

CONTROLLED MAINTENANCE PLAN

2-WIRE NO. 1 ELECTRONIC SWITCHING SYSTEM

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1. GENERAL

1.01 This section describes the specific plan for the maintenance of the No. 1 Electronic Switching System (ESS) and applies to all 2-wire No. 1 ESS offices. This plan specifically addresses the application of maintenance procedures for the No. 1 ESS and is supplemented by Section 201-020-510, General Controlled Maintenance Plan for Switching

systems. Section 201-020-510 gives the general principles, definitions, descriptions, explanations, and examples of the controlled maintenance concept. It is essential that the user be thoroughly familiar with the general controlled maintenance information stated in this document as a prerequisite for use of the No. 1 ESS Controlled Maintenance Plan.

1.02 This section is being reissued to align the No. 1 ESS Controlled Maintenance Plan with the General Controlled Maintenance Plan for Switching Systems (Section 201-020-510). This reissue includes the introduction of some new and changed maintenance control forms, switching control center operating procedures, and other general revisions. Since this reissue covers a general revision, arrows ordinarily used to indicate changes have been omitted.

1.03 The overall objective of a controlled maintenance plan is to maintain the designed switching capability of the equipment in a manner that will provide customers with excellent service while keeping operating expenses to a minimum. This section contains information and examples required to apply controlled maintenance to the No. 1 ESS.

1.04 The maintenance of Stored Program Control Systems (SPCS) is shifting toward centralized maintenance. Many of the forms and activities described in this plan will be completed by a Switching Control Center (SCC) in a centralized maintenance environment. This plan is to be implemented and administered in conjunction with the Network Maintenance Management Plan, Section 190-130-201.

1.05 Recommendations for changes, additions, or deletions to this section or to any of the controlled maintenance documents should be made on Form E-3973 as specified in Section 000-010-015.

2. CONTROLLED MAINTENANCE

2.01 *Controlled Maintenance* is the term applied to the maintenance plan described in this section. It consists of an appropriate balance of corrective and preventive maintenance tailored to meet the needs of the No. 1 ESS. A general description of controlled maintenance can be found in Section 201-020-510, General Controlled Maintenance Plan for Switching Systems.

Corrective Maintenance

2.02 The No. 1 ESS maintenance plan relies heavily on corrective maintenance. This approach is practical because the No. 1 ESS can detect and report to the maintenance force the first failure of most equipment and provide sufficient details to locate and remove the malfunctioning equipment from service. With the retrieval feature, such troubles may have little or no effect on customer service. Automatic testing will detect many faults with a minimum amount of manual effort, before they appear as call processing failures.

Preventive Maintenance

2.03 Preventive maintenance cannot be totally eliminated for the No. 1 ESS. Some equipment requires periodic cleaning, lubrication, or adjustment. Also, it is impossible to quickly obtain adequate trouble location details in some equipment areas. These troubles can be located only through routine testing.

3. TROUBLES, THEIR CAUSES, AND INFLUENCING FACTORS

3.01 Refer to Section 201-020-510, Part 3.

4. PREVENTIVE MAINTENANCE

A. Manual and Automatic Routine Identification

4.01 A description of all automatic tests, including those classified as preventive maintenance, can be found in Part 5 of this section. Those routines which are identified as preventive maintenance are identified in the No. 1 ESS Equipment Test List (ETL), Section 231-001-012 and Section 231-001-013

4.02 The No. 1 ESS ETL covers only the hardware unique to the No. 1 ESS. The Controlled Maintenance Plan for a given No. 1 ESS central office will use a number of different ETLs, each pertaining to a different class of equipment contained in that Central Office, i.e., power equipment, transmission equipment, etc. Table A lists the ETLs that may be required for a No. 1 ESS office. Additional ETLs may be required depending upon office equipment and configuration.

Note: Refer to Section 201-020-510, Part 4, for a detailed description of Preventive Maintenance procedures.

B. Scheduling of Routines (Form E-5450 and E-5451)

4.03 In No. 1 ESS central offices, two types of ETLs are used. The first type involves those Practice tests and inspections which are performed using test frames, test sets, or other such tools. The second involves the use of programmed diagnostic tests which are *not* run by the system on a regularly scheduled basis.

Note: For offices in which the preventive maintenance is scheduled by means of the Central Office Maintenance Management System (COMMS) or other applicable mechanized scheduling systems, Forms E-5450, E-5451, E-5452, E-5453, and E-5454 do not apply. Refer to the 190 series of Bell System Practices for information concerning COMMS.

4.04 Form E-5450, Equipment Test List (Fig. 1) contains columns listing the Bell System Practice, test requirements or paragraph, work description, test classification, frequency, and job number assigned in the office. Form E-5451 (formerly E-5845), Preventive Maintenance Schedule (Fig. 2), provides columns for listing the assigned job numbers (Form E-5450) for tests, equipment and work description, class, frequency, time, monthly schedule, etc.

Note: See 4.17 for adjusting estimated times for completion of routines (minutes per assignment, Form E-5451).

4.05 The No. 1 ESS Equipment Test Lists employ Form E-5450 and are contained in Section 231-001-012 and 231-001-013. In order to provide a complete record of all tests and inspections found in the Bell System Practice, the ETLs contain tests which may not apply to some offices. If certain tests on the ETL do not apply to a given office, NA should be written in the JOB NO. column of Form E-5450.

4.06 For other tests that are required in the office for which no ETL exists, the tests and the test interval information should be listed on blank E-5450 forms. Examples of these types of tests are building security, special equipment tests, inspections and samples, changing door code

alarms, safety items, and requirements for other equipment located in the office. A typical example of this application would be the establishment of a monthly MR (Mandatory Review) routine to verify that automatic trunk testing is scheduled and running. Form E-5451 is also used to schedule these routines as described above.

Note: The Equipment Test Schedule, Form E-5451, is perforated so that the scheduling portion can be removed and the remaining list of routines can be used in preparing the routine schedules for the following year.

C. Assignment and Results Recording of Routines (Form E-5452)

4.07 Form E-5452, Test and Inspection Work Order and Record, is used as the preventive maintenance work order and record of work performed. The front of Form E-5452 (Fig. 3) provides spaces at the top for recording assignment data, Practice number, equipment, work description, units involved, and progress made. The bottom of the form is for recording details of trouble(s) found and action taken. The back of the form provides more spaces for recording trouble details.

Note: For offices in which the preventive maintenance is scheduled by means of the Central Office Maintenance Management System (COMMS) or other applicable mechanized scheduling systems, Forms E-5450, E-5451, E-5452, E-5453, and E-5454 do not apply. Refer to the 190 series of Practices for information concerning COMMS.

4.08 Form E-5452 is issued for job assignments listed on the Preventive Maintenance Schedule (Form E-5451). Each time a job is assigned, a Form E-5452 is prepared except as noted in 4.10. Assignment and reference data are obtained from the assigned test and inspection summaries.

4.09 Form E-5452 specifies the work to be performed, and the details of the test failures and troubles found are to be entered in the spaces provided. Completion or partial completion details concerning a job are noted in the progress portion of the form.

4.10 Some tests and inspections do not ordinarily result in many found troubles or require a

great number of separate work operations. In these cases, it is not necessary to prepare Form E-5452. Test or inspection results may be directly recorded on Form E-5453 or E-5454. (See 4.12 for descriptions of Forms E-5453 and E-5454.)

4.11 All Test and Inspection Work Order and Record forms (E-5452) are to be filled out at the beginning of each month. In a Switching Control Center (SCC) environment these forms are then transmitted to the dispatch forces for scheduling and loading. In a non-SCC environment, these forms are maintained and controlled by central office personnel.

D. Summary of Routine Results (Forms E-5453 and E-5454)

4.12 Forms E-5453 or E-5454, Test and Inspection Summaries, are prepared from the Preventive Maintenance Schedule (Form E-5451). Space is provided on these forms for summarizing found troubles and craft work time for routines. These forms are also the source of information for preparing the Test and Inspection Work Order and Record (E-5452).

- Form E-5453 (see Fig. 4) provides spaces on the front for recording assignment data, Practices number, equipment, work description, number of equipment units involved, estimate of work time and results of work done. The back of the form provides additional spaces for results.
- Form E-5454 (see Fig. 5) is a smaller (5" X 8") version of Form E-5453. This form is more suitable where it is desired to set up a card file arrangement for test and inspection routines.

Note: For offices in which the preventive maintenance is scheduled by the Central Office Maintenance Management System (COMMS) or other applicable mechanized scheduling systems, Forms E-5450, E-5451, E-5452, E-5453, and E-5454 do not apply. Refer to the 190 series of Practices for information concerning COMMS.

4.13 Central office use of the Test and Inspection Summary Form (E-5453 or E-5454) should be in terms of the form which best meets the needs of a particular office. Either E-5453 or E-5454

(printed on heavy card stock) can be used but not a combination of both forms.

4.14 Form E-5453 or E-5454 must be prepared for each MW, MR, or TF requirement specified on the Preventive Maintenance Schedule, E-5451. These forms and procedures should also be applied to other equipment in the office even if it is not an integral part of the No. 1 ESS.

4.15 Form E-5453 or E-5454 provides the necessary information for preparing Form E-5452, Test and Inspection Work Order and Record. When the work order (Form E-5452) has been completed by the craftsperson, the trouble details, time spent, and initials of the craftsperson are to be transcribed on Form E-5453 or E-5454.

4.16 For a given office, there will be some tests on which few troubles are expected and the work can be completed in one working tour. In these cases, Form E-5453 or E-5454 may be used as both the work order and summary, and the test results may be posted directly on these forms (see Fig. 4 and 5).

4.17 Periodically, the *actual times* required to perform the tasks denoted on the Test and Inspection Summary, Form E-5453 or E-5454, **must be reviewed and adjusted** in order to more accurately forecast the time requirements necessary when scheduling jobs on the Preventive Maintenance Schedule (E-5451).

4.18 The following forms are to be administered and controlled by the SCC.

- Equipment Test List (E-5450)
- Preventive Maintenance Schedule (E-5451)
- Test and Inspection Work Order and Record (E-5452)
- Test and Inspection Summary (E-5453, E-5454)

Fig. 6 provides a simplified chart illustrating the use and flow of these forms.

5. CORRECTIVE MAINTENANCE

5.01 Corrective Maintenance consists of the activities associated with logging reports and locating, repairing, and recording the details

of troubles reported by the maintenance teletypewriter, customers, operators, alarms, other offices, testboards, Switching Control Center Systems, or other sources.

5.02 The primary means of communicating with the No. 1 ESS and determining system performance is through the maintenance teletypewriter (MCC-TTY).

Note: Reference to the MCC-TTY throughout this document also implies the capability of duplicate actions from SCCS data terminals.)

The MCC-TTY is also used by maintenance personnel to request a variety of system actions. In order to assist maintenance personnel in utilizing the MCC-TTY and evaluating system responses, three documents are provided:

- **Input Message Manual:** The input message manual lists TTY messages that can be typed on the maintenance TTYs to request a system action or function. A description of the format and the use of each message, as well as cautions and expected results, are given for each message. The messages are arranged in alphanumerical order, and a topical index guides the reader to the specific message to be used. Some of the types of actions and functions that these messages request are:

- (a) To diagnose a system unit
- (b) To initiate traffic counts
- (c) To trace a call
- (d) To read from or write into memory locations.

- **Output Message Manual:** The output message manual lists in alphanumeric order all the system output messages printed by the TTY. This document contains a description of each message, the reason each message was issued, the actions to be taken, if any, as a result of the message having been issued, and alarm indications that should accompany the message.

- **Trouble Locating Manual:** The trouble locating manual (TLM) is a maintenance document which supplements the output

message manual to help in locating troubles within system units. A TLM usually covers one functional unit of the system (for example program store, call store, etc). The TLM lists trouble numbers that are matched with numbers generated by the system during diagnostic tests. Trouble indications not having a matching TLM number can be resolved by the use of the Centralized Automatic Trouble Locating Analysis System (CATLAS). Refer to the 190 series of Practices for details concerning CATLAS. Except for TLM-1A001 on trunks and TLM-1A121 on TTYs, a TLM carries the same number as the *schematic drawing (SD)* of the functional unit with which it is associated.

A. Automatic Testing

5.03 In the No. 1 ESS there are three categories of automatic testing:

- (1) **Fixed Automatic Testing:** These tests are initiated from a fixed schedule contained in the generic program and are conducted daily. They are generally initiated during light traffic periods and consist of a series of exercises or tests on the control units, peripheral units, and TTY channels.
- (2) **Scheduled Automatic Testing:** These tests are initiated from a schedule contained in the traffic work table. This schedule is created on a per office basis. Included are operational tests for most of the outgoing and two-way trunks and service circuits, and automatic line insulation tests (ALIT).
- (3) **On-Demand Automatic Testing:** These tests are *manually* initiated through the use of a MCC-TTY input message, or they are *automatically* initiated by the fault recognition programs. This type of testing is available for the majority of the equipment contained in the No. 1 ESS switching machine.

5.04 As a part of the automatic testing of the No. 1 ESS and the equipment that it controls, certain performance and status measurements are made and printed on the MCC-TTY on an hourly basis, i.e., error counts for the preceding hour, equipment status, number of maintenance interrupts, number of network failures, data link status,

program store, and program store bus status. See Table B for a listing of hourly messages printed on the MCC-TTY. Hourly message printouts may vary depending upon generic program applications per office.

5.05 Generally, after midnight and on a daily basis, a series of exercises are automatically initiated by the generic program. These tests, commonly referred to as the *midnight routines*, are conducted on the following equipment areas:

- Central Control (CC)
- Program Stores
- Signal Processor
- Data Links
- AIOD
- Call Stores and Call Store Buses
- Signal Processor Call Stores
- Signal Processor Call Store Buses

The diagnostic results of these tests are reported via a teletype message generated on the MCC-TTY. The output messages take the format of DR01 and DR05 printouts. These messages must be analyzed for possible trouble conditions or failures. Analysis tickets should be generated as an input to the analysis file where the hourly messages indicate abnormal or trouble conditions. This applies to units that continuously fail automatic routines but pass manually initiated diagnostic tests.

Automatic Progression Testing

5.06 The automatic progression testing program is automatically started from the main program on a scheduled basis. Each time the automatic progression test is initiated, the trunk maintenance request list (TMRL) is examined for trunks that have remained on the list since the last program trunk test. All such trunks are removed from the TMRL and identified by a TTY message (TN01, TN02, TN03, TN04) for action. After checking the TMRL, trunk automatic progression testing begins. Trunks for testing are selected numerically by network number. The selection

includes idle, busy, and unassigned trunks. The circuit actions required to test the trunk are set and the trunk is tested. Trunks that pass the test are returned to the idle list, and trunks that fail are entered on the TMRL with an accompanying message on the TTY. It is recommended that automatic progression testing be scheduled to completely test the office at least once per week during periods of low traffic.

Automatic Line Insulation Tests (ALIT)

5.07 The ALIT checks line insulation values. All idle lines, except ground-start PBX lines, are tested. The ALIT is normally started at a specific time of day (determined by the Traffic Work Table) but can be initiated from the MCC-TTY or the local test desk. It is suggested that the ALIT be run each night and test all lines. The scheduling of the ALIT should be mutually agreed upon by the Repair Service Bureau and the central office maintenance force. The following tests can be performed:

- Short Circuit and Ring to Ground (SRG)
- Tip and Ring to Ground (TRG)
- Foreign Potential on Tip or Ring (FEMF)

When a line insulation test failure is detected, it is reported via teletypewriter printout.

Trunk and Service Circuit Testing

5.08 Trunk and service circuit automatic testing is originated directly from the MCC-TTY, trunk and line test panel, or scheduled automatically as indicated by the Traffic Work Table. For testing purposes, any circuit that is assigned a trunk network number and that is connected to the trunk link network is tested as a trunk circuit.

5.09 Upon completion of testing, the test administration program restores trunks that passed tests to an idle list or places trunks on the maintenance request list (TMRL) or trunk out-of-service list. A TTY message is given for all failures found.

B. Monitoring and Evaluating Office Performance

5.10 In order to monitor and evaluate the No. 1 ESS office performance, a program for

recording certain system measurements is to be established and maintained. This program is based on the manual entry of selected service, performance, and administrative measurements on Form E-5230, No. 1 ESS Control Record (see 5.15). This information is entered on a daily basis and then reviewed and compared against an established set of office performance objectives.

5.11 The primary source of office performance data entered on the Control Record is the daily maintenance count printout PM01, customer trouble reports (from local repair service), and AMA (automatic message accounting) printouts (from comptroller and accounting departments). The PM01 printout appears on the MCC-TTY at 2:30 a.m. each morning during low traffic conditions. The data printed has not been processed in any manner, but the format of the message is such that maintenance personnel in the central office can easily observe weekly trends in the performance of the office. Each day's counts are printed with one column of data on the left and a short description of the count just to the right. At the top and bottom of each printout is a sequence of numbers. These numbers serve as guides for a set of tear lines to aid in trimming the printout in accordance with the day of the week. The sheets are to be punched on the right edge and filed on the left facing page of a notebook. Monday's printout should be filed as is. Tuesday's printout should be trimmed along the "1" line and the "V" line. On each successive day of the week the printout is trimmed along the "V" line and the line corresponding to that day of the week. At the end of the week maintenance personnel will have seven adjacent columns of data over which to observe any trends in performance.

Note: The PM01 printout may be filed according to the method described above or any other system that meets local needs. Retention of these printouts as office records should be in accordance with Part 8.

5.12 On the 23rd day of each month, following the PM01 printout, a PM02 message is printed on the MCC-TTY. This printout accumulates data for the current service month into a summary format, which is then entered on the Control Record for the monthly total. For a complete description of the PM01 and PM02 printouts, see Section 231-120-302.

SECTION 231-001-010

5.13 In addition to the daily and monthly printouts (PM01 and PM02), plant measurement counts are also available to central office maintenance personnel upon teletypewriter request. During any trouble condition experienced by the system, maintenance personnel can request specific daily or monthly counts from any TTY channel by the use of the PLNT-MEAS-XXX input message. The system responds to the PLNT-MEAS-XXX input messages with a PM03 output message. See Section 231-120-302 for the use of the PLNT-MEAS-XXX message and cautions that should be exercised by maintenance personnel in utilizing the PM03 message.

5.14 Care must be exercised in the interpretation of the counts printed in the PM03 output message because not all counts are totally representative of the events in the system at any one time. Several of the counts are incremented only quarter-hourly or hourly. The PM03 output message is provided only to give maintenance personnel a general picture of the operation of the system. The counts are *not* zeroed after a manual printout request.

Control Records (Forms E-5230 and E-5230-1)

5.15 The Control Record, Form E-5230 (see Fig. 7), is designed to provide a simplified system for monitoring and evaluating the No. 1 ESS office. It provides a current picture of office performance on a daily basis which can then be compared to other daily performance levels and the current office performance objectives.

5.16 The Control Record (Form E-5230) format is arranged to facilitate easy transfer of information from the PM01 and PM02 printouts (Plant Measurement TTY messages) to the Control Record and to aid in the preparation of the Network Switching Performance Measurement Plan. Lines are provided for recording the individual measurement counts for each of the possible 31 days in a report period, including a total for the complete period. Day 1 of the reporting period is the 23rd day of the month. The reporting period ends on the 22nd day of the following month. At the end of the first 10 days and at the end of 20 days of the report period, lines are provided to enter the 10-day and 20-day office performance objectives and totals of the information columns for the actual previous 10 days office performance. This arrangement of the interim office performance totals and objectives allows for easy recognition

of real or potential service problems. At the end of the period, lines are provided to enter the objectives for the reporting month and the monthly office performance column totals. Objectives will be established for each of the individual measurements that is entered on Form E-5230. These objectives will be set to coincide with the 10-day, 20-day, and end-of-reporting-period totals. In determining objectives, use the previous month's base data for setting category goals. Objectives are to be established by the first day of the period and entered on the lines immediately below the 10-day, 20-day, and end-of-month total lines.

5.17 The information entered on the No. 1 ESS Control Record is obtained from the following sources:

(1) E-5230, Front

- Base Measurements—PM01
- Service Measurements—PM01
- Maintenance Measurements—PM01
- Performance Measurements—PM01

(2) E-5230, Back

- Performance Measurements—PM01
- Other Measurements
 - (a) Automatic Progression Testing—PM01
 - (b) Timeouts—PM01
 - (c) Peg Counts—Traffic
- Peripheral Orders—Hourly Printout Totals or SCCS Data
- Network Outage—PM01
- AMA Billing—Accounting and/or Running Total Log
- Customer Reports—Local Test Desk or Central Office Log

5.18 Form E-5230-1, No. 1 ESS Hourly Control Record (see Fig. 8), is optional and is provided for taking hourly measurements only

when dictated by specific trouble conditions or individual performance indicators, i.e., excessive false cross and grounds, supervisory failures, coin control failures, etc. As long as office performance is within set objectives, Form E-5230-1 is not required, but it may be used for special studies or general information purposes as required.

Setting Objectives

5.19 Significant deviations in the level of service can be readily detected through the use of preset objectives. By setting realistic objectives, the quality of customer service, level of office performance, and maintenance/administration of the No. 1 ESS can be evaluated. The attainment of these objectives can be used to determine if any changes are required in office maintenance. Failure to meet set objectives may be the stimulus for detailed analysis of maintenance teletypewriter printouts. See 5.21.

5.20 The establishment of objectives for a No. 1 ESS office is based on the attainment of high levels of service performance. The specific figures which are indicative of excellent service will become evident as experience is gained in the operation of No. 1 ESS central offices and by comparing results from the Network Switching Performance Measurement Plan. In setting the performance objectives for a central office, the performance index goal that is desired must be evaluated in terms of the cost of obtaining that goal. In the event that current performance is far below the index goal, it may be necessary to set interim objectives that can be met in a short period of time with a reasonable amount of effort. Unattainable or unreasonable objectives tend to have a detrimental effect on attempts to improve office performance. Office objectives must be re-evaluated periodically to reflect changes in office performance.

Analyzing Trouble Indicators

5.21 The maintenance teletypewriter is the primary source of maintenance information in the No. 1 ESS. A successful corrective maintenance program depends upon the effective use of the information received from the system on the MCC-TTY.

5.22 Output messages can be placed into three categories:

- Responses to input messages
- Status or informational reports
- Failure reports

Input message responses and failure reports are normally handled in a routine manner because they are the result of an outside request or source. However, messages that report status, counter readings, or failures, which may require immediate attention from craft personnel, may be ignored or improperly handled. Many of these messages are forewarnings of serious failures that may create system outages if they are not promptly investigated and corrected. A successful corrective maintenance program must include a formal routine for the administration and analysis of these messages.

5.23 It is unfeasible to take action on every status or failure report message that appears on the maintenance TTY. Therefore, the goal of a controlled maintenance plan is aimed at keeping failures and errors within the designed parameters of the system, i.e., alarm thresholds, message expansion, network errors, trunk error analysis tables, etc.

5.24 A formal routine for handling maintenance teletypewriter messages is to establish groupings for the various output messages and determine an acceptable level for each group. When the level (failure, errors, etc.) is exceeded for a group or subgroup in a given time frame, a detailed analysis of that group of messages is to be performed. Each group of messages should be analyzed periodically to identify any hidden faults in an attempt to improve the level of office performance.

5.25 For further information concerning analysis of messages, see 5.30.

Equipment Removed From Service

5.26 All No. 1 ESS offices are required to maintain a record of equipment outage in accordance with Section 201-114-001. Whenever a piece of equipment is removed from service or returned to service, an appropriate output message is transmitted to the maintenance TTY. These messages will

provide the information required by the Equipment Outage Log, Form E-4256, Fig. 9.

Equipment Status

5.27 The No. 1 ESS provides status reports on all pieces of equipment through status output messages, alarm and display control panel, and SCCS critical indicator panels. Some status reports are given daily at the conclusion of automatic testing, and other status reports can be provided on demand by using the appropriate input message. Maintenance personnel should be continuously aware of the equipment status for control units, peripheral units, trunks, service circuits, teletypewriter controllers, and attendant consoles.

5.28 Those units of equipment which are shown to be out of service and are not known cases of trouble or were not intentionally removed from service, are to be returned to service. The machine will test the unit before attempting to restore it to service. All units that cannot be restored to service should be investigated using approved trouble correcting techniques. Any common equipment troubles that cannot be cleared in a reasonable time should be handled according to escalation procedures contained in the Emergency Action Binder. See 7.03.

5.29 If the MCC-TTY equipment status reports contain trouble information that may be valuable in future analysis activity, this data is to be filed in the analysis file (see 5.30 through 5.36) and analyzed on a weekly basis. Any unit that continuously appears as out of service will require a detailed investigation.

Analysis File

5.30 For SCCS controlled offices much of the manual analysis effort and the associated message filing system is eliminated through the use of support equipment. For SCCS controlled offices and the analysis techniques to be used refer to the 190 division of Practices.

5.31 The analysis function in non-SCCS controlled offices requires the systematic storage of trouble indications from the maintenance TTY for those groups of messages that are currently being analyzed. In addition, messages will appear that the maintenance force would like to save for investigation at some future date although the

current level of performance does not call for an analysis of that group of messages. See 5.36 for a system to be used for analysis if teletypewriter printouts cannot be stored conveniently.

5.32 The hardware that is suggested to be used for the analysis file (see Fig. 10) is the same as the trouble ticket file. It should be located in the maintenance center or the SCC analysis work station for ready reference and study. It may be a separate file or a continuation of the ticket file.

5.33 The composition of the analysis file will vary widely between offices. The primary purpose of the analysis file is to organize output data and maximize its use. If the number of troubles in the system increases, the volume of printouts will increase. This may necessitate an expansion of the analysis file into more bins to separate the printouts into more meaningful groups. These groups should provide the means for more effective use of the data to isolate and clear troubles. The clearing of troubles will reduce the number of printouts and ultimately reduce the size of the analysis file. In the management of the maintenance job, the composition of the analysis file should be regularly reviewed in terms of the current level of printouts and the effectiveness of the file.

5.34 All output messages which provide trouble indications should be considered for filing in the analysis file, unless the message indicates a specific trouble and becomes a trouble ticket. When, as a result of analysis, certain output messages lead to the location of a trouble, these output messages should be associated with the ticket which records this trouble and the trouble ticket removed from the analysis file.

5.35 A basic problem in the use of the analysis file is the continuing need to eliminate extraneous information. Transient trouble conditions may generate output messages which will tend to clog the analysis file and make effective analysis more difficult. Age is one of the best measures to use in evaluating worth of the messages. In most cases, messages which do not become associated with similar messages within one week may be considered extraneous and can be discarded. However, sound judgment must be used in clearing the analysis file of unnecessary data.

5.36 In the past, the maintenance forces have cut the actual TTY printout into individual

messages for filing. These strips of paper are difficult to handle and have no room for notations. A central office may elect to use an analysis ticket for filing pertinent teletype messages in the analysis file. The Analysis Ticket, Form E-10029 (Fig. 11), is 3 1/2 inches by 7 inches and is used to copy or attach messages that require analysis and add details concerning the message.

C. Correcting Troubles

Repair Effort Priority

5.37 Service continuity of the No. 1 ESS is achieved by the duplication of all critical units. The loss of any duplicated unit will generally not affect traffic capacity/capability; however, the duplication or redundancy on which the reliability of the system depends will be lost and will result in service outages if the mate of the out-of-service unit develops a fault. The longer a duplicated unit is out of service, the greater is the probability that the mate will also experience a failure condition resulting in a system outage. It is, therefore, essential that a maintenance policy be followed which results in the quick repair and restoration to service of all critical units. Requests for assistance in the repair of critical units is covered in Part 6.

5.38 In cases of multiple troubles, effort should be applied to units in the following order of priority:

- (1) Central Processor
- (2) Networks
- (3) Other Major Peripheral Units
- (4) Trunks and Service Circuits

5.39 Intermittent troubles should not be ignored. The plant measurement printouts and other maintenance TTY messages are provided to assist in gathering the necessary information to recognize the existence of an intermittent trouble. Action must be taken to clear intermittent troubles associated with critical units on the same priority as hard faults. A number of major system outages have been the result of prolonged tolerance of intermittent troubles without seeking appropriate assistance.

Trouble Ticket

5.40 Trouble tickets are corrective maintenance work orders and records for central office maintenance personnel. These tickets are source documents for the details of trouble reports and the results of investigations into trouble conditions or reports. It is important that tickets be written for all trouble reports from customers, alarms, TTY printouts, operators, connecting offices, and other departments, as shown in Table C, when corrective action has been taken or the need for corrective action is present. All entries are to be complete, accurate, and legible. It is the supervisor's responsibility to instruct all craft personnel in the proper writing of trouble tickets and to assure that these instructions are being followed.

5.41 Form E-5231, No. 1 ESS Trouble Ticket (Fig. 12 and 13) is provided for the standardized recording of trouble in a No. 1 ESS office. The front of the trouble ticket provides space for entering information concerning reports and trouble indications. The back of the trouble ticket provides space for recording more detailed information about the trouble action taken, trouble location, coding information etc. A coding scheme is also provided for categorizing the final disposition of the trouble report. The form is 3 1/2 inches by 7 inches, printed on white paper and is designed to fit into a shirt pocket.

5.42 When tickets are closed out, details of found or not found troubles are recorded for future use on the back of the ticket. The right-hand portion of the back of the ticket is arranged for coding trouble data. One entry in the SOFTWARE/EQUIPMENT categories and one entry in the CAUSE category is to be checked to describe the nature of the trouble. All troubles which are found in the apparatus or wiring of an equipment frame should be coded to that equipment. Troubles which *came clear while testing* but which have been isolated to a particular equipment frame are also coded to that equipment. See Fig. 13 for trouble coding guidelines and Table D for a trouble coding decision chart.

5.43 Each trouble ticket must have an entry in the DISPOSITION block, located on the front of the ticket (Fig. 12). This entry will be alphanumeric and is obtained by combining the Trouble Coding information located on the back of the ticket (Fig. 13). The alphanumeric that is

formed by combining the SOFTWARE/EQUIPMENT and CAUSE entries is entered in the DISPOSITION space. See Fig. 14A through 14I for completed examples of No. 1 ESS Trouble Tickets.

Trouble Ticket Numbering

5.44 For identification and reference purposes, all trouble tickets must be numbered. Any numbering scheme that meets the needs of the central office/SCC may be used, i.e.

- 1, 2, 3, 4, etc — Serial Numbering
- 7-1, 7-2, 7-3, etc — July Trouble Tickets 1, 2, 3, etc.
- 3C1, 3C2, 3C3, etc. — March Customer Log ticket 1, 2, 3, etc.
- 11E1, 11E2, 11E3, etc, — November Equipment Log ticket 1, 2, 3, etc.

Central Office Log

5.45 The primary purpose of the Central Office Log, Form E-5457, is the recording of trouble reports and any unusual central office activity (installation or contractor work) which could result in trouble reports. Several separate central office logs for hardware, software, trunks etc., may be kept if the office is large. See Fig. 15 for an illustration of the Central Office Log, Form E-5457. Refer to Section 201-020-510, Part 5, for a description of the Central Office Log.

Note: For SCCS controlled offices the SCC Log is to be used.

D. Analysis of Trouble Records

Trouble Ticket File

5.46 The initial step in trouble analysis is the creation of a Trouble Ticket File which provides for the systematic storage of all trouble tickets. Trouble tickets are to be filed in accordance with the numeric portion of the disposition code found in the last line (right side) of the ticket front. The file should be located near the control analysis work stations in the SCC or in the maintenance center for offices not controlled by an SCC. See Fig. 10 for ordering information and an illustration of a suggested Trouble Ticket File.

5.47 In the ticket file, the ticket bins should be allocated similarly to the arrangement shown in the Table E. All "T" tickets are to be filed together according to the equipment or software group in which the troubles are found. All NTF tickets which cannot be associated with a particular unit of equipment should be filed in the bin designated as *NTF*. Separate bins are designated for filing *Memo, Hold for Repair*, and *Pending* trouble tickets issued during the current month. Spare bins may be used for special studies. As experience is gained with an office, the supervisor can change the layout of the ticket file as required to meet the needs of that particular office.

Trouble Summary

5.48 The second step of trouble analysis is the recording by month of the number of troubles associated with the designated equipment and their cause groups, the comparison of troubles by months (trends), the comparison of troubles with the past year's average, and the comparison of troubles with an objective trouble level.

5.49 Form E-5463, Trouble Summary, is provided for this purpose. A detailed description of the Trouble Summary can be found in Section 201-020-510, Part 5.

5.50 Fig. 16 is an illustration of Form E-5463 including examples of typical entries. All trouble ticket disposition codes are grouped under the recommended major headings listed in Table E. These major headings, which also appear on the ticket file, are used on the Trouble Summary. If conditions dictate, any of the major headings may be expanded to provide a more detailed Trouble Summary.

Analysis of Maintenance Records

5.51 The last stage of analysis is to be a detailed review of all maintenance records including the results of the Preventive Maintenance routines, the Trouble Summary, the Central Office Log, and, if necessary, individual Trouble Tickets. The Trouble Summary presents trouble data in large enough segments so that developing trends can be recognized. When adverse trends are seen, investigation should be made for determining the cause and adjustments made to maintenance activities as required. This analysis should include investigation into the type of apparatus or software in which

the trouble existed and the cause of troubles. This last stage of analysis should be performed at least every six months.

5.52 The analysis of maintenance activity includes establishing procedures to reduce corrective maintenance effort as well as making recommendations (to AT&T) concerning the adjustment of preventive maintenance routines, i.e., frequency adjustments, deletion or addition of routines, etc. Recommended changes should be submitted using Form E-3973 per Section 000-010-015.

6. MAJOR OUTAGES—OUTSIDE ASSISTANCE AND REPORTS

6.01 Stored Program Controlled Systems (SPCS) are more susceptible to complete system outages than are electromechanical systems. In order to minimize this outage time, a system of expertise has been developed in the to assist the central office in preventing equipment outages and/or recovering from total outages by quickly restoring duplicated units of equipment to service.

6.02 The structure of this hierarchy as defined by AT&T is as follow:

- (1) Central Office
- (2) Switching Control Center (SCC)
- (3) Technical Assistance Center (TAC)
- (4) Western Electric Regional Diagnostic Center
- (5) Western Electric Product Engineering Control Center (PECC)
- (6) Bell Telephone Laboratories (BTL)

The first three levels are operating telephone company organizations and can be structured differently in each company.

6.03 Failure of both units of duplicated equipment is the largest contributor to SPCS outage time. Therefore, it is important that all critical units be quickly repaired and restored to service. Requests for assistance in the repair of critical units should be referred to the next highest level of expertise as soon as it is apparent that the craftperson currently working on the problem is

not making definite progress toward repairing the equipment. Normally, this time period should not exceed four hours and, in many cases, experience has indicated that the request for assistance should have come after two hours or less of out-of-service time if it appears that no progress is being made. Each level of expertise should make the decision as to when to refer the problem to the next level.

Note: Each location must be familiar with operating company policies concerning the escalation of maintenance problems.

6.04 In the case of a complete system outage, the request for assistance should be made immediately. Complete instructions for requesting assistance in accordance with individual operating company guidelines are contained in the Emergency Action Binder. See 7.03. Fig. 17 is an example of a chart that should be placed in the Binder.

6.05 There is a natural tendency for personnel working on a problem to wait until the end of the shift or the end of the week before issuing a request for help to a higher level. This practice should be avoided. Those organizations that offer assistance normally work an eight-hour day, five days a week and, when possible, adequate advance notification should be given when requesting out of hours assistance.

6.06 AT&T, BTL, and WEC Co PECC have requested notification of all system outages through the use of Operational Trouble Reports (OTR) and Reports of Abnormal Service Conditions. Complete instructions concerning the submittal of these reports are to be maintained in the Emergency Action Binder.

7. DOCUMENTATION

7.01 The proper maintenance of a No. 1 ESS office depends upon the availability of the required documentation. Table F provides a suggested list of documents that should be available at the office or control center. The list applies mainly to No. 1 ESS equipment and should be supplemented as required locally, depending on the non-No. 1 ESS equipment present in the office.

7.02 A Broadcast Warning Transmission (BWT) log should be maintained for each office. Each overwrite added to the generic program should be entered on the log and a copy of each

BWT currently implemented in the office should be filed with the log.

7.03 Emergency action procedure books should be established for each office. A loose-leaf binder may be used to hold the information. The contents of each book should be comprised as follows:

- (1) A copy of all emergency action Practices. (All emergency action Practices are contained in the 231 series of Practices.)
- (2) Procedures to be followed for each type of emergency, i.e., loss of call processing, fire, power failure, etc.
- (3) List of names and telephone numbers of people to be notified in the event of an emergency.
- (4) Procedures to be used to obtain material from the WECO emergency supply stock.
- (5) Instructions for submitting operational trouble reports and reports of abnormal conditions.
- (6) Any other document(s) required by local management to be included in the binder.

8. RETENTION OF RECORDS AND ORDERING INFORMATION

8.01 The forms described in this section have been designed for containing useful information in an orderly fashion. The minimum length of time each record should be kept is found in the company record retention schedule. If it appears that it is advisable to retain certain records for a longer period than is indicated in the retention schedule, action should be taken to have the retention requirements changed. The normal practice should be to retain a record no longer than legally required.

8.02 A simple method for retaining these records is to establish large folders or mailing

envelopes, each marked with a month and the year. As each report month ends, records may be removed from the binders and filed in the appropriately marked envelope. At the same time, records in an envelope with a date that exceeds company retention requirements should be discarded. If stated retention periods exceed two years and reference to these records is infrequent, consideration should be given to storage of these records in records service centers.

Ordering Information

8.03 The forms required to implement the No. 1 ESS Controlled Maintenance Plan are packaged in the quantities shown below:

FORM NO.	FORMS PER PACKAGE
E-5230	50
E-5230-1	50
E-5231	50
E-5450	25
E-5451	50
E-5452	50
E-5453	25
E-5454	25
E-5457	50
E-5463	25
E-10029	50

Requisition orders for these forms will be for multiples of the quantities shown above and are to be formatted as follows:

(Quantity) Form Number

TABLE A
NO. 1 ESS ETL LIST

ETL	DESCRIPTION
026-001-011	Miscellaneous Equipment
030-001-011	Timers, Counters, Clocks, etc.
032-001-011	Miscellaneous Equipment
034-001-011	Recorders, Recorder Reproducers, etc.
065-001-011	Miscellaneous Equipment
069-001-011	Miscellaneous Methods
075-001-011	Tools and Materials
100-001-011	Test Equipment
103-001-011	Transmission Test Equipment
167-001-018	Power Units
201-001-011	Supplemental Information
231-001-012	No. 1 ESS
231-001-013	2-Wire No. 1 ESS

TABLE B

MCC-TTY HOURLY MESSAGES (SEE NOTE)

MESSAGE	DESCRIPTION
MA04	Count of errors
MA03	Reports the unit types and member numbers of subsystems in trouble (CC, PS, CS, etc.)
MA06	Prints all member numbers of the subtypes associated with scanners or network and signal distributors that are marked in trouble.
PS08	Prints some of the error data in the program store error record table.
PS09	Prints miscellaneous error information to support PS08.
MA05	Decimal count of the number of maintenance interrupts.
CS04	Reports status of all call store buses and call stores associated with the specified system (CC or SP)
MA15	Number of times the interrupt recovery program operated during previous hour.
PS03	Status of all program store buses and all program stores in the office.
NN13	Number of network failures of each type.
NN07	Number of links and number of switches requested out of service.
CTX14	Lists data links that are in an override state.
CTX19	Lists all data links in the emergency power state.

Note: Hourly printout messages are generic program oriented and may vary per program issue.

TABLE C

TROUBLE REPORT CLASSIFICATIONS

The major sources of trouble reports are assigned the following alphabetical designations for ease of identifying report sources on trouble tickets.		
TYPE OF TICKET	REPORT CLASS	REPORT SOURCE
T	A	Plant Service Center or Testboards
T	B	Network Administration, Network Service Center, or Traffic Department
T	C	Alarms — Critical or Duplicated Unit of Equipment Out of Service
T	D	Alarms — All other audible and visual
T	E	Maintenance Teletypewriter or Trouble Analysis
T	J	Other Offices or Other Sources or Reports
MEMO	No Class	All "Memo" Tickets

TABLE D
TROUBLE CODING DECISION CHART

ENTER INFO. IN ↓	IF TROUBLE IS FOUND	IF TROUBLE DISAPPEARS WHILE TESTING	IF EQUIPMENT IS NOT DETERMINED OR NO TROUBLE IS TESTED	IF TROUBLE LOCATES OUTSIDE OF CENTRAL OFFICE
A	ENTER EQUIPMENT AND LOCATION INFORMATION	ENTER EQUIPMENT AND LOCATION INFORMATION	NO ENTRY REQUIRED	CHECK ITEM 80. REF. OUT (SOFTWARE/EQUIPMENT)
B	ENTER CODE OF APPARATUS OR WIRING IF APPLICABLE	NO ENTRY REQUIRED	NO ENTRY REQUIRED	
C	CHECK ONE CAUSE	NO ENTRY REQUIRED	NO ENTRY REQUIRED	
D	CHECK ONE SOFTWARE/EQUIPMENT ITEM FOR EACH CASE OF TROUBLE			

ACTION TAKEN AND RESULTS OBTAINED	(D)	10. SOFTWARE		SOFTWARE/EQPT.
		20. PROCESSOR		
		30. PERIPHERAL		
		40. TRK. CKT.		
		50. DIST. FRAME		
		60. MISC.		
		70. NTF		
		80. REF. OUT		
	(C)	A. ENVIRONMENT		CAUSE
		B. WEAR		
		C. DEFECT		
		D. C. O. FORCE		
		E. OTHER FORCE		
		F. OTHER		
EQUIPMENT				
CKT PACK (B)	RELAY (B)	SWITCH (B)	FERROD (B)	FUSE (B)
FRAME (A)	LOCATION (A)	WIRING (B)		

TABLE E

TROUBLE TICKET FILE CATEGORIES/BINS

- 10. SOFTWARE
 - Generic
 - Line Translations
 - Trunk Translations
- 20. PROCESSOR
 - Signal Processor
 - Central Control
 - Program Store
 - Call Store
 - Central Pulse Distributor
- 30. PERIPHERAL UNIT
 - AMA
 - Scanner
 - Line Link Network
 - Trunk Link Network
 - Ringing and Tone
 - Teletype
 - Signal Distributor
- 40. TRUNK
 - Trunk Circuit
 - Service Circuit
 - Junctor Circuit
 - Facilities
- 50. DISTRIBUTING FRAMES
 - Distributing Frame
- 60. MISCELLANEOUS
 - Power
 - Centrex
 - Coin
 - Other
 - AIOD
- 70. NO TROUBLE FOUND
 - Originating
 - Terminating
 - Other
- 80. REFERRED OUT
 - Referred out
- PENDING
- MEMO
- HOLD FOR REPAIR

TABLE F

CONTROLLED MAINTENANCE PLAN RECOMMENDED DOCUMENTATION

I. The following is a list of ETLs and related Practices that are common to all 2-wire No. 1 ESS central offices for use in the controlled maintenance program. The content of this list will vary per office due to differences in office configuration (See Note).

<u>DOCUMENT</u>	<u>TITLE</u>	<u>DOCUMENT</u>	<u>TITLE</u>
026-001-011	ETL — Miscellaneous Equipment	069-305-301	General Cleaning of Equipment
026-355-701	DC Contactors Type KS-5722	075-001-011	ETL — Tools and Materials
026-365-701	Contactors Various	075-115-301	Hand Tools
026-370-701	Fuses, Mountings, Enclosures	075-120-701	Wire Wrapping Tool
026-371-501	Fuses and Fuse Panels	075-141-501	Insulating Gloves
030-001-011	ETL — Timers, Counters, Clocks, etc.	075-190-501	Soldering Irons
030-141-701	4A Timer	100-001-011	ETL — Test Equipment
032-001-011	ETL — Miscellaneous Equipment	100-101-101	35 Type Test Sets
032-724-701	Keys	100-136-701	Magnetic Latching Relay Timing Test Sets
034-001-011	ETL — Recorders, Recorder Reproducers, etc.	100-510-701	Electrical Indicating Instruments
034-351-701	Recorded Announcement	100-520-101	Portable Volt-Ohm-Millimeter
034-356-701	AMA Recorder KS-19125 List 1 and 2	103-001-011	ETL — Transmission Test Equipment
034-360-701	AMA Recorder KS-19125 List 3	103-204-100	TTS4
065-001-011	ETL — Miscellaneous Equipment	103-222-100	22A MW Reference Meter
065-100-501	Operator and Supervisor Chairs	103-327-100	MW Reference Generator
065-105-501	Ladders and Ladder Seats	103-327-500	MW Reference Generator
065-110-501	Extension Lamps and Cords	103-335-300	MW Distributing System
069-099-901MB	Ground Connections	103-335-502	MW Distributing System
069-001-011	ETL — Miscellaneous Methods	103-335-503	Idle Circuit Terminations
069-135-501	Solderless Connections	103-335-512	Jack Ended Outlets
		103-335-515	Transmission Test Lines
		103-344-701	24C Loop Check Generator

TABLE F (Cont)

CONTROLLED MAINTENANCE PLAN RECOMMENDED DOCUMENTATION

<u>DOCUMENT</u>	<u>TITLE</u>	<u>DOCUMENT</u>	<u>TITLE</u>
103-611-101	3C Noise Measuring Set	231-115-501	Office Alarms
103-620-101	6H Impulse Counter	231-125-302	MCC Alarm, Display and Control Panel
103-813-100	911 Data Test Set	231-128-503	OGT Circuit (SD-1A203-01)
163-220-701	Interrupter — Ring and Tone Plant	231-129-501	Line Insulation Test Circuit
167-001-018	ETL — Power Units	231-129-502	MF Test Environment Circuit
167-726-301	808A Ring and Tone Plant	231-129-506	Tone Presence Detector
167-727-301	812A Ring and Tone Plant	231-130-501	TLTP and STTP
201-001-011	ETL — Supplemental Information	231-131-501	Trunk Transmission (See Note)
201-204-501	Main and Intermediate Distributing Frames	231-135-501	TT Station Test Circuit
231-001-012	ETL — No. 1 ESS	231-136-501	TT Detector Test Circuit
231-003-501	TTY Facility Loop Tests	231-137-501	TT Detector Test Circuit
231-004-501	Memory Card Writer	231-148-301	Bus System Test Procedure
231-004-502	PS Memory Card and 1A MCW	231-151-302	Translation Check Procedures
231-004-701	1A MCW		
231-004-702	1A Memory Card Loader		
231-005-501	PS Memory Card — 759A Tool		
231-005-505	PS Memory Locations — 757A Tool		
231-006-501	8K Call Store Margin Check		
231-017-301	Dial Tone Delay Alarm		
231-024-501	Recorded Announcement		
231-001-013	ETL — 2-Wire No. 1 ESS		
231-105-303	System Evaluation		
231-114-501	Emergency Manual Line Circuit		

TABLE F (Cont)

CONTROLLED MAINTENANCE PLAN RECOMMENDED DOCUMENTATION

II. Program Documentation — The following documents are required to be kept in the central office. These documents are provided as a part of the Western Electric Equipment Order. The specific version and issue will depend upon the generic program installed in the office (see Note).

- PG — Program Document Index
- PD — Program Description
- PF — Program Flow Chart
- PR — Program Listing
- PI — Supplementary Information
- TLM— Trouble Locating Manual
- OM — Output Manual
- IM — Input Manual

III. Standard Drawings — The following information is required for each type of circuit installed in a given central office. These documents are provided as a part of the Western Electric Equipment Order (see Note).

- Schematic Diagrams (SD)
- Circuit Descriptions (CD)
- Wiring Diagrams (T)

IV. Office Records — These following documents are provided as a part of the Western Electric Equipment Order and are required to be kept in the central office (see Note).

- Hardware — One copy of the latest issue of all base drawings.
- Software — One copy of the following documents:
 - (1) Translation Data Assembler (TDA) Listing
 - (2) Parameter Data Assembler (PDA) Listing
 - (3) ESS forms

V. Miscellaneous — One copy of the No. 1 ESS Translation Guide is required for each office. Standing orders for any changes to this guide must be placed with the Western Electric Co. (see Note).

Note: In an SCC environment, the amount of documentation maintained in a central office should be kept to a minimum. Basic requirements would consist of selected BSPs, Input and Output Message Manuals, SDs, PDs, and T drawings.

EQUIPMENT TEST LIST						
B.S.P.	ISS	TEST OR REQ.	EQUIPMENT AND WORK DESCRIPTION	CLASS	FREQ.	JOB NO.
231-105-303	5		SYSTEM EVALUATION PROCEDURES			
		A	Central Control Test			
			Steps 1-6	MW	M	
			Steps 7-22	MW	6M	
		B	Signal Processor Test			
			Steps 1-3	MW	M	
			Steps 4-13	MW	6M	
		C	Program Store Test			
			Steps 1-3	MW	6M	
		D	Call Store Test			
			Steps 1-6	MW	I	
			I After each RC Update but not more than once per month			
			Steps 7-12	MW	6M	
		E	Peripheral Equipment Test			
			Steps 1-8	MW	M	
			Steps 9-16	MW	6M	
			Steps 17-20	MW	M	
			Steps 21-28	MW	6M	
		F	Peripheral Controller Enable Test	MW	I	
			I Following Growth to PU Bus			
		G	Lines, Trunks, and Service Circuit Test	TF	*	
231-114-501	4		EMERGENCY MANUAL LINE CIRCUIT TEST			
		A	Transfer Actions	MW	12M	
		B	Transfer of Individual Circuits	MW	12M	
		C	Busy Test of Associated Trunk	MW	12M	
		D	Customer Call to Oper & Oper Call to Customer	MW	12M	
		E	Dial Incoming Calls	MW	12M	
		F	Power Cross Detection	MW	12M	
231-115-501	7		OFFICE ALARMS			
		A	Miscellaneous Power Frame	MW	12M	
		B	Junctor Frame	MW	12M	
		C	Line Switching Frame	MW	12M	
		D	Line Junctor Switching Frame	MW	12M	
		E	Trunk Switching Frame	MW	12M	
		F	Trunk Junctor Switching Frame	MW	12M	
		G	Universal Trunk Frame	MW	12M	

Fig. 1—Equipment Test List (Form E-5450)

JOB NO.	EQUIPMENT AND WORK DESCRIPTION	CLASS	FREQ.	NUMBER UNITS	MIN PER ASGN.	JANUARY				FEBRUARY				MARCH				APRIL				MAY			
						1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	<u>1A CARD WRITER 231-001-704</u>																								
1	<u>3.01 CLEANING</u>	<u>MW</u>	<u>M</u>	<u>2</u>	<u>30</u>	X				X				X				X				X			
	<u>3.02 LUBRICATING</u>	<u>MW</u>	<u>M</u>	<u>2</u>	<u>5</u>	X				X				X				X				X			
	<u>1A CARD LOADER 231-004-702</u>																								
2	<u>2.01 CLEANING</u>	<u>MW</u>	<u>M</u>	<u>2</u>	<u>30</u>	X				X				X				X				X			
	<u>2.02B LUBRICATING</u>	<u>MW</u>	<u>M</u>	<u>2</u>	<u>5</u>	X				X				X				X				X			
3	<u>2.02 LUBRICATING</u>	<u>MW</u>	<u>M</u>	<u>2</u>	<u>5</u>	X				X				X				X				X			
	<u>2.02A LUBRICATING WORM GEAR</u>	<u>MW</u>	<u>12M</u>	<u>2</u>	<u>5</u>									X											
4	<u>EMERG. MANUAL LINE CKT. 231-114-504</u>		<u>2AM</u>	<u>15</u>	<u>5</u>																				
5	<u>OFFICE ALARM TESTS 231-115-501</u>		<u>12M</u>	<u>687</u>	<u>21 HRS</u>																				

DUE 4-78

This form provides for scheduling recurring work items on a "period" basis. Each month is divided into four schedule periods. The dates for the designated periods are as follows:

Period	Dates
1	1 - 7
2	8 - 14
3	15 - 21
4	22 to end of month

Enter test classification as specified on ETL

Interval at which the work item is scheduled for performance

Locally assigned job number

Number of units scheduled for test at the interval shown

Minutes required to perform the work item

TOTAL HOURS PER PERIOD

<u>1-26"</u>	<u>1-10"</u>	<u>1-20"</u>	<u>1-10"</u>	<u>1-26"</u>	<u>1-10"</u>	<u>10"</u>	<u>1-20"</u>	<u>1-10"</u>
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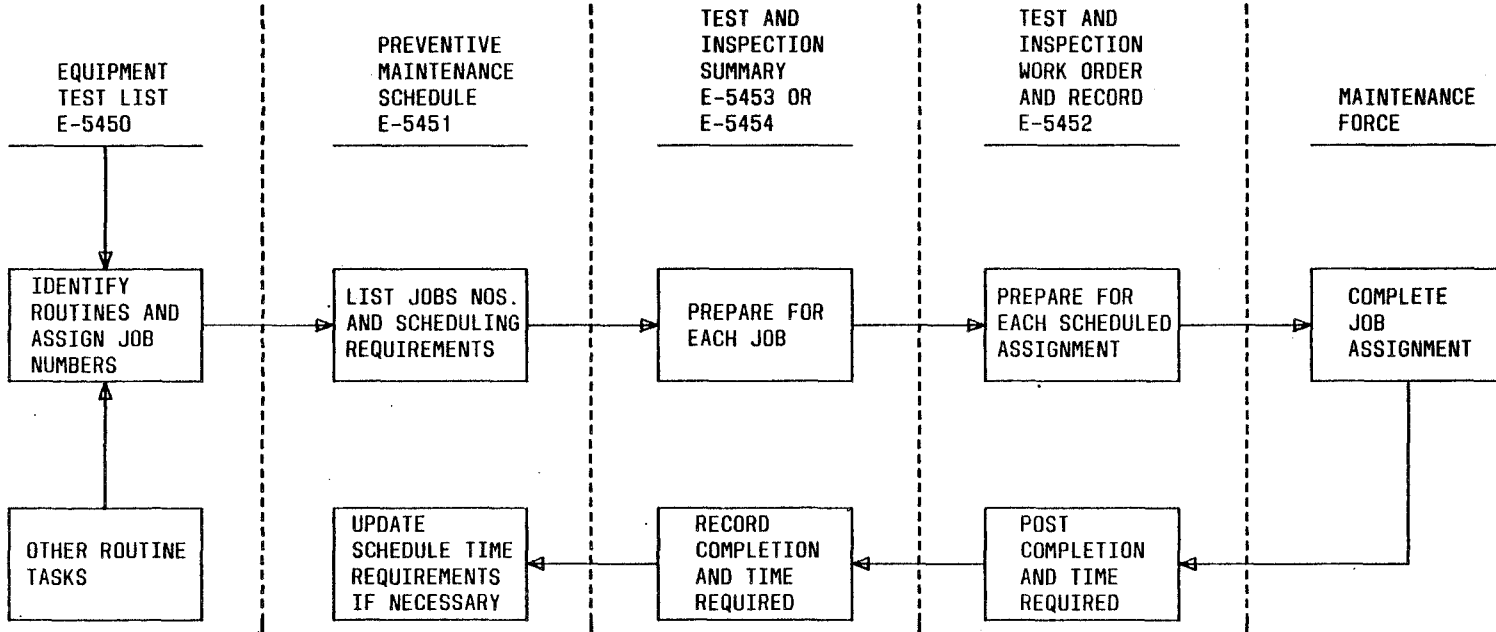


Fig. 6—Preventive Maintenance Forms and Flow Diagram

OFFICE _____

No. 1 ESS DAILY CONTROL RECORD

PERIOD _____

DAY	BASE MEASUREMENTS			SERVICE MEASUREMENTS				MAINTENANCE MEASUREMENTS						PERF. MEASUREMENTS				
	ORIG. CALLS (0000)	INC. CALLS (0000)	OUTG. CALLS (0000)	HDWR LOST		COIN FAIL.	DTS DELAY	FALSE STARTS	EMERG. ACTION		MTCE INTERR.	NETWORK FAILURES				ERRORS		
				CALLS	BILLING				LEVEL	M/A		SUPF	FCG	RVFY	PS	CS	SPCS	
1																		
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
10 D TOT.																		
10 D OBJ.																		
11																		
12																		
13																		
14																		
15																		
16																		
17																		
18																		
19																		
20																		
20 D TOT.																		
20 D OBJ.																		
21																		
22																		
23																		
24																		
25																		
26																		
27																		
28																		
29																		
30																		
31																		
MO TOT																		
MO OBJ																		
PREV MO.																		

Fig. 7—No. 1 ESS Control Record (Form E-5230) (Sheet 1 of 2)

DAY	PERF. MEAS.			OTHER MEASUREMENTS						PERIPHERAL ORDERS		NETWORK OUTAGE		AMA BILLING		CUSTOMER REPORTS			
	OUTAGE			AUTO PROG. TEST	TIMEOUTS				PEG COUNT		ERR	FSCN	LINK	SW	ENTRIES	NON-SALV. ENT.	CODE 5		CODE 8
	PROC.	PERIPH.	TRKS		ICT	PD	OGT	PRMT	REC.	XMTR							FRAME	EQUIP.	
1																			
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
10 D TOT.																			
10 D OBJ.																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			
20 D TOT.																			
20 D OBJ.																			
21																			
22																			
23																			
24																			
25																			
26																			
27																			
28																			
29																			
30																			
31																			
MO TOT																			
MO OBJ																			
PREV MO.																			

Fig. 7—No. 1 ESS Control Record (Form E-5230) (Sheet 2 of 2)

NO. 1 ESS HOURLY CONTROL RECORD

E-5230-1 (2-77)
BACK

OFFICE _____

DATE _____

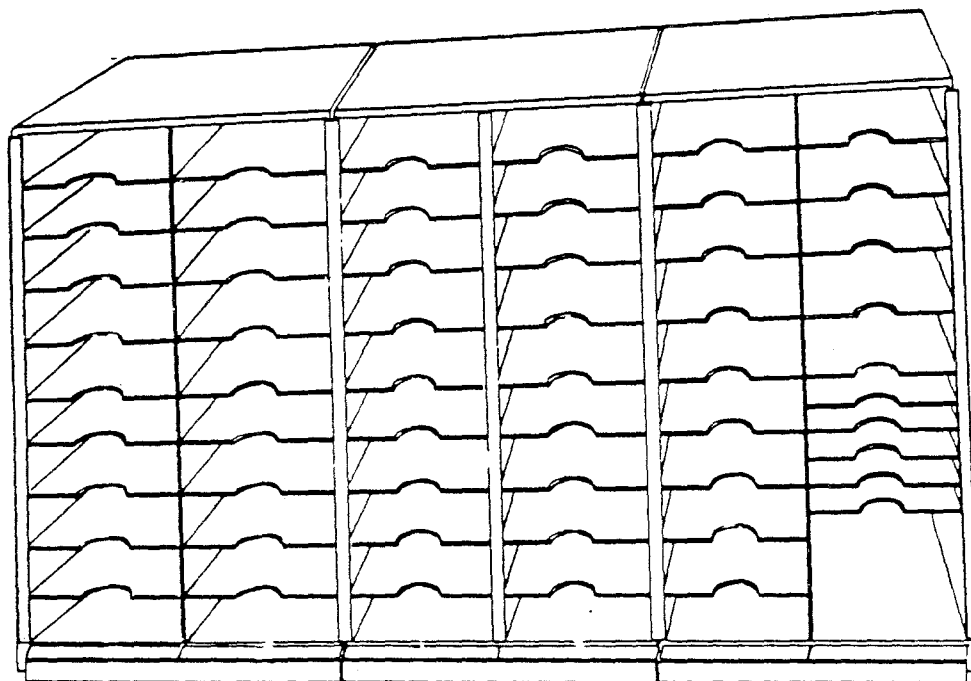
HOUR	OVERLOAD CONDITIONS		CRITICAL CALL PROCESSING DATA		RING AND TONE	EMERGENCY ACTION		EQUIPMENT OUTAGE		INTERRUPTS-NO. & LEVEL MA05		RECOVERY PROGRAM						
	LCD1	TOC01	HWRD	DVO'S	RT01	QUAN.-PH	TYPE-U-M-A	MA03	MA06	MTPL	SGL	MA15						
	A	B	C	D	E	F	G	H	I	J	K	L						
1																		
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
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15																		
16																		
17																		
18																		
19																		
20																		
21																		
22																		
23																		
24																		
TOTAL																		

ORIGINATING CALLS		MF TRANS. OFL.		AMA CHANGED BY	
INCOMING CALLS		DP TRANS. OFL.		ACTIVE TAPE NO.	
MF TRANS. REL.		RP TRANS. OFL.		NET FAB. M.B.	
DP TRANS. REL.		TOS TIME			
RP TRANS. REL.		TOS NUMBER			
MF TRANS. P.C.		RC MODS			
DP TRANS. P.C.		T-READ RC COUNTER			
RP TRANS. P.C.		T-READ AUX POINTER			

Fig. 8—No. 1 ESS Hourly Control Record (Form E-5230-1) (Sheet 2 of 2)

RECORD OF EQUIPMENT OUTAGE													
OFFICE OR MARKER GROUP _____										MONTH _____			
										SHEET _____ OF _____ SHEETS			
EQUIP AND NO.	TICKET NO.	OUT OF SERVICE					RESTORED TO SERVICE			N.B.D. OUTAGE		REMARKS	
		BY	REASON	REFERRED TO	DATE	TIME	DATE	TIME	BY	PLANT	OTHER		
A	TOTAL NUMBER OF OUTAGES		B.S.P. 201-114-001			$\frac{B+C}{A}$ OUTAGE RATIO		TOTAL NUMBER OF N.B.D. HOURS			B	C	I

Fig. 9—Record of Equipment Outage (Form E-4256)



ORDERING INFORMATION;
(QUANTITY) - TICKET ANALYSIS FILE - DRAWING 38-Y-3868
(QUANTITY) - SNAP ON 18G DESIGNATION STRIP,
TICKET ANALYSIS FILE - DRAWING 38-Y-3868
(QUANTITY) - DIVIDER, TICKET ANALYSIS FILE, DRAWING 38-Y-3868

Fig. 10—Trouble Ticket File/Analysis Ticket File

ANALYSIS TICKET			E-10029 (2-77)
DATE	INITIALS	SOURCE (MESSAGE-ALARM-REPORT)	
DETAILS			

Fig. 11—Analysis Ticket (Form E-10029)

TEL. NO./TRK GRP. & MEM. (A)	EQPT. NO. (A)	FRAME (A)	NO.1-NO.2-NO.3 ESS TROUBLE TICKET			E-5231 (7-77) FRONT			
CA. & PR./ASSOC. EQPT. (A)	CTX/MLHG NO. (A)	EST. TIME (B)	PRIORITY (B)	DATE (C)	OFFICE (D)		TKT. NO. (E)		
DETAILS OF REPORTED TROUBLE (A)			REPT BY (F)	LOC (G)	RCVD BY (H)	TIME (H)	CLASS (I)		
			CLEARED BY (J) TO		TIME (J)	DATE (J)	T M	O/S (K)	
			DISP TO (L)	START (L)	STOP (L)	DATE (L)	RESULT (L)		
			REF. TO & TEL. # (M)		TIME (M)	DATE (M)	TKT # (M)		
			FMN CK (N)	DISPOSITION (O)	CODE (P)	SCC WK TIME (Q)	FIELD WK TIME (R)		

NOTEDESCRIPTION

- A DETAILS OF TROUBLE REPORT.
 B TROUBLE PRIORITY AND ESTIMATED TIME.
 C DATE REPORT RECEIVED.
 D CENTRAL OFFICE NAME OR DESIGNATION.
 E SERIAL NO. OF TICKET.
 F INITIALS OF PERSON REPORTING OR EQUIPMENT DESIGNATION, IF FROM ALARM OR MCC-TTY.
 G ORIGIN OF REPORT.
 H INITIALS OF PERSON RECEIVING REPORT AND TIME.
 I REPORT CLASS (SEE TABLE).
 J INITIALS OF PERSON CLOSING REPORT, TIME, AND DATE REPORT CLOSED.
 K CHECK "O/S" (OUT OF SERVICE) IF EQUIPMENT IS REMOVED FROM SERVICE AND CHECK "T" (TROUBLE) OR "M" (MEMO).
 L GIVE INITIALS OF PERSON TROUBLE IS DISPATCHED TO, START AND STOP TIME, DATE, AND RESULT.
 M INITIALS AND TELEPHONE NO. OF PERSON THE REPORT IS REFERRED TO, TIME, DATE, AND TICKET NO. IF ANOTHER TICKET IS OPENED.
 N FOREMAN'S INITIALS UPON REVIEW OF TICKET.
 O DISPOSITION CODE FROM REAR OF TICKET.
 P CENTRAL OFFICE TROUBLE CODE.
 Q SCC TIME SPENT ON TROUBLE.
 R FIELD FORCE WORK TIME SPENT ON TROUBLE.

NOTE: ALL TIMES SHOULD BE ENTERED ON THE 24-HOUR CLOCK.

Fig. 12—No. 1 ESS Trouble Ticket (Form E-5231—Front)

ACTION TAKEN AND RESULTS OBTAINED	(B)	10. SOFTWARE		SOFTWARE/EQPT
		20. PROCESSOR		
		30. PERIPHERAL		
		40. TRK CKT		
		50. DIST FRAME		
		60. MISC		
		70. NTF		
		80. REF OUT		
	(C)	A. ENVIRONMENT		CAUSE
		B. WEAR		
		C. DEFECT		
		D. C. O. FORCE		
		E. OTHER FORCE		
		F. OTHER		
EQUIPMENT				
CKT PACK (D)	RELAY (D)	SWITCH (D)	FERROD (D)	FUSE (D)
FRAME (E)	LOCATION (E)	WIRING (F)		

NOTE

DESCRIPTION

- A DESCRIPTION OF ACTIONS CONCERNING THIS TICKET AND RESULTS.
- B CHECK THE APPLICABLE SPACE WHERE THE TROUBLE IS LOCATED.
 *CHECK NTF IF NO TROUBLE IS FOUND OR NO TROUBLE IS TESTED.
 *CHECK REF OUT IF TROUBLE REPORT IS REFERRED OUT TO ANOTHER OFFICE, PSC, OR TESTBOARD.
- C CHECK THE CAUSE IN CASES OF FOUND TROUBLE.
- D GIVE CODE OF FAULTY APPARATUS.
- E GIVE FRAME AND LOCATION IN THE FRAME (IF REQUIRED) WHERE TROUBLE WAS LOCATED.
- F GIVE WIRING LEAD DESIGNATION.

TROUBLE CODING GUIDELINES

SOFTWARE/EQUIPMENT	
CAUSE	CHECK ONE FOR EACH CAUSE OF TROUBLE
10. SOFTWARE	<ul style="list-style-type: none"> • TROUBLE CAUSED BY IDENTIFIABLE "BUGS" IN THE GENERIC PROGRAM. • TROUBLE CAUSED BY INCORRECT INFORMATION IN THE LINE TRANSLATION PORTION OF OFFICE DATA. • TROUBLE CAUSED BY INCORRECT INFORMATION IN THE TRUNK TRANSLATION PORTION OF OFFICE DATA. • TROUBLE CAUSED BY INCORRECT INFORMATION IN OFFICE DATA OTHER THAN LINE AND TRUNK TRANSLATIONS.
20. PROCESSOR	CHECK ONE FOR TROUBLES IDENTIFIED IN THESE EQUIPMENT AREAS.
30. PERIPHERAL	
40. TRUNK CKT	
50. DIST FRAME	
60. MISC	TROUBLES THAT CANNOT BE ASSIGNED TO ANY OTHER CATEGORIES.
70. NTF	<ul style="list-style-type: none"> • TROUBLE CAUSE CANNOT BE DETERMINED. • TROUBLES RELATED TO COMPLETED CONNECTIONS (NOISE, CANNOT HEAR, CUT-OFF, ETC.). REPORTS FROM ALARMS, TROUBLE RECORDERS, OR OTHER INDICATORS WHERE NO TROUBLE WAS FOUND OR TROUBLE CLEARED WHILE TESTING.
80. REF OUT	TROUBLE REPORTS THAT HAVE BEEN REFERRED TO OTHER DEPARTMENTS OR AGENCIES FOR FURTHER HANDLING.

CAUSE

CAUSE	CHECK ONE FOR EACH CAUSE OF TROUBLE
A. ENVIRONMENT	TROUBLES CAUSED BY DIRT, DUST, HEAT OR HUMIDITY. DIRT COULD PREVENT CONTACTS FROM CLOSING AND COMPLETING A CIRCUIT. FAILURE OF AIR CONDITIONING EQUIPMENT COULD RESULT IN A CHANGE IN TEMPERATURE AT A RATE TOO RAPID FOR THE PROPER OPERATION OF CIRCUITS.
B. WEAR	TROUBLES CAUSED BY APPARENT NORMAL DETERIORATION OR AGING. INCLUDES CONTACT EROSION, LOSS OF TENSION, METAL FATIGUE OR MECHANICAL WEAR. ALSO INCLUDES CASES WHERE REPLACEMENT IS NECESSARY BECAUSE MECHANICAL REQUIREMENTS CAN NO LONGER BE MET. WEAR INCLUDES TROUBLES DUE TO CHANGES IN ELECTRICAL CHARACTERISTICS OF DIODES, TRANSISTORS, ETC., WHERE THE TROUBLE CAN BE CLEARED BY CIRCUIT ADJUSTMENT.
C. DEFECT	TROUBLES CORRECTED BY REPLACEMENT OF APPARATUS OR COMPONENT FOR REASONS OTHER THAN "WEAR" OR "WORK ERROR". INCLUDES ELECTRICAL OR MECHANICAL FAILURES OF APPARATUS OR COMPONENTS, SUCH AS OPEN WINDINGS, CIRCUIT PACK FAILURES.
D. C. O. FORCE	TROUBLES LIKELY OR KNOWN TO HAVE BEEN CAUSED BY CENTRAL OFFICE MAINTENANCE PERSONNEL.
E. OTHER FORCE	TROUBLES LIKELY OR KNOWN TO HAVE BEEN CAUSED BY FORCES OTHER THAN CENTRAL OFFICE MAINTENANCE PERSONNEL, SUCH AS, ASSIGNMENT FORCES, INSTALLATION FORCES OR CONTRACTOR FORCES.
F. OTHER	TROUBLES WHERE THE CAUSE CAN NOT BE INCLUDED IN ONE OF THE ABOVE. THE "ACTION TAKEN" PORTION OF TROUBLE TICKET MUST SHOW A COMPLETE EXPLANATION WHENEVER "OTHER" IS CHECKED.

Fig. 13—No. 1 ESS Trouble Ticket (Form E-5231—Back)

TEL. NO./TRK GRP. & MEM. 221-4633	EQPT. NO. 00-010-113	FRAME	NO.1-NO.2-NO.3 ESS TROUBLE TICKET	E-5231 (7-77) FRONT			
CA. & PR./ASSOC. EQPT. 2-316	CTX/MLHG NO.	EST. TIME 30M	PRIORITY 1C	DATE 1-13-76	OFFICE TRI CG-0	TKT. NO. 1-21	
DETAILS OF REPORTED TROUBLE NOISY CONNECTION TO THE 279 OFFICE LAST CALL WAS NOISY TO 279-5648			REPT BY AC	LOC LTD	RCVD BY BJ	TIME 0915	CLASS A
			CLEARED BY DS TO AC		TIME 1000	DATE 1-13-76	<input checked="" type="radio"/> O/S M
			DISP TO DS	START 0915	STOP 1000	DATE 1-13-76	RESULT C
			REF. TO & TEL. # CC 393-1161		TIME 0955	DATE 1-13-76	TKT # 22
			FMN CK FB	DISPOSITION 70	CODE 8	SCC WK TIME 45M	FIELD WK TIME

ACTION TAKEN AND RESULTS OBTAINED TESTED DIRECT AND ALTERNATE TRK GROUPS FOR NOISE AND LOSS USING TRK-GROUP MESSAGE — NTF REFERRED TO CAROT CENTER FOR ROUTINE TESTING OF TDM GROUP	10. SOFTWARE		SOFTWARE/EQPT
	20. PROCESSOR		
	30. PERIPHERAL		
	40. TRK CKT		
	50. DIST FRAME		
	60. MISC		
	70. NTF	<input checked="" type="checkbox"/>	
	80. REF OUT		
	A. ENVIRONMENT		CAUSE
	B. WEAR		
	C. DEFECT		
	D. C. O. FORCE		
	E. OTHER FORCE		
	F. OTHER		

EQUIPMENT				
CKT PACK	RELAY	SWITCH	FERROD	FUSE
FRAME	LOCATION	WIRING		

Trouble: Customer reported noise on several calls to different numbers in the 279 exchange. Line tested OK - Frame tested OK. LTD referred report to office. All trunks tested OK.

Fig. 14A—Trouble Ticket—NTF

TEL. NO./TRK GRP. & MEM.	EQPT. NO.	FRAME <i>CC-1</i>	NO. 1-NO. 2-NO. 3 ESS TROUBLE TICKET			E-5231 (7-77) FRONT				
CA. & PR./ASSOC. EQPT.	CTX/MLHG NO.	EST. TIME <i>1 HR.</i>	PRIORITY <i>1A</i>	DATE <i>2-5-76</i>	OFFICE <i>BEL. CC-1</i>	TKT. NO. <i>2-11</i>				
DETAILS OF REPORTED TROUBLE <i>CENTRAL CONTROL FAILED HOURLY DGN. DH-3 4725-3718-4607 UNIV. # 0408-7710-0171</i>			REPT BY <i>TTY</i>	LOC <i>SCC</i>	RCVD BY <i>JR</i>	TIME <i>0810</i>	CLASS <i>E</i>			
			CLEARED BY <i>DH</i> TO <i>JR</i>		TIME <i>0830</i>	DATE <i>2-5-76</i>	<input checked="" type="checkbox"/> O/S M	<input checked="" type="checkbox"/>		
			DISP TO <i>DH</i>	START <i>0820</i>	STOP <i>0830</i>	DATE <i>2-5-76</i>	RESULT <i>C</i>			
			REF. TO & TEL. #			TIME	DATE	TKT #		
			FMN CK <i>FB</i>			DISPOSITION <i>20C</i>	CODE	SCC WK TIME <i>10m</i>	FIELD WK TIME <i>10m</i>	

ACTION TAKEN AND RESULTS OBTAINED <i>DEFECTIVE A6 PACK AT LOCATION 1-28-28 REPLACED PACK SENT DEFECTIVE PACK TO SCC</i>	10. SOFTWARE		SOFTWARE/EQPT	
	20. PROCESSOR	<input checked="" type="checkbox"/>		
	30. PERIPHERAL			
	40. TRK CKT			
	50. DIST FRAME			
	60. MISC			
	70. NTF			
	80. REF OUT			
	A. ENVIRONMENT			CAUSE
	B. WEAR			
	C. DEFECT	<input checked="" type="checkbox"/>		
	D. C. O. FORCE			
	E. OTHER FORCE			
F. OTHER				
EQUIPMENT				
CKT PACK <i>A6</i>	RELAY	SWITCH	FERROD	FUSE
FRAME <i>CC-1</i>	LOCATION <i>1-28-28</i>	WIRING		

Trouble: SCC analyzed trouble to be a defective circuit pack. Field force was contacted for pack replacement.

Fig. 14B—Trouble Ticket—Defect

TEL. NO./TRK GRP. & MEM. TGN 30-52	EQPT. NO.	FRAME UT 00-202-51	NO. 1-NO. 2-NO. 3 ESS TROUBLE TICKET		E-5231 (7-77) FRONT			
CA. & PR./ASSOC. EQPT.	CTX/MLHG NO.	EST. TIME 1 HR	PRIORITY 3B	DATE 3-22-76	OFFICE HINS CG-D	TKT. NO. 3-22		
DETAILS OF REPORTED TROUBLE REPEATED NN10 MESSAGES 'A' RELAY FAILS TO OPERATE			REPT BY PD	LOC SCC	RCVD BY	TIME 1520	CLASS E	
			CLEARED BY DH TO PD		TIME 1625	DATE 3-22-76	<input checked="" type="checkbox"/> O/S M	<input checked="" type="checkbox"/>
			DISP TO DH	START 1540	STOP 1625	DATE 3-22-76	RESULT C	
			REF. TO & TEL. #		TIME	DATE	TKT #	
			FMN CK FB	DISPOSITION 40 B	CODE	SCC WK TIME 20M	FIELD WK TIME 45M	

ACTION TAKEN AND RESULTS OBTAINED REPLACED TRUNK CKT - TESTED AND RESTORED TRUNK 'A' RELAY OUT OF ADJUSTMENT ADJUSTED RELAY PER BSP	10. SOFTWARE		SOFTWARE/EQPT
	20. PROCESSOR		
	30. PERIPHERAL		
	40. TRK CKT	<input checked="" type="checkbox"/>	
	50. DIST FRAME		
	60. MISC		
	70. NTF		
	80. REF OUT		
	A. ENVIRONMENT		CAUSE
	B. WEAR	<input checked="" type="checkbox"/>	
	C. DEFECT		
	D. C. O. FORCE		
	E. OTHER FORCE		
	F. OTHER		

EQUIPMENT				
CKT PACK	RELAY A	SWITCH	FERROD	FUSE
FRAME UT 00-202-51	LOCATION	WIRING		

Trouble: TTY printouts indicated a bad SD point. Identified trunk, made busy, and referred trouble to field force for correction.

Fig. 14C—Trouble Ticket—Wear

TEL. NO./TRK GRP. & MEM. 221-4735		EQPT. NO. 01-301-012	FRAME	NO.1-NO.2-NO.3 ESS TROUBLE TICKET			E-5231 (7-77) FRONT			
CA. & PR./ASSOC. EQPT. 36-444	CTX/MLHG NO. CTX-05	EST. TIME 30 MIN.	PRIORITY 1C	DATE 4-10-76	OFFICE HUU	CG-2	TKT. NO. 4-19			
DETAILS OF REPORTED TROUBLE NO DIAL TONE OPEN RING SIDE				REPT BY AC	LOC LTD	RCVD BY BJ	TIME 1615	CLASS A		
				CLEARED BY BJ TO AC		TIME 1645	DATE 4-10-76	<input checked="" type="checkbox"/> T M	O/S	
				DISP TO DH	START 1620	STOP 1640	DATE 4-10-76	RESULT C		
				REF. TO & TEL. #		TIME	DATE	TKT #		
				FMN CK FB	DISPOSITION 50D	CODE 5	SCC WK TIME 10M	FIELD WK TIME 20M		

ACTION TAKEN AND RESULTS OBTAINED LOOSE CONNECTION AT MDF RE-TERMINATED JUMPER	10. SOFTWARE		SOFTWARE/EQPT	
	20. PROCESSOR			
	30. PERIPHERAL			
	40. TRK CKT			
	50. DIST FRAME	<input checked="" type="checkbox"/>		
	60. MISC			
	70. NTF			
	80. REF OUT			
	A. ENVIRONMENT		CAUSE	
	B. WEAR			
	C. DEFECT			
	D. C. O. FORCE	<input checked="" type="checkbox"/>		
	E. OTHER FORCE			
	F. OTHER			
EQUIPMENT				
CKT PACK	RELAY	SWITCH	FERROD	FUSE
FRAME MDF	LOCATION V-13	WIRING X DOWN		

Trouble: Customer line tested open on ring side. MDF was unattended. SCC dispatched ticket to field force for correction.

Fig. 14D—Trouble Ticket—Work Error

TEL. NO./TRK GRP. & MEM. 278-5711	EQPT. NO. 03-101-122	FRAME	NO.1-NO.2-NO.3 ESS TROUBLE TICKET		E-5231 (7-77) FRONT		
CA. & PR./ASSOC. EQPT. 24-1011	CTX/MLHG NO.	EST. TIME 30 MIN.	PRIORITY 1C	DATE 5-1-76	OFFICE MAIN 06-2	TKT. NO. 5-3	
DETAILS OF REPORTED TROUBLE NO DIAL TONE			REPT BY AC	LOC LTD	RCVD BY BJ	TIME 0810	CLASS. A
			CLEARED BY JR TO AC		TIME 0825	DATE 5-1-76	<input checked="" type="checkbox"/> T / <input type="checkbox"/> O/S <input type="checkbox"/> M
			DISP TO AC	START 0815	STOP 0825	DATE 5-1-76	RESULT C
			REF. TO & TEL. #		TIME	DATE	TKT #
			FMN CK FB	DISPOSITION 10F	CODE 5	SCC WK TIME 15M	FIELD WK TIME -

ACTION TAKEN AND RESULTS OBTAINED VFY DN - OK VFY LEN - UNASSIGNED CORRECTED TRANSLATIONS	10. SOFTWARE	<input checked="" type="checkbox"/>	SOFTWARE/EQPT	
	20. PROCESSOR	<input type="checkbox"/>		
	30. PERIPHERAL	<input type="checkbox"/>		
	40. TRK CKT	<input type="checkbox"/>		
	50. DIST FRAME	<input type="checkbox"/>		
	60. MISC	<input type="checkbox"/>		
	70. NTF	<input type="checkbox"/>		
	80. REF OUT	<input type="checkbox"/>		
	A. ENVIRONMENT	<input type="checkbox"/>	CAUSE	
	B. WEAR	<input type="checkbox"/>		
	C. DEFECT	<input type="checkbox"/>		
	D. C. O. FORCE	<input type="checkbox"/>		
	E. OTHER FORCE	<input type="checkbox"/>		
	F. OTHER	<input checked="" type="checkbox"/>		
EQUIPMENT				
CKT PACK	RELAY	SWITCH	FERROD	FUSE
FRAME	LOCATION	WIRING		

Trouble: Customer reported No Dial Tone. Translation verification revealed the trouble area. SCC work force corrected the software.

Fig. 14E—Trouble Ticket—Translation Trouble

TEL. NO./TRK GRP. & MEM. 226-7000	EQPT. NO. 05-314-011	FRAME	NO. 1-NO. 2-NO. 3 ESS TROUBLE TICKET			E-5231 (7-77) FRONT			
CA. & PR./ASSOC. EQPT.	CTX/MLHG NO.	EST. TIME 15 MIN.	PRIORITY 1C	DATE 6-6-76	OFFICE HUU CG-0	TKT. NO. 6-15			
DETAILS OF REPORTED TROUBLE REPEATED RC FAILURES ON PBX LINE			REPT BY PD	LOC	RCVD BY	TIME 0945	CLASS E		
			CLEARED BY PD TO AC		TIME 0955	DATE 6-6-76	<input checked="" type="radio"/> T M	O/S	
			DISP TO	START	STOP	DATE	RESULT		
			REF. TO & TEL. # AC/LTD x3707			TIME 0955	DATE 6-6-76	TKT # 31	
			FMN CK FB	DISPOSITION 80	CODE	SCC WK TIME 10M	FIELD WK TIME		

ACTION TAKEN AND RESULTS OBTAINED REFERRED TO LOCAL TEST DESK FRAME JUMPER AND COILS OK	10. SOFTWARE		SOFTWARE/EQPT	
	20. PROCESSOR			
	30. PERIPHERAL			
	40. TRK CKT			
	50. DIST FRAME			
	60. MISC			
	70. NTF			
	80. REF OUT	<input checked="" type="checkbox"/>		
	A. ENVIRONMENT		CAUSE	
	B. WEAR			
	C. DEFECT			
	D. C. O. FORCE			
	E. OTHER FORCE			
	F. OTHER			
EQUIPMENT				
CKT PACK	RELAY	SWITCH	FERROD	FUSE
FRAME	LOCATION	WIRING		

Trouble: Repeated ringing continuity failures were observed by SCC personnel. Customer loop appears to be open. Trouble referred to LTD.

Fig. 14F—Trouble Ticket—Referred Out

TEL. NO./TRK GRP. & MEM.	EQPT. NO.	FRAME LSF 043	NO. 1-NO. 2-NO. 3 ESS TROUBLE TICKET		E-5231 (7-77) FRONT				
CA. & PR./ASSOC. EQPT.	CTX/MLHG NO.	EST. TIME 1 Hr.	PRIORITY 1D	DATE 7-7-76	OFFICE OLP CG-0	TKT. NO. 7-17			
DETAILS OF REPORTED TROUBLE CONTROLLER 0 FAILS DGN - PHASE 3 CHECK P10 RELAY			REPT BY PD	LOC SCC	RCVD BY	TIME 1840	CLASS E		
			CLEARED BY DH TO PD		TIME 0830	DATE 7-18-76	<input checked="" type="checkbox"/> T M	O/S 1	
			DISP TO DH	START 0800	STOP 0830	DATE 7-18-76	RESULT C		
			REF. TO & TEL. #		TIME	DATE	TKT #		
			FMN CK FB		DISPOSITION 30D	CODE	SCC WK TIME 1/2 H	FIELD WK TIME 1/2 H	

ACTION TAKEN AND RESULTS OBTAINED P10 RELAY COVER COCKED CORRECTED ALL TESTS PASS	10. SOFTWARE		SOFTWARE/EQPT	
	20. PROCESSOR			
	30. PERIPHERAL	<input checked="" type="checkbox"/>		
	40. TRK CKT			
	50. DIST FRAME			
	60. MISC			
	70. NTF			
	80. REF OUT			
	A. ENVIRONMENT		CAUSE	
	B. WEAR			
	C. DEFECT			
	D. C. O. FORCE	<input checked="" type="checkbox"/>		
	E. OTHER FORCE			
F. OTHER				
EQUIPMENT				
CKT PACK	RELAY P10	SWITCH	FERROD	FUSE
FRAME LSF 043	LOCATION	WIRING		

Trouble: Controller 1 removed from service by system. SCC work force analyzed problem to P10 relay. Field work force completed trouble location.

Fig. 14G—Trouble Ticket—Equipment Removed From Service

TEL. NO./TRK GRP. & MEM. 662-5542	EQPT. NO. 01-012-314	FRAME	NO.1-NO.2-NO.3 ESS TROUBLE TICKET			E-5231 (7-77) FRONT	
CA. & PR./ASSOC. EQPT. 36-244	CTX/MLHG NO.	EST. TIME 30 MIN	PRIORITY 8-14-76	DATE 8-14-76	OFFICE BOW CG-2	TKT. NO. 8-31	
DETAILS OF REPORTED TROUBLE NO DIAL TONE			REPT BY AC	LOC LTD	RCVD BY BJ	TIME 1115	CLASS A
			CLEARED BY AC TO BJ		TIME 1245	DATE 8-14-76	(T) O/S M
			DISP TO DH	START 1115	STOP 1240	DATE 8-14-76	RESULT C
			REF. TO & TEL. #		TIME	DATE	TKT #
			FMN CK FB	DISPOSITION 30C	CODE 5	SCC WK TIME	FIELD WK TIME 1 1/2

ACTION TAKEN AND RESULTS OBTAINED DEFECTIVE LINE FERROD (01-012-314) LINE MOVED TO 01-012-210 ISSUED MEMO TKT (8-36) TO REPLACE FERROD	10. SOFTWARE		SOFTWARE/EQPT
	20. PROCESSOR		
	30. PERIPHERAL	<input checked="" type="checkbox"/>	
	40. TRK CKT		
	50. DIST FRAME		
	60. MISC		
	70. NTF		
	80. REF OUT		
	A. ENVIRONMENT		CAUSE
	B. WEAR		
C. DEFECT	<input checked="" type="checkbox"/>		
D. C. O. FORCE			
E. OTHER FORCE			
F. OTHER			

EQUIPMENT				
CKT PACK	RELAY	SWITCH	FERROD 01-012-314	FUSE
FRAME	LOCATION	WIRING		

Trouble: No Dial Tone. Ticket is completed and a Memo Ticket is issued to replace the located faulty ferrod. See Fig. 14I for Memo Ticket.

Fig. 14H—Trouble Ticket—Deferred Repair

TEL. NO./TRK GRP. & MEM.	EQPT. NO.	FRAME	NO.1-NO.2-NO.3 ESS TROUBLE TICKET			E-5231 (7-77) FRONT		
CA. & PR./ASSOC. EQPT.	CTX/MLHG NO.	EST. TIME 2 HRS	PRIORITY 3A	DATE 8-14-76	OFFICE BOW CG-2	TKT. NO. 8-36		
DETAILS OF REPORTED TROUBLE REPLACE DEFECTIVE FERROD 01-012-314 (REF. TICKET 8-31)			REPT BY DH	LOC FIELD	RCVD BY BJ	TIME 1240	CLASS	
			CLEARED BY TO		TIME	DATE	T	O/S
			DISP TO FS	START 1900	STOP 2050	DATE 8-15-76	RESULT C	
			REF. TO & TEL. #		TIME	DATE	TKT #	
			FMN CK FB	DISPOSITION	CODE	SCC WK TIME	FIELD WK TIME 1 3/4 H	

ACTION TAKEN AND RESULTS OBTAINED REPLACED FERROD	10. SOFTWARE		SOFTWARE/EQPT	
	20. PROCESSOR			
	30. PERIPHERAL			
	40. TRK CKT			
	50. DIST FRAME			
	60. MISC			
	70. NTF			
	80. REF OUT			
	A. ENVIRONMENT		CAUSE	
	B. WEAR			
	C. DEFECT			
	D. C. O. FORCE			
	E. OTHER FORCE			
	F. OTHER			
EQUIPMENT				
CKT PACK	RELAY	SWITCH	FERROD	FUSE
FRAME	LOCATION	WIRING		

Trouble: This Memo Ticket was prepared to replace the defective line ferrod located on Ticket 8-31 (See Fig. 14H). No stroking is required in the SOFTWARE/EQPT. or CAUSE categories on the back of the ticket.

Fig. 14 I—Trouble Ticket—Deferred Repair (Memo Ticket)

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| ① NEW LINES INSTALLED FOR CENTREX CUSTOMER - TROUBLES RESULTED |
| DUE TO ASSIGNMENT ERRORS - REVIEWED WITH ASSIGNMENT BUREAU SUPV. |
| ② MODIFIED TRK. CIRCUITS - CHANGED PROCEDURE |
| ③ REMREED FRAME CHANGE NOTICE |
| ④ INSTALLED NEW GENERIC |
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Fig. 16—Trouble Summary (Form E-5463) (Sheet 2 of 2)

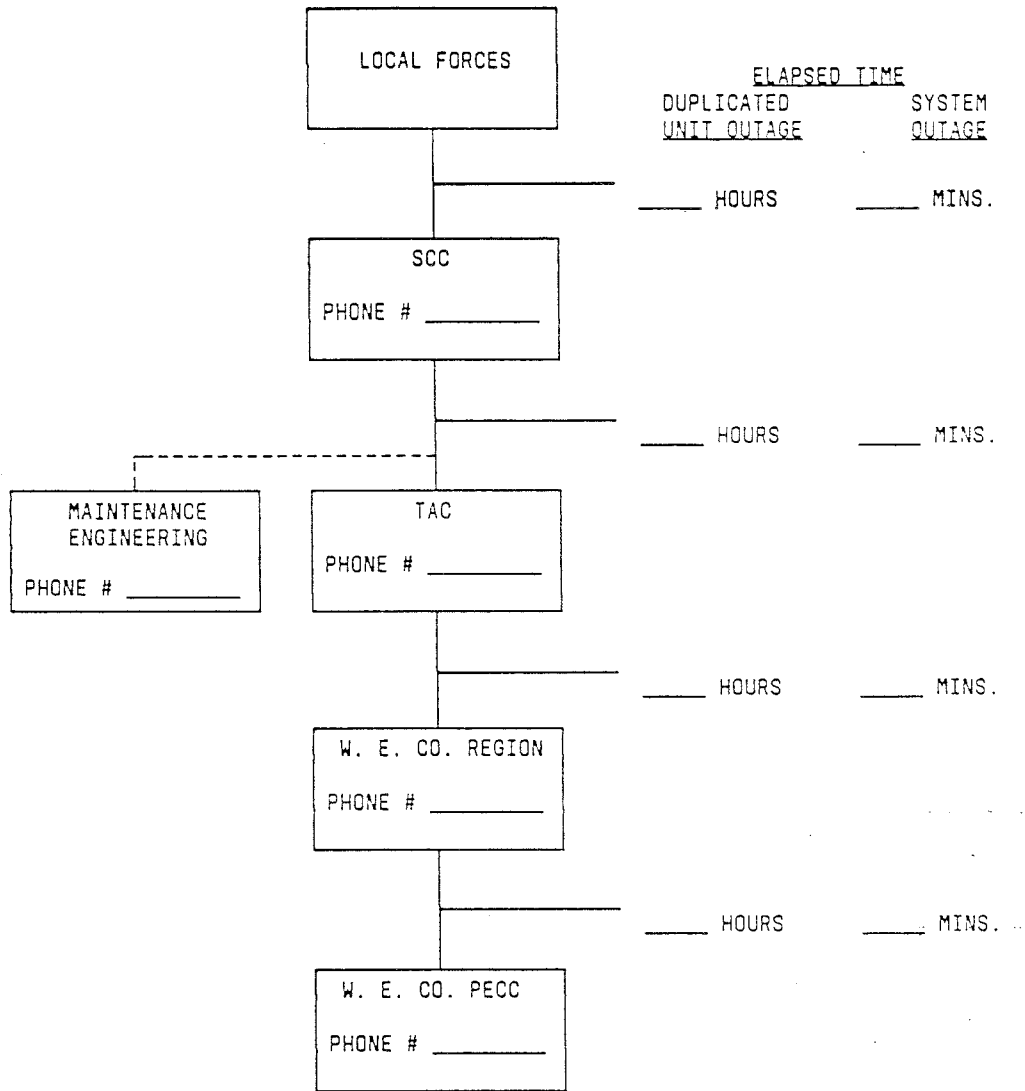


Fig. 17—Guidelines for Obtaining Outside Assistance