SWITCHING SYSTEMS MANAGEMENT

NO. 2 ELECTRONIC SWITCHING SYSTEM

SERVICE RESULTS

SERVICE OBSERVING

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Figures

1. GENERAL

1.01 This section describes service observing in the No. 2 Electronic Switching System (ESS) using either the 7B service observing set or the SD-96553 service observing circuit working to a remote No. 12 service observing desk. The network administrator is responsible for appraising the quality of dial service and ensuring that service is maintained at a satisfactory level. To ensure a satisfactory level of performance, traffic observations are measured to obtain data which may be used as a guide for the fullest utilization of equipment in satisfying service demands.

1.02 When this section is reissued, this paragraph will contain the reason for reissue.

1.03 The title of each figure includes a number(s) in parentheses which identifies the paragraph(s) in which the figure is referenced.

1.04 For procedures to be followed when service problems in No. 2 ESS offices require analysis and corrective action, refer to Dial Facilities Management Practices, Division H, Section 10m, Problem Analysis and Corrective Action. For a general discussion on service observing refer to Dial Facilities Management Practices, Division A, Section 4c, Dial Line Index.

2. SERVICE OBSERVING EQUIPMENT DESCRIPTION

2.01 Service observing may be accomplished in No. 2 ESS by using either the 7B service observing set at the No. 2 ESS office or by using the SD-96553 service observing circuit working to a remote No. 12 service observing desk. The 7B set is portable and may be provided specifically to serve a single No. 2 ESS or it may be transported to and used at several switching locations. Modifications to this set permit service observing on either regular or range extension lines which use unigauge plant facilities. However, since operation with regular or range extension lines requires the proper setting of a manual key on the 7B service observing set, a mixture of regular and range extension lines may not be observed simultaneously.

2.02 When the SD-96553 service observing circuit is to be used, a loop connector circuit must be provided per line to be observed. Each loop connector circuit may be strapped to enable observing on either a regular or range extension line.

7B SERVICE OBSERVING SET

2.03 The 7B service observing set consists of two portable units, a console, and a signal converter. In addition to the control keys and indicating lamps, the console unit contains a jack field for connecting the set to the wall-mounted patch field. The signal converter unit contains the operational equipment. The console unit and the signal converter unit are interconnected by a connectorized cord.

2.04 ***ED-1A237-30 Jack Panel:*** The ED-1A237-30 jack panel is a common panel used in both No. 1 ESS and No. 2 ESS. It serves as an access point on the modular combined distributing frame (CDF) where line cable facilities are connected to service observing facilities. This panel contains 30 jacks; the tip and ring of each jack correspond to jacks on the ED-3B029-10 patch field. One of these jack panels should be provided on the modular CDF for each CDF module installed. The corresponding jacks on all panels are individually multipled. These jack panels are not required if a common systems main distributing frame (MDF) is to be used instead of a CDF. In this type of application, the tip and ring cables from the ED-3B029-10 patch field are terminated on a distributing frame block. Connection to customer line facilities is made via a frame cross-connection.

2.05 ***ED-3B029-10 Patch Field:*** As mentioned in 2.04, the tip and ring leads of this patch field are cabled directly to the ED-1A237-30 jack panel. The sleeve lead associated with each jack on this panel is cabled to a peripheral decoder applique circuit which in turn is cabled to a peripheral decoder point. If a common systems MDF is provided, the ED-3B029-10 patch field is terminated directly on MDF horizontal blocks and the lines to be observed are cross-connected to the patch panel distributing frame terminations.

2.06 ***SD-2H117 Trunk Peripheral Decoder Applique Circuit:*** These circuits provide the sleeve lead required by the No. 7B service observing set for selecting lines to be observed. One circuit is required for each of the service observing loops equipped. Each circuit is assigned to a service observing loop and wired to the corresponding circuit on the patch field.

2.07 ***Peripheral Decoder Points:*** Each peripheral decoder pack contains 12 peripheral decoder points. Ordinarly, a peripheral decoder buffer consisting of three peripheral decoder points is used to operate relays in one trunk or service circuit. However, when used to control the relay in a trunk peripheral decoder applique circuit, each peripheral decoder point is assigned to a separate circuit.

2.08 ***W2FL Cords:*** A maximum of 30 of these cords is required to connect the distributing frame jack panel jacks to the customer line cable pair terminations (not required if a common systems MDF is provided).

2.09 ***3P3A Cords:*** A maximum of 30 of these cords is required to connect the jacks in the wall-mounted patch field to jacks in the 7B service observing set console unit.

REMOTE NO. 12 SERVICE OBSERVING DESK

2.10 Remote or centralized service observing using the No. 12 service observing desk may be provided by using the SD-996553-01 service observing circuit in the No. 2 ESS local office. Regular and range extension lines may be observed by providing an optional per-line wiring strap for each range extension line.

2.11 ***Service Observing Circuit (SD-9655-01):*** The No. 12 service observing desk is usually remotely located and is used where centralization of service observing is desirable. Equipment locally provided at the central office consists of the J93815 HL control and loop identification unit and one J93815 GB loop connector unit for every five loops. These two units in combination provide for the selection and identification of the line to be observed. The identification of the selected line is transmitted to the No. 12 service observing desk over a pair of wires which is then used to provide the transmission path if the line is to be observed. One control and loop identification unit provides control and identification capabilities for a maximum of 100 loops. One loop connector unit containing five connector circuits is required for every five loops to be observed. A wiring option on the connector unit is provided for each of the connector circuits. This wiring option must be made in order to observe either a range extension or nonrange extension line associated with the connector circuit. Each loop connector circuit is wired to the ED-1A237-30 jack panel for the tip and ring and to the SD-2H117 peripheral decoder applique circuit for the sleeve lead. If a common systems MDF is provided, the loop connector circuit tip and ring wires are cabled directly to MDF horizontal blocks.

2.12 ***ED-1A237-30 Jack Panel:*** The ED-1A237-30 jack panel is the same one described in 2.04 for use with a 7B service observing set; however, a maximum of 50 jacks may be used. If more than 50 jacks are required, the jack panel may be multipled in such a manner that all even frames are multipled together and all odd frames are multipled. A maximum of 100 loops may be provided in this manner.

2.13 ***SD-2H117 Trunk Peripheral Decoder Applique Circuit:*** One SD-2H117 trunk peripheral decoder applique circuit is required for each loop to be equipped for the service observing circuit. Each applique circuit is associated with a peripheral decoder point and is permanently wired to the peripheral decoder point. When lines are assigned to the service observing circuit, a loop must be selected and the associated peripheral decoder point must be assigned to the line by a recent change order. The trunk peripheral decoder applique circuit provides the sleeve lead for the loop connector unit and is used to identify originating calls.

2.14 ***Peripheral Decoder Point:*** Each trunk peripheral decoder applique circuit must be assigned a peripheral decoder point.

2.15 ***W2FL Cords:*** A maximum of 100 W2FL cords is required to connect the jack panel to the customer line cable pair termination on the CDF. These cords are not required if a common systems MDF is provided.

3. OPERATION AND USE

SERVICE OBSERVING USING THE 7B SERVICE OBSERVING SET

3.01 When service observing is to take place in an office, the portable 7B service observing set must be available and the preselected lines must be identified. The design of the 7B service observing set does not permit both regular and range extension lines to be simultaneously observed. A modification to the 7B set permits service observing to be accomplished on either regular or range extension lines by key selection. When designating the lines to be observed, either all regular or all range extension lines must be identified. It is important that the network design engineer carefully coordinate this limitation with the traffic service observing organization to ensure a thorough understanding of this restriction. Also, the network administration records must be accurately maintained to indicate range extension versus nonrange extension lines. This will be very important in the selection of lines to be observed by the service observing organization. When the lines to be service-observed (either all range extension or all nonrange extension) have been identified, the associated cable pair for each line is identified. A W2FL cord is used to connect the customer cable pair to a selected jack in the ED-1A237 jack panel when a CDF is used or a cross-connection is wired in if a common systems frame is provided. The jacks in the ED-1A237 jack panel and the ED-2B029 patch field have a direct 1:1 relationship. A 3P3A cord is used to connect the ED-3B029 patch field to the 7B service observing set console.

3.02 Each line to be observed must have an associated peripheral decoder point equipped with a trunk peripheral decoder applique circuit. The trunk peripheral decoder applique circuits will be cabled directly to the sleeve lead of the jacks on the ED-3B029 patch field. Therefore, once a line to be observed has been associated with a

particular jack (as discussed previously), a specific peripheral decoder point will also be associated with a line. This information on a per-line basis must be entered into translations via a service order message which can be accomplished via the service order or maintenance teletypewriter.

SERVICE OBSERVING USING THE REMOTE NO. 12 SERVICE OBSERVING DESK

3.03 If service observing is to be done on a remote basis using the No. 12 service observing desk, an SD-96553-01 service observing circuit is required in the local office to interface with the No. 2 ESS. Each line to be observed must be preselected and connected to a frame-mounted ED-1A237-30 jack panel by means of the W2FL cords in an office with a CDF. The jack panels are wired to the connector units of the SD-96553-01 with office wiring which is completed during the installation of the No. 2 ESS. Therefore, each connector is associated with a particular jack or jacks from the jack panels. If a common systems MDF is provided, any one of the 100 connector circuits may be cross-connected to any customer line and the jack panel. Cords are not provided. Each connector has a cross-connect option that must be wired properly when used with a range extension or nonrange extension line. A percentage of the connectors should be preassigned for range extension equivalent to the percentage of range extension lines in the office. In order to minimize the effect of having two service observing groups, additional connectors should be equipped to a maximum of 100 over and above the number required for observation; connectors and jacks should be preassigned for range extension and nonrange extension use. Assignments of lines to connectors must then be made on the basis of whether the line is range extended or not. (If an error is made, the service observing function will not operate properly; however, the customer's line will not be affected.) The network design engineer should carefully coordinate these restrictions and engineered preassignments with the service observing organization and maintenance forces to ensure that the arrangement provided is thoroughly understood by all concerned.

3.04 After the lines to be service-observed have been selected and connected to the loop connector units, service order messages are used to associate each line with the appropriate peripheral decoder point assigned to control the sleeve lead of the selected connector. This is done using the service order or maintenance teletypewriter. The network administrator should exercise caution in assigning service-observed lines to ensure that recent change capacity is not reduced.

3.05 The service observing circuit is put into operation through the use of the out-of-service key at the No. 12 service observing desk. Calls on this service observing circuit must then compete with other calls coming into the same desk position. Before a call is connected to the desk, a test is made to ensure that only calls originated after the circuit is released are connected. Only originating traffic is observed. If a call is not connected to an observed position within a definite time interval, the observing line circuit is released and the service observing circuit is enabled to seize a new call.

3.06 The service observing line circuit, which is connected to the service observing circuit, is identified by means of panel call indicator pulses. Loop identification is delayed by 0.5 second to ensure that the call is associated with an observing position. The observer may then identify the customer line being observed by consulting the record of patching assignments.

4. ASSIGNMENT OF SERVICE OBSERVING LOOPS

4.01 The intent of dial line observing is to measure a representative sample of the service provided on calls originating from lines within a particular dial entity. All lines which originate calls will be observed, with the exception of telephone company test lines. The following categories of lines will not be assigned for observing:

(a) Inward wide area telephone service (INWATS)

(b) Lines which are vacant and lines which are nonworking lines due to temporary suspension or disconnect

(c) Centrex lines restricted to 4-digit dialing

(d) PBX lines arranged for incoming service only, including such lines as airline reservations lines and PBX lines used for single message unit (SMU) calls only

(e) Dial teletypewriter exchange (DTWX) lines

(f) Lines used for common control switching arrangement (CCSA) calling

(g) No. 2 ESS trunks or service circuits

(h) Special lines exempt as a result of regulatory requirement or administrative agreement.

Note: PBX lines equipped to transmit DATA-PHONE® messages over circuits used for voice communications shall be assigned.

4.02 Subscribers' lines will be assigned to the multiline service observing circuit on a random basis. It will not be necessary to distribute assignments by class of service. Line assignments will be made weekly from the predetermined random number assignment table.

4.03 The primary unit for distribution of service observing loops in a No. 2 ESS office is the concentrator group in the line trunk switching frames. Each line trunk switching frame has two concentrator groups; there are eight concentrators per concentrator group in the 4:1 type office and eight concentrators per concentrator group in the 2:1 type office. The 4:1 type office will have line trunk switching frames 0 and 2 and line trunk switching frames 1 and 3 multipled at the B-links in order to attain the 4:1 concentration ratio in each network. The 2:1 type office will have frames 0 and 1 in each network. Trunks, service circuits, and customer lines are assigned to the terminal equipment numbers (TENs) of the concentrators. Each type of office will have the following:

(a) ***4:1 Type***

(1) Eight concentrator groups per line trunk network (zero through seven)

(2) Eight concentrators per concentrator group

(3) Thirty-two lines per concentrator or a total of 256 TENs per concentrator group.

(b) ***2:1 Type***

(1) Four concentrator groups per line trunk network (zero through three)

(2) Eight concentrators per concentrator group

(3) Thirty-two lines per concentrator or a total of 256 TENs per concentrator group.

4.04 One or more loops may be assigned to one or more concentrator groups. The number of lines to be sampled with each loop may be determined by the following formula:

Total number of concentrator groups/number of loops required = concentrator groups per loop.

4.05 The choice of terminal to which the observing loop will be assigned is completely random and will be made in accordance with procedures outlined in Traffic Service Observing Practices, Division B, Section 1G(2).

4.06 The two optional main frames available for use in the No. 1 ESS are as follows:

(a) Modular main frame (CDF)

(b) Standard main frame (conventional type).

4.07 When the modular main frame is used, attachment cords should be dedicated to each of the TEN verticals.

(a) The service observing group should prepare and maintain a separate random number assignment list for each TEN vertical. The network administrator can obtain for the service observing group a list of available TENs which are used for customer lines on each vertical. These lists must be updated periodically if the TENs are used for trunks and service circuits. Using this latter list, the service observing group will be aware of the entries on the random number list which are not used for customer lines.

4.08 When one of the other main frames is used, the cross-connections will be made at the block on the main frame and the jack panel; cords are not provided.

4.09 When concentrators have been modified for range extension and used with unigauge cable, the connector in the service observing unit must be wired for use with range extended or nonrange extended customer lines. In this case, it would be advisable to dedicate service observing loops for range extension and nonrange extension.

4.10 After the lines have been connected to the loop connector units by the maintenance personnel, service order messages (change order type) which utilize recent change areas are used to associate each line with the appropriate peripheral decoder point assigned to control the sleeve lead of the selected connector. This is accomplished by using the service order or maintenance teletypewriter and by utilizing the input manual for the proper message. Before removing a connection from an observed line, the deactivate message must have been typed to remove the sleeve lead from the customer line. Refer to Translation Guide 2H (TG-2H), Division 2, Section 6, for recent change administration.

PREPARATION OF DIAL LINE SERVICE OBSERVING LOOP ASSIGNMENT RECORD—FORM E-2510

4.11 Form E-2510 (Fig. 1) is provided for entering the necessary information required for assigning loops for dial line observing.

4.12 A list of the lines to be connected for observation shall be prepared by the group responsible for this activity, as determined locally. This will usually be either the network administration group or the service observing group.

4.13 Only two copies of Form E-2510 are to be prepared for each entity. The original copy is forwarded to network maintenance in a sealed envelope. It must be forwarded sufficiently in advance to permit network maintenance to complete the work at the desired time. After the plant work has been completed, network maintenance should return the original copy of Form E-2510 to the service observing department in a sealed envelope. A carbon copy of Form E-2510 shall be retained by the service observing bureau. Refer To Traffic Service Observing Practices, Division B, Section 1G(1), for procedures on how to prepare Form E-2510.

DISTRIBUTION OF OBSERVING ATTACHMENTS

4.14 In order to minimize the movement of observing loops in the frames of a No. 2 ESS office, each loop will be dedicated to certain concentrator groups and will be rotated only among those groups. The rotation of loops among groups will be on a 4-week basis in those cases where loops are dedicated to two or more groups. A record showing the particular location of a given loop for each 4-week rotation cycle should be maintained for each entry. In some cases, the number of loops may equal or exceed the number of groups. In such cases, a loop may be dedicated to only one group and will not be rotated.

4.15 The assignment of a loop to a particular terminal within the bay will be accomplished in such a manner as to make the choice a random selection. ***Each week*** the loop will be moved to a new terminal and the selection of the terminal number will be made from the random number assignment table in accordance with procedures outlined in the Traffic Service Observing Practices, Division B, Section 1G(2). It will not be necessary to maintain records to avoid the reassignment of a particular line.

4.16 Wide area telephone service (WATS) lines assigned in an office serving regular customers may receive special consideration if the assignment of these lines through random selection produces a large volume of DDD calls. Assignment procedures for WATS lines are covered in Traffic Service Observing Practices, Division B, Section 1G(1).

4.17 A centrex-CU type PBX served from the customer premises has "dial 9" trunks to a company dial central office for outgoing service. These "dial 9" lines in the dial central office will be observed on normal random assignment.

4.18 When new line equipment is added to a No. 2 ESS central office, dial line observing loops will be assigned to the terminals on the new equipment at a time when approximately 40 percent of the frame is loaded.

PREPARATION OF DIAL LINE OBSERVING LOOP ROTATION RECORD—FORM E-5574

4.19 Form E-5574 (Fig. 2) is designed to provide a record of the groups to which each loop is dedicated and the particular assignment of the loop for each 4-week period. Spaces are provided for 13 rotations of assignment covering a 52-week schedule.

4.20 The initial preparation of Form E-5574 will involve a study of actual equipment and frame layout in the office involved. A ratio of the number of groups to the number of available observing loops for each entity should be developed. If this ratio is one or less, the loop may be

permanently associated with the particular grouping. The physical layout of the office equipment will determine the actual groupings for each loop.

4.21 The equipment to be associated with a particular loop will be recorded in the appropriate columns on Form E-5574. A separate line is provided for the entry of a date (or dates) for each 4-week interval which will identify the actual period for which that assignment will apply. A continuous assignment record should be maintained for each observed entity.

SELECTION OF LINES FOR ASSIGNMENT USING THE RANDOM NUMBER ASSIGNMENT TABLE

4.22 The rules for selecting lines for assignment each week are outlined in Traffic Service Observing Practices, Division B, Section 1G(2).

WATS ASSIGNMENT PROCEDURES

4.23 Refer to Traffic Service Observing Practices, Division B, Section 1G(1), for information relating to WATS assignment procedures.

FORM E-2510 (10-69)
PRINTED IN U.S.A.

NO.__________

DIAL LINE SERVICE OBSERVING LOOP ASSIGNMENT

ENTITY ______________________________ CITY ________________

TYPE OF EQUIPMENT ________________________

PREPARED BY ____________________ DATE ____________ 19 ______

IF QUESTIONS CALL ____________________________________

TO BE COMPLETED BY ___________________________ A.M. P.M. ON ________ 19 ______

PLANT WORK COMPL. (√)	LOOP NO.	CLASS	GROUP COL. LLF NET	TERM. SW V-GRP. LSF	VERT. H-GRP. BAY	V-FILE CONC.	SW	LEVEL	
1	2	3	4	5	6	7	8	9	10

PLANT WORK

Connected By:

______________ ________ ________
NAME DATE TIME

Tested By:

______________ ________ ________
NAME DATE TIME

HEADINGS FOR COLUMNS

SXS & Panel: Class of Svc, Group, Term.
No. 1: Class of Svc, Col, SW, Vert.
No. 5: Class of Svc, LLF, Vert Grp, Horiz Grp, Vert File
ESS: Line Class Code, Net, LSF, Bay, Conc, SW, Level

Fig. 1—Dial Line Service Observing Loop Assignment Record—Form E-2510

FORM E-5574 (10-69)
PRINTED IN U.S.A.

DIAL LINE
OBSERVING LOOP ROTATION RECORD

Page ____ of ____

Prepared By ____________

Date ____________ 19 ____

ENTITY ____________ CITY ____________ AREA ____________

LOOP NO.	FRAME NO.	GROUPS COLUMNS VERT. GRPS. BAYS	CLASS OF SERV.	FOUR WEEK ROTATION PERIODS – ENTER DATE ASSIGNED												
				1-4	5-8	9-12	13-16	17-20	21-24	25-28	29-32	33-36	37-40	41-44	45-48	49-52

Fig. 2—Dial Line Observing Loop Rotation Record—Form E-5574