

CENTRALIZED AUTOMATIC REPORTING ON TRUNKS (CAROT)
CAROT 2 CONTROLLER ADMINISTRATION
GENERIC 2

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NOTICE

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1. GENERAL	
1.01 This section describes the CAROT 2 Controller (CC2) generic 2 administration. The CC2 administrator 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 to provide guidelines and recommendations for operating the CC2 in an efficient manner. It also provides supplementary information for CAROT 2, controller generic 2, Section 190-102-301 (TOP).	

Note: Although this section is written for generic 2, much of the information is applicable to generic 1.

1.04 The administration of the CAROT 2 controller requires a wide variety of system knowledge. Since CC2 administration is interwoven with so many other CAROT duties and responsibilities, it is almost impossible to tie everything together in a neat package. Thus, the person in charge of administration must become familiar with many aspects of CC2 operation.

2. SOFTWARE SYSTEMS AVAILABLE FROM THE CC2 CONSOLE

GENERAL

2.01 There are three software systems that are available for use at the CC2 console. The CAROT System is always in one of these software systems or states. Briefly, the three systems are as follows:

(a) **Real-Time System:** This system is in operation during routine testing, demand testing, and analysis. It is the only system in which remote users and/or Circuit Maintenance System (CMS) users are allowed access to the controller. Typically, the majority of the machine time is spent in this system.

(b) **Update System:** This system is normally scheduled automatically by the CC2 (see Part 3), but may also be run on command from the CC2 console. Its primary purpose is to update the data base; however, several other administrative functions may be performed during this time (see Part 9). No testing, remote-user usage, or CMS interaction is available while this system is running.

(c) **Utility System:** This system contains certain general purpose programs used to aid in the proper operation of the CC2 data base. Like the update system, no remote terminal usage is allowed during the operation of this system.

2.02 The capabilities and limitations of each system and how to transfer between the systems are described in Part 3.

REAL-TIME SYSTEM

2.03 In order to perform any function of the Real-Time System, the CC2 operator must be able to communicate with the system via the command console. When any key on the keyboard is struck (normally the space bar), CAROT will respond with an *xx*> prompter, where *xx* is a number between 01 and 99. This indicates the system is ready to accept a request. On rare occasions during heavy system load, CAROT may respond with the busy prompter ****>. If this occurs, the operator should wait several seconds and try again.

A. SET/SHOW Parameters

2.04 Various parameters pertinent to the update process, testing process, and to the efficient operation of the CAROT System must be set and/or shown from time to time. The **SET** and **SHOW** commands are shown in Section 190-102-301. Some of the parameters will be discussed throughout the rest of this section.

B. Show System Status

2.05 The CC2 operator is able to determine the current state of remote-user usage and testing port status by using the **SHOW:STATUS** command. The use of this command and the resulting display are shown in Section 190-102-301.

C. Interrogator Program

2.06 The operator should be thoroughly familiar with the capabilities of the program and able to use it to aid in diagnosing remote office test line (ROTL), Automatic Transmission Measuring System (ATMS), and CAROT test port failures. Instructions for running the interrogator function are found in the remote-user TOP 190-102-305. The interrogator procedures found in the remote-user TOP may be run from the CRT console (see paragraph 11.01).

D. Test Frame Tape Preparation

2.07 This background program (TAPE) accesses the test frame tape data base and generates a paper tape (and/or line printer outputs) of inputs for automated test frame operation. Another background program (RTAP) can read punched test frame tape to either the paper tape punch or line printer. When reading 5-level code paper tapes, a special adapter (supplied by BTL) is required for the paper tape reader.

E. Background Program Modules

2.08 Certain tasks that are to be performed in the Real-Time System require the ability to run background programs. Normally, the background programs will be run as a result of a task in Section 190-102-301. To run a background program the console command **RUN: program** is used, where *program* is the name of the desired program. The following is a brief description of the background programs.

- (a) **REPR**T—This program causes the daily office summary to be output on a peripheral device (normally the line printer).
- (b) **DMPCV**—This program reads a magnetic tape in the CAROT 2 update format and outputs the records onto the line printer, paper tape punch, or console.
- (c) **DISPA**—This program causes equipment and/or administrative data from the CAROT 2 data base to be displayed on the CRT console. This same information may be accessed during the update cycle by setting the **DISPLY** parameter. It may also be used to obtain ROTL telephone numbers for interrogator function and far-end

test line telephone numbers for ROTL trunk primary verification.

(d) **SELEC**—This program will cause information in the CAROT 2 data base to be copied on the line printer, magnetic tape, disc, console, or paper tape in the same format that it is stored. It can be used to obtain more compact information than **DISPA** or for gathering information for a bulk-edit process. If a magnetic tape were used to store the data, it could if necessary, be used to restore the data base.

(e) **DIAG**—This program will produce a list of controller diagnostic programs with instructions on how to run them.

(f) **RTAP**—This program will read a test frame tape and dump it onto the line printer or paper tape punch. It is used mainly in conjunction with and as verification for the information on the paper tape generated by the **TAPE** background program. It can also read tape produced by **5XB**, **4XB**, and **SXS**.

(g) **TAPE**—This program will produce a paper tape (and/or line printer copy) which may be used to control testing by an automatic test frame.

(h) **MIID**—This program allows the entry of trunk transmission maintenance index (**TTMI**) serial numbers which will be used by the controller when making **TTMI** magnetic tapes.

(i) **EDIT**—This program provides the capability to make changes to data base information which was accessed by the **SELEC** program. It can also be used to enter and edit report program generator (**RPG**) programs.

(j) **RPG**—This program provides the user with the ability to design summary reports.

Note: The **EDIT** and **SELEC** programs and **RPG** program are discussed in detail in Sections 190-102-206 and 190-102-207, respectively.

2.09 Most background programs may be aborted at any point in their execution by obtaining a real-time system prompter and typing **:ABORT**, followed by a carriage return. Other programs will specify certain commands in the input for

aborting the procedure. Still others must run to completion and cannot be aborted by the operator.

UPDATE SYSTEM

2.10 The update system is primarily included in the data base administration described in Section 190-102-201. It is important that the CC2 operator also have the following responsibilities:

- (a) Recognize and understand the part the update system plays in routine testing and automatic scheduling process (see Parts 3 and 4)
- (b) Be able to transfer between update and other systems
- (c) Understand the use of update parameters and how to use them efficiently
- (d) Understand how and be able to carry out the procedures for scheduling additional updates or rescheduling updates to run at an earlier time.

More details about the update process are contained in Part 9.

UPDATE UTILITY SYSTEM

2.11 The CAROT 2 Utility System (also referred to as the update utility system) is a collection of program modules used primarily in the data base administration to maintain the CC2 data base. The person responsible for CC2 administration should be able to transfer into and out of this system (paragraph 2.15) and should understand the program module procedures.

F. Utility System Menu

2.12 Whenever the utility system is initiated, a menu of available programs is printed on the CRT. The operator needs to select only the number corresponding to the program module desired. These program modules are normally accessed in the performance of a CC2 task (Section 190-102-301). The program modules used in performing CC2 administrative task are described below.

- (a) AROUN—Used in the reallocation of disc space.

- (b) ASIN—This problem module is used to produce a magnetic tape copy of data files existing in the data base. The data base information on tape is in update format. This program may be used in obtaining concise and up-to-date information on such things as control office testing startup dates and ROTL telephone numbers.

- (c) AUDFR—Performs an audit of the test frame data base by comparing the existing data with a master file magnetic tape.

- (d) AUDIT—Performs an audit of the routine and demand testing data base by comparing the existing data with a master file magnetic tape.

- (e) AUDCO—Performs an audit of the circuit-order data base by comparing the existing data with a master file magnetic tape.

- (f) AUDSC—Part of the software audit which audits the ability of the controller to access certain data base files.

- (g) CNVRT—Converts CAROT 1 trunk maintenance files on cassette tape to CAROT 2 update format on magnetic tape.

- (h) CONFI—Used to initialize data base during disc space reallocation.

- (i) DISK1—Used to generate a new data base parameters (DATAC2) tape for disc space reallocation.

- (j) RESTO—Used to rearrange type 3 files for disc space reallocation.

- (k) BACKUP/RESTORE—used to make a backup of the data base on magnetic tape or to restore the data base to normal using a backup tape.

- (l) TRDMP—Dump a transaction magnetic tape on any desired peripheral in update format.

- (m) VRDIT—Part of software audit which checks for proper scheduling of trunks and that all test lines have been associated with proper responder.

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(n) SCTSE—Part of software audit which checks the average number of access tries per retrieval of records in type 3 files.

2.13 Other program modules are contained in the utility system; however, they are for Western Electric diagnostic purposes and should not be used by CAROT center personnel.

2.14 More detailed information on the utility system program modules are contained in Parts 7, 8, 9, and 11.

TRANSFER BETWEEN SYSTEMS

2.15 The person responsible for CC2 administration should be thoroughly familiar with the recommended procedures for transfer between the three systems. This is important to minimize the disruption of ongoing processes. The procedures to be followed in transferring between the three software systems are summarized in Fig. 1. Notice that transfer is possible in either direction between the real-time and update systems, and between the real-time and utility systems.

2.16 Normal transfer from the real-time system into the update system is accomplished automatically by the system clock. However, it can be forced into the update system when a nonscheduled update is required (see paragraph 3.12). Once in the update system, the update program will terminate automatically with a **ROUTINE TEST SCHEDULING HAS BEEN PERFORMED** console message. During the update program, the operator can exit by typing **ABORT** on console. The update system will cause the message **OK!** to be printed and will execute the transfer at the first logical opportunity.

2.17 When the real-time system is running, the utility system can be initiated at any time by typing the commands **SET:UTIL=YES** and **SLEEP** at the console. The transfer will occur within a short time provided the **TMODE** (see Part 3) is in the proper state. If not, the message **TMODE WRONG FOR SLEEP---TRY AGAIN LATER** will be printed. The operator may exit into the real-time system by typing **DONE** in response to the list of utility programs displayed on the CRT.

2.18 The procedure for transferring into the utility system should also take into account any remote-usage activity in the controller (such as,

demand testing). Appropriate warning and signon messages should also be used, and a reasonable amount of time should be allowed for users to clean up their work and log off the system.

3. AUTOMATIC PROGRAM EXECUTION

GENERAL

3.01 The person in charge of CC2 administration has the following responsibilities in relation to automatic program execution within the CAROT center.

- (a) Ability to SET/RESET the CC2 automatic machine schedule.
- (b) Knowledge of all ramifications involved in changing machine schedules (paragraphs 3.02 through 3.07 and Part 4).
- (c) Maintaining machine schedule such that the available time in each week is effectively utilized for routine testing.
- (d) Ability to set up schedule to assure that routine testing results will normally be available for remote-user access at a time consistent with the start of the work day.
- (e) Ability to reset the automatic machine schedule to prevent routine testing during appropriate intervals such as holidays.
- (f) Ability to transfer into the update system and/or utility system according to a specified procedure and with a minimum of disruption.

AUTOMATIC MACHINE SCHEDULE

3.02 Each CAROT 2 center has a unique machine schedule which is used by the CC2 to automatically schedule the functions of data base updating, routine testing, and results analysis. It is also used by CC2 to automatically schedule trunks for routine testing. The machine schedule may be displayed or changed at the system console.

3.03 An example of a typical CC2 automatic machine schedule is provided in Fig. 2. As shown in this particular example, routine testing is run every night starting at 21:00 and ending at 7:30, except on the weekends. The schedule should be configured as necessary by the controller

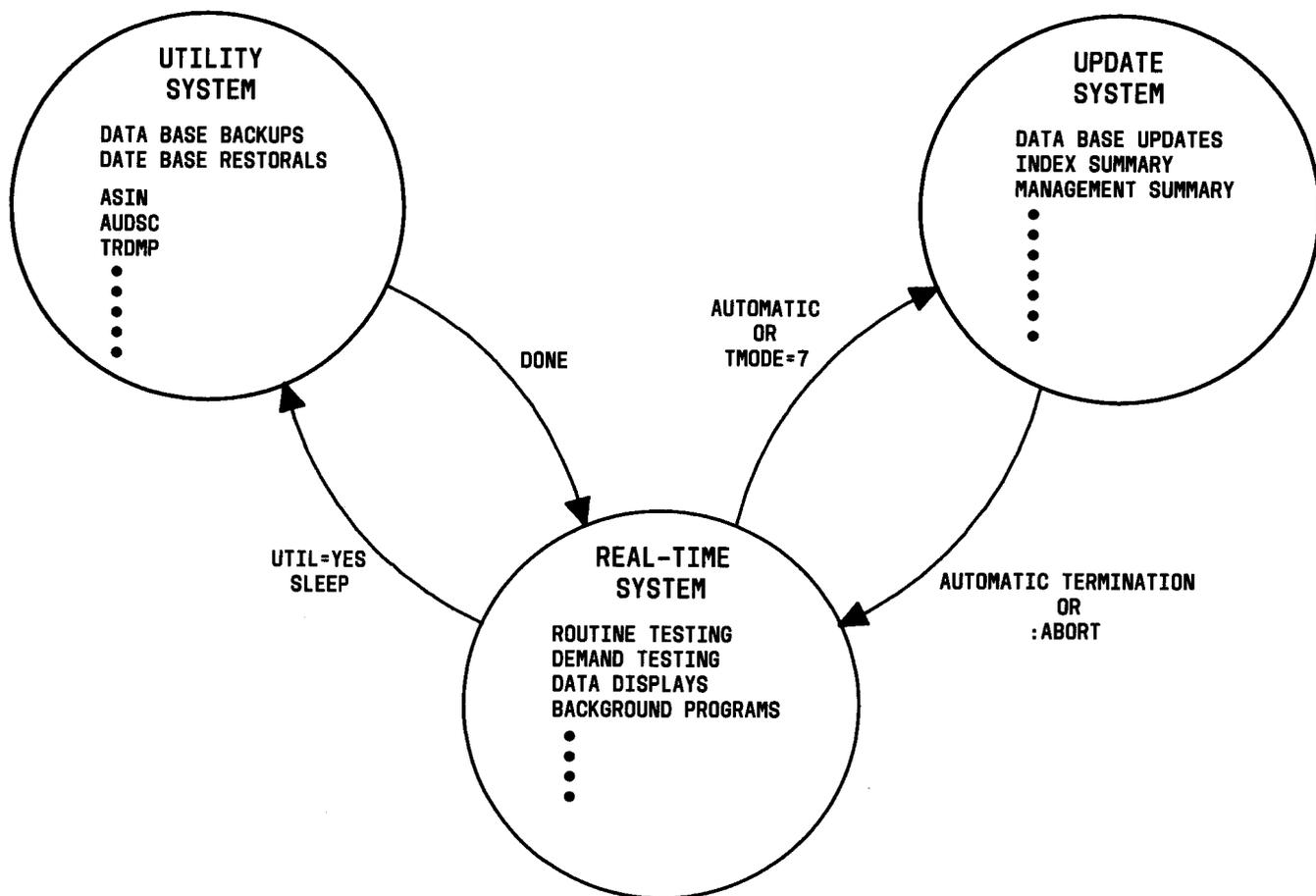


Fig. 1—Transfer Between Software Systems

administrator to meet local criteria. Considerations for setting the machine schedule are described in the following paragraphs and Part 4.

3.04 The sequence of operations (ie, an update followed by a period of routine testing, followed by analysis of results, followed by another update) must be maintained in the machine schedule. If this sequence is not followed, erroneous and misleading results are possible.

3.05 The time set for scheduled updates will depend on such criteria as whether or not the CAROT center will be manned during the updates, the size of an update on any particular day, and whether or not multiple runs of update are to be executed on a given day. Update must be scheduled prior to the start of the routine test run whether or not there is data base updating to be done. This is necessary because the update

software system performs certain functions necessary for the startup of routine testing.

3.06 The time set for the start of routine testing must be consistent with the sequence of programs as explained in paragraph 3.04. In addition, the time set for routine testing should be earlier than or at the same time of the earliest possible ROTL startup time. This is because each ROTL is assigned a startup time for routine testing which is consistent with the start of its nonbusy traffic period for the night.

3.07 The last considerations deal with analysis. Normally the routine test results will not be available to the remote users until at least one-half hour after analysis starts. Also, a backup tape *must* be made each morning before allowing remote users access to the CC2.

MACHINE SCHEDULE AS OF 11/12/76

	ANALYSIS	UPDATE	ROUTINE
MON	07:30	16:30	21:00
TUE	07:30	16:30	21:00
WED	07:30	16:30	21:00
THU	07:30	16:30	21:00
FRI	07:30	16:30	N/S
SAT	N/S	N/S	N/S
SUN	N/S	N/S	22:15

NOTES

1. N/S MEANS NOT SCHEDULED
2. TIME SHOWN IN EACH COLUMN IS STARTING TIME

Fig. 2—Automatic Machine Schedule—Example

TMODE VALUES

3.08 One of the means that the controller uses to control the automatic sequence of programs is the parameter **TMODE** (transition mode). The only time that the controller operator should ever set the value of **TMODE** is during a nonscheduled update (see Part 9).

3.09 Table A summarizes the values taken on by **TMODE** during a typical day. As shown in Table A, the utility system can be run only while **TMODE** has a value of 7 or -1. The value of 8 should be of interest to the CC2 administrator. It designates a transition from the real-time system to the update system. **TMODE** also takes on a value of 8 if the console operator schedules a transition to the utility system.

3.10 During the transition time when **TMODE=8**, all active remote users will be logged off and all current demand test results will be terminated with a special error message. The error message indicates to the remote user that the interruption is caused by transferring to the utility or update system.

3.11 On rare occasions, the controller may take up to several minutes to accomplish the transfer from the real-time system to the update

or utility systems. This should be considered normal and not considered cause for alarm.

FORCING AN UPDATE

3.12 There are occasions when it becomes desirable to either schedule an additional update during the day or reschedule the planned update at an earlier time. In order to effect the update with minimum disruption to the current users of the system, the following information is provided.

3.13 Determine the earliest time that update can run without disruption by showing the machine status (**SHOW:STATUS**). If no demand testing and no remote users logged on, the update may take place immediately. If demand testing and/or remote users are present, update should be scheduled at least 10 minutes from the present time.

3.14 Transmit a warning message to all on-line remote users, reflecting the new scheduled update time, as determined in paragraph 3.13.

3.15 Change the remote-user signon message to reflect the new update time.

3.16 Show the machine schedule (**SHOW:SCHED**) and set **TMODE=7**. Change the update time on machine schedule of today's update as determined in paragraph 3.13 (for example **WED.UD=01:00**).

3.17 When the update is finished, change the machine schedule back to its normal update time and change the signon message.

AUTOMATIC DISTRIBUTION OF ROUTINE TESTING RESULTS

3.18 A feature possible by the CAROT controller is the automatic dispersal of routine testing results to its control office remote users. After the analysis period in the morning, the controller will automatically call up and send each control office remote user the testing results from the previous night's routine tests.

3.19 The amount of testing results sent to the remote users is controlled by the CAROT center with the parameter **RLIMIT** (see Section 190-102-301). The testing results not sent, if any,

TABLE A

TMODE VALUES DURING TYPICAL DAY AT CAROT CENTER

TYPICAL TIME	FUNCTION(S)	SYSTEM	TMODE VALUE
07:30	Analysis	Real-Time	6
08:00	Demand Testing Data Displays Background Programs	Real-Time	7*
16:00	Update Transition	Update	8
16:30	Demand Testing Data Displays Background Programs	Real-Time	-1*
21:00	Routine Testing Demand Tests (Limited) Data Displays Background Programs	Real-Time	1,2,3 or 4
—	Data Displays Background Programs	Real-Time	5

* Transition to utility system is allowed only when TMODE = 7 or -1.

can be obtained by the remote user at a later time (see Sections 190-102-103 and 190-102-305).

3.20 During the time the controller is sending out routine testing results, it is possible for remote users to access the controller for demand testing, data displays, etc. In order to prevent the controller from using all multiplex ports for the distribution of testing results, the parameter **DISPRS** can be set at the console to limit the number of ports (1 through 16) used for distribution (**SET:DISPRS=10**).

Note: Before the automatic distribution of testing results can occur, the multiplexer must be activated by typing **MPBOOT** at the console.

4. AUTOMATIC ROUTINE TEST SCHEDULING

GENERAL

4.01 Each trunk in the CAROT data base is assigned a test schedule interval of 00, 10,

20, or 30 which designates how often the trunk will have routine testing performed. In generic 1, these test schedule intervals were fixed at 1, 7, 14, and 28 days, respectively. However, in generic 2, these intervals are variable; that is, they may be set to the number of days desired. For each interval, there is a corresponding parameter (**SCIN00**, **SCIN01**, **SCIN02**, **SCIN03**) which can be set or shown from the console.

Note: The routine test schedule intervals should not be changed unless instructed by the data base administrator. The number of days assigned to each interval is determined by a testing formula (see Section 190-102-205).

4.02 The CAROT controller will automatically schedule routine testing to guarantee that all trunks will be tested at least as often as necessary to meet the intervals discussed in paragraph 4.01. This is accomplished by scheduling an appropriate number of trunks in each schedule category in each ROTL/control office every night.

FULLY LOADED SYSTEM

4.03 Whenever all available routine testing capacity must be directed towards meeting the schedule interval, the controller may be said to be fully loaded. The amount of routine testing capacity is determined by the time available each night according to the machine schedule and by the number of test ports in an operational state. Under this condition a number of trunks are picked from each schedule list which will exactly meet the goal for that list. For example, if there were five equally spaced routine testing intervals in the week, then each night one-fifth of the trunks in every ROTL/control office's weekly schedule list would be scheduled.

LESS THAN FULLY LOADED CONTROLLER

4.04 During test pass number 1 of routine testing, the controller will make constant checks on the total number of tests that can be made during the current test interval. These checks involve the time available, the number of testing ports available, and a parameter called **AVGROT**. **AVGROT** is a weighted average number of routine tests per hour per port. If the check determines that more tests can be made than the number required to meet the schedule interval goals, then more trunks are scheduled. These trunks are picked according to their assigned schedule frequency. For example, we would pick four times as many extra weekly trunks as extra monthly trunks.

4.05 It should be noted that trunks are all assigned daily to appropriate schedule list for each ROTL/control office during each update cycle. But trunks are not actually scheduled for testing until each schedule list in each ROTL/control office is attained during routine testing.

ROTL RESCHEDULING

4.06 The only method for defeating the automatic routine test schedule discussed in paragraphs 4.02 through 4.05 is to reschedule a ROTL for one night. Setting the update parameter **ROTSCH=YES** allows the CAROT center to schedule all trunks in as many as five different ROTL offices for the current night only. In the case of very large offices, only as many trunks as can be tested with four test passes (as determined by the current value of the **AVGROT** parameter, see track and tune parameters) will be scheduled.

4.07 A CAROT center might wish to take advantage of this feature to get an overview of an entire ROTL office when it is first turned up for service. Since all scheduled trunks will be indexed, it might also be used late in a trunk transmission maintenance index (TTMI) reporting interval to *catch up* on measurements in an office which had experienced earlier equipment problems.

SUSPENDED ROUTINE TESTING

4.08 As discussed in paragraph 3.04 (Automatic Machine Schedule), the sequence of the daily operations must be maintained in the machine schedule. However, it is possible to schedule routine testing more than once before analysis and routine test results are produced (that is, stop routine testing and then continue routine testing the next night without going through analysis or update periods for that day). Suspension of routine testing is accomplished by setting the analysis time for a particular day in the machine schedule to a negative value.

4.09 This feature allows the results of routine testing over several days to be combined. The results will be treated the same as for a single test period with the exceptions that the dates and times will vary accordingly. This feature should be useful for testing; for example, Friday night, Saturday night, and Sunday night with the total results being generated on Monday morning. The analysis time on Monday should be adjusted to account for the extra time needed for the increased load.

5. REMOTE USERS

5.01 The CC2 was designed to enable the remote users to accomplish certain functions. These functions make the remote user's job of verifying installation and repair of trunks easier. Therefore, it is the responsibility of the administrator to ensure that all remote users are assigned the necessary functions.

REMOTE-USER CAPABILITIES

A. Remote-User Functions

5.02 The remote-user functions contained in Table B are assigned at the CRT console. The procedures for setting the functions are contained in Section 190-102-301.

TABLE B

REMOTE-USER TERMINAL FUNCTIONS

FUNCTION CODE	MEANING
CL	Resets all functions.
AL	Gives user all functions.
FA	Gives user noncircuit-order functions CP, ID, MS and OC as a group.
FB	Gives user all noncircuit-order functions AC, CM, CP, ID, IN, MB, MS, and RS.
AC	Allows access to any control office's reports and/or data.
CM	Allows remote-user terminal to function as CAROT controller console.
CP	Allows user to change own password
ID	Allows user to obtain own index summary data.
IH	Allows user to perform interrogator tests.
MB	Allows user to request maintenance busy override.
MS	Allows user to obtain own management summary data.
OC	Allows user to communicate with controller attendant.
RS	Allows user to reschedule testing.
CA	Gives user circuit-order functions CD, JE, OV, and OO as a group.
CB	Gives user all circuit-order functions CD, CY, DC, DD, JE, OO, and OV.
CD	Allows user to complete items and display completion notice file of own plant control office.
CY	Allows user to complete items, display completion notice file, and display data for other plant control offices.
DC	Allows user to change data parameters for completion.
DD	Allows user to modify due date of circuit-order completions or circuit-order items.
JE	Allows user to use jeopardy report functions.
OO	Allows user to complete items out of sequence.
OV	Allows user to override a test failure of the circuit and complete the item. Allows user to override equipment failure, or the fact that a test line does not exist and complete the item.

B. Manual Data Base Entry

5.03 The CC2 provides the capability for remote users to extract and edit data from the data bases, to store partially complete update records, and to enter data into the data base from any file prepared using these methods. More detailed information is contained in Sections 190-102-103 and 190-102-206.

CRT CONSOLE REMOTE-USER MODE

5.04 The CRT console normally functions as the CAROT 2 operator terminal. It can, however, function as a remote user. First, the console must be assigned a user number and password as does any other remote user. Second, the logon procedure for the console as a remote user must be performed.

5.05 Once the CRT console is logged on as a remote user, it can function as a remote user, or as an operator terminal. [All remote-user commands *must* be preceded by a slash (/)]. The console, as a remote user, can perform any of the procedures contained in remote-user Section 190-102-305 as long as all commands are preceded by a slash.

5.06 The CRT console must be logged off as a remote user before the start of the next scheduled routine test cycle or before halting the CC2.

6. CMS INTERACTION WITH CAROT

6.01 The CAROT System can be used to test trunks for the No. 4 ESS environment via the Circuit Maintenance System (CMS). CMS provides trunk and facility information across a data link for updating of the CAROT data base. In fact, CAROT can interface with up to three CMS data links.

6.02 The CC2 will accept CMS update only during routine and demand testing periods. During these periods, the CC2 has full control of the data link via the **LUP** and **LDOWN** console commands.

6.03 The CMS update information received by the CC2 is stored on disc, and a copy of the information is put on magnetic tape (referred to as the 710 tape). If the CMS data on disc is lost, due to a crash, the 710 tape can be used to read the information back onto the disc. Thus,

any time the CMS data link is turned up, a 710 tape should be mounted.

6.04 During the update cycle, all acceptable CMS update data is processed (along with any other data input during the same update run) and placed on the transaction tape. During the next period that CMS can send data to the CC2, a new 710 tape should be used to make a copy of the data. The old CMS data is now on the transaction tape and in the data base (see Part 9).

7. CAROT 2 CONTROLLER CRASHES

HOW TO RECOGNIZE A CRASH

7.01 A crash is when the CAROT 2 controller fails to operate in a prescribed manner. In general, the system will *not look right*. That is, a system that is running correctly should have the display register lights polling in both the data and test processors. (This assumes that the system is up for remote users. If the **MPBOOT** command has not been given, then the test processor will not be polling. In some cases this is normal.) It is safe to say that in 80 percent of the cases, if the system is polling in both processors, it is running properly.

7.02 The most obvious way in which the system will fail is to come to a halt or to print some system error message on the console.

HOW TO PROCESS A CRASH

7.03 The most important thing to remember after a crash is that the data base on the disc is no longer any good. This means that you *must* do a data base restoral. The second most important thing is to log the crash. Write down the information on the CRT console line printer and/or processor registers. This information may be useful to the service organization.

7.04 In general, the steps to take when the system crashes are (a) log the information, (b) notify PECC of any unusual crashes, (c) boot up controller, and (d) restore data base.

8. DATA BASE BACKUP/RESTORE

8.01 The backup/restore process is usually the responsibility of data base administration

(Section 190-102-201), but may be delegated to the person responsible for CC2 administration.

BACKUP MAGNETIC TAPE GENERATION

8.02 A backup magnetic tape should be made each working day after analysis has finished. This backup is necessary to preserve the results of the previous night's routine testing results and the accumulated management and index summary data. A backup tape can also be made during the update cycle. Although it is an optional part of the update process, it is probably a wise choice, particularly if a large amount of data was inputted to the data base.

DATA BASE RESTORAL

8.03 If the data base must be restored (normally due to a CC2 crash), a specific procedure must be followed depending on the time of the failure, when the last backup tape was made, and if CMS interacts with CAROT.

8.04 The three possible types of magnetic tapes which may need to be read into the CC2 to restore the data base are as follows:

- (a) Backup tape
- (b) Transaction tape
- (c) 710 tape.

Although the decision of which tapes to select is not difficult, it does require a basic understanding of the backup data base philosophy. The following restoral philosophy is divided into two parts, without CMS interaction and with CMS interaction.

A. Without CMS Interaction

8.05 Figure 3 shows two days in the life of a CAROT 2 controller. A day begins after analysis with the making of a backup data base tape. This tape will contain all of the information in the data base at this point in time. If a crash occurs during the day, the restoral procedure is dependent on the time of day. The following examples explain the time of the crash and which tapes must be used to restore the information lost.

Example 1

8.06 If a crash occurs after the morning backup tape is made (ie, during the demand testing period) but before a transaction tape is generated during update period (see crash #1 or #2 in Fig. 3), restore data base using backup tape generated after analysis.

Example 2

8.07 If a crash occurs after a transaction tape has been generated but before the end of the update period (see crash #3 in Fig. 3), restore data base using backup generated after analysis and latest transaction tape.

8.08 Normally, only one backup tape per day is generated. However, an optional part of the update period is the making of a backup tape. Example 3 discusses restoral assuming no update period backup tape has been made. Example 4 discusses restoral assuming an update period backup tape was made.

Example 3

8.09 If a crash occurs any time during routine testing or analysis periods (see crash #4 and crash #5 in Fig. 3), restore data base using backup tape generated after analysis and latest transaction tape.

Example 4

8.10 If a crash occurs any time during routine testing or analysis periods (see crash #4 and crash #5 in Fig. 3), restore data base using backup tape generated during update period.

B. With CMS Interaction

8.11 As discussed in Part 6, all acceptable CMS update data is placed on the transaction tape during an update run. Therefore, the transaction tape made at update becomes the primary backup method for the 710s if a crash occurs after update. If, however, a crash occurs before an update run, the 710 tape must be read to input the CMS data back into the CC2.

8.12 Figure 4 shows two days in the life of a CC2 with CMS interaction. As shown in the figure, CMS update may be received by the

CC2 during routine (Part 1 of CMS update data) or demand (Part 2 of CMS update data) testing periods. As discussed previously, the day begins with the making of a backup tape. The following examples explain the time of the crash and which tapes must be read into the CC2 to restore the lost information.

Example 5

8.13 If a crash occurs after the morning backup tape is made (ie, during the demand testing period) but before a transaction tape is generated during update period (see crash #1 or #2 in Fig. 4), restore data base using backup tape generated after analysis and CMS 710 tape. Notice the 710 tape contains CMS data from Part 1 of day N and part 2 of day N+1 periods.

Example 6

8.14 If a crash occurs after a transaction tape has been generated but before the end of the update period (see crash #3 in Fig. 4), restore data base using backup tape generated after analysis and latest transaction tape.

8.15 As mentioned previously, an optional part of the update cycle is making a backup tape. Example 7 discusses restoral assuming an update cycle backup tape was not generated. Example 8 discusses restoral assuming an update cycle backup tape was generated.

Example 7

8.16 If a crash occurs any time during routine testing or analysis periods (see crash #4 and crash #5 in Fig. 4), restore data base using backup tape generated after analysis, latest transaction tape, and CMS 710 tape. Notice the 710 tape contains data only from Part 1 of day N+1.

Example 8

8.17 If a crash occurs any time during routine testing or analysis periods (see crash #4 and crash #5 in Fig. 4), restore data base using backup tape generated during update cycle and CMS 710 tape. Notice the 710 tape contains data only from Part 1 of day N+1.

SUMMARY

8.18 As outlined in paragraph 8.01, the preceding examples were based on certain factors. A quick reference guide based on the examples is shown in Table C. If any of these factors differ, due to local operating procedure, the tapes selected for restoral may also differ. In general, the following rules apply:

- (a) Always restore data base using latest backup tape (see note).
- (b) If a transaction tape has been made since the backup tape was made, read it into the data base.
- (c) If CMS has sent any 710 tape data to CAROT since the last update run, read it into the data base.

Note: If the latest backup tape happened to be faulty, an earlier backup tape along with successive transaction tapes can be used to restore data base (see Section 190-102-201).

9. ROUTINE TASKS

GENERAL

9.01 This part is intended to provide the person in charge of CC2 administration a general working knowledge of how to use and what can be expected from some of the CC2 routine task procedures. Additional and more detailed information can be found in Sections 190-102-301 and 190-102-201.

UPDATE DATA BASE

A. Introduction

9.02 As discussed in Part 3, Automatic Machine Schedule, the update cycle is scheduled to be run at least once a day whether or not update data is to be inputted. If update data is to be inputted, the administrator has two options: (a) perform update requiring operator interaction, (b) perform update not requiring operator interaction. The distinction between *update requiring operator* and *update not requiring operator* is due to the fact that the CAROT center may not be manned during the update cycle. Therefore, the *update not requiring operator* would be performed. In most cases, however, the CAROT center will be

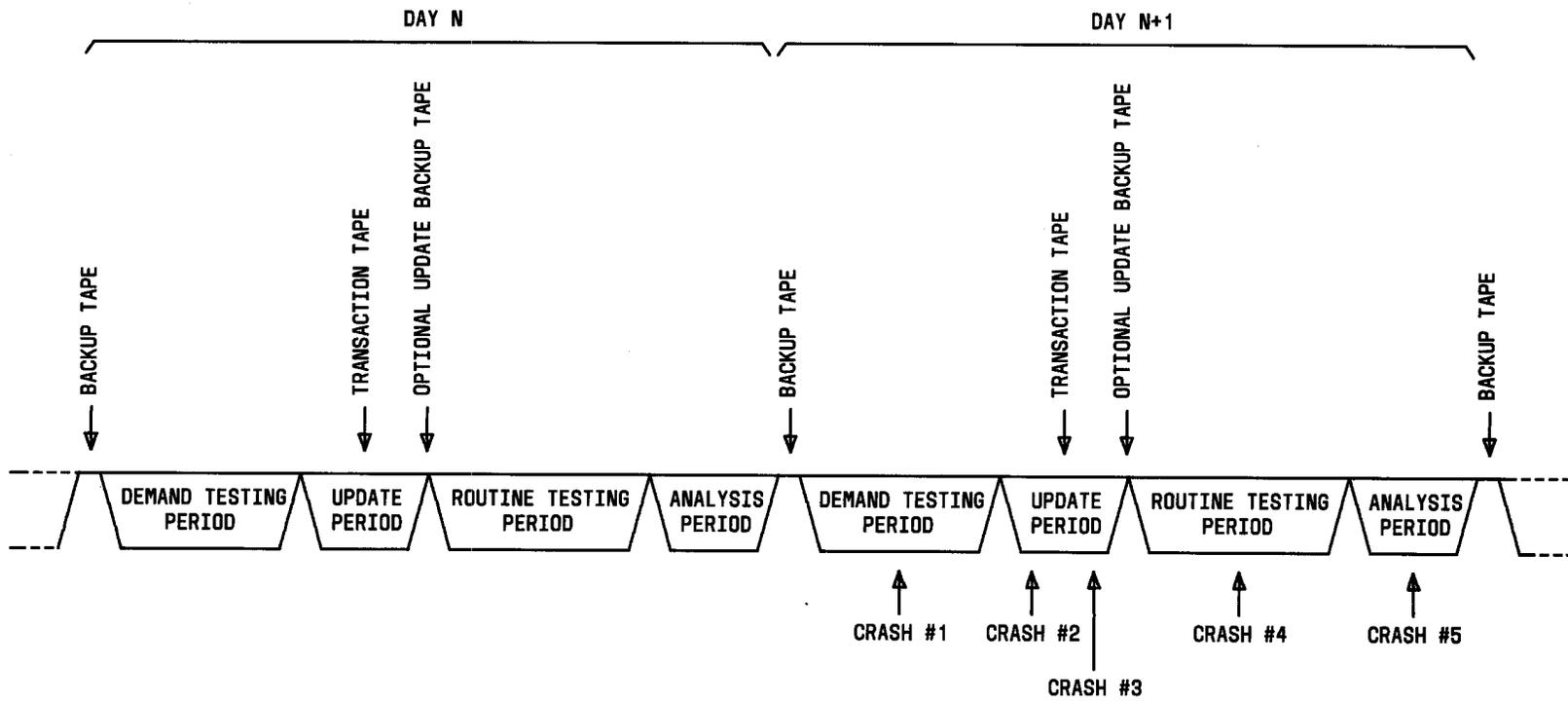


Fig. 3—CC2—Load Backup Data Base Without CMS Interaction

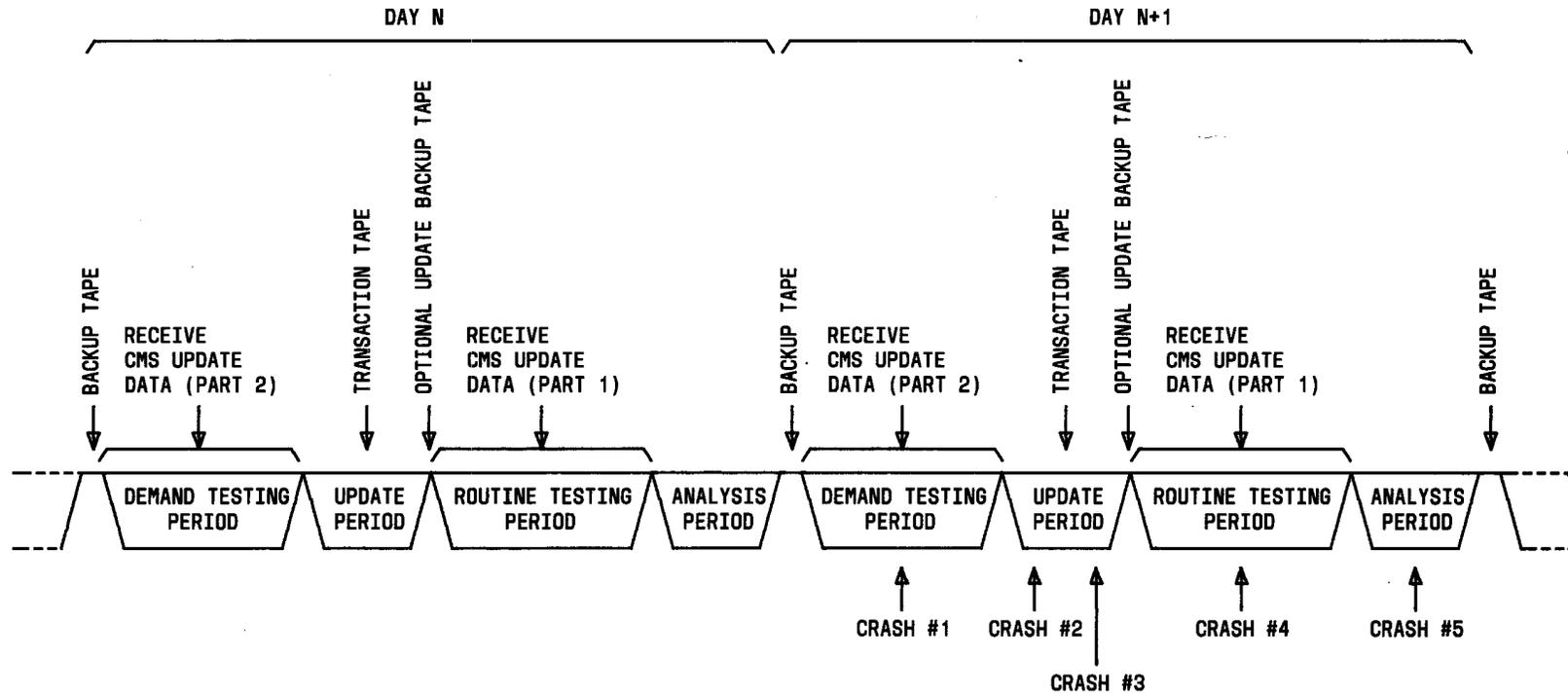


Fig. 4—CC2—Load Backup Data Base With CMS Interaction

TABLE C
BACKUP/RESTORE FACTORS

PERIOD OF DAY CRASH OCCURS	TAPES TO BE READ INTO CC2				
	NO CMS INTERACTION		WITH CMS INTERACTION		
	BACKUP	TRANSACTION	BACKUP	TRANSACTION	CMS UPDATE
Demand Testing	✓		✓		✓
Update (before transaction tape is made)*	✓		✓		✓
Update (after transaction tape is made)**	✓	✓	✓	✓	
Routing Testing	✓	✓	✓	✓	✓
Analysis	✓	✓	✓	✓	✓

* After tape(s) are read, update cycle must be started again.

** If a backup tape was made as part of update cycle (optional), reload data base using (1) only that backup tape (for no CMS interaction) or (2) that backup tape and the CMS update tape (for CMS interaction).

manned for update. Performing update with operator interaction is preferable since any hardware or software problems can be cleared by the operator.

9.03 Before update of the data base can be started, certain update parameters must be initiated. These update parameters tell the upcoming update program what the operator wishes to accomplish. Table D shows the update parameters and their meanings. The update parameters are equal to the default state unless they are set to the select state by the operator.

9.04 Notice in Table D that some of the parameters do not directly have anything to do with the actual update of the data base. These parameters are provided to access different types of information, make a backup, process data, and perform housekeeping after the update.

9.05 The following paragraphs discuss both types of operator interaction and how the update parameters are used.

B. Perform Update Requiring Operator Interaction

9.06 Since this update will have operator interaction, the parameter **OPER** would have been set to **YES**. The update procedure can be generally divided into five phases (Fig. 5).

Phase 1

9.07 Phase 1 allows for the input of update data from the peripherals to the preupdate utility space (**PUSPAC**). Each peripheral, including CMS data stored on disc, may input data to the CC2 and, in addition, user input files prepared by the EDIT program (see paragraph 5.03) and any updates required by circuit-order completions performed during the day. All acceptable update data is stored in **PUSPAC**. All data not acceptable is printed on the line printer with an appropriate error message.

9.08 The update parameters for the peripherals are **MAGTAP**, **PAPTAP**, and **OPERIN**. For example, if magnetic tape will be used to input update data, **MAGTAP** should be set equal to **YES**. Thus, when the update program begins to run, a

TABLE D
UPDATE PARAMETERS

SELECTION PARAMETER	DEFAULT STATE*	SELECT STATE	FUNCTION
OPER	NO	YES	Operator will not be in attendance during time that update system is running. This results in automatic resolution of errors and assumption that required peripherals have data mounted. Operator will be in attendance during time that update system is running. This results in instructions being relayed to system console in case of errors and whenever there is need to mount data for peripheral input.
MAGTAP	NO	YES	Data base will not be modified by data entered on 9-track magtape. Data base will be modified by data entered on 9-track magtape.
OPERIN	NO	YES	Data base will not be modified by data entered at system console during update time. Data base will be modified by data entered at system console during update time.
PAPTAP	NO	YES	Data base will not be modified by data entered on paper tape. Data base will be modified by data entered on paper tape.
UPFILE	NO	YES	User files generated by EDIT and SELEC programs will not be read. User files generated by EDIT and SELEC programs will be read.
PUSPAC	1000	4000 MAX	Minimum size of disc storage space used to temporarily store and process data base update inputs. Maximum size of disc storage space used to temporarily store and process data base update inputs.

*Default state is assumed by processor if parameter is not set by operator.

TABLE D (Contd)

UPDATE PARAMETERS

SELECTION PARAMETER	DEFAULT STATE*	SELECT STATE	FUNCTION
TRANS	NO		9-track magnetic tape will not be used as temporary storage device.
		YES	9-track magnetic tape will be used by update module of update system to store data in an internal representation. This feature is highly recommended because it greatly enhances operating speed of succeeding modules and saves data as backup.
TRANDT	ALL	INIT	Data base is modified using data stored on transaction tape at any time. Update modules will mark tape hung for use as transaction tape with special label that identifies it as transaction tape initialized today. Then switch is reset to ALL.
		TODAY	Data base is modified using data stored on transaction tape today.
		MM/DD/YY	Data base is modified using data stored on transaction tape on data specified.
UPDIN	IN		Data base will be modified by data entered from peripheral equipment. (Transaction tapes should always be used, however.)
		MT	Update data will be entered from peripheral equipment and stored on transaction tape. Data base will not be modified during this update.
		UT	Data base will be modified by data entered from transaction tape only.
INDLEN	0		No index summary reports are made.
		1	Index summary data reports are made for all offices.
		2	Index summary data reports are made for all offices, and registers are then cleared.
		3	Index summary data is written on magnetic tape and line printer. Registers are not cleared.

*Default state is assumed by processor if parameter is not set by operator.

TABLE D (Contd)

UPDATE PARAMETERS

SELECTION PARAMETER	DEFAULT STATE*	SELECT STATE	FUNCTION
INDLEN (Contd)		4	Index summary data is written on magnetic tape and line printer. Registers are then cleared.
		5	Index summary data is written on magnetic tape. Registers are not cleared.
		6	Index summary data is written on magnetic tape. Registers are then cleared.
NOIND	0		All daily management and index summary results will be added to cumulative results.
		1	Program will ask for ROTLs that should not have daily management and index data added to cumulative results.
		2	None of daily management and index data will be added to cumulative results.
		3	Used to eliminate control offices from trunk transmission maintenance index to be written on magnetic tape.
MANLEN	0		No management summary reports are made.
		1	Management summary reports are made for all offices.
		2	Management summary reports are made for all offices, and registers are then cleared.
BACKUP	NO		Backup tape will not be made.
		YES	After data base has been modified, it will be written onto 9-track magnetic tape for backup purposes.
DISPLY	NO		Display of equipment and administrative data will not be made.
		YES	Data display module will be enabled which displays data from directories of equipment and administrative files.
SCAT	NO		Module that checks accessibility of specific files will not be enabled.
		YES	Above module is enabled.

*Default state is assumed by processor if parameter is not set by operator.

TABLE D (Contd)

UPDATE PARAMETERS

SELECTION PARAMETER	DEFAULT STATE*	SELECT STATE	FUNCTION
INDEX	NO	YES	Module that initializes index data and computes number of trunks in each category will not be enabled. Above module is enabled.
ROTSCH	NO	YES	No ROTLs will be rescheduled for today's routine testing. ROTL rescheduling for today's routine testing is enabled.
GARBAG	NO	YES	Do not perform garbage collection on data base. Perform garbage collection on data base.
CNFTAP	0	1 2	No magnetic tape of completion notice file will be produced. Magnetic tape of completion notice file will be written in format for circuit provisions organization. File will not be cleared. Magnetic tape of completion notice file will be written in format for circuit provisions organization. File will be cleared.
COCTAP	0	1 2	No magnetic tape of completion notice file will be produced. Magnetic tape of completion notice file will be written in format for circuit-order completion system. File will not be cleared. Magnetic tape of completion notice file will be written in format for circuit-order completion system. File will be cleared.

*Default state is assumed by processor if parameter is not set by operator.

CRT message will ask for the magnetic tape data. In other words, the CRT will ask for update data from a peripheral only when the update parameter has been set equal to **YES**. The only other parameter for phase 1 is **UPFILE**. **UPFILE=YES** allows files created by the EDIT and SELEC programs to be read (see Section 190-102-306).

9.09 The **PUSPAC** update parameter determines the size of disc storage space to be used to

process the update inputs. Normally, the default state for **PUSPAC** is adequate.

Phase 2

9.10 After all accepted update inputs have been written into **PUSPAC**, phase 2 of the procedure is 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

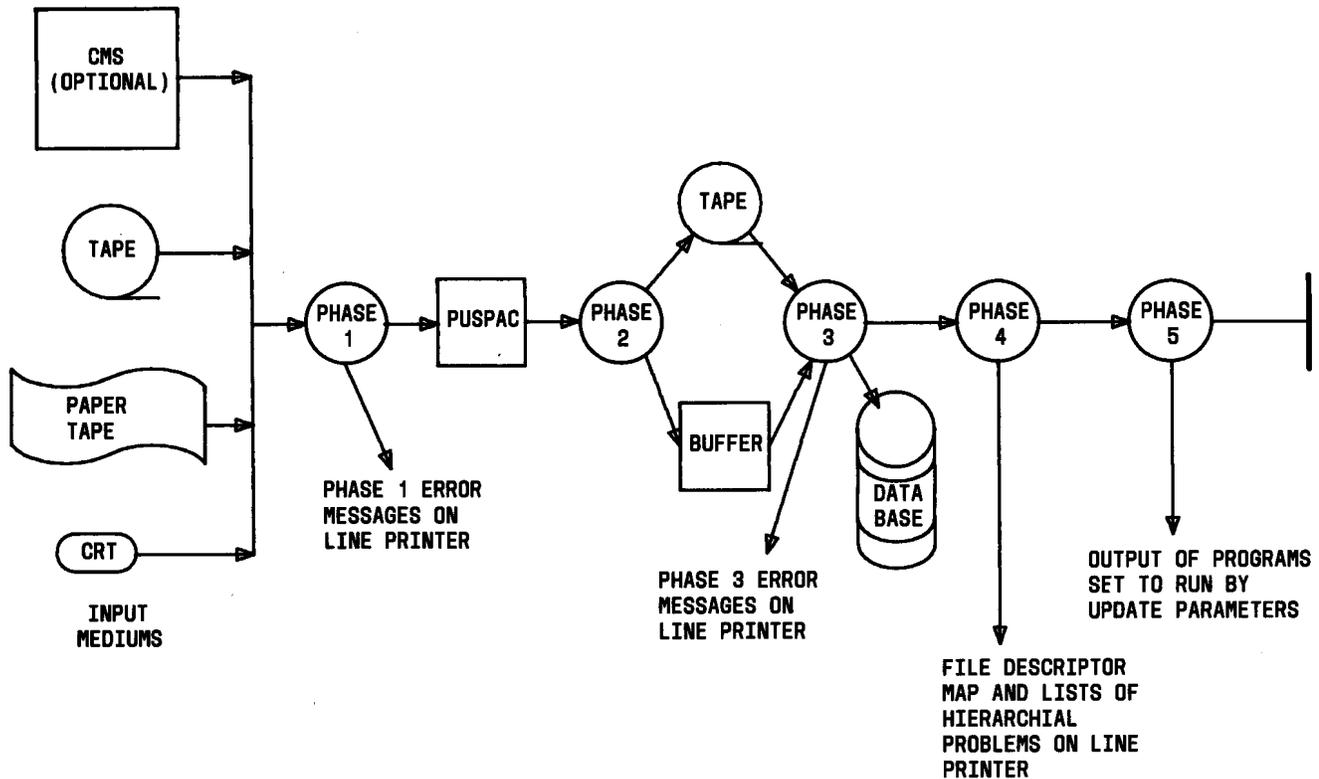


Fig. 5—Update Procedure

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 for backup considerations as well as in the interest of speed. The use of a transaction tape reduces the time required for data base updating (see Part 8).

9.11 The update parameter **TRANS** is used for making a transaction tape. If it is set equal to **YES**, the CRT will present the appropriate message.

9.12 Notice at this point in the update procedure, the CAROT data base has not as yet been modified. The data on the transaction tape will be used to modify the data base in phase 3.

Phase 3

9.13 Phase 3 of the update procedure rejects all data records entered out of hierarchial sequence (see Section 190-102-203) and enters all accepted update data in the data base. Basically, this consists of reading the transaction tape made

previously in phase 2. Thus, at this point in the update procedure, the data base has been modified.

Note: It is important to understand that until an update transaction has passed through phase 3, it has **not** modified the existing CAROT data base. Phases 1 and 2 have just prepared the update information for actual inclusion in the data base.

9.14 The phase 3 update parameters are **TRANDT** and **UPDIN**. For a normal update, **TRANDT** should be set to select state **INIT**. **UPDIN** should remain in default state. A further discussion of these parameters is contained in paragraph 9.27.

Phase 4

9.15 Phase 4 causes a file descriptor map and data base irregularities to be typed on the line printer.

9.16 Notice at this point in the update procedure, the CAROT data base has been modified.

Thus, the data base update has been completed. However, the operator has the option by use of the update parameters (see paragraph 9.03) to perform certain functions in phase 5. If none of the phase 5 update parameters have been selected, the update procedure is ended.

Phase 5

9.17 Phase 5 allows the operator to access different types of information, make a backup tape, process data, and perform housekeeping functions. The update parameters for phase 5 are discussed below.

9.18 The **NOIND** parameter 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 (see paragraph 9.19).

9.19 The **INDLEN** parameter is used to obtain cumulative index summary results. The 1-select state allows access to the data without having the information cleared from the registers. A 2-select state allows the data to be accessed and then clears the registers. The 2-select state is desirable when the index or management data has been collected for some period of time and a new period is desired. The 3-, 4-, 5-, and 6-select states allow a magnetic tape of index summary data to be made. If there are any control offices not desired on the tape, they can be eliminated by using the **NOIND** parameter (see paragraph 9.18).

9.20 The **MANLEN** parameter is used to obtain cumulative management summary results. The 1-select state allows access to the data without having the information cleared from the registers. A 2-select state allows the data to be accessed and then clears the registers. The 2-select state is desirable when the management data has been collected for some period of time and a new period is desired.

9.21 The **BACKUP** parameter allows a backup magnetic tape to be made. This parameter is desirable, especially after large amounts of update data has been entered into the CAROT data base.

9.22 The **DISPLY** parameter permits access to equipment and administrative data which is printed on line printer.

9.23 The **INDEX** parameter initializes index data, computes the number of trunks in each index, and computes the number of trunks in each category.

9.24 The **ROTSCH** parameter allows the operator to schedule all the trunks using a given ROTL for testing during the next routine testing period. A maximum of five ROTLs may be scheduled for any testing period.

9.25 The **SCAT** parameter checks the accessibility of 103 (trunk group), 203 (facility), 303 (trunk principal), 403 (circuit order), 503 (circuit-order item), 603 (test frame trunk group), and 703 (test frame trunk) files. The results of **SCAT** are printed on the line printer. Normally, the **SCAT** procedure is run as part of the software audit.

9.26 The **GARBAG** parameter is an internal housekeeping function which helps make the most efficient use of disc space. It should be run once a month.

9.27 The **CNFTAP** and **COCTAP** parameters allow 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. **COCTAP** writes the information to magnetic tape in a format suitable for other circuit-order control systems (COCS).

C. Interrupting Update Cycle Phases

9.28 The update phase can be interrupted; ie, the operator may leave the update process before all phases have been completed by typing **ABORT**. However, the remaining update phases **must** be completed (with or without operator interaction) before a normally scheduled routine test cycle can begin.

D. Optional Update Processes

9.29 The update process was designed to give the operator flexibility in updating the data base. One option the operator may find useful is the making of a transaction tape which will be read into the data base at a later time. In other

words, phase 3 is bypassed. Update parameter **UPDIN** equal MT controls this option (see Table D).

9.30 The second option allows a transaction tape to be read into the data base which was made at an earlier time (see paragraph 9.29). The update parameter **UPDIN=UT** controls this function. This option is mainly used when restoring the data base after a crash (see Part 8). The update parameter **TRANDT=mm/dd/yy** is used to state the date of the transaction tape to be read.

E. Perform Update not Requiring Operator Interaction

9.31 Basically, update not requiring operator interaction consists of loading the magnetic tape and/or tape reader with the update data. When the system clock reaches the update cycle time, the update data will be read and processed by the controller. Any hardware or software errors will be resolved by the controller.

9.32 As usual, the update parameters must be set in advance of the start of the update cycle. However, some precautions must be taken when setting the parameters since the update is without operator interaction. The following paragraphs discuss the update parameters.

9.33 The **OPER** parameter would, of course, remain in the default state of **NO**.

9.34 The **MAGTAP** and/or **PAPTAP** parameters would be set to **YES** if update data were to be inputted via that peripheral. The **OPERIN** parameter should remain in the default state of **NO** since no operator will be present. **UPFILE** may be set as desired.

9.35 The **TRANS** parameter may or may not be set to the select state of **YES**. The deciding factor here depends on whether or not update data is being inputted via the magnetic tape unit. If **MAGTAP=YES**, a transaction should not be made. Thus, update parameter **TRANS** should remain in the default state of **NO**. However, if all of the update data is being inputted via the paper tape reader, a transaction tape may be made (**TRANS=YES**). Update parameters **TRANDT**, and **UPDIN** should remain in their default state whether or not a transaction tape is made.

Note: If a transaction is made, a blank magnetic tape should be mounted.

9.36 Update parameters **MANLEN**, **SCAT**, and **GARBAG** may be set as desired. However, care must be taken when setting **NOIND** and **INDLEN** parameters. **NOIND** may be set to the select state of 1 or 2, but should not be set to 3. **INDLEN** may be set to the select state of 1 or 2, but should not be set to any other select state. In addition, update parameters **BACKUP**, **DISPLY**, and **ROTSCH** should remain in their default state because they require operator interaction.

PERFORM SOFTWARE AUDIT ON DATA BASE

9.37 The purpose of the software audit is to check if there are any software problems associated with the data base. The **AUDSC**, **VRDIT**, and **SCAT** programs are used for this purpose.

F. AUDSC Program

9.38 The **AUDSC** update utility program accesses each data record in type 3 files (ie, 103, 203, 303, etc) to determine if it can be retrieved. This program uses the latest backup tape (which should have been made after the most recent update) as a reference.

G. VRDIT Program

9.39 The **VRDIT** update utility program checks that all 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.

H. SCAT Program

9.40 The **SCAT** program is part of the update parameters run during the update cycle (see paragraph 9.25). It checks the average number of access tries per retrieval of records in type 3 files.

PERFORM CONTROLLER ROUTINES FOR PREVENTIVE MAINTENANCE

9.41 Normally, preventive maintenance of the hardware is performed by Hewlett-Packard or other designated service organizations. Therefore, the purpose of this procedure is to place the controller in a halted state. Once halted, with the **CAROT** operating system disc removed, any type of diagnostic and/or preventive maintenance may be performed without any harm to the system.

The only requirement of the service organization is that the controller be returned to the operator in the same halted state as it was before preventive maintenance. After the operating system software disc is installed, the operator can boot up the controller and restore the data base.

DATA BASE AUDIT PROCEDURES

9.42 An audit of the data base checks to ensure the information required in the data base is there and that it is correct. The audit procedure can be totally mechanized, partially mechanized, or totally manual depending on local procedures. Since a totally manual data base audit requires the scanning of the routines test results, it is not discussed here. Refer to Section 190-102-201 for additional information.

I. Mechanized Data Base Audit

9.43 In a completely mechanized procedure, the operator makes a copy of the data base files using the update utility system program ASIN. This magnetic tape is sent to the Circuit Provision Organization (CPO). The CPO compares this tape to an initial load tape (ie, a tape that provides a listing of all trunks that should be in the data base). If any corrections are necessary, the CPO will return a magnetic tape which will be inputted during the regular update cycle.

9.44 The magnetic tape generated by the ASIN program contains the CAROT data base arranged in the same format as the update tapes. If necessary, this tape could be used to restore the data base. It may be listed on the line printer using the DMPCV utility system program.

J. Partially Mechanized Data Base Audit

9.45 In a partially mechanized data base audit procedure, the CPO provides the CAROT controller with an initial load magnetic tape for each data base (ie, CAROT trunk, test frame, and/or circuit order) present in the CAROT. These magnetic tapes are read and compared with the information in the CAROT controller data bases. The line printer will print out error information and summary results. A magnetic tape of the error information and summary results can also be made. Normally, a copy of the error printout is sent to the CPO. The CPO will make an update magnetic tape with the appropriate corrections. This update

tape can be inputted during the normal update cycle.

9.46 The following update utility programs are run during the partially mechanized data base audit: AUDIT (for CAROT data base), AUDFR (for test frame data base), and AUDCO (for circuit-order data base).

SET TRACK AND TUNE PARAMETERS

9.47 In order to efficiently manage the testing process during both routine and demand testing, certain parameters are used to allocate and/or restrict the various processes involved. These parameters are referred to as track and tune parameters. The parameters are described in the following paragraphs.

K. Utility Space Management Parameters

9.48 During the course of routine testing, the disc space allocated to utility may be shared by many simultaneous processes such as print files, retest files, demand testing, and operational summary files. In order to prevent any one process from hogging all or most of the available disc utility space, limits are set on the amount of space that each process may use.

9.49 In addition, each ROTL/control office testing entity is allocated a limited amount of space in order to prevent it from hogging to itself all or most of the space assigned to any one process.

9.50 The utility space management parameters are **PRIPCT**, **RETPTCT** and **TDLPTCT** which are discussed in detail in the following paragraphs.

PRIPCT Parameter

9.51 The **PRIPCT** parameter is the maximum allowable percent of trunk tests that will be allowed to accumulate in the daily office printout file for any ROTL/control office entity. Thus, the actual number of trunk tests is based on the total number of trunks in the ROTL/control entity and the parameter percentage.

9.52 Another consideration for the **PRIPCT** parameter might be the need for limiting the number of troubles that get reported to a ROTL/control entity. For example, assume a CAROT center wishes to designate control office

entities according to the work force available to fix troubles. Thus, the number of troubles reported is changed by decreasing or increasing the percentage of the **PRIPCT** parameter.

9.53 It will be up to the person in charge of administration to determine if **PRIPCT** is too large or too small. The following guidelines are provided as an aid:

(a) **PRIPCT** is probably too small if the message **PRINT FILE OVERFLOW: RC=** (followed by ROTL/control office ID) is printed for too many different offices during routine testing. The determination of how many is too many is dependent on the number of ROTLs in the system, how early routine testing finished as a result of early terminations, etc.

Note: When the **PRINT FILE OVERFLOW** message is printed, testing for the particular ROTL/control office is terminated for the remainder of the testing period.

(b) **PRIPCT** is probably too large if the control offices complain of many more troubles reported than they can possibly repair. Discretion must be exercised here to prevent a few really bad offices from restricting operation on other offices.

(c) **PIPCT** may be too large if the message **NO DISC UTILITY SPACE: ROUTINE TESTING TERMINATED** is printed. This is a serious event since testing to all offices terminates at this point. Although a too high value of this parameter may have caused the termination, other parameters such as **RETPCT** may also be at fault. In addition, it is possible that the controller is running with less than the recommended amount of utility space in the data base. The data base administrator should be contacted for verification.

RETPCT Parameter

9.54 The **RETPCT** parameter is the maximum allowable percentage of trunks that may be placed in a retest file for any ROTL/control office entity. This parameter is very similar to **PRIPCT**. In fact, the considerations and guidelines for setting the percent of **RETPCT** are generally the same.

9.55 If the **RETPCT** percentage limit is exceeded during routine testing for any ROTL/control office entity, the message **RETEST FILE OVERFLOW: RC=** (followed by ROTL/control office ID) is printed. Routine testing for the particular ROTL/control office entity is terminated for the remainder of the testing period.

TDLPCT Parameter

9.56 The **TDLPCT** parameter is the maximum percentage of trunks in each control office which will be automatically rescheduled for the next night due to not finishing four test passes.

L. Average Trunk Test Time Parameters

9.57 Certain parameters have been defined for use by the system in determining the average amount of time needed to complete both routine and demand test sequences. These parameters may become out-of-date from time to time due to new ROTLs being added and/or existing trunk plant being gradually cleaned up.

AVGDEM Parameter

9.58 The **AVGDEM** parameter specifies the average number of trunk tests (per hour) performed during demand testing. This parameter will typically reflect such factors as the mix of small and expanded ROTLs and the current state of the trunk plant. **AVGDEM** is used in the determination of the estimated completion time presented to a user when his batch is submitted. In the interest of maintaining credibility with the users of the system, it may benefit the administrator of the CAROT center to maintain the accuracy of **AVGDEM**.

9.59 An inaccurate percentage value of **AVGDEM** may be determined by several means. The administrator at the CAROT should note on occasion how well the estimated completion time tracks the observed results when users are performing demand tests. Occasional significant discrepancies are to be expected since the parameter reflects an average condition. However, consistent discrepancies between the estimated and actual time for completion should be cause for concern. The parameter should be adjusted up or down, as necessary, if this happens.

9.60 Another indicator for an inaccurate **AVGDEM** percentage is complaints from remote users

that their estimated completion times are consistently and significantly in error. This could be quickly verified and corrected by running a mix of demand test batches from the console (see paragraph 5.04).

9.61 It should be stressed that this parameter will not show sudden inaccuracies, but will typically drift gradually away from its optimum value.

AVGROT Parameter

9.62 The **AVGROT** parameter is used to schedule the amount of trunk testing to be performed during a routine testing period. The value of **AVGROT** will be a weighted average number of tests per hour per test port. The **AVGROT** value is automatically regulated by the CAROT System. However, it can be temporarily set to another value if necessary. Once set to another value, the CAROT System will gradually regulate it back to its optimum value.

10. ACCEPTANCE PROCEDURE

10.01 After the CAROT center has been installed, certain diagnostic procedures must be performed to ensure proper operation. In accordance with the sales contract with Hewlett-Packard, the diagnostics must be performed for all CAROT installations. Therefore, PECC and the CAROT center personnel should observe the diagnostics while they are being performed by the Hewlett-Packard service representative. In addition, PECC must perform diagnostic procedures on the WECO-manufactured equipment.

10.02 From a CAROT center standpoint, the diagnostic procedures performed by Hewlett-Packard and PECC may be satisfactory for acceptance. If, however, the CAROT center wishes to perform its own acceptance tests, the procedures in Section 190-102-301 may be performed.

11. COMPANY ORDER TASKS

USING CRT CONSOLE AS REMOTE USER

11.01 The CRT console can function as a remote user as well as performing its normal functions. After the CRT console has logged on as a remote user, it can perform any of the procedures that are contained in the remote-user TOP 190-102-305. Whenever the CRT console is

logged on as a remote user, both CAROT controller commands and remote-user commands will be accepted. However, all remote-user commands typed at the CRT console **must** be preceded by a slash (/).

11.02 It should be noted that the CRT console **must** initially assign itself a remote-user number, password, and remote-user terminal functions before it can log on as a remote user.

REALLOCATE DISC SPACE

11.03 Each of the CAROT 2 data base files occupies a specific part of the data base storage area on disc. If the data base storage area on disc is not large enough to support the data base information, the data base storage area on disc can be enlarged.

11.04 When a CAROT is first installed, the initial data base storage area may not be enough. Thus, the disc space for a new installation must be reallocated. It may also be necessary to reallocate the disc space at some point after the CAROT System is in operation. Therefore, there are two procedures for reallocating disc space: (1) reallocate disc space for a new installation, and (2) reallocate disc space for an established data base.

11.05 Before any reallocation can begin, a plan for file-size requirements must be generated (see Section 190-102-201 for detailed information about file configuration and size requirements). The result of this plan is a work sheet which will be used by the operator during the reallocation procedure.

A. Reallocate Disc Space for a New Installation

11.06 The first procedure is to make a backup magnetic tape. Although the data base is blank at this time, the file requirements are present. Therefore, if the controller should crash during the reallocation procedure, the original data base can be restored.

11.07 The second step is to generate a new data base parameter (DATAC2) tape. This is accomplished by running update utility program DISK1. The new DATAC2 magnetic tape is used by the update utility system program CONFI to initialize the new data base. CONFI wipes out the old data base and uses the new DATAC2 tape

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to initialize the new file sizes and configurations on disc. After initialization, a backup tape must be made.

B. Reallocate Disc Spare for Established Data Base

11.08 The first step is to make a backup tape of the present data base. The next step is to generate a new DATAC2 tape and initialize the data base (see paragraph 11.07). Next, the update utility program AROUN is used to load the backup tape containing the old data base onto the disc in the newly created file configuration. If any of the type 3 files (ie, 103, 203, etc) have been expanded, the update utility program RESTO must be run on the files. After RESTO has been completed, a backup tape must be made.

CONVERT CAROT 1 DATA BASE TO CAROT 2 DATA BASE

11.09 After the initial equipment and administrative data has been established (refer to Section 190-102-201) and the additional equipment required for a CAROT 2 center has been installed and accepted, the CAROT 1 data base information must be put into the CAROT 2 data base.

11.10 Since CAROT 1 data base information is on cassette tape, the first step is to copy the cassette tapes onto 9-track magnetic tape. The CAROT 1 data now on magnetic tape is not in the proper format for CAROT 2. Thus the next step is to run the update utility program CNVRT. This program converts the CAROT 1 data into the CAROT 2 update format and dumps the results onto a blank magnetic tape. Now, there is a second set of magnetic tapes formatted in accordance with CAROT 2 requirements which will be used to update the data base.

11.11 However, before the CAROT 1 update tapes can be inputted, the administrative and equipment information must be inputted. The administrative and equipment information and the CAROT 1 update tapes are inputted during the normal update cycle.

12. RECOMMENDED TURNUP AND TRAINING GUIDELINES

INTRODUCTION

12.01 These guidelines provide a recommended procedure for establishing a working CAROT 2 center operation through a sequence of training steps. These training steps will familiarize the personnel with the available documentation and provide experience in the operation and administration of the CAROT center.

12.02 Basically, training is divided into five phases. Normally, the first four phases would be the training of the CAROT center supervisor; however, other CAROT center personnel may also be involved. For this reason, a brief discussion of the first four phases is given. Phase 5 is the most important because it involves the training of CAROT center operators during the time the data base is being built up. Additional information regarding training may be found in GL-76-09-073.

Note: All personnel should read the entire training plan before beginning the operation. Local variations in procedure should be determined and appropriate training goals set.

TRAINING PHASE 1—FAMILIARIZATION WITH DOCUMENTATION

12.03 In this phase, the CAROT center personnel must become familiar with the Bell System Practices and the plant training courses (PTC) available for CAROT 2. Table E lists the documents available for CAROT 2, generic 2.

12.04 It is recommended that Section 190-102-100 and PTC-308 CAROT be studied first. These courses will give new CAROT personnel the background information necessary for understanding other sections. In addition, PTC-278 TOP-User Training Course should be studied before trying to use Sections 190-102-301 and 190-102-305. This plant training course allows the personnel to become familiar with the organization and usage of TOP (Task Oriented Practices).

TRAINING PHASE 2—FIRST TRAINING VISIT

12.05 This phase allows for a 1-week training session at an operational CAROT center.

TABLE E
DOCUMENTS AVAILABLE FOR CAROT 2, GENERIC 2

SECTION	TITLE
*190-102-100	CAROT 2 Center — General Description
PTC-308	CAROT
190-102-202	CAROT 2 Controller Administration
†190-102-103	Remote-User General Description
*190-102-010	CAROT 2 Center and Control Offices — Duties and Responsibilities
*190-102-015	Analysis of Test Results
†190-102-201	Data Base Administration
†190-102-203	Data Base Description and Requirements
PTC-278	TOP User Training Course
*190-102-301	CAROT 2 Controller — Operating Procedures
*190-102-305	Remote-User Terminal — Operating Procedures
*500-580	Remote-User Terminal — Operating Instructions — Pocket Guide
†190-102-204	Circuit-Order Activity — Implementation and Description
†190-102-205	Optimal Trunk Test Scheduling
†190-102-206	Edit and Select Programs
†190-102-207	Report Program Generator
190-102-500	System Trouble Locating Procedures

*This section has not been reissued at this time. Check the index for availability of latest issue.

†This section has not been issued at this time. Check the index for availability of issue 1.

The considerations to be given when selecting a site are as follows:

- (a) The type of data base (that is, mechanized or nonmechanized)
- (b) Whether or not it is a converted CAROT 1 to CAROT 2
- (c) The type of information in the data base (such as, test frame and/or circuit-order data)
- (d) Whether the CAROT center interacts with the Circuit Maintenance System.

12.06 This training session should focus on data base requirements and administration, which includes experience in filling out forms for updating, special problems such as multimarker group offices, and conversion from CAROT 1 to CAROT 2, if applicable.

TRAINING PHASE 3—PREPARATION OF NEW DATA BASE

12.07 After returning from the first training visit, the administrator will be responsible for starting the equipment and administrative files for the new CAROT. If necessary, trunk and facility files should also be started.

TRAINING PHASE 4—SECOND TRAINING VISIT

12.08 A second training visit is necessary to gain experience with the hardware, software programs, and general day-to-day operations. Special emphasis should be placed on the following items:

- (a) Familiarization with the equipment, console keys, and computer keys
- (b) Familiarization with console commands
- (c) Perform an update to the data base
- (d) Gain an understanding of the analysis printout and daily office printouts
- (e) Familiarization with remote-user functions and parameters set from console
- (f) Perform demand testing and data displays from the console and from a remote terminal
- (g) Perform backups and restorals of data base
- (h) Perform various data base audits.

TRAINING PHASE 5—2-WEEK PRACTICE ROUTINE

A. General

12.09 The purpose of this 2-week training period is to familiarize CAROT center personnel with equipment and operational methods of the controllers and to commence training of central office personnel in the test results utilization and remote-usage features of CAROT.

12.10 Since this training will be occurring during the time the controller is being established, it is expected that other activities will also be taking place. These would include the continuing data base work, identifying CAROT testable trunk groups, filling out work sheets, punching paper tapes for update, coordinating ROTL installations, and coordinating procedures with CMS (if appropriate).

12.11 A new CAROT installation should not expect to begin full operation with remote office demand testing, etc, for at least 2 weeks (10 working days) following the acceptance of the controller. The time intervals given to each part of this training period are suggested intervals and

will vary according to local conditions. Intervals may also vary due to one of the following:

- (a) If the new CAROT 2 controller is a conversion from a CAROT 1, the intervals may be shortened. However, the objectives of the training are the same.
- (b) CMS applications are different from non-CMS CAROT centers in several ways. First, in a No. 4 ESS installation, CAROT 2 is generally used only for precutover trunk testing for several months before routine testing is performed. This precutover testing is on a demand basis only, with requests sent by CMS to CAROT 2 over the data link. Second, only equipment and administrative files need be entered directly into the CAROT data base. All trunk and facility data is passed from CMS to CAROT over the data link.

B. Preinstallation Duties

12.12 Prior to installation of the controller, the following activities should already have been completed:

- (a) All CAROT 2 documentation should be collected for use by CAROT personnel (Table E).
- (b) All CAROT center personnel should read the CAROT 2 documentation and become familiar with CAROT System and CAROT controller operations (see training phase 1).
- (c) The plan of equipment installation should be understood so data base updating activities can be planned.
- (d) The first necessary records for the data base should be prepared on the input medium to be used; that is, paper tape or magnetic tape. This includes, in order, the equipment files (responders, ROTLs, test line offices, and test lines) the administrative files (control offices for trunks, ROTL control offices), and the facilities, trunk groups, and trunks for at least one ROTL. Trunk and facility data for additional ROTL offices should be prepared on work sheets. However, the punching of the paper tape may be deferred until it is assured that the initial inputs have been successfully entered into the controller. This procedure is recommended to

prevent the repunching of large amounts of tape due to errors in the format. Section 190-102-203 should be followed carefully in the preparation of data for input. CMS/CAROT 2 installations need prepare only the equipment and administrative files for direct input to the controller. Trunk and facility files are sent by CMS over the data link. CAROT 1-to-CAROT 2 upgrade installations should utilize the program in Section 190-102-301 which converts CAROT 1 trunk maintenance file (TMF) cassettes to the CAROT 2 update format.

(e) All forms, materials, and other consumables (magnetic tapes, paper tapes, line printer paper, etc) are present in appropriate quantities (see J801-250-171 and EL-4226).

C. Day 1

12.13 The following activities should be performed during the first day:

- (a) Perform a system dump/load (SSDLU) of the CAROT operating system.
- (b) Familiarize personnel with equipment, console keys, and computer keys.
- (c) Perform the bootup procedure unit when it is understood.
- (d) After bootup, set NPA and PBX parameters.
- (e) Run a diagnostic on each peripheral device (disk, line printer, etc) unless it was performed during the acceptance test.
- (f) Practice loading and unloading magnetic tapes, paper tapes, and line printer paper.
- (g) Check the controller schedule and understand how to set and change the scheduled times for routine testing, analysis, and update.

Note: For the 10-day training period, the schedule should be set so that update runs daily (weekdays) at 1300. This allows the personnel to gain experience with the controller activities, and also allows extended afternoon update runs while the data base is first being established. Variations of this schedule will occur, however. Set routine testing to begin at 1800 and analysis at 0800 on weekdays. In CMS applications, routine testing with No. 4

ESS ROTLs will not be attempted as long as the routine testing startup dates in the ROTL control record are set to a future date. The machine schedule should nevertheless be set as described above.

- (h) Study and understand how to run updates.
- (i) Make a backup tape of the data base.
- (j) Do not run routine testing the first night; therefore, at the end of day 1, halt the processors and turn off the controller.

D. Day 2

12.14 The following activities should be performed during the second day.

- (a) Power up the controller and perform the bootup procedure.
 - (b) Restore data base with backup tape from day 1.
 - (c) Obtain update tapes containing equipment and administrative files for an update run. The first update input must be equipment files (responders, ROTLs, test line offices, and test lines). The second series of inputs should be the administrative files (control offices for trunks, ROTL control offices, and control offices for facilities).
- Note:** It is recommended that (for non-CMS applications) the facilities, trunk groups, and trunks for at least one ROTL be ready for input on day 2.
- (d) Run update and add data base information in the order discussed above. During the update, personnel should become familiar with the update steps, the update error messages and how to use the documentation to decipher them (see Section 190-102-201), and other material printed out during update. A transaction tape and a backup tape should be made during the update.

- (e) After examining error messages, determine what errors were made on input records, and type up the corrections (on paper tape). Perform another update to add corrected records to data base and to ensure that there are not

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any more errors. Again, make another transaction and backup tape.

- (f) Get printout of all equipment and administrative files.
- (g) For non-CMS applications, set up machine schedule for routine testing as discussed in day 1. If necessary, change analysis time to start before the personnel report to work.

E. Day 3

12.15 The following activities should be performed during the third day.

- (a) Check that analysis has run as scheduled, and get a copy of the test results, operational summary and daily office summary. Determine equipment problems and assign maintenance work.
- (b) Make a backup tape.
- (c) This step should be performed only by CAROT 2 centers with a remote-user multiplex for remote users. Learn how to add remote users to the system, assign passwords, authorize functions, etc. Set up an administrative system to control user numbers (such as, logoff numbers, passwords, control offices, and authorized functions).
- (d) Practice doing demand testing and data displays from console and teletypewriter (TTY). Make a signon message; use warning feature and pass messages between console and TTY.

Note: The data displays should be obtained to familiarize personnel with the format of the printouts. If this is a CMS/CAROT center, some data displays will not be possible at this time.

- (e) Run update to enter trunk and facility files for additional ROTLs. Make a transaction and backup tape.
- (f) In the morning, before personnel arrive, ensure machine schedule is set up for another routine testing period and analysis.

F. Day 4

12.16 The following activities should be performed during the fourth day.

- (a) Check that analysis has run as scheduled, then get a copy of the test results, operational summary and daily office summary. Determine equipment problems and assign maintenance work.
- (b) Make a backup tape.
- (c) Whenever update is not running, make demand tests on trunk troubles found to verify the results and get practice in machine usage.
- (d) Begin data base auditing methods. Check the test results for apparent data base errors, and work with central office personnel to determine errors and corrections. Check that the methods and processes for correcting data base errors are reasonable.
- (e) Continue data base updating.
- (f) Continue routine testing during the night.

G. Day 5

12.17 The following activities should be performed during the fifth day:

- (a) Make a backup tape.
- (b) Examine test results, operational summary, and daily office summary.
- (c) Continue data base auditing procedures.
- (d) Continue practicing demand testing and data displays from the console and TTY.
- (e) For CAROT 2 centers with the remote-user multiplex, begin planning and preparing a training and orientation session for central office personnel. Set up a tentative schedule for these sessions according to ROTL completion schedules. Do not plan to hold a training session until day 11, in order that the CAROT personnel may first become completely familiar with the operation of the controller. There should be a one-half day training on the use of the TTY. Subjects

to be covered should include an overview of the CAROT System, responsibilities of the CAROT center and ROTL offices, test results printouts and how to read them, priorities of Q2, trunks not tested, Q1s, etc. CAROT 2 remote-user language and TTY training, and all relevant documentation should be distributed.

- (f) Continue data base updating.
- (g) Continue routine testing during the night.

H. Day 6 Through Day 10

12.18 For these five days, the procedures should be similar to the schedule for day 5. The objective is for the personnel to become expert at running the controller and the CAROT center before full operation is assumed. All procedures in Sections 190-102-301 and 190-102-305 should be practiced. These include such functions as changing ROTL startup times, changing the date for a ROTL to begin routine testing (so faulty ROTLs will not be scheduled for a given night's test run), and removing faulty test lines from the data base. A practice training session for central office personnel should be held to ensure that any slides, viewgraphs, talks, papers, etc, are suitable.

ONGOING CAROT 2 CENTER TASKS

12.19 The following tasks must be performed on a daily basis at a CAROT center. They are listed in the approximate order of occurrence.

- (a) Get printout of routine testing results and operational summary from line printer.
- (b) Make a backup tape, label with Julian date, and store.
- (c) Get copy of daily office summary.
- (d) Update the signon message to reflect the present situation (such as, on early update run).
- (e) Make controller available for remote users.
- (f) Report Q2 trunks to non-TTY offices.

Note: The above tasks should be completed as soon as possible after starting work in the morning. This ensures that central office

personnel is able to get and act on their routine test results before the morning traffic buildup.

- (g) Analyze daily office summary and operational summary to identify ROTL and responder problems and to check the results of previous maintenance work.
- (h) Plan and assign corrective maintenance schedule for the day according to troubles in test results printout.

12.20 All of the above tasks are usually completed during the first one or two hours of the day. The following tasks are, in general, also performed daily, but the time spent on each varies according to local procedures.

- (a) Continue the ongoing data base work. This includes entering data for new ROTLs, data base examination procedures, and making corrections and edits as necessary.
- (b) Oversee the administration of test results utilization. This includes maintaining a log of Q2s and their repair disposition; periodically examining management summaries and test results for offices to find chronic large numbers of Q2s, Q1s, permanent busies, and high and dries; and providing assistance to central office personnel on remote usage and occasional repair or measurement problems.
- (c) Assistance to the CAROT System equipment maintenance force (such as, demand or interrogator tests), and maintain reports on results of equipment repairs.
- (d) Prepare the controller for update and routine testing. This includes the preparation of paper tapes or console update transactions.

Note: A log of such transactions should be maintained for future reference.

12.21 The following tasks are also the responsibility of the CAROT center, but are not performed on a daily basis:

- (a) Compile trunk transmission maintenance index data for computation by the responsible organization.

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(b) Compile management summaries of routine test results for the appropriate levels of management.

(c) Conduct training and orientation sessions for ROTL office personnel. This should

include TTY remote-user training for offices with TTYs.

(d) Maintain a log of remote-user numbers which have been assigned. This should include the control office, functions authorized for the user, password, etc.