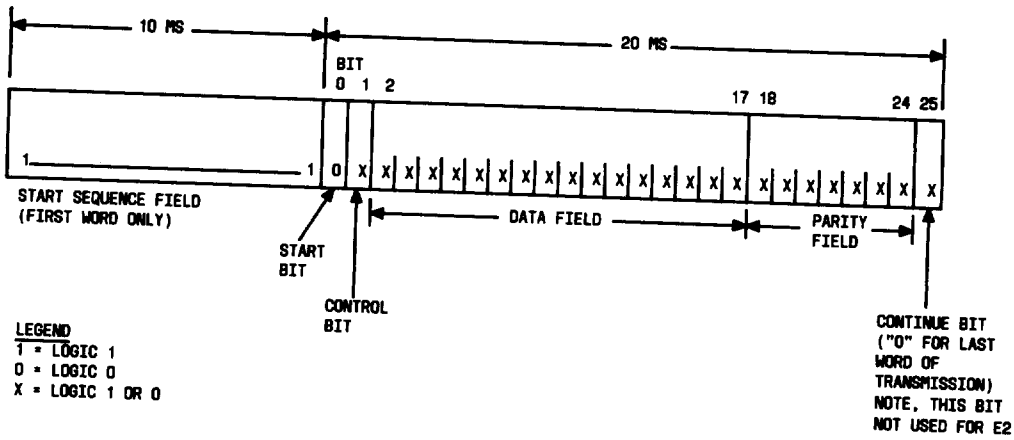
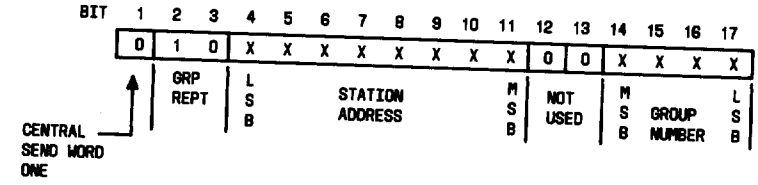
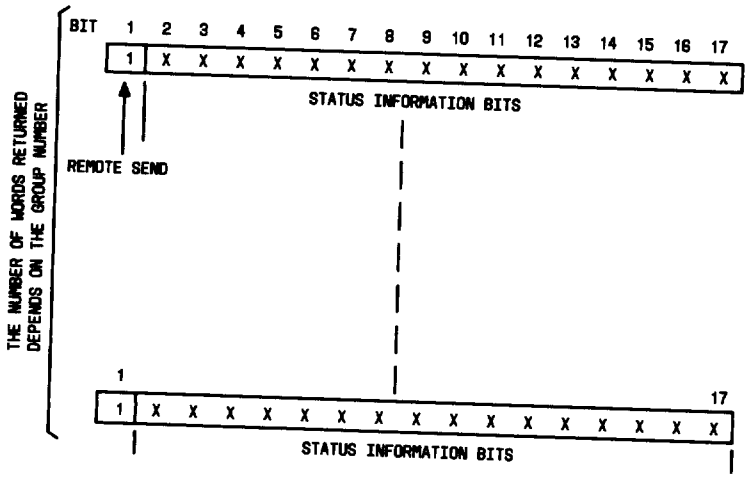


Fig. 8—Basic E2A Word Format

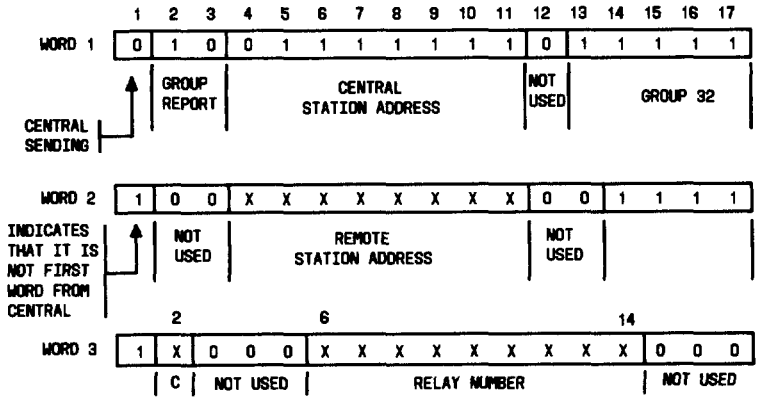


a - GROUP REPORT COMMAND FORMAT

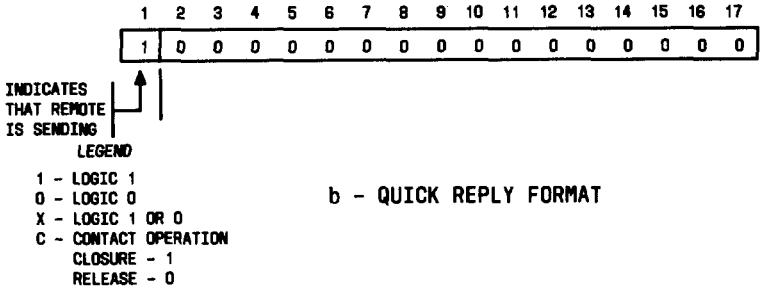


b - STATUS REPLY FORMAT

Fig. 9—Word Format of the GROUP REPORT Command and Status Reply Words Without Parity Bits



a - RELAY OUTPUT COMMAND



b - QUICK REPLY FORMAT

Fig. 10—Word Formats of the RELAY OUTPUT Command and Quick Reply Without Parity Bits and Continue Bit

reply from a remote, a retransmission of the command will be made. If the remote still fails to respond properly, the central will indicate that the station has failed or proceed as directed by its software or firmware.

3.12 If one or more CDOs are hubbed to the SAC remote, 16 status points, although only 15 are available to user (one subgroup or scan) and 4 control points are dedicated to each. The first CDO satellite is usually assigned subgroup 16, with each additional CDO satellite being assigned the next lower subgroup. For example, in the E3 System, the maximum number of input scans is 6144. If 4 CDO satellites are hubbed into the SAC remote, their respective subgroups are 64, 63, 62, and 61. The E3 central knows when it polls this SAC remote that subgroups 64 through 61 belong to satellite remotes and processes the information accordingly.

4. MAINTENANCE CONSIDERATIONS

4.01 A spare TCT is usually ordered. If a TCT malfunctions, it is replaced with the spare. The defective TCT is then returned to Western Electric for repair.

4.02 In the event of a failure of the E2A SAC 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 pack(s) are then returned to Western Electric for repair.

5. REFERENCES

5.01 The following is a list of Bell System Practices (BSP), schematic drawings (SD), and circuit descriptions (CD) associated with the E2A TCT and SAC remote as applied to the CSACS, EADAS/NM, SCOTS, TASC, and E3 Systems.

SECTION	DESCRIPTION
190-205-101	SCOTS—General Description
190-205-102	SCOTS—Central Description
190-205-103	SCOTS—Remote Description
190-210-100	TASC—System Description
190-210-101	TASC—General Description
190-210-102	TASC—Central Description
190-210-103	TASC—Remote Description
201-616-101	CSACS—Description
201-647-100	E3 System—Description
201-653-102	Switching Control Center System—Description
201-653-504	E2A Telemetry—Status and Command Remote and TCT Maintenance
252-116-101	EADAS/NM—Description
592-031-100	Data Set 202T—Description and Operation

CD AND SD	DESCRIPTION
1C535-01	TCT Application Schematic
1C543-01	Status and Command Remote—Application Schematic