ROUTINE OPERATIONS AND MAINTENANCE PROCEDURES

CONTENTS PAGE

1. INTRODUCTION

1.1 PURPOSE

This Routine Operations and Maintenance Manual contains both descriptive material and detailed procedures for routine operations and maintenance of the 5ESS® switch. This manual covers the 5E2(2) through 5E8 software releases. As the 5ESS switch continues to evolve, this manual will be reissued to cover future software releases.

This manual is primarily intended for telephone company personnel who schedule or perform routine maintenance for the 5ESS switch.

1.2 UPDATE INFORMATION

> *Note:* The copyright notice is no longer required on each page of this document. The notice on the back of the title page applies to the entire document. Therefore, the removal of this notice from pages provided in this update must not be construed as the relinquishment of the copyright.

This document has been renumbered from the 5D5 numbering plan to the 235 numbering plan. The cover, title page, and all changed and reissued pages carry the new number. The pages not updated will continue to carry the old number until they are changed or reissued. The 235 number replaces only the first three digits of the document number. The remaining six digits are unchanged. If you currently have this document on standing order, your order has been automatically changed to the new number.

The 5D5 to 235 renumbering also affects any former 5D5 document references. In addition, the Input Message Manual (formerly IM-5D000-01) and Output Message Manual (formerly OM-5D000-01) have been renumbered to AT&T 235-600-700 and AT&T 235-600-750, respectively. Any references to affected documents have been changed, on the updated pages only, to reflect the 235 numbering plan.

Two exceptions to the 5D5 to 235 renumbering are the Operator Services Position System (OSPS) documents which changed from 5D5 to 250 and Commercial Automatic Call Distributor (C-ACD) documents which changed from 5D5 to 475. Any references to these documents have been changed accordingly.

Also, AT&T is changing its terminology for "generic program" and "Broadcast Warning Message" to "software release" and "software update," respectively. This document employs the new terminology except in those situations where screen displays and Input/Output (I/O) messages still include the term BWM. For the purpose of clarity and to avoid confusion, BWM is shown in these screen displays and I/O messages and is included in the text describing them.

Issue 7.00 (July 1992) is a page update to support 5E2(2) through 5E8 software releases. Procedures have been added to Section 3 to support changes to the nailup process. Section 8 has a new procedure for replacing small computer system interface (SCSI) disk modules. Procedures have been added to Section 9 for provisioning the integrated digital carrier unit (IDCU). Section 11 has had minor changes to support the routine exercise feature.

Issue 7.01 (September 1992) is a page update to support 5E2(2) through 5E8 software releases. Procedure 3.7 has been modified to accommodate testing both the 2-amp charge-probe circuit and the new 15-amp charge-probe circuit. Procedure 8.36 has been modified to correct an input message command. Procedures 8.38 and 8.39 have been added to provide a way to off-line pump switching modules. Procedure 9.82 has been added to provide a method of dumping automatic message accounting (AMA) blocks to the receive-only printer (ROP).

1.3 MANUAL ORGANIZATION

This manual contains the following sections (tabs):

- ***SECTION 1—INTRODUCTION:*** Contains an introduction to AT&T 235-105-210.
- ***SECTION 2—EQUIPMENT TEST LIST:*** Lists preventive (routine) maintenance schedules for the 5ESS switch. Preventive maintenance is performed on a specified schedule to ensure continuing peak overall performance of the network.
- ***SECTION 3—OPERATIONS:*** Describes system control functions and/or procedures. The nailup procedures have been updated to support the new IDCU equipment. Procedure 3.7 has been modified to accommodate testing both the 2-amp charge-probe circuit and the new 15-amp charge-probe circuit.
- ***SECTION 4—MEMORY ALTERATION DESCRIPTION:*** Contains a description of the changes possible within the 5ESS switch data base. Covered within this section are software release update, office backup methods, office dependent data (ODD) backup, ODD recovery, editing the data base using the office data base editor (ODBE), and software release retrofit.
- ***SECTION 5—MEMORY ALTERATION PROCEDURES:*** Contains detailed level procedures for the subjects described in Section 4 of this manual.
- ***SECTION 6—ABNORMAL INPUT MESSAGE ACKNOWLEDGMENTS:*** Contains detailed level procedures for resolving abnormal input message acknowledgments, trunk and line work station acknowledgments, and recent change acknowledgments.
- ***SECTION 7—FAN AND ALARM TESTS:*** Contains detailed level procedures for fan and alarm tests. This section also contains procedures to change fan unit air filters.
- ***SECTION 8—MOVING HEAD DISK PROCEDURES:***

  > ***Note:*** Refer to AT&T 235-105-220 for Call Trace Procedures. These procedures were in Section 8 in earlier issues of AT&T 235-105-210.

  Contains detailed level procedures for converting, connecting, or replacing moving head disks (MHD). It also contains disk reconfiguration procedures for the 5E2(2) through 5E8 software releases. The 5E8 software release requires a "large" primary SCSI disk. Therefore, if the growth of SCSI disks to an office currently equipped with only SMD disks is contemplated, a conversion to SCSI primary disks with SMD disks as outboard disks is recommended since the 5E8 software release requires this conversion. A new procedure is provided for replacing a SCSI disk module. Procedure 8.36 has been modified to correct an input message command. Procedures 8.38 and 8.39 have been added to provide a way to off-line pump switching modules.

- ***SECTION 9—MISCELLANEOUS ROUTINE PROCEDURES:*** Contains detailed level procedures to bring up the 5ESS switch operations support systems (OSS). It also contains procedures to record announcements using the 13A recorded announcement unit. Procedure 9.82 has been added to provide instruction on dumping AMA data to the ROP. Procedures 9.83 through 9.95 have been added to support IDCU provisioning.
- ***SECTION 10—REMOTE OFFICE TEST LINE:*** Describes the functions and equipment of the remote office test line (ROTL) for the 5ESS switch.
- ***SECTION 11—ROUTINE EXERCISE PROCEDURES:*** Provides a description of the 5ESS switch routine exercise (REX).
- ***GLOSSARY:*** Provides brief definitions of acronyms and abbreviations used in this manual.
- ***INDEX:*** Lists the subjects covered in this manual.
- ***APPENDIX:*** Contains a job aid for the operations and maintenance checklist.

1.4 USER FEEDBACK

The producers of this manual are constantly striving to improve quality and usability. Please use the enclosed user feedback form for your comments and to advise us of any errors. If the form is missing or your comments will not fit, you can write to the following address:

AT&T NETWORK SYSTEMS
Department NN2413400
2400 Reynolda Road
Winston-Salem, NC 27106

Please include the issue number and/or date of the manual, your complete mailing address, and telephone number. We will attempt to answer all correspondence within 30 days, informing you of the disposition of your comments.

You may also call our Documentation HOT LINE if you need an immediate answer to a documentation question. This HOT LINE is not intended to eliminate the use of the user feedback form, but rather to enhance the comment process. The HOTLINE number is ***1-800-334-0404*** and it is available from 7:30 a.m. to 4:30 p.m. Eastern time (within North Carolina, dial ***1-919-727-6681***). Outside of those hours, the line is served by an answering machine. You can leave a message on the answering machine and someone will return your call the following business day.

Also, document users who have access to UNIX* system electronic mail facilities may send comments via electronic mail. The electronic address is **att!wrddo!hotline5**. Please make sure that the document title, number, and issue number are included in the mail along with the sender's name, phone number, and address.

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1.5 DISTRIBUTION

This manual is distributed by the AT&T Customer Information Center in Indianapolis, Indiana. Most operating telephone companies should place orders through their documentation coordinator. Some companies may allow customers to order directly from the Customer Information Center; however, the majority do not. Companies that use documentation coordinators to manage their orders receive a significant discount. If you do not know the name/number of the documentation coordinator for your company, you may call ***1-800-432-6600*** to obtain the name and telephone number.

Customers not represented by a documentation coordinator and AT&T employees can order the documentation for the 5ESS switch directly from the AT&T Customer Information Center. Proper billing information must be provided. These orders may be mailed to:

AT&T Customer Information Center
Order Entry
2855 N. Franklin Road
Indianapolis, IN 46219

Orders may also be called in on ***1-800-432-6600*** or faxed in on ***1-317-322-6484***.

1.6 TECHNICAL ASSISTANCE

Technical assistance for the 5ESS switch can be obtained by calling the Regional Technical Assistance Center (RTAC) at ***1-800-225-RTAC***. This telephone number is monitored 24 hours a day, 7 days a week. During regular business hours, your call will be answered by your local RTAC. Outside of normal business hours, all calls will be answered at a centralized technical assistance center where service-affecting problems will be dispatched immediately to your local RTAC. All other problems will be referred to your local RTAC on the next regular business day.

1.7 MAINTENANCE OF VENDOR EQUIPMENT

The 235-xxx-xxx manuals do not provide maintenance procedures for the repair of equipment manufactured by vendors other than AT&T (for example, tape drives, disk drives, etc.). To identify the appropriate maintenance document for other vendor equipment, refer to Section 3 of AT&T 235-001-001, *Documentation Description and Ordering Guide*.

1.8 REFERENCES

Documents for the Control Data Corporation 300-megabyte (MB) disks (KS-21995,L1 and KS-22072,L1) may be obtained from:

Control Data Corporation
Literature Distribution Services
308 North Dale St.
St. Paul, MN 55103
TEL: (612) 482-3800

Document numbers and titles for the Control Data Corporation 300-MB disk equipment are shown as follows:

- 83323430 — Hardware Maintenance Manual
- 83323440 — Hardware Reference Manual
- 83322440 — Normandale Circuits Manual
- 83323780 — Disk Drive Operator Manual.

Document numbers and titles for the Control Data Corporation 340-MB disk equipment are shown as follows:

- 83325050 — Hardware Maintenance Manual, Volume 1
- 83325060 — Hardware Maintenance Manual, Volume 2
- 83325070 — Hardware Maintenance Manual, Volume 3
- 83322440 — Microcircuits Manual, Volume 1
- 83324440 — Microcircuits Manual, Volume 2.

Documents for the Laser Magnetic Storage International Company tape units (KS-22762 and KS-23113) may be obtained from:

Laser Magnetic Storage International Company
2621 Van Buren Avenue
Norristown, PA 19403
TEL: (215) 666-4755

Document numbers and titles for the Laser Magnetic Storage International Company tape units are shown as follows:

- 49762900 — Reference Manual — Model 92185
- 49763000 — Vertical Mount Maintenance Manual — Model 92185
- 49768900 — Reference Manual — Model 92181
- 49769000 — Maintenance Manual — Model 92181.

Documents for the Century Data Systems 300-MB disks (KS-21995,L2 and KS-22072,L2) may be obtained from:

Century Data Systems, Inc.
1270 North Kraemer
Anaheim, CA 92806
TEL: (714) 632-7500

Document numbers and titles for the Century Data Systems 300-MB disk equipment are shown as follows:

- 76261-301 — Maintenance Instruction Manual
- 76261-701 — Maintenance Diagrams.

The document for the Datamedia Corporation KS-22921,L1 Datamedia COLORSCAN*/2 LAN PC/workstation that is used in the 5ESS switch master control center (MCC) may be obtained from:

Datamedia Corporation
ATTN: Customer Services Department
7401 Central Highway
Pennsauken, NJ 08109
TEL: (609) 665-5400

The document is 098MKS2290 — Maintenance Manual.

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3. OPERATIONS

INTRODUCTION

This section contains both descriptive material and detailed level procedures for system control functions and other operations associated with the 5ESS® switch. Some operations or system control functions can be performed by means of stand-alone input messages. In such cases, only a brief explanation of the function or the way to use the input message will be given. If a certain message sequence is required, there will be a procedure available to perform the functions correctly. The system control functions described in this section are as follows:

- ***Date and Time:*** Describes when and how the date and time can be set as well as the input messages to change the date and/or time.
- ***Alarm System Management:*** Describes the input messages necessary to perform alarm release and to assign alarm levels and labels, and the allowing or inhibiting of alarm reports.
- ***Command and Test Scheduling:*** Describes the four processes (automatic line insulation tests, automatic progression testing, office dependent data back up, and routine exerciser) that can be scheduled automatically by means of input messages. How to schedule these processes and how to change already scheduled ones are discussed.
- ***File and File System Management:*** Gives a brief explanation of all the possible input/output messages and some examples of how to use these messages. Since there are a variety of input messages to manage files and the file system, it is impossible to show standard procedures.
- ***Log File Handling:*** Detects and corrects transient errors or determines a chronological order of events. How these log files are built up and what types of log files are present in the system are described.
- ***Network Management:*** Avoids degrading of the network because of too many call attempts. One of the management capabilities is the automatic or manual trunk group controls. What these controls are used for and how it is possible to manipulate these controls by means of input messages are described.

The following subjects are also covered in this section.

- ***Office Record Form:*** Contains a detailed level procedure to print the office record form(s).
- ***Loading AMA Tapes:*** Contains procedures for loading and verifying AMA tapes.
- ***Preventive Maintenance for Tape Drives and Moving Head Disks:*** Covers preventive maintenance for moving head disks and procedures for testing the KEYSTONE* III tape drives when the drives are new and each time before making office backup tapes.
- ***Testing Power Distribution Frame Charge Circuit:*** Contains a procedure for testing the charge circuit (CHG CKT) in the power distribution frame (PDF). This test should be run every 6 months to ensure operational capability.
- ***Implement Nail-Up for Intra-Office Off-Premises Station Application***: Contains procedures to implement nail-up for intra-office off-premises station application.
- ***Modem Pooling***: Describes modem pooling application within the integrated services digital network (ISDN) environment.

DATE AND TIME

SET DATE AND TIME AFTER INITIALIZATION

After system initialization, the time and date have to be set. This can be done by using the **SET:CLK** input message. This message sets the system clock to the specified date and time or adjusts the system clock by plus or minus the seconds specified.

CHANGING DATE AND TIME

Changing the date and/or time can be done together or independently from one another. In a normal operating exchange, the date will not have to be changed. However, when a system clock failure occurs, the date might have to be changed after recovery. This can be done by means of the input message previously mentioned.

Changing the time can be necessary after a system clock failure or when the time has to be changed to daylight-savings time.

When changing date and time in an operating exchange, first check whether there are scheduled tests or ODD backups present. This can be done by entering the **OP:BKUPSTAT** input message. If there are some tests scheduled or ODD backups at the time the clock will be changed, it may be necessary to reschedule those tests. For example: if an ODD backup is scheduled and date and time has to be changed until a time past the scheduling, this ODD backup will be bypassed. In such a case, the backup might be rescheduled.

It is also possible to check whether scheduled routine exercises have been bypassed. This can be done by entering the **OP:ST-REX** input message.

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ALARM SYSTEM MANAGEMENT

GENERAL

The alarm system management is used to set or clear manual or automatic alarm release, to assign level and labels on scan points, and to provide alarm control.

ALARM RELEASE

The critical and major alarms in an exchange can be released manually or automatically. When the alarm mode is manual, the alarms have to be released by pressing the **ALM RLS** function key at the master control center (MCC) video terminal. If the alarm mode is set to automatic release, the alarms will be released in 5 seconds by the system.

Automatic or manual alarm release can also be activated by means of the menu commands 800 and 801 at the MCC Page 105/106—BLDG/POWER & ALARM CNTRLS. Minor alarms will be released automatically all the time, independent of the alarm release mode.

ALARM LEVEL AND LABEL ASSIGNMENTS

Alarm level and label assignments can be given to building or miscellaneous alarms. The assignments are shown at the MCC Pages 105/106—BLDG/POWER & ALARM CNTRLS and 119—MISCELLANEOUS ALARMS. The alarm level can be major or minor.

The label can consist of a maximum of nine upper-case characters, that is, letters, digits, spaces, plus, or minus signs. When a label has been assigned, the report data will show the old and new label. Once level and label are filled in, they are protected from loss when the system is booted.

ALARM CONTROL

Some alarms can be inhibited or allowed manually from alarm reporting. These alarms are as follows:

- Building power alarms
- External sanity power alarm
- Fan or fuse alarms of the time multiplex switch (TMS) or the message switch (MSGS)
- Miscellaneous alarms.

When a building power alarm is inhibited, the respective indicator at the MCC Page 105/106 will show the abbreviation INH in reverse video. Also the words BLDG INH in the SUMMARY STATUS AREA will be backlighted. To inhibit or allow building power alarms, one can use the appropriate input message or the menu command (shown at the MCC Page 105/106).

The external sanity monitor power alarm indicator is shown at the MCC Page 116—MISCELLANEOUS. Once the alarm is inhibited, the INHIBIT indicator will be in reverse video. Also this alarm can be inhibited or allowed by either the input message or the menu command at the appropriate MCC page.

The MSGS, TMS, and ONTC fan or fan fuse alarms can be inhibited by the system. When such an alarm is inhibited, this is shown at MCC Page 115—COMMUNICATION MODULE SUMMARY. The reason an alarm will be inhibited is because the respective scan point is chattering. After solving the problem, the alarm can be allowed again by entering the input message:

If MML, **ALW:ALM,MSGS=b;**
or
ALW:ALM,TMS=b;
or
ALW:ALM,ONTC=b;

If PDS, **ALW:ALM,MSGS b!**
or
ALW:ALM,TMS b!
or
ALW:ALM,ONTC b!

Where: b = unit number **0** or **1**

The miscellaneous alarms can be allowed or inhibited manually by means of the appropriate input message or the menu command at the MCC Page 119—MISCELLANEOUS ALARMS. When the alarm is inhibited, the INH indicator will backlight. Also the INHIBIT indicator of MISCELLANEOUS ALARMS at MCC Page 116 will be in reverse video. The miscellaneous frame fuse alarm can be inhibited by the system once the scan point is chattering. After solving the problem, the alarm can be allowed by entering the following input message:

If MML, **ALW:ALM,MFFUSE=b;**

If PDS, **ALW:ALM,MFFUSE b!**

Where: b = miscellaneous frame fuse unit number **0** or **1**

When this alarm is inhibited, the abbreviation INH is displayed in reverse video at the right of MISC FRAME FUSE ALARM.

COMMAND AND TEST SCHEDULING

GENERAL

There are eight processes that can be automatically scheduled by means of input messages. The processes are as follows:

- Automatic line insulation test
- Automatic progression testing
- Office dependent data (ODD) backup
- Routine exerciser
- Automatic line evaluation
- Per call test failure
- Stuck coin failures
- Automatic mismatch detection.

AUTOMATIC LINE INSULATION TEST (ALIT)

The automatic line insulation test (ALIT) scans lines to detect leakage to battery or ground and to notice unpressurized or under pressurized line cables. The ALIT is scheduled by means of recent change data. Which parameters have to be filled in can be found in AT&T 235-118-2XX, View 8.1—OFFICE PARAMETERS. If only for one time the ALIT has to be run at a different time, the parameters for the next ALIT can be changed by the input message **EXC:LIT?**. The second next ALIT session will run at the normal schedule time again. So if a complete rescheduling of the ALIT is necessary, the parameters have to be changed by means of recent change.

To verify how the next ALIT session has been scheduled, the **OP:LIT** input message can be used. Once an ALIT has started, it will generate an autonomous report. When the switching module (SM) is in minimum mode, like by initialization, the ALIT will be skipped or suspended. When the SM is fully initialized or in normal mode, ALITs will be run normally. When the report indicates that the test is suspended, this can also be caused by system overload. In that case, a report **OP LIT ACTIVE** will be displayed later when the ALIT resumes.

There are two reports indicating the completion of an ALIT. One will indicate that all lines have been tested in the scheduled time. The other report indicates that the test has stopped because the allotted time for the ALIT ran out. The test will be terminated gracefully. If all lines have to be tested, the parameters of the ALIT have to be changed by the **EXC:LIT** input message.

It is also possible to demand line insulation tests. They are called demand line insulation tests (DLIT). These tests can be requested for one directory or line equipment number.

AUTOMATIC PROGRESSION TESTING

An automatic progression test (APT) is performed on outgoing trunks. This test can indicate incorrect office dependent data, wiring or cross-connect errors, or faulty trunk circuit hardware. This test is scheduled by means of recent change procedures. Which parameters must be entered can be found in AT&T 235-118-2XX. Like the ALIT, an APT can be rescheduled once by means of the **SCHED:APT** input message. When APT is to be rescheduled definitely, the parameters must be changed by means of recent change.

To verify how the next APT has been scheduled, the **OP:APT** input message can be used. When an APT has started, an autonomous report **RPT APT STARTED** will be displayed. In APT, a history keeps track of information concerning the tests. This allows interruptions of the testing cycle when the trunks are needed for service or when the scheduled test time has run out. This will be indicated by an autonomous SUSPEND or STOP report. When the whole test cycle has completed, an autonomous COMPLETED report will be displayed. When an APT has been suspended, testing should resume again within 2 hours; otherwise, the APT will be aborted.

OFFICE DEPENDENT DATA BACKUP

The office dependent data (ODD) backups can be done on a scheduled basis. The actual time interval between scheduling ODD backups depends upon operating company practices. When scheduling ODD backups, it is better to schedule a differential dump. As this is the default, the parameter FULL must not be specified in the **BKUP:ODD** input message. When an ODD backup fails, a minor alarm will be generated. To reset the scheduled backup, the **CLR:ODDBKUP** input message can be used. Scheduled ODD backups can be shown by entering the **OP:BKUPSTAT** input message. When no backups are scheduled, the system response will be **NG**.

Refer to Section 5 of this document for detailed procedures on ODD backup.

ROUTINE EXERCISE

Refer to Section 11 of this document for descriptive and detailed procedures for routine exercise (REX).

AUTOMATIC LINE EVALUATION (ALE)

The ALE provides a daily summary report of digital subscriber lines (DSL) that have experienced transmission or protocol faults during that day. The report is composed of three parts: level 1, level 2, and protocol error records (PER).

The level 1 portion of the report includes all U-interface DSLs where the level 1 error performance has exceeded a prespecified threshold. The threshold for each DSL is defined by the daily report threshold maintained on RC/V view 22.15, Performance Monitoring Groups. The group that is assigned to a DSL is given in RC/V views 22.7, 23.2, and 23.8. For more information on the contents of the level 1 summary report, see the EXC:ALE-LEVEL1 output message.

The level 2 portion of the report includes all IDSN DSLs and trunks where the level 2 error performance has exceeded a prespecified threshold, that is, more than 2% of the received layer 2 frames have been received in error. For more information on the contents of the level 2 summary report, see the EXC:ALE-LEVEL2 output message.

The PER portion of the report includes all ISDN DSLs and trunks where at least one PER has been recorded. For more information on the contents of the PER summary report, see the EXC:ALE-PER output message.

Each of the summaries may be separately allowed or inhibited for the entire office. Also, the information for the reports may be directed at one of two message classes, that is, PRFM or PRFMMON. See the ALW:ALE and INH:ALE input messages for details.

The execution time for the daily automatic report is determined using RC/V view 8.1 to specify the performance monitoring start time.

In addition to the daily level 1 report, there are also level 1 interval reports. These interval reports will report all U-interface DSLs that have exceeded their respective interval report thresholds maintained on RC/V view 22.15, Performance Monitoring Groups. Only the 2B1Q (ANSI) U-interface DSL line card is supported by the interval report feature. The AT&T AMI U-interface DSL line card is not supported. Interval reports are not output. They are directed to the disks where the last interval report generated is available upon demand.

The hours between interval reports is determined by the performance monitoring REPORT INT global parameter maintained on RC/V view 8.1. The default interval is 1 (one) and can be set to values that are factors of 24 (1, 2, 3, 4, 6, 8, 12, 24).

For each DSL that is indicated on the level 1 or level 2 report summary, follow procedures specified in AT&T 235-105-220 (Procedure 2.3) for clearing line problems.

PER-CALL TEST FAILURE (PCTF)

As of the 5E6 software release, an individual REPORT PCTF output message will no longer be sent to the receive-only printer (ROP) for every PCTF as it occurs. Instead, a REPT PCTF SUMMARY report will be sent to the ROP on a periodic basis determined by the value in the PCTF interval global parameter (see RC/V view 8.1). The summary report will contain an entry for each port and High-Level Service Circuit (HLSC) which has experienced at least one PCTF since the previous automatically generated report was output. Each entry will indicate the PCTFs that have occurred by their type and count.

The PCTF report period can be set to occur every 15 minutes, 30 minutes, 45 minutes, 60 minutes, 6 hours, or 24 hours. The default is every 60 minutes (1 hour).

In addition to the automatic summary reports, the ability to manually request PCTF summary reports is provided via the input message OP:PCTF. Termination of the manual reports can be requested by entering the new STP:PCTF input message. By default, the summary reports will also be sent to the Switching Control Center (SCC).

Individual REPT PCTF messages will only be sent to the Repair Service Bureau (RSB) by default. The reporting of the individual PCTFs to the RSB is controlled by the PCTF verbose option on a per-SM basis. The PCTF verbose option can be altered via the ALW:PCTF,VERBOSE or INH:PCTF,VERBOSE input messages. The default for the verbose option is inhibited. An SM which is in the verbose mode will report all PCTF occurrences to the RSB by sending the normal REPT PCTF message. However, an SM which is not in the verbose mode will only report the first and tenth occurrence of a PCTF type on a line to the RSB. The first occurrence generates a REPT PCTF FIRST message and the tenth occurrence generates a REPT PCTF TENTH message.

The Touch Tone Fraud (TTF) PCTF is handled in a slightly different manner than the rest of the PCTF types. First of all, the individual REPT PCTF TTF messages are also sent to the SCC at all times; the mode of the SM has no affect on the reporting of the TTF PCTFs to the SCC. Secondly, the TTF PCTFs will not be reported to the RSB at all if the system is not in the verbose mode.

To resolve problems specified in the PCTF summary report, follow procedures specified in AT&T 235-105-220 (Procedure 2.3) for clearing line problems.

STUCK COIN FAILURES (SCF)

Stuck Coin Failures are reported at routine intervals. At each routine interval, the entire list of coin phones which have experienced stuck coin failures during the previous interval are printed (using the REPT SCF output message). The list of stuck coin failures that have occurred during the current interval can also be requested manually (using the OP SCF input message).

The SCF reporting is administered using RC/V to update the COIN INT global office parameter (see RC/V view 8.1). The allowed values for COIN INT are 15, 30, 45, and 60, corresponding to the number of minutes between interval reports of the stuck coin list.

The SCF report indicates the number of stuck coin failures on an individual coin line. When a stuck coin is detected, a second attempt to clear the coin is made. If the coin clears on the second attempt, the failure is recorded as a single attempt failure (1F). If both attempts fail, the failure is recorded as a dual attempt failure (1+2F). A count is maintained of the number of failure attempts (if both 1F and 1+2F failures occur, then only the number of 1+2F failures are retained).

To resolve problems specified in the SCF report, follow procedures specified in AT&T 235-105-220 (Procedure 2.3) for clearing coin line problems.

AUTOMATIC MISMATCH DETECTION

This section describes the NT1 mismatch test that is new for the 5E6 software release. This test performs Integrated Services Line Unit (ISLU) Network Termination (NT1), or first Basic Rate Interface Transmission Extension (BRITE) Channel Unit (CU), mismatch detection for U-interface Digital Subscriber Lines (U-DSLs). This test is needed because with the introduction of the 5E6 software release, two types of U-DSL technologies exist. The NT1/CU mismatch detection will detect if the wrong type of NT1 or CU is connected to the ISLU U-card.

The two types of ISLU U-DSL technologies in 5E6 are commonly referred to as:

- Alternate Mark Inversion (AMI) - this is the U-DSL service provided by the KCB10 U-card available in 5E4(2) and later software releases.
- American National Standards Institute (ANSI) 2B1Q Standard U-DSL - this is the U-DSL service that is new to 5E6 and is provided by the KCB17 ISLU U-card.

A mismatch exists if either one or both of the following conditions exist.

- The line card installed in the line card slot does not match the type of service assigned to the customer at line card provisioning time. An example is if the customer subscribes to AMI U-DSL services, but an ANSI U-card is installed in the line card slot. This is a line card mismatch.
- The NT1 or first BRITE CU that is connected to the U-card does not match the type of service assigned to the customer at line card provisioning time. An example is if the customer subscribes to AMI U-DSL services, but an ANSI NT1 is installed at the customer's premises. This is an NT1 mismatch.

The automatic mismatch test runs an electrical test on the U-card tip and ring, applying voltages and measuring currents, to determine what might (or might not) be connected to the U-card loop. The goal is to prevent mismatches, namely, to have ANSI Standard U-cards connected to ANSI Standard NT1s or CUs, and to have 5E4 AMI U-cards connected to AMI NT1s or CUs.

On an hourly basis, the automatic mismatch test runs on all U-cards that have D-channel port status indicating that ISDN layer 1 is not established at the 2-wire U-interface. Layer 1 may not be established because of a mismatch condition. When the automatic mismatch test detects a mismatch, then the D-channel port status supplementary information is updated to MSMTCH to indicate the mismatch condition, and a summary report is printed to the ROP for all U-DSLs that are found with a mismatch condition.

There are several office parameters that provide control of the automatic mismatch test, and the automatic mismatch test report. They are mismatch detection enable and report parameters found under RC/V view 8.1.

- ***ENABLE:*** This parameter allows or inhibits the automatic mismatch test from running in the entire office.
- ***REPORT:*** This parameter allows or inhibits the automatic mismatch test report from printing in the entire office.

There are additional controls for automatic mismatch and its report. These controls are on a switching module (SM) basis and can be used to inhibit or allow the automatic mismatch mechanism. This is controlled through the input messages INH:MISMATCH and ALW:MISMATCH. However, the SM controls are subordinate to the office parameters. This means that if the office parameter is set to no, then the SM controls have no affect.

FILE AND FILE SYSTEM MANAGEMENT

INTRODUCTION

Maintaining the file system includes the following:

- Checking file system resources
- Manipulating files
- Using the file system audits
- File system corruption detection [system integrity verification (SIV)]
- Backing up and restoring file systems.

GENERAL

This subject lists and briefly describes the input messages and reports used in managing files and the file system. These messages and responses are used in performing various actions such as reporting the contents of a file or directory and copying a file from an active disk to an off-line or out-of-service disk.

The input/output messages are categorized according to the function performed on the file or file system and how they are used (Type). The different functions and the corresponding tables are as follows:

- File System Control—Table 3-1
- File Modification and Retrieval—Table 3-2
- File Transfer and Backup—Table 3-3
- Maintenance Tools—Table 3-4.

The three types of input/output messages are routine, troubleshooting, and permanent. Routine messages are used periodically to determine actual or potential troubles in the system. The troubleshooting messages are used to clear troubles and will not cause permanent changes to the system. The messages labeled permanent can cause permanent changes in the file structure or process structure of the system. Permanent messages should be used upon concurrence with the local technical assistance organization or as directed in a software update.

A detailed description of these input messages can be found in AT&T 235-600-700 (formerly, IM-5D000-01) and a detailed description of these output messages can be found in AT&T 235-600-750 (formerly, OM-5D000-01).

CHECKING FILE SYSTEM RESOURCES

The **REPT FS** output message warns that a file system is about to run out of space. Immediate action must be taken to provide more space in the file system. Contact your technical assistance organization to determine the files that can be removed to provide file system space (for example, software update history).

File system free space can be monitored and action can be taken before the free space is used up. The command **OP:STATUS:FREEDISK** reports the free space and free i-nodes in the mounted file systems. Monitor these numbers regularly to determine if space or i-nodes are being depleted.

Running the file system block audit may increase the free space in a file system if the audit finds lost resources that it can recover. Note that no error is reported when lost free disk blocks are recovered.

The allocation of disk space to contiguous files is limited to the size of the largest set of contiguous free disk blocks in the file system. In a fragmented file system, this may be considerably less than total free space. The compaction audit can be used to increase the size of contiguous free disk space.

TABLE 3-1 FILE SYSTEM CONTROL		
MESSAGE/RESPONSE NAME (Note 1)	**TYPE**	**DESCRIPTION**
ALW:FSYS-ACCESS	Permanent	Changes access permission of files.
ALW:FSYS-MOUNT	Permanent	Mounts an unmounted file system so that the system can access files in the file system.
CLR:FSYS-OWNER	Permanent	Changes the owner of a file. All operating system files are owned by root.
CLR:FSYS-DIR	Permanent	Removes a directory from the file system.
CLR:FSYS-FILE	Permanent	Removes a file from the file system.
COPY:FSYS-CFILE	Permanent	Copies a file to a contiguous area of the disk. Contiguous files are transferred from disk to main memory more quickly than regular files.
COPY:FSYS-FILE	Permanent	Makes another copy of a file in a different directory. The copied file has the same name as the original file.
IN:FSYS-DIR	Permanent	Creates a new directory in the file system.
OP:ST-DISKUSE	Troubleshooting	Reports the number of blocks contained in all files and directories within each specified directory or file name.
OP:ST-FILESYS	Routine	Lists all currently mounted file systems, the directory under which they are mounted, and the time they were mounted.
OP:ST-FREEDISK	Routine	Lists the mounted file systems with the number of free blocks and free i-nodes. Used to determine if file system space is being depleted.
OP:ST-LISTDIR	Routine	Reports the contents of a specific directory or file.
REPT:FILESYS	Troubleshooting	This autonomous report warns that a file system within the central processor is about to run out of space.

Note:

1. The message/response names as presented in this table are not intended to be typed into the system. These names are provided so the user can reference these messages in AT&T 235-600-700, *Input Message Manual*, and AT&T 235-600-750, *Output Message Manual*, for the correct syntax.

TABLE 3-2

FILE MODIFICATION AND RETRIEVAL

MESSAGE NAME (Note 1)	TYPE	DESCRIPTION
IN:F-APND-A	Permanent	Appends a line to an American Standard Code for Information Interchange (ASCII) file.
IN:F-DEL	Permanent	Deletes one or more lines from an ASCII file.
IN:F-REPL	Permanent	Replaces lines in an ASCII file with user supplied lines.
DUMP:F-ALL	Troubleshooting	Prints the contents of an ASCII file on the receive-only printer.
DUMP:F-DATA	Troubleshooting	Prints the contents of a file in the specified format.
DUMP:F-PARTL	Troubleshooting	Prints one or more lines of an ASCII file.

Note:

1. The message/response names as presented in this table are not intended to be typed into the system. These names are provided so the user can reference these messages in AT&T 235-600-700, *Input Message Manual*, and AT&T 235-600-750, *Output Message Manual*, for the correct syntax.

TABLE 3-3 FILE TRANSFER AND BACKUP		
MESSAGE NAME (Note 1)	**TYPE**	**DESCRIPTION**
COPY:ACTDISK	Permanent	Copies a file from an active disk to an off-line or out-of-service disk.
COPY:CPOOSF	Permanent	Copies a file from an out-of-service disk to an active service disk.
COPY:CPSPDISK	Permanent	Copies a specific partition or a list of partitions from one of the system disks to an active spare disk.
COPY:PTN:ALL	Permanent	Copies one set of partitions into a corresponding set of partitions. This message is used to recover mutilated disk partitions from backup disk partitions and to generate partition backup copies.
COPY:TAPE-IN	Permanent	Copies files from a magnetic tape containing full or relative pathnames and header information, and places them in their respective directories. The message can also print a table of contents of the tape.
COPY:TAPE-OUT	Permanent	Copies one or more files to a magnetic tape along with relative pathnames and header information.

Note:

1. The message/response names as presented in this table are not intended to be typed into the system. These names are provided so the user can reference these messages in AT&T 235-600-700, *Input Message Manual*, and AT&T 235-600-750, *Output Message Manual*, for the correct syntax.

TABLE 3-4
MAINTENANCE TOOLS

MESSAGE NAME (Note 1)	TYPE	DESCRIPTION
OP:ST-SUM	Routine	Calculates a checksum for a given file and prints the number of blocks in the file.
VFY:TAPE	Routine	Verifies the readability of information on system tapes and the consistency of corresponding hash sums.

Note:

1. The message/response names as presented in this table are not intended to be typed into the system. These names are provided so the user can reference these messages in AT&T 235-600-700, *Input Message Manual*, and AT&T 235-600-750, *Output Message Manual*, for the correct syntax.

COPYING FILES TO NONACTIVE DISKS—UTILITY REQUIREMENTS

The active/nonactive disk copy utility copies a file from an active to a nonactive disk. The file can be a regular file, a contiguous file (type C or x), or a block device file (type b which consists of a partition or a file system).

To use this facility, the user needs to specify the following:

- ***The number of the destination disk:*** This disk must be out-of-service (OOS) or off-line (OFL) and does not have to be a mate of the active (ACT) disk.
- ***The full pathname of the source file that exists on an ACT disk:*** If the source is a regular or contiguous file, then this file must exist on a mounted file system.
- ***The full pathname or number of the destination partition on the nonactive disk:*** If a name is specified, then it must exist as a special device file on the active disk. If the source is a regular or contiguous file, then this partition must be a file system.
- ***The pathname on the destination partition where the file is to be written:*** If the destination pathname is not specified, then the pathname of the source file will be used. If the destination pathname starts with a "/", then the mount point will be excluded from it (destination pathname). It is not required that all directories in the pathname specified exist.

Examples of copying files can be found in Section 5 of this document.

EMERGENCY DUMP

On disk, a partition is reserved for emergency dump. When there has been data written in this partition, an autonomous report (**REPT EMERGENCY DUMP PARTITION FULL**) will be printed. When data has been written in the emergency dump partition, the emergency dump status flag will be set. Due to the status flag, the previously mentioned report will be printed periodically. When the flag has been set, no other emergency dump can be written within the next 12 hours. Therefore, an input message is present to clear the status flag. This message must only be used when the dumped data has been saved. As soon as the status flag has been cleared, the emergency dump partition is marked empty. The message to clear the status flag is **CLR:EMERDMP;**. Before saving the data, the status has to be investigated. This is done by means of the input message **OP:EMERSTAT;**. This will result in a report indicating on which disk, MHD 0 or 1, the data has been dumped, how many bytes have been written, and the hexadecimal address of each segment written. To save the dumped data, an emergency dump can be performed.

LOG FILE HANDLING

GENERAL

Hardware and software errors will generate error reports. These reports will either be printed on the ROP, collected in the log file, or both. The message class of the report is decisive whether a report will either be logged, printed, or both.

In software release 5E2(1), when there are reports of a certain message class, which are normally logged, the user can change the log option to log and print. This can be done by means of the input message **SET:LPS.** If there are reports of a message class, which have only the print option, the user can change those reports to print and log with the same message previously mentioned. To change the options to their original value, the input message **CLR:LPS,MSGCLS=ALL;** can be used. It is not possible to change a message class from the original print option to a log-only option and vice versa.

In software releases 5E2(2) through 5E7, the user can change the log or print option with the input message **CHG:LPS?.** This will direct the output to the **DAYLOG** file or print the data at the devices specified in the ECD for that message class. The **OP:LPS?** message can be used to determine the current log and print status of a message class.

On MCC display Page 110—SYSTEM INHIBITS, the poke command 411 can be entered to set all applicable message classes to log and print.

Log files can be used to do the following:

- ***Detect and correct transient errors:*** Correctable memory errors can occur at an increasing rate over many days. This problem can be detected by studying the log file entries.
- ***Determine a chronological order of events:*** This can be done by putting entries from several log files together.

Log files are defined in the classdef and device forms in the equipment configuration data base (ECD). All log files are located in the directory /etc/log [if 5E2(2) through 5E5] or /log/log (if 5E6 or later). The pathname for each log file is defined in the particular device form.

SIZE OF LOG FILES

To prevent a file system overflow, the files are limited in size. When a log file is first created, the file will be called XXXXX1, where XXXXX stands for the log filename. When half of the disk space is used, the contents of XXXXX1 is copied into XXXXX0, and the most recent information will be stored in XXXXX1 again. When all disk space is used, the "1-part" is again copied into the "0-part" which will overwrite the old information by then and the "1-part" will be filled again with the most recent information. Each log file entry has time of day information, real-time clock values, and sequence numbers.

The log files must be dumped at regular intervals to avoid losing the contents of the files. It is advisable to dump the files once a day.

The available space in the log file for operations on recent change data, RCLOG, can be obtained by using the **OP:AVAILLOG;** input message.

TYPES OF LOG FILES

There are several log files present in the exchange. Most of them are related to the administrative module (AM). Table 3-5 shows the log files related to the AM. Table 3-6 shows the log files related to recent change and equipment data and input messages.

TABLE 3-5
REVIEW OF THE LOG FILES RELATED TO THE AM

LOG FILE	DESCRIPTION
CONFLOG	Configuration management log file. This file contains a record of each error detected in a hardware unit. Activation of storing the information in **CONFLOG** is done by the **ALW:CNFLG** message.
ERLOG	Error interrupt log file. This file contains control unit (CU) error interrupts, except memory related ones.
MEMLOG	Memory history log file. This file contains the supplementary data for memory error interrupts. This log file will be used to locate transient memory failures.
IODRVLOG	Input/output driver log file. This file contains the error reports associated with the Input/Output Driver and Disk Driver.
PMLOG	Postmortem log file. This file contains the postmortem dumps.
SPLLOG	Spooler output log file. This file contains the spooler output process (SOP) failure printouts.
SIMLOG	System integrity monitor log file. This file contains errors detected by the system integrity monitor, usually dealing with resource overload conditions.
CMONLOG	Maintenance monitor log file. This file contains a record of terminated and restarted maintenance interface processes.
DAYLOG	Daylog file. This file contains output messages from the AM as well as SM, CM, and other areas of the switch. It is used to debug software faults and has detailed information that is not required for routine office operation. This file is a binary file in 5E2(2) through 5E5, and an ASCII file in 5E6 and later. The method used to dump the file is dependent upon the software release.

TABLE 3-6
LOG FILES USED FOR RECENT CHANGE DATA AND INPUT MESSAGES

LOG FILE	DESCRIPTION
RCLOG	Operations on recent change (RC) log files. This file contains the changes made by operations on RC data. When an insert is made, the log file will contain the new data. When an update is made, the log file will contain the new data. When a deletion has taken place, the old data will be stored in the log file. To inhibit logging of operations on RC data, the command 612 at the master control center (MCC), Page 110 - SYSTEM INHIBITS, must be keyed in. Note that unlogged operations on RC data will be lost after a boot. When an RC log file reaches 100 percent in use, the major alarm will be set off and the LOG FILE FULL message will be printed on the ROP, indicating that the RC/Vs are locked out until a backup is done.
ECDLOG	Equipment configuration data log file. This file contains all the changes made in the equipment configuration data base. The old as well as the new data will be kept.
CMDLOG	Command log file. This file contains all the input messages entered in the exchange together with the dialogue number and the person identity or the teletype number (dependent on the kind of authority chosen).

LOG FILE DUMPS

To preserve the log file information for later use, the contents of log files can be dumped. This can be done by using the **OP:LOG?** input message. With this input message, several options are provided to print a particular part of a log file instead of the whole log file. The keyword option or the type option can be used to look for transient errors. For example, if the maintenance person wants to retrieve only the error reports from the CONFLOG, the input message will be:
OP:LOG;LG="CONFLOG":TYPE=0291,DEVICE="xxx";.
If only the fault reports are required,
OP:LOG;LG="CONFLOG":TYPE=0801,DEVICE="xxx";
must be entered. The **xxx** means the logical output device to which the output should be routed (for example, rop0). Refer to AT&T 235-600-700, *Input Message Manual,* for complete information about the OP:LOG command.

To dump the contents of the MEMLOG file, the input message **OP:MEMERRS** must be entered.

An entire log file can also be dumped on tape for later investigation. This can be achieved by using the input message **OP:LOG?**.

USE OF THE DAY LOG FILE

The day log file is kept for the manufacturer to locate severe software faults. The contents of this log file have a hexadecimal format in 5E2(2) through 5E5 software releases, and an ASCII format in 5E6 and later software releases. The maintenance person in the exchange can make a dump of this log file, if necessary, by using the appropriate input message for the software release installed.

Dump of Day Log File—5E2(2) through 5E5: A dump of this log file can be made using the **DUMP:DAYLOG?** input message for the day log file of the AM or for a particular switching module.

The size of the day log file is such that in normal operation the log file will be able to contain all logged information for that day. When an entry is overwriting another entry which is less than 24 hours old, a minor alarm will be generated. This alarm is also called the 24-hour log lost alarm. The day log file can be inhibited by means of command **608** on MCC Page 110—SYSTEM INHIBITS. If this command is used, no 24-hour log lost alarm will be generated when an entry is overwritten within 24 hours.

When an entry is made, an autonomous report will indicate how many and what kind of reports are entering the file.

Dump of Day Log File—5E6 and Later: A dump of the day log file can be made using the **OP:LOG?** input messages described previously in the "Log File Dumps" section.

HOURLY PLANT REPORT

The hourly plant report contains data regarding originating, incoming, terminating, and outgoing calls, call connect setup troubles, and reflects the maintenance effect on traffic during the past hour.

If enabled, the hourly plant report is automatically printed. It can be enabled by using the **ALW:PLNTHR** input message. It can also be requested at any time. The **OP:PLNTHR** input message can be used to print the last complete hourly plant report. The **INH:PLNTHR** input message can be used to inhibit the printing of the hourly plant report.

The report is sent to the MCC, the SCCS, and the SCCS/NAC channel.

For more detailed information on the hourly plant report, refer to AT&T 235-070-100.

24-HOUR PLANT REPORT

The 24-hour plant report contains data regarding originating, incoming, terminating, and outgoing calls, call connect setup troubles, and reflects the maintenance effect on traffic during the past 24 hours.

The 24-hour report is generated and issued by the 5ESS switch once a day at 02:00:00 or 02:07:00 [software release 5E2(2)]. The report is sent to the MCC, the SCCS, and the SCCS/NAC channel and is saved for the next 24 hours to fulfill requests.

For more detailed information on the 24-hour plant report, refer to AT&T 235-070-100.

NETWORK MANAGEMENT

The overall performance of the network can be degraded if there are too many call attempts in a telephone network. Network management provides real-time surveillance and control techniques to minimize the network degradation.

TRUNK GROUP CONTROLS

One of the management capabilities is the automatic or manual trunk group controls. Trunk group controls are used to limit the access of calls to a trunk group, to control the overflow of calls from a trunk group, and to offer alternate routing chains to busy groups. The control methods used are either protective or expansive. Protective controls are used to control the spread of congestion in the network by restricting normal trunk access and overflow. Expansive controls allow the routing to expand beyond the normal in-chain routing during failure or overflow conditions.

Trunk group controls can be divided into two classes:

- ***Pre hunt:*** Applied after a trunk group has been chosen and before the hunt for an idle member starts.
- ***Post hunt:*** Applied after the trunk group hunt failed to locate an idle member and before alternate route treatment is applied.

The controls will be active when a threshold is reached. The threshold for prehunt controls is the percentage of all calls attempting to select a member in a trunk group. The percentage of all calls failing to select a member in a trunk group is the threshold for post hunt controls. There are four trunk group controls: cancel-to, cancel-from, skip, and reroute.

The cancel-to control is a prehunt control which cancels traffic destined for a specific trunk group. The call is then routed to one of the following announcements:

- ***NCA:*** No Circuit Announcement
- ***EA1:*** Emergency Announcement 1
- ***EA2:*** Emergency Announcement 2.

The cancel-from control is a post-hunt control which cancels calls failing to select a member in a trunk group. In this case, the call is routed also to one of the previously mentioned announcements.

The skip control is a prehunt control which skips the selected trunk group and provides an alternate route. When no alternate routes are available, the call will get the treatment defined for such a call.

The reroute control is a post-hunt control which provides a different routing chain to allow traffic to be routed over these secondary groups when the primary is congested. When no member has been found in the secondary groups, the call will be routed again by the primary groups. When a cancel in-chain return (CICR) is specified, the call will be routed to the no circuit announcement (NCA).

MODEM POOLING

The modem pooling application within the integrated services digital network (ISDN) environment provides the ability for ISDN customers to make data calls to an analog customer who has a modem. Analog customers can also originate a call to an ISDN customer who has subscribed to the modem pooling feature. These data calls make use of modems in a common pool instead of requiring individual analog lines and modems for each ISDN customer. A modem pool member consists of two basic sides, the digital side and the analog side. The ISDN modem pooling application from the digital side, used the BRI "D" channel provisioned for X.25 packet switching and is physically wired from a "T" or "U" integrated services line unit (ISLU) line card to the AT&T 7500 modular data module (MDM). The MDM performs X.25 to asynchronous protocol conversion. The analog side of the modem pool terminates to an analog line unit or ISLU "Z" analog line card and is wired to the analog modem. The digital and analog equipment is connected electrically by using an RS232C cable. The modem pool group should be built with a minimum of three modem pool members. Each modem pool member consists of a dedicated BRI, MDM, modem, and analog line.

Refer to Figure 3-1 for a basic layout of the modem pool.

There are two basic types of modem pools that can be assigned. They are as follows:

- ***Private Modem Pools*** are restricted to users that are members of a closed user group (CUG). The CUGs allow a predetermined set of users access to a modem pool. They are assigned during the line assignment process to the modem pool multiline hunt group and also to the ISDN customers who have subscribed to the modem pool feature. Once this is done, only ISDN customers with the same CUG number as the modem pool will have access to it. This would normally be the case when the hardware (modems and terminal adapters) is to be located at the end customer's premises.

- ***Public Modem Pools*** can be assigned in two different ways. One way is to build a modem pool using a new CUG number. Any ISDN customer that subscribes to the modem pooling feature would be assigned the same CUG as the public modem pool. Public modem pools could be located in the central office.

Another way to build a public modem pool is to override the permissions on the CUG to make the pool accessible by anyone knowing the phone number. A CUG must always be established for any modem pool.

The following recent change views are used to build the modem pool translations:

- Recent Change View 4.1 (Line Class Code)
- Recent Change View 8.5 (Timing Miscellaneous)
- Recent Change View 12.18 (Multiline Hunt Feature Definition)
- Recent Change View 3.5 (Multiline Hunt Group Line Assignment)
- Recent Change View 3.2 (Multiline Hunt Group Member Line Assignment)
- Recent Change View 23.2 (ISDN Individual DSL—PKT HML)
- Recent Change View 23.12 (ISDN Modem TN to DSL Assignment)
- Recent Change View 23.10 (CUG DSL Assignment).

Refer to AT&T 235-118-210, AT&T 235-118-213, and AT&T 235-118-216 for more details on the previously referenced recent change views.

The diagnostic program that tests the modem pool members is available on demand using the **TST:MP?** (test modem pool message) input message. Refer to AT&T 235-600-700, *Input Message Manual* (formerly, IM-5D000-01), for a full description of this input message. A minimum of three modem pool members are required in order for the **TST:MP?** message to be used. An error message will be printed if there are less than three modem pool members.

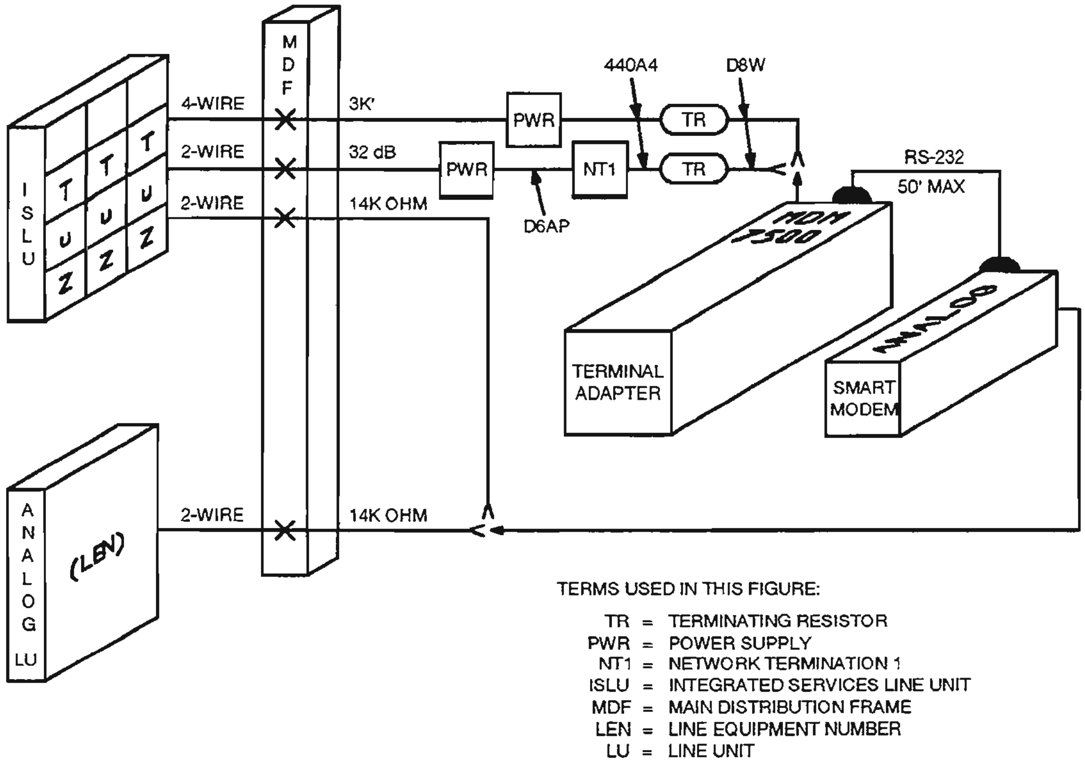

Figure 3-1 — Basic Layout of the Modem Pool

CALL MONITOR FEATURE

The call monitor feature provides an early detection mechanism for loss of call processing functionality when all other system indicators appear normal. The call monitor feature reports to the craft by ROP and an alarm indicator on MISC Page 116 when a failure in call completion analysis occurs. The ROP output is in the form of a REPT CALLMON 5- or 15-minute report. The ROP output message has either a major, minor, or no alarm.

The failure criteria are defined as follows:

- For the 5-minute report, failure occurs if more than 50 percent of the total calls attempted in a 5-minute period are not passed.
- For the 15-minute report, failure occurs if more than 90 percent of the total calls attempted in a 15-minute period are not passed.

The major alarm criteria are defined as follows:

- For the 5-minute report, a major alarm occurs if 40 percent or more of the total tests are "operational test failures."
- For the 15-minute report, a major alarm occurs if 50 percent or more of the total tests are "operational test failures."

The minor alarm criteria are defined as follows:

- For both the 5- and 15-minute reports, a minor alarm occurs if 70 percent or more of the total tests are "indeterminate" plus "not attempted" failures.

If no alarm criteria are met, no alarm will be printed with either analysis report. The output is also directed to the day log file. The output is in the form of a **REPT CALLMON** message. The body of the message is as follows:

```
A REPT CALLMON CURRENT [5 or 15] MINUTE REPORT
         CALLMON PRINTMODE = [NORMAL or VERBOSE]
         CALLMON STATE = [ALLOWED or INHIBITED]
         NON-CCS TEST CALL COMPLETION SUMMARY
         PASSED  FAILED  INDETERMINATE   NOT-ATTEMPTED   LAST-TRKG-PASSED
         a       b       c               d               e
         CCS TEST CALL COMPLETION SUMMARY
         PASSED  FAILED  INDETERMINATE   NOT-ATTEMPTED   LAST-TRKG-PASSED
         f       g       h               i               j
         TOP FIVE HIGHRUNNER FAILURE TYPES
         FAILURE-CODE    NUMBER-OF-OCCURRENCES
         H'k             l
         H'm             n
         H'o             p
         H'q             r
         H's             t
```

where the lower-case letters are decimal numbers (except for failure codes, which are in hexadecimal).

The call monitor will perform separate analysis for common channel signaling (CCS) test calls (if equipped) along with non-CCS test calls. The call monitor utilizes the terminal maintenance automatic progression testing (APT) functionality to make these operational test calls. Non-CCS test calls are based on the default APT test for the trunk group in the AM ODD relations RT_TRKG and TM_ATTT. All CCS test calls use the voice path assurance (VPA) continuity test.

The call monitor routinely cycles through the AM ODD relation RT_TRKG and selects trunk groups to use for making the test calls. A test call will be attempted every 30 seconds; two will be attempted (non-CCS and CCS) if CCS is equipped. It is recommended that the TELCo set up the APT schedule to allow testing on at least one trunk group from each possible SM. This schedule will maximize the benefit from this feature. The call monitor keeps an ever-changing list of possible trunk groups to select from in case it does not find a testable trunk group at the 30-second entry as it continues to step through the ODD. This list guarantees that the call monitor feature will always have a trunk to test.

The test calls that the call monitor attempts will peg traffic counts (that is, TRFC 15, TRFC 30), as will APT testing.

The call monitor can be inhibited as well as requested to print the past 15-minute history and print per-test call requests (verbose mode).

The miscellaneous page (116) displays the inhibit/allow/alarm status for the call monitor:

- Entering command 601 generates the message **INH:CALLMON**, which will inhibit the monitor from making test calls and performing call completion analysis. The inhibit box will backlight. This also clears the monitor's history data and trunk-test lists.
- Entering command 701 generates the message **ALW:CALLMON**, which allows the monitor to start the cycle of making test calls and performing call completion analysis. The backlighted inhibit box will extinguish.
- Entering command 801 generates the message **RTR:CALLMON,ALARM**, which retires a call monitor alarm condition. If the call monitor generates an alarm, the alarm box on the 116 page will backlight. This command will extinguish the alarm box. Note that call monitor alarms are suppressed if cutover is active.
- Entering command 901 generates the message **OP:CALLMON**, which will print the **OP CALLMON** message on the ROP. The body of the message is identical to **REPT CALLMON** discussed previously, except the first line which is:

```
M  OP CALLMON PAST 15 MINUTE REPORT
```

The verbose mode may be entered by typing **SET:CALLMON,VERBOSE**. The per-test call results will be printed in the form of a **REPT CALLMON** message. For 5E6 and earlier, the body of the message is as follows:

```
REPT CALLMON VERBOSE TEST CALL
        TRUNK GROUP = a   SIGNALING TYPE = b   TEST TYPE = c
        RESULT = d
        RETURN CODE = H'e
```

where ***a***, ***b***, and ***c*** are decimal numbers; ***d*** is a character string, and ***e*** is a hexadecimal number. The verbose mode is cleared by typing **CLR:CALLMON,VERBOSE.**

For 5E7 and later, the body of the message is as follows:

```
REPT CALLMON VERBOSE TEST CALL
        SM = a                 PORT = b
        TRUNK GROUP = c        MEMBER = d
        SIGNALING TYPE = e     TEST TYPE = f
        RESULT = g
        RETURN CODE = h
```

where ***a***, ***c***, ***d***, ***e***, and ***f*** are decimal numbers, ***b*** and ***h*** are hexadecimal numbers, and ***g*** is a character string. The verbose mode is cleared by entering **CLR:CALLMON,VERBOSE.**

The call monitor requires a global digital service unit (GDSU) equipped with transmission test facility (TTF) hardware. Refer to Section 11.1.8.1, TTF Resource Contention, for information relative to TTF resource contention. For 5E6 and later, the call monitor also requires integrated services test facility (ISTF) hardware for performing digital loopback test calls.

For details on interpreting the output, refer to AT&T 235-600-750, *Output Message Manual* (formerly, OM-5D000-01).

For troubleshooting details, refer to AT&T 235-105-220, *Corrective Maintenance Procedures*.

ROUTINE OPERATIONS AND MAINTENANCE PROCEDURES

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4. MEMORY ALTERATION DESCRIPTION

4.1 GENERAL

This document contains a description of the changes that are possible within the 5ESS® switch data base. Covered within this document are program update, office backup methods, office dependent data (ODD) backup, ODD recovery, editing the data base using the office data base editor (ODBE), and software release retrofit.

Detailed procedural information on memory alteration can be found in Section 5 of this manual. Other detailed procedural information can be found in the following AT&T documents:

- ***235-105-241:*** Software Release Retrofit Procedures—5E2(1) to 5E2(2)
- ***235-105-242:*** Software Release Retrofit Procedures—5E2(2) to 5E3
- ***235-105-243:*** Software Release Retrofit Procedures—5E3 to 5E4
- ***235-105-244:*** Software Release Retrofit Procedures—5E4 to 5E5
- ***235-105-245:*** Software Release Retrofit Procedures—5E5 to 5E6
- ***235-105-246:*** Software Release Retrofit Procedures—5E6 to 5E7
- ***235-105-340:*** Software Release Update Procedures—5E2(2)
- ***235-105-341:*** Software Release Update Procedures—5E3
- ***235-105-342:*** Software Release Update Procedures—5E4
- ***235-105-343:*** Software Release Update Procedures—5E5
- ***235-105-344:*** Software Release Update Procedures—5E6
- ***235-105-345:*** Software Release Update Procedures—5E7
- ***235-105-443:*** Large Terminal Growth Procedures—5E4
- ***235-105-444:*** Large Terminal Growth Procedures—5E5
- ***235-105-445:*** Large Terminal Growth Procedures—5E6
- ***235-105-446:*** Large Terminal Growth Procedures—5E7.

In this document, when references are made to input messages, the program documentation standard (PDS) message is listed. For the man-machine language (MML) equivalent message, refer to Tables 4-1 through 4-3. For 5E5 and later software releases, the PDS format is not used. Sample messages for 5E5, 5E6, and 5E7 software releases are shown in Tables 4-4, 4-5, and 4-6 respectively. For details on using these messages to perform the tasks described in this document, refer to the AT&T procedural documents previously listed. For complete details concerning the messages and the associated variable fields, refer to AT&T 235-600-700, *Input Message Manual.*

4.2 PROGRAM UPDATE

Program update is the process of activating orderly program changes in the switching equipment software. The changes are made to a particular software release and/or software release issue to solve a system problem.

The types of program updates available are as follows:

- Software Update
- Emergency fix.

4.3 SOFTWARE UPDATE

4.3.1 GENERAL

In-service offices receive most official software changes in the form of software updates. The software update originates as a fix for a problem within the software release.

Four external interfaces are employed to provide for the generation, distribution, and activation of software updates. These interfaces (Figure 4-1) are as follows:

1. ***Programmer Support System (PSS):*** The PSS originates software updates. After a software update has been assembled, tested, and approved at the PSS, a software update identification number is assigned. The software update is then transmitted to the Software Change Administration and Notification System (SCANS) for distribution.
2. *SCANS*: The SCANS is an AT&T time-shared computer system for orderly software update distribution. Maintenance personnel who subscribe to SCANS may access SCANS daily to receive and record the software updates. The SCANS also lists any software updates that have been canceled or changed. Refer to AT&T 190-306-010 and PA-591152 for SCANS procedures. For Switching Control Center System (SCCS) application, see PA-1P139, Section 12.
3. *SCCS*: Using a 1200-baud dial-up terminal, the SCCS has the capability of remote software update activation. The SCCS accesses SCANS and triggers the delivery of a software update using the program update subsystem. Then the received software update is remotely activated from the SCCS via the maintenance channel.
4. *CSCANS*: Another external interface which provides for the distribution of software updates only in offices that are so equipped is the Customer Service Computer Access Network System (CSCANS) interface. The CSCANS is a Regional Bell Operating Company (RBOC) owned and operated computer system for automated software update distribution. Subscribing offices may access CSCANS to receive software updates.

Under normal operating conditions, the software update distribution point is SCANS. However, in an emergency (such as a SCANS outage), a software update can be transmitted from the PSS over a data link directly to an office. Maintenance personnel at the SCCS or local office must make a verbal request to the regional technical assistance center (RTAC). The field update coordinator then sets up an emergency data link from the PSS to the switch and manually transmits the software update (after maintenance personnel have primed the switch for reception of the software update files). Procedures for activating the software update are not altered.

The software update activation responsibility between AT&T and the operating telephone company (OTC) is as follows:

- During preturnover (new office), retrofit, and restart intervals, the installer is responsible for obtaining and activating all current software updates which apply to that office.
- At all other times in a working office (when not in a retrofit or restart mode), the OTC is responsible for obtaining and activating all applicable software updates.

4.3.2 SOFTWARE UPDATE FORMAT

The software update format, illustrated in Figure 4-2, consists of at least four files:

1. ***Header File***: The header file contains the necessary information for maintaining the integrity of the software update. The information consists of the software update number, software release(s) affected, sequence number, name, size, and checksum of each file in the software update. This information is used by the verification process to verify each software update before activation.
2. ***Message File***: The message file contains the commands necessary to install the software update, plus any special instructions required. Figure 4-3 shows an example of a PDS message file.
3. ***Binary Update File(s)***: The binary update file contains the binary data for a file targeted for the update. For nonkillable processes, these take the form of minimal object (.m) files. For killable processes, these are updated object files for target processes.
4. ***The SCANS Information File***: The SCANS information file contains the software update number, software release(s) affected, general descriptive information, name and size of each file to be updated, associated software update(s), customer assistance request (CAR) numbers, and the name of the person to contact in case of trouble.

4.3.3 SCCS AND MASTER CONTROL CENTER INTERFACE

The software updates are normally activated remotely by the SCCS. Communication between the SCCS and the program update subsystem is over the maintenance channel. The local office can be unattended.

Software updates may also be activated locally at the master control center (MCC) video terminal. If the software updates are to be requested from SCANS by the local office, a 1200-baud terminal [other than the maintenance cathode ray terminal (MCRT)] must be present. The terminal must be full duplex, capable of printing at least 80 characters per line and must have a 212A-type data set. If the software updates are to be loaded into the switch from a tape, the 1200-baud terminal is not needed.

4.3.4 GENERAL FORMAT FOR ACTIVATION OF SOFTWARE UPDATES RECEIVED FROM SCANS

4.3.4.1 Reception from SCANS

To receive software updates, first a dial-up link must be established with SCANS. When the dial-up link is completed, the proper login, password, and subpassword is used to gain access to the SCANS data base. When access is obtained, a listing is requested of all items from SCANS. This listing is reviewed, and all applicable software updates are stored.

The office storage space required for each software update binary data package is provided in the software change size section of the software update. Prior to data transmission, it must be determined that sufficient file space is available in the directory on disk where the software updates are to be stored. If file space is insufficient, memory audit and space reclamation techniques are used to create space, or the software updates are requested in stages (one or two at a time) as space allows.

When enough file space is available, the office is primed for binary data package delivery by using the IN:REMOTE:START! message. During priming, file space is reserved and a transaction identifier (ID) is established. This transaction ID provides additional security at the application level in the file transfer process.

The office will receive data from SCANS for up to 24 hours after it is primed unless the data session is manually terminated using the IN:REMOTE:STOP! message. If the SCANS does not begin to send data within the 24-hour period, the data session times out and an IN REMOTE ERROR message is displayed at the SCCS (or MCC). After a time-out, the office will need to be primed again.

After priming, a delivery request is made to SCANS for the binary data packages. This request, which is usually made from a dial-up terminal between SCANS and the SCC, issues a binary overwrite (BOW) command to SCANS. The BOW command includes the 5ESS switch office name, the identification of the software updates, and a transaction ID.

As soon as a port is available, SCANS sets up a 4-wire dial-up link to the target office. This link is used for delivery of the binary data packages. Assuming no equipment failures or unusually high demand, SCANS will establish this link within 24 hours of the delivery request.

Using the access login and the transaction ID, SCANS accesses the AT&T 3B20 computer. The SCANS then establishes a 4800-b/s BX.25 data link to the target office. The binary update files, along with the header and message files, are then transmitted to the target office to be placed on disk in the software update directory (/etc/bwm) of a storage partition.

Upon successful reception of the binary overwrite files, the IN REMOTE STOPPED message is dumped at the SCCS work station and/or MCC video terminal to indicate that the binary files have been received and loaded into /etc/bwm.

Assuming that the binary update files have been received and verified, the BX.25 data link is automatically terminated.

The software updates received from SCANS are the same software updates generated at the PSS. The SCANS does not alter the internal structure or format of any software update. The SCANS information file is not required by the program update subsystem. If this file is sent along with the BOW, it is ignored.

4.3.4.2 Reception from CSCANS

To receive software updates from CSCANS, a dial-up link must first be established with CSCANS. When the dial-up link is completed, the proper login and passwords must be used to gain access to the CSCANS data base, for those offices that are so equipped. For subscribing offices, follow local CSCANS procedures for accessing the CSCANS data base and requesting applicable software updates.

The office storage space required for each software update binary data package is provided in the software change size section of the software. Prior to data transmission, it must be determined that sufficient file space is available in the directory on disk where the software updates are to be stored. If the file space is insufficient, memory audit and space reclamation techniques are used to create space, or the software updates are requested in stages (one or two at a time) as space allows.

When enough file space is available, the office is primed for binary data package delivery by using the UPD:INITPW:PASSWD="xxxxxx",KEY="yy"! message. In priming, a password and key must be selected through use of the UPD:INITPW message, and the identical password and key must be set in the CSCANS data base. This password provides additional security at the application level in the file transfer process.

The office will receive data from CSCANS at any time after it is primed and the CSCANS data base is updated. Note that the office will normally not need to be primed again. The office may be primed again, if desired for security or other reasons, through use of the UPD:INITPW:PASSWD="xxxxxx",KEY="yy"! message. It is important to note that the CSCANS data base must also be updated accordingly with the newly chosen password and key.

After priming, a delivery request is made to CSCANS for the binary data packages. Follow local CSCANS procedures for requesting a binary data package.

Upon successful reception of the binary overwrite files, a UPD:CSCANS message is dumped at the SCCS work station and/or MCC video terminal to indicate that the binary files have been received and loaded into /etc/bwm.

Assuming that the binary update files have been received and verified, the BX.25 data link is automatically terminated.

4.3.4.3 Verification

A process is provided by the program update subsystem to verify software updates before overwriting the resident software release. When the system receives the verification command, a check is made to confirm the existence and correctness of all files and associated checksums.

If a software update error is detected through verification, the software update in question should be requested again from SCANS. If the software update fails verification a second time, the Electronic Switching Assistance Center (ESAC) and the AT&T RTAC should be notified.

4.3.4.4 Activation

Note: This section is a general description of a software update activation. Except as noted, the description was written for the 5E2(2) specific software release. Later software releases allowed for enhanced program update capabilities through the use of a menu-driven craft interface.

After the software updates have been successfully verified, an executable message file for a specific software update is created. The message file contains an instruction set for activating a particular software update. The UPD:BWMNO"a"! message contains a software update number that corresponds to a specific message file and the pathname of the message file. Only one executable message file can be executed in the system at any one time. The previous executable message file is overwritten each time the UPD:BWMNO"a"! message is input.

Note: The software updates must be activated in sequential order.

The executable message file contains four user accessible sections. Only three sections are used for normal installation. The fourth section is used for emergency backout. Once an executable message file has been created for a specific software update, that software update can be installed by entering forms of the UPD:EXEC"a"! message as follows:

1. ***Apply***: The APPLY section is used to place an update into a temporary mode. It is executed by entering the UPD:EXEC"a";CMD APPLY! message.
2. ***Soak***: The SOAK section contains the recommended soak interval for a software update. A soak interval is a period of time when the software update is tested and observed for proper operation. Although it is possible to execute the SOAK section by using the UPD:EXEC"a";CMD:SOAK! message, each step of the SOAK section, where applicable, should be performed on a manual basis to allow close observation of the soak interval.
3. ***Official***: The OFFICIAL section is used to make the temporary update permanent following successful completion of the soak interval. It is executed by entering the UPD:EXEC"a";CMD OFFICIAL! message.
4. ***Backout***: The BACKOUT section is used only when it becomes necessary to back out of a temporary software update. It is executed by entering the UPD:EXEC"a";CMD BKOUT! message. Before software release 5E5, when an update had been made permanent, it could not be backed out. The 5E5 software release allowed for just the last official software update to be backed out. With the 5E6 software release, this was enhanced to allow for up to three official software updates to be backed out.

The APPLY, OFFICIAL, and BACKOUT sections each contain one or more executable messages. The SOAK section may or may not contain messages. A copy of the current executable message file may be obtained by using the UPD:BWMNO"b";LIST ALL! message.

The normal progression for software update activation is to execute the APPLY section first, followed by the SOAK section, and finally the OFFICIAL section.

If the system is rebooted when temporary updates are in place (other than switching module updates), the temporary disk file is thrown away, and the system boots from the official file, effectively backing out the update(s).

When a temporary update is made permanent, an updated version of the file is built in the same directory as the original version. A windowless move then takes place to effectively make the new version official. The in-core memory is not touched when an update is made official since the update has already been installed there.

The software updates can also be activated by maintenance personnel at the SCCS or MCC by printing the message file of the applicable software updates and manually installing the required messages.

4.3.4.5 Backout

During the soak interval, the temporary software update is observed to ensure proper performance. If the software update does not perform properly at any time during the soak interval, it should be backed out using the UPD:EXEC"a";CMD BKOUT! message. The BACKOUT section backs out the designated change, plus any subsequently installed temporary changes; that is, the backout process can only delete changes in the exact reverse order of application. A sequential list of changes that are in the temporary state may be obtained using the UPD:DISPLAY;TEMP! message.

4.4 EMERGENCY FIX

4.4.1 GENERAL

Regular program updates are performed in a timely and orderly fashion through software updates. Unexpected problems with the software release can occur that require immediate correction, not allowing time for the normal software update development and issue processes. These immediate corrections are known as emergency fixes. Emergency fixes are accomplished on a word-by-word basis under the direction of the AT&T Product Engineering Control Center (PECC).

Emergency fixes are assigned a sequential craft number similar to the software update number. The program update subsystem provides emergency fixes with the same status and processes as software updates (that is, make temporary, backout, make permanent). Emergency fixes specify the address to be changed, the new data to be inserted, and the old data to be matched. Emergency fixes are also known as address-data couplets.

4.4.2 SCCS AND MCC INTERFACE

As with software updates, most emergency fixes are activated remotely by the SCCS. Communication between the SCCS and the program update subsystem is via the maintenance channel. The local office can be unattended during the activation of the fix. Emergency fixes may also be activated locally through the MCC.

4.4.3 GENERAL FORMAT FOR EMERGENCY FIX ACTIVATION

4.4.3.1 Activation

The LOAD:UPNM....! message causes a temporary change to be made at the specified location. After a suitable test and soak period, the UPD:UPNM....;OFC! message makes the change permanent, and normal backout procedures can no longer be used.

4.4.3.2 Backout

Normal backout can be accomplished only while the fix is in a temporary state. The backout procedure can be implemented using the UPD:BKOUT;UPNMa! message. This message backs out the designated change, plus any subsequently installed changes, because the backout process can only delete changes in the exact reverse order of application. The UPD:DISPLAY;TEMP! message provides a sequential list of changes that are in a temporary state.

> *Note:* The UPD:BKOUT;UPNM a! message only restores the words specified in the change. If memory other than that specified in this change is mutilated, a system BOOT may be required to restore the switching system to normal.

4.5 SPACE RECLAMATION

4.5.1 RECLAIM SPACE IN SOFTWARE UPDATE STORAGE DIRECTORY /etc/bwm

As software updates are brought into /etc/bwm and activated, the space available in /etc/bwm for future software update storage is gradually reduced. To avoid running out of space, the file space occupied by software updates which have been made permanent should be cleared. Such space in /etc/bwm is cleared using the CLR:BWM:"b"! message. A listing of permanent updates should be obtained using the UPD:DISPLAY;OFC! message and compared to the contents of /etc/bwm using the OP:STATUS:LISTDIR,DN "/etc/bwm"! message.

4.5.2 RECLAIM PATCH SPACE

Update functions are installed in patch space. After an update has been soaked and made permanent, the old functions and decision functions are normally no longer needed. These should be removed from execution, and the space reclaimed for use on future updates. Prior to software release 5E4, the space reclamation is accomplished through the use of the UPD:AUD! message. From 5E4 to 5E6, the space reclamation is accomplished through the use of the UPD:RECLAIM! message. In 5E7 and later software releases, the space reclamation is performed automatically when the update is made permanent.

4.6 ERROR CONDITIONS

Tables 4-7 and 4-8 contain listings of possible error conditions that may be encountered during file transfer. Should any error conditions arise during update activation that are not listed in the table, refer to the error condition listing in AT&T 235-600-700, *Input Message Manual* (formerly IM-5D000-01), or AT&T 235-600-750, *Output Message Manual* (formerly OM-5D000-01), for the particular message in question.

4.7 ENHANCED PROGRAM UPDATE CAPABILITIES

Release 2 of the 5E2(2) software release provides enhanced program update capabilities through the use of a menu-driven craft interface. This interface provides a user friendly program update procedure which simplifies software update installation. These enhancements eliminate the need for lengthy input messages that must be entered precisely.

When a software update package is received, four types of files are included. One or more update files are included which contain modified or new functions in the form of an object file to fix a process. A message file (Figure 4-3) is included which contains a set of craft commands required to install a given software update. A header file is included which is used to verify the software update on site. This file contains information such as target software release issue, file size, and checksum for all files in the software update. Finally, a SCANS file contains a description of the problem being corrected and administrative information used by the SCANS to determine to which offices the software update should be sent.

The message file provides commands and instructions used by an automated display mechanism to guide the craft through the process of installing the associated software update. This process reduces the amount of time required for and the potential errors associated with manual message inputs. The craft may examine the contents of the message file and monitor the status of an update transaction via video display pages.

The menu-driven craft interface provides software update installation menu pages and program update pages (Figures 4-4 through 4-9). Numbered commands, called pokes, are entered from these display pages to perform the desired procedures. Refer to the Memory Alteration Procedures (Section 5) for detailed procedures using the menu-driven craft interface.

4.8 SOFTWARE UPDATE INSTALLATION

***Warning:** In 5E6 and later software releases, craft interface recovery feature (CIRF) provides the capability to recover the craft interfaces from craft lockout without affecting the call processing. This feature will kill UNIX* system processes including program-update processes; therefore, it should be used with great care. IT IS STRONGLY RECOMMENDED NOT TO USE THIS FEATURE WHILE SOFTWARE UPDATE IS IN PROGRESS because this feature may cause software update application in a state which cannot be recovered by any means.*

Note: Starting with the 5E5 software release (or 5E4 software release if software update 880080 is installed), master control center (MCC) Display Page **1940—EASY BWM INSTALLATION** (Figure 4-10) provides a simplified alternate method of installing software updates. With this method, the user is required to enter a minimum number of pokes manually and is not required to constantly monitor the software update progress. In the 5E6 software release, poke 9870 was changed from simply turning on the stop after soak (SAS) feature to allowing the user to toggle the SAS feature between being ON (so as to stop after the soak section) or OFF (so it will continue all the way to OFC). Refer to AT&T 235-105-110 for details on how to use MCC Display Page **1940**. The MCC Display Page **1960** is still the standard method to load or backout software updates.

The craft can install a software update through the use of the software update installation menu (Figures 4-4 and 4-5). This menu is on MCC Page 1960. The craft interface simplifies the task of installing a software update by directing the craft through the installation process. The upper part of the display provides a list of menu items, each of which is identified by a poke number. The lower part of the menu page provides a display window for sections of the message file. The current section of the message file, called the working section, is displayed so it may be examined by the craft before execution. If the working section does not fit in the designated window, the craft can scroll forward and backward using the NEXT and PREVIOUS window pokes. The message file may be printed on the MCC printer by entering the PRINT poke provided on the menu page. A RESPONSE line is provided on the software update installation page to provide response messages to the craft during software update installation. Sequencing checks are made between software updates to ensure proper sequencing for all software updates in a 5ESS switch.

To select a particular software update, the START software update poke is entered along with the desired software update number. The menu page then displays the current status of the requested software update and sets the "BWM =" indicator to the requested software update name.

* Registered trademark of UNIX System Laboratories, Inc.

Prior to 5E5 software release, the message file is in a combined program documentation standard (PDS) and man-machine language (MML) format so it can be used in all 5ESS switches. The VERIFY poke automatically deletes messages from the message file which are not in the language format required for the specific office. For 5E5 and later software releases, the PDS format is not used. The necessary tool changes have been made in the 5E6 software release to provide only MML format in the message file. Additionally, this poke checks the message file integrity. The VERIFY poke must be executed before the software update can be applied to the system. When this poke is completed successfully, an indicator is provided on the display to notify the craft that the software update was successfully verified. The VERIFY poke may be executed as many times as desired. However, if there was no change to the message file since the last VERIFY poke was executed and the VERIFY flag is set to COMPLETED, subsequent VERIFY commands are rejected.

When the software update has been successfully verified, the contents of the APPLY section of the message file are automatically displayed. The action indicators (DISPLAY, PRINT, EXEC ALL, and EXEC NEXT) are then used in conjunction with the section indicators (APPLY, SOAK, OFC, BKOUT, and FILE) to perform the desired software update installation functions. A single poke number is used to represent the action desired and the section of the message file to be acted upon. The first two digits represent the action and the second two digits represent the section.

To apply the selected software update, the 9310 poke (EXEC ALL, APPLY) is used. This poke causes all commands in the APPLY section of the message file to be executed automatically and in sequential order. These commands may be executed one at a time using the 9410 (EXEC NEXT, APPLY) poke. The 9410 poke must be used repetitively to execute all the commands in the APPLY section. The 9310 poke may be used at any time after a 9410 poke in order to cause the execution of all remaining command lines in the APPLY section of the message file.

Subsequent to an EXEC poke, the RESET LINE poke may be used to reset the current command to be executed. This poke is entered followed by a comma and a line number to which the execution pointer should be reset. The specified line is then highlighted and may be executed again. If the requested line number is in the next or previous display window, the RESET LINE poke causes the display window to be adjusted.

If an error occurs during the execution of a command line, a summary of the error is displayed on the RESPONSE line of the menu page. The command line causing the error is displayed, and a detailed error message is printed on the MCC printer. If the 9310 poke is being used when the error occurs, execution of the next command line (if any are still remaining) is automatically stopped.

The STOP EXEC poke (9560) may be used subsequent to the EXEC ALL poke to stop execution of the next command line in the section.

Updates intended for switching modules are automatically propagated to all operational switching modules. Any switching modules which are isolated at the time of the update do not get updated.

When all command lines in the section are successfully executed, a "CMPL" indicator associated with the APPLY status is displayed, and the content of the SOAK section is automatically displayed. This guides the user to the next step of the software update installation process. This section of the message file contains the procedures required to test the software update and the required soak interval.

The DISPLAY poke (91XX) may be used to display selected sections of the message file. The first ten lines of the section are displayed in the display window. If more than ten lines exist for the selected section, the NEXT WINDOW and PREV WINDOW pokes may be used to scroll forward and backward through the section. These pokes do not affect the execution of commands and may be used only after a DISPLAY or EXEC poke has been entered for a given software update.

The PRINT FILE F poke (9260), added in 5E4, can be used to print out any American standard code for information interchange (ASCII) files associated with the currently installed software update.

If a failure occurs during the SOAK procedure, the software update must be backed out. The BKOUT section of the message file is displayed by using the 9140 (DISPLAY, BKOUT) poke. This section provides information to the craft and commands required to back out the given software update. The 9340 (EXEC ALL, BKOUT) poke automatically executes all commands in the BKOUT section of the message file, one by one, and in sequence. When the execution of these commands is completed successfully, the content of the APPLY section is again automatically displayed on the menu page.

When the software update has been successfully tested, it may be made official. This means that the software release file in the official disk partition is updated. Thus, the update can be saved across system bootstraps. However, reloading the system from the backup disk partition will destroy the update unless the updated software release file is copied to the backup partition. The 9330 (EXEC ALL, OFC) poke is used to make the software update official. This poke cannot complete until all command lines in the APPLY section have been completed successfully, and soak section is completed and timer is expired.

4.9 PROGRAM UPDATE MAINTENANCE

The 5E5 and 5E6 versions of the program update maintenance menu page (MCC Page 1950) are shown in Figures 4-6 through 4-9. The display pokes provide an on-line log of history of all software updates installed into the current software release issue in a 5ESS switch office. The history of a software update (Figures 4-11 through 4-14) consists of, but is not limited to, the following information:

- Name of software update
- Status of software update (temporary or official)
- Time of last transaction
- Pathname of target object file
- Pathname of the update files for the target object.

In the 5E3 software release, because of software optioning, three new fields were added to the history file. The new fields are "package sequence number", "configuration", and "affected SM list."

For the 5E5 software release, one field was added for the backout last official (BOLO) feature. For the 5E6 software release, three additional fields were added (see Figures 4-7, 4-8, and 4-9).

When this menu page is selected and displayed, the history for a particular software update can be requested by using poke 9101 followed by a comma and the desired software update name. All updates associated with the specified software update are then printed on the MCC printer. The "BWM =" indicator is then set to the requested software update name.

Poke 9102 (OFC) may be used to request a history printout of all updates in the system which have been made official.

Poke 9103 (TEMP) may be used to request a history printout of all software updates which are in the temporary state.

Poke 9104 (ALL) may be used to request a history printout of all software updates in the 5ESS switch active log.

Poke 9104, SUM may be used to request a list of the last OFFICIAL, last CRAFT, and any TEMPORARY software update in the 5ESS switch.

If all software updates in the active log have been made official and memory space used by the old version of the replaced functions has been reclaimed, the history of these software updates may be stored in the archive log to conserve disk space. Subsequently, these histories may be printed on the MCC printer by typing "9104,backlog".

The updates shown in Figures 4-11, 4-12, 4-13, and 4-14 are in a temporary state. The most important status flag is the INSTALLED (or INSTLD for 5E2 and earlier) flag. An administrative module initialization can cause temporary updates in the administrative module to be removed. Consequently, the INSTALLED flag is reset and is cleared from the software update history after completion of the initialization. An administrative module initialization does not affect temporary updates installed in switch modules. The history of a software update which updates switch modules is global to all switch modules. Therefore, any interface module initialization does not cause the INSTALLED flag to be reset for a temporary switch module update.

In 5E2 and earlier, the INST flag is used to indicate that an update is a file replacement. Any updates without an INST flag are function replacements for nonkillable processes. In 5E3 and later software releases, the process type is described more explicitly by using the correct process types (see Figures 4-12, 4-13, or 4-14). From 5E3 to 5E7, an OFC flag is added to the history entry after the update is made official. From 5E3 to 5E7 for a function replacement, an AUDT (or AUD for 5E2 and earlier) flag is added to the history after memory space used by the old version of the replaced function(s) is reclaimed. For 5E6 or earlier, if the reclamation of memory space fails, an AUDABT flag is added to the history entry instead. In 5E7, the AUDABT flag is set only when the reclamation of non-AM updates fails.

A file replacement may be verified by checking the time stamp and file size on the target file at the directory where the original file is located. When a function replacement is installed, the new address of the function is printed on the printer. The new address may be used to establish a breakpoint to detect when the replacement function is called.

If an update is targeted for multiple switch modules, two pieces of information are available to verify that the update is in all of the target modules. The first piece of information is the UPD Module Report. This report is generated and printed on the MCC printer automatically after a temporary update has been successfully applied, but one or more modules did not receive the update. The report identifies all modules which received the update and all modules which did not receive the update. If all modules received the update, the report is not printed.

The other piece of information is available on MCC Page 1800 (Figures 4-15 and 4-16). Box 10 is called UPDBKOUT. This indicator shows whether or not recently applied SM program updates are currently loaded or backed out.

Both MCC Pages 1850 and 1851 (Figures 4-17 and 4-18) are added in 5E6 for communication module processor (CMP) inhibit and recovery control. Box 10 is the UPBACKOUT LIGHT. If the selected module *should* have the update, the box will be lighted.

Menu Page 1950 also provides the ability to detect update inconsistencies in the system. Poke 9200 (VERIFY INCONSISTENCY) provides this capability. For example, if a temporary update is booted out of the administrative module as a result of an initialization, and a switch module is isolated when an update is installed in all switch modules, an update inconsistency occurs. In this case, the isolated module does not receive the update. The use of poke 9200 generates the report shown in Figures 4-19, 4-20, and 4-21.

Poke 9300 (RECOVER FORWARD) may be used from menu Page 1950 to reapply all temporary updates in an inconsistent state. Poke 9400 (RECOVER BACKWARD) removes the temporary updates, starting from the last one in the system. If there is no inconsistency, a message will print to the ROP. Both pokes automatically determine the starting and ending points of the software update sequence so that a recovery process can be performed.

As the number of software updates installed in the system increases, disk space used by the history files grows. When all software updates have been made official and memory space used by the old version of the functions is reclaimed, most software update history can be saved in an archive file in a condensed format. This can be done by entering the **UPD:REDUCE** command manually. There is no corresponding poke on the 1950 page.

On menu Page 1950, poke 9600 may be used in clear disk space occupied by the software updates after the software update is made official. An automatic check is made to verify that the specified software update was made official before the space is cleared. The space occupied by all software updates which have been made official may be cleared by typing **"9600,ALL"**, or the space occupied by a single software update can be cleared by typing **9600** followed by a comma and the specific software update name.

Poke 9650 may be used to expand a compressed software update after it has been completely transmitted to the switch. This same poke may also be used to stop expansion on the software update that is currently being downloaded.

Prior to 5E7, poke 9500 (RECLAIM PATCH SPACE) is used to perform an update audit or space reclamation function. This causes memory locations previously used for old function text and decision function text to be released so that they may be used for future program updates. In 5E7, poke 9500 has been removed from the Page 1950 because the space reclamation is performed automatically when an update is made official. Three additional pokes were added in the 5E3 software releases to manipulate the soak timer information, they are as follows:

- Poke 9700 can be used to reset the soaking time to **HH** hours and **MM** minutes.
- Poke 9710 prints out the soak timer information on the ROP.
- Poke 9720 may be used to abort the soak timer.

Prior to the 5E5 software release, only temporary updates could be backed out. The 5E5 software release added poke 9900 which allowed the user to remove the last official software update. The 5E6 software release further enhanced poke 9900 to allow the user to back out up to the last three official software updates in the reverse order in which they were applied.

The command **UPD:PUMPBWM** is used when a pump action is required to pump the temporary image generated by the software update. This command does not make sense unless a software update has been applied. In 5E6, "TARGET" is a new field which is used to specify the target. The command is **UPD:PUMPBWM:TARGET={CMP|SM}**. In 5E7, "CONFIG" is a new option which is used to specify the configuration for SM and peripherals. The command is **UPD:PUMPBWM:SM,[CONFIG={standard|LOADED|BASIC}]**. The command for CMP is **UPD:PUMPBWM:CMP**.

The command **UPD:PUMPOFC** is used when a pump action is required to pump the official image. This is the default case. This command is used to override the **UPD:PUMPBWM** command. In 5E6, "TARGET" is a new field which is used to specify the target. The command is **UPD:PUMPOFC:TARGET={CMP|SM}**. In 5E7, the command is modified as follows: **UPD:PUMPOFC:{CMP|SM}**.

> *Note:* **UPD:PUMPBWM/UPD:PUMPOFC** has no effect on the standby CMP. The standby CMP will always be pumped with the same image in the active CMP.

4.10 OFFICE BACKUP METHODS

4.10.1 GENERAL

The backups for MHDs in an office can be the software backup disk(s) and/or a set (sequence) of tapes. The optional software backup disk(s) (MHD14/MHD15) is/are a bootable copy of MHD0/MHD1. The tapes will contain all of the text and data-base partitions required to recover an office to a call processing state. Two sets of tapes are required in the 5E2(2) software release: one for the text and one for the data-base data. The 5E3 software release requires three sets of tapes: (1) one for AM text, (2) one for AM ODD, and (3) one for SM ODD. In software releases 5E4(2) and later, at least four sets of tapes are required: (1) one for AM text, (2) one for AM ODD, (3) one for SM text, and (4) one for each disk containing SM ODD.

4.10.2 GENBKUP ROUTINE

The full office backup procedure is the process used to save a copy of the office software (text, ODD and ECD data bases). The full office backup is done in order to provide a reliable vehicle for system recovery in the event that data in both disk drives becomes mutilated. The recommended tape to use for the backup is GRAHAM Ultramax or a tape of equal or higher quality.

To simplify the procedure, an automated procedure using GENBKUP exists. GENBKUP executes all audits and creates an AM Text, SM Text, AM ODD tapes, and the software backup disk. With software release 5E6, the CMP text and CMP ODD are part of the AM text and AM ODD, respectively. If any commands find errors during the execution of GENBKUP, the GENBKUP procedure will quit with a message indicating the command which found the error(s). GENBKUP should be entered from the recent change terminal or a supplemental trunk line work station.

> ***Warning: The GENBKUP procedure could abort if the 5ESS switch contains a software update in the temporary state. This would be caused by differences between the incore version and the disk version created by a temporary software update.***

After the **RCV:MENU:GENBKUP** message is typed in on the RC/V terminal or the **195** Poke is entered on the STLW terminal, the screen is painted with pages that inform the craft of GENBKUP commands being performed in the switch and ask for inputs from the craft. In general, all pages have a header that looks like the following illustration.

PROCESSING - # #   GENBKUP PROCEDURE   PAGE n OF m

After invoking GENBKUP, the following options are displayed in order for the craft to choose the kind of backup desired.

- **t**: Backup to Tape
- **p**: Physical Tape Verification
- **c**: Check LDFT Tape Header
- **d**: Software Disk Backup
- **u**: Update and Verify Disks
- **v**: Verify Disk Data
- **rt**: Restart Tape Sequence
- **rd**: Restart Sftw Bkup Disk
- **q**: To Quit.

If either **d** or **t** is entered, a second page is displayed asking "Which software disk is to be updated?", or for tape "What is to be backed up?". The system then updates several disk partitions and runs a number of audits and compares before generating the backup entities. The **u** option causes the disk updates, audits, and compares to be run without generating any backup entities. This can be run from the SCC while the craft is still in the office and is used to create 300-MB shelf copies and run the preliminary verification before the backup entities are actually made. GENBKUP remembers the results of this verification for 24 hours. Entering a **v** causes only the audits and compares to be run. The *restart* options, **rt** and **rd**, will be displayed if GENBKUP has been entered within the last 24 hours and has executed the **BKUP:ODD** and **COPY:PTN** commands.

In general, a list of commands is displayed. While each command is being executed, that line is backlighted and a counter **PROCESSING - ##** is incremented while each command is executing to indicate command activity. The counter is restarted for each new command. In addition to the screen response, FSBLK audit, FSLINK audit, compare-disk-to-core results, and other messages associated with the commands being executed are also printed on the ROP. During the ROOT TO BACKUP ROOT PARTITION COPY page, which follows the audits, the system MHDs (0/1) are simplexed and then duplexed by the COPY:PTN:ALL command.

When the ODD Backup commands are to be executed, the craft is given the option of inhibiting recent changes for the entire ODD backup process or only during the final steps. Inhibiting for the entire process will decrease the elapsed time of the backup process but will increase the time the customer is inhibited from making recent changes. The time variation will be office dependent. If any problems are encountered by the office backup process, an informative message will be output to the screen and printed on the ROP. The message will indicate craft action(s) to be done.

During the tape backup sequences, the craft is prompted when tapes should be mounted and unmounted. At each tape mounting operation, the craft prompts the system by typing in **GO**. The craft is then asked if the tape should be verified automatically after the tape is written. Normally the craft should answer "yes", but some circumstances (such as time) may warrant deferring the tape verification until another time. In this case, the label that is printed on the ROP when the tape is to be unmounted contains a "VERIFY: NOT DONE" statement. Following automatic tape verification, the label that is printed on the ROP when the tape is to be unmounted contains a "VERIFIED: SUCCESSFUL" statement. The tape label is printed on the ROP for each tape in a sequence. At the end of a tape sequence, the "What is to be backed up?" prompt is returned. The craft reply entered starts the sequence again. The initial audits, compares, and ODD backups are run only once.

The following is a list of backup dependencies:

Software Backup Disks

- The software backup disk
- SM Text tape to match the software update level of the AM Text on the Backup Disk
- SM ODD tape to match the RC level of the AM ODD on the Backup Disk.

Backup Tapes

- Text - AM Text tape and SM Text tape at the same software update level
- ODD - AM ODD tape and SM ODD tape(s) at the same RC level.

300-MB Shelf Disk Packs

- Identical software update levels and RC levels for two disk packs (one for MHD0/MHD1, the other for MHD2/MHD3).

4.10.3 BACKUP LEVELS

4.10.3.1 General

There are four to five levels of backups possible in the 5ESS switch, depending upon the type of disks equipped. These levels are as follows:

1. Memory to primary-disk backup
2. DMERT operating system root partition to backup-root partition to backup
3. Office dependent data (ODD) backup to tape
4. Full office backup to tape or disk
5. Disk pack backup (300-MB only).

The first four backups listed are identical for the 300-MB, 340-MB, and SCSI disks. The last backup listed is for the 300-MB disk only. Only a general description of these backup methods is provided in this section. For detailed procedures covering the 300-MB, 340-MB, and SCSI disks, refer to Memory Alteration Procedures (Section 5). The 300-MB removable disk backup configurations are shown in Figure 4-22.

4.10.3.2 Memory (core) to Primary Disk Backup

This backup is done any time changes to the office text or data are made permanent. This includes software updates and data base recent changes. The data base recent changes consist of ODD and equipment configuration data (ECD). It consists of saving the changes from memory to MHD 0 and 1. When the memory changes have been made permanent, they are available on disk for automatic recovery situations which require booting.

4.10.3.3 DMERT Root to Backup-Root Partitions

This backup is performed prior to making changes permanent to data, program, or other files in the DMERT root partitions (/dev/root,/dev/db,/dev/etc, and/dev/boot). These changes are the result of software updates or ECD recent changes. The term primary partitions refers to the root partitions listed in Table 4-9. This backup consists of copying the partitions shown in Table 4-9 from the primary to backup partitions. Files in these partitions are identified by pathnames that begin with something other than /no5text.

Normally, system operation is performed from the files in the root partitions. This is indicated by the emergency action interface page having item 31 (BACK_ROOT) cleared. Backup-root partitions are used only for recovery situations. This means that if backup-root is used to perform recovery operations, the required corrections should be made to the root partitions and control of the system must be returned to the root partitions. No ECD recent changes or software updates should ever be applied to the system while it is running on the backup-root partitions.

4.10.3.4 ODD Backup to Tape

The ODD backup to tape is a backup of the office data base and the AT&T 3B20 computer data base on one tape. The ODD tape will contain the current working data base in the following partitions:

/dev/db	[Software release 5E2(1) and earlier]
/dev/no5odd1 or /dev/no5odd2	[Software release 5E2(1) and earlier]
/dev/no5aodd1	[Software release 5E2(2) and later]
/dev/no5dodd1	
/dev/no5smodd	[Software release 5E2(1) Exlarge configuration, 5E2(2) and 5E3]
/dev/no5sodd(i)	[Software release 5E4 and later].

The set of data base partitions to be backed up depends on the contents of the /no5text/rcv/aimrc file.

4.10.3.5 Full Office Backup to Tape

This procedure is used to create all of the tapes for the backup desired.

4.10.3.6 300-MB Disk Pack Backup

4.10.3.6.1 General

Backup disks contain all software required to provide an operational 5ESS switch. A backup disk may be saved external to the disk drives (shelf copy). Shelf copies are made from each of the disk drives in the system on a scheduled basis. These shelf copies are referred to as MHD 0 and MHD 1 shelf copies. Backups of MHD 0 or 1 are also referred to as primary/boot disk copies. The certified disk is another type of shelf backup. This is a primary disk which has recently been used to boot the administrative module (AM) in the root partitions and has, therefore, been proven to be valid.

4.10.3.6.2 MHD 0/1 Shelf Disks

These shelf disks are copies of the associated disk drive contents obtained by removing the disk pack from the particular disk drive and keeping them in a safe place. They should be labeled in some way so that they can be identified. Refer to Memory Alteration Procedures (Section 5) for detailed procedures on making shelf copies.

4.10.3.6.3 Disk Pack Rotation

When a disk pack is removed from MHD 0 or MHD 1 to make a shelf backup disk, it must be replaced with a disk pack currently used as a shelf copy. The replacement disk pack should be the oldest shelf copy made from the other disk drive. The backup disk packs should be alternated between disk drives to provide the disk pack rotation sequence shown in Figure 4-22. (Currently, offices employing Century Data System disk drives cannot perform this shelf backup rotation procedure.) At least one shelf copy from each disk drive must be maintained at all times. The sequence described here provides one shelf copy from one of the drives and two copies from the other drive. Each time a backup copy is made, it should be made from the disk drive which currently has only one shelf copy.

4.10.3.6.4 Certified Disk

The certified disk is a primary disk copy which has recently been used to boot the AM in the root configuration. Once the system is stable after a DMERT level 3 or greater initialization, the disk used in the boot sequence is used as the latest certified disk. The backup procedure for this disk is covered in the Memory Alteration Procedures (Section 5).

4.10.4 GENBKUP PROCESS: HOW IT WORKS AND WHAT IT DOES

4.10.4.1 Introduction

GENBKUP is the general term used for the program that runs the automated full office backup. The procedures for a full office backup (disk and tape) are described in Section 5 of this document. Section 5 describes in detail what GENBKUP does and what the expected outcome is at each step. This section provides additional information about the program for help in troubleshooting GENBKUP problems.

It is assumed that the user of this document is familiar with the 5ESS switch and the GENBKUP procedure.

4.10.4.2 General Information

GENBKUP is an interactive UNIX system process and is started by **RCV:MENU:GENBKUP;** input message or 195 poke. It terminates itself when the user enters "q" (for quit), when so prompted, or when the process encounters an error condition. If you wish to terminate GENBKUP (and you are not at a prompt where "q" is available), start another GENBKUP from another terminal. Because of built-in concurrency control, the new GENBKUP will detect the old GENBKUP and will ask you if you wish to terminate the old GENBKUP. The "y" (yes) answer will terminate the old GENBKUP. The new GENBKUP will then go on to do the preliminary checking, but you will be able to terminate it by entering "q" when the initial menu is displayed.

The input message (RCV:MENU:GENBKUP) should be used on a recent change (RC) terminal while the poke (195) should be used on a supplementary trunk and line work station (STLWS) terminal or the master control center (MCC). When the input message is used, the /usr/bin/genbkup program is executed while the poke executes /usr/bin/SIgenbkp. Both programs are compiled from one source file using different libraries for terminal control functions and are basically identical. Both programs, therefore, are treated in this document as a single entity which is referred to as GENBKUP.

4.10.4.3 High-Level Program Flow

The following is a high-level program flow. Some messages that appear on the screen are shown to relate internal program steps to external stages.

I. Initial checking (if test fails, it will abort or asks for more input).

1. Terminal name and type.
2. Special device files for tape drive 0 (high and low density).
3. No memory growth in progress.
4. No ODD BKUP in progress.
5. No other GENBKUP is running. Checks for the presence of /tmp/.genbkupLOCK file and if found, asks the user if he/she wishes to terminate the other GENBKUP.
6. Change directory to /cft/shl.
7. Check sums (sum -r) of /no5text/bkup/*.ptn files against the values stored in /no5text/bkup/bkupsum file.
8. ****PTN FILES ARE OK**** (screen message, asterisks do not print on screen).
9. Check partitions and file systems listed in /no5text/bkup/parchk.list. Check to see if they are in the SG database, check some of their sizes against vtoc. Create /updtmp/.GBbboot.bf, /updtmp/.GBlboot.bf and /updtmp/.GBprompat.o files to check bootfile sum values against those in /no5text/bkup/boot.sum. Remove the .GB files when done.
10. ****FOUND ALL PARTITIONS****
11. Check if / (root), /etc, and /database are mounted on primary (root, etc, and db), or on backup (broot, betc, and bdb). If all are mounted on primary, no action is required. If all on backup or some on primary and some backup, set a flag to offer limited menu options.

    Check if other file systems are mounted: no5text, no5odd, updtmp, log, cdmp, rclog, bwm, tmp, unixa, cft, dg, usrbin (last three for only 5E6 and later), smtext (for 5E4 and later), no5sodd, no5codd, smlog, and unixabf. If some are found to be mounted on nonstandard mount directory or not mounted, set a flag to offer limited menu options.
12. ****MOUNT TABLE IS OK****

13. Check if restart option may be offered. Offer restart option, if all of the following conditions are met:

    i. /etc, /db, and / (root) are on primary partitions.

    ii. The file /updtmp/.genbkupCHK exists and was created or last modified within past 24 hours.

    iii. The file (.genbkupCHK) indicates ODD time later than the last modification of cpodd.out and /dev/no5aodd1 is currently mounted. In other words, no BKUP:ODD was run since the last time GENBKUP ran BKUP:ODD input message and /no5odd/cpdata is mounted on /dev/no5aodd1 rather than on no5aodd2. In 5E6, the check is done for disk odd -- if disk odd is on no5dodd1 rather than on no5dodd2.

    And/or

    The file (.genbkupCHK) indicates TXT time later than the last modification of /no5text/.version, /etc/.version and /broot/.version. In other words, no software update was made official since the last time GENBKUP ran COPY:PTN,ALL input message. (During this step, a temporary directory /genbkupDIR is created to mount /broot in order to access /broot/.version. After reading the time-stamp of /version, the partition is unmounted.)

14. ****PROCEEDING...****

15. Display on screen when last GENBKUP tasks were done.
    "COPY PARTITION ALL CMD DONE ON ....",
    "AM TEXT TAPE SEQUENCE MADE ON ...", etc.

II. Display main menu on screen. Items displayed on the menu will vary depending on the conditions found during the initial checking. Perform the task selected by the user. When done, display the menu again. Exit when the user selects "q".

If no software update activity is detected, and root, etc, and db are mounted on primary:

t) Backup to Tape
p) Physical Tape Verification
c) Check LDFT Tape Header
d) Software Disk Backup
u) Update and Verify Disks
v) Verify Disk Data
rt) Restart Tape Sequence (If either TXT or ODD allowed, see previous Step I.13)
rd) Restart Sftw Bkup Disk (If both TXT and ODD allowed, see Previous Step I.13)
q) To Quit

If no software update activity is detected, and root, etc, and db are mounted on backup:

m) Make Root Copy
t) Backup to Tape
p) Physical Tape Verification
c) Check LDFT Tape Header
u) Update and Verify Disks
v) Verify Disk Data
q) To Quit

If one or more of the following is true -- (1) software update activity is detected; (2) some of root, db, etc partitions are mounted on primary while others are mounted on backup; (3) a mount table inconsistency (some partitions are mounted on nonstandard directory or not mounted) was found:

t) ODD Backup to Tape
p) Physical Tape Verification
c) Check LDFT Tape Header
q) To Quit

III. Steps taken in each item on the previous main menu:

t) Backup to Tape (or ODD Backup to Tape):

Display variable menu depending on conditions, receive response, perform the task selected by the user, and when the task is complete, display the menu again. Return to the main menu when "q" is selected.

g) AM TEXT (See NOTE 1)
x) SM TEXT (See NOTE 2)
a) AM ODD
s) SM ODD
t) TOP TAPE
q) To Quit

NOTE 1: AM TEXT not displayed if any of the following conditions is true:
1. Software update activity is detected.
2. root, etc, and db are on backup partitions.
3. Mount table inconsistency is found.

NOTE 2: SM TEXT not displayed if any of the following conditions is true:
1. Software update activity is detected.
2. Mount table inconsistency is found.
3. 5E3 or earlier software release.

g) AM TEXT:

i. Display Page 1 of "AM TEXT VERIFICATION" and execute all the audit messages displayed on the screen (AUD:FSBLK=1,INS="xxx"; AUD:FSLINK=1,INS="xxx"; etc.).

ii. Display Pages 2, 3, and 4 of "AM TEXT VERIFICATION" and execute all the compare disk to core messages displayed on the screen (CMPR:DISK:CORE,FN="xxx"; etc.).

iii. If 5E5 or later software release, Display Page 5 of "AM TEXT VERIFICATION" and execute VFY:FILE,FLIST="/no5text/bkup/CRCfile"; message.

iv. If COPY:PTN,ALL (copy root, etc, db, and boot partitions to broot, betc, bdb, and bboot partitions or vice versa depending on which are mounted) has not been done already during this GENBKUP session, display "ROOT TO BACKUP ROOT PARTITION COPY" page and execute all the messages displayed on the screen (OP:MHD=0/1,INFO, VFY:MHD=0/1 and COPY:PTN:ALL,SRC="xxx").

v. If the current official AM ODD is not on primary disk pair (that is, /no5text/rcv/aimrc points to no5aodd2 in 5E5 or earlier or no5dodd2 in 5E6 or later), run BKUP:ODD. If Recent Change is not already inhibited, the user will be given a choice of inhibiting RC for the entire time or a part of the time. Depending on what option is chosen and whether RC is already inhibited, BKUP:ODD,AM is also run. This is done so that when the whole thing is done, AM ODD will point to primary disk pair (that is, /no5text/rcv/aimrc points to no5aodd1 or no5dodd1 rather than no5aodd2 or no5dodd2).

vi. Warn that the tape must be at least 2300 feet long. Ask if the tape should be verified after it is made. Test the tape drive; read in the tape header; and if the header is readable, display the date and the type of the tape contents about to be overwritten. Write tape (COPY:BKDISK:START,SRC="xxx"...). Verify tape (VFY:TAPE,TD="xxx"...) if it was requested. Print label and ask to unmount the tape. If more tape is needed (which may happen if written in low density), write the next tape with COPY:BKDISK,ACK:TPSIZE=2300 message.

x) SM TEXT:

i. Display "SM TEXT VERIFICATION" page and execute all the audit messages displayed on the screen (AUD:FSBLK=1,INS="xxx"; AUD:FSLINK=1,INS="xxx"; etc.).

ii. Write tape. See Step "vi." of AM TEXT for more detail.

a) AM ODD:

i. If BKUP:ODD has not been already run in this GENBKUP session, run BKUP:ODD. If Recent Change is not already inhibited, the user is given a choice of inhibiting RC for the entire time or a part of the time. Run BKUP:ODD once or twice depending on which option is chosen. Also run BKUP:ODD,AM if current official AM ODD is not on primary disk. This is done so that when the whole thing is done, AM ODD will be on the primary disk pair rather than on the secondary (that is, /no5text/rcv/aimrc will point to no5aodd1 or no5dodd1 rather than to no5aodd2 or no5dodd2).

ii. Display "AM ODD VERIFICATION" screen, and execute AUD:FSBLK and AUD:FSLINK for /dev/no5aodd1.

iii. Write tape. See Step "vi." of AM TEXT for more detail.

s) SM ODD:

i. If BKUP:ODD has not been already run in this GENBKUP session, run BKUP:ODD. See previous AM ODD Step "i.".

ii. Display "SM ODD VERIFICATION" page(s), and execute AUD:FSBLK and AUD:FSLINK for /dev/no5coddl and /dev/no5soddX partitions.

iii. Write tape. See Step "vi." of AM TEXT for more detail. Minimum of one tape for each SM ODD partition (for example, imdata1, imdata2, etc.) will be written.

t) TOP TAPE:

i. Test the tape drive; read the tape header; and if the header is readable, display the date and the type of the tape contents about to be overwritten. Write TOP tape via "/bin/dd if=/etc/topfile of=/dev/mt08". Verify the tape via VFY:TAPE... (or VFY:FILE... in 5E6 and later). Print the label and ask to unmount the tape.

p) Physical Tape Verification:

Check if the tape can be read and if it is a load-disk-from-tape (LDFT) tape. Read in the header and determine the date the tape was written and what kind of tape it is (for example, text, odd, etc.). Display the information. Run VFY:TAPE... command to verify the tape.

c) Check LDFT Tape Header:

Read the tape header. Check and print what type (text, database, etc.), sequence number, density, and device name. If the tape contains VTOC, read the VTOC contents and print them out in a similar format as done in DUMP:MHD=x,VTOC.

d) Software Disk Backup:

Ask which software backup disk (14 or 15) is to be updated. Verify AM TEXT, AM ODD and SM ODD partitions, and if BKUP:ODD has not been run yet, run BKUP:ODD. (See AM TEXT, AM ODD, and SM ODD steps for verification and BKUP:ODD.)

Check MHDs 0 and 1. Remove MHD 14 (or 15), initialize (clear) MHD 14 (or 15).

COPY:ACTDISK:MHD=14,SRC="/dev/vtoc",PTN="/dev/vtocb1" (copies vtoc to MHD 14) (MHD=15 and PTN="/dev/vtocb1" if MHD 15 was picked by the user).

Restore MHD 14 (or 15) and copy from active disk to backup disk. COPY:SPDISK:SRC="/no5text/bkup/prmdsk.ptn",DEST="/no5text/bkup/bkdsk1.ptn" (or bkdsk2.ptn).

u) Update and Verify Disks:

If BKUP:ODD has not been run already during this GENBKUP session, then run BKUP:ODD (see AM TEXT steps for more detail).

Verify AM TEXT, AM ODD, and SM ODD partitions. Same audits, compare disk to core etc. messages are run as in verifications for AM TEXT, AM ODD, and SM ODD.

This option does everything "Backup to Tape" does except making tapes. This option is identical to "Verify Disk Data" except for BKUP:ODD which is done here but not in "Verify Disk Data."

v) Verify Disk Data:

Verify AM TEXT, AM ODD, and SM ODD partitions. Same audits, compare disk to core etc. messages are run as in verifications for AM TEXT, AM ODD, and SM ODD.

rt) Restart Tape Sequence:

Display conditions under which this option is allowed and ask for "go" input.

This option lets you write tapes without verifications and BKUP:ODD. It is usually used when "Update and Verify" was run earlier in the day (within last 24 hours) and another BKUP:ODD was not run during the intervening period.

Display variable menu depending on conditions and receive response.

g) AM TEXT (displayed only if TEXT restart allowed)
x) SM TEXT (displayed only if 5E4 or later)
a) AM ODD (displayed only if ODD restart allowed)
s) SM ODD (displayed only if ODD restart allowed)
t) TOP TAPE
q) To Quit

g) AM TEXT:

i. Write AM TEXT tape. See Step "vi." of AM TEXT section in "Backup to Tape."

x) SM TEXT:

i. Run SM TEXT partition verification (audits of sm text partitions). Write SM TEXT tape. See Step "vi." of AM TEXT section in "Backup to Tape."

a) AM ODD:

i. Run AM ODD partition verification (audits of AM ODD partition). Write AM ODD tape. See Step "vi." of AM TEXT section in "Backup to Tape."

s) SM ODD:

i. Run SM ODD verification page (audits of SM ODD partitions). Display the SM ODD partitions and let the user choose which partition to write to tape. Write SM ODD tape. See Step "vi." of AM TEXT in "Backup to Tape."

t) TOP TAPE:

i. Identical to "Top Tape" in "Backup to Tape" option.

rd) Restart Sftw Bkup Disk:

Display conditions under which this option is allowed and ask for "go" input.

The rest of the steps are identical to "Software Disk Backup" option described earlier except that partition verifications and BKUP:ODD are not run here.

m) Make Root Copy:

Verify AM TEXT partitions and run COPY:PTN,ALL input message. See AM TEXT verification steps for more detail.

4.10.4.4 Craft Input Messages Issued by GENBKUP

GENBKUP accomplishes many of its tasks by issuing craft input messages. These messages issued by GENBKUP are shown on the screen and the currently running input message is highlighted. After each input message is issued, GENBKUP waits and periodically looks in the logfile /log/log/MTCLOG0 (or MTCLOG1, whichever is current) for the output message from the input message process. (These logfiles are under /etc/log directory in 5E3 and earlier software releases.) If the output message indicates success, GENBKUP goes on to the next step. If the output message indicates failure, GENBKUP aborts. GENBKUP will also abort if the output message is not found during a certain waiting period. The waiting period for each message is different depending on the input message. The frequency at which GENBKUP searches the logfile is every 3 to 15 seconds depending on the input message. Therefore if an input task completes and if GENBKUP is still waiting a few minutes after the completion report prints on the ROP, it can be assumed that something is wrong. (You must be careful, however, not to mistake an interim completion report for the completion report. For example, BKUP:ODD may print completion report for each module such as AM, but BKUP:ODD is still going on for other modules. GENBKUP waits until everything is done.)

The following is the list of craft input messages issued by GENBKUP with the output message pattern string GENBKUP searches for in the logfile. The wait time for each type is as of 5E6; they may vary in different software releases.

AUD:FSBLK=%d,INS="/dev/%s"
AUD:FSLINK=%d,INS="/dev/%s"

Wait time=300 sec.; search interval=3 sec.

Success string:	"[^0-9]0 *ERRORS *FOUND"
Failure strings:	"DATA.* *ERROR *203" "AUD *FS.* *ERROR" "AUD *FS.* *NOT *STARTED" "AUD *FS.* *ABORTED" "AUD *FS.* *STOPPED"

BKUP:ODD
BKUP:ODD,AM

Wait time=42000 sec.; search interval=10 sec.

Success string: "BKUP *ODD *COMPLETED"

Failure strings: "ABT *ODD.* *COMPLETED"
"BKUP:ODD; *RL"
"BKUP *ODD.* *ABORTED"
"BKUP *ODD.* *STOPPED"
"BKUP *ODD.* *NOT *STARTED"

CMPR:DISK:CORE,FN="%s"

Wait time=1200 sec.; search interval=3 sec.

Success string: " ARE *EQUAL"

Failure strings: " MISMATCH"
" FAILED *TO *OPEN"
"CMPR *DISK *CORE *STOPPED"

COPY:ACTDISK:MHD=14,SRC="/dev/vtoc",PTN="/dev/vtocb1"
COPY:ACTDISK:MHD=15,SRC="/dev/vtoc",PTN="/dev/vtocb2"

Wait time=3000 sec.; search interval=6 sec.

Success string: "COPY *ACTDISK *ON"

Failure string: "COPY *ACTDISK *STOPPED"

COPY:BKDISK,ACK:TPSIZE=2300[,EXT]
COPY:BKDISK,START,SRC="%s",TD="%s",FN="%s",TPSIZE=2300[,EXT][,MRG]

Wait time=12600 sec.; search interval=10 sec.

Success strings:	"MOUNT *NEXT *TAPE"
	"DISMOUNT"
Failure strings:	"COPY *BKDISK *STOPPED"
	"CAN'T *RUN *WITH *SYSTEM"
	"BKDISK *PROCESS *ID *NOT *FOUND"
	"BKDISK.* *START *WAS *NOT *ISSUED"
	"RE-WRITE *ENTIRE *SEQUENCE"
	"RE-INITIATE *ENTIRE *PROCEDURE"
	"OPEN *DISK"
	"OPEN *TAPE"
	"NEW *TAPE.* *TRY *AGAIN"
	"MOUNT *TAPE.* *ACK.*"

COPY:SPDISK:SRC="/no5text/bkup/prmdsk.ptn",DEST="/no5text/bkup/bkdsk1.ptn"
COPY:SPDISK:SRC="/no5text/bkup/prmdsk.ptn",DEST="/no5text/bkup/bkdsk2.ptn"

Wait time=3600 sec.; search interval=10 sec.

Success string:	"COPY *SPDISK *COMPLETED"
Failure strings:	"COPY *SPDISK .*CODE *24[0-9]"
	"COPY *SPDISK *STOPPED"

COPY:PTN:ALL,SRC="/no5text/bkup/bkup.ptn",DEST="/no5text/bkup/prim.ptn"
COPY:PTN:ALL,SRC="/no5text/bkup/prim.ptn",DEST="/no5text/bkup/bkup.ptn"

Wait time=3600 sec.; search interval=10 sec.

Success strings:	"COPY *FILESYS *FILE *COMPLETED"
	"COPY *PTN .* *COMPLETED"
Failure strings:	"COPY *FILESYS *FILE *STOPPED"
	"COPY *PTN .* *STOPPED"
	"DISK *ACCESS"
	"ABORTED *CODE"

INIT:MHD=14,VFY

Wait time=5400 sec.; search interval=8 sec.

Success string: "INIT *MHD *14 *COMPLETED"

Failure strings: "INIT *MHD *14 *STOPPED"
"INIT *MHD *14 *ERROR"
"INIT *MHD *14 *NOT *STARTED"
"INIT *MHD *14 *EARLY *TERM *VFY"
"INIT *MHD *14 *ABORTED"

INIT:MHD=15,VFY

Wait time=5400 sec.; search interval=8 sec.

Success string: "INIT *MHD *15 *COMPLETED"

Failure strings: "INIT *MHD *15 *STOPPED"
"INIT *MHD *15 *ERROR"
"INIT *MHD *15 *NOT *STARTED"
"INIT *MHD *15 *EARLY *TERM *VFY"
"INIT *MHD *15 *ABORTED"

OP:MHD=0:INFO

Wait time=240 sec.; search interval=3 sec.

Success string: "MHD *0.* *ACT"

Failure strings: "OP *MHD *0 *INFO *NOT *STARTED"
"OP *MHD *0 *INFO *STOPPED"
"OP *MHD *0 *INFO *ERROR"
"OP *MHD *0 *INFO *ABORTED"
"MHD *0.* *INIT"
"MHD *0.* *GROW"
"MHD *0.* *UNEQIP"
"MHD *0.* *OFL"
"MHD *0.* *UNAV"
"MHD *0.* *OOS"

OP:MHD=1:INFO

Wait time=240 sec.; search interval=3 sec.

Success string:	"MHD *1.* *ACT"
Failure strings:	"OP *MHD *1 *INFO *NOT *STARTED"
	"OP *MHD *1 *INFO *STOPPED"
	"OP *MHD *1 *INFO *ERROR"
	"OP *MHD *1 *INFO *ABORTED"
	"MHD *1.* *INIT"
	"MHD *1.* *GROW"
	"MHD *1.* *UNEQIP"
	"MHD *1.* *OFL"
	"MHD *1.* *UNAV"
	"MHD *1.* *OOS"

OP:MHD=14:INFO

Wait time=240 sec.; search interval=3 sec.

Success strings:	"MHD *14.* *OOS"
	"MHD *14.* *ACT"
Failure strings:	"OP *MHD *14 *INFO *NOT *STARTED"
	"OP *MHD *14 *INFO *STOPPED"
	"OP *MHD *14 *INFO *ERROR"
	"OP *MHD *14 *INFO *ABORTED"
	"MHD *14.* *INIT"
	"MHD *14.* *GROW"
	"MHD *14.* *UNEQIP"
	"MHD *14.* *OFL"
	"MHD *14.* *UNAV"

OP:MHD=15:INFO

Wait time=240 sec.; search interval=3 sec.

Success strings:	"MHD *15.* *OOS"
	"MHD *15.* *ACT"
Failure strings:	"OP *MHD *15 *INFO *NOT *STARTED"
	"OP *MHD *15 *INFO *STOPPED"
	"OP *MHD *15 *INFO *ERROR"
	"OP *MHD *15 *INFO *ABORTED"
	"MHD *15.* *INIT"
	"MHD *15.* *GROW"
	"MHD *15.* *UNEQIP"
	"MHD *15.* *OFL"
	"MHD *15.* *UNAV"

RMV:MHD=14

Wait time=5400 sec.; search interval=5 sec.

Success strings:	"RMV *MHD *14 *COMPLETED"
	"RMV *MHD *14 *STOPPED *H'5"
Failure strings:	"RMV *MHD *14 *ABORTED"
	"RMV *MHD *14 *STOPPED"

RMV:MHD=15

Wait time=5400 sec.; search interval=5 sec.

Success strings:	"RMV *MHD *15 *COMPLETED"
	"RMV *MHD *15 *STOPPED *H'5"
Failure strings:	"RMV *MHD *15 *ABORTED"
	"RMV *MHD *15 *STOPPED"

RMV:MTC=0

Wait time=180 sec.; search interval=3 sec.

Success strings:	"RMV *MTC *0 *COMPLETED" "RMV *MTC *0 *STOPPED *H'5"
Failure strings:	"RMV *MTC *0 *ABORTED" "RMV *MTC *0 *STOPPED" "RCVRY *MTC *0" "RCVRY *MT *0"

RST:MHD=14

Wait time=5400 sec.; search interval=10 sec.

Success string:	"RST *MHD *14 *COMPLETED"
Failure strings:	"RST *MHD *14 *STOPPED" "RST *MHD *14 *ABORTED"

RST:MHD=15

Wait time=5400 sec.; search interval=10 sec.

Success string:	"RST *MHD *15 *COMPLETED"
Failure strings:	"RST *MHD *15 *STOPPED" "RST *MHD *15 *ABORTED"

RST:MTC=0

Wait time=300 sec.; search interval=4 sec.

Success string:	"RST *MT *0 *COMPLETED"
Failure strings:	"RST *MTC *0 *STOPPED" "RST *MTC *0 *ABORTED"

VFY:MHD=0

Wait time=1800 sec.; search interval=5 sec.

Success string:	"VFY *MHD *0 *COMPLETED"
Failure strings:	"VFY *MHD *0 *NOT *STARTED"
	"VFY *MHD *0 *STOPPED"
	"VFY *MHD *0 *ERROR"
	"VFY *MHD *0 *ABORTED"
	"VFY *MHD *0 *EARLY *TERM *VERIFY"

VFY:MHD=1

Wait time=1800 sec.; search interval=5 sec.

Success string:	"VFY *MHD *1 *COMPLETED"
Failure strings:	"VFY *MHD *1 *NOT *STARTED"
	"VFY *MHD *1 *STOPPED"
	"VFY *MHD *1 *ERROR"
	"VFY *MHD *1 *ABORTED"
	"VFY *MHD *1 *EARLY *TERM *VERIFY"

VFY:TAPE,TD="":RETRY=3

Wait time=5400 sec.; search interval=6 sec.

Success strings:	"MISMATCHES.* *0.* *DATA *MISMATCHES.* *0"
	"VFY *TAPE *COMPLETED *RETRIES.* *0"
Failure strings:	"VFY *TAPE *ABORTED"
	"VFY *TAPE *STOPPED"
	"ABORTED *CODE"
	"VFY TAPE COMPLETED .* MISMATCHES *[1-9]"
	"VFY *TAPE *COMPLETED *RETRIES"

VFY:FILE,FLIST="/no5text/bkup/CRCfile"
VFY:FILE,FN="/dev/mt08 i";

Wait time=5000 sec.; search interval=10 sec.

Success string: "VFY *FILE *COMPLETED.*"

Failure strings: "VFY *FILE *CANNOT *OPEN.*"
"VFY *FILE *VERIFICATION.*FAILED*"
"VFY *FILE *VERIFICATION.*FAILURE*"
"VFY *FILE *SPECIFICATION *FILE *ERROR.*"

4.10.4.5 Files Used and/or Created by GENBKUP

GENBKUP uses many files during its execution. Some are created by GENBKUP and others are a part of switch software. Since many failure messages mention these files, their names and functions are briefly described here.

The following switch software files are used by GENBKUP:

/no5text/rcv/aimrc

/no5text/bkup/aodd.ptn
/no5text/bkup/bkdsk1.ptn (bksml1.ptn in 5E2)
/no5text/bkup/bkdsk2.ptn (bksml2.ptn in 5E2)
/no5text/bkup/bkup.ptn
/no5text/bkup/bkupsum
/no5text/bkup/boot.sum
/no5text/bkup/codd.ptn
/no5text/bkup/parchk.list
/no5text/bkup/prim.ptn
/no5text/bkup/prmdsk.ptn (prmsml.ptn in 5E2)
/no5text/bkup/smtext.ptn
/no5text/bkup/sodd1.ptn
/no5text/bkup/sodd2.ptn
/no5text/bkup/sodd3.ptn
/no5text/bkup/sodd4.ptn
/no5text/bkup/sodd5.ptn
/no5text/bkup/sodd6.ptn
/no5text/bkup/text.ptn
/no5text/bkup/xtrafs.ptn

If GENBKUP cannot access any of the above files, GENBKUP will fail.

The file /no5text/rcv/aimrc is used to find out if currently official AM ODD is on no5aodd1 or on no5aodd2 (in 5E6 the check is for disk odd). This information is used to decide if it is needed to run BKUP:ODD,AM after the full BKUP:ODD is done.

Files with the .ptn suffix contain names of partitions that are copied to tape/disk. These file are used in input messages "COPY:BKDISK...", "COPY:SPDISK..." and "COPY:PTN:ALL...". Sums of these .ptn files are compared against sums stored in the bkupsum file during the initial checking.

Parchk.list contains names of partitions that are checked against SG database and VTOC.

The following files are created by GENBKUP:

/no5text/bkup/.GBcpyptn
/no5text/bkup/.GBamtext
/no5text/bkup/.GBsmtext
/no5text/bkup/.GBamodd
/no5text/bkup/.GBsmodd1
/no5text/bkup/.GBsmodd2
/no5text/bkup/.GBsmodd3
/no5text/bkup/.GBsmodd4
/no5text/bkup/.GBsmodd5
/no5text/bkup/.GBsmodd6
/no5text/bkup/.GBtoptape
/no5text/bkup/.GBsftwdsk14
/no5text/bkup/.GBsftwdsk15

/updtmp/.GBbboot.bf
/updtmp/.GBlboot.bf
/updtmp/.GBprompat.o
/updtmp/.genbkupCHK
/updtmp/.genbkupLOCK
/updtmp/.genbkupLINK

/tmp/GBtape.hst

The .GBxxx files under /no5text/bkup are used to inform the user when GENBKUP tasks were run last. Each file represents a task run by GENBKUP. For example, when an AM text tape is made via GENBKUP, the file .GBamtext is created (or replaces the old one) and when GENBKUP is run next time, "AM TEXT TAPE SEQUENCE MADE ON ....." message is displayed on the screen just before the initial menu is displayed. They are empty history files and the presence or absence of these files does not affect GENBKUP functionality (except for the message display).

The temporary files /updtmp/.GBbboot.bf, /updtmp/.GBlboot.bf, and /updtmp/.GBprompat.o are created for copying the bootfiles. Bootfiles are in the lboot and bboot partitions, and the "sum" operations cannot be done on them since they are not really files. The contents of the partitions are copied to the created files and then the files are summed. The sum values are then compared against those stored in boot.sum. They are removed when the compare is successful.

The file /updtmp/.genbkupCHK contains information on when the last BKUP:ODD and COPY:PTN were done. The information is then used to decide if the restart option may be allowed. If either or both were done within last 24 hours, certain restart options are offered in the initial menu (provided other conditions are met). The /tmp/.genbkupLOCK (and /tmp/.genbkupLINK which is linked to .genbkupLOCK) are used for concurrency control to detect already running GENBKUP process.

The file /tmp/GBtape.hst is created to record tape drive test history. Just before a tape is written, the tape drive and the tape is tested to ensure it is writable. Also if the tape was previously used, the header information is read in to inform the user of the contents if possible. During this test, information available at each step is written to the /tmp/GBtape.hst file. The file is not removed at the end of GENBKUP so that it can be read by the user if needed.

4.10.4.6 If GENBKUP Terminates Abnormally

In this section some common cases of GENBKUP abnormal termination are described along with what may be done to correct the situation. If the suggested steps fail to correct the situation, seek next level of technical assistance.

Terminal Hung Up

When poke 195 is used (rather than RCV:MENU:GENBKUP message) the system (not GENBKUP) creates a file under /tmp called pipe_x (x being the name of the terminal such as "l" for ttyl). This file is removed if the program exits (normally or abnormally); however, if an abnormal interrupt or a system init occurs, the file may be left behind. If the file already exists when poke 195 is entered from the same terminal, the terminal may be hung up or GENBKUP may not be able to start. If that happens, try the following: remove the pipe file (for example, /tmp/pipe_l); remove the tty controller for the terminal; then restore the tty controller and the tty; and then restart GENBKUP. Note that pokes 199, 198, and 196 will also have the same problem under a similar circumstance (that is, any of these pokes can leave the pipe file behind under similar circumstances and any of these pokes will make the terminal to be hung up if the pipe file is left behind).

POPEN SUM ERROR

GENBKUP uses system resource called pipe (via popen()) and since pipe is a limited resource, popen() sometimes fails (you will see a message "POPEN SUM ERROR ..."). There is a limited number of pipes that can be in use at one time and if there are many other processes that also use pipes, the chance of popen failing is increased. If that happens, try the following: check to see if the pipe-file (see previous "Terminal Hung Up") is left behind in /tmp, if yes, remove it; remove the tty controller for the terminal where GENBKUP aborted, then restore the tty controller and the tty; and restart GENBKUP. (If popen() failed on a /updtmp/.GB* file, they may be left behind, but this will not affect the next GENBKUP run.)

Input Message Failure

If GENBKUP aborts due to failed input message, the failed input message is printed on the ROP. The cause of the failure must be investigated and corrected before restarting GENBKUP. In many cases, corrective actions to take can be found in AT&T 235-600-750, *Output Message Manual* pages for the output message that reported the failure. In general, GENBKUP has no control over failures of input messages and the cause of failure is unrelated and unknown to GENBKUP.

For example, if VFY:FILE,FLIST="/no5text/bkup/CRCfile" fails, first, look up the *Output Message Manual* "VFY FILE" page and learn what the failure means. Then take corrective actions accordingly. For example, if the VFY failure was due to a crcvalue mismatch, this means that the stored crcvalue and the calculated crcvalue did not match for the file mentioned in the failure message. The VFY command calculates crcvalue for each file listed in /no5text/bkup/CRCfile and then compares it against the value stored in the file /.crcvalues. A mismatch means that the file currently on the switch is not identical to the same file when the stored crcvalue was generated. The file may be corrupted or private updates or overwrites in the system may exist. You must seek appropriate technical assistance to correct the situation.

Input Message Time-Out

If GENBKUP aborts due to the expiration of the waiting period ("time-out"), GENBKUP prints the expired input message on the ROP. Check the ROP and investigate if the message ever completed.

If the message never completes or completion message never arrives, investigate the cause and correct the situation.

If the message completes shortly after the time-out, then retry GENBKUP when the system load is lighter. The message probably took longer than usual due to system load. However, if this happens consistently on the same message OR if the message completes a long time (for example, 10 or 15 minutes) after the time-out, the problem needs further investigation. Seek next level of technical assistance.

If the message completed before GENBKUP timed out, it is due to either GENBKUP was waiting for a wrong output message or the output message was not sent to MTCLOG. Check MTCLOG0 or MTCLOG1 whichever was current at the time and see if the output message reporting the completion/failure is in it.

If the output message is found in the MTCLOG and the time stamp agrees (that is, the time stamp is between the times when the input message was issued and when GENBKUP timed out), GENBKUP was waiting for a wrong message. Check the output string pattern listed in this document. If there is a mismatch between what was printed and what GENBKUP expected, this must be reported to the next level technical support.

If the output message was not found in the MTCLOG and the message is printed on the ROP, check the ECD classdef form for the output message class to see if MTCLOG is listed as one of the devices. If not, modify the ECD form to add MTCLOG and retry GENBKUP.

Others

If GENBKUP aborts due to other reasons than those mentioned earlier, consult AT&T 235-600-750, *Output Message Manual* "RCV MENU GENBKUP" page and find the error message matching the one printed on the ROP/screen by GENBKUP. Take corrective actions suggested in the manual.

4.11 BACKUP SCHEDULES AND GUIDELINES

4.11.1 GENERAL

The scheduling of various backup levels is determined by local practices based on the following guidelines.

4.11.2 MEMORY TO PRIMARY DISK (MHD 0/1)

Memory to primary disk backup should be scheduled based on recent change and software update activity. Scheduled intervals for disk backup may vary; they can be performed as often as daily or as infrequently as monthly.

4.11.3 DMERT ROOT PARTITIONS TO BACKUP PARTITIONS

The DMERT root partitions backup should be based on root partition changes associated with the ECD and software update activity. The primary partitions should be copied to the backup partitions before ECD and/or software updates are made permanent. This backup activity is not required for individual changes but should be done for sets of changes. If there is a number of software updates which affect the root partitions, the root partitions should be copied to backup root and the software updates should be applied. However, if all software update changes were made to files with pathnames beginning with /no5text, then this type of backup is not needed. The no5text partition does not have a backup partition on the disk.

4.11.4 ODD BACKUP TO TAPE

The frequency of the ODD backup to tape will depend on how often an ODD backup (from main store to disk) is performed in the particular office. The ODD backups should be performed on a regular basis. The appropriate time to schedule an ODD disk image backup to tape is before an ODD backup. This will allow the maximum soak period for the ODD disk image before it is written to tape. Also, whenever the ECD has been altered, the ODD backup to tape should not be used. The full office-to-tape backup should be used instead. This is because the ODD backup to tape does not cover the ECD. All ODD disk image backup tapes made between two full office-to-tape backups should be saved. When a new ODD backup tape is made after a full office backup, the oldest ODD disk image backup tape made since the previous office backup should be discarded first. The recommended tape to use for the backup is GRAHAM Ultramax or a tape of equal or higher quality. The following schedule for ODD backup to tape is recommended:

a. If an ODD backup is performed daily, the ODD disk image backup should be done once a week.

b. If an ODD backup is performed twice a week, the ODD disk image backup should be done once every 2 weeks.

c. If an ODD backup is performed weekly, the ODD disk image backup should be done once a month.

In any event, an ODD disk image backup should be done at least once a month and no more than once a week. In addition to the ODD backup to tape, an ODD recovery from tape procedure is provided in the Memory Alteration Procedures (Section 5).

4.11.5 FULL OFFICE BACKUP TO TAPE

The recommended tape to use for the backup is GRAHAM Ultramax or a tape of equal or higher quality. The full office backup tapes should be made based on the following considerations:

1. Office backup tapes should be made when the number of permanent software updates in the office reaches a point that makes it desirable to back up the software changes to tape. The number of software updates is office dependent but should not be more than 5.
2. Office backup tapes should be made when there is text/data base coupling that results from a recent change or software update change. The coupling and the need to make an office backup should be specified in the software update documentation.
3. Office backup tapes should be made whenever the office experiences a DMERT level 3 or higher initialization. The backup should be done after the system stabilizes and the disks are duplexed.
4. After a software release retrofit, a set of office backup tapes should be made of the new software release. Once the office is committed to the new software release, the old software release backup tapes should be purged from the office in approximately 2 weeks. Also, the new software release tapes used to boot the office during the software release retrofit should be kept as certified tapes until they are no longer usable as backup tapes.

4.11.6 MHD 0/1 PRIMARY DISK (SHELF COPY)

Shelf copies of MHD 0/1 should not be made more frequently than weekly on a per-drive basis. The schedule for making shelf copies should consider the frequency of changes made to the data base (ODD or ECD) and the number of software updates installed since the last backup.

4.11.7 CERTIFIED DISK (SHELF COPY)

Whenever the AM requires booting, the disk pack used to perform the boot process should be made the latest certified disk. This guarantees a bootable backup shelf copy. The replacement disk pack should be the oldest shelf copy of a certified disk.

The minimum number of shelf backup disk packs is four. Three are required to rotate backup disks between disk drives for the detection of head alignment problems between the drives. One disk is required for the certified disk. Additional shelf backup disk packs may be maintained if desired (for example, it may be desired to maintain additional certified disks). Figure 4-22 shows the backup disk configuration.

4.12 OFFICE DEPENDENT DATA BACKUP

4.12.1 PURPOSE

The purpose of ODD backup is to provide a sound basis for recovery by allowing the system to recover quickly from a boot or pump. The changes to the ODD may be introduced by regular recent change (RC), customer-originated recent change (CORC), maintenance, and ODBE.

Backup of the ODD makes the current memory image (that is, in-core contents) of the ODD permanent on disk. The ODD in the AM, CMP, and all of the SMs will be backed up during this operation.

4.12.2 ORIGINATION

Origination for ODD backup is under local control. Local control is required for the following reasons:

a. The ODD backup is run "on demand."

b. After the first initialization of the office, the dynamic head blocks stored in the ODD must be backed up.

4.12.3 FREQUENCY

The frequency of ODD backup depends on the disk space allocated to log regular RCs and CORCs and the number of these changes in the system. With the 5E2(1) software release, the percentage of disk log capacity may be obtained by using the OP:LOGSTAT; message. In addition to showing the percentage, the output message will also indicate the number of regular RCs and CORCs in the disk log. With the 5E2(2) and later software releases, the OP:RCSTAT,SM=x&&x,AM; (for 5E6, OP:RCSTAT,SM=x&&y,AM,CMP=a&&b) message will give the number of recent changes in a processor. The OP:CORC STAT,SM=x&&y,AM,CMP=a&&b; message will give the amount of CORCs in each processor.
The OP:ODD,SM=x&&y,CMP=a&&b,AM; message will give the percent of memory used and also the percent of available memory for each processor.

It is recommended that the ODD be backed up whenever the disk log reaches 80 percent of the log space usage. To avoid recent change performance degradation, the backup should be run in off-peak hours when system load and RC input are minimal.

4.12.4 SAFEGUARDS

When the disk log files reach 80 percent of the log file space usage, an alarmed output message notifies local maintenance personnel.

When an ODD backup is in progress, CORCs are blocked and the subscriber receives reorder tone. Similarly, when the EXC:ODDRCVY;ALL! message is required, the backup request is denied. Also, if an attempt to perform an ODD backup is initiated while a processor is in the RC BKOUT state, the backup request is denied for this processor.

4.12.5 DISK SPACE REQUIREMENTS

The ODD backup requires disk space for two copies of the entire ODD. The first copy is used as a working copy for the file update during backup, while the other copy is considered a "save" copy.

4.12.6 RELIABILITY AND RECOVERY

Errors may be introduced during an ODD backup operation. These errors may be due to bad or lost messages, buffer overwrites, etc.

All processes used during an ODD backup are automatically released if a failure occurs. If the backup fails, a manual restart of the ODD backup operation should correct the problem. If not, a more serious system malfunction may be indicated. Seek technical assistance.

The ODD backup does not interface directly with any of the levels of software recovery. If a processor or the system has an initialization during an ODD backup, the ODD backup is normally aborted with no damage done to the official ODD files. The ODD backup can be restarted at another time. After the initialization, an RC recovery must be performed to reinstate the lost RCs and CORCs.

4.13 OFFICE DEPENDENT DATA RECOVERY

A stable or transient clear backs out all RCs and CORCs entered since the last ODD backup. This is because system initialization restores the memory version of the ODD with the disk version created by the most recent ODD backup. The ODD recovery consists of reapplying the backed-out RCs and CORCs. Records of the RCs and CORCs are logged in disk files during the updating process. The ODD recovery provides all features needed by maintenance personnel to recover the ODD.

The EXC:ODDRCVY! input message is usually generated automatically after a system initialization is completed. The output message generated is prefixed with an "A" to indicate that the ODD recovery was automatically started.

Manual recovery is needed after all craft-initiated system initializations. Manual recovery is also needed after automatic initializations when the system integrity monitor determines that the ODD recovery may be faulty. When manual intervention is needed, the EXC ODDRCVY NOT STARTED alarm message is dumped to indicate that the automatic recovery was not started and that a manual ODD recovery is needed. All recent change activity is blocked until the command has been completed.

One of the following EXC:ODDRCVY! message sections may be used to manually recover the ODD:

- RCLOG for recovery of all regular recent changes
- CORCLOG for recovery of all customer-originated recent changes
- ALL for recovery of all regular and customer-originated recent changes.

If a manual recovery is needed and the OP:LOGSTAT! message is run, the OP LOGSTAT output message displays a reminder that the ODD recovery has not been performed since the system initialization occurred. ODD recovery procedures can be found in AT&T 235-105-250, *System Recovery*.

4.14 OFFICE DATA BASE EDITOR

The office data base editor (ODBE) is a tool that gives the user the ability to create, inspect, and modify the contents of the data base in an interactive mode. Normally, RC is the primary tool for this function. But, ODBE may be used to correct conditions which cause RC to fail.

While using the ODBE, care must be taken not to overwrite and/or delete information critical to the operation of the office.

The ODBE allows the user to insert, update, delete, and review data in the data base on a per-tuple basis. The ODBE also provides dictionary information to the user such as what attributes are in a relation, what is the valid range of inputs to an attribute, etc. The ODBE can also display the number of tuples that are currently in a base relation.

The ODBE prompts the user for attribute values by name (one at a time), converts from screen format into the data base format, then packs the values into a tuple for the data base manager. This feature, and its reversal, allows the ODBE to do bulk inserts and reviews. This allows the insertion of large amounts of data that has been prepared well ahead of the ODBE session.

The ODBE has a set of states, inputs, and resulting states as follows:

a. ***Enter Relation Name:*** The user is prompted for the desired relation. In this state, the user can list all relations in the data dictionary.

b. ***Enter Tuple Operation:*** The user is prompted for the data operation to be performed (insert, delete, update, review, batch insert, or batch review). In this state, the user can list the dictionary information about the attributes of the relation.

c. ***Enter Primary Key:*** The user is prompted for the components of the key, by name, which uniquely defines a tuple in this relation. The user can display the dictionary about the components of the primary key.

d. ***Enter Attribute Value:*** The user is prompted for the attribute by name. The user can display the dictionary information about the attribute.

When in an ODBE state, the user can go to the next lower state, the next higher state, or remain in the same state by means of a response. A valid user response is usually a data base defined name, an encoded choice from a menu of options, or an ODBE special character. Special characters have a meaning only if they are the first character in a user response. See Table 4-10 for the ODBE special characters and the associated meanings.

When inputting data, white space (blanks, tabs, new lines, etc.) is ignored and serves only to delimit item values. White space may be input as an item value by placing the entire value in double quotes. This holds true whether the input is interactive or from a bulk input file.

4.15 SOFTWARE RELEASE RETROFIT

Software release retrofit refers to the implementation of a new software release (for example, 5E2, 5E3, etc.). The new software release is delivered to the office on a magnetic tape supplied by AT&T.

Prior to a software release retrofit, all units should be operational.

Application of the software release retrofit should be planned for a low-traffic period to minimize the number of calls affected by the call processing interruption(s). In some cases, associated hardware and/or firmware changes may be required.

4.16 REFERENCES

To obtain more detailed information on the subjects discussed within this document, refer to the following documents:

- AT&T 190-306-010, *SCANS Procedures*
- AT&T 235-105-110, *System Maintenance Requirements and Tools*
- AT&T 235-105-220, *Corrective Maintenance Procedures*
- AT&T 235-105-241, *Software Release Retrofit Procedures [5E2(1) to 5E2(2)]*
- AT&T 235-105-242, *Software Release Retrofit Procedures [5E2(2) to 5E3]*
- AT&T 235-105-243, *Software Release Retrofit Procedures (5E3 to 5E4)*
- AT&T 235-105-244, *Software Release Retrofit Procedures (5E4 to 5E5)*
- AT&T 235-105-245, *Software Release Retrofit Procedures (5E5 to 5E6)*
- AT&T 235-105-246, *Software Release Retrofit Procedures (5E6 to 5E7)*
- AT&T 235-105-250, *System Recovery*
- AT&T 235-105-340, *Software Release Update Procedures [5E2(2)]*
- AT&T 235-105-341, *Software Release Update Procedures (5E3)*
- AT&T 235-105-342, *Software Release Update Procedures (5E4)*
- AT&T 235-105-343, *Software Release Update Procedures (5E5)*
- AT&T 235-105-344, *Software Release Update Procedures (5E6)*
- AT&T 235-105-345, *Software Release Update Procedures (5E7)*
- AT&T 235-105-443, *Large Terminal Growth Procedures (5E4)*
- AT&T 235-105-444, *Large Terminal Growth Procedures (5E5)*
- AT&T 235-105-445, *Large Terminal Growth Procedures (5E6)*
- AT&T 235-105-446, *Large Terminal Growth Procedures (5E7)*
- AT&T 235-600-700, *Input Message Manual* (formerly IM-5D000-01)
- AT&T 235-600-750, *Output Message Manual* (formerly OM-5D000-01).

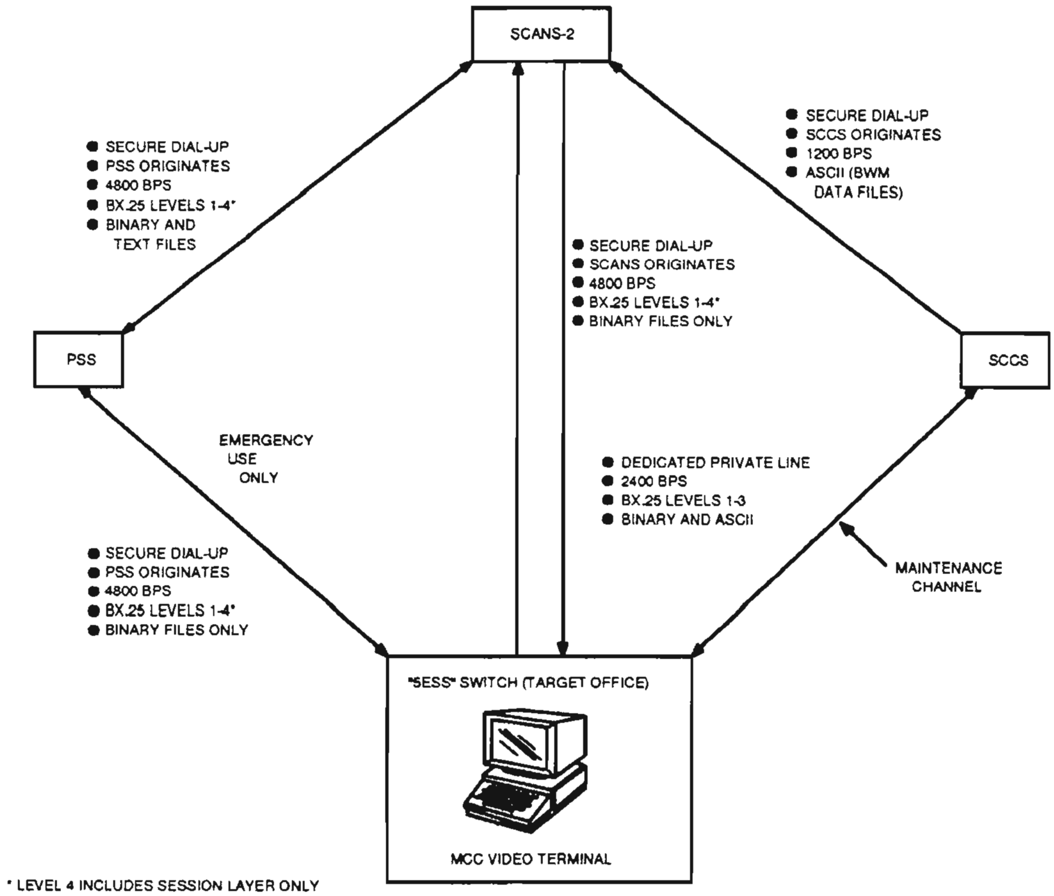

Figure 4-1 — Program Update Distribution

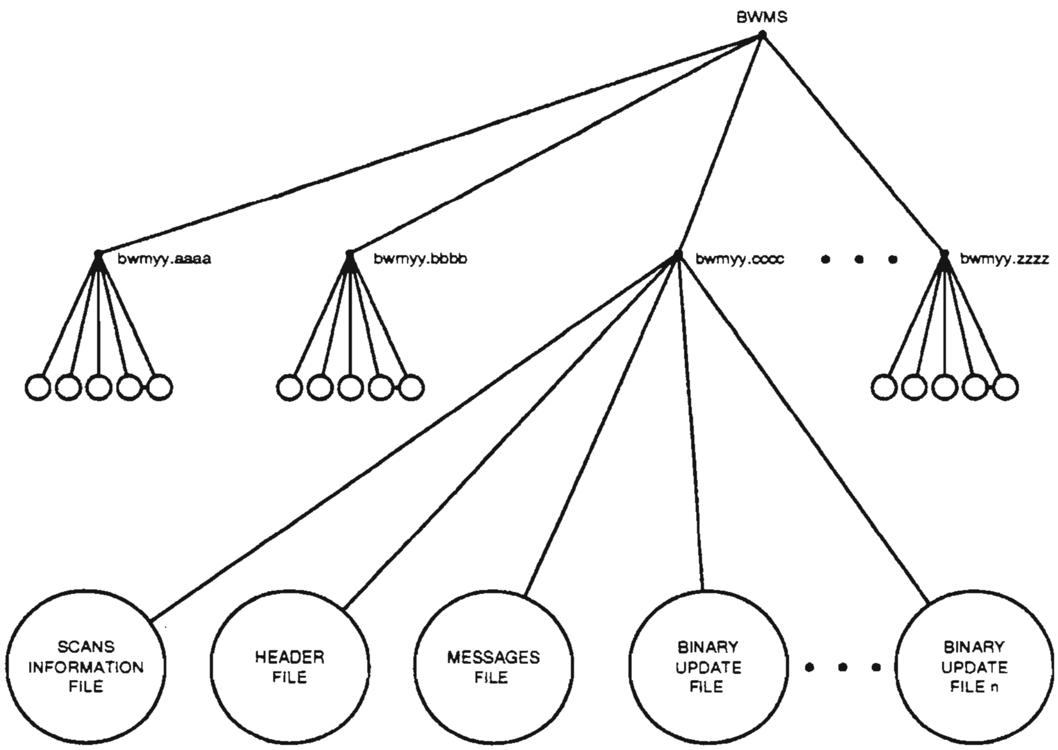

Figure 4-2 — Software Update Structure

```
"BEGIN BWM81-0241
"
"APPLY.**********************************************************************"
"
UPD:UPNM BWM81-0241:FN"/im/sysgeneric.o".DF"/imnbrl/sysgenhs.out":UF/etc/bwm/81
0241/JBterm.m"!
"
"SOAK.***********************************************************************"
"
"               This BWM should soak for 0 days, 1 hours, 0 minutes
"               before being made official.
"               The following instructions should be executed during this
"               interval and yield the expected results.
"
" run a call volume with PROCALL and observe that there are no power
" ring failures.
"
"
"BKOUT.**********************************************************************"
"
"               If during the installation of this BWM, or at any time
"               during the SOAK period, you feel that the applied updates
"               should be backed out of the system, enter the following
"               command(s):
"
UPD:BKOUT:UPNM:BWM81-1241!
"
"OFFICIAL.*******************************************************************"
"
"               To make the updates applied in this BWM official, wait the
"               prescribed SOAK interval and then enter sequentially the
"               following command(s).
"
UPD:UPNM BWM81-0241;OFC!
"
"END  BWM81-0241
```

Figure 4-3 — Example of a Message File (5E3)

```
SYS EMER    CRITICAL    MAJOR     MINOR     BLDG/PWR    BLDG INH  CKT LIM     SYS NORM
OVERLOAD    SYS INH      AM     AM PERPH   OS LINKS       SM         CM           MISC
________________________________________________________________________________________
CMD:                                     ____________________1960 - BWM INSTALLATION
                                                             BWM = BWM83-0001
9000,Y   START BWM Y    9570 NEXT WINDOW         91xx DISPLAY     (xx =     10 APPLY
9010     VERIFY CMPL    9575 PREV WINDOW         92xx PRINT       20 SOAK  30 OFC
9560     STOP EXC       (Y = 10 CHAR BWM NAME)   93xx EXEC ALL    40 BKOUT 50 FILE)
9565,Z   RESET LINE Z   (Z = 3 DIGIT LINE NO)    94xx EXEC NEXT
__________________________SECTION EXECUTION STATUS______________________________________
   APPLY CMPL           SOAK CMPL           OFC INPG              BKOUT
RESPONSE:_______________________________________________________________________________
11 "
12 "OFFICIAL-----------------------------------------------------------------------
13 "
14 "To make the update applied in this BWM official, wait the
15 "prescribed SOAK interval and then enter sequentially the
16 "following command(s):
17 "
18 UPD:UPNM="BWM83-0001":OFC;
19 "
20 UPD:AUD;
________________________________________________________________________________________
```

Figure 4-4 — BWM Installation Menu Page 1960 (5E3 and Earlier)

```
SYS EMER    CRITICAL  MAJOR      MINOR     BLDG/PWR    BLDG INH  CKT LIM     SYS NORM
OVERLOAD    SYS INH    AM      AM PERPH   OS LINKS       SM         CM           MISC
________________________________________________________________________________________
                                         _______1960 - BWM INSTALLATION BWM = BWM89-0001
9000,Y   START BWM Y    9570 NEXT WINDOW         91xx DISPLAY     (xx =     10 APPLY
9010     VERIFY CMPL    9575 PREV WINDOW         92xx PRINT       20 SOAK  30 OFC
9560     STOP EXC       (Y = 10 CHAR BWM NAME)   93xx EXEC ALL    40 BKOUT 50 FILE)
9565,Z   RESET LINE Z   (Z = 3 DIGIT LINE NO)    94xx EXEC NEXT
                        (F = FILENAME IN BWM)    9260,F PRINT FILE F
__________________________SECTION EXECUTION STATUS______________________________________
   APPLY CMPL           SOAK CMPL           OFC INPG              BKOUT
RESPONSE:_______________________________________________________________________________
21 "
22 "OFFICIAL-----------------------------------------------------------------------
23 "To make the update applied in this BWM official, wait the
24 "prescribed SOAK interval and then enter sequentially the
25 "following command(s):
26 "
27 UPD:OFC:DATA, UPNM="BWM89-0001";
28 "
29 UPD:RECLAIM:DATA, ALL;
30"END BWM89-0001
________________________________________________________________________________________
```

Figure 4-5 — BWM Installation Menu Page 1960 (5E4 and Later)

```
 SYS EMER CRITICAL MAJOR    MINOR   BLDG/PWR  BLDG INH CKT LIM  SYS NORM
 OVERLOAD SYS INH   AM     AM PERPH OS LINKS     SM        CM       MISC
CMD:                                 1950 - PROGRAM UPDATE MAINTENANCE

                                                BWM = BWM83-0001
DISPLAY BWM HISTORY
9101,Y   BWM Y       COMPLETED       9200    VERIFY INCONSISTANCY
9102     OFC                         9300    RECOVER FORWARD
9103     TEMP                        9400    RECOVER BACKWARD
9104     ALL                         9500    RECLAIM PATCH SPACE
                                     9600,Y CLEAR BWM Y

(Y = 10 CHAR BWM NAME)
```

Figure 4-6 — Program Update Menu Page 1950 (5E2 and Earlier)

```
 SYS EMER CRITICAL MAJOR    MINOR   BLDG/PWR  BLDG INH CKT LIM  SYS NORM
 OVERLOAD SYS INH   AM     AM PERPH OS LINKS     SM        CM       MISC
                                     1950 - PROGRAM UPDATE MAINTENANCE

DISPLAY BWM HISTORY
9101,Y   BWM Y                       9200    VERIFY INCONSISTANCY
9102     OFC                         9300    RECOVER FORWARD
9103     TEMP                        9400    RECOVER BACKWARD
9104     ALL                         9500    RECLAIM PATCH SPACE
                                     9600,Y CLEAR BWM Y

                                        SOAK TIMER FOR BWM =
                                     9700,HH,MM RESET TIMER      COMPLETED
                                     9710       PRINT TIMER INFO
                                     9720       ABORT SOAK TIMER

                     (5E5 only)      9900    BACKOUT LAST OFC BWM  IN PROGRESS
(Y = 10 CHAR BWM NAME)               (HH = HOURS)        (MM = MINUTES)
```

Figure 4-7 — Program Update Menu Page 1950 (5E3 Through 5E5)

```
 SYS EMER CRITICAL MAJOR    MINOR   BLDG/PWR  BLDG INH CKT LIM  SYS NORM
 OVERLOAD SYS INH   AM     AM PERPH OS LINKS     SM        CM       MISC
_______________________________________________________________________
                                   ______1950 - PROGRAM UPDATE MAINTENANCE


DISPLAY BWM HISTORY                ____________________________
9101,Y  BWM Y                      9200    VERIFY INCONSISTANCY
9102    OFC                        9300    RECOVER FORWARD
9103    TEMP                       9400    RECOVER BACKWARD
9104    ALL                        9500    RECLAIM PATCH SPACE
                                   9600,Y CLEAR BWM Y

LAST OFC BWM      BWM89-0067         ____SOAK TIMER FOR BWM =  NONE
2nd FROM TOP      BWM89-0051       9700,HH,MM RESET TIMER      COMPLETED
3rd FROM TOP      BWM89-0045       9710       PRINT TIMER INFO
9900 BACKOUT OFC                   9720       ABORT SOAK TIMER


(Y = 10 CHAR BWM NAME)             (HH = HOURS)         (MM = MINUTES)
```

Figure 4-8 — Program Update Menu Page 1950 (5E6)

```
 SYS EMER CRITICAL MAJOR    MINOR   BLDG/PWR  BLDG INH CKT LIM  SYS NORM
 OVERLOAD SYS INH   AM     AM PERPH OS LINKS     SM        CM       MISC
_______________________________________________________________________
                                   ______1950 - PROGRAM UPDATE MAINTENANCE


DISPLAY BWM HISTORY                ____________________________
9101,Y  BWM Y                      9200    VERIFY INCONSISTANCY
9102    OFC                        9300    RECOVER FORWARD
9103    TEMP                       9400    RECOVER BACKWARD
9104    ALL                        9600,Y CLEAR BWM Y
                                   9650,X EXPAND BWM

LAST OFC BWM      BWM89-0067         ____SOAK TIMER FOR BWM =  NONE
2nd FROM TOP      BWM89-0051       9700,HH,MM RESET TIMER      COMPLETED
3rd FROM TOP      BWM89-0045       9710       PRINT TIMER INFO
9900 BACKOUT OFC                   9720       ABORT SOAK TIMER


(X = Y OR STOP)  (Y = 10 CHAR BWM NAME)  (HH = HOURS)  (MM = MINUTES)
```

Figure 4-9 — Program Update Menu Page 1950 (5E7)

```
 SYS EMER CRITICAL MAJOR    MINOR   BLDG/PWR  BLDG INH CKT LIM  SYS NORM
 OVERLOAD SYS INH   AM     AM PERPH OS LINKS     SM        CM       MISC
__________________________________________________________________________
CMD:                                              _________1940   Easy BWM Installation
__________________________________________________________________________
9800          Start Execution          9850,F     Dump Inst BWM File
9810,[Y]      Change Install BWM Name  9860       Stop Execution
9820,[Y]      Change Back Out BWM Name 9870       Stop After Soak OFF
9830,[Y]      Change Apply BWM Name
9840,HH,MM    Change BWM Soak Interval Timer

(Y = 10 Character BWM Name or NONE for no BWM, HH = Hours, MM = Minutes,
 F = Filename)
__________________________________________________________________________
RESPONSE: EASY BWM IS IDLE

           Install BWM Name          BWM89-0050
           Back out BWM Name         BWM89-6082
           Apply BWM Name            NONE
           BWM Soak Interval Timer   24-00
__________________________________________________________________________
```

Figure 4-10 — Easy BWM Installation Page 1940

```
---------------------- Update Number 1 ----------------------
Time & Date Stamp: SUn Feb 5 16:34:15 1984
Update Name: BWM84-0001
Status = 0x430
•           INSTLD
•           OILD
•           OGEN
Type = 0x8
•           IM
Official Pfile Path = /no5text/im/IM.out
Working Pfile Path = /no5text/im/_ IM.out
Bound Upd File Path = /updtmp/UpdFi1000089
.m update file path[0] = /etc/bwm/840001/PCbgsch.m

A. INTERFACE MODULE UPDATE


---------------------- Update Number 2 ----------------------
Time & Date Stamp: Thu Feb 9 04:58:59 1984

Update Name: BWM84-0002
Status = 0x408
•           INST
•           INSTLD
Type = 0x241
•           TERM
•           SP
•           NREL
Official Pfile Path = /no5text/prc/fpump
Working Pfile Path =
Bound Upd File Path =
New OFC Pfile Path =
.m Update file Path[0] = /etc/bwm/840002/fpump


B. KILLABLE PROCESS UPDATE
USING FILE REPLACEMENT
```

Figure 4-11 — Typical BWM Histories [5E2(2) and Earlier]

```
--------------------- Update Number 1 ----------------------
Time & Date Stamp:             Thu Feb 20 04:58:59 1989

Update Name:                   BWM89-0001
Processor Name:                AM
BWM sequence number:           1
Package sequence number:
 0,   0,   0,   0,   0,   0,   0,   0,   0,   0
 0,   0,   0,   0,   0,   0,   0,   0,   0,   0
 0,   0,   0,   0,   0,   0,   0,   0,   0,   0
 0,   0,   0,   0,   0,   0,   0,   0,   0,   0
 0,   0,   0,   0,   0,   0,   0,   0,   0,   0
 0,   0,   0,   0,   0,   0,   0,   0,   0,   0
 0,   0

Transaction = 0x8:
.           NEW RELEASE OF FILE
File Update Type = 0x41:
.           KILLABLE PROCESS
.           SUPERVISOR PROCESS
Status = 0xc:
.           INSTALLED
Official Pfile Path = /no5text/prc/fpump
Working  Pfile Path =
Bound Upd File Path =
New OFC Pfile Path =
Saved BOLO FN/UPD Path =
Saved BOLO DF File Path =
.m Update file Path[0] = /etc/bwm/890001/fpump  (if 5E3)
.m Update file Path[0] = /etc/bwm/BWM89-0001/fpump (if 5E4 or later)
```

Figure 4-12 — Typical BWM History of an AM Update (5E3 and Later)

```
---------------------- Update Number 10 -----------------------
Time & Date Stamp:          Sun Feb 23 16:34:15 1989

Update Name:                BWM89-0002
Processor Name:             SM
OSsyspatch address          0x3feb2c
BWM sequence number:        10
Package sequence number:
 0,   0,   0,   0,   0,   0,   0,   0,   0,   0
 0,   0,   0,   0,   0,   0,   0,   0,   0,   0
 0,   0,   0,   0,   0,   0,   0,   0,   0,   0
 0,   0,   0,   0,   0,   0,   0,   0,   0,   0
 0,   0,   0,   0,   0,   0,   0,   1,   0,   0
 0,   0,   0,   0,   0,   0,   0,   0,   0,   0
 0,   0,   0,   0,   0,   0,   0,   0,   0,   0
 0,   0,   0,   0,   0
Configuration:              BASIC
Affected SM list:
 2,        3

Transaction = 0x2:
.          FUNCTION REPLACEMENT
File Update Type = 0x808:
.          CONTIGUOUS FILE
.          NON-KILLABLE PROCESS
.          SM
Status = 0xb:
.          INSTALLED
.          OGEN
.          OILD
Official Pfile Path = /no5text/im/D.basic/IM.out
Working  Pfile Path = /no5text/im/D.basic/__IM.out
Bound Upd File Path = /updtmp/UpdFil327790
New OFC Pfile Path = /updtmp/PflObj327790
Saved BOLO FN/UPD Path =
Saved BOLO DF File Path =
.m Update file Path[0] = /etc/bwm/890002/PCtrnsch_c.m  (if 5E3)
.m Update file Path[0] = /etc/bwm/BWM89-0002/PCtrnsch_c.m (if 5E4 or later)
Updated function            PCloss has new address of 0xf3034
```

Figure 4-13 — Typical BWM History of an SM Update (5E3 through 5E6)

```
--------------------- Update Number 10 ----------------------
Time & Date Stamp:            Sun Feb 23 16:34:15 1989

Update Name:                  BWM89-0002
Processor Name:               SM
OSsyspatch address            0x3feb2c
BWM sequence number:          10
Package sequence number:
 0,   0,   0,   0,   0,   0,   0,   0,   0,   0
 0,   0,   0,   0,   0,   0,   0,   0,   0,   0
 0,   0,   0,   0,   0,   0,   0,   0,   0,   0
 0,   0,   0,   0,   0,   0,   0,   0,   0,   0
 0,   0,   0,   0,   0,   0,   0,   1,   0,   0
 0,   0,   0,   0,   0,   0,   0,   0,   0,   0
 0,   0,   0,   0,   0,   0,   0,   0,   0,   0
 0,   0,   0,   0,   0
Configuration:                BASIC
Affected SM list:
 2,        3

Transaction = 0x2:
.          FUNCTION REPLACEMENT
File Update Type = 0x808:
.          CONTIGUOUS FILE
.          NON-KILLABLE PROCESS
.          SM
Status = 0xb:
.          INSTALLED
.          OGEN
Official Pfile Path = /no5text/im/D.basic/IM.out
Working  Pfile Path = /no5text/im/D.basic/___IM.out
Bound Upd File Path = /updtmp/UpdFilbIM
New OFC Pfile Path =
Saved BOLO FN/UPD Path =
Saved BOLO DF File Path =
.m Update file Path[0] = /etc/bwm/890002/PCtrnsch_c.m  (if 5E3)
.m Update file Path[0] = /etc/bwm/BWM89-0002/PCtrnsch_c.m (if 5E4 or later)
Updated function              PCloss has new address of 0xf3034
```

Figure 4-14 — Typical BWM History of an SM Update (5E7)

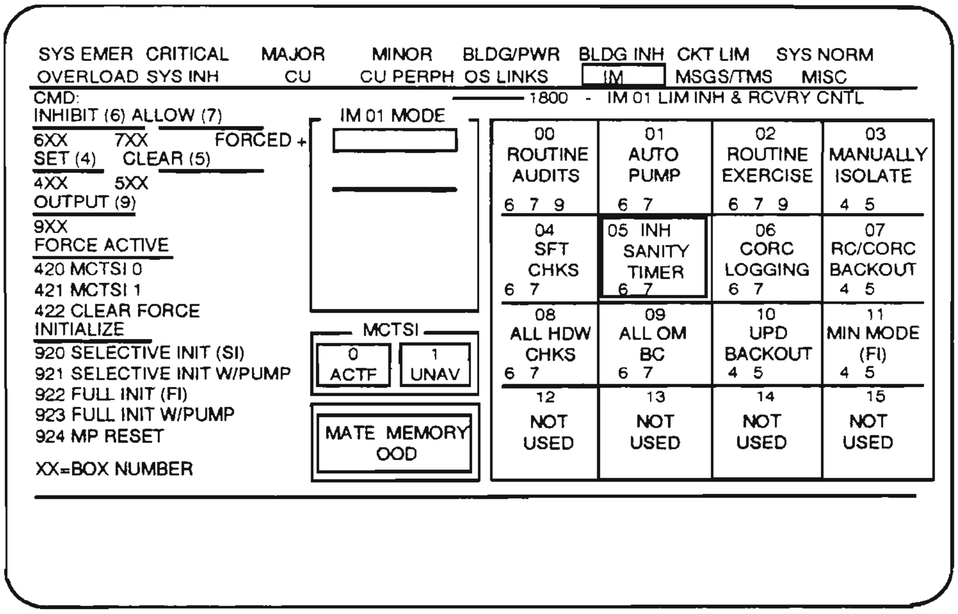

Figure 4-15 — Switching Module Inhibit and Recovery Control Page 1800 [5E2(1) and Earlier]

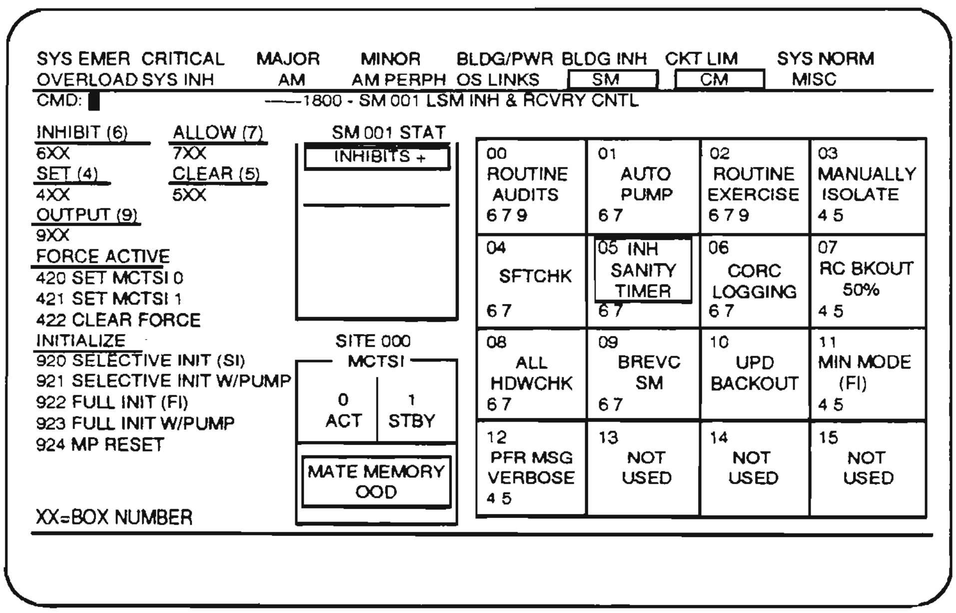

Figure 4-16 — Switching Module Inhibit and Recovery Control Page 1800 [5E2(2) and Later]

```
SYS EMER   CRITICAL  MAJOR   MINOR     BLDG/PWR BLDG INH  CKT LIM   SYS NORM
OVERLOAD   SYS INH    AM     AM PERPH  OS LINKS   SM        CM        MISC
                                   ------1850 - CMP 0 PRIM INH & RCVRY CNTL

2XX INHIBIT CMP 0 PRIM       CMP 0 PRIM STAT
3XX ALLOW CMP 0 PRIM         0-0  ACT         00        01        02        03
4XX SET CMP 0 PRIM           POSTINIT         ROUTINE   AUTO      NOT       NOT
5XX CLEAR CMP 0 PRIM            31            AUDITS    PUMP      USED      USED
6XX INHIBIT CMP 0                             6 7 9     6 7
7XX ALLOW CMP 0                               04        05        06        07
9XX OUTPUT CMP 0 PRIM                         SFTCHK    ALARMED   NOT       RC
800 OUTPUT CMP 0 STATUS                                 MSG       USED      BKOUT
INITIALIZE CMP 0 PRIM                         6 7       DSCD                4 5
919 PURGING INIT (PGI)                        08        09        10        11
920 SELECTIVE INIT (SI)       MATE STAT       ALL       BREVITY   UPD       MIN
922 FULL INIT (FI)            (SEE NOTE)      HDWCHK    CONTROL   BACKOUT   MODE
923 FULL INIT W/PUMP          1-0  STBY       2 3       6 7
                               INHIBITS +

XX=BOX NUMBER          (NOTE: SEE 1851,0 CMP 0 MATE INH & RCVRY CNTL)
```

Figure 4-17 — Communication Module Processor Inhibit and Recovery Control Page 1850

```
SYS EMER   CRITICAL  MAJOR   MINOR     BLDG/PWR BLDG INH  CKT LIM   SYS NORM
OVERLOAD   SYS INH    AM     AM PERPH  OS LINKS   SM        CM        MISC
                                   ------1851 - CMP 0 MATE INH & RCVRY CNTL

2XX INHIBIT CMP 0 MATE          MATE STAT
3XX ALLOW CMP 0 MATE         1-0  STBY        00        01        02        03
4XX SET CMP 0 MATE           INHIBITS +       ROUTINE   AUTO      NOT       NOT
5XX CLEAR CMP 0 MATE                          AUDITS    PUMP      USED      USED
9XX OUTPUT CMP 0 MATE        SW-REQ             9       SEE NOTE
800 OUTPUT CMP 0 STATUS                       04        05        06        07
INITIALIZE CMP 0 MATE                         SFTCHK    ALARMED   NOT       RC
919 PURGING INIT (PGI)                                  MSG       USED      BKOUT
920 SELECTIVE INIT (SI)                       SEE NOTE  DSCD                4 5
922 FULL INIT (FI)                            08        09        10        11
923 FULL INIT W/PUMP         CMP 0 PRIM STAT  ALL       BREVITY   UPD       MIN
OFFLINE PUMP CMP 0 MATE       (SEE NOTE)      HDWCHK    CONTROL   BACKOUT   MODE
930 START                    0-0  ACT         2 3       SEE NOTE
931 STOP                     POSTINIT

XX=BOX NUMBER          (NOTE: SEE 1850,0 CMP 0 PRIM INH & RCVRY CNTL)
```

Figure 4-18 — Communication Module Processor Inhibit and Recovery Control Page 1851

```
VFY UPDCON IN PROGRESS

TABLE OF INCONSISTENCIES
UPNM           UPD NUMBER    TYPE (NOTE1)       PROCESSOR
BWM84-0001     1             1                  CP
BWM84-0002     2             1                  IM3

VFY UPDCON COMPLETED

NOTE:
  1.           Type 1 means that an update has been recorded in a
               BWM history file but not installed in the processor
               specified. Consult the Output Manual (under VFY UPDCON)
               for other types of inconsistency.
```

Figure 4-19 — Typical Update Inconsistency Report [5E2(2) and Earlier]

```
UPD VFYCON IN PROGRESS

UPD VFYCON - TABLE OF INCONSISTENCIES FOLLOWS
UPNM           UPD NUMBER    TYPE     PROCESSOR

BWM88-0001     6             7        ISLU-CC : SM3
               STATUS        UNIT#    CC#
               INCONSISTENT  1        0

               REMOVE/RESTORE INCONSISTENT PERIPHERALS

BWM88-0001     5             7        PSU-PH :  SM3
               STATUS        PSU#     SHELF#    PH#
               INCONSISTENT  0        0         5
               INCONSISTENT  0        0         10

               REMOVE/RESTORE INCONSISTENT PERIPHERALS

BWM88-0001     1             1        AM

UPD VFYCON COMPLETED
```

Figure 4-20 — Typical Update Inconsistency Report (5E3 to 5E6)

```
UPD VFYCON IN PROGRESS

UPD VFYCON - TABLE OF INCONSISTENCIES FOLLOWS
UPNM          UPD NUMBER    TYPE      PROCESSOR

BWM88-0001    6             7         ISLU-CC : SM3
              STATUS        UNIT
              INCONSISTENT  ISLUCC=3-1-0

              REMOVE/RESTORE INCONSISTENT PERIPHERALS

BWM88-0001    5             7         PSU-PH :  SM3
              STATUS        UNIT
              INCONSISTENT  PSUPH=3-0-0-5
              INCONSISTENT  PSUPH=3-0-0-10

              REMOVE/RESTORE INCONSISTENT PERIPHERALS

BWM88-0001    1             1         AM

UPD VFYCON COMPLETED
```

Figure 4-21 — Typical Update Inconsistency Report (5E7)

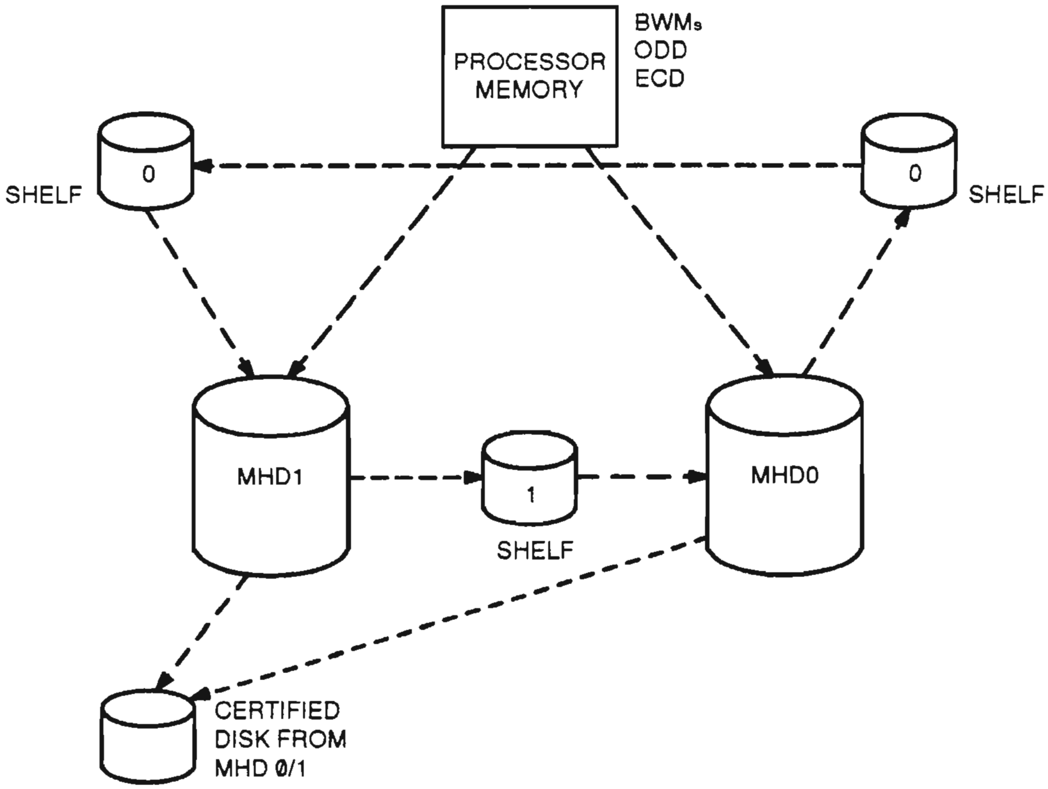

Figure 4-22 — 300-MB Removable Disk Backup Configuration

TABLE 4-1
SAMPLE PDS AND MML MESSAGES [5E2(2) AND EARLIER]

PDS

```
APPLY -
   UPD:UPNM "BWM89-0080";FN"/no5text/hm/HMidb",NREL:UF"HMidb"!
   UPD:UPNM "BWM89-0080";FN"/no5text/prc/okp":UFFN"okp.ls"!
   UPD:UPNM "BWM89-0080";FN"/no5text/prc/smkp":UFFN"smkp.ls"!
   UPD:UPNM "BWM89-0080";FN"/no5text/im/IM.out",DF
      "/no5text/im/IMhs.out":UFFN"IM.out.ls"!
   UPD:VERSION,APPLY "5E2(2) 02.05 BWM89-0080"!

SOAK -
   STOP:EXC:ANY,FN"/etc/cron.app",UCL!

OFFICIAL -
   UPD:UPNM; "BWM89-0080";OFC!
   UPD:AUD!

BKOUT -
   UPD:BKOUT;UPNM "BWM89-0080"!
   UPD:VERSION, BKOUT "5E2(2) 02.05 BWM89-0080"!
```

MML

```
APPLY -
   UPD:UPNM = "BWM89-0080":FN = "/no5text/hm/HMidb",NREL:DATA ,
      UF = "HMidb";
   UPD:UPNM = "BWM89-0080":FN = "/no5text/prc/okp":DATA ,
      UFFN = "okp.ls";
   UPD:UPNM = "BWM89-0080":FN = "/no5text/prc/smkp":DATA ,
      UFFN = "smkp.ls";
   UPD:UPNM = "BWM89-0080":FN = "/no5text/im/IM.out",
      DF = "/no5text/im/IMhs.out":DATA ,UFFN = "IM.out.ls";
   UPD:VERSION,APPLY="5E2(2) 02.05 BWM89-0080";

SOAK -
   STOP:EXC:DATA ,ANY,FN = "/etc/cron.app",UCL;

OFFICIAL -
   UPD:UPNM = "BWM89-0080":OFC;
   UPD:AUD;

BKOUT _
   UPD:BKOUT:UPNM = "BWM89-0080";
   UPD:VERSION,BKOUT="5E2(2) 02.05 BWM89-0080";
```

TABLE 4-2
SAMPLE PDS AND MML MESSAGES (5E3)

PDS

APPLY -

```
UPD:APPLY:FILER, UPNM "BWM123456x", TARGET AM, NREL,
  FN "/bin/banner", UF "banner" !
UPD:APPLY:FUNCR, UPNM "BWM123456x", TARGET AM,
  FN "/no5text/prc/smkp", UF "UPrclaim c.m" !
UPD:APPLY:FUNCR, UPNM "BWM123456x", TARGET SM,
  FN "IM.out", DF "IMhs.out", PACKINFO "BWM123456x.pk" !
UPD:APPLY:FUNCR, UPNM "BWM123456x", TARGET PI,
  FN "PI.out", DF "perf.out", PACKINFO "BWM123456x.pk" !
UPD:APPLY:FUNCR, UPNM "BWM123456x", TARGET PH,
  FN "PH.out", DF "perf.out", PACKINFO "BWM123456x.pk" !
UPD:APPLY:FUNCR, UPNM "BWM123456x", TARGET ISLU,
  FN "ISLU.out", DF "perf.out", PACKINFO "BWM123456x.pk" !
UPD:APPLY:FUNCR, UPNM "BWM123456x", TARGET RAF,
  FN "RAF.out", DF "perf.out", PACKINFO "BWM123456x.pk" !
```

SOAK -

BKOUT -

```
UPD:BKOUT:UPNM "BWM123456x"!
```

OFFICIAL -

```
UPD:OFC:UPNM "BWM123456x"!
```

MML

APPLY -

```
UPD:APPLY:DATA, FILER, UPNM="BWM123456x", TARGET=AM, NREL,
  FN="/bin/banner", UF="banner" ;
UPD:APPLY:DATA, FUNCR, UPNM="BWM123456x", TARGET=AM,
  FN="/no5text/prc/smkp", UF="UPrclaim_c.m" ;
UPD:APPLY:DATA, FUNCR, UPNM="BWM123456x", TARGET=SM,
  FN="IM.out", DF="IMhs.out", PACKINFO="BWM123456x.pk" ;
UPD:APPLY:DATA, FUNCR, UPNM="BWM123456x", TARGET=PI,
  FN="PI.out", DF="perf.out", PACKINFO="BWM123456x.pk" ;
UPD:APPLY:DATA, FUNCR, UPNM="BWM123456x", TARGET=PH,
  FN="PH.out", DF="perf.out", PACKINFO="BWM123456x.pk" ;
UPD:APPLY:DATA, FUNCR, UPNM="BWM123456x", TARGET=ISLU,
  FN="ISLU.out", DF="perf.out", PACKINFO="BWM123456x.pk" ;
UPD:APPLY:DATA, FUNCR, UPNM="BWM123456x", TARGET=RAF,
  FN="RAF.out", DF="perf.out", PACKINFO="BWM123456x.pk" ;
```

SOAK -

BKOUT -

```
UPD:BKOUT:DATA, UPNM="BWM123456x";
```

OFFICIAL -

```
UPD:OFC:DATA, UPNM="BWM123456x";
```

TABLE 4-3
SAMPLE PDS AND MML MESSAGES (5E4)

PDS	APPLY - UPD:APPLY:FUNCR, UPNM "BWM123456x", TARGET PH16, FN "PH16.out", DF "ph16perf.out", PACKINFO "BWM123456x.pk" ! UPD:APPLY:FUNCR, UPNM "BWM123456x", TARGET PH128, FN "PH128.out", DF "ph2perf.out", PACKINFO "BWM123456x.pk" ! UPD:APPLY:FUNCR, UPNM "BWM123456x", TARGET DCLU5, FN "DCLU5.out", DF "perf.out", PACKINFO "BWM123456x.pk" ! SOAK - BKOUT - OFFICIAL -
MML	APPLY - UPD:APPLY:DATA, FUNCR, UPNM="BWM123456x", TARGET=PH16, FN="PH16.out, DF="ph16perf.out", PACKINFO="BWM123456x.pk" ; UPD:APPLY:DATA, FUNCR, UPNM="BWM123456x", TARGET=PH128, FN="PH128.out", DF="ph2perf.out", PACKINFO="BWM123456x.pk" ! UPD:APPLY:DATA, FUNCR, UPNM="BWM123456x", TARGET=DCLU5, FN="DCLU5.out", DF="perf.out", PACKINFO="BWM123456x.pk" ! SOAK - BKOUT OFFICIAL -

TABLE 4-4
SAMPLE MML MESSAGES (5E5)

```
MML
          APPLY -
            UPD:APPLY:DATA, FUNCR, UPNM="BWM123456x", TARGET=PH2A,
              FN="PH2A.out", DF="perf.out", PACKINFO="BWM123456x.pk" ;
            UPD:APPLY:DATA, FUNCR, UPNM="BWM123456x", TARGET=PH2G,
              FN="PH2G.out", DF="perf.out", PACKINFO="BWM123456x.pk" ;

          SOAK -
            UPD:PMPPERF:TARGET=PH2A;
            UPD:PMPPERF:TARGET=PH2G;
            UPD:PMPPERF:TARGET=ISLU;
            UPD:PMPPERF:TARGET=RAF;

          BKOUT -
            UPD:PMPPERF:TARGET=PH2A;
            UPD:PMPPERF:TARGET=PH2G;
            UPD:PMPPERF:TARGET=ISLU;
            UPD:PMPPERF:TARGET=RAF;

          OFFICIAL -
```

TABLE 4-5
SAMPLE MML MESSAGES (5E6)

```
MML
        APPLY -
          UPD:APPLY:DATA, FUNCR, UPNM=STDCMPMSGH, TARGET=MSGH,
            FN="CMPMSGH.out", DF="CMPMSGH.out", PACKINFO="pkinfo" ;
          UPD:APPLY:DATA, FUNCR, UPNM=OIOPFUNCR1, TARGET=OIOP,
            FN="OIOP.out", DF="perf.out", PACKINFO="pkinfo" ;
          UPD:APPLY:DATA, FUNCR, UPNM=PH3CFUNCR1, TARGET=PH3C,
            FN="PH3C.out", DF="perf.out", PACKINFO="pkinfo" ;

        SOAK -
          UPD:DISPLAY:DATA, UPNM=STDCMPMSGH;
          UPD:DISPLAY:DATA, UPNM=OIOPFUNCR1;
          UPD:PMPPERF:DATA, TARGET=OIOP;
          UPD:DISPLAY:DATA, UPNM=PH3CFUNCR1;
          UPD:PMPPERF:DATA, TARGET=PH3C, UCL;

        OFFICIAL -
          UPD:OFC:DATA, UPNM=STDCMPMSGH;
          UPD:OFC:DATA, UPNM=OIOPFUNCR1;
          UPD:OFC:DATA, UPNM=PH3CFUNCR1;

        BKOUT -
          UPD:BKOUT:DATA, UPNM=STDCMPMSGH;
          UPD:BKOUT:DATA, UPNM=OIOPFUNCR1;
          UPD:PMPPERF:DATA, TARGET=OIOP;
          UPD:BKOUT:DATA, UPNM=PH3CFUNCR1;
          UPD:PMPPERF:DATA, TARGET=PH3C;
```

TABLE 4-6
SAMPLE MML MESSAGES (5E7)

```
MML
        APPLY -
          UPD:APPLY:DATA, FUNCR, UPNM=STDCMPMSGH, TARGET=MSGH,
            FN="CMPMSGH.out", DF="CMPMSGH.out", PACKINFO="pkinfo" ;
          UPD:APPLY:DATA, FUNCR, UPNM=OIOPFUNCR1, TARGET=OIOP,
            FN="OIOP.out", DF="perf.out", PACKINFO="pkinfo" ;
          UPD:APPLY:DATA, FUNCR, UPNM=PH3CFUNCR1, TARGET=PH3C,
            FN="PH3C.out", DF="perf.out", PACKINFO="pkinfo" ;

        SOAK -
          UPD:DISPLAY:DATA, UPNM=STDCMPMSGH;
          UPD:DISPLAY:DATA, UPNM=OIOPFUNCR1;
          UPD:PMPPERF:DATA, UPNM=OIOPFUNCR1;
          UPD:DISPLAY:DATA, UPNM=PH3CFUNCR1;
          UPD:PMPPERF:DATA, TARGET=PH3C, UCL;

        OFFICIAL -
          UPD:OFC:DATA, UPNM=STDCMPMSGH;
          UPD:OFC:DATA, UPNM=OIOPFUNCR1;
          UPD:OFC:DATA, UPNM=PH3CFUNCR1;

        BKOUT -
          UPD:BKOUT:DATA, UPNM=STDCMPMSGH;
          UPD:BKOUT:DATA, UPNM=OIOPFUNCR1;
          UPD:PMPPERF:DATA, UPNM=OIOPFUNCR1;
          UPD:BKOUT:DATA, UPNM=PH3CFUNCR1;
          UPD:PMPPERF:DATA, TARGET=PH3C;
```

TABLE 4-7
FILE TRANSFER ERROR CONDITIONS (SCANS INTERFACE)

CAUSE	EFFECT	ACTION TO BE TAKEN
Insufficient space for incoming file (Initial size for directory /etc/bwm is 5 MB).	File transfer session terminated.	(1) Verify and install applicable software updates received from SCANS-2. (2) Clear directory /etc/bwm after updates have been made "permanent." (3) Enter second request for remaining software updates.
Incoming file length exceeds maximum file length permitted (2 MB max.).	File transfer continues with next file.	(1) Invalid software update. Contact ESAC and PECC.
File with identical pathname already exists.	File transfer continues with next file.	(1) Verify all software updates at completion of session. (2) Clear those software updates in which verification was unsuccessful. (3) Enter second request for any remaining software updates.
Incoming file interrupted by sending process.	File transfer session will be terminated if three consecutive files are interrupted.	(1) Enter second request for affected software updates. (2) If problem persists, contact field update administrator.
Sending process is unable to continue and aborts session.	File transfer session terminated.	(1) Verify and install applicable software updates received from SCANS. (2) Enter second request for transmission of remaining software updates. (3) If problem persists, contact SCANS administrator.
Unrecoverable conditions detected by the retrieve process.	File transfer session terminated.	(1) Verify and install applicable software updates received from SCANS-2. (2) Enter second request for transmission of remaining software updates. (3) If problem persists, contact PECC.

TABLE 4-8
FILE TRANSFER ERROR CONDITIONS (CSCANS INTERFACE)

CAUSE	EFFECT	ACTION TO BE TAKEN
Insufficient space for incoming file (Initial size for directory /etc/bwm is 5 MB).	File transfer session terminated.	(1) Verify and install applicable software updates received from CSCANS. (2) Clear directory /etc/bwm after updates have been made "permanent." (3) Enter second request for remaining software updates.
Incoming file length exceeds maximum file length permitted (2 MB max.).	File transfer continues with next file.	(1) Invalid software update. Contact ESAC and PECC.
File with identical pathname already exists.	File transfer continues with next file.	(1) Verify all software updates at completion of session. (2) Clear those software updates in which verification was unsuccessful. (3) Enter second request for any remaining software updates.
Incoming file interrupted by sending process.	File transfer session will be terminated if three consecutive files are interrupted.	(1) Enter second request for affected software updates. (2) If problem persists, contact field update administrator.
Sending process is unable to continue and aborts session.	File transfer session terminated.	(1) Verify and install applicable software updates received from CSCANS. (2) Enter second request for transmission of remaining software updates. (3) If problem persists, contact CSCANS administrator.
Unrecoverable conditions detected by the retrieve process.	File transfer session terminated.	(1) Verify and install applicable software updates received from CSCANS. (2) Enter second request for transmission of remaining software updates. (3) If problem persists, contact PECC.

TABLE 4-9 SOURCE AND DESTINATION PARTITIONS FOR BACKUP	
SOURCE PRIMARY (ROOT) PARTITIONS	DESTINATION (BACKUP-ROOT) PARTITIONS
/dev/boot	/dev/bboot
/dev/root	/dev/broot
/dev/etc	/dev/betc
/dev/db	/dev/bdb

TABLE 4-10 ODBE SPECIAL CHARACTERS	
SPECIAL CHARACTER	MEANING
?	Help — gives a list of the valid responses.
*	Display information relevant to the current state (for example, list all valid relations).
!	Go back to next lowest state.
<	Go back to most previous attribute.†
>	Skip all remaining attributes and perform the appropriate tuple operation.
/	Skip this attribute. Leave the current attribute value the same.
cntrl-d	Get out of ODBE and rewrite the data base.
† Can only be used in "Enter Attribute" state.	

5.38 MAKE FULL OFFICE BACKUP DISK—5E4 AND LATER

OVERVIEW

This procedure allows the craft to do the following:

- Make Full Office Backup of the AM Text and AM office dependent data (ODD) to software backup disk and corresponding tapes.
- Create Shelf copies of disks in 300-MB disk offices.
- Make Full Office Backup Tape procedures should be used if only the 300-MB shelf disk copies are to be pulled.

This procedure applies to offices with software release 5E2(2).02.04 (software update 880066) or later. This procedure also applies to offices with software release 5E3(1).04.01 (software update 880067) or later.

The full office backup disk procedure is the process used to save a copy of the office software [text, ODD, and equipment configuration data (ECD) data bases]. The full office backup is done in order to provide a reliable vehicle for system recovery in the event that data in both system disk drives becomes mutilated. The procedure should be done during nonprime hours as the disks will be simplex during any partition copies, partition clears, and restorals. Also, it is recommended that the automatic message accounting (AMA) data be processed prior to making the backup disk.

A software backup disk (MHD14 or MHD15) is created from the files on the system disk, and backup tapes are created from the SM text and SM ODD on the outboard disks. Also, two (or more) tape sequences are required, one tape for SM Text, and one tape for each disk pair that is allocated for SM ODD. The tapes made on KS23113, LIST 14 (KEYSTONE* III) tape drives must be writable at 6250 bits-per-inch (bpi) and should be certified tapes. Certified tapes are tapes that have been verified to be writable at 6250 bpi. The tapes should also be usable across the expected temperature range of the particular office.

To simplify the procedure, an automated procedure using GENBKUP exists which can be called from the master control center (MCC), the supplementary trunk and line work station (STLWS) terminal, or the recent change and verify (RC/V) terminal. GENBKUP executes all audits, populates the software backup disk(s) with AM text and AM ODD, and creates the SM Text, SM ODD tapes. If any commands find errors during the execution of GENBKUP, GENBKUP will quit gracefully with a message indicating the command which found the errors. This procedure will take approximately 2 to 4 hours to complete PLUS the time to perform ODD backup if the GENBKUP is used; otherwise, 8 to 12 hours are required. Plan accordingly so the office won't be running simplex disks during prime hours. GENBKUP should be entered from the recent change terminal or a supplemental trunk line work station. After invoking GENBKUP, it will query you for the type of backup that is wanted and tell you when tapes should be mounted and unmounted.

* Registered trademark of Laser Magnetic Storage International Company

When using GENBKUP, the portion of the backup process that runs the BKUP:ODD, simplexes disks, clears partitions, and restores partitions may be done separately from the tape (and software backup disk) generation. GENBKUP may be entered from the SCC during nonprime hours and exited (entering "q") before the backup media is changed. When the main menu is displayed, request tapes instead of software disk backup to execute the memory checking logic of GENBKUP. When GENBKUP prompts for the tape to be mounted, exit (entering "q") and return to the tape menu. The tapes and software backup disk may be generated during normal shift hours by reentering GENBKUP when the craft is in the office and able to manipulate the backup tapes. GENBKUP remembers for 24 hours that the initial disk simplexing and partition copies were executed and bypasses them. Software backup disk and matching backup tapes (text and ODD) should always be made in the same GENBKUP session.

Disk backup of the entire office should be done at least once a month or more often if many software updates and/or ECD changes are being added to the office. An office should keep two different versions of office backup disks (one on each copy), with the oldest copy being discarded when a new copy is made.

PROCEDURE OVERVIEW

This section gives an overview of the backup procedure. Those sections of the procedure that can make use of GENBKUP are noted. Those sections noted with "GENBKUP v–option" are sections that can be run separately by using the verify option of GENBKUP. The use of this verify option is not documented in this procedure.

- Preparation.
  - — Run tape drive operational diagnostics.
  - — Determine present ODD Backup schedule and Clear that schedule.
  - — Inhibit routine exercise (REX).
  - — Stop any active or scheduled REX diagnostics.
  - — Activate any /no5text or /smtext software updates in the soak state.
  - — Activate any ECD/SG recent changes that have not been activated.
- Consistency checks (GENBKUP or Manually).
  - — Check consistency of tables used for COPY:PTN commands.
  - — Check consistency of disk partitions with File System Audits.
  - — Check consistency between "core" and disk files with Kernel Compares.

8. MOVING HEAD DISK PROCEDURES

This section contains detailed level procedures for converting, connecting, or replacing moving head disks (MHD). It also contains disk reconfiguration procedures, remote disk configuration procedures, and auto spare disk description. The following procedures are contained in this section:

- Conversion of Warm Spare Disk to Off-line Spare Disk Configuration
- Connection of Off-line Spare Disk in a Running System
- Replacement of 340-MB Moving Head Disk Drive
- Reconfiguration of Disks - 5E2(2) through 5E7
- Configuration of Remote Disk
- Description of Auto Spare Disk Feature.

Warning: It is potentially hazardous to use non-KS spare disks with the 5ESS® switch. The use of spare disks that are not purchased through AT&T and which, therefore, do not conform to our KS specifications is not recommended. These non-KS disks are not properly formatted and do not have the defect tables written on them. Since it is not recommended that the 5ESS switch write to non-KS disks, there is a high risk of a spare not being immediately available if a failure should occur. This situation is potentially service affecting.

The 5E8 software release will require a "large" primary small computer system interface (SCSI) disk. Therefore, if the growth of SCSI disks to an office currently equipped with only SMD disks is contemplated, a conversion to SCSI primary disks with SMD disks as outboard disks is recommended since the 5E8 software release will require this conversion.

8.1 DISK RECONFIGURATION PROCEDURES—5E2(2) AND LATER

8.1.1 GENERAL—5E2(2) AND LATER

The 5E2(2) software release supports six different disk configurations (or layouts). The disk configurations are named 300S, 300M, 300L, 340S, 340M, and 340L.

The 5E3 software release supports three different disk configurations (or layouts). The disk configurations are named 300M, 340M, and 340L.

The 300S, 300M, and 300L disk configurations are for 300-MB disks. The 340S, 340M, and 340L disk configurations are for 340-MB disks. A 340-MB disk configuration can never be used on 300-MB disks. A 300-MB disk configuration normally exists on 340-MB disks only in a post-conversion time frame.

Each disk configuration requires a minimum number of disk pairs. In some cases, additional disks pairs can be added (disk growth) to increase the automatic message accounting (AMA) data storage capacity of the office. Disk growth is limited by the maximum number of disk pairs that the disk configuration will support. Table 8-1 gives the minimum required disk pairs and the maximum supported disk pairs for each disk configuration in the 5E2(2) and 5E3 software releases.

TABLE 8-1 MINIMUM - MAXIMUM DISK PAIRS PER DISK CONFIGURATION						
SOFTWARE RELEASE	DISK CONFIGURATION					
	300S	300M	300L	340S	340M	340L
5E2(2)	1 - 2	2 - 2	2 - 2	1 - 7	2 - 7	2 - 7
5E3		2 - 2			2 - 7	3 - 7

The 5E4 software release introduced the concept of a base disk configuration to which optional disk pairs could be added (disk growth) as needed by an office. This allows an office a greater degree of flexibility in planning and meeting their own individual disk needs.

The 5E4, 5E5, and 5E6 software releases support four different base disk configurations (or layouts). The disk configurations are named 300A, 340A, 340B, and 340C. The 300A disk configuration is for 300-MB disks. The 340A, 340B, and 340C disk configurations are for 340-MB disks.

The 5E7 software release does not support the 300-MB disk drive. It supports only 340A, 340B, and 340C layouts for storage module device (SMD) and small computer systems interface (SCSI) drives.

The 5E4 and later software releases support three layouts for optional disk pairs in the 340-MB disk configurations. The options are as follows:

- ***Option 1:*** This option provides two disk partitions (each equal to one-half of the available disk space) for AMA data.
- ***Option 2:*** This option provides one disk partition (equal to one-half of the available disk space) for switching module (SM) office dependent data (ODD). It also provides two disk partitions (each equal to one-quarter of the available disk space) for AMA data.
- ***Option 3:*** This option provides one disk partition (equal to almost the entire available disk space) for SM ODD. Two small disk partitions are also provided for AMA data to satisfy the requirements of the AMA data storage process.

The 5E6 software release supports the Small Computer Systems Interface (SCSI) disk drives in addition to the 300-MB and 340-MB disk drives. The 5E7 software release supports the SCSI and SMD disk drive layouts for 340A, 340B, and 340C disk configurations. The SCSI disks use the same disk configurations (340A, 340B, and 340C) as used on the 340-MB disks. The SCSI disks can be added (disk growth) to an office that currently has only 340-MB (SMD) disk drives or all SCSI drives. If the growth of SCSI disks to an office currently equipped with only SMD disks is contemplated, a conversion to SCSI primary disks with SMD disks as outboard disks is recommended since the 5E8 software release will require this conversion. The maximum number of disk pairs remains the same as it would be for an office with 340-MB disk drives. Offices that have all SCSI disk drives can have up to 15 disk pairs, however, the last 8 disk pairs (MHD 16 through MHD 31) can only be configured as Option 1 disk pairs.

Table 8-2 shows the number of disk pairs required by each base disk configuration, and the maximum number of optional disk pairs supported by each base configuration in the 5E4, 5E5, 5E6, and 5E7 software releases.

TABLE 8-2
REQUIRED - OPTIONAL DISK PAIRS PER BASE DISK CONFIGURATION

SOFTWARE RELEASE	BASE DISK CONFIGURATION			
	300A	340A	340B	340C
5E4	2 - 0	2 - 5	2 - 5	3 - 4
5E5	2 - 0	2 - 5	2 - 5	3 - 4
5E6	2 - 0	2 - 5 2 - 13*	3 - 4 3 - 12*	3 - 4 3 - 12*
5E7		2 - 5 2 - 13*	3 - 4 3 - 12*	3 - 4 3 - 12*

* Available only in offices with all SCSI disk drives.

The terms growth, conversion, retrofit, and reconfiguration, as applied to the disks, are defined as follows:

Growth is a hardware procedure that adds an additional disk, or disk pair, to an existing office. For 5E6 or later software releases, *growth* includes addition of SCSI frames and disks for preparation of a 5E6/5E7 to 5E8 retrofit.

Conversion is a procedure that replaces one type of disk hardware with a newer type. Two types of disk conversion are currently supported.

- Replace 300-MB disks with 340-MB disks [5E6 and earlier software releases].
- Replace 340-MB disks with SCSI disks [5E6 and later software releases].

Retrofit is a procedure that replaces an existing software release with a later software release or a newer version of the existing software release, for example, 5E2(2) to 5E3.

Reconfiguration is a procedure that replaces the current disk configuration with a disk configuration that has more system capacity, for example, 300S to 300M.

The disk reconfigurations that are possible for each software release are given in the following illustrations.

DISK RECONFIGURATION SUPPORTED BY THE 5E2(2) SOFTWARE RELEASE

CURRENT DISK CONFIGURATION	NEW DISK CONFIGURATION					
	300S	300M	300L	340S	340M	340L
300S		x	x	c	c	c
300M			x		c	c
300L		x			c	c
340S					x	x
340M						x
340L					x	

DISK RECONFIGURATION SUPPORTED BY THE 5E3 SOFTWARE RELEASE

CURRENT DISK CONFIGURATION	NEW DISK CONFIGURATION		
	300M	340M	340L
300M		c	
340M			x
340L			

DISK RECONFIGURATION SUPPORTED BY THE 5E4 AND 5E5 SOFTWARE RELEASES

CURRENT BASE DISK CONFIGURATION	NEW BASE DISK CONFIGURATION			
	300A	340A	340B	340C
300A		c	c	
340A		o	x	x
340B			o	x
340C				o

DISK RECONFIGURATION SUPPORTED BY THE 5E6 SOFTWARE RELEASE

CURRENT BASE DISK CONFIGURATION	NEW BASE DISK CONFIGURATION			
	300A	340A	340B	340C
300A		c		
340A		o	x	x
340B			o	x
340C			x	o

In the previous illustrations:
c = Reconfiguration after conversion.
o = Reconfiguration of optional disks. (Base remains the same.)
x = Reconfiguration of base disks (and optional disks).

DISK RECONFIGURATION SUPPORTED BY THE 5E7 SOFTWARE RELEASE

CURRENT BASE DISK CONFIGURATION	NEW BASE DISK CONFIGURATION		
	340A	340B	340C
340A	o	x	x
340B		o	x
340C		x	o

In the previous illustration:
o = Reconfiguration of optional disks. (Base remains the same.)
x = Reconfiguration of base disks (and optional disks).

Warning: The 340L disk configuration in the 5E2(2) software release and the 340C base disk configuration in the 5E4 and later software releases have a limited AMA data storage capacity. If you are reconfiguring to one of these disk configurations, it may be necessary to grow an additional disk pair first in order to have sufficient AMA data space on the new disk configuration.

8.1.2 DISK RECONFIGURATION OVERVIEW—5E2(2) AND LATER

From a very high-level view, disk reconfiguration has some of the following characteristics of software release retrofit:

- The disks are divided into an on-line system (composed of the even numbered disks) and an off-line system (composed of the odd numbered disks).
- A new disk configuration is built on the off-line disk system.
- The system is booted onto the new disk configuration.
- After some system sanity tests are performed, the disks are duplexed.
- If any of the sanity tests fail, the system is booted back onto the original disk configuration.

The major difference between software release retrofit and disk reconfiguration is the amount of new data that is brought into the office. The only new data required for a disk reconfiguration are the volume table of contents (VTOC) files for the new disk configuration. The new equipment configuration data base (ECD) and system generation (SG) data bases are evolved from the existing data bases on the switch. The ODD and other data for the new disk configuration are copied from the old disk configuration.

The disk reconfiguration procedure is designed to be completed in a single 8-hour shift. During this shift, all recent changes (RC) must be blocked. All persons that regularly install RCs must be notified in advance of the disk reconfiguration procedure.

Disk reconfiguration consists of a written procedure and a set of tools to support that procedure. Normally the disk reconfiguration tools are transmitted to an office electronically using the software change administration and notification system (SCANS) utility just prior to the time of the reconfiguration procedure. To obtain a current copy of the reconfiguration tools, contact the AT&T Product Engineering Control Center (1-708-510-4923). More than one set of tools may exist for software releases that have had manufacturing update loads that changed the disk layouts.

8.1.3 PREPARATION FOR A DISK RECONFIGURATION—5E2(2) AND LATER

In order to increase the probability of a successful disk reconfiguration, some verification and testing of the existing system should be done ahead of time. ***This verification and testing should be performed several days before the actual reconfiguration procedure is scheduled.***

8.1.3.1 Determining the Current Disk Configuration—5E2(2)

The current disk configuration must be determined before starting the disk reconfiguration procedure.

With the 5E2(2) software release, there are two procedures that can be used to determine the current disk configuration.

- The manual procedures determine the sizes of some key disk partitions of the current disk configuration. These sizes are then compared with those in Tables 8.21-1 through 8.21-7 to determine the disk configuration. This approach is useful when the disk configuration is unknown or when disk reconfiguration tools are not available.

  If the disk reconfiguration tools have not been received, perform the steps in Procedure **8.21** to determine the current disk configuration.

- The second method uses several scripts from the reconfiguration tools to verify the disk configuration. This assumes that the disk configuration is known. However, this method can also be used, on a trial and error basis, when the disk configuration is unknown. Since the scripts do all the work, this is the easiest and fastest of the two methods.

  If the disk configuration tools have been received, either over the SCANS link or on tape, perform the steps in Procedure **8.22** to determine the current disk configuration.

  Note: Procedure **8.21** can always be used whether or not the disk reconfiguration tools are available.

8.1.3.2 Determining the Current Disk Configuration—5E3

As with the 5E2(2) software release, the 5E3 disk reconfiguration procedure should not be started until the current disk configuration is determined. Often the current disk configuration can be determined by simply comparing the office disk equipage with the configuration characteristics in paragraph 8.1.1 of this section. However, there are times when this does not resolve the problem. There are two other (more lengthy and more accurate) methods that can be used to determine which disk configuration the office is running on (Procedure **8.26** in this section). This procedure determines the sizes of some key disk partitions of the current disk configuration. Comparing these sizes with those given in the tables of Procedure **8.26** will identify the disk configuration being used. Procedure **8.26** gives the step-by-step procedures for determining the disk configuration from the contents of the VTOCs and from the contents of the SG data base.

8.1.3.3 Determining the Current Disk Configuration—5E4 AND LATER

The disk reconfiguration procedure for the 5E4 and later software releases contain a procedure that determines the current disk base configuration and the configuration of any optional disks. The results are displayed on the master control center (MCC) video terminal and are printed on the read-only printer (ROP). In the 5E4 and later software releases, it is not necessary to know the current disk configuration as long as the office has a valid disk configuration.

8.1.3.4 Off-Line Pump All SMs—5E2(2) and Later

Disk reconfiguration checks the validity of the SM ODDs on the new disk configuration by off-line pumping all of the SMs in the office. This also verifies that the RLsmconf ODD relation was correctly rebuilt in the 5E4 and later software releases. This test is meaningful if, and only if, all SMs can be off-line pumped before the disk reconfiguration procedure is performed. If the office has 5E2(2) or 5E3 software release, perform the steps in Procedure **8.23** to verify that all SMs can be off-line pumped. If the office has 5E4 or a later software release, perform Procedure **8.31**.

8.1.4 ASSIGNMENT OF OPTIONAL DISKS—5E4 AND LATER

In the 5E4 and later software releases, one of the disk reconfiguration tools provides a conversational interface with the user. This tool must be run from a recent change and verify (RC/V) or supplementary trunk and line work station (STLWS) terminal. This tool allows the user to specify all of the disk reconfiguration parameters from a set of menus. If the user makes an invalid choice, an error message will be printed and the menu will be redisplayed so the user can make another choice. The configuration of each optional disk pair in the new disk configuration is determined during this step. Disk reconfiguration does not allow optional disk pairs to be assigned completely at random. It always tries to minimize the number of disk pairs containing the SM ODD by imposing the following rules.

- Optional disk pair "n" can be assigned as option 2 or option 3 if, and only if, disk pair "n-1" is a required disk pair (part of the base configuration), or it is an optional disk pair that has been assigned as option 3.
- Optional disk pair "n" can always be assigned as option 1.

Following these rules minimizes the number of disk pairs containing SM ODD, which minimizes the number of backup tape sequences that have to be written to do a full office backup. This minimizes the time it would take to "dead start" an office from tape. It also minimizes the possibility of having to reload all of the AM and SM ODDs from tape due to duplex disk failures.

8.1.5 CONTENTS OF THE DISK RECONFIGURATION TOOLS—5E2(2) AND LATER

The disk reconfiguration tools are made up of shell scripts, VTOCs, RCV keystroke files, data/information files, and "C" object files. Usually the disk reconfiguration tools are implemented as shell scripts. However, in some cases it is much easier, and more efficient, to use a "C" program. Disk reconfiguration scripts (tools) that are normally called directly from a terminal are referred to as first-level scripts. Second-level scripts (tools) are normally called from first-level scripts instead of a terminal. The keystroke files are used to modify and evolve the ECD and SG data bases for the new disk configuration.

Table 8-3 gives the contents of the disk configuration tools for the current software releases.

TABLE 8-3

CONTENTS OF DISK RECONFIGURATION TOOLS FOR CURRENT SOFTWARE RELEASES

TYPE OF FILE	SOFTWARE RELEASE					
	5E2(2)	5E3	5E4	5E5	5E6	5E7
C Object File	4	2	2	4	5	5
First-Level Scripts	14	15	13	13	13	14
Second-Level Scripts	5	3	5	5	5	5
ECD Keystroke Files	5	2	18	18	26	26
SG Keystroke Files	5	2	18	18	26	26
VTOC files	33	16	24	24	33	31
Data/Information Files	9	6	11	11	11	9

8.1.5.1 Clear Off-Line Superblock (COFLSB)

Note: In 5E2(2), clear off-line superblock (COFLSB) is a disk reconfiguration tool. In 5E3 and later software releases, COFLSB is part of the software release.

All file system (FS) partitions that grow in size or move on the disk must have their superblocks rebuilt according to the new disk layout. Since the UNIX* operating system provides no tool for the off-line disk, one had to be written. The COFLSB program is used to attach to a partition on off-line disk and to clear the partition's superblock. The COFLSB provides a mount off-line partition (MOP) type of interface to the invoking script that allows it to read or write the off-line partition for a maximum period of 4 hours. When the invoking script is done accessing the off-line partitions, it kills the COFLSB process. When COFLSB terminates normally (due to a time-out or a kill command), it unmounts the off-line partition. If COFLSB is aborted due to a system recovery (51 or higher), the off-line partition may not be unmounted and may remain in the mount table. This condition can only be cleared by calling COFLSB to remount the partition and then killing COFLSB. The RMVOFLMNTS script will remove a hung-mount table entry caused by an abnormal COFLSB termination.

The RMVOFLMNTS script performs the following operations when it finds a hung-mount table entry due to an abnormal COFLSB termination:

- Determines which off-line partition has the hung-mount point
- Calls COFLSB to remount the off-line partition
- Kills the COFLSB process.

The RMVOFLMNTS script is called at the beginning of the COPYODDOFL and MISCOFLINIT scripts before they use COFLSB to mount an off-line partition. It can also be called directly by entering the following message at the master control center (MCC) video terminal.

If MML, **EXC:ENVIR:UPROC,FN="/updtmp/site/rmvoflmnts",ARGS="MCC";**

If PDS, **EXC:ENVIR:UPROC,FN "/updtmp/site/rmvoflmnts",ARGS ("MCC")!**

Response: **RMVOFLMNTS COMPLETED**

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8.1.5.2 FMOVE Software Update—5E2(2)

All of the SM ODD and the critical information (CI) files are stored as extent files (type X) beginning with the 5E2(2) software release. In previous software releases, these files were stored as contiguous (type C) files. The ODD files are copied on a file-by-file basis from the active system to the off-line system to minimize the copy time. This requires the following three operations for the SM ODD and CI files:

1. A falloc command to allocate space for the file.
2. A vcp command to copy the data as a contiguous file.
3. A fmove command to convert the contiguous file to an extent file.

The fmove command as it exists in the 5E2(2) software release is slow. The RTR file compaction capability (RTR software update 1.2.12) considerably speeded up the fmove command; however, this software update did not go into the 5E2(2) software release. A partition of this software update is packaged with the disk reconfiguration tools and is inserted during the time that ODD files are being copied.

8.1.5.3 FMAPPLY—5E2(2)

The purpose of the FMAPPLY script is to install the fmove portion of the RTR 1.2.12 software update package. The FMAPPLY script is called from the COPYODDOFL script and performs the following operations:

- Creates the /etc/bwm/fmove.bwmx directory.
- Copies the /updtmp/site/shell.m file to the /etc/bwm/fmove.bwmx directory.
- Issues the UPD command to install the partial software update.

8.1.5.4 FMBKOUT—5E2(2)

The purpose of the FMBKOUT script is to remove the fmove portion of the RTR 1.2.12 software update package that was installed by the FMAPPLY script. The FMBKOUT script is called at the end of the COPYODDOFL script and at each failure exit of the COPYODDOFL script. The FMBKOUT script performs the following operations:

- Issues the UPD command to back out of the fmove software update.
- Removes the /etc/bwm/fmove.bwmx/shell.m file.
- Removes the /etc/bwm/fmove.bwmx directory.

It is possible for the COPYODDOFL script to be terminated abnormally leaving the fmove software update installed. If that should ever happen, the RMBKOUT can be called to remove the fmove software update by entering the following message at the MCC video terminal.

If MML, **EXC:ENVIR:UPROC,FN="/updtmp/site/fmbkout",ARGS="MCC";**

If PDS, **EXC:ENVIR:UPROC,FN "/updtmp/site/fmbkout",ARGS ("MCC")!**

Response: **FMBKOUT COMPLETED**

8.1.6 ODD INFORMATION FILES

The 5E2(2) and 5E3 software releases contain four ODD partitions that must be copied from the active disk system to the off-line disk system during the disk reconfiguration procedure. The 5E4 and later software releases contain a minimum of four and a maximum of nine ODD partitions that must be copied from the active disk system to the off-line disk system during the disk reconfiguration procedure. These files are as follows:

- ***no5doddl:*** This FS partition contains the AM disk ODD. Since this partition contains only raw data, it is copied from the active disk to the off-line disk as a partition.
- ***no5aoddl:*** This FS partition contains the disk backup of the AM resident ODD. Beginning with the 5E6 software release, this partition also contains the communication module processor (CMP) ODD file. This partition is copied from the active disk to the off-line disk on a file-by-file basis.
- ***no5coddl:*** This FS partition contains the critical information and hashsum files for all of the SMs in the office. Beginning with the 5E4 software release, this partition also contains the redundant SM ODD file. This partition is copied from the active disk to the off-line disk on a file-by-file basis.
- ***no5soddl:*** In the 5E2(2) or 5E3 software release, this FS partition contains the ODDs for all of the SMs in the office. This partition is copied from the active disk to the off-line disk on a file-by-file basis.
- ***no5sodd(1-6):*** In 5E4 and later software releases, at least one partition is required and up to six partitions could exist in either the current or new disk configuration. These FS partitions contain the ODDs for all of the SMs in the office (with the exception of the redundant SM ODD file). These partitions are copied from the active disk to the off-line disk on a file-by-file basis.

Since the ODDs are unique to each office, the disk reconfiguration procedure can only do a limited amount of checking to verify that the ODDs on the off-line disk are complete and correct. In the final analysis, the correctness of the ODDs must be determined by those performing the reconfiguration procedure. Information will be printed during the COPYODDOFL procedure to aid in this determination.

Up to five information files will be printed on the receive-only printer (ROP) while the ODD partitions are being copied. These files are all created in the /updtmp/temp directory and contain the following information:

- ***info.am:*** This file is printed after the administrative module (AM) ODD partition (no5aodd1) has been copied to the off-line disk. The first part contains a list of the files in the no5aodd1 partition of the active system. The second part contains a list of the files that were copied to the off-line system. In both cases, the information is given in the format of the UNIX operating system "ls -las" instruction. When this file is printed on the ROP, you should check the ROP output to ensure that all of the no5aodd1 files that should have been copied to the off-line system were actually copied.

  Note: Since the ECD configuration system scripts will no longer be valid, the directory containing them is not copied to the new disk configuration.

- ***info.ci:*** This file is printed after the critical information partition (no5codd1) has been copied to the off-line disk. The first part of the file contains a list of the files in the no5codd1 partition of the active system. The second part contains a list of the files that were copied to the off-line system. In both cases, the information is given in the format of the UNIX operating system "ls -las" instruction. When this file is printed on the ROP, check the ROP output to ensure that all of the no5codd1 files that should have been copied to the off-line system were actually copied.

- ***info.sm:*** With either software release 5E2(2) or 5E3, this file is printed after the SM ODD (no5sodd1) has been copied to the off-line disk. The first part of the file contains a list of the files in the no5sodd1 partition of the active system. The second part contains a list of the files that were copied to the off-line system. In both cases, the information is given in the format of the UNIX operating system "ls -las' instruction. When this file is printed on the ROP, check the ROP output to ensure that all of the no5sodd1 files that should have been copied to the off-line system were actually copied.

  With software release 5E4 or later, this file is printed after the SM ODD partitions [no5sodd(1-6)] have been copied to the off-line disk. The first part of the file contains a list of the ODD files in each of the no5sodd(1-6) partitions of the active system. The second part contains a list of the ODD files that were copied to each of the no5sodd(1-6) partitions on the off-line system. In both cases, the information is given in the format of the UNIX operating system "ls -las" instruction. When this file is printed on the ROP, check the ROP output to ensure that all of the no5sodd(1-6) files that should have been copied to the off-line system were actually copied.

  Note: An SM ODD file will not necessarily be in the same partition on the off-line system as it was on the on-line system.

- ***infofile:*** This file is printed at the conclusion of the procedure. It contains information about the AM ODD and each SM ODD on the off-line disk. The information printed includes the software release, data, processor, oda-issue, etc. Check the ROP output to ensure that all ODD files were accessed, and determine if the data printed is appropriate for your office.

- ***debug:*** This file contains timing information about the partitions and the files that were copied from the active system to the off-line system. It gives the starting and completion times for each partition that was copied, the completion time for each file that was copied, the UNIX operating system processes used to copy each file, and the return codes from each of the UNIX operating system processes. Initially this file was to be used for timing analysis and as an aid in debugging the script (hence the name). Later it was realized that this file could provide valuable information if the script should fail, so the file was left in the script.

  A word of caution is in order. The return code from the vcp command will almost always be a 1 (fail) when copying an extent file. This does not mean that the command failed. It occurs because the extent files are usually not an integral number of blocks (512 bytes) in size. This causes the vcp command to get an input error when it runs out of data while copying the last block of the file.

- ***error:*** In the 5E3 software release, the error file is used to collect all of the information messages and all of the apparent error messages that are printed by the processes called by the COPYODDOFL procedure. The contents of this file are useful if, and only if, the procedure fails. This file must be printed manually. In the 5E4 and later software releases, this file will be printed on the ROP if the COPYODDOFL procedure fails.

- ***uoaodd_info:*** With the 5E4 and later software releases, when the SM ODD files are copied from the active to the off-line disk system, there is no guarantee that the files will remain in the same disk partition. An ODD relation (RLsmconf) in the cpodd.out file of the AM ODD partition contains information for each equipped SM in the system, including the suffix number for the partition containing the SM's ODD file. The disk reconfiguration procedure contains a program (UOAODD) to update the disk partition information in the RLsmconf relation on the off-line disk system.

The uoaodd_info file is generated by the UOAODD process when it is called in the COPYODDOFL procedure. The file always contains the original contents of the RLsmconf relation for the equipped SMs and the number of SM ODD files found on the off-line disk system. If it was necessary to update the off-line RLsmconf relation, the file will also contain the contents of the updated RLsmconf relation. This file will be printed on the ROP if the UOAODD process fails.

Any of the previous files can be dumped on the ROP by typing the following message at the MCC:

If MML,	**EXC:ENVIR:UPROC,FN="/bin/sh",ARGS="-c"-"/bin/lpr < /updtmp/temp/xxx";**
If PDS,	**EXC:ENVIR:UPROC,FN "/bin/sh",ARGS ("-c","/bin/lpr < /updtmp/temp/xxx")!**
Where:	xxx = The name of the file to be printed.

8.1.7 REMOTE DISK CONFIGURATION

Warning 1: If both MHD 0 and MHD 1 have been swapped with other MHDs using the remote disk configuration feature, the system will most likely not recover from a level 52 or higher boot. When remote disk configuration is used, the system should be allowed to remain in this condition for as short a time as possible.

Warning 2: Because the reconfiguration consists of ECD changes, care should be taken so that an incore activate does not copy the changes to disk. However, because the configuration is incore only, a level 53 or higher boot will restore the original MHD configuration.

Warning 3: Whenever the mate of an active MHD is restored, a copy of the active MHD is copied over. It is important to remember that when a swapped disk is being restored, its old contents are being destroyed. If a level 53 or higher boot occurs, the system will go to its original MHD configuration–not knowing that disk contents have changed. If the system tries to run on such a disk, the result could be unpleasant.

The remote disk configuration feature provides the ability to remotely swap disk without having to dispatch personnel to the office. When an MHD fails in an office, the remote disk configuration feature can be used to perform a software switch of the failed MHD and another MHD. When this is done, the two MHDs swap identities for the purpose of file access. For example, if MHD "b" fails and MHD "c" is a warm spare, the remote disk configuration feature can swap MHD "b" and MHD "c" in software. When MHD "c" is restored after the swap, it gets a copy of the mate of MHD "b" (MHD "a"). This leaves MHDs "a" and "c" as a duplex pair. The following is a step-by-step summary:

- ***a***, ***b*** - duplex pair, both active
- ***a***, ***b*** - pair, ***b*** failed (OOS)
- Swap ***b*** and ***c***
- ***a***, ***c*** - pair, ***c*** OOS
- Restore ***c***
- ***a***, ***c*** - pair, ***c*** restoring by copying from ***a***
- ***a***, ***c*** - duplex pair, both active.

The selection of the MHDs to be swapped is important. If an office has a warm spare on the same DFC as the failed MHD, that warm spare is the ideal choice. Because the swap is done between MHDs on the same DFC, the resulting duplex pair still employs both DFCs. If there are no warm spares in an office, care should be taken in selecting an MHD because, after the swap, the former mate will be simplex.

The procedure for the swap is straightforward. If MHD "b" is the failed MHD and MHD "c" is the choice for the swap, the following messages should be used:

RMV:MHD=c;
SW:MHD=b,MHD=c;
RST:MHD=c;

Where: ***b*** is already out of service (OOS)
c goes OOS
b and ***c*** are swapped
c gets a copy of the contents of ***MHD a*** (the mate to ***b***) and goes active (ACT).

After the previous messages are entered, a **REPT MHD** output message will be printed showing the paired MHDs on their corresponding MDCT forms with the swapped MHDs indicated by an "*". This output message will repeat approximately every hour as long as the configuration is nonstandard. A manual request to produce this information can be entered by using the **OP:MHD:CFG** input message.

The MCC Display Page **123/125** can be used to check the status of the MHDs. If the MHD swap involves an MHD that is marked essential (such as one of the primary disk pair), Page **123** will reflect these MHDs going through the unequipped and growth states as the swap changes the essential bit.

When the swap(s) is done and the MHDs have been replaced or repaired, a single input message can put the system back into the standard configuration. This message is as follows:

SW:MHD=ALL:STANDARD;

If this request cannot run to completion (because one of the swapped MHDs is not OOS, for example), the input message can be repeated after corrective action has been taken.

Refer to AT&T 235-600-700, *Input Message Manual* (formerly IM-5D000-01), for more information concerning the previous referenced input messages.

8.1.8 AUTO SPARE DISK

The *auto spare disk* feature is part of software releases 5E5 and later. Whenever the feature detects an MHD that has been removed from service, except by a manual input command, it starts a timer. When the timer expires in about 30 minutes, the feature again looks at the MHD. If the MHD is still out of service, the feature is triggered.

Upon being triggered, the feature checks that all the MHDs are presently configured in their normal state and that the spare MHD (14 is the spare for the DFC 0 MHDs and 15 is the spare for the DFC 1 MHDs) is active. It then verifies that the defective MHD's mate (for example, MHD 0 and 1 are mated, as are 2 and 3, etc.) can read every track on it. Next, the feature removes the spare MHD from service.

The feature then uses ECD recent change (RCVECD) to configure the ECD to mate the spare MHD with the (defective MHD's) mate MHD. The defective MHD is left unmated. For example, if the defective MHD was 0, then MHDs 14 and 1 would be mated and MHD 0 would be left unmated. Finally, the spare MHD will be restored duplex with the mate MHD.

At some later time, when the defective MHD has been repaired, the user enters a command or poke to normalize the configuration. The feature first verifies that the mate MHD can read all tracks. It then removes from service the spare MHD and the (previously) defective MHD. Next, the ECD is restored to the normal configuration. Finally, both MHDs are restored to service and the feature is ready to be retriggered.

If any step in the initial (before the defective MHD is repaired) procedures fails, then a major alarm is generated and an error report is printed on the ROP. The alarm repeats about every 15 minutes until (1) the defective MHD is restored to service, (2) any manual configuration of any MHD completes successfully, or (3) the feature is inhibited for the entire office.

8.1.8.1 User Interface

The automatic MHD configuration feature interfaces to the user by display pages and input/output messages. The following sections give an overview of these messages and display pages.

8.1.8.1.1 Input Messages

The user is provided with input messages to inhibit and allow the feature on a per-MHD basis as well as on the entire office. The formats of these messages are as follows:

INH:AUTOCFG [:MHD=x];
and
ALW:AUTOCFG [:MHD=x];

Input messages are also provided to manually switch the configuration of the MHDs. These messages provide the following functions: switch the configuration of any two MHDs, configure a spare MHD for a specified defective MHD, and configure the office to the normal MHD configuration either office wide or on a specified MHD. The formats of these messages are as follows:

SW:MHD=x:MHD=y;
SW:MHD=x:REPLACE;
SW:MHD=ALL:STANDARD;
and
SW:MHD=x:STANDARD;

In addition, an input message is provided to generate an output message showing the current configuration of the MHDs and any inhibits that are active on the feature. The format of this message is as follows:

OP:MHD:CFG;

8.1.8.1.2 Output Messages

Output messages of this feature provide the craft with in-progress and completion status for both manually and automatically started configuration commands. The format of these messages is as follows:

REPT SW MHD . . . [IN PROGRESS | COMPLETED | FAILED]
<reason(s) for FAILED>

Both manually requested and periodic (when off-normal) output messages are provided to show the MHD configuration and the feature's inhibit status. The format of these messages is as follows:

REPT MHD CONFIGURATION
<configuration of MHDs>
<automatic MHD configuration inhibit status>

8.1.8.1.3 Display Pages

Three display pages are used by this feature. They are the disk status page (Page 123), the automatic MHD configuration control page (Page 178), and the automatic MHD configuration status page (Page 179). In 5E6 and later software releases, the automatic MHD configuration status page extends into Page 180.

8.1.8.1.3.1 Disk Status Page (Page 123)

Display Page 123 displays the in-service/out-of-service status of all the MHDs. This is the only page that is displayed when the system is running in full DIOP [both primary MHDs (0 and 1 normally) are failed]. As a non-normal configuration of the MHDs effects the DIOP recovery procedures (the data on the configured spare MHD must be reloaded from tape), an indication of any non-normal configured MHDs is shown on this page.

When all the MHDs are in their normal configuration, this indicator shows the status of the feature (that is, **OFF**, **READY**, **INHIBITED**, or **IN PROGRESS**).

8.1.8.1.3.2 Automatic MHD Configuration Control Page (Page 178)

Display Page 178 provides pokes for all of the normal input commands of this feature. It also provides a display area that indicates which, if any, configuration command is currently executing and what the command is currently doing (that is, verifying an MHD, updating the ECD, etc.).

8.1.8.1.3.3 Automatic MHD Configuration Status Page (Page 179)

Display Page 179 (and Page 180 in 5E6) shows, in detail, the configuration of all the MHDs.

8.1.8.2 Control Files

This feature was designed to Bell Communications Research, Inc., specifications. One of the specifications stipulated that "turning on" and "turning off" (as opposed to "allow" and "inhibit") were to be noncasual operations, since each telephone company may want to do these as matter of policy within their company. As such, the following instructions in this section should not be executed until such time as the telephone company decides upon and publishes their policy for this feature.

As shipped, this feature is "off" and cannot be turned "on" by any of the previous commands. To turn "on" this feature, enter the following commands:

EXC:ENVIR:UPROC,FN="/bin/touch",ARGS="/etc/inhmhd";
STOP:EXC,ANY,UCL,FN="/no5text/prc/SMaprts";
ALW:AUTOCFG,MHD=0;
ALW:AUTOCFG,MHD=1;
ALW:AUTOCFG,MHD=14;
ALW:AUTOCFG,MHD=15;
ALW:AUTOCFG;

Either MHD 14 or MHD 15 are required for operation of this feature; however, both MHD 14 and MHD 15 should be used to get the most benefit.

As shipped, this feature will only replace a failed MHD 0 or MHD 1. This is indicated on the REPT MHD CONFIGURATION output message by the phrase "EXCLUDED FROM OFF-NORMAL CONSIDERATION" being displayed next to all inhibited MHDs except 0, 1, 14, and 15.

It is possible to allow this feature to replace the other MHDs (2 through 13) also. To enable this feature for additional MHDs, enter the following command for each additional MHD:

EXC:ENVIR:UPROC,FN="/bin/sh",ARGS="echo MHD ALW x>>/etc/definhmhd";

Where: x = MHD number (for example, 2)

After the additional MHDs have been specified, enter the following command:

STOP:EXC,ANY,UCL,FN="/no5text/prc/SMaprts";

8.1.8.3 5E6 Addition

In the 5E5 software release, this feature allows for a single *automatic configuration* of a spare MHD to replace a failed MHD. Any additional MHD failures never result in another *automatic configuration*.

However, in the 5E6 software release, this feature, in a certain case, *will* execute a second *automatic configuration*. If (1) a nonprimary MHD (for example, 2 through 13 or 16 through 31) fails and (2) *automatic configuration* replaces it with the spare MHD, and then (3) a primary MHD (0 or 1) *on the same DFC side* fails, this feature will execute a second *automatic configuration* to configure the spare to replace the primary MHD.

Of course, for this to operate, the nonprimary MHDs must be added into the /etc/definhmhd file for this feature to operate (see Section 8.1.8.2). Also, the primary MHD must be on the same DFC side as the previously failed MHD.

Since the primary MHDs are more important than the other MHDs, moving the spare to replace a failed primary MHD is desirable. This action is restricted to the same DFC side so the office will have at least one spare MHD with a bootable primary image on it.

9.65 CONVERSION PROCEDURE FROM TEMPORARY CNI DATA TO PERMANENT CNI DATA FOR CCS FUNCTIONALITY

OVERVIEW

This procedure describes how to convert from temporary common network interface (CNI) data, which is used for installation purposes, to actual CNI data needed for common channel signaling (CCS) functionality. This procedure is for the 5E6 software release and requires that the actual CNI data be available. The CNI data is obtained by contacting the network administration group. For AT&T offices, this group would be the CCIS network administration center (CNAC). For local exchange carriers (LEC), obtain this data from the local exchange carrier CCS administrator.

PROCEDURE

1. Enter recent change to update CNI data views.

2. Update office identification (ID) data (View 15.1):

   (a) At field 1, enter office ID.

   (b) Update values for fields 2 through 6 for this office indicated on translation guide (TG) form ESS 5011(01).

   Note: For LEC offices, fields 2 and 4 must be **0** and field 3 must be **32**.

3. Update link indentification data (View 15.2):

   (a) At field 1 enter GROUP a indicated on TG form ESS 5012-1(01).

   (b) At field 2 enter MEMBER b indicated on TG form ESS 5012-1(01).

   (c) Update fields 3 through 22 for values indicated on TG forms ESS 5012-1(01) and ESS 5012-2(01).

   Note 1: For LEC offices, field 8 must be **32** and fields 10 and 11 must be **0**.

   Note 2: Field 13 must be updated to a UNA state at this time.

   (d) Repeat Step **3** for each link node equipped in this office.

4. Insert logical physical data (View 15.3):

   For each low-speed link or high-speed link carrying low-speed traffic in this office, do the following.

   (a) At field 1, enter GROUP indicated on TG form ESS 5013(01).

   (b) At field 2, enter MEMBER indicated on TG form ESS 5013(01).

   (c) Insert field 3 virtual link (VL0) value for all links (low speed and high speed) indicated on TG form ESS 5013(01).

   (d) Enter field 3 virtual link values VL1 through VL7 for high-speed links as required from TG form ESS 5013(01). These fields remain blank for low-speed links.

   (e) Repeat Step **4** for each link node equipped in this office.

5. Insert nonlocal network identification data, if required (View 15.12):

   Note: This step is required only if this office is routing to a nonlocal network. A nonlocal network is defined as a network ID other than the network ID for this office. If nonlocal routing is not used in this office, go to Step **7**

   (a) Insert field 1 NLNID value indicated on TG form ESS 5022(01).

   (b) Insert field 2 FLAG value indicated on TG form ESS 5022(01).

   (c) Insert field 3 PREFLS value indicated on TG form ESS 5022(01).

   (d) Repeat Step **5** for each nonlocal network ID on TG form ESS 5022(01).

6. Insert small nonlocal network cluster and member table, if required (View 15.13):

   Note: This step is required only if this office is routing to other small nonlocal networks. If routing to other small nonlocal offices is not used in this office, go to Step **7**.

   (a) Insert field 1 NLNID value indicated on TG form ESS 5023(01).

   (b) Insert field 2 CLUSTER value indicated on TG form ESS 5023(01).

   (c) Insert field 3 FLAG value indicated on TG form ESS 5023(01).

   (d) Insert field 4 LS value indicated on TG form ESS 5023(01).

   (e) Insert field 5 MEMBER1 value indicated on TG form ESS 5023(01).

   (f) Insert field 6 FLAG1 value indicated on TG form ESS 5023(01).

   (g) Insert field 7 LS1 value indicated on TG form ESS 5023(01).

   (h) Insert field 8 MEMBER2 value indicated on TG form ESS 5023(01).

   (i) Insert field 9 FLAG2 value indicated on TG form ESS 5023(01).

   (j) Insert field 10 LS2 value indicated on TG form ESS 5023(01).

   (k) Repeat Step **6** for each additional small nonlocal network ID indicated on TG form ESS 5023(01).

7. Insert cluster member data (View 15.9):

   (a) At field 1, enter NETWORK indicator using the supplied office data.

   (b) At field 2, enter CLUSTER indicated on TG form ESS 5019(01).

   (c) Insert field 3 FLAG value indicated on TG form ESS 5019(01).

   (d) Insert field 4 LINKSET value indicated on TG form ESS 5019(01).

   (e) Repeat Step **7** for each network ID on TG form ESS 5019(01).

8. Update global title translation (View 15.11):

   (a) At field 1, enter TRANSLATION TYPE **256**.

   (b) Verify that field 2 PC1 is the required point code indicated on TG form ESS 5021(01).

   (c) If PC1 is incorrect, update field to correct value.

   (d) Verify that field 3 PC2 is the required point code indicated on TG form ESS 5021(01).

   (e) If PC2 is incorrect, update field to correct value.

9. Update global title translation, if required (View 15.11):

   Note: This step is required only if additional translators are needed for this office. If no additional translators are needed, go to Step **10**.

   (a) At field 1 enter TRANSLATION TYPE indicated on TG form ESS 5021(01).

   (b) At field 2 PC1, enter the required point code indicated on TG form ESS 5021(01).

   (c) At field 3 PC2, enter the required point code indicated on TG form ESS 5021(01).

   (d) Repeat Step **9** for each translation type indicated on TG form ESS 5021(01).

10. Insert/update direct signaling application, if required (View 8.17):

   (a) At field 1, enter APPLIC indicated on TG form ESS 5537(01).

   (b) At field 2, enter TRANS TYPE indicated on TG form ESS 5537(01).

   (c) At field 3, enter SUB SYS NBR indicated on TG form ESS 5537(01).

   (d) Repeat Step **10** for each application type indicated on TG form ESS 5537(01).

11. Insert subsystem 3 information (View 15.10):
    (a) At field 1 SUBSYSTEM, enter **3**.
    (b) At field 2 SIG GRP ADR, enter **64**.
    (c) At field 3 SIG MEM ADR, enter **0**.
    (d) At field 4 SIG CHAN, enter **160**.
    (e) At field 5 LOCAL INDEX, enter **14** if direct link nodes (DLNs) are equipped; otherwise, enter **15**.
    (f) At field 6 WANT PAUSE, enter **NO PAUSE**.
    (g) At field 7 SIMP DUPL, enter **SIMPLEX**.
    (h) At field 8 MGMT CHAN, enter **159**.
    (i) At field 9 MATE SSN, enter **0**.
    (j) At field 10 MATE PTCODE, enter **000000000** (9 zeros).
    (k) At field 11 MGMT GRP ADR, enter **64**.
    (l) At field 12 MGMT MEM ADR, enter **0**.

12. Insert subsystem information, if required (View 15.10):

    Note: This step is required only if additional subsystems are needed for this office. If no additional subsystems are needed, go to Step **14**.

    (a) At field 1, enter SUBSYSTEM indicated on TG form ESS 5020(01).
    (b) At field 2, enter SIG GRP ADR indicated on TG form ESS 5020(01).
    (c) At field 3, enter SIG MEM ADR indicated on TG form ESS 5020(01).
    (d) At field 4, enter SIG CHAN indicated on TG form ESS 5020(01).
    (e) At field 5, LOCAL INDEX, enter **14** if DLNs are equipped; otherwise, enter **15**.
    (f) At field 6, enter WANT PAUSE indicated on TG form ESS 5020(01).
    (g) At field 7, enter SIMP DUPL indicated on TG form ESS 5020(01).
    (h) At field 8, enter MGMT CHAN indicated on TG form ESS 5020(01).
    (i) At field 9, enter MATE SSN indicated on TG form ESS 5020(01).
    (j) At field 10, enter MATE PTCODE indicated on TG form ESS 5020(01).
    (k) At field 11, enter MGMT GRP ADR indicated on TG form ESS 5020(01).
    (l) At field 12, enter MGMT MEM ADR indicated on TG form ESS 5020(01).
    (m) Repeat Step **12** for each subsystem indicated on TG form ESS 5020(01).

13. Exit Recent Change.

14. Run NIDATA audits by typing and entering the following command (CMD) at the master control center (MCC) or supplementary trunk and line work station (STLWS):

    CMD: **AUD:NIDATA=x;**

    Where: x = audit number 1, 2, 3, 4, 5, 6, 7, 8, or 9.

    Response: **AUD NIDATA x COMPLETED**
    a ERRORS FOUND
    b ERRORS CORRECTED

    Note: The number of errors corrected should equal the number of errors found. If these numbers differ, seek technical assistance for correction procedures.

    Repeat Step **14** until all the audits specified are completed.

    Warning: The following steps should be completed only when this office is ready to connect into the signaling network. Performing the following steps will connect this office into the signaling network.

15. Remove all equipped link nodes that have signaling links by typing and entering the following command at the MCC or STLWS:

    CMD: **RMV:LNxx=yy;**

    Where: xx = group number 00 or 32
    yy = member number 1, 2, 3, 4, 5, or 6.

16. Enter Recent Change to update CNI data views.

17. Update link identification data (View 15.2):

    (a) At field 1, enter GROUP indicated on TG form ESS 5012-1(01).

    (b) At field 2, enter MEMBER indicated on TG form ESS 5012-1(01).

    (c) Update field 13 to an AVL state.

    (d) Repeat Step **17** for each link node on TG form ESS 5012-1(01).

18. Update CCS office parameters, if required, and enter the required fields (View 8.15).

19. *Note:* This step is ONLY for a CNI ring which:

    - Contains high-speed link nodes

      or

    - Is in an AT&T NSD office

      or

    - Is in an LEC office which uses the ring solely for credit card checking.

    For all other LEC offices and LEC offices that have CNI rings which are connected to more than one network (that is, AT&T NSD and LEC), leave DS SPEED parameter at 48 and continue with Step **20**.

    Update CCS office parameters, if required (View 8.15, DS SPEED parameter) by updating field 4 to **560**.

20. Exit Recent Change.

21. *Note:* This step will put the signaling links into an active state that will transmit messages to the far-end signaling office.

    Restore all equipped link nodes that have signaling links by typing and entering the following command at the MCC or STLWS:

    CMD: **RST:LNxx=yy;**

    Where: xx = group number 00 or 32
    yy = member number 1, 2, 3, 4, 5, or 6.

22. Clear interprocess message switch (IMS) manual ring mode:

    (a) Enter UNIX® RTR system recent change and verify (RC/V) with a poke **199**.

    (b) Enter the incore data base with reviewonly set to **n**.

    (c) Type and enter **trbegin** and execute form.

    (d) Exit Recent Change.

23. Initialize the CNI ring by typing and entering the following command at the MCC or STLWS:

    CMD: **INIT:CNI,LVL1;**

    Response: **INIT CNI LVL1**
    REPORT=CCSINIT INIT SUCCESSFUL

24. Activate the recent changes:
    (a) Enter UNIX RTR system RC/V with a poke **199**.
    (b) Enter the incore data base with reviewonly set to **n**.
    (c) Type and enter **yes**.
    (d) Type and enter **e**.
    (e) Type and enter **<**.
    (f) Exit Recent Change.

25. Back up the office dependent data (ODD) by typing and entering the following command:

    CMD: **BKUP:ODD;**

    Response: **BKUP ODD COMPLETED**

26. Turn CNI reports on by typing and entering the following command:

    CMD: **INH:REPORT:OFF;**

27. Turn on CCS call monitor by typing and entering the following command:

    CMD: **ALW:CALLMON;**

28. Copy backup partitions by using genbackup.

    Reference: **Procedure 5.40**

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

9.83 PERFORM IDCU FACILITY DEGROWTH PROCEDURE—5E8 AND LATER

OVERVIEW

9.83.1 Prepare Integrated Digital Carrier Unit (IDCU) Facilities for Degrowth

This procedure assumes that all of the ports associated with a PUB43801 integrated digital carrier unit (IDCU) facility are unassigned or that the remote terminal (RT) connected to the facility has been degrown. If they have not, then either remove the line assignments to the PUB43801 facilities or perform the appropriate degrowth procedures in this manual to effect these equipment degrowths.

PROCEDURE

9.83.2 Verify and Set Initial Conditions

1. At master control center (MCC), observe Summary Status Area for a **SYS NORM** indication.
2. If a SYS NORM indication is not obtained, type and enter the following command:

   OP:SYSSTAT;

3. At MCC, type and enter the following command:

   OP:OFFNORM,SM=a;

   Where: a = Switching module (SM) number.

   Comment: Evaluate system response to determine if system status is acceptable to continue. Specific attention is required for areas that can cause SM isolation or service impact during the IDCU facility (IFAC) degrowth procedure. Correct any deficiency as required.

Warning: Steps 4 and 5 are recommended but not required. Local practices should control their use.

4. At MCC, type and enter the following command:

   INH:REX,SM=a;

   Where: a = SM number of degrowth IDCU facilities.

   Response: **OK**

5. At MCC, type and enter the following command:

   OP:REXINH;

9.83.3 Backup Office-Dependent Data, If Necessary

Note: Prior to the responses given, there will be completed responses for each SM and the application office-dependent data (ODD) of the administrative module (AM).

1. At MCC, type and enter the following command:

   BKUP:ODD,AM,CMP=a[&&b],NRODD=c[&&d],RODD=c;

   Where: a = CMP or lower limit of range of CMPs
   b = Upper limit of range of CMPs
   c = SM or lower limit of range of SMs
   d = Upper limit of range of SMs.

   Responses: **BKUP ODD FULL AM COMPLETED**
   BKUP ODD CMP a[&&b] COMPLETED
   BKUP ODD NRODD c[&&d] COMPLETED
   BKUP ODD RODD c COMPLETED
   BKUP ODD COMPLETED

   Note: Data base back up will take several minutes to complete.

9.83.4 Allow Peripheral Fault-Recovery Messages To Be Printed

Note: The following command allows the messages for the units, whose message class is set, to be printed on the receive-only printer (ROP). They are also sent to the log file unless the **LOG=OFF** or **LOG OFF** option is used.

1. At MCC, type and enter the following command once for each of the message classes of the peripherals that exist on the SM where the degrowth is being done:

   CHG:LPS,MSGCLS=pfr_mon,PRINT=ON,LOG=OFF;

2. At MCC, type and enter the following command:

   SET:PERPH,SM=a,VERBOSE;

   Where: a = SM number.

3. At MCC, type and enter the following command:

   INH:BREVC,SM=a;

   Where: a = SM number.

9.83.5 Remove IFACs from Service

1. At MCC, for each IFAC being degrown, type and enter the following command:

   RMV:IFAC=a-b-c;

   Where: a = Switching Module (SM) number
   b = IDCU number
   c = IFAC number.

   Response: **RMV IFAC** a b c **COMPLETED**

2. Repeat Step **1** for each IFAC being deleted.

9.83.6 Delete IFAC Data from Data Base

1. Select and prepare terminal for recent change and verify activities.

   Reference: **Procedure 9.18**

2. Type and enter **20.23**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

3. If all IFACs on a loop-side interface (LSI) are to be deleted, then continue this procedure at Step **4**. Otherwise, go to Step **10**.

4. Type and enter **D**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed. Cursor at **SM** attribute.

5. Select the completed work order Form 20.23 indicating what LSI is having all of its IFACs deleted. This form should have the KEY attributes listed in the following display.

```
1. SM        ___  INPUT APPROPRIATE DATA
2. IDCU      _
3. LSI       _
```

6. Using the selected work order as a guide, type and enter the indicated values for each KEY attribute.

   Response: System completes remainder of view.
   Enter Delete, Change, Validate, Screen #, or Print:

7. Verify data.

8. Type and enter **D**

   Response: **deleting ....FORM DELETED**
   FACILITY EQUIPMENT (IFAC) page displayed with KEY attributes blank.

9. Continue this procedure at Step **25**.

10. Type and enter **U**

    Response: **FACILITY EQUIPMENT (IFAC)** page displayed. Cursor at SM attribute.

11. Select the completed work order Form 20.23 indicating what facilities are to be deleted. This form should have the KEY attributes listed in the display.

```
1. SM      ___   INPUT APPROPRIATE DATA
2. IDCU    _
3. LSI     _
```

12. Using the selected work order form as a guide, type and enter the indicated values for each KEY attribute.

    Response: System completes remainder of view.
    Enter Update, Change, Validate, Screen#, or Print:

13. Type and enter **C**

    Response: **Change Field:**

14. Type and enter **4**

    Response: **Field 4:** **Row:**

15. Type and enter the row number of an IFAC being degrown.

    Response: Cursor at EQSTAT attribute of an IFAC.

16. Type and enter '

    Response: Cursor at PM GRP attribute of an IFAC.

17. Type and enter '

    Response: Cursor at FACILITY ID attribute of an IFAC.

18. Type and enter '

    Response: Cursor at SUP MTHD attribute of an IFAC.

19. Type and enter '

    Response: Cursor at PUB43801 attribute of an IFAC.

20. Type and enter '

    Response: **Field 4:** **Row:**

21. For each remaining IFAC to be degrown on this LSI, execute Steps **15** through **20**. When no IFACs remain to be grown, continue this procedure with Step **22**.

22. Hit CARRIAGE RETURN.

    Response: **Change Field:**

23. Hit CARRIAGE RETURN.

    Response: **Enter Update, Change, Validate, Screen#, or Print:**

24. Type and enter **U**

    Response: **updating ....FORM UPDATED**
    FACILITY EQUIPMENT (IFAC) page displayed.

25. Type and enter **<**

    Response: **20.0 SM PACK & SUBPACK VIEWS** page displayed.

9.83.7 Verify IFAC Data

1. Type and enter **20.23**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

2. Type and enter **R**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed.

3. Using the selected work order form as a guide, again type and enter the indicated values for each KEY attribute.

```
1. SM       ____  INPUT APPROPRIATE DATA
2. IDCU     _
3. LSI      _
```

   Response: System completes remainder of view.
   Enter Review, Change-Insert, Validate, Screen#, or Print:

4. If all facilities on an LSI were deleted, **FORM NOT FOUND** will be returned. Otherwise, verify that data is consistent with work order Form 20.23.

   Comment: Correct any errors using terminal in the update mode.

5. Type and enter **<**

   Response: **20.0 SM PACK & SUBPACK VIEWS** page displayed.

6. Type and enter **q**

   Response: **RCV-196 COMPLETED**

9.83.8 If Required, Repeat Steps *9.83.6* and *9.83.7* to Delete the IFACs on the Other LSI

9.83.9 Remove DS1 Cross Connects

1. **TELCO or craft function.** Remove IFAC cross connects at DSX.

9.83.10 Verify Deleted IFACs at MCC

1. At MCC, type and enter the following command:

   187x,y

   Where: x = IDCU number
   y = SM number.

   Response: IFAC page is displayed.

2. Verify that degrown IFACs are no longer displayed.

9.83.11 Backup Office-Dependent Data

Note: Prior to the response there will be completed responses for each SM and the AM.

1. At MCC, type and enter the following command:

   BKUP:ODD;

   Response: **BKUP ODD COMPLETED**

9.83.12 Inhibit Additional Peripheral Fault Recovery (PFR) Message Printing

1. At MCC, type and enter the following command:

   ALW:BREVC,SM=a;

   Where: a = SM number.

2. At MCC, type and enter the following command:

   CLR:PERPH,SM=a,VERBOSE;

   Where: a = SM number.

3. At MCC, type and enter the following command:

   CHG:LPS,MSGCLS=ALL,FROMBKUP;

9.83.13 Return Routine Exercises to Normal

1. At MCC, type and enter the following command:

   ALW:REX,SM=a;

   Where: a = SM inhibited.

   Response: **OK**

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

9.84 PERFORM IDCU FACILITY GROWTH PROCEDURE—5E8 AND LATER

PROCEDURE

Note: The integrated digital carrier unit (IDCU) common hardware and the associated loop-side interface (LSI) must be operational before the IDCU Facilities (IFAC) may be grown in.

9.84.1 Verify and Set Initial Conditions

1. At master control center (MCC), observe Summary Status Area for a SYS NORM indication.
2. If a SYS NORM indication is not obtained, type and enter the following command:

   OP:SYSSTAT;

3. At MCC, type and enter the following command:

   OP:OFFNORM,SM=a;

   Where: a = Switching module (SM) number.

   Comment: Evaluate system response to determine if system status is acceptable to continue. Specific attention is required for areas that can cause SM isolation or service impact during this IFAC growth procedure. Correct any deficiency as required.

Warning: Steps 4 through 6 are recommended but not required. Local practices should control their use. If routine exercise (REX) is inhibited, it must be allowed at the conclusion of this growth procedure.

4. At MCC, type and enter the following command:

   INH:REX,SM=a;

   Where: a = Number of the SM growing IFACs.

5. At MCC, type and enter the following command:

   OP:REXINH;

   Response: The inhibit status will be printed. Verify this printout.

6. At MCC, type and enter the following command:

   BKUP:ODD;

   Response: **BKUP ODD COMPLETED**

9.84.2 Allow Peripheral Fault Recovery Messages To Be Printed

1. At MCC, type and enter the following command:

   SET:PERPH,SM=a,VERBOSE;

   Where: a = SM number.

2. At MCC, type and enter the following command:

   INH:BREVC,SM=a;

   Where: a = SM number.

3. At MCC, type and enter the following command:

   CHG:LPS,MSGCLS=pfr_mon,PRINT=ON,LOG=OFF;

9.84.3 Add IFACs Into Data Base

1. Select and prepare terminal for recent change and verify activities.

   Reference: **Procedure 9.18**

2. Type and enter **20.23**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

3. Type and enter **I**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed. Cursor at SM attribute.

4. Select the completed work order Form 20.23 for the identified SM and IDCU. This form should have the KEY attributes listed in the following display:

```
1. SM      ___  INPUT APPROPRIATE DATA
2. IDCU    _
3. LSI     _
```

5. Using the selected work order form as a guide, type and enter the indicated values for each KEY attribute.

   If the response is that the cursor is positioned at the first IFAC EQSTAT attribute, then continue this procedure at Step **6**.

   If the response is "DUPLICATE FORM", then do the following:

   - Type and enter **^**

     Response: **ENTER DATA BASE OPERATION**
     I=Insert, R=Review, U=Update, D=Delete:

   - Type and enter **U**

     Response: **FACILITY EQUIPMENT (IFAC)** page displayed. Cursor at SM attribute.

   - Continue this procedure at Step **9**.

6. Using the selected work order form as a guide, type and enter the indicated values for each remaining attribute. Type and enter a **G** for each IFAC being grown.

   Response: **Enter Insert, Change, Validate, Screen#, or Print:**

7. Type and enter **I**

   Response: **inserting ....FORM INSERTED**
   FACILITY EQUIPMENT (IFAC) page displayed.

8. Continue this procedure at Step **22**.

9. Using the selected work order form as a guide, type and enter the indicated values for each KEY attribute.

   Response: **Enter Update, Change, Validate, Screen#, or Print:**

10. Type and enter **C**

    Response: **Change Field:**

11. Type and enter **4**

    Response: **Field 4:** **Row:**

12. Type and enter the row number of an IFAC being grown.

    Response: Cursor at EQSTAT attribute of an IFAC.

13. Type and enter **G**

    Response: Cursor at PM GRP attribute of an IFAC.

14. Type and enter data from the service order.

    Response: Cursor at FACILITY ID attribute of an IFAC.

15. Type and enter data from the service order.

    Response: Cursor at SUP MTHD attribute of an IFAC.

16. Type and enter data from service order.

    Response: Cursor at PUB43801 attribute of an IFAC.

17. Type and enter data from the service order.

    Response: **Field 4: Row:**

18. For each remaining IFAC to be grown on this LSI, execute Steps **12** through **17**. When no IFACs remain to be grown, continue this procedure at Step **19**.

19. Hit CARRIAGE RETURN.

    Response: **Change Field:**

20. Hit CARRIAGE RETURN.

    Response: **Enter Update, Change, Validate, Screen#, or Print:**

21. Type and enter **U**

    Response: **updating ....FORM UPDATED**
    FACILITY EQUIPMENT (IFAC) page displayed.

22. Type and enter **<**

    Response: **20.0 SM PACK & SUBPACK VIEWS** page displayed.

9.84.4 Verify IFAC Data

1. Type and enter **23**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

2. Type and enter **R**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed. Cursor at SM attribute.

3. Using the selected work order Form 20.23 as a guide, again type and enter indicated values for each KEY attribute listed in the following display.

```
1. SM         ___   INPUT APPROPRIATE DATA
2. IDCU       _
3. LSI        _
```

   Response: System completes remainder of view.
   Enter Review, Change-Insert, Validate, Screen#, or Print:

4. Verify data is consistent with the service order.

   Comment: Correct any errors using terminal in the update mode.

5. Type and enter **<**

   Response: **20.0 SM PACK & SUBPACK VIEWS** page displayed.

6. Type and enter **q**

   Response: **RCV-196 COMPLETED**

9.84.5 Repeat Steps *9.84.3* and *9.84.4* for IFACs To Be Grown on the Other LSI, If Required

9.84.6 Safe Stop Point

If the IFACs being grown are to be used to terminate a remote terminal (RT), then go to Step **9.84.13**. Making the IFACs operational and testing is part of the RT growth procedures.

Continue with Step **9.84.7** for IFACs which are being grown for use with PUB43801 terminations.

9.84.7 Change IFACs to Operational

1. Select and prepare terminal for recent change and verify activities.

   Reference: **Procedure 9.18**

2. Type and enter **20.23**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

3. Type and enter **U**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed. Cursor at SM attribute.

4. Using the selected work order Form 20.23 as a guide, again type and enter the indicated values for each KEY attribute listed in the following display:

```
1. SM        ____  INPUT APPROPRIATE DATA
2. IDCU      _
3. LSI       _
```

   Response: System completes remainder of view.
   Enter Update, Change, Validate, Screen#, or Print:

5. Type and enter **C**

   Response: **Change Field:**

6. Type and enter **4**

   Response: **Field 4:** **Row:**

7. Type and enter row number of an IFAC being grown.

   Response: Cursor at EQSTAT attribute of an IFAC.

8. Type and enter **O**

   Response: Cursor at PM GRP attribute of an IFAC.

9. Hit CARRIAGE RETURN.

   Response: Cursor at FACILITY ID attribute of an IFAC.

10. Hit CARRIAGE RETURN.

    Response: Cursor at SUP MTHD attribute of an IFAC.

11. Hit CARRIAGE RETURN.

    Response: Cursor at PUB43801 attribute of an IFAC.

12. Hit CARRIAGE RETURN.

    Response: **Field 4: Row:**

13. For each remaining IFAC to be grown on this LSI, execute Steps **7** through **12.** When no IFACs remain to be grown, continue this procedure at Step **14.**

14. Hit CARRIAGE RETURN.

    Response: **Change Field:**

15. Hit CARRIAGE RETURN.

    Response: **Enter Update, Change, Validate, Screen#, or Print:**

16. Type and enter **U**

    Response: **updating ....FORM UPDATED**
    FACILITY EQUIPMENT (IFAC) page displayed.

17. Type and enter **<**

    Response: **20.0 SM PACK & SUBPACK VIEWS** page displayed.

9.84.8 Verify Facility Data

1. Type and enter **23**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

2. Type and enter **R**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed. Cursor at SM attribute.

3. Using the selected work order Form 20.23 as a guide, again type and enter the indicated values for each KEY attribute listed in the following display:

```
1. SM       ____  INPUT APPROPRIATE DATA
2. IDCU     _
3. LSI      _
```

   Response: System completes remainder of view.
   Enter Review, Change-Insert, Validate, Screen#, or Print:

4. Verify data is consistent with the work order form.

   Comment: Correct errors using terminal in the update mode.

5. Type and enter **q**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed.

6. Type and enter **<**

   Response: **20.0 SM PACK & SUBPACK VIEWS** page displayed.

7. Type and enter **q**

   Response: **RCV-196 COMPLETED**

9.84.9 Repeat Steps *9.84.7* and *9.84.8* for IFACs To Be Grown on the Other LSI, If Required

9.84.10 Perform DS1 Cross Connects

1. If the PUB43801 termination is not ready, loop it at the digital cross-connect frame (DSX). Otherwise, perform DS1 cross connects. This is a telephone company or craft function.

9.84.11 Restore IFACs to Service

1. At MCC, type and enter the following command:

   RST:IFAC=a-b-c;

   Where: a = SM number
   b = IDCU number
   c = IFAC number.

   Response: **RST IFAC a b c COMPLETED**

9.84.12 Verify IFAC Growth on MCC Page

1. At MCC, type and enter **187x,y**

   Where: x = IDCU number
   y = SM number.

2. Verify that the added IFACs are active with no carrier group alarms present.

9.84.13 Turn Off IDCU Fault Recovery Reports

1. At MCC, type and enter the following command:

   ALW:BREVC,SM=a;

   Where: a = SM number.

   Response: **OK**

2. At MCC, type and enter the following command:

   CLR:PERPH,SM=a,VERBOSE;

   Where: a = SM number.

3. At MCC, type and enter the following command:

   CHG:LPS:MSGCLS=ALL,FROMBKUP;

   Response: **OK**

9.84.14 Backup Office-Dependent Data

Note: Prior to the response, there will be completed responses for each SM, the administrative module (AM), and the communication module processor (CMP), if applicable.

1. At MCC, type and enter the following command:

   BKUP:ODD;

   Response: **BKUP ODD COMPLETED**

9.84.15 Return Routine Exercise to Normal

1. At MCC, type and enter the following command:

   ALW:REX,SM=a;

   Where: a = SM inhibited.

   Response: **OK**

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

9.85 DELETE IDCU FACILITY ASSIGNED TO TR303 RT—5E8 AND LATER

PROCEDURE

All nailup, hair-pin, or digital subscriber loop (DSL) services which are assigned to a facility must be removed from the facility before deleting facility from the TR303 remote terminal (RT).

The facilities which carry the embedded operations channel (EOC) and traffic measurement channel (TMC) data links to the TR303 RT may not be deleted.

9.85.1 Verify and Set Initial Conditions

1. At master control center (MCC), observe Summary Status Area for a SYS NORM indication.
2. If a SYS NORM indication is not obtained, type and enter the following command:

   OP:SYSSTAT;
3. At MCC, type and enter the following command:

   OP:OFFNORM,SM=a;

   Where: a = Switching module (SM) number.

   Comment: Evaluate system response to determine if system status is acceptable to continue. Specific attention is required for areas that can cause SM isolation or service impact during this IDCU facility (IFAC) disassociation procedure. Correct any deficiency as required.

Warning: Steps 4 through 6 are recommended but not required. Local practices should control their use. If routine exercise (REX) is inhibited, it must be allowed at the conclusion of this growth procedure.

4. At MCC, type and enter the following command:

   INH:REX,SM=a;

   Where: a = Number of the SM degrowing IFACs.
5. At MCC, type and enter the following command:

   OP:REXINH;

   Response: The inhibit status will be printed. Verify this printout.
6. At MCC, type and enter the following command:

   BKUP:ODD;

   Response: **BKUP ODD COMPLETED**

9.85.2 Allow Peripheral Fault Recovery Messages To Be Printed

1. At MCC, type and enter the following command:

   SET:PERPH,SM=a,VERBOSE;

   Where: a = SM number.

2. At MCC, type and enter the following command:

   INH:BREVC,SM=a;

   Where: a = SM number.

3. At MCC, type and enter the following command:

   CHG:LPS,MSGCLS=pfr_mon,PRINT=ON,LOG=OFF;

9.85.3 Remove from Service IFACs Which Are To Be Deleted from TR303

1. At MCC, type and enter the following command for each of the IFACs associated with the RT being converted:

   RMV:IFAC=a-b-c;

   Where: a = SM number
   b = IDCU number
   c = IFAC number.

   Response: **RMV IFAC a b c COMPLETED**

2. Repeat Step **1** for each IFAC assignment to be deleted.

9.85.4 Verify IFACs To Be Degrown from the TR303 Are OOS

1. At MCC, type and enter **187xyy,z**

   Where: x = IDCU number
   yy = RT number
   z = SM number.

9.85.5 Delete IFACs from TR303 RT

1. Select and prepare terminal for recent change and verify activities.

   Reference: **Procedure 9.18**

2. Type and enter **18.15**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

3. Type and enter **U**

   Response: **REMOTE TERMINAL** page displayed. Cursor at SM attribute.

4. Select the completed work order Form 18.15 indicating what facilities are to be deleted from the TR303. This form should have the KEY attributes listed in the following display:

```
1. SM           ____  INPUT APPROPRIATE DATA
   UNIT TYPE    IDCU
3. UNIT NUMBER  _
4. RT EX        __
```

5. Using the selected work order form as a guide, type and enter the indicated values for each KEY attribute.

   Response: System completes remainder of view.
   Enter Update, Change, Validate, Screen#, or Print:

6. Type and enter **C**

   Response: **Change Field:**

7. Type and enter **150**

   Response: **Field 150:** **Row:**

8. Type and enter the row number (RT Termination Number) of a facility being deleted from the TR303.

   Response: Cursor at IFAC attribute of an RT IFAC TERMINATION.

9. Type and enter '

   Response: **Field 150:** **Row:**

10. For each remaining IFAC to be deleted from this TR303, execute Steps **8** and **9**. When no IFACs remain to be added, continue this procedure at Step **11**.

11. Hit CARRIAGE RETURN.

    Response: **Change Field:**

12. Hit CARRIAGE RETURN.

    Response: **Enter Update, Change, Validate, Screen#, or Print:**

13. Type and enter **U**

    Response: **updating ....FORM UPDATED**
    REMOTE TERMINAL page displayed.

14. Type and enter **<**

    Response: **18.0 SM & REMOTE TERMINALS VIEWS** page displayed.

9.85.6 Verify TR303 RT Data

1. Type and enter **15**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

2. Type and enter **R**

   Response: **REMOTE TERMINAL** page displayed. Cursor at SM attribute.

3. Using the selected work order form as a guide, again type and enter the indicated values for each KEY attribute.

```
1. SM           ____   INPUT APPROPRIATE DATA
   UNIT TYPE    IDCU
3. UNIT NUMBER  _
4. RT EX        __
```

   Response: System completes remainder of view.
   Enter Review, Change-Insert, Validate, Screen#, or Print:

4. Verify data is consistent with the selected work order form.

   Comment: Correct errors using terminal in the update mode.

5. Type and enter **q**

   Response: **REMOTE TERMINAL** page displayed.

6. Type and enter **<**

   Response: **18.0 SM & REMOTE TERMINALS VIEWS** page displayed.

7. Type and enter **q**

   Response: **RCV-196 COMPLETED**

9.85.7 Delete Unused IFACs from the Data Base

1. Select and prepare terminal for recent change and verify activities.

   Reference: **Procedure 9.18**

2. Type and enter **20.23**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

3. If all IFACs on a loop-side interface (LSI) are to be deleted, then continue this procedure at Step **4**. Otherwise, continue this procedure at Step **10**.

4. Type and enter **D**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed. Cursor at SM attribute.

5. Select the completed work order Form 20.23 indicating what facilities are to be deleted from the TR303. This form should have the KEY attributes listed in the following display:

```
1. SM      ___   INPUT APPROPRIATE DATA
2. IDCU    ___
3. LSI     ___
```

6. Using the selected work order form as a guide, type and enter the indicated values for each KEY attribute.

   Response: System completes remainder of view.
   Enter Delete, Change, Validate, Screen #, or Print:

7. Verify data.

8. Type and enter **D**

   Response: **deleting ....FORM DELETED**
   INTEGRATED DIGITAL CARRIER UNIT page displayed with KEY attributes blank.

9. Continue this procedure at Step **25**.

10. Type and enter **U**

    Response: **FACILITY EQUIPMENT (IFAC)** page displayed. Cursor at SM attribute.

11. Select the completed work order Form 20.23 indicating what facilities are to be deleted from the TR303. This form should have the KEY attributes listed in the following display:

```
1. SM     ___  INPUT APPROPRIATE DATA
2. IDCU   ___
3. LSI    ___
```

12. Using the selected work order form as a guide, type and enter the indicated values for each KEY attribute.

    Response: System completes remainder of view.
    Enter Update, Change, Validate, Screen#, or Print:

13. Type and enter **C**

    Response: **Change Field:**

14. Type and enter **4**

    Response: **Field 4: Row:**

15. Type and enter the row number of an IFAC being degrown.

    Response: Cursor at EQSTAT attribute of an IFAC.

16. Type and enter '

    Response: Cursor at PM GRP attribute of an IFAC.

17. Type and enter '

    Response: Cursor at FACILITY ID attribute of an IFAC.

18. Type and enter '

    Response: Cursor at SUP MTHD attribute of an IFAC.

19. Type and enter '

    Response: Cursor at PUB43801 attribute of an IFAC.

20. Type and enter '

    Response: **Field 4: Row:**

21. For each remaining IFAC to be degrown on this LSI, execute Steps **15** through **20**. When no IFACs remain to be degrown, continue this procedure at Step **22**.

22. Hit CARRIAGE RETURN.

    Response: **Change Field:**

23. Hit CARRIAGE RETURN.

    Response: **Enter Update, Change, Validate, Screen#, or Print:**

24. Type and enter **U**

    Response: **updating ....FORM UPDATED**
    FACILITY EQUIPMENT (IFAC) page displayed.

25. Type and enter **<**

    Response: **20.0 SM PACK & SUBPACK VIEWS** page displayed.

9.85.8 Verify IFAC Data

1. Type and enter **20.23**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

2. Type and enter **R**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed.

3. Using the selected work order form as a guide, again type and enter the indicated values for each KEY attribute.

```
1. SM   ____   INPUT APPROPRIATE DATA
2. IDCU _
3. LSI  _
```

   Response: System completes remainder of view.
   Enter Review, Change-Insert, Validate, Screen#, or Print:

4. Verify data is consistent with the selected work order form.

   Comment: Correct any errors using terminal in the update mode.

5. Type and enter **<**

   Response: **20.0 SM PACK & SUBPACK VIEWS** page displayed.

6. Type and enter **q**

   Response: **RCV-196 COMPLETED**

9.85.9 If Required, Delete and Verify IFACs Unassigned from the TR303 that Are on the Other LSI

9.85.10 Remove DS1 Cross Connects

1. **Telephone Company Function** - Remove cross connects for unused IFACs.

9.85.11 Verify IFAC Changes on MCC Page

1. At MCC, type and enter the following command:

   187xyy,z

   Where: x = IDCU number
   yy = RT number
   z = SM number.

2. Verify that the deleted IFACs are not displayed.

9.85.12 Turn Off IDCU Fault Recovery Reports

1. At MCC, type and enter the following command:

   ALW:BREVC,SM=a;

   Where: a = SM number.

   Response: **OK**

2. At MCC, type and enter the following command:

   CLR:PERPH,SM=a,VERBOSE;

   Where: a = SM number.

3. At MCC, type and enter the following command:

   CHG:LPS:MSGCLS=ALL,FROMBKUP;

   Response: **OK**

9.85.13 Backup Office-Dependent Data

Note: Prior to the response, there will be completed responses for each SM, the administrative module (AM), and the communication module processor (CMP) if applicable.

1. At MCC, type and enter the following command:

   BKUP:ODD;

   Response: **BKUP ODD COMPLETED**

9.85.14 Return Routine Exercise to Normal

1. At MCC, type and enter the following command:

   ALW:REX,SM=a;

   Where: a = SM inhibited.

   Response: **OK**

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

9.86 PERFORM IDCU FACILITY ASSIGNMENT TO TR303 RT—5E8 AND LATER

PROCEDURE

The integrated digital carrier unit (IDCU) common hardware and the associated loop-side interface (LSI) must be operational before the IDCU facilities (IFAC) may be grown in. The TR303 remote terminal (RT) must be operational, and the IFACs to be added must be in the **GROW** state before performing this procedure.

9.86.1 Verify and Set Initial Conditions

1. At master control center (MCC), observe Summary Status Area for a SYS NORM indication.
2. If a SYS NORM indication is not obtained, type and enter the following command:

   OP:SYSSTAT;

3. At MCC, type and enter the following command:

   OP:OFFNORM,SM=a;

   Where: a = Switching module (SM) number.

   Comment: Evaluate system response to determine if system status is acceptable to continue. Specific attention is required for areas that can cause SM isolation or service impact during this growth procedure. Correct any deficiency as required.

Warning: Steps 4 through 6 are recommended but not required. Local practices should control their use. If routine exercise (REX) is inhibited, it must be allowed at the conclusion of this growth procedure.

4. At MCC, type and enter the following command:

   INH:REX,SM=a;

   Where: a = Number of the SM growing IFACs.

5. At MCC, type and enter the following command:

   OP:REXINH;

   Response: The inhibit status will be printed. Verify this printout.

6. At MCC, type and enter the following command:

   BKUP:ODD;

   Response: **BKUP ODD COMPLETED**

9.86.2 Allow Peripheral Fault Recovery Messages To Be Printed

1. At MCC, type and enter the following command:

   SET:PERPH,SM=a,VERBOSE;

   Where: a = SM number.

2. At MCC, type and enter the following command:

   INH:BREVC,SM=a;

   Where: a = SM number.

3. At MCC, type and enter the following command:

   CHG:LPS,MSGCLS=pfr_mon,PRINT=ON,LOG=OFF;

9.86.3 Change to *Operational* IFACs Which Are To Be Assigned to TR303

1. Select and prepare terminal for recent change and verify activities.

   Reference: **Procedure 9.18**

2. Type and enter **20.23**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

3. Type and enter **U**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed. Cursor at SM attribute.

4. Select the completed work order Form 20.23 indicating what facilities are to be assigned to the TR303. This form should have the KEY attributes listed in the following display:

```
1. SM   ___   INPUT APPROPRIATE DATA
2. IDCU _
3. LSI  _
```

5. Using the selected work order form as a guide, type and enter the indicated values for each KEY attribute.

   Response: System completes remainder of view.
   Enter Update, Change, Validate, Screen#, or Print:

6. Type and enter **C**

   Response: **Change Field:**

7. Type and enter **4**

   Response: **Field 4: Row:**

8. Type and enter row number of an IFAC being grown.

   Response: Cursor at EQSTAT attribute of an IFAC.

9. Type and enter **O**

   Response: Cursor at PM GRP attribute of an IFAC.

10. Hit CARRIAGE RETURN.

    Response: Cursor at FACILITY ID attribute of an IFAC.

11. Hit CARRIAGE RETURN.

    Response: Cursor at SUP MTHD attribute of an IFAC.

12. Hit CARRIAGE RETURN.

    Response: Cursor at PUB43801 attribute of an IFAC.

13. Hit CARRIAGE RETURN.

    Response: **Field 4: Row:**

14. For each remaining IFAC to be grown on this LSI, execute Steps **8** through **13**. When no IFACs remain to be grown, continue this procedure at Step **15**.

15. Hit CARRIAGE RETURN.

    Response: **Change Field:**

16. Hit CARRIAGE RETURN.

    Response: **Enter Update, Change, Validate, Screen#, or Print:**

17. Type and enter **U**

    Response: **updating ....FORM UPDATED**
    FACILITY EQUIPMENT (IFAC) page displayed.

18. Type and enter **<**

    Response: **20.0 SM PACK & SUBPACK VIEWS** page displayed.

9.86.4 Verify IFAC Data

1. Type and enter **23**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

2. Type and enter **R**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed. Cursor at SM attribute.

3. Using the selected work order form as a guide, again type and enter the indicated values for each KEY attribute.

```
1. SM ___   INPUT APPROPRIATE DATA
2. IDCU _
3. LSI  _
```

   Response: System completes remainder of view.
   Enter Review, Change-Insert, Validate, Screen#, or Print:

4. Verify data is consistent with the selected work order form.

   Comment: Correct errors using terminal in the update mode.

5. Type and enter **q**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed.

6. Type and enter **<**

   Response: **20.0 SM PACK & SUBPACK VIEWS** page displayed.

7. Type and enter **q**

   Response: **RCV-196 COMPLETED**

9.86.5 If Required, Update to Operational and Verify IFACs to Be Assigned to TR303 that Are on the Other LSI

9.86.6 Perform DS1 Cross Connects

1. **Telephone Company function.**

9.86.7 Assign IFACs to TR303 RT

1. Type and enter **18.15**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

2. Type and enter **U**

   Response: **REMOTE TERMINAL** page displayed. Cursor at SM attribute.

3. Select the completed work order Form 18.15 indicating what facilities are to be assigned to the TR303. This form should have the KEY attributes listed in the following display:

```
1. SM            ____  INPUT APPROPRIATE DATA
   UNIT TYPE     IDCU
3. UNIT NUMBER   _
4. RT EX         __
```

4. Using the selected work order form as a guide, type and enter the indicated values for each KEY attribute.

   Response: System completes remainder of view.
   Enter Update, Change, Validate, Screen#, or Print:

5. Type and enter **C**

   Response: **Change Field:**

6. Type and enter **150**

   Response: **Field 150: Row:**

7. Type and enter the row number (RT Termination Number) of a facility being added to the RT.

   Response: Cursor at IFAC attribute of an RT IFAC TERMINATION.

8. Type and enter data from the selected work order form.

   Response: **Field 150: Row:**

9. For each remaining IFAC to be added to this RT, execute Steps **7** and **8**. When no IFACs remain to be added, continue this procedure with Step **10**.

10. Hit CARRIAGE RETURN.

    Response: **Change Field:**

11. Hit CARRIAGE RETURN.

    Response: **Enter Update, Change, Validate, Screen#, or Print:**

12. Type and enter **U**

    Response: **updating ....FORM UPDATED**
    REMOTE TERMINAL page displayed.

13. Type and enter **<**

    Response: **18.0 SM & REMOTE TERMINALS VIEWS** page displayed.

9.86.8 Verify TR303 RT Data

1. Type and enter **15**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

2. Type and enter **R**

   Response: **REMOTE TERMINAL** page displayed. Cursor at SM attribute.

3. Using the selected work order form as a guide, again type and enter the indicated values for each KEY attribute.

```
1. SM          ____  INPUT APPROPRIATE DATA
   UNIT TYPE   IDCU
3. UNIT NUMBER _
4. RT EX       __
```

   Response: System completes remainder of view.
   Enter Review, Change-Insert, Validate, Screen#, or Print:

4. Verify data is consistent with the selected work order form.

   Comment: Correct errors using terminal in the update mode.

5. Type and enter **q**

   Response: **REMOTE TERMINAL** page displayed.

6. Type and enter **<**

   Response: **18.0 SM & REMOTE TERMINALS VIEWS** page displayed.

7. Type and enter **q**

   Response: **RCV-196 COMPLETED**

9.86.9 If Required, Assign and Verify IFACs To Be Assigned to TR303 that Are on the Other LSI

9.86.10 Restore Newly Assigned IFACs to Service

1. At MCC, type and enter the following command:

   RST:IFAC=a-b-c;

   Where: a = SM number
   b = IDCU number
   c = IFAC number.

   Response: **RST IFAC a b c COMPLETED**

2. Repeat Step **1** for each IFAC assigned to the TR303.

9.86.11 Verify IFAC Growth on MCC Page

1. At MCC or trunk and line work station, go to MCC Page 187a,b

   Where: a = IDCU number
   b = SM number.

2. Verify that the added IFACs are active with no carrier-group alarms present.

9.86.12 Turn Off IDCU Fault Recovery Reports

1. At MCC, type and enter the following command:

   ALW:BREVC,SM=a;

   Where: a = SM number.

   Response: **OK**

2. At MCC, type and enter the following command:

   CLR:PERPH,SM=a,VERBOSE;

   Where: a = SM number.

3. At MCC, type and enter the following command:

   CHG:LPS:MSGCLS=ALL,FROMBKUP;

   Response: **OK**

9.86.13 Backup Office-Dependent Data

Note: Prior to the response, there will be completed responses for each SM, the administrative module (AM), and the communication module processor (CMP), if applicable.

1. At MCC, type and enter the following command:

   BKUP:ODD;

   Response: **BKUP ODD COMPLETED**

9.86.14 Return Routine Exercise to Normal

1. At MCC, type and enter the following command:

   ALW:REX,SM=a;

   Where: a = SM inhibited.

   Response: **OK**

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

9.87 PERFORM IDCU TR303 RT DEGROWTH PROCEDURE—5E8 AND LATER

PROCEDURE

9.87.1 Prepare IDCU TR303 RT for Degrowth

This procedure assumes that all terminal assignments (line and/or trunks) have been removed from the remote terminal before degrowth occurs.

9.87.2 Verify and Set Initial Conditions

1. At master control center (MCC), observe Summary Status Area for a SYS NORM indication.
2. If a SYS NORM indication is not obtained, type and enter the following command:

   OP:SYSSTAT;

3. At MCC, type and enter the following command:

   OP:OFFNORM,SM=a;

   Where: a = Switching module (SM) number.

   Comment: Evaluate system response to determine if system status is acceptable to continue. Specific attention is required for areas that can cause SM isolation or service impact during the remote terminal (RT) degrowth procedure. Correct any deficiency as required.

Warning: Steps 4 and 5 are recommended but not required. Local practices should control their use.

4. At MCC, type and enter the following command:

   INH:REX,SM=a;

   Where: a = SM number of degrowth integrated digital carrier unit (IDCU) RT.

   Response: **OK**

5. At MCC, type and enter the following command:

   OP:REXINH;

9.87.3 Backup Office-Dependent Data, If Necessary

Note: Prior to the responses given, there will be completed responses for each SM and the application office-dependent data (ODD) of the administrative module (AM).

1. At MCC, type and enter the following command:

   BKUP:ODD,AM,CMP=a[&&b],NRODD=c[&&d],RODD=c;

   Where: a = Communication module processor (CMP) or lower limit of range of CMPs
   b = Upper limit of range of CMPs
   c = SM or lower limit of range of SMs
   d = Upper limit of range of SMs.

   Response: **BKUP ODD FULL AM COMPLETED**
   BKUP ODD CMP a[&&b] COMPLETED
   BKUP ODD NRODD c[&&d] COMPLETED
   BKUP ODD RODD c COMPLETED
   BKUP ODD COMPLETED

   Note: Data base back up will take several minutes to complete.

9.87.4 Allow Peripheral Fault Recovery Messages To Be Printed

Note: The following command allows the messages for the units whose message class is set to be printed on the receive-only printer (ROP). They are also sent to the log file unless the **LOG=OFF** or **LOG OFF** option is used.

1. At MCC, type and enter the following command once for each of the message classes of the peripherals that exist on the SM where the degrowth is being done:

   CHG:LPS,MSGCLS=pfr_mon,PRINT=ON,LOG=OFF;

2. At MCC, type and enter the following command:

   SET:PERPH,SM=a,VERBOSE;

   Where: a = SM number.

3. At MCC, type and enter the following command:

   INH:BREVC,SM=a;

   Where: a = SM number.

9.87.5 Remove IDCU Facilities from Service

Note: If the RT is equipped with protection line switching (PLS), remove the IFACs associated with the protection (PROT) first.

1. At MCC, type and enter the following command for each of the IDCU facilities (IFAC) which connects the RT to the IDCU.

   RMV:IFAC=a-b-c,UCL;

   Where: a = SM number
   b = IDCU number
   c = IFAC number.

   Response: **RMV IFACILITY a b c COMPLETED**

9.87.6 Verify IFACs Which Are Associated with the TR303 Being Degrown Are OOS

1. At MCC, type and enter the following command:

   187xyy,z

   Where: x = IDCU number
   yy = RT number
   z = SM number.

9.87.7 Inhibit Protection Line Switching, If Provided, on All IFACs Associated with the RT Being Degrown

Note: Inhibit protection line switching for the **P** RT DS1 FAC first.

1. At MCC, type and enter the following command:

   INH:RT,FAC=a-b,PROT;

   Where: a = Site identification (SID) number
   b = RT DS1 FAC number (A-D,P for TR008 and 1-28 for TR303)

   Response: **INH RT FAC = a-b PROT COMPLETED**

9.87.8 Delete RTs Data from Data Base

1. Select and prepare terminal for recent change and verify activities.

   Reference: **Procedure 9.18**

2. Type and enter **18.15**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

3. Type and enter **D**

   Response: **REMOTE TERMINAL VIEW** page displayed. Cursor at SM attribute.

4. Select the completed work order Form 18.15 for the identified TR303. This form should have the KEY attributes listed in the following display:

```
1. SM          ____  INPUT APPROPRIATE DATA
2. UNIT TYPE   IDCU
3. UNIT NUMBER _
4. RT EX       __
```

5. Using the selected work order form as a guide, type and enter the indicated values for each KEY attribute.

   Response: System completes remainder of view.

   Enter Delete, Change, Validate, Screen #, or Print:

6. Verify data.

7. Type and enter **D**

   Response: **deleting.....FORM DELETED**
   REMOTE TERMINAL VIEW page displayed with attributes blank.

8. Type and enter **<**

   Response: **18.0 SM AND REMOTE TERMINALS VIEWS** page displayed.

9.87.9 Delete Unused IFACs from Data Base

1. Select and prepare terminal for recent change and verify activities.

   Reference: **Procedure 9.18**

2. Type and enter **20.23**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

3. If all IFACs on a loop-side interface (LSI) are to be deleted, then continue this procedure at Step **4**. Otherwise, continue this procedure at Step **10**.

4. Type and enter **D**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed. Cursor at SM attribute.

5. Select the completed work order Form 20.23 indicating what LSI is having all of its IFACs deleted. This form should have the KEY attributes listed in the following display:

```
1. SM        ___   INPUT APPROPRIATE DATA
2. IDCU      ___
3. LSI       ___
```

6. Using the selected work order form as a guide, type and enter the indicated values for each KEY attribute.

   Response: System completes remainder of view.
   Enter Delete, Change, Validate, Screen #, or Print:

7. Verify data.

8. Type and enter **D**

   Response: **deleting ....FORM DELETED**
   FACILITY EQUIPMENT (IFAC) page displayed with KEY attributes blank.

9. Continue this procedure at Step **25**.

10. Type and enter **U**

    Response: **FACILITY EQUIPMENT (IFAC)** page displayed. Cursor at SM attribute.

11. Select the completed work order Form 20.23 indicating what facilities are to be deleted. This form should have the KEY attributes listed in the following display:

```
1. SM      ___   INPUT APPROPRIATE DATA
2. IDCU    ___
3. LSI     ___
```

12. Using the selected work order form as a guide, type and enter the indicated values for each KEY attribute.

    Response: System completes remainder of view.
    Enter Update, Change, Validate, Screen#, or Print:

13. Type and enter **C**

    Response: **Change Field:**

14. Type and enter **4**

    Response: **Field 4: Row:**

15. Type and enter the row number of an IFAC being degrown.

    Response: Cursor at EQSTAT attribute of an IFAC.

16. Type and enter '

    Response: Cursor at PM GRP attribute of an IFAC.

17. Type and enter '

    Response: Cursor at FACILITY ID attribute of an IFAC.

18. Type and enter '

    Response: Cursor at SUP MTHD attribute of an IFAC.

19. Type and enter '

    Response: Cursor at PUB43801 attribute of an IFAC.

20. Type and enter '

    Response: **Field 4: Row:**

21. For each remaining IFAC to be degrown on this LSI, execute Steps **15** through **20**. When no IFACs remain to be degrown, continue this procedure with Step **22**.

22. Hit CARRIAGE RETURN.

    Response: **Change Field:**

23. Hit CARRIAGE RETURN.

    Response: **Enter Update, Change, Validate, Screen#, or Print:**

24. Type and enter **U**

    Response: **updating ....FORM UPDATED**
    FACILITY EQUIPMENT (IFAC) page displayed.

25. Type and enter **<**

    Response: **20.0 SM PACK & SUBPACK VIEWS** page displayed.

26. Type and enter **q**

    Response: **RCV-196 COMPLETED**

9.87.10 If Required, Repeat the Previous Step to Delete the Unused IFACs on the Other LSI

9.87.11 Verify Degrowth at MCC

1. At MCC, type and enter the following command:

   188xyy,z

   Where: x = IDCU number
   yy = RT number
   z = SM number.

2. Verify that MCC page does not come up.

3. At MCC, type and enter the following command:

   187x,y

   Where: x = IDCU number
   y = SM number.

4. Verify that deleted IFACs are not displayed.

9.87.12 Backup Office-Dependent Data

Note: Prior to the response, there will be completed responses for each SM and the AM.

1. At MCC, type and enter the following command:

   BKUP:ODD;

   Response: **BKUP ODD COMPLETED**

9.87.13 Inhibit Additional PFR Message Printing

1. At MCC, type and enter the following command:

   ALW:BREVC,SM=a;

   Where: a = SM number.

2. At MCC, type and enter the following command:

   CLR:PERPH,SM=a,VERBOSE

   Where: a = SM number.

3. At MCC, type and enter the following command:

   CHG:LPS,MSGCLS=ALL,FROMBKUP;

9.87.14 Return Routine Exercises to Normal

1. At MCC, type and enter the following command:

   ALW:REX,SM=a;

   Where: a = SM inhibited.

   Response: **OK**

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

9.88 PERFORM IDCU TR303 RT GROWTH PROCEDURE—5E8 AND LATER

PROCEDURE

The integrated digital carrier unit (IDCU) common hardware and the associated loop-side interface (LSI) and electrical line interface (ELI) must be operational, and the IDCU facilities (IFAC), which are to be associated with the growth TR303 remote terminal (RT), must be in the **GROW** state (per **Procedure 9.84**).

9.88.1 Verify and Set Initial Conditions

1. At master control center (MCC), observe Summary Status Area for a SYS NORM indication.
2. If a SYS NORM indication is not obtained, type and enter the following command:

   OP:SYSSTAT;

3. At MCC, type and enter the following command:

   OP:OFFNORM,SM=a;

   Where: a = Switching module (SM) number.

   Comment: Evaluate system response to determine if system status is acceptable to continue. Specific attention is required for areas that can cause SM isolation or service impact during this RT growth procedure. Correct any deficiency as required.

Warning: Steps 4 through 6 are recommended but not required. Local practices should control their use. If routine exercise (REX) is inhibited, it must be allowed at the conclusion of this growth procedure.

4. At MCC, type and enter the following command:

   INH:REX,SM=a;

   Where: a = Number of the SM growing the RT.

5. At MCC, type and enter the following command:

   OP:REXINH;

   Response: The inhibit status will be printed. Verify this printout.

6. At MCC, type and enter the following command:

   BKUP:ODD;

   Response: **BKUP ODD COMPLETED**

9.88.2 Allow Peripheral Fault Recovery Messages To Be Printed

1. At MCC, type and enter the following command:

   SET:PERPH,SM=a,VERBOSE;

   Where: a = SM number.

2. At MCC, type and enter the following command:

   INH:BREVC,SM=a;

   Where: a = SM number.

3. At MCC, type and enter the following command:

   CHG:LPS,MSGCLS=pfr_mon,PRINT=ON,LOG=OFF;

9.88.3 Update IFACs from Grow to Operational

1. Select and prepare terminal for recent change and verify activities.

   Reference: **Procedure 9.18**

2. Type and enter **20.23**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

3. Type and enter **U**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed. Cursor at SM attribute.

4. Select the completed work order Form 20.23 indicating what facilities are to be assigned to the TR303. This form should have the KEY attributes listed in the following display:

```
1. SM   ____  INPUT APPROPRIATE DATA
2. IDCU _
3. LSI  _
```

5. Using the selected work order form as a guide, type and enter the indicated values for each KEY attribute.

   Response: System completes remainder of view.
   Enter Update, Change, Validate, Screen#, or Print:

6. Type and enter **C**

   Response: **Change Field:**

7. Type and enter **4**

   Response: **Field 4: Row:**

8. Type and enter row number of an IFAC being grown.

   Response: Cursor at EQSTAT attribute of an IFAC.

9. Type and enter **O**

   Response: Cursor at PM GRP attribute of an IFAC.

10. Hit CARRIAGE RETURN.

    Response: Cursor at FACILITY ID attribute of an IFAC.

11. Hit CARRIAGE RETURN.

    Response: Cursor at SUP MTHD attribute of an IFAC.

12. Hit CARRIAGE RETURN.

    Response: Cursor at PUB43801 attribute of an IFAC.

13. Hit CARRIAGE RETURN.

    Response: **Field 4: Row:**

14. For each remaining IFAC to be grown on this LSI, execute Steps **7** through **13**. When no IFACs remain to be grown, continue this procedure with Step **15**.

15. Hit CARRIAGE RETURN.

    Response: **Enter Update, Change, Validate, Screen#, or Print:**

16. Type and enter **U**

    Response: **updating ....FORM UPDATED**
    FACILITY EQUIPMENT (IFAC) page displayed.

17. Type and enter **<**

    Response: **20.0 SM PACK & SUBPACK VIEWS** page displayed.

9.88.4 Verify IFACs Data

1. Type and enter **23**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

2. Type and enter **R**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed. Cursor at SM attribute.

3. Using the selected work order form as a guide, again type and enter the indicated values for each KEY attribute.

```
1. SM   ___   INPUT APPROPRIATE DATA
2. IDCU _
3. LSI  _
```

   Response: System completes remainder of view.
   Enter Review, Change-Insert, Validate, Screen#, or Print:

4. Verify data is consistent with the selected work order form.

   Comment: Correct errors using terminal in the update mode.

5. Type and enter **q**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed.

6. Type and enter **<**

   Response: **20.0 SM PACK & SUBPACK VIEWS** page displayed.

7. Type and enter **q**

   Response: **RCV-196 COMPLETED**

9.88.5 Perform DS1 Cross Connects

1. **Telephone Company function.**

9.88.6 Insert TR303 RT Information Into Data Base

1. Select and prepare terminal for recent change and verify activities.

   Reference: **Procedure 9.18**

2. Type and enter **18.15**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

3. Type and enter **I**

   Response: **REMOTE TERMINAL** page displayed. Cursor at SM attribute.

4. Select the completed work order Form 18.15 for the identified TR303. This form should have the KEY attributes listed in the following display:

```
1. SM           ____  INPUT APPROPRIATE DATA
   UNIT TYPE   IDCU
3. UNIT NUMBER _
4. RT EX       __
```

5. Using the selected work order form as a guide, type and enter the indicated values for each attribute. For the **RT EQSTAT** attribute marked "per HCP", type and enter a **G.**

   Response: **Enter Insert, Change, Validate, Screen#, or Print:**

6. Type and enter **I**

   Response: **inserting ....FORM INSERTED**
   REMOTE TERMINAL page displayed.

7. Type and enter **<**

   Response: **18.0 SM & REMOTE TERMINALS VIEWS** page displayed.

9.88.7 Update TR303 RT from Grow to Operational

1. Type and enter **18.15**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

2. Type and enter **U**

   Response: **REMOTE TERMINAL** page displayed. Cursor at SM attribute.

3. Using the selected work order form as a guide, again type and enter the indicated values for each KEY attribute.

```
1. SM           ____  INPUT APPROPRIATE DATA
   UNIT TYPE    IDCU
3. UNIT NUMBER  _
4. RT EX        __
```

   Response: System completes remainder of view.
   Enter Update, Change, Validate, Screen#, or Print:

4. Type and enter **C**

   Response: **Change Field:**

5. Type and enter **15**

   Response: Cursor at TR303 RT EQSTAT attribute.

6. Type and enter **O**

   Response: **Change Field:**

7. Hit CARRIAGE RETURN.

   Response: **Enter Update, Change, Validate, Screen#, or Print:**

8. Type and enter **U**

   Response: **updating ....FORM UPDATED**
   REMOTE TERMINAL page displayed.

9. Type and enter **<**

   Response: **18.0 SM & REMOTE TERMINALS VIEWS** page displayed.

9.88.8 Verify TR303 RT Data

1. Type and enter **15**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

2. Type and enter **R**

   Response: **REMOTE TERMINAL** page displayed. Cursor at SM attribute.

3. Using the selected work order form as a guide, again type and enter the indicated values for each KEY attribute.

```
1. SM           ____  INPUT APPROPRIATE DATA
   UNIT TYPE    IDCU
3. UNIT NUMBER  _
4. RT EX        __
```

   Response: System completes remainder of view.
   Enter Review, Change-Insert, Validate, Screen#, or Print:

4. Verify data is consistent with the selected work order form.

   Comment: Correct errors using terminal in the update mode.

5. Type and enter **q**

   Response: **REMOTE TERMINAL** page displayed.

6. Type and enter **<**

   Response: **18.0 SM & REMOTE TERMINALS VIEWS** page displayed.

7. Type and enter **q**

   Response: **RCV-196 COMPLETED**

9.88.9 Restore IFACs to Service

1. At MCC, type and enter the following command:

   RST:IFAC=a-b-c;

   Where: a = SM number
   b = IDCU number
   c = IFAC number.

   Response: **RST IFAC a b c COMPLETED**

2. Repeat Step **1** for each IFAC associated with the grown TR303.

9.88.10 Verify RT Growth on MCC Pages

1. At MCC or trunk and line work station, go to MCC Page 188yzz,x

   Where: y = IDCU number
   zz = RT number
   x = SM number.

2. Verify that the added IFACs are active with no carrier group alarms present.

9.88.11 Turn Off IDCU Fault Recovery Reports

1. At MCC, type and enter the following command:

   ALW:BREVC,SM=a;

   Where: a = SM number.

   Response: **OK**

2. At MCC, type and enter the following command:

   CLR:PERPH,SM=a,VERBOSE;

   Where: a = SM number.

3. At MCC, type and enter the following command:

   CHG:LPS:MSGCLS=ALL,FROMBKUP;

   Response: **OK**

9.88.12 Backup Office Dependent Data

Note: Prior to the response, there will be completed responses for each SM, the administrative module (AM), and the communication module processor (CMP) if applicable.

1. At MCC, type and enter the following command:

   BKUP:ODD;

   Response: **BKUP ODD COMPLETED**

9.88.13 Return Routine Exercise to Normal

1. At MCC, type and enter the following command:

   ALW:REX,SM=a;

   Where: a = SM inhibited.

   Response: **OK**

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

9.89 PERFORM IDCU TR008 RT DEGROWTH PROCEDURE—5E8 AND LATER

PROCEDURE

9.89.1 Prepare IDCU TR008 RT for Degrowth

This procedure assumes that all terminal assignments (line and/or trunks) have been removed from the remote terminal before degrowth occurs.

9.89.2 Verify and Set Initial Conditions

1. At master control center (MCC), observe Summary Status Area for a SYS NORM indication.
2. If a SYS NORM indication is not obtained, type and enter the following command:

   OP:SYSSTAT;

3. At MCC, type and enter the following command:

   OP:OFFNORM,SM=a;

   Where: a = Switching module (SM) number.

   Comment: Evaluate system response to determine if system status is acceptable to continue. Specific attention is required for areas that can cause SM isolation or service impact during the remote terminal (RT) degrowth procedure. Correct any deficiency as required.

Warning: Steps 4 and 5 are recommended but not required. Local practices should control their use.

4. At MCC, type and enter the following command:

   INH:REX,SM=a;

   Where: a = SM number of degrowth integrated digital carrier unit (IDCU) RT.

   Response: **OK**

5. At MCC, type and enter the following command:

   OP:REXINH;

9.89.3 Backup Office Dependent Data, If Necessary

Note: Prior to the responses given, there will be completed responses for each SM and the application office dependent data (ODD) of the administrative module (AM).

1. At MCC, type and enter the following command:

   BKUP:ODD,AM,CMP=a[&&b],NRODD=c[&&d],RODD=c;

   Where: a = Communication module processor (CMP) or lower limit of range of CMPs
   b = Upper limit of range of CMPs
   c = SM or lower limit of range of SMs
   d = Upper limit of range of SMs.

   Response: **BKUP ODD FULL AM COMPLETED**
   BKUP ODD CMP a[&&b] COMPLETED
   BKUP ODD NRODD c[&&d] COMPLETED
   BKUP ODD RODD c COMPLETED
   BKUP ODD COMPLETED

   Note: Data base back up will take several minutes to complete.

9.89.4 Allow Peripheral Fault Recovery Messages To Be Printed

Note: The following command allows the messages for the units whose message class is set to be printed on the receive-only printer (ROP). They are also sent to the log file unless the **LOG=OFF** or **LOG OFF** option is used.

1. At MCC, type and enter the following command once for each of the message classes of the peripherals that exist on the SM where the degrowth is being done:

   CHG:LPS,MSGCLS=pfr_mon,PRINT=ON,LOG=OFF;

2. At MCC, type and enter the following command:

   SET:PERPH,SM=a,VERBOSE;

   Where: a = SM number.

3. At MCC, type and enter the following command:

   INH:BREVC,SM=a;

   Where: a = SM number.

9.89.5 Remove IFACs from Service

Note: If the RT is equipped with protection line switching (PLS), remove the IFAC associated with the protection (PROT) first.

1. At MCC, type and enter the following command for each of the IDCU facilities (IFAC) which connect the RT to the IDCU.

   RMV:IFAC=a-b-c,UCL;

   Where: a = SM number
   b = IDCU number
   c = IFAC number.

   Response: **RMV IFACILITY a b c COMPLETED**

9.89.6 Verify IFACs Associated with the TR008 Being Degrown Are OOS

1. At MCC, type and enter the following command:

   187xyy,z

   Where: x = IDCU number
   yy = RT number
   z = SM number.

9.89.7 Inhibit Protection Line Switching, If Provided, on All IFACs Associated with the RT Being Degrown

Note: Inhibit protection line switching for the **P** RT DS1 FAC first.

1. At MCC, type and enter the following command:

   INH:RT,FAC=a-b,PROT;

   Where: a = Site identification number (SID)
   b = RT DS1 FAC number (A-D,P for TR008 and 1-28 for TR303).

   Response: **INH RT FAC = a-b PROT COMPLETED**

9.89.8 Delete RTs Data from Data Base

1. Select and prepare terminal for recent change and verify activities.

   Reference: **Procedure 9.18**

2. Type and enter **18.15**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

3. Type and enter **D**

   Response: **REMOTE TERMINAL VIEW** page displayed. Cursor at SM attribute.

4. Select the completed work order Form 18.15 for the identified TR008. This form should have the KEY attributes listed in the following display:

```
1. SM          ____  INPUT APPROPRIATE DATA
   UNIT TYPE   IDCU
3. UNIT NUMBER _
4. RT EX       __
```

5. Using the selected work order form as a guide, type and enter the indicated values for each KEY attribute.

   Response: System completes remainder of view.

   Enter Delete, Change, Validate, Screen #, or Print:

6. Verify data.

7. Type and enter **D**

   Response: **deleting ....FORM DELETED**
   REMOTE TERMINAL VIEW page displayed with attributes blank.

8. Type and enter **<**

   Response: **18.0 SM AND REMOTE TERMINALS VIEWS** page displayed.

9.89.9 Delete Unused IFACs from Data Base

1. Select and prepare terminal for recent change and verify activities.

   Reference: **Procedure 9.18**

2. Type and enter **20.23**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

3. If all IFACs on a loop-side interface (LSI) are to be deleted, then continue this procedure at Step **4**. Otherwise, continue this procedure at Step **10**.

4. Type and enter **D**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed. Cursor at SM attribute.

5. Select the completed work order Form 20.23 indicating what LSI is having all of its IFACs deleted. This form should have the KEY attributes listed in the following display:

```
1. SM        ___  INPUT APPROPRIATE DATA
2. IDCU      ___
3. LSI       ___
```

6. Using the selected work order form as a guide, type and enter the indicated values for each KEY attribute.

   Response: System completes remainder of view.
   Enter Delete, Change, Validate, Screen #, or Print:

7. Verify data.

8. Type and enter **D**

   Response: **deleting ....FORM DELETED**
   FACILITY EQUIPMENT (IFAC) page displayed with KEY attributes blank.

9. Continue this procedure at Step **25**.

10. Type and enter **U**

    Response: **FACILITY EQUIPMENT (IFAC)** page displayed. Cursor at SM attribute.

11. Select the completed work order Form 20.23 indicating what facilities are to be deleted. This form should have the KEY attributes listed in the following display:

```
1. SM        ___  INPUT APPROPRIATE DATA
2. IDCU      ___
3. LSI       ___
```

12. Using the selected work order form as a guide, type and enter the indicated values for each KEY attribute.

    Response: System completes remainder of view.
    Enter Update, Change, Validate, Screen#, or Print:

13. Type and enter **C**

    Response: **Change Field:**

14. Type and enter **4**

    Response: **Field 4:** **Row:**

15. Type and enter the row number of an IFAC being degrown.

    Response: Cursor at EQSTAT attribute of an IFAC.

16. Type and enter '

    Response: Cursor at PM GRP attribute of an IFAC.

17. Type and enter '

    Response: Cursor at FACILITY ID attribute of an IFAC.

18. Type and enter '

    Response: Cursor at SUP MTHD attribute of an IFAC.

19. Type and enter '

    Response: Cursor at PUB43801 attribute of an IFAC.

20. Type and enter '

    Response: **Field 4:** **Row:**

21. For each remaining IFAC to be degrown on this LSI, execute Steps **15** through **20**. When no IFACs remain to be degrown, continue this procedure with Step **22**.

22. Hit CARRIAGE RETURN.

    Response: **Change Field:**

23. Hit CARRIAGE RETURN.

    Response: **Enter Update, Change, Validate, Screen#, or Print:**

24. Type and enter **U**

    Response: **updating ....FORM UPDATED**
    FACILITY EQUIPMENT (IFAC) page displayed.

25. Type and enter **<**

    Response: **20.0 SM PACK & SUBPACK VIEWS** page displayed.

26. Type and enter **q**

    Response: **RCV-196 COMPLETED**

9.89.10 If Required, Repeat Step 9.89.9 to Delete Unused IFACs on the Other LSI

9.89.11 Verify Degrowth at MCC

1. At MCC, type and enter the following command:

   188xyy,z

   Where: x = IDCU number
   yy = RT number
   z = SM number.

2. Verify that MCC page does not come up.

3. At MCC, type and enter the following command:

   187x,y

   Where: x = IDCU number
   y = SM number.

   Verify that deleted IFACs are not displayed.

9.89.12 Backup Office-Dependent Data

Note: Prior to the response, there will be completed responses for each SM and the AM.

1. At MCC, type and enter the following command:

   BKUP:ODD;

   Response: **BKUP ODD COMPLETED**

9.89.13 Inhibit Additional PFR Message Printing

1. At MCC, type and enter the following command:

   ALW:BREVC,SM=a;

   Where: a = SM number.

2. At MCC, type and enter the following command:

   CLR:PERPH,SM=a,VERBOSE;

   Where: a = SM number.

3. At MCC, type and enter the following command:

   CHG:LPS,MSGCLS=ALL,FROMBKUP;

9.89.14 Return Routine Exercises to Normal

1. At MCC, type and enter the following command:

   ALW:REX,SM=a;

   Where: a = SM inhibited.

   Response: **OK**

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

9.90 PERFORM IDCU TR008 RT GROWTH PROCEDURE—5E8 AND LATER

PROCEDURE

The integrated digital carrier unit (IDCU) common hardware and the associated loop-side interface (LSI) and electrical line interface (ELI) must be operational, and the IDCU facilities (IFAC), which are to be associated with the growth TR008 remote terminal (RT), must be in the **GROW** state (per Procedure 9.84).

9.90.1 Verify and Set Initial Conditions

1. At master control center (MCC), observe Summary Status Area for a SYS NORM indication.
2. If a SYS NORM indication is not obtained, type and enter the following command:

   OP:SYSSTAT;

3. At MCC, type and enter the following command:

   OP:OFFNORM,SM=a;

   Where: a = Switching module (SM) number.

   Comment: Evaluate system response to determine if system status is acceptable to continue. Specific attention is required for areas that can cause SM isolation or service impact during this RT growth procedure. Correct any deficiency as required.

Warning: Steps 4 through 6 are recommended but not required. Local practices should control their use. If routine exercise (REX) is inhibited, it must be allowed at the conclusion of this growth procedure.

4. At MCC, type and enter the following command:

   INH:REX,SM=a;

   Where: a = Number of the SM growing the RT.

5. At MCC, type and enter the following command:

   OP:REXINH;

   Response: The inhibit status will be printed. Verify this printout.

6. At MCC, type and enter the following command:

   BKUP:ODD;

   Response: **BKUP ODD COMPLETED**

9.90.2 Allow Peripheral Fault Recovery Messages To Be Printed

1. At MCC, type and enter the following command:

   SET:PERPH,SM=a,VERBOSE;

   Where: a = SM number.

2. At MCC, type and enter the following command:

   INH:BREVC,SM=a;

   Where: a = SM number.

3. At MCC, type and enter the following command:

   CHG:LPS,MSGCLS=pfr_mon,PRINT=ON,LOG=OFF;

9.90.3 Update IFACs from Grow to Operational

1. Select and prepare terminal for recent change and verify activities.

   Reference: **Procedure 9.18**

2. Type and enter **20.23**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

3. Type and enter **U**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed. Cursor at SM attribute.

4. Select the completed work order Form 20.23 for the identified SM. This form should have the KEY attributes listed in the following display:

```
1. SM ____   INPUT APPROPRIATE DATA
2. IDCU _
3. LSI  _
```

5. Using the selected work order form as a guide, type and enter the indicated values for each KEY attribute.

   Response: System completes remainder of view.
   Enter Update, Change, Validate, Screen#, or Print:

6. Type and enter **C**

   Response: **Change Field:**

7. Type and enter **4**

   Response: **Field 4: Row:**

8. Type and enter row number of an IFAC being grown.

   Response: Cursor at EQSTAT attribute of an IFAC.

9. Type and enter **O**

   Response: Cursor at PM GRP attribute of an IFAC.

10. Hit CARRIAGE RETURN.

    Response: Cursor at FACILITY ID attribute of an IFAC.

11. Hit CARRIAGE RETURN.

    Response: Cursor at SUP MTHD attribute of an IFAC.

12. Hit CARRIAGE RETURN.

    Response: Cursor at PUB43801 attribute of an IFAC.

13. Hit CARRIAGE RETURN.

    Response: **Field 4: Row:**

14. For each remaining IFAC to be grown on this LSI, execute Steps **7** through **13**. When no IFACs remain to be grown, continue this procedure at Step **15**.

15. Hit CARRIAGE RETURN.

    Response: **Enter Update, Change, Validate, Screen#, or Print:**

16. Type and enter **U**

    Response: **updating ....FORM UPDATED**
    FACILITY EQUIPMENT (IFAC) page displayed.

17. Type and enter **<**

    Response: **20.0 SM PACK & SUBPACK VIEWS** page displayed.

9.90.4 Verify IFACs Data

1. Type and enter **23**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

2. Type and enter **R**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed. Cursor at SM attribute.

3. Using the selected work order Form 20.23 as a guide, again type and enter the indicated values for each KEY attribute.

```
1. SM   ___   INPUT APPROPRIATE DATA
2. IDCU _
3. LSI  _
```

   Response: System completes remainder of view.
   Enter Review, Change-Insert, Validate, Screen#, or Print:

4. Verify data is consistent with the selected work order form.

   Comment: Correct errors using terminal in the update mode.

5. Type and enter **q**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed.

6. Type and enter **<**

   Response: **20.0 SM PACK & SUBPACK VIEWS** page displayed.

7. Type and enter **q**

   Response: **RCV-196 COMPLETED**

9.90.5 Perform DS1 Cross Connects

1. **Telephone Company function.**

9.90.6 Insert TR008 RT Information into Data Base

1. Select and prepare terminal for recent change and verify activities.

   Reference: **Procedure 9.18**

2. Type and enter **18.15**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

3. Type and enter **I**

   Response: **REMOTE TERMINAL** page displayed. Cursor at SM attribute.

4. Select the completed work order Form 18.15 for the identified TR008. This form should have the KEY attributes listed in the following display:

```
1. SM           ____  INPUT APPROPRIATE DATA
   UNIT TYPE    IDCU
3. UNIT NUMBER  _
4. RT EX        __
```

5. Using the selected work order form as a guide, type and enter the indicated values for each attribute. For the **DIGROUP EQSTAT** attributes marked "per HCP", type and enter a **G**.

   Response: **Enter Insert, Change, Validate, Screen#, or Print:**

6. Type and enter **I**

   Response: **inserting ....FORM INSERTED**
   REMOTE TERMINAL page displayed.

7. Type and enter **<**

   Response: **18.0 SM & REMOTE TERMINALS VIEWS** page displayed.

9.90.7 Update TR008 RT from Grow to Operational

1. Type and enter **18.15**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

2. Type and enter **U**

   Response: **REMOTE TERMINAL** page displayed. Cursor at SM attribute.

3. Using the selected work order Form 18.15 as a guide, again type and enter the indicated values for each KEY attribute listed in the following display:

```
1. SM           ____  INPUT APPROPRIATE DATA
   UNIT TYPE    IDCU
3. UNIT NUMBER  _
4. RT EX        __
```

   Response: System completes remainder of view.
   Enter Update, Change, Validate, Screen#, or Print:

4. Type and enter **C**

   Response: **Change Field:**

5. Type and enter **23**

   Response: Cursor at TR008 SHELF A EQSTAT attribute.

6. Update EQSTAT from **G** to **O** for all DIGROUPs being grown.

   Response: **Change Field:**

7. Hit CARRIAGE RETURN.

   Response: **Enter Update, Change, Validate, Screen#, or Print:**

8. Type and enter **U**

   Response: **updating ....FORM UPDATED**
   REMOTE TERMINAL page displayed.

9. Type and enter **<**

   Response: **18.0 SM & REMOTE TERMINALS VIEWS** page displayed.

9.90.8 Verify TR008 RT Data

1. Type and enter **15**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

2. Type and enter **R**

   Response: **REMOTE TERMINAL** page displayed. Cursor at SM attribute.

3. Using the selected work order Form 18.15 as a guide, again type and enter the indicated values for each KEY attribute listed in the following display:

```
1. SM           ____  INPUT APPROPRIATE DATA
   UNIT TYPE    IDCU
3. UNIT NUMBER  _
4. RT EX        __
```

   Response: System completes remainder of view.
   Enter Review, Change-Insert, Validate, Screen#, or Print:

4. Verify data is consistent with the selected work order form.

   Comment: Correct errors using terminal in the update mode.

5. Type and enter **q**

   Response: **REMOTE TERMINAL** page displayed.

6. Type and enter **<**

   Response: **18.0 SM & REMOTE TERMINALS VIEWS** page displayed.

7. Type and enter **q**

   Response: **RCV-196 COMPLETED**

9.90.9 Restore IFACs to Service

1. At MCC, type and enter the following command:

   RST:IFAC=a-b-c;

   Where: a = SM number
   b = IDCU number
   c = IFAC number.

   Response: **RST IFAC** a b c COMPLETED

2. Repeat Step **1** for each IFAC associated with the grown TR008.

9.90.10 Verify RT Growth on MCC Pages

1. At MCC or trunk and line work station, go to MCC Page 188xyy,z

   Where: x = IDCU number
   yy = RT number
   z = SM number.

2. Verify that the added IFACs are active with no carrier group alarms present.

9.90.11 Turn Off IDCU Fault Recovery Reports

1. At MCC, type and enter the following command:

   ALW:BREVC,SM=a;

   Where: a = SM number.

   Response: **OK**

2. At MCC, type and enter the following command:

   CLR:PERPH,SM=a,VERBOSE;

   Where: a = SM number.

3. At MCC, type and enter the following command:

   CHG:LPS:MSGCLS=ALL,FROMBKUP;

   Response: **OK**

9.90.12 Backup Office-Dependent Data

Note: Prior to the response, there will be completed responses for each SM, the administrative module (AM), and the communication module processor (CMP) if applicable.

1. At MCC, type and enter the following command:

   BKUP:ODD;

   Response: **BKUP ODD COMPLETED**

9.90.13 Return Routine Exercise to Normal

1. At MCC, type and enter the following command:

   ALW:REX,SM=a;

   Where: a = SM inhibited.

   Response: **OK**

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

9.91 PERFORM IDCU TR008 RT TO TR303 RT CONVERSION—5E8 AND LATER

PROCEDURE

9.91.1 Prepare IDCU TR008 RT for Conversion

The TR008 remote terminal (RT) must be operational prior to the execution of this procedure.

9.91.2 Verify and Set Initial Conditions

1. At master control center (MCC), observe Summary Status Area for a **SYS NORM** indication.
2. If a SYS NORM indication is not obtained, type and enter the following command:

   OP:SYSSTAT;
3. At MCC, type and enter the following command:

   OP:OFFNORM,SM=a;

   Where: a = Switching module (SM) number.

   Comment: Evaluate system response to determine if system status is acceptable to continue. Specific attention is required for areas that can cause SM isolation or service impact during this integrated digital carrier unit (IDCU) RT conversion procedure. Correct any deficiency as required.

Warning: Steps 4 and 5 are recommended but not required. Local practices should control their use. If routine exercise (REX) is inhibited, it must be allowed at the conclusion of this growth procedure.

4. At MCC, type and enter the following command:

   INH:REX,SM=a;

   Where: a = Number of the SM converting the IDCU RT.
5. At MCC, type and enter the following command:

   OP:REXINH;

   Response: The inhibit status will be printed. Verify this printout.

9.91.3 Backup Office-Dependent Data, If Necessary

Note: Prior to the responses given, there will be completed responses for each SM and the application office-dependent data (ODD) of the administrative module (AM).

1. At MCC, type and enter the following command:

   BKUP:ODD,AM,CMP=0,NRODD=a[&&b],RODD=a;

   Where: a = SM or lower limit of range of SMs
   b = Upper limit of range of SMs.

   Responses: **BKUP ODD FULL AM COMPLETED**
   BKUP ODD CMP 0 COMPLETED
   BKUP ODD NRODD a[&&b] COMPLETED
   BKUP ODD RODD a COMPLETED
   BKUP ODD COMPLETED

   Note: Data base back up will take several minutes to complete.

9.91.4 Allow Peripheral Fault Recovery Messages To Be Printed

Note: The following command allows the messages for the units, whose message class is set, to be printed on the receive-only printer (ROP). They are also sent to the log file unless the **LOG=OFF** or **LOG OFF** option is used.

1. At MCC, type and enter appropriate message once for each of the message classes of the peripherals that exist on the SM where the degrowth is being done:

   CHG:LPS,MSGCLS=pfr_mon,PRINT=ON,LOG=OFF;

2. At MCC, type and enter the following command:

   SET:PERPH,SM=a,VERBOSE;

   Where: a = SM number.

3. At MCC, type and enter the following command:

   INH:BREVC,SM=a;

   Where: a = SM number.

9.91.5 Remove from Service IFACs Associated with RT

1. At MCC, type and enter the following command for each of the IDCU Facilities (IFAC) associated with the RT being converted:

   RMV:IFAC=a-b-c,UCL;

   Where: a = SM number
   b = IDCU number
   c = IFAC number.

   Response: **RMV IFAC a b c COMPLETED**

9.91.6 Change RT Hardware

Remote-terminal vendor procedure
Execute this step concurrently with the following step.

9.91.7 Update TR008 RT to TR303

1. Select and prepare terminal for recent change and verify activities.

   Reference: **Procedure 9.18**

2. Type and enter **18.15**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

3. Type and enter **U**

   Response: **REMOTE TERMINAL** page displayed. Cursor at SM attribute.

4. Select the completed work order Form 18.15 for the identified TR008. This form should have the KEY attributes listed in the following display.

```
1. SM           ____ INPUT APPROPRIATE DATA
   UNIT TYPE    IDCU
3. UNIT NUMBER  _
4. RT EX        __
```

5. Using the selected work order form as a guide, type and enter the indicated value for each KEY attribute.

   Response: System completes remainder of view.
   Enter Update, Change, Validate, Screen#, or Print:

6. Type and enter **C**

   Response: **Change Field:**

7. Type and enter **5**

   Response: Cursor at RT INTERFACE attribute.

8. Type and enter **TR303**

   Response: **Change Field:**

9. Type and enter **13**

   Response: Cursor at SUP METHOD attribute.

10. Type and enter data from work order form.

    Response: **Change Field:**

11. Type and enter **15**

    Response: Cursor at TR303 RT EQSTAT attribute.

12. Type and enter **O**

    Response: **Change Field:**

13. Type and enter **150**

    Response: **Field 150:** **Row:**

14. Type and enter the row number of an IFAC termination from the work order form.

    Response: Cursor at an IFAC attribute of an RT IFAC TERMINATION.

15. Type and enter data from work order form.

    Response: **Field 150:** **Row:**

16. Repeat Steps **14** through **15** for each IFAC associated with converted TR008. When information for all IFACs has been entered, continue with Step **17.**

17. Hit CARRIAGE RETURN.

    Response: **Change Field:**

18. Type and enter the next attribute number from the work order form.

    Response: Cursor at TRAFFIC MEASUREMENT CHANNEL (TMC) and EMBEDDED OPERATIONS CHANNEL (EOC) attribute.

19. Type and enter data from work order form.

    Response: **Change Field:**

20. Repeat Steps **18** and **19** for each TMC and EOC attribute shown on the work order form. When all attributes have been entered, continue with Step **21.**

21. Hit CARRIAGE RETURN.

    Response: **Enter Update, Change, Validate, Screen#, or Print:**

22. Type and enter **U**

    Response: **updating ....FORM UPDATED**
    REMOTE TERMINAL page displayed.

23. Type and enter **<**

    Response: **18.0 SM & REMOTE TERMINALS VIEWS** page displayed.

9.91.8 Verify TR303 RT Data

1. Type and enter **5**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

2. Type and enter **R**

   Response: **REMOTE TERMINAL** page displayed. Cursor at SM attribute.

3. Using the selected work order form as a guide, again type and enter the indicated values for each KEY attribute.

```
1. SM            ____  INPUT APPROPRIATE DATA
   UNIT TYPE     IDCU
3. UNIT NUMBER   _
4. RT EX         __
```

   Response: System completes remainder of view.
   Enter Review, Change-Insert, Validate, Screen#, or Print:

4. Verify data is consistent with the work order form.

   Comment: Correct errors using terminal in the update mode.

5. Type and enter **q**

   Response: **REMOTE TERMINAL** page displayed.

6. Type and enter **<**

   Response: **18.0 SM & REMOTE TERMINALS VIEWS** page displayed.

7. Type and enter **q**

   Response: **RCV-196 COMPLETED**

9.91.9 Restore IFACs to Service

1. At MCC, type and enter the following command:

   RST:IFAC=a-b-c;

   Where: a = SM number
   b = IDCU number
   c = IFAC number.

   Response: **RST IFAC a b c COMPLETED**

2. Repeat Step **1** for each IFAC associated with the converted TR008.

9.91.10 Execute Provisioning of the TR303 RT

1. At MCC, type and enter the following command:

   EXC:RT,PROV,TYPE=ALL,LRT=d-e-f;

   Where: d = SM number
   e = IDCU number
   f = Local RT number.

   Response: **EXC RT PROV TYPE=ALL SID=f LRT=d-e-f COMPLETE - NO TASKS PENDING**

9.91.11 Verify RT Conversion on MCC Pages

1. At MCC or trunk and line work station, go to MCC Page 188xyy,z

   Where: x = IDCU number
   yy = RT number
   z = SM number.

2. Verify that the RT is displayed properly.

9.91.12 Backup Office-Dependent Data

Note: Prior to the responses given, there will be completed responses for the SM and the application ODD of the AM.

1. At MCC, type and enter the following command:

   BKUP:ODD,AM,CMP=0,NRODD=a;

   Where: a = Number of the SM converting the IDCU RT.

   Responses: **BKUP ODD FULL AM COMPLETED**
   BKUP ODD CMP 0 COMPLETED
   BKUP ODD NRODD a COMPLETED
   BKUP ODD COMPLETED

   Note: Data base back up will take several minutes to complete.

9.91.13 Inhibit Additional Fault Recovery Message Printing

Note: Wait 30 minutes before starting this procedure, and monitor the ROP for "ANALYSIS ONLY", "REPT TRBL", and "PFR" messages that may implicate this hardware or associated hardware. If any messages are seen, take appropriate corrective maintenance action and wait again. When no messages are seen, continue with this procedure.

1. At MCC, type and enter the following command:

   ALW:BREVC,SM=a;

   Where: a = SM number.

2. At MCC, type and enter the following command:

   CLR:PERPH,SM=a,VERBOSE;

   Where: a = SM number.

3. At MCC, type and enter the following command:

   CHG:LPS,MSGCLS=ALL,FROMBKUP;

9.91.14 Return Routine Exercises to Normal

1. At MCC, type and enter the following command:

   ALW:REX,SM=a;

   Where: a = SM inhibited.

   Response: **OK**

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

9.92 PERFORM IDCU TR008 RT ADDITION OF DIGROUPS PROCEDURE—5E8 AND LATER

PROCEDURE

The integrated digital carrier unit (IDCU) common hardware, the associated loop-side interfaces (LSI), and the associated electrical-line interface (ELI) must be operational. The IDCU facilities (IFAC), which are to be associated with the additional TR008 remote terminal (RT) digroups, must be in the growth state (per Procedure 9.84). This procedure assumes that each equipped digroup or dual-digroup has an IFAC associated with it.

The additional RT hardware must have been installed and tested prior to the execution of this procedure.

9.92.1 Verify and Set Initial Conditions

1. At master control center (MCC), observe Summary Status Area for a SYS NORM indication.
2. If a SYS NORM indication is not obtained, type and enter the following command:

   OP:SYSSTAT;
3. At MCC, type and enter the following command:

   OP:OFFNORM,SM=a;

   Where: a = Switching module (SM) number.

   Comment: Evaluate system response to determine if system status is acceptable to continue. Specific attention is required for areas that can cause SM isolation or service impact during this RT growth procedure. Correct any deficiency as required.

Warning: Steps 4 through 6 are recommended but not required. Local practices should control their use. If routine exercise (REX) is inhibited, it must be allowed at the conclusion of this growth procedure.

4. At MCC, type and enter the following command:

   INH:REX,SM=a

   Where: a = Number of the SM growing the RT.
5. At MCC, type and enter the following command:

   OP:REXINH;

   Response: The inhibit status will be printed. Verify this printout.
6. At MCC, type and enter the following command:

   BKUP:ODD;

   Response: **BKUP ODD COMPLETED**

9.92.2 Allow Peripheral Fault Recovery Messages To Be Printed

1. At MCC, type and enter the following command:

   SET:PERPH,SM=a,VERBOSE;

   Where: a = SM number.

2. At MCC, type and enter the following command:

   INH:BREVC,SM=a;

   Where: a = SM number.

3. At MCC, type and enter the following command:

   CHG:LPS,MSGCLS=pfr_mon,PRINT=ON,LOG=OFF;

9.92.3 Verify the IFACs Associated with the Added Digroups are in the *GROW* State

1. At MCC, type and enter the following command:

   187z,x

   Where: z = IDCU number
   x = SM number.

9.92.4 Update from Grow to Operational the IFACs Associated with the Added Digroups

1. Select and prepare terminal for recent change and verify activities.

   Reference: **Procedure 9.18**

2. Type and enter **20.23**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

3. Type and enter **U**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed. Cursor at SM attribute.

4. Select the completed work order Form 20.23 indicating what facilities are to be assigned to the added digroup. This form should have the KEY attributes listed in the following display.

```
1. SM ___   INPUT APPROPRIATE DATA
2. IDCU _
3. LSI  _
```

5. Using the selected work order form as a guide, type and enter the indicated values for each KEY attribute.

   Response: System completes remainder of view.
   Enter Update, Change, Validate, Screen#, or Print:

6. Type and enter **C**

   Response: **Change Field:**

7. Type and enter **4**

   Response: **Field 4: Row:**

8. Type and enter row number of an IFAC being grown.

   Response: Cursor at EQSTAT attribute of an IFAC.

9. Type and enter **O**

   Response: Cursor at PM GRP attribute of an IFAC.

10. Hit CARRIAGE RETURN.

    Response: Cursor at FACILITY ID attribute of an IFAC.

11. Hit CARRIAGE RETURN.

    Response: Cursor at SUP MTHD attribute of an IFAC.

12. Hit CARRIAGE RETURN.

    Response: Cursor at PUB43801 attribute of an IFAC.

13. Hit CARRIAGE RETURN.

    Response: **Field 4: Row:**

14. For each remaining IFAC to be updated on this LSI, execute Steps **8** through **13**. When no IFACs remain to be updated, continue this procedure with Step **15**.

15. Hit CARRIAGE RETURN.

    Response: **Enter Update, Change, Validate, Screen#, or Print:**

16. Type and enter **U**

    Response: **updating ....FORM UPDATED**
    FACILITY EQUIPMENT (IFAC) page displayed.

17. Type and enter **<**

    Response: **20.0 SM PACK & SUBPACK VIEWS** page displayed.

9.92.5 Verify IFAC Data

1. Type and enter **23**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

2. Type and enter **R**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed. Cursor at SM attribute.

3. Using the selected work order form as a guide, again type and enter the indicated values for each KEY attribute.

```
1. SM   ___  INPUT APPROPRIATE DATA
2. IDCU _
3. LSI  _
```

   Response: System completes remainder of view.
   Enter Review, Change-Insert, Validate, Screen#, or Print:

4. Verify data is consistent with the work order form.

   Comment: Correct errors using terminal in the update mode.

5. Type and enter **q**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed.

6. Type and enter **<**

   Response: **20.0 SM PACK & SUBPACK VIEWS** page displayed.

7. Type and enter **q**

   Response: **RCV-196 COMPLETED**

9.92.6 If Required, Repeat Steps 9.92.4 and 9.92.5 for IFACs Assigned to the Added Digroups on the Other LSI

9.92.7 Perform Cross Connects at DSX panel

1. **Telephone Company function**

9.92.8 Update Added Digroup to the GROW state in the Data Base

1. Select and prepare terminal for recent change and verify activities.

   Reference: **Procedure 9.18**

2. Type and enter **18.15**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

3. Type and enter **U**

   Response: **REMOTE TERMINAL** page displayed. Cursor at SM attribute.

4. Select the completed work order Form 18.15 indicating what digroups are to be added. This form should have the KEY attributes listed in the following display.

```
1. SM          ____  INPUT APPROPRIATE DATA
   UNIT TYPE   IDCU
3. UNIT NUMBER _
4. RT EX       __
```

5. Using the selected work order form as a guide, type and enter the indicated values for each KEY attribute.

   Response: System completes remainder of view.
   Enter Update, Change, Validate, Screen#, or Print:

6. Type and enter **C**

   Response: **Change Field:**

7. If Digroup B is being added as Mode 1, continue this procedure at Step **8**. Otherwise, continue this procedure at Step **16**.

8. Type and enter **26**

   Response: Cursor at DIGROUP B MODE attribute.

9. Type and enter **UNCONC**

   Response: **Change Field:**

10. Type and enter **27**

    Response: Cursor at DIGROUP B EQSTAT attribute.

11. Type and enter **G**

    Response: **Change Field:**

12. Type and enter **28**

    Response: Cursor at DIGROUP B CLI attribute.

13. Type and enter information from work order form.

    Response: **Change Field:**

14. Type and enter **29**

    Response: Cursor at DIGROUP B IFAC attribute.

15. Type and enter information from work order form.

    Response: **Change Field:**

16. If Digroup C is being added as Mode 1, continue this procedure at Step **17**. Otherwise, continue this procedure at Step **25**.

17. Type and enter **30**

    Response: Cursor at DIGROUP C MODE attribute.

18. Type and enter **UNCONC**

    Response: **Change Field:**

19. Type and enter **31**

    Response: Cursor at DIGROUP C EQSTAT attribute.

20. Type and enter **G**

    Response: **Change Field:**

21. Type and enter **32**

    Response: Cursor at DIGROUP C CLI attribute.

22. Type and enter information from work order form.

    Response: **Change Field:**

23. Type and enter **33**

    Response: Cursor at DIGROUP C IFAC attribute.

24. Type and enter information from work order form.

    Response: **Change Field:**

25. If Digroup D is being added as Mode 1, continue this procedure at Step **26**. Otherwise, continue this procedure at Step **34**.
26. Type and enter **34**

    Response: Cursor at DIGROUP D MODE attribute.
27. Type and enter **UNCONC**

    Response: **Change Field:**
28. Type and enter **35**

    Response: Cursor at DIGROUP D EQSTAT attribute.
29. Type and enter **G**

    Response: **Change Field:**
30. Type and enter **36**

    Response: Cursor at DIGROUP D CLI attribute.
31. Type and enter information from work order form.

    Response: **Change Field:**
32. Type and enter **37**

    Response: Cursor at DIGROUP D IFAC attribute.
33. Type and enter information from work order form.

    Response: **Change Field:**
34. If Dual Digroup CD is being added as Mode 2, continue this procedure at Step **35**. Otherwise, continue this procedure at Step **49**.
35. Type and enter **30**

    Response: Cursor at DIGROUP C MODE attribute.
36. Type and enter **CONC**

    Response: **Change Field:**
37. Type and enter **31**

    Response: Cursor at DIGROUP C EQSTAT attribute.
38. Type and enter **G**

    Response: **Change Field:**
39. Type and enter **32**

    Response: Cursor at DIGROUP C CLI attribute.
40. Type and enter information from work order form.

    Response: **Change Field:**
41. Type and enter **33**

    Response: Cursor at DIGROUP C IFAC attribute.

42. Type and enter information from work order form.

    Response: **Change Field:**

43. Type and enter **34**

    Response: Cursor at DIGROUP D MODE attribute.

44. Type and enter **CONC**

    Response: **Change Field:**

45. Type and enter **35**

    Response: Cursor at DIGROUP D EQSTAT attribute.

46. Type and enter **G**

    Response: **Change Field:**

47. Type and enter **36**

    Response: Cursor at DIGROUP D CLI attribute.

48. Type and enter information from work order form.

    Response: **Change Field:**

49. Hit CARRIAGE RETURN.

    Response: **Enter Update, Change, Validate, Screen#, or Print:**

50. Type and enter **U**

    Response: **updating ....FORM UPDATED**
    REMOTE TERMINAL page displayed.

51. Type and enter **<**

    Response: **18.0 SM & REMOTE TERMINALS VIEWS** page displayed.

9.92.9 If Provided, Inhibit Protection Line Switching for Those RT Facilities Associated with the Added Digroups

1. At MCC, type and enter the following message:

   INH:RT,FAC=a-b,PROT

   Where: a = Site identification number (SID)
   b = RT DS1 FAC (B, C, and/or D)

   Response: **INH RT FAC = a-b PROT COMPLETED**

2. Repeat Step **1** for each RT DS1 FAC associated with an added digroup.

9.92.10 At the MCC, Verify that Added Digroups Are in the GROW State

1. Att MCC, type and enter **188yzz,x**

   Where: y = IDCU number
   zz = RT number
   x = SM number.

9.92.11 Update Added Digroups from Grow to Operational

1. Type and enter **15**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

2. Type and enter **U**

   Response: **REMOTE TERMINAL** page displayed. Cursor at SM attribute.

3. Using the selected work order form as a guide, again type and enter the indicated values for each KEY attribute.

```
1. SM          ____  INPUT APPROPRIATE DATA
   UNIT TYPE   IDCU
3. UNIT NUMBER _
4. RT EX       __
```

   Response: System completes remainder of view.
   Enter Update, Change, Validate, Screen#, or Print:

4. Type and enter **C**

   Response: **Change Field:**

5. Type and enter **27**

   Response: Cursor at TR008 DIGROUP B EQSTAT attribute.

6. If digroup B is being added, update EQSTAT from **G** to **O** and hit RETURN, else just hit RETURN.

   Response: **Change Field:**

7. Type and enter **31**

   Response: Cursor at TR008 DIGROUP C EQSTAT attribute.

8. If digroup C is being added, update EQSTAT from **G** to **O** and hit RETURN, else just hit RETURN.

   Response: **Change Field:**

9. Type and enter **35**

   Response: Cursor at TR008 DIGROUP D EQSTAT attribute.

10. If digroup D is being added, update EQSTAT from **G** to **O** and hit RETURN, else just hit RETURN.

    Response: **Change Field:**

11. Hit CARRIAGE RETURN.

    Response: **Enter Update, Change, Validate, Screen#, or Print:**

12. Type and enter **U**

    Response: **updating ....FORM UPDATED**
    REMOTE TERMINAL page displayed.

13. Type and enter **<**

    Response: **18.0 SM & REMOTE TERMINALS VIEWS** page displayed.

9.92.12 Verify Added Digroup Information in the Data Base

1. Type and enter **15**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

2. Type and enter **R**

   Response: **REMOTE TERMINAL** page displayed. Cursor at SM attribute.

3. Using the selected work order form as a guide, again type and enter the indicated values for each KEY attribute.

```
1. SM          ____  INPUT APPROPRIATE DATA
   UNIT TYPE   IDCU
3. UNIT NUMBER _
4. RT EX       __
```

   Response: System completes remainder of view.
   Enter Review, Change-Insert, Validate, Screen#, or Print:

4. Verify data is consistent with the work order form.

   Comment: Correct errors using terminal in the update mode.

5. Type and enter **q**

   Response: **REMOTE TERMINAL** page displayed.

6. Type and enter **<**

   Response: **18.0 SM & REMOTE TERMINALS VIEWS** page displayed.

7. Type and enter **q**

   Response: **RCV-196 COMPLETED**

9.92.13 Restore IFACs to Service

1. At MCC, type and enter the following command for each IFAC terminating an added digroup or dual digroup:

   RST:IFAC=a-b-c;

   Where: a = SM number
   b = IDCU number
   c = IFAC number.

   Response: **RST IFAC a b c COMPLETED**

9.92.14 At the MCC, Verify Added Digroups Are Active

1. At MCC, go to MCC Page 188xyy,z

   Where: x = IDCU number
   yy = RT number
   z = SM number.

9.92.15 Verify the IFACs Associated with Added Digroups Are ACTIVE with No Carrier Group Alarms (CGA) Present

1. At MCC, type and enter **187z,x**

   Where: z = IDCU number
   x = SM number.

9.92.16 *If Inhibited*, Allow Protection Line Switch on the RT Facility Associated with the Added Digroup

1. At MCC, type and enter the following command for each RT FAC terminating an added digroup or dual digroup:

   ALW:RT,FAC=a-b,PROT;

   Where: a = Site identification number
   b = RT DS1 FAC (B, C, and/or D).

9.92.17 Turn Off Fault Recovery Reports

1. At MCC, type and enter the following command:

   ALW:BREVC,SM=a;

   Where: a = SM number.

   Response: **OK**

2. At MCC, type and enter the following command:

   CLR:PERPH,SM=a,VERBOSE;

   Where: a = SM number.

3. At MCC, type and enter the following command:

   CHG:LPS:MSGCLS=ALL,FROMBKUP;

   Response: **OK**

9.92.18 Backup Office-Dependent Data

Note: Prior to the response, there will be completed responses for each SM, the administrative module (AM), and the communication module processor (CMP) if applicable.

1. At MCC, type and enter the following command:

   BKUP:ODD;

   Response: **BKUP ODD COMPLETED**

9.92.19 Return Routine Exercise to Normal

1. At MCC, type and enter the following command:

   ALW:REX,SM=a;

   Where: a = SM inhibited.

   Response: **OK**

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

9.93 PERFORM IDCU TR008 RT DELETION OF DIGROUPS PROCEDURE—5E8 AND LATER

PROCEDURE

9.93.1 Prepare Integrated Digital Carrier Unit (IDCU) TR008 RT for Deletion of Digroups

This procedure assumes that all line and trunk assignments have been removed from the digroups to be deleted before the deletion occurs.

At the end of this procedure, execute the IDCU facility (IFAC) degrowth procedure (9.83) for those IFACs which were associated with the deleted digroups.

9.93.2 Verify and Set Initial Conditions

1. At master control center (MCC), observe Summary Status Area for a SYS NORM indication.
2. If a SYS NORM indication is not obtained, type and enter the following command:

   OP:SYSSTAT;
3. At MCC, type and enter the following command:

   OP:OFFNORM,SM=a;

   Where: a = Switching module (SM) number.

   Comment: Evaluate system response to determine if system status is acceptable to continue. Specific attention is required for areas that can cause SM isolation or service impact during this RT growth procedure. Correct any deficiency as required.

Warning: Steps 4 through 6 are recommended but not required. Local practices should control their use. If routine exercise (REX) is inhibited, it must be allowed at the conclusion of this growth procedure.

4. At MCC, type and enter the following command:

   INH:REX,SM=a;

   Where: a = Number of the SM growing the RT.
5. At MCC, type and enter the following command:

   OP:REXINH;

   Response: The inhibit status will be printed. Verify this printout.
6. At MCC, type and enter the following command:

   BKUP:ODD;

   Response: **BKUP ODD COMPLETED**

9.93.3 Allow Peripheral Fault Recovery Messages To Be Printed

1. At MCC, type and enter the following command:

   SET:PERPH,SM=a,VERBOSE;

   Where: a = SM number.

2. At MCC, type and enter the following command:

   INH:BREVC,SM=a;

   Where: a = SM number.

3. At MCC, type and enter the following command:

   CHG:LPS,MSGCLS=pfr_mon,PRINT=ON,LOG=OFF;

9.93.4 Inhibit Protection Line Switch

1. At MCC, if the RT has a protection line, type and enter the following command for those facilities associated with the deleted digroups:

   INH:RT,FAC=a-b,PROT;

   Where: a = Site Identification (SID) number
   b = RT DS1 FAC (B, C, and/or D).

9.93.5 Unconditionally Remove IFACs from Service

1. At MCC, type and enter the following command for each of the IFACs which connect the digroups to be degrown to the IDCU:

   RMV:IFAC=a-b-c,UCL;

   Where: a = SM number
   b = IDCU number
   c = IFAC number.

   Response: **RMV IFACILITY a b c COMPLETED**

9.93.6 Update TR008 RT Digroup Information in the Data Base

1. Select and prepare terminal for recent change and verify activities.

   Reference: **Procedure 9.18**

2. Type and enter **18.15**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

3. Type and enter **U**

   Response: **REMOTE TERMINAL** page displayed. Cursor at SM attribute.

4. Select the completed work order Form 18.15 indicating what digroups are to be deleted. This form should have the KEY attributes listed in the following display:

```
1. SM           ____ INPUT APPROPRIATE DATA
   UNIT TYPE    IDCU
3. UNIT NUMBER _
4. RT EX        __
```

5. Using the selected work order form as a guide, type and enter the indicated values for each KEY attribute.

   Response: System completes remainder of view.
   Enter Update, Change, Validate, Screen#, or Print:

6. Type and enter **C**

   Response: **Change Field:**

7. If Digroup B is being deleted, continue this procedure at Step **8**. Otherwise, continue this procedure at Step **16**.

8. Type and enter **26**

   Response: Cursor at DIGROUP B MODE attribute.

9. Type and enter **'**

   Response: **Change Field:**

10. Type and enter **27**

    Response: Cursor at DIGROUP B EQSTAT attribute.

11. Type and enter '

    Response: **Change Field:**

12. Type and enter **28**

    Response: Cursor at DIGROUP B CLI attribute.

13. Type and enter '

    Response: **Change Field:**

14. Type and enter **29**

    Response: Cursor at DIGROUP B IFAC attribute.

15. Type and enter '

    Response: **Change Field:**

16. If Digroup C is being deleted, continue this procedure at Step **17**. Otherwise, continue this procedure at Step **25**.

17. Type and enter **30**

    Response: Cursor at DIGROUP C MODE attribute.

18. Type and enter '

    Response: **Change Field:**

19. Type and enter **31**

    Response: Cursor at DIGROUP C EQSTAT attribute.

20. Type and enter '

    Response: **Change Field:**

21. Type and enter **32**

    Response: Cursor at DIGROUP C CLI attribute.

22. Type and enter '

    Response: **Change Field:**

23. Type and enter **33**

    Response: Cursor at DIGROUP C IFAC attribute.

24. Type and enter '

    Response: **Change Field:**

25. If Digroup D is being deleted, continue this procedure at Step **26**. Otherwise, continue this procedure at Step **34**.
26. Type and enter **34**

    Response: Cursor at DIGROUP D MODE attribute.
27. Type and enter '

    Response: **Change Field:**
28. Type and enter **35**

    Response: Cursor at DIGROUP D EQSTAT attribute.
29. Type and enter '

    Response: **Change Field:**
30. Type and enter **36**

    Response: Cursor at DIGROUP D CLI attribute.
31. Type and enter '

    Response: **Change Field:**
32. Type and enter **37**

    Response: Cursor at DIGROUP D IFAC attribute.
33. Type and enter '

    Response: **Change Field:**
34. If Dual Digroup CD is being deleted, continue this procedure at Step **35**. Otherwise, continue this procedure at Step **49**.
35. Type and enter **30**

    Response: Cursor at DIGROUP C MODE attribute.
36. Type and enter '

    Response: **Change Field:**
37. Type and enter **31**

    Response: Cursor at DIGROUP C EQSTAT attribute.
38. Type and enter '

    Response: **Change Field:**
39. Type and enter **32**

    Response: Cursor at DIGROUP C CLI attribute.

40. Type and enter '

    Response: **Change Field:**

41. Type and enter **33**

    Response: Cursor at DIGROUP C IFAC attribute.

42. Type and enter '

    Response: **Change Field:**

43. Type and enter **34**

    Response: Cursor at DIGROUP D MODE attribute.

44. Type and enter '

    Response: **Change Field:**

45. Type and enter **35**

    Response: Cursor at DIGROUP D EQSTAT attribute.

46. Type and enter '

    Response: **Change Field:**

47. Type and enter **36**

    Response: Cursor at DIGROUP D CLI attribute.

48. Type and enter '

    Response: **Change Field:**

49. Hit CARRIAGE RETURN.

    Response: **Enter Update, Change, Validate, Screen#, or Print:**

50. Type and enter **U**

    Response: **updating ....FORM UPDATED**
    REMOTE TERMINAL page displayed.

51. Type and enter **<**

    Response: **18.0 SM & REMOTE TERMINALS VIEWS** page displayed.

9.93.7 Verify TR008 RT Data

1. Type and enter **15**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

2. Type and enter **R**

   Response: **REMOTE TERMINAL** page displayed. Cursor at SM attribute.

3. Using the selected work order form as a guide, again type and enter the indicated values for each KEY attribute.

```
1. SM           ____  INPUT APPROPRIATE DATA
   UNIT TYPE    IDCU
3. UNIT NUMBER  _
4. RT EX        __
```

   Response: System completes remainder of view.
   Enter Review, Change-Insert, Validate, Screen#, or Print:

4. Verify data is consistent with the work order form.

   Comment: Correct errors using terminal in the update mode.

5. Type and enter **q**

   Response: **REMOTE TERMINAL** page displayed.

6. Type and enter **<**

   Response: **18.0 SM & REMOTE TERMINALS VIEWS** page displayed.

7. Type and enter **q**

   Response: **RCV-196 COMPLETED**

9.93.8 Verify RT Digroup Degrowth on MCC Pages

1. At MCC, go to MCC Page 188xyy,z.

   Where: x = IDCU number
   yy = RT number
   z = SM number.

2. Verify that the removed digroups are not displayed.

9.93.9 Turn Off Fault Recovery Reports

1. At MCC, type and enter the following command:

   ALW:BREVC,SM=a;

   Where: a = SM number.

   Response: **OK**

2. At MCC, type and enter the following command:

   CLR:PERPH,SM=a,VERBOSE;

   Where: a = SM number.

3. At MCC, type and enter the following command:

   CHG:LPS:MSGCLS=ALL,FROMBKUP;

   Response: **OK**

9.93.10 Backup Office-Dependent Data

Note: Prior to the response, there will be completed responses for each SM, the administrative module (AM), and the communication module processor (CMP) if applicable.

1. At MCC, type and enter the following command:

   BKUP:ODD;

   Response: **BKUP ODD COMPLETED**

9.93.11 Return Routine Exercise to Normal

1. At MCC, type and enter the following command:

   ALW:REX,SM=a;

   Where: a = SM inhibited.

   Response: **OK**

STOP. YOU HAVE COMPLETED THIS PROCEDURE. GO TO PROCEDURE 9.83 TO DELETE THE IFACS ASSOCIATED WITH DEGROWN DIGROUPS.

9.94 PERFORM IDCU TR008 MODE I TO MODE II CONVERSION—5E8 AND LATER

PROCEDURE

9.94.1 Verify and Set Initial Conditions

1. At master control center (MCC), observe Summary Status Area for a SYS NORM indication.
2. If a SYS NORM indication is not obtained, type and enter the following command:

   OP:SYSSTAT;

3. At MCC, type and enter the following command:

   OP:OFFNORM,SM=a;

   Where: a = Switching module (SM) number.

   Comment: Evaluate system response to determine if system status is acceptable to continue. Specific attention is required for areas that can cause SM isolation or service impact during this integrated digital carrier unit (IDCU) remote terminal (RT) conversion procedure. Correct any deficiency as required.

***Warning:* Steps 4 and 5 are recommended but not required. Local practices should control their use. If routine exercise (REX) is inhibited, it must be allowed at the conclusion of this growth procedure.**

4. At MCC, type and enter the following command:

   INH:REX,SM=a;

   Where: a = Number of the SM converting the IDCU RT.

5. At MCC, type and enter the following command:

   OP:REXINH;

   Response: The inhibit status will be printed. Verify this printout.

9.94.2 Backup Office-Dependent Data, If Necessary

Note: Prior to the responses given, there will be completed responses for each SM and the application office-dependent data (ODD) of the administrative module (AM).

1. At MCC, type and enter the following command:

   BKUP:ODD,AM,CMP=0,NRODD=a[&&b],RODD=a;

   Where: a = SM or lower limit of range of SMs
   b = Upper limit of range of SMs.

   Responses: **BKUP ODD FULL AM COMPLETED**
   BKUP ODD CMP 0 COMPLETED
   BKUP ODD NRODD a[&&b] COMPLETED
   BKUP ODD RODD a COMPLETED
   BKUP ODD COMPLETED

   Note: Data base back up will take several minutes to complete.

9.94.3 Allow Peripheral Fault Recovery Messages To Be Printed

Note: The following command allows the messages for the units whose message class is set to be printed on the receive-only printer (ROP). They are also sent to the log file unless the **LOG=OFF** or **LOG OFF** option is used.

1. At MCC, type and enter the following command once for each of the message classes of the peripherals that exist on the SM where the degrowth is being done:

   CHG:LPS,MSGCLS=pfr_mon,PRINT=ON,LOG=OFF;

2. At MCC, type and enter the following command:

   SET:PERPH,SM=a,VERBOSE;

   Where: a = SM number.

3. At MCC, type and enter the following command:

   INH:BREVC,SM=a;

   Where: a = SM number.

9.94.4 Remove from Service IFACs Associated with RT Being Modified

Note: If the RT is equipped with protection line switching (PLS), remove the IFAC associated with the protection (PROT) first.

1. At MCC, type and enter the following command for each of the IDCU facilities (IFAC) associated with the RT being converted:

   RMV:IFAC=a-b-c,UCL;

   Where: a = SM number
   b = IDCU number
   c = IFAC number.

   Response: **RMV IFAC a b c COMPLETED**

9.94.5 Verify that IFACs Which Are Associated with the TR008 Being Modified Are OOS

1. At MCC, type and enter **187xyy,z**

   Where: x = IDCU number
   yy = RT number
   z = SM number.

9.94.6 Inhibit Protection Line Switching, If Provided, on all IFACs Associated with the RT Being Modified

Note: Inhibit protection line switching for the **P** RT DS1 FAC first.

1. At MCC, type and enter the following command:

   INH:RT,FAC=a-b,PROT;

   Where: a = Site identification (SID) number
   b = RT DS1 FAC number (A-D,P for TR008, and 1-28 for TR303).

   Response: **INH RT FAC = a-b PROT COMPLETED**

9.94.7 Change RT Hardware

Warning: This step may be service affecting.

1. RT vendor procedure - execute this step concurrently with the following step.
2. Refer to the appropriate vendor procedure for configuring the RT hardware for Mode II operation.

9.94.8 Update TR008 RT from Mode I to Mode II

1. Select and prepare terminal for recent change and verify activities.

   Reference: **Procedure 9.18**

2. Type and enter **18.15**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

3. Type and enter **U**

   Response: **REMOTE TERMINAL** page displayed. Cursor at SM attribute.

4. Select the completed work order Form 18.15 for the identified RT. This form should have the KEY attributes listed in the following display:

```
1. SM          ____  INPUT APPROPRIATE DATA
   UNIT TYPE   IDCU
3. UNIT NUMBER _
4. RT EX       __
```

5. Using the selected work order form as a guide, type and enter the indicated values for each KEY attribute.

   Response: System completes remainder of view.
   Enter Update, Change, Validate, Screen#, or Print:

6. Type and enter **C**

   Response: **Change Field:**

7. If Digroups A and B are being converted to Dual Digroup AB, continue this procedure at Step **8**. Otherwise, continue this procedure at Step **14**.
8. Type and enter **22**

   Response: Cursor at DIGROUP A MODE attribute.

9. Type and enter **CONC**

   Response: **Change Field:**

10. Type and enter **26**

    Response: Cursor at DIGROUP B MODE attribute.

11. Type and enter **CONC**

    Response: **Change Field:**

12. Type and enter **29**

    Response: Cursor at DIGROUP B IFAC attribute.

13. Type and enter '

    Response: **Change Field:**

14. If Digroups C and D are being converted to Dual Digroup CD, continue this procedure at Step **15**. Otherwise, continue this procedure at Step **21**.

15. Type and enter **30**

    Response: Cursor at DIGROUP C MODE attribute.

16. Type and enter **CONC**

    Response: **Change Field:**

17. Type and enter **34**

    Response: Cursor at DIGROUP D MODE attribute.

18. Type and enter **CONC**

    Response: **Change Field:**

19. Type and enter **37**

    Response: Cursor at DIGROUP D IFAC attribute.

20. Type and enter '

    Response: **Change Field:**

21. Hit CARRIAGE RETURN.

    Response: **Enter Update, Change, Validate, Screen#, or Print:**

22. Type and enter **U**

    Response: **updating ....FORM UPDATED**
    REMOTE TERMINAL page displayed.

23. Type and enter **<**

    Response: **18.0 SM & REMOTE TERMINALS VIEWS** page displayed.

9.94.9 Verify TR008 RT Data

1. Type and enter **15**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

2. Type and enter **R**

   Response: **REMOTE TERMINAL** page displayed. Cursor at SM attribute.

3. Using the selected work order form as a guide, again type and enter the indicated values for each KEY attribute.

```
1. SM           ____  INPUT APPROPRIATE DATA
   UNIT TYPE    IDCU
3. UNIT NUMBER _
4. RT EX        __
```

   Response: System completes remainder of view.
   Enter Review, Change-Insert, Validate, Screen#, or Print:

4. Verify data is consistent with selected work order form.

   Comment: Correct errors using terminal in the update mode.

5. Type and enter **q**

   Response: **REMOTE TERMINAL** page displayed.

6. Type and enter **<**

   Response: **18.0 SM & REMOTE TERMINALS VIEWS** page displayed.

7. Type and enter **q**

   Response: **RCV-196 COMPLETED**

9.94.10 Restore to Service IFACs Still Assigned to the Mode II RT

Note: If the RT is equipped with PLS, restore the IFAC associated with the protection (PROT) last.

1. At MCC, type and enter the following command:

   RST:IFAC=a-b-c;

   Where: a = SM number
   b = IDCU number
   c = IFAC number.

   Response: **RST IFAC a b c COMPLETED**

9.94.11 Allow Protection Line Switching, If Provided, on All IFACs Associated with the RT Being Modified

Note: Allow protection line switching for the **P** RT DS1 FAC last.

1. At MCC, type and enter the following command:

   ALW:RT,FAC=a-b,PROT;

   Where: a = SID number
   b = RT DS1 FAC number (A-D,P for TR008, and 1-28 for TR303).

   Response: **ALW RT FAC = a-b PROT COMPLETED**

9.94.12 Remove Unused IFACs from the Data Base

1. Select and prepare terminal for recent change and verify activities.

   Reference: **Procedure 9.18**

2. Type and enter **20.23**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

3. Type and enter **U**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed. Cursor at SM attribute.

4. Select the completed work order form 20.23 for the identified unused IFACs. This form should have the KEY attributes listed in the following display.

```
1. SM   ____   INPUT APPROPRIATE DATA
2. IDCU _
3. LSI  _
```

5. Using the completed work order form as a guide, type and enter the indicated values for each KEY attribute.

   Response: System completes remainder of view.
   Enter Update, Change, Validate, Screen#, or Print:

6. Type and enter **C**

   Response: **Change Field:**

7. Type and enter **4**

   Response: **Field 4: Row:**

8. Type and enter the row number of an IFAC being degrown.

   Response: Cursor at EQSTAT attribute of an IFAC.

9. Type and enter '

   Response: Cursor at PM GRP attribute of an IFAC.

10. Type and enter '

    Response: Cursor at FACILITY ID attribute of an IFAC.

11. Type and enter '

    Response: Cursor at SUP MTHD attribute of an IFAC.

12. Type and enter '

    Response: Cursor at PUB43801 attribute of an IFAC.

13. Type and enter '

    Response: **Field 4: Row:**

14. For each remaining IFAC to be degrown on this loop-side interface (LSI), execute Steps **8** through **13**. When no IFACs remain to be removed, continue this procedure at Step **15**.

15. Hit CARRIAGE RETURN.

    Response: **Change Field:**

16. Hit CARRIAGE RETURN.

    Response: **Enter Update, Change, Validate, Screen#, or Print:**

17. Type and enter **U**

    Response: **updating ....FORM UPDATED**
    FACILITY EQUIPMENT (IFAC) page displayed.

18. If unused IFACs need to be deleted on the other IDCU LSI, then repeat Steps **4** through **17** for those IFACs. Otherwise, continue this procedure with Step **19.**

19. Type and enter **<**

    Response: **20.0 SM PACK & SUBPACK VIEWS** page displayed.

9.94.13 Verify Removal of Unused IFACs from the Data Base

1. Type and enter **23**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

2. Type and enter **R**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed. Cursor at SM attribute.

3. Using the selected work order form 20.23 as a guide, again type and enter the indicated values for each KEY attribute.

```
1. SM   ___   INPUT APPROPRIATE DATA
2. IDCU _
3. LSI  _
```

   Response: System completes remainder of view.
   Enter Review, Change-Insert, Validate, Screen#, or Print:

4. Verify data is consistent with selected work order form.

   Comment: Correct errors using terminal in the update mode.

5. If unused IFACs were removed on the other IDCU LSI, then repeat Steps **3** and **4** for those IFACs. Otherwise, continue this procedure with Step **6.**

6. Type and enter **q**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed.

7. Type and enter **<**

   Response: **20.0 SM PACK & SUBPACK VIEWS** page displayed.

8. Type and enter **q**

   Response: **RCV-196 COMPLETED**

9.94.14 Perform DS1 Cross Connects

1. **Installation function** - Remove cross connects for unused IFACs.

9.94.15 Verify RT Conversion on MCC Pages

1. At MCC or trunk and line work station, type and enter **188yxx,z**

   Where: y = IDCU number
   xx = RT number
   z = SM number.

2. Verify that the RT is displayed properly at the MCC.

9.94.16 Backup Office-Dependent Data

Note: Prior to the responses given, there will be completed responses for the SM and the application ODD of the AM.

1. At MCC, type and enter the following command:

   BKUP:ODD,AM,CMP=0,NRODD=a;

   Where: a = Number of the SM converting the IDCU RT.

   Response: **BKUP ODD FULL AM COMPLETED**
   BKUP ODD CMP 0 COMPLETED
   BKUP ODD NRODD a COMPLETED
   BKUP ODD COMPLETED

   Note: Data base back up will take several minutes to complete.

9.94.17 Inhibit Additional Fault Recovery Message Printing

Note: Wait 30 minutes before starting this procedure, and monitor the ROP for "ANALYSIS ONLY", "REPT TRBL", and "PFR" messages that may implicate this hardware or associated hardware. If any messages are seen, take appropriate corrective maintenance action and wait again. When no messages are seen, continue with this procedure.

1. At MCC, type and enter the following command:

   ALW:BREVC,SM=a;

   Where: a = SM number.

2. At MCC, type and enter the following command:

   CLR:PERPH,SM=a,VERBOSE;

   Where: a = SM number.

3. At MCC, type and enter the following command:

   CHG:LPS,MSGCLS=ALL,FROMBKUP;

9.94.18 Return Routine Exercise to Normal

1. At MCC, type and enter the following command:

   ALW:REX,SM=a;

   Where: a = SM inhibited.

   Response: **OK**

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

9.95 PERFORM IDCU TR008 MODE II TO MODE I CONVERSION—5E8 AND LATER

PROCEDURE

9.95.1 Prepare IDCU TR008 RT for Conversion

The additional integrated digital carrier unit (IDCU) facilities (IFAC) which are to be associated with the TR008 remote terminal (RT) must be in the growth state.

Reference: **Procedure 9.84**

9.95.2 Verify and Set Initial Conditions

1. At master control center (MCC), observe Summary Status Area for a SYS NORM indication.
2. If a SYS NORM indication is not obtained, type and enter the following command:

   OP:SYSSTAT;

3. At MCC, type and enter the following command:

   OP:OFFNORM,SM=a;

   Where: a = Switching module (SM) number.

   Comment: Evaluate system response to determine if system status is acceptable to continue. Specific attention is required for areas that can cause SM isolation or service impact during this IDCU RT conversion procedure. Correct any deficiency as required.

Warning: Steps 4 and 5 are recommended but not required. Local practices should control their use. If routine exercise (REX) is inhibited, it must be allowed at the conclusion of this growth procedure.

4. At MCC, type and enter the following command:

   INH:REX,SM=a;

   Where: a = Number of the SM converting the IDCU RT.

5. At MCC, type and enter the following command:

   OP:REXINH;

   Response: The inhibit status will be printed. Verify this printout.

9.95.3 Backup Office-Dependent Data, If Necessary

Note: Prior to the responses given, there will be completed responses for each SM and the application office-dependent data (ODD) of the administrative module (AM).

1. At MCC, type and enter the following command:

   BKUP:ODD,AM,CMP=0,NRODD=a[&&b],RODD=a;

   Where: a = SM or lower limit of range of SMs
   b = Upper limit of range of SMs.

   Response: **BKUP ODD FULL AM COMPLETED**
   BKUP ODD CMP 0 COMPLETED
   BKUP ODD NRODD a[&&b] COMPLETED
   BKUP ODD RODD a COMPLETED
   BKUP ODD COMPLETED

   Note: Data base back up will take several minutes to complete.

9.95.4 Allow Peripheral Fault Recovery Messages To Be Printed

Note: The following command allows the messages, for the units whose message class is set, to be printed on the receive-only printer (ROP). They are also sent to the log file unless the **LOG=OFF** or **LOG OFF** option is used.

1. At MCC, type and enter the following command once for each of the message classes of the peripherals that exist on the SM where the growth is being done:

   CHG:LPS,MSGCLS=pfr_mon,PRINT=ON,LOG=OFF;

2. At MCC, type and enter the following command:

   SET:PERPH,SM=a,VERBOSE;

   Where: a = SM number.

3. At MCC, type and enter the following command:

   INH:BREVC,SM=a;

   Where: a = SM number.

9.95.5 Update IFACs from Grow to Operational

1. Select and prepare terminal for recent change and verify activities.

   Reference: **Procedure 9.18**

2. Type and enter **20.23**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

3. Type and enter **U**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed. Cursor at SM attribute.

4. Select the completed work order form 20.23 for the identified RT. This form should have the KEY attributes listed in the following display.

```
1. SM   ___    INPUT APPROPRIATE DATA
2. IDCU _
3. LSI  _
```

5. Using the selected work order form as a guide, type and enter the indicated values for each KEY attribute.

   Response: System completes remainder of view.
   Enter Update, Change, Validate, Screen#, or Print:

6. Type and enter **C**

   Response: **Change Field:**

7. Type and enter **4**

   Response: **Field 4:** **Row:**

8. Type and enter row number of an IFAC being grown.

   Response: Cursor at EQSTAT attribute of an IFAC.

9. Type and enter **O**

   Response: Cursor at PM GRP attribute of an IFAC.

10. Hit CARRIAGE RETURN.

    Response: Cursor at FACILITY ID attribute of an IFAC.

11. Hit CARRIAGE RETURN.

    Response: Cursor at SUP MTHD attribute of an IFAC.

12. Hit CARRIAGE RETURN.

    Response: Cursor at PUB43801 attribute of an IFAC.

13. Hit CARRIAGE RETURN.

    Response: **Field 4: Row:**

14. For each remaining IFAC to be grown on this loop-side interface (LSI), execute Steps **8** through **13**. When no IFACs remain to be grown, continue this procedure at Step **15**.

15. Hit CARRIAGE RETURN.

    Response: **Change Field:**

16. Hit CARRIAGE RETURN.

    Response: **Enter Update, Change, Validate, Screen#, or Print:**

17. Type and enter **U**

    Response: **updating ....FORM UPDATED**
    FACILITY EQUIPMENT (IFAC) page displayed.

18. If IFACs need to be added on the other IDCU LSI, then repeat Steps **4** through **17** for those IFACs. Otherwise, continue this procedure with Step **19**.

19. Type and enter **<**

    Response: **20.0 SM PACK & SUBPACK VIEWS** page displayed.

9.95.6 Verify Facility Data

1. Type and enter **23**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

2. Type and enter **R**

   Response: **FACILITY** page displayed. Cursor at SM attribute.

3. Using the selected work order form as a guide, again type and enter the indicated values for each KEY attribute.

```
1. SM   ____   INPUT APPROPRIATE DATA
2. IDCU _
3. LSI  _
```

   Response: System completes remainder of view.
   Enter Review, Change-Insert, Validate, Screen#, or Print:

4. Verify data is consistent with the selected work order form.

   Comment: Correct errors using terminal in the update mode.

5. If IDCU Facilities were added on the other IDCU LSI, then repeat Steps **3** and **4** for those IFACs. Otherwise, continue this procedure with Step **6**.

6. Type and enter **q**

   Response: **FACILITY EQUIPMENT (IFAC)** page displayed.

7. Type and enter **<**

   Response: **20.0 SM PACK & SUBPACK VIEWS** page displayed.

8. Type and enter **q**

   Response: **RCV-196 COMPLETED**

9.95.7 Perform DS1 Cross Connects

1. **Telephone Company function.**

9.95.8 Remove from Service IFACs Associated with RT Being Modified

Note: If the RT is equipped with protection line switching, remove the IFAC associated with the protection (PROT) first.

1. At MCC, type and enter the following command for each of the IFACs associated with the RT being converted:

   RMV:IFAC=a-b-c,UCL;

   Where: a = SM number
   b = IDCU number
   c = IFAC number.

   Response: **RMV IFAC a b c COMPLETED**

9.95.9 Verify IFACs Associated with the TR008 Being Modified Are OOS

1. At MCC, type and enter **187xyy,z**

   Where: x = IDCU number
   yy = RT number
   z = SM number.

9.95.10 Inhibit Protection Line Switching, If Provided, on All IFACs Associated with the RT Being Modified

Note: Inhibit protection line switching for the **P** RT DS1 FAC first.

1. At MCC, type and enter the following command:

   INH:RT,FAC=a-b,PROT;

   Where: a = SID number
   b = RT DS1 FAC number (A-D,P for TR008, and 1-28 for TR303).

   Response: **INH RT FAC = a-b PROT COMPLETED**

9.95.11 Change RT Hardware

Warning: This step may be service affecting.

1. RT vendor procedure - execute this step concurrently with the following step.
2. Refer to the appropriate vendor procedure for configuring the RT hardware for Mode I operation.

9.95.12 Update TR008 RT from Mode II to Mode I

1. Select and prepare terminal for recent change and verify activities.

   Reference: **Procedure 9.18**

2. Type and enter **18.15**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

3. Type and enter **U**

   Response: **REMOTE TERMINAL** page displayed. Cursor at SM attribute.

4. Select the completed work order Form 18.15 for the identified RT. This form should have the KEY attributes listed in the following display:

```
1. SM           ____   INPUT APPROPRIATE DATA
   UNIT TYPE    IDCU
3. UNIT NUMBER  _
4. RT EX        __
```

5. Using the selected work order form as a guide, type and enter the indicated values for each KEY attribute.

   Response: System completes remainder of view.
   Enter Update, Change, Validate, Screen#, or Print:

6. Type and enter **C**

   Response: **Change Field:**

7. If Dual Digroup AB are being converted to Digroups A and B, continue this procedure at Step **8**. Otherwise, continue this procedure at Step **14**.

8. Type and enter **22**

   Response: Cursor at DIGROUP A MODE attribute.

9. Type and enter **UNCONC**

   Response: **Change Field:**

10. Type and enter **26**

    Response: Cursor at DIGROUP B MODE attribute.

11. Type and enter **UNCONC**

    Response: **Change Field:**

12. Type and enter **29**

    Response: Cursor at DIGROUP B IFAC attribute.

13. Type and enter information from work order form.

    Response: **Change Field:**

14. If Dual Digroup CD are being converted to Digroups C and D, continue this procedure at Step **15**. Otherwise, continue this procedure at Step **21**.

15. Type and enter **30**

    Response: Cursor at DIGROUP C MODE attribute.

16. Type and enter **UNCONC**

    Response: **Change Field:**

17. Type and enter **34**

    Response: Cursor at DIGROUP D MODE attribute.

18. Type and enter **UNCONC**

    Response: **Change Field:**

19. Type and enter **37**

    Response: Cursor at DIGROUP D IFAC attribute.

20. Type and enter information from work order form.

    Response: **Change Field:**

21. Hit CARRIAGE RETURN.

    Response: **Enter Update, Change, Validate, Screen#, or Print:**

22. Type and enter **U**

    Response: **updating ....FORM UPDATED**
    REMOTE TERMINAL page displayed.

23. Type and enter **<**

    Response: **18.0 SM & REMOTE TERMINALS VIEWS** page displayed.

9.95.13 Verify TR008 RT Data

1. Type and enter **15**

   Response: **Enter Data Base Operation**
   I=Insert, R=Review, U=Update, D=Delete:

2. Type and enter **R**

   Response: **REMOTE TERMINAL** page displayed. Cursor at SM attribute.

3. Using the selected work order form as a guide, again type and enter the indicated values for each KEY attribute.

```
1. SM          ____ INPUT APPROPRIATE DATA
   UNIT TYPE   IDCU
3. UNIT NUMBER _
4. RT EX       __
```

   Response: System completes remainder of view.
   Enter Review, Change-Insert, Validate, Screen#, or Print:

4. Verify data is consistent with the selected work order form.

   Comment: Correct errors using terminal in the update mode.

5. Type and enter **q**

   Response: **REMOTE TERMINAL** page displayed.

6. Type and enter **<**

   Response: **18.0 SM & REMOTE TERMINALS VIEWS** page displayed.

7. Type and enter **q**

   Response: **RCV-196 COMPLETED**

9.95.14 Restore IFACs to Service

1. At MCC, type and enter the following command:

   RST:IFAC=a-b-c;

   Where: a = SM number
   b = IDCU number
   c = IFAC number.

   Response: **RST IFAC a b c COMPLETED**

9.95.15 Allow Protection Line Switching, If Provided, on All IFACs Associated with the RT Being Modified

Note: Allow protection line switching for the **P** RT DS1 FAC last.

1. At MCC, type and enter the following command:

   ALW:RT,FAC=a-b,PROT;

   Where: a = SID number
   b = RT DS1 FAC number (A-D,P for TR008, and 1-28 for TR303).

9.95.16 Verify RT Conversion on MCC Pages

1. At MCC, type and enter **188yxx,z**

   Where: y = IDCU number
   xx = RT number
   z = SM number.

2. Verify that the RT is displayed properly at the MCC.

9.95.17 Backup Office-Dependent Data

Note: Prior to the responses given, there will be completed responses for the SM and the application ODD of the AM.

1. At MCC, type and enter the following command:

   BKUP:ODD,AM,CMP=0,NRODD=a;

   Where: a = Number of the SM converting the IDCU RT.

   Response: **BKUP ODD FULL AM COMPLETED**
   BKUP ODD CMP 0 COMPLETED
   BKUP ODD NRODD a COMPLETED
   BKUP ODD COMPLETED

   Note: Data base back up will take several minutes to complete.

9.95.18 Inhibit Additional Fault Recovery Message Printing

Note: Wait 30 minutes before starting this procedure, and monitor the ROP for "ANALYSIS ONLY", "REPT TRBL", and "PFR" messages that may implicate this hardware or associated hardware. If any messages are seen, take appropriate corrective maintenance action and wait again. When no messages are seen, continue with this procedure.

1. At MCC, type and enter the following command:

   ALW:BREVC,SM=a;

   Where: a = SM number.

2. At MCC, type and enter the following command:

   CLR:PERPH,SM=a,VERBOSE;

   Where: a = SM number.

3. At MCC, type and enter the following command:

   CHG:LPS,MSGCLS=ALL,FROMBKUP;

9.95.19 Return Routine Exercise to Normal

1. At MCC, type and enter the following command:

   ALW:REX,SM=a;

   Where: a = SM inhibited.

   Response: **OK**

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

ROUTINE OPERATIONS AND MAINTENANCE PROCEDURES

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10. REMOTE OFFICE TEST LINE

10.1 GENERAL

This section describes the functions and equipment of the remote office test line (ROTL) for the 5ESS® switch.

The ROTL is a feature that allows interoffice trunk testing automatically from a Centralized Automatic Reporting on Trunks (CAROT) system. The CAROT system is a computerized system that automatically accesses and tests trunks for a maximum of 14 offices simultaneously. The 5ESS switch ROTL supports the following capabilities:

- Transmission tests—100, 102, and 105 test lines
- Connection appraisal—100, 102, and 105 test lines
- Security callback
- Trunk make-busy and restore
- Trunk status request
- Balance and long-term test.

Note: The 100, 102, and 105 test lines are at the far end of the trunk. Transmission test calls and connection appraisal calls are placed via ROTL toward the distant test lines. The 5ESS switch ROTL supports test calls toward the indicated test lines by providing trunk access and seizure, outpulsing of the digits necessary to reach the test line, and a tone detection capability which recognizes when the indicated test line has answered the test call.

The same transmission tests performed by CAROT/ROTL can be requested locally with the "TST:TRK" input message and with poke commands at the trunk and line work station (TLWS).

The ROTL functions are answering calls from CAROT controller, receiving information in the form of multifrequency (MF) digits, and causing trunks to be accessed and attached to the responder for transmission measurement.

The 5ESS switch should be equipped with at least two ROTL ports. It has the ability to park incoming ROTL calls by returning test progress tone back to the CAROT system while ROTL waits for the resources needed to complete the calls. The tone detector that listens for recycling is the resource that is unavailable. The number of ROTL calls that can be parked is determined by the number of ports assigned to ROTL. The number of ROTL calls that can be served simultaneously is determined by the lesser of the number of ports and the number of transmission test function (TTF) circuits available to ROTL. The minimum TTF configuration contains one measurement circuit pack (TN304). It is capable of supporting one ROTL call. Some of the circuits on this circuit pack are shared with other test features and contention can occur. The most heavily used resource is the responder and ROTL is given a higher priority than other users of this resource. Additional measurement circuit packs may be added in a global digital service unit (DSU) group if unequipped circuit pack locations in the unit are available. Each TN304 circuit pack will accommodate one ROTL call. Two TTFs can be assigned in an switching module (SM) if the SM is equipped with two global digital service units (GDSUs). Any number of SMs can be equipped with TTFs. To make use of the additional TTFs, ROTL ports would have to be assigned across the respective switching modules.

Other ROTL functions are determining the test call instructions, seizing the trunk, and causing outpulsing over the trunk under test to the distant office.

10.2 EQUIPMENT

In the 5ESS switch, the ROTL hardware functions are provided by the TTF which is a group of circuit packs in the global DSU. These circuit packs are not provided exclusively for ROTL, but ROTL utilizes the capability provided by this hardware to perform its functions. The ROTL software uses the TTF to perform the following functions:

- Detect tones from CAROT (not MF-priming digits)
- Perform call disposition analysis for the trunk under test
- Perform measurements, encode the results, and send them to CAROT
- Send a detailed error code to CAROT in response to a ring forward
- Internally connect a digital path from the trunk under test to the CAROT path.

The TTF accesses voice-frequency channels only through the bit stream as provided over the peripheral interface data bus (PIDB). Direct control resides within the module controller of the module in which it is located, and such control is exercised by software interaction over the peripheral interface control bus (PICB).

10.3 TRUNK CONDITIONING

The CAROT Test Center can perform the following functions:

- Perform a security callback
- Remove trunks from service
- Restore trunks to service
- Request the status of a trunk or group of trunks [in-service or out of service (locked out or disabled)].

These functions are requested by the test center via MF commands.

10.3.1 TRUNK MAKE-BUSY AND RESTORE

When the 5ESS switch system software receives a request to make a trunk remote maintenance-busy or a request to restore the trunk to service, the response is as follows:

a. A determination is made whether or not authorization has been established for the make-busy or restore request. If authorization has not been established (that is, a security callback has been performed), a 120-interruptions per minute (IPM) low tone is sent to the control location.

b. If authorization has been established, the trunk identification and the action request (make-busy or restore trunk) is passed to the software controlling trunk status AT&T 3B20D computer memory.

c. When the trunk status has been updated, a message is returned to the ROTL and a message is printed in the 5ESS switch. The printed message lists the action taken.

d. The ROTL then returns a proper tone response to the CAROT controller. Refer to Table 10-1 for proper tone responses.

The make-busy and restore request is handled by the 5ESS switch software and an MF receiver that is shared with call processing.

10.3.2 SECURITY CALLBACK

To prevent unauthorized remote locations from taking trunks out of service, several conditions must be satisfied prior to affecting the condition of a trunk. First, the remote location must identify itself as being on an authorized list. The identification (ID) digit, supplied in the priming, must correspond to a valid entry in the office dependent data (ODD) relation "ROTLCB". Second, the 5ESS switch must place a call to a prestored directory number and connect the tone detector to the callback circuit. Third, the remote location must transmit the unlocking frequency (1004 Hz) to the ROTL over the callback circuit. Fourth, the ROTL (tone detector) must recognize the unlocking frequency and must declare that authorization has been established. The authorization list states whether a particular test center is authorized to exceed the automatic maintenance limit (AML). Currently, only manual test centers are allowed to exceed the AML. The AML limits the total number of trunks in a trunk group which can be in an out-of-service condition at any one time. Once a security callback is performed, it is effective until the caller disconnects.

10.3.3 TRUNK STATUS REQUESTS

In addition to conditioning trunks, any test center can request the maintenance-busy status of either a single trunk or a trunk group. A single-trunk request is followed by the trunk identity (trunk group and member), and it asks if that trunk is currently available to customer traffic. A group request asks if any trunk in the group is maintenance-busy, and if so, if there are more trunks than the AML permits maintenance-busy in the group. The proper tone responses are summarized in Table 10-2.

10.4 TESTS PERFORMED BY ROTL

10.4.1 GENERAL

The 5ESS switch ROTL is capable of making test calls to 100-type, 102-type, and 105-type far-end transmission test lines. The transmission measuring circuits perform loss and noise measurements, and self-checks on an originating and terminating basis. Far-to-near transmission loss and near-end noise measurements are made in conjunction with the 100-type test line. Only far-to-near loss measurements are made with the 102-type test line. The 105-type test line provides 2-way transmission loss and noise measurements, noise with tone, gain slope, and return-loss measurements.

The test center (Figure 10-1) originates a call to the ROTL office via a Direct Distance Dialing (DDD) network connection. The call is processed with the central office switching equipment in the same manner as a regular call. When the ROTL has been seized, it returns a 2225-Hz test progress tone to the test center. When the 5ESS switch is prepared to receive test priming information (an MF receiver is connected), the test progress tone is turned off. This is an indication to the test center to transmit priming information to ROTL. This priming information includes the type of action to be performed. Any error detected in the priming information will result in 120 IPM being returned by ROTL. When the action specified is a transmission test, the priming information also includes the trunk under test identity and the far-end test line (FETL) digits. Refer to Table 10-3 for a summary of ROTL priming information. At the conclusion of each action (either successful or unsuccessful), ROTL can be given a recycle command (1 second of 1300 Hz). The ROTL will return to the state of preparing to receive digits. The ROTL will send the test progress tone and when it is ready to receive a new command, the test progress tone will terminate. At the conclusion of all testing, CAROT sends a drop access command (2 seconds of 1300 Hz) which causes ROTL to disconnect. If CAROT disconnects, ROTL will also disconnect and release all resources associated with the call.

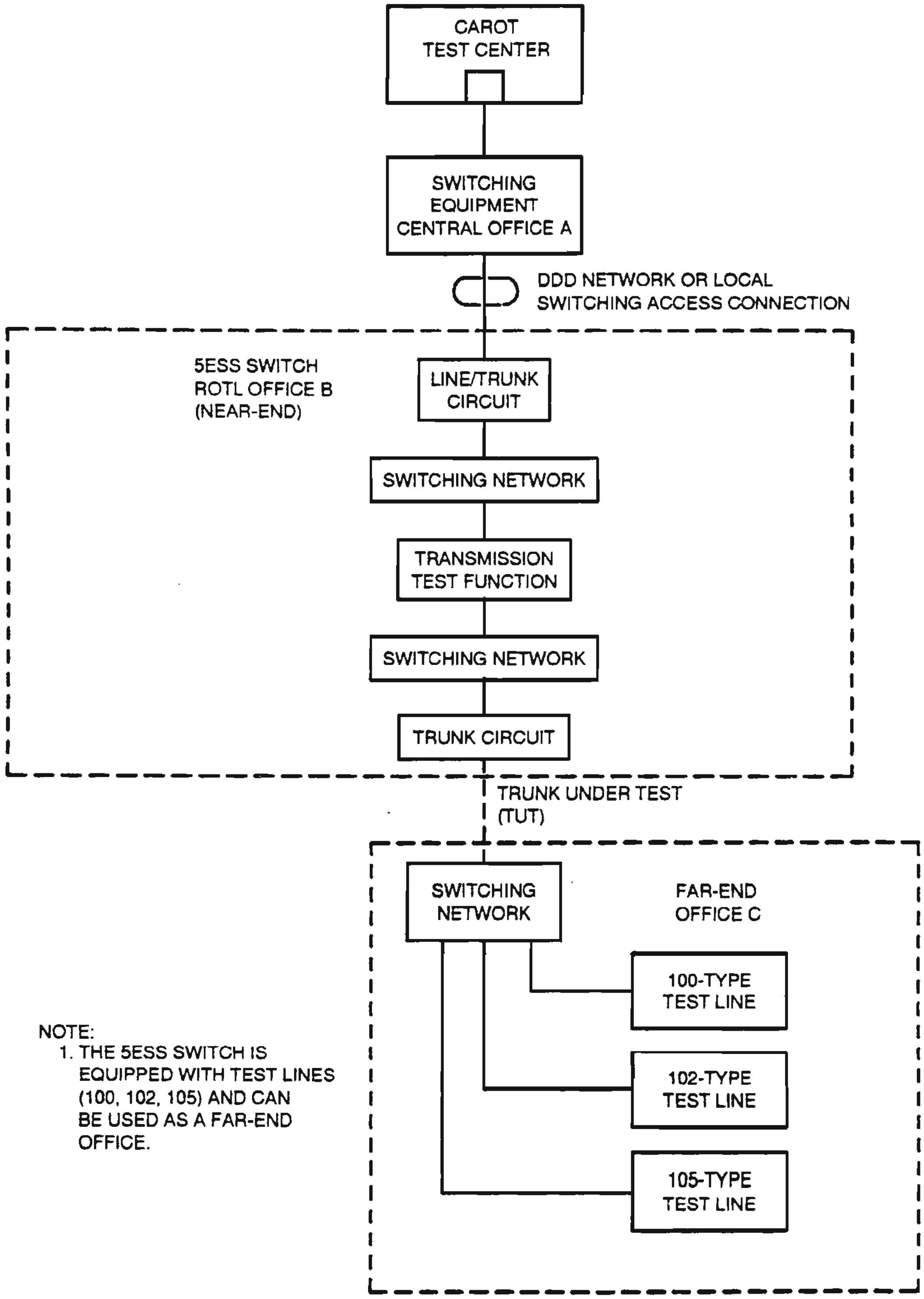


Figure 10-1 — 5ESS Switch ROTL Application

10.4.2 REMOTE OFFICE RESPONDER TESTING

10.4.2.1 Transmission Tests (100-Type Test Line)

This test is a 1-way (far-to-near) loss and/or noise transmission test to a 100-type test line in the far-end office. The test center transmits MF test priming information to the 5ESS switch which is interpreted by the ROTL program. The ROTL program decodes the priming information and connects a TTF tone detector to the trunk under test (TUT) and reserves a TTF responder. If either of these resources are not available, ROTL will queue them. When the TUT is seized, a 0.5-second burst of test progress tone is sent to CAROT by ROTL. The FETL number is outpulsed exactly as received in the priming. The far-end office connects to a 100-type test line. Then, the far-end office transmits a nominal 1004-Hz for a nominal 5.5 seconds to the ROTL office. This tone is followed by a quiet termination. The tone is detected by ROTL and another 0.5-second burst of test progress tone is sent from ROTL to CAROT. If prior to the 1004-Hz tone any audible rings or other signals (low tone) are heard by ROTL, it will send low tone to CAROT that follows the envelope of the received signal. Reorder or busy tone will appear to be heard directly from the far end by CAROT, but actually the tones have been regenerated. If the test progress tone is heard instead of the expected milliwatt tone, reorder will be sent to CAROT. The near-end responder is activated and a third 0.5-second burst of test progress tone is sent to CAROT. This tone is the signal that CAROT can start making measurements. If the responder in the near-end office is requested by the test center to make a 1000-Hz loss measurement, the near-end responder measures the received signal from the trunk under test. The responder then generates a measurement data signal consisting of a 1200-Hz guard tone and a 2200-Hz data tone followed by a 1200-Hz trailing guard tone. The duration of the data tone is proportional to the amplitude of the received signal. The measurement data signal is forwarded to the test center. Then, the ROTL office sends a 1000-Hz signal to the test center for as long as the 1000-Hz signal is present from the far-end office. The near-end responder resets when the tone is turned off by the far-end office to await additional MF commands from the test center. The ROTL will continue to wait for measurement commands until one of the following is received:

- CAROT disconnects
- Recycle
- Release
- Release/make-busy.

The maximum elapsed time is 3 minutes.

10.4.2.2 Transmission Tests (102-Type Test Line)

This test is a 1-way loss test (far-to-near) to a 102-type test line in the far-end office. It follows a pattern similar to the 100-type test line. The test center transmits MF test priming information to the 5ESS switch which is interpreted by the ROTL program as a request to connect to the trunk under test. The terminating 102-type test line directory number is then outpulsed to the far-end office over the trunk under test. Unlike the 100 test, no TTF responder is reserved at this point. When the test line is seized at the far-end office, the 102-type test line transmits 1000 ±10 Hz at 0 dBm to the ROTL office. When this tone is detected, the second burst of test progress tone is sent to CAROT as in the 100-type test line call. At this point, ROTL requests a TTF responder. The third burst of test progress tone is started when the responder is requested, terminated, available, and ready to make measurements. These types of test lines interrupt the signal periodically at approximately 10-second intervals. The responder in the ROTL office makes a loss measurement only when the tone is present so that the interruption in the 1000 Hz from the 102-type test line does not cause any error in the measurement.

10.4.3 RESPONDER-TO-RESPONDER TESTING

10.4.3.1 Transmission Tests (105-Type Test Line)

10.4.3.1.1 General

Responders provide 2-way transmission loss and noise measurements and a variety of other measurements of the trunk under test. The test center controls the measurements of trunks between the near-end office and a far-end office containing the 105-type test line. All measurement results on the trunk under test are sent back to the test center in the form of frequency-shift data signals.

The 105 call follows a pattern similar to the 100-type and 102-type test line calls. When the trunk under test has been seized, the first burst of test progress tone is sent and the directory number of the far-end 105-type test line is outpulsed. The far-end sends back test progress tone while it is queuing for a responder. The test progress tone is terminated when the far-end responder is ready. The termination of this test progress tone causes the second burst of test progress tone to be sent to CAROT by ROTL. After the connection has been established and the far-end responder has been connected, ROTL makes a bid for the near-end responder at the ROTL office. The third burst of test progress tone is sent to CAROT while waiting on a responder as in the 102-type test line call. When the responder is available, control is given to the CAROT Test Center. The test center controls the action of the responder.

10.4.3.1.2 Loss Measurements

Loss measurements are initiated when the test center sends a 2/6-MF command signal, which requests loss measurements, to the ROTL responder and to the far-end responder.

The ROTL responder sends the 1200-Hz guard tone to the test center. Simultaneously, the far-end responder sends a 1004-Hz (1-mw) test tone over the trunk under test. This tone level is to be measured by the ROTL responder.

The ROTL responder measures the 1-kHz signal received from the far-end responder. It converts the measured loss to a 2200-Hz data tone. Then, the ROTL responder transmits the 2200-Hz data tone to the test center immediately following the 1200-Hz guard tone. The 2200-Hz data tone is followed by a second 1200-Hz guard tone. The ROTL responder also transmits a 1000-Hz (1-mw) test tone to the far-end responder after the far-to-near transmission test has been made. The 1000-Hz test tone transmitted to the far end from the ROTL responder allows the near-to-far loss on the trunk under test to be measured.

The far-end responder measures the level of the 1000-Hz signal from the ROTL responder. The received signal is converted to a 2200-Hz data signal which is transmitted back toward the test center along with guard tone on both sides of the data signal. The value of the measurement is indicated by the length of time that the responder sends 2200 Hz. The relationship between the measurement and length of the 2200-Hz signal is logarithmic. The ROTL responder detects the 1200-Hz guard tone. When the guard tone is detected, the trunk under test is bridged to the access connection. The access connection routes the measurement results to the test center. After completing the loss measurements, the responders return to a signal-receive state awaiting further command signals from the test center.

10.4.3.1.3 Noise Measurements

Noise measurements are initiated when the test center sends the appropriate 2/6-MF command signals to the ROTL responder and far-end responder.

The far-end responder terminates the trunk under test. The ROTL responder measures the near-end noise, converts the measurements into a 2200-Hz data signal, and transmits this signal (as guard-data-guard) to the test center. The test center then sends a second 2/6-MF signal to the responders.

The far-end responder recognizes the MF signal and measures the far-end noise. During the measurement, the ROTL responder provides a termination for the trunk under test. The far-end responder transmits a 1200-Hz guard tone, followed by the 2200-Hz data signal, and then 1200-Hz guard tone toward the test center. The ROTL responder detects the 1200-Hz guard tone and bridges (cuts through) the trunk under test to the access connection, so that the guard-data-guard (2200-Hz data signal) from the far-end responder can be sent to the test center. The responders then return to a signal-receive state awaiting further MF command signals from the center.

The test center causes self-checks to be made on both near-end (simulated) and far-end responders for loss, noise, and other tests that are requested. The results of the self-checks are transmitted back to the test center. These tests consist of the following:

- Return-loss measurement
- Noise with tone measurement
- Gain-slope measurements.

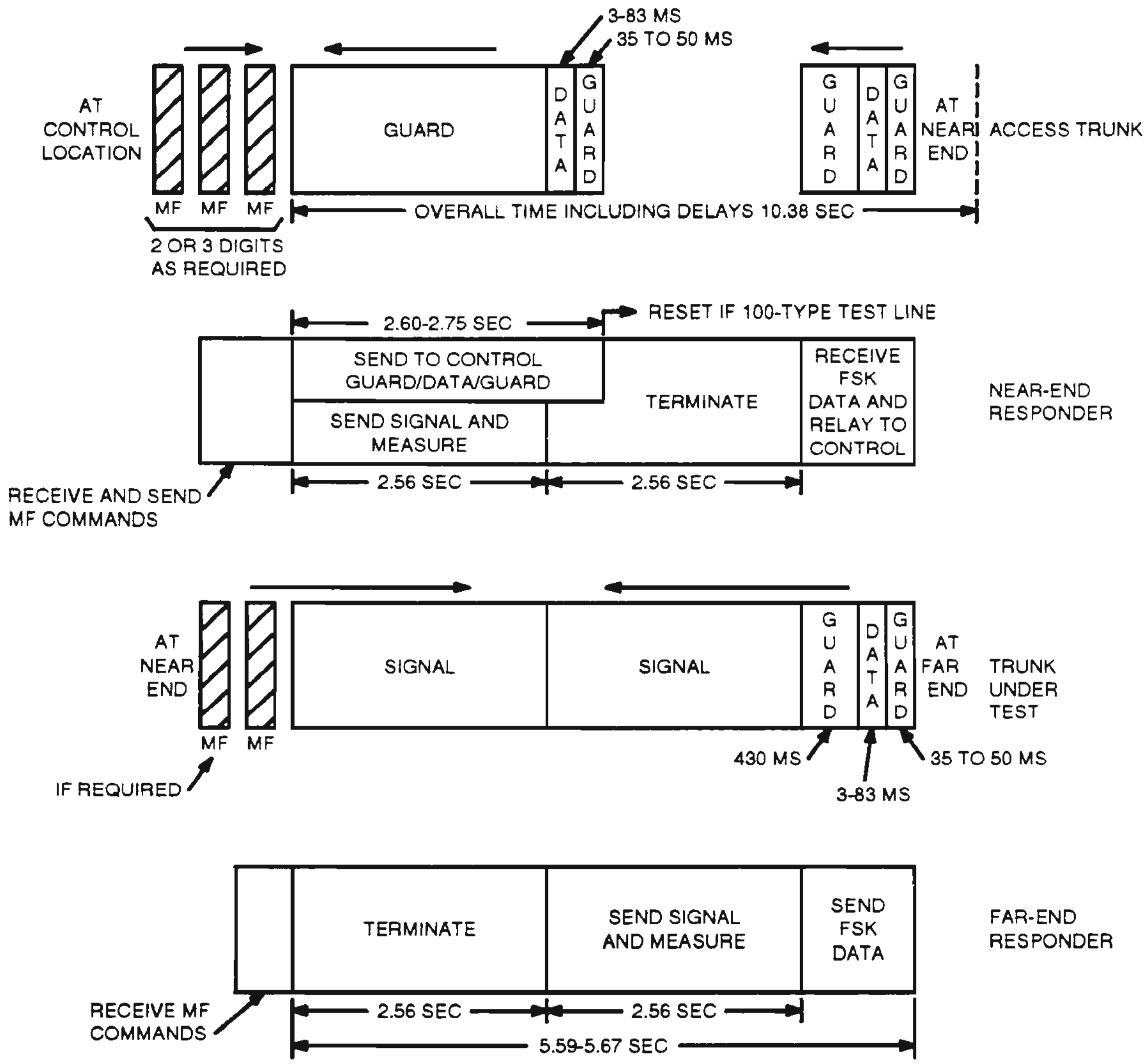
The return-loss measurement is initiated when the near-end responder receives 2 or 3 MF digits as a request for a return-loss measurement. It relays the layer 2 (and 3, if required) MF digit(s) which denote the test desired to the far-end responder (Table 10-4). The far-end responder applies quiet termination for 2.56 seconds upon receipt of the MF command. The three return-loss tests are: echo return-loss, singing return-loss, and singing return-high loss. All three tests have the same timing.

As soon as the near-end responder receives the test request, it starts sending a guard tone (1200 Hz) to the control location. A guard tone is sent for 2.6 to 2.75 seconds. At the same time, the near-end starts transmitting the proper signal to the far end and also measuring the return-loss. The "return-loss" signal is not a signal sent by the far-end responder but is the portion of the transmitted signal which is reflected back. The transmit-measure process lasts for 2.56 seconds. Note that the 2.56-second quiet termination provided by the far-end responder will not be in exact synchronism with the near-end quiet termination due to transmission delays.

After the near-end responder completes the measurement, it sends data (2200 Hz) to the control location. The duration of the data signal is proportional to the return-loss measurement. Then the near-end sends a guard tone for 25 to 50 milliseconds. As soon as the near-end completes the measurement, it also applies a quiet termination to the trunk under test. This quiet termination lasts for 2.56 seconds. At the end of the 2.56-second quiet termination interval, the near-end is ready to receive data from the far-end. It will wait for data for 2.56 seconds, and if none is received in that period, the near-end resets. If data is received, the near end relays it to the control location, and at the end of the signal, resets.

After the far-end receives the test request (MF) digit, it applies a quiet termination for 2.56 seconds as previously described. It then transmits the test signal (according to which return-loss test is being performed) and measures the return signal for 2.56 seconds. It then transmits the measurement to the near-end in the guard-data-guard format as described for the near-end responder. The far-end responder then resets.

Note that the time intervals as shown in (Figure 10-2) for the far- and near-end responders are not synchronous. Transmission delays are not shown.



NOTE:
1. TRANSMISSION DELAYS NOT SHOWN

Figure 10-2 — Timing Interval for Return Loss Measurements

The noise with tone measurement is the same as the loss measurement described in Part 10.4.3.1.2 of this section except for the following:

- The received tone is processed in the noise measurement path with the addition of a 1000-Hz band rejection filter.
- The transmitted tone from the far-end responder toward the near end is always 1004 Hz at -16 dBm. This is the first action that the far-end responder takes after satisfactorily receiving a command to make the noise with tone measurement.

The gain slope measurements involve making loss measurements at the following three frequencies and levels:

- 404 Hz at -16 dBm
- 1004 Hz at -16 dBm
- 2804 Hz at -16 dBm.

The three frequencies are used to measure the bandwidth of the trunk which is the range of frequencies that the trunk can transmit.

Table 10-4 summarizes the ROTL responder interpretation of the MF signals from CAROT or other locations. The column labeled "MF Signals" shows the sum of two frequencies. The power of the two tones is measured as though the tones were continuous.

There are four columns called "LAYER" numbered 0 through 3. These indicate the state of the MF receiver in the responder. The first two layers, 0 and 1, are used only for a near-end responder interfacing with a ROTL. The purpose of layer 0 is to inform the responder (in the ROTL office only) that the impedance of the trunk under test is 600 ohms, that the office is arranged for testing at test point 0, and that the far-end test line is code 100, 102, or 105. This information is transmitted via the first MF pulse received in the 0 layer of the MF receiver. When the responder in the ROTL office is in the 0 or 1 layer, no MF information is forwarded to the far end of the trunk under test.

The release MF signal in any layer causes the responder to signal the test line that the trunk under test should be released. If the two pulses are received in succession, then the responder will signal the ROTL that the trunk under test should be made busy and then released. A delay of 200 ms is begun, after the receipt of the first 900 Hz plus 1300 Hz MF signal, to check for the occurrence of another 900 Hz plus 1300 Hz MF signal within that interval.

The layer MF pulse causes the MF detector in the responder to go to the next higher state (for example, from layer 0 to layer 1). When an MF signal other than RL or layer is received with the MF receiver in layer 0, it must shift to layer 2 so that the next MF will be interpreted as a test instruction and be transmitted to the far end of the trunk under test. Note that the far-end responder is initially in layer 2. Layers 0 and 1 signals are not transmitted to the far end.

When the responder is used with a code 105-type test line or a miniresponder is used at the terminating end of the trunk under test, the initial state of the MF receiver must be layer 2. This is necessary because the first MF pulse will contain test rather than conditioning information.

At the conclusion of a transmission test, CAROT normally sends a release digit (MF 5 digit) to accomplish the following:

- Release the test equipment
- Return the trunk to its prior test condition
- Recycle ROTL in preparation for a new set of priming.

The CAROT can also send a release/make-busy command (two MF 5 digits). This command recycles ROTL but leaves the trunk in an out-of-service/maintenance/CAROT (OOS/MTCE/CAROT) state. The CAROT can also send a recycle command (1 second, 1300 Hz) which has the same effect as the release. The recycle command can be given at any time and is also used at the conclusion of each nontransmission test command to recycle ROTL. The ROTL responses to the above three commands are summarized in Tables 10-5 and 10-6.

10.4.4 BALANCE AND LONG-TERM TEST

The terminal balance function of the ROTL involves connecting a tone-and-quiet source to a selected outgoing trunk from the ROTL central office. Upon receipt of the same information as a transmission test, except for a different request code, a call is originated by the ROTL over the selected trunk. When the call terminates, a 1000-Hz start test tone burst is expected by ROTL. After it occurs, the tone-and-quiet source is attached to the trunk in the ROTL office. This source provides 10 seconds of 1004-Hz (0 dBm) tone followed by a 30-minute period of quiet balance termination during which balance measurements or adjustments can be made at the far end of the CAROT trunk or line. The test is terminated by receiving a disconnect on the trunk under test. After 60 seconds of quiet termination, the ROTL is no longer associated with this test, and a recycle signal from the test center will have no effect. Prior to this, a recycle will be accepted.

10.4.5 CONNECTION APPRAISAL TEST

The Connection Appraisal feature provides for conducting a transmission test on a connection setup from the 5ESS switch office to a test line in a distant office with normal routing and trunk selection. More than one trunk may be used in a built-up connection. The directory number of the far-end transmission test line is included in the priming information. When priming is complete, a test line in a far-end office is dialed up. When the test line is seized, the test sequence proceeds in a manner similar to a routine transmission test.

For a connection appraisal test, the ROTL originates a call in a subscriber-like manner by using digits contained in the priming information sent from the control location. The sequence of signals is identical to that for trunk transmission tests with the following variations:

- Call processing trunk hunting mechanisms are used to determine the trunk to be used for the call.
- There is no monitoring for supervisory hits.
- The overall connection, instead of a particular trunk, is measured.
- There is no make-busy capability.

10.5 OFFICE DEPENDENT DATA REQUIREMENTS

Office dependent data is required in the 5ESS switch for the ROTL feature. The CAROT accesses ROTL through the DDD network by dialing a directory number assigned to ROTL which will terminate at test software in the 5ESS switch. Since a directory number is assigned to ROTL, the ROTL directory number must be associated with a unique route index. A route index defines how a call is to be routed. The route index associated with the ROTL directory number routes to a trunk group of ROTL test ports. The ROTL test ports must be assigned in the switching modules with transmission test functions.

The 5ESS switch data base must contain the callback directory number of the CAROT and any directory number of authorized manual location(s) for the ROTL security callback. The ROTL security call is described in Part 10.3.2 of this section. This list of authorized locations must be defined in the 5ESS switch. The list also contains the authority for each directory number (none, manual, or automatic). The "none" maintenance test mode inhibits any and all callers from a given CAROT from changing the trunk status of the tested trunks. All "manual" mode locations have the authority to remove trunks from service allowing the automatic maintenance limit to be exceeded. The "auto" maintenance test mode indicates that the CAROT or control location can automatically remove trunks from service if they fail specific tests. The automatic maintenance limit with the "auto" mode cannot be exceeded. The automatic maintenance limit is established by the operating telephone company customer and states the number of trunks that can be removed from service.

The screening index and digit analysis selector that will be used for ROTL security callback and connection appraisal calls must be defined. The screening index and digit analysis selector are accessed during digit analysis of ROTL calls.

The assignment of office dependent data is made via the initial office data administration run or recent change menus and view. The data assignments required for ROTL consist of the following:

- A trunk group and trunk group member for ROTL test ports
- Route index to the trunk group of ROTL test ports
- Line class code for ROTL
- ROTL test line
- Digit analysis selector and screen index data
- CAROT code and security callback data.

The data assignments in the 5ESS switch can be made via the video display terminal, TELETYPE® 4025BS teletypewriter terminal, VT*-100 video terminal, or equivalent, by using the interactive process provided by the recent change menus and views. With systems using program documentation standards commands, use the following input messages to access the recent change menus and views.

- RCV:MENU:APPRC!—5E1(1A) software release
- RCV:MENU:APPRC;PRINT!—5E1(2) and later software releases.

With systems using the man-machine language (MML) commands [5E1(2) and later software releases], use RCV:MENU,DATA APPRC,PRINT; to access the recent change menus and views. Refer to the 5ESS Input Message Manual [AT&T 235-600-700 (formerly IM-5D000-01)] for further details.

The recent change view transition procedures differ depending on the software release in the office. If you are not familiar with the procedures for going from one view to another, refer to the appropriate section for further details concerning the recent change menus and views. The appropriate documents are listed in the REFERENCES paragraph of this section.

The recent change views that are necessary to make the data assignments for ROTL and examples showing data assignments are as follows:

- TRUNK GROUPS—TRUNK GROUP VIEW (View 5.1) (Figure 10-3)
- TRUNKS—GROUPS AND MEMBER VIEW (View 5.5) (Figure 10-4)
- ROUTING AND CHARGING—ROUTE INDEX VIEW (View 10.2) (Figure 10-5)
- LINE MISC-LINE CLASS CODE VIEW (View 4.1) (Figure 10-6)
- LINES-PBX DIRECT INWARD DIALING AND TEST VIEW (View 1.5) (Figure 10-7)
- MISC-OFFICE PARAMETERS VIEW (View 8.1) (Figure 10-8)
- MISC-REMOTE OFFICE TEST LINE VIEW (View 14.2) (Figure 10-9).

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10.6 REFERENCES

The following documents may be consulted for additional information:

- ***AT&T 235-600-700:*** Input Message Manual—5ESS Switch (formerly IM-5D000-01)
- ***AT&T 235-600-750:*** Output Message Manual—5ESS Switch (formerly OM-5D000-01)
- ***AT&T 235-080-100:*** 5ESS Switch Translation Guide (formerly TG-5)
- ***AT&T 235-118-200:*** Recent Change Procedures—Menu Mode—5E2(1) and later Software Releases—5ESS Switch
- ***AT&T 235-118-201:*** Recent Change Procedures—Batch Release—5E2(1) and later Software Releases—5ESS Switch
- ***AT&T 235-118-202:*** Recent Change Procedures—Text Interface—5E2(1) and later Software Releases—5ESS Switch

```
SCREEN 1 OF 4                5ESS SWITCH
                             TRUNK GROUP

 *1. TGN          ____       #15. IAPT         _
  4. CLCI GRP ID  _______     16. INSEP        ___
 #5. TRK DIR      _____       17. RMK          ______________
 #6. HUNT TYPE    ____        18. FAR END NPA  ___
  7. SCR          ____        19. INPLS        ________
  8. GLARE YLD    _           20. OUTPLS       ________
  9. DAS          __          21. MODULE       ___
#10. TRK CLASS    _______     22. BRCS         _
 11. CARRIER ID   ___        #23. NCD SCRN     _________
 12. INC TNDWNK   _           24. ORIG LATA    __
 13. FREE ANS     _
 14. ATTTN        ___
```

Figure 10-3 — Example of Trunk Group Assignments (Sheet 1 of 4)

```
SCREEN 2 OF 4            5ESS SWITCH
                         TRUNK GROUP

    ANNC TRUNKS      35. GL ANN TGN ___
26. ANNC CYCL _      36. BILLING DN ________________
27. BARGE IN  _      37. CUTTHRU    _    48. CAMAQ       _
                     39. VALNPA     ___  49. DIR CON DN  _____
    OPERATOR TRUNKS  40. VALNXX1    ___  50. BUSY LAMP   ____
28. OUTPL REQ _      41. VALNXX2    ___  51. MK BUSY KEY ____
29. AUDIBLE   _      42. VALNXX3    ___  52. FGB BILL    _
30. SIGNAL    _____  43. VALNXX4    ___  53. CMC         _
31. FREE TERM _      44. VALNXX5    ___  54. BLK NO ANI  _
32. INIT      _      45. VALNXX6    ___  55. ATT BILL    _
33. FINAL     _      46. VALNXX7    ___  56. CMC ID      _
34. TSPS TYPE _____  47. VALNXX8    ___
```

Figure 10-3 — Example of Trunk Group Assignments (Sheet 2 of 4)

```
SCREEN 3 OF 4            5ESS SWITCH
                         TRUNK GROUP

     VERIFY ONLY
57. GRP SIZ   ____
58. ACT SIZ   ____
59. SATELLITE _
60. TERM SFG  _
```

Figure 10-3 — Example of Trunk Group Assignments (Sheet 3 of 4)

```
SCREEN 4 OF 4            5ESS SWITCH
                         TRUNK GROUP
WARNING: These fields will update all members in the group if
not left blank or if "CHange" fields are marked "Y". The data
displayed are fefault values and does not reflect existing data.

61. TRANS CLASS     __    69. STOPGO      _ 77. SUPV      ___
62. CH TRAN CLASS   _     70. CH STOPGO   _ 79. ANI       _
63. IDLE STATE      ___   71. HOLD BUSY   _ 80. CH ANI    _
64. CH IDLE STATE   _     72. CH HOLD BUSY _
65. IN START DIAL   ___   73. SATELLITE   _
66. CH IN START     _     74. CH SATELLITE _
67. OUT START DIAL  ____  75. TRF SAMPLE  _ 81. START MBR ___
68. CH OUT START    _     76. CH TRF SAMP _ 82. END MBR   ___
```

Figure 10-3 — Example of Trunk Group Assignments (Sheet 4 of 4)

```
SCREEN 1 OF 2                5ESS SWITCH
                             TRUNK NUMBER

*1. TGN            ____     20. CGASPN        ________
*2. MEMB NBR       ____     21. HOLD BUSY     _
10. TEN            _____    22. SATELLITE     _
11. DEN            ______   23. TRF SAMPLE    _
12. LTP            ____     24. CAMOPTLK TEN  ______
13. CLCI TRK ID    ____     25. CAMOPTLK DN   _______
14. TRANS CLASS    __       26. ACTN          _
15. SUPV           ___      27. OTODPN1       _______
16. IDLE STATE     ___      28. OTODPN2       _______
17. IN START DIAL  _____    29. SLC OTODPN3   _______
18. OUT START DIAL ____     30. SLC OTODPN4   _______
19. STOPGO         _        35. BRCS          _
```

Figure 10-4 — Example of Trunk Group Member Assignments (Sheet 1 of 2)

```
SCREEN 2 OF 2                5ESS SWITCH
                             TRUNK MEMBER

36. AUTO        _
37. SLVLD SPN   ___________
38. ANI         _
```

Figure 10-4 — Example of Trunk Group Member Assignments (Sheet 2 of 2)

```
                             5ESS SWITCH
                        ROUTE INDEX (ROUTING)

*1. RTI         ____          12. LTDRI      _
*2. ETYP        _____         13. CSTLRI     _
 3. TGN         ____
*4. DIG DLTD    __
 5. PREF DIG    _____
#6. NEXT RTI    ____
 7. SIG PRO     ____
 8. ANI IND     _
 9. OVLAP IND   _
10. RT DES TYP  ________
11. RMK         ________________
```

Figure 10-5 — Example of Route Index Assignments

```
                              5ESS SWITCH
                            LINE CLASS CODE

*1. LCC         ___
*2. RAX         __
#3. SERVCL      ________
#4. TERM        ________
#5. SCR         ____
 6. LINESCRN    _
 7. DAS         __
#8. INSEP       ___
#9. DESEP       ___

11. RMK         _________________________
```

Figure 10-6 — Example of Line Class Code Assignments

```
                     5ESS SWITCH
               PBX-DID LINE (LINE ASSIGNMENT)

 *1. TN     ______     46. TSTCODE   ____
#12. PTY    _          48. TMK       _______________
#16. MFRI   _          49. TRC       _
#20. RAX    __         62. PCSRED    ____
#21. LCC    ___        63. CSRCOUNT  ___
 32. RTI    _____      64. MBDN      ___________
```

Figure 10-7 — Example of Test Assignments

```
SCREEN 1 OF 4                  5ESS SWITCH
                   OFFICE PARAMETERS (MISCELLANEOUS)

*1. OFFICE ID _____  13. IMPLD NPA ___        APT TESTING
 2. IMLT2     _      14. SPLIT OFC _         ___________
 3. EXSIG     _      15. PERC1SILC ____  20. HRSTART  __
 4. MANROUT   ___    16. PERC2SILC ____  21. MNSTART  __
 5. POTENT    _____  17. HOME NPA  ___   22. DURATION _
 6. TIMEZONE  ___    18. TD-WINDOW ___   23. RUNSUN   _
 7. DST       _      19. CCS       _     24. RUNMON   _
 8. CUTTRANS  _                          25. RUNTUE   _
 9. HOLIDAY   ___                        26. RUNWED   _
10. SES       ____                       27. RUNTHR   _
11. POFFLOSS  _                          28. RUNFRI   _
12. RING TOT  _____                      29. RUNSAT   _
```

Figure 10-8 — Example of Screen Index and Digit Analysis Selector Assignments (Sheet 1 of 4)

```
SCREEN 2 OF 4                      5ESS SWITCH
                      OFFICE PARAMETERS (MISCELLANEOUS)
 ALIT TESTING
 ____________            ______________________________________
30. ALITHRSTART   __       37. SST        _   44. LOCSUPV   _
31. ALITMNSTART   __       38. LOCANSW    _   45. TOLLSUPV  _
32. ALITDURATION  _        39. LOCABND    _   46. ICSUPV    _
33. LITRANGE      _        40. TOLLABND   _   47. ALLSUPV   _
34. LITTYPE       _______  41. SPECABND   _   48. AMAOPTION _____
                           42. ALLABND    _
TRK MAINT DA OPT           43. ICTERM     _
________________
35. SCR           ____
36. DAS           __
```

Figure 10-8 — Example of Screen Index and Digit Analysis Selector Assignments (Sheet 2 of 4)

```
SCREEN 3 OF 4                  5ESS SWITCH
                  OFFICE PARAMETERS (MISCELLANEOUS)

    EADAS/RMAS OPTIONS       PERM SIG & COIN          TOUCH TONE FRAUD
    __________________       _______________          ________________
49. EADASOPT          _    55. 5 MIN PST    __     62. ALLOW TTF      _
50. RMASOPT           _    56. VAR PST      ___    63. PRINT TTF      _
                           57. VAR INT      __     64. SIGI           _
    CAMA OPTIONS           58. COIN INT     __
    ____________                                       OPEN CKT TEST LINE
51. TRKTRCD1          _______  DIVISION OF REVENUE     __________________
52. TRKTRCD2          _______  ___________________ 65. TONE DUR       ___
53. TRKTRCD3          _______  59. DRON          _  66. OPEN INT       ___
54. TRKTRCD4          _______  60. DRHRLY        _
                               61. DRCOUNTTYPE   ____
```

Figure 10-8 — Example of Screen Index and Digit Analysis Selector Assignments (Sheet 3 of 4)

```
SCREEN 4 OF 4                  5ESS SWITCH
                   OFFICE PARAMETERS (MISCELLANEOUS)

   CI OPTIONS              ALARM REPORTS
   __________              _____________
67. CARRID       ___    70. REPORT SUMMARY      __
68. INC WINK     _

MULTIFREQ RINGING       COMMUNICATION MODULE
_________________       ____________________
69. REVMAN       _      71. SIDE 0          ___
                        72. SIDE 1          ___
                        73. CONV            _
```

Figure 10-8 — Example of Screen Index and Digit Analysis Selector Assignments (Sheet 4 of 4)

```
                        5ESS SWITCH
                  REMOTE OFFICE TEST LINE
*1. ROTL CODE    _
#2. ROTL DN      _____________
 3. ROTL MODE    ____
 4. CARRIER ID   ___
```

Figure 10-9 — Example of Control Location Assignments

TABLE 10-1
ROTL RESPONSE FOR MAKE-BUSY OR RESTORE

RESPONSE	CONDITION
Test Progress Tone-2225 Hz	Trunk made busy or restored.
Two Burst Test Progress Tone* (2225 Hz)	Trunk made busy and automatic maintenance limit has been exceeded.
60-IPM Low Tone	Request refused because automatic maintenance limit would be exceeded or trunk is traffic busy.
120-IPM Low Tone	Security call back for ROTL unlock was not successful.
* Each tone and quiet separation period is 520 ± 80 ms.	

TABLE 10-2
ROTL RESPONSE FOR TRUNK OR TRUNK GROUP STATUS REQUEST

RESPONSE	CONDITION
Two Burst Test Progress Tone* (2225 Hz)	Some trunks in group are made busy, but automatic maintenance limit has not been reached.
60-IPM Low Tone	Individual Trunk - Trunk out of service.
60-IPM Low Tone	Trunk Group - The number of trunks in the group out of service at or above the automatic maintenance limit.
120-IPM Low Tone	Priming information error.
Test Progress Tone-2225 Hz	Individual Trunk - Trunk in service.
Test Progress Tone-2225 Hz	Trunk Group - All trunks in group in service.
* Each tone and quiet separation period is 520 ± 80 ms.	

TABLE 10-3
ROTL PRIMING INFORMATION

ROTL USAGE			DIGITS TRANSMITTED TO ROTL MF RECEIVER 1	2	3	4	. . . .	24 (max)
Transmission Test		100-type	KP*	0	0	MODIFIER	Trunk Group (4) Trunk Member (4)	Far-End Test Line Number‡ + ST† (≤ 11 digits)
		102-type	KP	0	2			
		105-type	KP	0	5			
	Override Made Busy	100-type	KP	1	0		Trunk Identifier†	
		102-type	KP	1	2			
		105-type	KP	1	5			
Balance and Long Term Tests			KP	4	0			
	Override Made Busy		KP	4	1			
Make Busy and Restore	Make Trunk Remote Busy		KP	5	0		Trunk Identifier†	ST
	Restore Trunk Made Remote Busy		KP	5	1			
Trunk Status Request	Individual Trunk		KP	5	2			
	Trunk Group by Trunk		KP	5	3			
	Trunk Group by Group		KP	5	4		Trunk Group Identifier + ST	
Callback Unlock Request			KP	5	5	ID	ST	
Connection Appraisal	100-type		KP	6	0	Far-End Test Line Number§ +ST (≤ 15 digits)		
	102-type		KP	6	2			
	105-type		KP	6	5			

* KP = Key Pulse (Start Pulse)
† ST = Stop Pulse
‡ Exact digits to be outpulsed
§ 7, 10, or 11 digit directory number of far-end test line.

TABLE 10-4 (NOTE)
INTERPRETATION OF RESPONDER MF COMMANDS

MF SIGNALS Hz	LAYER 0	LAYER 1	LAYER 2	LAYER 3
700 + 900	600, 0, 105	-	Loss Self-Check: The responder closes a loop to measure its input and output of 1004 Hz (0 dBm)	High frequency return self-check measurement
700 + 1100	600, 0, 102	-	Loss Measurement at 1004 Hz (0 dBm)	High frequency return loss measurement
700 + 1300	600, 0, 100	-	Noise Self-Check: Far-end responder checks itself (1004 Hz at -67 dBM)	-
700 + 1500	-	-	-	-
700 + 1700	-	-	Echo return loss measurement	Echo return loss self-check measurement
900 + 1100	-	-	C-noise measurement with far-end responder	-
900 + 1300	Release	Release	Release	Release
900 + 1500	-	-	Low frequency return loss measurement	Low frequency return loss self-check measurement
900 + 1700	-	-	Loss measurement at 1004 Hz at -16 dBm	Self-check measurement at 1004 Hz at -16dBm
1100 + 1300	-	-	Loss measurement at 404 Hz at -16 dBm	Self-check measurement at 404 Hz at -16dBm
1100 + 1500	-	-	Noise self-check measurement on responder in the ROTL office	-
1100 + 1700	Layer	Layer	Layer	-
1300 + 1500	-	-	Noise measurement with the responder in the ROTL office	-
1300 + 1700	-	-	Loss measurement at 2804 Hz at -16 dBm	Self-check measurement at 2804 Hz at -16 dBm
1500 + 1700	-	-	Noise measurement in the presence of a 1004-Hz tone at -16 dBm	Noise with tone self-check measurement through the appropriate filters

Note: Dashes indicate unassigned code-state combinations.

TABLE 10-5 (NOTE)
ROTL RESPONSES TO RECYCLE, RELEASE, AND RELEASE/MAKE BUSY AFTER TRANSMISSION TESTS

CAROT COMMAND SENT TO ROTL	ROTL RESPONSE TO COMMAND	MEANING
Release or recycle	Test progress tone	Normal, trunk release, ready for new priming at end of test progress tone.
	60-IPM low tone (busy)	A supervisory hit or disconnect was detected on the trunk under test during testing. (A recycle command is normally sent by CAROT to recycle ROTL after this response is receive.)
Release make busy	Test progress tone	Normal, trunk make busy, ready for new priming at end of test progress tone.
	120-IPM low tone (reorder)	No authorization to remove trunks (security call back not performed).
	60 IPM (busy}	Could not busy trunk, probably due to AML being exceeded.
	Silence	A recycle authorization sent by CAROT. ROTL will return 60 IPM indicating that a hit or disconnect was detected on the trunk under test. A second recycle is required to recycle ROTL.

Note: There is no monitoring for supervisory hits or disconnects on 102-type tests, or on connection appraisal. At any time, ROTL sends 120-IPM low tone (reorder) to CAROT; there may be additional information available from ROTL. This information can be requested by sending a ring forward request (1300 Hz for 100 ms). Ring forward is not used by the 5ESS switch ROTL in normal testing as it does not perform operational tests. The response to ring forward will be in the guard-data-guard format. An alternative is to request a noise measurement. It will also trigger the guard-data-guard reply, which can be interpreted as a noise reading and converted to the error code. Table 3-6 lists the 5ESS switch ROTL errors.

TABLE 10-6
RING FORWARD ERROR REPLIES

92A PULSE LENGTH (milliseconds)	H310 NOISE READING* (dB)	MEANING
9	18	Unknown, no further information
17	22	Route failure to test trunk
25	26	Failed to set up path to trunk
33	30	Failure during call disposition analysis
41	34	Failure at trunk under test
49	38	Failure to close path to trunk
57	42	Could not understand priming
65	46	No answer supervision received on trunk
73	50	Security callback has not been completed
81	54	Hardware failure
89	58	Failed to activate (seize) trunk
97	62	Failure during outpulsing
105	66	Glare seen on trunk
113	70	Interrupt seen at trunk process
121	74	TTF CUT tone detector detected wrong tone
129	78	Data base error
137	82	Failed to get a wink
153	90	Failed to send milliwatt on a BALT test

* The noise readings are taken using either the 92A or H310 test sets, the two common test sets used for ROTL. The H310 test set is only capable of determining the ring forward error by making a noise measurement. The error reply is converted into an equivalent noise reading in dB. The 92A test set can make the noise measurement, or it has provisions for measuring the duration of the error tone directly in milliseconds.

11.13 INHIBIT SCHEDULING OF DGN REX TEST FOR A UNIT

OVERVIEW

The **INH:REX** message is used to inhibit the scheduling of a unit for routine exercise (REX) in the communication module (CM) or in a switching module (SM) for diagnostic (DGN) test only.

PROCEDURE

1. At master control center (MCC) video terminal, type in message:

   For 5E2(2) only,

   If MML, **INH:REX{,CM | ,SM=a},b;**

   If PDS, **INH:REX{,CM | ,SM a},b!**

   For 5E3 through 5E7,

   If MML, **INH:REX{,CM[,f] | ,SM=a,b};**

   If PDS, **INH:REX{,CM[,f] | ,SM a,b}!**

   Where: a = Number of the SM for which REX is to be inhibited
   b = The SM unit type to be inhibited. The DGN tests are the only test types that may be inhibited on a unit basis.

LU = c	-- Line unit
LDSU = 0	-- Local digital service unit
GDSU = d	-- Global digital service unit
MSU = {0 | 1}	-- Metallic service unit
DCTU = 0	-- Directly connected test unit
MTIB	-- Metallic test interface bus
RAU	-- Remote answering unit
RLI	-- Remote line interface
MCTSI	-- Module controller/time slot interchanger
BTSR	-- Bootstrapper circuit
ASC	-- Alarm service circuit
RCLK	-- Remote clock
TU = c	-- Trunk unit
DCLU = c	-- Digital carrier line unit
DLTU = {0 | 1}	-- Digital line and trunk unit
PSU = 0	-- Packet switching unit [5E3 - 5E7 only]
ISLU = c	-- Integrated services line unit [5E3 - 5E7 only]
RAF = c	-- Recorded announcement frame [5E3 - 5E7 only]

ISTF = e -- Integrated services test facility [5E3 - 5E7 only]

c = Unit number between 0 and 7.

d = Unit number between 1 and 7.

e = Unit number between 0 and 3.

f = The CM unit type to be inhibited. If none is specified, all units are inhibited.

MSGS = {0 | 1} -- Message Switch

ONTC = {0 | 1} -- Office Network Timing Complex

Response: **OK** is printed in response message to indicate request is valid and accepted.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

11.15 ALLOW SCHEDULING OF A UNIT FOR REX DGN TEST

OVERVIEW

The **ALW:REX** message is used to allow the scheduling of a unit for routine exercise (REX) in the communication module (CM) or in a switching module (SM) for diagnostic (DGN) test only.

PROCEDURE

1. At master control center (MCC) video terminal, type in message:

   If MML, **ALW:REX{,CM | ,SM=a },b;**

   If PDS, **ALW:REX{,CM | ,SM a },b!**

   Where: a = Number of the SM that has been selected to be allowed
   b = Unit to be allowed within a module for DGN test only.

LU=c	-- Line unit
LDSU=0	-- Local digital service unit
GDSU=d	-- Global digital service unit
MSU={0 | 1}	-- Metallic service unit
DCTU=0	-- Directly connected test unit
MTIB	-- Metallic test interface bus
RAU	-- Remote answering unit
RLI	-- Remote line interface
MCTSI	-- Module controller/time slot interchanger
BTSR	-- Bootstrapper circuit
ASC	-- Alarm service circuit
RCLK	-- Remote clock
TU=c	-- Trunk unit
PSU=0	-- Packet switching unit
ISLU=c	-- Integrated services line unit
RAF=c	-- Recorded announcement frame
ISTF=e	-- Integrated services test facility

   c = Number between 0 and 7
   d = Number between 1 and 7
   e = Number between 0 and 3

   Response: **OK** is printed in response message to indicate request is valid and accepted.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

C

I

L

M

N

O

* Resistered trademark of Laser Magnetic Storage International Company

R

U

V

W