CAROT 2/GENERIC 2

DATA BASE ADMINISTRATION

CENTRALIZED AUTOMATIC REPORTING ON TRUNKS (CAROT)

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1. GENERAL

1.01 This section describes the CAROT 2 data base administrator. It should be noted that data base administration is a function and is not necessarily a single person's job.

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

1.03 This section is intended as a tool for the person responsible for data base administration to acquire an appreciation of what needs to be done to efficiently initialize, operate, and maintain the data base for the CAROT 2 System. This section describes the ***what-to-do*** aspects of data base administration. Given are outlines of tasks to be performed in planning and coordination, implementation, and maintenance of the CAROT 2 data base. The ***how-to-do*** procedures are provided in Task Oriented Practice (TOP) 190-102-301.

1.04 The CAROT 2 testing data base is a collection of data about the equipment used in testing trunks, the assigned control offices responsible for the maintenance of trunks, and the specific trunks to be tested. Data stored in the CAROT 2 controller is comprised of records, which in turn are grouped into files. For purposes of this section, a record is defined as a collection of data items listed under a given name, and a file is defined as a collection of records with the same name [ie, responder records as a group can be identified as a responder file (see Fig. 1)]. When stored on disc, data records in different files are linked together into data networks, each network containing all of the data necessary to uniquely identify a specific trunk or trunk group to be tested. For more detailed information on the CAROT 2 data base, reference should be made to Section 190-102-203.

1.05 The activities relating to data base administration can be roughly divided into three major phases (ie, planning and coordination, implementation, and maintenance). Maintenance is broadly defined as the activities necessitated by the dynamic characteristics of the CAROT 2 data base to keep it topical, effective, and efficient. Although separated in this practice, in actuality there is never a clearly defined division of these phases.

1.06 Table A provides a list of the program modules used in manipulating and viewing the CAROT 2 data base and a brief description of the purpose of each module. As shown in Table A, there are three sets of software systems, as seen by a controller operator, which run in the CAROT 2 controller.

(a) The Real-Time System software is running whenever routine testing, demand testing, analysis or remote-user functions are occurring, or when any of the modules listed in Table A for the Real-Time System software are being used. Any time a boot-up is done (covered in TOP 190-102-301), the Real-Time System software is initiated.

(b) The Update System software runs each day at a specified time. The modules listed in Table A to be used during the time that the Update System software is running must be specified by setting ***flags*** prior to the time that the update process is scheduled to begin (covered in TOP 190-102-301). For more information on the update process, see Part 5.

(c) The third system is the Update Utility System. When the Real-Time System software is running, the Utility System software can be initiated by typing the commands **SET:UTIL=YES** and **SLEEP** at the CRT console. Once the system has been initiated, all of the program modules listed in Table A for the system can be used. In general, with the exception of BACKUP/RESTORE, which is used just about every day, the modules are run only on a long-term periodic basis or when possible trouble is indicated.

2. PLANNING AND COORDINATION

2.01 A systematic approach to the administration of the CAROT 2 data base must be developed in the planning and orientation phase. This includes the following:

- Identify data sources
- Identify trunk and circuit-order flow
- Design revisions to trunk and circuit-order flow
- Define process for initial acquisition of data
- Coordinate data path interfaces between all organizations in the paths
- Design data processing center changes to programs and position practices.

The coordination required when a Circuit Maintenance System (CMS 1A, 1B) is involved is somewhat different than described in the following paragraphs. CMS coordination is described in Part 3 of this section.

IDENTIFY DATA SOURCES

2.02 The sources of each data item required by CAROT are located in the traffic and engineering groups concerned with the trunk and circuit-order process. The specific data item entries in forms used in a mechanized environment must be identified. The complete set of data items required by CAROT should be available.

2.03 Initially, much of the information required to establish the CAROT 2 controller data base may have to be obtained from records and physical inventories in the central offices involved. However, once the data base has been established, as much data as possible should be obtained from other sources so that involvement of central office forces is minimized.

2.04 Information required to access and test trunks can be classified as trunk identification, facility identification, transmission parameters, trunk priming (trunk channel or pair number and trunk location address), test line, responder and remote office test line (ROTL) type, and telephone numbers. As shown in Fig. 2, information is available from three primary sources:

(a) Facility and equipment assignment, referred to as the engineering circuit design and provision group

(b) Trunk and common control assignment groups

(c) Central office operation groups.

IDENTIFY TRUNK AND CIRCUIT-ORDER FLOW

2.05 The source of authorization orders to add, disconnect, or rearrange trunks and to cancel or modify previous orders should be identified. It should be determined how supporting information such as machine appearances, test connector assignments, common control assignments, and circuit assignments are added to the authorization orders. Also, it should be determined how the authorization orders are distributed to the plant forces and how notices that the plant forces have completed their work and have transmitted them back to the concerned traffic and engineering groups. The appropriate engineering, assignment, and operating groups should forward copies of all circuit layout records, traffic and trunk orders, and ineffect notices, together with any changes in test connector assignment, to the circuit provision organization functioning as the mechanized data base support group. This data should then be forwarded to the CAROT center on 9-track magnetic tape.

2.06 While the activities of these various functional groups are often correlated, each source may also act independently. For example, the facility assigned to a specific trunk may be changed without a simultaneous change in the trunk equipment assignment and vice versa. A machine-load-and-balance adjustment may occur independently as a result of equipment additions and changing traffic patterns in an office. Since screening and coordinating data inputs for the data base is the responsibility of the CAROT center, the full cooperation of all groups should be obtained early in CAROT implementation; however, formal methods should be established to assure a timely and accurate flow of information.

DESIGN REVISIONS TO TRUNK AND CIRCUIT-ORDER FLOW

2.07 On the basis of information collected in paragraphs 2.02 through 2.06, the most effective way of revising the current process to provide complete information to the CAROT center should be determined. Consideration should be given in how to minimize clerical effort at the CAROT center and how to maximize the accuracy of the CAROT data base. This should be done by taking into account pending mechanization of trunk records and the possibility of establishing circuit-order completion reporting through the CAROT center as an aid in performing circuit-order tests and in exerting closer administrative control over the circuit-order process. Manpower needed at the CAROT center, electronic data processing (EDP) support, and effort required in other organizations for the revision of existing processes and their continuing operation should also be estimated.

2.08 The local methods used to gather the data base information required to generate the trunk file for the CAROT System should be established well in advance of the actual start of automatic testing by the controller. Once these methods have been established, the collection of data should be started and the trunk files prepared prior to the turnup of the ROTLs. Some factors to consider in advance preparation are as follows:

- Size and number of trunk groups to be tested
- Availability of information required for the trunk file
- Number of updates that would occur because of rearrangements during the advance preparation stage.

2.09 An objective must be to combine as much data as possible close to its source and to provide one input to the CAROT center. Part 4 of this section outlines types of administrative interaction methods utilized between trunk and common control assignment, circuit provision, and operating organizations that lead to an efficient and straightforward initial load and update process.

DEFINE PROCESS FOR INITIAL ACQUISITION OF DATA

2.10 When a ROTL is first turned up, it is necessary to obtain data on existing trunks from traffic and engineering master files, check its accuracy against plant records in the local offices, rectify discrepancies, code the information on work sheets, punch the data on paper tape, and assemble the initial trunk and facility data base. At this time, the initial trunk connector assignments must be made and tables of supporting information originated. Test line and ROTL directory numbers must be collected and the office directory initialized. Each of these tasks and the appropriate methods to accomplish it must be defined according to the particular methods and situation of each operating company.

COORDINATE DATA PATH INTERFACES BETWEEN ALL ORGANIZATIONS IN PATHS

2.11 Since methods of record keeping, trunk design and provision, and information distribution vary within the Bell System, an objective of the CAROT/ROTL universe must be to coordinate as much as possible the interfaces between the different organizations. This should involve familiarizing the organizations with the data forms and information required by the CAROT System. Detailed information on the data forms available for data compiling and how to complete the CAROT 2 work sheets is provided in Section 190-102-203.

DESIGN DATA PROCESSING CENTER CHANGES TO PROGRAMS AND POSITION PRACTICES

2.12 If data concerning circuit and trunk orders is to be provided by a data processing center operating on a pre-BIS/TIRKS basis, changes will probably have to be made to include traffic data, such as trunk relay assignments and common control assignments, in the mechanized system. Such changes are complex; therefore, the design of methods for constructing a complete EDP record of the data required by the CAROT center should be started early.

3. COORDINATE WITH CMS FOR EACH NO. 4 ESS MACHINE TO BE TESTED BY CAROT

3.01 When a Circuit Maintenance System (CMS 1A, 1B) interfaces with a CAROT System, the planning and coordination required in CAROT data base administration is somewhat different than described in Part 2. CMS interfaces with the CAROT System via a data link. CMS provides trunk and facility information across the data link

for updating of the CAROT 2 data base. CAROT 2 can perform trunk testing for up to 3 different No. 4 ESS machines. Each No. 4 ESS machine requires a separate data link into CAROT (even if all three No. 4 ESS machines are served by the same CMS 1B). The following instructions apply to each of the No. 4 ESS machines:

(a) Process definition for initial acquisition of data not supplied by CMS

(b) Data path interface coordination with CMS personnel.

DEFINE PROCESS NEEDED FOR INITIAL ACQUISITION OF DATA

3.02 The CAROT 2 controller is installed well in advance of cutover of No. 4 ESS. However, No. 4 ESS trunk and facility records are not inputted to CAROT 2 via the data link until immediately prior to cutover (see paragraph 3.05). During the precutover period, CAROT 2 is used to perform demand tests on trunks which have not yet been entered in the CAROT 2 data base via the update process (Part 5). To perform the precutover tests, it is essential that the equipment files (ROTLs, responders, and test lines) for the trunks be entered when the CAROT 2 controller is first installed. Administrative data should also be entered at this time. This data can be obtained from the No. 4 ESS Machine Administrative Center (MAC). This data is entered in the same manner as for a conventional (non-CMS) CAROT 2 controller.

3.03 After cutover of the No. 4 ESS, trunk and facility records are inputted automatically via the data link at any time during the day (during CAROT real time operation); however, they are stored temporarily in a file on disc and are added to the data base only during the update program run (Part 5). At the conclusion of an update run, a report on the updates is automatically sent back to CMS via the data link. Figure 3 shows the information flow in a CAROT/No. 4 ESS environment (covered in Section 190-102-203).

3.04 The following work sheets should be filled out by the CAROT 2 System or MAC personnel for No. 4 ESS. This data, including the far-end test line directory, should be prepared before the controller is installed. This will permit precutover demand testing well in advance of the cutover date. Information on the data required for these work sheets is given in Section 190-102-203.

FORM NO.	TITLE
E 6725	CAROT 2 Responder, ROTL, and Test Line Work Sheet
E 6726	CAROT 2 Control Office for Trunk Work Sheet
E 6727	CAROT 2 Control Office for Facilities Work Sheet

3.05 It is also important that plans are made to update the CAROT 2 data base in increments prior to cutover. The CMS storage area in CAROT 2 for CMS updates is not large enough to handle more than approximately 1500 trunks during one update cycle (Part 5). Thus for cutovers involving more than 1500 trunks, the CAROT 2 data base must be updated in stages. As CMS update requests (termed 710 commands) are received by CAROT 2, they may be stored on magnetic tape as well as the disc. The 710 tape serves as an additional backup medium in the event of a system crash (Part 5).

COORDINATE DATA INTERFACES WITH CMS PERSONNEL

3.06 CMS personnel should be familiarized with the CAROT 2 System data base hierarchy (Fig. 1). As shown in Fig. 1, CAROT 2 System personnel must enter equipment and administrative data before CMS update information will be accepted. Thus, if a new trunk group (or subgroup) is to be updated by CMS, the far-end test line data must be entered before the CMS update is attempted. Otherwise, the new trunks will be rejected during the update process with error messages indicating that no far-end test line exists. Messages indicating the failure of a stated action are also returned to CMS at the conclusion of the update program run (Part 5). Coordination with CMS personnel should occur so that these errors are corrected.

3.07 As shown in Fig. 3, only the test results showing trunks with confirmed Q2s and made maintenance busy are automatically sent to CMS. These are sent in real time, ie, during routine testing as soon as they are confirmed. After CAROT has completed the analysis of the routine test results, the results are sent across the data link to CMS to be printed out on the CMS line printer. In cases where several No. 4 ESS machines are assigned to one CAROT, the Q2s and routine test results for each No. 4 ESS machine are sent over the data link assigned to that No. 4 ESS machine.

4. IMPLEMENTATION

4.01 A CAROT 2, generic 2 data base may evolve in one of three ways:

(1) It can be new, ie, there was not any previous CAROT data base

(2) It can be converted from a CAROT 2, generic 1 data base

(3) It can be converted from a CAROT 1 data base.

The following paragraphs discuss the implementation of each evolution.

CAROT 2 DATA BASE (NEW)

A. Train Data Processing and CAROT Center Personnel

4.02 Data processing center personnel who are responsible for entering data previously handled manually must be trained to initialize the new position practices. CAROT center personnel who are responsible for checking the validity of data and for initializing correction procedures must be trained to recognize each data item in both CAROT records and source records. They must understand the significance of the data item within CAROT/ROTL operations and for trunk maintenance. CAROT center personnel must also be trained to recognize data items such as test line numbers associated with the office directory and to obtain these sources from plant department records. Operation of CAROT controller programs and their use in updating the data base, initializing automatic trunk tests, and analyzing test results must also be learned.

B. Collect Initial Data for Offices

4.03 Collection of data for each ROTL office should be completed about one month before completion of the ROTL installation. A month in advance should be early enough to provide data for ROTL acceptance testing, but should be late enough to eliminate the wasted effort of updating data that is not required for testing. Whether the initial data for the CAROT center is received from the data processing center or is collected manually, a comparison of traffic, engineering, and plant department records should be made to eliminate the more obvious errors and to ensure completeness of the inventory of trunks to be tested. A comparison of records and physical equipment should not be made because errors of this sort will be discovered during ROTL turnup. The test line numbers needed for testing trunk groups outgoing from the offices should be checked against or acquired from the contents of the office directory.

4.04 To establish the appropriate data base for the trunk testing operation, office description forms and trunk group description forms (paragraph 4.05) should be completed for each ROTL office. This information will then be transferred to the trunk file and trunk and facility group work sheets for each trunk outgoing from a ROTL. Related information on each ROTL (responder and test line) and on the respective control offices must also be entered on the designated work sheets. To accommodate test frame tape and circuit-order completion operations, related information must be entered on the appropriate work sheets described in paragraph 4.06.

4.05 The forms involved in establishing a CAROT 2 data base and their applications are as follows:

(a) ***Office Description Forms:*** These forms are used in the initial assembly of information related to arrangements for automatic trunk testing in each office, ROTL directory numbers, and test connector assignments.

(b) ***Trunk Group Description Forms:*** These forms are used in the initial assembly of trunk group dependent data as related to expanded SXS, expanded 5XB, and 1XB/XBT ROTLs.

(c) ***CAROT 2 Work Sheets:*** These work sheets are used in the intermediate phase of data manipulation. They are used to format information derived from other sources; ie, office description forms, trunk group description forms, etc, for manual or mechanized data entry processes.

4.06 A listing of forms that will be useful in collecting CAROT 2 data base information follows. Those forms identified by reference numbers (enclosed in parentheses) may be ordered from Western Electric and those that are not must be reproduced locally.

- Office Description From Trunk Maintenance File Data No. 5XB ROTL Office (ODF—C CAROT)
- Office Description Form Trunk Maintenance File Data SXS ROTL Office (ODF—D CAROT)
- Office Description Form Trunk Maintenance File Data Expanded Step-by-Step ROTL Office (ODF—E CAROT)
- Office Description Form Trunk Maintenance File Data Expanded Step-By-Step ROTL Office (ODF—F CAROT)
- Office Description Form Trunk Maintenance File Data 1XB/XBT ROTL Office (ODF—G CAROT)
- Expanded Step-By-Step ROTL Trunk Group Description Form
- Crossbar Tandem and No. 1 Crossbar ROTL Trunk Group Description Form
- Expanded No. 5 Crossbar ROTL Trunk Group Description Form
- CAROT 2 Responder, ROTL, and Test Line Work Sheet (E 6725)
- CAROT 2 Control Office for Trunks Work Sheet (E 6726)
- CAROT 2 Control Office for Facilities Work Sheet (E 6727)
- CAROT 2 Circuit-Order Plant Control Office Work Sheet (E 6728)
- CAROT 2 Test Frame Office Work Sheet (E 6729)
- CAROT 2 Circuit-Order Work Sheet (E 6730)
- CAROT 2 Trunk File Work Sheet (E 6731)
- CAROT 2 Trunk Group and Test Priming Work Sheet (E 6732)
- CAROT 2 Facility Group Work Sheet (E 6733)

4.07 The initial data must be an accurate record of those equipment and trunk areas involved as of a predetermined date. To ensure the continued accuracy of the data base, methods must be established to incorporate all additions, deletions, and changes as they are subsequently reported.

4.08 Additional supporting information required by the CAROT center, other than just described, may be found in the following sections:

- Section 314-205-500 for gain slope maintenance limits
- Section 660-402-300 for loss deviation guides
- Section 660-403-500 for noise limits, if not provided on the circuit layout record card
- Section 880-400-106 for C-notch noise.

C. Institute a Trunk File Initial Load Process

4.09 The process for gathering data for the initial load should minimize the involvement of the central office forces and allow most of the convert-and-prepare process to occur outside the CAROT center. As shown in Fig. 4, the CAROT center is responsible for identifying testable trunk groups. If the ROTL is installed in an ESS (No. 1 or No. 2) or small electromechanical office, the trunk assignment organization will provide the per-trunk priming information and pass this information directly to the circuit provision organization. If the ROTL installed is an expanded electromechanical ROTL, the trunk assignment organization will prepare a trunk group description (TGD) form and enter the per-trunk priming information on the TGD form. The trunk assignment organization will then forward the TGD form to the common control assignment organization. The common control assignment organization is responsible for providing the trunk group priming information on the TGD form and for forwarding the form to the circuit provision organization. The circuit provision organization is responsible for the convert-and-prepare process and for providing facility assignment and transmission parameter information.

4.10 For the initial load, it is recommended that the input data be prepared at a centralized data processing center on 9-track magnetic tape; although, it can exist on paper tape. This data can then be used in establishing the CAROT 2 data base. Information required for the initial load and the hierarchial restraints involved is provided in Fig. 1 and discussed in Section 190-102-203.

D. Institute Trunk and Circuit-Order Flow Changes

4.11 The flow of the trunk and circuit-order information must be modified to include the CAROT center in its distribution. Also, completion notices must be routed to the CAROT center to initiate updating of the CAROT data base. The flow of information in a typical trunk file update process when no No. 4 ESS is involved is shown in Fig. 5. When No. 4 ESS is involved, trunk and facility information is provided by CMS over a data link (see Part 3). As shown in Fig. 5, the responsibilities of the different organizations are the same as for the initial load process (Fig. 4).

E. Institute Data Audit Techniques

4.12 CAROT center records and traffic, engineering, and plant records should be compared periodically to detect discrepancies that may arise. These discrepancies could be caused by routing incomplete orders to the CAROT center or by corrections to the CAROT data base that have not been communicated to the engineering or traffic organizations. If the records are mechanized, the audits may be made more thoroughly and at more frequent intervals, such as quarterly. In a manual environment, spot checks may be made at some less frequent interval, depending on order activity rates. For more detailed information on auditing the CAROT 2 data base, see Part 6.

F. Determine Size of Data Base Required

4.13 A small, blank initial CAROT 2 data base is supplied by WE with the CAROT 2 controller software. The blank data base contains information required by the CAROT 2 programs to perform their intended tasks. The data storage space on disc is allocated according to the number of records of each type to be entered. Thus all records of a given type (eg, trunk records) are stored within a specific area of disc. If enough records of a type are added to fill up the allocated area, any additional record will be rejected.

4.14 The blank data base supplied by WE is too small for use by the telephone company. It is provided only to allow the system to operate properly when it is first installed on the disc. WE also supplies a data base parameter's (DATAC2) tape which contains the information necessary for CAROT to configure a standard sized data base. The file sizes provided by this data base parameter's tape are as follows.

CATEGORY	FILE NUMBER	MAXIMUM NUMBER OF RECORDS ALLOWED
TRUNKS (CAROT)	303	80,000
TRUNKS (TEST FRAME)	703	0
RESPONDERS	601	504
ROTLS	101	202
TEST LINES & TEST OFFICES	102	1001
TEST FRAME OFFICES	701	0
CONTROL OFFICES FOR TRUNKS	201	208
CONTROL OFFICES FOR FACILITIES	301	210
TRUNK GROUPS (CAROT)	103	6666
FACILITY GROUPS	203	6666
TRUNK GROUPS (TEST FRAME)	603	0
PLANT CONTROL OFFICES	501	0
CIRCUIT ORDERS	403	0
CIRCUIT ORDER ITEMS	503	0

The remaining space in the data base is designated as utility space. If the data base in any of the above categories grows to exceed the maximum number of entries allowed within the next three years, or test frame tape capability is to be employed at the outset of initializing a system, then a new data base configuration should be initialized as described in Part 7. Otherwise, the data base reconfiguration should be postponed to a later time when it becomes necessary. The number of trunks in the data base may not exceed 130,000 for CAROT testing and 130,000 for test frame testing. It should be noted, however, that if there are a large number of CAROT trunks requiring daily or weekly testing, the frequency of testing requirement may not be able to be met if the maximum number of trunks are entered in the data base. If given a typical mixture of test frequencies to maintain proper test intervals, the maximum number of CAROT trunks should be about 100,000.

G. Establish New CAROT 2 Data Base

4.15 After the initial load data has been prepared for input (paragraphs 4.09 and 4.10) and the CAROT 2 center equipment has been installed and accepted, it is possible to establish the CAROT 2 data base. A general outline of what must be done is provided in Fig. 6 and discussed in the following paragraphs. Detailed procedures for the establishment are provided in TOP 190-102-301.

4.16 As shown in Fig. 6, the establishment of a new CAROT 2 data base contains several backup operations. A backup operation consists of copying the CAROT 2 data base from disc to magnetic tape. A restoral operation consists of copying the CAROT 2 data base from magnetic tape to disc. The CAROT 2 data base backup and restoral philosophy is described in Part 5.

4.17 The first step in establishing a new CAROT 2 data base is to determine the file size required to hold the data base information (see Part 7). If the file sizes will fit the data base provided by WE on the DATAC2 tape (paragraph 4.14), then the original DATAC2 tape data base will be loaded into the CAROT controller. If the file sizes will not fit, a new DATAC2 tape will have to be configured for the new file sizes. The configuration process is discussed in detail in Part 7.

4.18 Using the DATAC2 tape, the program CONFI must be run to initialize the data base on the disc. Once this has been completed, the first backup tape can be made. Although the data base is blank at this time, the information on file sizes stored on the DATAC2 tape is saved on the backup tape.

4.19 After a backup tape is made of the original blank data base or a new blank data base, the update process is then used to enter the following blank records via the CRT console. ("®" means operate the RETURN key; "_" means operate the SPACE bar.)

/AD®

/CFNOT_KNOWN®

/RENOT_KNOWN®

/GFNONE_ENTERED®

/END®

These blank records allow any of the following actions during an update cycle:

(a) Leave the responder ID blank in the RO and ED records.

(b) Leave the control office for facilities ID blank in the GF or GN record.

(c) Leave the facility group ID blank in the TF record.

4.20 These blank ID items may be used when the information on the responder ID, facility group ID, or control office for facilities ID is not available or is nonexistent.

(a) The responder record entry (RENOT KNOWN) permits the subsequent addition of non-105 type lines (ie, test lines not associated with a responder) to the data base.

(b) The control office for facilities record entry (CFNOT KNOWN) permits the subsequent addition of facility group (GF) records which are not assigned to any control office. Thus, the control office for facility item in that GF record can be left blank and will default to the ***not known*** category.

(c) The facility group record entry (GFNONE ENTERED) permits the subsequent addition of trunks that are not assigned to a facility group. Therefore, in the record entry sequence of AD, TG, TF, TH, and TT, leaving all blanks in the TF record will cause these trunks to be assigned to the ***none entered*** facility group.

4.21 After the blank items have been entered, it is necessary to install the remote user HELP file. The HELP file is delivered on mylar tape with the generic 2 software. It is loaded while the controller is running in the Real-Time System. The tape is mounted in the tape reader and the command **CRHP** is typed at the console. This will replace any existing HELP file with the new one.

4.22 After the HELP file has been entered, the update process is then used to add the equipment and administrative data required for the initial load. This update run may produce error messages caused by incorrect date entries. After all errors have been identified and rectified, either the DISPA OR SELEC program module (Table A) should be run to obtain a printout of equipment and administrative files to check that they are complete. The update process is then used to enter the initial load trunk and facility information. Trunk and facility information for No. 4 ESS trunks is supplied by CMS via the data link (see Part 3).

CAROT 2 DATA BASE (CONVERTED FROM CAROT 1)

A. Train Data Processing and CAROT Center Personnel

4.23 Data processing center personnel previously responsible for supplying CAROT 1 data must be trained to recognize the new format and hierarchial structure of the CAROT 2 data base (Section 190-102-203) and the additional information required (equipment and administrative files). CAROT center personnel responsible for checking the validity of data and initializing rectification procedures must be trained to recognize each data item both in the new CAROT 2 format (Section 190-102-203) and in source records. CAROT center personnel must also be trained to recognize the additional CAROT 2 data items (equipment and administrative files) and to obtain information constituting these data items from plant departmental records. Operation of new CAROT 2 controller programs and their use in updating the data base, initializing automatic trunk tests, and analyzing test results must also be learned.

B. Collect Initial Equipment and Administrative Data for Offices

4.24 Equipment and administrative data for the trunks and facilities presently located on the CAROT 1 TMFs must be collected and entered on the appropriate CAROT 2 work sheets (Section 190-102-203). This initial data must be an accurate record of those equipment and administrative areas involved as of a predetermined date. New methods may have to be established to incorporate all additions, deletions, and changes in equipment and administrative data as they are subsequently reported.

C. Prepare Initial Equipment and Administrative Data for Conversion Process

4.25 It is recommended that the initial equipment and administrative data be prepared at a centralized data processing center on 9-track magnetic tape; although it can exist on paper tape. This data can then be used in the conversion process described in paragraphs 4.28 through 4.39. Information required for the initial equipment and administrative data and the hierarchial restraints involved is provided in Fig. 1 and discussed in Section 190-102-203.

D. Institute Data Audit Techniques

4.26 Data base audit techniques must be determined as described in paragraph 4.12.

E. Determine Size of Data Base Required

4.27 It should be determined whether or not the configuration of the blank data base supplied by Western Electric is adequate, as described in paragraph 4.13.

F. Convert CAROT 1 to CAROT 2 Data Base

4.28 After the initial equipment and administrative data has been established and the additional equipment required for a CAROT 2 center has been installed and accepted, it is possible to convert the CAROT 1 to a CAROT 2 data base. A general outline of what must be done is provided in Fig. 7 and described in the following paragraphs. Detailed procedures for the conversion are provided in TOP 190-102-301.

4.29 As shown in Fig. 7, the conversion of a CAROT 1 to a CAROT 2 data base contains several backup operations. Backup and restoral operations are discussed in paragraph 4.16. The CAROT 2 data base backup and restoral philosophy is described in Part 5.

4.30 The first step in converting a CAROT 1 to a CAROT 2 data base consists of connecting the CAROT 1 cassette unit to I/O slot 24 of the data processor. The ED-1P381-30, Group 1 program is then run and the CAROT 1 TMF cassettes are copied on magnetic tape. The total of all the TMFs on one magnetic tape should contain no more than 50,000 trunks because disc storage space required by the CNVRT program module (Table A) is limited. If there are more than 50,000 trunks, a second magnetic tape must be used.

4.31 The next step is to determine the file sizes required to hold the data base information (Part 7). If the file sizes will fit the data base configuration provided by WE on the DATAC2 tape, then the original DATAC2 tape data base will be loaded into the CAROT controller. If the file sizes will not fit, a new DATAC2 tape will have to be configured for new file sizes. The configuration process is discussed in detail in Part 7. Using

the DATAC2 tape, the program CONFI must be run to initialize the data base on the disc. Once this has been completed, the first backup tape can be made. Although the data base is blank at this time, the empty files in the proper configuration is saved.

4.32 In CAROT 1 Systems, multiple ROTL IDs are assigned to any ROTL associated with multiple marker group switching machines or that is engaged in testing trunks out of more than one switching office. When converting to a CAROT 2 data base, all multiple ROTL IDs associated with a given ROTL must be changed to a single ID. The CNVRT program facilitates these changes.

4.33 When the CNVRT program is running, it reads the magnetic tape of CAROT 1 TMFs and produces a CAROT 2 update conversion tape for subsequent input to the CAROT 2 data base. Each time a different ROTL TMF is encountered, a message is printed out on the system console requesting the name by which the ROTL is to be known in the CAROT 2 data base. The operator replies by entering the ROTL ID that is to be common to a specified ROTL and to all its associated multiple switching applications. Using the ROTL ID entered at the console, the CNVRT program then adds fictitious data to the ROTL ID and creates fictitious equipment and administrative records on the CAROT 2 update conversion tape as shown in Fig. 8.

> ***Note:*** The CNVRT program can be run either before or after establishing a new blank data base (see paragraph 4.31).

4.34 The fictitious records referenced in paragraph 4.33 are entered to satisfy the hierarchical constraints on the CAROT 2 data base and thereby allow for the subsequent entry of the CAROT 1 trunk groups and trunks for the given ROTL. The CNVRT program module continues reading the CAROT 1 TMF and produces on the CAROT 2 update conversion tape a YG,YB record pair for each trunk group, followed by a GF record for each facility group, and a TG TF TH TT series for adding trunks. All facilities are automatically assigned to the blank (ie, NOTKNOWN) control office for facilities. The ROTL ID entered in YB record is the same as that entered by the console operator. The control office for trunk names is entered in the YB record as it was read from the CAROT 1 TMF. If the control office ID field of the CAROT 1 cassette is blank, then the CNVRT program module uses the A office of the trunk group ID as the control office for trunks in the CT, RC, and YB records. Because the fictitious records satisfy the hierarchical requirements of the update program, the CAROT 2 update conversion tape produced by the CNVRT program could be used by itself as an initial load for the CAROT 2 data base. However, the fictitious equipment and administrative files contained on this tape would then have to be changed to reflect the real data. Thus in practice, the correct equipment and administrative records prepared by the CAROT center should be entered into the data ***before*** the CAROT 2 update conversion tape is entered. When the update process is performed in this order, all the fictitious record data whose corresponding ***real*** entities already exist in the data base (because of prior entry of the equipment and administrative records) will now be rejected. Rejection of records occurs because the update program blocks duplicate record entry attempts. It is recommended that the CAROT 2 update tapes not exceed 10,000 trunks when running the CNVRT program module. This facilitates the use of the update program.

4.35 After the CNVRT program module has run, the HELP file should be loaded as discussed in paragraph 4.21. The update process is then used to enter blank records on the CRT console as described in paragraphs 4.18 and 4.19. The update process is then used to add to the data base the equipment and administrative data required for the initial load. After all the errors have been identified and the DISPA or SELEC program module has been run to see that the equipment and administrative files are complete, the update process is then used to enter the previously prepared initial load produced by CNVRT (trunk and facility information and fictitious equipment and administrative records). DISPA or SELEC program module should be run to identify all fictitious equipment and administrative entries that are not rejected. All troubles should be corrected and the proper data entered at the next update run.

4.36 In order to assign facility groups to the proper control office for facilities, it is necessary to prepare an update tape containing a series of change transactions with GF,GN record pairs. This may be done at any time after the CAROT 2 data base has been established. Refer to Section 190-102-203 for further information on CF, GF, and GN records.

CAROT 2 DATA BASE (CONVERT FROM CAROT 2, GENERIC 1 TO CAROT 2, GENERIC 2)

A. Preparation of Generic 1 CAROT Controller for Conversion

4.37 Before the generic 1 CAROT controller is turned down for the generic 2 conversion, a backup tape ***must*** be made. This final generic 1 backup tape will be used to load the generic 2 CAROT controller with the generic 1 data base information. In addition, the generic 1 to generic 2 data base conversion process resets all TTMI (index) and management summary counters to zero. It is therefore recommended to do the conversion at the same time the index counters would ordinarily be cleared. It is also recommended that the programs VRDIT and AUDSC be run on the generic 1 data base before conversion. This will ensure, to the possible extent, that a good data base will be converted.

B. Determine Size of Data Base Required

4.38 When converting from generic 1 to generic 2, the data base must be configured to provide adequate file space. File configuration and size is discussed in Part 7.

C. Convert From Generic 1 to Generic 2 Data Base

4.39 After the additional controller equipment, if any, has been installed and accepted, the conversion of the generic 1 data base can begin. A general outline of what must be done is provided in Fig. 9 and described in the following paragraphs. Detailed procedures for the conversion are provided in TOP 190-102-301.

4.40 As shown in Fig. 9, the conversion contains several backup operations. Backup and restoral operations are discussed in paragraph 4.16. The CAROT 2 data base backup and restoral philosophy is described in Part 5.

4.41 The first step in the conversion is to load the CAROT 2, generic 2 programs by running the SSDLU program module.

4.42 The next step is to determine the file sizes required to hold the data base information (Part 7). If the file sizes will fit the data base provided by WE on the DATAC2 tape, then the original DATAC2 tape data base will be loaded into the CAROT controller. If the file sizes will not fit, a new DATAC2 tape will have to be configured for new file sizes. The configuration process is discussed in detail in Part 7. Using the DATAC2 tape, the program CONFI must be run to initialize the data base on the disc.

4.43 The backup tape containing the generic 1 data base is then loaded as part of the AROUN program. If any type 3 file (103, 203, etc) has been increased in size, run the RESTO program. Next, run the FX504 program and install the help file (see paragraph 4.21). Finally, make a backup tape of the new generic 2 data base.

5. UPDATE PROCESS

GENERAL

5.01 A typical trunk file update process when No. 4 ESS is not involved is shown in Fig. 10. When No. 4 ESS is involved, trunk and facility information is provided by CMS over a data link (see Part 3). Input forms used for collecting data for the update process are described in paragraphs 4.05 and 4.06.

DATA BASE UPDATE INPUT METHODS

5.02 The CAROT 2 data base may be updated by magnetic tape provided by a mechanized records system or by punched paper tape containing data entered on manual records (work sheets). These methods can be used for entering data pertaining to routine and demand trunk (RDT) tests, test frame tape preparation (TFTP) procedures, and circuit-order testing and completion (COTC) work. The COTC process is referenced in paragraphs 5.04 through 5.08.

A. Update from Mechanized Records System

5.03 The CAROT 2 data base may be updated from an update file on 9-track, IBM-compatible, magnetic tape written by a mechanized records system. As shown in Fig. 10, the tape is read by an RDT update process which updates the RDT data base. This, in turn, supports the process in servicing the requests placed by craft personnel. If the TFTP process is implemented, its data base is updated from the same input file.

5.04 The process of updating the COTC data base for implementing circuit-order testing is shown in Fig. 11. Information on pending circuit orders is passed from the mechanized records system to CAROT 2 on the COTC update tape as the circuit orders are issued. In this case, the information is held in the COTC data base for the purpose of testing only; ie, craft personnel can ask for normal demand tests of the trunk by circuit layout order number. The completion would then be reported through established channels back to the mechanized records system. When the order becomes effective, the mechanized system would update CAROT 2 by deleting the pending order from the COTC data base and adding it to the RDT data base (or by changing or deleting the circuit from the RDT data base). In this scheme, CAROT 2 has no control over the circuit-order completion.

5.05 The COTC process utilizing completion reporting through CAROT 2 is shown in Fig. 12. When craft personnel have finished circuit-order testing and reported the completion to CAROT 2, the completion is entered in the CAROT 2 data base. This causes a flag to be set on the trunk, if it exists in the RDT data base, to prevent routine testing until the RDT data base has been updated to reflect the circuit-order work. The completion is also marked in the COTC data base so that the completion report generation process will issue a completion notice back to the mechanized records system and put it on the completion report printed at the CAROT center. The mechanized records system must return the proper updates back to CAROT once the circuit-order completion is accepted and becomes effective. It is not advisable to implement updates to the COTC and RDT data bases at the CAROT center since the completion report may well be rejected by the mechanized records system. Local updates (ie, at the CAROT center) to COTC and RDT data bases would then cause the CAROT 2 and mechanized record system data bases to diverge.

5.06 Completion reporting will be implemented so that the CAROT System rejects a completion report unless the trunk has passed the circuit-order test limits for those tests that CAROT can perform. A rejection may be overridden by a second completion message, but this will be noted on the completion notice file. Such overrides may be legitimate since the capability for correcting information in the COTC data base by remote terminal request may not have been provided.

B. Update from Manual Records

5.07 To update the data base using the manual process, a clerk assembles data from manual records and enters it on 8-level paper tape. Once the data is entered, the CAROT System proceeds as before. Figure 13 shows the manual update process for the RDT data base. Information on pending circuit orders can also be assembled manually and entered on paper tape as shown in Fig. 14. To avoid entering the data manually more than once (ie, once to the COTC data base and then to the RDT data base), local COTC update and local RDT update processes are enabled, causing updates to the COTC and RDT data bases after the completions have been reported. Cross-checks between the CAROT data base and manual records must be made manually to prevent divergence of the two data bases.

C. Update in Mixed Systems

5.08 All the processes which would be obtained by overlaying Fig. 10 through Fig. 14 can coexist in the same CAROT center. The update software is not changed to enable one process or another; rather, the input data is changed. Details concerning circuit-order record items used to enable circuit-order testing, circuit-order completion, and local RDT data base updating are covered in Section 190-102-203. Mixed systems might occur where some parts of a company have a mechanized records system and other parts have a manual one; or where completions on message trunks could be accepted through CAROT 2, but completions to CCSA trunks would have to be completed manually.

UPDATE SOFTWARE SYSTEM

5.09 The update software is normally arranged to operate at a set time each day as specified to the CAROT 2 controller by the operator. A typical operation of the CAROT 2 update software is shown in Fig. 15. Procedures for performing update tasks are given in TOP 190-102-301.

5.10 As shown in Fig. 15, update inputs are accepted in order according to the medium on which they are contained. If update is to run unattended prior to update time, paper tape must be placed in the readers and the magnetic tape must be mounted if any data on these media is to be entered into the data base. CMS update information received via the data link is automatically inputted at the proper time (first in the sequence).

5.11 There are advantages to the attended operation since minor errors in the update inputs can be corrected and reentered during the update process (paragraph 5.13). Also, a transaction tape cannot be made during unattended operation if inputs are to be read in from magnetic tape. A transaction tape is a copy of the data base update inputs on magnetic tape (paragraph 5.15).

5.12 As inputs on each of the individual update input mediums are entered, phase 1 of the update software rejects update inputs containing illegal data items, incomplete data, or data with format errors (Fig. 15). The offending data entry and an appropriate error statement is typed on the line printer. Table B lists the phase 1 error statements and their meaning. Phase 1 also causes all accepted data base update inputs to be written on disc in a preupdate utility space (PUSPAC).

5.13 Data base update input information is held in PUSPAC until all input mediums have been acted upon by phase 1. PUSPAC is normally set to approximately 4000 (space for about 6000 trunks). Phase 1 errors should be checked to determine if the offending record will cause large scale phase 3 error messages. For example, if a record rejected by phase 1 is higher in the CAROT 2 data base hierarchial structure (Fig. 1) than subsequent records, the subsequent records will be rejected with error codes by phase 3. Data with extensive phase 1 errors will have to be corrected and reentered at a subsequent update time. Phase 1 errors are listed in Table B.

5.14 Also during phase 1, any circuit orders and items which have been completed will be analyzed. If the routine and demand testing data base is to be automatically updated, then the ACTION data records pertaining to the item are stored in PUSPAC in order to add, delete, or change a trunk. If the circuit-order testing and completion data base is to be automatically updated, then records needed to delete the circuit order or item are stored in PUSPAC. At the end of phase 1 activity, the number of circuit order and item completions is printed out on the console and line printer.

5.15 After all accepted update inputs have been written in PUSPAC, phase 2 of the update software is then used to transfer the information to phase 3. This is accomplished by creating a transaction tape (a copy of all the update information on magnetic tape) or by writing it one record at a time in a small buffer space on disc. It is recommended that a transaction tape be created because of backup considerations (paragraphs 5.22 through 5.25) and the occurrence of a faster transfer from phase 2 to phase 3.

5.16 Phase 3 of the update software rejects all data records entered out of hierarchial sequence (Section 190-102-203) and enters all accepted data in the data base. The offending record and an error message code is typed on the line printer in **TROUBLE: FILE=oonnn, OPERATION=oooon, CODE=oonnn.** Phase 3 error message codes are described in paragraph 5.17 and in Table C.

5.17 Phase 3 error message codes are typed on the line printer in the following format:

TROUBLE: FILE=oonnn, OPERATION=oooon, CODE=nnnnn.

nnn = 101—ROTL

= 201—Control Office for Trunks

= 301—Control Office for Facility

= 501—Plant Control Office

= 601—Responder

= 701—Test Frame Office

= 102—Test Line Directory Office or Test Line

= 103—Trunk Group

= 203—Facility

= 303—Trunk Principal

= 403—Circuit Order

= 503—Circuit-Order Item

= 603—Test Frame Trunk Group

= 703—Test Frame Trunk

= 104—ROTL Control Office

= 904—K Field Priming

n = 1—Addition to Data Base

= 2—Deletion to Data Base

= 3—Change to Date Base

nnnnn = Specific error in offending record with regard to the file ID and the type of operation (see Table C).

5.18 After phase 3 has ended, phase 4 of the update software causes a file descriptor map to be typed on the line printer. Phase 4 also causes listings of data base irregularities, when present, to be typed on the line printer (paragraph 5.20).

5.19 Figure 16 shows a typical file descriptor map which provides a listing of the current number of entries for each file in the data base. The file numbers and IDs correspond to those described in paragraphs 5.17. Additional file IDs included on a file descriptor map are as follows:

nnn = 204—CAROT Trunk Test Parameters

= 804—Test Frame Trunk Test Parameters

= 704—Utility

5.20 Following the file descriptor map is a listing of the following data base hierarchial structure irregularities, when present:

LIST OF ROTLS WITH NO TRUNK GROUPS

LIST OF RESPONDERS WITH NO ROTLS OR TEST LINES

LIST OF TEST LINES WITH NO TRUNK GROUPS

LIST OF CONTROL OFFICES FOR TRUNKS USING NO ROTL

LIST OF CONTROL OFFICES FOR FACILITY USING NO FACILITIES

LIST OF ROTL-CONTROL RECORDERS WITH NO TRUNK GROUPS

LIST OF TRUNK GROUPS WITH NO TRUNKS

LIST OF PLANT CONTROL OFFICES WITH NO CIRCUIT ORDERS

LIST OF TEST FRAME OFFICES WITH NO TRUNK GROUPS

LIST OF CIRCUIT ORDERS WITH NO ITEMS.

These irregularities should be checked to determine why they are present. Entries listed under the above headings could be caused by any of the following reasons:

(a) Typographical errors made when preparing data for entry into the data base via the update process

(b) Equipment and administrative records entered as preparation for subsequent entry of trunk and facility records

(c) The deletion from the data base of a dependent file in the hierarchial structure (Fig. 1). The deletion could have occurred intentionally or by accident. For example, entries listed under the first heading (LIST OF ROTLS WITH NO TRUNK GROUPS) are ROTLs which have no trunk groups assigned to them. If the reason for the presence of any of the entries is not readily apparent, the SELECT or ASIN program modules should be used to view the data base to determine the cause.

BACKUP PHILOSOPHY

A. General

5.21 Because of the large amount of work and time involved in establishing a CAROT 2 data base, backup tapes must be made daily so that the data base can be restored after a disaster (head crash, hardware problems, etc). A backup tape is a copy of the data base on magnetic tape. The tape label on the outside of each of the backup tape reels should clearly indicate the tape number and the date it was made.

Note: Every CAROT 2 data base file is stored on the backup tape. This does not, however, include the user created disc files (see Section 190-102-206). These are not stored on the tape; but remain on the disc until purged by the user running the EDIT program.

5.22 A transaction tape should be made whenever there are data base update inputs during the update process. It is a copy of all the data base inputs on magnetic tape. The same reel of tape can hold the inputs from several update runs. The tape label on the outside of the reel should clearly indicate what update inputs (dates) are included on the tape.

Day N = Today

Day N-1 = Yesterday

Day N-2 = Day before yesterday.

5.23 Make a backup the first thing in the morning after analysis is completed. This insures that the previous night's routine test results are not lost if a controller failure occurs during the day. If CMS is involved, a copy of the update inputs should be made on magnetic tape as they are received over the data link (Paragraphs 5.31 through 5.36).

5.24 Initially, nine backup tapes should be made and numbered consecutively. These nine backup tapes and all three transaction tapes should be maintained at all times. A proper rotation of the nine backup tapes insures that the data base can be restored in case there are several consecutive bad backup tapes (paragraphs 5.37 and 5.38). The bad tapes could be caused by a read error in the tape reader. Also, it is a good idea to make an extra backup tape once a month and store it outside the CAROT center.

5.25 Backup and restoral of the data base is accomplished using the BACKUP/RESTORE program module (Table A). For detailed information on how to restore the data base and make a backup using the BACKUP/RESTORE program module, see TOP 190-102-301.

B. Recovery From Disaster (Without CMS Interaction)

5.26 The method of recovering from disaster and restoring the data base to normal depends upon the time and date of occurrence. Figure 16 shows the CC2 schedule without CMS interaction for two typical days. Crash times are included for explanation purposes only. The following paragraphs (5.27 through 5.29) explain the time of the crash and which tapes must be read into the CC2 to restore the information lost. The examples used assume that the backup tape is good and does not have a parity error. This possibility is discussed in paragraphs 5.37 and 5.38.

5.27 ***Crash 1 or 2:*** As shown in Fig. 17, crashes 1 and 2 occur during the demand testing period and update period. These crashes occur after the backup tape is made for Day N but before a transaction tape is generated during the update period. In this case, the data base is restored using the backup tape made on Day N after analysis.

5.28 ***Crash 3:*** As shown in Fig. 17, crash 3 occurs during the update cycle. This crash occurs after the transaction tape has been generated but before the end of the update period. The data base is restored by using the backup tape made on Day N after analysis and rerunning the update cycle using the latest transaction tape.

5.29 ***Crash 4 or 5:*** As shown in Fig. 17, crash 4 occurs during routine testing, and crash 5 occurs during analysis. The data base is restored using the backup tape generated after analysis on Day N and rerunning update using the latest transaction tape. If an optional backup tape was made during update on Day N, the data base is restored by loading only the backup tape during the update period.

5.30 A more complicated recovery procedure can occur in any of the above examples if the latest backup tape has a parity error. In this case, a previous backup tape must be loaded. Also, update must be run using all subsequent transaction tapes. Rotation of the nine backup tapes and the order in which the tapes should be used for restoral are discussed in paragraphs 5.37 through 5.38.

C. Recovery From Disaster (With CMS Interaction)

5.31 CMS update data (sent via the data link) may be received by CC2 during routine or demand testing period. The CMS information received by CC2 is stored on disc and a copy is also made on magnetic tape (710 tape). During the update cycle, all acceptable CMS update data (received during latest routine and demand testing period) is placed on the transaction tape with any

other data during the same update cycle. Thus, the transaction tape contains the same CMS data as is on the 710 tape. A new magnetic tape should be mounted for 710 commands after each update cycle. Therefore, the transaction tape made during the latest update becomes the primary backup for the 710 commands if a crash occurs after the update cycle.

5.32 The method of recovering from disaster and restoring the data base to normal depends upon the time and date of occurrence. Figure 18 shows the CC2 schedule with CMS interaction for two typical days. Crash times are included for explanation purposes only. The following paragraphs (5.33 through 5.35) explain the time of the crash and which tapes must be read to restore the information lost. The examples used assume that the backup tape is good and does not include a parity error. Rotation of the nine backup tapes and the other in which the tapes should be used for restoral are discussed in paragraphs 5.36 through 5.37.

5.33 ***Crash 1 or 2:*** As shown in Fig. 18, crashes 1 and 2 occur during the demand testing and update periods after a backup tape is made but before a transaction tape is generated during the update period. The data base is restored by loading the backup tape (generated after analysis on Day N) and by restoring the 710 tape data. Loading the 710 tape causes the previous CMS update inputs to be read and stored in the preupdate space on disc. The 710 tape contains data from part 1 of Day N-1 and part 2 of Day N.

5.34 ***Crash 3:*** As shown in Fig. 18, crash 3 occurs during the update cycle. This crash occurs after the transaction tape has been generated but before the end of the update period. The data base is restored by loading the backup tape (generated after analysis) and loading the current transaction tape.

5.35 ***Crash 4 or 5:*** As shown in Fig. 18, crash 4 occurs during routine testing, and crash 5 occurs during analysis. The data base is restored by loading the backup tape made on Day N after analysis, running update using the transaction tape, and restoring the latest 710 tape data. The 710 tape contains data only from part 1 of Day N. If an optional backup tape were made during update on Day N, the data base is restored by loading the backup tape (generated during update on Day N) and restoring the 710 tape data. This 710 tape contains data only from part 1 of Day N.

5.36 A more complicated recovery procedure can occur in any of the above examples if the latest backup tape has a parity error. In this case, a previous backup tape must be loaded. Also, update must be run using all subsequent transaction tapes and the latest 710 tape data must be restored.

D. Backup Tape Rotation

5.37 Proper rotation of the nine data base backup tapes will insure that the data base can be restored in the case that several consecutive backup tapes are bad. A check sheet that can be copied and used to keep a record of the rotation is shown in Fig. 19. Phase 1 in the rotation is the first set of backups made after the initial nine or after phase 32 or the previous check sheet. When phase 32 is completed return to phase 1 on a new check sheet.

5.38 An example of a partially filled out check sheet is shown in Fig. 20. If a crash were to occur before a new backup was made on tape number 2 (phase 12), the backup tapes circled plus tapes 8 and 9 on the previous check sheet would be the tapes that could be used to restore the data base. If parity errors were present on five consecutive backup tapes, the order that the tapes would be used for restoral is as follows:

ORDER OF RESTORAL	BACKUP TAPE NO.
1st	1
2nd	4
3rd	3
4th	2
5th	5
6th	7

E. Additional Update Error Messages

Pauses During Update

5.39 Occasionally during the running of the update process, the controller may stop its' processing and display a CRT error message such as **UPD1: PAUSE xx** , where xx may be one of the following numbers:

xx	Type of Trouble
4	File manager read error
5	File manager write error
6	Checksum error on read of file manager file
12	File manager file bit map error
13	File manager file bit map error
73	Scatter table doesn't point to right record
74	Scatter store algorithm points to last sector in table
75	Disc error
76	Disc error
77	Bad sector address

5.40 PAUSE error messages are indications of either data base or disc hardware problems. In any event, the following action should be taken.

(a) Halt both processors and reboot.

(b) Dump completion notice file (program LICNF) to get a list of the circuit orders completed since the latest backup tape was made.

(c) Run LFILE to get list of user files to be used by update.

(d) Restore the data base using the latest backup.

(e) Restore the users file using the EDIT program to save the desired files for update.

(f) Recomplete the circuit orders and items which had been completed since the last backup tape was made.

5.41 If a PAUSE 75 or 76 (which indicates a disc hardware problem) recurs, then disc diagnostics should be run and/or the maintenance organization notified. If any of the other PAUSE messages recur, the recovery procedure in paragraph 5.40 should be tried again; however, an older backup tape must be used to restore the data base. Continue trying older backup tapes until update can be run successfully. Then use update and transaction tapes to restore the data base to its latest form. If any circuit-order completions were done in the time between the backup and this update, they must be repeated. In all cases of recurring PAUSE messages, the PECC center should be notified.

5.42 In addition, it can be ascertained from the **PAUSE** messages and other update messages on the CRT and line printer whether the problem occurred during the analysis of completions, user files, update input tape, or whatever stage of update. This information will be of value to PECC in determining the location or cause of the problem.

6. DATA BASE AUDIT PROCEDURES

6.01 A CAROT audit tape is generated by the CAROT 2 controller, via the ASIN program module. It provides a 9-track magnetic tape copy of the CAROT 2 controller data base as recovered from disc storage and arranged in the format employed by the update program to update the data base. (Only the routine and demand testing and test frame data bases are outputted by the ASIN program. To get the circuit-order testing and completion data base in update format, the SELEC program must be used). The audit tape is primarily intended to verify the content accuracy of the CAROT 2 controller data base. An audit tape containing the complete CAROT 2 controller data base can also be used to reload the system data base in the event of a disc crash. This is possible since the tape, as outputted by the ASIN program module, contains the data base arranged in the same format as the update tapes. ASIN will also produce an update tape of specific files in the CAROT 2 data base. This tape may be listed on the line printer using the DMPCV program module.

6.02 An audit of the CAROT 2 data base should be performed each quarter and whenever a new office is added to the data base. The audit checks to insure the information required in the data base is there and that it is correct. It is the responsibility of the data base administrator to provide a procedure for performing the audit. The audit procedure can be totally mechanized, partially mechanized, or totally manual as described in the following paragraphs. The person responsible for data base administration should strive to have a totally mechanized audit procedure.

MECHANIZED DATA BASE AUDIT

6.03 In a completely mechanized procedure, the CAROT center should send the audit tape prepared using the ASIN program module to the circuit provision organization (CPO). The CPO runs a program to compare the audit tape to an initial load tape (ie, a tape that provides a listing of all trunks that should be in the data base). The program should also provide a tape containing corrections to the data base in update format. The program should be implemented by the person responsible for the CAROT data base administration.

PARTIALLY MECHANIZED DATA BASE AUDIT

6.04 In a partially mechanized data base audit procedure, the CPO provides the CAROT center with an initial load tape. This is a magnetic tape in update format containing all the trunks that should be in the CAROT 2 data base. Separate tapes must be provided for the CAROT trunk data base file, test frame trunk data base file. The CAROT center personnel run the AUDIT, AUDFR (Table A) program modules to audit the data base. AUDFR is used only for audits of the TFTP data base. These programs provide the following listings:

(a) Trunks on initial load tape that cannot be found in data base

(b) Trunks in data base that have the following problems:

- Priming does not agree with initial load tape
- Test parameters do not agree with initial load tape
- Facility information does not agree with initial load tape.

(c) Trunks listed in data base that do not exist on initial load tape.

MANUAL DATA BASE AUDIT

6.05 In a totally manual data base audit procedure, personnel at the CAROT center must constantly scan routine test results for data base errors. The CAROT center must notify all parties involved with priming errors. In addition, periodic comparisons must be made between the CAROT 2 data base, central office records and any circuit provision organization master lists of CAROT testable trunks.

6.06 A particularly useful method for finding trunk priming errors is provided by the INDEX program module. In addition to counting trunks for TTMI purposes (paragraphs 9.01), INDEX will list all trunks which have not had a routine test run made on them (which is often the case if the trunk priming is incorrect). When a trunk record is added to the data base, it contains a flag word which is initially set to zero. This word is reset to a specific value when a routine test is completed on the trunk. The INDEX program module can read these flags and print out all trunks which have not been tested. If the proper option is selected during the update cycle for INDEX, these flags will be reset to zero on all trunks.

OFFICE CERTIFICATION

6.07 The person responsible for data administration should also implement an office certification procedure. An office certification procedure is a method of manually auditing the data base and test results on a per-office basis to determine the level of data base errors and overall trunk performance. The object of data base administration should be to concentrate on clearing the data base errors.

6.08 The office certification procedure should be done when the office is first entered in the data base and every two years thereafter. The procedure should last approximately two months. In general, the first month should be spent working with the office to improve trunk performance and data base errors. The second month should consist of obtaining the measurement results for use in the report. These results can be obtained from the management summary report and index summary results report. (See Section 190-102-015 and TOP 190-102-301.)

6.09 Table D lists the trunk trouble call dispositions, the possible causes of the troubles, and goals that should be obtained as far as minimizing these troubles. It should be noted that it may require more than two months to reach the goals given in Table D.

7. FILE CONFIGURATION AND SIZE

GENERAL

7.01 Each of the CAROT 2 data base files occupies a specific part of the data base storage area on disc. It is the responsibility of the person in charge of data base administration to determine when the data base storage area must be rearranged to fit the particular CAROT System. The data base configuration may have to be changed when the CAROT System is first installed. It may also be necessary to reconfigure the data base at some point after the CAROT System is in operation. In either case, the data base should be configured to be adequate for a three-year period.

7.02 The person responsible for data base administration should know well in advance when a reconfiguration will have to be done. This can be accomplished by monitoring the file descriptor map (Fig. 16) and records showing the present sector allocation and the utilization for each file. A work sheet which should be copied as required to monitor the various file utilizations is provided by Fig. 21. The multiplier for the various files is shown at the bottom of Fig. 21. A typical use of the work sheet for monitoring responder file utilization is shown in Fig. 22. The PRESENT ALLOCATION portion of the work sheet can be used for input to the reconfigure process.

7.03 Certain phase 3 update error messages (Table C) are indications that the data base must be reconfigured. The real-time diagnostic message **NO DISC UTILITY SPACE: ROUTINE TESTING TERMINATED** is also a possible indicator. This message could mean the space on disc designated for the utility file is too small.

FILE STORAGE CHARACTERISTICS

7.04 A CAROT 2 System can have a variety of disc drive units depending on whether it is a new or a converted controller and the size of the data base. In any event, the CAROT 2 data base is scattered on all the disc space designated for it.

7.05 Each of the CAROT 2 files require a certain number of logically adjacent sectors on the disc system to store data. A sector is the amount of space on a disc track required to store 256 ASCII characters. Each disc track contains 48 sectors.

7.06 Each CAROT 2 disc stores data base information in logical units. A logical unit may be defined as a grouping of sectors on disc. The logical units assigned for data base storage and the number of sectors on each logical unit for each possible CAROT 2 disc configuration is shown in Table E.

7.07 A CAROT 2 file can be contained on any part of a logical unit or on more than one logical unit. The location of each file according to logical unit and sector is provided on a separate magnetic tape labeled DATAC2. The DATAC2 tape is supplied by Western Electric with the CAROT 2 software package. The DATAC2 tape is used by the CAROT Data Base Management System (DBMS) in the reconfiguration process described in paragraphs 7.14 through 7.24.

7.08 Since a generic 2 CAROT installation can contain a variety of disc configurations (see Table E), the DATAC2 magnetic tape supplied by Western Electric has been configured such that only certain existing generic 1 CAROT centers will be able to use it as is. The generic 2 DATAC2 tape is configured for a data base that is compatible with the standard generic 1 data base, except that it assumes that the CAROT installation has two 7905 disc drives. That is, if a generic 1 controller meets the following requirements, the conversion to a generic 2 data base may be made with the generic 2 DATAC2 tape provided by Western Electric:

(a) The present data base configuration is the same as that on a standard generic 1 DATAC2 tape, ie, a generic 1 data base reconfiguration has never been done.

(b) The controller uses two 7905 disc drives.

(c) The circuit order features of generic 2 are not to be utilized initially.

7.09 Normally, it will be necessary for almost every generic 2 installation to modify the DATAC2 data base parameter tape and initialize the files on disc. This is regardless of whether it is an initial installation, a generic 1 to generic 2 conversion, or whatever.

FILE USAGE CHARACTERISTICS

7.10 The CAROT data base is made up of the files shown in Table F and Table G. Each file must be configured to a specific size by the CAROT DBMS. The configuration process is discussed in paragraph 7.14.

7.11 The circuit-order files are of two types. The first type is the standard CAROT data base file such as PCO (501), CKTO (403), and COI (503). These are the same in structure and relationship as the control office for trunks, trunk group, and trunk files in the routine and demand testing data base. These type of files are stored on disc in areas called data base space. This is the same space in which all routine and demand testing and test frame tape data files are stored.

7.12 The second type of circuit-order data base files are called file manager files. The file manager (FMGR) is a program (part of the Hewlett Packard software package) which maintains various files on disc, and permits access to these files by other programs (eg, update programs) or thru console interaction. The file manager files utilized in the circuit-order data base are those whose file number ends in a digit 5 (eg, 105 and 1005).

7.13 The reason for explaining these file types is due to the logical unit assignments required when allocating disc space (see Table E). Some of the logical units will be assigned to the data base while some will be assigned to the file manager files. Logical units cannot be assigned to both the data base space and the file manager files. If there is not enough file manager space, either the data base space must be configured to a smaller size or additional disc hardware must be provided.

CONFIGURATION/RECONFIGURATION PROCESS

A. General

7.14 As discussed in the file storage characteristic (paragraph 7.04), each of the CAROT 2 files require a certain number of logically adjacent sectors on the disc system to store data. In order to determine where data will be stored and how much disc storage area will be used by CAROT files, a configuration/reconfiguration process is used. The configuration process is associated with a new or converted CAROT data base, while the reconfiguration process is associated with an established data base where files are being expanded.

B. Introduction

7.15 The configuration/reconfiguration process can be generally divided into two phases, planning and implementation. In the planning phase, the data base administrator must calculate the total number of sectors required for storage of the new data base. This is necessary to ensure it will fit in the disc storage area of his particular disc drive(s). The implementation phase is used to make the actual changes to the disc space.

7.16 The number of sectors required by the new data base can be calculated and inputted by one of two modes, automatic or semiautomatic. In the automatic mode, computation of the number of sectors is based on the assumption that there is an average of 12 trunks per trunk group and facility group. If the particular trunk network is designed such that there are fewer than 12 trunks per trunk group or facility group, more trunk group and facility group records must be allocated. In this case, the semiautomatic mode must be used to allocate the additional space required.

7.17 A data base configuration/reconfiguration is explained in the following paragraphs. Detailed procedures for running the programs are provided in TOP 190-102-301.

C. Planning Phase

Determine File Size Requirements

7.18 The first step in a configuration/reconfiguration process is to estimate the maximum number of entries for the next three years for the following files:

FILE NUMBER	FILE ID
101	ROTLs
201	Control Offices for Trunks
301	Control Offices for Facilities
501	Plant Control Offices
601	Responders
701	Test Frame Offices
102	Test Line Offices
303	Trunks—CAROT
503	Circuit-Order Items
703	Test Frame Trunks

It should be noted that the program modules used for data base reconfiguration will not allow any file sizes to be decreased.

> ***Note:*** The number of sectors in file 503 is automatically allocated such that there will be one circuit order for each 10 items (ie, it is assumed that each order contains 10 items on the average).

File Manager Files

7.19 The next step is to estimate the number of sectors needed for the completion notice file (1005). Answer the following questions:

(1) What is the maximum number of completions expected per day?

(2) How many days worth of completions will be stored in the CNF file before it is cleared (ie, written out on magnetic tape or line printer for analysis)?

Multiply the above two numbers to get the maximum number of completions to be stored in the CNF file. About 3 sectors of CNF file space are required for each completion.

> ***Note:*** Do not over estimate the size of the CNF file. The file can be cleared and a magnetic tape or line printer report written every day if necessary.

7.20 Using the work sheet for file manager files (Fig. 23), calculate the total number of sectors required for each file and then total the sectors at the bottom of the work sheet. This will be the number of sectors needed for file manager files. Note that the ACTION data files (105,205,305 and 405) are automatically allocated three sectors for each item in file 503. These sectors are split up among the four files such that the maximum file size is 16,000 sectors, except for file 405, whose maximum size is 12,000. Thus the maximum number of ACTION data sectors is 60,000, corresponding to 20,000 items.

Calculate Sectors Required For Data Base Space

> ***Note:*** In practice, many COTC data bases will not use a full 3 sectors of ACTION data per item. Thus a data base may be configured for 30,000 items, which will automatically cause the allocation of the maximum 60,000 ACTION data sectors. If the average number of ACTION data sectors used per item is only 2 (which is probable in no test frame data is included in the ACTION data), then up to 30,000 items can be added without running out of ACTION data space.

7.21 Automatic Mode: A work sheet that can be used for calculation of the total sectors for data base space is provided in Fig. 24. As shown in Fig. 24, files 101, 201, 301, 501, 601, 701, 102, 303, 503 and 703 have a set sector allocation per record. The number of records in each file multiplied by the sector allocation for each record provides the total sector allocation for the file. The sector allocation for files 103, 203, and 204 is determined by dividing the number of records in file 303 by the number of records in file 303 required for one sector allocation in files 103, 203, and 204, respectively. The sector allocation for file 403 is determined by the number of circuit-order items in file 503. The sector allocation

for files 603, 804, and 904 is determined by dividing the total number of records in file 703 by the number of records in file 703 required for one sector allocation in files 603, 804, and 904, respectively. The sector allocation for files 504 and 104 is determined by dividing the total number of records in file 101 by the number of records in file 101 required for one sector allocation in files 504 and 104. The sector allocation for file 704 (utility) should be between 20,000 and 20,100. After the total sector allocation for each file has been calculated, enter the total at the bottom of the work sheet.

Note: Keep in mind that the reconfiguration process does not allow files to be reduced in size. Thus, do not over estimate file sizes.

7.22 Semiautomatic Mode: A work sheet that can be used for calculation of the total sector size of a reconfigured data base is shown in Fig. 25. As shown in Fig. 25, files 103, 203, 603, 204, 804, and 904 as well as files 101, 201, 301, 501, 601, 701, 102, 303, 503, and 703 have a set allocation per record. The number of records in each file multiplied by the sector allocation for each record provides the sector allocation for the file. Sector allocation for files 403, 104, 504, 604, and 704 is determined the same way as the automatic mode. After the total sector allocation for each file has been calculated, enter the total at the bottom of the work sheet.

Determine Logical Unit Assignments

7.23 At this point in the planning phase, the size of the file manager and data base space has been calculated. The next step is to divide up the available disc logical units to most efficiently store the data. To do this, add up the number of sectors on the logical disc units (for the particular disc configuration in Table E) until a number greater than the ***data base space*** required is reached. These logical units will be assigned to the data base space.

Note: No more than 8 logical units can be assigned to the data base space.

7.24 To allow for future change flexibility, do not assign all of the last data base logical units to the data base. Allot only enough to give 20,000 to 20,100 sectors of utility space. In addition, the last logical unit must have at least 150 extra sectors for data base management overhead.

Note: In the case of two 7905 disc drives (Table E), there are two logical unit structures possible for the second disc depending on whether the hardward discs unit number is set to 3 or 4. This allows the flexibility necessary to hold a data base with a standard generic 1 routine and demand testing data base configuration with some circuit-order files added for generic 2. Whichever configuration is chosen must be adhered to, ie, unit 3 cannot be changed to unit 4 or vice versa without redoing the entire reconfiguration process.

7.25 To determine the logical units for the file manager files, add up the number of sectors on the remaining logical disc units (Table E) until a number greater than the file manager space required is reached. These logical units will be assigned to the file manager. Any logical units not used by the data base space and file manager files will remain unassigned. Make sure that the total file manager space assigned on the logical units is greater than the amount calculated in Fig. 24. If not, either a new disc is necessary or the file requirements must be lowered. For example, the circuit-order data base could hold items for a shorter time and thereby reduce the total number held at any one time. Instead of adding circuit-order items 30 days before the due date, they might be added 3 weeks or even 2 weeks before the due date. This will reduce the space for circuit orders, items, and action data.

Planning Phase Example

7.26 Paragraphs 7.27 through 7.29 discuss an example of the planning phase for the configuration/reconfiguration process using the following "typical" number of records for the files.

Number of Records	File
110	ROTLs (101)
110	Control office for trunks (201)
200	Control office for facilities (301)
400	Responders (601)
0	Test frame offices (701)
800	Test line offices (102)
100,000	Trunks—CAROT (303)
7,500	Trunk groups—CAROT (103)
7,500	Facilities (203)
0	Test frame trunks (703)
0	Test frame trunk groups (603)
150	ROTL control offices (104)
15,000	Circuit-order items (503)
1500	Circuit orders (403)
110	Plant control offices (501)
500	Completion Notice File (1005)

7.27 The first step is to fill out the disc storage allocation work sheet (Fig. 23) with the appropriate records and make the necessary calculations (Fig. 26). In this example, the file manager requires at least 46,848 sectors. The second step is to decide to use the automatic or semiautomatic mode for calculating data base sectors (paragraph 7.16). In this example, the assumption is made that there is an average of 12 trunks per trunk group and facility group. Thus, the automatic mode is selected. As shown in the example work sheet (Fig. 27), the data base requires 67,864 to 67,969 sectors. The 100 sector difference is due to the utility file sector allocation.

7.28 Using the rules outlined in paragraphs 7.23 through 7.25, assign logical units to the total sectors required are between 67,680 and 67,780. Looking at Table E, determine the optional logical unit assignments for the disc system. In this example, one 7920 disc drive is assumed. The following list is a possible logical unit assignment for the data base sectors.

LOGICAL UNIT	MAX. NUMBER OF SECTORS USABLE (TABLE E)	NUMBER OF SECTORS TO BE USED FOR DATA BASE SPACE
24	32, 640	32, 640
25	31, 440	31, 440
26	6, 282	3, 700

In this case, the maximum total number of sectors usable per Table E in 70,362. Since this example requires only 67,780 sectors (upper limit), only part of logical unit 26 (ie, 3700 sectors) will be assigned for data base use.

7.29 The remaining logical units provide more than enough sectors required by the file manager files [46,848 (Fig. 26)]. The logical units assigned to the file manager might be as follows:

Logical Unit	Number of Sectors
22	32,640
10	9,648
11	9,696

These logical units would provide 51,984 sectors for the file manager space with logical units 15 and 23 unassigned.

D. Implementation Phase

7.30 After the planning phase is complete, the actual changes to the files can be made. This is accomplished by running a series of programs which are discussed in the following paragraphs. Figure 28 shows the general steps in the reconfiguration process while the configuration process was discussed in Fig. 6, 7, and 9.

> ***Note:*** The use of a 7920 disc drive may cause an additional step in the configuration process. In CAROT installations where a new 7920 disc drive is being used, a special routine (called initialize) in the SSDLU program ***must*** be run to make the disc pack suitable for storing data. In addition, anytime the disc pack in a 7920 disc drive is replaced with a new disc pack, the special routine ***must*** be run. This routine finds bad tracks on the pack and causes spare tracks on the pack to be substituted for them.

Make a Backup Tape

7.31 Several times during the implementation phase, a backup tape is made. This ensures that all previous configuration/reconfiguration effort will be saved in the event of a controller crash.

7.32 For the reconfiguration process, the first backup tape made is of the old data base arrangement. This backup tape is necessary because the CONFI program module wipes out the old data base and initializes a blank data base on disc. The backup tape also stores the file configurations and sizes for the old data base required by the AROUN program module. Also, if any problems occur which prevent the completion of the reconfiguration process, this tape can be used to restore the old data base.

Create New DATAC2

7.33 DATAC2 is the title for the magnetic tape supplied by Western Electric containing the data base parameters (file configurations, locations, and sizes). A new DATAC2 is created using the DISK1 program module when configuring/reconfiguring the data base. When running DISK1, the operator must specify the logical units specified for disc storage, the mode of allocating sectors and the file sizes to be changed. If the automatic mode is selected, the operator enters the number of entries for files 101, 201, 301, 601, 701, 102, 303, and 703. If the semiautomatic mode is selected, the operator enters only information for the individual files that are to be changed. The operator enters the number of entries for files 101, 201, 301, 601, 701, and 102, and the sector allocation (buckets) for files 303, 103, 203, 204, 603, 703, 904, and 804. The program module will reject the new parameters if there is not enough room for the new files. In both modes, the number of circuit-order item (503) is requested, as well as the size of the CNF (1005) file. If no circuit-order data base is desired, then zero should be the reply to both these questions.

> ***Note:*** In operation, the DISK1 program module takes only about 15 minutes to run. Thus, rerunning the program module several times to construct the optimum configuration by examining the results of both the automatic and semiautomatic modes is a reasonable practice.

Assign Logical Units To File Manager

7.34 The logical units assigned to file manager are inputted and initialized using the following procedure:

(1) Bootup controller if not already in Real-Time System.

(2) After getting normal CAROT prompter, type **:ON,FMGR.** A colon (:) prompter will be returned by controller.

(3) Type **MC,-xx** where xx is the logical unit number. A colon (:) prompter will be returned.

(4) Type **IN,SA,-xx,xx,DATA,0,2** where xx is the logical unit number.

(5) Repeat Steps 3 and 4 for each logical unit to be assigned to the file manager.

(6) After last logical unit has been assigned, type **EX.**

Initialize New Data Base

7.35 The CONFI program module is used to initialize a new data base. CONFI wipes out the old data base and uses the DATAC2 tape created by DISK1 to initialize the new file sizes and configurations on disc.

Load Old Data Base on Reconfigured Disc

7.36 The AROUN program module is used to load the backup tape containing the old data base on to the disc in the newly created file configuration. In the case of a new CAROT 2 or a CAROT 1 to CAROT 2 conversion, the AROUN program is not used. In these cases, the data base information is added during the normal update cycle. However, before this can be done, the blank data base must be initialized with certain blank ID records (paragraph 4.19). Detailed procedures for entering these records are contained in Section 190-102-301.

Run FX504 Program

7.37 The FX504 program converts the generic 1 TTMI and management summary file to the generic 2 format. Note that any summary data existing in the generic 1 data base is set to 0 (zero). Therefore, it is necessary to get printouts of the summaries before converting to generic 2. It is advisable to do the generic 1 to generic 2 conversion at the end of a reporting period to minimize the inconvenience of totaling summary data.

Run RESTO Program

7.38 If files 103, 203, 303, 403, 503, 603 or 703 have been expanded, the program RESTO must be run. Each file(s) affected must be run by RESTO in a specific order, as shown in the following:

(a) If file 103, 203, or 303 has been expanded, run RESTO on all 3 files in the order 303, 103, and 203.

(b) If file 403 or 503 has been expanded, run RESTO on both files in the order 503 and 403.

(c) If file 603 or 703 has been expanded, run RESTO on both files in the order 703 and 603.

Steps a, b, and c may be completed in any order.

8. GARBAGE COLLECTION

8.01 A newly initialized data base is stored on disc so that it is most efficient to access by any of the CAROT 2 programs or program modules. A data base transaction such as a delete operation during the update process (Part 5) can create vacant positions in the various files. The process of restoring the file storage area to a more efficient state is called garbage collection.

8.02 The GARBAG program module should be run once a month. It should also be run when certain phase 3 error messages (Table C) occur to create more file space by closing up vacant spaces in certain files. A detailed procedure for performing garbage collection using the GARBAG program module is provided for in the update cycle in TOP 190-102-301.

9. INDEX DATA

9.01 The INDEX program module performs the following separate functions depending on the option selected:

(a) Counts the number of trunks in each index category and stores these numbers in the proper index data for each ROTL/control office

(b) Causes a printout of those trunks which are not indexed by CAROT for any reason and a corresponding measurement code identification number (Table H)

(c) Causes a printout of those trunks that have not had a routine test made on them.

The specific function desired may be specified by typing the number corresponding to the proper option when requested by the program module.

9.02 For TTMI purposes, the INDEX program module need be run only as TTMI printouts are required. INDEX ***does not*** print out the TTMI reports, nor does it affect the counts of tests made or test result deviation counters.

9.03 The **NOIND** flag is used to delete daily ROTL or responder index data. This is useful when a ROTL or responder has failed in such a way that routine test results will be erroneous and should not be used for index purposes. It can also be used to eliminate control offices from TTMI data when making a magnetic tape.

9.04 The INDLEN flag reads the TTMI data record containing the number of measurements in the deviation intervals on a per-ROTL basis and outputs the data to the line printer or magnetic tape unit (index summary results report—see Section 190-102-015). Care should be taken when setting the INDLEN flag so that the TTMI counters ***are not*** initialized to zero unless that is specifically desired by the controller operator when initializing a new TTMI interval.

9.05 The INDLEN flag can be used to obtain TTMI data at any run of the update program software (Part 5). INDEX should be run immediately prior to the time that the index summary results report is to be requested. This requires two separate update runs—the first run with the INDEX flag set and the second with the INDLEN flag set. This assures that the number of trunks listed on the TTMI report will be as accurate as possible. For more information on setting update flags (update cycle) and what they do, refer to TOP 190-102-301.

9.06 It is important to note that index results for the first month of CAROT operation for any particular office may not be a true representation of the state of trunk transmission in the office. For example, biweekly trunks requiring six tests per quarter would not be tested enough to be indexed. The person responsible for data base administration should examine the data base for errors possibly causing trunks not tested to be listed in the index.

9.07 The generic 2 TTMI printout is different from the generic 1 printout. Instead of allowing only certain combinations of schedule and index (facility type) codes, the new TTMI allows all combinations of schedule and index codes. This gives a total of 12 index categories.

10. SOFTWARE AUDIT

10.01 A data base software audit's purpose is to check if there are any software problems associated with the data base. The VRDIT, SCAT and AUDSC utility program modules are used by the data base administrator to perform this function.

VRDIT PROGRAM MODULE

10.02 The VRDIT utility program module checks that all the test lines are associated with the proper responder. It also checks that all of the trunk test parameter groups are on the proper testing schedule. A printout on the line printer indicates the number of test parameter records scheduled for testing (both operational and transmission) and the number of those that are not (ie, those which have a test schedule code of 99). The sum of the two numbers for transmission testing should equal the total number of records in file 204 printed on the file descriptor map (Fig. 16). Also, the sum of the two numbers for operational testing should equal the total number of records in file 204. VRDIT should be run twice a month. Any results printed out by VRDIT which indicate data base abnormalities indicate a software problem and should be referred to the designated service organization in accordance with local procedures.

VRDAC PROGRAM MODULE

10.03 The VRDAC program is used to examine the integrity of the circuit-order data base. Specifically, the program checks that:

(1) The link between each circuit-order item and its associated ACTION data is correct,

(2) the links within the chains of ACTION data sectors are correct, and

(3) ACTION data sectors flagged as empty are really empty.

10.04 The information VRDAC prints out is as follows:

(1) For each ACTION data file (105, 205, 305, 405) it prints out the number of empties and the number of fulls according to the empty flag in each section.

(2) The total number of action data sectors with data and the total number of circuit-order items.

(3) If any errors are found, suitable error messages are printed out.

The sum of the action file "FULL" for all four files should equal the total number of ACTION file sectors with data. Further, the number of circuit-order items printed out should equal the number of records in file 503 given on the most recent file descriptor map. If either of these conditions are not met or if any error messages are printed out, the data base contains errors and should be considered broken. Previous backup tapes may be tried to check on VRDAC results or the trouble should be referred to the designated service organization in accordance with local procedures. VRDAC should be run at least twice per month in installations utilizing the COTC data base.

SCAT PROGRAM MODULE

10.05 The SCAT utility program module checks the average number of access tries per retrieval of records in files 103, 203, 303, 403, 503, 603, and 703. The number should be less than or equal to five for each of the files. If it is not, the file size should be enlarged for the offending file (see Part 7). SCAT should be run once a month.

AUDSC PROGRAM MODULE

10.06 The AUDSC utility program module access each data record in files 103, 203, 303, 403, 503, 603, and 703 to determine if it can be retrieved. The number of records in each of the files that can be retrieved is listed. The numbers should correspond exactly to those listed on the file descriptor map (Fig. 16). AUDSC should be run once a month. If the numbers do not correspond, a software problem is indicated which should be referred to the designated service organization in accordance with local procedures.

11. ADMINISTRATION OF THE CIRCUIT-ORDER DATA BASE

GENERAL

11.01 After a CAROT center is in operation, it is the responsibility of the data base administrator to monitor the circuit-order activities to insure proper operation. The administration of the circuit-order files involves the following tasks:

(a) Maintain a watch on the update and completion activity to insure the proper functioning of the configured file sizes

(b) Periodically produce reports of completion activity utilizing the plant control office management summaries provided by the controller

(c) Periodically produce lists of overdue circuit-order items for the use of personnel responsible for circuit-order activity

(d) Periodically perform audits of the circuit-order data base to ensure that it contains the proper data relative to a central circuit-order process utilized by the CAROT center.

MONITORING OF CIRCUIT-ORDER COMPLETION ACTIVITY

A. Plant Control Office Management Summary

11.02 The plant control office (PCO) management summary data is stored in the file manager file PCOREP. There is one PCOREP record for each PCO record in the data base. The data held

in the record is divided into two categories. The first category is the data on completion activity which is updated in real-time as completions are done by remote users. This category includes the number of items completed (additions, disconnections, and changes) since the counters were last cleared.

11.03 The second category includes data on the contents of the circuit-order data base associated with the PCO. This data is updated only by running the program ORDUE. The information stored includes the number of items of various types in the data base and the number of overdue items. It should be understood that the data base counters in this second category are not updated as items are added to the data base. The only way to keep the counters up to date is to run the program ORDUE periodically (at least once per week) depending on the amount of circuit-order updates.

11.04 The PCO management summary data may be displayed on the line printer using the program MANPC (in the utility system), or at a remote-user terminal using the DISP:MNCO.PCO command. The completion activity counters in category 1 (paragraph 11.02) may be initialized to zero by using certain options of the MANPC program.

COMPLETION NOTICE FILE

11.05 This file contains the information on every completion performed since the file was last cleared. The data is stored such that each completion is associated with its PCO record. The CNF tape is written directly from this file.

11.06 In practice, it is expected that in most cases a CNF tape will be written at some specified interval (probably daily) and sent to the circuit provision organization for processing. In some cases, printouts of the CNF file will be obtained for administering the circuit provision function.

11.07 In all cases, it will be necessary to periodically clear the CNF file. This need not be done each time a CNF tape is written (assuming the system which processes the CNF tape can handle completions which appear on the tape several days in succession). The CNF file must, however, be cleared often enough so that it does not fill up. If the file does become filled, no more completions will be permitted.

11.08 There are two ways to clear the CNF file:

(a) Set the parameter CNFTAP=2 before running update. The CNF tape will be written and the file cleared.

(b) Use option 4 of the program ORDUE.

11.09 The contents of the CNF file may be printed out in several ways:

(a) Set the update parameter CNFTAP=1 or 2 so that a CNF tape is written. Then get a printout of the tape by using the program CNFTA.

(b) Run the program LICNF to get a printout of the disc file.

(c) Request a remote-user display using the DISP:CNF.PCO command.

A. Format of CNF Tape

11.10 The CNF tape consists of a single data set of fixed length records, unblocked; ie, one per block. The record length is determined by the controller operator. The operator must answer the question: "DO YOU WANT CIRCUIT-ORDER TEST RESULTS ON THE CNF TAPE?". If the answer is affirmative, the record length is 840 characters (420 words of 16 bits each). If the answer is negative, the record length is 240 characters (120 words of 16 bits each). All records are written in American standard code for information interchange (ASCII). The tape will have standard International Business Machine (IBM) compatible labels (volume 1, header 1, header 2). The volume serial number will be 999999 and the data set identifier will be CAROTCNF.

Record Formats

11.11 The record format depends on whether the completion is for a circuit order or a circuit-order item. Only a circuit order-item completion will contain test results. The circuit-order completion indicates only that all items on the circuit order have been completed by CAROT. The record format of a circuit-order item completion is shown in Fig. 29. Characters 69 through 212 contain data on the trunk to be completed. If any data has been changed, it appears in its changed form in this block. If the data item is changeable by the user upon completion, it is

indicated in CHANGEABLE? column. The remainder of the record contains 26 word blocks which are concatenated. These blocks contain the results of the circuit-order tests. The first two characters (called a record identifier) of each of these blocks indicates the type of test result to follow. The record identifier character will be 05 (level measurement), 06 (noise measurement), or 07 (operational test result). The format of the three types of test result blocks are shown in Fig. 29. There may be up to 12 such test result blocks, with the remainder of the record filled in with blanks. If the record identifier equals 08, an error message will be contained in the block.

11.12 The record format for a circuit-order completion is shown in Fig. 30. Character 1 through 66 contain the necessary information while the remainder of the record is filled with blanks.

CIRCUIT-ORDER PROGRAMS

11.13 Several system programs are provided to monitor the completion activity and the content of the circuit-order data base. These programs are discussed in the following paragraphs.

A. LICNF Program

11.14 This program will print out the contents of the completion notice file. It allows the console operator to obtain a list of circuit order and circuit-order item numbers which have been completed by remote users since the completion notice file was last cleared. A printout may be obtained for either a specific plant control office or for all plant control offices.

B. CNFTAP Program

11.15 This update cycle program allows for the making of a magnetic tape of the circuit-order completions reported to the CAROT controller. CNFTAP writes the information to magnetic tape in a format suitable for the circuit order bureau. The completion notice file may or may not be cleared as selected by the user.

C. MANPC Program

11.16 This program may be run in the utility system in order to obtain printouts of the PCO management summary data. By selecting certain options, the completion activity counters can be cleared to zero. This also causes the start date of the PCO management summary to be set to today's date. This may be done on an individual PCO basis, if desired.

D. ORDUE Program

11.17 This program offers three options:

(1) Count overdue circuit-order items and other data base statistics for the PCO management summary

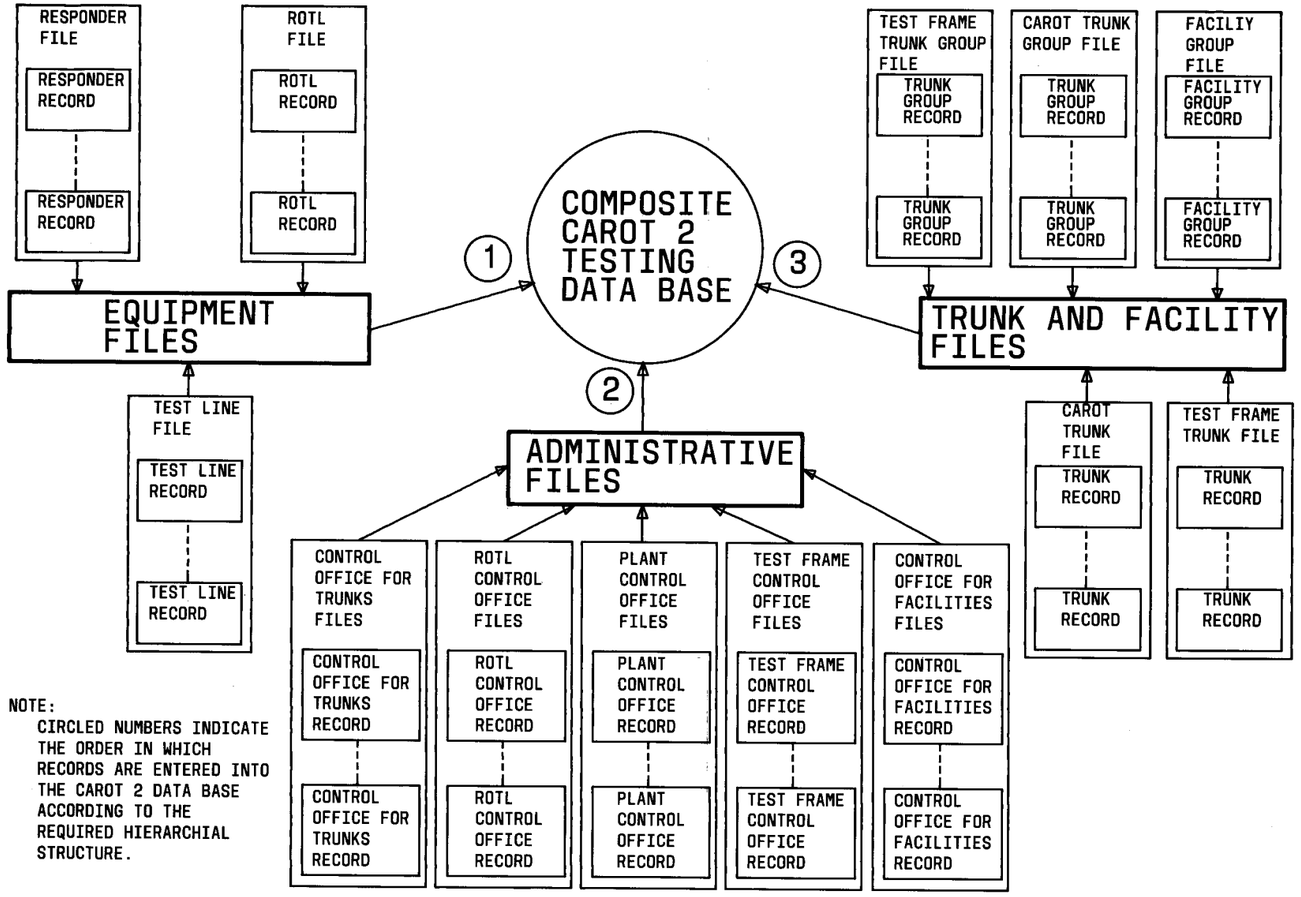
(2) Same as option 1, but also prints out all overdue circuit-order items

(3) Clear the CNF file.

11.18 Option 1 stores the counts of the contents of the circuit-order data base in the PCO management summary record for each PCO. Option 2 performs the same function as option 1, but it also provides a list of overdue circuit-order items on the line printer. Option 3 clears the contents of the CNF disc file. This option may be run instead of running the update parameter **CNFTAP**.

E. CNFTA

11.19 This program is run in the Real-Time System to produce a printout of a CNF tape on the line printer.



NOTE:
CIRCLED NUMBERS INDICATE THE ORDER IN WHICH RECORDS ARE ENTERED INTO THE CAROT 2 DATA BASE ACCORDING TO THE REQUIRED HIERARCHIAL STRUCTURE.

Fig. 1—CAROT 2 Testing Data Base Hierarchial Structure and Data Entry Sequence

TABLE A

PROGRAMS USED BY CAROT 2 DATA BASE ADMINISTRATOR

PROGRAM MODULES	SOFTWARE SYSTEM	DESCRIPTION
SSDLU	—	Program on perforated mylar tape used to load CAROT 2 generic programs (mag tape supplied by Western Electric) onto disc (see Part 4).
ED-1P381-30	—	Program on perforated mylar tape used in converting CAROT 1 to CAROT 2 data base (see Part 4).
SELEC	Real Time	Copies selected information in data base on line printer, magnetic tape, disc. console or paper tape in same format that it was input.
DMPCV		Reads a mag tape in CAROT 2 update format and types the records on the line printer.
REPRT		Prints out copy of daily-office summary results on CRT, line printer, or paper tape.
RTAP		Produces printout of test frame paper tape on line printer.
TAPE		Produces paper tape used to control testing by a test frame.
DISPA		Displays equipment and/or administrative data from the data base on CRT.
EDIT		Allows data base information to be changed.
RPG		Allows data base information to be used to generate summary reports.
LICNF		Prints out the contents of the CNF file on console or line printer.
CNFTA		Reads a CNF magnetic tape and prints records on line printer.
CNFTAP	Update	Produces mag tape of completion notice file.
GARBAG		Rescatters data in data base to make it more efficient to access. It may also provide additional file space (see Part 8).
INDEX		Used to count number of trunks for index results report (see Part 9).
INDLEN		Used to obtain index summary report (see Part 9).
MANLEN		Used to obtain management summary reports.
SCAT		Used to perform audits of CAROT 2 software (see Part 10).

TABLE A (Contd)

PROGRAMS USED BY CAROT 2 DATA BASE ADMINISTRATOR

PROGRAM MODULES	SOFTWARE SYSTEM	DESCRIPTION
BACKUP/ RESTORE	Update and Utility	Used to make a backup of the data base on magnetic tape or to restore the data base to normal using a backup tape.
CNVRT	Utility	Used to converting CAROT 1 to CAROT 2 data base (see Part 4).
AUDIT		Used to perform audit of CAROT 2 data base (see Part 6).
AUDFR		
ASIN		
AUDCO		
DISK 1		Used in reconfiguring and changing sizes of files (see Part 7).
CONF 1		
AROUN		
RESTO		
TRDMP		Copies transaction tape data on line printer or CRT console in readable format.
AUDSC		Used to perform audits of CAROT 2 software (see Part 10).
VRDIT		
VRDAC		Used to perform audits of circuit-order testing and completion data base (Part 10)
FXVAR	—	Western Electric maintenance tools.
UNIFL		
IFNOC		
DECRP		
FIXAC		

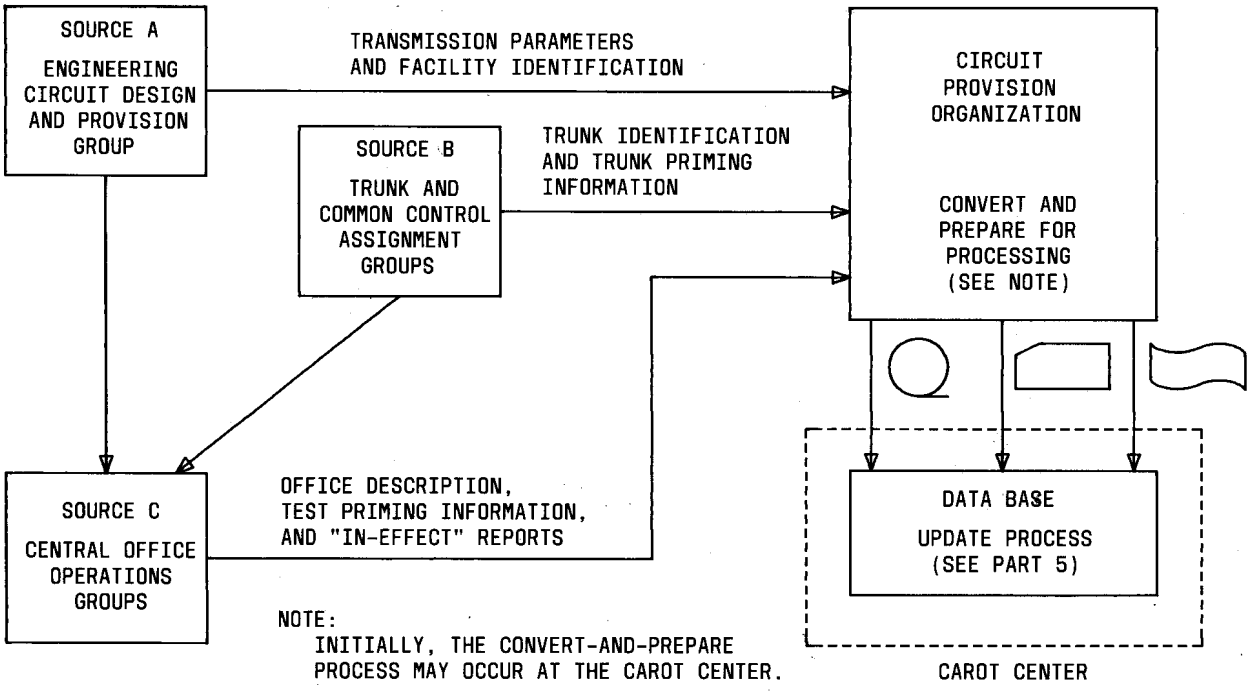


Fig. 2—Information Flow (Non-No.4 ESS)

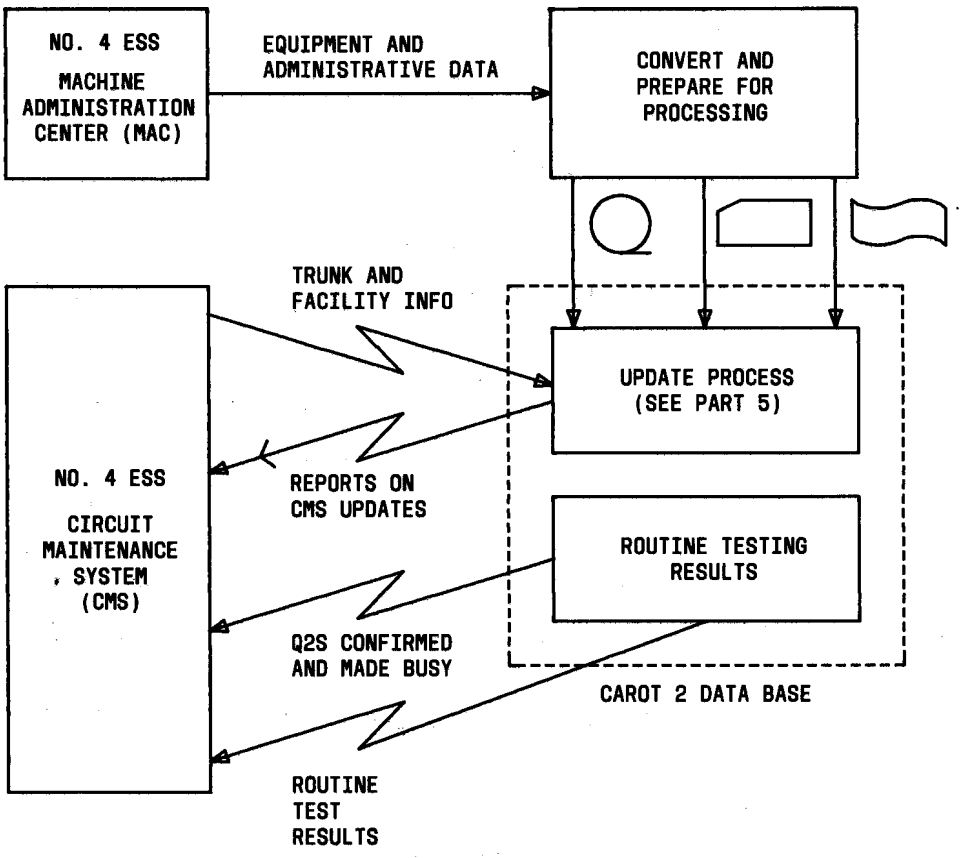
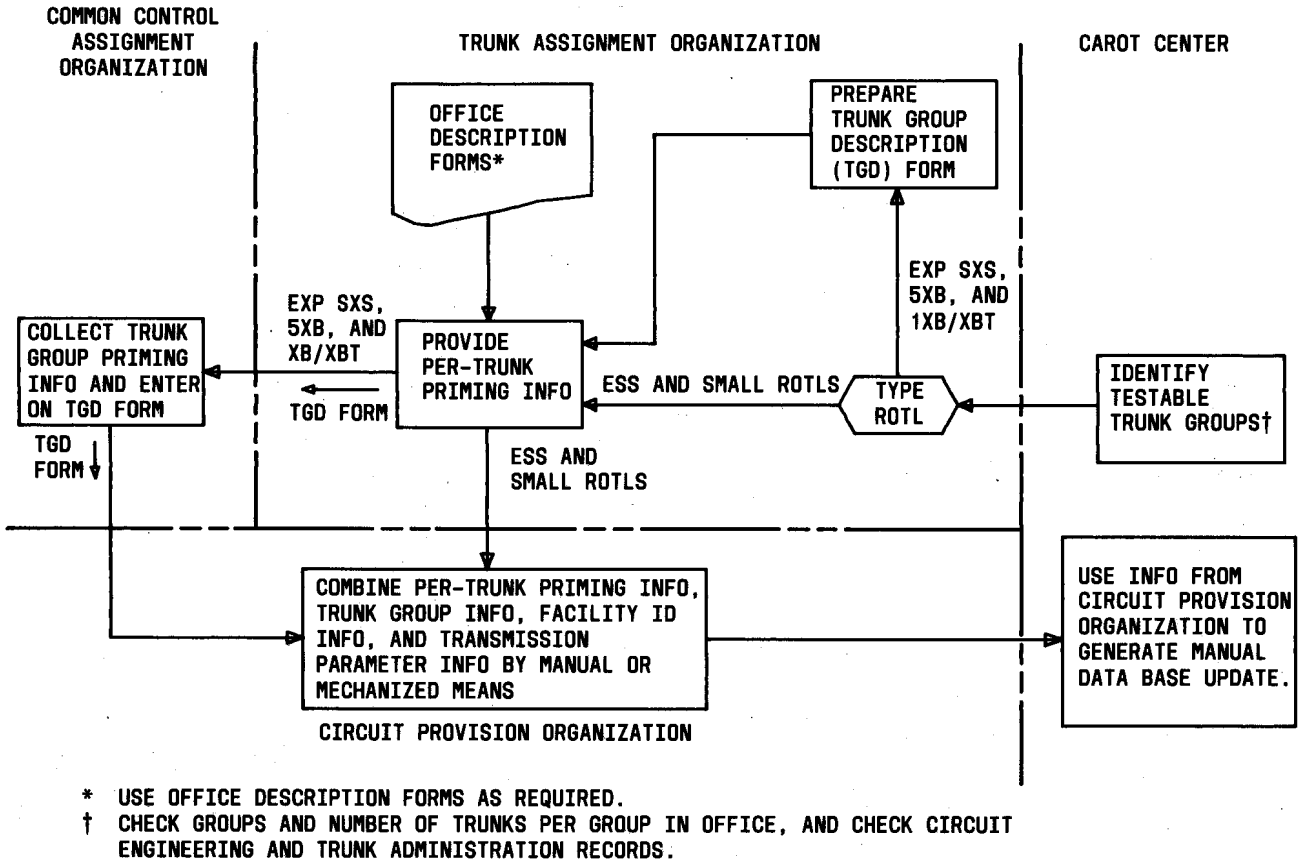


Fig. 3—CAROT/No. 4 ESS Information Flow



* USE OFFICE DESCRIPTION FORMS AS REQUIRED.
† CHECK GROUPS AND NUMBER OF TRUNKS PER GROUP IN OFFICE, AND CHECK CIRCUIT ENGINEERING AND TRUNK ADMINISTRATION RECORDS.

Fig. 4—CAROT 2 Trunk File Initial Load Process (Non-No. 4 ESS)

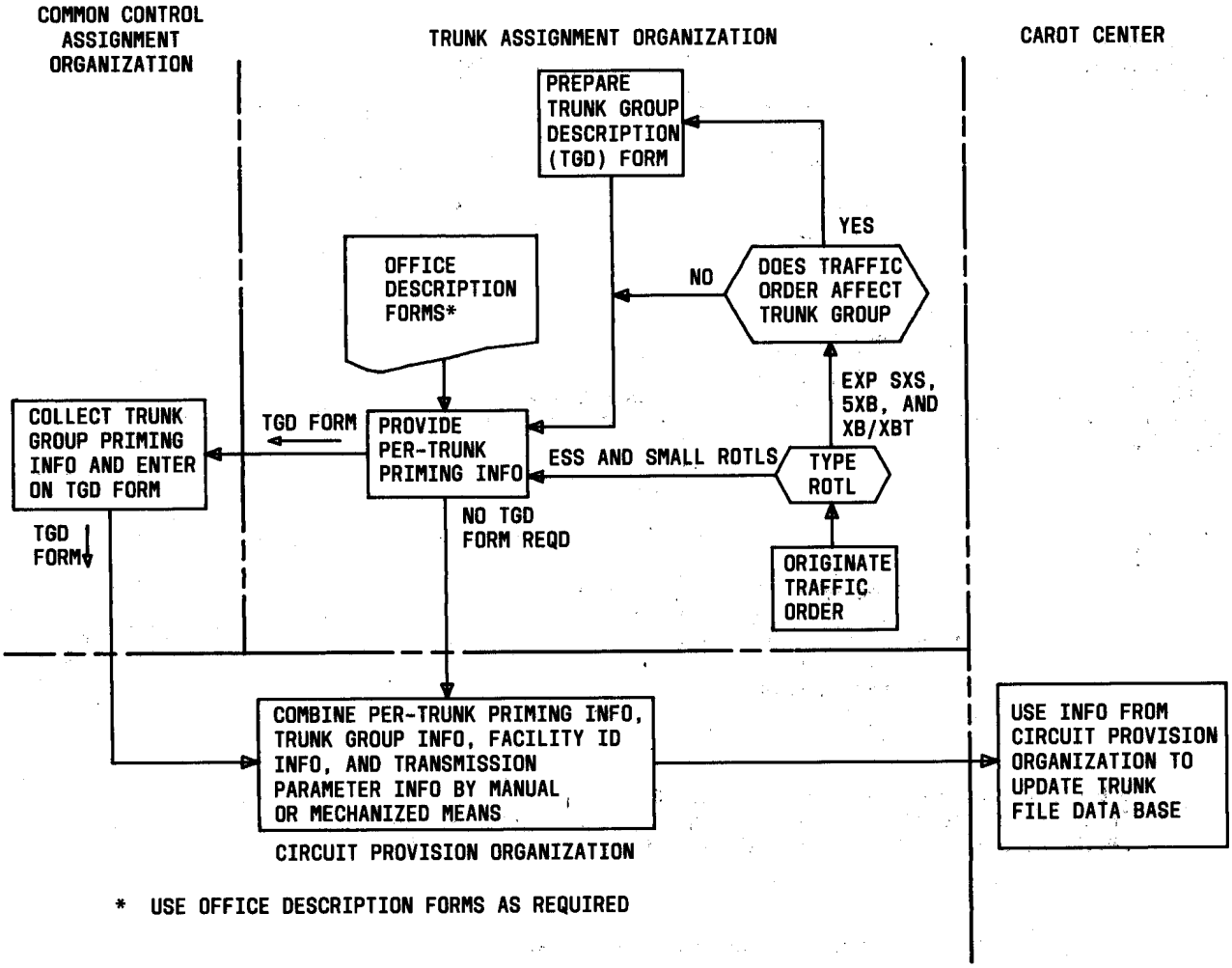


Fig. 5—CAROT 2 Trunk File Update Process Information Flow

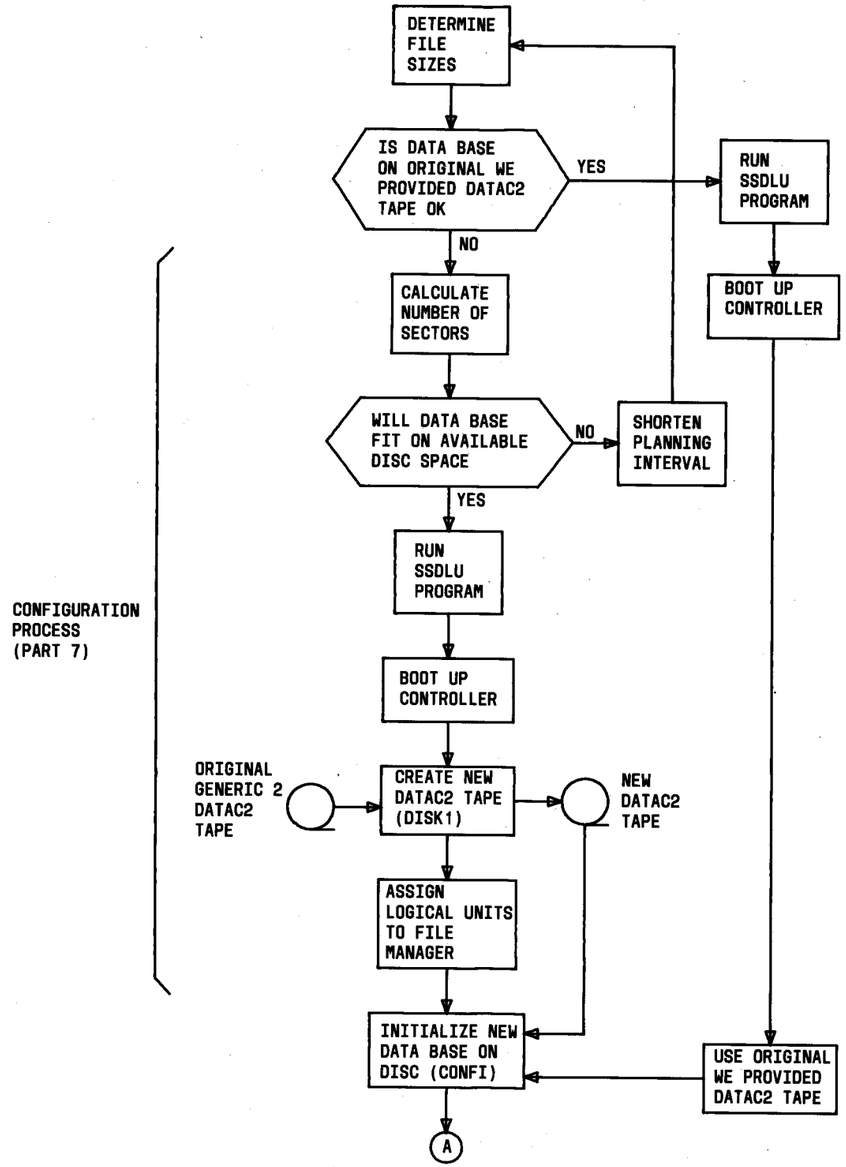


Fig. 6—Establishment of New CAROT 2 Data Base (Page 1 of 2)

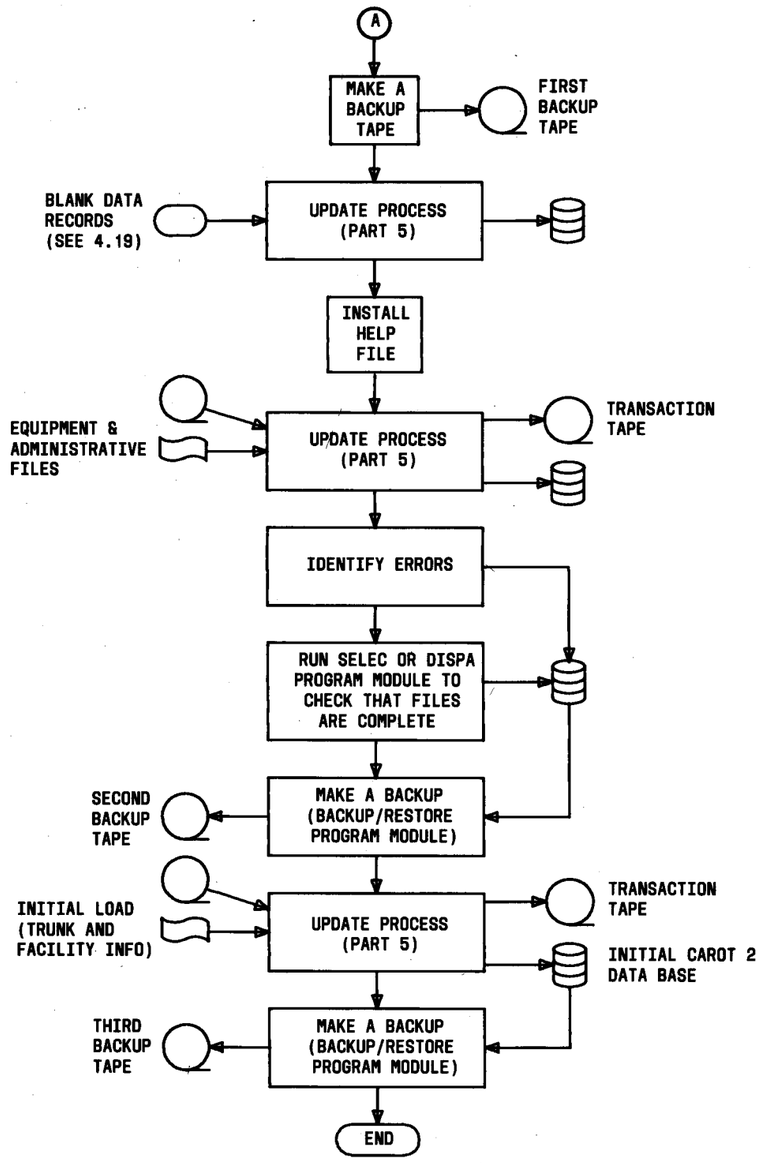


Fig. 6—Establishment of New CAROT 2 Data Base (Page 2 of 2)

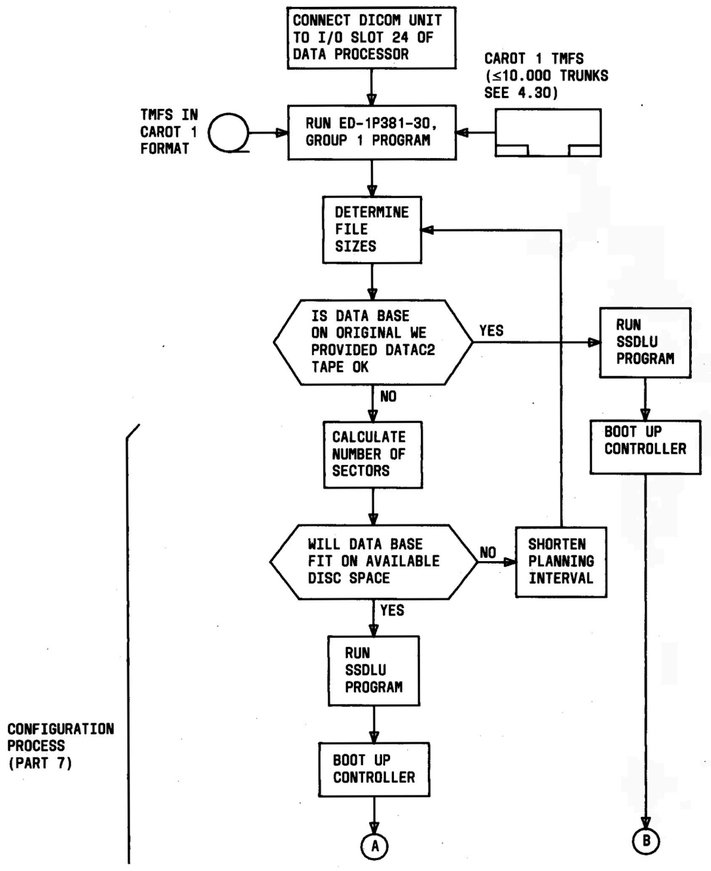


Fig. 7—Conversion of CAROT 1 to CAROT 2 Data Base (Page 1 of 3)

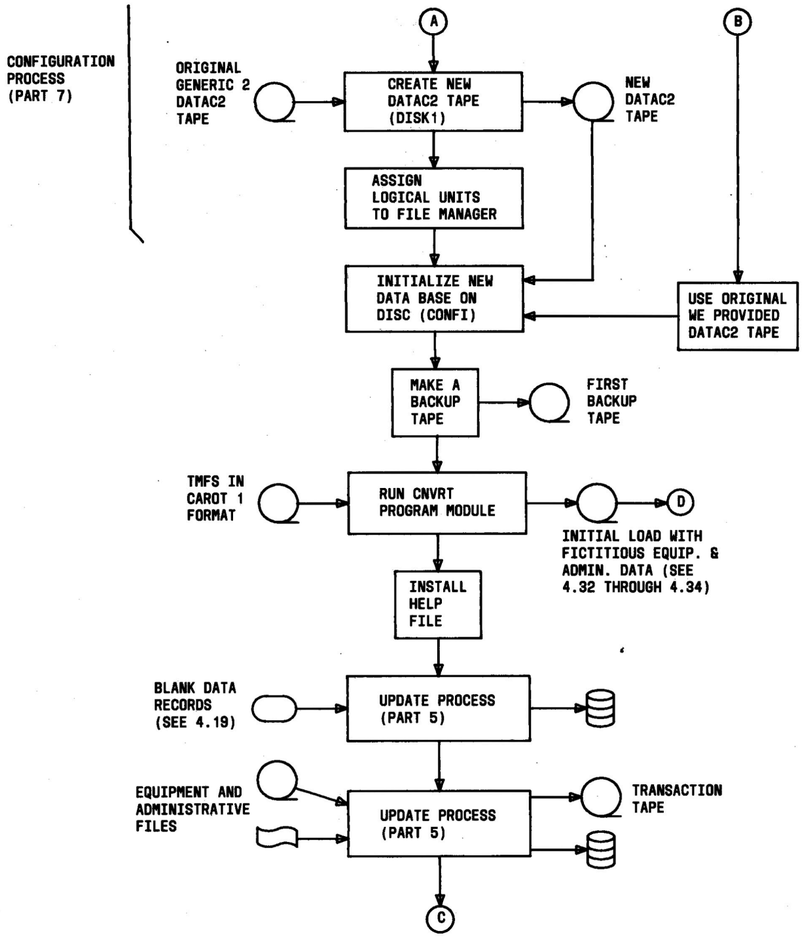


Fig. 7—Conversion of CAROT 1 to CAROT 2 Data Base (Page 2 of 3)

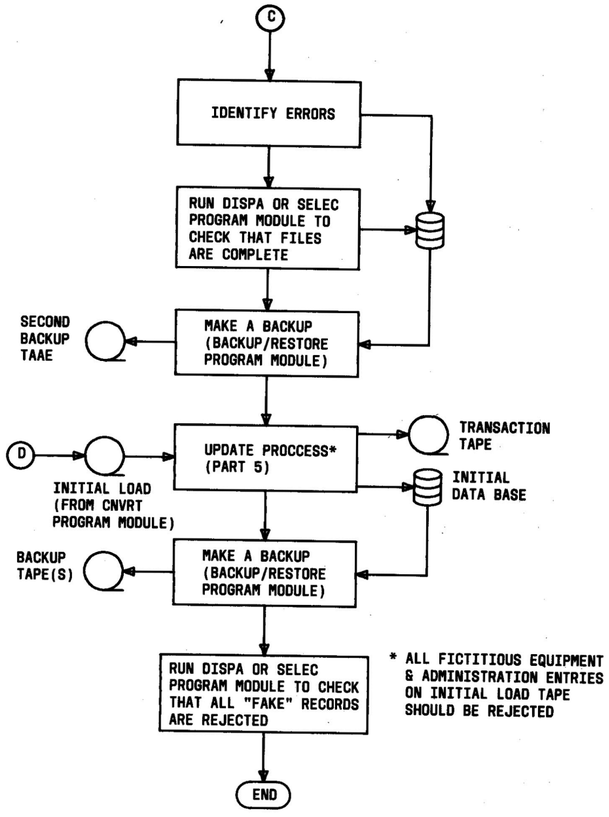


Fig. 7—Conversion of CAROT 1 to CAROT 2 Data Base (Page 3 of 3)

LINE	RECORD TYPE	DESCRIPTION
(1)	RESPONDER (RE)	RESPONDER ID (ATLNGABU12T) EQUAL TO FIRST 11 CHARACTERS OF ROTL ID* AND FICTITIOUS RESPONSER TYPE (52A) AND OPTION (001)
(2)	ROTL (RO)	ROTL ID (ATLNGABU12TO)*, FICTITIOUS ROTL TYPE (1ES) AND TELEPHONE NUMBER (1111222333444), AND RESPONDER ID EQUAL TO FIRST 11 CHARACTERS OF ROTL ID*
(3)	TEST LINE OFFICE (OD)	TERMINATING OFFICE ID (ATLNGATH63A) AS IT APPEARED ON CASSETTE AND FICTITIOUS OFFICE TYPE (SXS L)
(4)	CONTROL OFFICE FOR TRUNKS (CT)	CONTROL OFFICE ID (ATLNGABU12T) AS IT APPEARED ON CASSETTE AND FICTITIOUS DATES FOR MANAGEMENT AND INDEX SUMMARY COLLECTION (01/01/99 AND 01/01/99)
(5)	ROTL CONTROL (RC)	CONTROL OFFICE ID (ATLNGABU12T) AS IT APPEARED ON CASSETTE, ROTL ID (ATLNGABU12TO)*, AND FICTITIOUS DATES FOR ROUTINE TESTING TO START (01/01/99, 01/01/99, 01/01/99, 01/01/99, AND 01/01/99)

(1) /REATLNGABU12T 52A001

(2) /ROATLNGABU12TO1ES1111222333444 ATLNGABU12T

(3) /ODATLNGATH63ASXS L

(4) /CTATLNGABU12T 01/01/9901/01/99

(5) /RCATLNGABU12T ATLNGABU12TO 01/01/9901/01/9901/01/9901/01/9901/01/99

* THE ROTL ID IS AS PREVIOUSLY ENTERED BY THE OPERATOR

Fig. 8—Example of Equipment and Administrative Records Created by CNVRT Program Module (ROTL ID = ATLNGABU12TO)

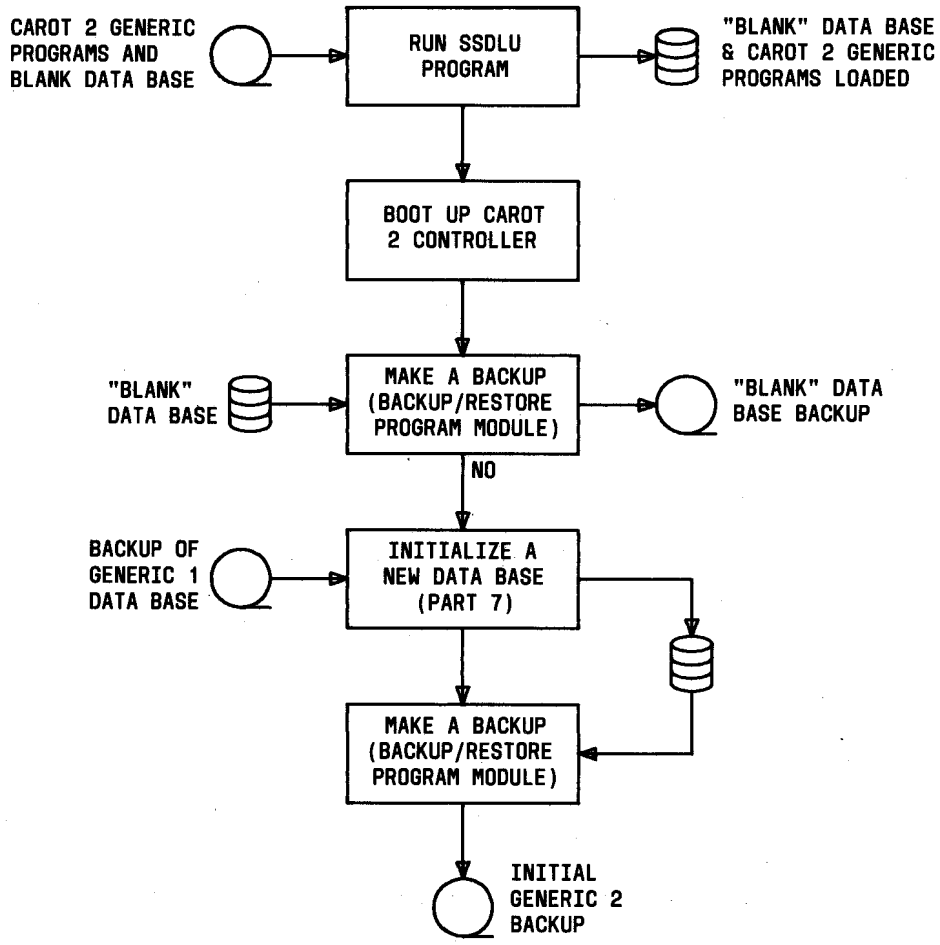


Fig. 9—Conversion of CAROT 2 Generic 1 Data Base to CAROT 2 Generic 2 Data Base

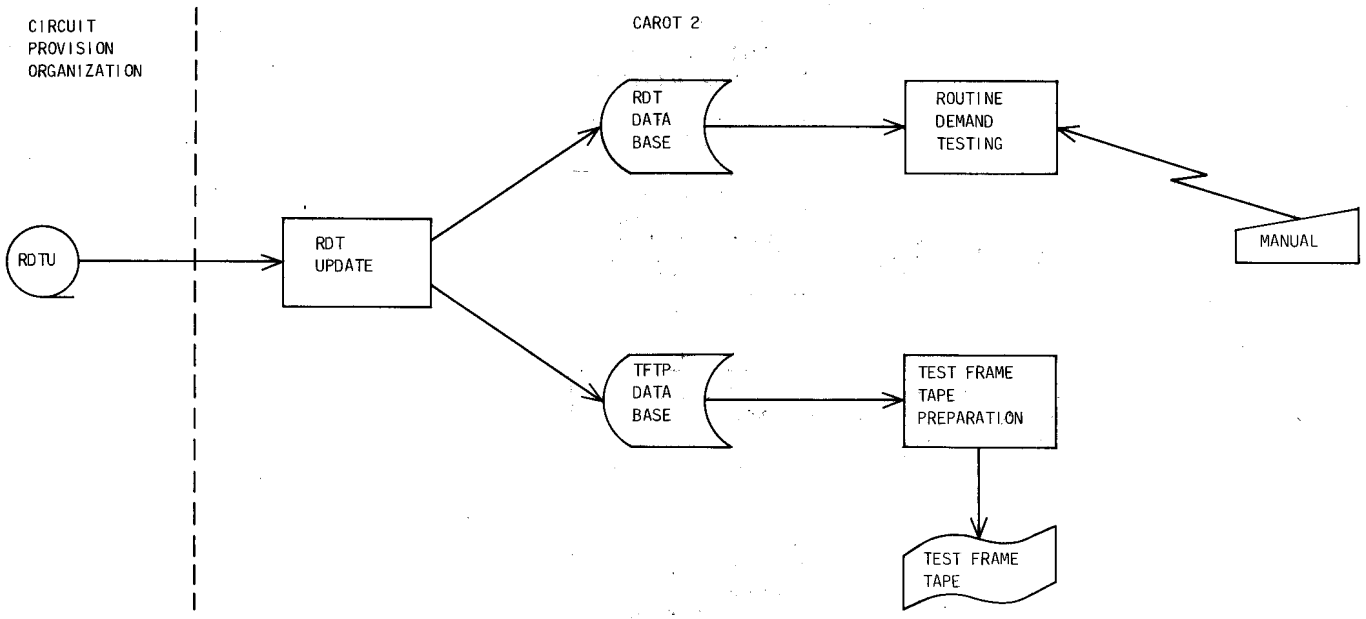


Fig. 10—CAROT 2 Mechanized Inputs—Routine and Demand Testing Implemented

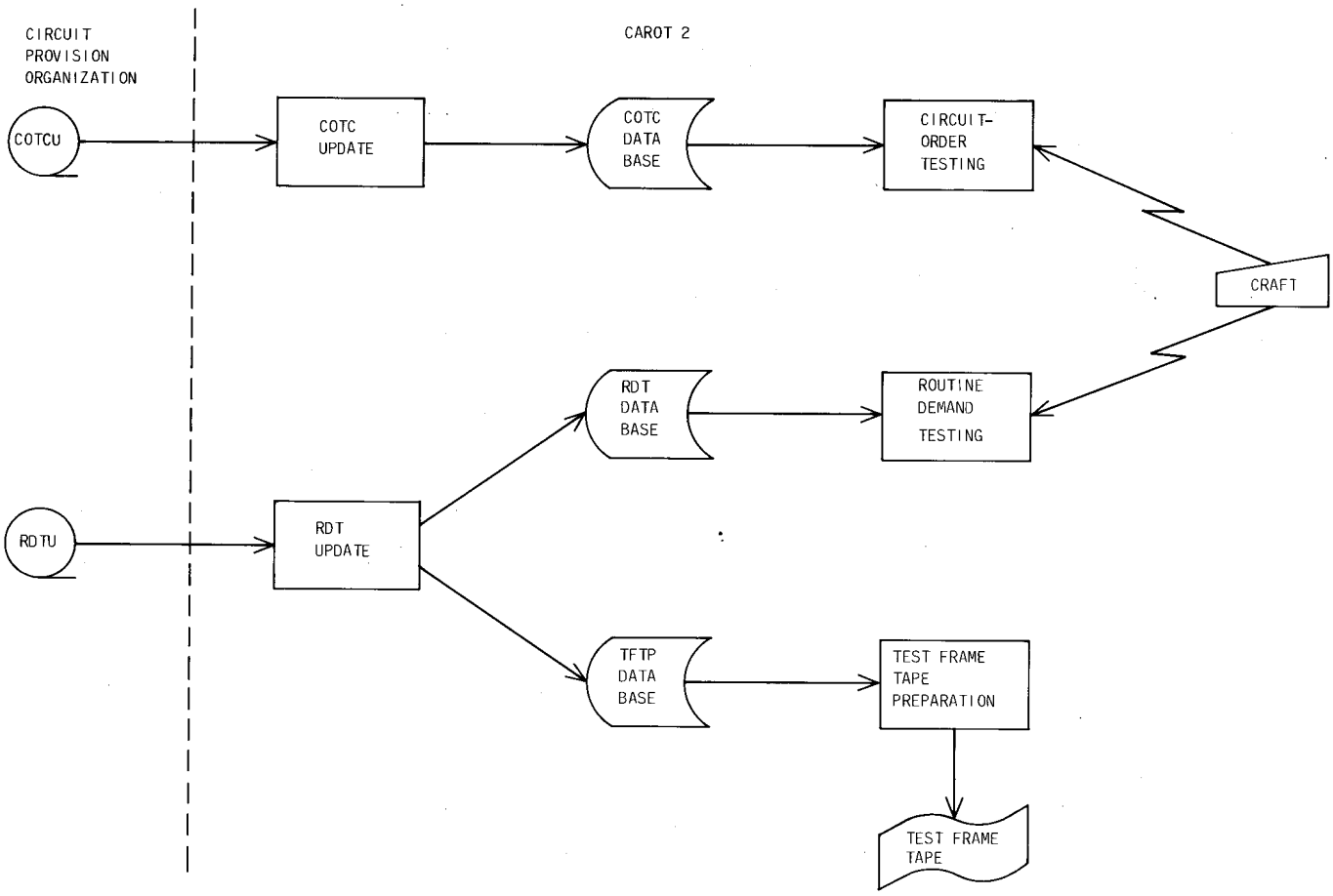


Fig. 11—CAROT 2 Mechanized Inputs—Routine and Demand Testing and Circuit-Order Testing Implemented

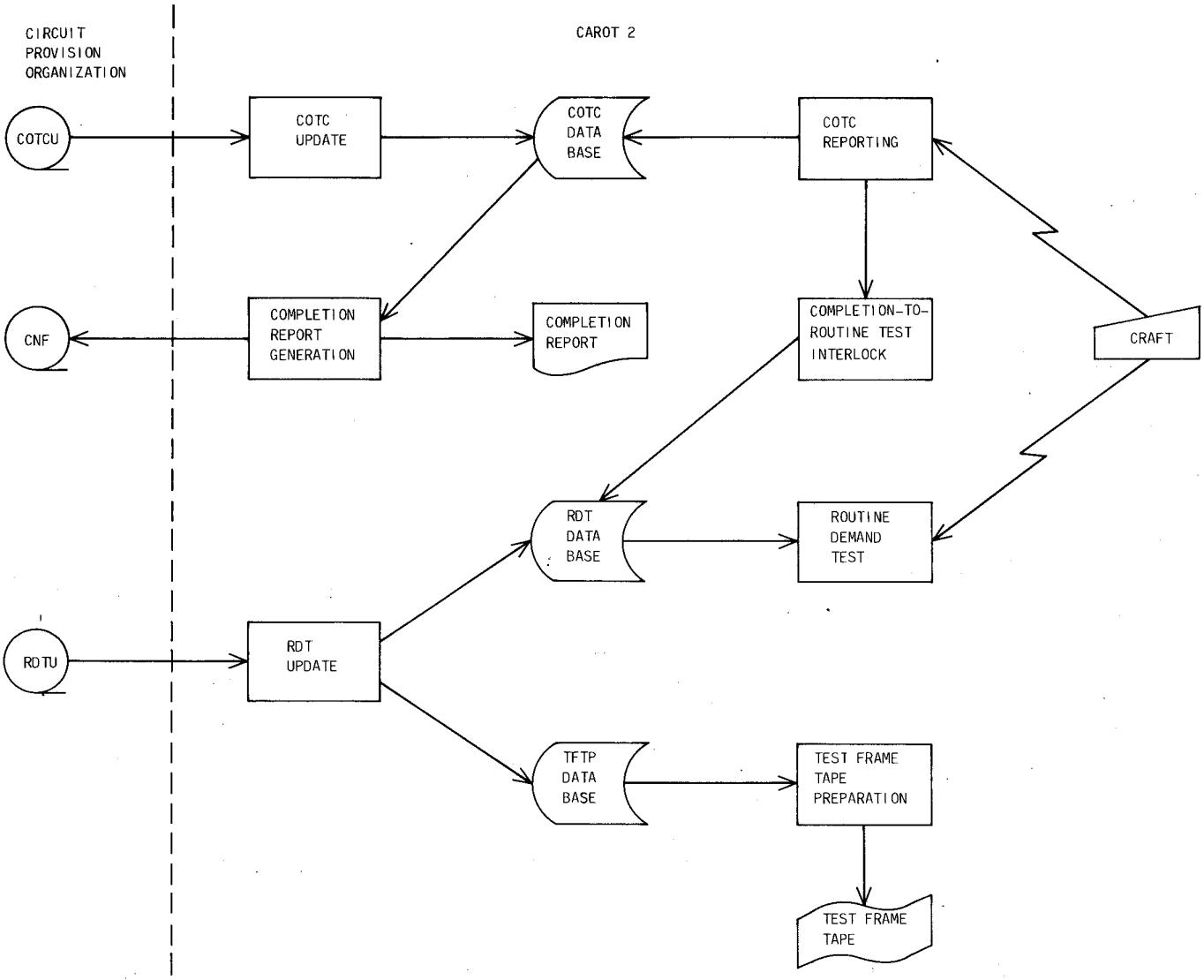


Fig. 12—CAROT 2 Mechanized Inputs—Routine and Demand Testing and Circuit-Order Testing and Completion

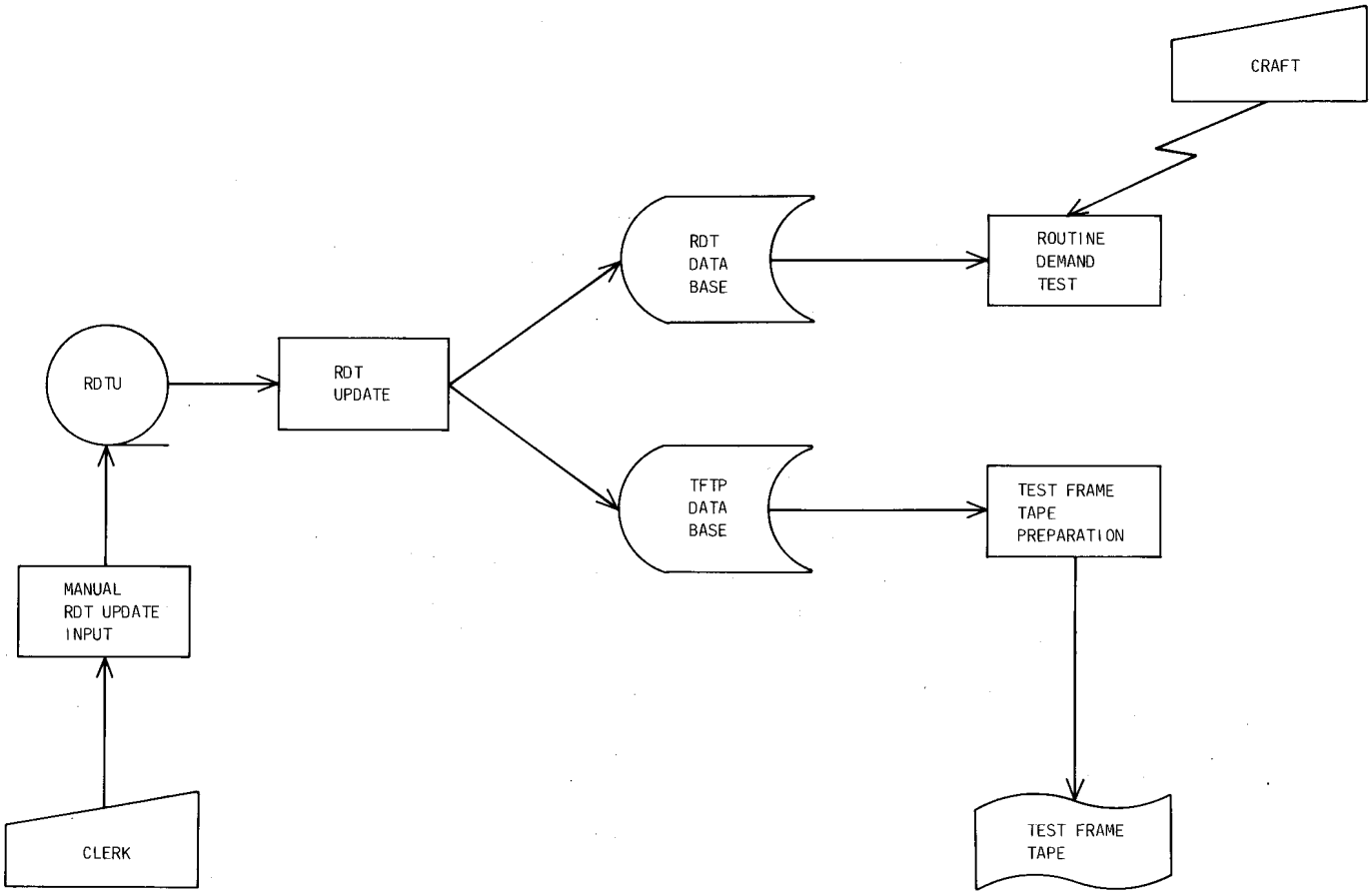


Fig. 13—CAROT 2 Manual Inputs—Routine and Demand Testing Implemented

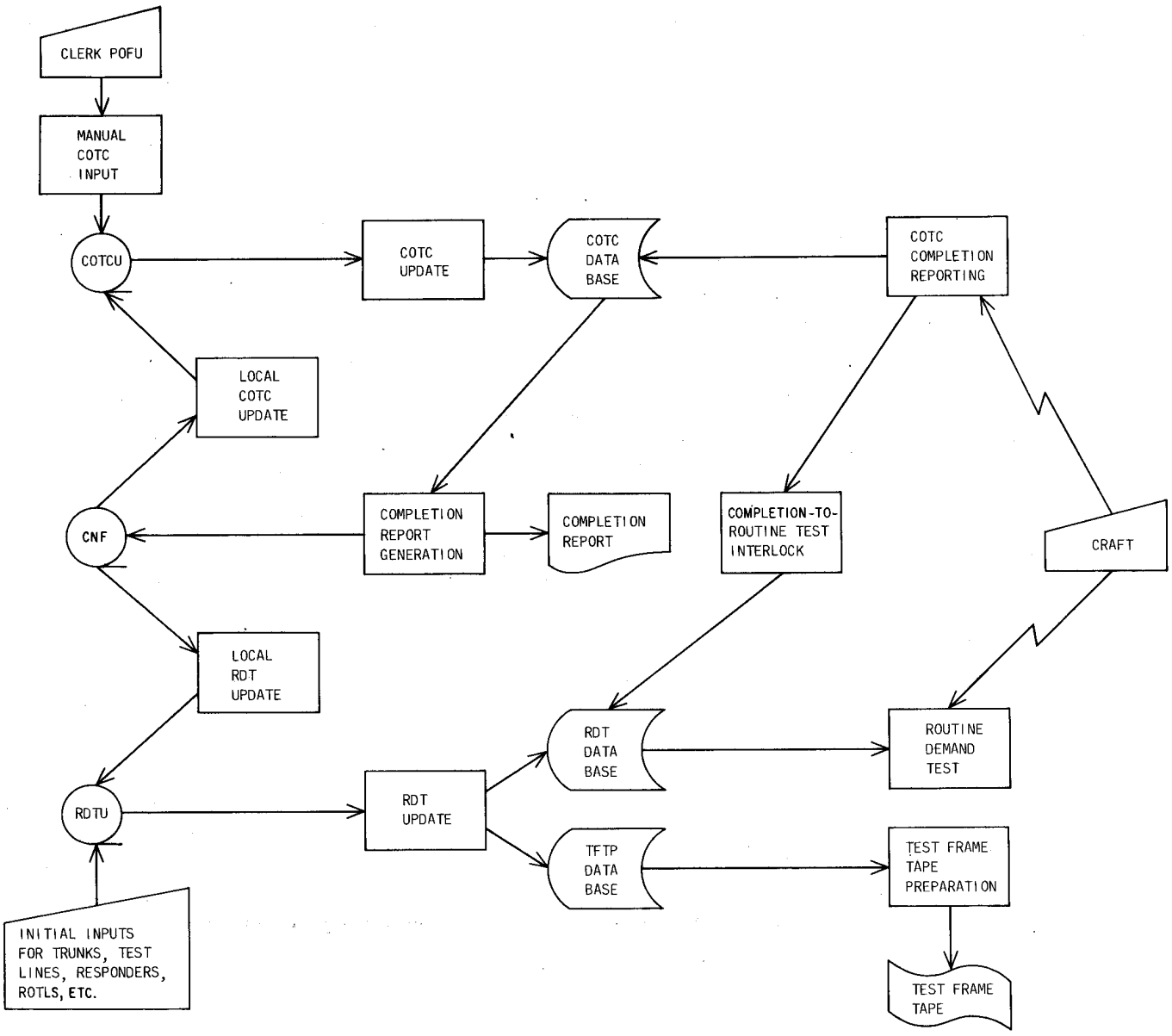


Fig. 14—Manual Inputs—Routine and Demand Testing and Circuit-Order Testing and Completion Reporting Implemented

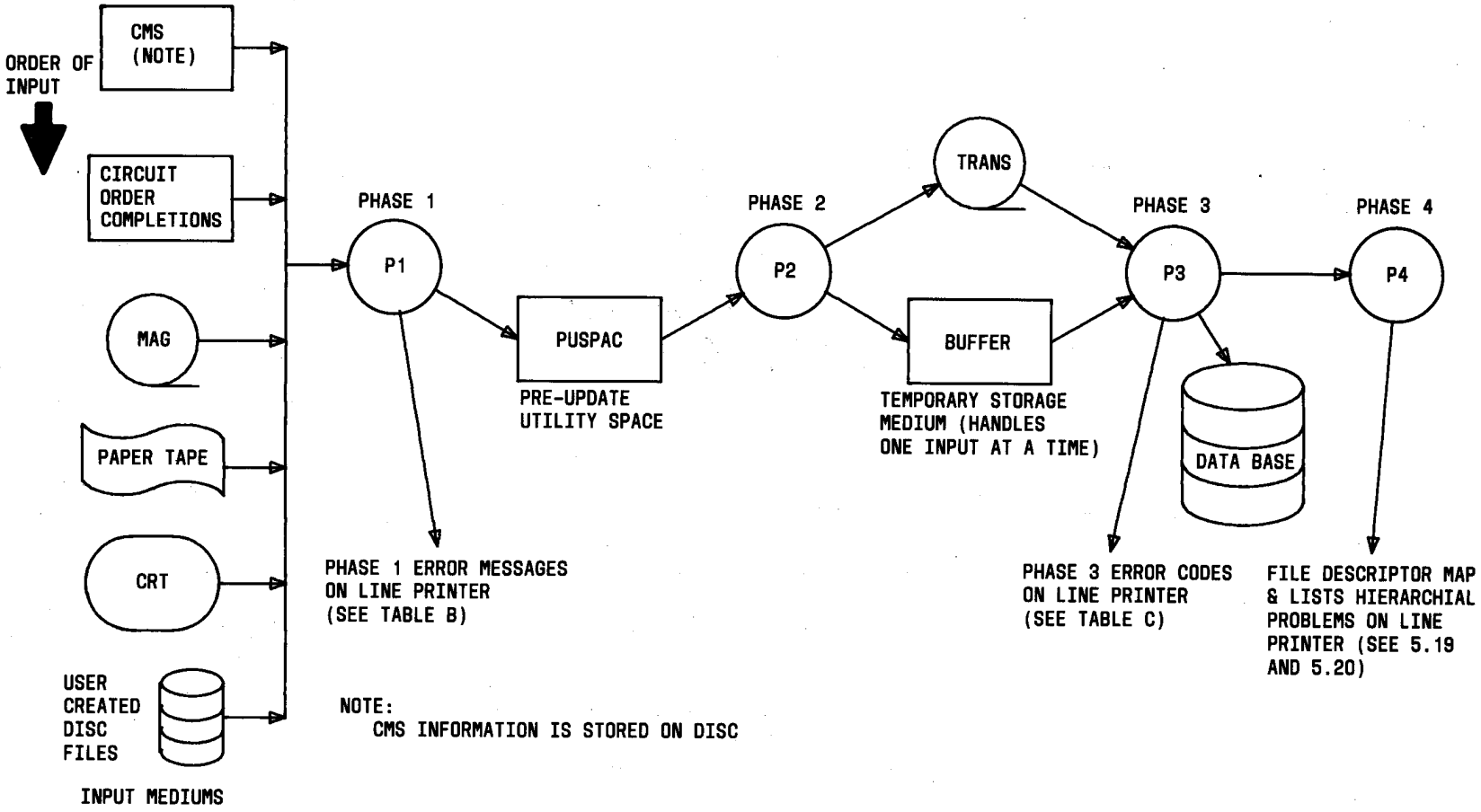


Fig. 15—Update Software Process

TABLE B

UPDATE PROGRAM – PHASE 1 ERROR STATEMENTS

ERROR STATEMENT*	MESSAGE MEANING	PROGRAM DISPOSITION
CHARACTER X X IS ILLEGAL FOR ALPHANUMERIC DATA. IT WILL BE REPLACED BY BLANK.	A nonalphanumeric character such as + or * is located at position X X.	The nonalphanumeric character is replaced by a blank.
BAD RECORD	A record other than an add, delete, or change record contains incorrect information (data with typographical errors, format errors, etc) for entry into the data base.	The offending record is rejected and typed on the line printer. †
NONALPHANUMERIC DATA AT CHARACTER X X	A record has nonalphanumeric data starting at at position X X.	
BAD DATA FIELD STARTING AT CHARACTER X X. THIS FIELD IS X X CHARACTERS LONG.	A record has a data field starting at position X X and continuing for X X number of characters which contains illegal data for that particular field; for example, 61A entered as responder type.	
ILLEGAL DATE STARTING AT CHARACTER X X	Date entered starting at character position X X in a record has already occurred or has a typographical error.	
BAD INFORMATION FOR THIS TASK— X X SOME MISSING DATA	Data that is supposed to be at character position X X in a record [for example, a slash (/) in front of a record] is missing.	

See footnotes at end of table.

TABLE B (Contd)

UPDATE PROGRAM – PHASE 1 ERROR STATEMENTS

ERROR STATEMENT*	MESSAGE MEANING	PROGRAM DISPOSITION
TROUBLE IN CO ANALYSIS OF TYPE = *Z Z*		
Where Z Z = 1	Unassigned	
= 2	No update tasks completed by action data	Rejected
= 3	Illegal update task completted by action data for the action code given in this PV record	Rejected
= 4	Too many occurrences of a particular task in action data	Rejected
= 5	Unassigned	
= 6	Bad action code in PV record	Rejected
= 7	Unassigned	
= 8	PC record following action data; ie, no PV record following action data	The previous action data records are rejected, and this PC is accepted as if it is beginning a new string of action data.
= 9	Ran out of space in PUSPAC	This update rejected. The data base should be restored to it's preupdate backup. PUSPAC should be set larger and the entire update repeated.
= 10	Bad record in action data associated with this PV	Rejected
= 11	Ran out of room in action file	This item rejected. The data base should be restored to it's preupdate backup, reconfigured to have larger circuit—order and action data files, and the entire updata repeated.

See footnotes at end of table.

TABLE B (Contd)

UPDATE PROGRAM – PHASE 1 ERROR STATEMENTS

ERROR STATEMENT*	MESSAGE MEANING	PROGRAM DISPOSITION
= 12	Got a cancel (PV with "K" action code) with action data	Rejected
= 13	Action data record out of sequence	All update input records Rejected until a new PC record is encountered
= 14	Got data base action code within an action data string	The action taken depends on the records which follow in the input stream. If the next record is a PC or PV, then the action indicated by this record is applied to the COTC data base. If the next record is a valid RDT update record, it is applied to the RDT data base.

* X X indicates a variable character position; see Section 190-102-203

† Any time a record is rejected, the remaining records should be examined to see that additional errors are not caused because of hierarchial restraints in the data base. For example, if an add record is followed by successive trunk group and trunk records, the rejection of a trunk group record could cause all the trunks listed for the rejected trunk group record to be added to the preceding trunk group.

TABLE C

UPDATE PROGRAM - PHASE 3 ERROR CODES

NNN VALUE FOR FILE = 00NNN	N VALUE FOR OPERATION = 0000N	NNNNN VALUE FOR CODE = 000NN	CODE = NNNNN MEANING	CORRECTIVE ACTION
101	1	00001	The responder designated for the ROTL to be added does not exist in the data base.	Investigate responder ID for a typographical error. If this is not the case, audit the data base to determine why the responder record is not there.
		00010	Another ROTL designated as using the same equipment does not exist in the data base.	Investigate ROTL entry for a typographical error. If this is not the case, audit the data base to determine why the other ROTL record is not there.
		00011	Combination of above two codes. (See Note)	Perform the two corrective actions listed above.
		00030	The ROTL to be added already exists in the data base.	Investigate ROTL entry for a typographical error. If this is not the case, audit the data base to determine why the ROTL record record is already there.
		00040 00050 00060	There is no more room in the data base for more ROTL records.	If code = 00040, reconfigure data base (Part 7). If code = 00050 or 00060, check file descriptor map to determine if the maximum number of ROTL records allowed has been reached. If the maximum number has been reached, reconfigure data base (Part 7); otherwise, perform garbage collection (Part 8) and try to enter the record again.
	2	01030	The ROTL record to be deleted does not exists in the data base.	Investigate ROTL entry for a typographical error. If this is not the case, audit the data base to determine why the ROTL record to be deleted is not there.
		01043	The ROTL record to be deleted has trunk groups that it accesses and cannot be deleted.	Investigate ROTL entry for a typographical error. If this is not the case, audit the data base to determine why there are trunk groups listed that it accesses.
	3	02030	The ROTL record to be changed does not exist in the data base.	Investigate ROTL entry for a typographical error. If this is not the case, audit the data base to determine why the ROTL record to be changed is not there.
		02070	The new responder designated for ROTL to be assigned to does not exist in the data base.	Investigate responder ID for a typographical error. If this is not the case, audit the data base to determine why new responder designated for the ROTL is not there.
201	1	00030	The control office for trunks (COT) to be added already exists in the data base.	Investigate COT entry for a typographical error. If this is not the case, audit the data base to determine why the COT record is already there.
		00040 00050 00060	There is no more room in the data base for more COT records.	If code = 00040, reconfigure data base (Part 7). If code = 00050 or 00060, check file descriptor map to determine if the maximum number of COT records allowed has been reached. If the maximum number has been reached, reconfigure data base (Part 7); otherwise, perform garbage collection (Part 8) and try to enter the data again.
	2	01030	The COT record to be deleted does not exist in the data base.	Investigate COT entry for a typographical error. If this is not the case, audit the data base to determine why the COT record to be deleted is not there.
	3	02030	The COT record to be changed does not exist in the data base.	Investigate COT entry for a typographical error. If this is not the case, audit the data base to determine why the COF record to be deleted is not there.
301	1	00030	The control office for facilities (COF) to be added already exists in the data base.	Investigate COF entry for a typographical error. If this is not the case, audit the data base to determine why the COF record is already there.
		00040 00050 00060	There is no more room in the data base for COF records.	If code = 00040, reconfigure data base (Part 7). If code = 00050 or 00060, check file descriptor map to determine if the maximum number of COF records allowed has been reached. If the maximum number has been reached, reconfigure data base (Part 7); otherwise, perform garbage collection (Part 8) and try to enter the data again.
	2	01030	The COF record to be deleted does not exist in the data base.	Investigate COF entry for a typographical error. If this is not the case, audit the data base to determine why the COF record to be deleted is not there.
		01043	The COF record to be deleted has facilities using it and cannot be deleted.	Investigate COF entry for a typographical error. If this is not the case, audit the data base to determine why facilities are assigned to the COF.
	3	02030	The COF record to be changed does not exist in the data base.	Investigate COF entry for a typographical error. If this is not the case, audit the data base to determine why the COF to be changed is not there.
501	1	00030	The PCO to be added already exists in the data base.	
		00040 00050 00060	There is no more room in the data base for PCOs.	If the error code = 50 or 60, reboot and restore the data base to the latest preupdate backup, reconfigure the data base for more space, and rerun the update. If the error code = 40, ---
	2	01030	The PCO to be deleted does not exist in the data base.	
		01040	The PCO to be deleted has circuit orders assigned to it and cannot be deleted.	
	3	02030	The PCO to be deleted does not exists in the data base.	
601	1	00030	The responder to be added already exists in the data base.	Investigate responder entry for a typographical error. If this is not the case, audit the data base to determine why the responder record is already there.
		00040 00050 00060	There is no more room in the data base for responder records.	If code = 00040, reconfigure the data base (Part 7). If code = 00050 or 00060, check file descriptor map to determine if the maximum number has been reached, reconfigure data base (Part 7) otherwise; perform garbage collection (Part 8) and try to enter the data again.
	2	01030	The responder record to be deleted does not exist in the data base.	Investigate responder entry for a typographical error. If this is not the case, audit the data base to determine why the responder record to be deleted is not there.
		01043	The responder to be deleted has a ROTL or test line using it and cannot be deleted.	Investigate responder entry for a typographical error. If this is not the case, audit the data base to determine why a test line or ROTL is using the responder.
	3	02030	The responder record to be changed does not exist in the data base.	Investigate responder entry for a typographical error. If this is not the case, audit the data base to determine why the responder record to be changed is not there.

See note at end of table.

TABLE C (Contd)

UPDATE PROGRAM - PHASE 3 ERROR CODES

NNN VALUE FOR FILE = 00NNN	N VALUE FOR OPERATION = 0000N	NNNNN VALUE FOR CODE = 000NN	CODE = NNNNN MEANING	CORRECTIVE ACTION
701	1	00030	The test frame office to be added already exists in the data base.	Investigate frame office entry for a typographical error. If this is not the case, audit the data base to determine why the test frame office is already there.
		00040 00050 00060	There is no more room in the data base for test frame office records.	If code = 00040, reconfigure data base (Part 7). If code = 00050 or 00060, check file descriptor map to determine if the maximum number of test frame office records allowed has been reached. If the maximum number has been reached, reconfigure data base (Part 7); otherwise, perform garbage collection (Part 8) and try to enter the data again.
	2	01030	The test frame office record to be deleted does not exist in the data base.	Investigate test frame office entry for a typographical error. If this is not the case, audit the data base to determine why the test frame office record to be deleted is not there.
		01043	The test frame office has trunks assigned to it and cannot be deleted.	Investigate test frame office entry for a typographical error. If this is not the case, audit the data base to determine why trunks are assigned to the office.
	3	02030	The test frame office record to be changed does not exist in the data base.	Investigate test frame office entry for a typographical error. If this is not the case, audit the data base to determine why the test frame office record to be changed is not there.
102 (Testline Directory Office)	1	00030	The test line directory office to be added already exists in the data base.	Investigate test line directory office entry for a typographical error. If this is not the case, audit the data base to determine why the test line directory office record is already there.
		00040 00050 00060	There is no more room in the data base for test line directory office records.	Check file descriptor map to determine if the maximum number of test line directory offices allowed has been reached. If the maximum number has been reached, reconfigure data base (Part 7) ; otherwise, perform garbage collection (Part 8) and try to enter the data again. Garbage collection may or may not work the first time for code 00040 and should be tried again if it does not. If garbage collection fails to cure the problem after 2 or 3 times, reconfigure data base.
	2	01030	The test line directory office record to be deleted does not exist in the data base.	Investigate test line directory office entry for a typographical error. If this is not the case, audit the data base to determine why the test line directory office to be deleted is not there.
		01043	The test line directory office has trunk groups assigned to it and cannot be deleted.	Investigate test line directory office entry for a typographical error. If this is not the case, audit the data base to determine why there are trunk groups assigned to the test line directory office.
	3	02030	The test line directory office record to be changed does not exist in the data base.	Investigate test line directory office entry for a typographical error. If this is not the case, audit the data base to determine why the test line directory office to be changed is not there.
102 (Testline)	1	00001	A ROTL record designated as performing a ROTL for the test line entry to be added does not exist in the data base.	Investigate ROTL ID for a typographical error. If this is not the case, audit the data base to determine why the ROTL record is not there.
		00010	The responder designated for the test line to be added does not exist in the data base.	Investigate responder ID for a typographical error. If this is not the case, audit the data base to determine why the responder record is not there.
		00011	Combination of above two codes. (See Note)	Perform the two actions listed above.
		00030	The test line record to be added already exists in the data base.	Investigate test line entry for a typographical error. If this is not the case, audit the data base to determine why the test line record is already there.
		00040	There is no more room in the data base for test line records.	Check file descriptor map to determine if the maximum number of test lines allowed has been reached. If the maximum number has been reached, reconfigure data base (Part 7); otherwise, perform garbage collection (Part 8) and try to enter the data again. Garbage collection may or may not work the first time and should be tried again if it does not. If garbage collection fails to cure the problem after 2 or 3 times, reconfigure data base.
		00050	The test line office designated for the test line to be added does not exist in the data base.	Investigate test line office ID for a typographical error. If this is not the case, audit the data base to determine why the test line office record is not there.
	2	01030	The test line record to be deleted does not exist in the data base .	Investigate test line record for a typographical error. If this is not the case, audit the data base to determine why the test line record to be deleted is not there.
	3	02030	The test line record to be changed does not exist in the data base.	Investigate test line record for a typographical error. If this is not the case, audit the data base to determine why the test line record to be changed is not there.
		02070	The new responder designated for the test line to be assigned to does not exist in the data base.	Investigate responder ID for a typographical error. If this is not the case, audit the data base to determine why the new responder designated for the test line is not there.
		02075	The new responder designated for the test line to be assigned to already has the test line assigned to it.	Investigate test line ID for a typographical error. If this is not the case, audit the data base to determine why the new responder already has the test line assigned to it.
		02080	The new ROTL corresponding to the ROTL ID does not exist in the data base.	Investigate ROTL ID for a typographical error. If this is not the case, audit the data base to determine why the new ROTL corresponding to the ROTL ID does not exist in the data base.
103	1	00001	The ROTL control office record designated for the trunk group to be added does not exist in the data base.	Investigate ROTL control office ID for a typographical error. If this in not the case, audit the data base to determine why the ROTL control office record is not there.
		00010	The ROTL record designated for the trunk group when testing in the primary direction does not exist in the data base.	Investigate ROTL ID for a typographical error. If this is not the case, audit the data base to determine why ROTL designated for the primary direction of testing is not there.
		00100	The ROTL record designated for the trunk group when testing in the alternate direction does not exist in the data base.	Investigate ROTL ID for a typographical error. If this is not the case, audit the data base to determine why the ROTL designated for the alternate direction of testing is not there.
		01000	The test line office designated for the trunk group when testing in the primary direction does not exist in the data base.	Investigate test line office ID for a typographical error. If this is not the case, audit the data base to determine why the test line office designated for the primary direction of testing is not there.

See note at end of table.

TABLE C (Contd)

UPDATE PROGRAM - PHASE 3 ERROR CODES

NNN VALUE FOR FILE = 00NNN	N VALUE FOR OPERATION = 0000N	NNNNN VALUE FOR CODE = 000NN	CODE = NNNNN MEANING	CORRECTIVE ACTION
103 (Contd)	1 (Contd)	10000	The test line office designated for the trunk group when testing in the alternate direction does not exist in the data base.	Investigate test line office ID for a typographical error. If this is not the case, audit the data base to determine why the test line office designated for the alternate direction of testing is not there.
		00011,00101, 10011, etc.	Combination of above 4 codes. (See Note)	Perform combinations of 4 corrective actions listed above as required.
		00030	The trunk group record to be added already exists in the data base.	Investigate trunk group record for a typographical error. If this is not the case, audit the data base to determine why the trunk group record is already there.
		00040	There is no more room in the data base for trunk group records.	Reconfigure data base (Part 7).
	2	01030	The trunk group record to be deleted does not exist in the data base.	Investigate trunk group record for a typographical error. If this is not the case, audit the data base to determine why the trunk group record to be deleted is not there.
	3	02030	The trunk group record to be changed does not exist in the data base.	Investigate trunk group record for a typographical error. If this is not the case, audit the data base to determine why the trunk group record to be changed is not there.
203	1	00001	The control office designated for facility does not exist in the data base.	Investigate control office ID for a typographical error. If this is not the case, audit the data base to determine why the control office for the facility to be added is not there.
		00030	The facility record to be added already exists in the data base.	Investigate facility record for a typographical error. If this is not the case, audit the data base to determine why the facility record is already there.
		00040	There is no more room in the data base for facility records.	Reconfigure data base (Part 7).
	2	01030	The facility to be deleted does not exist in the data base.	Investigate facility record for a typographical error. If this is not the case, audit the data base to determine why the facility record to be deleted is not there.
		01043	The facility has trunk groups assigned to it and cannot be deleted.	Investigate facility record for a typographical error. If this is not the case, audit the data base to determine why trunk groups are assigned to the facility.
	3	02030	The facility record to be changed does not exist in the data base.	Investigate facility record for a typographical error. If this is not the case, audit the data base to determine why the facility record to be changed is not there.
		02070	The new control office for the facility to be assigned to does not exist in the data base.	Investigate control office ID for a typographical error. If this is not the case, audit the data base to determine why the new control office designated for the facility is not there.
303	1	00101	The trunk group record designated for the trunk(s) to be added does not exist in the data base.	Investigate trunk group ID for a typographical error. If this is not the case, audit the data base to determine why the trunk group record designated for the trunk(s) is not there.
		00111 or 00110	The facility record designated for the trunk(s) to be added does not exist in the data base.	Investigate facility ID for a typographical error. If this is not the case, audit the data base to determine why the facility record designated for the trunk is not there.
		00100	There is no more room in the data base for test parameter files.	Reconfigure data base (Part 7).
		00030	The trunk record to be added already exists in the data base.	Investigate trunk record for a typographical error. If this is not the case, audit the data base to determine why the trunk record is already there.
		00040	There is no more room in the data base for trunk records.	Reconfigure data base (Part 7).
	2	01030	The trunk record to be deleted does not exist in the data base.	Investigate trunk record for a typographical error. If this is not the case, audit the data base to determine why the trunk record to be deleted is not there.
	3	02030	The trunk record to be changed does not exist in the data base.	Investigate trunk record for a typographical error. If this is not the case, audit the data base to determine why the trunk group record to be changed is not there.
		02070	The new facility designated for the trunk(s) to be assigned does not exist in the data base.	Investigate facility ID for a typographical error. If this is not the case, audit the data base to determine why the new facility designated for the trunk(s) is not there.
403	1	00001	The PCO for this circuit order does not exist in data base.	
		00030	This circuit order already exists in data base.	
		00040	No more room in data base for circuit orders.	
	2	01030	The circuit order to be deleted does not exist in data base.	
503	1	00001	The circuit order designated for this item does not exist in the data base.	
		00030	The item to be added already exists in the data base.	
		00040	There is no more room in the data base for circuit-order items.	
	2	01030	The item to be deleted does not exist in the data base.	
	3	02030	The item to be changed does not exist in the data base.	

See note at end of table.

TABLE C (Contd)

UPDATE PROGRAM - PHASE 3 ERROR CODES

NNN VALUE FOR FILE = 00NNN	N VALUE FOR OPERATION = 0000N	NNNNN VALUE FOR CODE = 000NN	CODE = NNNNN MEANING	CORRECTIVE ACTION
603	1	00001	The test frame office designated for the trunk group in the principal direction of testing does not exist in the data base.	Investigate test frame office ID for a typographical error. If this is not the case, audit the data base to determine why the test frame office designated for the trunk group in the primary direction of testing is not there.
		00010	The test frame office designated for the trunk group in the alternate direction of testing does not exist in the data base.	Investigate test frame office ID for a typographical error. If this is not the case, audit the data base to determine why the test frame office designated for the trunk group in the alternate direction of testing is not there.
		00011	Combination of above 2 codes. (See Note)	Perform 2 corrective actions listed above.
603		00030	The test frame trunk group record to be added already exists in the data base.	Investigate test frame trunk group record for a typographical error. If this is not the case, audit the data base to determine why the test frame trunk group record is already there.
		00040	There is no more room in the data base for test frame trunk groups.	Reconfigure data base (Part 7).
	2	01030	The test frame trunk group to be deleted does not exist in the data base.	Investigate test frame trunk group record for a typographical error. If this is not the case, audit the data base to determine why the test frame trunk group record to be deleted is not there.
	3	02030	The test frame trunk group to be changed does not exist in the data base.	Investigate test frame trunk group record for a typographical error. If this is not the case, audit the data base to determine why the test frame trunk group record to be changed is not already there.
703	1	00101	The test frame trunk group record designated for the test frame trunk(s) to be added does not exist in the data base.	Investigate test frame trunk group ID for a typographical error. If this is not the case, audit the data base to determine why the test frame trunk group designated for the test frame trunk(s) is not there.
		00111	The facility record designated for the test frame trunk(s) to be added does not exist in the data base.	Investigate facility ID for typographical error. If this is not the case, audit the data base to determine why facility record designated for the test frame trunks is not there.
		00100	There is no more room in the data base for test frame test parameter files.	Reconfigure data base (Part 7).
	1	00030	The test frame trunk record to be added already exists in the data base.	Investigate test frame trunk record for a typographical error. If this is not the case; audit the data base to determine why the test frame trunk record is already there.
703		00040	There is no more room in the data base for test frame trunk records.	Reconfigure data base (Part 7).
	2	01030	The test frame trunk record to be deleted does not exist in the data base.	Investigate test frame trunk record for a typographical error. If this is not the case, audit the data base to determine why the test frame trunk record to be deleted is already there.
	3	02030	The test frame trunk record to be changed does not exist in the data base.	Investigate test frame trunk record for a typographical error. If this is not the case, audit the data base to determine why the test frame trunk record to be changed is already there.
		02080	The new facility designated for the test frame trunk(s) to be assigned does not exist in the data base.	Investigate facility ID for a typographical error. If this is not the case, audit the data base to determine why the new facility designated for the test frame trunk(s) is not there.
104	1	00001	The ROTL listed for the ROTL control office does not exist in the data base.	Investigate ROTL ID for a typographical error. If this is not the case, audit the data base to determine why the ROTL listed for the ROTL control office is not there.
		00010	The control office for trunks listed for the ROTL control office does not exist in the data base.	Investigate control office for trunks ID for typographical error. If this is not the case, audit the data base to determine why the control office for trunks listed for the ROTL control office is not there.
		00011	Combination of above two codes. (See Note)	Perform the 2 corrective actions listed above.
		00030	The ROTL control office record to be added already exists in the data base.	Investigate ROTL control office record for a typographical error. If this is not the case, audit the data base to determine why the ROTL control office record is already there.
	1 (Contd)	00049	There is no more room in the data base for ROTL control office records.	Reconfiguration data base (Part 7).
		00020	There is no more room in the data base for index and management summary data.	
104 (Contd)	2	01030	The ROTL control office record to be deleted does not exist in the data base.	Investigate ROTL control office record for a typographical error. If this is not the case, audit the data base to determine why the ROTL control office record to be deleted is not there.
		01043	The ROTL control office has trunk groups assigned to it and cannot be deleted.	Investigate ROTL control office record for a typographical error. If this is not the case, audit the data base to determine why trunk groups are using the ROTL control office.
	3	02030	The ROTL control office record to be changed does not exist in the data base.	Investigate ROTL control office record for a typographical error. If this is not the case, audit the data base to determine why the ROTL control office record to be changed is not there.
904		00001	The test frame trunk group designated for the K-field priming does not exist in the data base.	Investigate test frame trunk group ID for a typographical error. If this is not the case, audit the data base to determine why the test frame trunk group designated for the K-field priming is not there.
	1	00030	The K-field priming record to be added already exists in the data base.	Investigate K-field priming record for a typographical error. If this is not the case, audit the data base to determine why the K-field priming record is already there.
		000040	There is no more room in the data base for K-field priming records.	Reconfigure data base (Part 7).
	2	01030	The K-field priming record to be deleted does not exist in the data base.	Investigate K-field priming record for a typographical error. If this is not the case, audit the data base to determine why the K-field priming record to be deleted is not there.
	3	02030	The K-field priming record to be changed does not exist in the data base.	Investigate K-field priming record for a typographical error. If this is not the case, audit the data base to determine why the K-field priming record to be changed is not there.

Note: When several types of errors are combined into one code (e.g., in file 103) the individual (code = NNNNN) codes are simply added together to produce the combined code. Thus a code of 00011 is a code 00001 combined with a code 00010, and a code 10111 is a combination of codes 10000,00100,00010, and 00001.

```
FILE DESCRIPTOR MAP
-------------------------------------------------------------------
**********
FILE  101 HAS   63 ENTRIES ///ROTL
**********
FILE  201 HAS   47 ENTRIES ///C.O. TRUNKS
**********
FILE  301 HAS   45 ENTRIES ///C.O. FACILITY
**********
FILE  601 HAS   78 ENTRIES ///RESPONDER
**********
FILE  701 HAS   14 ENTRIES ///TEST FRAME OFFICE
**********
FILE  102 HAS  197 ENTRIES ///TEST LINE OFFICE
**********
FILE  103 HAS   1196. ENTRIES ///TRUNK GROUP-CAROT
**********
FILE  203 HAS   2853. ENTRIES ///FACILITY
**********
FILE  303 HAS  34705. ENTRIES ///TRUNK-P-CAROT
**********
FILE  603 HAS      4. ENTRIES ///TRUNK GROUP-TEST FRAME
**********
FILE  703 HAS     36. ENTRIES ///TRUNK-TEST FRAME
**********
FILE  104 HAS   65 ENTRIES ///ROTL-CONTROL
**********
FILE  204 HAS 3621 ENTRIES ///TEST PARAMETERS CAROT-P
**********
FILE  704 (UTILITY) HAS  3676 BUCKETS
ON THE EMPTY LIST
**********
FILE  804 HAS    9 ENTRIES ///TEST PARAMETERS FRAME
**********
FILE  904 HAS    4 ENTRIES ///K-PRIMING
```

Fig. 16—Example of File Description Map

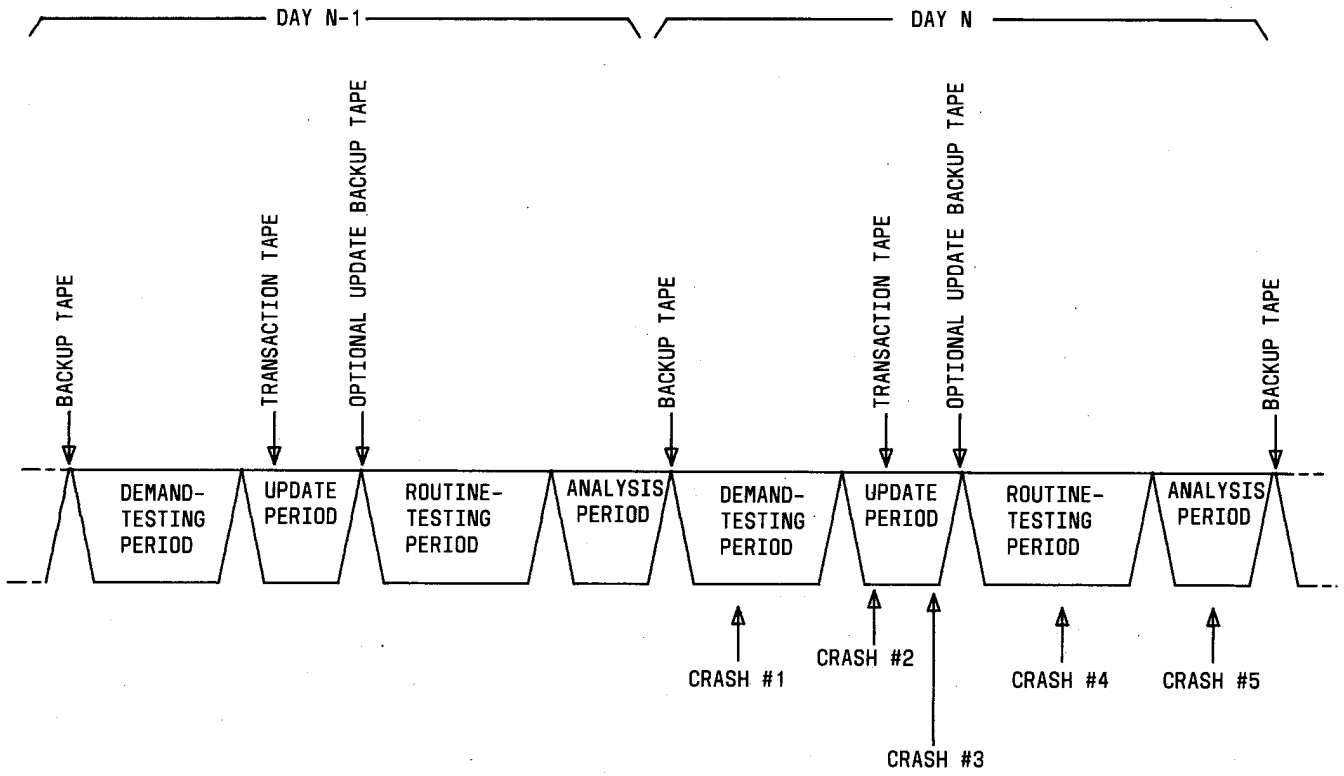


Fig. 17—CC2-Restore Backup Data Base Without CMS Interaction

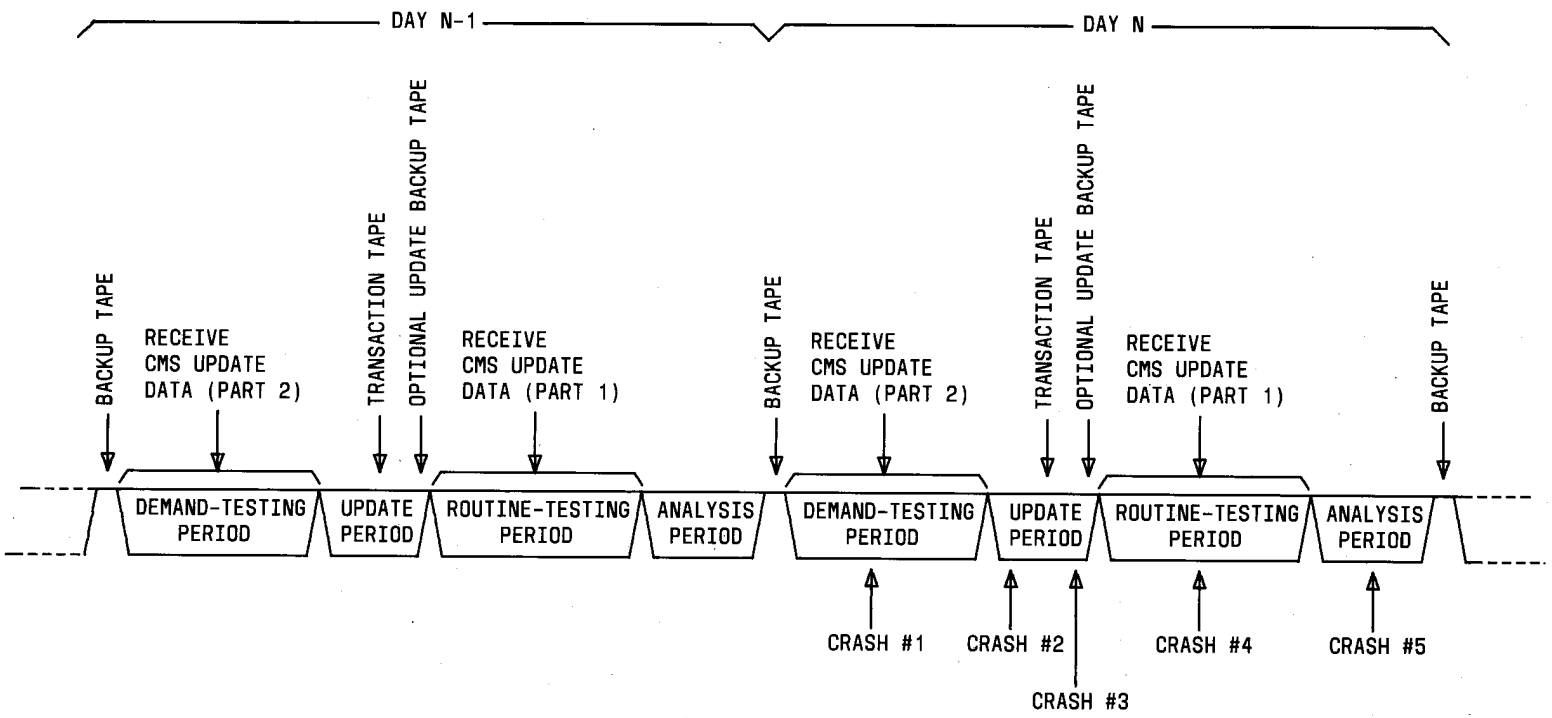


Fig. 18—CC2-Restore Backup Data Base With CMS Interaction

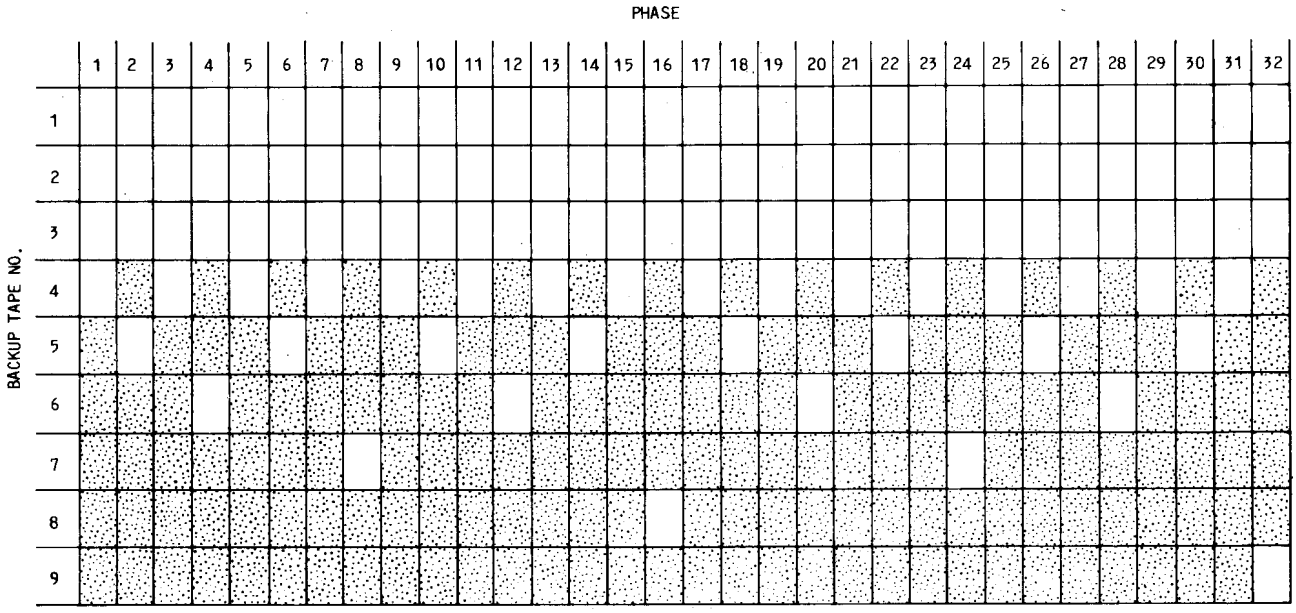
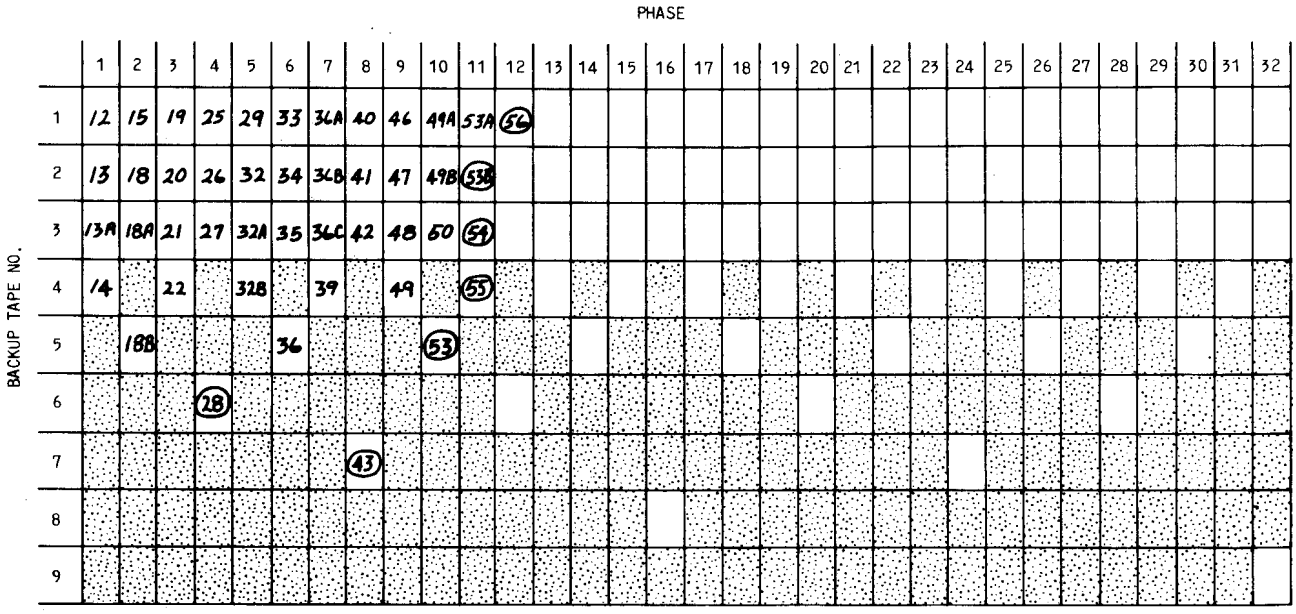


Fig. 19—Backup Tape Restoration Check Sheet



NOTE:
NUMBERS ENTERED ON CHECKSHEET ARE JULIAN CALENDER DATES. LETTERS A, B, C, ETC, INDICATE EXTRA BACKUPS MADE THE SAME DAY.

Fig. 20—Backup Tape Restoration Check Sheet Example

TABLE D

OFFICE CERTIFICATION PROCEDURE GOALS

DISPOSITION	CAUSE AND PERCENTAGE OR MAXIMUM ALLOWABLE NUMBER			
	EQUIPMENT	DATA BASE	TRUNK	UNIDENTIFIED
Q2	0% or 0	0% or 0	.2% or 4	.1% or 2
Q1	0% or 0	0% or 0	Note	1% or 2
BUSY	1% or 2	1% or 2	2% or 4	1% or 2
H & D	1% or 2	1% or 2	1% or 2	1% of 2
All others causing trunks not to be tested	1% or 2	1% or 2	1% or 2	1% or 2

Note: For a TTMI subcomponent index of 98, the following maximum percentages are allowable:

Loss> .7	7.8% for E repeater, nongain 26.6% for carrier
Loss> 1.7	2.8% for carrier
Noise	2.9% exceeding maintenance limit.

FILE SUPPORT

PRESENT ALLOCATION

DATE	NUMBER	X	MULT *	=	SECTORS ALCTD

UTILIZATION

DATE	NUMBER	DATE	NUMBER	DATE	NUMBER	DATE	NUMBER

* THE FILES AND THEIR ASSOCIATED MULTIPLIER ARE AS FOLLOWS:

101=.55 301=.16 601=.23 102=1.05 503=.29
201=.18 501=.25 701=.16 303= .29 703=.17

Fig. 21—File Utilization Work Sheet

Responder (601) FILE SUPPORT

PRESENT ALLOCATION

DATE	NUMBER	X	MULT *	=	SECTORS ALCTD
1-3-76	600		.23		138

UTILIZATION

DATE	NUMBER
1-3-76	400
1-4-76	400
1-5-76	416
1-6-76	425
1-7-76	451
1-10-76	451
1-11-76	452
1-12-76	452
1-13-76	452
1-14-76	452

DATE	NUMBER

DATE	NUMBER

DATE	NUMBER

* THE FILES AND THEIR ASSOCIATED MULTIPLIER ARE AS FOLLOWS:

101=.55	301=.16	601=.23	102=1.05	503=.29
201=.18	501=.25	701=.16	303= .29	703=.17

Fig. 22—Example of a Responder File Utilization Work Sheet

TABLE E

POSSIBLE DISC CONFIGURATIONS

DISC CONFIGURATION		LOGICAL UNIT NUMBER STRUCTURE	MAXIMUM DATA BASE SECTORS	MAXIMUM FILE MANAGER SIZE	
				SECTORS FOR FILE STORAGE	TRACKS
Two 7905 (s)	First 7905 (unit 0)	* 2	0	0	0
		* 3	0	0	0
		10	9648	0	0
		11	9696	0	0
		15	9696	0	0
		* 16	0	0	0
	Second 7905 (unit 3)	17	28,800	28,800	600
		18	28,800	28,800	600
	Second 7905 (unit 4)	37	9696	9696	202
		38	9696	9696	202
		39	9696	9696	202
		40	9696	9696	202
		41	9696	9696	202
		42	9696	9696	202
One 7905 and one 7920	First 7920 (unit 0)	* 2	0	0	0
		* 3	0	0	0
		10	9648	0	0
		11	9696	0	0
		15	9696	0	0
		* 16	0	0	0
		22	32,640	32,544	680
		23	32,544	32,544	680
		24	32,640	32,544	680
		25	31,440	31,344	655
		26	6282	6384	134
	First 7905 (unit 3)	17	28800	28800	600
		18	28800	28800	600
One 7905 and one 7920	First 7905 (unit 4)	37	9696	9696	202
		38	9696	9696	202
		39	9696	9696	202
		40	9696	9696	202
		41	9696	9696	202
		42	9696	9696	202

* Reserved for system use only.

TABLE E (Contd)

POSSIBLE DISC CINFIGURATIONS

DISC CONFIGURATION		LOGICAL UNIT NUMBER STRUCTURE	MAXIMUM DATA BASE SECTORS	MAXIMUM FILE MANAGER SIZE.	
				SECTORS FOR FILE STORAGE	TRACKS
		* 2	0	0	0
		* 3	0	0	0
	One	10	9648	0	0
	7920	11	9696	0	0
		15	9696	0	0
	(unit 0)	* 16	0	0	0
		22	32,640	32,544	680
		23	32,640	32,544	680
		24	32,640	32,544	680
		25	31,440	31,344	655
		26	6282	6384	134
		* 2	0	0	0
		* 3	0	0	0
		10	9648	0	0
Two	First	11	9696	0	0
		15	9696	0	0
7920 (s)	7920	* 16	0	0	0
		22	32640	32,544	680
	(unit 0)	23	32640	32,544	680
		24	32640	32,544	680
		25	31440	31,344	655
		26	6282	6384	134
		27	0	32,544	680
Two	Second	28	0	32,544	680
7920	7920	29	0	32,544	680
		30	0	32,544	680
	(unit 1)	31	0	32,544	680
		32	0	32,544	680

* Reserved for system use only.

TABLE F

ROUTINE AND DEMAND TESTING AND TEST FRAME FILES

FILE NUMBER	FILE ID
101	ROTLs
201	Control offices for trunks
301	Control offices for facilities
601	Responders
701	Test frame offices
102	Test line offices
103	Trunk groups — CAROT
203	Facilities
303	Trunks — CAROT
603	Trunk groups — test frame
703	Trunks — test frame
104	ROTL control offices
204	Test parameters — CAROT
704	Utility space
804	Test parameters — test frame
904	K-priming

TABLE G

CIRCUIT ORDER FILES

FILE NUMBER	FILE ID
501	Plant control offices
403	Circuit order
503	Circuit — order item
105	Action data
205	Action data
305	Action data
405	Action data
505	Plant control office — management summary data
605	Jeopardy reports
705	User input files for update
805	Completions
905	Unassigned
1005	Completion notice file

FILE	NUMBER OF RECORDS IN FILE 503		SECTORS PER RECORD	TOTAL FILE SECTOR ALLOCATION
105-405		X	3	

FILE	NUMBER OF PLANT CONTROL OFFICES IN FILE 501		SECTORS PER OFFICE	TOTAL FILE SECTOR ALLOCATION
505		X	1	

FILE	NUMBER OF COMPLETIONS TO BE STORED		SECTORS PER RECORD	TOTAL FILE SECTOR ALLOCATION
1005		X	3	

FILE	NUMBER OF RECORDS IN FILE 1005		NUMBER OF 1005 RECORDS REQ FOR 1 SECTOR	TOTAL FILE SECTOR ALLOCATION
605		÷	20	

FILE	TOTAL FILE SECTOR ALLOCATION
705	3
805	200
905	10

TOTAL SECTOR ALLOCATION FOR FILES

Fig. 23—Disc Storage Allocation Work Sheet for File Manager Files

FILE	NUMBER OF RECORDS		SECTORS PER RECORD	TOTAL FILE SECTOR ALLOCATION
101		X	.55	
201		X	.18	
301		X	.16	
501		X	.25	
601		X	.23	
701		X	.16	
102		X	1.05	
303		X	.29	
503		X	.29	
703		X	.17	

FILE	NUMBER OF RECORDS IN FILE 101		NUMBER OF 101 RECORDS REQ FOR 1 SECTOR	TOTAL FILE SECTOR ALLOCATION
104		÷	1.5	
504		÷	1.5	

FILE	UTILITY FILE SECTOR ALLOCATION
704	20000-20100

FILE	NUMBER OF RECORDS IN FILE 303		NUMBER OF 303 RECORDS REQ FOR 1 SECTOR	TOTAL FILE SECTOR ALLOCATION
103		÷	20	
203		÷	30	
204		÷	24	

FILE	NUMBER OF RECORDS IN FILE 703		NUMBER OF 703 RECORDS REQ FOR 1 SECTOR	TOTAL FILE SECTOR ALLOCATION
603		÷	40	
804		÷	30	
904		÷	60	

FILE				TOTAL FILE SECTOR ALLOCATION
604	–		–	362

FILE	NUMBER OF RECORDS IN FILE 503		NUMBER OF 503 RECORDS REQ FOR 1 SECTOR	TOTAL FILE SECTOR ALLOCATION
403		÷	60	

TOTAL SECTOR ALLOCATION FOR FILES

Fig. 24—Disc Storage Allocation Work Sheet (Automatic Mode)

FILE	NUMBER OF RECORDS		SECTORS PER RECORD	TOTAL FILE ALLOCATION
101		X	.55	
201		X	.18	
301		X	.16	
501		X	.25	
601		X	.23	
701		X	.16	
102		X	1.05	
103		X	.59	
203		X	.40	
303		X	.29	
503		X	.29	
603		X	.29	
703		X	.17	
204		X	.25	
804		X	.20	
904		X	.20	

FILE	NUMBER OF RECORDS IN FILE 101		NUMBER OF 101 RECORDS REQ FOR 1 SECTOR	TOTAL FILE ALLOCATION
104		÷	1.5	
504		÷	1.5	

FILE	NUMBER OF RECORDS IN FILE 503		NUMBER OF 503 RECORDS REQ FOR 1 SECTOR	TOTAL FILE ALLOCATION
403		÷	60	

FILE	UTILITY FILE ALLOCATION
704	20000-20100

FILE	TOTAL FILE ALLOCATION
604	362

TOTAL SECTOR ALLOCATION FOR FILES

Fig. 25—Disc Storage Allocation Work Sheet
(Semiautomatic Mode)

FILE	NUMBER OF RECORDS IN FILE 503		SECTORS PER RECORD	TOTAL FILE SECTOR ALLOCATION
105-405	*15,000*	X	3	*45,000*

FILE	NUMBER OF PLANT CONTROL OFFICES IN FILE 501		SECTORS PER OFFICE	TOTAL FILE SECTOR ALLOCATION
505	*110*	X	1	*110*

FILE	NUMBER OF COMPLETIONS TO BE STORED		SECTORS PER RECORD	TOTAL FILE SECTOR ALLOCATION
1005	*500*	X	3	*1500*

FILE	NUMBER OF RECORDS IN FILE 1005		NUMBER OF 1005 RECORDS REQ FOR 1 SECTOR	TOTAL FILE SECTOR ALLOCATION
605	*500*	÷	20	*25*

FILE	TOTAL FILE SECTOR ALLOCATION
705	3
805	200
905	10

TOTAL SECTOR ALLOCATION FOR FILES
46,848

Fig. 26—Example of Disc Storage Allocation Work Sheet for File Manager Files

FILE	NUMBER OF RECORDS		SECTORS PER RECORD	TOTAL FILE SECTOR ALLOCATION
101	*110*	X	.55	*60.5*
201	*110*	X	.18	*19.8*
301	*200*	X	.16	*32*
501	*110*	X	.25	*27.5*
601	*400*	X	.23	*92*
701	*0*	X	.16	*0*
102	*800*	X	1.05	*840*
303	*100,000*	X	.29	*29,000*
503	*15,000*	X	.29	*4,350*
703	*0*	X	.17	*0*

FILE	NUMBER OF RECORDS IN FILE 101		NUMBER OF 101 RECORDS REQ FOR 1 SECTOR	TOTAL FILE SECTOR ALLOCATION
104	*110*	÷	1.5	*73*
504	*110*	÷	1.5	*73*

FILE	UTILITY FILE SECTOR ALLOCATION
704	20000-20100

FILE	NUMBER OF RECORDS IN FILE 303		NUMBER OF 303 RECORDS REQ FOR 1 SECTOR	TOTAL FILE SECTOR ALLOCATION
103	*100,000*	÷	20	*5,000*
203	*100,000*	÷	30	*3,333*
204	*100,000*	÷	24	*4,167*

FILE	NUMBER OF RECORDS IN FILE 703		NUMBER OF 703 RECORDS REQ FOR 1 SECTOR	TOTAL FILE SECTOR ALLOCATION
603	*0*	÷	40	*0*
804	*0*	÷	30	*0*
904	*0*	÷	60	*0*

FILE				TOTAL FILE SECTOR ALLOCATION
604				362

FILE	NUMBER OF RECORDS IN FILE 503		NUMBER OF 503 RECORDS REQ FOR 1 SECTOR	TOTAL FILE SECTOR ALLOCATION
403	*15,000*	÷	60	*250*

TOTAL SECTOR ALLOCATION FOR FILES
67,680-67,780

Fig. 27—Example of Disc Storage Allocation Work Sheet (Automatic Mode)

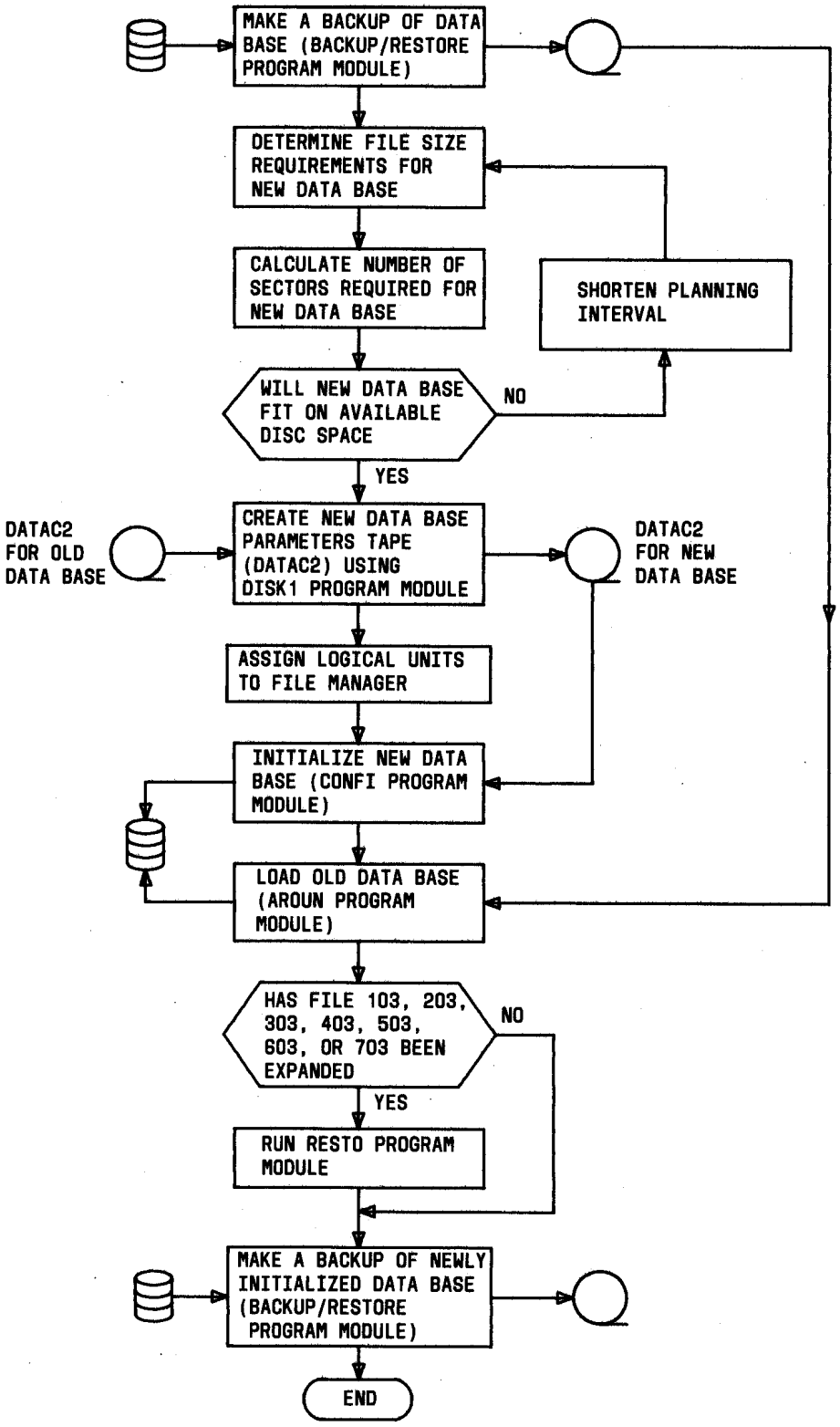


Fig. 28—File Reconfiguration Process

TABLE H

INDEX PROGRAM MODULE MEASUREMENT CODES FOR TRUNKS NOT INDEXED

MEASUREMENT CODE	MEANING	ACTION
1	Trunks with index code <6 which are tested to a 102 test line	Manual noise measurements must be made for TTMI.
2	Trunks in the following categories: (a) Transmission test schedule code of either 99 or 40 (b) Index code >6 to a 102 test line (c) Trunks with no test line	Manual transmission and noise test must be made for TTMI.
3	Trunks with an index code of 99	These trunks are not included in the TTMI by CAROT. If they are to be indexed, manual transmission and noise measurements must be made.

CHARACTER(S)	CONTENTS
1=	BLANK
2=	ASCII Ø OR 1 INDICATING THAT THE COMPLETION HAS (1) OR HAS NOT (Ø) BEEN ANALYZED BY UPDATE
3=	BLANK
4=	TYPE OF COMPLETION: Ø (ITEM)
5-22=	CIRCUIT ORDER NUMBER
23-26=	ITEM NUMBER AND SUPPLEMENT CHARACTER
27-38=	DATE COMPLETION ENTERED INTO CAROT
39-50=	DATE OF COMPLETION AS INPUT BY USER (LIARS DATE)
51-61=	11 CHARACTER PLANT CONTROL OFFICE ID
62=	BLANK
63-65=	CAROT USER NUMBER
66=	TEST FAILURE OVERRIDE FLAG: Ø= OVERRIDE NOT REQUESTED 1= OVERRIDE REQUESTED 2= NOTEST REQUESTED
67=	TEST RESULTS STATUS FLAG: 1= FAILED CIRCUIT ORDER LIMITS 2= PASSED CIRCUIT ORDER LIMITS 3= NO TESTS DUE TO EQUIPMENT FAILURE 4= NO TESTS DUE TO TRUNK NOT ACCESSIBLE 5= ITEM NOT CAROT TESTABLE 6 = ITEM IS A CANCEL
68=	CHANGE OF DATA FLAG: Ø= NO CHANGE OF DATA 1= ONE OR MORE PARAMETERS CHANGED

CNF Tape Record Format (Circuit-Order Item Completion) (Sheet 1 of 4)

CHARACTER(S)	CONTENTS	NUMBER OF CHARACTERS	CHANGEABLE?
69-106	FACILITY GROUP ID	38	NO
107	IMPEDANCE	1	NO
108	BLANK		
109	TEST PAD LOSS	1	YES
110	BLANK		
111	RERING	1	YES
112	BLANK		
113-114	TRANS SCHED	2	YES
115-116	INDEX CODE	2	YES
117	BLANK		
118-120	EML X 10	3	YES
121-122	C.O. LOSS LIMIT	2	YES
123-124	C.O. NOISE LIMIT	2	YES
125-126	NIAL	2	YES
127-128	RETURN LOSS CLASS	2	YES
129-130	GAIN SLOPE CLASS	2	YES
131-132	N/T LIMIT	2	YES
133-134	PAR LIMIT	2	YES
135	ECHO SUPP FLAG	1	YES
136	BLANK		
137	NO. DIG. TO OUTPULSE	1	YES
138	BLANK		
139-141	REPL. NPA	3	YES
142	BLANK		
143-145	REPL. NNX	3	YES
146	BLANK		
147-148	OPER TST SCHED.	2	YES
149-151	TRAFFIC USE	2	NO
151	DIRECTION CODE	1	YES
152	BLANK		
153-156	TRUNK NUMBER	4	NO
157	SPEC SERV CHAR	1	NO
158	BLANK		
159-163	CHAN NO.	5	YES
164	BLANK		
165-178	TRUNK LOCAT ADDR.	14	YES
179-189	CONT OFFC FAC.	11	YES
190	BLANK		
191	PRETEST FLAG	1	NO
192	BLANK		
193-211	FRAME TLA	19	YES
212	BLANK		

NOTES:
1. IF THE COMPLETED ITEM IS TYPE K (CANCEL), CHARACTERS 69-89 CONTAIN THE CIRCUIT ORDER AND ITEM NUMBER (LEFT JUSTIFIED) OF THE CANCELLED ITEM.
2. IF THE COMPLETED ITEM IS A TYPE D (DISCONNECT), CHARACTER 69-212 ARE BLANK.

CNF Tape Record Format (Circuit-Order Item Completion) (Sheet 2 of 4)

RECORD IDENTIFIER = 05: LEVEL MEASUREMENT

CHARACTER(S)	CONTENTS
3-7	= ACRONYM SPECIFYING MEASUREMENT MADE LEVEL = LEVEL AT 1000 HZ, 0 DBM L1000 = LEVEL AT 1000 HZ, -16 DBM L400 = LEVEL AT 400 HZ, -16 DBM L2800 = LEVEL AT 2800 HZ, -16 DBM
10-14	= FAR TO NEAR MEASURED LEVEL IN A F5.1 FORMAT
15-21	= LOWER LIMIT ON LEVEL IN F7.1 FORMAT
22-27	= UPPER LIMIT ON LEVEL IN F6.1 FORMAT
28-35	= NEAR TO FAR MEASURED LEVEL IN A F8.1 FORMAT
36-42	= LOWER LIMIT ON LEVEL IN F7.1 FORMAT
43-48	= UPPER LIMIT ON LEVEL IN F6.1 FORMAT
52	= MEASUREMENT FAILURE FLAG F = FAILED A LIMIT BLANK = NO FAILURE

RECORD IDENTIFIER = 06: NOISE MEASUREMENT

CHARACTER(S)	CONTENTS
3-7	= ACRONYM SPECIFYING MEASUREMENT MADE NOISE = BACKGROUND C-MESSAGE NOISE N/T = NOISE WITH TONE
10-12	= MEASURED NEAR-END NOISE IN I3 FORMAT
13-18	= NOISE CIRCUIT ORDER LIMIT IN I7 FORMAT
19-33	= MEASURED FAR-END NOISE IN I15 FORMAT
34-39	= NOISE CIRCUIT ORDER LIMIT IN I7 FORMAT
52	= MEASURED FAILURE FLAG F = FAILED LIMIT BLANK = NO FAILURE

CNF Tape Record Format (Circuit-Order Item Completion) (Sheet 3 of 4)

RECORD IDENTIFIER = 07: OPERATIONAL TEST RESULT

CHARACTER(S)	CONTENTS
3	= BLANK
4	= PASS/FAIL FLAG AS FOLLOWS P=PASS F=FAIL T=TRIP FAILURE R=PRETRIP FAILURE
5	= BLANK
6-14	= ADDITIONAL INFORMATION IF FAILURE (TO--2.6) = TIMEOUT 2 RECEIVED 6 EXPECTED (NO SYNC) = NO SYNC PULSE RECEIVED (SHORT 1) = SHORT FIRST 103 PULSE (7 SYNC) = 7 PULSES ON SYNC TEST LINE (RF1 TO) = RING FORWARD FAILURE (RF1 TPT) = RING FORWARD FAILURE (RF2 TO) = RING FORWARD FAILURE
18	= D IF DISCONNECT TIMING FAILURE, BLANK IF PASSED OR NOT MADE
22	= CENTREX TRANSFER FAILURE ON SUNC TEST LINE OR BLANK IF PASSED OR NOT MADE
52	= FAILURE FLAG = F FOR ANY FAILURE OR BLANK OTHERWISE

CNF Tape Record Format (Circuit-Order Item Completion) (Sheet 4 of 4)

Fig. 29

CHARACTER(S)	CONTENTS
1	BLANK
2	ASCII Ø OR 1 INDICATING THAT THE COMPLETION HAS (1) OR HAS NOT (Ø) BEEN ANALYZED BY UPDATE
3	BLANK
4	TYPE OF COMPLETION: 1 (CKTO)
5-22	ASCII CKTO NUMBER
23-26	BLANKS
27-38	DATE COMPLETION ENTERED INTO CAROT
39-50	DATE OF COMPLETION INPUT BY USER (LIARS DATE)
51-61	11 CHAR PLANT CONTROL OFFICE ID
62	BLANK
66	BLANK USER NUMBER

Fig. 30—CNF Tape Record Format (Circuit-Order Completion)