

FEATURE DOCUMENT
SYSTEM FEATURES
NO. 3 ELECTRONIC SWITCHING SYSTEM

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NOTICE

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FEATURE DEFINITION AND DESCRIPTION**1. DEFINITION**

1.01 The No. 3 Electronic Switching System (ESS) is a small electronic central office that has been developed to offer modern telephone service to small communities. It is capable of serving from several hundred to approximately 4500 lines and has a peak capacity of 11,000 busy hour calls.

1.02 The No. 3 ESS uses stored program control to offer service and maintenance features that are commonly associated with ESS offices. The extensive use of new devices and technology has resulted in a system requiring much less building space than any machine of comparable switching capacity.

1.03 This system was designed primarily for small unattended offices and as a result, offers the advantage of remote maintenance and administrative tasks.

1.04 Other advantages of the No. 3 ESS include the short time interval between order due date and service date and simplified telephone company engineering and growth procedures.

1.05 Most of the system is completely assembled, interconnected, and system tested at the factory with the actual office program. The engineering effort for the No. 3 ESS has been minimized by extensive use of plug-in circuits and a physical design that packages the system as efficiently as possible. Special attention has been given to providing arrangements of equipment which minimize engineering without affecting flexibility. The use of standardized floor plans eliminates the engineering of frame location, cable racks, and cabling. The primary growth unit is the network frame which provides the network, associated control, trunks, and service equipment for 384 terminals in one package with plug-in trunks, service circuits, and junctions.

1.06 The No. 3 ESS is available with either the SO-2 Issue 4A or the 3E3 generic program.

2. DESCRIPTION

2.01 Functionally, the No. 3 ESS (Figure 1) is a stored program controlled system which consists of three major equipment areas as follows:

- System Control
- Peripheral Equipment
- Maintenance and Administrative Facilities.

This equipment is controlled either directly or indirectly by sequences of coded instructions stored in memory. The following text describes each of the major equipment areas and their relationship to each other and the stored program.

A. System Control

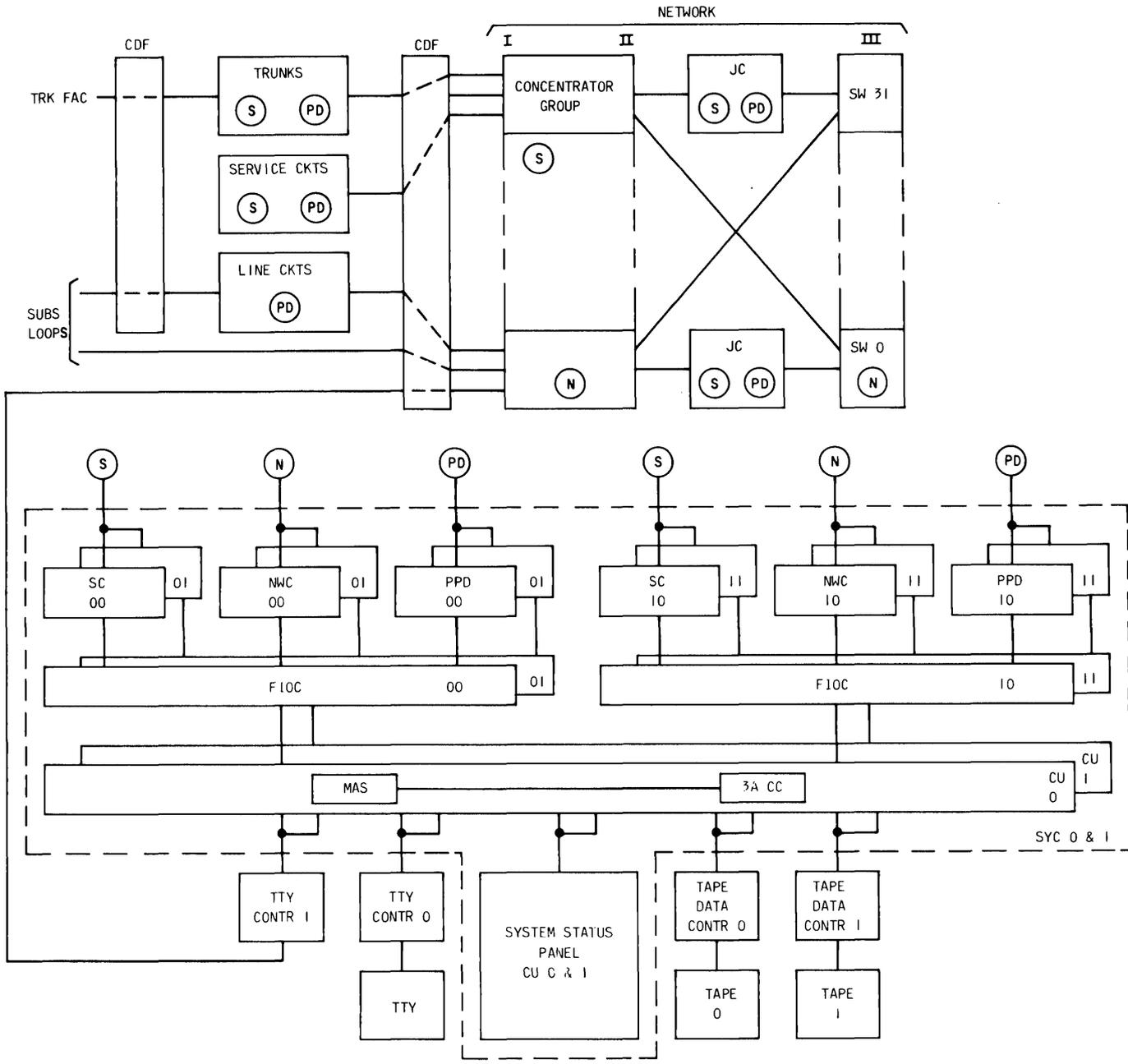
2.02 The system control (SYC) serves in an executive (or administrative control) capacity, directing all system functions to process and collect data for the No. 3 ESS. The SYC is duplicated for reliability and consists of a control unit (CU), its associated peripheral controllers, and power supplies. In the No. 3 ESS, the SYCs operate in a duplex mode meaning one SYC always has active control over the system while the other operates in a standby mode. Therefore, each SYC is a separate and complete unit capable of controlling the peripheral equipment and system actions. The on-line SYC keeps both the on-line and standby main store memories up-to-date. The standby SYC can assume control of system operation as required. The SYCs operate asynchronously meaning that they are not matching operations in their normal operating mode.

Control Unit

2.03 A CU consists of a 3A Central Control (3A CC), its associated main store (MAS), and the system status panel (SSP). The SSP is shared by both CUs. The CU contains the system program and data processing hardware for controlling system actions.

3A Central Control

2.04 The 3A CC is the heart of the CU. It uses a 32-bit, 1024-word read only memory (ROM) and microprograms to interpret and act on commands fetched from the MAS. Microprograms in the



- PD - PERIPHERAL DECODER POINT
- S - SCAN POINT
- N - NETWORK CONTROL POINT
- JC - JUNCTION CIRCUIT
- SW - SWITCH
- SC - SCANNER CONTROLLER
- NWC - NETWORK CONTROLLER
- PPD - PERIPHERAL PULSE DISTRIBUTOR
- FIOC - FRAME INPUT OUTPUT CONTROLLER
- MAS - MAIN STORE
- 3A CC - 3A CENTRAL CONTROL
- CU - CONTROL UNIT
- SYC - SYSTEM CONTROL

Fig. 1—No. 3 ESS Block Diagram

ROM permit control and logic functions to be performed by microsequences rather than by hard wired logic circuitry as used by most other ESS machines. In addition, all of the basic operating programs that control timing, initialization, emergency action, man-machine interface, etc, are permanently stored in the ROM.

2.05 The front of the 3A CC housing contains the 3A CC control panel. The control panel provides a man-machine interface for program debugging during installation and for trouble isolation when manual intervention is required.

Main Store

2.06 The MAS is an electrically alterable (writable) store made up of Insulated Gate Field Effect Transistors (IGFET). The MAS is made up of 32K word modules and is growable in modules of 32K each. Each word consists of 18 bits, containing two parity bits.

2.07 The MAS contains the No. 3 ESS call records, translation data, and the system program. This store also provides temporary memory used to store call processing and administrative information required for system operation.

2.08 Changes are made to translation data in the MAS information via recent change (RC) messages entered via a teletypewriter (TTY). The types of data that can be changed by RC messages include changes in subscriber service, trunk additions, routing changes, service observing assignments, changes in office code treatment, etc.

Peripheral Controllers

2.09 The peripheral controllers direct and control actions of peripheral equipment as a result of commands from the CU.

Frame Input/Output Controller

2.10 The 3A CC controls the entire periphery over 6.67-megabit serial input/output (IO) channels. The frame IO controller (FIOC) serves as an interface between the 3A CC and the peripheral controllers. It converts information between serial and parallel forms (depending on the direction of flow) and gates the data to and from the peripheral controllers. The FIOC is duplicated for reliability. Each 3A CC has a dedicated FIOC that enables it

to communicate with its associated peripheral controllers.

Network Controller

2.11 The network controller (NWC) directs current pulses to selected network crosspoints to establish paths through the network. This action is initiated when a network order is sent to the network controller from the 3A CC via the FIOCs. Verification of proper access pulsing is returned to the 3A CC via the FIOC.

2.12 The network controllers are also used to operate and release line cutoff and test vertical switches associated with the network terminals (lines and trunks).

2.13 When a network order has been sent and the network access enabled, the network controller and network pulser validate the selected path. Once the path is validated, a start signal is sent to the network pulser which generates a pulse to be sent through the control windings of the designated remanent reed (remreed) switches, thus closing or opening the switches as required.

Scanner Controller

2.14 The scanner controller receives address information from the 3A CC via the FIOC for a designated scanner row to be interrogated. The results of the interrogation are sent back to the 3A CC via the FIOC.

Peripheral Pulse Distributor Controller

2.15 The peripheral pulse distributor (PPD) controller receives information from the FIOC and directs it to the transformer matrix of the PPD. This matrix is used to select and access relays in the peripheral circuitry via the peripheral decoder circuit.

B. Peripheral Equipment

2.16 The peripheral equipment is that equipment used by the control complex to switch calls through the office and to perform other related functions. Upon command from the control complex, the periphery performs tasks such as scanning customer lines, selecting paths through the network, changing circuit state relays, etc.

Switching Network

2.17 The switching network is a 5-stage folded design using the sealed contact remreed switch. It is a space division network in which terminals are connected via 2-wire metallic connections and are switched through five stages (crosspoints) of remreed switches. Lines, trunks, and test and service circuits are intermixed among the terminals (on the same side of the network) which may total up to 5760. All connections, including interoffice talking connections, digit receiving, ringing, and signaling, are made through the remreed network.

2.18 The network, as shown in Figures 2 and 3, is constructed of modules called concentrator groups. Each concentrator group includes two stages of switching for up to 384 lines, test circuits, trunks, and service circuits. The two stages of switching concentrate the 384 terminations down to 64 links (a fixed 6:1 concentration ratio). One-half of these links from each concentrator group is distributed (one each) to the inputs of the 32 switches making up the third stage of the network. The other half of the links of a concentrator group is connected, via circuit junctors, to the outputs of the third stage.

2.19 The No. 3 ESS network uses a junctor circuit in all connections between terminals. The junctor circuit provides loop supervision in both directions on intraoffice calls and toward the line on outgoing and incoming calls. Also, the junctor circuit opens, or cuts through, the network tip and ring leads between the switched terminals.

Scanners

2.20 The No. 3 ESS scanners are used to detect the on-hook and off-hook status of customer lines, to check the status of talking paths for flash and disconnect, to monitor certain test points in various frames, and to scan other miscellaneous points about which information is desired. The scanning element used in No. 3 ESS is the ferrod sensor. The No. 3 ESS uses one scanner divided into 512 scan point blocks. The scanner scans lines for change of state and provides supervision for junctors, trunks, and service circuits in the network frame, monitors maintenance circuits, alarm circuits, and some trunks and service circuits.

Peripheral Pulse Distributor and Peripheral Decoder

2.21 The PPD provides the access and control for the peripheral decoders (PD). The PD controls peripheral circuit relays as determined by the 3A CC. The PPD selects PD points to be operated via a transformer matrix. The PPD receives information from the 3A CC via the FIOC and the PPD controller, makes a PD group selection, and places selection information into the PD shift register. The information in the PD shift register selects one, two, or all three relays.

C. Maintenance and Administrative Facilities

Teletypewriter and Teletype Controllers

2.22 The TTY is the primary means of communication between the system and maintenance personnel. The system uses the TTY to print out test results, trouble records, and diagnostic results. The TTY may be used by maintenance personnel for requesting tests, removing and restoring equipment, and making changes to the office data.

2.23 The No. 3 ESS has a minimum of two TTY control units which are accessible by the on-line 3A CC (up to four TTY control units may be provided). Each TTY control unit may be equipped with two independent TTY controllers. Each controller provides four ports to accommodate four TTYs. The No. 3 ESS only uses one controller in each of the two basic TTY control units. One controller is designated the maintenance unit and the other is the miscellaneous unit.

2.24 Maintenance TTY Controller: This controller is dedicated to maintenance TTYs. One port is used for the local maintenance TTY and the remaining three ports can be assigned to remote maintenance TTYs. The local and remote maintenance TTYs receive the same information from the system.

2.25 Miscellaneous TTY Controller: The miscellaneous controller provides TTY access for administrative functions. This unit allows direct distance dialing (DDD) data link access for several centralized TTYs and is used for such functions as service orders, traffic measurements, or repair bureau. The miscellaneous ports are redirected and become maintenance ports if the maintenance controller becomes inoperative.

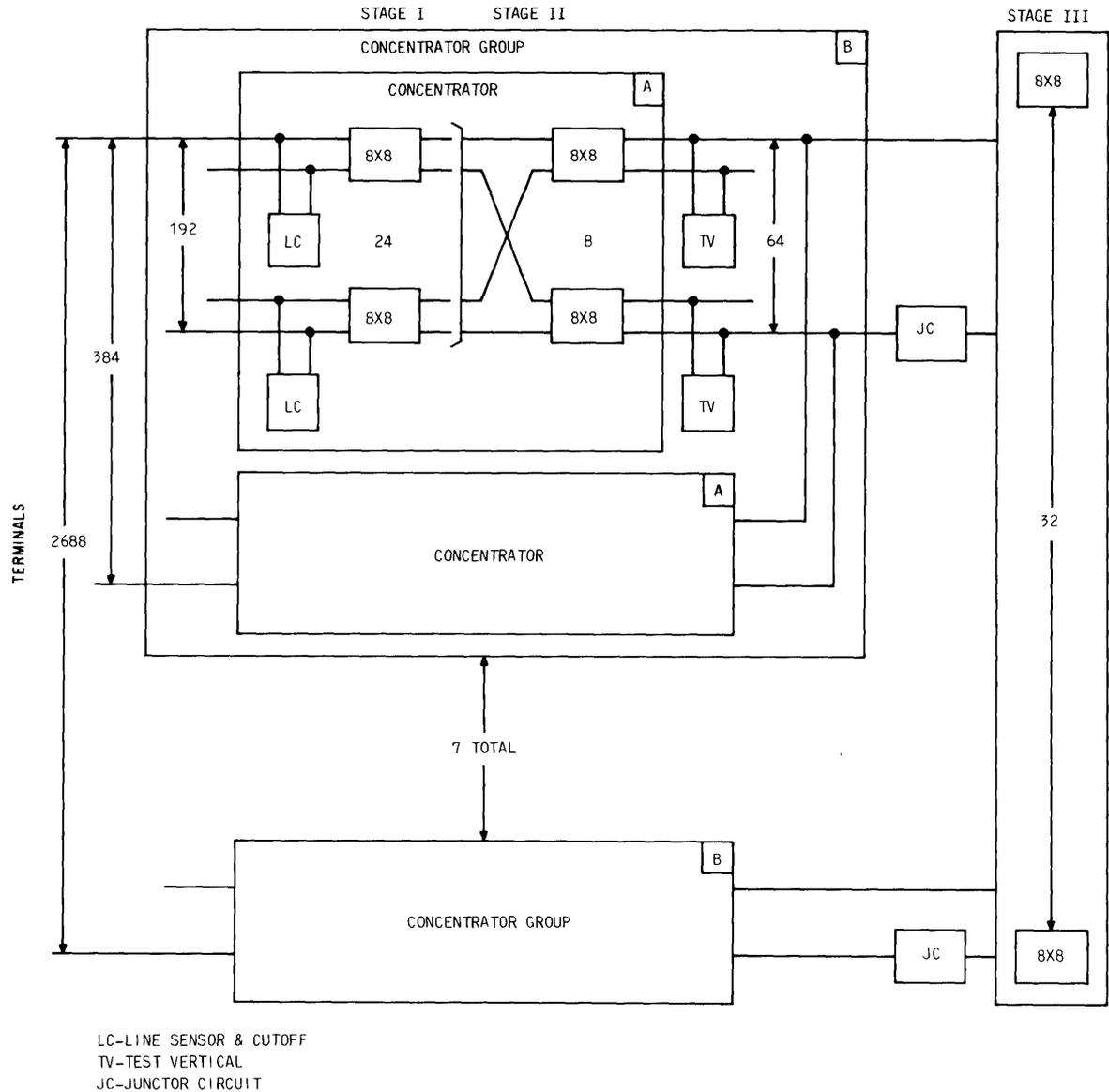


Fig. 2—No. 3 ESS Switching Network (2688 Terminals)

Tape Data Facilities

2.26 The tape data facility consists of two tape data controllers and two associated cartridge tape units. Each 3A CC has its own preferred tape system under normal operating conditions but may also access the other tape system. Each tape contains all of the programs, parameters, and translation data that reside in the MAS and serves as a backup to the MAS. In the event of MAS failure if office data is destroyed, it is restored via a sequence of loader programs and the backup tape.

2.27 The tape systems also contain infrequently used system programs. These programs are referred to as nonresident since they are stored external to the MAS. Nonresident programs include infrequently requested diagnostics, service programs, etc. These programs are paged into the MAS when they are required by the system.

System Status Panel

2.28 The SSP provides a means for manual system control when emergency situations occur. In

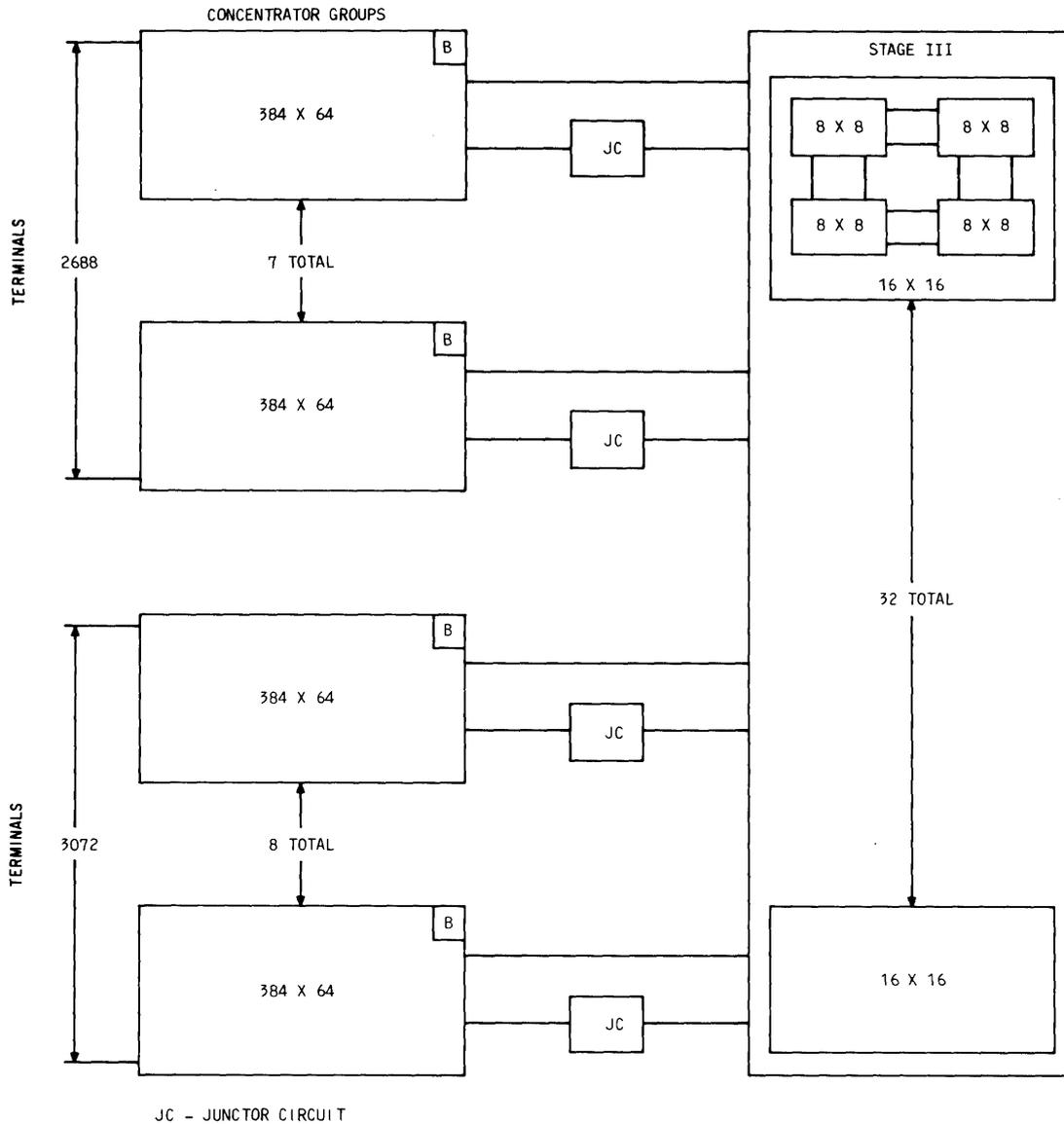


Fig. 3—Maximum Size Network for No. 3 ESS

addition, it contains keys for test control, alarm control, and panel power.

2.29 Visual indications are provided on the SSP to relate system status to maintenance personnel. The types of indications provided by the SSP include SYC status, other equipment status, equipment troubles, and power failures.

Trunk and Line Test Panel

2.30 The trunk and line test panel (TLTP) provides the capability to manually access all lines, trunks, and service circuits for testing purposes. The TLTP contains two access trunks which have appearances on the network. The TLTP allows maintenance personnel to remove lines, trunks, and service circuits from service or to return them

to service. The TLTP is equipped with a voltmeter and jacks for connecting external test equipment to the access trunks. Other test equipment may also be used in conjunction with the TLTP for performing transmission and operational tests on trunks and lines.

D. Stored Program Control

2.31 The No. 3 ESS is a stored program control system meaning that the majority of system actions are determined by sequences of instructions coded and stored in memory. These instructions are grouped into categories called programs. A program contains all of the data necessary to control the accomplishment of a specific task. These programs consist of combinations of precisely defined instructions which are read from main memory and transmitted one at a time to the processor for execution via microprogram sequences and data manipulation logic. The stored program makes use of stored data called translation data which contains information pertaining to customer lines and system parameters. To alter system operation or customer features, changes are made only to the stored translation data rather than to hardware or wiring.

2.32 Stored programs in the No. 3 ESS are stored as either resident or nonresident.

2.33 *Resident Programs:* The resident programs are those stored in a write protected portion of the MAS. The resident programs include all of the call processing programs and some of the administrative and maintenance programs.

2.34 *Nonresident Programs:* These programs are stored on magnetic tape in the tape data controller (TDC) and are transferred to the main store as required. The remaining administrative and maintenance programs which are used infrequently by the system are brought in upon request from the tape as required. The tape also contains a backup of all main store data that is essential to system operation.

2.35 Stored programs in the No. 3 ESS are grouped according to the functions they perform. They are categorized as follows:

- Operational Programs
- Administrative Programs

- Maintenance Programs.

Operational Programs

2.36 Operational programs include all programs that pertain to the processing of calls. Some of the functions performed by these programs are as follows:

- Input and output of data
- Line scanning to detect originations
- Digit receiving
- Digit interpretation and routing
- Digit outpulsing
- Establishing network paths.

Administrative Programs

2.37 Administrative programs include all programs that pertain to the control of administrative tasks, such as adjustment of service provided and adjustment of equipment to meet changing traffic conditions or to report on areas that need maintenance attention. Some of the functions performed by these programs are as follows:

- To administer changes to stored data to accommodate service orders or plant changes
- To record office traffic characteristics
- To report on plant measurements including service measurements and performance measurements which reflect the basic health of the system through cumulative error counts and failure rates
- To report system trouble conditions.

Maintenance Programs

2.38 The maintenance programs in No. 3 ESS include all programs which relate to maintenance of the system hardware or stored program. Some of the functions performed by these programs are:

- Detecting of equipment troubles and/or stored program inconsistencies

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- Attempting to recover a working system when failure occurs
- Diagnosing the system to pinpoint the location of troubles.

Stored Program Hierarchy

2.39 The No. 3 ESS stored program is categorized into two levels, base level and interrupt level programs.

Base Level Programs

2.40 Base level programs are executed sequentially at approximately 100-millisecond intervals. The base level contains most call processing programs plus many maintenance tasks which can be deferred or are of low priority and can be called in at the end of the call processing loop. All base level tasks are scheduled by the base level monitor program which also determines the additional tasks to be performed after the normal call processing scan.

Interrupt Level Programs

2.41 There are two types of interrupt level programs that break into the base level, the timed interrupt and the demand interrupt. After the interrupt level has completed its allocated work, control is returned to the base level.

2.42 Timed Interrupts: Timed interrupts occur every 10 milliseconds and are hardware-initiated. Timed interrupts include such call processing functions as immediate start trunk scanning, digit receiving, or digit outputting.

2.43 Demand Interrupts: This type of interrupt breaks into the base level when a fault or trouble of high priority is detected. Demand interrupts are initiated by mismatches between the on-line and off-line call stores, by some peripheral unit and IO errors, or by manual request. When a demand interrupt occurs, the trouble recovery programs are immediately initiated. Following appropriate recovery actions, the problem is passed to the lowest priority base level maintenance programs for further resolution.

E. Call Processing

2.44 This part is a generalized explanation of typical calls being processed by the No. 3 ESS. The call processing programs use several memory blocks to retain storage of data associated with junctors and lines during the duration of a call. Three of these storage blocks that are used in the description are as follows.

- **Transient Call Record (TCR):** A TCR is a 16-word block of temporary store assigned to monitor calls in a transient state. Some of the functions of the TCR are as follows:

- (a) store the state of the call
- (b) collect and send digits
- (c) record assigned service circuits
- (d) identify whether control of the call is at base level, interrupt level, or both
- (e) store progress marks that identify sections of stored instructions to be executed next.

- **Terminal Memory Record (TMR):** A TMR is a 4-word block of storage assigned to each junctor. For calls in progress (transient), the assigned TCR and scan point number of the connected circuits are stored in the TMR. For stable calls, the TMR stores the scan point numbers of the calling and called parties, and charging data.

- **Input Hoppers:** Input hoppers are used to store changes in the states of lines, trunks, junctors, and service circuits until the data is used by the software.

2.45 This description does not cover the processing of calls involving custom calling features. For a more complete description of call processing refer to Section 233-150-130, **Basic Call Processing**.

Intraoffice Call

Origination and Dialing Connection (Part 3, Figure 4)

2.46 When a customer originates a call by going off-hook, current flows through the ferrod

sensing element associated with that line. The off-hook state is reported to the CU by a scanner assigned to the line terminal when it is interrogated by the input monitor program. The scan point number is placed in the input hopper. A second scan is initiated to ensure the validity of the origination.

2.47 Upon detection of a service request, a TCR is selected to record the progress of the call. A customer dial pulse receiver (CDPR) and a path through the network from the line to the CDPR via a junctor are selected and connected. Supervision is maintained in the CDPR at this point. The CDPR is placed in its dial tone state. Dial tone is removed (or broken) by the release of a relay in the CDPR as soon as the start of the first digit is detected.

Digit Collection and Analysis and Ringing Connection (Part 3, Figure 5)

2.48 Dial pulses detected by the CDPR are counted or tones are translated into digits and recorded in the TCR. A translation of the first three digits defines the call type and the number of additional digits to expect.

2.49 After all digits are received and the call is determined to be intraoffice, terminating translation is done on the called number to determine the terminal equipment number (TEN) and terminating treatment. If the called line is determined to be idle (from line busy-idle status information in the MAS), a connection is established between the called line and a ringing circuit and the talking path is reserved. Audible ringing tone is applied to the calling line through the junctor. Every 100 ms the ringing circuit is scanned for off-hook (answer) and the junctor is scanned for on-hook (abandonment).

Talking Connection (Stable Call) (Part 3, Figure 6)

2.50 When the called line answers, the ringing circuit is released and the remaining part of the previously reserved talking path is established. During talking, the junctor is scanned every 100 ms for supervision. The TCR is idled and a terminal memory record (TMR) associated with the junctor maintains a record of the call during the talking state.

Disconnect (Part 3, Figure 7)

2.51 When a change to on-hook by either party is detected, the change is verified 150 ms later to ensure that it was a true on-hook. This is a safeguard against momentary on-hook conditions or hits which would cause disconnect actions to be performed prematurely. If the calling party goes on-hook first and a valid on-hook is detected, all network connections and the TCR are released. If the called party disconnects first, a 10-second time-out period is started. If the called party goes off-hook before time-out occurs, the talking connection is reestablished. After time-out occurs or the calling party disconnects, all network connections, the TCR, and the TMR are released.

Interoffice Calls

Outgoing Calls

2.52 When translation of the first three dialed digits (assuming the first digit is not a 0 or 1) indicates an interoffice call, the number of digits to expect and a route index are obtained from the translation information. The route index information provides the outgoing trunk group number, any digit prefixing and deletion actions which may be required, the type of transmitter to be used, the alternate route index to be used if all trunks are busy, and any special options if required. With this information, the calling line continues to be supervised from the CDPR, and the call proceeds as follows:

- (a) an idle outgoing trunk is selected
- (b) an idle transmitter, if needed, is selected
- (c) a network path between the transmitter and the trunk circuit is established
- (d) a network path between the calling line and the trunk circuit is reserved.

2.53 The idle transmitter, if needed, is connected through a junctor to the outgoing trunk. A seizure signal is sent to the distant office when a polarity and continuity check is made by the transmitter. If correct polarity is verified, outputting can begin under control of the distant office. On completion of outputting, the transmitter is released and supervision from the distant office is transferred from the transmitter to the trunk circuit. The

previously reserved path between the calling line and the trunk circuit is established and the CDPR is released. Every 100 ms the trunk is scanned via the scanner associated with the trunk for answer and the calling line is scanned via the junctor for possible abandonment. When the called line answers, the change in supervision from the distant office (via the trunk) is recognized. When a disconnect (on-hook) is detected at the junctor for the calling party or at the trunk for the called party, a calling party disconnect routine is implemented.

Incoming Call

2.54 Origination and Dialing Connection

(Part 3, Figure 8): Incoming calls are detected by the supervisory scan of incoming trunks. When a seizure is detected, the trunk circuit, identified by its scanned location, has a translation sequence performed which provides trunk class information necessary for processing the call. From this information, the CU determines if a receiver is to be used, the number of digits to be received, and the type of supervisory signals required. An idle multifrequency (MF) receiver, if needed, and the network path between the trunk circuit and the receiver are selected. For loop trunks, the junctor is put in the bypass state and supervision of the trunk is maintained via the incoming receiver. For non by-link operation, a start dial signal is transmitted to the distant office which, in turn, transmits four or more digits of the called line directory number.

2.55 Digit Analysis and Ringing Connection

(Part 3, Figure 9): When all the digits have been received and recorded in the main store memory, a directory number translation is performed. This translation provides the terminal equipment number of location and the terminating class-of-service information of the called directory number. If the called number is found to be busy, a tone circuit supplying busy tone is connected to the incoming trunk via a junctor. If the line is idle, audible tone (ringback) is provided by the junctor, a talking path is reserved, and ringing is applied to the called line.

2.56 Talking Connection (Part 3, Figure 6):

When the called line answers, a relay operates in the ringing circuit and ringing is automatically tripped. The previous connections are released and the reserved talking path is then established.

This is accomplished in the same manner as described for intraoffice calls.

2.57 Disconnect (Part 3, Figure 10): The

100-ms trunk supervisory scan program scans for disconnect (on-hook) at the junctor for the line and at the trunk for the calling party. Either end disconnecting starts talk-off timing (150 ms). If the distant end has disconnected first, a time-release period of 10 seconds is started. During this time, the called line is scanned every 100 ms for on-hook. Should the trunk be re seized during this timing period, the connection to the previously called line would be released and, if after the timed-release period the called line remains off-hook, the off-hook line is treated as a new origination. If the called line disconnects first, the on-hook is transmitted to the distant office.

3. FEATURE FLOW DIAGRAM

3.01 Figures 4 through 10 show the basic flow of calls being processed by the No. 3 ESS as described in Part 2 under E, Call Processing. The flowcharts show occurrences in logical sequences for the sake of simplicity and ease of understanding, while in reality many of the actions may be occurring simultaneously.

3.02 Figures 4 through 7 show the flow of typical intraoffice or outgoing calls. Figures 8 through 10 apply to incoming calls only. Figure 6 applies to all types of calls.

4. INTERACTIONS

4.01 Not applicable.

ATTRIBUTES

5. STATION/SYSTEM

5.01 The No. 3 ESS is designed to serve up to 5760 terminals. The system offers a wide range of features including TOUCH-TONE® and automatic number identification (ANI). ANI will be provided to a distant centralized automatic message accounting (CAMA) office. The Automatic Message Accounting Recording System (AMARS) is available with Issue 4 of the SO-2 generic program. AMARS in the No. 3 ESS is accomplished via AMARC centers.

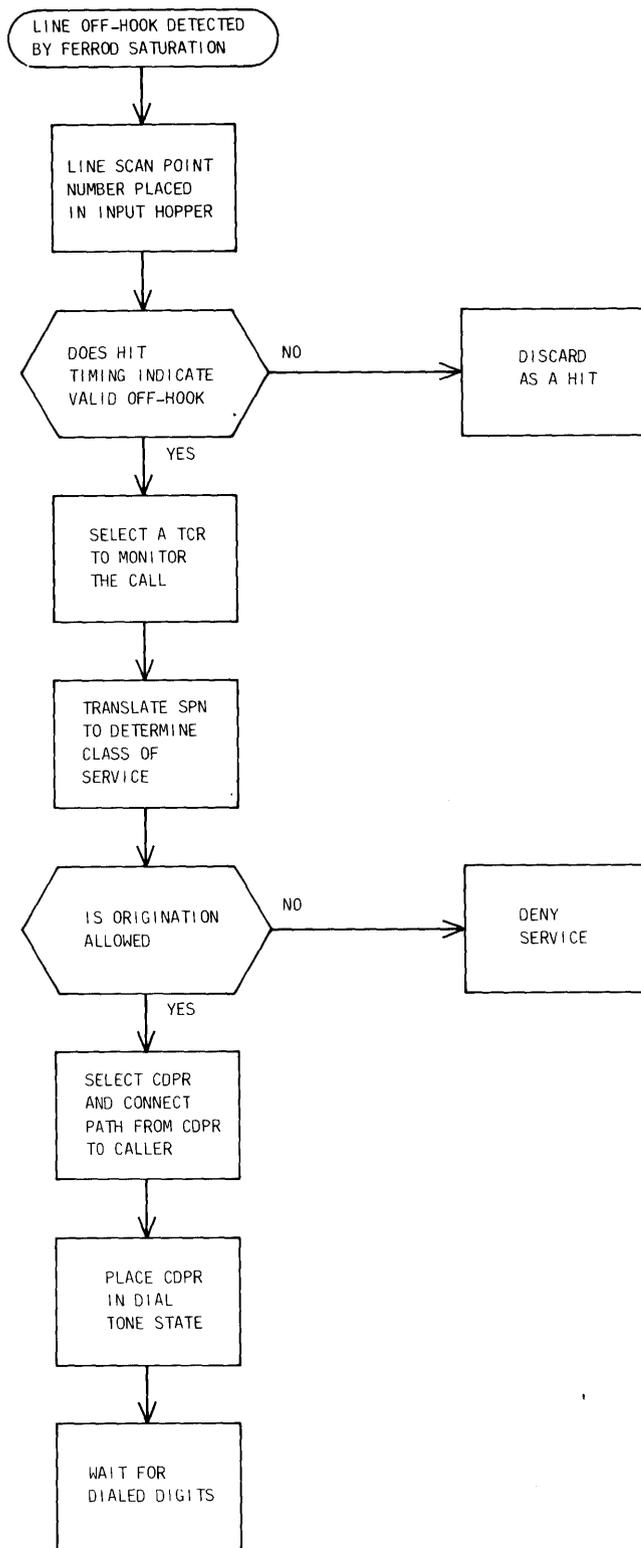


Fig. 4—Origination and Dialing Connection (Intraoffice and Outgoing Calls)

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5.02 The No. 3 ESS is capable of providing local tandem switching functions. Intertoll or CAMA traffic cannot be switched on a tandem basis through the No. 3 ESS.

5.03 The No. 3 ESS offers 32 major classes of service and capability for eight office codes. Office codes can be shared using the thousands digit translation for differentiation. The limit is 30 combinations of office codes and thousands digits.

5.04 Tables A through D contain information concerning features of No. 3 ESS as follows:

- Line Features—Table A
- Trunk Features—Table B
- Routing Features—Table C
- Miscellaneous Features—Table D.

Trunking Capabilities

5.05 The No. 3 ESS offers the following trunking capabilities:

- Outgoing local (Extended Area Service—EAS)
- Incoming local (EAS)
- 2-way local (EAS) (E&M)
- 2-way operator office (E&M)
- Outgoing recording completing
- Incoming toll switch
- Outgoing CAMA
- Incoming toll
- Incoming from local test desks No. 14 and 16
- Outgoing intercept
- Outgoing verification request
- Outgoing TSP and TSPS
- Local tandem.

General Features of No. 3 ESS

5.06 The following list is a glossary of features offered by the No. 3 ESS.

Billing Treatment

- (a) ANI—automatic number identification for toll calls. Calling numbers are outpulsed to a CAMA center.
- (b) Bill to Listed Directory Number—LDN outpulsed to CAMA on billable DDD calls.
- (c) Flat Rate—permits calls to a group of selected NXX codes without additional charge.
- (d) Free Terminating—answer supervision is not returned when such a line is called.
- (e) Hotel-Motel—same requirements as message rate service plus provision of a remote display of the total number of message units on originating calls to billable destinations.
- (f) AMARS—Automatic Message Accounting Recording System is used to generate and complete certain call information associated with calls that originate in the No. 3 ESS. AMARS in the No. 3 ESS is accomplished by transmitting billing information over a data link to an Automatic Message Accounting Recording Center (AMARC).
- (g) Message Rate—permits completion of calls to a group of selected single and multmessage unit destinations, which are assigned initial and overtime message periods, with charges made accordingly. Message rate service in the No. 3 ESS is provided by software message registers. When customers require message information to be displayed on the customer's premises, hardware message registers may be provided in addition to the software registers.
- (h) ONI—operator number identification for calls routed to the CAMA operator for charging.
- (i) QZ Billing—toll calls from lines having this feature are routed to a CAMA operator for identification.

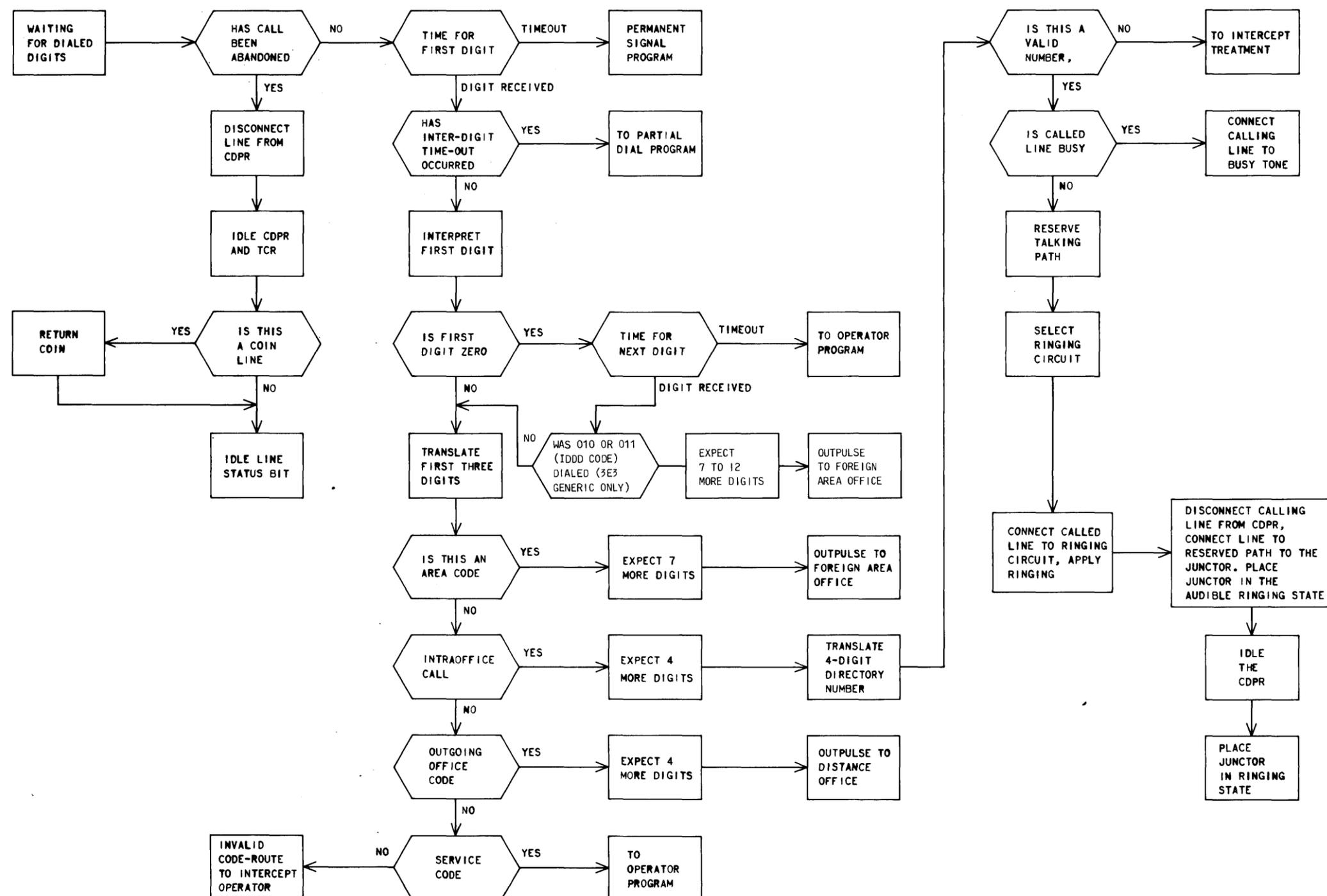


Fig. 5—Digit Collection and Analysis and Ringing Connection (Intraoffice and Outgoing Calls)

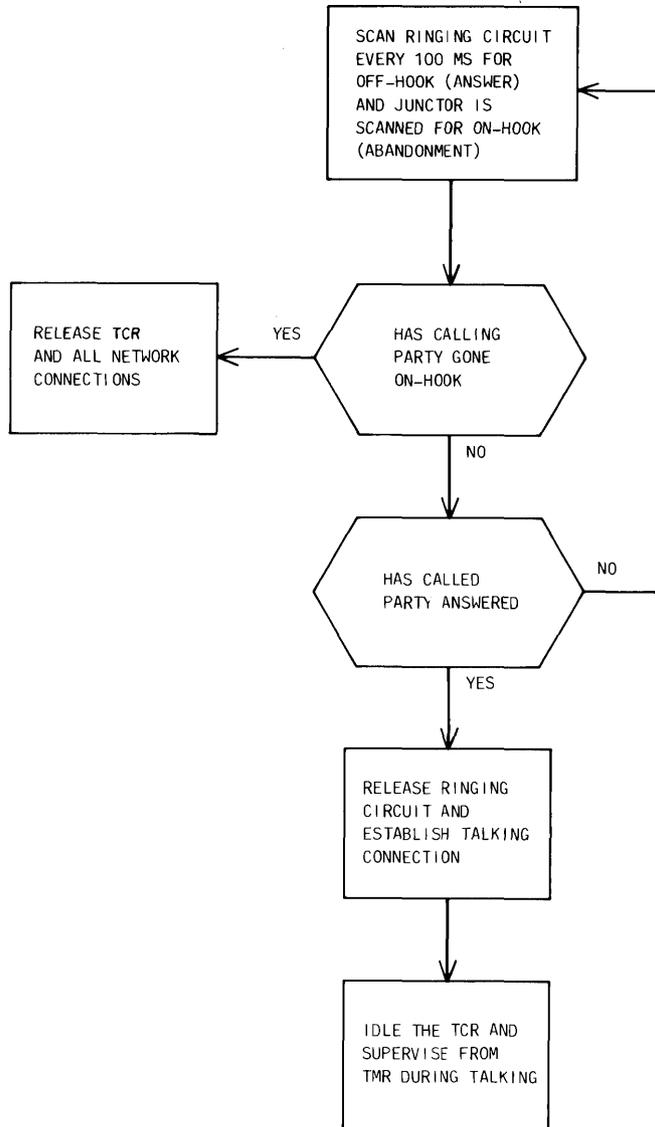


Fig. 6—Answer Detection and Talking Connection (All Types of Calls)

Hunt Arrangements

- (a) **Multiline Hunt**—allows calls to hunt over a preselected group of customer facilities in order to connect a calling party with an idle facility within the group.
- (b) **No Hunt**—the No. 3 ESS is capable of associating directory numbers with individual facilities which may also be part of a multiline hunt group. Calls to these directory numbers do not cause hunting to occur.

- (c) **Series Completion**—allows calls to be routed to any designated directory number within the same office code if the original number is busy.

Custom Calling Features

- (a) **Call Forwarding**—when activated by a station user, this feature automatically routes calls intended for his station line to another station line the user has designated. Forwarded calls may be toll charged if the forwarded-to party is in a different rate area.
- (b) **Call Waiting**—permits a customer who is in the talking state of an established call to be notified of an incoming call. The customer may then elect to receive the second call, via switchhook flash while holding the existing connection.
- (c) **Speed Calling**—permits a station user to originate calls to frequently called numbers by dialing predesignated codes consisting of fewer digits than normally required. Speed calling lists may contain 8 or 30 entries or both. Individual entries may be changed by the subscriber.
- (d) **Threeway Calling**—a station user can add a third party to any established call for a 3-party conference without the assistance of an operator.

Miscellaneous Features

- (a) **Call Tracing**—on both intra and interoffice calls, provides originating line identification or incoming trunk identification on calls completed to a specified line or number.
- (b) **Zone 16 Service**—No. 3 ESS offices provide for zone 16 service. Refer to **Customer Loop Design Rules** for details.
- (c) **Make-Busy**—permits the business customer to make lines appear busy to the central office for any subsequent terminating calls.
- (d) **Noise Immunity Line**—circuit used to prevent false service requests due to longitudinal noise on lines.

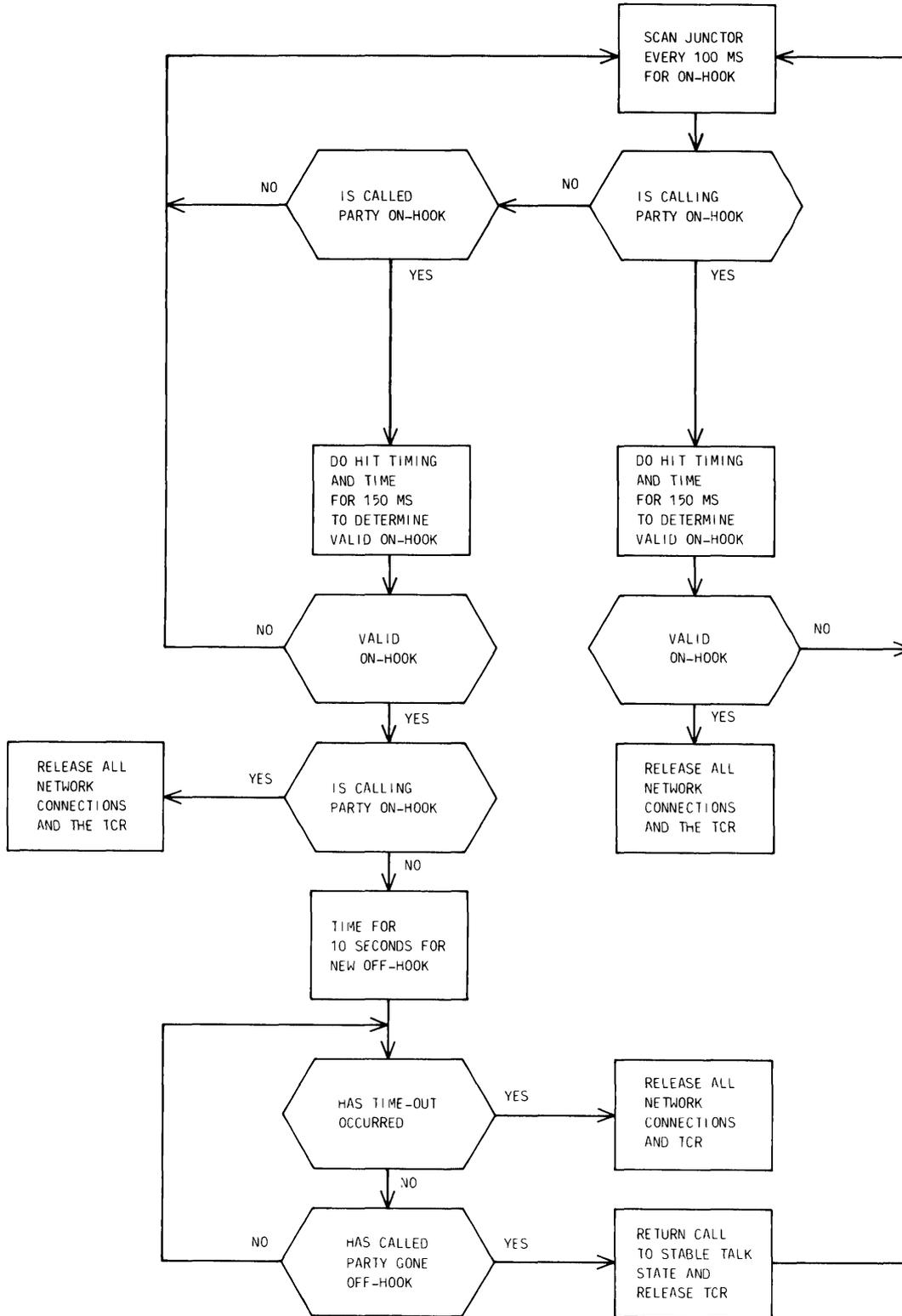


Fig. 7—Disconnect (Intraoffice and Outgoing Calls)

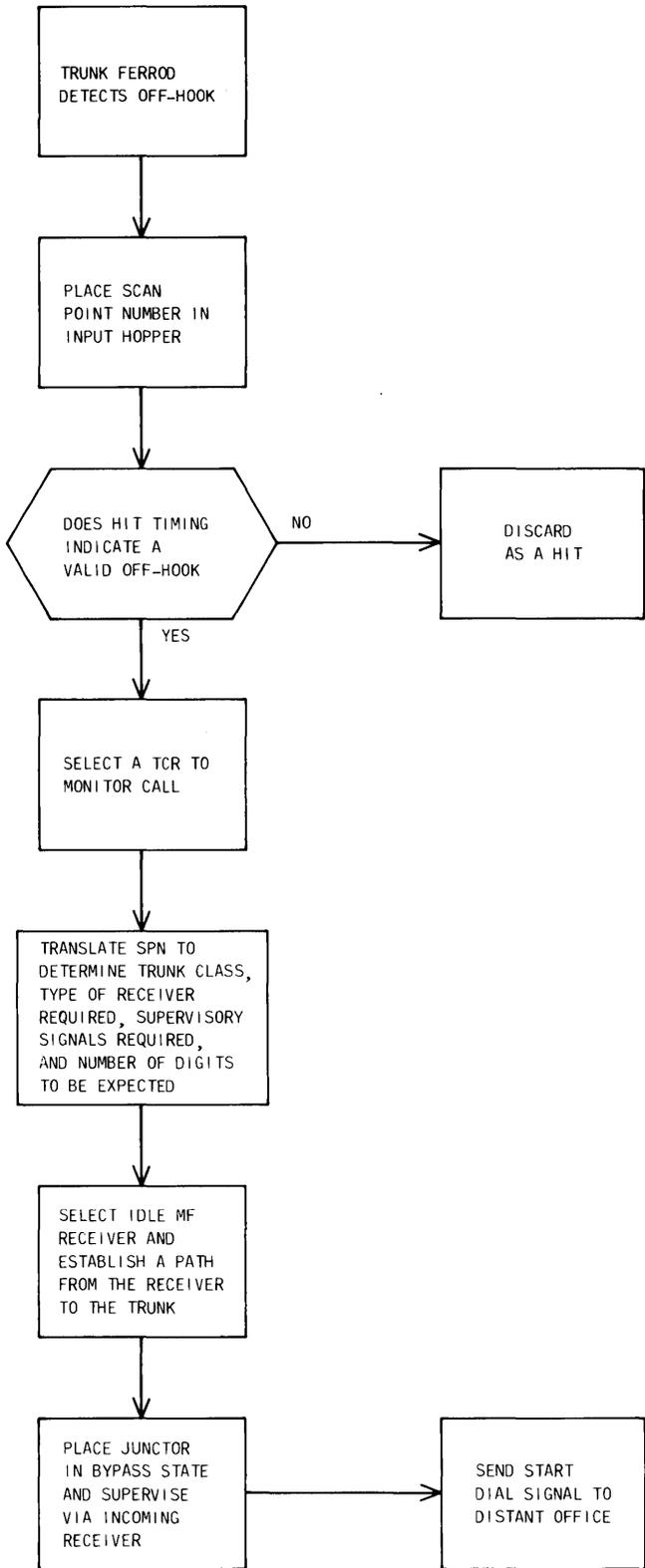


Fig. 8—Origination and Dialing Connection (Incoming Calls)

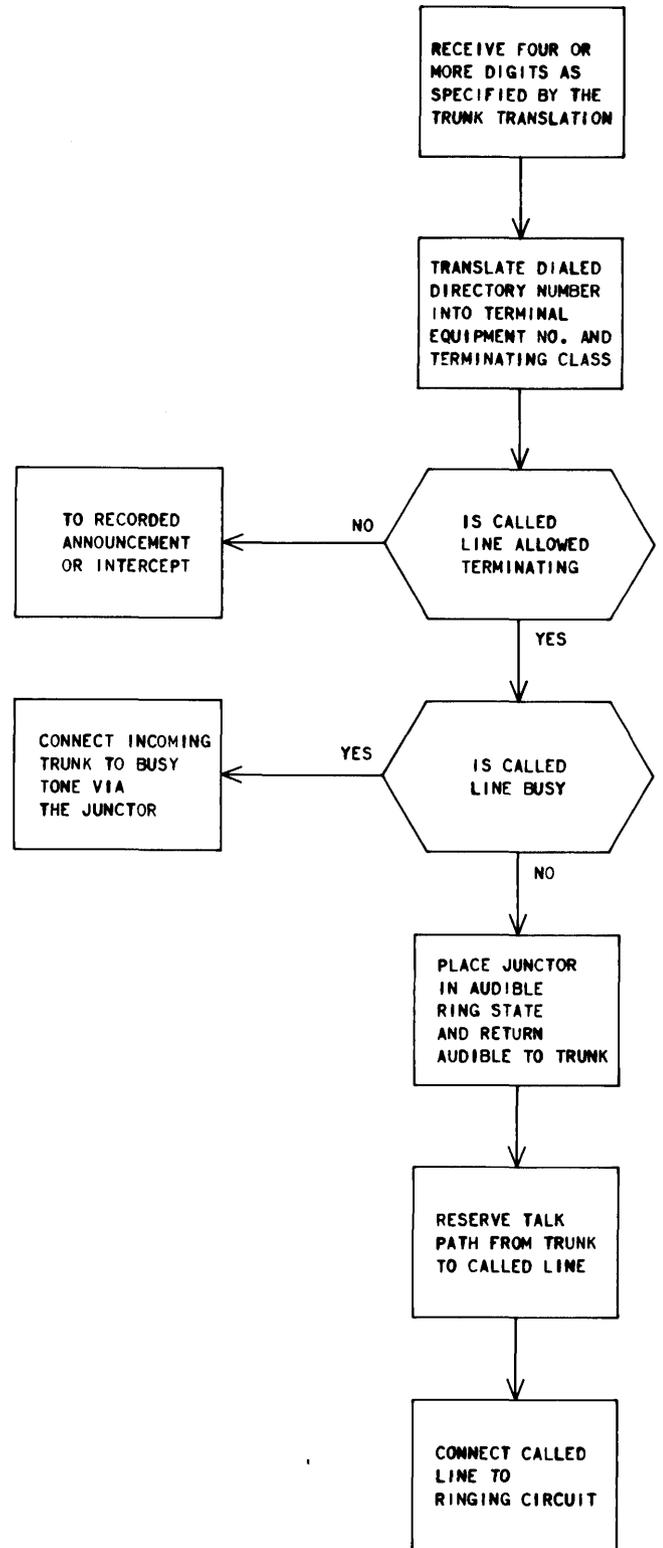


Fig. 9—Digit Analysis and Ringing Connection (Incoming Calls)

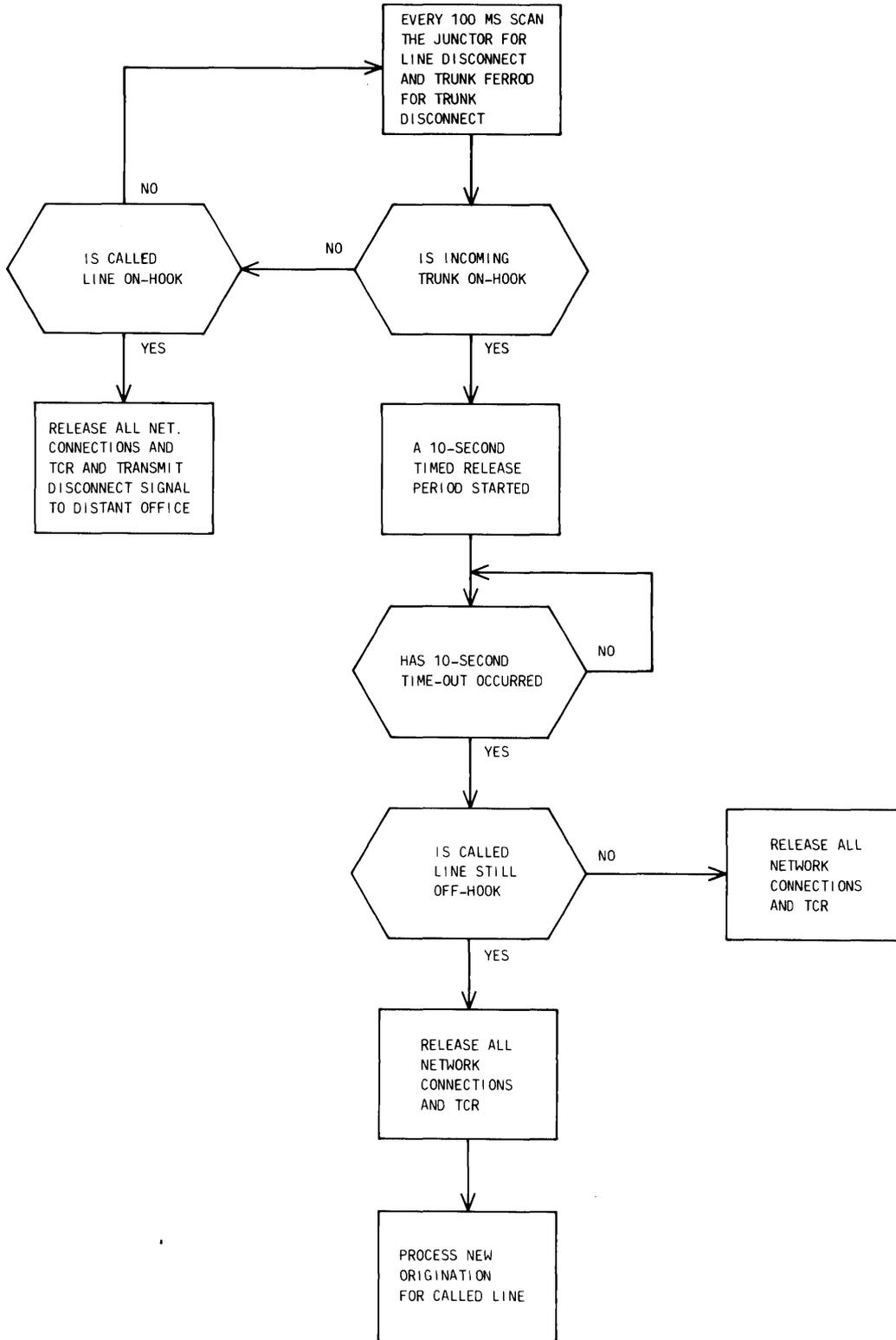


Fig. 10—Disconnect (Incoming Calls)

TABLE A

LINE FEATURES

LINE FEATURE	TYPE OF LINE					
	SINGLE PARTY				MULTIPARTY	
	RES BUS	MAN	PBX	COIN	2	4&8
Originating	X	X	X	X	X	X
Terminating	X	X	X	X	X	X
Flat Rate	X	X	X	—	X	X
Message Rate	X	—	X	—	X	—
Hotel — Motel (To TSP/TSPS)	—	—	X	—	—	—
Free Terminating	X	X	X	—	—	—
TOUCH-TONE®	X	—	X	X	X	X
Dial Pulse 10 PPS	X	—	X	X	X	X
ANI	X	—	X	X	X	—
ONI	X	—	X	—	X	X
Bill to Listed Number	X	—	X	—	—	—
QZ Billing	X	—	X	—	—	—
Remote Message Register	X	—	X	—	X	—
Software Message Register	X	—	X	—	X	—
Reverting Calls	—	—	—	—	X	X
Plug Up List	X	X	X	X	X	X
Emergency Manual Line	X	X	X	—	—	—
Emergency Line (Fire, Police)	X	X	X	—	—	—
Denied-Originating	X	X	X	X	X	—
Denied-Terminating	X	X	X	X	X	X
Loop Start	X	X	X	X	X	X
Ground Start	X	—	X	X	—	—
Immediate Ring	X	X	X	X	X	X
Coin First	—	—	—	X	—	—
Dial-Tone-First	—	—	—	X	—	—

TABLE A (Contd)

LINE FEATURES

LINE FEATURE	TYPE OF LINE					
	SINGLE PARTY				MULTIPARTY	
	RES BUS	MAN	PBX	COIN	2	4&8
Retain Coin on 0 or X11	—	—	—	X	—	—
Return Coin on 0 or X11	—	—	—	X	—	—
Local Overtime	—	—	—	X	—	—
Multiline Hunt	X	—	X	—	—	—
Series Completion	X	—	X	—	—	—
No Hunt	X	—	X	—	—	—
Make Busy	X	—	X	—	—	—
Dynamic Service Prot	X	X	X	X	X	X
Group Alerting	X	—	—	—	—	—
Call Waiting	X	—	—	—	—	—
Speed Calling	X	—	X	—	—	—
Threeway Calling	X	—	—	—	—	—
Call Fowarding	X	—	X	—	—	—
Toll Diversion	—	—	X	—	—	—
Toll Restriction	X	X	X	X	X	—
Local Service Observing	X	X	X	X	X	X
Line Lockout	X	X	X	X	X	X
Call Tracing	X	X	X	X	X	—
Nonsynchronized Audible	X	X	X	X	X	X

RES — Residential

BUS — Business

MAN — Manual

PBX — Private Branch Exchange

COIN — Coin Station

(e) Plug-Up-List—calls to lines on this list are routed to trouble intercept.

(f) Reverting Calls—calls originated by 2-, 4-, or 8-party stations which are terminated on stations served by the same line.

(g) Sleeve Lead—provides sleeve lead functions for such services as line service observing or busy indication.

(h) Toll Diversion—places a restriction on the calling area available to PBX extensions by transmitting a diversion signal to the PBX.

TABLE B

TRUNK FEATURES

TRUNK FEATURES	LOCAL			OPERATOR		OGT CAMA OR TSP/TSPS	TOLL ICT	LOCAL TEST DESK #14 & #16 ICT
	OGT	ICT	2-WAY	REC COMP	TOLL SWITCH			
E&M Lead	X	X	X	X	X	X	X	—
Reverse Battery	X	X	—	X	X	X	—	X
Immediate Start	X	X	X	—	—	—	—	—
Wink Start	X	X	X	—	X	X	X	X
Delay Dial	—	—	—	—	—	—	X	—
Stop — Go	X	—	X	—	—	—	—	—
Dial Pulsing	X	X	X	—	—	—	X	X
Multifrequency Pulsing	X	X	X	—	X	X	X	—
Inband Coin & Rering	—	—	—	X	X	X	—	—
Class of Service Tone	—	—	—	X	—	—	—	—
Automatic Ring	—	—	—	—	X	—	—	—
No Test Access	—	—	—	—	X	—	—	X
Local Tandem	X	X	X	—	—	—	—	—

OGT — Outgoing Trunk

ICT — Incoming Trunk

REC COMP — Recording Completing

TABLE C
ROUTING FEATURES

ROUTING FEATURE	
Access Codes	0+, 1+
Service Codes	X11, 11X (Converted to X11 for processing)
Emergency Service Bureau	911
Directory Assistance (Information) Codes	411, 1+411, 555-1212, 1+555-1212, NPA+555-1212, 1+NPA+555-1212
TSP/TSPS Access	0, 0+, 1+
Dialing Plan	1, 3, 7, 10 Digit Dialing (Exclusive of Access Codes) (Format = NXX-NXX-XXXX where: N = 2-9, X = 0-9)
Alternate Routing	Up to 2 Alternate Routes
Shared Office Code with Another Office	Via Thousand's Digit Translation
Foreign Area Translation	Up to 3 Foreign Area Translators (Optional)
Extended Area Service (EAS)	—

TABLE D

MISCELLANEOUS FEATURES

MISCELLANEOUS LINE FEATURES
Partial dial treatment Permanent signal treatment 8-Party semiselective ringing and 4-party full selective 8-Party divided code ringing and 4-party semiselective Sleeve lead function 32 Major classes of service 8 Incoming office codes 256 Routes
MISCELLANEOUS TRUNK FEATURES
Delete digits (up to 7 or all) Prefix digits (up to 3)
MISCELLANEOUS EQUIPMENT ARRANGEMENT FEATURES
7-Foot frames — Single sided Fire detection Earthquake and disaster bracing (optional) RF and External Power Protection (optional) Unitized Equipment Arrangement Loose Frame Shipment (optional)
MISCELLANEOUS HARDWARE FEATURES
Low profile combined distributing frame Protector units Reuse of existing protector and MDF (optional) Power plant — solid state, 151A type Ringing and tone supply plant, 1/2 amp

- (i) Toll Restriction—customers with this class of service are permitted to complete calls to preselected NXX codes in certain NPAs.
- (j) 911 Calls—Customers dialing 911 are connected to the emergency service bureau. The service bureau can hold the connection for as long as the attendant remains off-hook. Other features provided are emergency ringback, switchhook status, and abandoned call indications.

Protective Arrangements

- (a) Dynamic Service Protection—lines designated class A (eg, fire, police, etc) are given preference over class B lines for originating calls when overload conditions are reached in emergency situations.
- (b) Overload Announcement—an overload announcement is available that can be enabled by the maintenance TTY or by a remote traffic TTY. This announcement, when enabled, is heard instead of overflow tone when the connected junctor is placed in the overflow state. This feature will be available in 3E3 and later generics.

Coin Features

- (a) Coin First—requires deposit of the initial coins before the customer receives dial tone.
- (b) Dial Tone First—dial tone returned without deposit; no initial deposit required for dial 0 calls.
- (c) Local Coin Overtime—this feature is used when local coin overtime charging is provided.

Permanent Signal and Partial Dial Treatment

- (a) Partial Dial—such calls are routed to tone or announcement and then given permanent signal treatment, if necessary.
- (b) Permanent Signal—such a condition exists if a line fails to disconnect after a call is torn down or if an originating line remains off-hook for an excessive period of time without transmitting digits. In No. 3 ESS, this condition is handled more efficiently than in other ESS systems. A sequence of tones and then an operator challenge is initiated to alert the subscriber. If action is not taken by the

subscriber, the line goes to the “high and wet” state. Any combination of these steps may be provided at the option of the operating company. With Issue 3 of SO-2 and later generics, when a line is put in the permanent signal stage (ie, the line’s status bits are changed to the permanent signal status indication) the line is entered into the high and wet list. Each member that is in the list is scanned for on-hook at a 100 millisecond scan rate. The normal line scan only scans for originations and not for changes from permanent signal to normal idle as was done with earlier generics (earlier than Issue 3 of SO-2). The two ways a line can go from permanent signal to normal idle are:

- (1) If a line on the high and wet list goes on-hook, the line’s status is changed to normal idle since members of this list are scanned for on-hook at a 100 millisecond rate.
- (2) The high and wet list can contain a maximum of eight members and is a first in, first out list, ie, if the list is filled (eight members) when another member is entered into the list, then the first member that was entered into the list is now automatically removed from the list. The status of the removed line remains permanent signal, but now the line is not on the high and wet list; therefore, the line is now high and dry. Every line that is high and dry is scanned for on-hook every two minutes. If an on-hook is detected, then the line’s status is changed to normal idle. The line is out of service from the time the customer goes on-hook until the on-hook is detected (maximum of 2 minutes).

Trunk Signaling

- (a) Delay Dial (Incoming Loop Only)—the called office signals off-hook toward the calling end and remains in the off-hook condition until a register sender is attached and is ready to receive pulses. At that time, the called office changes to an on-hook condition which is a start dialing indication to the calling office.
- (b) Immediate Start—the originating distant switching system (usually SXS) does not wait for a start signal before sending dial pulses. The terminating switching system must be ready

to receive pulsing in less than 65 ms. The No. 3 ESS is ready in 40 ms.

(c) Stop-Go—a momentary off-hook signal, given during an interdigital interval, to indicate that dial pulsing should stop until the transition from off-hook to on-hook, or GO signal is returned. This feature is used when connected to a step-by-step tandem.

(d) Wink Start—a momentary off-hook (140 to 290 ms) signal sent from the terminating office to the originating office as an indication that outpulsing may begin at the end of the timed off-hook wink.

Miscellaneous Trunk Features

(a) Class-of-Service Tone—short tone to the operator which identifies the type of originating call.

(b) Inband Coin and Rering—coin collect, coin return, and rering signaled by a wink, followed by multifrequency tones.

(c) Multiwink—a series of on-hook winks to indicate operator released, operator attached, coin collect, coin return, or ringback from TSPS.

(d) No-Test Access—trunk is bridged onto an existing connection to enable an operator or maintenance personnel to complete calls to facilities which may be busy.

6. LIMITATIONS

6.01 Table E lists the performance specifications and limitations of the No. 3 ESS.

6.02 Table F lists the quantities of equipment and store sizes required for different size offices. The table is arranged according to the number of terminals required. There may be minor variations in these quantities depending on call rates, CCS, and custom calling features.

7. RESTRICTION CAPABILITY

7.01 Subscriber services may be allowed or restricted through use of 32 major classes of service. All restrictions may be invoked by translation changes using recent change TTY input messages.

8. COST DATA

8.01 For overall system costs, refer to the appropriate WECO pricing organization. For cost data on individual features of No. 3 ESS, refer to the 233 division Feature Documents.

INCORPORATION INTO SYSTEM

9. PLANNING

9.01 The following paragraphs describe the traffic engineering considerations for planning the installation of a No. 3 ESS central office.

Traffic Engineering Considerations

9.02 The No. 3 ESS system design permits a minimum of effort for the preparation of traffic information for the equipment order. Some of the reasons for this are listed in the following:

(a) No junctor engineering is required. Each network frame includes all of the network and junctors required for the addition of 384 terminals to the network.

(b) The 6:1 concentration ratio provided in the network design is fixed.

(c) Scanner engineering has been greatly simplified compared to other ESS systems. Scanner facilities for 512 scan points are included in each network frame. This, together with the 512 scan point master scanner in the control frame, should provide sufficient scan points for most applications.

(d) Space is provided on the network frames for trunks and service circuits. Additional space is provided on the control frame and the miscellaneous frame(s) which are always provided. All trunks, except the local test desk incoming trunk, are designed to be inserted in the universal trunk circuit unit which can be located in the network frame, control frame, and miscellaneous frame(s).

(e) Most scan points and all peripheral decoder points are preassigned on each network frame, reducing any engineering consideration in these areas. The number of peripheral decoder circuit packs required for other system functions must be determined. The quantity depends on

TABLE E

PERFORMANCE SPECIFICATIONS AND LIMITATIONS

TRAFFIC CAPACITIES				
Network traffic capacity — 20,300 CCS				
Call handling capacity — 11,000 Peak BHC				
LINE, TRUNK, SERVICE CIRCUIT CAPACITIES				
	MIN	MAX		
Terminals	384	5760		
Lines	—	4500 (approximately at 3.0 CCS/line O+T)		
Trunks	—	128 per trunk group (up to 128 groups)		
Service circuit groups	—	64		
Up to 16 series completion lines per series completion group.				
64 Maximum PBX entities each with a maximum of 64 central office access lines.				
SWITCHING LIMITATIONS				
Does not offer Centrex service				
BUILDING ENVIRONMENT				
	TEMPERATURE (°F)		RELATIVE HUMIDITY (%)	
	MIN	MAX	MIN	MAX
Recommended operating ranges*	40°	100°	20%	55%
Short term limits (3 days at a time, 15 days a year)**	35°	120°	20%	80%
<p>* Room ambient temperature is measured at a point along an equipment aisle at a distance 15 inches in front of the applicable unit and 5 feet above the floor.</p> <p>** The 20% relative humidity minimum is set for electrical charge considerations. At very low humidity there is danger of static discharge between tools and electronic equipment which could damage semiconductor devices.</p> <p>ESS equipment heat dissipation is not to exceed 20 watts per square foot.</p> <p>Air conditioning — as required to meet temperature and humidity requirements.</p>				
BUILDING PARAMETERS				
10 feet of clear ceiling height required.				
Floor loading — 150 pounds per square foot.				

TABLE E (Contd)

PERFORMANCE SPECIFICATIONS AND LIMITATIONS

CUSTOMER LOOP LIMITS
1600-ohm maximum customer loop length (not including 200-ohm station set) 10K ohms loop leakage limit (noncoin lines)
POWER REQUIREMENTS
Single phase commercial ac (60 Hz) power consumption of 55 to 110 amps at 120 volts. Single point grounding

the number and type of trunks and service circuits.

(f) Processor engineering considerations involve providing sufficient memory to handle the traffic and translation for lines, trunks and service circuits. See Table F for general guidelines. For more details, refer to Network Design Sections 233-060-ZZZ.

9.03 Because of the considerations in 9.02, traffic engineering is required for determining the number of network frames, trunk circuits, service circuits, and memory modules. The following paragraphs comment on network and service circuit requirements.

Frame Requirements

9.04 For all frames other than network frames, refer to Table G for guidelines. The following text discusses the network frame requirements.

Network Frames

9.05 The No. 3 ESS is designed to serve as a small electronic office with a maximum capacity of approximately 4500 lines using 15 network frames. The line capacity of any No. 3 ESS is dependent on the following factors: (1) CCS load on the network, and (2) terminal requirements (total lines, trunks, and service circuits to be assigned to the network frame).

9.06 The No. 3 ESS uses a folded network. The terminal CCS capacity of each network frame is 1355 CCS and the terminal capacity is 384 terminals. The smallest unit of line growth in

the No. 3 ESS is the network frame or 384 lines. The procedures for calculating network frame requirements are outlined in the 233-060-ZZZ series.

9.07 Figure 11 can be used to estimate the line capacity and network frames for planning purposes. An adjustment is made in the curves of Figure 11 to include terminals required for trunks and service circuits based on the %IAO. Enter Figure 11 with the number of working lines and the O+I CCS/line to determine the line capacity and the number of frames required. Figure 11 can also be used with the O+T CCS/line by converting O+T CCS/line to O+I CCS/line with the following conversion:

$$O+I \text{ CCS/line} = (O+T)(1-\%IAO/200)$$

Figure 11 is based on the following approximations:

$$\text{Network Frames (CCS limited)} \approx (O+T) \text{ CCS/line} \times (2-\%IAO/100)/1355$$

$$\text{Network Frames (CCS limited)} \approx (O+I) \text{ CCS/line} \times \text{lines} \times 2/1355$$

$$\text{Network Frames (terminal limited)} \geq \text{lines} + \text{trunks} + \text{service circuits} + 5\% \text{ administrative spares}/384$$

Service Circuits

9.08 Part 10 lists the service circuits available in No. 3 ESS. These circuits are engineered on a CCS basis. Procedures for determining service circuit requirements are included in the 233-060-ZZZ series.

10. HARDWARE ENGINEERING

10.01 The major hardware units required for No. 3 ESS are listed in this part. Also listed are trunks, service circuits, and miscellaneous special circuits. For a complete listing of circuits and their corresponding SD and CD numbers, refer to Part 23, REFERENCES.

10.02 The No. 3 ESS equipment is arranged in a fixed floor plan arrangement as shown in Figure 12. This floor plan makes efficient use of floor and building space.

Framework

10.03 The No. 3 ESS uses frames that are seven feet high and two feet, two inches or four feet, four inches wide. The processor frame, maintenance frame, test frame, power frame, and supplementary power frame are 18 inches deep. All other frames are 12 inches deep. A brief description of the No. 3 ESS frames is given in the following paragraphs.

10.04 Processor Frame (J1C058B): The processor frame (Figure 13) houses the two 3A CCs, the main store memories, the 3A CC control panels, and power converters. The processor frame makes extensive use of integrated circuit hardware. Since the No. 3 ESS uses a serial bussing arrangement, the processor requires very little cabling between it and the periphery. One double bay processor frame is required per office.

10.05 Network Frame (J3H001B-1): Each network frame (Figure 14) provides the first and second stage remreed switches for 384 terminals, 32 junctors, 24 universal trunk circuits, 4 CDPRs, 3 regular ringing circuits, and associated control equipment. This approach of providing all the equipment necessary for each increment of network growth on a single bay frame reduces the frame count for a small office, thereby minimizing material, engineering, and installation costs. Since neither optional units nor optional wiring (except for ground start, loop start option for ferroids) is required on the network frame, the only variation between frames is the quantity and type of circuit packs for trunks and service circuits. The first and second stages of the network are connectorized to facilitate repair and are organized to minimize interruption of service during repair. All trunk units (except local test desk trunks) are

universally wired to accept the most commonly used trunk circuits. One to 15 network frames may be equipped.

10.06 Control Frame (J3H001C-1): The control frames 0 and 1 (Figure 15) house the duplicated peripheral controllers with the associated +3 volt power converters and the third stage of the network. The network third stage is also connectorized to facilitate repair and growth to the 16 by 16 matrix of switches required when the number of network frames exceeds 7 frames (or 2688 terminals). The remaining space on the frames is reserved for trunk and service circuits which do not grow proportionally with network or additional equipment. Control frame 0 is equipped to accommodate the first seven network frames. It also contains the master scanner matrix and terminal strip units. Control frame 1 is equipped to accommodate network frames 8 through 15.

10.07 Low Profile Combined Distributing Frame (ED-97797-70): The distributing frame (Figure 16) for No. 3 ESS is called a Low Profile Combined Distributing Frame (LPCDF). This frame is nine feet high, two feet wide (or optionally 2.5 feet wide) and is equipped in increments of nine vertical units. This arrangement provides for terminating and cross-connecting 3840 network terminal pairs. The LPCDF may be equipped with up to two such modules to accommodate a maximum of 5760 terminals or 15 network frames.

10.08 Maintenance Frame (J1C060A-1): The maintenance frame (Figure 17) houses the system status panel, tape data controllers, tape cartridges, TTY controllers, and the maintenance TTY. The maintenance frame is equipped on a one per office basis.

10.09 Test Frame (J3H001D-1): The test frame (Figure 18) contains the trunk and line test panel and test circuits required for maintenance of the trunks, junctors, and service circuits and some system functions. The test frame is equipped on a one per office basis.

10.10 151A Power Plant (J86872A-1): The power plant is shown in Figure 19 and is made up of a power frame and a supplementary power frame. The power frame is a double bay frame equipped on a one per office basis and houses fuse panels, a power control, and three -48 volt, 100-amp rectifiers. The supplementary power

TABLE F
EQUIPMENT AND STORE REQUIREMENTS

TERMINALS	QUANTITIES														
	0-384	385-768	769-1152	1153-1536	1537-1920	1921-2304	2305-2688	2689-3072	3073-3456	3457-3840	3841-4224	4225-4608	4609-4992	4993-5376	5377-5760
*Network Frame(s)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Control Frame 0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Control Frame 1	0	0	0	0	0	0	0	**1	1	1	1	1	1	1	1
Miscellaneous Frames (Minimum)	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2
Maintenance Frame	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Test Frame	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Processor Frame	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Combined Distributing Frame	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2

*Based on terminal limited network

**Expansion of third stage switch

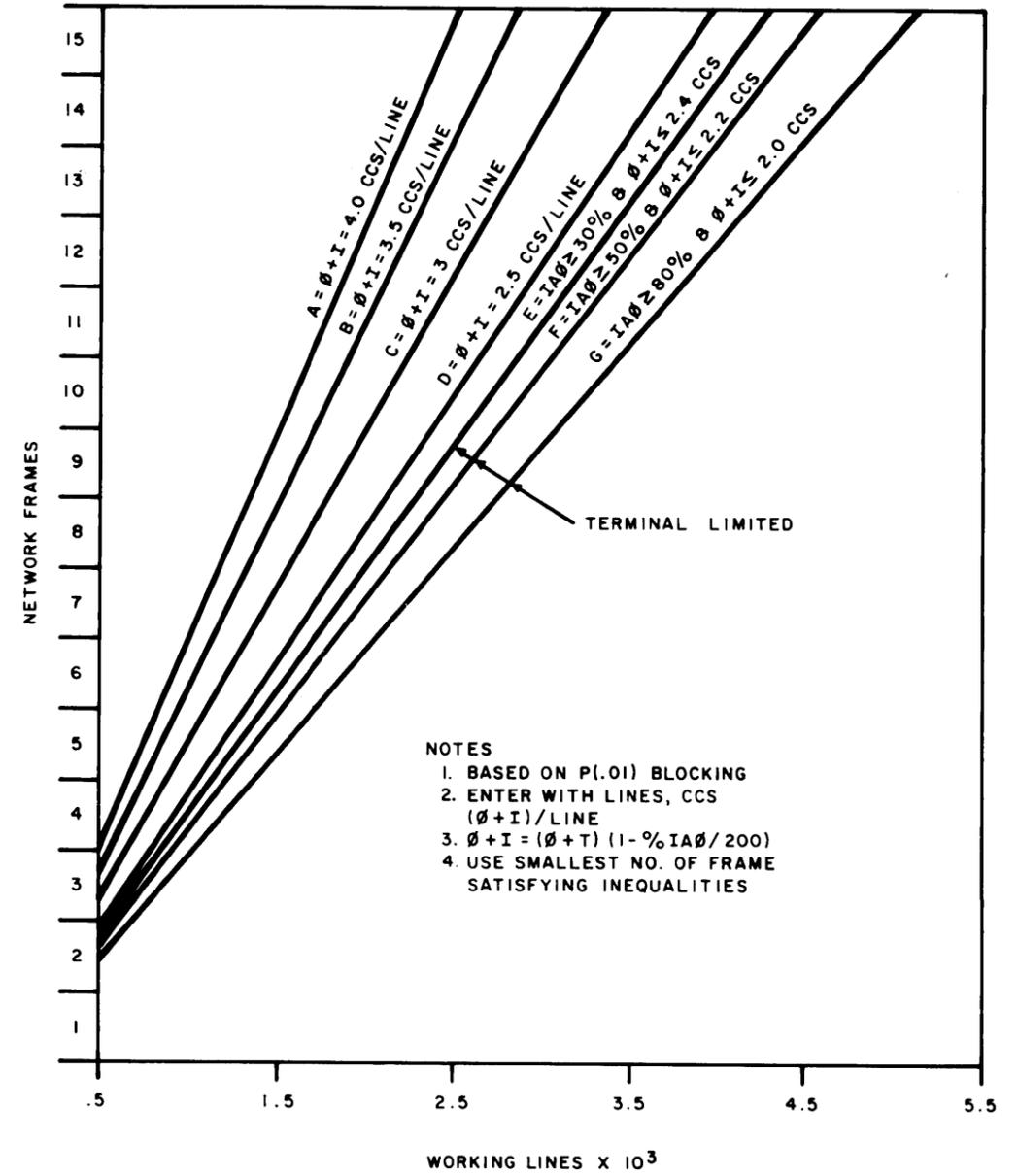
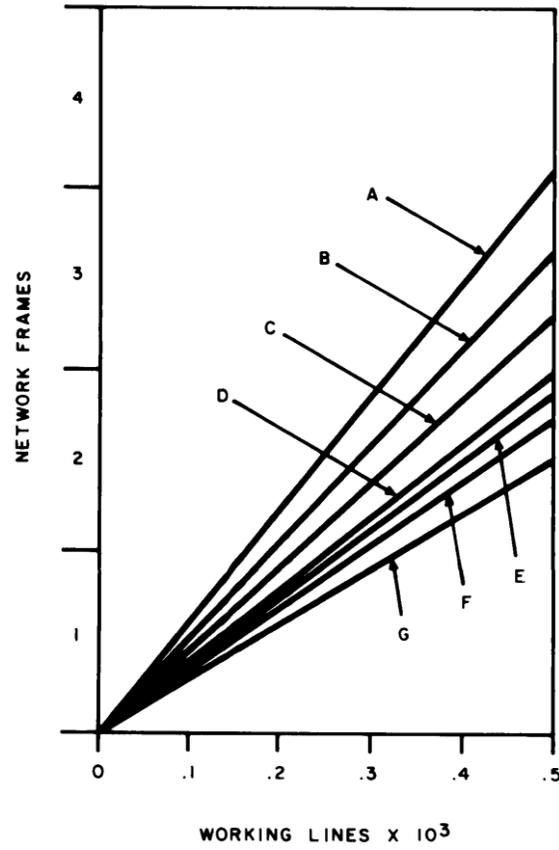


Fig. 11—No. 3 ESS Estimated Network Requirements

NO. 3 ESS FULLY EQUIPPED OFFICE FLOOR PLAN

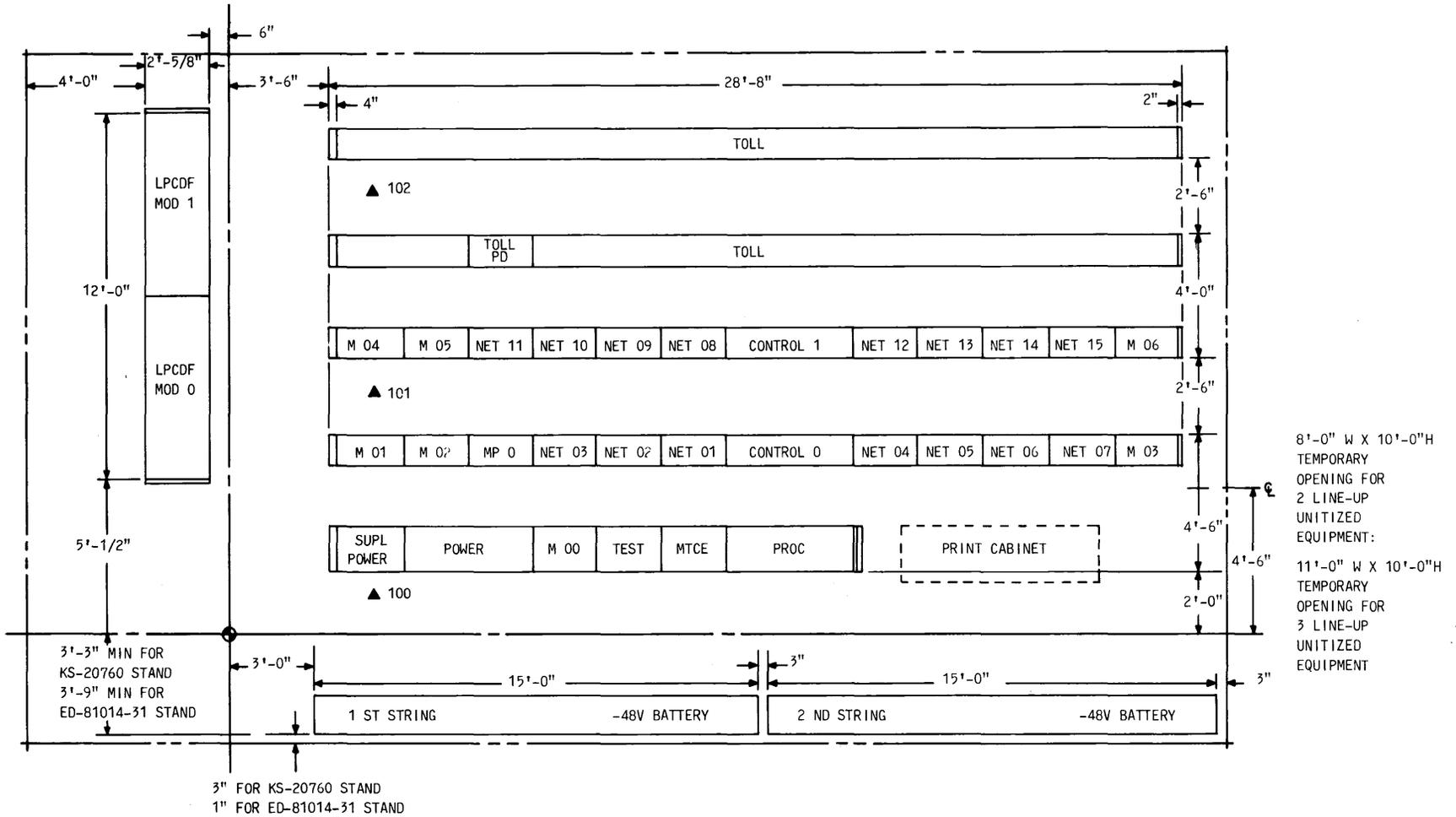


Fig. 12—No. 3 ESS Floor Plan

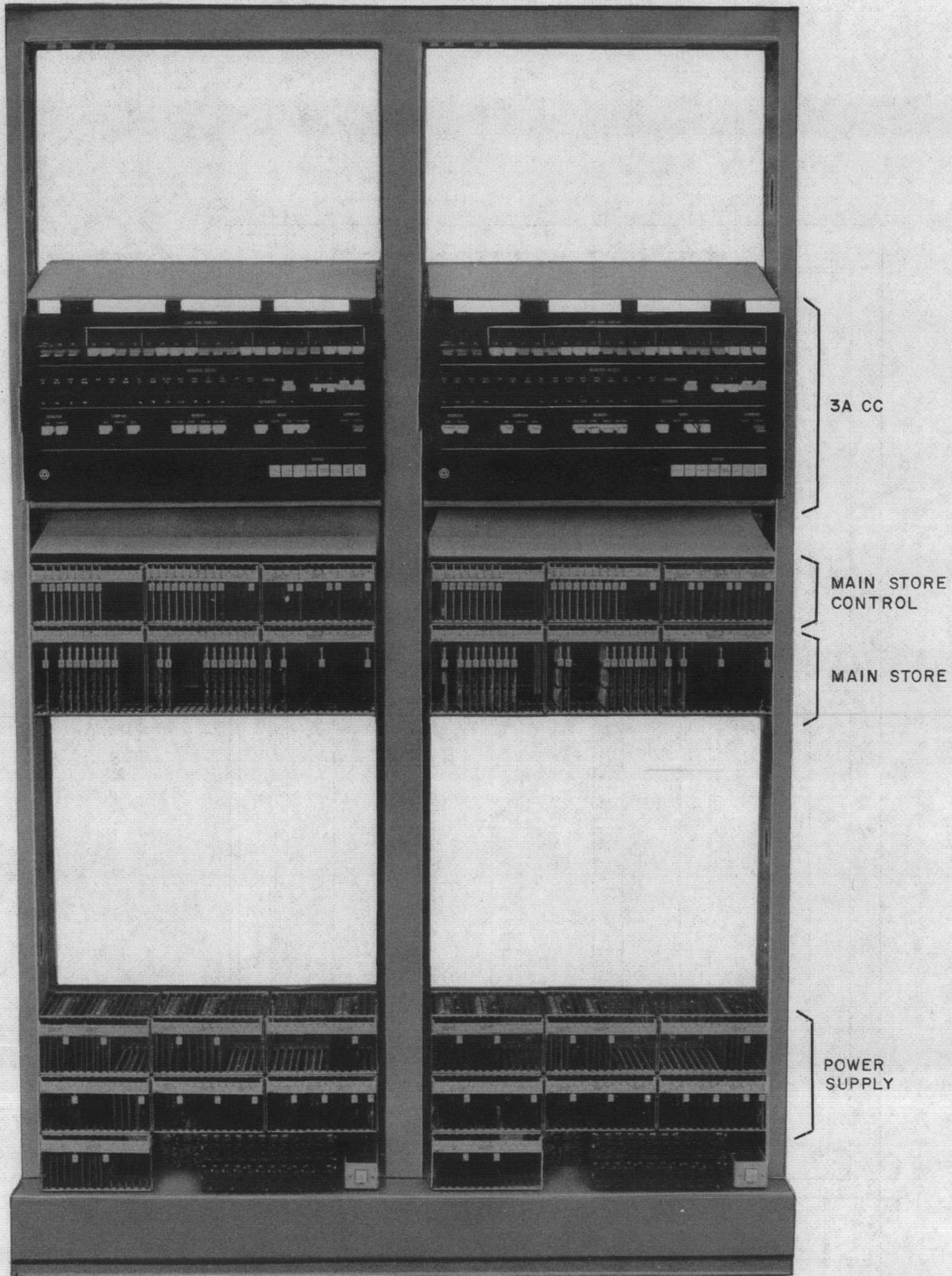


Fig. 13—Processor Frame

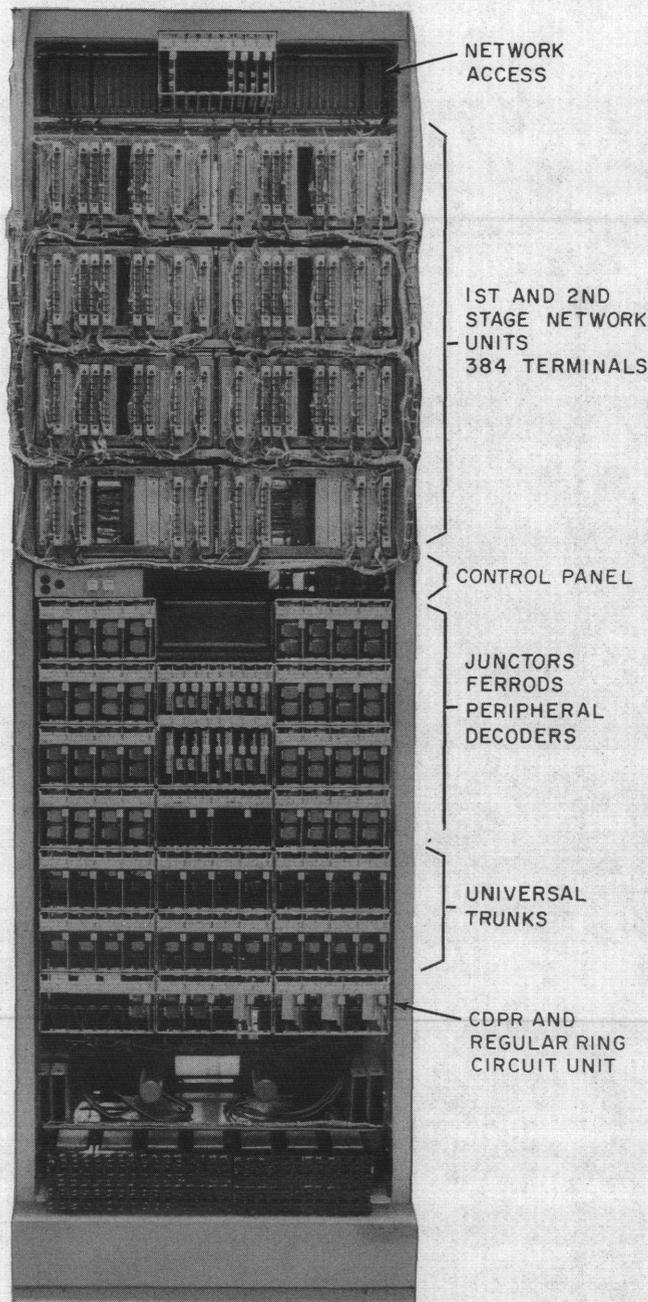


Fig. 14—Network Frame

frame provides space for two additional -48 volt, 100-amp rectifiers and their associated fuse panels. This frame plus the power frame comprises a full sized 400-amp 151A plant. The full power plant has the capacity for a maximum size No. 3 ESS with a reserve of 300 amps for transmission equipment.

10.11 *Miscellaneous Power Frame*

(J87824A-1): The miscellaneous power frame (Figure 20) contains the ringing and tone plant and the converter plants for +24 volts, +48 volts, and ± 130 volts. Converters for other voltages are located on the processor, maintenance, and control frames. No. 3 ESS provides no +24, +48, or ± 130 volt power to non-ESS frames.

10.12 *Miscellaneous Frame (J3H001E-1):*

The miscellaneous frame contains trunk and service circuits which do not fit on the network frames or control frames. At least one miscellaneous frame is required in every office. Additional miscellaneous frames are provided as necessary.

Line Circuits

10.13 Five auxiliary line circuit types can be used in a No. 3 ESS installation. These line circuit types and their applications are listed in the following paragraphs.

10.14 *Public Emergency Line Circuit*

(SD-26164-01): This circuit is used to terminate up to ten different simultaneous calls to a public emergency line (eg, fire department) and ring the station or stations on this line. The answering station, after determining the emergency, operates a key which causes the circuit to sound a siren.

10.15 *Group Alerting Line Circuit*

(SD-95883-01): This circuit provides means, independent of the switching network, to alert a special group of customers over regular message telephone lines. This circuit, typically used for volunteer fire departments, may be activated from up to three remote control points.

10.16 *Emergency Line Circuit (SD-96469-01):*

This circuit is used to allow operators to complete direct emergency calls (independent of the switching machine) to police, fire, or other emergency lines. It also allows operators to bridge across existing calls to these lines. Since the circuit is applied only to terminal hunting groups, additional incoming calls from the switching machine will hunt for an idle terminal.

10.17 *Noise Immunity Line Circuit*

(SD-3H208-01): The noise immunity line circuit is used when excessive environmental

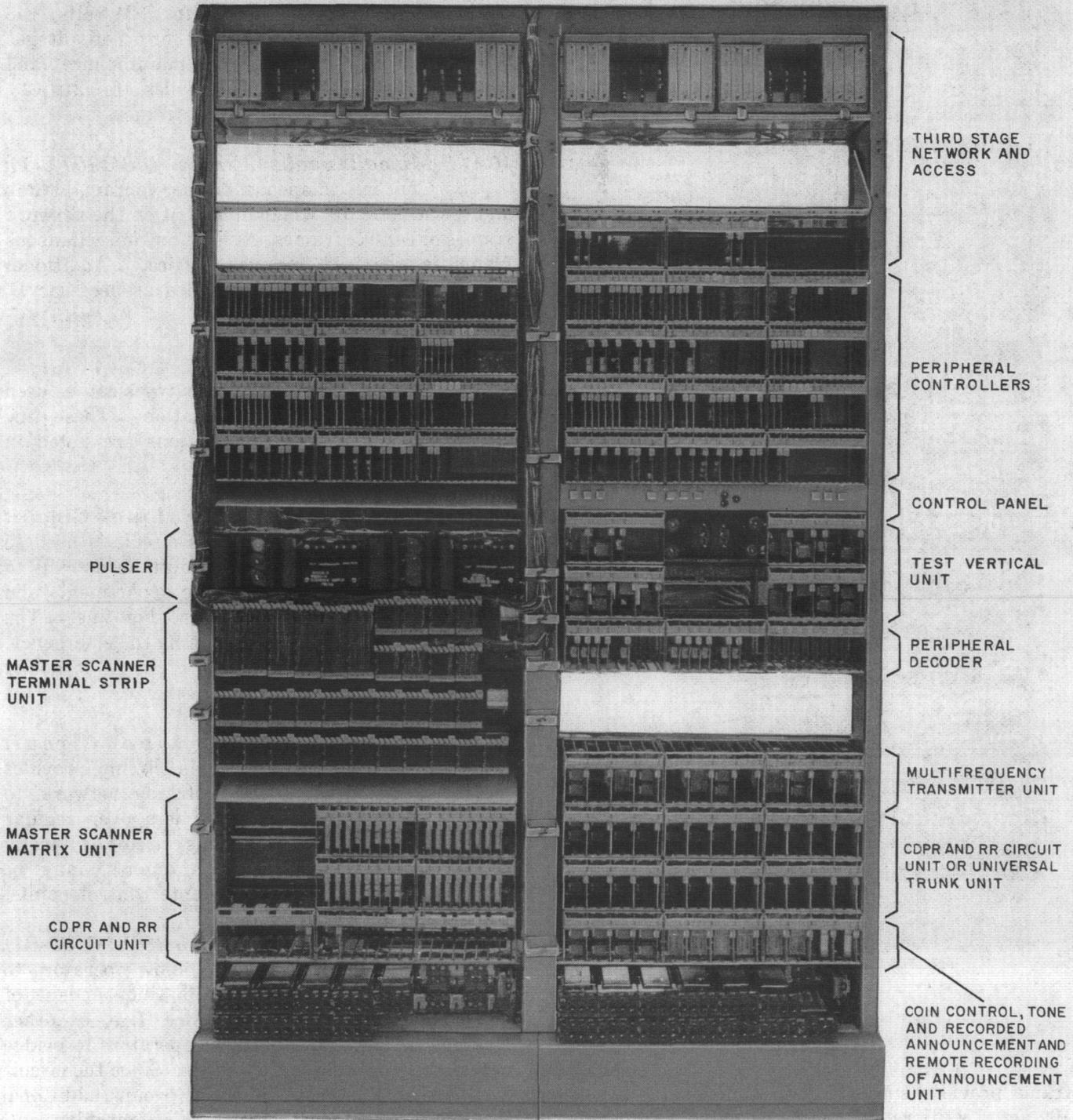


Fig. 15—Control Frame

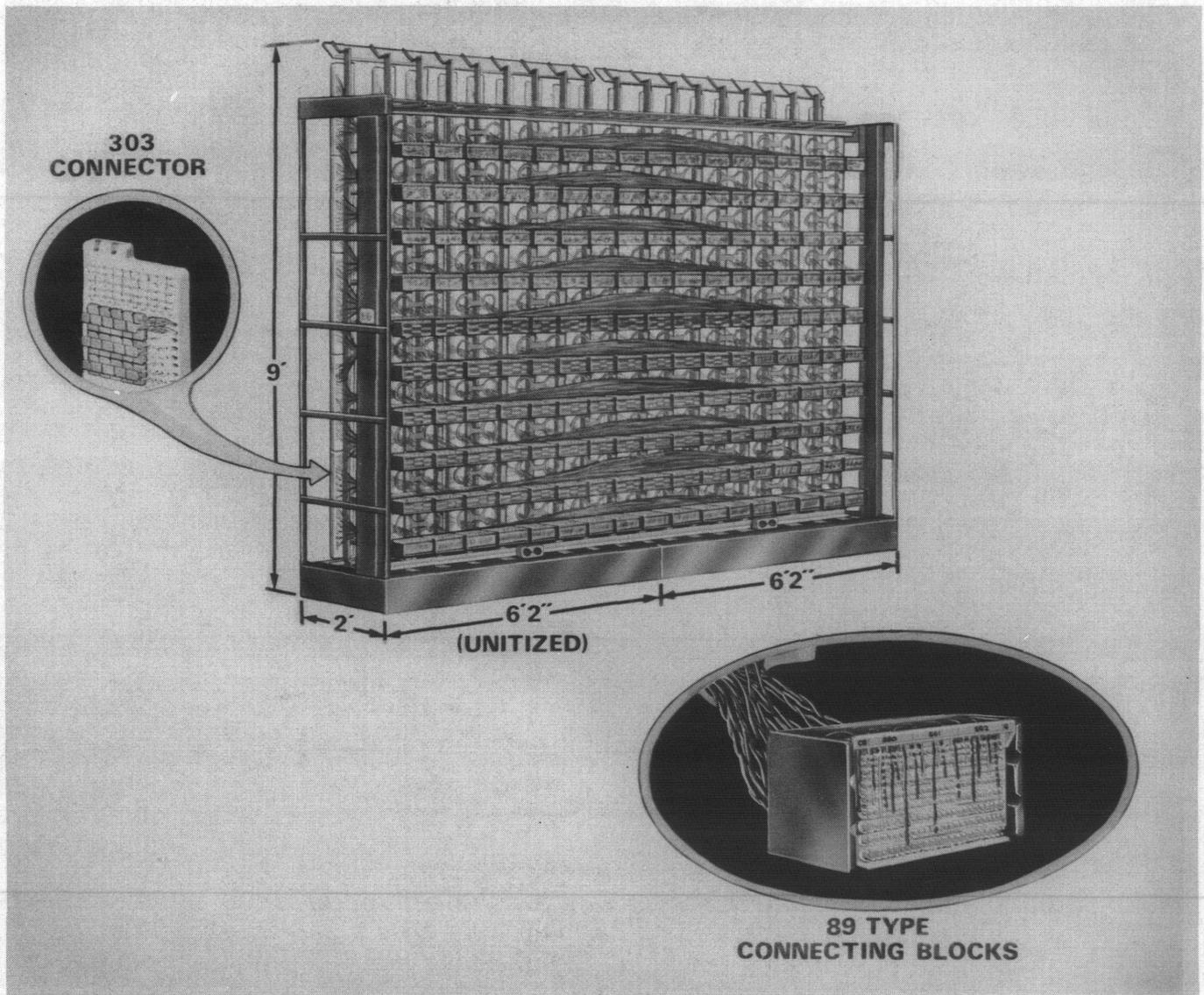


Fig. 16—Low Profile Combined Distributing Frame

noise is present which exceeds the operating characteristics provided by the normal line sensor.

10.18 Dial-Tone-First Coin Line Circuit (SD-3H205-01): This circuit is used to provide "dial-tone-first" service to coin lines.

Universal Trunk Circuits

10.19 Table G lists the universal trunk circuits offered by the No. 3 ESS and their applications according to pulsing, signaling, and class. These trunks may be plugged into any

position of the universal trunk unit located in the network, control, and miscellaneous frames.

Service Circuits

10.20 Nine service circuit types are available for No. 3 ESS. These circuits and a description of their uses follow.

(a) **Customer Dial Pulse Receiver (SD-3H410-01):** A customer dial pulse receiver receives dial pulses from dial pulse customers and serves as an interface to a

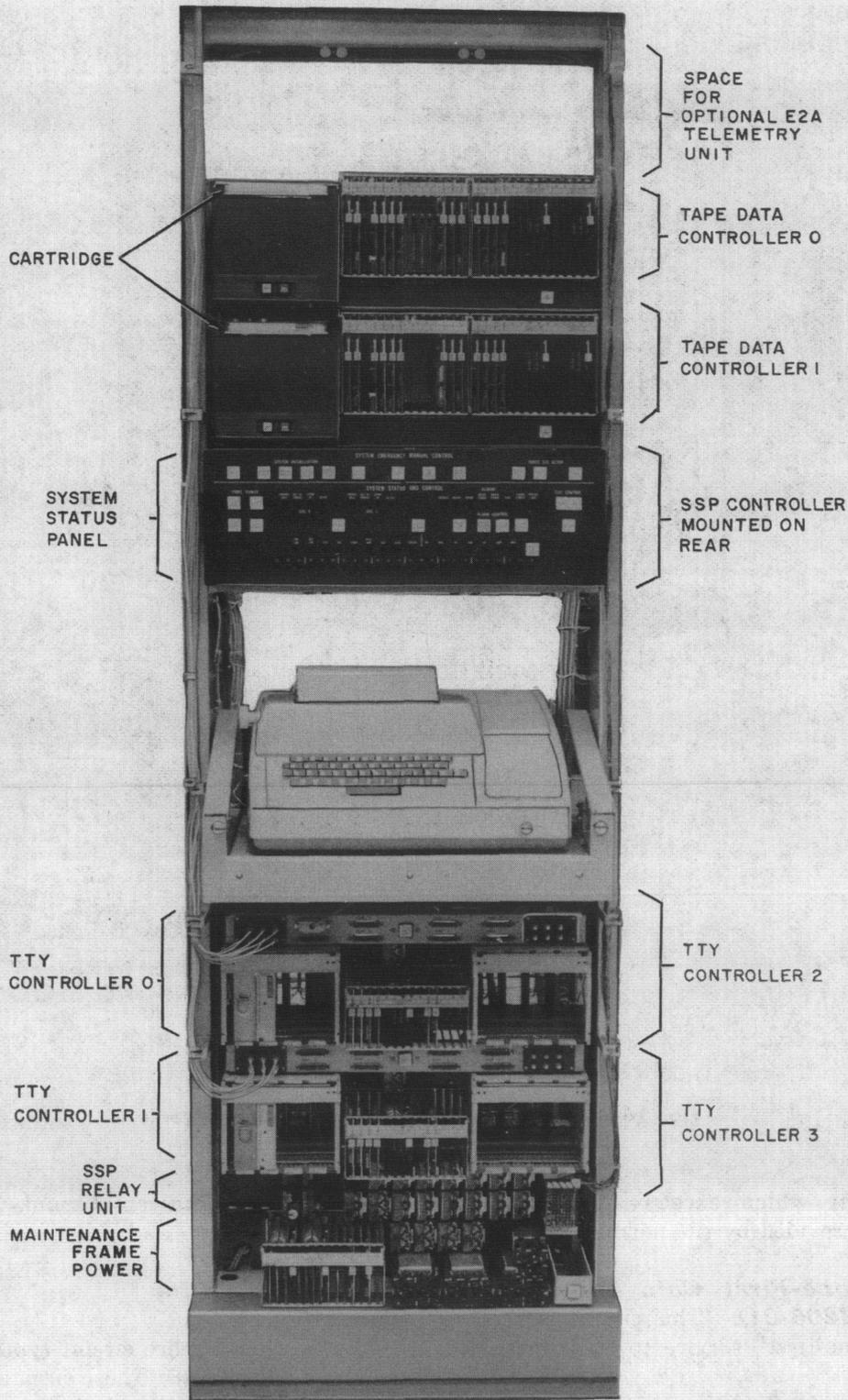


Fig. 17—Maintenance Frame

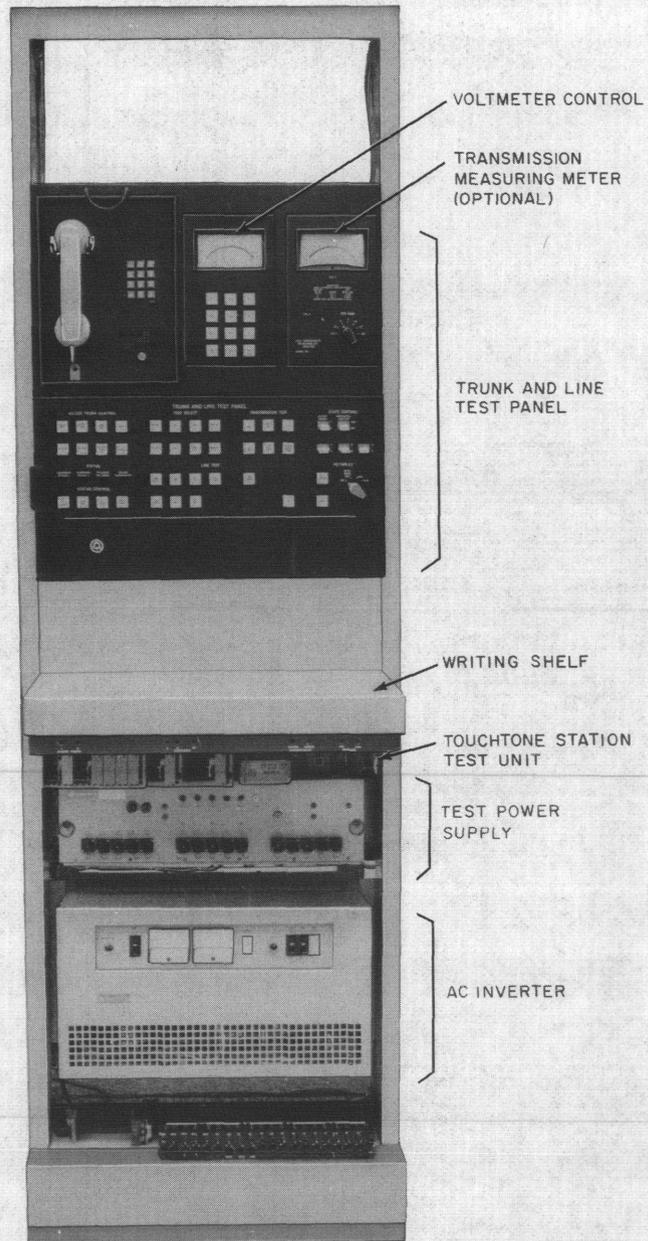


Fig. 18—Test Frame

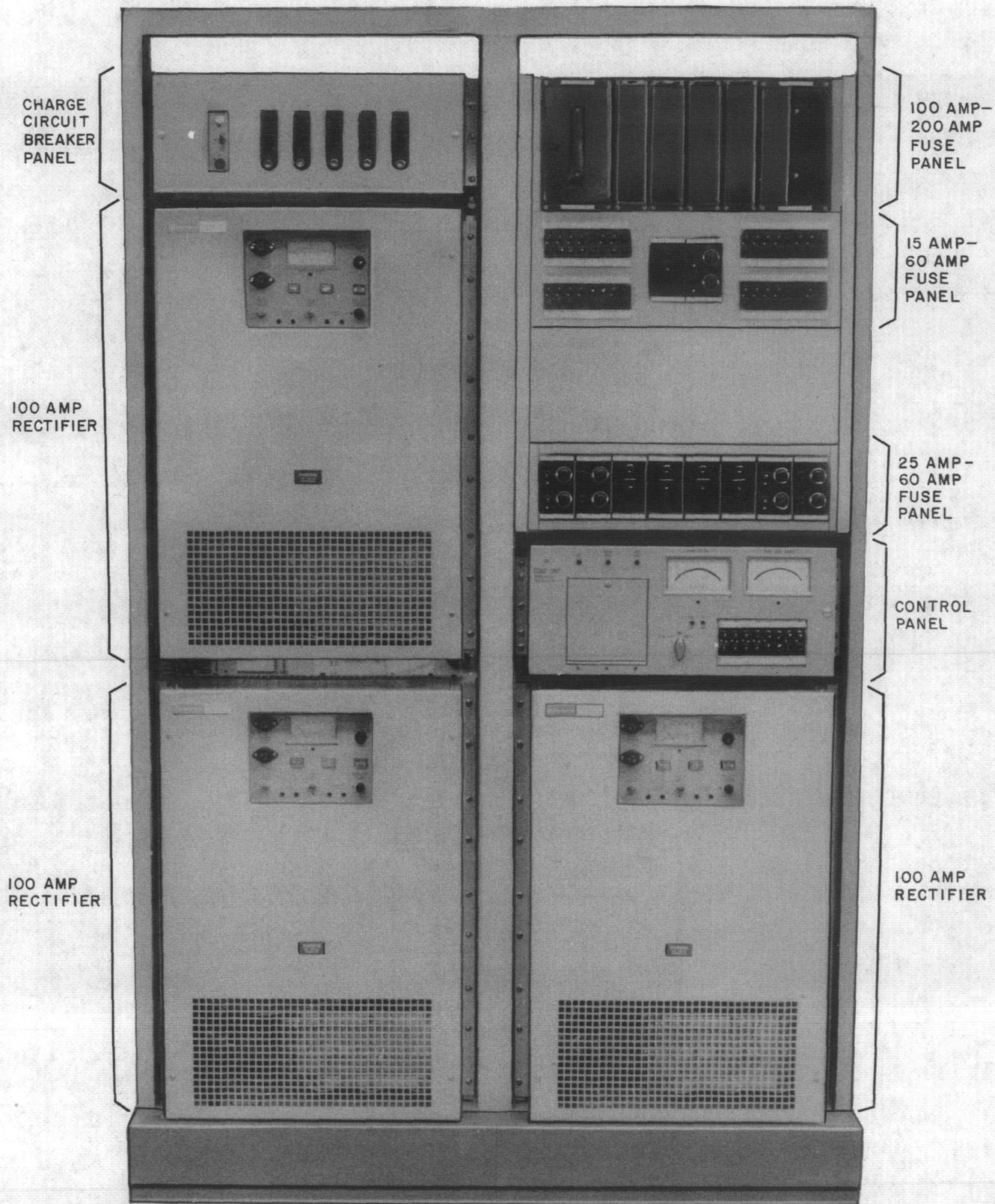


Fig. 19—151A Power Plant

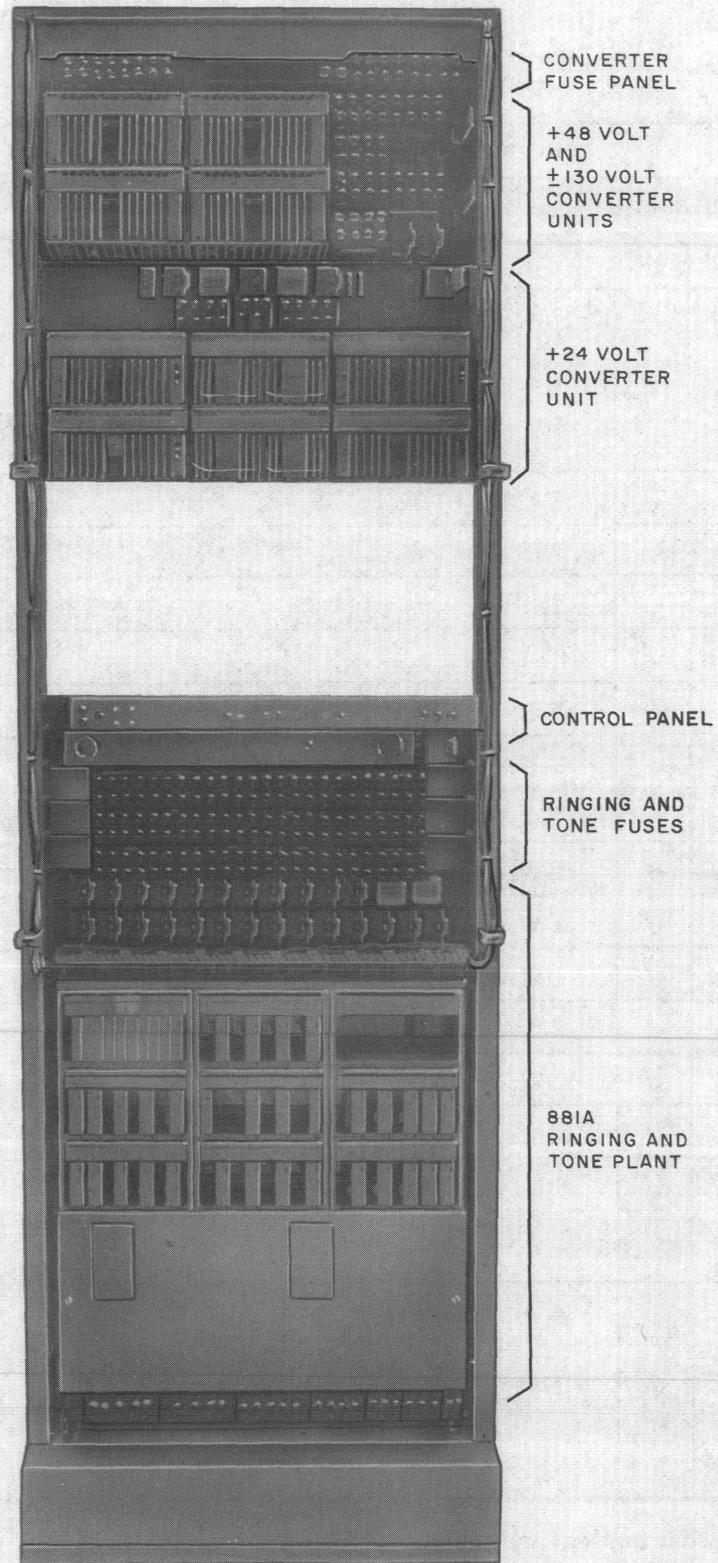


Fig. 20—Miscellaneous Power Frame

TABLE G

UNIVERSAL TRUNK CIRCUITS

UNIVERSAL TRUNK CIRCUIT (SD-3H220-01)						
TRUNK CIRCUIT TYPE	PULSING		USE	CLASS		
	DP	MF		NC	CN	COMB
Outgoing Reverse Battery CPS-FB 399 TOC 00206	✓	✓	EAS*	—	—	—
E&M Lead CPS-FB 382 TOC 50204 or CPS-FB 391 TOC 50205	—	✓	CAMA	—	—	—
	—	✓	AIS	—	—	—
	—	✓	TSP	✓	✓	—
	—	✓	TSPS	✓	✓	✓
	—	—	REGULAR AND TROUBLE INTERCEPT	—	—	—
	✓	✓	1-WAY OUT EAS*	—	—	—
	—	—	1-WAY OUT SWBD	✓	✓	✓
	✓	✓	1-WAY IN SWBD	✓	✓	✓
	✓	✓	1-WAY IN EAS*	—	—	—
	✓	✓	1-WAY IN TOLL CONNECT	—	—	—
	✓	✓	2-WAY SWBD	✓	✓	✓
	✓	✓	2-WAY EAS*	—	—	—
Incoming Re- verse Battery Wink or Imme- diate CPS-FB 371 TOC 10203	✓	✓	EAS*	—	—	—
	✓	✓	OUTGOING SWBD	✓	✓	✓
	✓	✓	INCOMING SWBD	✓	✓	✓
Incoming Reverse Battery (Delay Dial) CPS-FB 370 TOC 10202	—	✓	TOLL CONNECT (FROM 4A ONLY)	—	—	—

* EAS includes crossbar tandem and all local offices except panel.

EAS — Extended area service

NC — Noncoin

CN — Coin

COMB — Coin noncoin

TOC — Trunk order code

TOUCH-TONE receiver from TOUCH-TONE customers when service is requested.

(b) ***TOUCH-TONE Receiver Circuit (SD-3H401-01)***: A TOUCH-TONE receiver circuit and a customer dial pulse receiver are used together to detect TOUCH-TONE frequencies.

(c) ***Superimposed Ringing Circuit (SD-3H406-01)***: A superimposed ringing circuit provides ringing to 4-party full select, and 8-party semiselect lines.

(d) ***Regular Ringing Circuit (SD-3H410-01)***: A regular ringing circuit is used to ring individual, coin, revertive, PBX, 2-party lines, 4-party semiselect lines, and 8-party coded lines.

(e) ***Dial Pulse Transmitter (SD-3H403-01)***: A dial pulse transmitter sends dial pulses to a distant office.

(f) ***Coin Control, Conference Tone and Recorded Announcement, and Remote Recording of Announcement Circuit (SD-3H411-01)***: Provides coin control to collect or return coins and to make initial and overtime deposit checks. This circuit also provides high tone, low tone, receiver off-hook tone, and custom calling service tones. Audible ringing and overflow tones are returned via the junctor. This circuit is also used with the 7A announcement machine and allows announcements to be recorded locally or remotely. This circuit also provides the 3-port connections for custom calling features.

(g) ***Multifrequency Receiver Circuit (SD-3H402-01)***: A multifrequency receiver circuit detects multifrequency signals.

(h) ***Multifrequency Transmitter Circuit (SD-3H404-01)***: A multifrequency transmitter circuit is used to transmit multifrequency pulsing.

(i) ***3-Port Conference Circuit (SD-3H230-01)***: Conference circuit used to bridge three parties together on a 3-way call.

11. SOFTWARE ENGINEERING

11.01 Refer to Table F for No. 3 ESS store size requirements. The table shows a rough

relationship between terminal size and the amount of store space needed to accommodate the specified number of terminals. These relationships vary somewhat according to:

- System features assigned
- Traffic load and mix, and
- Custom calling features.

Refer to the 233-060-ZZZ series for details.

12. COMPATIBILITY

12.01 For compatibility information on the interface of No. 3 ESS circuits and other Bell System circuits, refer to SD-3H912, Scanner, Peripheral Pulse Distributor and Peripheral Decoder Assignment Rules and Compatibility Guide.

13. OFFICE DATA

13.01 The No. 3 ESS software consists of a program and custom office data. The custom office data is known as translations. The program is the same for every office and is not changeable. The translations however, are unique to each office and must be changed as subscriber service and office parameters change. In processing calls, the program accesses and uses the office data to convert information received about a call into actions to control the call.

Translation Data

13.02 The No. 3 ESS translation data is arranged according to data categories and number of words per entry. All data is indexed by the program by accessing a fixed area of translation store called the ***Master Table Index (MTI)***.

Master Table Index

13.03 The MTI provides linkages (symbolic name and address information) to all the various translators. The MTI is a fixed length (about 225 words) and occupies a fixed store location. The MTI is a reference table used by the program to locate the address in translation store where data pertinent to specific types of translation processes is stored. Some data tables are located in the MTI and no further addressing is required.

Translators

13.04 A translator contains either detailed information that the program requires for a specific translation or abbreviated codes identifying where the detailed information can be found in an associated expansion table.

Translator Access

13.05 Access to information in a specific translator is accomplished by input information plus information found in the MTI (Figure 21). Input information consists of an MTI table selector code and an index for accessing the translators. A search in the MTI using the selector code will either locate data or an address for the desired table and a code specifying the number of words per entry in the translator. The input parameter index times the number of words per entry added to the starting address of the translator will locate the desired information.

Expansion Tables

13.06 If some translation data requires more than the available storage in the translator table, expansion tables are used to store the information. Access to expansion tables may be:

- (a) from an abbreviated code in a translator table, or
- (b) from fixed addresses in the MTI.

13.07 The abbreviated codes used to locate expansion tables save memory space by denoting frequently required translation information. The expansion tables are used to obtain the detailed version of the abbreviated code. Memory space is saved since the detailed version is stored only once in an expansion table and accessed whenever needed.

Translation of Calls

13.08 Figures 22, 23, and 24 show the flow of various types of calls in terms of translation information. These figures are intended to cover the general or usual case and do not, therefore, cover translation of special or custom features. A more detailed explanation of translations will be included in future 233 division Bell System Practices.

Translation Changes

13.09 The initial office translations are generated by the WECO Regional Data Center from input forms submitted by the TELCO via the Office Data Administration (ODA) system. The ODA produces a magnetic tape cartridge containing the office data for the specific office which is sent to the office location and inserted into memory.

13.10 For normal service order activity and office parameter changes, the recent change (RC) mechanism is used. This method consists of inputting changes via TTY input messages. Refer to the input message manual for a description of RC messages.

13.11 In existing No. 3 ESS offices, a repack of data by reallocation can be accomplished by the telephone company at the No. 3 ESS.

13.12 When the office records become outdated due to recent change activity, the No. 3 ESS has the capability to automatically generate records directly. Office records are partially provided in Issue 4 of the SO-2 program. That is, three output forms are automatically generated by the No. 3 ESS. The 3E3 program provides the remainder of the form types.

14. GROWTH/RETROFIT PROCEDURES

14.01 The No. 3 ESS is designed with flexibility for future growth. The majority of the traffic dependent units in the No. 3 ESS are growable. Refer to Table F for the relationships between office terminal capacity and hardware and software additions.

14.02 The network frame is the main growth entity since it provides most of the equipment necessary for each increment of network growth. Each network has the capacity for 384 terminals. The third stage of switching which is located on the initial control frame (0) can accommodate up to seven network frames or 2688 terminals.

14.03 The addition of an eighth network frame requires an expansion of the third stage switch. An additional control frame must be installed to accommodate the third stage extension switches.

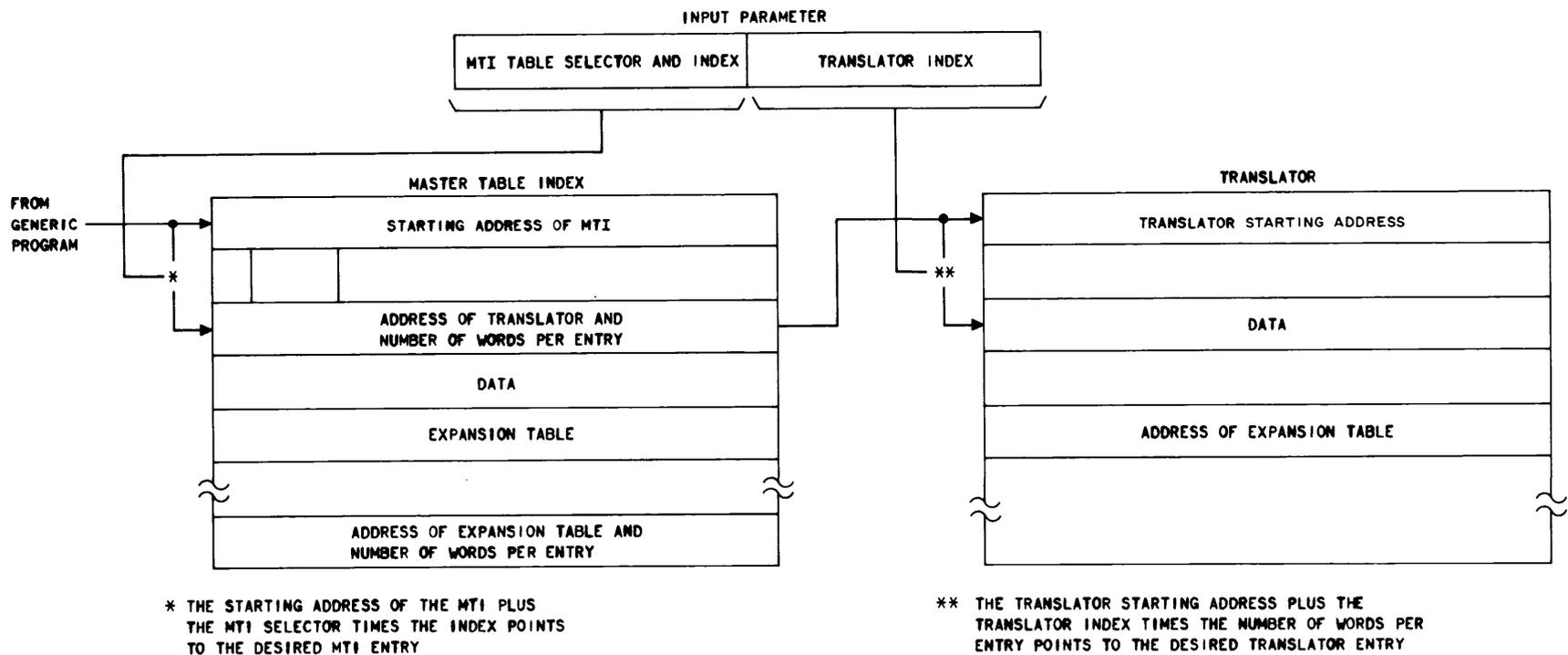


Fig. 21—Access to a Typical Translator

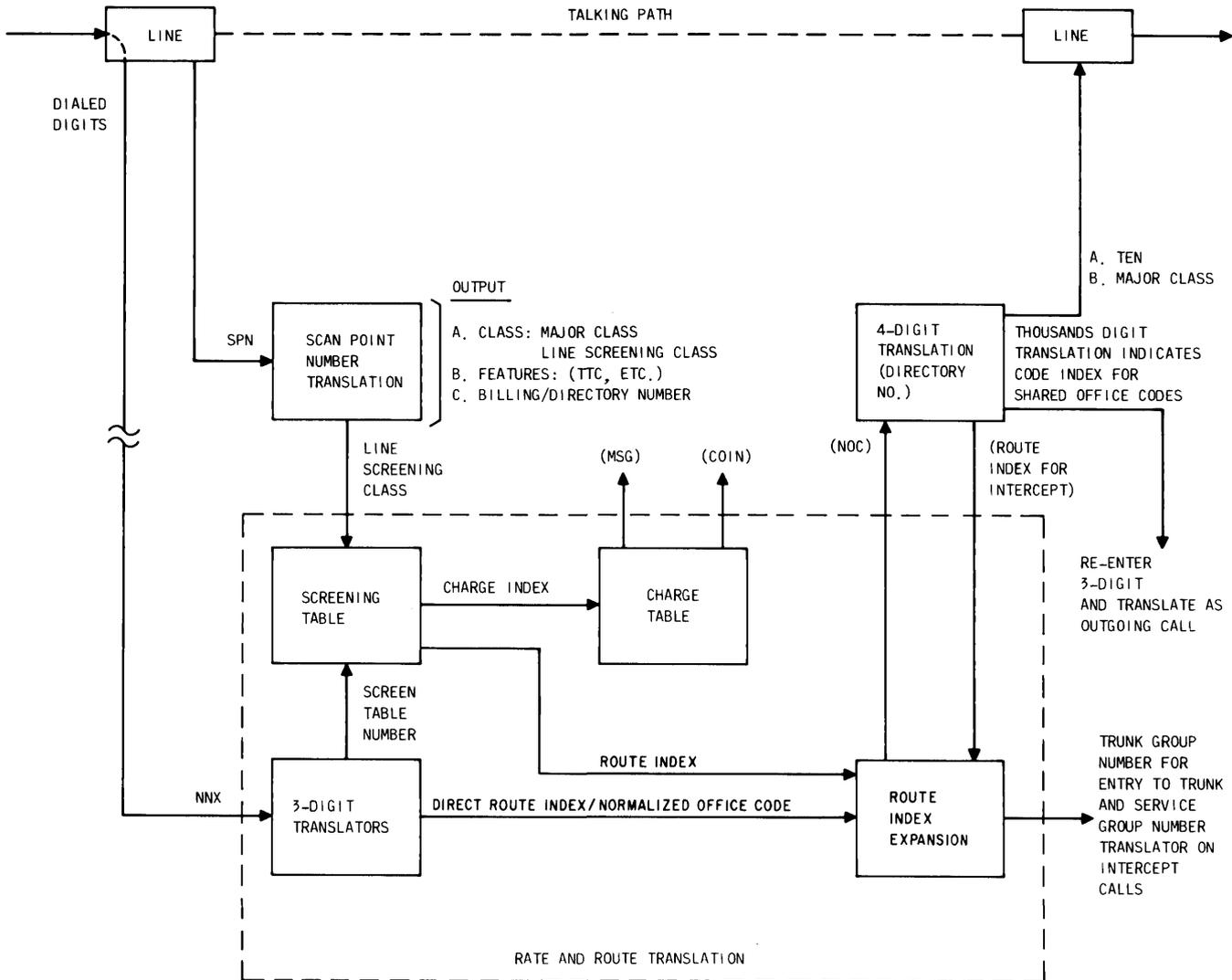


Fig. 22—Translation of Intraoffice Call

15. TESTING

Maintenance and Administration Plan

15.01 The No. 3 ESS maintenance plan is shown in block diagram form in Figure 25. The primary function of the maintenance design of the system is to automatically detect faults and initiate recovery procedures. An automatic trouble detection scheme is used which is supplemented by automatic diagnostics and manual diagnostic facilities.

Automatic Trouble Detection

15.02 The No. 3 ESS uses the following methods to detect system troubles.

(a) **Check Circuits**—Self-checking is performed by the 3A CC, MAS controller, network controller, PPD, and scanner controller. If a failure is detected by a check circuit, under normal situations a switch will occur to the other system control.

(b) **Call Processing Tests**—During call processing, many checks are performed which verify the integrity of the peripheral hardware and the accuracy of internal data. Any detected failure initiates a recovery action.

(c) **Routine Testing**—These are tests of hardware performed automatically on a scheduled basis (every 24 hours, for example).

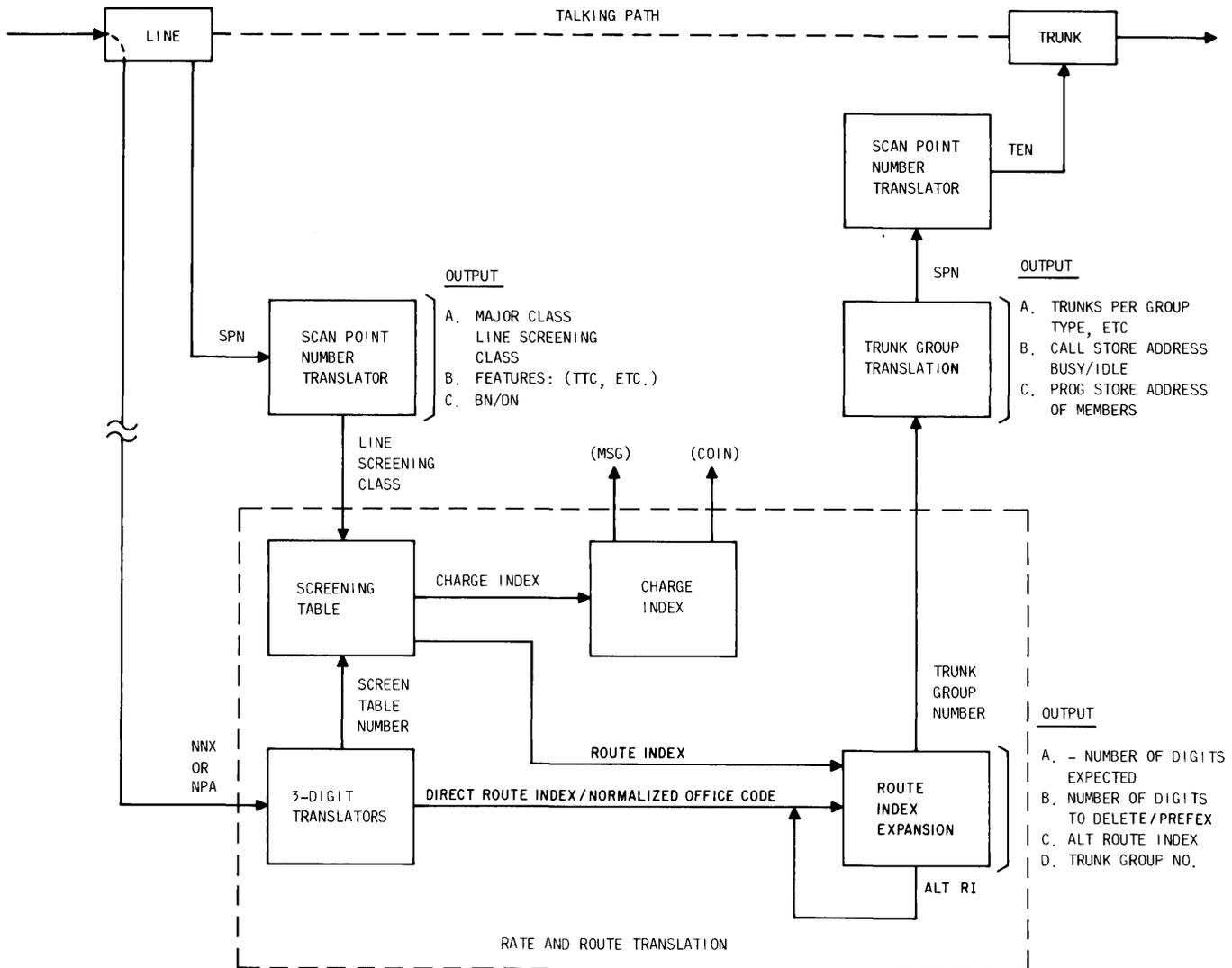


Fig. 23—Translation of Outgoing Call

These tests may also be manually requested via the local or remote maintenance TTY.

Automated Maintenance Facilities

15.03 When the system detects troubles, it tries to pinpoint the trouble and take corrective action. The automated facilities used to accomplish this are categorized into two general areas as follows:

(a) **Recovery**—When failures are detected, the system takes corrective action to identify the failed unit and takes it out of service. The results of such actions are indicated on the maintenance TTY and the SSP.

(b) **Diagnostics**—Programmed diagnostics are nonrestricted programs that must be initiated manually via the maintenance TTY. They provide the capability for accessing, testing, and exercising selected portions of the system. Manual testing of trunks, service, and line circuits may be done using the Trunk and Line Test Panel.

Maintenance and Diagnostic Tools

15.04 The following documents serve as the primary maintenance and diagnostic tools for the No. 3 ESS.

(a) **Trouble Locating Manual (TLM)**—The TLM is basically used to identify faulty circuit

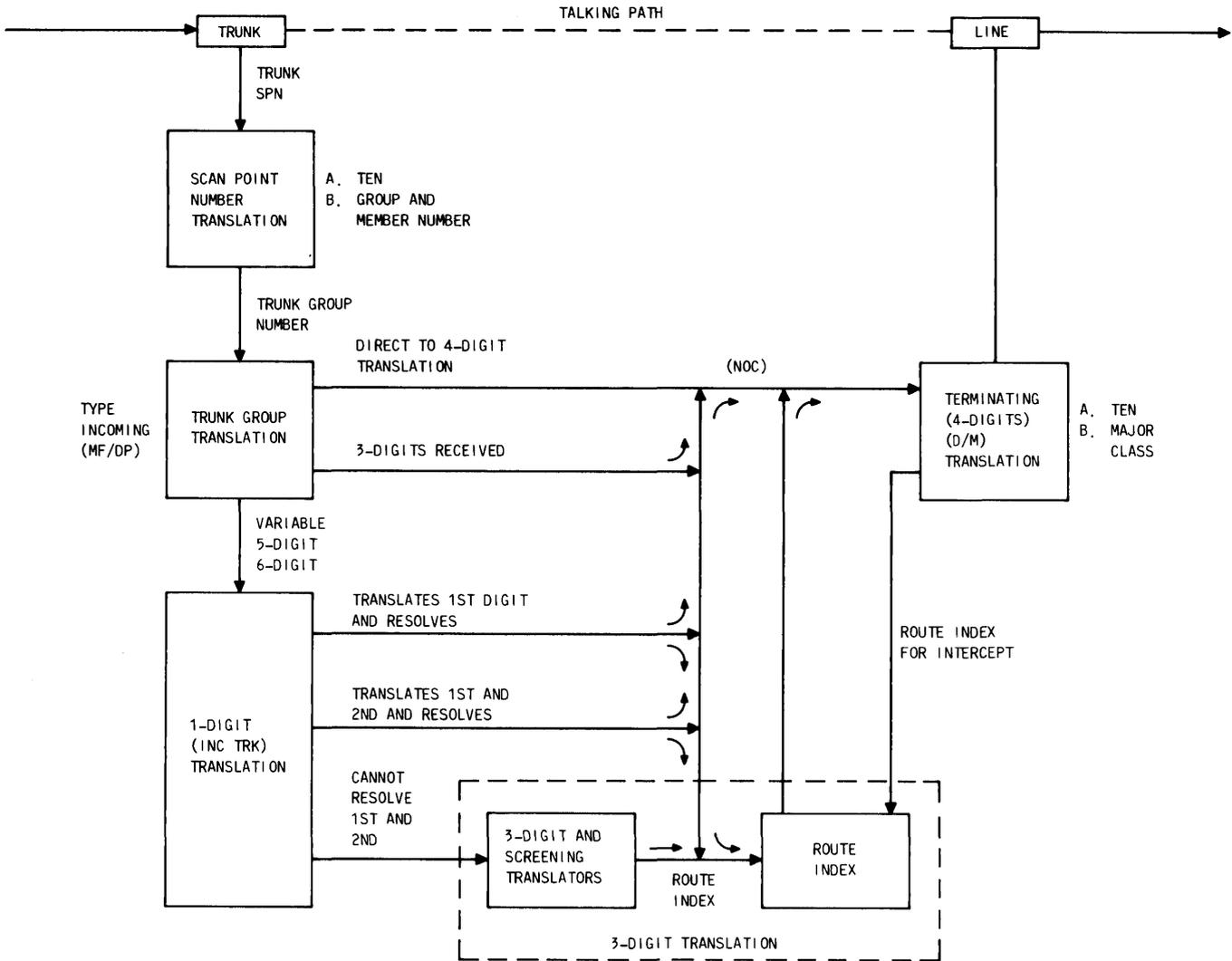


Fig. 24—Translation of Incoming Call

packs associated with particular failures. The TTY prints out a coded number which, when referenced in the TLM, indicates a list of possible faulty circuit packs.

(b) **Input Message Manual (IM)**—The IM is a listing of TTY input codes understood by the system, and used to inform the system that it must perform a specific task.

(c) **Output Message Manual (OM)**—The OM is a listing of output codes automatically produced on a TTY and initiated either as a result of a TTY input or a system action. The OM describes the purpose and significance of the output codes as presented on the TTY.

Maintenance and Testing Requirements

15.05 The No. 3 ESS should be maintained and tested in accordance with the 233 series Bell System Practices. See Part 23, REFERENCES for a listing of No. 3 ESS Bell System Practices.

Remote Maintenance and Operation

15.06 The No. 3 ESS can be operated and maintained from a remote switching control center (SCC). The SCC can be equipped with a SSP similar to the one in the No. 3 ESS office. An E2A telemetry system is used to connect the remote SSP to the No. 3 ESS. The remote SSP in conjunction with a remote TTY, provides

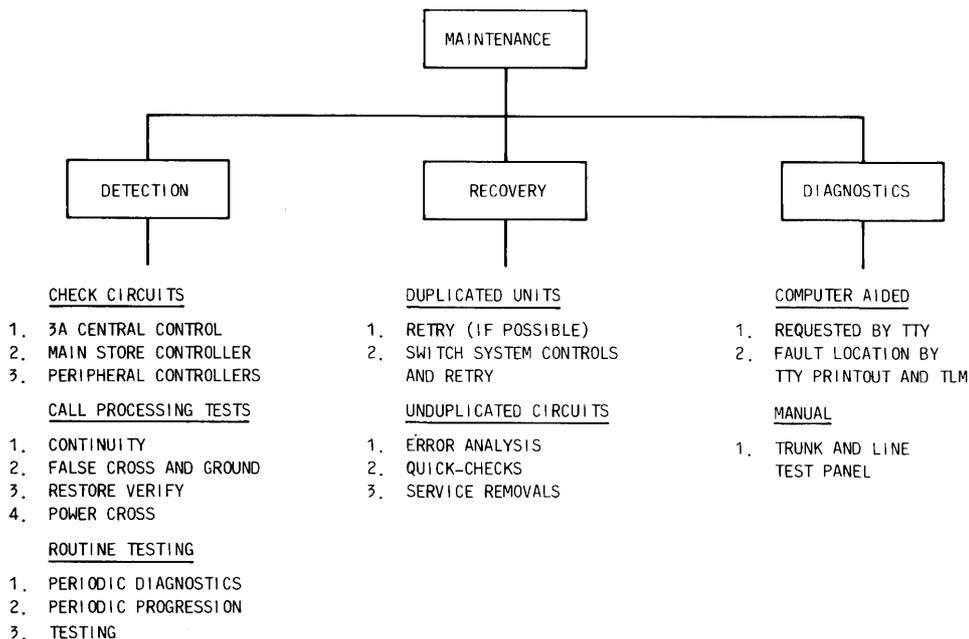


Fig. 25—No. 3 ESS Maintenance Plan

maintenance personnel at the SCC with capabilities to connect to the No. 3 ESS. These controls are equivalent to the controls in the local office.

15.07 Remote Office Test Line (ROTL) is expected to be available in 3E3. ROTL is a feature that allows interoffice trunk testing automatically from a centralized automatic reporting on trunks (CAROT) system.

ADMINISTRATION

16. MEASUREMENTS

16.01 The No. 3 ESS stored program maintains a record of usage of many traffic dependent units or items. These records indicate traffic conditions such as frequency of use of certain circuits, numbers of various types of calls made and services used, and when the office equipment is approaching or exceeding its engineered loads. Table H summarizes the types of plant and traffic measurements recorded by the No. 3 ESS.

16.02 The recommended method for reporting traffic usage and peg counts is to store the hourly measurements on the tape cartridge for the hours specified by the network administrator. The system will automatically print the schedules

on an overnight basis on a remotely located TTY. Under this arrangement, the system can automatically dial up the remote TTY at the times specified in translations. Other arrangements that may be used include dedicated TTY facilities and hourly printouts.

17. RECORD KEEPING

17.01 Initial office records are provided by WECO when the ODA run is completed. Office record updates may be generated by the No. 3 ESS during periods of light traffic via a TTY input request. Office records are partially provided in SO-2, Issue 4. That is, three output forms are automatically generated by the No. 3 ESS. The remaining forms are provided with the 3E3 generic.

18. CHARGING

18.01 Charging for toll calls in a No. 3 ESS are via CAMA facilities in another office. AMARS via AMARC is included in Issue 4 of the SO-2 program.

TABLE H

PLANT AND TRAFFIC MEASUREMENTS

ITEM	PEG COUNT	USAGE	OVERFLOW COUNT
TRUNK GROUPS	✓	✓	✓
PBX	✓	✓	✓
SERVICE CIRCUIT GROUPS	✓	✓	✓
JUNCTOR GROUPS	—	✓	—
NETWORK CONCENTRATORS	—	✓	—
LINES	—	✓	—
CALL TYPES (ORIG, TERM, ETC)	✓	—	—
CLASS OF SERVICE	✓	—	—
PREROUTE	✓	—	—
OFFICE COUNTS	✓	✓	—

AVAILABILITY**19. NEW INSTALLATIONS**

- 19.01 The No. 3 ESS is expected to be generally available in the first quarter of 1978.

20. GROWTH/RETROFIT

- 20.01 This section is not applicable to this feature document.

SUPPLEMENTARY INFORMATION**21. GLOSSARY**

- 21.01 The following list identifies terms used in this section that may be unfamiliar to the reader.

3A Central Control (3A CC)—A data processor that serves as the controlling element of a No. 3 ESS.

Concentrator Group—A 384 terminal portion of the switching network that includes the first two stages of switching and provides a 6 to 1 concentration ratio of terminals to B-links.

Control Unit—The combination of 3A CC, main store, power, and the system status panel.

Duplication—Providing two of the same units in vital areas to maintain call handling capabilities if a problem occurs to one of the units.

Ferrod Sensor—A current sensing device used in scanners to detect the status of a unit or circuit.

Input Message Manual (IM)—A listing of TTY input codes used to direct the system to perform specific tasks.

Interoffice Call—A call involving two or more switching offices to establish a talking path.

Intraoffice Call—A call connection involving two subscribers assigned to the same switching office.

Junctor—A circuit that provides a path between the stage II and stage III switches and provides several circuit states.

Line—Any connection to network terminal that is not classified as a trunk or service circuit.

Main Store (MAS)—The storage unit of the CU that stores the system program and provides memory for system operation.

Network—The equipment that provides a 2-wire metallic talking path for switching telephone calls. The No. 3 ESS uses remreed switches in its network.

Nonresident Programs—Programs physically stored outside the MAS and called into use when needed. These programs are stored on magnetic tape cartridges in the No. 3 ESS.

Off-Hook—The condition that indicates the active state (closed loop) of a line, trunk or service circuit.

On-Hook—The condition that indicates the idle state (open loop) of a line, trunk or service circuit.

Output Message Manual (OM)—A listing of TTY output codes that may be printed out by the system. The OM describes the purpose and significance of each output code.

Remanent Reed (Remreed) Switch—The basic switching element used in the No. 3 ESS switching network.

Service Circuit—Specialized circuits that can be connected through the network to lines or trunks to provide such functions as detect dial pulses, supply busy tone, or audible ringing tone, etc.

Service Order—A change or addition involving subscriber lines.

Single Sided Network—A network having all lines, trunks, and service circuits terminating on the same side.

System Control (SYC)—The combination of the CU, frame input/output controllers (FIOCs) and peripheral controllers plus any other equipment that is switched in and out of service with the CU.

Terminal—A physical location on a network for tip and ring connections.

Translation—The conversion of information from one form to another; in ESS for example, conversion of dialed digits into routing and terminating information.

Trouble Locating Manual (TLM)—A manual used to identify faulty circuit packs associated with particular failures. The system prints out trouble numbers that when referenced in the TLM indicates a list of possible faulty circuit packs.

Trunk—A metallic communications path interconnecting switching offices.

22. REASONS FOR REISSUE

22.01 This is the initial issue of this feature document.

23. REFERENCES

23.01 The following tables provide lists of detailed documentation on the No. 3 ESS.

TABLE I. Schematic Drawing and Circuit Description List

TABLE J. Program Documentation

TABLE K. Bell System Practices

TABLE I

NO. 3 ESS SCHEMATIC DRAWING AND CIRCUIT DESCRIPTION LIST

NUMBER	TITLE
SD/CD-1A199-01	TOUCH-TONE Station Test Circuit
CPS-A163	TOUCH-TONE Station Test — Input Amplifier
CPS-A164	TOUCH-TONE Station Test — TOUCH-TONE Limiter
CPS-A165	TOUCH-TONE Station Test — 697 and 770 Hz Detectors
CPS-A166	TOUCH-TONE Station Test — 852 and 941 Hz Detectors
CPS-A167	TOUCH-TONE Station Test — 1209 and 1336 Hz Detectors
CPS-A168	TOUCH-TONE Station Test — 1447 and 1633 Hz Detectors
CPS-A175	TOUCH-TONE Station Test — Signal Present Timer
SD/CD-1C900-01	3A Central Control
CPS-FA1010	Bit Slice Board 1
CPS-FA1011	Four-out-of-eight Decoder (From)
CPS-FA1012	Data Manipulation 1
CPS-FA1013	Data Manipulation 2B
CPS-FA1014	Data Manipulation 3
CPS-FA1015	Data Manipulation 4
CPS-FA1016	Microcontrol Board 1
CPS-FA1017	Microcontrol Board 2
CPS-FA1018	Microcontrol Board 3
CPS-FA1019	Microcontrol Board 4
CPS-FA1020	Microcontrol Board 5
CPS-FA1021	Microcontrol Board 6
CPS-FA1022	Microcontrol Board 7
CPS-FA1023	Microcontrol Board 8
CPS-FA1024	Bit Slice Board 2
CPS-FA1025	Clock (3A CC)
CPS-FA1026	Bus Parity Checker
CPS-FA1027	Error Register and Display 1
CPS-FA1028	Error Register and Display 2
CPS-FA1029	Main Memory Control
CPS-FA1030	Miscellaneous Decoder and Slice Control
CPS-FA1031	Four-out-of-eight Checker
CPS-FA1032	Miscellaneous Circuits
CPS-FA1033	Program and Timer Counters
CPS-FA1034	Console and 3A CC Interface
CPS-FA1035	Maintenance Channel Board 1
CPS-FA1036	Maintenance Channel Board 2
CPS-FA1037	Maintenance Channel Board 3

TABLE I (Contd)

NO. 3 ESS SCHEMATIC DRAWING AND CIRCUIT DESCRIPTION LIST

NUMBER	TITLE
CPS-FA1038	I/O Status Board
CPS-FA1039	I/O Channel 2
CPS-FA1040	Extended Main Memory Interfaces
CPS-FA1045	Four-out-of-eight Decoder (To)
CPS-FA1046	Double Store Read
CPS-FB6	Protection Circuit
CPS-FB152	12 V Reference
CPS-FB486	Crystal Oscillator
CPS-FC21	+3 V Reference and Filter Circuit
CPS-FC201	10 I/O Subchannels
CPS-FC202	Maintenance Interface
SD/CD-1C901-01	3A CC Control Panel
SD/CD-1C902-01	Main Store Controller
CPS-FA1060	Bit Slice Circuit
CPS-FA1061	Timing Circuit
CPS-FA1062	Check A Circuit
CPS-FA1063	Maintenance A Circuit
CPS-FA1064	Maintenance B Circuit
CPS-FA1065	Command Circuit
CPS-FA1066	Check B Circuit
CPS-FA1067	Parity Circuit
CPS-FC21	+3 V Reference and Filter Circuit
CPS-FC203	Clock Circuit
CPS-FC262	Power Control Circuit
SD/CD-1C903-01	Main Store Memory
CPS-JL2	Fanout Circuit
CPS-JL2	Memory Circuit
SD/CD-1C904-01	Tape Data Controller
CPS-JK5	Serial Peripheral Interface A
CPS-JK6	Serial Peripheral Interface B
CPS-JK7	Serial Peripheral Interface C
CPS-JK8	Bus Terminator A
CPS-JK9	Bus Terminator B
CPS-JK10	Buffer A
CPS-JK11	Buffer B
CPS-JK12	Buffer C
CPS-JK13	Buffer D
CPS-JK16	Tape Unit Controller A
CPS-JK17	Tape Unit Controller B
CPS-JK18	Tape Unit Controller C
CPS-JK19	Tape Unit Controller D

TABLE I (Contd)

NO. 3 ESS SCHEMATIC DRAWING AND CIRCUIT DESCRIPTION LIST

NUMBER	TITLE
SD/CD-1C905-01 CPS-FA1058 CPS-FA1059 CPS-FB152 CPS-FB494 CPS-FC21 CPS-FC200 CPS-FC261 AR17 108D	TTY Controller Tip/Ring Unit Channel Circuit Tip/Ring Unit Line Circuit +12 V Reference Circuit -48 V to +24 V Converter and Power Alarm Circuit +3 V Reference and Filter Circuit Teletypewriter Controller Interface and Timing Circuits Interface and Timing Circuits for TTYC Arranged for Mate Operation Circuit EIA to Current Loop Interface Data Set
SD/CD-1C906-01	System Status Panel Circuit
SD/CD-1C907-01 CPS-FA1100 CPS-FA1102 CPS-FA1103 CPS-FB152 CPS-FC21 CPS-FC208 CPS-FC209	System Status Panel Controller Display Register and Key Memory Logic Miscellaneous Circuits Maintenance Telemetry Interface +12 V Reference +3 V Reference and Filter Circuit Maintenance Transformers Driver
SD/CD-1C908-01	System Status Panel Relay Circuit
SD/CD-1C909-01 CPS-FC210	Maintenance Frame Power Circuit Power Alarm and Control
SD/CD-1C910-01	Processor Frame Circuit
SD/CD-1C911-01 CPS-FC210	Processor Frame Power Circuit Power Alarm and Control
SD/CD-1C912-01	Maintenance Frame Circuit
SD/CD-1C913-01	Electronic Reed Pulser Circuit
SD/CD-2P021-01	E2A Telemetry

TABLE I (Contd)

NO. 3 ESS SCHEMATIC DRAWING AND CIRCUIT DESCRIPTION LIST

NUMBER	TITLE
SD/CD-3H110-01 CPS-FA993 CPS-FA994 CPS-FA995 CPS-FA996 CPS-FA997 CPS-FA998 CPS-FA999 CPS-FA1000 CPS-FA1001 CPS-FB152 CPS-FB288 CPS-FB351 CPS-FB404 CPS-FB405 CPS-FB406 CPS-FB409 CPS-FB412 CPS-FB413 CPS-FB421 CPS-FC21 CPS-FC135 CPS-FC188 CPS-FC193 CPS-FC204 CPS-FC205 CPS-FC206 CPS-FC207 CPS-FC219 CPS-FC229 CPS-FC307 CPS-FC330	Peripheral Controller FIOC Sequence Controller FIOC Register Board PPD Sequencer PPD Vertical Translator Scanner Sequencer NC Input Level and Misc. Decoder NC Switch or Level Decoder NC Concentrator Group Decoder NC Control Logic 12 V Reference Interrogate Current Driver FIOC Receiver Transmitter NC Input Group Select NC High and Dry Select NC Stage Three Group Select Power Control Scanner Test Board Scanner Timer NC Timing and Guard Control 3 V Reference and Filter Board Scanner Column Detector NC Output Group Select NC Node Select PPD Horizontal PPD Vertical Driver PPD Matrix Board PPD Level Control NC Group Checks NC 16 V Supply NC Gate Select Scan Interrogate Matrix
SD/CD-3H120-01	15A Grid Circuit
SD/CD-3H121-01	15B Grid Circuit
SD/CD-3H122-01 CPS-FC191 CPS-FC192	First and Second Stage Access Circuit NC Output Level Select NC Input Level Select
SD/CD-3H130-01	15C Grid Circuit

TABLE I (Contd)

NO. 3 ESS SCHEMATIC DRAWING AND CIRCUIT DESCRIPTION LIST

NUMBER	TITLE
SD/CD-3H131-01 CPS-FC190	Third Stage Access Circuit NC Stage Three Level Select
SD/CD-3H140-01 CPS-FC183 CPS-FC184	Master Scan Matrix Trunk and Master Scanner Ferrods Master Scanner Ferrods
SD/CD-3H150-01 CPS-FC181	Distribute Point Circuit Peripheral Decoder Board
SD/CD-3H200-01 CPS-FC181 CPS-FC182 CPS-FC183 CPS-FC185 CPS-FB372 CPS-FB401 SD-82250-01	Juncter and Junctor Control Circuit Peripheral Decoder Circuit Juncter Circuit Ferrods Trunk and Service Circuit Ferrods Splitting Resistors Juncter Circuit Battery Boost Auxiliary Circuit Battery Boost Converter
SD/CD-3H205-01 CPS-FB428	Dial-Tone-First Coin Circuit Dial-Tone-First Coin Line Circuit
SD/CD-3H208-01 CPS-FB407 CPS-FB408	Noise Immunity Line Circuit Loop Start Line Ground Start Line
SD/CD-3H220-01 CPS-FB399 CPS-FB370 CPS-FB371 CPS-FB389 CPS-FB391	Universal Trunk Circuit Outgoing Reverse Battery Trunk and Outgoing Reverse Battery High-Low Two-Way E&M Lead Trunk Circuit Incoming Reverse Battery Trunk Circuit (Delay Dial) Nonpreferred Incoming Reverse Battery Trunk Circuit (Wink or Immediate) or Local Tandem Trunk Circuit or Local Tandem Two-Way or One-Way E&M or Local Tandem

TABLE I (Contd)

NO. 3 ESS SCHEMATIC DRAWING AND CIRCUIT DESCRIPTION LIST

NUMBER	TITLE
SD/CD-3H401-01 CPS-A118 CPS-A120 CPS-A121 CPS-A122 CPS-A123 CPS-A124 CPS-A946 CPS-A1025	TOUCH-TONE Calling Detector TTR — Input Amplifier TTR — TT Limiter and Resistor TTR — 697 and 770 Hz Detectors TTR — 852 and 941 Hz Detectors TTR — 1209 and 1336 Hz Detectors TTR — 1447 and 1663 Hz Detectors TTR — Signal Present Timer TTR — Scanner Driver
SD/CD-3H402-01 CPS-A152 CPS-A260 CPS-A263 CPS-A264 CPS-A265 CPS-A266 CPS-A1024	Multifrequency Receiver Circuit MFR — MF Channel Detectors MFR — Vario Losser and Guard Filters MFR — Guard Filters MFR — 700, 900, 1100 Hz Channel Filters MFR — 1300, 1500, 1700 Hz Channel Filters MFR — Signal Present Timer MFR — Scanner Driver
SD/CD-3H403-01 CPS-FB403	Dial Pulse Transmitter Circuit Dial Pulse Transmitter Circuit
SD/CD-3H404-01 CPS-FB362 CPS-FB363 CPS-FB364	Multifrequency Transmitter Circuit MFT — Frequency Select Relays MFT — Tip and Ring MFT — Oscillators
SD/CD-3H406-01 CPS-FB375 CPS-FB376	Superimposed Ringing Circuit SR — Ringing Control SR — Trip and Safety Trip Detectors
SD/CD-3H410-01 CPS-FB358 CPS-FB367	Customer Dial Pulse Receiver and Regular Ringing Circuit Regular Ringing Circuit Customer Dial Pulse Receiver Circuit
SD/CD-3H411-01 CPS-FB383 CPS-FB423 CPS-FB426 CPS-FB427	Coin Control, Tone and Announcement Circuit Tone and Announcement Circuit Coin Control Circuit Remote Recording Circuit Conference Circuit

TABLE I (Contd)

NO. 3 ESS SCHEMATIC DRAWING AND CIRCUIT DESCRIPTION LIST

NUMBER	TITLE
SD/CD-3H520-01	Peripheral Test Circuit
CPS-FB500	Continuity and Polarity Test Circuit
CPS-FB501	DPR Test — Tip and Ring
CPS-FB502	DPR Test — Pulse Control
CPS-FB504	Transmission Test Termination Circuit
CPS-FB505	MW and Transmission Environment Test Circuit, Port 0
CPS-FB506	MW and XMISSION ENV Test — Port 1
CPS-FB507	MW and XMISSION ENV Test — Pads A
CPS-FB508	MW and XMISSION ENV Test — Pads B
CPS-FB509	MW and XMISSION ENV Test — Oscillator
CPS-FB510	Loop Environment Test Circuit
CPS-FB511	Trunk and Line Test Panel (TLTP)
CPS-FB512	Transmission Control Circuit
CPS-FB513	Distribute Points (TLTP)
CPS-FB514	Voltmeter Control Circuit (TLTP)
CPS-FB515	Ringing and Flash CNT (TLTP)
CPS-FB516	Electrical Lock (TLTP)
CPS-FB517	TPD — Amplifier
CPS-FB517	TPD — Timer
CPS-FB521	STA Ringer Test — Tip and Ring
CPS-FB522	STA Ringer Test — Dial Pulse
CPS-FB523	Detector and Scanner Driver
CPS-FB524	LIT — Power Supply
CPS-FB525	LIT — Comparator
CPS-FB526	LIT — Line Switching
CPS-FB527	TTR Test — D Sine Converter
CPS-FB528	TTR Test — Output Stage
CPS-FB529	TTR Test — Power Supply
CPS-FB529	TTR Test — Divide Counter
SD/CD-3H901-01	Network Frame
SD/CD-3H902-01	Control Frame
CPS-FB414	+3 Volt Signal Battery
CPS-FB415	Alarm 0
CPS-FB416	Alarm 1
CPS-FB417	Test Vertical Network Connector
CPS-FB419	Test Vertical Test Circuit
	Connector

TABLE I (Contd)

NO. 3 ESS SCHEMATIC DRAWING AND CIRCUIT DESCRIPTION LIST

NUMBER	TITLE
CPS-FB420 CPS-FB422 CPS-FB425	Test Vertical False Cross and Ground Test Circuit Test Vertical Power Cross Test Circuit Office Alarm and Sounder Circuit
SD/CD-3H904-01	Test Frame
SD/CD-3H905-01	Miscellaneous Power Frame
SD/CD-82255-01 188A, 189A Power Unit 184B Power Unit 184A Power Unit	Ringing and Tone Plant +24 Volt Converter ±130 Volt Converter +48 Volt Converter
SD/CD-3H907-01	DC Power Distribution
SD/CD-3H908-01	AC Power Distribution
SD-3H910	Trunk Order Codes
SD/CD-1A210-01	Remote Master Scanner Applique Circuit
SD/CD-3H911-01	Distributor Applique Circuit
SD/CD-3H912-01	Scanner, Peripheral Pulse Distributor and Peripheral Decoder Assignment Rules and Compatibility Guide

TABLE J

PROGRAM DOCUMENTATION

PR NUMBER	PROGRAM NAME	PROGRAM TITLE
I. Common System Programs		
1C910-32	CDGNM	Common Diagnostic Monitor
1C911-32	CDGDSR	Double Store Read Test
1C912-32	CDGMCH	MCH, Gating Bus, Clock and Register Initialization Test
1C913-32	CDGTO	To and From Field Crosspoint Tests
1C914-32	CDGMLT	Multiple Crosspoint Tests
1C915-32	CDGREG	Register Gating Tests
1C916-32	CDGMIC	Microstore Content Test
1C917-32	CDGFN	Data Manipulation Logic (DML) Tests
1C918-32	CDGS3A	Off-line Store Diagnostic Code
1C919-32	CDGMC1	Micro Control Tests
1C920-32	CDSPA1	DS and PA+1 Adder Tests
1C921-32	CDGMSQ	Store Bus Controller Tests
1C922-32	CDGSIO	Store IO Access Test
1C923-32	CDGSMX	Store Multiplex Circuit Test
1C924-32	CDGSBS	Store Bus Communication Test
1C925-32	CDGSFA	Store Fanout Boards Test — Part A
1C926-32	CDGSFB	Store Fanout Boards Test — Part B
1C927-32	CDGSWP	Store Write Protect Test
1C928-32	CDGSON	Interprocessor Store Bus Test
1C929-32	CDGSD	Memory Element Test
1C930-32	CDGMI	Micro Interpret, Multiple Crosspoint and Parity Check Tests
1C931-32	CDGNTI	Timing Counter, Interrupt, Address and Data Matcher and IO Tests
1C932-32	CSTATS	System Status Bits, Switching and System Status Panel Tests
1C933-32	CDGNOF	Off-Line Diagnostic Code
1C934-32	CDGSCP	Store Control and Parity Test
1C935-32	CDGSDF	Store Controller Data Register Test
1C950-32	CBLM	Common Base Level Monitor
1C952-32	CINIT	Common Initialization
1C953-32	CIPL	Common Initial Program Loader
1C954-32	CNRUTL	Common Nonresident Utilities
1C955-32	CPAGM	Common Tape Paging Monitor
1C956-32	CSYSUB	Common System Subroutines
1C957-32	CTAPH	Common Tape Handler
1C958-32	CTAPM	Common Tape Maintenance
1C959-32	CTSD	Common Temporary Store Definition
1C962-32	CUTIL	Common Utilities
1C970-32	CPATCH	Common Patch Area
II. Resident Administration Programs		
3H000-02	ATC	Application Temporary Change Program
3H001-02	AUDB	Audit Programs
3H002-02	AUDITS	Audit Monitor, Audit Subroutines and Some Audit Programs
3H003-02	AUDNET	Network Audit Program
3H004-02	BLMMA	Application Portion of Base Level Monitor

TABLE J (Contd)
PROGRAM DOCUMENTATION

PR NUMBER	PROGRAM NAME	PROGRAM TITLE
II. Resident Administration Programs (Contd)		
3H005-02	CTRACR	Resident Portion of the Call Trace Program
3H006-02	INITA	Allocation Portion of the Initialization Programs
3H007-02	RCWTE	Recent Change — Translation Store Modification Subroutines
3H008-02	TRAFIC	Traffic and Plant Measurements
3H009-02	TVTAB	Transfer Vector Table
3H010-02	APATCH	Applications Patch Area
3H011-02	ATSD	Application Temporary Store Definition
3H012-02	CTTYH	Application Version of Common TTY Handler Program
3H013-02	CTTYT	Application Version of Common TTY Tables
3H014-02	MASACS	Main Store Access Routines
3H015-02	TTYAPP	Compatibility Package for Common System TTY
3H016-02	T1AREA	Application TTY Tables
3H017-02	TRSUBS	Traffic Subroutines
3H018-02	TDATA	Translations Data
3H019-02	ATCA	Auxiliary Application Temporary Change Program
3H186-02	ABM	ABM Buffer Management
3H187-02	AMA	Automatic Message Accounting
3H262-02	DATADM	Data Administration Program
III. Nonresident Administration Programs		
3H020-02	ADMCON	Administrative Functions Control Programs
3H021-02	CDISUB	Code Index Print Subroutine
3H022-02	COPYLC	Line Class Code Translation Update Program
3H023-02	CUT	Cutover Program
3H024-02	CVTSUB	Data Conversion Subroutines
3H025-02	LCSUB	Line Class Code Table Access Routine
3H026-02	LINSUB	Verify Line — Utility Subroutine
3H027-02	LNKSUB	Linked Output Message Subroutine
3H028-02	MEMSUB	Group Member Print Subroutine
3H030-02	OPDATA	Office Data File Update Program
3H031-02	PBXSUB	Print PBX/MLH Group Data
3H032-02	PRTSUB	Line Print Subroutine
3H033-02	RCAC	Recent Change — Autoconnect Data
3H034-02	RCBTN	Recent Change — Define Group of One Thousand Numbers as Billing Number
3H035-02	RCCDI	Recent Change — Code Index Expansion Entries
3H036-02	RCCFN	Recent Change — Call Forwarding
3H037-02	RCCHI	Recent Change — Charge Index
3H038-02	RCCKT	Recent Change — Trunk or Service Circuit
3H039-02	RCDIG	Recent Change — Define 3- or 6-Digit Code
3H040-02	RCDP	Recent Change — Define or Remove a Peripheral Decoder
3H041-02	RCGRP	Recent Change — Define Features for Trunk or Service Circuit
3H042-02	RCLCC	Recent Change — Line Class Code
3H043-02	RCLINE	Recent Change — Line Service Orders
3H044-02	RCMLHG	Recent Change — Multiline Hunt Group Information
3H045-02	RCMOVE	Recent Change — Subroutines to Move Data
3H046-02	RCMPY	Recent Change — Multiparty Line Service Order

TABLE J (Contd)

PROGRAM DOCUMENTATION

PR NUMBER	PROGRAM NAME	PROGRAM TITLE
III. Nonresident Administration Programs (Contd)		
3H047-02	RCMTL	Recent Change — Multiline Hunt Group Terminal Information
3H048-02	RCNG	Recent Change — Number Group Definition
3H049-02	RCODIG	Recent Change — One-Digit Translator
3H050-02	RCOE	Recent Change — Specify Miscellaneous Terminal Equipment
3H051-02	RCOFIC	Recent Change — Office Identification Parameters
3H052-02	RCPCH	Recent Change — Specify Punching of Customer Dialed Changes
3H053-02	RCREAD	Recent Change — Subroutines to Load Translation Data Into Translation Buffer
3H054-02	RCRTI	Recent Change — For Route Indices
3H055-02	RCSCN	Recent Change — Change a Speed Calling List
3H056-02	RCSCR	Recent Change — Screening Class Expansion Entry
3H057-02	RCSP	Recent Change — Miscellaneous Scan Point Definition
3H058-02	RCSUB	Recent Change — Subroutines
3H059-02	RCTOTA	Recent Change — Specify Terminal Office Test Access Number
3H060-02	RCTTY	Recent Change — TTY Definitions
3H061-02	RCTWOP	Recent Change — Two-Party Line Service Orders
3H062-02	RCZERO	Recent Change — Zero Incorrect Office Data
3H063-02	RTISUB	Route Index Printing Subroutines
3H064-02	SCFSUB	Verify Call Forwarding and Speed Calling
3H065-02	SNGSUB	Single Line Output Message Subroutine
3H066-02	VRCFN	Verify Call Forwarding Telephone Number
3H067-02	VRCIRI	Verify Code Index and Route Index Translations
3H068-02	VRDATE	Verify Data of Translation Files
3H069-02	VRDIG	Verify 3-Digit — 6-Digit Translation
3H070-02	VRFATD	Verify Search Type Foreign Area Translation Default Code Index
3H071-02	VRGRP	Print Group and Member Data for Trunk or Service Circuit
3H072-02	VRLINE	Verify Line Translations
3H073-02	VRLSTR	List Route Indices Pointing to a Trunk Group
3H075-02	VRLST3	List 3-Digit Codes Pointing to a Route Index
3H076-02	VROCDN	List Normalized Office Codes with Office Data
3H077-02	VRSCN	Verify Speed Calling
3H078-02	VRTHDI	Verify Thousands Digit Translation
3H079-02	CTRACN	Call Trace Program — Nonresident
3H080-02	OFR	Office Records
3H081-02	OTOTST	Office to Office Test Program
3H082-02	TRKSUB	Trunk Group Data Print Subroutines
3H083-02	VRLSTO	List Working Terminals (OEs) in a Concentrator
3H084-02	VRSCR	Verify Screening Table
3H085-02	VRLCC	Verify Line Class Table Store on Tape
3H086-02	NRTRAF	Nonresident Traffic Routines
3H087-02	RCCLS	Recent Change Class of Service
3H088-02	RCG TSA	Recent Change Trunks, Service Circuits and Multiline Hunt Groups Traffic Assignments
3H089-02	RCINCP	Recent Change Intercepts
3H090-02	RCQDUM	Recent Change Quarter Hourly Report

TABLE J (Contd)

PROGRAM DOCUMENTATION

PR NUMBER	PROGRAM NAME	PROGRAM TITLE
III. Nonresident Administration Programs (Contd)		
3H091-02	RCQH	Recent Change Quarter Hourly Schedules
3H092-02	RCREPT	Recent Change Traffic Report Schedules
3H093-02	RCSCHE	Recent Change Schedule Assignments
3H094-02	CHIP	Changes to Programs that can Only be Installed via CHIP facility
3H095-02	CTC	Common Systems Temporary Change Program
3H096-02	DTC	Common Systems Diagnostics Temporary Change Program
3H097-02	FILPUB	Read and Write Subroutines for Office Record Generation
IV. Call Processing Programs (Resident)		
3H150-02	COIN	Coin Clean-up Routines
3H151-02	CUSTER	Customer Error Program
3H152-02	CUSTOM	Custom Calling Program
3H153-02	DIGPRO	10-Millisecond Interrupt Program — Digit Receiving & Sending
3H154-02	DISCON	Disconnect Progress Mark
3H155-02	DNTRP	Digit Interpretation Progress Marks
3H156-02	EMERG	911 Service Program
3H157-02	EQPSEL	Equipment Selection Subroutines
3H158-02	FALTCR	Call Failure Program
3H159-02	FASTTK	Fast Trunk Scan Program
3H160-02	INPUT	Input Monitor Program
3H161-02	LCLCHG	Local Charge — Coin and Message Register
3H162-02	LNORIG	Line Origination Program
3H163-02	NTCONN	No-Test Trace Connection Program
3H164-02	OPER	Operator Call Program
3H165-02	OUTCAL	Outgoing Call Program
3H166-02	PATHNT	Network Path Hunt, Busy and Idle
3H167-02	PCAT	Catalog of Peripheral Control Sequences
3H168-02	POINT	Peripheral Order Interpreter
3H169-02	POPS	Peripheral Order Subroutines
3H170-02	PSUBS	Peripheral Network Subroutines
3H171-02	QTMON	Network Queue and Timing Hopper Monitor
3H172-02	RING	Ring and Answer — Completion of Intraoffice Calls
3H173-02	SCANS	Base Level Scanning Programs
3H174-02	TCRSCN	Base Level TCR Scan
3H175-02	TERM	Completion of Incoming and Intraoffice Calls
3H176-02	TKORIG	Trunk Origination Program
3H177-02	TKPROC	Trunk, Junctor and Service Circuit Input Processing
3H178-02	TVADM	Test Vertical Status Administration Program
3H179-02	XSLSPN	Scan Point Number Translation Program
3H180-02	XSLSUB	Basic Translation Subroutines
3H181-02	XSL3DG	Three-Digit Translation Program
3H182-02	XSL4DG	Four-Digit Translation Program
3H184-02	TREWAY	Conference Calling Program

TABLE J (Contd)

PROGRAM DOCUMENTATION

PR NUMBER	PROGRAM NAME	PROGRAM TITLE
V. Resident Maintenance Programs		
3H250-02	ACPORT	Autoconnect Port Control Program
3H251-02	MCSUB	Maintenance Subroutines
3H252-02	MTTYC	Resident TTY Message Program
3H253-02	OFFTL	Office Test Line Handler
3H254-02	PURC	Peripheral Controller Fault Recovery
3H255-02	PWSC	Power and Alarm Scan
3H256-02	TSVEA	Trunk, Line, Service Circuit and Network Line Error Analysis
3H257-02	TSVREQ	Trunk, Line, Service Circuit and Network Link TTY Message Handler
3H258-02	TSVSUB	Maintenance Subroutines for Replicated Circuits and Lines
3H259-02	TTYMAP	TTY Message Administration Programs
3H260-02	SCSUBS	Application Conversion Subroutines
3H261-02	TSVIOM	Trunk and Service Circuit IMOM Program
VI. Nonresident Maintenance Test Data Tables		
A. Controller Diagnostics		
3H265-02	DCNSUB	Diagnostic PUDAL Statement Execution Subroutines
3H266-02	DCON	Diagnostic Control Program
3H267-02	FIOCT	Frame IO Controller Diagnostic
3H268-02	NTCT	Network Controller Diagnostic
3H269-02	PPDT	Peripheral Pulse Distributor Diagnostic
3H270-02	RTPT	Ringling and Tone Plant Diagnostic
3H271-02	SCNT	Scanner Controller Diagnostic
3H272-02	TTYT	TTY Controller Diagnostic
B. Trunk and Service Circuit Diagnostics		
3H280-02	CCCT	Coin Control Circuit Test
3H281-02	CDPRT	Customer Dial Pulse Receiver Tests
3H282-02	CNPLT	Continuity and Polarity Test Circuit
3H284-02	EMTWT	Two-Way E&M Trunk Test
3H285-02	SUPRT	Superimposed Ringing Circuit Test
3H286-02	JCTRT	Junctor Circuit Test
3H288-02	MFRT	Multifrequency Receiver Test
3H289-02	MFTT	Multifrequency Transmitter Test
3H290-02	MWLAT	Milliwatt and Transmission Environment Test Circuit Test
3H291-02	ORBT	Outgoing Reverse Battery Trunk Test
3H292-02	RACT	Recorded Announcement Tests
3H293-02	RRCT	Regular Ringing Circuit Test
3H294-02	TDPTT	Dial Pulse Transmitter Circuit Test
3H295-02	TPDT	Tone Present Test Circuit Tests
3H297-02	TTRT	Trunk Operational and Transmission Tests
3H298-02	TVCT	FCG, PC, RV and Test Vertical Circuit Tests
3H299-02	TONET	Tone Circuit Tests

TABLE J (Contd)
PROGRAM DOCUMENTATION

PR NUMBER	PROGRAM NAME	PROGRAM TITLE
VI. Nonresident Maintenance Test Data Tables (Contd)		
C. Nonresident Maintenance Programs		
3H310-02	ALIT	Line Insulation Test
3H311-02	LTDH	Local Test Desk Handler
3H312-02	MNRSUB	Maintenance Nonresident Miscellaneous
3H313-02	NFEX	Network Fabric Exercise
3H314-02	MAUD	Maintenance Audits
3H316-02	SRTH	Station Ringer Test Program
3H317-02	TLTPC	Trunk and Line Test Panel
3H318-02	TSVMON	Trunk and Service Circuit Maintenance Aids Programs
3H319-02	TSVNR	Trunk, Line & Service Circuit Nonresident Routines
3H320-02	NWGRID	Network Grid Utility Programs
3H321-02	GRDUTL	Grid Removal Utility Subroutines
3H322-02	MNRPCH	Patch Area for Nonresident Maintenance Programs
VII. Program Related Documents		
A. Trouble Locating Manuals		
TLM-3H100-01		Frame IO Controller (FIOCT)
TLM-3H101-01		Scanner Controller (SCNT)
TLM-3H102-01		Peripheral Pulse Distributor (PPDT)
TLM-3H103-01		Network Controller (NTCT)
TLM-3H104-01		Ringing and Tone Plant (RTPT)
TLM-3H105-01		TTY Controller (TTYT)
TLM-3H110-01		Overall Trunk and Service Circuit TLM
TLM-3H111-01		Customer Dial Pulse Receiver (CDPRT)
TLM-3H112-01		Superimposed Ringing Circuit (SUPRT)
TLM-3H113-01		Multifrequency Receiver (MFRT)
TLM-3H114-01		Multifrequency Transmitter (MFTT)
TLM-3H115-01		Test Vertical Circuit (TVCT)
TLM-1C900-01		Common Systems Processor Trouble Locating Manual
TLM-1C904-01		Common Systems Tape Data Controller Trouble Locating Manual
B. Other Program Related Documents		
IM-3H300-01		Input Message Manual
OM-3H300-01		Output Message Manual
PA-3H300-02		Office Data Tables Layout Specifications
PG-3H902		Program and Documentation Guide
PK-1C900-01		Maintenance Reference Manual (Common Systems)
PK-1C901-01		Command Manual
PK-3H300-02		Load Map
PK-3H301-01		Network Trouble Shooting Manual
PK-3H302-01		Miscellaneous Fixed Alarms

TABLE K

BELL SYSTEM PRACTICES

A. HARDWARE SECTIONS	
NUMBER	TITLE
233-000-001	Organization of System Documentation
233-000-010	Numerical Index (Other than 233 Division)
233-001-011	Equipment Test List
233-100-005	Administrative Data Link
233-100-010	Emergency Action Procedures
233-101-115	Office Records
233-110-000	Control Complex Description
233-110-200	Control Complex Operation
233-120-100	Switching Network
233-121-100	Scanners
233-121-105	Pulse Distributor & Peripheral Decoders
233-121-110	Frame Input Output Controller
233-121-115	Trunk, Test, & Service Circuits
233-120-120	Distributing Frame
233-121-125	Spare Equipment Handling & Storage Procedures
233-130-100	Power Equipment
233-135-100	Test Equipment
233-135-105	Trunk & Line Test Panel
233-135-110	Remote Office Test Line
233-140-100	Office Maintenance
233-141-100	Centralized Office Maintenance
233-141-105	Maintenance Handbook
233-141-110	Service Observing
233-142-100	TOP Volume 1 (Developmental)
233-160-001	General Growth Procedures
233-170-100	Precutover Procedures
680-536-101	Service Order Procedures
966-210-100	General Description
233-060-ZZZ	Network Switching Engineering
<u>NO. 3/SCCS DOCUMENTS</u>	
190-117-110	SCCS/No. 3 General Description
190-117-310	Operation and Test Procedures
190-117-311	Emergency Action Procedures
190-117-312	Peripheral Unit Troubles
190-117-313	Trunk Troubles
<u>NO. 3/COMMON SYSTEM DOCUMENTS</u>	
254-300-100	3A Processor
254-300-110	3A CC Description
254-300-120	3A CC Theory of Operation

TABLE K (Contd)

BELL SYSTEM PRACTICES

A. HARDWARE SECTIONS (Contd)	
NUMBER	TITLE
254-300-140	Processor Power System
254-300-150	Main Store and Supplementary
254-300-160	Processor Maintenance Frame
254-300-170	Tape Data Controller
254-300-180	System Status Panel and Controller
254-300-190	Teletypewriters and Teletypewriter Controller
B. SOFTWARE SECTIONS	
233-150-100	General Description
233-151-105	Call Processing
233-151-110	Call Tracing
233-151-115	Operator Functions
233-151-120	Charging
233-151-125	Input Processing & Scanning
233-151-130	Basic Call Processing
233-151-135	Custom Calling
233-151-140	Network Path Hunt
233-151-145	Digit Processing
233-151-150	Translations
233-151-155	Peripheral IO Control
233-151-160	911 Calling
233-151-165	Automatic Message Accounting Recording Center
233-152-105	Recent Changes
233-152-120	Teletypewriters
233-152-125	System Control
233-152-130	Tape Operations
233-152-135	Traffic & Plant Measurements
233-152-140	Audits
233-152-145	System Cutover Tests
233-153-105	Programmed Maintenance Aids
233-153-106	Network Fabric Exercise
233-153-115	Trunk & Service Circuit, Diagnostics
233-153-120	Peripheral Unit Diagnostics
233-153-125	Alarm & Status Reporting
233-153-130	Initialization & Fault Recovery
233-153-135	Error Analysis & Fault Detection
233-153-140	Peripheral Unit Fault Recovery
233-153-145	ROTL, CAROT, ATMS
233-153-150	SCCS Interface
233-154-130	Recent Change Users Guide
233-154-135	Translation Subroutines
233-154-145	Pudal Diagnostic Language
233-060-ZZZ	Network Switching Engineering

TABLE K (Contd)

BELL SYSTEM PRACTICES

C. FEATURE DOCUMENTS
233-190-ZZZ – No. 3 ESS Feature Documents
D. TRAFFIC ENGINEERING
233-060-ZZZ
E. NETWORK ADMINISTRATION
233-020-ZZZ