

PROCESSOR CONTROLLED AND ANCILLARY SYSTEMS  
FUNCTIONAL SYSTEM DESCRIPTION  
NETWORK SWITCHING ENGINEERING  
1A VOICE STORAGE SYSTEM

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 <b>1. GENERAL</b>	
1.01 This section describes the functional operations and interrelationship of the major equipment components comprising the 1A Voice Storage System (VSS). Additionally, the equipment use is described in terms of typical call sequence for the presently offered services (see Section 255-061-010 for a broad view of equipment components and service descriptions).	
1.02 Whenever this section is reissued the reason(s) for reissue will be listed in this paragraph.	
1.03 References in this section to methods, planning, data requirements, service levels, and equipment quantities are based on American Telephone and Telegraph Company recommendations.	
 <b>2. SYSTEM FUNCTIONS</b>	
<b>GENERAL</b>	
2.01 There are three main functions in the operation of the Voice Storage System (VSS): <i>Central Control; Voice Path operation; and Signalling Path operation.</i>	

**CENTRAL CONTROL**

**2.02** The Central Control consists of an Auxiliary 3A Processor with an associated memory, Main Store (MAS). The Control Unit is fully duplicated and provides 256K words (K=1024) per Control Unit. Additionally, there is a pair of Supplementary Main Store (SMAS) frames that can supply up to 768K words per frame in increments of 128K. The 3A Processor directs and administers all operations of the VSS via bus systems through units on the Peripheral Control (PC) frame and the Voice Message Controller (VMC).

**VOICE PATH AND SIGNALLING PATH****A. Trunks (Common)**

**2.03** Common to both the Voice and Signalling Path functions is the trunk connection between the client office (subscriber serving office) and the VSS (see Fig. 1).

**2.04** The subscriber accesses or is accessed by the VSS via a dedicated, single route, 2-way trunk group between the client office and VSS. (For client office trunk interface provisioning responsibility refer to RL-78-12-056.)

**2.05** At the VSS, the trunk terminates in a *Voice Access Circuit (VAC)* which consists of the following:

*Trunk Access Circuit (TAC)* that is equipped with:

- (a) VSS trunk circuit
- (b) TOUCH-TONE® service receiver
- (c) Coder/decoder (CODEC)
- (d) Voice present (VP) detector
- (e) Automatic gain control (AGC).

**Buffer (BUF)**

**2.06** Each Voice Access Circuit Unit (VACU) may contain 1-16 VACs. Each VACU also contains the first stage access to both the Voice and Signalling paths. Access to the Voice path is the First Stage Switch (FSS). Access to the Signalling Path is the First Stage Matrix (FSM).

**2.07** All trunk usage, voice or signalling, is under the control of the TAC-Matrix Scanner Controller (TMSC). The TMSC interfaces with the System Processor via the Peripheral Control (PC) unit for total system control. Access to the TMSC from the TACs is via the TAC Interface (TACI) in each VACU and the Service Access Matrix (SAM). SAM is comprised of the First Stage Matrix (FSM) and the Second Stage Matrix (SSM).

**2.08** Each Voice Access Circuit frame mounts two VACUs. VSS capacity is 16 VAC frames. Total office capacity is *512 VACs, 32 VACUs, 16 VAC frames.*

**2.09** Figure 2 illustrates the VSS components involved in the Voice Path. The Voice Path is used for the two major functions of *recording* and *playback* of messages and announcements. The functional control of both these operations is performed by the System Processor. The control of the trunk activity is via the TAC-Matrix Scanner Controller (TMSC) on the Peripheral Control (PC) frame. The control of the storage and retrieval from storage is via the Voice Message Controller (VMC).

**Recording**

**2.10** The analog voice signal comes in over the trunk from the client office to the VSS Voice Access Circuit. The CODEC decodes the analog voice signal into digital signals. The digital signals are spilled into the memory of the Voice Access Circuit Buffer (VAC BUF).

**2.11** A path to the VMC is established from the BUF via the FSS of the VACU; and from the FSS via the Second Stage Switch (SSS). The SSS is located on the PC frame. These two stages of switching are sometimes called the Voice Message Controller Switch. (The Voice Path distribution from the BUF to the VMC may be seen in Fig. 3). The number of FSSs per VACU and the number of SSSs are directly related to the number of VMCs. A fully equipped VSS has a capacity for eight VMCs.

**2.12** The VMC controls the storage of the message/announcement to be filed on the disk storage units known as Disk Transports (DTs). The physical capacity in DTs for VSS is eight per VMC. However, this may be limited by the real-time capacity of each VMC. Therefore, the

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design capacity has been set at three DTs per VMC.

### Duplication

2.13 All messages/announcements are duplicated for service protection. Duplication is always made on a DT assigned to a VMC different from the original storage location. See Fig. 4 for an illustration of duplication functions on the Voice Path.

2.14 Under control of the System Processor, the DT location of the unduplicated message is sought. A path is established from that DT through its serving VMC, the associated SSS and an FSS to a VAC buffer. The message is stored in the buffer memory in digital segments equivalent to five seconds of voice. Next, a path is selected to reach a VMC numbered differently from the one serving the original storage location. The message is then sent from the VAC buffer memory via FSS, SSS, and VMC to the duplicate storage location. The mode of transmission is entirely digital.

*Note:* The Voice Access Circuit, including the trunk, is not available for any other use during duplication. Other demands for trunk use have higher priority than duplication. If there is a call for trunk use, such as a subscriber request, duplication will be aborted and attempted at a later time.

### Playback

2.15 When playback is required, the System Processor identifies the storage location of the message/announcement to be played back. A path is then established from the DT to the associated VMC and SSS. Via the FSS of the VACU, the digitized information is dumped into the buffer associated with the VAC on which the playback request was made. The CODEC in the TAC encodes the digitized signals into analog voice signals. The voice is then sent to the subscriber or caller in the client office.

### Subscriber Control Codes

2.16 The users of VSS services may control the use of the service by dialing instruction codes. For example, messages may be skipped, saved or repeated. These codes are received by the TOUCH-TONE service receiver in the TAC.

The TOUCH-TONE service receiver performs the combined functions of receiving and detecting supervisory signals from the ESS and dial pulses and TOUCH-TONE calling control digits from customers. Information from dial pulse instruments is sent to VSS over E&M signalling leads. The instructions are shifted to the System Processor for interpretation via the TACI and the TMSC.

### C. Signalling Path and Control

2.17 The Signalling Path in VSS carries the intermachine communication between the client office equipment and the VSS. This information provides data for billing, recontacting the subscriber, activating and deactivating the services, service orders, maintenance, administration, etc.

2.18 The communications are passed as digits (tones) of Multifrequency (MF) signalling. MF receivers and transmitters at both VSS and the client office are used for this intercommunication.

2.19 The signalling conditions between the client office and VSS are best understood by discussing the established path, Fig. 5, and the control of the signalling path, Fig. 6, separately.

### Signalling Path

2.20 Signals between the client office and VSS are routed on the 2-way trunks. Access between the MF receivers and transmitters and the trunk (TAC) is through the SAM.

2.21 The SAM is two stage (see Fig. 8). An FSM is located in each VACU with a capacity of 16 TACs on one side accessing as many as 15 Second Stage Matrices (SSMs) on the other side. The paths between the FSM and SSM are called "A" links. The signalling interconnection of the "A" links is shown in Fig. 8. (Note: Initial installations of VSS require the installation of only SSM 1-8 as a balanced equipment provision). The SSMs are located on the PC frame.

2.22 Again looking at Fig. 5, note that the MF signals between the client office and VSS are analog. The CODEC in the TAC does analog/digital or digital/analog conversion enabling digital signalling between the TAC and SAM. The MF receivers and transmitters, located on the Service Circuit (SC) frame require analog format. Each SSM has one

or two CODEC units associated with it depending on the number of service circuits associated with that SSM. Each CODEC unit is equipped with four CODEC circuits and is permanently assigned to service and test circuits (see Fig. 10).

#### Signalling Path Control

**2.23** The control of the Signalling Path to and from the TAC is exercised via the TMSC, see Fig. 6. The TMSC handles all activity between the TAC and the System Processor and the TAC and Service Circuits. The interface between the TMSC/Service Circuits and the System Processor is the PC unit. The TMSC interfaces with the trunk (TAC) via the TAC Interface units (TACI) and with the SSM via the SSM Interface unit in the SSM.

**2.24** The appropriate MF intermachine messages move between transmitters or receivers and the System Processor via the PC unit on the Peripheral Control Frame (see Fig. 7).

### 3. CALL SEQUENCE

#### GENERAL

**3.01** The services presently planned for the use of VSS are *Custom Calling Services II* (CCS II) and *Custom Announcement Service*. CCS II includes *Call Answering Service* and *Advance Calling*. Refer to local tariffs for specifics of service offerings.

#### CALL ANSWERING

**3.02** Call Answering Service provides for answering a subscriber's telephone with a *greeting*. The caller may then leave a message for retrieval by the subscriber at a later time. This service is available in two forms: to the *Daily* user and on a subscribed *Monthly* basis for the heavier user.

**3.03** There are four operational functions performed in the provision of Call Answering Service:

- (1) Activation
- (2) Intercept
- (3) Retrieval

(4) Deactivation.

**3.04** Each operation is separate and distinct.

Activation, retrieval, and deactivation are initiated by the subscriber in the client office by dialing a code (usually \*5X for TOUCH-TONE dialing or 115X for rotary dial) associated with the particular operation. Intercept occurs when the service is in an active state. Calls to the activated call answering directory number (DN) are intercepted at the client office and sent to the VSS for answer and recording of messages.

**3.05** Each of these four operations is performed with the aid of prompting announcements and tones. (See Table A for Call Answering Service Illustrative System Announcements.)

**3.06** Block diagrams of the Call Sequence of each operation for both the Daily user and Monthly Subscriber to Call Answering are shown in Fig. 11 through 17.

**3.07** In order to simplify the diagrams, tones and announcements not associated with the successful use of the service have been grouped. Grouped under LIMITS are tones and announcements associated with certain conditions limited by tariff; eg, exceeding limits placed on number of messages stored at any one time, length (time) of messages, length (time) of greetings, number of simultaneous intercepted calls, message storage time (days). Grouped under ERRORS are dialing errors, system errors, denial of service (not subscribed or not permitted), service conflicts, etc. OVERFLOW grouping covers the usual system path's busy conditions.

#### A. Activation

##### Daily User

**3.08** No service order is required to be instituted as a Daily user of Call Answering Service. The service is invoked by the daily user by dialing the proper access code/s and is totally usage-sensitive billed. Activation procedure for the Daily user is shown in Fig. 11.

**3.09** The user dials a 2-digit access code (\*51 from TOUCH-TONE dialing lines or 1151 from rotary dial lines). The client office seizes a trunk to VSS. VSS returns a wink start signal to the client office. The wink indicates that an MF

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receiver is attached and that VSS will respond to the ESS within the prescribed service criterion (to be discussed in Section 255-061-050). The client office then sends the request for activation to VSS along with user identification information. This information is transmitted to VSS in Multifrequency (MF) signalling digit sequences designated MF packets. Activation information averages 12 MF digits.

**Note:** This operation follows the Signalling Path (TAC-TACI—FSM—TMSC-SSM—CODEC MF receiver).

**3.10** After the MF packet has been transmitted, the user is cut through to the VSS. The VSS logo and an activate verification announcement is retrieved from a Disk Transport (DT) and returned to the user via the Voice Path (DT-VMC-SSS-FSS VAC buffer-TAC). This announcement requests the user to dial 2 if a system greeting is to be used for intercept, or 7 if the user wishes to record a personal greeting.

**3.11** As soon as a 2 or 7 is dialed, VSS selects another trunk to the client office and sends an activate MF packet over the Signalling Path (MF transmitter-SSM-CODEC-TMSC-FSM-TACI-TAC) and on to the client office. ESS sends a wink to indicate receipt of a good activate message(s). Verification of activation information contains an average of 16 MF digits.

**3.12** If the subscriber elects to record a personal greeting, the greeting will be repeated automatically. If no greeting is recorded, calls will be answered by a system standard greeting or a previously recorded greeting if one is actively in storage. All voice activity takes the main Voice Path (TAC-VAC buffer-FSS-SSS-VMC-DT).

**3.13** Activation of Call Answering Service permits use of the user's line for outgoing service.

### Monthly Subscriber

**3.14** Activation of Call Answering Service by the monthly subscriber is shown in Fig. 12. Availability of monthly Call Answering Service is initiated by a service order. The service order information is sent from the client office to VSS in MF signalling packets as described in paragraph 3.09. Service order information may be in the range of 17-37 MF digits.

**3.15** Monthly subscriber activation is very similar to that of the Daily user except that activation for the monthly subscriber takes place after two seconds or more of the activate verify announcement is played. (Compare Fig. 11 and 12.)

**3.16** The monthly subscriber controls the sequence of events, recording, repeat greeting currently in use, and use of standard greeting by dialing single digit control codes (7, 6, and 2, respectively). Except for activation itself, other events are automatically provided for the monthly subscriber. The possible reiterative use of the control codes and repetition of error is machine-limited to prevent abuse.

**3.17** Control codes are received in the TAC by the TOUCH-TONE service receiver. The codes are reformatted and transmitted via TACI and TMSC to the system processor for interpretation and action.

### B. Intercept

#### Daily Users and Monthly Subscribers

**3.18** The intercept function for Call Answering Service is the same for all subscribers as far as VSS operation is concerned (see Fig. 13). However, the specific time at which intercept takes place in the client office may vary between the daily user and monthly subscriber.

**3.19** The activated daily user's directory number (DN) will be intercepted when busy or not answered after three rings. The activated monthly subscriber's DN will be answered when busy. In addition, the monthly subscriber may specify on the service order that interception of unanswered calls should take place after 0 rings, "answer immediate," or "don't answer" after 1 through 7 rings as desired.

**3.20** A call to a directory number (DN) with Call Answering Service activated is recognized by the client office. At the appropriate time, the client office seizes a trunk to VSS. VSS returns a wink start, indicating an MF receiver is available. The client office MF pulses an information packet to VSS (average 11 digits—Signalling Path use).

**3.21** The caller is then connected to VSS and answered by the Call Answering subscriber's previously selected greeting requesting that a

message be recorded. If no message is received, or the message is either too short or too long, the caller is instructed to hang up and call again (Voice Path use). When a message is received an MF packet is transmitted from VSS to ESS to set the Message Waiting Indicators (MWI). See paragraph 3.24.

**3.22** VSS is capable of handling 15 simultaneous intercepts for the same Call Answering subscriber. However, it is planned that a lower limit on simultaneous calls will be set by tariff.

### **C. Retrieval and Deactivation**

**3.23** Since the retrieval and deactivation operations for Call Answering have many steps in common, they will be discussed together.

**3.24** In order to assist the subscriber in timing the retrieval actions, the client office can provide two Message Waiting Indicators, Message Waiting Tone (MWT), and Message Waiting Ring (MWR). The first indicator is given in an activated subscriber off-hook condition and the second indicator is given in an activated subscriber on-hook condition.

#### **Daily User**

**3.25** Retrieval and Deactivation procedures for the Daily users are shown in Fig. 14 and 15 respectively.

#### **Retrieval**

**3.26** The user in the client office dials the retrieval code, \*52 or 1152. The client office sets up the trunk to VSS. VSS acknowledges the request for service with a wink signal. A descriptive MF packet is sent to VSS (average 11 digits) via the VSS Signalling Path. The client office connects the user to VSS.

**3.27** The user is informed by a VSS announcement as to the number of messages waiting, no messages, and/or a message presently being recorded. VSS then proceeds to playback the messages. Playback uses the Voice Path (DT-VMC-SSS-FSS-VAC buffer-TAC).

**3.28** Message playback is formatted as follows:

- 3 seconds of silence

- 1/4 second delimiter tone
- One second silence
- Day of week message recorded
- Time of day message recorded
- One second of silence
- Message.

If some callers have left no message, the user is informed by a VSS announcement delivered in the message slot of the format.

**3.29** The Daily user may exercise only one control function which is SKIP. SKIP is accomplished by dialing 4 during the message to be skipped. Messages will be played back a maximum of three times. Upon subscriber disconnect, all messages heard completely at least once and all messages skipped will be erased from storage. If all messages are retrieved, an MF packet is sent from VSS to ESS to remove the Message Waiting Indicators.

#### **Deactivation**

**3.30** The user dials the deactivate code, \*53 or 1153. The client office seizes a trunk to VSS. A wink start signal is returned to ESS indicating that VSS is ready to receive the call. The client office sends an MF packet to VSS (average 11 digits). The user is connected to VSS. VSS replies with an announcement acknowledging the deactivation request.

**3.31** During deactivation the user receives a last opportunity to hear any messages that still remain in storage. If the user remains on the line, the call sequence proceeds to the retrieval mode. Subscriber disconnect erases all messages and personal greetings from storage.

**3.32** Deactivation will take place when the subscriber goes on-hook at any time after two seconds of the acknowledgement announcement has been played. Actual deactivation occurs over a separate trunk seized by VSS after two seconds of the announcement has occurred. VSS sends an MF packet of approximately 11 digits to the client office.

**Monthly Subscriber**

3.33 Retrieval and Deactivation procedures for the monthly subscriber are shown in Fig. 16 and 17 respectively.

**Retrieval**

3.34 Retrieval action by the Monthly Call Answering subscriber differs from the Daily user mainly in the control the monthly subscriber may exercise over the retrieval procedure by dialing appropriate control codes. Controls consist of SKIP (4), SAVE (9), REPEAT (6), PAUSE (3). SKIP will skip a message; SAVE will save a message for retrieval at a later time; REPEAT will permit repetition of message(s); PAUSE permits a three second delay in message delivery.

3.35 At the end of retrieval, all messages heard and not saved are erased from storage.

**Deactivation**

3.36 Deactivation for the monthly subscriber follows the same general operation as the Daily user except for the same control ability that may be exercised during the retrieval mode. Also, a monthly subscriber's messages will not be erased unless heard and not saved or skipped during deactivations.

**CUSTOM ANNOUNCEMENT SERVICE**

3.37 Custom Announcement Service is very similar to Call Answering Daily except that the caller may not leave a message. The three operations are:

- (1) Activation
- (2) Intercept
- (3) Deactivation.

3.38 The call sequence of these operations are shown in Fig. 18 through 20. The definition of ERRORS, LIMITS, and OVERFLOW in these figures is the same as that shown in paragraph 3.07. Illustrative system announcements for this service may be found in Table B.

**A. Activation**

3.39 The subscriber dials an activation code (\*58 or 1158, TOUCH-TONE dialing or rotary dial respectively). The client office recognizes the request and seizes a trunk to VSS. VSS acknowledges the ability to receive an MF packet with a wink start signal. The subscriber's directory number (DN) is determined and an MF information packet is sent to VSS (Signalling Path use). The client office cuts through the subscriber to the VSS trunk.

3.40 Depending on how the service is tarified, the Custom Announcement Service may have calls answered by a standard greeting or may have the option of recording a personal greeting. Figure 18 follows the latter condition.

3.41 VSS sends an activation verification announcement to the user. If the user stays off-hook for two seconds or more of this announcement, VSS seizes another trunk to the client office, sends an activation MF packet to the client office, and service is activated. The client office sends a wink acknowledgement when a good MF packet is received. If the user goes on-hook (hangs up) in less than two seconds from the start of the announcement, service will not be activated.

3.42 The verification announcement indicates to the user that a personal greeting may be recorded, if desired.

3.43 If no recording is made within a prescribed time, the user is requested to hang-up. If a recording is made, the user may stay on the line and hear one playback of the greeting.

3.44 A final announcement thanks the user and leads to disconnect.

**B. Intercept**

3.45 A caller dials the directory number (DN) of a subscriber with activated Custom Announcement service. The call is routed over the usual trunking to the client office serving the Custom Announcement Service user. Immediate intercept occurs. See Fig. 19.

3.46 The client office intercepts the call to the activated DN and selects a trunk to VSS. A wink start signal is received from VSS. An MF information packet is sent to VSS.

**3.47** The caller is connected to VSS and receives the Logo, the current greeting is played, and the VSS disconnects.

### C. Deactivation

**3.48** The user dials a Custom Announcement Service deactivation code of \*59 or 1159. The client office selects a trunk to VSS, receives a wink start signal from VSS, and sends a deactivation information MF packet. The client office connects the user to VSS.

**3.49** The user is sent a deactivation verification announcement. If the user stays off-hook for two seconds or more of the announcement, the service is deactivated. If less than two seconds of the announcement is played before the user hangs up, service is not deactivated. Service is deactivated when VSS seizes a trunk to ESS and sends an MF deactivation packet to ESS.

### ADVANCE CALLING

**3.50** Advance Calling Service permits a telephone subscriber served from a No. 1/1A ESS equipped for CCS II services, to record a voice message to be delivered to a specified directory number at some later time. Delivery time may be user or system designated.

**3.51** The three sequences of operation for this service are:

- (1) Input
- (2) Status check
- (3) Delivery.

Call sequence diagrams for these operations are shown in Fig. 21, 22, and 23, respectively. Illustrative system announcements for this service may be found in Table C.

#### A. Input

**3.52** The Advance Calling user dials \*41 or 1141 activation code. The client office recognizes the request, seizes a trunk to VSS, and VSS returns a wink start signal. An MF information packet (11 digits) is sent to VSS. The user is then connected from the client office to VSS.

**3.53** The user receives an advance calling acknowledgment announcement and is requested to dial the telephone number to which the message should be delivered. Two dialing errors are permitted before the request is made to hang-up and start again. The dialed number is stored in Disk Transport via the Voice Path. The number is concatenated from prerecorded numbers stored in Disk Transport and is repeated to the user via the Voice Path for verification.

**3.54** The user is then given an opportunity to choose between Customer Specified Delivery time or System Specified Delivery time by dialing 9 for Customer Specified Delivery and 7 for System Specified Delivery.

**3.55** If Customer Specified Delivery is elected, an announcement instructs the user in the method of inputting the requested delivery time. The user will then proceed to dial the Customer Specified Delivery information. The system then repeats the message delivery time back to the user. If System Specified Delivery is elected, the system proceeds immediately to the message recording stage.

**3.56** The user records the message to be delivered. The message is repeated for the user's approval. An option of approving the message (dial 2), rerecording the message (dial 6) or replaying the message (dial 3) is given.

**3.57** If the message is approved for delivery, the user may either proceed to disconnect or recycle to recording additional messages for future delivery or to checking the delivery status of messages formerly recorded for delivery. This is accomplished by dialing appropriate control codes.

**3.58** All user input is subject to detailed error check with at least two opportunities to correct errors before receiving a request to hang-up and start again.

#### B. Status Check

**3.59** The Advance Calling user has the opportunity to check the delivery status of the message(s) that has been placed. See Fig. 22.

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**3.60** Status check reports on the following conditions:

- (a) Undeliverable
- (b) Not delivered—still trying
- (c) Delivered.
  - Message totally heard
  - Message partially heard
  - Message not heard.

**3.61** The user dials the Advance Calling Status check code \*45 or 1145. A VSS trunk is seized. A wink acknowledgement is returned from VSS to the client office. An MF packet containing the Originating Directory Number (ODN) is sent to VSS. The user is connected to VSS.

**3.62** VSS checks the Delivery Directory Numbers (DDNs) on file for this ODN. If there are no messages on file, VSS indicates this state with an announcement. If there are messages on file, the user is requested to dial the DDN of the message to be checked.

**3.63** VSS reports one of the states, undeliverable, "still trying," or delivered. If the message is undeliverable, the user may initiate another advance call by dialing \*41 or 1141 to invoke the input routine or may disconnect. If the report is "still trying," the user is given the opportunity to cancel the message.

**3.64** When the reported state is "delivered," three conditions of delivery are indicated: "not heard," partial and played (see paragraph 3.69 through 3.72).

**3.65** The user may recycle to either Status Check or Input by dialing the appropriate code or may disconnect.

**C. Delivery**

**3.66** VSS determines that a delivery attempt should be made. This decision is based on either the customer specified time associated with the message or on a complex series of algorithms that attempt to deliver at a reasonable time that is outside system busy hours. See Fig. 23.

**3.67** VSS seizes a trunk to the client office from which the input message originated. After receiving a wink start signal from ESS indicating an MF receiver is available, a delivery MF packet is sent. The packet contains the Originating Directory Number and Delivery Directory Number of the message and consists of approximately 18 digits.

**3.68** The client office proceeds to set up the call from VSS to the Delivery Directory Number in the normal manner. VSS immediately begins to scan for voice.

**3.69** When busy or reorder tone is recognized, VSS disconnects from the client office and sets the status on this message to either "still trying" or "undeliverable" whichever is appropriate.

**3.70** When ringing is recognized, VSS continues to scan for voice. If there is no answer or the terminating party is off-hook for less than two seconds, VSS will set the status of the message to "still trying" or "undeliverable".

**3.71** When VSS recognizes an off-hook for two seconds or more, an introductory announcement is played. VSS then delivers the message. If the terminating party remains off-hook, the message will be replayed and a sign-off announcement given.

**3.72** VSS sets the status of the message to one of the applicable "delivered" states: disconnect during greeting (not heard), partially delivered or delivered.

**3.73** Immediately upon disconnect by the DDN, VSS seizes another trunk to the client office and sends a billing MF packet of 46 digits. This consists of the information necessary to bill the call charges from the Originating Directory Number to the Delivery Directory Number and is recorded on the client office Automatic Message Accounting (AMA) Equipment. Billing data for the use of all VSS services is transmitted to Automatic Message Accounting Recording Center (AMARC) from VSS.

**4. OTHER ENHANCEMENTS TO SERVICES**

**4.01** In addition to the basic services offered for VSS use, there are other enhancements to these services currently available:

- (a) Remote Access and Privacy Code
- (b) Monitor and Cut-Through.

**REMOTE ACCESS AND PRIVACY CODE**

**4.02** Remote Access permits a subscriber to this service to use and control the VSS services from a station set other than the one which has that service. In order to assure that Remote Access by a subscriber is not invoked by other than the subscriber, a privacy code may be used by the subscriber. The Privacy Code designation is under the control of the subscriber.

**4.03** Remote Access Service with the initial Privacy Code is instituted for the subscriber via service order. When the service order is input the Privacy Code is usually set to "NULL"; ie, not required but can be set by the subscriber. Changes in Privacy Code may be made by the subscriber.

**4.04** Flowcharts showing the use of Remote Access Service and Privacy Code changes are shown in Fig. 24, 25 and 26 respectively. Illustrative System announcements are shown in Table D.

**A. Remote Access**

**4.05** The subscriber to Remote Access Service dials the Remote Access Directory Number (DN) for the client office from which the subscriber's regular telephone services are provided. The Remote Access DN is a regular 7-digit central office number (NXX-XXXX) where the NXX is located in the subscriber's VSS client office. (If the Remote Access subscriber is calling from an office located in a Numbering Plan Area (NPA) other than the one in which the client office is located, the Remote Access DN must be preceded by the NPA code of its client office.) If the subscriber is using remote access on an interoffice trunk basis the station set being used must be equipped for TOUCH-TONE dialing since end-to-end signalling will be used between the subscriber and VSS.

**4.06** The client office recognizes a remote request for VSS access and seizes a trunk to VSS. VSS returns a wink start signal indicating that an MF receiver is available. The ESS sends an MF packet to VSS indicating that this is a remote access call and the remote subscriber is connected to VSS through the client office.

**4.07** VSS returns an announcement requesting the subscriber to dial the Directory Number of the VSS subscribing line and the Privacy Code. See Table D for Remote Access and Privacy Code Illustrative System Announcements.

**4.08** One basic error in directory number and privacy code input is allowed. The second error prompts a request for disconnect. If no digits are dialed within 10 seconds of completion of the prompting announcement or insufficient digits are received followed by a 10-second interval with no digits, a request for subscriber disconnect is made.

**4.09** When an acceptable number of digits has been dialed, the Directory Number and Privacy Code are checked for validity. The first error permits a recycle for correction. The second error is sent to the disconnect routine.

**4.10** The dialing of a valid Directory Number and Privacy Code leads to an announcement requesting the subscriber to dial CCS II access codes as required (except the monitor code). Procedure then follows the usual call sequence of the service and activities accessed by the proper code as shown in Fig. 12, 14 through 19, 21, 22, and 25.

**B. Privacy Code Change**

**4.11** The subscriber to Remote Access Service may change a Privacy Code by using the Privacy Code Change service. This service is available through both remote and local access to any subscriber who uses a VSS Privacy Code.

**4.12** Remote access for Privacy Code change starts as any other Remote Access Service Use as described in paragraph 4.05 through 4.10. When the Remote Access Service user dials the Privacy Code Change service 1155 or \*55, the call sequence is as shown in Fig. 25.

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4.13 After dialing the Privacy Code change code, the subscriber is requested to dial a new Privacy Code.

4.14 If the subscriber recognizes an error a star (\*) may be dialed and a recycle will take place. After a second such error the subscriber is requested to disconnect.

4.15 When the subscriber dials a valid Privacy Code [zero to nine digits not including star (\*) or pound sign (#)] followed by # indicating the end of dialing, the new Privacy Code will be concatenated and repeated to the subscriber. The subscriber may then disconnect or dial any of the VSS service codes (except Privacy Number Change and monitor).

4.16 If there is a system error such that the new Privacy Code is not properly stored, the subscriber is so informed and requested to hang up and call again.

4.17 When no dialing occurs within ten seconds of the original system announcement, the subscriber will time-out to disconnect. The old Privacy Code will remain in effect.

4.18 Local access to Privacy Code Change is shown in Fig. 26. The subscriber dials 1155 or \*55. The client office seizes a trunk to VSS. VSS returns a wink start signal indicating the ability to handle the call. ESS sends an MF packet to VSS containing subscriber identification information. The subscriber is then connected to VSS.

4.19 VSS instructs the subscriber to dial the old Privacy Code and proceeds to check whether this subscriber indeed now has a Privacy Code. When the existence of a Privacy Code is determined, the call sequence proceeds to the same routine as described under remote access in paragraphs 4.13 through 4.17.

### MONITOR AND CUT-THROUGH

4.20 This add-on service permits a subscriber to Call Answering to listen to a caller currently leaving a message when the service is activated by dialing \*54 or 1154 and, if desired, to cut-through to the call answering state (by flashing the switchhook) and hold a conversation with the caller. This service is not permitted when using Remote Access to Call Answering Service.

### 5. REFERENCES

5.01 For more detailed information of equipment operation and control see the following Sections:

- 255-102-ZZZ Equipment Description
- 255-103-ZZZ Software Description
- 255-021-0ZZ Network Administration
- 255-061-0ZZ Measurements
- 231-090-151 Interface with Voice Storage Systems—No. 1 and No. 1A ESS.

TABLE A

## CALL ANSWERING SERVICE — ILLUSTRATIVE SYSTEM ANNOUNCEMENTS

NAME	CONTENT
CARP 1	You have no messages waiting.
CARP 2	Your caller did not leave a message.
CARP 3	An incoming call is being answered. Please stay on the line to hear the message. There will be a short delay until the call is completed.
CARP 5	This concludes message playback.
CARP 6	This concludes message playback. Another user of your service is listening to the balance of the messages at this time.
CARP 7	Please dial Call Answering service whenever we may assist you. Thank you. [10 seconds silence]
CARP 8	All messages will be erased when you hang up. If you want another playback, please stay on the line. You can skip a message by dialing 4.
CARP 9	Hello. When you hang up, Call Answering service will no longer answer your telephone.
CARP 10	Please dial Call Answering service when you want your telephone answered again. Thank you. [10 seconds silence]
CARP 11	We're sorry. because of a temporary equipment problem, your message was not recorded. Please hang up and call again. Thank you. [10 seconds silence]
CARP 12	[TONE] [1 second silence] Thank you for calling If you want to continue your message, please hang up and call again. Goodbye. [10 seconds silence]
	Note: [TONE] is 1 second duration, 2225 Hz.
CARP 13	Here is the greeting now in use.
CARP 14	[One second silence, 1/2 second 2225 Hz tone, one second silence] You may hang up now or dial a 2, 6 or 7.
CARP 15	[One second silence] Call Answering Service <i>will</i> answer your telephone with the standard greeting. When you hear this dial tone [stutter dial tone], you will have messages waiting. To play back your messages, dial 1152. To turn off the service, dial 1153. You may hang up now or stay on the line to hear the standard greeting. [1 1/2 second silence] The standard greeting is [One second silence]
	["Your call is being answered by the Bell System Call Answering Service. The person you called is unable to answer the telephone right now but will return your call as soon as possible. Please leave a message which includes your name and telephone number. You will have 30 seconds to record your message after you hear the tone."] [One second silence]
	Your calls will be answered by this greeting. Thank you. [10 seconds silence]

TABLE A (Contd)

## CALL ANSWERING SERVICE — ILLUSTRATIVE SYSTEM ANNOUNCEMENTS

NAME	CONTENT
CARP 16	[LOGO, one second silence] Hello. Your Bell System Call Answering service <i>is</i> operating and will answer your telephone. You may now dial a 2, 6, or 7.
CARP 17	[One second silence] Begin recording at the tone, and then dial 6 when you finish. [One second silence, 3/4 second TOUCH TONE <sup>®</sup> C]
CARP 18	[1/4 second 2225 Hz tone, one second silence] Since you did not record a greeting, we will answer your telephone with the standard greeting or with your previously recorded personal greeting. If you want to change your greeting, please hang up and dial 1151 again. Thank You. [10 second silence]
CARP 19	Your telephone will be answered using the standard greeting. You may hang up now or dial 6 to hear your greeting.
CARP 20	[One second 2225 Hz tone, one second silence] Call Answering service <i>will</i> answer your telephone. You may hang up now, or stay on the line to hear your greeting. [Recommend 3 second silence]
CARP 22	[LOGO, one second silence] Hello. This is your Bell System Call Answering service. Your calls can be answered with a standard greeting, or with your own personal greeting. To use the <i>standard</i> greeting, dial 2. To record a <i>personal</i> greeting, dial 7. Please dial now. [3 second silence] To use the standard greeting, dial the number 2. To record a personal greeting, dial the number 7. Please dial now. [3 second silence]
CARP 24	[LOGO, one second silence] Hello. Your Call Answering service cannot operate because you have too many messages waiting to be played back. Please play back your messages by hanging up and dialing 1152. Thank you [10 second silence]
CARP 25	[One second silence] To change your greeting, please hang up and dial 1151 again. When you hear this dial tone [stutter dial tone], you will have messages waiting. To play back your messages, dial 1152. To turn off the service, dial 1153. Thank you [10 second silence]
CARP 31	[1/4 second 2225 Hz tone, one second silence] We're sorry. You <i>must</i> dial a 2 or 7 to turn on Call Answering service, <i>or</i> to change the greeting now in use. If you want to try again, please hang up and dial 1151 again. Thank you [10 seconds silence].
CARP 33	[1/4 second 2225 Hz tone, one second silence] No message was received within the time required. <i>If you want to leave a message</i> , please hang up and call again. Thank you. [10 seconds silence].
CARP 34	Hello
CARP 35	Hello. Your Call Answering service will <i>no longer</i> answer your telephone. Your greeting and all messages <i>will be erased</i> when you hang up. Please stay on the line to hear your messages.
CARP 36	Hello. Your Call Answering service will <i>no longer</i> answer your telephone. Your greeting and all messages <i>will be erased</i> when you hang up. Please stay on the line to hear your messages. A call is now being answered and ...

## TABLE A (Contd)

## CALL ANSWERING SERVICE — ILLUSTRATIVE SYSTEM ANNOUNCEMENTS

NAME	CONTENT
CARA 1	Your call is being answered by the Bell System Call Answering Service. The person you call is unable to answer the telephone right now but will return your call as soon as possible. Please leave a message which includes your <i>name and telephone number</i> . You will have 30 seconds to record your message after you hear the tone. [one second silence]
COMP 1	[Number] Calls since you last played back your messages
COMP 2	To <i>hear</i> your greeting, dial 6. To record a <i>new</i> greeting, dial 7. To use the <i>standard</i> greeting, dial 2.

TABLE B

**CUSTOM ANNOUNCEMENT SERVICE  
ILLUSTRATIVE SYSTEM ANNOUNCEMENTS**

NAME	CONTENT
DNDA-1	Your call is being answered by Custom Announcement Service. The person you called is unavailable at this time. Please call again later, Thank you. [10 seconds silence].
DNDP-3	[LOGO, one second silence] Your Bell System Custom Announcement Service <i>is</i> operating and will answer your telephone with a greeting. If you want to record a <i>personal</i> greeting, begin recording when you hear the tone. If you want your greeting replayed, please stay on the line. [One second silence, 3/4 second TOUCH-TONE® C].
DNDP-5	[1 second 2225 Hz tone, 1 second silence]. Your telephone will be answered using the greeting you have recorded. If you want to change your greeting, please hang up and call Custom Announcement Service again. Thank you. [10 seconds silence].
DNDP-7	[1/4 second 2225 Hz tone, 1 second silence]. Since you did not record a greeting, the standard greeting or your previously recorded greeting will be used to answer your telephone. If you want to record a new greeting, please hang up and call Custom Announcement Service again. Thank you. [10 seconds silence].
DNDP-11	Hello. When you hang up, Custom Announcement Service will no longer answer your telephone. Please call Custom Announcement Service when you want your telephone answered again. Thank you. [10 seconds silence].
DNDP-17	[1 second 2225 Hz tone, 1 second silence]. Your greeting will now be played back. If you want to change it, please hang up and call Custom Announcement Service again. Thank you.

**TABLE C**  
**ADVANCE CALLING SERVICE**  
**ILLUSTRATIVE SYSTEM ANNOUNCEMENTS**

NAME	CONTENT
VMSP-3	<p><b><i>Greeting Input</i></b>  [Logo] Hello. This is your Bell Advance Calling Service.</p>
VMSP-4	<p><b><i>DN Input</i></b>  Please dial the telephone number to which you want your message delivered. Dial as you normally would.</p>
VMSP-5	<p><b><i>DN Incomplete</i></b>  We're sorry. You have dialed an incorrect number of digits. The numbers you dialed are (numbers).</p>
VMSP-6	<p><b><i>DN Invalid</i></b>  We're sorry. You did not dial a working telephone number. The number you dialed is (numbers).</p>
VMSP-7	<p><b><i>DN Denied</i></b>  We're sorry. Advance calls cannot be delivered to (number).</p>
VMSP-8	<p><b><i>No DN</i></b>  We're sorry. We did not receive a number.</p>
VMSP-9	<p><b><i>Excess errors</i></b>  We're sorry. No more corrections can be made during this call.</p>
VMSP-10	<p><b><i>Hang up</i></b>  Please hang up and call your Bell Advance Calling Service again. Thank you. [10 seconds silence].</p>
VMSP-11	<p><b><i>DN verify</i></b>  The number to which you want your message delivered is [(number) (3 seconds silence)].</p>
VMSP-12	<p><b><i>Delivery type</i></b>  We will begin attempting delivery of your message, when you finish recording, if you dial the number 7 now. To select a particular time for delivery, please dial 9.</p>
VMSP-14	<p><b><i>Time</i></b>  Please indicate in your local time when you want your message sent. First dial the hour and the minutes. Then dial A for a.m. or P for p.m.</p>

## TABLE C (Contd)

ADVANCE CALLING SERVICE  
ILLUSTRATIVE SYSTEM ANNOUNCEMENTS

NAME	CONTENT
VMSP-15	<p><b><i>Time invalid</i></b></p> <p>We're sorry. You have incorrectly dialed the time you want your message sent. The numbers you dialed are (numbers).</p>
VMSP-16	<p><b><i>No time</i></b></p> <p>We're sorry. We did not receive a delivery time.</p>
VMSP-17	<p><b><i>No AM or PM</i></b></p> <p>We're sorry. You did not indicate a.m. or p.m. The numbers you dialed are (numbers).</p>
VMSP-18	<p><b><i>Time incomplete</i></b></p> <p>We're sorry. You have not dialed enough digits. The numbers you dialed are (numbers).</p>
VMSP-19	<p><b><i>Time verify</i></b></p> <p>Thank you. The time you want your message sent is [(day of week) (time) (a.m., p.m., noon, midnight)].</p>
VMSP-21	<p><b><i>Record Tone</i></b></p> <p>[One second silence, 3/4 second TOUCH-TONE® C].</p>
VMSP-22	<p><b><i>No Message Recorded</i></b></p> <p>No message has been recorded.</p>
VMSP-26	<p><b><i>Replay Two, Message Two</i></b></p> <p>You did not dial 2. If you want your message delivered, please dial 2 now. Otherwise it will be erased.</p>
VMSP-27	<p><b><i>No Message Approval</i></b></p> <p>You did not dial 2. Without your approval we cannot deliver your messages. Please hang up and dial 1141 again. Thank you. [10 seconds silence]</p>
VMSP-28	<p><b><i>Delivery verify</i></b></p> <p>Thank you. Your Advance Call is scheduled for delivery.</p>
VMSP-29	<p><b><i>Control Code</i></b></p> <p>You may hang up now, or stay on the line and dial 1141 to send another message. (P) To check the delivery status of this message at a later time, dial 1145. Thank you.</p>

TABLE C (Contd)

**ADVANCE CALLING SERVICE  
ILLUSTRATIVE SYSTEM ANNOUNCEMENTS**

NAME	CONTENT
VMSP-30	<p><b><i>Message Delivery One</i></b></p> <p>[One second silence, LOGO, one second silence] Hello. This is the Bell System Advance Calling Service with a message recorded earlier for delivery to this number. Please stay on the line to hear the message. It will be repeated. [One second silence, 1/4 second 2225 Hz tone, one second silence]</p>
VMSP-31	<p><b><i>Message delivery two</i></b></p> <p>[2 1/2 second silence, 1/4 second 2225 Hz tone, 2 1/2 second silence].</p>
VMSP-32	<p><b><i>Delivery end</i></b></p> <p>This concludes delivery of your Bell Advance Calling message. Thank you. [10 second silence].</p>
VMSP-33	<p><b><i>Status</i></b></p> <p>[Logo]. Hello. Your Bell Advance Calling Service is ready to check the delivery status of your messages.</p>
VMSP-34	<p><b><i>No Messages</i></b></p> <p>We have no record of any message to be delivered for you.</p>
VMSP-35	<p><b><i>DN Status</i></b></p> <p>Please dial the telephone number for the message you want to check. Dial the entire number exactly as if you were dialing it directly.</p>
VMSP-37	<p><b><i>Status Still Trying</i></b></p> <p>We have not yet delivered your message of (day), (time) [one second silence, 1/4 second 2225 Hz tone, one second silence]</p>
VMSP-38	<p><b><i>Cancel</i></b></p> <p>To cancel future attempts to deliver this message, please dial zero.</p>
VMSP-39	<p><b><i>Status — No delivery</i></b></p> <p>We're sorry. We were not able to deliver your message of [(day) (time) (1 second silence, 1/4 second 2225 Hz tone, 1 second silence)].</p>
VMSP-40	<p><b><i>Status — Disconnect greeting</i></b></p> <p>But your party hung up during our greeting and your message was not played. [1 second silence, 1/4 second 2225 Hz tone, 1 second silence].</p>

TABLE C (Contd)

ADVANCE CALLING SERVICE  
ILLUSTRATIVE SYSTEM ANNOUNCEMENTS

NAME	CONTENT
VMSP-41	<p><b><i>Status — Disconnect message</i></b></p> <p>But your party hung up before your message was completely played. [1 second silence, 1/4 second 2225 Hz tone, 1 second silence].</p>
VMSP-43	<p><b><i>Cancel verify</i></b></p> <p>Thank you. No future attempts will be made to deliver this message. [1 second silence, 1/4 second 2225 Hz tone, 1 second silence].</p>
VMSP-58	<p><b><i>Record</i></b></p> <p>When you hear the tone, please record your message. You will have one minute of recording time. After recording your message, please dial 2 to approve it for delivery. To hear your message played back, dial 3. To re-record it, dial 6.</p>
VMSP-59*	<p><b><i>Record</i></b></p> <p>Thank you. Your message will now be played back. As soon as you've heard enough to approve it for delivery, dial 2. To re-record your message, dial 6.</p>

TABLE D

## REMOTE ACCESS AND PRIVACY CODE ILLUSTRATIVE SYSTEM ANNOUNCEMENTS

NAME	CONTENT
PINP-0	[VSS Logo] Hello. A privacy code is not presently available to your number. For information, please hang up and call your business office. Thank you. [10 seconds silence].
PINP-1	Hello. Please dial your current privacy code.
PINP-2	We did not receive a correct privacy code. Please dial it again.
PINP-3	We're sorry. We cannot complete your call because too many errors have been made. Please hang up and call again later. Thank you. [10 seconds silence].
PINP-4	To change your privacy code, please dial the numbers you want to use for your new privacy code.
PINP-5	We're sorry. Because of a temporary equipment problem your new privacy code was not recorded and your previous privacy code is still in effect. To change it, please hang up and call again. Thank you. [10 seconds silence].
PINP-6	We're sorry. You cannot use star to make more error corrections during this call. The privacy code which is in effect will be repeated at the end of this announcement. To enter another privacy code you must hang up and call again. [10 seconds silence].
PINP-7	We're sorry. You have dialed incorrectly. Please hang up and call again later. Thank you. [10 seconds silence].
PINP-8	[VSS Logo] Hello. This is your Bell System Remote Access Service. Please dial the seven digit number of your telephone, followed by your privacy code.
PINP-9	We're sorry. You have dialed incorrectly. Do not hang up, but redial the seven digit number of your telephone, followed by your privacy code.
PINP-10	Please dial the service code of the feature you want to use.
PINP-11	You may now dial the service code for any other feature you want to use. Otherwise, please hang up. Thank you.

## Concatenations:

1. (Your privacy code) (numbers) (is now in effect. Silence)
2. (Your privacy code) (numbers)(is now in effect. Thank you)
3. (No privacy code) (is now in effect. Thank you)
4. (Since we received no digits, no privacy code) (is now in effect. Silence)

- LEGEND:
- AGC - AUTOMATIC GAIN CONTROL
  - CODEC - CODER/DECODER
  - DT - DISK TRANSPORT
  - FSM - FIRST STAGE MATRIX
  - FSS - FIRST STAGE SWITCH
  - MF - MULTI-FREQUENCY
  - PC - PERIPHERAL CONTROL
  - SC - SERVICE CIRCUIT
  - SSM - SECOND STAGE MATRIX
  - SSS - SECOND STAGE SWITCH
  - TAC - TRUNK ACCESS CIRCUIT
  - TACI - TAC INTERFACE
  - TIU - TERMINAL INTERFACE UNIT
  - TMSC - TAC-MATRIX SCANNER CONTROLLER
  - TIRE - TOUCH-TONE SERVICE RECEIVER
  - VMC - VOICE MESSAGE CONTROLLER
  - VP DET - VOICE PRESENT DETECTOR
  - VSS - VOICE STORAGE SYSTEM

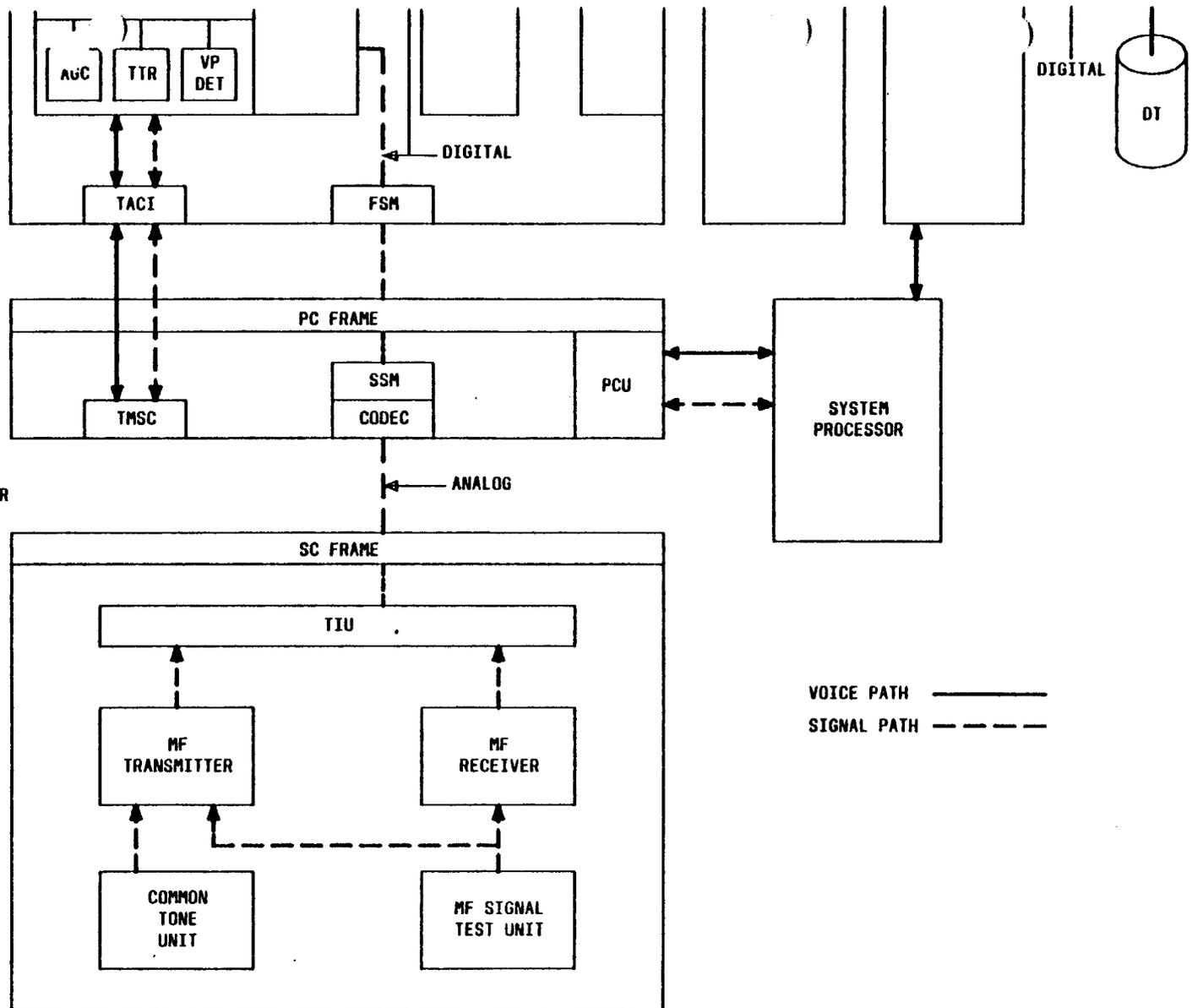


Fig. 1—Voice and Signalling Path

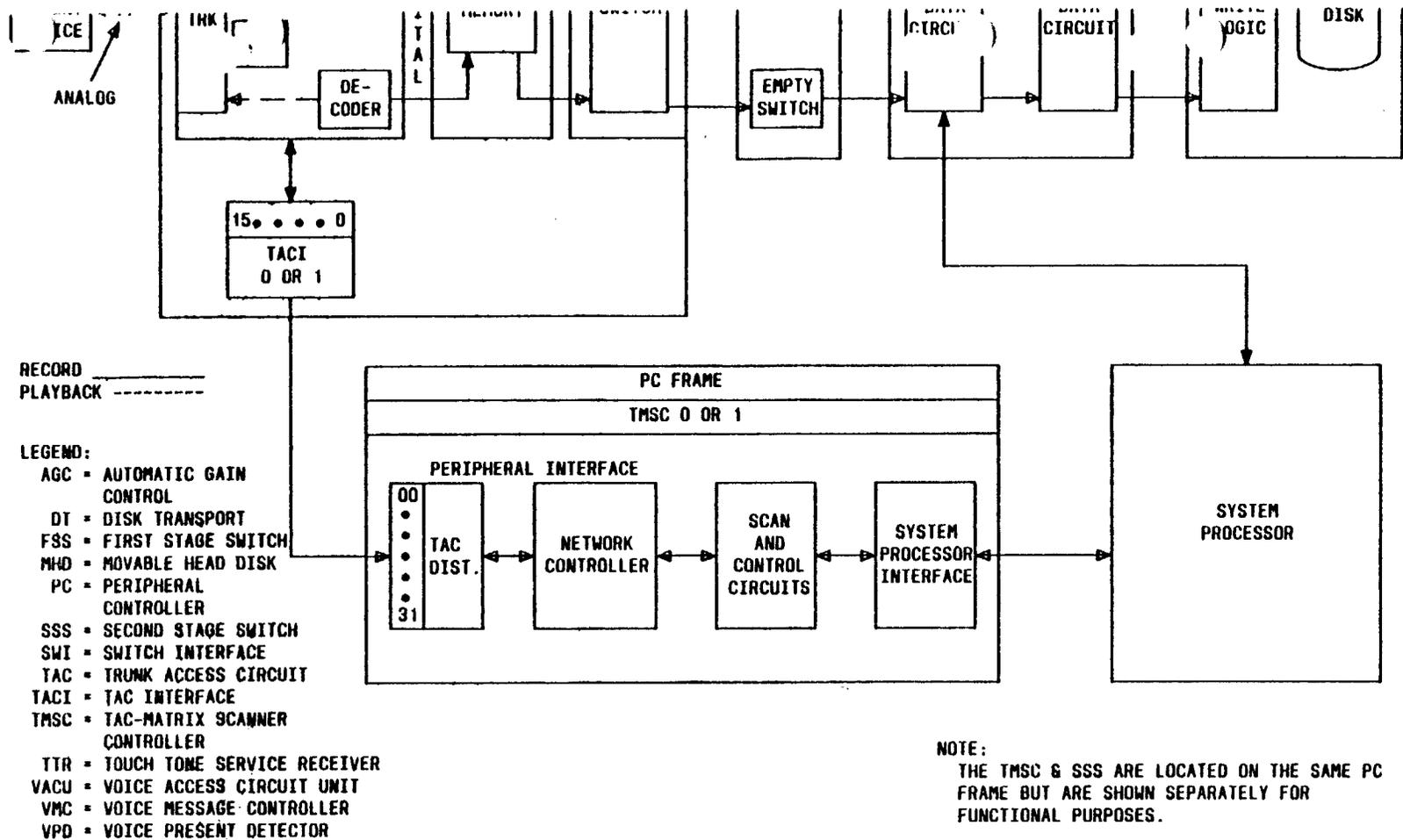


Fig. 2—Voice Path and Control

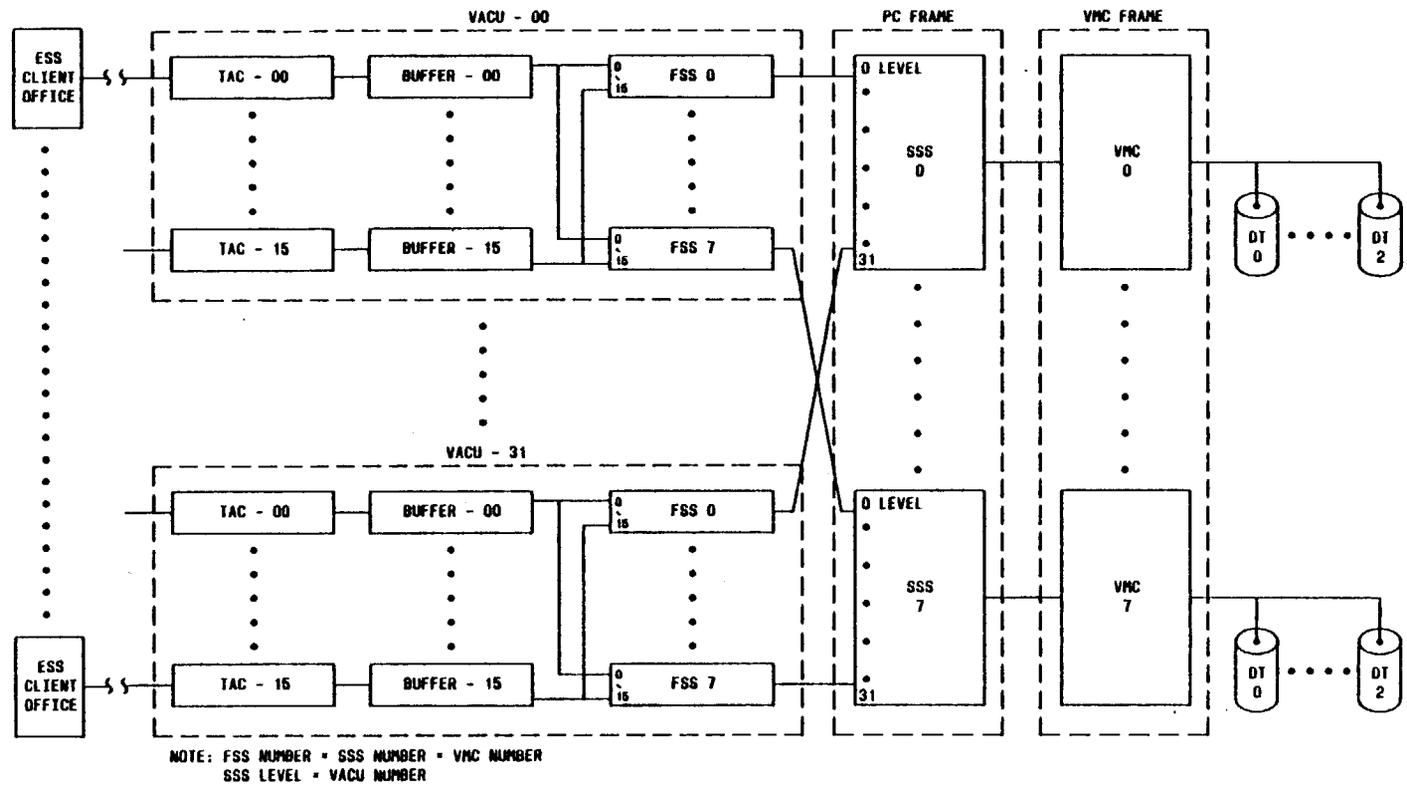


Fig. 3—Voice Path Distribution

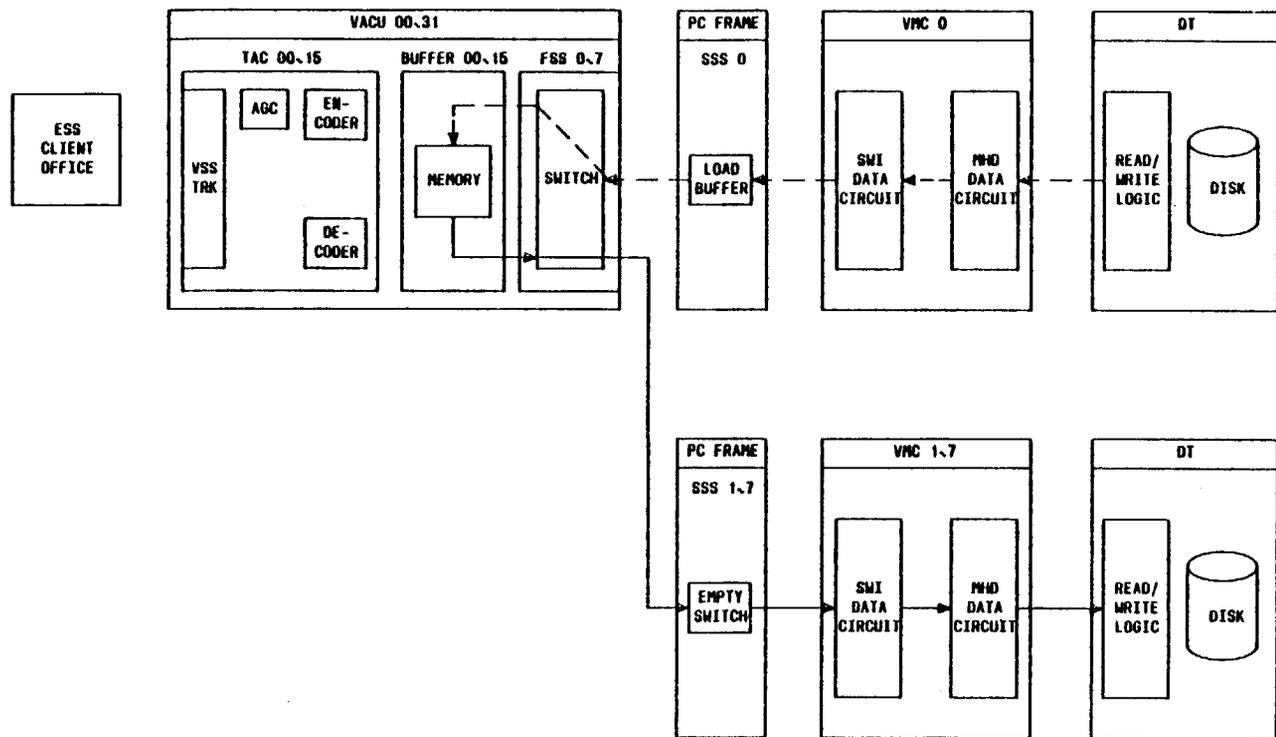


Fig. 4—Voice Path Duplication

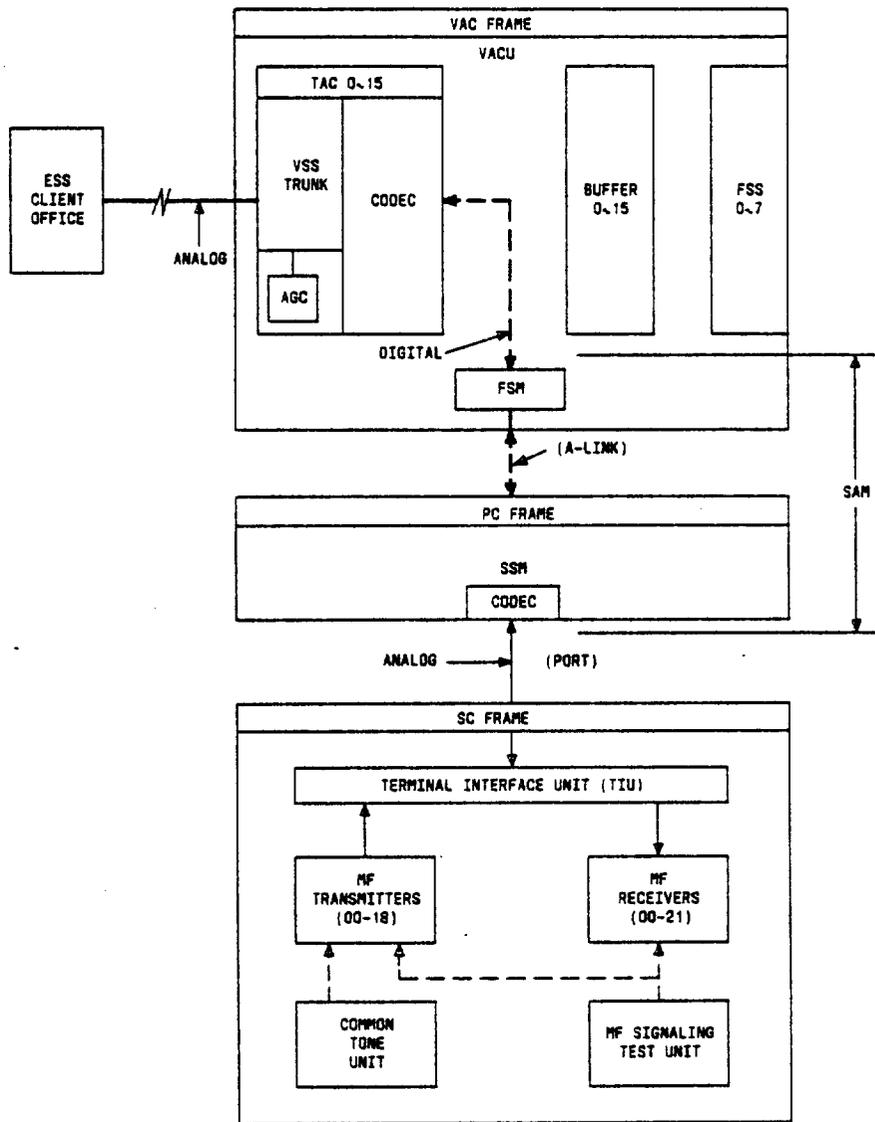


Fig. 5—Signalling Path to/from Service Circuits

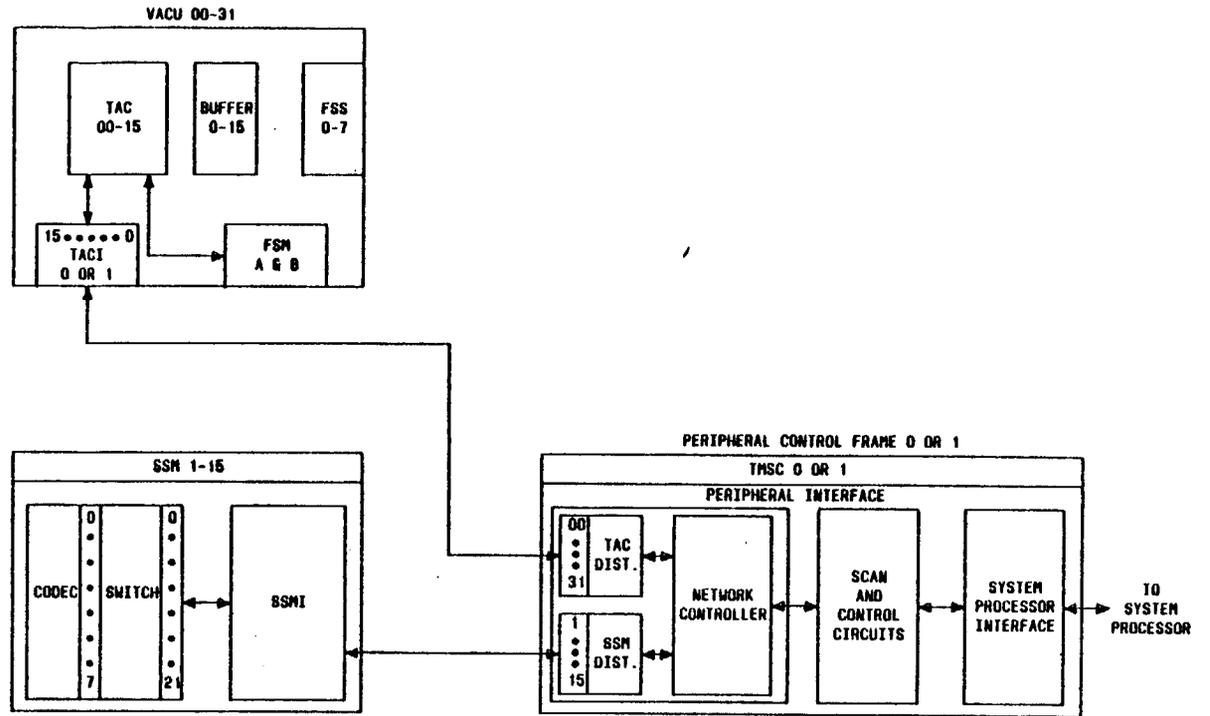


Fig. 6—TMSC Control of Signalling Path

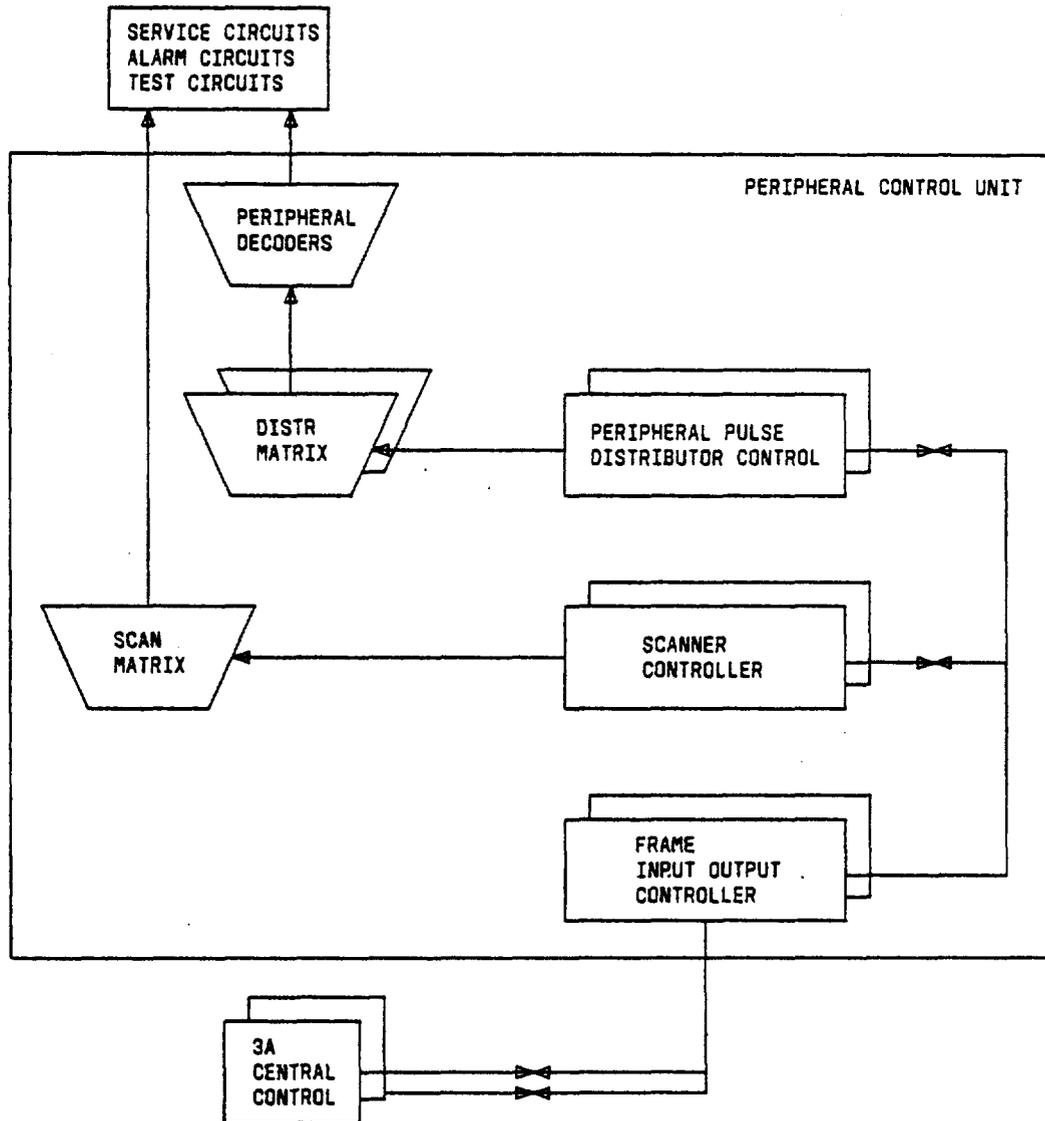


Fig. 7—Communication between System Processor and Service Circuits

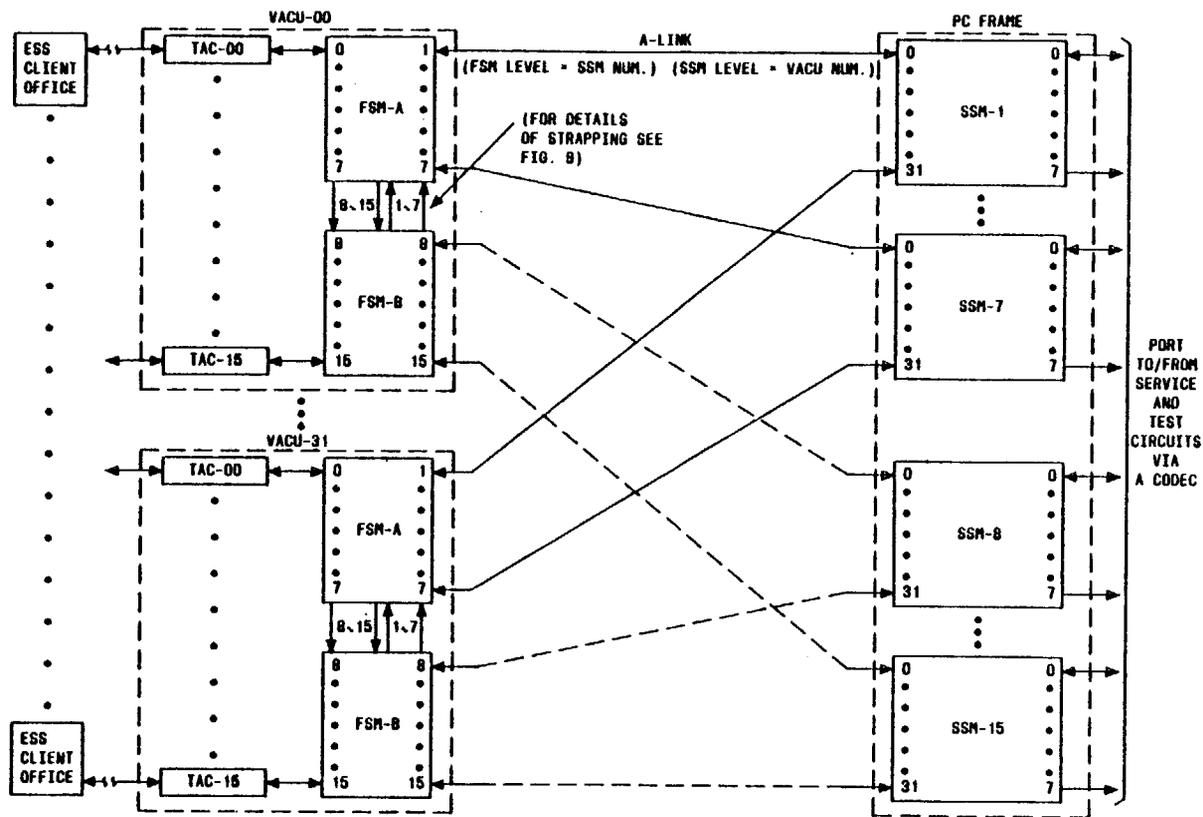


Fig. 8—VSS Signalling Path Distribution

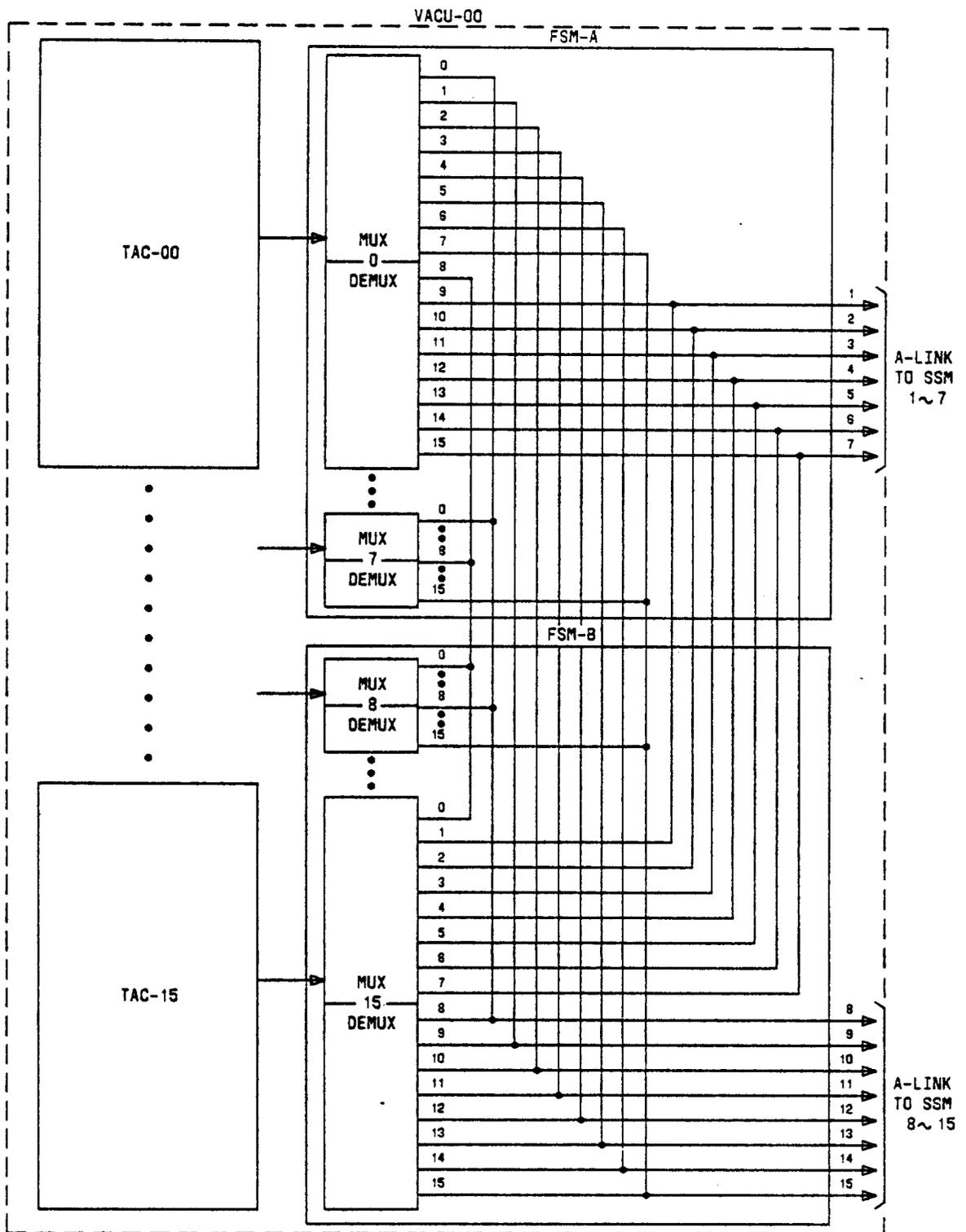


Fig. 9—FSM A&B Signalling Interconnection

SSM PORT → ↓	1	2	3	4	5	6	7	8	SERVED BY CODEC UNIT A ON EACH SSM
0	T0	T1	T2	T3	T4	T5	T6	T7	
1	R0	R1	R2	R3	R4	R5	R6	R7	
2	R8	R9	R10	R11	R12	R13	R14	R15	
3	TLI	105 TL	AGC	TTT	TLI	105 TL	AGC	TTT	SERVED BY CODEC UNIT B ON EACH SSM
4	T8	T9	T10	T11	T12	T13	T14	T15	
5	R16	T R17	T R18	R19	R20	R21			
6									
7	T16	T T17	T T18						

- LEGEND:
- AGC - AGC TEST PORT
  - R0-21 - MF RECEIVERS
  - T - MF RECEIVER AND TRANSMITTER LOCATION USED FOR TEST
  - T0-18 - MF TRANSMITTERS
  - TLI - TEST LINE INTERFACE
  - 105TL - 105 TEST LINE
  - TTT - TOUCH-TONE TEST SET

Fig. 10—Second Stage Matrix



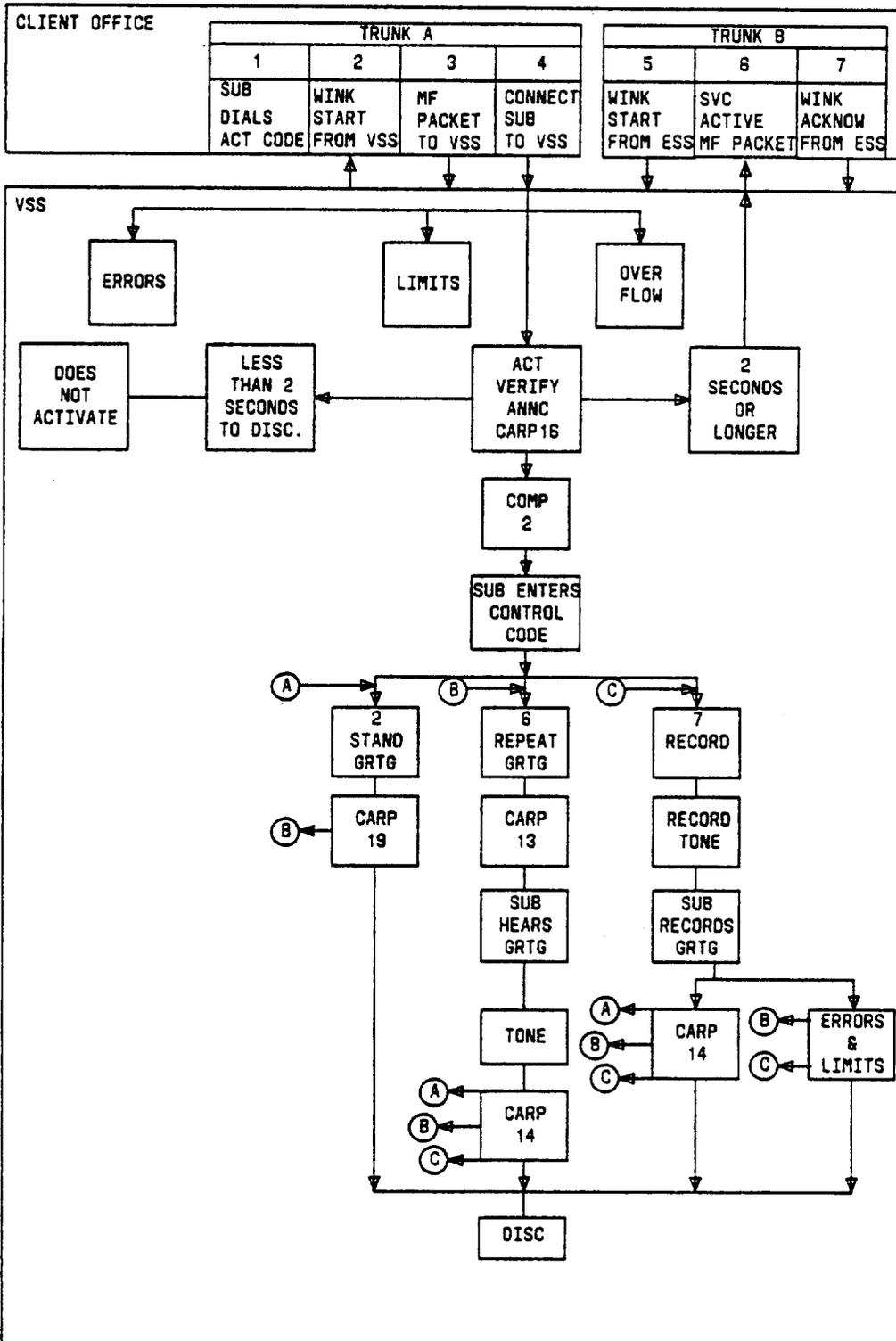
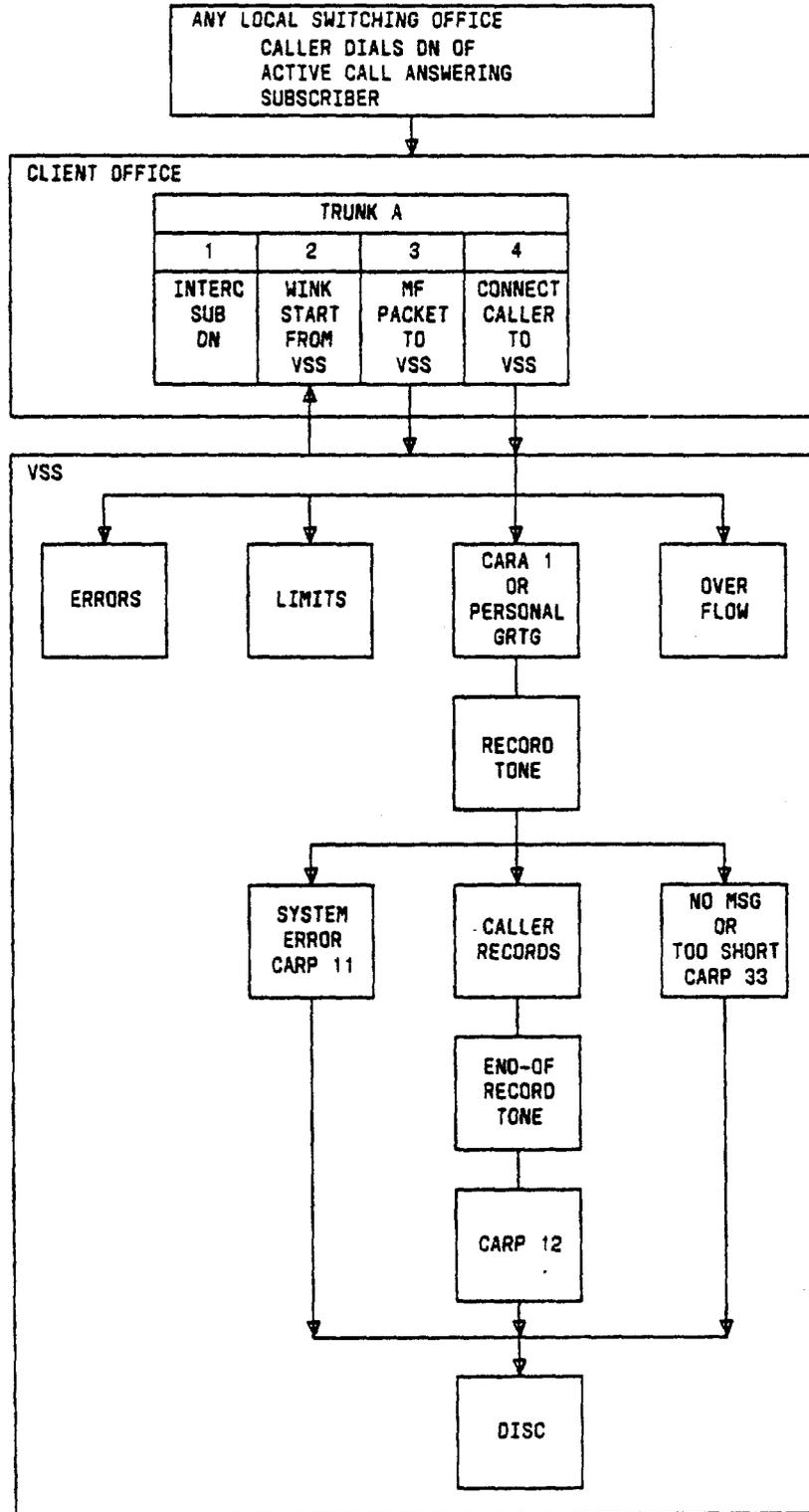


Fig. 12—Call Answering Monthly—Activation



LEGEND:

- ACKKNOW = ACKNOWLEDGE
- CARA 1 = SYSTEM STANDARD GREETING  
SEE TABLE A FOR CONTENT
- CARP = SYSTEM ANNOUNCEMENTS  
SEE TABLE A FOR CONTENT
- DISC = DISCONNECT
- ON = DIRECTORY NUMBER
- GRTG = GREETING
- INTERC = INTERCEPT
- MSG = MESSAGE
- SUB = SUBSCRIBER

Fig. 13—Call Answering Daily and Monthly—Intercept

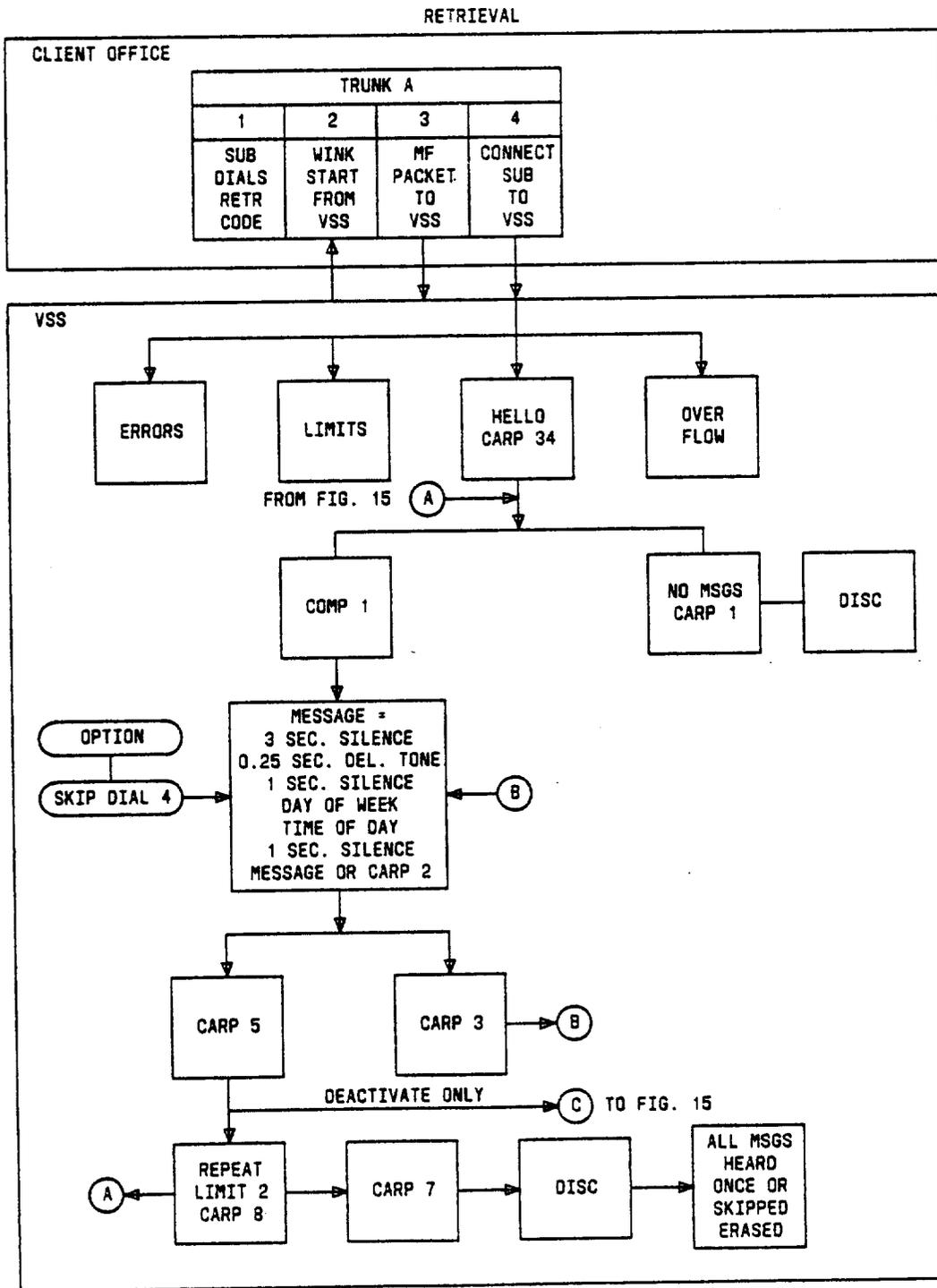


Fig. 14—Call Answering Daily—Retrieval

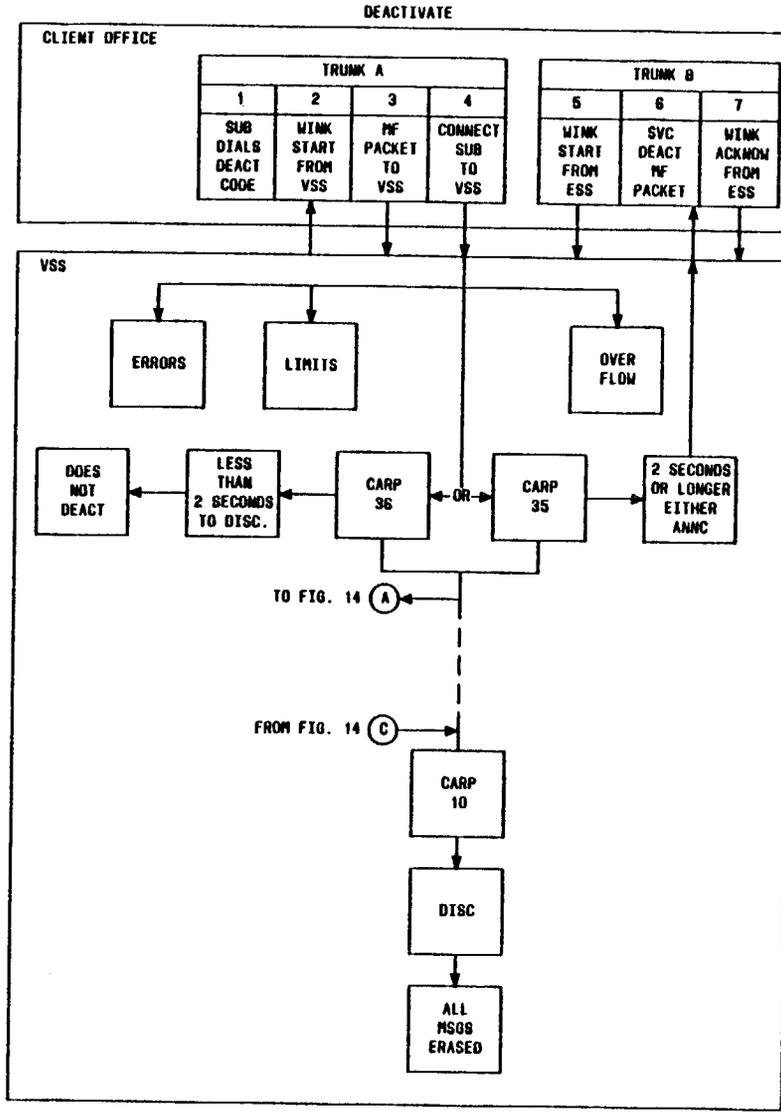


Fig. 15—Call Answering Daily—Deactivation

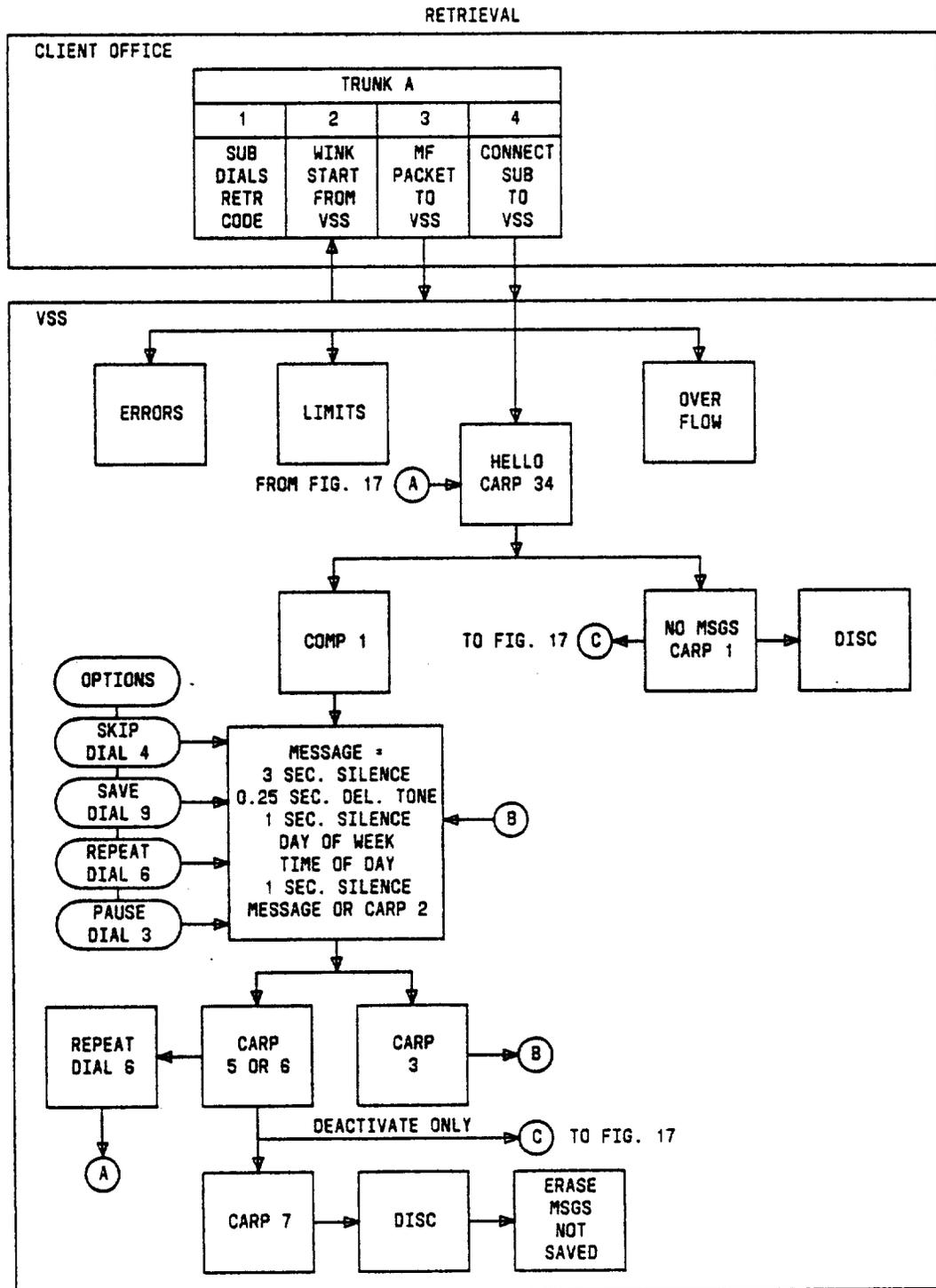


Fig. 16—Call Answering Monthly—Retrieval

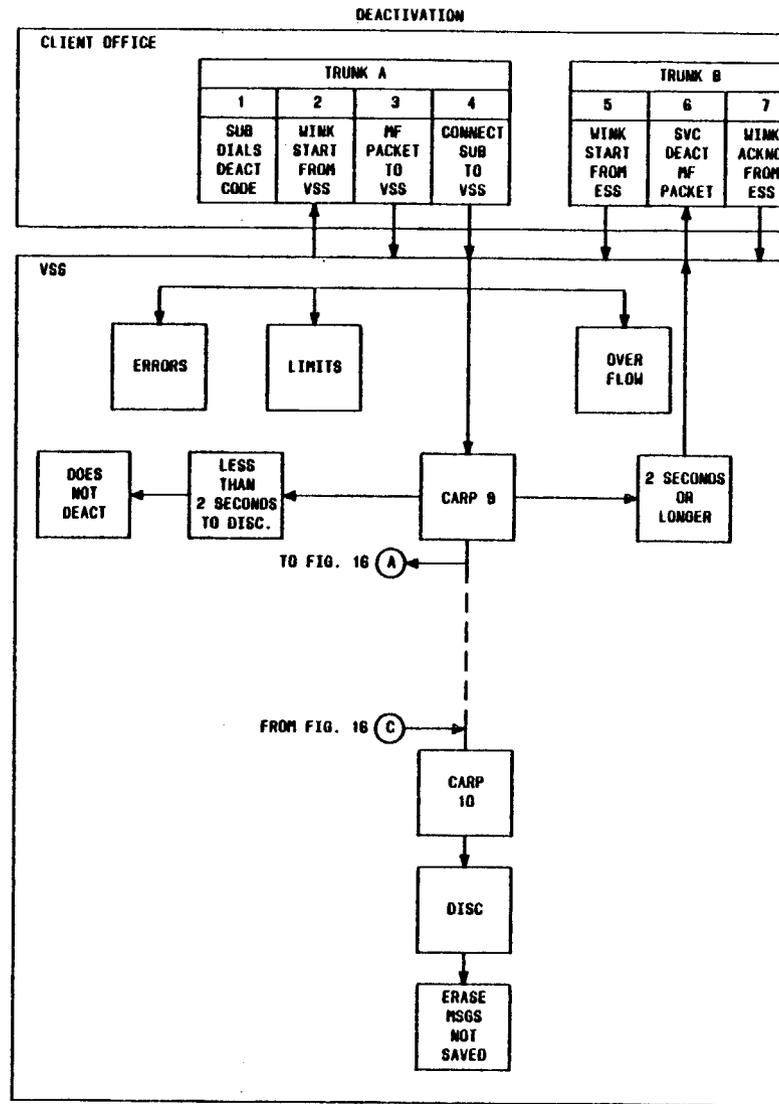
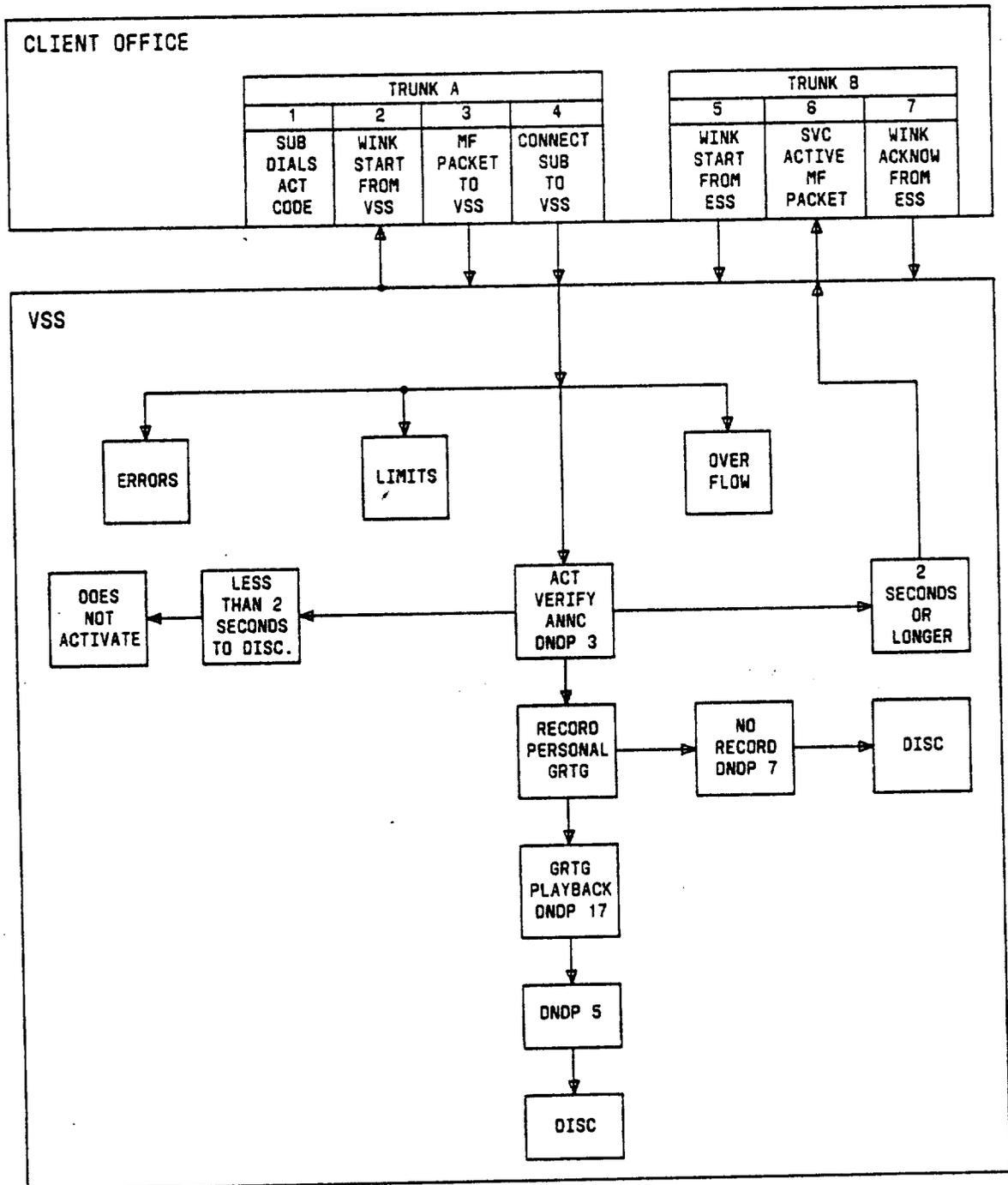
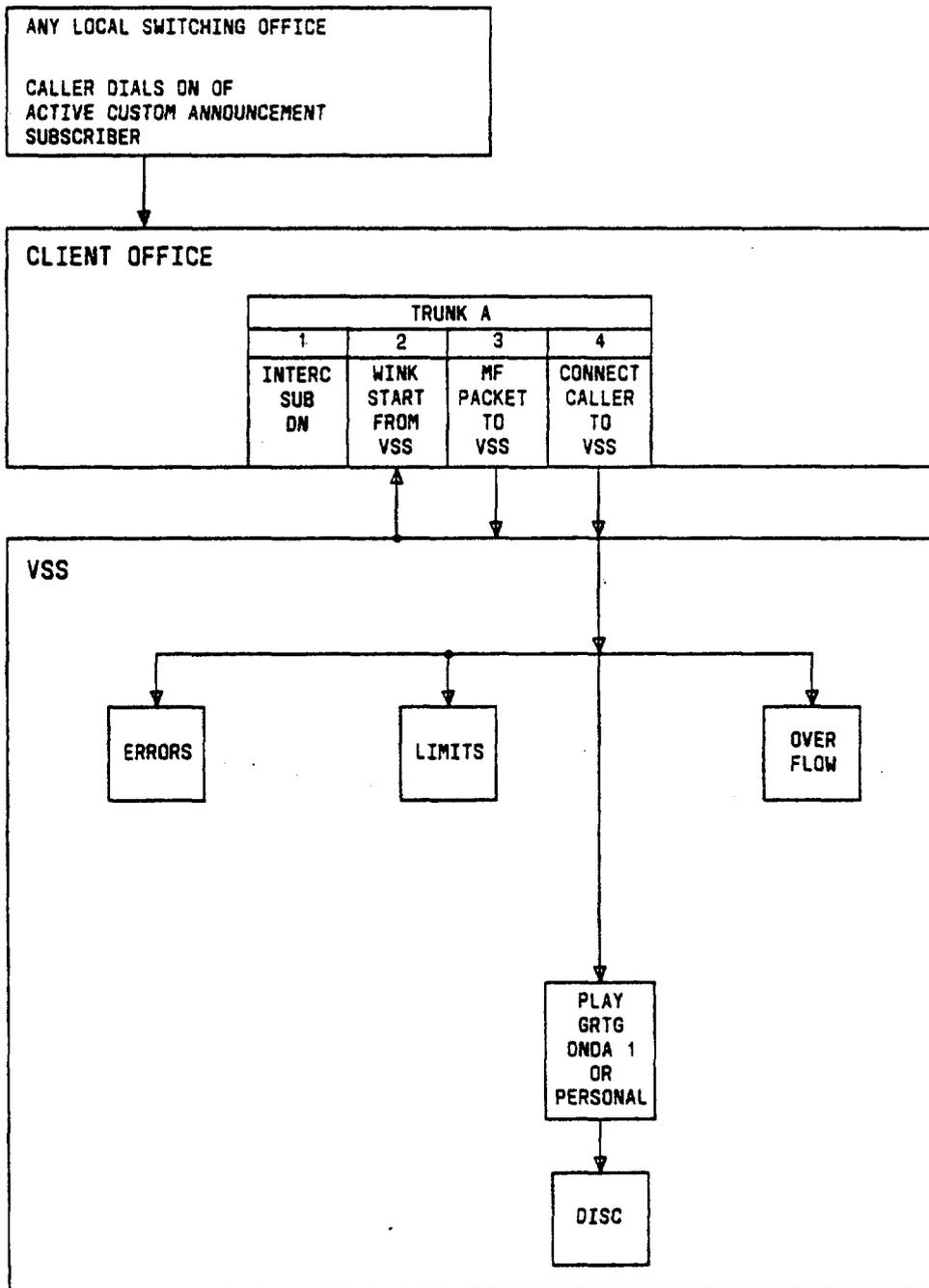


Fig. 17—Call Answering Monthly—Deactivation



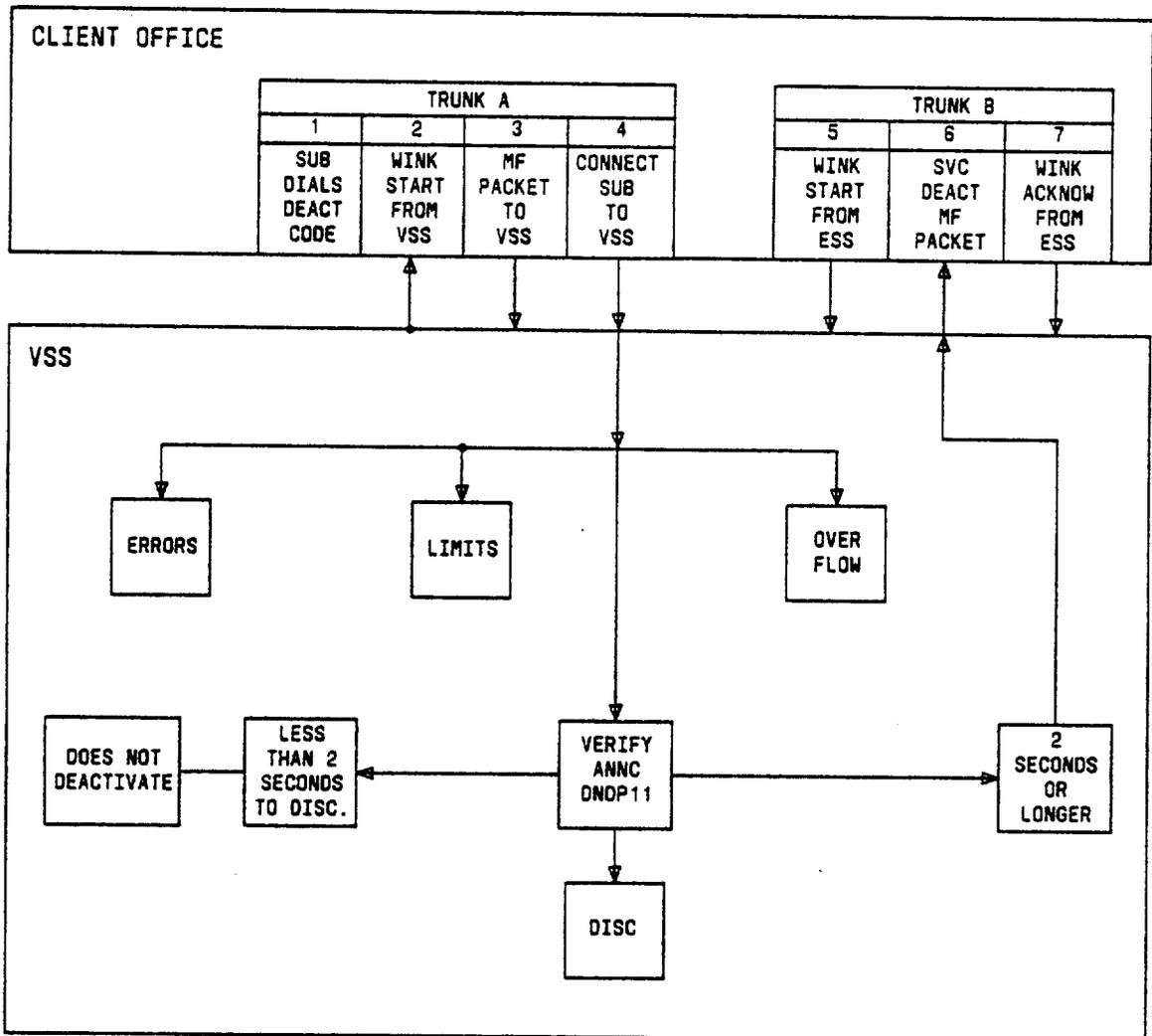
NOTE:  
SEE TABLE B FOR DNOPXX ILLUSTRATIVE ANNOUNCEMENT CONTENT

Fig. 18—Custom Announcement Service—Activation



NOTE:  
SEE TABLE B FOR DNDAX ILLUSTRATIVE ANNOUNCEMENT CONTENT

Fig. 19—Custom Announcement Service—Intercept



NOTE:  
SEE TABLE B FOR ONDPXX ILLUSTRATIVE ANNOUNCEMENT CONTENT

Fig. 20—Custom Announcement Service—Deactivation

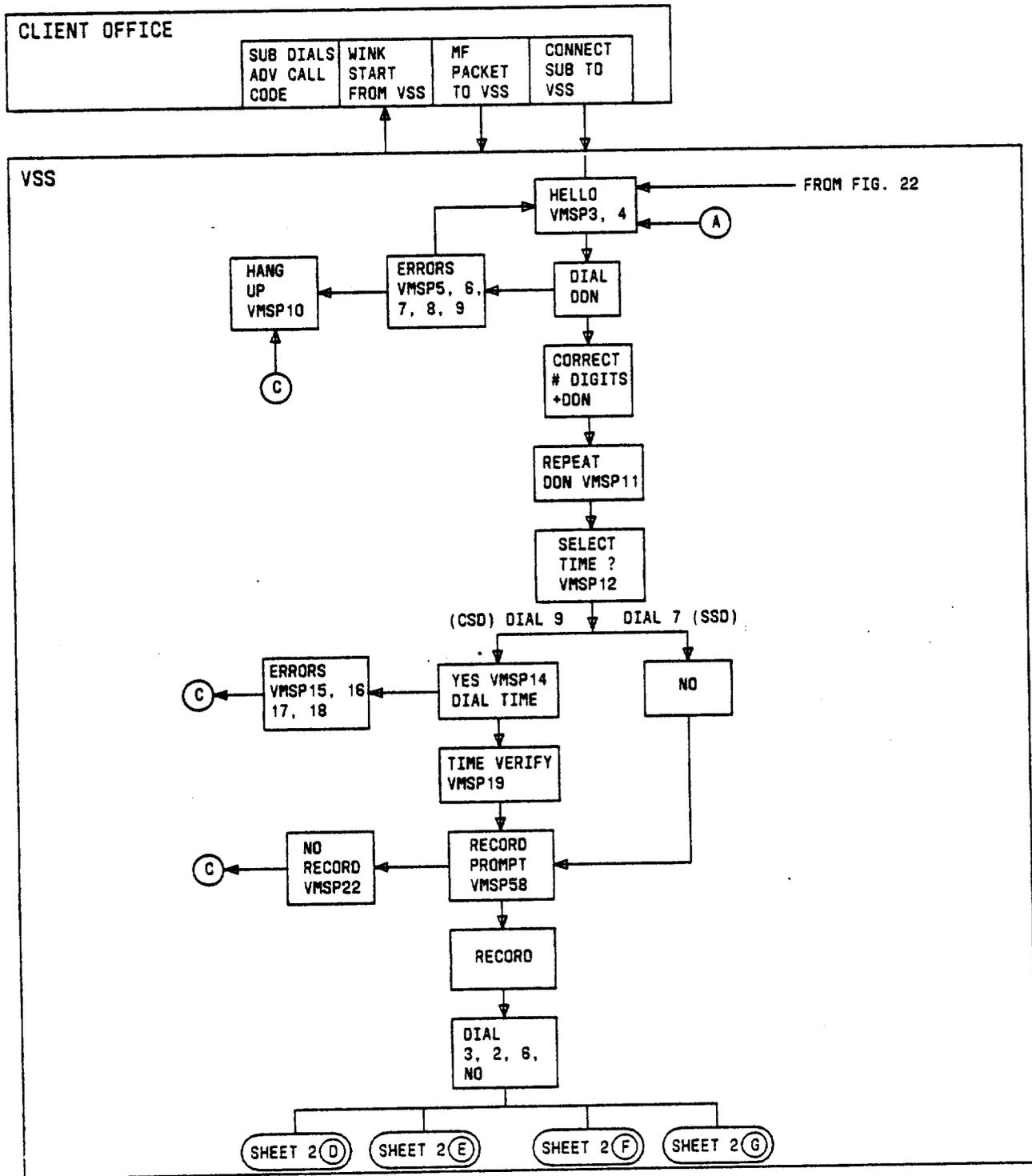


Fig. 21—Advance Calling—Input (Sheet 1 of 2)

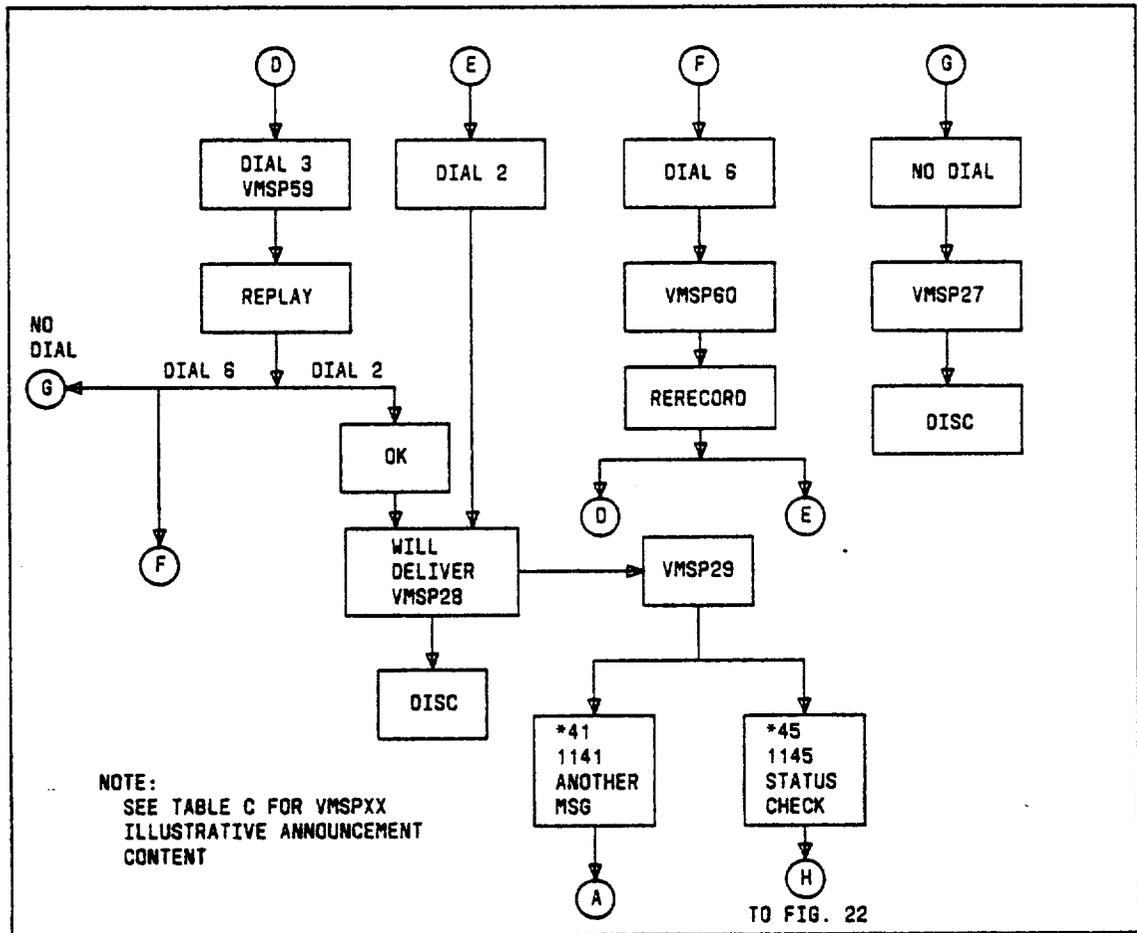


Fig. 21—Advance Calling—Input (Sheet 2 of 2)

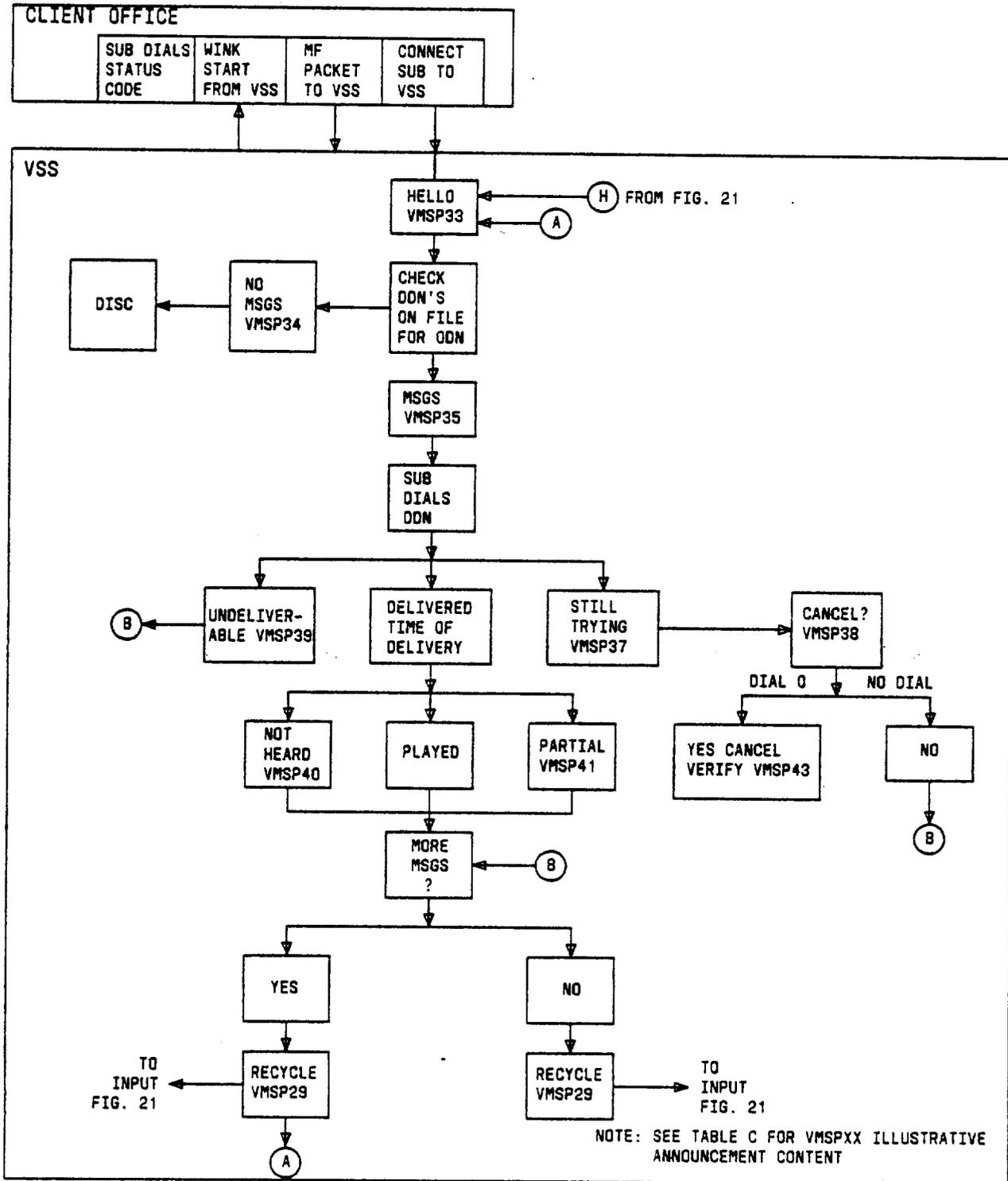


Fig. 22—Advance Calling—Status Check

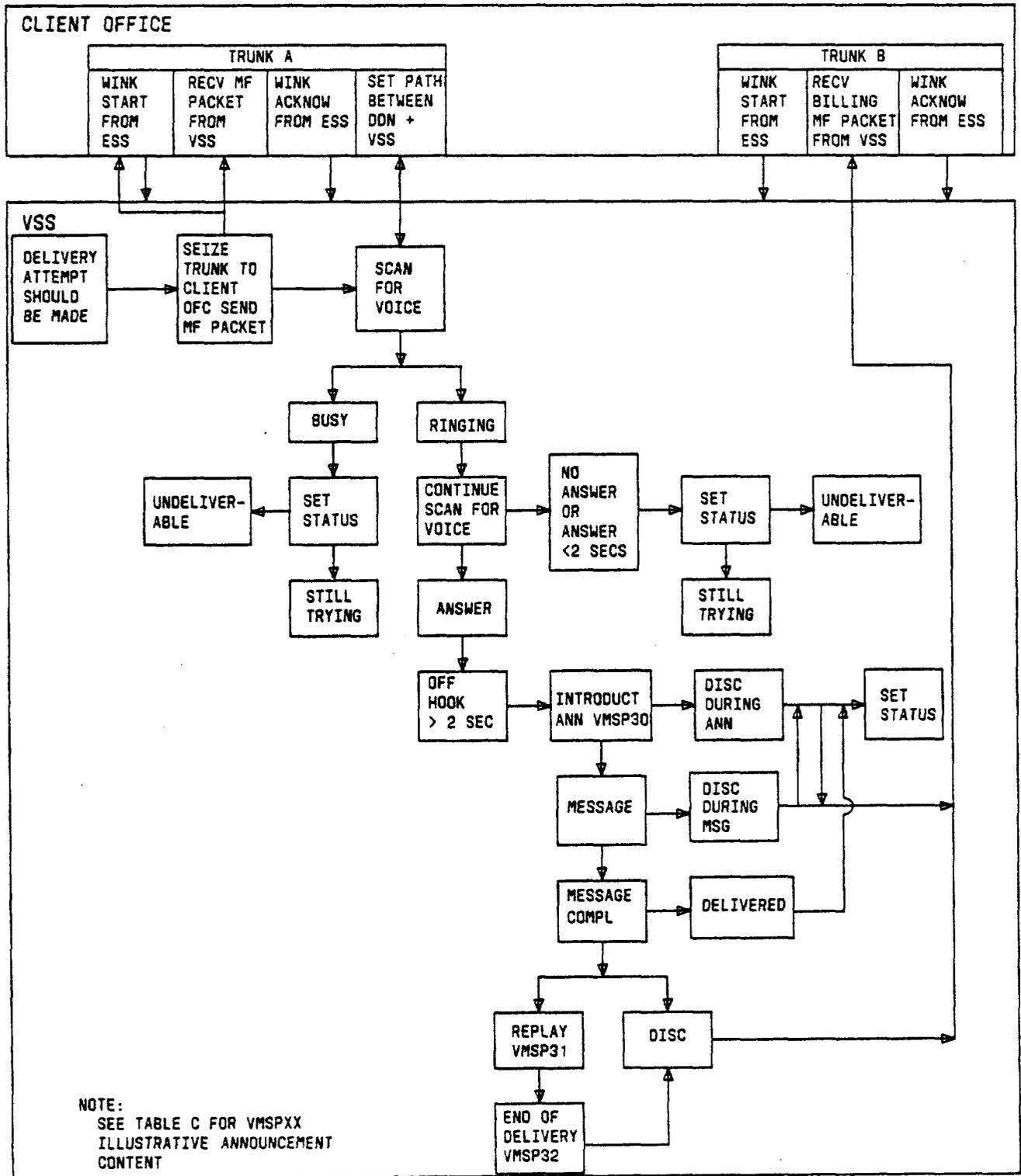


Fig. 23—Advance Calling-Delivery

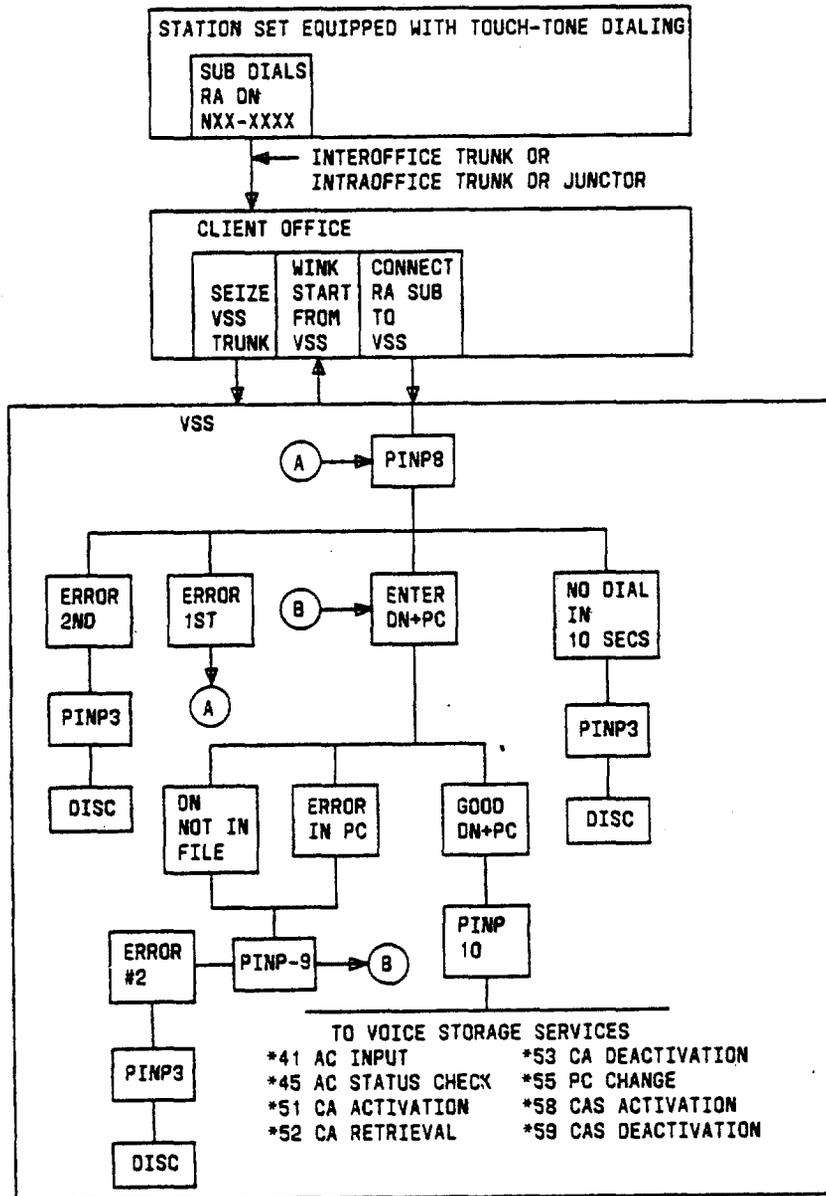
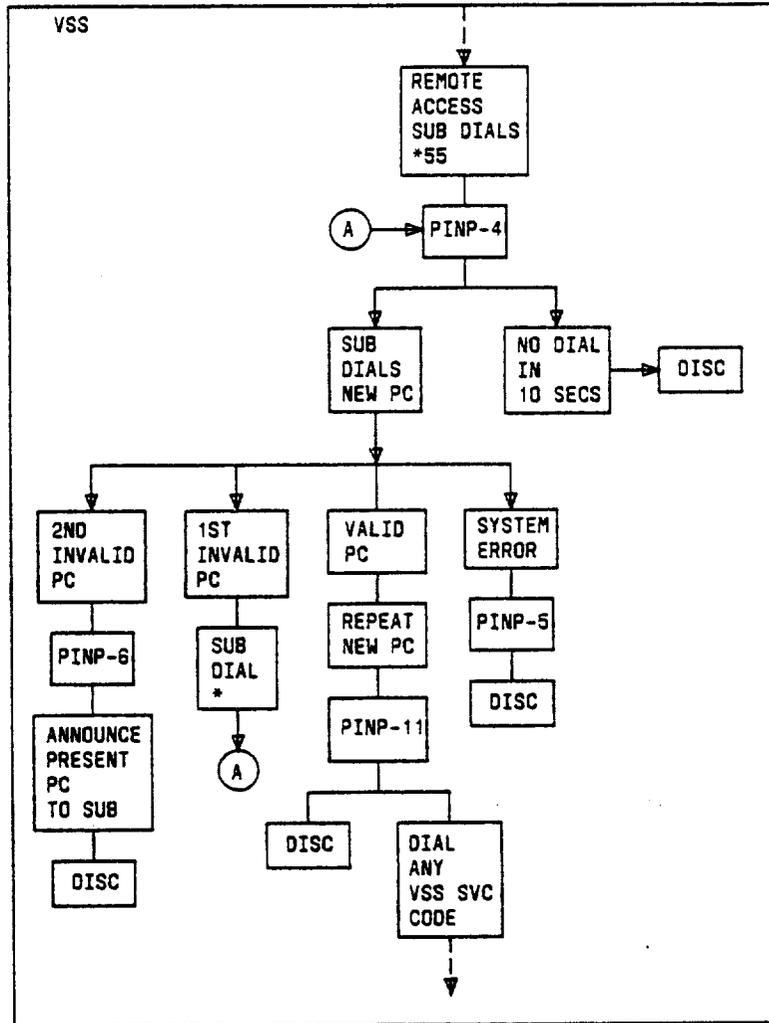


Fig. 24—Remote Access Service Use



LEGEND:  
 DISC - DISCONNECT  
 PC - PRIVACY CODE  
 PINP - SEE TABLE D FOR  
 ILLUSTRATIVE ANNOUNCEMENTS  
 SUB - SUBSCRIBER

Fig. 25—Privacy Code Change—Remote Access

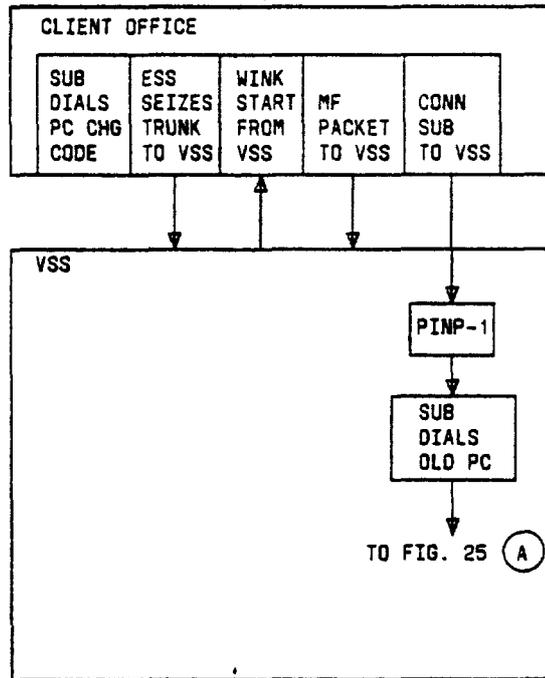


Fig. 26—Privacy Code Change—Local Access