SWITCHING SYSTEMS MANAGEMENT
NO. 1 ELECTRONIC SWITCHING SYSTEM
SERVICE RESULTS
SERVICE OBSERVING

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1. GENERAL

1.01 This section describes service observing. It will explain the purpose, describe the equipment, present the operations involved, and delineate the administrative responsibilities associated with service observing.

1.02 Whenever this section is reissued, the reason for reissue will be listed in this paragraph.

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

OBJECTIVES

1.04 Service observing provides a means of determining how effectively the telephone system serves the customer. Observations show how well a switching machine functions from the customer's point of view. Equipment malfunctions, overloads, or other problems which prevent a customer from satisfactorily completing a call are detected early; frequently permitting corrective action to be taken before the customer complains.

1.05 The network switching performance measurement plan was developed in order to provide an overall measurement of the quality of service provided by a switching machine. (Refer to Dial Facilities Management Practice, Division H, Section 6k(4), Service Results—Performance Measurement Plan.) This plan uses measured components and performance indicators to determine an index which represents the quality of service. Most of the elements that comprise the index are measured by the machine itself. However, to provide a standard measure of service that is independent of the machine being measured, certain elements from the service observing reports have been included in the index.

1.06 One performance indicator that can be obtained only by service observing is percentage of system overflow. Although the switching machine is capable of measuring overflow within itself, only by service observing can the number of occurrences presented to a customer by the entire system be determined.

1.07 Certain equipment irregularities cannot be measured within the machine but must be determined by service observing. These are no ring, wrong number equipment, misdirected, and some miscellaneous problems grouped under the heading of "other."

1.08 Although much of the data obtained by service observing is not included in the performance measurement plan, it contributes to an overall understanding of how well the system is serving the customer. The network administrator should review all service observing data and be aware of any indication of deteriorating service. A description of the service faults which make up a service observing report can be found in the Traffic Service Observing Practice, Division B, Sections 1c and 1d.

PROCEDURES

1.09 The initiation of service observing requires the installation of dedicated service observing equipment both in the central office and at a centralized service observing location. Observations are made from the centralized location on special desks equipped to provide a representative selection of calls for observation. Special trunks are used to carry the data and customer's call to the service observing desk from the various central offices being observed. At the central office, equipment is required to intercept and select individual calls and identify the calling and called numbers. This equipment is described in Part 2 of this section.

1.10 Service observing personnel working hours vary in order that observations can be obtained in proportion to customer calling rates. To obtain a representative measure of service, observations must be taken on weekends and holidays as well as normal business days. In addition, it is frequently difficult to properly assess an observed call to determine the actual malfunction, if any. Further complications are introduced by the variations of equipment being used in the several central offices. To overcome these problems, the Traffic Service Observing Practice describes procedures to be followed under various circumstances in order to obtain a realistic appraisal of the service being provided.

1.11 Service observing requires interdepartmental effort as described below.

- The service observing group takes and records service observations.
- Network administration provides data to determine proper distribution of observations and assigns customer lines to loops.
- Network maintenance maintains the service observing equipment, and puts up the service observing connections.
- Engineering is responsible for providing sufficient equipment to perform service observing.

1.12 Service observing should be provided for any city having 10,000 or more total working main stations. Single or multitraffic unit cities of 3,000 to 10,000 total working main stations are

eligible for observing when service observing equipment is provided within the city, or when observations can be taken from an existing remote observing location. A traffic unit of less than 3000 working main stations should be observed if other traffic units within the city are observed. However, if difficulty is met in reaching the observing quotas, the results need not be summarized officially. In a city where official observations are already being made, a new traffic unit should start observations on an unofficial basis at cutover in order to evaluate machine operation. As soon as 3000 working main stations have been reached, observations should become official, with results being tallied after the three months required to establish a data base.

1.13 Service observing is a continuous program with official results reported monthly. Results are based, however, for any traffic unit on a series of 900 observations plus or minus 100. Generally, these observations are taken at the rate of 300 per month. Monthly results, therefore, are normally a summation of observations for the two previous months plus the 300 observations for the current month.

1.14 The 900 observations that make up a quota consist of home numbering plan area (HNPA) calls. Foreign numbering plan area (FNPA) calls are also observed and reported as they occur. Although the number of FNPA calls observed should be proportional to the number of FNPA calls handled by the switching machine, no particular effort is made to maintain such a proportion.

1.15 To be truly representative of actual service, it is important that HNPA observations be taken for each period of the day (morning, afternoon, and evening) in a quantity that is proportional to the number of HNPA calls made during those periods. It is necessary for the network administrator to determine the distribution of originating calls for each of the observed hours of the day. The service observing group will then adjust their schedule so as to distribute observations in a like proportion. New studies should be made at least annually.

1.16 Observations must be distributed by class of user. This is accomplished through a system of random selection of customer lines for observation. The service observing group should also conduct studies to determine if this is being accomplished and recommend changes in loop assignments to achieve a proper proportion if necessary.

2. EQUIPMENT

2.01 Service observing equipment consists of the service observing desk, which is usually located at some convenient central location; the service observing trunks which carry data and voice; and the service observing circuits, loops, and miscellaneous equipment located in each central office being observed. Originating calls on observed lines are routed via the loops to the service observing circuit where one is selected and routed via the trunks to the service observing desk. If originating calls are received on more trunks than there are observing positions in operation, another selection takes place and the selected call is then received at one of the observing positions at the desk. A description of the service observing equipment follows.

SERVICE OBSERVING DESK

2.02 The No. 12 service observing desk consists of a lineup of two-position sections. Up to 20 positions may be installed. The desk is designed to permit 60 or more call-distributing service observing circuits to be connected. Arrangements include circuits for 20 classes of service. A maximum of 24 circuits of one class can be assigned to one position, however, if all 20 classes are not used additional circuits of one class can be assigned to the unused equipment for any other class.

2.03 When an end office service observing circuit is placed in operation by a key at the observing position, calls selected by that circuit can compete with other calls to the observing desk. Selection at the desk occurs as follows:

- Before a call is connected, a test is made to ensure that only calls originated after the circuit has been released are connected. Any call which is in progress at the time the service observing circuit becomes idle is prevented from being connected.

- If a call is not connected to an observer position within a definite time interval, the observing line circuit is released and the service observing circuit is enabled to seize a new call.

- If more than one observing line circuit is seized simultaneously, the lowest numbered circuit is connected to the service observing circuit and the others are released.

- The observing line circuit (loop), which is connected to the service observing circuit, is identified by means of indicator lamps on the desk. Loop identification is delayed for 0.5 seconds after the call is connected to the service observing trunk to ensure that the call has been associated with an observing position.

- When an observation is complete, the circuit is released by operation of a release key. If a call is not completed for any reason and the observer wishes to monitor repeated attempts, the observing position will remain connected to the same customer line until the release key is operated. Operation of the release key sets the service observing equipment to select the next originating call from any customer line connected for observation.

2.04 A tape printer or pen register is located at each position of the desk. As the calling customer dials the called number, the dial pulses are registered on the tape. The desks can be modified to handle TOUCH-TONE® calls as well as rotary dial.

2.05 The Service Evaluation System (SES) is being developed to replace the No. 12 desk. Use of the SES will permit larger service observing bureaus to serve an expanded area, including traffic units that could not be accessed by the No. 12 desk. Centralized bureaus and a simplified format for manually recording call data, plus mechanization of many of the observers functions will improve the integrity of the data and provide a greater degree of standardization in service measurements.

2.06 Incorporation of the SES has little or no impact on the equipment or assignment of lines at a central office. The SES will interface with the existing service observing circuit for each traffic unit through a signal converter/allotter (SC/A). One signal converter/allotter can handle up to 16 service observing circuits (SOCs). Signals from the SOC (direct current, multifrequency, dial pulse, and TOUCH-TONE) are processed and converted to digital data for transmission to the service evaluation center (SEC). The SEC can handle up to 143 signal converter/allotters or equivalent, providing a theoretical capacity for one SES of 2288 traffic units. Voice and data are transmitted to the SEC, which can be located at any distance from the central office. Digital control signals for the SOC are sent from the SEC to the SC/A for conversion to direct current.

2.07 The SEC consists of a minicomputer system, a call distributor circuit and a generic control program. A line printer is used to print the service observing reports generated. The computer monitors automatic signals from the observing circuit and keyed inputs from the observer, placing all pertinent data concerning the call on magnetic tape. The computer also controls the displays presented to the observer on a computer data terminal (CDT).

2.08 The service evaluation bureau (SEB) consists of up to 38 evaluation positions and one administrative position that can also be used for evaluations. Each evaluation position contains a CDT and a keyboard for inputting data to the SEC. The administrative position has the means to control such SEC functions as maintaining observation quotas per traffic unit, establishing selected evaluation positions as training positions (where they will operate normally, but the data input to the SEC will not be entered as an observation), and changing the status of traffic units. The administration position can control the use of evaluation positions for functions other than training. A position can be assigned as a monitoring position where a supervisor will observe the same display as that presented at any selected evaluation position, thereby providing a means of quality control. An evaluation position can also be assigned for an auditing function. All evaluations containing a service fault are collected and can be called to the audit position for review before being released for summarization.

SERVICE OBSERVING TRUNK (SD-95530-01)

2.09 The service observing desk is connected to the end office equipment by a service observing trunk (Fig. 1). A separate trunk is required for each switching machine entity being observed. Besides the talking path from the customer line, the trunks carry panel call indicator pulses to cause the loop identity lights at the observing position to light. Dial pulses are sent to activate the tape printer or pen register. The

trunk also carries other control and signal circuits between the service observing circuit and the desk.

SERVICE OBSERVING CIRCUIT (CD-1A142-01)

2.10 The local dial line service observing circuit is a multiline call distributing circuit with the following features.

- A maximum of 100 observing line circuits (loops) may be connected to one local dial line service observing circuit.
- A panel call indicator pulsing arrangement is included for identification of the observing line circuit (loop) selected for observation.
- Means are provided for observing coin lines without affecting the operation of coin box trunk circuits.
- A dial pulse amplifier circuit is provided which repeats the dial pulses from a customer line to the pen register or tape printer at the service observing desk.
- A TOUCH-TONE pulse converter circuit is provided, if necessary, to translate TOUCH-TONE to dial pulses.

2.11 When a customer line has been selected for observing, it is connected at the main distributing frame to the service observing circuit by means of a W2 FL (Electronic Switching System [ESS] modular frame) or W2GY (COSMIC frame) cord connected to a 272A or 272B jack panel on the ESS modular, or COSMIC frames. Where the common systems (conventional) main distributing frame is used, the subscriber lines are cross connected to connecting blocks that are directly wired to the service observing circuit. The jack panel will accept up to 50 cord plugs. The jack panels can be multipled to every other section of frame. A second set of panels multipled to the remaining sections will then provide the 100 maximum lines the service observing circuit is capable of handling. Jack panel 272A is numbered from 00 to 49 and jack panel 272B is numbered from 50 to 99.

3. OPERATIONS

3.01 Service observing requires the coordinated efforts of several departments. The tasks that must be performed, the frequency of performance, and the organization most often designated to perform the tasks are described in the paragraphs which follow. Based upon local decisions, the actual departments that perform these tasks may vary somewhat from those identified in this section.

INITIATION OF SERVICE

3.02 Service observing is initiated by the network administrator who forwards a request to engineering to provide the necessary end office equipment and trunks. A guide to when service observing should be instituted is as follows:

- A lightly loaded end office of less than 3000 lines should have service observing performed on an unofficial basis if a service observing center is available.
- Official service observing should be instituted as soon as an office reaches 3000 working main stations.
- A newly established end office of more than 3000 lines should initiate service observing at cutover, and observations should be reported officially as soon as a 900 observation data base has been established.

3.03 Engineering will determine the equipment required and arrange for its arrival. The equipment will include trunks, service observing circuit, signal converter/allotter if required, relay panels, jack panels, service observing cords and other items, including a miscellaneous trunk frame when necessary. The lead time for procuring, installing, and testing this equipment may be 18 months or more. Plans for initiation of service observing must, therefore, coincide with plans for initiation of a new end office, or expansion of an existing one. There is no requirement for changing translations or parameters, or for making assignments for the service observing trunks.

3.04 Determination of the number of loops required in a No. 1 ESS office is as follows:

(a) Determine from the service observing supervisor the number of observations per day that will be desired from the end office in order to reach the quota of 900 observations.

(b) Determine from the service observing supervisor the number of observing positions that will be in operation to observe that end office during the service observing desk busy hour.

(c) Obtain a multiplying factor from the following:

POSITIONS IN OPERATION	MULTIPLYING FACTOR
1	15
2	10
3	7.5
4 or more	6

Using the multiplying factor and the number of observations required per day as established in (a) above, determine the number of originating calls that are required to produce sufficient traffic to permit the service observing group to obtain the desired number of observations.

(d) Divide the number of originating calls, as determined in (c), by the average originating day calling rate of a dial subscriber line. This will give the number of loops required to obtain the particular quota of observations.

Note: The average originating day calling rate is the average of the originating calls peg count per day of the three highest months. For a new office this figure can be estimated by taking the peg count measurements of any nearby office having a reasonably similar distribution of class of service.

Example:

Number of observations per day—12

Number of positions observing the office—3

Multiplying factor—7.5

$7.5 \times 12 = 90$

Originating day calling rate -1.83

$90 \div 1.83 = 49$

Number of loops—49.

3.05 The number of loops required as derived by the method above is an approximation. After a few months of operation, the network administrator should determine from the service observing supervisor if any difficulty is being experienced in obtaining the desired number of observations. If less than 900 observations are being obtained, more loops should be provided. An index based on too few observations will not be representative of the true performance of the machine. If observation quotas for the day are being reached too early during the observing period, more loops than necessary may be employed. ***This is not only costly in maintenance personnel time, but will provide an index to machine performance that is representative of only a portion of the machine day.***

3.06 The service observing group will attempt to distribute observations in proportion to the daily and hourly originating call rate. The network administrator must determine the distribution of originating calls to total daily calls for the morning, afternoon, and evening periods (hourly for these periods where the SES is used for observing). These figures should be determined for each day of the week, including Saturdays and Sundays. These data must be supplied to the service observing group. The network administrator must also supply the service observing group with the ratio of each class of service, by number of lines, to the total number of working lines. All of the above data should be checked yearly and service observing should be notified of any changes.

LOOP ASSIGNMENT

3.07 There are two objectives in the assignment of service observing loops.

- In order that the small number of observations made each month be representative of the total number of originating calls processed by the switching machine, it is important that service observing loops be rotated between customer lines at regular intervals, and that loop assignments be made on a completely random basis.

- In order that maintenance costs be kept to a minimum, it is also important to minimize

the removal and replacement of service observing loops.

To meet both of these conflicting objectives, the following method has been devised.

3.08 If the number of loops required for service observing is equal to or in excess of the number of line switch frame bays in an office:

(a) One or more loops shall be dedicated to each bay, and will be rotated only among customer lines that are associated with that bay.

(b) The jack end of the service observing cord (or the service observing circuit connector block end of a cross connection) need never be moved.

(c) The customer line end should be rotated weekly as described later.

3.09 If the number of line switch frame bays exceeds the number of service observing loops required:

(a) As many service observing loops, as necessary, will be dedicated to more than one bay.

(b) The customer line end should be rotated weekly as described later.

(c) The jack end of the loop should be rotated between bays every four weeks.

(d) A record will be maintained showing the rotation between bays of dedicated loops. (See next paragraph.)

3.10 Form E-5574, Dial Line Service Observing Loop Rotation Record, (Fig. 2) is used to record the four-week rotation of dedicated loops. A separate form is required for each traffic unit in the office. A study must be made of the main distributing frame layout in order to achieve the objectives listed below. Dedicated loop assignments are recorded on the form as follows:

(a) Fill out the top as indicated on the form.

(b) Enter the number of the first loop to be assigned in the left-hand column on the top line.

(c) In the next column enter the number of the line switch frame to which the loop will be dedicated.

(d) In the third column enter the number of the bay to which the loop will be dedicated. If the loop will be dedicated to more than one bay, use succeeding lines to indicate the additional bays. Make additional entries in the frame number column as necessary.

(e) In the fourth column list the class of service to which the bay is dedicated. If bays are not dedicated to one class of service, leave this column blank.

(f) On the next vacant line in the left-hand column, enter the number of the next loop to be assigned.

(g) Continue to assign loops to dedicated frames and bays in such a manner that all customer lines will be considered for assignment at some time, but a complete rerunning of loops can be minimized.

(h) Loops will be reassigned weekly as described in 3.16; but only the customer line end of the service observing cord will be relocated weekly. Every four weeks the entire cord will be relocated as called for by changing the bay to which the cord had been assigned to the next bay listed in column 3 for that loop number.

(i) Under the appropriate four-week rotation period, on the top line, enter the date the loop is being reassigned.

(j) On the line associated with the loop number, and under the proper four-week rotation period, enter the number of the frame and bay to which the loop is being assigned.

(k) Using the random number assignment table, and procedures described in 3.16, make all loop assignments to the frames and bays indicated for the four-week period identified in step (j) above.

3.11 In offices where the line switch frame bays are dedicated to specific classes of service, dedicated loop assignments should be made. This should be done such that the number of loops assigned to a particular class of service, compared

to the total number of service observing loops, is proportional to the number of customer lines assigned to that class of service compared to the total number of customer lines. In this type of office, the service observing group may make a periodic study of observations by class of service. If the number of observations obtained are not proportional to the number of customers per class of service, the number of dedicated loops per class of service can be adjusted so as to obtain a proportionate number of observations.

3.12 In offices where an ESS modular main distributing frame is used, one or more loops may be assigned to one or more adjacent equipment verticals on the main distributing frame (MDF) using the following formula:

$$\frac{\text{Total Number of Equipment Verticals}}{\text{Number of Loops Required}} = \text{Number of Equipment Verticals per Loop}$$

Loops thus dedicated to particular ESS MDF verticals will be rotated between verticals every four weeks as described in 3.08.

3.13 For an ESS modular MDF, weekly rotation among customer lines will be achieved as described in 3.16 except that a separate random number assignment list will be prepared for each vertical. Entries on each random number assignment list that are not equipped on any particular vertical can be lined out on the random number assignment list to speed up loop assignments.

3.14 If more than one control group is placed on an MDF, a fully duplicated service observing circuit and set of jacks, cords, etc, would be required for each control group. A separate set of random number assignment lists would also be necessary. To avoid errors and assist in identification each set of control group equipment should be color coded. Coloring should be done at the rear of the terminals on the MDF, the cords, the jack box, Form 5574, and the weekly loop assignment Form E-2510.

3.15 When a new line switch frame is added to a dial central office, dial line observing loops should be assigned to the terminals on the new equipment at such time as the frame becomes approximately 40 percent loaded.

3.16 Rotation of loop assignments between customer lines shall be done weekly and on a completely random basis. This is achieved using the No. 1 ESS Random Number Assignment Tables in the back of this section. There are two tables available. Table A is for high usage bays (2:1 concentration ratio), and Table B is for regular usage bays (4:1 concentration ratio). Loop assignments are made on Form E-2510, Dial Line Service Observing Loop Assignment. Only two copies of the form are prepared. The original is sent to network maintenance and the copy is forwarded to the service observing group. After network maintenance has completed the connections, the original will be forwarded to the service observing group. Sealed envelopes will be used for the transfer of Form E-2510 at all times.

3.17 Form E-2510 is completed as follows (Fig. 3):

(1) Forms will be consecutively numbered each week.

(2) ***ENTITY:*** Insert the NNX for the control group being assigned.

(3) ***CITY:*** Write in the city in which the office is located.

(4) ***TYPE OF EQUIPMENT:*** Write in No. 1 ESS.

(5) ***PREPARED BY:*** Insert the name of the person making the assignment.

(6) ***DATE:*** Enter the date the form was prepared.

(7) ***IF QUESTIONS CALL:*** Fill in the name and telephone number of the person to be notified if any problems arise concerning the assignment.

(8) ***TO BE COMPLETED BY:*** Insert the time and date that all connections shall be made and tested by, in order that service observing can commence on schedule.

(9) ***Column 1:*** Leave blank to be used by the frame person who makes the connections.

(10) ***Column 2:*** List each loop that is being assigned.

(11) ***Column 3:*** List the line class code for the customer line being assigned.

(12) ***Column 4:*** List the line link network to which the loop is being assigned.

(13) ***Column 5:*** List the line switch frame to which the loop is being assigned. Refer to Form E-5574 to determine the line switch frame and bay to which assignment is to be made for each loop.

(14) ***Column 6:*** List the bay to which the loop is being assigned. Refer to Form E-5574.

(15) ***Column 7:*** List the concentrator as determined from the random number assignment table (see 3.18).

(16) ***Column 8:*** List the switch to which the loop is being assigned as obtained from the random number assignment table.

(17) ***Column 9:*** List the level to which the loop is being assigned as determined from the random number assignment table.

(18) ***Column 10:*** Leave blank.

(19) ***Connected By:*** The frame person making the connections will check off each connection when completed in column 1 and fill out the line marked ***connected by.***

(20) ***Tested By:*** The person testing the circuits will fill out the bottom line.

3.18 Loop assignments are made as follows:

- Take the first unused number and assign loops to that terminal for each bay.

  (a) The left digit in the random number identifies the concentrator.

  (b) The next digit identifies the switch.

  (c) The two right-hand digits identify the level.

- If more than one loop is dedicated to a single-bay, take the next unused number for the second loop.

- As soon as a number is selected, draw a line through it and consider it as a ***used*** number, even if no assignments for that number are made.

- If any of the lines selected for a particular loop are ***excluded,*** choose the next unused number for those lines.

- Continue using numbers as necessary until all loops have been assigned.

- Assignments for the next week will commence with the first ***unused*** number on the random number assignment table after assignments for the current week are completed.

- A separate table will be maintained for each control group having conventional or common systems main interconnecting (COSMIC) frames.

- Where the ESS modular MDF is employed, a separate table shall be maintained for each vertical.

- Progress through a table for one control group (or vertical) does not have to be at the same rate of progress through the table for another control group (or vertical).

3.19 Every originating line, regardless of class of service, shall be assigned with the exception of test lines. Lines which are excluded from assignment are as follows:

(1) Inward wide area telephone service (INWATS).

(2) Vacant and nonworking lines (provided they are nonworking due to temporary suspension or disconnect).

(3) Centrex lines restricted to four-digit dialing and centrex lines that are toll restricted.

(4) Private branch exchange (PBX) lines dedicated to incoming service only.

(5) Dial teletypewriter exchange (DTWX) lines, however, PBX lines equipped to transmit dataphone messages over voice communication circuits shall be assigned.

(6) Lines used for common control switching arrangement (CCSA) calling.

3.20 Most calls from wide area telephone service (WATS) are direct distance dialing (DDD) calls. Total DDD observations should be proportional to the number of DDD calls originated daily. It is necessary, therefore, to obtain WATS observations in the same proportion to total DDD observations as WATS traffic is to total DDD traffic. This is accomplished through control of WATS lines being assigned rather than through discarding or refusing to accept WATS observations. The service observing group will control the assignment of WATS lines in a particular geographic area such as district, division, city, area, or company to assure a proper proportion of WATS observations for each control group.

3.21 In locations where WATS customers are served by several dial central offices, WATS lines must be assigned so that each office is observed proportionately. Where WATS customers are concentrated in a single office, loops must be assigned such that when the 900 local calls have been observed, a proportionate number of WATS calls have been observed also. Random selection of WATS lines should be made provided this produces a proper proportion of observations. Where random assignment of WATS lines fails to produce a proportionate number of observations, one or more loops should be dedicated to WATS observations and rotated among WATS lines weekly. The number of dedicated loops will be determined by trial and close coordination between the service observing group and the person making the service observing loop assignments.

CONNECTIONS

3.22 Service observing loops will be connected to customer lines at the MDF by network maintenance personnel in accordance with the Dial Line Service Observing Loop Assignment, Form E-2510. After the connections are made the service observing loops and circuits will be tested to assure proper operations. Form E-2510 will then be forwarded by maintenance to the service observing group in a sealed envelope.

3.23 For No. 1 ESS, following connection of a service observing loop, a message must be typed into the maintenance TTY to inform the system to activate service observing on the given directory number. A message must be typed to terminate service observing before the connection at the MDF is removed. A separate message is required for each loop both after making the connection, and before removing it.

OBSERVATIONS

3.24 Service observing will commence in accordance with a schedule determined by the service observing organization. Approximately 70 observations will be taken for each entity being observed during any particular week. An attempt will be made to proportion the number of calls observed throughout the day and week according to call distribution studies made by the network administrator.

3.25 An observation begins when a customer being observed goes off-hook. A signal is received at the observing desk which designates the circuit or trunk which has been seized, and thus identifies the NNX. Two lights are lighted to identify the loop number being observed.

3.26 Coincident with the circuit indication a timing clock will start, enabling the observer to time various steps in the progress of the call. The dial pulses are translated into a digital printout on a tape printer, or marks by a recording pen to identify the called party.

3.27 The observation is terminated when it is apparent to the observer that the correct number has been reached, or if the calling customer reaches a station busy condition or a ring no answer. The observer completes the mark sense card and releases the line permitting seizure of a new call. If the call was ineffective, the observer will not release the line thus permitting observations of subsequent attempts by the customer to obtain a connection to the called party. Rules governing the conduct of observations and procedures for determining whether equipment is at fault on any observed call can be found in the Traffic Service Observing Practices, Division B, Sections 1a through 1c(2).

REPORTS

3.28 The results of the service observing activity are forwarded to the network administrator monthly. The results are summarized for the approximately 300 observations for the current month combined with the 600 observations from the preceding two months. Arrangements may be made locally for additional summary reports when these may be beneficial in analyzing the effectiveness of corrective action taken as a result of problems encountered from studies of the various machine performance indicators.

3.29 Data included in the summary reports such as percentage of reorder and no circuit (% RO/NC) and percentage of equipment irregularities (wrong number due to equipment, misdirected, no ring, etc) must be included in the network switching performance measurement plan. Arrangements must be made to receive the service observing summary report in sufficient time to include the above data in the measurement plan.

4. ADMINISTRATION

4.01 Using rules spelled out in the Traffic Service Observing Practices, the service observing group will attempt to maintain a schedule that will assure that observations taken are representative of the switching machine operation under all types of loading conditions. To achieve this, the service observing group must be kept informed of changes that occur in office equipment, class of service balance, calling rate, or other parameters that would influence service observing results.

RESPONSIBILITIES OF NETWORK ADMINISTRATOR

4.02 The network administrator must make periodic measurements, usually annually, to detect such changes as percentage of usage of machine per periods of the day and percentage of usage per class of service. If a large change in central office configurations occurs, the service observing group should be informed at once.

4.03 The network administrator is responsible for following up on summary reports from the service observing group and taking whatever action is indicated to improve machine performance. Service observing summary reports are also useful in determining the effectiveness of measures taken to overcome problems indicated by analysis of daily machine measurements.

4.04 The network administrator is responsible for including equipment irregularities and wrong numbers due to equipment, parameters that are obtainable only from service observing, in the network switching performance measurement plan as specified in Dial Facilities Management Practice, Division H, Section 6k(4). The network switching performance index is a measure of the quality of service provided by the switching machine. Service observing contributes inputs to the index. It also provides other indications of the quality of service that are not included in the index.

RESPONSIBILITIES OF SERVICE OBSERVING ORGANIZATION

4.05 The service observing group is responsible for keeping other organizations cognizant of problems that may affect good service. Monthly reports are generated to achieve this cognizance. The monthly reports are generally machine prepared and are weighted in an attempt to form an accurate measure of the performance of not only each machine, but also each district, division, city, area, and company.

4.06 It is the responsibility of the service observing group to maintain observing schedules such that observations are representative of actual usage. When scheduling alone is not able to compensate for changes in office parameters, the service observing group should coordinate with the network administrator the changes in loop assignment that will achieve the desired proportion of observations to total equipment usage.

4.07 The service observing organization is responsible for maintaining secrecy of communications. They will not, therefore, identify a particular customer line in reporting a trouble that has been observed.

RESPONSIBILITIES OF NETWORK MAINTENANCE

4.08 Network maintenance is responsible for testing, servicing, repairing or replacing as necessary the various service observing equipment in the central office. This includes the service observing circuit; the various loops, jacks, plugs

and other connection devices; and the various electrical assemblies and other hardware required.

4.09 Network maintenance is also responsible for making the loop connections called for on the loop assignment form and testing each connection by the time indicated on the form. Unassigned loops should be removed at the time other loops are being transferred from the current assignment to the new assignment.

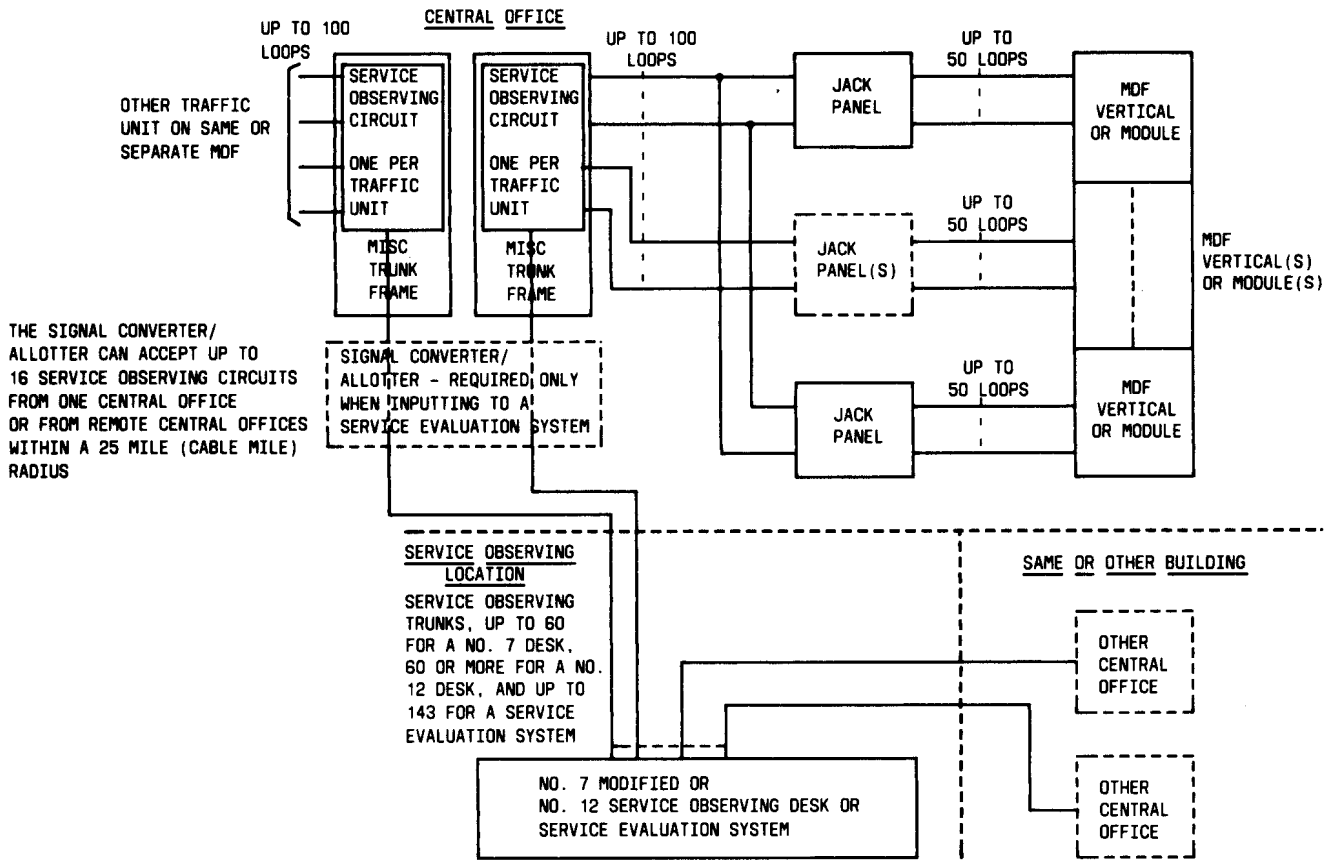

Fig. 1—Service Observing Circuit Connections (2.09)

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

DIAL LINE
OBSERVING LOOP ROTATION RECORD

Prepared By AnnAbelle

Date MAY 6 1976

ENTITY 225 CITY Northland AREA Eastern

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
				5/20/76	6/17/76	7/15/76	8/12/76	9/9/76	10/7/76	11/4/76	12/2/76	12/31/76	1/28/77	2/24/77	3/24/77	4/21/77
00	00	00		00		00		00		00		00		00		00
		02			02		02		02		02		02		02	
01	01	00			00		00		00		00		00		00	
		02		02		02		02		02		02		02		02
02	02	00		00	00	00	00	00	00	00	00	00	00	00	00	00
03	02	02		02	02	02	02	02	02	02	02	02	02	02	02	02
04	03	00		00		00		00		00		00		00		00
		02			02		02		02		02		02		02	
05	04	00			00		00		00		00		00		00	
		02		02		02		02		02		02		02		02

Fig. 2—Dial Line Observing Loop Rotation Record, Form E-5574 (3.09)

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

NO. 37

DIAL LINE SERVICE OBSERVING LOOP ASSIGNMENT

ENTITY 225 CITY

TYPE OF EQUIPMENT No.1 ESS

PREPARED BY Annabelle DATE JAN. 24 19 77

IF QUESTIONS CALL Clyde Camel

TO BE COMPLETED BY 8:00 (A.M.) P.M. ON 1-28 19 77

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
	00		00	00	02	7	2	13	
	01		00	01	00	4	2	06	
	02		00	02	00	7	2	13	
	03		00	02	02	7	2	13	
	04		00	03	02	4	2	06	
	05		00	04	00	7	2	13	
	06		00	05	02	6	3	13	
	07		00	06	00	7	2	13	
	08		00	07	00	7	2	13	
	09		00	07	02	4	2	06	
	10		01	00	02	6	3	13	
	11		01	01	00	7	2	13	
	12		01	02	02	6	7	07	
	13		01	03	00	7	2	13	
	14		01	03	00	7	2	13	
	15		01	04	02	4	2	06	
	16		01	05	02	7	2	13	
	17		01	06	00	4	2	07	
	18		01	07	02	7	2	13	
	19		02	00	00	7	2	13	
	20		02	01	00	7	2	13	
	21		02	01	02	5	2	14	
	22		02	02	02	4	2	06	
	23		02	03	00	7	2	13	

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. 3—Dial Line Service Observing Loop Assignment, Form E-2510 (3.17)

TABLE A
RANDOM NUMBER ASSIGNMENT TABLE
NO. 1 ESS
HIGH USAGE BAYS

Begin with the first number in Row A, along Row A to the end, then Row B, etc.

	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.
A	1002	4403	7600	7502	3502	0003	4403	3102	7002	0102	3603	5003	0600
B	4703	6600	2501	5000	5402	7201	4602	1502	6603	5301	0101	4201	4100
C	3402	2102	7701	2301	2201	1602	7503	6601	0000	6301	2702	6100	4600
D	5700	4201	2203	4101	7100	5101	1303	6703	5201	0703	0601	0001	0001
E	3203	0303	1401	6503	5501	6402	0303	0701	5603	0602	4603	6703	0600
F	7102	3701	0303	5103	4600	0201	7203	1301	4301	1400	6200	0402	6500
G	6003	1101	2602	6300	3700	3103	7202	0503	5501	1002	6200	7403	6003
H	1401	5001	1703	0103	4203	1303	1501	4201	6503	7502	1703	5103	6203
I	2601	1200	1703	1503	1100	0301	2002	5601	6003	1000	1100	7203	2401
J	7202	5700	6303	0502	3101	1501	2500	1300	1000	0703	4200	1300	0100
K	3003	6202	6201	5703	4002	1302	1503	6702	6200	0002	7401	2402	7000
L	3302	5302	0703	3203	1403	7701	3500	1502	7402	0703	6601	0402	3401
M	6303	0403	6703	1400	5301	0403	3003	1001	6102	4003	2202	1302	1103
N	5703	4301	6301	3400	0400	4601	3600	3200	2303	1001	0003	4002	7502
O	6400	7300	5101	4001	6500	1603	3703	4103	4100	3401	6300	3200	2501
P	6000	6201	0001	6300	1703	6300	6602	3602	4001	1102	0102	1302	1001
Q	1401	2101	7102	7001	7003	5400	6202	3300	7603	6100	3101	2301	4303
R	6600	3202	7600	1301	0001	3101	1202	1202	7000	0702	1400	5301	0301
S	1203	3502	5200	4002	3001	1402	3100	3003	5002	6700	3702	3501	3402
T	2400	6603	5201	3603	4002	3102	2003	5200	1602	0101	6700	1002	5003
U	0703	1201	4402	1601	2203	1600	3501	4200	0100	2702	5600	7101	2201
V	0001	2400	7600	1003	7203	7603	0503	2400	4603	2503	4303	3502	2403
W	5203	5501	3501	6700	1303	2002	5500	5100	1102	1600	0103	6002	7600
X	3400	2401	4400	6503	0302	5203	0102	3300	2100	0002	1001	3700	5100
Y	1003	5601	1401	4503	1000	7702	4703	7000	4700	2301	6102	0702	2501
Z	5602	6301	4603	7303	1301	3401	6703	3003	7403	7600	0700	5200	2302
A	0600	5302	5601	1401	5601	7502	4002	6500	6400	3401	0302	0701	3501
B	7501	1200	5101	6300	3202	2502	5002	0503	4202	1101	1601	4403	6203
C	2302	5001	6001	6401	2403	3400	7601	0102	3701	5203	2200	4300	3402

TABLE A (Cont)
RANDOM NUMBER ASSIGNMENT TABLE
NO. 1 ESS
HIGH USAGE BAYS

	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.
D	6000	6103	4001	3303	0501	5701	3000	2503	5602	0602	3202	6000	1203
E	0003	3701	1001	6700	1602	4100	5101	3501	0702	2300	1700	4100	0502
F	4502	0703	7602	5302	1401	4400	6500	3301	3202	7402	2002	3103	2200
G	4200	7703	3201	0202	0400	0503	0701	7000	7100	6203	6402	7602	5000
H	6501	0100	1102	4703	0501	2401	2202	6102	6301	2001	5400	7700	2502
I	4500	6703	1501	4103	0200	6500	6000	1303	4100	5001	1100	6300	4000
J	1700	2003	3002	2703	6600	0202	3002	7501	6703	3702	6501	4403	7500
K	4702	3100	7002	0600	4702	6703	2103	0602	7202	5703	3500	3001	0702
L	2303	1703	2403	2501	6602	1502	7001	3300	2603	7700	4301	3400	1603
M	7201	4601	6303	2100	6103	0603	0701	4102	5303	2602	4303	4000	3402
N	2502	0300	7600	1003	1703	6200	6002	5601	3001	0002	0702	0501	5602
O	4203	3702	3502	4601	5403	2700	2602	6003	3401	0702	1401	0500	5700
P	1403	0000	2203	5003	7702	6400	5700	2701	1202	6600	2602	3703	5500

TABLE B
RANDOM NUMBER ASSIGNMENT TABLE
NO. 1 ESS
REGULAR BAYS

Begin with the first number in Row A, along Row A to the end, then Row B, etc.

	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.
A	1007	5209	0312	7009	1203	0002	5108	0214	6215	6210	1114	1014	2112
B	2115	2310	0012	7215	0004	2115	1105	1113	4310	7309	6100	7100	1308
C	3314	4114	2008	7106	6208	6014	2310	3315	3009	2113	5111	4008	0206
D	0311	1203	7014	4305	5311	0207	4303	1107	6113	0113	5315	1215	4313
E	5111	2013	1311	7009	3109	6210	6310	0110	7212	6206	3305	7211	1101
F	3010	5007	5301	3001	4006	3215	7307	4213	6215	7300	0212	4205	0307
G	3314	5313	5015	5207	6310	4213	4304	6314	0310	4305	3106	1103	2213
H	2113	5313	1300	4013	6002	3310	1003	4009	7309	5114	0101	6313	4108
I	3103	2010	4010	0109	1306	6201	1101	2110	1112	1112	7010	3007	6310
J	3112	3108	3209	1310	0111	1212	2000	7214	7010	3112	4304	0201	1215
K	5003	5003	7213	4206	6313	6307	5214	2208	3201	6201	1010	2008	7312
L	6111	2215	0314	2001	7007	1110	0107	6010	3205	3208	4313	5101	3307
M	2010	1110	0102	7002	4109	6303	2201	2302	1000	2101	3010	1011	4110
N	0208	0011	2015	6214	6313	5113	3009	0002	3206	0311	4115	6204	5209
O	6010	3207	7115	6112	0113	0308	2011	1114	4306	1014	1207	6108	1215
P	2304	3008	0105	4105	1100	2306	7200	1200	4311	0109	1210	5113	5107
Q	7201	7010	0207	3214	1003	3109	6213	2204	2010	2204	0008	7100	7109
R	6206	0101	0115	2305	1212	2212	6312	0107	7006	7315	1102	4006	0013
S	6310	5011	1004	0010	2002	2300	2209	2114	4309	4215	0008	6014	3003
T	0107	2214	3214	2109	5108	2304	3101	6314	6110	6108	6307	1100	3209
U	3009	1013	6206	0213	0100	2005	7115	4302	6203	3107	2110	5009	1300
V	7003	7205	7011	2202	6205	7204	1208	0307	2313	2208	6015	0000	6009
W	3208	5115	7001	3008	5100	2203	1002	0203	3207	4310	3314	0113	1313
X	4314	4110	7013	3115	7202	7100	6202	4008	3208	0003	3110	5203	4308
Y	2109	0013	4212	1310	2310	3111	4315	0306	5110	3006	2111	6209	5011
Z	3001	2212	1012	5103	6209	1315	1100	4000	4315	5206	4310	5106	7010
A	5009	7213	7000	2203	5208	1013	1310	4305	4001	0102	4215	3105	2111
B	3205	5312	5207	7200	0213	7112	6113	5009	0104	0001	1315	5305	7011
C	6102	6100	0207	7113	3108	5214	1307	0006	6103	0304	0010	1110	3204

TABLE B (Cont)
RANDOM NUMBER ASSIGNMENT TABLE
NO. 1 ESS
REGULAR BAYS

	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.	CSLe.
D	4311	1012	4014	5112	1111	2114	6103	2014	3008	1313	0001	7312	6106
E	5210	5107	6314	6100	0107	2015	5312	2211	2013	5200	2114	3010	2312
F	5110	6309	7014	3214	1204	1214	1111	1205	4201	6206	0103	4014	6012
G	3208	0104	3113	1212	2313	3315	1014	2006	2003	0305	3107	2311	1206
H	1201	0210	2113	7309	4302	4013	3011	1211	7300	2315	4210	0012	1015
I	7101	7206	6104	7112	4006	3007	0013	0304	6107	5311	5202	3208	0201
J	4309	7113	3315	2113	7105	3211	1214	0311	0111	7014	5306	2214	4002
K	2103	4014	5011	1103	7112	6203	3211	5315	3307	4111	4115	1109	5003
L	1009	3015	0312	6013	1105	3209	3300	0315	4101	1104	3115	1012	7107
M	4100	2214	5301	2115	3114	7204	4100	1007	7015	0108	7108	2106	1311
N	7114	2003	3304	6115	3015	2311	4313	5101	2215	0008	0113	5203	6311
O	6113	5310	1009	5200	6304	7112	3009	1003	0013	0002	7010	7004	4313
P	3306	7215	0202	0104	3215	6102	0112	7205	0204	7205	5303	1105	3114