TELETYPEWRITER SELECTIVE CALLING SYSTEMS
TESTING FROM CUSTOMER FIELD LOCATIONS
WITH SERVING TEST CENTERS

1. GENERAL

1.01 This section has been developed to assist the TTY serviceman in performing maintenance tests from customer field locations with Serving Test Centers (STCs).

1.02 For each private line teletypewriter selective calling system described, the practice will provide a summary description of the system, operation, equipment and "on line" test procedures. In addition, reference to Bell System Practices (BSPs) and other pertinent information shall be shown in the tables associated with the particular selective calling system.

1.03 Abbreviations and referent terms pertaining to equipment and test procedures are covered in the appendix at the end of the practice.

2. PRELIMINARY ARRANGEMENTS COMMON TO ALL TESTS WITH STCs

2.01 A fundamental concept in teletypewriter maintenance is observation and analysis. In connection with a maintenance visit, realize that the system or equipment was working at some point in time prior to the malfunction. Something happened, either electrical or mechanical, to cause the customer to report a trouble condition in connection with the system or equipment. Whenever possible, discuss the trouble condition with the attendant who reported the malfunction and have them try to duplicate the condition. Check the hard copy and tape format since many conditions on selective calling systems are caused by new or inexperienced personnel attempting to operate the equipment.

2.02 Contingent upon the type of selective calling system involved, the nature of the trouble and the type of station (master or outlying), STCs will usually suspend or condition the loop to the station that is suspected to be in trouble. STCs may elect to remove the station from active service by placing the station loop on an artificial (dummy) termination. This usually occurs when there is a possibility that the station may interfere with the normal operation of the selective calling system. In the case of an outlying station, the serving test center may advise the attendant at the master station to put the outlying location on "skip," thus allowing them to receive but not transmit traffic until the maintenance man arrives.

2.03 Upon arrival at the customer's field location, and after preliminary trouble investigation, the teletypewriter repairman shall call the serving test center and advise them that he is working at the equipment location. On intercompany Bell System services, this will enable the STC to advise the distant test centers that a maintenance man is working on the facilities. In addition, the STC may be able to provide information concerning the trouble condition from the record card and indicate the tests that were performed prior to the arrival of the TTY repairman.

2.04 The loop current on a teletypewriter station loop should read a minimum of .060 amps for the proper operation of the equipment. In general practice, the STC sets the loop current at .0625 amps. Measure the loop current by going in series with the loop (never one side to ground). If the loop current is low, call the serving test center and have them adjust the line current before starting to look for a malfunction in the equipment. Low loop current will affect the operation of the selective calling system and cause the equipment to produce false and erroneous responses to test procedures. If it is necessary to have the STC adjust the loop current, ask the test deskman to test the equipment prior to making adjustments at the customer's field location. Readjustment of the loop current will usually clear marginal malfunctions of the equipment.

3. 83B-TYPE TELETYPEWRITER SELECTIVE CALLING SYSTEMS – GENERAL DESCRIPTION

3.01 The 83B1, 83B2 and 83B3 teletypewriter selective calling systems operate on a half duplex (2-wire) basis with up to 40 #28 type (5 level) teletypewriters connected to a single circuit (loop). A control station (#28 ASR-master-station) is used in conjunction with a transmitter control equipment cabinet to provide automatic polling of the transmitters (tape readers) at both the master and outlying (remote) stations.

3.02 The master station transmitter start circuit polls each outlying station in a predetermined sequence for traffic, thus eliminating conflicts between stations that wish to send simultaneously. The polling pattern consists of a sequence of two-letter transmitter start codes (TSCs) transmitted during periods when no station-to-station traffic is being sent (idle circuit period). Every station has a two-letter call directing code (CDC) to which the station alone responds and a broadcast code to which all stations respond. On many systems there are group codes to which various combinations or groups of stations respond.

3.03 As a circuit assurance feature and an indication that the individual station is functioning properly, each station responds to CDCs and TSCs as follows:

    (a) CDC Answer-back: When a station is selected by the receipt of its CDC it sends

an answer-back signal (the letter "V") back to the sending station indicating that it is ready to receive message traffic.

NOTE: On a broadcast code, only the master station responds with a "V" answer-back.

(b) No Traffic Response: When a station being polled does not have a tape in the transmitter, the station control unit sends a no traffic response (the letter "V") back to the master station which then polls the next station in sequence.

3.04   An optional push button calling arrangement is available for use with the 83B-type stations and may be used to send CDCs preceding the text of messages which do not have CDCs perforated into the tape. There are a maximum of 40 push buttons available with a specific CDC assigned to each push button. Prior to inserting the text tape in the transmitter, the station attendant will operate the non-locking push buttons corresponding to the CDCs of the selected receiving stations. When the transmitter start code (TSC) for the sending station is received, the CDCs corresponding to the previously selected push buttons are sent to the line, followed by the end of address code (carriage return-line feed-letters). The text of the tape followed by the end of message code (figures-H-letters) will then be sent to the line.

4. TESTING 83B-TYPE TELETYPEWRITER SELECTIVE CALLING SYSTEMS WITH STCs FROM CUSTOMER FIELD LOCATIONS

4.01   The test procedure charts for the 83B-type selective calling systems are derived from the test information provided to Long Lines test deskmen at LL serving test centers. The first column, "Test Function" describes the objective of the test. The second column, "STC Test procedure" is the instruction to the test deskmen. The third column, "TTY Repair Procedure At Sta. Location" reflects the anticipated reaction of the equipment as it would appear to the teletypewriter repairman at the customer's field location. In addition, there are diagnostic notes shown in the third column to assist the TTY serviceman with the test procedures.

4.02   Detailed information concerning equipment description, operation and overall test procedures for the 83B1, 83B2 and 83B3 selective calling systems shall be found in the following Bell System Practices:

BSP REFERENCE	DESCRIPTION
581-100-100	83B1 Description & Operation
581-100-101	83B1 Pushbutton Calling Circuit
581-100-102	83B2 Description & Operation
581-100-103	83B3 General Description
581-100-104	83B3 Interface to CPE*
581-100-500	83B1 & 83B2 Operating Tests
581-100-501	83B3 Overall Tests

*Customer provided equipment

5. FINAC – TELETYPEWRITER SELECTIVE CALLING SYSTEM – GENERAL DESCRIPTION

5.01   FINAC is an acronym for Fast Interline Nonprinting Activate Control. The system is designed to operate on a 5-level, 60, 75 or 100 words-per-minute (WPM) full duplex arrangement using #28 ASR teletypewriters.

5.02   A maximum of eleven sending and receiving outlying stations are permissible on a circuit in addition to one master station. Message traffic from the outlying stations is picked up by transmitter start codes (TSCs) originated by the master station.

5.03   The master station monitors both the send and receive loops and is not assigned a transmitter start code (TSC) or a call directing code (CDC). Each outlying station is equipped with a selective calling arrangement (stunt box) and in addition to the TSC it is assigned a call directing code (CDC). Contingent upon the customer's requirements, broadcast or group codes may be installed at the outlying stations.

5.04   FINAC operates as a torn tape system with all outgoing messages prepared on tape and transmitted under control of the sixth pin of the station transmitter. No provisions are made for one outlying station to transmit directly to another outlying station on the same circuit (loop). All interstation traffic is picked up by the master station on the receive side of the full duplex arrangement and retransmitted on the send side of the full duplex arrangement.

TABLE A

83B1, 83B2, 83B3 SELECTIVE CALLING SYSTEM		
TEST FUNCTION	**STC TEST PROCEDURE**	**TTY REPAIR PROCEDURE AT STA. LOCATION**
1. TO TURN ON STATION REC. TTY.	(A) SEND FIGURES-H-LETTERS	(A) TYPING UNIT SHOULD BE IN SELECT NON-PRINT CONDITION (Note: The type suppression bar should be toward your left as you look at the typing unit.)
	(B) SEND STATION CDC	(B) THE STATION SHOULD RESPOND WITH A "V" ANSWER-BACK (Note: The type suppression bar should be shifted to the right. The typing unit is now in select print condition.)
	(C) SEND CARRIAGE RETURN-LINE FEED-LETTERS	(C) THE TYPE BOX RETURNS TO THE LEFT HAND MARGIN AND THE TYPING UNIT IS IN NON-SELECT PRINT CONDITION
	(D) SEND STATION CDC	(D) THE CDC SHOULD BE PRINTED ON THE HARD COPY AND NO "V" ANSWER-BACK SHOULD BE GENERATED BY THE STATION
	(E) SEND FOX OR OTHER TEST SIGNALS	(E) THE STATION SHOULD RECEIVE UNDISTORTED FOX WITH A MARGIN OF 70 POINTS (Note: Set the range finder at the mid-point and have STC send 25% switch bias — You should receive the fox error free.)
	(F) SEND THE END OF MESSAGE CODE FIGURES-H-LETTERS	(F) THE STATION SHOULD GO INTO A SELECT NON-PRINT CONDITION

2. PICK UP TAPE	(A) SEND STATION TSC WITH NO TAPE IN THE TRANSMITTER	(A) THE STATION SHOULD SEND BACK A "V" NO TRAFFIC RESPONSE
		
		(Note: For Item B prepare a test tape with the the following message format:)
		
		  — 10 Letters
		  — Station two-letter CDC**
		  — Letters, Carriage Return, Line Feed, Letters
		  — Two lines of FOX, RY, etc.
		  — Figures-H-Letters, followed by at least 8 letters
		
		**83B3 stations do not require their own CDC in the message format to print home copy

	(B) SEND STATION TSC WITH TAPE IN THE TRANSMITTER	(B) WITH TAPE IN THE TRANSMITTER AND THE TRANSMITTER IN "RUN" POSITION, THE BID LAMP SHOULD BE LIT — RECEIPT OF THE TSC WILL ACTIVATE THE TRANSMITTER AND SEND THE TEST MESSAGE (Note: If the STC has the loop held up on a dummy circuit, the test deskman will have to send the "V" answer-back following the CDC to allow the tape to run through the transmitter.)
	(C) *TAKE A TMS FROM THE STATION TRANSMITTER	(C) *(Note: The Long Lines instructions do not call for a TMS, however, the communications serviceman may request that they make the transmission measurement as a precaution.)

5.05 The polling pattern is generated by the master station's transmitter start code (TSC) generator in a fixed sequence. Each letter of the polling pattern is preceded by a carriage return (<) function followed by the transmitter start code (TSC) in the following sequence <Y, <B, <A, <X, <Z, <J, <S, <D, <W, <F, <E. At the master station during outgoing transmission with the receive side idle, the TSC generator recognizes each carriage return character sent, stops transmission and supplies the second letter of the TSC in sequence and restarts transmission. With both the send and receive sides idle, the TSC generator supplies the carriage return character (<) as well as the second character of the TSC. With both the send and receive sides busy, the TSC generator recognizes each carriage return character transmitted on the send side, stops transmission, generates a blank character instead of a valid second letter TSC and resumes transmission. The carriage return-blank sequence is recognized as an invalid TSC and is disregarded by the outlying stations. During incoming transmission at the master station with the send side idle, no TSCs will be generated until the receive side becomes idle. The TSC generator provides a one-second interval between transmission of valid TSCs to allow the outlying station transmitter time to start.

6. TESTING THE FINAC TELETYPEWRITER SELECTIVE CALLING SYSTEM WITH STCs FROM CUSTOMER FIELD LOCATIONS

6.01 The test procedure charts for FINAC are derived from test information provided to the Long Lines test deskman at Long Lines serving test centers. The first column, "Test Function" describes the objective of the test. The second column, "STC Test Procedure," is the instruction to the test deskmen. The third column, "TTY Repair Procedure At The Sta. Location," reflects the anticipated reaction of the equipment as it would appear to the TTY serviceman at the customer's field location. In addition, there are diagnostic notes shown in the third column to assist the TTY serviceman with test procedures.

6.02 Detailed information concerning equipment description, operation and overall test procedures for the FINAC shall be found in the following Bell System Practices:

BSP REFERENCE	DESCRIPTION
581-803-500	FINAC — Telegraph-office Responsibilities Test Procedures for TTY Circuits
581-803-501	FINAC — Master Station to Control Description, Operation & Test Procedures
581-803-502	FINAC — Outlying Station Control Ckt. EA 12616 Description, Operation & Test Procedures
581-803-503	FINAC — Outlying Station Control Ckt. EA 12944 Description, Operation & Test Procedures

7. 8A1 & 8B1 DATA SELECTIVE CALLING SYSTEMS — GENERAL DESCRIPTION

7.01 Both the 8A1 and 8B1 data selective calling systems operate at 100 words-per-minute, even parity, using the 8 level, American Standard Code for Information Interchange (ASCII-63).

7.02 The 8A1 system operates on a half-duplex basis using #35 type teletypewriter equipment with station polling generated by a line controller unit (LINCO). The line controller is capable of polling up to a maximum of 25 remote sending stations. Upon receipt of the station polling pattern (TSC), the station is capable of transmitting message traffic via tape reader (35ASR) or keyboard (35KSR) contingent upon the type of equipment at the customer's location. The line controller capacity places no restrictions on the number of receiving only (#35RO) stations that may be used in the system other than message traffic load considerations.

7.03 The 8B1 data selective calling system is a full duplex arrangement using a Data Communications Processor (DCP) to exert complete control over all signal line activity. It polls each #35ASR tape reader for message traffic and selectively calls one or more receiving units (#35ASRs or #35ROs) for message reception. All control codes and incoming messages are sent via the Data Communications Processor (DCP) on the receive side of the full duplex circuit and are directed to one or more receiving stations located on the customer's premises. Answer-back codes and outgoing

TABLE B

FINAC SELECTIVE CALLING SYSTEMS		
TEST FUNCTION	**STC TEST PROCEDURE**	**TTY REPAIR PROCEDURE AT STA. LOCATION**
1. TEST FOR STA. CONNECT ON VALID CDC	(A) SEND FIGURES-H-LETTERS	(A) RECEIVING STA. TYPING UNIT SHOULD BE IN SELECT NON-PRINT CONDITION
	(B) SEND STA. CDC FOLLOWED BY LETTERS	(B) THE TYPING UNIT SHIFTS TO SELECT-PRINT CONDITION (Note: The receipt of the CDC will unblock the blinding arrangement in slots 33 & 34 of the stunt box)
	(C) SEND CARRIAGE RETURN – CARRIAGE RETURN**	(C) THE TYPE BOX ASSEMBLY SHOULD RETURN TO THE LEFT HAND MARGIN (Note: The first CR should suppress printing of the next character – **The test procedure calls for a second CR, however, since CR is a nonprinting function – have the test deskman send the TSC "X" which should not print if blinding arrangement is good.)
	(D) SEND LINE FEED, LETTERS	(D) END OF ADDRESS CODE – THE TYPING UNIT SHOULD BE IN NON-SELECT PRINT CONDITION AND ONE LINE FEED UP
	(E) SEND FOX OR OTHER TEST SIGNALS	(E) THE STATION SHOULD RECEIVE UNDISTORTED FOX WITH A MARGIN OF 70 POINTS
	(F) SEND STATION DISCONNECT FIGURES-H-LETTERS	(F) THE STATION SHOULD GO INTO A SELECT NON-PRINT CONDITION (Note: See Section 581-803-500 for additional tests of blinding arrangement and master station transmitter start code.
2. PICK UP TAPE AT OUTLYING STA.	(A) SEND FIGURES-H-LETTERS, CARRIAGE RETURN, FOLLOWED BY STA. CDC	(A) WITH A TAPE IN THE TRANSMITTER AND THE TRANSMITTER IN "RUN" POSITION, THE RECEIPT OF THE STATION TSC WILL ACTIVATE THE TRANSMITTER AND SEND THE TEST MESSAGE (Note: — Release of the 6th pin — Operate of the start/stop lever to stop — Operation of the taut tape argt. Should stop transmission. The transmitter should be unable to restart until a subsequent TSC is sent to reoperate the station equipment.)

message traffic from the outlying locations are received at the Data Communications Processor (DCP) on the send side of the full duplex circuit. At the #35ASR teletypewriter locations, the transmitters send blind while incoming messages are received on the page printer (both under control of the station's controller equipment).

8. 8A1 DATA SELECTIVE CALLING SYSTEM — CONTROL CODES

8.01 The 8A1 line controller (LINCO) does not have the capability of handling message traffic, hence, a #35ASR teletypewriter is associated with the LINCO to act as an intercept machine if a called station does not respond to its CDC. The LINCO will respond to the CDC and automatically intercept the subsequent message via the #35ASR reperforator.

8.02 The LINCO generates an individual two-character TSC for each sending station on the system. The TSC two-character sequence consists of a control "P" (DCo) and a variable alpha character (depending on the individual station's TSC). The station will respond with one of the following response codes:

- (A) Message traffic (see format under CDCs-Par. 8.03).

- (B) No traffic response (\ACK).

- (C) Keyboard operation response (SOM SOM).

- (D) Maintenance alarm response (BELL BELL).

8.03 When the message to be transmitted from the receipt of the TSC is on tape, the tape format consists of a two-letter CDC followed by "delete" (8 levels marking) and an idle line (steady marking) condition. The LINCO will store the CDC and check the format for deviations. The called station will respond with a reverse slash ACK (\) indicating that it is ready to receive. If the LINCO detects a deviation in the tape format from the sending station, it will generate a BK-pause-EOT (break-pause-control D) sequence; stop the tape reader and return control of the system to the LINCO. When a called station fails to respond to its CDC within one second the LINCO reperforator

turns on and the LINCO will send * ACK (*\) to inform the sending station that the message is being transmitted to the intercept ROTR. If the intercept ROTR is out of service the LINCO will respond with # ACK (#\). The sending station's transmitter will start and send the entire message, however, the station attendant will have to resend the message to the missing station. This allows for transmission of multi-address codes without interruption.

8.04 Upon completion of the address portion of the tape consisting of at least one CDC, the polled (sending) station must use an end-of-address (control B), delete, code sequence to indicate the beginning of message text. Upon completion of the message tape, the polled (sending) station must use an end-of-transmission (control D), delete, code sequence to indicate the end of transmission from the sending station.

8.05 When a #35KSR station is polled for message traffic, the start of message code SOM SOM (control A) is sent in response to the station TSC. The LINCO will recognize the SOM and switch to the keyboard mode of operation, thus allowing the station up to thirty seconds to start sending.

9. 8B1 DATA SELECTIVE CALLING SYSTEM — CONTROL CODES

9.01 The Data Communications Processor (DCP) regulates the flow of traffic on the send and receive sides of the full duplex circuit. In full duplex operation, interrupted sending and receiving sequences are required to maintain a maximum traffic flow to the DCP. During normal operation, a selected tape reader may be interrupted (stopped) to allow a called station to send its CDC answer-back to the DCP on the send side of the full duplex. An outlying station in the process of receiving message traffic may be interrupted to allow a TSC to be sent over the receive side of the full duplex, when the DCP senses an idle sending circuit or recognizes the EOT (control D) at the end of transmission.

9.02 The DPC will poll the outlying station's tape reader on the receive side of the full duplex by sending 2-letter TSC consisting of control "P" (DCo) and the station's discrete second letter TSC. The processor pauses after each TSC to

allow the station to respond. A station having no traffic to send will respond with a reverse slash ACK (\ACK) code sequence. A station with message traffic will respond by beginning message traffic.

9.03 The DCP relays each message received from the outlying stations on the send side to the desired receiving units on the receive side of the full duplex arrangement. When the DCP has a message available for transmission, it will transmit the CDCs, pausing after each CDC for an answerback response on the send side of the duplex. A called station in the idle condition will respond with a reverse slash ACK (\ACK) code sequence indicating that the station is ready to receive. If the receiving unit is low on paper or tape, it will respond with a BELL-BELL (control G, control G) maintenance alarm condition.

9.04 The null code is generated by the DCP and transmitted over the receive loop to the station controller logic which is designed to temporarily disconnect a sending tape reader or selected receiving units upon receipt of the null code. This renders both the send and receive sides of the duplex arrangement idle for subsequent polling or selective calling by the DCP. The end of address (EOA) code (control B) reactivates the sending and receiving units that were previously selected. The EOA code is always followed by a delete character for buffer (timing) purposes.

9.05 When an end-of-transmission (EOT) code (control D) is transmitted from an outlying station on the send side of the full duplex, it is received by the DCP and has no effect on the receive side of the circuit. When the EOT code is transmitted by the DCP on the receive side of the full duplex, it restores the selective calling arrangement (stunt box) in the receiving units to a select, non-print condition.

9.06 Once selected by receipt of a TSC, a tape reader may be stopped at any time so that a subsequent TSC will be required to restart it. The DCP sends a null-delete-x-off sequence. The null-delete places the selected reader and, if the receive leg is busy, selected receiving units in the hold condition. The x-off will disconnect the selected tape reader. Following the x-off, a TSC will start the next reader in sequence and a subsequent end of address (EOA) would reactivate the selected receiving units.

10. TESTING THE 8A1 AND 8B1 DATA SELECTIVE CALLING SYSTEMS WITH STCs FROM CUSTOMER FIELD LOCATIONS

10.01 The test procedure charts for the 8A1 and 8B1 data selective calling systems are derived from the test information provided to the Long Lines test deskmen at the Long Lines serving test center. The first column, "Test Function" describes the objective of the test. The second column, "STC Test Procedure" is the instruction to the test deskmen. The third column, "TTY Repair Procedure at Sta. Location" reflects the anticipated reaction of the equipment as it would appear to the TTY serviceman at the customer's field location. In addition, there are diagnostic notes shown in the third column to assist the TTY serviceman with test procedures.

10.02 Detailed information concerning equipment description, operation and overall test procedures for the 8A1 and 8B1 data selective calling systems shall be found in the following Bell System Practices:

BSP REFERENCE	DESCRIPTION

8A1 and 8B1 Data Selective Calling System

Add 581-120-100	8A1 (Half Duplex) — General Description and Operation
Add 581-120-101 581-120-101	8B1 (Full Duplex) — General Description and Operation

8A1 Data Selective Calling System — Line Controller

Add 581-120-100 581-121-100	35A-1 Line Controller — General Description and Principles of Operation
581-120-200	35A-1 Line Controller — Installation
581-121-400	35A-1 Line Controller — Wiring Diagrams
581-121-700	35A-1 Line Controller — Adjustments

BSP REFERENCE	DESCRIPTION

**8A1 Data Selective Calling System —
Line Controller (continued)**

581-121-701	35A-1 Line Controller — Lubrication
Add 581-121-800	Cabinet (LAC) and Electrical Components — Parts

**8A1 and 8B1 Data Selective Calling —
Station Sets**

Add 581-122-100	
581-122-100	8A1 — General Description and Principles of Operation
Add 581-122-101	
581-122-101	8B1 — General Description and Principles of Operation
Add 581-122-200	
581-122-200	8A1 and 8B1 — Installation and Checkout
Add 581-122-300	
581-122-300	8A1 and 8B1 — Trouble Shooting
Add 581-122-400	
581-122-400	8A1 and 8B1 — Wiring Diagrams
581-122-800	8A1 and 8B1 — 198400 HF Station Controller Assembly — Parts

11. MODIFIED 8A1 AND 8B1 DATA SELECTIVE CALLING SYSTEM FOR GENERAL ELECTRIC RECORDS COMMUNICATION NETWORK (GE RECOMM)

11.01 The General Electric Recomm Network consists of both half and full duplex circuits and is a modified version of the 8A1 and 8B1 data selective calling systems. Two customer-owned and maintained communication processors are provided to control all traffic on the network. Additional functions performed by the processor are as follows:

    (a) System Control: Polling and selection of stations on the line is accomplished under program control. Individual messages can be routed to more than one outlying station by proper coding.

    (b) Message Accumulation: Messages are assembled, routed, and distributed under program control.

    (c) Storage: Storage is provided for messages that cannot be transmitted for any reason.

    (d) System Monitoring: Incomplete or improperly coded messages are rejected and a service message is automatically transmitted to the originating station. Information on service messages can be found in the customer directory located at each station console.

11.02 All message transmission is from the processor to the outlying station or vice versa. There is no direct transmission between stations. There are no provisions for keyboard entry in the Recomm Network.

11.03 Each #35ASR and #35RO is equipped with a station controller to perform switching operations and to act as an interface between the station and the loop facility.

12. GE RECOMM — CONTROL CODES

12.01 All control codes are monitored by the processor and all stations on the facility. The outlying station's tape reader is under control of the TCSs sent from the processor. The second character of the TSC, CDC and station answer-back (A/B) is the same alpha character and is individual to the particular station. For example, if the station has been assigned alpha character "A," the second letter of the TSC, CDC and A/B will be "A."

12.02 Transmitter Start Code (TSC): The TSC is a 2-character code — the first character is DCo (control P) with the second character the station's individual alpha character. When a TSC is generated by the processor, all stations read the code, however, only the encoded station will answer back.

TABLE C

8A1 SELECTIVE CALLING SYSTEM		
TEST FUNCTION	**STC TEST PROCEDURE**	**TTY REPAIR PROCEDURE AT STA. LOCATION**
1. POLLING A STATION	(A) SEND CONTROL D	(A) END OF TRANSMISSION CODE (Note: Clears stunt box and typing unit goes to select non-print condition)
	(B) SEND CONTROL P	(B) FIRST CHARACTER OF TSC
	(C) SEND STATION'S TSC ALPHA CHARACTER	(C) SECOND CHARACTER OF TSC
	(D) LOOK FOR STA. RESPONSE	(D) THE STATION WILL RESPOND WITH ONE OF THE FOLLOWING: 1. AFTER BID IS PLACED – TAPE STARTS WITH STRING OF DELETE CHARACTERS 2. STA. SENDS SOM SOM (CONTROL B, CONTROL B) FOR KEYBOARD OPERATION 3. NO TRAFFIC-\ACK AUTOMATICALLY SENT BY STATION 4. BELL-BELL (CONTROL G, CONTROL G) STATION IN MAINTENANCE CONDITION 5. NO RESPONSE – CIRCUIT OR EQUIPMENT FAILURE (Note: Station May be Local Mode)
2. STATION CALL-IN (TURNS ON STA. REC. TTY)	(A) SEND CONTROL D	(A) END OF TRANSMISSION CODE (Note: Clears stunt box and typing unit goes to select non-print condition.)
	(B) SEND STATION'S 2 LETTER CDC	(B) STATION WILL RESPOND WITH ONE OF THE FOLLOWING: 1. READY TO RECEIVE-\ACK AUTOMATICALLY SENT BY STATION 2. NO RESPONSE – STA. IN MAINTENANCE CONDITION DUE TO CIRCUIT OR EQUIPMENT FAILURE (Note: Should the station fail to respond to its CDC, the stored CDC will be released to the LINCO intercept. (See Part 4 of test procedure for intercept answer-back)
	(C) SEND CONTROL B	(C) CONTROL B IS THE END OF ADDRESS CODE (EOA) – LONG LINES SHOULD THEN SEND FOX OR OTHER TEST MESSAGE (Note: Check for margin of 70 points.)
	(D) SEND CONTROL D	(D) CONTROL D IS END OF TRANSMISSION CODE-STATION SHOULD GO TO SELECT NON-PRINT

TABLE C (Continued)

8A1 SELECTIVE CALLING SYSTEM		
TEST FUNCTION	**STC TEST PROCEDURE**	**TTY REPAIR PROCEDURE AT STA. LOCATION**
3. LINCO TIME-OUT	(A) LINCO WILL WAIT ONE (1) SECOND FOR POLLED STA. TO RESPOND TO TSC	(A) IF STATION DOES NOT RESPOND TO TSC – LINCO SEND OUT – BREAK-PAUSE-CONTROL D (EOT) (Note: Polling is then resumed with next TSC in the polling pattern.)
	(B) TAPE LEADER WITH 30 SECONDS OF RUBOUTS	(B) INDICATION OF STUCK TAPE – AFTER 30 SECONDS, LINCO SENDS OUT BREAK-PAUSE-CONTROL D (EOT) (Note: Upon receipt of a line break signal, both the sending station and selected receiving station will enter into a break alarm condition. The white break alarm lamp will be lighted and audible alarm will sound. To clear the break lamp, the red break release key at the left side of the keyboard must be depressed. If the red alarm lamp and the audible alarm are activated, turn the alarm key to vertical then back to horizontal – this procedure should clear alarms.)
		(C) BREAK ALARM – WHILE THE STA. IS IN BREAK ALARM CONDITION – NO TAPE CAN BE PICKED UP AND THE STA. WILL RESPOND TO POLLING WITH THE NO TRAFFIC TO SEND RESPONSE (\ACK)
4. LINCO INTERCEPT	(A) SEND CDC	(A) STA. SHOULD RESPOND TO CDC WITHIN ONE SECOND – IF IT DOES NOT THE LINCO (ROTR) WILL AUTOMATICALLY RESPOND WITH * ACK (*\) TO INFORM THE SENDING STA. THAT THE MESSAGE IS BEING SENT TO INTERCEPT
		(B) IF THE INTERCEPT MACHINE IS OUT-OF-SERVICE LINCO WILL RESPOND WITH #ACK (#\) SEE PAR. 8.03
5. POLLING A STATION *Note: There are no Long Lines job aid cards for 8B1 full duplex operation, however, in the interest of uniform test procedures, a test for 8B1 has been included for information purposes.	(A) SEND CONTROL D (EOT)	(A) CONTROL D TRANSMITTED ON THE RECEIVE SIDE OF THE FULL DUPLEX WILL RESTORE THE STATION'S STUNT BOX TO SELECT NON-PRINT CONDITION
	(B) SEND CONTROL P	(B) CONTROL P IS THE FIRST CHARACTER OF THE TSC
	(C) SEND STATION'S ALPHA CODE	(C) SECOND CHARACTER OF TSC
	(D) LOOK FOR STATION ANSWER-BACK ON THE SEND SIDE OF THE FULL DUPLEX	(D) WITH NO TAPE IN THE READER THE STATION WILL RESPOND WITH A REVERSE SLASH ACK (\ACK) (Note: A station with message traffic will respond by beginning message traffic.)
	(E) WITH THE READER SENDING TAPE ON THE SEND SIDE OF THE DUPLEX – SEND NULL-DELETE ON THE RECEIVE SIDE OF THE DUPLEX – THIS WILL STOP THE TAPE READER AND THE EOA CODE CONTROL B) WILL RESTART THE READER	(E) RECEIPT OF NULL-DELETE SHOULD STOP THE TAPE READER TEMPORARILY – RECEIPT OF CONTROL B (EOA) WILL RESTART THE READER (Note: Null-delete-X-Off will disconnect the reader and a subsequent TSC is necessary to restart it.)
	(F) SEND CONTROL D (THIS CONCLUDES TSC TEST)	(F) RECEIPT OF CONTROL D (EOT) WILL RESTORE THE STUNT BOX TO SELECT NON-PRINT CONDITION

TABLE C (Continued)

8A1 SELECTIVE CALLING SYSTEM		
TEST FUNCTION	STC TEST PROCEDURE	TTY REPAIR PROCEDURE AT STA. LOCATION
6. STATION CALL-IN	(A) SEND CONTROL D	(A) END OF TRANSMISSION CODE
	(B) SEND STATION'S TWO CHARACTER CDC	(B) A STATION IN IDLE CONDITION WILL RESPOND WITH A REVERSE SLASH ACK (\ACK)
	(C) SEND END OF ADDRESS CODE — CONTROL B	(C) RECEIPT OF THE EOA WILL CAUSE THE STATION'S STUNT BOX TO GO INTO THE NON-SELECT PRINT CONDITION
	(D) SEND FOX OR OTHER TEST MESSAGE	(D) CHECK FOR A MARGIN OF 70 POINTS ON UNDISTORTED FOX
	(E) SEND EOT CODE CONTROL D (THIS CONCLUDES THE CDC TEST)	(E) RECEIPT OF THE EOT CODE PLACES THE STUNT BOX IN SELECT NON-PRINT CONDITION (Note: When a station is low on paper or tape — receipt of a CDC will cause the station controller to respond with a Bell, Bell code sequence on the send leg.)

12.03 Call Directing Code (CDC): The CDC is a 2-character code; the first character is S1 (control Y), with the second character the station's individual alpha character. All stations read the code, however, only the encoded station will answer back.

12.04 Answer-Back Code (A/B): The A/B code is a 2-character code; the first character is S2 (control Z) with the second character the station's individual alpha character. The A/B code is sent to the processor by the encoded station in response to a CDC. It is also transmitted to the processor upon receipt of a TSC if the station has no message traffic to send.

12.05 Start of Transmission Code: The start of transmission (SOT) code is a single character (control B). After a CDC is sent from the processor and the A/B code returned, the processor sends SOT. This code will condition the called receiver to the nonselect print condition and all other receivers to the nonselect, nonprint condition. A receiving station will not print the CDCs, A/B, or SOT codes. This code is also used as the first control character in tapes transmitted to the processor. The term SOT is used in the Recomm Network in place of, and is synonymous with, end of address.

12.06 End of Transmission Code: The end of transmission (EOT) code is a single character (control D). The EOT code is always followed by a minimum of 12 deletes when originated from an outlying station. On a half duplex circuit, it is used as a disconnect code and is recognized by the stunt box, which stops the transmitter distributor (TD). In addition, the EOT restores all teletypewriters on the circuit to the select nonprint condition. On a full duplex circuit, the sending machine has no means of detecting this code. The code is detected by the processor, which then generates the X-Off sequence on the receive side of the circuit to stop the TD. The EOT code is also used between addresses of a multiple address message on both half and full duplex. In this case, the TD is stopped but is immediately restarted on receipt of its TSC.

12.07 Interrupt Code (Control X Delete): This code is generated only by the processor and is used on full duplex circuits. It precedes a CDC or TSC sent from the processor. In the case of a CDC, any TD sending will be stopped to permit an A/B

from the station on the send side of the circuit from the station called. When preceding a TSC, any selected receivers are placed in a nonprint condition to prevent copying the TSC.

12.08 X-Off: This code is generated by the processor and is used on full duplex circuits. It is sent on the receive side of the circuit to stop a station TD after the EOT code is received at the processor.

12.09 Bell-Bell: This code is generated by the station after receiving the CDC for the station if the paper supply is low. Under this condition, the CDC will not select the station.

12.10 Separate Code: This code (control R) is used on multiple address messages after the last address. It indicates to the processor that all addresses have been transmitted and that the text of the message will follow.

12.11 Emergency Stop: A 400-MS break is generated by the processor on a half duplex circuit.

13. TESTING THE GE RECOMM DATA SELECTIVE CALLING SYSTEM WITH STCs FROM CUSTOMER FIELD LOCATIONS

13.01 The test procedure charts for the GE Recomm data selective calling system is derived from the test information provided to the Long Lines test deskmen at the Long Lines serving test center. The first column, "Test Function," describes the objective of the test. The second column, "STC Test Procedure," is the instruction to the test deskmen. The third column, "TTY Repair Procedure at Sta. Location," reflects the anticipated reaction of the equipment as it would appear to the TTY serviceman at the customer's field location. In addition, there are diagnostic notes shown in the third column to assist the TTY serviceman with test procedures.

13.02 Detailed information concerning equipment description, operation and overall test procedures for the GE Recomm System shall be found in the Bell System Practices listed under the 8A1 and 8B1 data selective calling systems (paragraph 10.02) of this practice.

TABLE D

GE RECOMM HDX SELECTIVE CALLING SYSTEM		
TEST FUNCTION	STC TEST PROCEDURE	TTY REPAIR PROCEDURE AT STA. LOCATION
1. STATION CALL-IN (TURNS ON REC. TTY MACHINE)	(A) SEND CONTROL D	(A) CONTROL D IS EOT CODE AND RETURNS STUNT BOX TO SELECT NON-PRINT CONDITION
	(B) SEND CONTROL Y	(B) FIRST CHARACTER CDC
	(C) SEND STATION'S ALPHA CHARACTER	(C) SECOND CHARACTER CDC
	(D) READ ANSWER-BACK	(D) THE STATION WILL RESPOND WITH THE CDC ANSWER-BACK — CONTROL Z, FOLLOWED BY THE STATION'S ALPHA CHARACTER
	(E) SEND CONTROL B — START OF TRANSMISSION CODE (SOT)	(E) THE STATION WILL GO INTO NON-SELECT PRINT CONDITION AND IS READY TO RECEIVE TEXT
	(F) SEND FOX OR OTHER TEST MESSAGE	(F) THE STATION SHOULD RECEIVE UNDIS— TORTED FOX WITH A MARGIN OF 70 POINTS (Note: Reset range finder at mid-point.)
	(G) SEND CONTROL D (THIS CON- CLUDES THE STA. CALL-IN TEST	(G) CONTROL D IS EOT CODE AND RESTORES STUNT BOX TO SELECT NON-PRINT CONDITION (Note: With this system a parity error sent from the processor will not alarm and the station may copy the garble character.)
2. PICK UP TAPE AND TEST FOR NO TRAFFIC RESPONSE	(A) SEND CONTROL D	(A) CONTROL D IS EOT CODE AND RETURNS STUNT BOX TO SELECT NON-PRINT CONDITION
	(B) SEND CONTROL P	(B) FIRST LETTER OF TSC
	(C) SEND STATION'S ALPHA CHARACTER	(C) SECOND LETTER OF TSC
	(D) READ TSC ANSWER-BACK	(D) WITH NO TAPE IN THE READER THE STATION WILL RESPOND WITH CONTROL Z FOLLOWED BY THE STATION'S ALPHA CHARACTER INDICATING NO TRAFFIC TO SEND (Note: With tape in the reader the test deskman will see the tape leader (rubouts) followed by the message format and EOT Control D.)

TABLE E

GE RECOMM FDX SELECTIVE CALLING SYSTEM		
TEST FUNCTION	STC TEST PROCEDURE	TTY REPAIR PROCEDURE AT STA. LOCATION
1. STATION CALL-IN (TURNS ON REC. TTY MACHINE)	(A) SEND CONTROL D	(A) CONTROL D IS EOT CODE AND RETURNS STUNT BOX TO SELECT NON-PRINT CONDITION
	(B) SEND CONTROL X	(B) CONTROL X STOPS ANY TRANSMITTER THAT MAY BE SENDING ON THE SEND SIDE OF THE FULL DUPLEX (Note: This is necessary to clear the send loop for the station answer-back to the CDC.)
	(C) SEND CONTROL Y	(C) CONTROL Y IS FIRST CHAR. OF CDC
	(D) SEND STATION'S ALPHA CODE	(D) STA. ALPHA CODE (Note: This code is individual to station and is the same for CDCs, TSCs and answer-backs.)
	(E) READ STA. ANSWER-BACK	(E) STATION WILL RESPOND WITH CONTROL Z AND ITS ALPHA CODE
	(F) SEND CONTROL B AFTER RECEIPT OF VALID A/B	(F) CONTROL B IS THE START OF TRANSMISSION (SOT) CHARACTER (Note: The term SOT is used in the GE RECOMM system in place of, and is synonymous with, the end of address (EOA) code in the 8B1 system.)
	(G) SEND FOX OR OTHER TEST MESSAGE	(G) THE STATION SHOULD RECEIVE UNDISTORTED FOX WITH A MARGIN OF 70 POINTS
	(H) SEND CONTROL D (THIS CONCLUDES CDC TEST)	(H) CONTROL D IS EOT CODE AND RESTORES STUNT BOX TO SELECT NON-PRINT CONDITION
2. PICK-UP TAPE AND TEST FOR NO TRAFFIC RESPONSE	(A) SEND CONTROL X	(A) CONTROL X, ON A FULL DUPLEX CIRCUIT, WHEN PRECEDING A TSC WILL PLACE ANY SELECTED RECEIVERS IN A NON-PRINT CONDITION TO PREVENT COPYING THE TSC
	(B) SEND CONTROL S	(B) CONTROL S (X-OFF SEQUENCE) IS SENT ON THE RECEIVE SIDE OF THE DUPLEX TO STOP THE TAPE READER AFTER RECEIPT OF AN EOT CODE BY THE PROCESSOR
	(C) SEND CONTROL P	(C) FIRST CHARACTER OF TSC
	(D) SEND STATION'S ALPHA CODE	(D) SECOND CHARACTER OF TSC
	(E) READ STATION'S NO TRAFFIC RESPONSE	(E) UPON RECEIPT OF THE STA. TSC WITH NO TAPE IN THE TAPE READER, THE STATION WILL RESPOND WITH CONTROL Z, FOLLOWED BY THE STATION'S ALPHA CODE (Note: With a tape in the reader the test deskman will see the tape leader (rubouts) followed by the message format and EOT control D.)
	(F) SEND CONTROL X, CONTROL S (THIS CONCLUDES STA. TSC TEST)	(F) CONTROL X, CONTROL S IS A DELETE, X-OFF SEQUENCE WHICH MAY BE USED TO STOP A TRANSMITTER. A TSC IS REQUIRED TO RESTART TRANSMISSION

14. 85A DATA SELECTIVE CALLING SYSTEMS – GENERAL INFORMATION

14.01 The 85A data selective calling system consists of a customer-provided computer switcher and a multiplicity of outlying stations connected on the same circuit (loop) or number of circuits. Through the use of a store-and-forward operation in the computer switcher, the sending and receiving teletypewriters are connected for interstation or intracircuit message traffic.

14.02 The 85A1 and 85A2 data selective calling systems operate on a half duplex basis. A previously offered "Echoplex" feature (similar to a full duplex operation) has been discontinued by the AT&T company. This practice does not include any information pertaining to Echoplex operation. The 85A1 system operates at 100 WPM using #33 type and/or #35 type teletypewriter equipment. The 85A2 system operates at 150 WPM using #37 type teletypewriter equipment.

14.03 The computer switcher controls the operation of the facilities and handles the selection of stations for the polling and transmission of message traffic. The computer switcher polls the individual stations, in sequence, to determine if the station has message traffic to send. The outlying stations respond, when polled, with indications about their "traffic-to-send" status (NAK, CAN, ACK — see paragraph 15.01, item 2). When a station is selected to send, it transmits the entire heading of the message to the computer switcher and stops. The heading contains the address codes of the stations that have been designated by the originator as recipients of the message to be transmitted. The computer switcher verifies the validity of the header information and stores the address codes as station "Call-In" codes before proceeding with the "Call-In" process.

14.04 The "Call-In" process consists of the computer switcher interrogating each of the receiving stations to be selected, individually, in sequence, as to its availability to receive message traffic. Each individual outlying station will respond to the "Call-In" process with a discrete indication as to its status. Stations that respond to the "Call-In" process with a "Ready-To-Receive" (CAN or ACK), automatically become selected receivers. Repeated "Call-In" attempts are made when a station responds with a Not-Ready-To-Receive (NAK) response. In the instances when stations respond with Not-Ready-To-Receive (NAK) to repeated attempts, the computer switcher will direct the station's message to intercept. When all of the available addressed stations and intercepted stations (if required) have been called in, the computer switcher unblinds all selected receivers and the selected sender, thus allowing the message tape to be transmitted. The End-Of-Transmission code (EOT) at the end of the message causes all selected receivers plus the selected sender to assume the idle circuit (unselected) condition. The computer switcher then will assume control of the facilities and proceed with its polling sequence.

14.05 It should be noted that the answer-back response shown for the 85A data selective calling systems and the test procedure tables have been altered to agree with the type of answer-back that applies to the new data auxiliary sets as described in paragraph 15.01 of this field maintenance practice.

15. 85A DATA SELECTIVE CALLING SYSTEMS – STATION CONTROL UNIT IDENTIFICATION AND OPERATIONAL REARRANGEMENTS

15.01 Effective March, 1971, the AT&T company introduced a new 85A-type station controller which superseded the original data auxiliary set (DAS) 820G1 station controller; several features provided with the new control units differ from those provided with the 820G1 controllers. A comparison of the station control units and feature differences are as follows:

(a) Station Control Unit Identification

SYSTEM	OLD DATA AUX. SET	NEW DATA AUX. SET
85A1		
#33, 35ASR & RO	820G1	820G-L1/4
#35 ROTR	820G1	820G-L1/5
85A2		
#37 ASR & RO	NONE	820G-L1/2
#37 ROTR	NONE	820G-L1/3

(b) Additional Features Available in New Controllers.

    (1) Station arrangements for M37 teletypewriter apparatus.

(c) Changes in Station Operation.

(1) The old controller unselects on either a low paper (friction feed) or a paper out (sprocket feed) condition that occurs during transmission. The new controller, however, provides a screw-switch option which permits the station to operate on the basis of:

- Continuing to send when a low paper condition occurs (friction feed) until it unselects on EOT.

- Stopping transmission when a paper out condition occurs (sprocket feed). As a manual override feature, normal transmission can be caused to resume by operating the paper alarm key and holding it operated.

(2) A change in the logic of the CAN response has been incorporated in the new controller. This change is significant since it now permits the computer switcher to determine the readiness of the receiver to accept traffic as a part of the poll response. The computer, therefore, must be programmed to accomodate the CAN response in a different manner for the new controller than was done for the old controller. The responses to poll and meaning of the responses for the old and new controllers are listed below:

OLD DATA AUX. SET	NEW DATA AUX. SET
NAK— no traffic	*NAK — no traffic; not ready to receive.
CAN— last message improperly received	**CAN — no traffic; ready to receive.
***ACK— traffic	***ACK — traffic; ready to receive.

*The NAK response is generated by the new controller if the receiver is not ready even though traffic is available.

**The accuracy of a message delivery to a new controller may still be checked by means of the Call-In or Roll-Call process.

***SIC or "Start of Transmission" are also valid responses denoting traffic in both old and new controllers.

(3) There is no option in the new controllers for the Echoplex mode of operation.

(d) Miscellaneous: The old controllers are not "On-Line" compatible with the new controllers and there are no plans for modifying the old controllers to make them so. Therefore, old and new controllers should not be intermixed in the same system. The old controllers should be used for additions to existing systems, but new systems provided after the first quarter of 1971 should use the new controllers.

16. TESTING THE 85A DATA SELECTIVE CALLING SYSTEMS WITH STCs FROM CUSTOMER FIELD LOCATIONS

16.01 The test procedure charts for the 85A1 and 85A2 data selective calling systems are derived from the test information provided to the Long Lines test deskman at the Long Lines serving test center. It should be noted that the answerback responses shown in the test procedure tables have been altered to agree with the type of answerback responses that apply to the new data auxiliary sets 820G-L1/2 through 820G-L1/5, effective March, 1971.

16.02 On the test procedure charts, the first column, "Test Function," describes the objective of the test. The second column, "STC Test Procedure," is the instruction to the test deskmen. The third column, "TTY Repair Procedure at Sta. Location," reflects the anticipated reaction of the equipment as it would appear to the TTY serviceman at the customer's field location. In addition, there are diagnostic notes shown in the third column to assist the TTY serviceman with test procedures.

16.03 Detailed information concerning equipment description, operation and overall test procedures for the 85A systems shall be found in the following Bell System Practices:

85A1 SYSTEM

BSP REFERENCE	DESCRIPTION
581-130-100	System Description
581-130-100	System Maintenance

85A1 SYSTEM (Continued)

BSP REFERENCE	DESCRIPTION
581-131-100	Outlying Station for 100-Words per Minute Operation — Description
581-131-200	Outlying Station for 100-Words per Minute Operation — Installation
581-131-300	Outlying Station for 100-Words per Minute Operation — Maintenance
581-131-500	Outlying Station for 100-Words per Minute Operation — Test Procedures

85A2 SYSTEM

BSP REFERENCE	DESCRIPTION
581-131-101	Outlying Station for 150-Words per Minute Operation — Description and Operation
581-131-201	Outlying Station for 150-Words per Minute Operation — Installation
581-131-301	Outlying Station for 150-Words per Minute Operation — Maintenance
581-131-501	Outlying Station for 150-Words per Minute Operation — Test Procedures

17. 86A DATA SELECTIVE CALLING SYSTEMS — GENERAL INFORMATION

17.01 The 86A data selective calling service consists of a customer-provided computer switcher and a multiplicity of outlying stations connected to the same circuit (loop) or a number of circuits through the computer switcher on a half-duplex (HDX) basis. The computer switcher governs the selection of outlying stations for sending and receiving purposes with traffic being handled via a "Store and Forward" operation. 86A type systems employ the USA standard code for information interchange (ASCII, 67) using an 11-bit character code at 100 WPM (110-band) or a 10-bit character code at 150 WPM (150-band). The 86A1 stations provide for 100 WPM operation using #33- and #35-type teletypewriter equipment. The 86A2 stations provide for 150 WPM operation using #37-type teletypewriter equipment. A typical outlying station consists of a (#33, #35 or #37) teletypewriter, DAS 820B-type station controller, 108A or 109E-type data set and a DAS 804-type attendant set. The station controller used in conjunction with the attendant set performs the necessary line and supervisory control functions for the station. In addition, the station controller also provides for the regeneration of incoming and outgoing signals between the teletypewriter and the facility (loop).

17.02 A half-duplex (HDX) station can either transmit or receive at any given time. Only one station at a time can transmit message traffic on a multi-station line, however, any number (or all) of the stations on a multi-station line can be selected to receive message traffic simultaneously.

18. 86A1 AND 86A2 DATA SELECTIVE CALLING SYSTEMS — COMPUTER SWITCHER OPERATION

18.01 The normal half-duplex (HDX) operation of the 86A1 and 86A2 stations permit the computer switcher to perform the following functions:

(a) Pick up message traffic from a selected sending station for storage and subsequent transmission.

(b) Transmit messages from storage to one or more selected receiving stations.

(c) Allow for direct transmission from a selected tape reader to selected receiving stations on the same circuit. This feature avoids the necessity of message storage and subsequent retransmission that is common to 86B-type (full duplex) systems in which all messages must be routed through the computer switcher.

18.02 The computer switcher polls a station on the line by sending its station polling code (SPC). The station answers back in one of the following ways, indicating its status:

TABLE F

85A1 & 85A2 SELECTIVE CALLING SYSTEM		
TEST FUNCTION	STC TEST PROCEDURE	TTY REPAIR PROCEDURE AT STA. LOCATION
1. POLLING SEQUENCE	(A) SEND CONTROL D (EOT) (B) SEND CONTROL P FOLLOWED BY STATION CALL-IN CODE	(A) CONTROL D IS THE END-OF-TRANSMISSION CODE — THE STATION RETURNS TO IDLE MODE UPON RECEIPT OF EOT (B) THE STATION WILL RESPOND WITH: *NAK — NO TRAFFIC — <u>NOT</u> READY TO REC. or *ACK — TRAFFIC — READY TO RECEIVE or *CAN — NO TRAFFIC — READY TO RECEIVE *See Paragraph 15.01 for explanation of response feature.
2. PICKING UP A TAPE	(A) AFTER STATION HAS BEEN POLLED AND RESPONDED THAT IT HAS TRAFFIC TO SEND (ACK) — SEND A CONTROL B FROM THE STC (B) THE COMPUTER SWITCHER WOULD NOW SEND THE TIME-DATE-MSG. NO. (TDM). TO RESTART TAPE SEND CONTROL B	(A) UPON RECEIPT OF CONTROL B THE STATION TAPE READER WILL START AND SEND SEVERAL DELETES FOLLOWED BY CONTROL A AND STOP (B) UPON RECEIPT OF THE SECOND CONTROL B THE STATION'S TAPE READER WILL START AND CONTINUE TRANSMISSION UNTIL THE END-OF-MESSAGE SEQUENCE CONTROL C, CONTROL D IS SENT. AT THIS POINT THE READER WILL STOP AND THE STATION RETURNS TO THE IDLE MODE
3. STATION CALL-IN (TURNS ON REC. PORTION OF TTY)	(A) SEND CONTROL D (B) SEND CONTROL E FOLLOWED BY THE STATION CALLING CODE (SCC) (C) SEND FOX OR OTHER TEST MESSAGE	(A) CONTROL D IS EOT — RETURNS STATION TO IDLE MODE (B) UPON RECEIPT OF THE SCC THE STATION WILL RESPOND WITH AN "ACK" OR "CAN" IF IT IS READY TO RECEIVE OR A "NAK" IF IT IS NOT READY TO RECEIVE (C) THE STATION SHOULD RECEIVE UNDISTORTED FOX WITH A MARGIN OF 70 POINTS
4. AUTOMATIC LOOP-BACK TEST	(A) THE DATA SET MUST BE A 108A TYPE (SERIES 4 OR LATER)	(A) AUTOMATIC LOOP BACK TEST MADE BY LL FROM STC — NOT AVAILABLE WHEN STA. IS EQUIPPED WITH DATASET 109A

- P ACK: Priority Traffic Available — Ready to Receive

- P NAK: Priority Traffic Available — Not Ready to Receive

- R ACK: Regular Traffic Available — Ready to Receive

- R NAK: Regular Traffic Available — Not Ready to Receive

- CAN: No Traffic to Send — Ready to Receive

- NAK: No Traffic to Send — Not Ready to Receive

18.03 When a station is selected to transmit, the computer switcher can send the select sending station the time, date and message number (TDM) for the message to be transmitted. Under normal operating conditions, the station then sends the heading of the message to the computer switcher and stops, allowing the computer switcher to Call-In any on-line stations whose station identity codes (SIC) appear on the tape heading. Upon satisfactory completion of the Call-In process, the selected sending station's tape reader is restarted by the computer switcher for transmission of the message text. Contingent upon the requirements of the customer, the stations can be arranged not-to-stop for the Call-In process when it is desirable for all message traffic to be routed through the computer switcher for store and forward handling.

18.04 86A type stations, receive message traffic automatically and unattended. The computer switcher calls the station using the station's call enquiry code (CEC). The station replies with its station identity code (SIC) and with an indication of its readiness to receive as follows:

- SIC ACK: Ready to Receive

- SIC NAK: Not Ready to Receive

After receipt of message traffic, a station can be queried (Roll-Call process) by the computer switcher to determine if a message was properly received. The Roll-Call responses of a station are:

- SIC CAN: Message Properly Received

- SIC NAK: Message Not Properly Received

19. STATION OPERATION — 86A1 AND 86A2 STATIONS

19.01 Message traffic is prepared from the station keyboard on punched tape. All messages follow a similar format which consists of a SOH (start-of-heading), the message heading, STX (start of text) and a ETX (end of text). Subsequent messages are prepared on a continuous tape basis using the same format — SOH, Heading, STX, Text, ETX. The ETX of the last message must be followed by an EOT (end-of-transmission). A "Transmission" may be constituted of any number of messages with the final message followed by the EOT character. A "Hold" feature allows transmission to be stopped at the ETX (end-of-text) that indicates the end of a message to permit the original tape to be removed and a subsequent tape to be inserted into the reader without the station restoring to idle condition (when it is in a "Selected-To-Transmit" condition). The computer switcher is generally arranged to allow about 30 seconds for this operation prior to "Timing Out" and treating this as an interrupted transmission.

19.02 The computer switcher has the capability of interrupting a selected transmitter at any time. Such an interruption results in a visual and audible emergency stop alarm indication on the attendant set. At this time, the computer switcher can transmit a service message to the station to indicate the reason for the interruption. Any irregularity in the tape reader operation, such as "Tape-Out" or "Torn-Tape," results in a visual and audible tape alarm indication.

19.03 When the computer switcher has message traffic to forward, it calls the addressed stations on the line and selects them as receivers. The receiving teletypewriters must be "In Service" and "Ready-To-Receive." If a station is not ready to receive when called, a "Call Lamp" at the station attendant set will indicate that a "Not Ready" response to the "Call-In" has been sent by the station controller. Conversely, if the station is "Ready-To-Receive," the "Call Lamp" will flash momentarily and the "REC Lamp" in the attendant set will light indicating that the station is in the "Selected-To-Receive" condition. A similar action occurs if the computer switcher calls-in a station (or stations) on the same line as the originating station in order to permit them to receive the originator's message at the time it is being transmitted by the originator.

19.04 As a system assurance measure, the 86A system may be equipped to check message delivery through the use of a "Roll-Call" option. After a message has been transmitted, a query (Roll-Call) from the computer switcher causes the station to indicate the status of the previously transmitted message. If the message was received satisfactorily, the station controller responds with SIC-CAN (station identity code-message correctly received). In the case of a negative response SIC-NAK (station identity code-message not properly received). The computer switcher may, providing all traffic is handled on a store-and-forward basis, automatically resend improperly received messages.

20. TESTING THE 86A DATA SELECTIVE CALLING SYSTEM WITH STCs FROM CUSTOMER FIELD LOCATIONS

20.01 The test procedure charts for the 86A data selective calling system are derived directly from the test information provided to the Long Lines test deskmen at the Long Lines STCs. The first column, "Test Function," describes the objective of the test. The second column, "STC Test Procedure," is the instruction to the test deskmen. The third column, "TTY Repair Procedure at Sta. Location," reflects the anticipated reaction of the equipment as it would appear to the TTY serviceman at the customer's field location. In addition, there are diagnostic notes shown in the third column to assist the TTY serviceman with test procedures.

20.02 Detailed information concerning equipment description, operation and overall test procedures for the 86A1 and 86A2 data selective calling systems shall be found in the following Bell System Practices:

BSP REFERENCE	DESCRIPTION
581-136-100	86A1 — 100 WPM Data Stations — Description and Operation
581-136-200	86A1 — 100 WPM Data Stations — Installation
581-136-300	86A1 — 100 WPM Data Stations — Maintenance
581-136-500	86A1 — 100 WPM Data Stations — Test Procedures

BSP REFERENCE	DESCRIPTION
581-136-101	86A2 — 150 WPM Data Stations — Description and Operation
581-136-201	86A2 — 150 WPM Data Stations — Installation
581-136-301	86A2 — 150 WPM Data Stations — Maintenance
581-136-501	86A2 — 150 WPM Data Stations — Test Procedures

21. 86B DATA SELECTIVE CALLING SYSTEMS — GENERAL INFORMATION

21.01 The 86B data selective calling service consists of a number of outlying stations connected to the same circuit (LOOP), or to a multiplicity of circuits and a customer-provided computer switcher. The computer switcher, operating on a full duplex (FDX) basis, controls the selection of outlying stations, enabling them to be selected to send and/or receive message traffic via a "store-and-forward" operation. 86B-type systems employ the standard code for information interchange (ASCII, 67) using an 11-bit character code at 100 WPM (110-band) or a 10-bit character code at 150 WPM (150-band). 86B1 stations provide for 100 WPM full duplex (FDX) operation using #33 and #35 type teletypewriter equipment. 86B2 stations provide for 150 WPM full duplex (FDX) operation using #37 type teletypewriter equipment. A typical outlying station consists of a (#33, #35 or #37) teletypewriter, data auxiliary set (DAS) 820B-type station controller, 108A data set and a DAS 804-type attendant set. The station controller used in conjunction with the attendant set performs the necessary line and supervisory control functions for the station. In addition, the station controller also provides for the regeneration of incoming and outgoing signals between the teletypewriter and the facility (LOOP).

21.02 A full duplex (FDX) station has the capability of transmitting and receiving at the same time. Only one station on a multi-station line can transmit at one time. However, any number of stations on a multi-station line can be selected to receive the same message traffic simultaneously. All station-originated messages are transmitted to the switcher, stored and then forwarded.

TABLE G

86A1 & 86A2 SELECTIVE CALLING SYSTEMS		
TEST FUNCTION	**STC TEST PROCEDURE**	**TTY REPAIR PROCEDURE AT STA. LOCATION**
1. POLLING A STATION	(A) SEND CONTROL D, CONTROL P FOLLOWED BY STATION'S SPC (STATION POLLING CODE)	(A) CONTROL D (EOT: END-OF-TRANSMISSION) RESTORES THE STATION TO IDLE MODE. CONTROL P (DLE: DATA-LINK-ESCAPE) THE DLE DEFINES THE START OF A POLLING SEQUENCE AND ACTIVATES THE STATION CONTROLLER LOGIC CIRCUITS – THE STATION POLLING CODE (SPC) FOR EACH STATION IS A SINGLE CHARACTER UNIQUE TO THE STATION BEING POLLED
	(B) CHECK FOR STATION RESPONSE (SIMILAR TO AN ANSWER-BACK)	(B) THE STATION WILL RESPOND WITH ONE OF THE FOLLOWING: (1) CAN: NO TRAFFIC – READY TO REC. (2) NAK: NO TRAFFIC – NOT READY TO REC. (3) R-ACK: REGULAR TRAFFIC – READY TO REC. (4) R-NAK: REGULAR TRAFFIC – NOT READY TO REC. (5) P-ACK: PRIORITY TRAFFIC – READY TO REC. (6) P-NAK: PRIORITY TRAFFIC – NOT READY TO REC.
2. PICK UP TAPE	(A) PREPARE TO PICK UP TAPE	(A) WITH THE STATION OFF THE NETWORK AND THE STATION LOOP TERMINATED AT THE STC, INSERT A TEST TAPE INTO THE TAPE READER GATE. PLACE THE TR BAT HANDLE ON "RUN" – OPERATE THE BID KEY (Note: At this time, the tape will advance to SOH (Control A) and stop. The station is now in the Traffic Available state.)
	(B) SEND CONTROL D (EOT)	(B) CONTROL D IS EOT – RESTORE STA. TO IDLE MODE.
	(C) SEND CONTROL P (DLE)	(C) CONTROL P IS DLE (DATA LINK ESCAPE) INDICATES START OF POLLING SEQUENCE
	(D) SEND CONTROL E (ENQ)	(D) CONTROL E IS ENQ (ENQUIRY) CONDITIONS CONTROLLER FOR RECEIPT OF STATION'S CEC (CALL-ENQUIRY-CODE
	(E) SEND STATION'S CEC	(E) DETECTION OF ENQ, CEC, SEQUENCE WILL PUT THE STATION INTO A SELECTED-TO-SEND CONDITION WITH THE TRANS-REC LAMP LIGHTED. THE STATION CONTROLLER WILL RESPOND BY SENDING SOH. THE STATION NOW AWAITS A "GO-AHEAD" SIGNAL FROM THE COMPUTER SWITCHER
	(F) READ – SOH (CONTROL A FROM THE STATION'S CONTROLLER) AND SEND CONTROL Q DC1 (DEVICE CONTROL 1)	(F) RECEIPT OF CONTROL Q (DC1) TERMINATES POLLING SEQUENCE: BLINDS ALL OTHER STATIONS AND UNBLINDS THE TYPING UNIT ASSOCIATED WITH THE TAPE READER UNDER TEST. THE COMPUTER SWITCHER WOULD NOW SEND TIME, DATE AND MESSAGE NUMBER (TDM)

TABLE G (Continued)

86A1 & 86A2 SELECTIVE CALLING SYSTEMS		
TEST FUNCTION	**STC TEST PROCEDURE**	**TTY REPAIR PROCEDURE AT STA. LOCATION**
2. PICK UP TAPE (Cont.)	(G) SEND CONTROL B (STX) (FIRST STX)	(G) RECEIPT OF CONTROL B STX (START-OF-TEXT) RESTARTS TAPE READER SENDING OUT THE HEADING AND ADDRESS CODES FOR INTENDED RECEIVERS. THE TAPE READER STOPS AGAIN UPON TRANSMISSION OF STX THAT IS PUNCHED INTO THE TAPE AT THE END OF THE HEADING AND ADDRESS CODES (Note: The computer switcher would verify the heading to check for valid address codes and Call-In designated stations.)
	(H) SEND CONTROL B (STX) (SECOND STX)	(H) RECEIPT OF CONTROL B (STX) RESTARTS TAPE READER WHICH CONTINUES TO SEND UNTIL IT DETECTS CONTROL C ETX (END-OF-TEXT) AT THE END OF THE TAPE WHICH STOPS THE TRANSMISSION
3. TEST ROLL CALL OPTION (Note: This is not a mandatory feature of an 86A system.)	(A) ROLL CALL-SEND CONTROL E ENQ (ENQUIRY) FOLLOWED BY THE STATION'S CEC (CALL-ENQUIRY-CODE) (Note: Since only the station under test can respond — the CEC of the station under test must be used. Under normal conditions an ETX preceding the ENQ defines the beginning of a roll call for each selected station.)	(A) DURING NORMAL ON-LINE OPERATION WITH THE COMPUTER SWITCHER (C-S), THE C-S WILL SENSE THE ETX AT THE END OF TAPE THE C-S WILL THEN SEND ENQ, CEC FOR EACH STATION INVOLVED WITH THE PREVIOUS TRANSMISSION. EACH STATION WILL RESPOND TO THE ROLL CALL WITH IT'S SIC (STATION-IDENTITY-CODE) FOLLOWED BY CAN OR NAK AS FOLLOWS: SIC-CAN: MESSAGE PROPERLY RECEIVED SIC-NAK: MESSAGE NOT PROPERLY RECEIVED
4. CALL-IN (ACTIVATES THE STATION'S RECEIVING TELETYPEWRITER)	(A) SEND CONTROL D (EOT) (B) SEND CONTROL E (ENQ) (C) SEND STATION'S CEC (D) SEND FOX OR OTHER TEST MESSAGE (E) SEND CONTROL D (EOT)	(A) CONTROL D (EOT: END-OF-TRANSMISSION) RESTORES THE STATION TO IDLE MODE (B) CONTROL E (ENQ: ENQUIRY) CONDITIONS THE CONTROLLER FOR RECEIPT OF THE STATION'S CEC (CALL ENQUIRY CODE) (C) UPON RECEIPT OF THE CEC THE STATION CONTROLLER WILL RESPOND AS FOLLOWS: SIC-ACK: READY TO RECEIVE SIC-NAK: NOT READY TO RECEIVE (Note: In the event of no response the computer switcher will usually time-out within 600 milliseconds.) (D) THE STATION SHOULD RECEIVE TWO COMPLETE LINES — ERROR FREE (E) RECEIPT OF CONTROL D (EOT: END-OF-TRANSMISSION) RESTORES THE STATION TO IDLE MODE

22. 86B1 AND 86B2 DATA SELECTIVE CALLING SYSTEMS — COMPUTER SWITCHER AND STATION OPERATION

22.01   The 86B full duplex (FDX) station equipment is designed to allow for flexible operation and is capable of handling the required "on-line" administrative functions independently of the terminal equipment. The 86B station control logic provides a variety of features to maintain the flexibility required to adapt it to computer controlled systems that employ different operational formats. In general, the computer switcher will have the capability to perform the following functions:

(a)   When a station is selected to transmit, the computer switcher can send the date, time and message number (DTM) to the typing unit of the selected tape reader.

(b)   A selected station can receive message traffic automatically and unattended. The computer switcher will send the station's call enquiry code (CEC). The station responds with its station identity code (SIC) and with an indication as to its readiness to receive as follows:

● SIC-ACK: Ready to Receive

● SIC-NAK: Not Ready to Receive

After receipt of message traffic, a station can be queried (roll-call process) by the computer switcher to determine if a message was properly received. The Roll-Call responses of a station are:

● SIC-CAN: Message Properly Received

● SIC-NAK: Message Not Properly Received

(c)   The computer switcher can select the receiving portion of a station or stations while the send side of the FDX is busy. During the selection of the receiving teletypewriter(s), the computer switcher will interrupt (STOP) the transmitting tape reader so that the station response may be transmitted to the computer switcher. Conversely, with the send side of the FDX idle and the receiver side busy, the computer switcher can suspend transmission and send out station polling codes (SPC). The computer switcher will then resume transmission to the previously selected receiving stations.

22.02   The computer switcher polls every station on the line periodically by sending Control P (Data Link Escape-"DLE") followed by the polling code (SPC) of the station being polled. The DLE defines the start of the polling sequence and activates the appropriate logic circuits at the stations. If message traffic was in progress, transmission of the DLE causes the control logic at the selected receiving stations to blind the receiving units to signals until an unblind code is received. If the incoming line were cocked when polling was initiated the computer switcher will wait a minimum of 600 milliseconds after sending the DLE before sending the station's SPC. The pause insures that the incoming line is idle. The station controller answer-back depends upon the status of the sending and receiving terminals as follows:

STATION RESPONSE	DESCRIPTION
P-ACK	Priority Traffic Available — Ready to Receive
P-NAK	Priority Traffic Available — Not Ready to Receive
R-ACK	Regular Traffic Available — Ready to Receive
R-NAK	Regular Traffic Available — Not Ready to Receive
CAN	No Traffic to Send — Ready to Receive
NAK	No Traffic to Send — Not Ready to Receive

22.03   The 86B type stations respond to polling without becoming selected senders; a separate function is required to assign a selected-to-send status to a station. Upon receipt of a polling response from a station, the computer switcher may send the SPC (Station Polling Code) of the next station to be polled. After transmission of the initial DLE code and the first SPC it is not necessary for the computer switcher to send DLE again. However, a subsequent DLE character will not affect the station operation.

22.04 When there is message traffic to be transmitted to a station, the computer switcher initiates a station Call-In sequence by calling each intended receiver and in turn, receiving the station Call-In response (ready-to-receive status). If the transmitting circuit of the computer switcher (station receive side) has been idle, the computer switcher will send Control R, Control D (DC2, EOT). This sequence insures that all receivers are in the idle mode of operation. When the computer switcher has received an indication that a station is ready to receive during the polling sequence, it can elect to call the station as a receiver. The Call-In process is initiated by the transmission of ENQ (Control E) by the computer. This will stop the tape reader of any selected sender, inhibit the generation of a polling request by any cocked sending station, define the beginning of the Call-In procedure and blind any previously selected receiving stations. The computer switcher will follow the initial ENQ with the station's CEC (call enquiry code) and wait for the station response. The station will respond with a SIC-ACK or a SIC-NAK indicating its receiving status. If the station response is ACK the call lamp on the attendant set will flash and the REC lamp will light. This indicates that the station has been selected as a receiver. The computer will transmit the message traffic starting with STX (Start-of-Text) and close with ETX (End-of-Text). If the station replies with a SIC-NAK the call lamp on the receiving terminal attendant set will light and remain lit. The call lamp may be extinguished by restoring the station to the ready-to-receive condition.

23. TESTING THE 86B DATA SELECTIVE CALLING SYSTEMS WITH STCs FROM CUSTOMER FIELD LOCATIONS

23.01 The test procedure charts for the 86B data selective calling systems are derived directly from the test information provided to the Long Lines test deskmen at the Long Lines STCs. The first column, "Test Function," describes the objective of the test. The second column, "STC Test Procedure," is the instruction to the test deskmen. The third column, "TTY Repair Procedure at Sta. Location," reflects the anticipated reaction of the equipment as it would appear to the TTY serviceman at the customer's field location. In addition, there are diagnostic notes shown in the third column to assist the TTY serviceman with test procedures.

23.02 Detailed information concerning equipment description, operation and overall test procedures for the 86B1 and 86B2 data selective calling systems shall be found in the following Bell System Practices:

BSP REFERENCE	DESCRIPTION
581-136-102	86B1 — 100 WPM Data Station — Description and Operation
581-136-202	86B1 — 100 WPM Data Station — Installation
581-136-302	86B1 — 100 WPM Data Station — Maintenance
581-136-502	86B1 — 100 WPM Data Station — Test Procedures
581-136-103	86B2 — 150 WPM Data Station — Description and Operation
581-136-203	86B2 — 150 WPM Data Station — Installation
581-136-303	86B2 — 150 WPM Data Station — Maintenance
581-136-503	86B2 — 150 WPM Data Station — Test Procedures

24. ADNET (ADMINISTRATION DATA NETWORK) — GENERAL INFORMATION

24.01 ADNET is a basic 86-type data selective calling system using the No. 1 electronic switching system arranged with data features (No. 1 ESS ADF) to serve in the same capacity as the computer switcher does in the conventional 86A and 86B data selective calling systems. For the purpose of convenience and as a common referent, the store-and-forward data switching system of the ESS will be referred to as "ADF."

24.02 Use of ESS equipment allows the ADNET system to operate at speeds much higher than the rate at which events associated with a single message can occur. This allows the ESS control equipment to be time-shared by all of the terminal facilities associated with the system. The ADF is a store-and-forward message switcher which can handle both full duplex (FDX) and half duplex

TABLE H

86B1 & 86B2 SELECTIVE CALLING SYSTEMS		
TEST FUNCTION	**STC TEST PROCEDURE**	**TTY REPAIR PROCEDURE AT STA. LOCATION**
1. DISCONNECT CODE	(A) SEND CONTROL R (DC2) FOLLOWED BY CONTROL D (EOT)	(A) RECEIPT OF CONTROL R (DC2: DEVICE-CONTROL 2) FOLLOWED BY CONTROL D (EOT: END-OF-TRANSMISSION) ALLOWS THE STATION CONTROLLER TO CLEAR AND RETURNS THE STATION TO THE IDLE MODE
2. POLLING A STATION	(A) SEND CONTROL P (DLE) FOLLOWED BY THE STATION'S SPC (STATION POLLING CODE) (B) CHECK FOR A STATION RESPONSE (SIMILAR TO AN ANSWER-BACK)	(A) CONTROL P (DLE: DATA-LINK-ESCAPE) DEFINES THE START OF A POLLING SEQUENCE AND ACTIVATES THE STATION CONTROLLER LOGIC CIRCUITS — THE STATION POLLING CODE (SPC) FOR EACH STATION IS A SINGLE CHARACTER UNIQUE TO THE STATION BEING POLLED (B) THE STATION WILL RESPOND ON THE STATION'S SEND SIDE OF THE FULL DUPLEX (FDX) WITH ONE OF THE FOLLOWING: (1) CAN: NO TRAFFIC — READY TO REC. (2) NAK: NO TRAFFIC — NOT READY TO REC. (3) R-ACK: REGULAR TRAFFIC — READY TO REC. (4) R-NAK: REGULAR TRAFFIC — NOT READY TO REC. (5) P-ACK: PRIORITY TRAFFIC — READY TO REC. (6) P-NAK: PRIORITY TRAFFIC — NOT READY TO REC.
3. PICK UP TAPE	(A) PREPARE TO PICK UP TAPE (Note: With a tape in the station tape reader, operation of the bid key will advance the tape to SOH (Start-Of-Heading) (B) SEND CONTROL P (DLE) FOLLOWED BY STATION'S SPC (STA. POLLING CODE) (C) SEND CONTROL E (ENQ) (D) SEND STATION'S CEC (CALL-ENQUIRY-CODE)	(A) INSERT TEST TAPE INTO THE TAPE READER (TR) GATE AND OPERATE THE BAT HANDLE TO RUN. OPERATE THE BID BUTTON WHICH SHOULD LIGHT AND ADVANCE THE TAPE UNTIL SOH IS DETECTED (B) CONTROL P (DLE: DATA-LINK-ESCAPE) DEFINES THE START OF A POLLING SEQUENCE AND ACTIVATES THE STA. CONTROLLER LOGIC CIRCUITS — THE SPC FOR EACH STATION IS A SINGLE CHARACTER UNIQUE TO THE STATION BEING POLLED (C) CONTROL E (ENQ: ENQUIRY) CONDITIONS THE CONTROLLER FOR THE RECEIPT OF THE STATION'S CEC (CALL-ENQUIRY-CODE) (D) WITH A TAPE IN THE TR GATE AND THE BID KEY ACTIVATED, RECEIPT OF THE CEC WILL CAUSE THE CONTROLLER TO RESPOND WITH SOH (START-OF-HEADING). AFTER SENDING THE SOH THE STATION WILL BE IN THE SELECTED-TO-SEND MODE (Note: If the tape had been removed from the tape reader gate the controller would respond with NAK.)

TABLE H (Continued)

86B1 & 86B2 SELECTIVE CALLING SYSTEMS		
TEST FUNCTION	**STC TEST PROCEDURE**	**TTY REPAIR PROCEDURE AT STA. LOCATION**
3. PICK UP TAPE (Cont.)	(E) SEND CONTROL P (DLE) FOLLOWED BY CONTROL Q (DC1)	(E) CONTROL P (DLE: DATA-LINK-ESCAPE) DEFINES THE START OF POLLING CONTROL Q (DC1: DEVICE CONTROL 1) TRANSFERS THE TYPING UNIT OF THE (ASR) PAGE PRINTER TO THE RECEIVE SIDE OF THE CONTROLLER (Note: The computer could now send the TDM (Time-Date-And-Message Number) if the computer program requires TDM.)
	(F) SEND CONTROL R (DC2)	(F) CONTROL R (DC2: DEVICE CONTROL 2) TRANSFERS THE TYPING UNIT OF THE (ASR) PAGE PRINTER BACK TO THE SEND OF THE CONTROLLER AND STARTS THE TAPE READER. THE STATION WILL SEND THE MESSAGE HEADING, STX (CONTROL B) MESSAGE TEXT, ETX (CONTROL C) AND STOP UPON DETECTING EITHER SOH (CONTROL A) OR EOT (CONTROL D). UPON RECEIPT OF EOT (END-OF-TAPE) THE STATION BECOMES UNSELECTED AND ASSUMES THE IDLE MODE
4. STATION CALL-IN (SELECTS RECEIVING TELETYPE-WRITERS)	(A) SEND CONTROL R (DC2) FOLLOWED BY CONTROL D (EOT)	(A) RECEIPT OF CONTROL R (DC2: DEVICE-CONTROL 2) FOLLOWED BY CONTROL D (EOT: END-OF-TRANSMISSION) ALLOWS THE STATION CONTROLLER TO CLEAR AND RETURNS THE STATION TO THE IDLE MODE
	(B) SEND CONTROL E (ENQ)	(B) CONTROL E (ENQ: ENQUIRY) CONDITIONS THE CONTROLLER FOR RECEIPT OR THE STATION'S CEC (CALL-ENQUIRY-CODE)
	(C) SEND STATION'S CEC (CALL-ENQUIRY-CODE)	(C) UPON RECEIPT OF THE CEC THE STATION CONTROLLER WILL RESPOND AS FOLLOWS: SIC-ACK: READY TO RECEIVE SIC-NAK: NOT READY TO RECEIVE (Note: In the event of no response the computer switcher will usually time-out within 600 milliseconds.
	(D) UPON RECEIPT OF SIC-ACK SEND CONTROL E (ENQ)	(D) RECEIPT OF CONTROL E (ENQ) UNDER NORMAL OPERATING CONDITIONS BLINDS THE SELECTED STATIONS TO ALLOW THE COMPUTER SWITCHER TO CALL-IN ADDITIONAL STATIONS AND WILL STOP TRANSMISSION ON THE SEND SIDE OF THE CONTROLLER SO THAT STATION RESPONSES MAY BE RECEIVED AT THE COMPUTER SWITCHER
	(E) SEND CONTROL R (DC2)	(E) RECEIPT OF CONTROL R (DC2: DEVICE CONTROL 2) UNBLINDS ALL SELECTED RECEIVERS AND RESTARTS THE SELECTED TAPE READER
	(F) SEND FOX OR OTHER TEST MESSAGE	(F) THE STATION SHOULD RECEIVE TWO COMPLETE LINES — ERROR FREE
	(G) UPON COMPLETION OF TESTS — SEND CONTROL D (EOT)	(G) RECEIPT OF CONTROL D (EOT: END-OF-TRANSMISSION) RESTORES THE STATION TO IDLE MODE

TABLE H (Continued)

86B1 & 86B2 SELECTIVE CALLING SYSTEMS		
TEST FUNCTION	STC TEST PROCEDURE	TTY REPAIR PROCEDURE AT STA. LOCATION
5. TEST ROLL CALL OPTION (Note: This is <u>not</u> a mandatory feature of an 86B system)	(A) ROLL CALL-SEND CONTROL E ENQ (ENQUIRY) FOLLOWED BY THE STATION'S CEC (CALL-ENQUIRY-CODE) (Note: Since only the station under test can respond — the CEC of the station under test must be used. Under normal conditions an EXT preceding the ENQ defines the beginning of a roll call for each selected station.)	(A) DURING NORMAL ON-LINE OPERATION WITH THE COMPUTER SWITCHER (C-S), THE C-S WILL SENSE THE ETX AT THE END OF TAPE THE C-S WILL THEN SEND ENQ, CEC FOR EACH STATION INVOLVED WITH THE PREVIOUS TRANS-MISSION. EACH STATION WILL RESPOND TO THE ROLL CALL WITH ITS SIC (STATION-IDENTITY-CODE) FOLLOWED BY CAN OR NAK AS FOLLOWS: SIC-CAN: MESSAGE PROPERLY REC. SIC-NAK: MESSAGE <u>NOT</u> PROPERLY REC.
6. AUTOMATIC LOOP BACK (USING A 108A DATA SET)	(A) SEE JOB AID CARD 86B-ITEM 6	(A) THIS TEST IS MADE DIRECTLY FROM THE LONG LINES SERVING TEST CENTER (STC) AND DOES NOT REQUIRE A COMMUNICATIONS SERVICEMAN AT THE STATION LOCATION
7. EMERGENCY STOP	(A) SEE JOB AID CARD 86B-ITEM 7	(A) EMERGENCY STOP MALFUNCTIONS ARE USUALLY DETECTED AT THE COMPUTER SWITCHER LOCATION AND CAN BE VERIFIED BY THE STC WITHOUT A COMMUNICATIONS SERVICEMAN AT THE CUSTOMER'S LOCATION. IN THE EVENT THAT IT IS NECESSARY TO DIS-PATCH ON THE TROUBLE, THE TEST PROCEDURES MAY BE FOUND IN THE BSPs LISTED IN PARAGRAPH 23.02
8. INITIALIZING A LINE	(A) FOR REMOTE INITIALIZING OF THE STATION CONTROLLER FOLLOW THE INSTRUCTIONS SHOWN ON THE JOB AID CARDS FOR 86B-ITEM 8	(A) UNDER THE NORMAL OPERATING CON-DITIONS, WHEN POWER IS INITIALLY APPLIED TO THE STATION, AN INITIAL-IZER CIRCUIT IN THE STATION CON-TROLLER APPLIES A MOMENTARY POSITIVE VOLTAGE TO ALL CRITICAL STATE LOGIC MEMORY ELEMENTS. THIS ACTION PLACES THE STATION CONTROLLER IN THE IDLE MODE (Note 1: In the event of a "Lock-Up" of the controller and/or equipment where both on-line and local tests fail to clear the condition . . . ."Turn-Off" the AC power switches, then pull out the AC power plug. Slowly count to twelve and "Plug-In" to the twelve and "Plug-In" to the AC power again) (Note 2: Removing the AC power, allowing for a circuit decay interval and re-energizing will often clear "Lock-Ups" caused by circuit races which occur under test con-ditions. The "Lock-Up" condition is en-countered when unusual and often accidental combinations of characters may be introduced into the controller. <u>Under the normal sequence of operation, this should not occur</u>)

TABLE H (Continued)

86B1 & 86B2 SELECTIVE CALLING SYSTEMS		
TEST FUNCTION	**STC TEST PROCEDURE**	**TTY REPAIR PROCEDURE AT STA. LOCATION**
9. COCKING MODE	(A) FOR A REMOTE TEST OF THE COCKING MODE – SEE DESCRIPTION JOB AID CARD 86B-ITEM 9	(A) COCKING SEQUENCE – TO COCK THE SENDING STATIONS, THE COMPUTER SWITCHER SENDS THE TWO CHARACTER SEQUENCE EOT DC2. UPON DETECTION OF EOT WHILE IN THE POLLING STATE, ALL SENDING STATIONS WILL ASSUME THE COCKED STATE AND ANY SELECTED RECEIVING STATIONS WILL REMAIN SELECTED TO RECEIVE. RECEIPT OF DLE, EOT, DC2 WILL ACTIVATE THE PROPER STATION LOGIC CIRCUITRY SO THAT THE STATIONS WILL AUTOMATICALLY GENERATE THEIR STATION IDENTIFY CODE (SIC) AS A POLLING REQUEST SIGNAL WHEN THEY HAVE TRAFFIC TO SEND. THE COMPUTER SWITCHER WOULD NOW BE PREPARED TO ACCEPT A POLLING REQUEST SIGNAL WHEN IT IS GENERATED. THE DC2 WILL ALSO UNBLIND ANY SELECTED RECEIVE STATIONS BLINDED BY DLE ALLOWING ANY INTERRUPTED MESSAGE DELIVERY TO BE RESUMED

(HDX) lines at 100 WPM using #33 and #35 type teletypewriter equipment. In addition, the ADF is capable of handling 150 WPM #37 receiving only (#37 RO) teletypewriters on a half duplex (HDX) basis.

24.03 A typical outlying station consists of a (#33, #35 or #37) type teletypewriter, DAS 820B-type station controller, 108A or 109A type data set and a DAS 804-type attendant set. The station controller used in conjunction with the attendant set performs the necessary line and supervisory control functions for the station. In addition, the station controller provides for the regeneration of signals between the station equipment and the loop facilities.

24.04 As indicated in paragraph 24.01 the AD-NET is a basic 86-type data selective calling arrangement using the ESS ADF in place of the computer switcher. The system responds to polling, Call-In and other functions in the same manner as the 86A and 86B data selective calling systems. For summary information pertaining to the half duplex arrangement, see parts 17 through 19 and for full duplex, see parts 21 through 23 of this practice.

25. TESTING ADNET SELECTIVE CALLING SYSTEMS WITH STCs FROM CUSTOMER FIELD LOCATIONS

25.01 The test procedure charts for ADNET selective calling systems are derived from the test information provided to the Long Lines test deskmen at the Long Lines STC. The first column, "Test Function," describes the objective of the test. The second column, "STC Test Procedure," is the instruction to the test deskmen. The third column, "TTY Repair Procedure at Sta. Location," reflects the anticipated reaction of the equipment as it would appear to the TTY serviceman at the customer's field location. In addition, there are diagnostic notes shown in the third column to assist the TTY serviceman with test procedures.

25.02 Detailed information concerning equipment description, operation and overall test procedures for ADNET selective calling systems shall be found in the following Bell System Practices:

BSP REFERENCE	DESCRIPTION
580-301-100	No. 1 ESS ADF 100 WPM — HDX Description & Operation
580-301-101	No. 1 ESS ADF 100 WPM — FDX Description & Operation
580-301-102	No. 1 ESS ADF 150 WPM — HDX Description & Operation

TABLE I

ADNET (HDX) SELECTED CALLING SYSTEMS		
TEST FUNCTION	**STC TEST PROCEDURE**	**TTY REPAIR PROCEDURE AT STA. LOCATION**
1. POLLING A STATION	(A) SEND CONTROL D (EOT), CONTROL P (DLE) FOLLOWED BY THE STATION'S SPC (STATION POLLING CODE)	(A) CONTROL D (EOT: END-OF-TRANSMISSION) RESTORES THE STATION TO IDLE MODE. CONTROL P (DLE: DATA-LINK-ESCAPE) THE DLE DEFINES THE START OF A POLLING SEQUENCE AND ACTIVATES THE CONTROLLER LOGIC CIRCUITS. THE STATION POLLING CODE (SPC) FOR EACH STATION IS A SINGLE CHARACTER UNIQUE TO THE STATION BEING POLLED
	(B) CHECK FOR STATION RESPONSE (SIMILAR TO AN ANSWERBACK)	(B) THE STATION WILL RESPOND WITH ONE OF THE FOLLOWING: (1) CAN: NO TRAFFIC — READY TO REC. (2) NAK: NO TRAFFIC — NOT READY TO REC. (3) R-ACK: REGULAR TRAFFIC — READY TO REC. (4) R-NAK: REGULAR TRAFFIC — NOT READY TO REC. (Note: ADNET station attendants are instructed not to use the priority button on the station attendant set. However, if the priority feature were used the response would be: P-ACK: PRIORITY TRAFFIC — READY TO REC. P-NAK: PRIORITY TRAFFIC — NOT READY TO REC.
2. PICK UP TAPE	(A) PREPARE TO PICK UP TAPE	(A) WITH THE STATION OFF THE NETWORK AND THE STATION LOOP TERMINATED AT THE STC, INSERT A TEST TAPE INTO THE TAPE READER GATE. PLACE THE TR BAT HANDLE ON "RUN" — OPERATE THE BID KEY (Note: At this time, the tape will advance to SOH (Control A) and stop. The station is now in the Traffic Available state.)
	(B) SEND CONTROL D (EOT)	(B) CONTROL D IS EOT — RESTORES STA. TO IDLE MODE
	(C) SEND CONTROL P (DLE)	(C) CONTROL P IS DLE (DATA LINK ESCAPE) INDICATES START OF POLLING SEQUENCE
	(D) SEND CONTROL E (ENQ)	(D) CONTROL E IS ENQ (ENQUIRY) CONDITIONS CONTROLLER FOR RECEIPT OF STATION'S CEC (CALL-ENQUIRY-CODE)
	(E) SEND STATION'S CEC	(E) DETECTION OF ENQ, CEC, SEQUENCE WILL PUT THE STATION INTO A SELECTED-TO-SEND CONDITION WITH THE TRANS-REC LAMP LIGHTED. THE STATION CONTROLLER WILL RESPOND BY SENDING SOH. THE STATION NOW AWAITS A "GO-AHEAD" SIGNAL FROM THE ADF

TABLE I (Continued)

ADNET (HDX) SELECTED CALLING SYSTEMS		
TEST FUNCTION	STC TEST PROCEDURE	TTY REPAIR PROCEDURE AT STA. LOCATION
2. PICK UP TAPE (Cont.)	(F) READ – SOH (CONTROL A FROM THE STATION'S CONTROLLER) AND SEND CONTROL Q DC1 (DEVICE CONTROL 1)	(F) RECEIPT OF CONTROL Q (DC1 TERMINATES POLLING SEQUENCE: BLINDS ALL OTHER STATIONS AND UNBLINDS THE TYPING UNIT ASSOCIATED WITH THE TAPE READER UNDER TEST. THE ADF WOULD NOW SEND TIME, DATE AND MESSAGE NUMBER
	(G) SEND CONTROL B (STX)	(G) RECEIPT OF CONTROL B (STX: START-OF-TEXT) RESTARTS THE TAPE READER SENDING OUT THE HEADING AND ADDRESS CODES OF INTENDED RECEIVERS. THE TAPE READER WILL STOP AGAIN UPON THE TRANSMISSION OF STX THAT IS PUNCHED INTO THE TAPE AT THE END OF THE HEADING AND ADDRESS CODES (Note: The ADF will verify the heading, check for valid address codes and Call-In designated stations.)
	(H) SEND CONTROL B (STX)	(H) RECEIPT OF CONTROL B (STX) RESTARTS THE TAPE READER WHICH CONTINUES TO SEND UNTIL IT DETECTS CONTROL C (ETX: END-OF-TEXT) AT THE END OF THE TAPE, WHICH STOPS TRANSMISSION (Note: In the event that a Control D (EOT: End-Of-Transmission) is punched into the tape the station would restore to the idle mode.)
3. CALL-IN (ACTIVATES THE STATION'S REC. TELETYPEWRITER)	(A) SEND CONTROL D (EOT)	(A) CONTROL D (EOT: END-OF-TRANSMISSION) RESTORES THE STATION TO IDLE MODE
	(B) SEND CONTROL E (ENQ)	(B) CONTROL E (ENQ: ENQUIRY) CONDITIONS CONTROLLER FOR RECEIPT OF STATION'S CEC (CALL-ENQUIRY-CODE)
	(C) SEND STATION'S CEC	(C) UPON RECEIPT OF THE CEC THE STATION CONTROLLER WILL RESPOND WITH THE (SIC: STATION-IDENTITY-CODE) FOLLOWED BY AN ACK OR A NAK AS FOLLOWS: SIC-ACK: READY TO REC. SIC-NAK: NOT READY TO REC.
	(D) READ STATION RESPONSE IF THE RESPONSE IS A STC-ACK SEND CONTROL A (SOH), CONTROL E (ENQ), CONTROL R (DC2) AND CONTROL B (STX) FOLLOWED BY FOX OR OTHER TEST MESSAGE	(D) WHEN THE STATION RESPONDS WITH A SIC-ACK THE TRANS/REC. LAMP IS LIGHTED AND THE TYPING UNIT UNBLINDED. THE ADF WOULD SEND THE STATION'S ADDRESS AND MESSAGE DELIVERY NUMBER. ADDITIONAL STATIONS ARE CALLED IN THE SAME MANNER. THE ADF SENDS ENQ (CONTROL E), DC2 (CONTROL R) RECEIPT OF ENQ BLINDS THE SELECTED STATIONS AND THE SUBSEQUENT DC2 UNBLINDS THE PAGE PRINTERS FOR RECEIPT OF DELIVERY TIME, DATE, ORIGINATING AND MESSAGE HEADING, FOLLOWED BY STX (START-OF-TEXT). THE STATION IS NOW "LOCKED-IN" TO RECEIVE TEXT OR A TEST MESSAGE – THE STATION SHOULD RECEIVE TWO COMPLETE LINES OF FOX, ERROR FREE

TABLE I (Continued)

ADNET (HDX) SELECTIVE CALLING SYSTEMS		
TEST FUNCTION	**STC TEST PROCEDURE**	**TTY REPAIR PROCEDURE AT STA. LOCATION**
3. CALL-IN (ACTIVITIES THE STATION'S REC. TELETYPE- WRITER (Cont'd.)	(E) ROLL CALL — AT THE END OF THE TEST MESSAGE SEND CONTROL C (ETX), CONTROL E (ENQ) FOLLOWED BY STATION'S CEC (CALL-ENQUIRY-CODE) (Note: Since only the station under test can respond — the CEC for that station must be used. Under the normal control of the ADF the ETX preceding the ENQ defines the roll call for each selected station.)	(E) UNDER NORMAL ON-LINE CONDITIONS THE ADF SENSES THE ETX AT THE END-OF-TEXT AND SENDS ENQ, CEC FOR EACH PREVIOUSLY SELECTED STATION. EACH STATION RESPONDS WITH ITS SIC (STATION-IDENTITY-CODE) FOLLOWED BY A CAN OR A NAK AS FOLLOWS: SIC-CAN: MESSAGE PROPERLY REC. SIC-NAK: MESSAGE NOT PROPERLY REC.
4. DISCONNECT	(A) SEND CONTROL D (EOT)	(A) RECEIPT OF CONTROL D (EOT: END-OF-TRANSMISSION) RESTORES THE STATION TO THE IDLE MODE
5. AUTOMATIC LOOP-BACK TEST	(A) THE STATION MUST BE EQUIPPED WITH A DATA SET 108A (SEE JOB AID CARD #41)	(A) THE AUTOMATIC LOOP-BACK TEST DOES NOT REQUIRE A COMMUNICATIONS SERVICEMAN IN ATTENDANCE AT THE STATION LOCATION

TABLE J

ADNET (FDX) SELECTIVE CALLING SYSTEMS		
TEST FUNCTION	**STC TEST PROCEDURE**	**TTY REPAIR PROCEDURE AT STA. LOCATION**
1. WIPEOUT OF AN ADNET FDX STATION (INITIALIZING A LINE)	(A) SEE ITEM 1 OF JOB AID CARD #43	(A) UNDER NORMAL OPERATION CONDITIONS, WHEN THE POWER IS INITIALLY APPLIED TO THE STATION, THE INITIALIZER CIRCUIT IN THE STATION CONTROLLER APPLIES A MOMENTARY POSITIVE VOLTAGE TO ALL CRITICAL STATE LOGIC MEMORY ELEMENTS. THIS ACTION PLACES THE STATION CONTROLLER IN THE IDLE MODE (IF ADDITIONAL INFORMATION IS REQUIRED SEE THE TEST PROCEDURE CHART FOR 86B1 AND 86B2 DATA SELECTIVE CALLING SYSTEMS ITEM 8A, NOTES 1 & 2).
2. PICK UP STA. TAPE (FDX)	(A) UNDER NORMAL CONDITIONS, PRIOR TO PICKING UP A STATION'S TAPE THE ADF WILL SEND A POLLING SEQUENCE AS FOLLOWS: SEND CONTROL D (EOT), CONTROL P (DLE) FOLLOWED BY SPC (STATION'S-POLLING-CODE) (B) CHECK FOR STATION RESPONSE (SIMILAR TO AN ANSWER-BACK) (C) PREPARE TO PICK UP TAPE (Note: With a tape in the Tape Reader's Gate, Operation of the bid button should advance (hobble) the tape to SOH (Start-Of-Heading) the tape reader will stop. The station is now in a ready-to-send state.) (Note: If the reader does not hobble to SOH, send Control D (EOT), Control R (DC2) the station controller is now cocked and the reader should hobble the tape to SOH.)	(A) RECEIPT OF CONTROL D (EOT: END-OF-TRANSMISSION) ALLOWS THE STATION CONTROLLER TO CLEAR AND PLACES THE STATION IN THE IDLE MODE. CONTROL P (DLE: DATA-LINK-ESCAPE) DEFINES THE START OF A POLLING SEQUENCE AND ACTIVATES THE STATION CONTROLLER LOGIC CIRCUITS – THE STATION POLLING CODE (SPC) FOR EACH STATION IS A SINGLE CHARACTER UNIQUE TO THE STATION BEING POLLED (B) THE STATION WILL RESPOND ON THE STATION'S SEND SIDE OF THE FDX WITH ONE OF THE FOLLOWING: (1) CAN: NO TRAFFIC – READY TO REC. (2) NAK: NO TRAFFIC – NOT READY TO REC. (3) R-ACK: REGULAR TRAFFIC – READY TO REC. (4) R-NAK: REGULAR TRAFFIC – NOT READY TO REC. (Note: ADNET station attendants are instructed not to use the priority button on the station attendant set. However, if the priority feature were used the response would be: P-ACK: PRIORITY TRAFFIC – READY TO REC. P-NAK: PRIORITY TRAFFIC – NOT READY TO REC. (C) INSERT THE TEST TAPE INTO THE TAPE READER'S GATE, OPERATE THE BAT HANDLE TO "RUN". OPERATE THE BID BUTTON WHICH SHOULD LIGHT AND ADVANCE THE TAPE UNTIL THE READER SENSES CONTROL A (SOH: START-OF-HEADING). THE TAPE READER SHOULD STOP

TABLE J (Continued)

ADNET (FDX) SELECTIVE CALLING SYSTEMS		
TEST FUNCTION	**STC TEST PROCEDURE**	**TTY REPAIR PROCEDURE AT STA. LOCATION**
2. PICK UP STA. TAPE (FDX) (Cont.)	(D) SEND CONTROL P (DLE), CONTROL E & STATION'S CEC	(D) RECEIPT OF CONTROL P (DLE: DATA-LINK-ESCAPE) DEFINES THE START-OF-POLLING SEQUENCE. CONTROL E (ENQ: ENQUIRY) CONDITIONS THE CONTROLLER FOR THE RECEIPT OF THE STATION'S CEC (CALL-ENQUIRY-CODE)
	(E) ON THE STC MONITOR — READ CONTROL A (SOH: START-OF-HEADING) ON THE STATION'S SEND SIDE OF THE FDX	(E) UPON RECEIPT OF THE STATION'S CEC, THE STATION CONTROLLER RESPONDS WITH CONTROL A (SOH: START-OF-HEADING) WITH A TAPE IN THE TAPE READERS GATE AND THE BID KEY OPERATED. AFTER RESPONDING WITH SOH THE STATION WILL BE IN THE SELECTED-TO-SEND MODE WITH THE "TRANSMIT" LAMP ON THE ATTENDANT SET LIGHTED (Note: If the tape had been removed from the tape reader gate, the controller would have responded with a NAK (No Traffic).
	(F) SEND CONTROL P (DLE) FOLLOWED BY CONTROL Q (DC1) (TDM) TIME-DATE-MESSAGE NO. SEQUENCE	(F) IN AN "ON-LINE" CONDITION, THE ADF WOULD SEND A TDM (TIME-DATE-MESSAGE NUMBER) SEQUENCE BY TRANSMITTING CONTROL P (DLE: DATA-LINK-ESCAPE), CONTROL Q (DC1: DEVICE CONTROL 1) TRANSFER THE TYPING UNIT OF THE (ASR) PAGE PRINTER TO THE RECEIVE SIDE OF THE CONTROLLER — THE ADF WOULD NOW SEND THE TDM
	(G) SEND CONTROL R (DC2)	(G) RECEIPT OF CONTROL R (DC2: DEVICE-CONTROL 2) TRANSFERS THE TYPING UNIT OF THE (ASR) PAGE PRINTER BACK TO THE SEND SIDE OF THE CONTROLLER AND STARTS THE TAPE READER. AFTER THE HEADING AND TEXT ARE TRANSMITTED THE END OF TEXT (ETX-CONTROL C) APPEARS ON THE TAPE. IF THE HOLD BUTTON IS OPERATED THE TAPE WILL STOP — IF NOT, THE TAPE WILL CONTINUE UNTIL SOH (START-OF-HEADING) OR EOT (END-OF-TRANSMISSION) IS DETECTED AND STOP. UPON SENDING EOT, THE STATION BECOMES UNSELECTED AND THE CONTROLLER ASSUMES THE IDLE MODE
3. STATION CALL-IN (SELECTS RECEIVING TELETYPE-WRITERS)	(A) SEND CONTROL R (DC2), CONTROL D (EOT), CONTROL E (ENQ) FOLLOWED BY THE STATION'S CEC (CALL-ENQUIRY-CODE)	(A) RECEIPT OF CONTROL R (DX2: DEVICE-CONTROL 2) FOLLOWED BY CONTROL D (EOT: END-OF-TRANSMISSION) ALLOWS THE STATION CONTROLLER TO CLEAR AND RETURNS THE STATION TO THE IDLE MODE. CONTROL E (ENQ: ENQUIRY) CONDITIONS THE CONTROLLER FOR RECEIPT OF THE STATION'S CEC (CALL-ENQUIRY-CODE)
	(B) READ STATION RESPONSE ON THE STATION'S SEND SIDE OF THE FDX	(B) UPON RECEIPT OF THE CEC, THE STATION CONTROLLER WILL RESPOND WITH ONE OF THE FOLLOWING: SIC-ACK: READY TO REC. SIC-NAK: NOT READY TO REC.

TABLE J (Continued)

ADNET (FDX) SELECTIVE CALLING SYSTEMS		
TEST FUNCTION	**STC TEST PROCEDURE**	**TTY REPAIR PROCEDURE AT STA. LOCATION**
3. STATION CALL-IN (SELECTS RECEIVING TELETYPE-WRITERS) (Cont.)	(C) UPON RECEIPT OF SIC-ACK FROM THE STATION SEND CONTROL A (SOH), CONTROL E (ENQ), CONTROL R (DC2), CONTROL B (STX, FOLLOWED BY FOX OR OTHER TEST MESSAGE UPON COMPLETION OF THE TEST MESSAGE SEND CONTROL D (EOT) TO RESTORE STATION TO THE IDLE MODE (D) RECEIPT OF A SIC-NAK AS A STATION CALL-IN RESPONSE: THE STC SHOULD ADVISE THE COMMUNICATIONS SERVICE-MAN TO CHECK THE STATION EQUIPMENT	(C) THE STATION SHOULD RECEIVE TWO COMPLETE LINES OF FOX ERROR FREE (D) TRANSMISSION OF A SIC-NAK RESPONSE FROM THE STATION CONTROLLER MAY BE THE RESULT OF THE FOLLOWING COMMON CONDITIONS: — OUT-OF-SERVICE KEY OPERATED ON THE ATTENDANT SET — OUT OF FORMS OR LOW ON PAPER — FORM FEEDOUT IN OPERATION — STATION CONTROLLER IN THE PROCESS OF INITIALIZING THE CIRCUIT OR THE DATA SET IS IN THE MANUAL TEST MODE — LOW TAPE INDICATION IF THE STATION IS USING RO AND ROTR AS A MASTER RECEIVING UNIT
4. AUTOMATIC LOOP-BACK (USING 108A DATA SET)		(A) THIS TEST IS MADE DIRECTLY FROM THE SERVING TEST CENTER (STC) AND DOES NOT REQUIRE A COMMUNICATIONS SERVICEMAN AT THE STATION LOCATION
5. TURN-ON OF THE SENDING MACHINE'S TYPING UNIT (FDX)	(A) ON A FDX ARRANGEMENT WHEN A STATION HAS A TAPE TO TRANSMIT, THE ADF IS PROGRAMMED TO SEND THE TIME, DATE AND MESSAGE NUMBER (TDM). TO SEND THE TDM THE ADF MUST TRANSFER THE RECEIVE LOOP OVER TO THE SENDING MACHINE'S TYPING UNIT IN THE FOLLOWING MANNER: MONITOR THE STATION'S SEND SIDE OF THE FDX — READ SOH (START-OF-HEADING) FROM THE STATION'S TAPE SEND CONTROL D (EOT) CONTROL P (DLE), CONTROL E (ENQ) FOLLOWED BY THE STATIONS CEC (CALL-ENQUIRY-CODE) (B) ON THE STC MONITOR, READ THE STATION'S RESPONSE TO THE CEC	(A) PREPARE TO TEST THE TYPING UNIT ASSOCIATED WITH THE STATION'S TAPE READER AS FOLLOWS: INSERT TEST TAPE INTO THE TAPE READER'S GATE AND OPERATE THE BAT HANDLE TO RUN. OPERATION OF THE BID BUTTON LIGHTS THE LAMP WITHIN THE BUTTON AND ADVANCES (HOBBLES) THE TAPE UNTIL CONTROL A (SOH: START-OF-HEADING) IS TRANSMITTED BY THE TAPE READER WHICH WILL <u>STOP</u> THE TAPE READER RECEIPT OF CONTROL D, CONTROL P DEFINES THE START OF A POLLING SEQUENCE. CONTROL E CONDITIONS THE CONTROLLER FOR THE RECEIPT OF THE STATION'S CEC (B) THE STATION WILL RESPOND TO THE CEC WITH ONE OF THE FOLLOWING: SIC-ACK: READY TO REC. SIC-NAK: <u>NOT</u> READY TO REC.

TABLE J (Continued)

	ADNET (FDX) SELECTIVE CALLING SYSTEMS	
TEST FUNCTION	STC TEST PROCEDURE	TTY REPAIR PROCEDURE AT STA. LOCATION
5. TURN-ON OF THE SENDING MACHINE'S TYPING UNIT (FDX) (Cont.)	(C) UPON RECEIPT OF AN ACK SEND CONTROL P (DLE) FOLLOWED BY CONTROL Q (DC1) — SEND FOX OR OTHER TEST MESSAGE — AFTER THE TESTS HAVE BEEN COMPLETED, SEND CONTROL R (DC2) FOLLOWED BY CONTROL D (EOT)	(C) IN AN "ON-LINE" CONDITION, THE ADF WOULD SEND THE TDM SEQUENCE BY TRANSMITTING CONTROL P (DLE: DATA-LINK-ESCAPE), CONTROL Q (DC1: DEVICE-CONTROL 1). THIS SEQUENCE TRANSFERS THE TYPING UNIT OF THE (ASR) PAGE PRINTER TO THE RECEIVE SIDE OF THE CONTROLLER — THE ADF WOULD NOW SEND THE TDM THE STATION SHOULD RECEIVE TWO COMPLETE LINES OF FOX — ERROR FREE RECEIPT OF CONTROL R (DC2: DEVICE-CONTROL 2) CONTROL D (EOT: END-OF-TRANSMISSION) TRANSFERS THE TYPING UNIT OF THE ASR PAGE PRINTER BACK TO THE SEND SIDE OF THE CONTROLLER AND EOT RETURNS THE STATION TO THE IDLE MODE
6. COCKING MODE	(A) COCKING MODE — BY THIS METHOD, ALL STATIONS WITH MESSAGE TRAFFIC TO SEND CAN REQUEST A START OF POLLING FROM THE ADF. WITH THIS SYSTEM, WHEN THE SEND SIDE OF THE FDX IS IDLE, THE ADF WILL NOT POLL CONTINUOUSLY.	(A) COCKING SEQUENCE — TO COCK THE SENDING STATIONS, THE COMPUTER SWITCHER SENDS THE TWO CHARACTER SEQUENCE EOT DC2. UPON DETECTION OF EOT WHILE IN THE POLLING STATE, ALL SENDING STATIONS WILL ASSUME THE COCKED STATE AND ANY SELECTED RECEIVING STATIONS WILL REMAIN SELECTED TO RECEIVE. RECEIPT OF DLE, EOT, DC2 WILL ACTIVATE THE PROPER STATION LOGIC CIRCUITRY SO THAT THE STATIONS WILL AUTOMATICALLY GENERATE THEIR STATION IDENTITY CODE (SIC) AS A POLLING REQUEST SIGNAL WHEN THEY HAVE TRAFFIC TO SEND. THE COMPUTER SWITCHER WOULD NOW BE PREPARED TO ACCEPT A POLLING REQUEST SIGNAL WHEN IT IS GENERATED

APPENDIX

ABBREVIATIONS AND REFERENT TERMS

ABBREVIATION	DESCRIPTION
AB	ANSWER-BACK
ACK	ACKNOWLEDGE (AFFIRMATIVE)
ADF	#1 ESS ARRANGED WITH DATA FEATURES
ASCII	AMERICAN STANDARD CODE FOR INFORMATION INTER-CHANGE
ASR	AUTOMATIC SEND AND REC.
BEL	BELL OR OTHER SIGNAL
BLANK	ALL 5 LEVELS SPACING (5 LEVEL CODE)
CAN*	NO TRAFFIC -- READY TO RECEIVE *See Par. 15.01 Item C (2)
CDC	CALL DIRECTING CODE
CEC	CALL ENQUIRY CODE
CR	CARRIAGE RETURN
CS	COMPUTER SWITCHER
DAS	DATA AUXILIARY SET
DC1, DC2	DEVICE CONTROL 1, 2 ETC.
DCP	DATA COMMUNICATIONS PROCESSOR
DEL	DELETE -- 8 LEVELS MARKING (ASCII)
DLE	DATA LINK ESCAPE
DS	DATA SET
ENQ	ENQUIRY
EOA	END OF ADDRESS
EOM	END OF MESSAGE
EOT	END OF TRANSMISSION
ETX	END OF TEXT

ABBREVIATION	DESCRIPTION
FDX	FULL DUPLEX
FIGS "H"	END OF MESSAGE (5 LEVEL)
FOX	TEST MESSAGE (THE QUICK BROWN FOX ETC.)
HDX	HALF DUPLEX
KSR	KEYBOARD SENDING AND RECEIVING
LF	LINE FEED
LINCO	LINE CONTROLLER UNIT
LTRS	ALL 5 LEVELS MARKING (5 LEVEL CODE)
NAK	NEGATIVE ACKNOWLEDGMENT
NULL	NULL -- 8 LEVELS SPACING (ASCII)
RO	RECEIVING ONLY
ROTR	RECEIVING ONLY TYPING REPERFORATOR
SIC	STATION IDENTITY CODE
SOH	START OF HEADING
SOM	START OF MESSAGE
SP	SPACE OR SPACING
SPC	STATION POLLING CODE
STX	START OF TEXT
TD	TRANSMITTER DISTRIBUTOR
TR	TAPE READER
TSC	TRANSMITTER START CODE
WPM	WORDS PER MINUTE
X-OFF	STOP TRANSMISSION
X-ON	START TRANSMISSION