E2 STATUS REPORTING AND CONTROL SYSTEM
STATUS POLLING CENTRAL
DESCRIPTION

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1. INTRODUCTION

A. General

1.01 This section describes the equipment and operating features of the E2 status polling central. An overall description of the E2 Status Reporting and Control System is given in Section 201-644-100.

1.02 The E2 system is a solid-state, general purpose telemetry system which can be tailored to each customer's requirements. It consists of a central station and a number of remote stations (Fig. 1). Typically, a status polling central is designed to gather information from the remotes and display the received information at the central station. The E2 status polling central is completely automatic. There are no switches, dials, etc., used for normal operation.

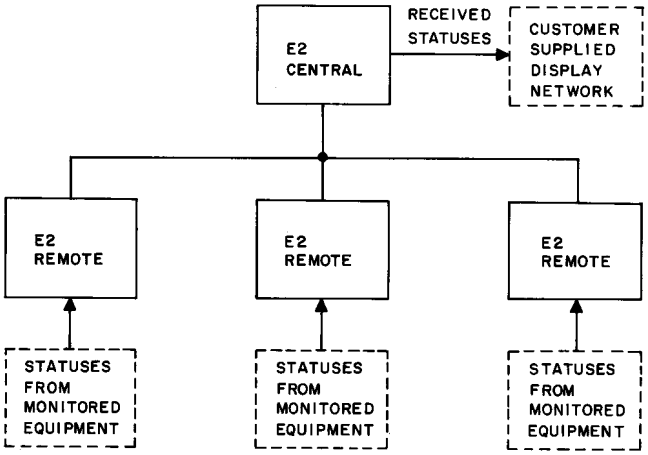

Fig. 1—E2 Status Polling System

1.03 The status polling central consists mostly of circuit packs (CPs) which mount in 6-inch high by 23-inch wide shelves. The number of CPs and, therefore, the number of shelves contained in an E2 central depend on the number of remote stations and statuses to be reported in the system.

1.04 The E2 status polling system provides no type of status display. Each status in each group from each remote station has a dedicated mercury wetted latching relay where it is stored. The contacts of the relay can be used to light a status lamp in a customer provided wall display or for any other similar application.

1.05 The maximum capability of the E2 status polling central is the ability to monitor 32 remote stations each of which may contain up to 4096 statuses. Statuses are arranged in 16 ***groups*** of 256 statuses each. Groups are further divided

into 16 ***subgroups*** of 16 statuses each. Subgroups are also referred to as ***words.***

B. Status Polling

1.06 Status polling is simply the requesting and receiving of individual (remote station) status information by the central station. The central station transmits a word requesting a status group report from the first status group in the first remote station. After the remote station responds with a status group report, the central asks for the second status group from that station. This continues until the last status group from that station is polled, at which time the central interrogates the second remote station, etc. When the last status group from the last station is retrieved, the central repeats the process. This continues indefinitely.

1.07 Information is received from remotes only in response to a request by the central. After the central has transmitted its request for information, it starts a timer while waiting for a reply. If the timer, located in the polling circuit, times out before a reply is received, the polling circuit initiates another request for the same group and remote. If the second request is not answered, an alarm is indicated and the polling circuit is updated to the first group in the next remote. If the second request is answered by the remote, the group polling sequence continues.

2. PHYSICAL DESCRIPTION

2.01 Figure 2 shows a typical E2 status polling central. The central equipment mounts in a 23-inch wide bay containing CPs for the basic E2 equipment and memory. The central also contains a 2-inch jack strip used for facility access, a 6-inch high filter and fuse panel, and a 6-inch high maintenance panel.

2.02 Excluding memory, the equipment mentioned above takes up only part of one bay. The memory circuitry varies in size depending on the number of statuses in the system. It may range from part of one bay to three bays. When more than one bay is used, they are installed adjacent to each other.

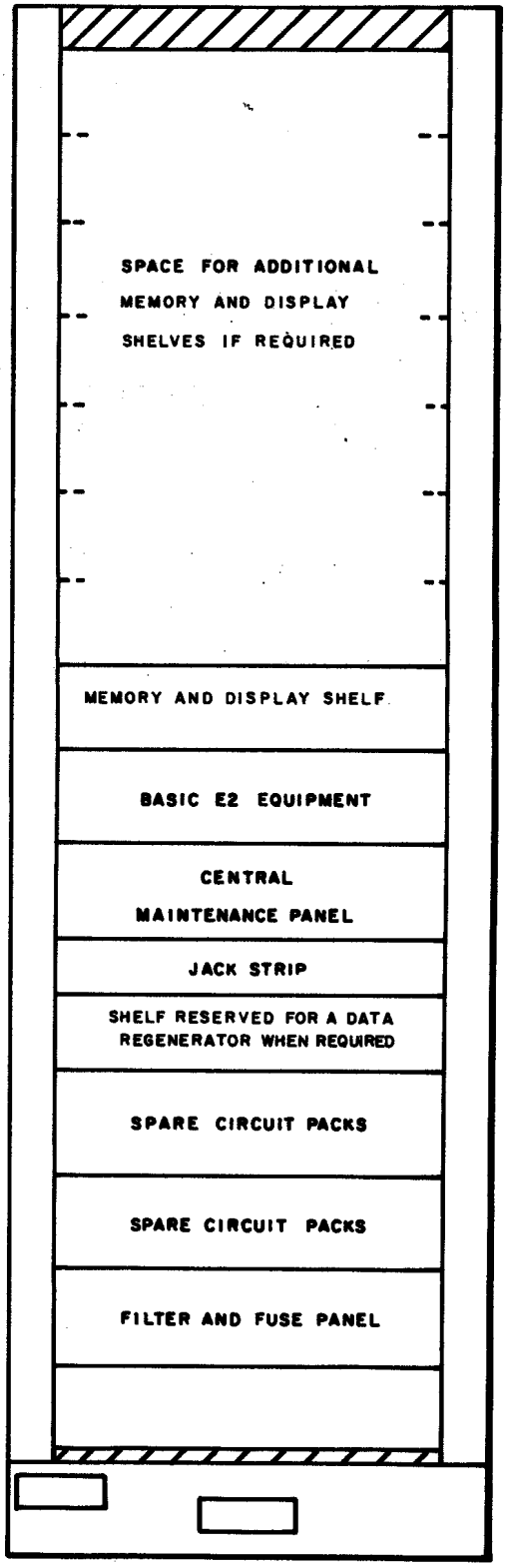

Fig. 2—Typical Status Polling Central

3. FUNCTIONAL DESCRIPTION

A. General

3.01 The central sends a request for information to the remote stations in the system. The word sent by the central contains a remote address and a group number. Information coming back to the central is stored on relays assigned to that remote and group.

3.02 Figure 3 shows an overall block diagram of the status polling central. The data transmission circuit contains the data receiver and transmitter needed for the conversion of the frequency-shift-keyed (FSK) data to digital data and the digital data to FSK data, respectively. The data transmission control (DTC) circuit contains the counting, timing, storage, and error circuitry necessary for the incoming and outgoing data. The group receiver and matrix selector circuits provide gating and control of the received data and direct the data to its proper place in the memory circuit. The memory circuit stores the received data and provides relays to drive the customer supplied display network. The maintenance panel provides a visual indication as to whether the central, facility, and remote are functioning correctly. When a problem is detected, an appropriate flip-type indicator is set.

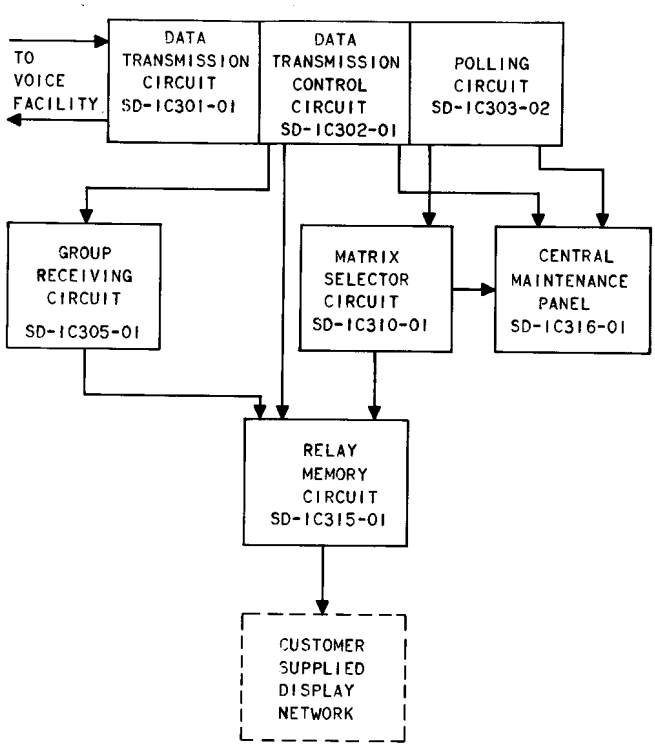

Fig. 3—Block Diagram of the Status Polling Central

B. Transmitting

3.03 Figure 4 shows a functional block diagram of the status polling central. Transmission is accomplished by the data transmission circuit (SD 1C301-01). Data received from the DTC circuit (SD 1C302-01) is converted into FSK tones and is then applied to a voice-frequency data network.

3.04 The polling circuit initiates transmission by sending a set-transmit-mode signal (STM1) to the DTC. The DTC then starts its word length counter and sends 5.5 logic 1 preparatory bits (Fig. 5A). These bits synchronize all the remotes on the facility. The next bit sent is a logic 0 (start bit) which is used to sync the clocks at the remotes for the following information bits.

3.05 As the start bit occurs, the remote address and group number are loaded in parallel into the shift register from the polling circuit. These 17 bits (Fig. 5B) are transmitted to the remote to provide it with all the information necessary to perform a status group report. Bit 1 indicates to the remote that the information being received is from the central. Bits 2 through 17 contain the type of request (status group report), remote station address number, and the status group number.

3.06 The 17 information bits are also shifted to the parity control circuit and the 7 parity bits are generated. As the parity bits are being generated, the information bits are being transmitted by the data transmission circuit. Once all information bits are transmitted, the parity bits follow.

C. Receiving

3.07 When the one-word command, status group report, initiated by the central has been received by the intended remote, it is checked for parity and if good is processed by the remote equipment. The remote equipment then selects the proper group of statuses to be reported and loads the information into the shift register for transmission back to the central. This process continues until all statuses in the up-to-16 groups have been reported. As each word is received at the central station it is checked for parity and if

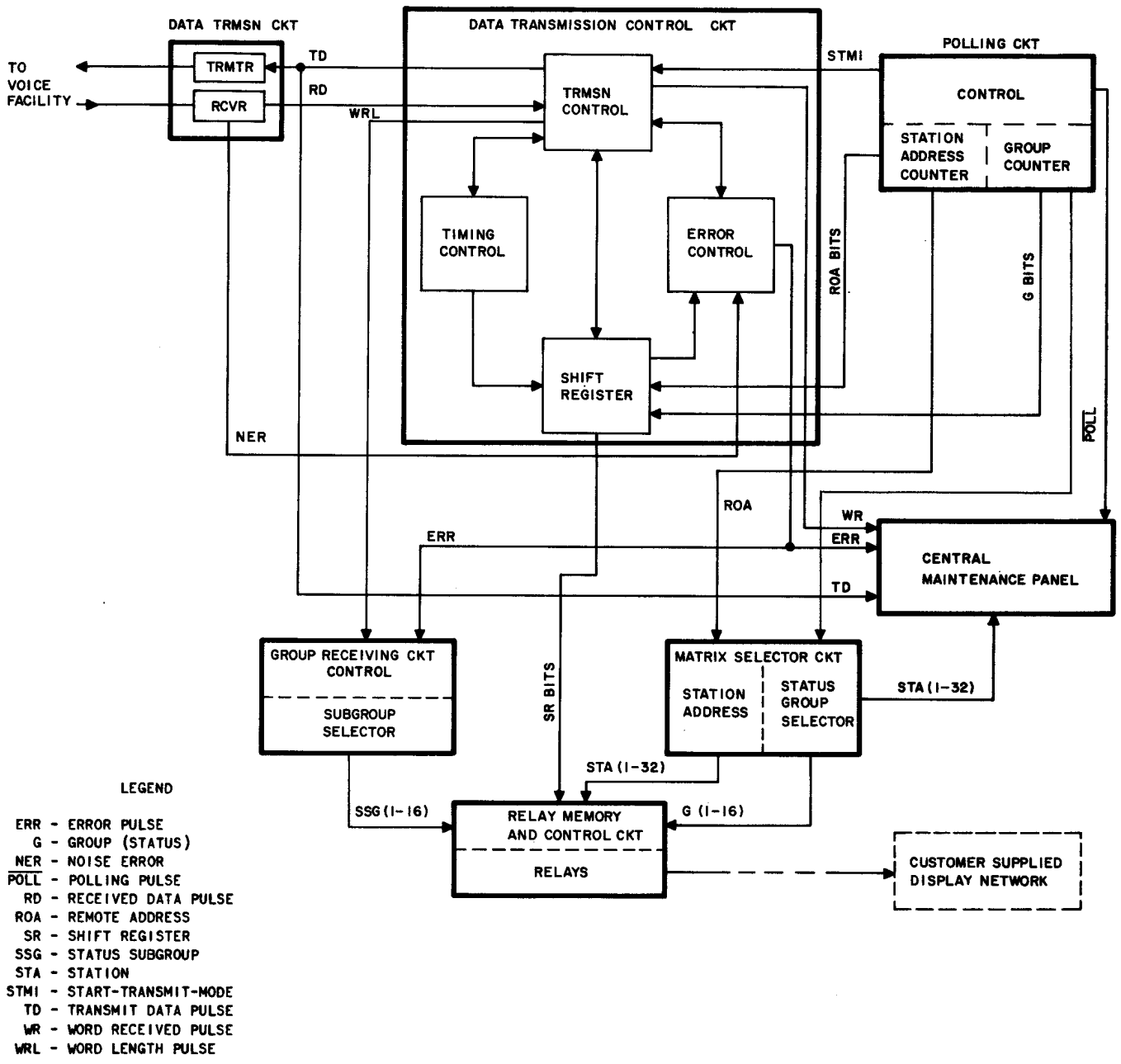

Fig. 4—Status Polling Central Functional Block Diagram

good sent to the memory circuit via the shift register. If the word is found to be in error, the entire group is ignored and the command for the same status group is reinitiated. When all status groups in a remote have polled, the address counter is incremented by one and the next remote station is polled.

D. Storage

3.08 A status is stored according to its station number, group number, subgroup number, and status number assignment. Each status is stored on a separate relay.

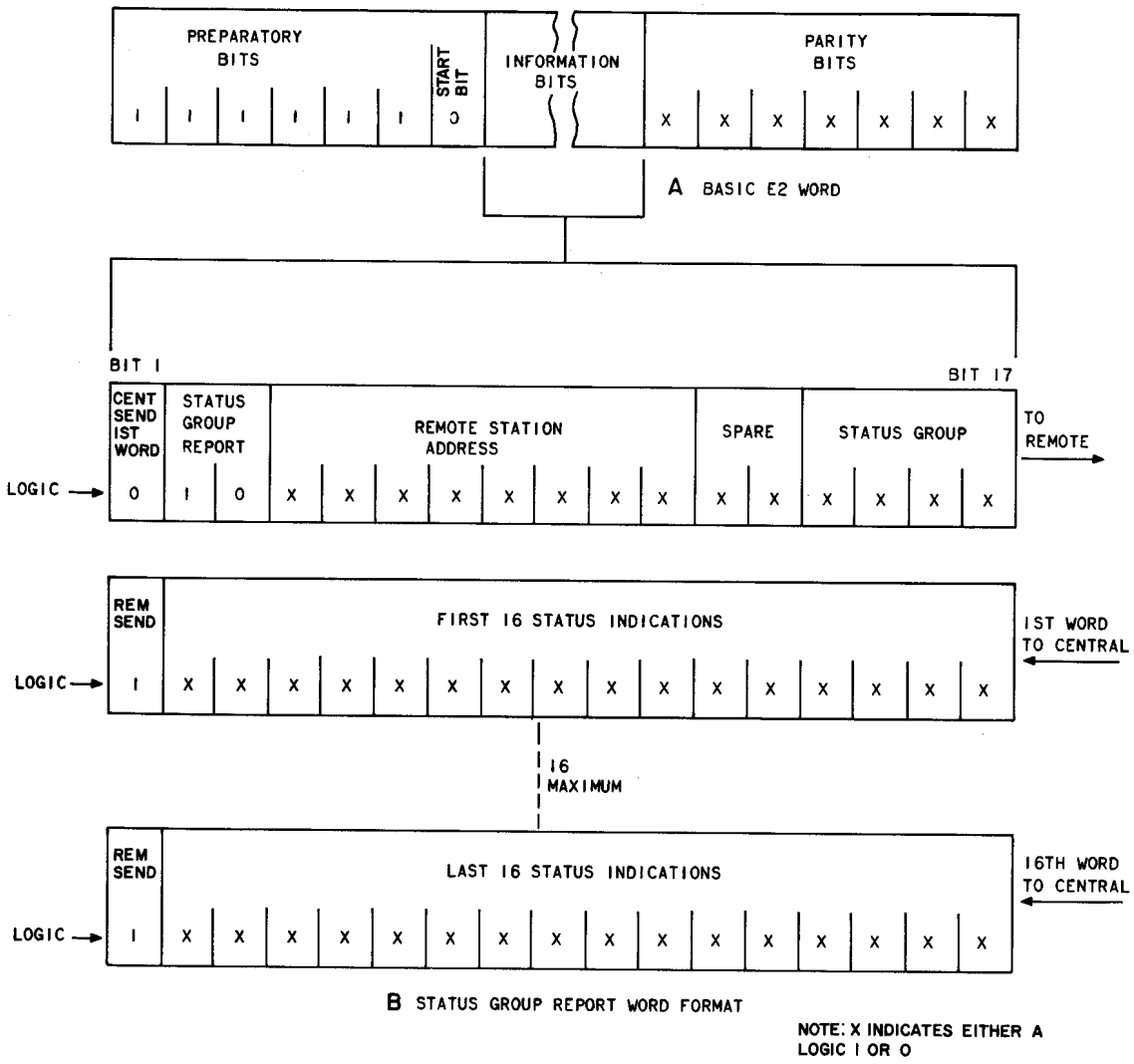

Fig. 5—E2 Word Format

3.09 Station and group numbers for incoming statuses already exist in the polling circuit since the polling circuit dictates which statuses are requested by sending the station and group address to the shift register when the central is transmitting. Since a group may contain as many as 256 statuses, a remote may send up to 16 words (subgroups) for each request from the central. The equipment that keeps track of the subgroup number is the group receiver. As each word coming from the remote is processed, the counter in the group receiver is updated. When all 16 words are received, the counter is reset in preparation for the next group.

3.10 The number of outputs from the relay selection circuitry depends on the number of stations, groups, etc., there are in the system. A system operating at full capacity has 32 output leads (one for each station) coming from the station address circuitry, 16 output leads (one for each group) coming from the group address circuitry, 16 output leads (one for each subgroup) coming from the subgroup address circuitry, and 16 output leads (one for each status) coming from the 17-bit shift register.

3.11 A lead from each of the above groups is needed to activate each relay. As a word

is being received, there are 16 relays ready to be loaded. These relays all belong to the same subgroup, group, and station. After the parity check has indicated the word is without error, the 16 statuses in the shift register are allowed to set or reset the relays corresponding to that word.

3.12 The relay contacts can be used at the discretion of the telephone company. That is, they may be used to provide the switching to activate lights, alarms, etc., providing the current through the contacts does not exceed 0.5 amperes.

4. CENTRAL MAINTENANCE PANEL

4.01 The central maintenance panel (J92618AC) uses integrated circuit logic and is mounted in one shelf at the central as shown in Fig. 2. The main purpose of this panel is to indicate that the status polling operation is being properly executed. It additionally can isolate a failure to the central or to a particular remote station.

4.02 A list of the pushbuttons and indicators on the panel and their associated functions are given in Table A.

TABLE A

FLIP INDICATOR OR PUSHBUTTON	FUNCTION
CF (Central Fail)	A flip-type indicator which when set indicates transmission has stopped.
REPLY	A lamp which when enabled blinks every time a valid word is received by the central.
PARITY ERROR	A lamp which when enabled blinks every time a word with incorrect parity is received.
CLEAR	Clears all flip indicators and lamps.
TEST-ENABLE	Momentary test for all lamp and flip indicators. A locking illuminated pushbutton which enables the REPLY and PARITY ERROR lamps.
ALARM-ACO	The ALARM lamp is illuminated when a troubled is detected. The ACO button is a cutoff for the audible and visual alarms.
32 Station Fail Flip Indicators	If a single station failure flip indicator is set, the central has not received a valid reply from that remote. If several station failure flip indicators are set, it is possible that each station has failed independently or that a common part of the facility between the central and remote is bad. This situation can be clarified by performing various tests with the remote test panel.

4.03 The various tests associated with this panel can be found in Section 201-644-513.

5. REFERENCES

5.01 The following is a list of circuit descriptions (CDs), schematic drawings (SDs), and Bell System Practices (BSPs) associated with the E2 status polling central.

CDs and SDs

1C301-01	Data Transmission Circuit
1C302-01	Data Transmission Control Circuit
1C303-02	Polling Circuit
1C305-02	Group Receiving Circuit
1C310-01	Matrix Circuit
1C315-01	Memory and Display Circuits
1C316-01	Maintenance and Test Circuits

BSPs

201-644-100	Overall System—Description
201-644-111	Remote Station—Description
201-644-513	Status Polling Central—Tests
314-411-110	E2 Data Network—Description
314-411-210	E2 Data Network—Installation
314-411-310	E2 Data Network—Maintenance
314-411-510	E2 Data Network—Tests