
GBPPR 'Zine – Issue #11 – February 2005



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i like ice cream.

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Recent Changes Software Description / #1 ESS

BELL SYSTEM PRACTICES
AT&T Co SPCS

SECTION 231-045-150
Issue 2, August 1983

RECENT CHANGES SOFTWARE DESCRIPTION

2-WIRE NO. 1 AND NO. 1A "ESS*" SWITCH

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C. Validity and Translation Errors . . .	26	1.04 The RCSS consists of a collection of Recent Change message interpretation programs. These programs accept and validate recent change input messages and generate the proper translation data for storage in translation memory. The RCSS provides maintenance personnel with a means of modifying the translation data to reflect changes in customer service requirements and in the internal system.
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1. GENERAL		
INTRODUCTION		
1.01 This section describes the program actions performed by the Recent Change Subsystem (RCSS) operating in a No. 1 or No. 1A ESS switch central office. Information unique to the No. 1A ESS switch application is so noted. Applications which are unique to the No. 1 ESS switch are not described in this document.		
1.02 This section is reissued to delete the outdated materials and to include coverage of generic programs 1E7, 1AE7, and later generic programs. Revision arrows are used to emphasize these changes.		
1.03 Part 6 provides a list of abbreviations and acronyms used in this section.		
SCOPE OF SECTION		
1.05 The information provided in this section includes a description of the following:		
(a) Operation of the RCSS at the system level		
(b) Operation of the RCSS at the program level		
(c) Program control and data flow through the RCSS.		
2. BRIEF DESCRIPTION OF PROGRAM IDENTIFICATIONS (PIDENTS) INVOLVED		
2.01 The RCSS is comprised of code and message pidents. The message pidents are tables of data which precisely define the recent change messages. The control program or code pidents are recent change programs of executable code (ie, ESS switch instructions) which control the operation of the RCSS. The code pidents are listed in Table A. Many of the operations of the RCSS are repetitive in nature and are accomplished by applying fixed algorithms to the data in the message tables. Therefore, a substantial portion of the RCSS can be said to be table driven by the message pidents. The message pidents are listed in Section 231-048-301.		
CONTROL (CODE) PIDENTS		
2.02 The Recent Change Initialization and General Control (RCIG) program is the control program for all recent change processing. The RCIG provides the interface with the TTY system. Processing the first line of a recent change message (including internal data buffer initialization) is handled by RCIG, as is the execution control of each of the other code pidents. In addition, RCIG controls auxiliary RCSS functions in No. 1A ESS switch such as listing the rollback area (RBA) and allowing or inhibiting the various recent change message sources.		

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♦TABLE A♦

RCSS CODE PIDENTS

PIDENT	TITLE: Recent Change	DOCUMENT REFERENCE NO. 1 ESS SWITCH	DOCUMENT REFERENCE NO. 1A ESS SWITCH
QURC	Queuing For CCSC Changes		6A115
RCMU*	Message Update		6A230
RCIB*	Interface Block Builder		6A231
RCIG	Initialization and General Control	PR-1A300	6A300
RCIE	Input Editor	PR-1A301	6A301
RCKI	Keyword Input	PR-1A302	6A302
RCVC	Validity Check	PR-1A303	6A303
RCTF	Translation Data Format	PR-1A304	6A304
RCCH	Change Order Processor	PR-1A305	6A305
RCFI	Format Interpreter Routines	PR-1A306	6A306
RCWL	Work List Processor	PR-1A307	6A307
RCDY	Delayed Order Processor	PR-1A308	6A308
RSUB	General Subroutines	PR-1A309	6A309
RCTS	Table Subroutines	PR-1A319	6A319
RCSI	Shared Information and Input Subroutines	PR-1A320	6A320
RCxx*	(One pident per message)	PR-1A3yy	6A3yy
QUDB	Queuing for RC Control System	PR-1A830	6A830

* No. 1A ESS switch only.

† Refer to Sectin 231-048-301 for message pidents.

2.03 ♦The Recent Change Queuing (QUDB) program is the control program for the queuing and serving of the queued recent change input message from any of the allowable sources. All clients, including TTY, are queued upon entry into the RCSS. The QUDB then determines when recent change scratch is available for use and which queued message has priority. After serving the appropriate client off its queue, RCIG is called to do further initialization and start up processing of the message.♦

2.04 The Recent Change Input Editor (RCIE) program provides the link between the TTY

buffer and the RCSS. Services provided include character translation and character screening.

2.05 The Recent Change Keyword Input (RCKI) program performs the processing and local error-checking of the recent change message keywords.

2.06 The Recent Change Validity Check (RCVC) program verifies that the recent change message input contains a valid set of both keywords and data.

2.07 The Recent Change Translation Data Format (RCTF) program processes the NEW pass of

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format interpretation, used when the building of a new translation is required by a recent change message.

2.08 The Recent Change Change Order Processor (RCCH) program processes the change (CHG) pass of format interpretation, used when a recent change message requires a change in existing translation data.

2.09 The Recent Change Format Interpreter Routines (RCFI) pident is a collection of subroutines that administer the scratch area in memory used for translation formatting.

2.10 The Recent Change Work List Processor (RCWL) program does pass 1 processing of work list entries made by the message pidents (No. 1A ESS switch only).

2.11 The Recent Change Delayed Order Processor (RCDY) program provides:

- (a) Means of implementing recent changes which have been processed earlier on a delayed basis.
- (b) Builds the delayed activation block (DAB)
- (c) Expand DAB entry points for phone activation and TTY activation of delayed recent changes
- (d) Expands the rollforward block.

2.12 The Recent Change Interface Block Builder (RCIB) program (No. 1A ESS switch only) provides the basic interface between those portions of the No. 1A ESS switch and No. 4 ESS switch RCSS used by the No. 1A ESS switch RCSS. The RCIB converts the recent change work list into a form usable by the memory update program.

2.13 The Recent Change Message Update (RCMU) program (No. 1A ESS switch only) performs the actual insertion or modification of translation data in the translation area of memory.

2.14 Queuing For Recent Change Control (QURC) program provides a means of buffering customer changeable speed calling (CCSC) list entries until the RCSS is able to process them. The entries are stored in a queue and are then processed by the RCSS as time permits. (Entries are active on queue.)

2.15 The General Subroutines (RSUB) pident is a collection of subroutines called as necessary by the other control pidents.

SHARED PIDENTS

2.16 ♦The Recent Change Control (RCCN) program assembles customers logs and performs miscellaneous maintenance in the customer-originated recent change area. In No. 1 ESS switch the recent change control program also performs recent change insertion.♦

2.17 The Table Subroutines (RCTS) pident consists of ♦assembler language subroutines accessed by the recent change message pidents to do things that are difficult or impossible to do in the recent change macro language.♦

2.18 The Shared Information and Table Subroutines (RCSI) pident consists of data tables accessed by the recent change control system to locate the correct message pident based on the message name (ie, RC:LINE), assemble keyword data, and correctly index into translations.

MESSAGE PIDENTS

2.19 The RCSS message pidents are listed in Section 231-048-301. In general, there is one message pident for each recent change message (exceptions will be noted later). Each message pident is comprised of a set of data tables used to drive the code pidents.

3. BRIEF DESCRIPTION OF RELATIONSHIP TO OTHER FUNCTIONS

INTERFACE WITH OTHER PROGRAMS

A. No. 1A ESS Switch Main Program

3.01 The ESS switch main program flags used by the RCSS are as follows:

- (a) ♦Flag 447 is base level class D flag used for the queuing and input processing programs.
- (b) Flag 209 is a base level class D flag used for message processing.
- (c) Flag 1029 is a main program fill job to allocate additional real time to TTY recent change input processing as it becomes available (traffic load dependent).♦
- (d) Flag 321 (RCMUGENT) is a base level class B flag used for updating translation data.

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- (f) Flag 316 (RCMUFENT) is a base level class E flag used for auxiliary program control.

3.02 The first two flags are carry-overs from No. 1 ESS switch. Due to the significant differences in the way processor input/output and main program scheduling is done in No. 1A ESS switch, the 100-ms flag used by No. 1 ESS switch for input/output is not needed. The entry rate for a class D MP flag is every 50 ms and is almost independent of traffic load. A recent change entry rate is relatively infrequent, causing a significant response delay when inputting a recent change message. Another MP flag is used to give additional entries to the RCSS on a traffic-dependent basis, thereby decreasing response time to acceptable levels except during traffic overload. The RCMUGENT flag requires a higher entry rate to ensure a rapid update of the translation data.

B. TTY Programs

3.03 The TTY programs provide the RCSS with the ability to receive recent change message inputs from the TTY and to report acceptance or reason for rejection of the input message (IM) through TTY acknowledgments and output messages (OMs). A recent change message input occurs on a line-by-line basis. The input characters are interpreted by the input/output programs after an entire line is typed, delimited with an end-of-transmission (EOT) character, and, for a DATASPEED® 40 TTY, transmitted by repositioning the cursor and operating the SEND key. The TTY service request is queued and processed as soon as the RCSS is idle.

3.04 The recent change messages are treated as messages requiring special handling. When the input/output program sees the input message verb "RC:", it passes the entire input to RCINIT for processing. If the RCSS is idle, the RCINIT initializes the RCSS to process the message. ♦The RCINIT calls QUTTYL in QUIDB to determine whether or not there is space on the TTY queue for the message input. If the queue is full, an acknowledgment RL<BUSY> is printed at the TTY which input the message. If there is space on the queue, the message is put on queue and the flag is set to request queue service. ♦

3.05 The RCSS output handled by the TTY programs is of two types: TTY acknowledgments and OMs. The TTY acknowledgments consist of a few American Standard Code for Information Interchange (ASCII) characters loaded by the RCSS di-

rectly into the TTY buffer. The TTY acknowledgment provides an immediate status response for the message. Data for a recent change OM is passed to the TTY programs by loading the data into scratch area in call store and initiating a TTY print call. For a description of recent change TTY acknowledgments and OMs, refer to Section 231-048-301.

INTERFACE WITH PROGRAM STORE

3.06 The RCSS consists of 12 code (or control) pidents (No. 1 ESS switch), and 15 code (or control) pidents (No. 1A ESS switch), two shared pidents (RCTS and RCSI), and a set of message pidents. The 13 control pidents and the shared pident RCTS are code pidents made up of No. 1/1A ESS switch instructions. The shared pident RCSI consists entirely of data tables, some full program store-word (24-bit) tables, and some 12-bit tables.

4. SUBSYSTEM FUNCTIONAL DESCRIPTION

4.01 Inputs to the RCSS may occur simultaneously from up to six different sources (Fig. 1):

- (a) Customer lines
- (b) Service order activation phone
- (c) Office recent change channel
- (d) Service order TTY (includes paper tape or magnetic cartridge)
- (e) ♦Centrex station rearrangements (CSR) customer
- (f) Inward Wide Area Telecommunication Service (INWATS) data base for busy/idle status indicator (BISI) messages. ♦

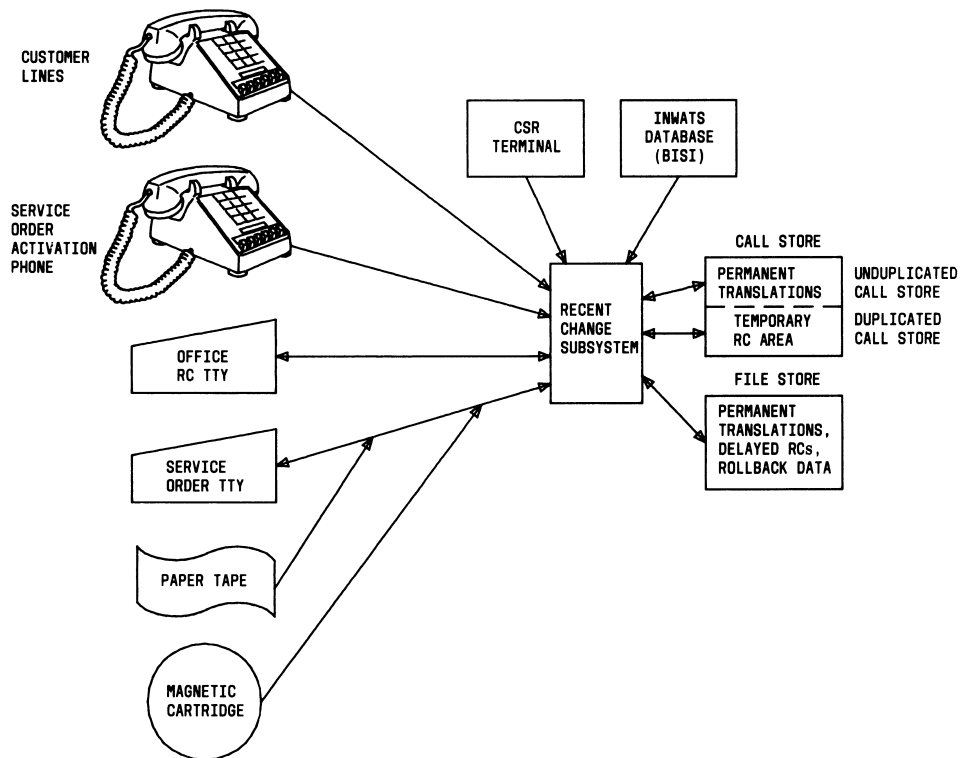
These requests for RCSS service may originate for any number of reasons. Inputs from customer lines, CSR or BISI, are not under central office control. However, the end result in each case is that the translation data requires changes. (Inputs can be restricted by the central office.)

TRANSLATION DATA STORAGE

4.02 In the No. 1A ESS switch, translation data is stored in core memory in unduplicated call store. The recent changes with permanent status are stored in the translations data area of unduplicated

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◆ Fig. 1—Recent Change Subsystem Inputs (No. 1A ESS Switch) ◆

protected call store with two complete backup copies stored on disk in the file stores. The recent changes that are temporary (eg, call forwarding changes) are stored in the temporary recent change area in duplicated call store, and also, in the temporary recent change backup area in file store. The file store also provides for storage of delayed recent changes and translation rollback data (ie, a copy of the original translation data, before modification, of every translation word affected by a permanent status recent change).

QUEUING OF RECENT CHANGE INPUTS

4.03 With the advent of customer changeable speed calling (CCSC), it became necessary for the

RCSS to handle an increasingly large volume of inputs. The basic philosophy is that customer-originated requests for changing a speed call list entry will be queued in a searchable queue until the RCSS is free to process the entries.

4.04 The recent change queue consists of a dedicated block in duplicated call store whose size (length in call store words) is defined in parameters and, thus, is office-engineered. The queue entries are processed in the order of their occurrence in the queue. Conversely, the queue is read from bottom to top in response to a request from the speed calling

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program. This ensures that the most recent information is returned for call processing purposes. For example, it is possible that two queue entries for the same speed calling list entry could exist at the same time. Reading from bottom to top yields the most recent information.

CUSTOMER LINE INPUTS

4.05 The queue control program in the RCSS interfaces directly with the call processing programs which interpret speed call list changes from customer lines. When a customer dials the proper access code to change a speed call list entry (see Feature Document 231-090-101), the call processing program decodes the request and stores the change information in a holding register. The RCSS is then requested to load the change information into the CCSC queue (Fig. 2). The RCSS then ensures that the request is valid and can be loaded into the queue. Once the queue entry is processed, the speed call list change is active and can be accessed as necessary by the speed calling program.

INPUTS FROM THE OFFICE RECENT CHANGE AND SERVICE ORDER TTYs

4.06 Most of the changes to the translation data in the No. 1A ESS switch memory will be the result of recent change messages input from the TTYs, either manually, via paper, magnetic tape, or magnetic disk. Refer to Section 231-048-301 for general recent change information, including a list of all recent change messages and keywords.

4.07 The recent change messages entered via the TTY may have either immediate or delayed status. Unless entered as a delayed message, the RCSS will immediately process the message, format new or modified translation data, and then update the translation data in call store. If the recent change is of a permanent type, the translation data in unduplicated call store is changed. The translation data image in file store is then brought up to date.

ROLLBACK (1A ESS SWITCH)

4.08 There will be instances where a recent change message or several recent change messages will affect the translation data in such a way as to degrade or disrupt system activities. To correct problems of this nature, it is necessary to "undo" the recent changes suspected of causing the problems by

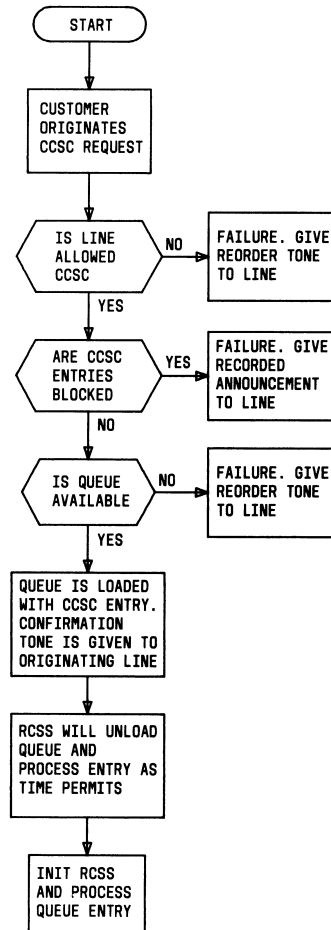


Fig. 2—Processing a CCSC Request

reinstating the original translation data as it appeared before the recent change message was input. This operation is termed rollback.

4.09 Each time a recent change message affecting the permanent translation data in unduplicated call store is entered, a rollback block (RBB) is

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built by the RCSS and stored in the rollback area on disk. The disk rollback area is a dedicated block of disk storage whose length is Compool defined. The current size of the rollback area is 128 BINKs, where 1 BINK = 1024 (decimal) words. Each RBB, identified by an internally generated recent change order number, contains the address and original data of each translation word affected by the associated recent change message.

ROLLBACK AREA MANAGEMENT

A. Type I Rollback

4.10 Type I rollback is automatically initiated by the RCSS to remove a partially completed recent change. Each recent change message that is accepted by the RCSS and is to be inserted into the translation data base creates a single RBB in the rollback area. Each RBB contains the address and old data for each word of translations altered by the recent change. The RBB is created and stored in the file store rollback area before any updating of the translation data takes place. This is done in case the update process is, for any reason, interrupted (eg, interrupt, disk return failure, etc). If the update should fail before the entire update is complete, the RBB data is used to remove the partially completed recent change. This kind of rollback is referred to as Type I rollback.

B. Type II Rollback

4.11 Type II rollback is the process of removing or canceling recent changes which successfully update translation data and are effective with respect to call processing. Type II rollback must be requested manually, either by an input message (IM) or via the master control center (MCC).

C. Rollback Data Storage Concepts

4.12 The rollback area is logically circular, ie, the physical beginning and end of the rollback area act as though they were adjacent memory locations in a ring buffer. Thus, as RBBs are stored and the rollback area fills up, additional RBBs overlap the first RBBs stored, causing that particular rollback data to be lost. To avoid this overlap, office personnel regularly write a new translation tape. This tape is a "snapshot" of translations data at that particular point in time. When this tape dump is performed, all RBBs which were created prior to the old

latest system tape are discarded, freeing up a large (approximately 40 percent) portion of the rollback area.

4.13 As shown in Fig. 3, the rollback area is presented as a pie-shaped figure to represent its circularity. Associated with the rollback area are three indexes or pointers: TAPE1, TAPE2, and NEXT. The NEXT index points to where the next RBB will be stored when a new recent change message is successfully processed. The TAPE2 index shows where the NEXT pointer was when the latest translation tape was written. The TAPE1 index, likewise, marks the position of the NEXT index when the next to the latest translation tape was written.

4.14 Looking at Fig. 3 notice that the latest translation tape dump was followed by recent change messages 13, 14, 15, 16, and 17 as indicated by the TAPE2 index. To restore translations to the state that existed when the latest tape was written, it is necessary to roll back recent changes 17, 16, 15, 14, and 13. This is a rollback to TAPE2. To restore translations to the state that existed when the next to the latest tape was written, recent changes 12, 11, 10, 9, 8, and 7 must also be rolled back. This is a rollback to TAPE1. It is not possible to roll back beyond the time of the writing of the next to the latest tape; ie, RBBs 6, 5, 4, 3, 2, and 1 cannot be rolled back and should be considered nonexistent, as indicated by the dotted lines.

4.15 When a new translation tape is written, the rollback area tape indexes are repositioned to reflect the existence of a new translation tape and the old (latest) translation tape is now the next to the latest translation tape. Refer to Fig. 3 and assume that a new translation tape has just been written and that no recent changes have been input since. The TAPE2 index is now pointing to the same position as is the NEXT index and the TAPE1 index is moved up to the old TAPE2 position. At this point, a rollback to TAPE2 (the latest translation tape) would have no effect since no recent changes have been input since the latest translation was written. A rollback to TAPE1, however, could be done. This would roll back recent changes, 17, 16, 15, 14, and 13. Rollback beyond recent change 13 (ie, the new TAPE1 index) is now impossible.

4.16 It is necessary to write new translation tapes on a regular basis to avoid filling up the rollback area and overtaking the TAPE1 or TAPE2 in-

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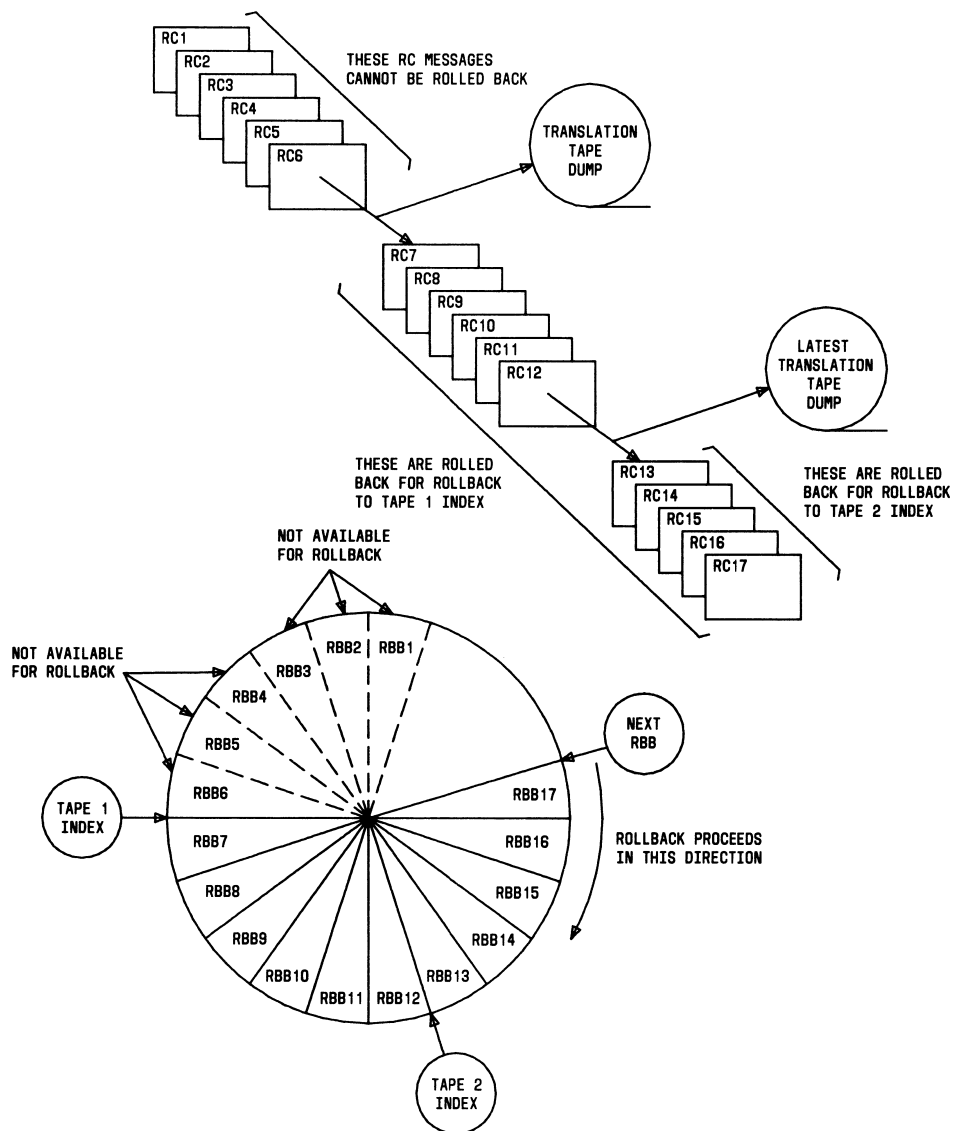


Fig. 3—Recent Change Rollback Data Storage

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dexes. The frequency of writing translation tapes depends on the recent change activity level in a particular office.

4.17 The current size of the rollback area is 128K for all offices, providing storage for about 800 recent change messages, although this figure can vary considerably depending on the type of messages input.

4.18 Tape dumps may have to be performed every other day for some offices and once a week for others. The rule is that, when the portion of the rollback area used since the latest tape dump reaches 40 percent, a tape dump should be performed as soon as practical, eg, that same evening. The percentage of the rollback area used since the latest tape dump is reported by an RC:WARNING OM when the percentage exceeds 40 percent and by the REPT:RC CENSUS OM as an hourly printout or in response to the OP:RCCENSUS IM. Since no indication is given of how much of the rollback area has been used since the next to the latest tape was written, the 40 percent rule must be strictly adhered to or the TAPE1 index can be overtaken without warning. Should the TAPE1 index be overtaken, it is moved up to coincide with the TAPE2 index with a resulting REPT:RC WARNING OM stating that a rollback to the next to the latest tape (TAPE1) is no longer possible. If additional recent changes are entered beyond the 90 percent mark until the TAPE2 index is overtaken, the TAPE1 and TAPE2 indexes will be moved forward as many RBBs as necessary to store the new RBB. A REPT:RC WARNING OM will state that complete rollback to the latest system tape (TAPE2) is no longer possible. A partial rollback to TAPE2 can be performed, but the rollback is limited by the TAPE2 index which has been moved and no longer represents the state of translations that existed when the latest translation tape was written.

4.19 Type II rollback can be performed via the MCC with a Phase 4, 5, or 6 or by means of a TTY IM without going through a phase. There are four modes of Type II rollback by MCC request:

- Rollback to a particular order number
- Rollback a specified number of orders
- Rollback to the TAPE2 index
- Rollback to the TAPE1 index.

4.20 Type II rollback via the TTY is done without a phase; of course, the ESS switch must be

sane enough to allow input/output via a TTY channel for this method to work. The TTY rollback is restricted to 20 decimal orders per rollback request, and only as far back as the TAPE2 index, ie, TTY rollback is limited to a rollback to the latest translation tape. Refer to the section entitled General Recent Change Information—2-Wire No. 1A ESS switch (Section 231-048-301) for more Type II rollback information.

4.21 Each RBB has an internal order number assigned to it before being stored in the rollback area. This RCSS assigned order number is completely independent of the user specified external order number entered with the order (ORD) keyword in the recent change message. The internal order number, is of the following form:

MMDDSSSS

where MM = month (1-14 octal)

DD = day of the month (1-37 octal)

SSSS = daily sequence number

(0-7777 octal)

The internal order number in addition to providing a unique identifier for each RBB, also gives information on when the RBB was created and stored in the rollback area.

4.22 Each day at midnight, the date is updated and the sequence number is reset to zero. This numbering scheme is useful in that it defines what can be called "safe rollback points." Assuming that all recent change activity is halted around the hour of midnight, due to the working hours shift change, and that translations are in a valid state so far as can be determined, it should always be safe to roll back to midnight or any particular day. This is done by rolling back through order number MMDD0000.

4.23 For example, assume that all recent change activity for June 26 ended at 10:00 p.m. and the system seemed to be in good shape. The next day recent change activity resumed and at 3:20 p.m. that afternoon serious system problems began to appear with indications of translation data mutilation due to recent change errors. The decision is made to roll back recent changes to clear the problem. Rollback of an arbitrary number of recent changes is dangerous

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because the resulting state of translations at the completion of the rollback is not known. Rollback to TAPE2 or TAPE1 is maybe too drastic, possibly causing disruption of service to a large number of customers. Rollback to midnight of the previous day, a known safe point, is recommended in this situation. An MCC rollback in a phase 4, 5, or 6 through internal order number 06330000 is performed without delay resulting in the removal of the bad recent change message(s). When the bad recent change is isolated and corrected, the day's recent change messages can be reentered using the rollforward procedure, floppy disk, paper tape or magnetic cartridge backup. But, as a result of the rollback, followed by a rollforward, CCSC list changes will be lost and each affected customer will have to reestablish the list. Call forwarding recent changes are kept in the temporary recent change area and produce no rollback data; consequently, they are not affected by rollback. The example illustrates the importance of the rollback data to extricate an office from service-disrupting problems caused by faulty translation data. It should emphasize the importance of keeping the rollback data clean.

4.24 An easy way to generate messy rollback data and run the risk of generating translation data errors is to try to fix a bad recent change with additional recent changes. The use of RC:PSWD is often abused in this way. The proper way to correct a bad recent change is to roll back the order and then reenter it correctly.

Note: The following sequence is provided only as an example of a method used to roll back a bad recent change order. This is not intended for use as an operating procedure nor should it be used as such. (Refer to Section 231-048-301.)

- (a) Inputs to the RCSS from delayed service order activation, the service order TTY, CCSC, CSR and BIS1 must be inhibited by typing:

INH:RCSOURCE DLY!

INH:RCSOURCE RCS!

INH:RCSOURCE SCV!

INH:RCSOURCE CSR!

INH:RCSOURCE BIS!

These commands will prevent additional RBBs from being created and stored in the rollback area.

(Refer to the RCIG pident for RCSS control command information.) Should the recent change queue fill up during this time, customer speed calling list changes will be rejected and could cause some customer complaints. Note that call forwarding need not be inhibited since RBBs are not created for this type of recent change.

- (b) List the last few orders in the rollback area by typing at the office recent change channel:

OP:RCRBLIST, LAST n! where n is a decimal integer.

The response is a list of the last n orders found in the rollback area with latest order printed first. A sample output response to OP:RCRBLIST, LAST 7! is shown in Fig. 4. Listing the last several orders in the rollback area is necessary so that, after the rollback through the bad recent change message is accomplished, it is known which recent change(s) must be reentered or rolled forward. Referring to Fig. 4, if order 06330021 is the bad message, six orders (06330026 through 06330021) must be rolled back to remove the bad recent change. The input source of these recent change orders can be recognized by the form of the external order number. If all external order numbers are assigned according to an established convention, the input source can be easily determined. For example, a service order could have an order number of at least six digits (or could have a letter prefix) to distinguish it from a delayed order which can have at most five digits with no letter prefix allowed. An SCLIST order with an external order number of 0 is obviously a customer-originated recent change, etc.

- (c) Count the number of orders you wish to roll back and type the rollback message:

RCCNL:ROLLBACK,NEXT nn! where $1 < n \leq 20$

In the example, n is 6. The response is:

REPT:RC WARNING ROLLBACK INITIATED
AND COMPLETED THROUGH ORDER
aaaaaaaa

for each order rolled back followed by a total rollback report message:

REPT:RC WARNING RC ROLLED BACK 6 ORDERS
THROUGH ORDER bbbbbbbb AS REQUESTED

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```
M 01 0P:RCRBLIST MSG C0MPL
      R0LLBACK AREA 0RDERS SINCE THE LATEST TAPE:

          0 06330026 SCLIST
      21394 06330025 LINE
          0 06330024 SCLIST
T2221645 06330023 LINE
F2221645 06330022 LINE
          0 06330021 PSWD
          0 06330020 TGMEM
```

Message identifier

Internal order number

External (0RD) order number

Fig. 4—Sample Output for OP:RCRBLIST OM

(d) Reenter the corrected recent change message.

(e) Reenter the recent changes which had to be rolled back to get to the bad recent change. The service bureau may have to be notified if some of the rolled-back orders were input on-line on the recent change service (RCS) order channel. Activated-delayed orders will have to be reentered from the TTY. The CCSC list changes will be corrected only after the customer discovers their list is incorrect and fixes it.

(f) Allow recent change change activity on the inhibited sources. The OP:RCCENSUS IM can be used to verify which sources are inhibited. The ALW:RCSOURCE message destroys rollforward data, and can be used to allow input once again from these sources. (Refer to IM-6A001.)

ROLLFORWARD

4.25 ♦The use of file store to store rollforward data allows quick, automatic retrieval of data when needed. The rollforward data for a particular recent change is stored in the rollforward block (RFB) of that recent change. The RFB for a particular recent change message is created after all memory locations affected by the recent change are identified. When the recent change message passes all data checks, the updating of translation data in core and disk stor-

age begins. One of the first stages of this update process is to create a RBB and store it in the rollback area in disk storage. It is during the generation of the RBB that the RFB is retrieved from storage and inserted into the RBB.

4.26 The number of words of rollforward data for a recent change message varies widely. In general, the length of RFB is proportional to the number of keywords input. Change orders do not follow this rule, however, since many keywords are internally generated. Current estimates indicate that on the average one-half of the rollback area is consumed by rollforward data. Since the length of the RFB is variable, an index pointer is used to point to the start of the rollback data which immediately follows the rollforward data.

4.27 Rollforward data is normally not accessed until after a rollback has been performed. Therefore, as part of the rollback process the RFB must be extracted from the RBB and saved in an area apart from the rollback data. This area, called the rollforward stack (RFS), begins at the logical end of the rollback area. That is, the RFS is loaded from the bottom of the rollback area, whereas the rollback blocks are loaded from the top. The rollback area can thus be described as a circular "buffer". The RFS is accessed via an index pointer saved in the rollback area control block. Also located in the rollback area

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control block is a 4-word block index pointing to the next RFB as well as the length, in 4-word block, of that RFB. The first RFB is linked to the second RFB and so on with a zero link indicating the end of the RFS.♦

DELAYED RECENT CHANGES

4.28 A delayed recent change message may be entered by specifying DELAY in the message format. The entire message is processed normally, including syntax and data checks, but no translation data updating is done. Instead, the message is compressed and stored in the delayed recent change area in file store. The message is not effective until the recent change message is activated. Activation is accomplished by another recent change message from the TTY or via the service order activation phone.

INPUTS FROM THE SERVICE ORDER ACTIVATION PHONE

4.29 A central office telephone set whose major class of service is "activate service order" may be used to activate delayed recent changes. The delayed recent change is activated by dialing the order (ORD) number, nnnnn, filled out to five digits with leading zeros. If no delayed message with the dialed order number is found, reorder tone is heard. ♦ If the recent change interactive queue is full or another delayed activation via phone is still being processed, ♦ busy tone is heard and the user may try again. If the delayed message associated with the dialed order number is found in memory, dial tone is returned and other order numbers may be dialed as appropriate. However, receipt of dial tone does not guarantee that the delayed message was activated. The TTY should be checked for an ACPT RC18 output message indicating successful activation. See Section 231-048-301.

5. PROGRAM FUNCTIONAL DESCRIPTION

RECENT CHANGE MESSAGE PROCESSING

A. General

5.01 The actual recent change messages, formats, and procedures for entering a recent change message are not described in this document. Refer to Section 231-048-302 for general recent change information, system user information, and general practice.

5.02 Each recent change message specifies an operation or set of operations which alters the con-

tents of translation data memory. As such, each message is expressly defined in three types of tables:

- (a) The message keyword table contains the keywords and data formats associated with each message.
- (b) The message validity table provides the data and validity checks to be used to ensure valid data and keyword combinations.
- (c) The translation format table provides the translation data layouts of the translation data to be built or modified as a result of each valid combination of keywords.

5.03 Each of the three basic table types has a set of processing routines. A combination of these tables and routines makes up three modules that are the heart of the RCSS (Fig. 5):

- Input processing
- Validity checking
- Translation data formatting.

B. New Order Processing

5.04 The input processing module examines the input message keywords, checks the associated data for proper format, and assembles the data into a convenient form for storage and access by the following modules. Only local data checking is done; any checking that requires knowledge of data in other keywords (or existing translations) is left to the validity checking module.

5.05 The validity checking module determines whether the input message is a valid combination of keywords and data. Validity checking also decides which translation format should be built as a result of the input message.

5.06 The translation data formatting module places the data received in the message into the proper format for the translation that is to be built by the message.

5.07 The message storage buffer (MSB) is a table in duplicated call store used for communication between the program modules (Fig. 5). The entire input message is stored in the MSB after the

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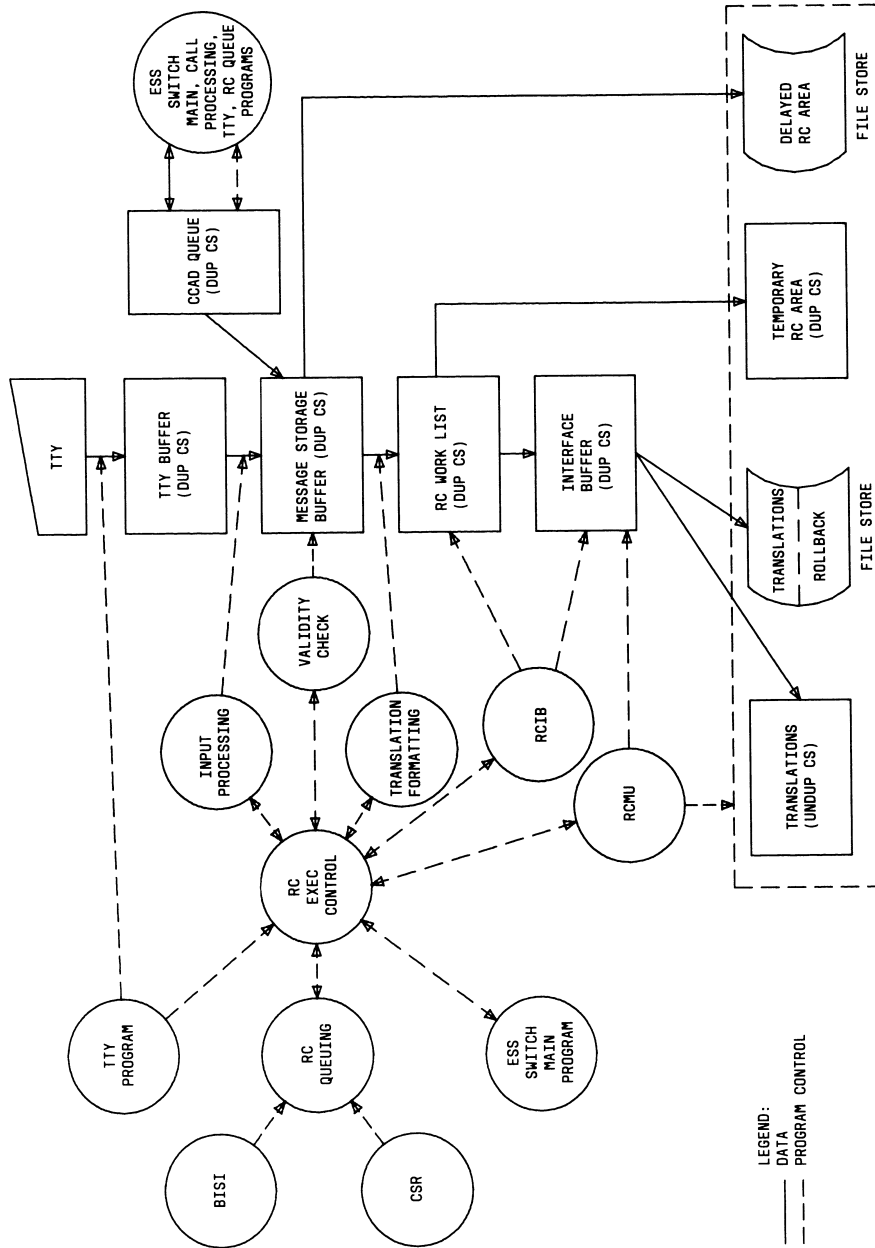


Fig. 5—No. 1A ESS Switch Recent Change Subsystem

input processing module has performed range checks and appropriate conversions on the data. This allows an arbitrary order of keywords within a message and more efficient validity checking since all of the data is available when validity checking is performed.

5.08 After validity checking is accomplished, the format module reads the MSB and builds the proper translations for storage in the recent change work list. The RCIB then formats the translation data into an interface buffer which provides temporary storage for RCMU. Rollback blocks are built and the translation data is then stored in translation memory.

5.09 The sequence just described traces the basic flow through the RCSS for a NEW order. The additional recent change order types, ie, CHG and OUT with immediate (IMMED) or DELAY options, are discussed on a basic internal system level in the following paragraphs. Detailed information is provided in the program description portion of this section.

C. Change and Out Order Processing

5.10 The change processing module allows recent change messages (CHG or OUT) to be specified for translations that are currently in the active state. For a CHG message, information from an existing translation is combined with data from the input message (IM) to produce a modified translation. For example, a customer may wish to buy call forwarding service. Using one CHG message, this feature may be added to the customer's line without respecifying or even being aware of the other features already assigned to the line. This is possible because old information is retrieved from the customer's existing translation instead of being required in the IM.

5.11 The change processing module moves all the information from an existing translation into the MSB, except where data from the IM has already been stored in the MSB by the input processing module. The combination of data from the IM and the existing translation makes the MSB look exactly as it would have looked if a NEW type recent change message had been typed to build the desired translation. After the change processing module has finished, the message can be treated as a NEW type message.

5.12 An OUT message is used to undo everything done in a NEW order. The call store blocks are

returned to the idle link list and unassigned codes are entered into the translators. By using the format interpreting routines that are used to build translation formats for NEW orders, OUT order processing is able to locate all blocks that are to be returned and all translators that are to be unassigned.

D. Delay Order Processing

5.13 Delayed recent change messages are entered from the TTY and processed into the MSB (Fig. 5). The message is thoroughly checked for valid data and keywords as is any recent change message. If errors are present, normal error responses are given. After the complete recent change message is assembled in the MSB, normal message processing stops. No translation formatting is done and the translation data is not modified. Instead, the MSB image, in compressed form, is stored in a DAB on disk. The delayed recent change area on disk provides storage for approximately 500 DABs, ie, one DAB for each delayed recent change message.

5.14 A directory at the start of the delayed recent change area provides a 2-word entry for each DAB. Word one contains the order number associated with the delayed recent change message; word two contains the starting disk address and the length of the DAB. At activation time, the delayed recent change activation routines locate the DAB via the directory and expand the recent change message back into the MSB. The MSB now contains the recent change message exactly as if it had just been entered from the TTY. Message validity is checked again before any translation formats are built. Normal recent change message processing then continues.

PROGRAM DESCRIPTIONS

A. Control Pidents

◆ QUIDB

5.15 The QUIDB is the queue control program of the RCSS. Any message which is entered from any recent change source must be queued before it can be processed. The QUIDB provides the queuing, queue service, queue release, and queue audit function for all of the RCSS queues. The following are the different queues within the RCSS:

- (a) Recent Change Administrative IM Queue (No. 1A ESS switch only)
- (b) Recent Change TTY Queue

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- (c) Recent Change Interactive Queue
- (d) Recent Change Batch Queue
- (e) CCSC Queue.

5.16 The recent change administrative IM queue is used for all recent change administrative IMs which require the use of RCMU. This queue has the highest priority in queue service, as the messages which use it are generally trying to clean up garbaged recent changes. These messages should therefore be given priority over normal recent change message processing. An entry on this queue will be served as soon as a recent change scratch block becomes available.

5.17 This algorithm is used because the entries on the recent change interactive queue require higher priority than the recent change batch queue and the CCSC queue. The recent change interactive queue has human client waiting for a response at the end of processing the recent change message. On the other hand, the recent change batch and CCSC queues do not have a human client waiting for a response. Therefore, their priorities are not as great as the recent change interactive queue.

5.18 The audit of the queues is an addition to Audit 4 which goes through the headcells of all of the queues and checks for any garbaged data within those queues. If bad data is found, the entire queue is reinitialized, thus removing any entries on the queue at the time, and an audit error is printed.

5.19 The recent change TTY queue is used for all recent change messages which are input from the service order or recent change office channels. This queue is given second highest priority behind the recent change administration IM queue. An entry on the recent change TTY queue will be served when a recent change scratch block becomes available. However, there should be nothing on the recent change administrative IM queue to be served and no other TTY recent change message or segmented message in input processing.

5.20 The recent change interactive queue is used for recent change messages which originate from centrex station rearrangement (CSR) clients and for delayed activation of service orders via phone.

5.21 The recent change batch queue is used for recent change messages which originate from

the INWATS data base for the Busy/Idle Status Indicator (BISI) feature.

5.22 The CCSC queue is used for customer changeable speed calling changes made by customers via the phone.

5.23 The recent change interactive, recent change batch, and CCSC queues are served when a recent change scratch block becomes available and when neither the recent change administrative IM queue nor the recent change TTY queue is served. The priority of service for these three queues is as follows:

- (a) Recent change interactive queue—16 out of 24 times
- (b) Recent change batch queue—4 out of 24 times
- (c) CCSC queue—4 out of 24 times.♦

RCIG

5.24 The RCIG is the input screening, initialization and general control module of the RCSS. It provides IM and channel screening, system initialization for message processing, control of the message processing sequence, and control of several auxiliary recent change functions such as TTY rollback and listing rollback area orders.

5.25 The RCIG screens all inputs from the following sources of recent change input:

- (a) Service order TTY (including paper tape/magnetic cartridge or magnetic disk)
- (b) Office recent change TTY.

5.26 In addition, the office recent change TTY is the most important source of recent change information. Any recent change message and all recent change administrative messages can be entered via the office recent change channel. The office recent change channel is selected from among those channels specified in the recent change IM class. Currently, the channels in the recent change IM class are:

- (a) LOC—local maintenance TTY
- (b) REM—remote maintenance TTY
- (c) SC1—switching control center TTY No. 1

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(d) SC2—switching control center TTY No. 2

(e) SRM—supplementary remote maintenance.

The RCS (service order TTY) is also in the recent change IM class but cannot be selected as the office recent change channel.

5.27 After a system reinitialization (SR) or phase which zeros call store, the office recent change channel is null. To assign an office recent change channel, type at any recent change input class channel:

```
ALW:RCCHAN aaa! where aaa = LOC
                        = REM
                        = SC1
                        = SC2
                        = SRM
```

5.28 The system response to the above IM is:

REPT:RC WARNING

OFFICE RC CHANNEL = aaa

This response is accompanied by a spurt minor alarm. It is not intended that the office recent change channel be casually switched from channel to channel.

5.29 As part of its input screening function, RCIG checks that any recent change message or recent change administrative IM was input on a legal TTY channel. The legal input channels from the various IMs are shown below:

Type of Message	Legal Input Channel
RC:	RCS, Office Recent Change
ALW:RCCHAN	LOC, REM, SC1, SC2, SRM
ALW:RCSOURCE	Office Recent Change
INH:RCSOURCE	Office Recent Change
OP:RCCENSUS	RCS, Office Recent Change
OP:RCRBLIST	RCS, Office Recent Change

RCCNL:ROLLBACK Office Recent Change

RCACT:ROLLFWD Office Recent Change

OP:RCDYLIST Office Recent Change

OP:RCRFLIST Office Recent Change

When RCIG determines that a recent change message (RC: or otherwise) was input on an illegal channel, it acknowledges with a ?C TTY acknowledgment, and the RCSS is otherwise unaffected.

5.30 The RCIG also checks the status of the RCSS and the allow/inhibit flag associated with the recent change source. If the input source is inhibited, the RCSS acknowledges the request by sending an RL,<LOCKOUT> TTY acknowledgment to the input channel, where RL indicates repeat later. If the source is not inhibited but the appropriate queue is full, the RCSS returns an RL,<BUSY> TTY acknowledgment.

5.31 The RCIG performs an SR for processing recent change requests. An IM which begins with "RC:" is passed to RCIG at subroutine RCINIT from the input/output program (IOCP). After queue service of the request, control is passed to a routine (RCINIT1) to process the first input line. The entire input line is passed to RCIG in the channel memory block. From this input, RCINIT1 extracts the message index (LINE, TRUNK, PSWD, etc); type (NEW, CHG, or OUT); and the action option (IMMED or DELAY). If an input error is detected in the heading, an invalid heading (IH) or error (ER) TTY acknowledgment is given and the channel is released. If no errors are found in the first line, a time break is taken to wait for the next input line.

5.32 All IMs which are not of the new No. 1A ESS switch format, ie, all converted No. 1 ESS switch IMs, have to be screened by the RCSS in case the RCSS is expecting input on that particular channel. There is no way to distinguish between a converted No. 1 ESS switch IM and an input line of a recent change message. Thus, all nonstandard IMs are passed to RCIG from the input/output program. The RCIG routine, Recent Change TTY Message (RCTTYM), checks to see if a recent change message line is expected on the input channel. The RCTTYM compares the input channel number with the channel number stored in the usage word of each recent change scratch block, which is in use by a TTY in

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input processing. If the two do not match, the input is passed to pident TTYM as a converted No. 1 ESS switch IM. If the input channel numbers match, the input is assumed to be the next line of a recent change message being processed as described in pidents RCIE and RCKI.

5.33 The general control portion of RCIG directs the flow of program control among the other control modules in the RCSS, according to the type of IM being processed. The four basic parts of the general control module are:

- (a) Data tables
- (b) A sequence initialization routine
- (c) The sequencer
- (d) A routine used to exit from the RCSS.

5.34 There are several data tables used to control the sequencing of RCSS control modules. Table GSEQNO translates the type of message (NEW, CHG, or OUT) and action option (IMMED or DELAY) into a sequence number. This sequence number is then used as an index into a second table, GSEQTAB, which consists of lists of the control modules arranged in the order in which they are to receive control for each sequence. Two call store program state words, R2PSW1 and R2PSW2, are used by general control to record the number of the module currently in control.

5.35 Sequence initialization routine translates a code in item R2ISEQ of state word R2PSW2 into a sequence number, using table GSEQNO. The R2ISEQ is set by the initialization module on the basis of the message type (NEW, CHG, OUT) and the action option (IMMED or DELAY). The module number of the initialization module is stored in item R2LUN of state word R2PSW1 to indicate that the initialization module was the last to have control.

5.36 The general control sequencer selects the flow of control between modules, based on the type of message being processed. It does this by indexing into the sequence table GSEQTAB with the sequence number in program state word R2PSW1 to get an ordered list of modules for the sequence being processed. The module number stored in program state word R2PSW1 is used as an index into the sequence to derive the next module that should get control.

This module number is stored in program state word R2PSW1 to indicate that the module now has control. The traffic load of the office is then determined, and R2VSEGIN is set to indicate the amount of work that must be performed between real time breaks, according to the module that is to receive control. Control is then passed to the proper module through the subroutine linkage mechanism. Every module returns to the address in J with registers restored.

5.37 The RCSS exit routine checks item R2SUBM of program state word R2PSW1 to determine if the message just processed is complete or is a segmented message. For a segment, the RCSS is reinitialized for the next segment and the general control sequence is restarted. For a complete message, if there were no errors, an accept message is printed, the internal order number daily sequence number is incremented, and control is returned to the ESS switch main program via routine RSQUIT.

5.38 The last function of RCIG is to control the recent change administrative functions. These functions are:

- (a) Listing the orders in the rollback area
- (b) Inhibiting/allowing the various recent change input sources
- (c) Processing the ALW:RCCHAN IM,
- (d) Processing the OP:RCCENSUS IM
- (e) Performing TTY rollback operations
- (f) Automatically inhibiting CCSC if the recent change audit finds a problem in the recent change queue.

RCIE

5.39 The RCIE is the recent change input editor and does the initial processing of the input characters passed in the TTY buffer from IOCP. The RCIE is stimulus-controlled in that the client programs (either RCIG for first line processing or RCKI for keyword processing) turn it on by requesting a line of input. The functions performed by RCIE are as follows:

- (a) Character translation, from 7-bit ASCII to recent change character code, and loading into line buffer

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(b) Character screening to reject any characters not in the allowed character subset and to discard ignore characters (like RUBOUT and XOFF) and all characters within quotes

(c) Determination of end of line so a complete line can be passed back to the client

(d) Loading of input error TTY acknowledgment or line accept TTY acknowledgment.

5.40 The RCIE is structured as a state table with the translated recent change character codes used as input to get the next state and an associated work routine. For example, if the system is in the state GETLIN (get a line) and the input is "/" (slash), the next state found in the state table is FORCHK (check the input format) and the work routine will return the line to the client program. The characters in the TTY buffer are unloaded one at a time via an RSUB routine. The characters are immediately translated by the XLATE table into recent change character code and stored in the recent change input buffer (Fig. 6).

RCKI

5.41 The RCKI is the recent change keyword input program and performs the processing and local error-checking of the keywords of a recent change message. The descriptions of the valid keywords and data formats are read from 12-bit word tables, the message keyword table, and the supplementary input table. Word layouts of the 12-bit tables are contained in the program listing.

5.42 The input consists of the keyword units of the message read from the recent change input buffer (Fig. 6). Based on the format information stored in the 12-bit input tables, the keyword data is read and checked for errors. The checks performed by RCKI are local to each keyword unit. The message is rejected if a keyword is not valid for the message, or if the data (if any) has the wrong format or range. The assembled data is then stored in the MSB, and the corresponding keyword-received bit in the truth value table is set. If more than one call store word is required for keyword data storage, an MSB auxiliary block is used.

5.43 Error termination can be caused by two types of errors, user errors and internal errors. An

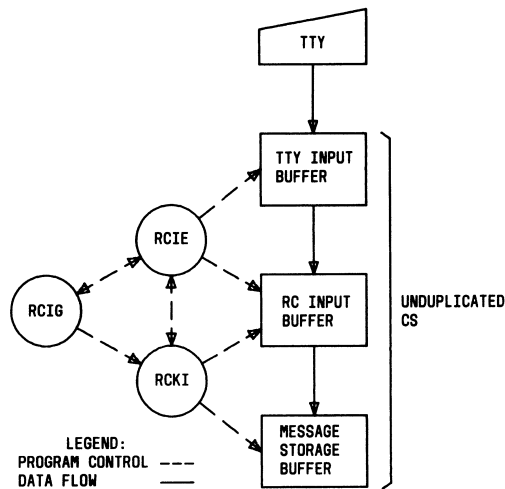


Fig. 6—RCSS Input Processing

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error code is assigned to each type of user error, such as invalid keyword or invalid octal digit. The error code, along with the octal line and column where the error is located, is passed to the RSPRNT routine. The RSPRNT routine uses the error code in a correctable error TTY acknowledgment if the line ended with a / (slash), or in an INPUT type of an RC18 OM. Refer to Section 231-048-302 for error code explanations.

5.44 An internal error results from defensive programming checks. For example, if the control pushdown list (which saves 12-bit addresses while jumping within the supplementary input table) were to reach an overflow condition, an internal error would result. The program state at the time of the error is reported by an RC16 internal error OM via a call to the RSPBUG routine.

RCVC

5.45 The RCVC is the recent change validity check program. This program processes the validity tables contained in a message pident to ensure that the combination of keywords with their input data and the existing translation data (in memory) will produce a valid translation change. Valid translation changes are determined by translation and call processing restrictions and the administrative restrictions (eg, lines with centrex major class of service cannot be changed to plain old telephone service). The RCVC also forms a bit string called the format selector which is used on a bit-by-bit basis by the format pidents (RCFI, RCTF, RCCH) to build the correct formatted translation data.

5.46 The validity tests of each message are specified within a table consisting of 12-bit words. Layouts for the individual words are contained in the RCVC program listing.

5.47 Each validity section of a pident has three contiguous parts:

- Data check
- Logic check
- Format selector definition.

There can be up to three validity sections depending on the message type (NEW, CHG, or OUT). Each section is ended by an all zero 12-bit word, and if a sec-

tion is not needed, a single all zero word marks its absence.

5.48 In addition, validity check processing results in a bit string stored in the format selector. This bit string defines a translation format and is used by the format section.

RCTF, RCFI, RCCH (Format Section)

5.49 The format section of the RCSS (RCTF, RCFI, and RCCH) builds images of translation data generated by NEW and CHG type messages and stores them in the recent change work list. For CHG and OUT messages, the format section retrieves existing translation data from translation memory in unduplicated call store.

5.50 The format section uses three RCSS interface tables to communicate with the rest of the system:

- MSB (R2MSB)
- Truth value bits (R2TRVAL)
- Format selector (R3FORSEL).

5.51 The MSB holds keyword input data and some data generated internally by the data check section of RCVC. The truth value bits indicate which keywords have been received as input and which data checks and nodes are true. The format selector consists of five call store words with the appropriate bits set to indicate the exact layout of the translation data being prepared.

5.52 Two types of data tables are used by the format section:

- Translation format table
- Change table.

Each recent change message has both types in its pident, describing the format of the translation data for that message.

5.53 The translation format table consists of 12-bit words arranged into units called operations that are interpreted by the format section. The sequence of operations in a message's translation format table provides for all possible arrangements of

translation data that can be built by that message. The 12-bit data words associated with each operation in the translation format table are generated at compile time by a SWAP macro call describing that operation. The collection of all SWAP macros used to generate the translation format table forms a language to describe the translation formats. The format selector words are used to conditionally execute the translation format operations and thereby build the translation as specified in the recent change message.

5.54 The change table for each message consists of three parts:

- Change screening table
- Change transition table
- YES/NO and data/NO keyword list.

5.55 The change screening table contains information used by the format section while retrieving translation data from translation memory. It describes some required relationships between translation data and keyword inputs as well as updating keyword, truth value between change and new pass of a message. For example, when extracting data from translations for a change order, a data item of zero ordinarily means that the item is unassigned. If a zero value indicates valid data for a keyword, this fact would be recorded in the change screening table.

5.56 The change transition table describes keywords that must be moved on CHG type messages. For example, the keyword New Telephone Number (NTN) in the RC:LINE message must be moved to Telephone Number (TN) after the old TN is unassigned so that NTN will be assigned.

5.57 The YES/NO and data/NO keyword list contains all YES/NO and data/NO keywords so that set or reset the truth values for the keywords on change messages can be performed on them after translation data retrieval.

5.58 The format section operates in two passes:

- NEW pass
- CHG pass.

5.59 The NEW pass interprets the translation format table for the message being processed

under control of the format selector, to build the translation data required by the IM. This table describes to the program what input keyword, truth value bit, or format selector bit is associated with each item in the translation data. Moving the keyword data from the MSB, truth value bit, or format selector bit, the NEW pass builds the item of translation data in the recent change work list.

5.60 A CHG message is processed as an OUT message followed by a NEW message. That is, all translations are internally unassigned by a CHG pass and then modified and reassigned by a NEW pass. Interpreting the translation format table for the message being processed under control of the format selector, the CHG pass moves each item of existing translation data (from unduplicated CS) into its proper MSB location or truth value bit. As it goes through the translation data, it also generates the recent change work list entries to unassigned translations and returns all blocks involved to the idle link list. After the CHG pass, the MSB looks exactly as it would immediately after a NEW message had been input, and the data in translations has been modified so that this "NEW" message is acceptable.

5.61 The OUT messages stop after the CHG pass because all the work list entries necessary to unassign the translation have been made.

RCFI

5.62 The RCFI is a set of format interpretation subroutines that administer the scratch area in memory and decode translation format table operations. These subroutines are called by RCTF and RCCH. As each translation format table entry is decoded by RCFI routines, the format scratch area in unduplicated call store is updated with outputs for use by RCTF and RCCH as well as updating keyword, truth value between change and new pass of a message used by subsequent RCFI routines. Memory word layouts are provided in the RCFI program listing.

RCTF

5.63 The RCTF processes the NEW pass of format, using the MSB, truth value bits, format selector, and translation format table, and then constructs a translation data image in the recent change work list. The RCTF keeps track of where it is currently building translation data in a scratch word

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called the present word pointer. As each translation format table operation is read for RCTF by RCFI, the present word pointer is moved, or information is entered into the word pointed to by the present word pointer, on the basis of data that has been assembled in the format scratch location by RCFI. The unit of translation data assembly by RCTF is the item, a set of one or more contiguous bits within a word. For each item described by a translation format table entry, the contents of the MSB location, truth value bit, format selector bit, or constant that goes into that item, are inserted into the word pointed to by the present word pointer.

RCCH

5.64 The RCCH processes the CHG pass of format.

Using the translation format table and format selector, RCCH retrieves items from existing translations and moves them into the MSB and sets the corresponding truth value bits. The RCCH also uses the present word pointer in format scratch to keep track of which translation data word it is currently examining. As each translation format table operation is read for RCCH by RCFI, the present word pointer is moved or an item is moved from the word pointed to by the present word pointer into its appropriate MSB location or truth value bit. As each translation data item is examined, it is looked up in the change screening table to see if it needs special error screening or updating keyword, truth value between change and new pass of a message. Some translation format operations also cause recent change work list entries to be made to unassign the translator being examined and to give back associated blocks of translation memory to the idle link list of available space.

5.65 After the entire translation format table has been interpreted by RCCH, two cleanup functions are performed. First, the change transition move table is examined to see if any keywords should be moved before the NEW pass of the system. A keyword move means moving the contents of one MSB location to another. Second, the YES/NO and data/NO keywords in the YES/NO and data/NO keyword list are made to appear as they would have had they just been input.

RCWL

5.66 In the No. 1A ESS switch, RCWL performs the first pass processing of the recent change work list entries made by the format section pidents.

A work list entry consists of a gauge word and two or more data words. The gauge word contains a 5-bit right-adjusted item, the gauge, which characterizes the work list entry (there are 15 different types). The RCWL has the primary task of obtaining call store space for the eventual storage of Auxiliary (AUX) block data. The work list entries are altered somewhat in the process for subsequent processing by RCIB.

RCIB and RCMU (No. 1A ESS switch Only)

5.67 The RCIB takes the translation data built in the work list and converts it into a form acceptable to RCMU. The data is formed into primary change blocks (PCB) which are stored in the interface block. Each PCB is a block of 4 to 36 words containing a call store address and 1 to 32 consecutive words of data to be written starting at that address. A single recent change message may result in several PCBs being built to overwrite translation data. The RCMU reads the interface block and writes the translation data directly into translation memory (unduplicated call store) making the recent change immediately effective. The disk image of the translation data is brought up to date, and the rollback blocks (RBBs) are built and stored in the disk rollback area.

RCDY

5.68 The RCDY processes recent change messages which are entered on a delayed basis. The MSB image of the delay recent change is compressed (after validity checking) and stored in the delayed recent change area on disk. A directory at the start of the delayed recent change area contains a 2-word entry for each delayed recent change (Fig. 7). The recent change order number (enter with the recent change message) identifies each delayed recent change message and is the first word of a 2-word entry in the directory. The second word contains the relative address which points to the DAB containing the condensed MSB image of the recent change message. The second word also contains the length of the associated DAB.

5.69 At activation time, RCDY locates the desired DAB by equating the order number specified in the activate message with the order number in a

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particular 2-word entry in the directory. The start and end disk addresses are then computed from the second word in the control block entry, and the complete recent change message is expanded back into the MSB. Once the MSB is loaded with the recent change message, RCDY returns control to the normal message processing routines where validity is again checked and normal message processing resumes.

The message is then processed to completion as if it had just been input.

RSUB

5.70 The RSUB consists of more than 60 subroutines used by the other control pidents. Subroutines are included in RSUB if they were presently or potentially called from more than one pident.

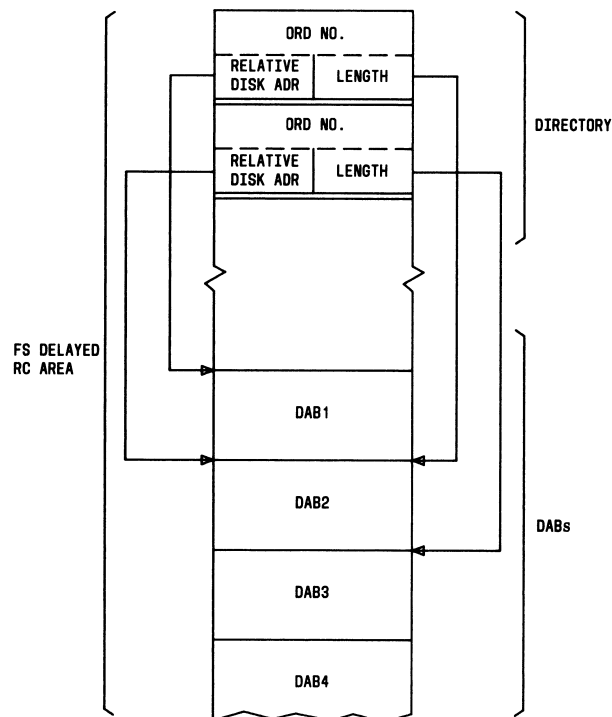


Fig. 7—Delayed Recent Change Message Storage

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B. Shared Pidents

RCTS and RCSI

5.71 The shared pidents, RCTS and RCSI, are sometimes referenced while using other pidents in connection with problem analysis procedures. The RCTS consists of a collection of special purpose subroutines, used by the control pidents, which provide functions that are too specialized to be handled efficiently by the macro languages of input, data check, and format.

5.72 The RCSI consists of five data tables accessed by several code pidents during recent change message processing. The tables are as follows:

(a) Message Head Table: The message head table contains a vector for each recent change message pident. This table is used by control pident RCIG.

(b) Tag and Assignment Table: Each table entry provides the structure of a translator in terms of head table, number of bits in selector and index, PTW (primary translation word) and head table unassignment codes, and power of expansion values. These tables are used by the RSGTAG routine in control pident RSUB when generating the TAG (program store address) of a translator.

(c) Parameter Table: This table is a Transfer Vector (TV) table for the parameters used in format checking of the keyword data. This table is used by control pident RCKI.

(d) TV Table for Supplementary Input Tables: Each table entry contains relocatable addresses of two separate supplementary input table assembly routines. The table is used when the entry in the keyword table of a message pident points to a supplementary input table assembly routine in RCSI for special keyword data processing. This table is used by control pident RCKI.

(e) Supplementary Input Table: Each table entry consists of two or more 12-bit words that describe the data of a keyword and indicate whether to store the data in the MSB or MSB auxiliary

area. Any of the recent change message pidents can point to entries in this table. This table is accessed by control pident RCKI, using the TV table.

C. Message Pidents

5.73 There is a separate message pident for each recent change message (with the exception of "RC:ACT:" for delayed messages, which is contained in RCDY). In general, there is a separate message pident for each type of translator (with a few exceptions such as RCLI, which affects both directory number and line equipment number translators; and TG and TGBVT, both of which affect the same translator). Each message pident is made up of 12-bit data tables which are used to drive the control pidents. There are six types of tables:

- Message Head
- ♦Keyword Data Assembly♦
- Keyword
- Validity
- Format
- Change.

These tables provide the decision-making information necessary to control the processing flow in the associated control pidents.

Message Head Table

5.74 The message head table contains the following:

- (a) Pident message identification
- (b) Relative address of associated tables and subtables
- (c) Types of recent change messages allowed (NEW, CHG, OUT) unless prohibited

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(d) Number of associated keyword units

(e) Number of MSB entries.

Note: The MSB is a storage facility in the CS area. The MSB consists of the MSB proper and auxiliary areas. The MSB proper consists of a 1-word entry assigned for each keyword in the recent change message, 1-word entries for internal keyword, and the MSB auxiliary area is for use when the 1-word entry is inadequate to store the keyword data.

Keyword Data Assembly Table

5.75 The Keyword Data Assembly Table (KDAT) is used for supplementary input routines which are required only for a particular recent change message. These routines are put in the KDAT table rather than in the RCSI. Consequently, the RCSI is for routines used by more than one pident. If a routine is used in only one pident, it is put in the KDAT table in the message pident.

Keyword Table

5.76 The keyword table contains all valid keywords for the message in condensed hashed form. (This hashed form is a number created by combining the keyword character codes according to an arbitrary, but fixed algorithm, to achieve a compact code for the total keyword.)

5.77 For each keyword, the table contains the following:

- (a) Hashed form of the keyword
- (b) Either a description of the data that must accompany the keyword, including a limited number of basic checks such as type of data, number of digits, for more complex forms of keyword data, or a pointer to the description of supplementary input tables located in either the KDAT table or the shared pident RCSI
- (c) An indicator for allowing the keyword to be repeated in segmented messages
- (d) A word containing the actual characters of the keyword (the first two and the last two characters if the keyword is more than four long) used to print back recent change messages for the

OP:RCDYLIST and OP:RCRFLIST messages with the detail option. (No. 1A ESS switch only).

5.78 There can also be a:

- (a) Internal keyword: Scratch and storage area used by message pident.
- (b) Keyword equivalence: Specifies equivalent alternative keyword name (ie, NTN synonymous to NEWTN or CFN synonymous to CFTN).
- (c) Keyword collision table: If two keywords hash value are the same, both keywords are placed in the collision table. In collision table first, second, and last two letters are used for keyword name.
- (d) CSR keyword equivalence: Specifies equivalent alternative keyword CSR keyword name inputs.
- (e) CSR keyword collision: If two keywords hash value are the same, both keywords are placed in the CSR collision table. In CSR collision table first, second, and last two letters are used for keyword name.
- (f) CLOG/AMA keyword table: Used for customer originated recent change output messages to print keyword names.

Validity Table

5.79 The number of validity tables contained in a message pident varies in accordance with the number of message types (NEW, CHG, OUT, or equivalents) allowed by the message. Typically, a validity table is provided for each message type allowed, but certain validity tables are combined in some messages, such as one combined table for both CHG or OUT messages. Each subtable name is prefixed by NEW, CHG, OUT, or equivalents. Normally, validity tables are provided for the following major functions:

- (a) Data Check Table: The data check table contains the detailed checks performed on keyword data (which includes comparing keyword data with translation values, checking translation assignments, and testing for specific values of keyword data) and the algorithms to calculate internal keyword values.

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(b) Logic Check Table: The logic check table contains Boolean tests to be performed on previously defined truth value bits for keyword units, data checks, or logic checks. These tests check the consistency of the input keywords, and existing translations for valid combinations of keywords and data. If the tests are successful the truth bit for that test is set to true. Some checks cause RC18 messages to be printed if they fail the set of tests. (Section 231-048-302)

(c) Format Selector Table: The validity format selector table contains a set of Boolean operations to be performed upon the truth value bits to derive the format selector bits.

Format Table

5.80 The translation format table contains the data format description of the translator words changed by the recent change message. Each item in a word of the affected translator is described in terms of size, displacement, auxiliary word number, etc. The new contents of the translator words and items are described in terms of:

- Truth value bits
- Format selector bits
- Data in the MSB
- Data in the MSB auxiliary area.

The RCTF uses this data to build translation data from MSB data and the MSB auxiliary area data. The RCCH uses it to reconstruct MSB data, MSB auxiliary area data, and truth value bits from old data in translations.

Change Table

5.81 The change transition screening table is only used to process a CHG or OUT message; therefore, change tables are not provided for many messages. The table contains the following:

- (a) A change keyword list that is used at the end of the CHG pass of the format table to move data from one keyword to another in preparation for a NEW pass of the format table. The list allows truth table bits for the moved data to be updated.
- (b) Comparison checks between old and new keyword data (a match failure results in a CHGER-type RC18 message).

- (c) All YES/NO and data/NO keywords of the message.

ERROR PROCESSING

A. User-Detected Errors

5.82 The simplest form of error detection is recognition by a user, while typing the message (either on-line or perforating a tape off-line). One way to correct such an error is to use the underscore, each occurrence of which effectively backspaces one character. (Thus, LEM_N internally becomes LEN, and TN456 _ 456 becomes TN 456). The underscore, however, cannot undo the effect of a control character (!, /, %, carriage return, etc).

Note: Underscore is for model 35 TTY. Model 43 TTY uses the backspace key. On CRTs the cursor is repositioned to the error and the correction mode.

5.83 Another way of correcting a user-detected error is to cancel the current line of input with the dollar sign (\$). An ampersand (&) cancels the current message or, if segmented, the current segment of the message.

B. Input Format Errors

5.84 If a format error is made and the line is ended with a slash (/) or percent sign (%), for segmented messages only, the system responds with a correctable error TTY acknowledgment identifying the type of error and the column number (number of character spaces, in octal) of the error. The line in error is automatically canceled, and may be immediately retyped. These errors are also called correctable errors. Since they are detected by the input processing program, they can be corrected without repeating earlier input lines. Details of these TTY acknowledgments are given in Section 231-048-302.

C. Validity and Translation Errors

5.85 These errors are only detected after input is complete and the total input is checked for internal validity and consistency with translation data already existing in the system. These errors are uncorrectable in the sense that the entire message (for segmented messages, only the last segment must be reentered, but all keywords must be entered) must be reentered. Detection is announced by the TTY ac-

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knowledgegment "ER" following the end of message (!) or end of nonfinal segment (%), and the explanation of the error is given in subsequent output message (OM). These OMs are described in Section 231-048-302.

D. Internal Errors

5.86 The RC16 INTERR (internal error) printout, as a response to a recent change message, indicates some type of abnormal message termination. (An abnormal message termination is in contrast with a normal message termination such as accept, reject for input or validity, or reject for insufficient recent change memory). The internal error termination is accompanied by an extensive octal dump of key recent change message control and data words to permit a thorough analysis of the problem causing the termination. The analysis of the dump requires an understanding of the RCSS structure. Assuming this, the following paragraph gives clues of how to analyze an RC16 INTERR problem, with some examples.

INTERR Data

5.87 The first RC16 INTERR printout, consisting of six words, gives the central control register at the time of detecting an internal error. Of most importance here is the L register, which gives the code pident location at which the error was detected. By going to the location in the pident listing pointed to by L, one can find a description of the reason for the internal error, an interpretation of the other central control registers, as well as use of the other INTERR printouts.

5.88 Update Errors: If an error occurs during the update of the translation data (eg, a disk request did not complete) a Type I rollback is automatically initiated to remove any part of the recent change which may have been completed through translation update. Thus, if any part of the recent change update fails, the entire recent change message fails and must be reinput from the beginning. The REPT:RCFAILURE OM reports the update failure, and this normally occurs following the "IP" TTY acknowledgment printed after the end-of-message character (!). It can also occur after the segmented message character (%) since each segment is a complete recent change in itself. (See Section 231-048-302 for details.)

5.89 Interpreting the Central Control Registers: Although the contents of central con-

trol registers depend on the specific INTERR call, the programming standards adopted by the RCSS permit some general statements about their probable contents. The order of the registers are F, K, L, X, Y, and Z.

(a) Register L: This register is the address of client calling INTERR routine. Correct interpretation of the location pointed to by L is the most critical step in the interpretation of INTERR printouts. In some instances, L alone will provide all the necessary information. In others, some or all of the following INTERR printouts will need to be interpreted. Of special importance here is L within the pident RSUB. The RSUB consists of shared subroutines referenced by the other code pidents. In this case, L will normally tell what the error is, but will not specify when or where the error occurred. In this case, one must look at the state words and push-down scratch to find where the error occurred.

(b) Register X: In pidents RCKI, RCVC, RCFI, RCCH, or RCTF, register X will likely contain the 12-bit address in the table where the INTERR occurred. This permits isolation of the error to a 12-bit word in the message pident. For example, if L points to RCFI and X points to the 12-bit word following a TAG table instruction in any message pident, one can deduce with reasonable confidence that the translation data (eg, trunk network number, line equipment network) being used to create a call store address at this point is not producing a valid call store address. This can be further verified by looking in the listing of RCFI as indicated by L.

(c) Registers F, K, Y, Z: Use L and pident listing to find contents.

State Words

5.90 The second INTERR message, consisting of ten words, (twelve words for 1E7/1AE7 and later generics) prints state and pointer words of the RCSS. Of greatest significance here are the following:

- (a) The R2PSW1 (4-0) equals code pident currently in control.
- (b) The R2NAPDS points to the next available word of push-down scratch.
- (c) The R2NAMSBA gives the next available word of the MSB auxiliary area.

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- (d) The R2NAWL gives the next available work list location.
- (e) The R2TRVAL specifies address of the truth table (1E7/1AE7 and later generic).
- (f) The R2SB specifies address of recent change scratch block being used for the input message (1E7/1AE7 and later generics).

For more details refer to Section 231-048-302.

5.91 As mentioned previously, some INTERR printouts tell what the error is, but not where it is located (especially in RSUB). In these cases, one can use C(R2NAPDS)—1 to C(R2PDS) (ie, all used push down scratch) to find a history of events leading up to the internal error. Since the scratch system gives client addresses and, in some cases, the contents of the central control registers when a client called subroutine, one can work backward from the scratch entries at C(R2NAPDS)—1 to determine the problem. (Note that one must understand the layouts of scratch seized in R2PDS.)

Input Control

5.92 The third INTERR printout gives five input control words, in call store addresses starting with 17515:

- (a) R2SVCHAR—ASCII character last processed
- (b) R2ISTATE—Input editor state
- (c) R2BUNLD—Line buffer unload pointer (1E6/1AE6 generic programs)
- (d) R2LINE—Current line (1E6/1AE6 generic programs)
- (e) R2COLUMN—Current column (1E6/1AE6 generic programs)
- (f) R2BUFPTR1—Line buffer load pointer (RCIE) and line buffer unload pointer for last keyword (RCKI)
- (g) R2BUFPTR2—Current line buffer unload pointer for RCKI
- (h) R2CCHRPOS—Current line and column.

5.93 The fourth and fifth INTERR printouts give a Boolean history of input, data check, validi-

ty, and format selection of the recent change message. By inspecting the truth value table (fourth printout), one can see which keywords were received, which data checks were true, and which validity tree nodes were true. The format selector (fifth printout) gives the selected paths through format based on input and translation data.

Push-Down Scratch

5.94 The sixth and seventh INTERR printouts give a portion of the 168-word push-down scratch. Selected for printout are the first 14 words (sixth INTERR message) and last 14 used, plus the next seven available (seventh INTERR = 21 words). In some circumstances it will be necessary to DUMP additional push-down scratch locations.

6. ABBREVIATIONS AND ACRONYMS

6.01 The following is a list of abbreviations and acronyms used within this section.

ASCII	American Standard Code for Information Interchange
BINK	Binary one thousand (memory block of 1024 (decimal) words)
BISI	Busy/Idle Status Indicator
CCSC	Customer Changeable Speed Calling
CS	Call Store
CSR	Centrex Station Rearrangement
DAB	Delayed Activation Block
EOT	End Of Transmission
FS	File Store
IM	Input Message
INWATS	Inward Wide Area Telecommunication Service
NTN	New Telephone Number
MCC	Master Control Center
MSB	Message Storage Buffer

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OM	Output Message	RFB	Rollforward Block
PCB	Primary Change Block		
Pident	Program Identification	SC1	Switching Control Center TTY No. 1
PS	Program Store		
PTW	Primary Translation Word	SC2	Switching Control Center TTY No. 2
RBA	Rollback Area		
RBB	Rollback Block	SR	System Reinitialization
RC	Recent Change		
RCS	Recent Change Service Order TTY	SWAP	Switching Assembly Program
RCSS	Recent Change Subsystem	TN	Telephone Number

Nortel DMS-100 Table CLLI

Table Name

Common Language Location Identifier.

Functional Description of Table CLLI

The Common Language Location Identification (CLLI) codes identify the far-end of each announcement, tone, or trunk group.

The CLLI codes describe each announcement, tone, trunk group, test trunk, national milliwatt test line, and service circuit.

You must enter the CLLI codes for all national milliwatt test lines in tables CLLI and TRKGRP. In table TRKGRP, type TTL2, field MWDBLEVEL specifies the card code of the milliwatt test line. The card code indicates the dB level of the milliwatt source. Field MWSPRVSN specifies the supervision. The old fixed pseudo CLLI codes can be present. Pseudo CLLI code cannot assume the dB level and supervision.

The international milliwatt test lines continue to use the fixed pseudo CLLI codes, INTL102T, INTL102L, and INTL100Q. In table TRKGRP (type TTL2), the international test lines, INTL102T, INTL102L, and INTL100Q have datafill in fields MWDBLEVEL and MWSPRVSN. The switch does not use the information in these fields.

The list of codes must contain the fixed pseudo codes that apply to the switch. The list of codes must contain the codes that the operating company defines.

Use the Command Interpreter (CI) command `RENAMECLLI` to rename or change the spelling of a current CLLI code. Use the CI command `CLLINUMBER` to obtain the number associated with the CLLI name. Specified tables require the CLLI number and not the CLLI name. Refer to the *Basic Translations Tools Guide* for additional information.

Note: Do not use the CI command `RENAMECLLI` for primary rate interface (PRI) trunks that are used as a PRI Public Safety Answering Point (PSAP).

The following are the four types of CLLI codes:

- The CLLI codes that external (EXT) files contain. The system adds these codes to table CLLI if a feature is in the switch.
- The fixed CLLI codes that you must add to table CLLI. The spelling of the codes must be the same as the spelling that appears.
- The suggested CLLI codes that you must add to table CLLI. The spelling of these codes can be different. This condition applies if the spelling of the code is the same in each table in which the code appears.
- The CLLI codes that the operating company defines.

The CLLI codes the EXT files contain appear in the following table. The system adds these codes to table CLLI for an associated feature.

The type of restart the system requires after the addition of the CLLI code to table CLLI appears in the following list. This addition allows this CLLI code to occur in another table. The system requires this restart to increase the TRKGRSIZ for the specified CLLI.

If your switch has the NORESTARTSWACT utility, a service interruption does not occur when you activate data changes. Refer to the *NORESTARTSWACT User Guide*.

CLLI Codes that Depend on the Feature

CLLI	Explanation	Related Table	Restart
BBTOUT	Board-to-Board Testing	None	None
DLSE	Dial Line Service Evaluation	None	None
DMODEMC	Digital Modem, Bell 212 Communication Protocol	DMODEM	None
DPPSC	Distributed Processing Peripheral Scan Circuits	DPP	None
DSCKT	Dialable Short	MTAHORIZ	None
EADNMCLLI	Engineering and Administration Data Acquisition System for Network Management	EADNMTG	None
FRBTONE	Faultsman's Ringback Tone (Use this tone to access acknowledgement tone. The acknowledgement tone is a special information tone that resides in the Digital Recorded Announcement Machine [DRAM].)	DRAMS	Cold
ITSE	Incoming Toll Service Evaluation	None	None
MISCSC	Miscellaneous Scan Group (SC) Circuits (See note 9.)	SCGRP	None
MISCSD	Miscellaneous Signal Distributor (SD) Circuits (See note 9.)	SDGRP	None
NWMSC	Network Management Scan Point	NWMSC	None
NWMSD	Network Management Signal Distributor Point	NWMSD	None
OFFHKSUP	Supervision Signal Off-Hook (See note 5.)	OFRT and all RTEREF subtables	None
ONHKSUP	Supervision Signal On-Hook (See note 5.)	OFRT and all RTEREF subtables	None
ROTLSC	Remote Office Test Line Scan Point	ROTLSCSD	None
ROTLSD	Remote Office Test Line Signal Distributor Point	ROTLSCSD	None
STGOVFL	Equal Access Shared Trunk Group Overflow Peg	IBNRTE	None

-continued-

CLLI Codes that Depend on the Feature (continued)

CLLI	Explanation	Related Table	Restart
STRG	Station Ringer (Refer to the current station ringer test example.)	None	None
SYNCH	Synchronous Test Line (Refer to route reference 11 for table OFRT.)	OFRT and all RTEREF subtables	None
TERMARTER	International ARTER Transmission Testing of Turkish Trunks (The addition of these trunks occurs at Initial Program Load [IPL] time by terminating ARTER software code.)	None	Cold
TOPSCOINCOLLECT	TOPS Coin Collect (See note 4.)	OFRT and all RTEREF subtables	None
TOPSCOINDISABLE	TOPS Coin Key Pad Disable (See note 4.)	OFRT and all RTEREF subtables	None
TOPSCOINENABLE	TOPS Coin Key Pad Enable (See note 4.)	OFRT and all RTEREF subtables	None
TOPSCOINRETURN	TOPS Coin Return (See note 4.)	OFRT and all	None
TRKLPBK	Dialable Loopback for Trunks that are DS-0 Channels (These trunks include ISDN User Part [ISUP] trunks. See note 10.)	None	None
WINKSUP	Supervision Signal Wink (See note 5.)	OFRT and all RTEREF subtables	None

 -End-

The fixed CLLI codes to add to table CLLI appear in the following table. The spelling of the fixed CLLI codes must be the same as the spelling that appears.

Fixed CLLI Codes

CLLI	Explanation	Related Table	Restart
AIS	Automatic Intercept System Trunk	TRKGRP (type AI)	None
ALL	SATOVER Table Generic CLLI	SATOVER	None
AOSSANN	Auxiliary Operator Services System (ADSS) Announcement	ANNS DRMUSERS	None
AOSSDEV	ADSS Device	AOSSDEV	Cold
AOSSPOS	ADSS Position	AOSSPOS	Cold
AOSSPOSDATA	ADSS Position Data	AOSSPOS	Cold
ASCS	Alarm Sending and Checking	ASCS	None

 -continued-

Fixed CLLI Codes (continued)

CLLI	Explanation	Related Table	Restart
ATMERA	ATME2 Type-A Responder (See note 11.)	OVR0-9	Cold
ATMERB	ATME2 Type-B Responder (See note 11.)	OVR0-9	Cold
ATMERC	ATME2 Type-C Responder (see note 11)	OVR0-9	Cold
BVTONE	Busy Verification Tone (See note 7.)	STN	Warm
CAPOX	CAMA Call Waiting Suspension	CAMACSW	Cold
CF3P	Three-Port Conference Circuit	CONF3PR	None
CF6P	Six-Port Conference Circuit	CONF6PR	None
COPP	Cutoff on Permanent Signal and Partial Dial	None	None
CPOS	CAMA Position Talk Circuit	CAMACSW	Cold
CPOSKEY	CAMA Position Key Circuit	CPOS	Cold
CSUSP	Traffic Operator Position System (TOPS) CAMA Suspension Circuit	CSUSP	None
CWT	Call Waiting Tone	STN	Warm
DCLTONE	Dialable Cable Locator Tone	TRKGRP (type MAINT)	None
DCTTERMBERT	Data Call Tester Bit Error Tester Termination Application	DNIBERT	None
DGT300	DMS-300 Digital Digitone Receivers	RECEIVER	None
DISTCWT	Distinctive Call Waiting Tone	STN	Warm
DMODEM	Digital Modem (Integrated Business Network [IBN], TOPS.)	None	None
DQB300	Dial-up Autoquote Modem at 300 Baud	DQMODEM	None
DQB1200	Dial-up Autoquote Modem at 1200 Baud	DQMODEM	None
DRCWTONE	Distinctive Ringing/Call Waiting Tone	STN	Warm
DTU	Digital Test Unit	TRKGRP (type MAINT)	None
EAPEG	Equal Access Overflow Peg	AMAOPTS	None
EBOT	Executive Busy Override Warning Tone (Most switches use this tone. The UK switches are the only switches that do not use this tone.)	STN	Warm

-continued-

Fixed CLLI Codes (continued)

CLLI	Explanation	Related Table	Restart
ENHCWT1	Enhanced Call Waiting Tone for the First Secondary Directory Number (SDN)	STN	Warm
ENHCWT2	Enhanced Call Waiting Tone for the Second SDN	STN	Warm
ENHCWT3	Enhanced Call Waiting Tone for the Third SDN	STN	Warm
ERWT	Expensive Route Warning Tone	STN	Warm
ESADGTR	Emergency Stand-Alone Digitone Receivers	TRKGRP	None
ESUP1 to ESUP5	Digital Echo Suppressors (See note 3.)	ECHOSUP	None
FMTSC	Fiber Multiplex Terminal Scan Point	FMTSC	None
FPOT	Foreign Potential Test (Refer to example at the end of this section.)	OFRT and all RTEREF subtables	None
GTERM102T	Terminates Testlines on Global 100 Trunks (This CLLI routes an incoming call to the MTM test equipment. The MTM generates a T102 toll milliwatt tone.)	None	None
GTERM100Q	Terminates Testlines on Global 100 Trunks (This CLLI routes an incoming call to the MTM test equipment. The MTM generates a T100 quiet termination.)	None	None
GTERM102S	Terminates Testlines on Global 100 Trunks (This CLLI routes an incoming call to the MTM test equipment. The MTM generates a T102 steady tone.)	None	None
GTERM102L	Terminates Testlines on Global 100 Trunks (This CLLI routes an incoming call to the MTM test equipment. The MTM generates a T102 local milliwatt tone.)	None	None
HOBICDEV	Hotel Billing Information Center Device	HOBICDEV	Cold
HSET	Maintenance Head Set Circuit	TRKGRP (type MAINT)	None
IEBOT	International Executive Busy Override Tone (Only UK switches use this tone.)	STN	Warm
IDLE	Idle (Only in a North American switch uses this CLLI. Refer to example at the end of this section.)	OFRT and all RTEREF subtables	None

-continued-

Fixed CLLI Codes (continued)

CLLI	Explanation	Related Table	Restart
INTL100Q	International 100 Balance Test Line	TRKGRP (type ITL2)	None
INTL102T	International 102 Test Line	TRKGRP (type ITL2)	None
INTL102L	International 102 Test Line	TRKGRP (type MAINT)	None
ISDNBRIVOE	Integrated Services Digital Network	STDPRI RTEREF	None
IROH	International Receiver Off-Hook	TONES	Warm
ITOPSDEV	International TOPS Device (See note 6.)	ITOPSDEV	Cold
ITOPSPoS	International TOPS Position Voice (See note 6.)	ITOPSPoS	Cold
ITOPSPoSDATA	International TOPS Position Data Trunk (See note 6.)	ITOPSPoS	Cold
JACK	TTP - Toll Jack Circuit	TRKGRP (type MAINT)	None
KSR2ICVR	For Licensee Use Only	RECEIVER1	None
KSR2OCVR	For Licensee Use Only	RECEIVER	None
LKOUT	Lockout (Refer to example at the end of this section.)	OFRT and all RTEREF subtables	None
LOOPA1	Loop-Around Test Line, Port 1	TRKGRP (type LOOPA)	None
LOOPA2	Loop-Around Test Line, Port 2	TRKGRP (type LOOPA)	None
LTU	Line Test Unit	TRKGRP (type MAINT)	None
MF300	DMS-300 Analog and Digital MF Receivers	RECEIVER	None
MJACK	Metallic Jack	MTAMDRVE	Cold
MOBICPT	Mobile Intercept	None	Cold
MOBRODR	Mobile Reorder	None	Cold
MONTALK	Talk and Monitor (This CLLI is for Line Test Unit [LTU].)	TRKGRP (type MAINT)	None
MTADriver	Metallic Test Access Driver	MTAHORIZ	None
MTU	Metallic Test Unit (nondomestic) or Multiline Test Unit (domestic)	TRKGRP (type MAINT)	None
NOSYN	Nonsynchronous Test Line (See route reference 11 for table OFRT.)	OFRT and all RTEREF subtables	None
OAUSC	Office Alarm Unit Scan Groups (See note 2.)	ALMSCGRP	None

-continued-

Fixed CLLI Codes (continued)

CLLI	Explanation	Related Table	Restart
OAUSD	Office Alarm Unit Signal Distributor (See note 2.)	ALMSDGRP	None
OCKT	Open Circuit Termination	TRKGRP (type SOCKT)	None
OHQT	Off-Hook Queuing Tone	STN	Warm
OOCDEV	Overseas Operator Center (OOC) Device	TOPSDEV	Cold
OOCPOS	OOC Operator Position - Voice	TOPSPOS	Cold
OOCPOSDATA	OOC Operator Position - Data	TOPSPOS	Cold
OPMPES	Outside Plant Module Power and Environmental System	OPMINV	None
PCNOR	Preset Conference Normal Notification Tone	STN	Warm
RCVATDUK	A-Law Automatic Tone Detector (UK)	RECEIVER	None
RCVRATD	Audio Tone Detector	RECEIVER	None
RCVRCDC	Coin Detection Circuit Receiver	RECEIVER	None
RCVRCOIN	Automatic Coin Toll Service Receiver	RECEIVER	None
RCVRDGT	Digital Digitone Receiver Circuits	RECEIVER	None
RCVRDTUK	A-Law Digitone Receiver (UK)	RECEIVER	None
RCVRMCCS	Mechanized Calling Card Receiver	RECEIVER	None
RCVRMF	Analog and Digital MF Receivers	RECEIVER	None
ROH	Receiver Off-Hook	STN	Warm
ROTLTP	Remote Office Test Line (ROTL) Port	TRKGRP (type ROTL)	None
SIGTERM	CCS6 Signaling Terminal	None	None
SCKT	Short Circuit Termination	TRKGRP (type SOCKT)	None
SSMAN	Silent Switchman (See table OFCENG, parameter SILENT_SWITCHMAN_TIMEOUT.)	OFCENG	None
SVDTMF	Dual-Tone Multifrequency (DTMF) Transmitter	SVRCKT	Warm
SVMFC	R2 Interregister Signaling Circuit	SVRCKT	Warm
SVOBSV	Service Observing Circuit	SVRCKT	Warm
TASISC	TASI State Controller	TASIB	None

-continued-

Fixed CLLI Codes (continued)

CLLI	Explanation	Related Table	Restart
TASISD	TASI State Controller	TASIB	None
TERM100Q	Termination 100 Test Line	TRKGRP (type TTL2)	None
TERM102L	Termination 102 Test Line	TRKGRP (type TTL2)	None
TERM102T	Termination 102 Test Line	TRKGRP (type TTL2)	None
TERM103T	Terminating 103 Test Line	OFRT and all RTEREF subtables	None
TERM105	Terminating 105 Test Line (The use of fixed pseudo CLLI TERM105 occurs if ROTL equipment is present.)	TRKGRP (type T105)	Cold
TERM105T	Terminating 105 Test Line (The use of fixed pseudo CLLI TERM105T occurs if ROTL equipment is not present. This condition permits the use of the 105 test line with the Transmission Test Unit (TTU) at the terminating office. Tables TRKGRP, TRKSGRP or TRKMEM do not require additional datafill.)		None
TERM107T	Terminating 107 Test Line (Preemption test line.)	None	Cold
TERM108	Terminating 108 Test Line	TRKGRP	None
TISS	Terminating International 103 Signal Supervisory Test Line	TSTLCONT (subtable TLNOS)	None
TOPSDEV	TOPS Device (See note 6.)	TOPSDEV	Cold
TOPSPOS	TOPS Position - Voice (See note 12.)	TOPSPOS	None
TOPSPOSDATA	TOPS Position - Data (See note 12.)	TOPSPOS	None
TTT	Transmission Trunk Test	TRKGRP (type MAINT)	None
TTU	Transmission Test Unit	TRKGRP (type MAINT)	None
VER90	Operator Verification (See note 1.)	TRKGRP (type VR)	None

-End-

A list of suggested CLLI codes you must add to table CLLI appears in the following table. The spelling of these codes can be different. The spelling of the code must be the same in each table in which the code appears. Use the spelling that appears.

Suggested CLLI Codes

CLLI	Explanation	Related Table	Restart
ACCSTOPS	Automatic Calling Card Service Bilingual Announcement	ANNS	None
ACTSTOPS	Automatic Coin Toll Service	ANNS	None
RING	Ringback Tone (See note 8.)	TONES	None
DSCDBUSY	DSCWID Busy Announcement	RESOFC	None
DSCWDDFLT	DSCWID Default Announcement	RESOFC	None
DSCWDDSCN	DSCWID Disconnect Announcement	RESOFC	None
DSCWDHOLD	DSCWID Hold Announcement	RESOFC	None
DSCWDRMDR	DSCWID Reminder Announcement	RESOFC	None

Note 1: Code VER90 is for the operator verification trunk group in the host switch. The operating company defines the codes for the operator verification trunk groups at the remote location.

Note 2: Trunk group size for fixed pseudo CLLI codes OAUSC and OAUSD equals the number of scan and signal distributor groups. The office alarm requires the scan and signal distributor groups.

Note 3: For codes ESUP1 to ESUP5, the value in field TRKGRSIZ must be equal to two times the number of digital echo suppressors. The digital echo suppressors are for the code in table ECHOSUP. One digital echo suppressor must be present for each port.

Note 4: The pseudo CLLI codes TOPSCOINCOLLECT, TOPSCOINENABLE, TOPSCOINDISABLE, and TOPSCOINRETURN allow the operating company to specify coin signals. These coin signals are for calls that arrive at an access tandem on TOPS trunks. These calls do not route to an operator. One CLLI code allows the operating company to make sure the system enables Digitone key pads. These Digitone key pads are on coin phones. The system allows these Digitone key pads for feature group B calls and for 800 service calls. Some end offices do not leave the key pads in the correct state. Special CLLI code TOPSCOINENABLE allows the operating company to have complete flexibility to enable these pads. To use this CLLI code, place this code at the beginning of a route list. This route list must route the call to an incoming (IC) trunk. To route a call on trunk group OGEACAR1, the operating company can enter the following data in a route in table OFRT:

```
999 ( S D TOPSCOINENABLE ) ( N D OGEACAR1 0 N N )
```

This datafill sends a coin enable signal to enable a Digitone key pad for all coin calls that use route list. After the coin signal finishes, the call routes to trunk group OGEACAR1. A coin call can originate from an end office that left the key pad in the correct state. When this event occurs, calls from these offices can route to a different route list. This route list does not include the coin enable the CLLI code. This routing avoids the additional post-dial delay the coin enable signal causes.

The addition of a coin signal to a route list can occur. This addition adds approximately 3 seconds of post-dial delay to each coin call that uses this route list. The time for the transmission of the coin signal is 3 seconds.

The three other types of coin signals are pad disable, coin collect, and coin return. A requirement to send these signals for some calls on TOPS trunks that do not route to TOPS operators can occur. Three CLLI codes, TOPSCOINDISABLE, TOPSCOINCOLLECT, and TOPSCOINRETURN are available for this purpose.

The position of these coin CLLI codes is at the beginning of a route list before any trunk CLLI codes. The system can require more than one coin signal. When this event occurs, the addition of more than one CLLI code to the route list can occur. Only calls that originate on TOPS trunks and that a TOPS operator does not complete can use the CLLI codes. The Centralized Automatic Message Accounting (CAMA) calls that route to a TOPS operator can use the CLLI codes. Calls that transfer to an IC operator service can use the CLLI codes. These conditions occur because the TOPS operator does not complete these calls.

The system can route non-coin calls to a route list with the special coin CLLI code. The software determines that the call is non-coin. The system does not attempt coin signaling.

To use the four CLLI codes, add the codes to table CLLI. The system does not require a restart. The removal of restart requirement occurred in CSP04.

Note 5: The system can use the CLLI codes at the end of a route list. The CLLI codes send the correct supervision signal to the originating office. This event occurs if all members of the outgoing trunk group are busy. The system performs the standard treatment after the system completes this procedure. The system only supports the following trunk group types: SC, IS, IT, OI, OC, OP, TI, T2, TOPS, A5, and TDDO.

Note 6: You can enter the fixed CLLI code TOPSDEV, ITOPSPPOS, ITOPSPPOS DATA, or ITOPSPDEV in table CLLI. When you perform this action, you must perform a cold restart before you enter tuples in the associated tables. To increase the size of tables TOPSDEV, ITOPSPPOS, or ITOPSPDEV, you must delete all members of these tables. The value in field TRKGRSIZ in table CLLI increases for the associated fixed CLLI code or codes. Perform a cold restart or a reload restart. Enter the members of the table again.

Note 7: The remote switch in the network Busy Verification Line (BVL) requires the Busy Verification Tone (BVTONE) circuit. You must enter the fixed CLLI code BVTONE on the remote switch in table CLLI.

Note 8: Treatment No Terminal Responding (NTRS) or Call Rejected (CREJ) can occur on an ISDN Basic Rate Access (BRA) call. When this event occurs, the caller receives audible ringback. The system can apply ringback at the originating agent after these events occurred. The definition of a tone that software generated appears in table TONES for ISDN switches. This tone is *RING. Enter the *RING tone in table CLLI. Table OFRT and fields LNT and OFFTREAT in table TMTCNTL.TREAT define tuples. This action maps treatments NTRS and CREJ to this tone. When one of these treatments occurs, the system sustains audible ringback at the originating end of the call.

Note 9: You can enter members of the SC and SD groups in tables SCGRP and SDGRP. When this event occurs, the system automatically enters a tuple in table CLLI for pseudo fixed CLLI codes MISCSC and MISCSD.

Note 10: Trunk group size for CLLI code TRKLPBK is equal to 0 (zero). This event occurs because table TRKMEM does not assign trunks.

Note 11: For ATME2 to function, add the three CLLI codes ATMERA, ATMERB, and ATMERC to table CLLI. Perform a cold restart. If you do not perform this action, the system does not bind the correct CLLI codes.

Note 12: For CSP04, the system eliminates the restart requirement when the size of table TOPSPOS changes. Before CSP04, the size increased as *Note 6* indicated for the other TOPS tables. In CSP04, to increase the size, increase the value of TRKGRSIZ in table CLLI for TOPSPOS and TOPSPOSDATA CLLIs. Add the new tuples in table TOPSPOS. The system does not require a restart.

Deallocation of memory does not change. You must delete all tuples as follows:

- Delete all tuples in table TOPSPOS.
- Change the value of field TRKGRSIZ in table CLLI for both TOPSPOS and TOPSPOSDATA CLLIs to value 0.
- Change the value of field TRKGRSIZ in table CLLI for both TOPSPOS and TOPSPOSDATA CLLIs to the new size.
- Add tuples or add tuples again to table TOPSPOS.

The system does not require a restart.

Warning: The maximum size of table TOPSPOS is 1023 tuples. The TRKGRSIZ can be higher than 1023 for fixed CLLI (TOPSPOS or TOPSPOSDATA). When this event occurs, the addition of tuples to table TOPSPOS cannot occur and an error message appears. You cannot change tuples. You must delete and add all tuples again. The steps for this action appear above. For releases before CSP04, this condition causes an outage because of the cold restart requirement.

Deleting CLLI Codes from Table CLLI

To delete a CLLI code, you must delete the CLLI code from all tables in which the code appears. You must perform this action before you delete the tuple from table CLLI. The system does not require that you delete the tuple from table CLLIMTCE. When you delete the tuple table CLLI, the system deletes the tuple from table CLLIMTCE.

The CI command `TABREF` can determine the other tables that a CLLI code can reference.

Assigning CLLI Codes for Spare Analog Trunks

All spare analog trunks in the switch must appear in the table TRKGRP with a CLLI code of SPAREXXXXXX. The XXXXXX is the card code of the spare analog trunk or trunks. If spare analog trunks are present with a card code of 2X83AA, the CLLI code is SPARE2X83AA. The value of field TRKGRSIZ must be large enough to handle all spare analog trunks until the next extension. You must add the spare analog trunks to table CLLIMTCE.

Signaling Engineering and Administration System (SEAS) 1.1 Enhancements

Feature AL1334 (SEAS 1.1 Enhancements) changed the design of routeset CLLI codes. Routeset CLLI codes are the key to table C7RTESET when the SEAS commands `ADD RTE` or `CHG RTE` modify data routing information.

Feature AL1334 maintained tuples in table CLLI. These tuples are the key to table C7LKSET. Field ADMININF in table CLLI contains the far-end office name. This name is in field FECLLI of table C7LKSET as SEAS commands ADD_LS or CHG_LS provide.

Note: For feature AE0901 for BT7, you must enter EMERGENCY_CALL_ANN in field ADMININF in table CLLI. This entry specifies that an emergency call announcement will occur.

Routeset CLLI Codes

For feature AL1334, the name that is the routeset name changes to reflect information about the routeset the data determines. This action can occur by the two following methods.

The name can be the exact name entered in field FECLLI of table C7LKSET of the linkset. This table defines the linkset as the associated route of the routeset. A route is associated if the far-end point code of this linkset is the correct point code of this routeset. The far-end point code is in field FEPC of table C7LKSET. The routeset is in field DPC of table C7RTESET.

If the routes are not associated, the routeset name can be the textual representation of the point code of the routeset. This textual representation is a field that contains nine digits.

You must create the name of the routeset when the definition of a route for a new destination occurs. Routes are not defined to this point code. When the addition of a route to a current routeset occurs, the routeset name does not change. When the following events occur, the routeset name changes to reflect the new configuration:

- The SEAS uses the command CHG_RTE to add an associated route where a route was not present.
- The SEAS uses the command CHG_RTE to remove a current associated route.

Field ADMININF for Linkset CLLI Tuples

Field ADMININF of table CLLI stores any additional information on the CLLI code you define. With feature AL1334, the field ADMININF indicates the associated far-end CLLI name of the linkset you add. The associated far-end CLLI name is in field FECLLI in table C7LKSET. You can use the SEAS command CHG_LS to change the name in field FENAME of the linkset. When you change the name, you must update field ADMININF to maintain this new relationship.

The SEAS commands ASGN_LS and CHG_LS provide the far-end name information.

Limits

The system maintains the routeset name relationship that feature AL1334 defines only if the SEAS interface changes the data. If the DMS table control interface changes this data, the routeset name does not change.

The DMS table control interface can change table C7LKSET. When this event occurs, the system does not update field ADMININF of table CLLI to reflect the far-end name of the linkset.

The DMS table control interface can make changes. When this event occurs, operating company personnel must maintain the name relationships manually.

To invoke the DMS-100G Terminating Test Line Service, you must enter the CLLI name. Provisioned CLLI names are fixed. You cannot delete the CLLI names.

The DMS–100 Terminating Test Line datafill must be in the office for a DMS–100G Terminating Test Line to function. A warning message appears if the datafill is not present when you provision table CLLI. Calls that originate in an office where DMS–100 datafill is not available transfer to datafill_error treatment. Offices can use DMS–100 and DMS–100G Terminating Test Line routing. For these offices, use different digits for digits the originating office outpulses.

Tables TRKGRP, TRKSGRP, and TRKMEM do not require additional datafill. The DMS–100 test line datafill must be present in the office for DMS–100G Test Line to function correctly.

Station Ringer Test Examples

To activate the Station Ringer Test (SRT), dial a two–digit code and the last five digits of the Directory Number (DN). This DN is the DN for which the test occurs. The two–digit code can be 57. For example, to test DN 621–1234, the tester dials 571–1234. This condition applies if the DNs in an office do not share the same last five digits. The same office can serve two DNs, 621–1234 and 631–1234. When this event occurs a separate test cannot occur for each station because the only dialing pattern possible is 571–1234. This dialing pattern refers to both DNs.

A more current method to invoke SRT is to dial the SRT access code and the DN for which the test occurs. This method can be present with the method that appears above.

The SRT access code is nominally three digits. Datafill can change the SRT access code. Both access methods function on the same switch. You can use datafill access codes for both methods to dial SRT.

The DN for which the test occurs can be seven digits without the Numbering Plan Area (NPA). This DN can be ten digits with NPA. The DN can be a seven–digit DN. If this condition occurs, the SRT tests that compare the number dialed against the station dialing cannot include the NPA. This condition does not cause a problem often. A problem occurs only if the same switch serves two DNs that differ only by NPA. Operating companies can use different datafill to allow one the following events to occur:

- Access code plus seven– or ten–digit DN dialing of SRT
- Access code plus seven–digit dialing only
- Access code plus ten–digit dialing only

If the operating company specifies the first option, and the subscriber dials seven digits, a pause of several seconds occurs. After the pause, the system processes the call. The pause occurs because the line module (LM) waits. The LM waits to make sure the subscriber does not dial additional digits.

Example

The DN to test is DN 613–621–1234. The older SRT access code is 57. The newer SRT access code is 999. Dial 571–1234, 999–621–1234, or 999–613–621–1234 from that station to invoke SRT.

Administrative Trunk Group Number (ADNUM)

In table CLLI, field ADNUM can range from 0 to 8191. This range is one less than the maximum size of table CLLI. This field allows the operating company to associate an ADNUM with each

DMS-100 family trunk group CLLI code. This ADNUM must be different between the CLLI codes. This ADNUM remains fixed for the life of the trunk group. The number of dump-and-restore actions that occur on the switch does not affect this condition.

The range of values for field ADNUM starts at 0 (zero). The range is from 0 to a number that is one less than the size of table CLLI. The size of table CLLI appears in table DATASIZE. For example, if the size of table CLLI is 650, the maximum value that for field ADNUM is 649.

For pseudo CLLI codes, the operating company assigns a specified ADNUM occurs. The pseudo CLLI codes are CLLI codes added from EXT files. These numbers start with 1 and continue in ascending order. Avoid a value of 0 (zero) because specified downstream processors do not accept 0 as an allowed identifier. These downstream processors include Engineering and Administrative Data Acquisition System (EADAS) for Network Management (EADAS/NM). To assign a 0 causes an error message. The system does not reject the entry.

Assign CLLI codes that the operating company defines in sequence. Start with the lower numbers. The ADNUM values 1 to 50 are for pseudo CLLI codes. The value 0 (zero) is not always correct for some downstream processing.

The number of CLLI codes the operating company defines can be greater than the size of table CLLI minus 50. When this event occurs, increase the size of table CLLI. This increase in table size prevents the use of ADNUM values reserved for additional future pseudo CLLI codes.

Modifying the Value in Field ADNUM

You can change the value in field ADNUM. You can change this value if other tables in the DMS-100 switch do not refer to the CLLI code. To change the ADNUM value, you must remove tuples that contain the CLLI code from the following tables:

- All routing tables
- Trunk tables
- Any other tables

You must delete the tuple that contains the CLLI code in table CLLI. You must enter this tuple again in table CLLI to change the value of field ADNUM.

See sections EADAS/DC changes and EADAS/NM changes.

Default ADNUMs for Pseudo CLLI Codes

The default ADNUM assigned to each pseudo CLLI code that an EXT file adds appears in the following table:

Default ADNUMs

CLLI	ADNUM
DLSE	1
DMODEMC	2
DPPSC	3
DSCKT	4
EADNMCLLI	5
FRBTONE	6
ITSE	7
NWMSC	8
NWMSD	9
OFFHKSUP	10
ONKHSUP	11
STGOVFL	12
STRG	13
SYNCH	14
TERM105T	15
TOPSCOINCOLLECT	16
TOPSCOINDISABLE	17
TOPSCOINENABLE	18
TOPSCOINRETURN	19
WINKSUP	20
BBTOUT	21
ROTLSC	22
ROTLSD	23
TRKLPBK	24
TERMARTER	25
MISCSC	26
MISCSD	27
NILWAITANNC	29

Note: The ADNUM assigned to a CLLI code must be different. The system does not allow you to assign an ADNUM associated with another CLLI code. Do not use an ADNUM assigned to a pseudo CLLI code for CLLI codes the operating company defines.

The EADAS for Data Collection (EADAS/DC) and EADAS Network Management (EADAS/NM) interfaces to the DMS-100 change. This change allows the use of the ADNUM in table CLLI.

EADAS/DC Changes

The record identification (ID) fields in the EADAS/DC sections for the following Operational Measurement (OM) groups contain the administrative number. This number relates to the CLLI code:

- TRK
- TRK250
- NWMSILC
- DCRICTRK

The ADNUM orders the records in these sections.

The EADAS/DC section contains the counts for the preceding OM groups. The information associated with these counts is as follows:

- The numeric record ID parameter associated with the feature commands `EADASKEY` and `EADASFMT` is the ADNUM value.
- The output of the CI command `OMDUMP` for EADAS/DC collection classes identifies the CLLI codes. The output identifies the codes by the character name of the codes.

The operating company cannot change the ADNUM for a CLLI code if both of the following conditions apply:

- The system reports OM counts for that CLLI code to EADAS/DC.
- The OM counts the system reports to EADAS/DC are for one of the following OM groups:
 - ◆ TRK
 - ◆ NWMSILC
 - ◆ TRK250
 - ◆ DCRICTRK

To change an ADNUM, you must remove the tuples that refer to the CLLI code of the ADNUM from all tables. You must delete the tuple in table `CLLI` that contains the ADNUM. You must enter this tuple again in table `CLLI` with the new ADNUM value. Enter tuples that contain the CLLI code again. Enter these tuples in the tables from which you removed these tuples.

EADAS/NM Changes

If an ADNUM changes, the ADNUM sets the EADAS/NM trunk group list discrete to indicate the change. The office can have feature package `X455AB` (1A EADAS Network Management). If the office has this package, a change to the ADNUM creates two entries. These entries are in the EADAS/NM trunk group changed list. One entry identifies the old ADNUM. The other entry identifies the new ADNUM.

Table TRKNAME

Table `TRKNAME` is a read-only table. The system enters data in this table with entries in table `CLLI`. With an ADNUM value, the associated CLLI code can appear in table `TRKNAME`. The reverse mapping appears in table `CLLI`. See the example at the end of this section.

Datafill Sequence

You do not need to enter data in other tables before you enter data in table `CLLI`.

Table Size

0 to 8192 tuples

The system allocates memory by field `SIZE` in table `DATASIZE` for the entry with field `DATSKEY` equal to `CLLI`. To extend table `CLLI`, increase the value of field `SIZE` in table `DATASIZE`. Perform a cold restart. If your switch has the `NORESTARTSWACT` utility, an interruption of service does not occur when you activate data changes. Refer to the *NORESTARTSWACT User Guide*.

Datafill

Datafill for table CLLI appears in the following table:

Field Descriptions for Table CLLI

Field or Subfield	Entry	Explanation
CLLI	alphanumeric (vector of a maximum of 16 characters)	<p><i>Common Language Location Identifier</i></p> <p>Enter a CLLI code to identify the far-end of each announcement, tone, or trunk group.</p> <p>Note: You can only enter alphabetic characters, numeric characters, and _ (underscores) in this field. The first character must be alphabetic. The use of other special characters like @, #, \$, %, ^, &, *, (,), -, +, =, /, , ;, :, ?, }, and { can cause errors in the data in this field.</p> <p>For best use, a CLLI code must contain a maximum of 12 characters. Only the first 12 characters appear on the MAP. When a CLLI code appears in a log report, the whole 16-character CLLI code appears.</p> <p>The recommended code for a gateway switch contains the following elements:</p> <ul style="list-style-type: none">* <i>SITE - Site.</i> This element has three characters. This element identifies of the site. The site is a switch. If more than one site is present in a city, each site has a name. If only one site is in a city, enter the abbreviated city name.* <i>SUFFIX - Suffix.</i> This element has two characters. This element identifies the trunk group. If more than one trunk group is in the same site, each trunk group has a different number for identification.* <i>COUNTRY - Country.</i> This element has three characters. This element identifies the name of the country that is the location of the site.* <i>CITY - City.</i> This element has three characters. This element identifies the name of the city at the far-end of each trunk group. If only one site is in a city, and the abbreviated city name identified the entry, leave CITY blank. If more than one site is present in a city, use both element SITE and element CITY. <p>Note: The CLLI code can occupy 11 characters of the string of 16 characters. The field ends at the first blank character. For example, only one trunk group can be present for a specified switch. When this event occurs, only the element SITE requires data entry as the CLLI code.</p>

-continued-

Field Descriptions for Table CLLI (continued)

Field or Subfield	Entry	Explanation
		<p>The recommended CLLI code for other than a gateway switch contains the following elements:</p> <ul style="list-style-type: none"> * <i>PLACE</i> - <i>Place</i>. This element has four characters. This element identifies the name of the city or town at the far-end of each group. This element can identify the name for each tone or announcement. * <i>STATE</i> - <i>State or Province</i>. This element has two characters. This element identifies the state or province at the far-end of the trunk group. * <i>BLDG</i> - <i>Building</i>. This element has two characters. This element identifies the building number at the far-end of the trunk group. * <i>TRAFUNIT</i> - <i>Traffic Unit</i>. This element has three characters. This element identifies the designation of the traffic unit at the far-end of the trunk group. * <i>SUFFIX</i> - <i>Suffix</i>. This element has one character. This element identifies trunk groups that terminate at the same location. <p>Note 1: This CLLI code can occupy 12 characters of the field of 16 characters. The system treats the CLLI code as a character string. The field ends at the first blank character. If only one trunk group ends at a specified switch, only the element <i>PLACE</i> requires data entry for the CLLI code.</p> <p>Note 2: For feature AE0901 for BT7, the entry EMERCALL in this field specifies the emergency call feature.</p>
ADNUM	numeric (0 to 8191)	<p><i>Administrative Trunk Group Number</i></p> <p>Enter a number in the range from 0 to one less than the current size of table CLLI. The current size of table CLLI appears in field SIZE of table DATASIZE.</p> <p>The operating company must not assign Administrative Numbers (ADNUM) below 51. This condition allows for future growth in the number of pseudo CLLI codes.</p> <p>The ADNUMs for fixed CLLI codes and CLLI codes the operating company defines have a specified range. This range is from 51 to the size of table CLLI that appears in table DATASIZE minus one. The ADNUMs for pseudo CLLI codes external (EXT) files add must use the default value.</p> <p>The value of field ADNUM in table CLLI must be different. The system rejects attempts to add a CLLI code with an ADNUM that is in use.</p>

-continued-

Field Descriptions for Table CLLI (continued)

Field or Subfield	Entry	Explanation
		<p>You cannot change field ADNUM in table CLLI if one of the following events occurs:</p> <ul style="list-style-type: none"> * The system reports Operational Measurement (OM) counts to the Engineering and Administrative Data Acquisition System (EADAS). The system reports OM counts for Data Collection (EADAS/DC). These OM counts are for OM groups TRK, NWMSILC, TRK250, or DCRICTRK. * The CLLI code is in the EADAS Network Management (EADAS/NM) trunk group schedule. <p>The operating company can change the ADNUM value. This event can occur if other tables in the switch do not refer to the CLLI code of the ADNUM value.</p> <p>You must delete the tuple that contains the ADNUM value to change an ADNUM value. You must perform the following actions:</p> <ul style="list-style-type: none"> * Delete the tuple * Change the ADNUM value * Enter the tuple again in table CLLI
TRKGRSIZ	numeric (0 to 2047)	<p><i>Trunk Group Size</i></p> <p>Enter the maximum number of trunk members to assign in the trunk group. This number allocates storage. This number can be greater than the number of initial working trunks.</p> <p>The only continuous change you can make to this quantity is to increase the size. An attempt to decrease TRKGRSIZ causes an error message. The only size reduction that can occur is to decrease the quantity in field TRKGRSIZ to 0 (zero). When this event occurs, you must delete all members that use this CLLI code before you decrease the quantity to 0.</p> <p>Enter 10 for a DRAM or EDRAM of 4 minues. Enter 33 for an EDRAM of 16 minutes.</p> <p>You must define an announcement CLLI Audiogram Delivery Services (ADS). If the ADS has only one EDRAM card, you can set the field TRKGRSI to 30. This action allows all 30 channels on the EDRAM card to connect at the same time. These channels connect to play ADS OOSPs. See the Audiogram Delivery Services-Offer of Service Prompt functionality (ENSV0013) in this document.</p>

 -continued-

Field Descriptions for Table CLLI (continued)

Field or Subfield	Entry	Explanation
ADMININF	alphanumeric (vector of a maximum of 32 characters)	<p><i>Administrative Information</i></p> <p>Enter operating company administration information. The switch does not use the information in this field.</p> <p>Note: Use only alphabetical characters, numeric characters, and _ (underscores) to enter data in this field. The use of other special characters, like @, #, \$, %, ^, &, *, (,), -, +, =, /, , ;, :, ?, }, and cause errors in the data in this field.</p> <p>The following entries are the recommended entries in field ADMININF for a gateway switch:</p> <ul style="list-style-type: none"> * DIR * MED * SIG * SRVCAT * N6MODE * MISC <p><i>DIR - Direction.</i> This entry is optional datafill for administration only. If the system requires specification of the direction, enter the direction of the traffic in the trunk group. If the system does not require direction, enter a - (dash) for entry DIR.</p> <p><i>MED - Medium.</i> This entry of one character is optional datafill for administration only. If the system requires specification of the medium, enter the medium of the trunk group. The medium is S for satellite or C for cable. If the system does not require the medium, enter a - (dash) for entry MED. If the entries that follow MED do not contain information, leave MED blank.</p> <p><i>SIG - Signaling.</i> This entry of one character is optional datafill for administration only. If the system requires specification of the signaling type, enter the signaling type for the trunk group. The signaling type is 5 for CCITT Signaling No. 5 (N5) and 6 for CCITT Signaling No. 6 (N6). If the system does not require specification of the signaling type, enter a - (dash) for entry SIG. If the entries that follow entry SIG do not contain information, leave SIG blank.</p> <p><i>SRVCAT - Service Category.</i> This entry of three characters is optional datafill for administration only. If the system requires specification of the service category, enter the type of service the trunk group provides. The type of service is TEL for telephone. If the system does not require specification of the service category, enter a - (dash) in entry SRVCAT. If the entries that follow entry SRVCAT do not contain information, leave SRVCAT blank.</p>

-continued-

Field Descriptions for Table CLLI (continued)

Field or Subfield	Entry	Explanation
		<p><i>NO6MODE - Signaling 6 Mode.</i> This entry of four characters is optional datafill for administration only. If the system requires specification of the N6 mode, enter the following:</p> <ul style="list-style-type: none"> * FA for fully associated * QA for quasi-associated * FQ for fully and quasi-associated <p>This entry can identify which route set or signaling link set carries the signal for this trunk group. If the system does not require specification of the N6 mode, enter a - (dash) for entry NO6MODE. If the entries that follow entry NO6MODE do not contain information, leave MO6MODE blank.</p> <p><i>MISC - Miscellaneous Information.</i> This entry of 12 characters is optional datafill for administration only. If the system requires miscellaneous information, you can enter any data in this field. For example, the entry can contain the full name of the abbreviated site name. If the system does not require this entry, leave MISC blank.</p> <p>Note: The field ADMININF can occupy 32 characters. The system treats this field like a character string. The field ends at the first blank character. You must enter an _ (underscore) between each entry in field ADMININF, if the entries that follow this entry are not blank.</p> <p>The recommended entries for field ADMININF for other than a gateway switch are TRAFCLS, OFFCLS, and TRKGRTYP.</p> <p><i>TRAFCLS - Trunk Group Traffic Class.</i> This entry is optional datafill for administration only. If the system requires specification of traffic class, enter one of the traffic classes that operating company practices define. If the system does not require specification of traffic class, enter a - (dash) for entry TRAFCLS.</p> <p><i>OFFCLS - Office Class.</i> This entry is optional datafill for administration only. If the system requires specification of office class, enter one of the office classes that operating company practices define. If the system does not require specification of office class, enter a - (dash) for entry OFFCLS. If entry TRKGRTYP is blank, entry OFFCLS can be blank.</p>

-continued-

 Field Descriptions for Table CLLI (continued)

Field or Subfield	Entry	Explanation
		<p>TRKGRTYP - Trunk Group Type. This entry is optional datafill for administration only. The system can require specification of the trunk group type. When this event occurs, enter an alphanumeric entry equal to one of the trunk group types that the operating company practices define. If the system does not require specification of trunk group type, leave TRKGRTYP blank.</p> <p>Note 1: The field ADMININF can occupy 32 characters. The system treats this field like a character string. The field ends at the first blank character. You must enter an _ (underscore) between each entry in field ADMININF, if the entries that follow this field are not blank.</p> <p>Note 2: For feature AE0901 for BT7, the entry EMERGENCY_CALL_ANN in this field specifies that an emergency call announcement will occur.</p>

 -End-

Datafill Example

An example of datafill for table CLLI for a North American local, toll, or combined local & toll DMS-100 switch appear in the following figure:

Datafill Example for Table CLLI

Example of a MAP display:

CLLI	ADNUM	TRKGRSIZ	ADMININF
HLFXNS0101T	100	24	PH_43_IT
OTWAON23CG00	101	225	FG_45_DTS
OTWAON23CG00	102	30	CO_54_CA
OTWAON2323H1	103	150	LA_54_LA
CF3P	54	12	MI
ESUP1	55	128	MI
TERM102T	57	1	MI
TERM102L	58	0	MI
TERM100Q	59	0	MI
SCKT	60	0	MI
OCKT	61	0	MI
ASCS	62	0	MI
FBOT	51	0	MI
LKOUT	52	0	MI
IDLE	53	0	MI
CF6P	56	12	MI

The associated datafill of table TRKNAME appears in the following figure:

Datafill Example for Table TRKNAME

Example of a MAP display:

ADNUM	CLLI
51	FPOT
52	LKOUT
53	IDLE
54	CF3P
55	ESUP1
56	CF6P
57	TERM102T
58	TERM102L
59	TERM100Q
60	SCKT
61	OCKT
62	ASCS
100	HLFXNS0101T0
101	OTWAON23CG00
102	OTWAON23CG01
103	OTWAON2323H1

An example of datafill for a gateway DMS switch appears in the following figure:

Datafill Example for Table CLLI

Example of a MAP display:

CLLI	ADNUM	TRKGRSIZ	ADMININF
MOS01URS	300	2	BS5TEL_MOSCOW
MOL03GBNLON	301	52	OC5TEL_MOLLISON
CF3P	51	12	MI
ESUP1	52	128	MI
TERM102T	53	1	MI
TERM102L	54	0	MI
TERM100Q	55	0	MI
ALL	56	2	SATOVER_CLLI
MF300	57	250	MF_RECEIVERS
DGT300	58	100	DIGITONE_RCVRS

An example of datafill for feature AE0901 in BT7 appears in the following figure:

Datafill Example for Table CLLI

Example of a MAP display:

CLLI	ADNUM	TRKGRSIZ	ADMININF
EMERCALL	124	3	EMERGENCY_CALL_ANN

Description of Previous Examples

Switches that have three-port conference circuits require this pseudo fixed CLLI code CF3P. The trunk group size is equal to three times the number of conference circuits assigned in table CONF3PR. One trunk group is present for each port.

Switches that are not gateway, and have less than 1024 digital echo suppressors require this pseudo fixed code ESUP1. The trunk group size is equal to two times the number of digital echo suppressors assigned to this code in table ECHOSUP. One trunk group is present for each port.

Switches that have the terminating 102 test lines require CLLI codes TERM102T, TERM102L, and TERM100Q. You must enter the CLLI codes in table TRKGRP (type TTL2). This table defines the dB level and supervision.

Trunk group size for CLLI code TERM102T is equal to 1. You can assign only 1 mW trunk for each dB level in table TRKMEM. Trunk group size for CLLI codes TERM102L and TERM100Q is equal to 0 (zero). This condition applies because trunks are assigned in table TRKMEM.

The pseudo fixed CLLI codes SCKT and OCKT are associated with the transmission termination trunk group. This trunk group is in a local or combined local/toll switch.

Trunk group size for CLLI code SCKT is equal to the number of transmission termination trunk circuits table CLLI allocates. Trunk group size for CLLI code OCKT is equal to 0 (zero).

The system requires this pseudo fixed CLLI code ASCS in a local or a combined local/toll switch. One of the following conditions must apply to the switch:

- The switch can send and check alarms with tones.
- The switch can use the Automatic Number Identification (ANI) information digit 8 to send alarms over a Traffic Service Position System (TSPS) or TOPS trunk.

The system requires the Foreign Potential Test Code (FPOT) in a local or combined local and toll switch. The FPOT must be one of the routes in the route lists for partial dial time-out and permanent signal time-out treatments for lines. This condition applies if the system requires a foreign potential test.

The system requires line lockout (LKOUT) and idle (IDLE) codes in a North American local or combined local and toll switch.

One of these codes must be the last route in the route lists associated with the treatments for lines. You must not use the code IDLE in an international switch.

Switches that have six-port conference circuits require this pseudo fixed code CF6P. The trunk group size is equal to six times the number of six-port conference circuits.

Some DMS-300 gateway switches require the pseudo fixed code ALL. These switches permit an incoming trunk group that receives signaling by satellite to connect to an outgoing trunk group that transmits signals by satellite.

The DMS–300 gateway switches that have digital Digitone receivers and digital or analog multifrequency (MF) receivers require the following pseudo fixed CLLI codes:

- MF300
- DGT300

Table CLLI for BT7

For feature AE0901 for BT7, table CLLI must contain the entry EMERCALL in the field CLLI. This entry specifies the emergency call feature. Table CLLI must contain the entry EMERGENCY_CALL_ANN in the field ADMININF. This entry specifies that an emergency call announcement will occur.

Nortel DMS–100 SERVORD Information

Introduction

This article provides an introduction to the switch query command and service order system (SERVORD) for the local side of the DMS–100 switch. The SERVORD system changes, adds, or deletes options and services on the subscriber lines. Operating companies use the query commands in the input and output system of the DMS switch to determine the characteristics of telephone lines. Service order and query commands consist of a command name and a series of parameters.

Query Commands

Some users have access to a switch Input/Output Device (IOD). Query commands allow these users to determine the status of Directory Numbers (DN) or Line Equipment Numbers (LEN) for lines. Examples of DN or LEN status are *working* or *not assigned*. This information helps users prepare service orders.

Query command reports can tell the end user important information. This information includes the Line Class Code (LCC) and if any options are assigned to a line.

Service Order Commands

End users enter service orders into an IOD to control the local side of a DMS–100 switch. This article describes service orders that the user can enter in a switch. Refer to the *Input/Output System Reference Manual*, NTP 297–1001–129. This manual describes the classes and function of the IODs for the switch.

Change LEN (CLN) is an example of a service order command. The user enters the `CLN` command, along with any parameters that apply, into an IOD that is online to a DMS switch. The switch then changes the LEN of each specified telephone subscriber.

Entering and Exiting the SERVORD Environment

To enter the SERVORD environment, type `SERVORD` at an input prompt after you logon to a valid service order IOD. After you press `ENTER`, the switch responds with the `SO:` prompt. Enter the desired service order command at the input prompt.

To exit the SERVORD environment, type `QUIT` or `LEAVE` and press `ENTER` at the input prompt. This command produces the response `CI:` from the switch. If you look at a datafill table when you attempt to exit, `QUIT` brings you back to the `SO:` prompt. A second `QUIT` takes you to the `CI:` prompt. To exit directly back to `CI:` after you look at a table in SERVORD, type `QUIT ALL` and press `ENTER`.

Input Prompt (>)

An input prompt (>) indicates that the information that follows is a command: `>BSY`

Parameters

Parameters follow commands. These parameters define the specifications of the command act upon and determine what effect the command can have.

Line Class Codes

A Line Class Code (LCC) is an alphanumeric code that identifies the class of service assigned to a line. An example of a LCC is M5009. The Meridian M5009 business sets have nine keys.

Line Service Options and Features

Use line service options and features to add services to a line. An example of an optional service is three-way calling (3WC). This service allows a telephone subscriber to talk to a third party without operator support.

This article refers to SERVORD options and features as options. Differences between options and features does not affect the way the article uses the term. Refer to the following paragraphs and examples for a description of these differences.

To enter an option, type in the name of the option at the appropriate prompt. A \$ informs the system that you finished with the option. For example, to add the Reverse Coin Disposal (RCD) option, enter the following:

Example of the RCD Option

```
SO:
>ADO
SONUMBER: NOW 92 4 17 AM
>$
DN_OR_LEN:
>6210000
OPTION:
>RCD
OPTION:
>$
COMMAND AS ENTERED:
ADO NOW 92 4 17 AM 6210000 ( RCD ) $
ENTER Y TO CONFIRM, N TO REJECT OR E TO EDIT
>Y
-----
```

You can add features in the same fashion, but the features require additional information. This information describes the parameters of the option. After you enter the option, the system presents the next prompt. This prompt and entry sequence repeats until you enter all the required parameters. For example, to add the Automatic Call Forwarding (CFW) feature to a line, define the following:

- The type of call forwarding that the subscriber wants.
- The type of screening desired.
- The number of calls that the user can forward at one time.

A \$ informs the system that you are finished with the feature. The system displays the command sequence that you entered. To confirm the sequence and have the command take effect, enter Y. Enter N to reject, or E to edit.

The following example shows the CFW option added to a line:

Example of the CFW Option

```
SO:
>ADO
SONUMBER: NOW 92 4 17 AM
>$
DN_OR_LEN:
>6210000
OPTION:
>CFW
CFWTYPE:
>C
SCRNCL:
>NSCR
NUMCALLS:
>3
OPTION:
>$
COMMAND AS ENTERED:
ADO NOW 92 4 17 AM 6210000 ( CFW C NSCR 3 ) $
ENTER Y TO CONFIRM, N TO REJECT OR E TO EDIT
>Y
```

Set, Subset, Key, and DN Features

Each feature must be one of four types. Set features associate with all the DN appearances on the set. Subset features associate with a subset of the DN appearances on the set. The DN keylist specifies this subset when SERVORD assigns the feature to a line. Key features must function separately from the other keys on the set. DN features do not require a separate key on the set. DN features associate with single DN appearances. The DN features are assigned to the key of the appropriate DN appearance.

For additional information about each feature and associated service orders, refer to the feature planning guides and translation manuals.

Prompts

The prompts you see on-screen can be different from the prompts in this article. System prompts differ from feature-to-feature. The prompts also differ according to the information the user enters. Local differences also cause prompt differences. These differences include: feature packages, office parameters, enhanced software versions, and BCS load.

The example below shows how the information you enter can cause the prompts to vary. When you add the OBS option to a line, the OBSTYPE parameter branches the prompts in one of three ways. The way that the prompt branches depends on your selection (BASIC, EXTENDED, or FOBS):

Example of the OBS Feature in Prompt Mode

```
SO:
>ADO
SONUMBER: NOW 92 3 23 PM
>
DN_OR_LEN:
>6211234
OPTKEY:
>4
OPTION:
>OBS
OBSTYPE:
>BASIC          >EXTENDED      >FOBS
ACDGROUP:      OPTKEY:      FOBS_ACDGROUP:
>ACDGRP4      >$          >ACDGRP1
OPTKEY:      FOBSTYPE:
>$          >SUBGROUP
          FOBS_SUBGROUP:
          >2
          OPTKEY:
          >$
```

Input and Output Devices

You can enter service orders or query commands to control a DMS switch. You can enter these orders/commands through an IOD. The *Input/Output System Reference Manual*, NTP 297–1001–129, describes the IODs for DMS–100 switches. Each IOD has a prime function and only accepts commands that are appropriate to its prime function. Operating companies can modify IODs to accept different commands.

Service Order Entry Rules

A service order command consists of a command name and a series of parameters. Each service order has a different name. For example, the new DN command is `NEWDN`. Enter the parameters that follow the command either in prompt or no–prompt mode.

Enter a command at an IOD to control the switch. The software prompts you to enter the first parameter. If you enter a valid parameter, the system prompts for the next parameter. This process continues until you enter all the required parameters. If you enter an invalid parameter, the switch prompts you to try again.

Sample Service Order in Prompt Mode

The service order `NEWDN` command adds DNs to an office line. In the following example, a block of consecutive DNs from 2265400 to 2265999 is assigned to route 12:

Example of the NEWDN Command in Prompt Mode

```
CI:
>SERVORD
SO:
>NEWDN
SONUMBER: NOW 92 4 17 AM
>
SNPA:
>613
BLOCK_OF_DNS:
>YES
FROM_DN:
>2265400
TO_DN:
>999
DNTYPE:
>RTE
ROUTE:
>OFRT
RTEIDX:
>12
COMMAND AS ENTERED:
NEWDN NOW 92 4 17 PM 613 YES 2265400 999 RTE OFRT 12
ENTER Y TO CONFIRM, N TO REJECT OR E TO EDIT
>Y
```

Sample Service Order in No-Prompt Mode

You can also enter a command and not wait for each parameter prompt. To accomplish this action, enter a command and all appropriate parameters on the same line. You must enter the parameters in the correct order, and spaces must separate the items.

The NEWDN command example appears as follows if you enter the command in no-prompt mode:

```
>NEWDN $ 613 YES 2265400 999 RTE OFRT 12
```

If you enter an invalid parameter, the switch reverts to prompt mode. The prompting begins after you enter the last valid parameter in the sequence.

Processing Service Orders

The switch can process service orders in three different ways: immediately, pending for future activation, and in bulk for future activation. The following paragraphs explain each alternative.

Immediate Activation

Service orders entered with the date as the SO number receive immediate activation. When the switch receives a service order assigned in this way, the switch processes the order immediately. The current date is the default value for the SO number. Press **ENTER** to accept this SO number:

```
>NEWDN  
SONUMBER: NOW 92 4 17 AM  
>
```

Pending Service Orders

Pending service orders are service orders that the user enters with a valid number and a future date. When the DMS switch receives a pending service order from an IOD, the switch processes the service order on the date specified.

The procedure used to create pending service orders is similar to the procedure used to create service orders for immediate activation. Pending service orders require you to enter a future time and date. The pending order subsystem of the switch stores the pending service orders.

Bulk Service Orders

Bulk service orders are service orders that you enter in groups with valid numbers and an assigned date for activation. Each group is called a batch. On the specified date, the switch processes the service orders. You can enter batch service orders on a local or remote IOD.

You can create bulk service orders in the store file system, and copy the system file to a magnetic tape or disk drive device. You can then transfer files on the tape or disk to the switch at a later time.

The procedure to create bulk service orders is similar to the procedure to create pending service orders. The difference is that you enter a batch and not a single order.

Option Incompatibility

Some options are not compatible with other options. For example, the Answer Emergency Message Key (AEMK) option is not compatible with the Uniform Call Distribution (UCD) option. The "Options Incompatibility" table (OPTOPT) described later in this article lists the options that are not compatible for each option.

Some options are not compatible with LCCs. For example, AEMK is not compatible with M2009s that do not have an answer emergency message key. The M2009 is the LCC for Meridian M2009 business sets. The "Line Class Codes and Compatible Options" table (LCCOPT) later in this article lists the options that are compatible with specified LCCs.

You cannot modify the LCCOPT and OPTOPT tables. These tables are read-only. When you add lines by service orders, the system references these tables to retain compatibility between LCCs and options. The system references these tables to make sure that you do not add options that are not compatible to the same line. Note that during bulk data entry, the line tables LCCOPT and OPTOPT are not referenced.

Table controls do not always perform option error checking when you enter data in a table. Use the table editor to enter the data. The recommended method to assign line options is service orders.

Refer to the data schema section of the *Translations Guide* for additional information on OPTOPT and LCCOPT.

Using the Edit Function

When entry of a service order or query command is complete, the system displays the complete service order or query command. The system displays the order or command for verification purposes. The switch prompts for a **Y** to confirm, an **N** to reject, or an **E** to edit.

Enter **Y** if the system displays the correct data. Enter **N** if the service order or query command is not correct. If the order or command is not correct you must abort the process. Enter **E** to display the complete service order or query command in the prompt mode. The system displays each prompt with the data as entered. If the data requires no change, enter a null. To change the data, enter new information.

If you enter **Y**, the switch verifies the service order or query command. If the switch detects an error of this type, the switch rejects the service order or query command. The system displays or prints the reason for the rejection.

Journal Files

The day-to-day changes to the database of the DMS switch are recorded on a storage device called a journal file. When the journal file is active, the system records service orders set for immediate activation. The system records the orders in a batch or set for pending on the day the system activates the orders. You can use the journal file to enter a service order again if a switch failure occurs.

If you enter a valid service order and the journal file is active, you will receive a message like the following:

```
-----  
1992/01/08 10:49:02.751 THU. JOURNAL FILE RECORD ID 259  
-----
```

If the journal file is not active, you receive a message like the following:

```
-----  
JOURNAL FILE IS INACTIVE, SERVICE ORDERS NOT ALLOWED  
SHOULD ORDER BE ALLOWED ANYWAY? (Y or N)  
-----
```

If you receive this message, notify switch personnel before you enter the service order. You risk loss of data if a switch failure occurs before the system records the results of service orders.

Cancelling a Service Order

To end a service order in mid-entry, type **ABORT** at the input prompt and press the **ENTER** key. The system disregards the previous input for that service order or command sequence.

Error Messages

Several different messages can occur while you enter service orders. The switch provides error messages when you enter a service order sequence. The switch also provides error messages when you confirm a service order.

Error Messages in a Service Order Sequence

When you use the prompt mode, an error message occurs if the response is not a valid parameter. The system provides additional information on the prompt, and the system waits for input. If you enter a second invalid response, you will receive additional information about the prompt.

The example that follows displays the result of the entry of a value (321) for the ALTLSC prompt outside the acceptable range. The second attempt (268) that is not correct produces an error message that supplies the range of recognized responses (0 to 255):

Example of an Invalid Parameter

ALTLSC:

>321

*** ERROR ***

TYPE OF ALTLSC IS LSC_FLAG_COMBINATION_NUMBER

PLEASE ENTER:

ALTLSC:

>268

*** ERROR ***

TYPE OF ALTLSC IS LSC_FLAG_COMBINATION_NUMBER

TYPE IS LSC_FLAG_COMBINATION_NUMBER {0 TO 255}

PLEASE ENTER:

ALTLSC:

Error Messages During Service Order Acceptance

When you attempt to confirm a service order with the *Edit* function the system can generate an error message. You can receive error messages that do not allow the user to reject or edit the service order. If you receive this sort of message, query the data for that set and examine the data. Normally the system does not accept all or part of the service order. You must press N to abort the order.

Correcting Errors

If you make a keying error, and the cursor is on the same line, backspace to the error. Type out the characters that remain in the entry, and press ENTER.

Service Orders for DMS-100 Wireless Switches

To provision wireless data on the DMS-100 Wireless switch, operating companies use the MSERVORD (Mobile Service Order) provisioning tool. Operation of MSERVORD on the DMS-100 Wireless switch is almost the same as the wireless DMS-MTX version of SERVORD. The difference is that the operating company personnel enter the MSERVORD command and not the SERVORD command.

The following figure describes how to access provisioning for wireline and wireless data on the NA100 switch. Note that the user enters the command MSERVORD for wireless data:

```
CI:
>SERVORD
SO:
>HELP
HELP IS AVAILABLE FOR THE COMMANDS:
HELP, ADD, ADO, CDN CICIP, CLN, ABNN, DBNN, DEL, DEO, EST, NEW,
OUT, PLP, RES, SUS, NEWDN, OUTDN, SWAP, BULK, CHF, DSP, CHG, ADA,
DEA, CKLN, SLT, DELCF, SUSGRP, RESGRP, SADO, SDEO, CLTG, SDNA,
SETPH, ADDPH, CHAPH, DELPH, SWLT, CISG, CHDN, NEWACD, CHL, COPYSET
TYPE HELP CMDNAME FULL FOR SYNTAX
TYPE HELP CMDNAME fieldname FOR SYNTAX OF A FIELD
>HELP NEW
SERVICE ORDER COMMAND NEW IN LINE
ESTABLISHES INITIAL SERVICE FOR ALL NON-HUNT LINES
>SERVORD
ALREADY IN SERVORD
>MSERVORD
MSO:
>HELP
HELP IS AVAILABLE FOR THE COMMANDS:
HELP, ADO, DEO, NEW OUT, RES, SUS, BULK, ECHO, STOPECHO, CSN, CCG,
CHPIN, CEPGRP, DELGRP, CEPMEM, DELMEM, CSV
TYPE HELP CMDNAME FULL FOR SYNTAX
TYPE HELP CMDNAME fieldname FOR SYNTAX OF A FIELD
>HELP NEW
SERVICE ORDER COMMAND NEW
ESTABLISHES INITITAL SERVICE FOR CELLULAR SUBSCRIBERS
>MSERVORD
ALREADY IN MSERVORD
```

Note: Notice that the error response "ALREADY IN SERVORD" [or MSERVORD] displays if the user attempts to access the provisioning tool again.

Service Order Echo

The service order echo feature is only available in offices that have BCS12 or later software and feature package NTX901AA. This feature allows you to send a summary of data that results from the entry of a valid service order. The feature allows you to send the summary to an IOD that is online with the DMS switch.

You must logon at an IOD to activate the service order echo feature. You must assign the IOD in the terminal device (TERMDEV) system data table. The data schema section of the *Translations Guide* describes the TERMDEV system data table.

SERVORD Help

You can use the `HELP` command to find information on `SERVORD` and `PENDING` commands. Query commands do not have help features. From the `SERVORD` subsystem, the user can obtain a listing of input commands. The user can use the `HELP` command to research the input commands. Do not attempt to use `HELP` when in the middle of a service order or command sequence.

To access `HELP`, type `HELP` at the cursor and press `ENTER`, as described in the following example:

Example of HELP

```
SO:
>HELP
HELP IS AVAILABLE FOR THE COMMANDS:
ABNN, ADA, ADD, ADDPH, ADO, BULK, CDN, CHAPH, CHDN, CHF,
CHG, CHL, CICP, CISG, CKLN, CLN, CLTG, DBNN, DEA, DEL,
DELCP, DELPH, DEO, DSP, EST, HELP, NEW, NEWACD, NEWDN,
OUT, OUTDN, PLP, RES, RESGRP, SADO, SDEO, SDNA, SETPH,
SLT, SUS, SUSGRP, SWAP, SWLT
TYPE HELP CMDNAME FULL FOR SYNTAX
TYPE HELP CMDNAME fieldname FOR SYNTAX OF A FIELD
>
```

To research a service order command, at the input prompt type `HELP`, the command, and then the ENTER key. The system provides you with a definition of the command. For example, the entry of the `SUSGRP` command produces the following:

Example of Command HELP

```
SO:
>HELP SUSGRP
SUSGRP: SUSPEND SERVICE OF A GROUP OF LINES
THE TYPE OF GROUPINGS ARE:
NCOS: CUSTOMER GROUP AND NETWORK CLASS OF SERVICE
```

To receive syntax information, type `HELP`, the command name, `FULL`, and press ENTER:

Example of Full Command HELP

```
SO:
>HELP SUSGRP FULL
SUSGRP: SUSPEND SERVICE OF A GROUP OF LINES
THE TYPE OF GROUPINGS ARE:
NCOS: CUSTOMER GROUP AND NETWORK CLASS OF SERVICE
FOR COMMAND SUSGRP ENTER:

SONUMBER      NEW_SO_DUE
GROUPDATA
GROUPTYPE     {NCOS}
CUSTGRP       CUSTOMER_GROUP
NCOS          {0 TO 255}
```

For syntax information on a field, type `HELP`, the command name, the field name, and press ENTER:

Example of Field HELP

SO:
>HELP SUSGRP GROUPDATA
GROUPDATA
GROUPTYPE {NCOS}
CUSTGRP CUSTOMER_GROUP
NCOS {0 TO 255}

Service Order Simplification

Make sure the appropriate feature is present and field RES_AS_POTS of office parameter RES_SO_SIMPLIFICATION is set to Y. This state allows you to convert a POTS line to Residential Enhanced Services (RES). You can make this conversion when you add a RES-specific option to the line. For additional information, refer to table OFCVAR in *Office Parameters Reference Manual*. When you remove the last RES-specific option from the line, the system converts the line back to the original LCC. This service order simplification capability is limited to certain types of lines. The following table indicates the applicable line types and the features required:

Service Order Simplification Prerequisite Features

Line Type	Feature	Feature Name	Functionality
1FR	AG1246	RES/CLASS Service Order Simplification and OA&M	NTXA64AA
Hunt Group Lines	AG1542	RES: Service Order Simplification for Hunt Groups	NTXA64AA
1MR	AG1544	RES: 1MR Service in RES	NTXA64AA
WATS Lines	AF2244	WATS on RES	NTXA64AA
Coin Lines	NC0369	RES Platform Enhancements	NTXQ90AB
ZMD, ZMZPA	NC0485	RES Platform Enhancements, Phase 2	NTXQ90AB

Office parameter RES_SO_SIMPLIFICATION contains two fields, RES_AS_POTS (default is Y) and ENHANCED_POTS_OPTIONS (default is N). Field RES_AS_POTS controls the automatic change of LCC capability, as mentioned in the preceding text. This field controls the query display (for example, QDN) of RES or POTS lines and RES-specific options. These options are RES-specific for the purpose of service order simplification: ACB, ACRJ, AR, ARDDN, CALLOG, CFRA, CNAB, CNAMD, CND, CNDBO COT, CPU, CWR, CXR, DDN, DRCW, DSCWID, FTRGRP, GIC, MDN, MSB, MWT, NFA, RCHD, SACB, SC3, SCA, SCF, SCRJ, SCU, SCWID, SL, SLVP, SMDI, WUC, XXTRG.

Field ENHANCED_POTS_OPTIONS controls the prompting for RES-specific fields when the user adds POTS options to a line. The user can add POTS option CFDA (Call Forwarding Do Not Answer) to a line with ENHANCED_POTS_OPTIONS set to Y. If you take this action, the system prompts an extra field CFDACNTL. If ENHANCED_POTS_OPTIONS is set to N, the service order operates like the POTS example. For more information, refer to table OFCVAR in *Office Parameters Reference Manual*.

Hunt-specific options cannot function on RES Zero Minus Denied (ZMD) / Zero Minus Zero Plus Accepted (ZMZPA) lines. The options do not function on these lines because the lines cannot be part of hunt groups.

The user can use the new **MAKERES** command at the CI level:

- To convert POTS lines to RES.
- To allocate the necessary data store.
- To assign incoming and outgoing call memory to each line.

Service Order Tables

Service Order Commands

The following table lists valid Service Order (SERVORD) commands.

Service Order Commands

Command	Use	Application
ABNN	Add a bridged night number.	* Hunt group members
ADA	Add an authorization code (authcode).	* Offices with IBN authcodes
ADD	Add line(s) to an existing hunt group.	* Hunt group members
	Add existing lines to call pickup group.	* Call pickup groups
	Add existing lines to Simultaneous Ringing (SimRing) group.	* SimRing groups
ADO	Add options to lines, add existing lines to a DNH group or add options to a teen service DN.	* Individual lines
		* Teen service DNs
		* DNH group members
		* Pilots of hunt groups
	Add options to hunt group lines specified by LEN.	* MLH/DLH group members
	Add proprietary business set (P-phone) and data unit options to business set keys.	* Business sets and data units
BULK	Verify or update (execute) from a batch of service orders input in bulk.	* All service order types
CDN	Change directory number	* All DNs of a hunt group except the pilot DN
		* Remote call forwarding
		* Permitted on teen service PDNs, not teen service SDNs

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Service Order Commands (continued)

Command	Use	Application
CHDN	Change hunt directory number.	* Allows the change of DN associated with a member of a MLH group
CHF	Change option information for option that already exists on a line.	* Individual lines * Teen service DNs * Teen service DNH group member * Pilots of hunt groups * MLH/DLH group members * WATS * Options of ESDNs * All options must be deleted to change an ESDN to an SDN * Integrated Voice and Data Sets (IVDs) * Business sets and data units
CHG	Change translation/routing information. Change OUTWATS zone. Change LCC.	* Offices with IBN authcodes, lines, trunks and VFGs * Business set, RES, and POTS lines * Unavailable to ESDN lines
	Note: When changing LCC, the number of assigned options and the number of assigned keys must not exceed 30 and 24, respectively.	
CHL	Change list. Used to add, change, and delete a screening list's DNs.	* Individual lines * Teen service DNH group members * Pilots of hunt groups * MLH/DLH group members * WATS * Options of ESDNs * Integrated Voice and Data Sets (IVDs) * Business sets and data units
CICP	Change intercept.	* All unassigned DNs
CISG	Change ISDN service group.	* LCME ISDN loops

-continued-

Service Order Commands (continued)

Command	Use	Application
CKLN	Change keyset line equipment number.	* Business sets and data units
CLN	Change line equipment number.	* All lines except party lines and ESDN lines
CLTG	Change line treatment group.	* All POTS lines except ESDN lines
COPYSET	Provision up to 100 lines at a time based on datafill for model set.	* Business sets and RES, POTS, and IBN lines
		Note 1: The COPYSET command is only valid for unassigned DNs.
		Note 2: If a LEN is specified in the COPYSET command, the LEN must be Hardware Assigned/Software Unassigned (HASU).
DBNN	Delete bridged night number.	* Hunt group members
DEA	Delete an authorization code (authcode).	* Offices with IBN authcodes
DEL	Delete line from a hunt group.	* Hunt group members except pilot
	Delete line(s) from a Simultaneous Ringing (SimRing) group.	* SimRing group members except pilot
DELCF	Delete casual options.	* Standard lines (international)
DEO	Delete options from lines.	* Individual lines
		* Teen service DNs
		* DNH group members
		* Pilots of hunt groups
	Delete options from hunt group lines specified by LEN.	* MLH/DLH group members
	Delete options from Meridian Business Set (MBS) keys.	* Business sets and data units
DSP	Display translation/routing information. Display OUTWATS zone. Display LCC assigned to a business set.	* Offices with IBN authcodes, lines,
ECHO	Turns on echoing of service orders to a terminal connected to the DMS-100 switch.	* Service order echo

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Service Order Commands (continued)

Command	Use	Application
EST	Establish a hunt group.	* Hunt group with members having common option
		* 2WW service business sets with DNH group dat
	Establish a call pickup group.	* Existing lines
	Establish a Simultaneous Ringing (SimRing) group.	* Existing lines
EXBADD	Add LENS to an existing MADN Extension Bridging (EXB) group.	* MADN EXB groups
EXBADO	Add features to primary and secondary LENS.	* Secondary LENS
EXBCHG	Change primary LEN to an existing secondary LEN.	* Primary and secondary LENS, and all members of a group that have an existing feature
EXBDELG	Delete secondary LENS from the EXB group, and delete the EXB from the primary LEN.	* Secondary LENS in the EXB group and the primary LEN
EXBDELM	Delete secondary LENS from the MADN EXB group.	* Secondary LENS from the MADN EXB group
EXBDEO	Delete features from LENS from the MADN EXB group.	* Primary and secondary LENS
EXBEST	Create a MADN EXB group from an existing POTS DN or LEN.	* POTS DN or LEN
NEW	Establish service.	* Individual (non-hunt) lines and party lines
		* Business sets and data units
NEWACD	Allows the operating company to establish a new ACD supervisor or agent set with a single command.	* Business sets
NEWDN	Assign a block of DNS not associated with line equipment.	* DNS associated with an office route
	OR	
	Assign a station not associated with a LEN as the remote station to which calls are forwarded.	* Remote call forwarding
OUT	Remove service.	* Individual lines
		* Pilots of hunt groups
		* Business sets and data units

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Service Order Commands (continued)

Command	Use	Application
OUTDN	Deletes the assignment of a block of DNs.	* DNs associated with an office route
	OR	
	Deletes assignment of a remote station to which calls are forwarded.	* Remote call forwarding
PLP	Plug-up (place on trouble intercept).	* Individual lines
		* Pilots of hunt groups
		* DNH group members
RES	Restore services from suspension or plug-up.	* Individual lines
		* Teen service DNs
		* Pilots (to restore hunt group)
	Restore service to an RCF DN.	* Remote call forwarding
RESGRP	Restore service for a group of lines.	* Groups of lines (NCOS)
SDNA	Set up directory number attributes.	* Groups of directory numbers
STOPECHO	Turn off echoing of service orders to a terminal connected to the DMS-100 switch.	* Service order echo
SUS	Suspend service.	* individual lines
		* Teen service DNs
		* Pilots (to suspend hunt group)
		* Remote call forwarding
SUSGRP	Suspend service for a group of lines.	* Groups of lines (NCOS)
SWAP	Enables the exchange of DNs for up to 32 LENS.	* Offices with IBN authcodes except ESDN lines

-End-

Line Class Codes

The following table defines the basic types of services associated with subscriber lines. More detailed information on Line Class Codes (LCC) can be found under table LINEATTR in the data schema section of the *Translations Guide*.

Note: Features on the DMS-100G switch use Agent Class Codes (ACC) instead of line class codes. For more information on table ACC, see "ACC" in the data schema section of the *Translations Guide*.

Line Class Codes

Line Class Code	Type of Service
1FR	Individual Flat Rate (residence and business)
1MR	Individual Message Rate
2FR	Two-Party Flat Rate (residence and business)
2WW	Two-Way WATS
4FR	Four-Party Flat Rate (residence and business)
8FR	Eight-Party Flat Rate (residence and business)
10FR	Ten-Party Flat Rate (residence and business)
ATA	Analog Terminal Adapter
CCF	Coin, Coin First (prepay)
CDF	Coin, Dial Tone First
CFD	Coin Free Dialing
COIN	Coin (international)
CSD	Circuit-Switched Digital Service (CSDDS)
CSP	Coin (semi-postpay)
DATA	Data Unit
EOW	Enhanced Outward WATS (feature package NTXA16AA)
ETW	Enhanced Two-Way WATS (feature package NTXA16AA)
IBN	Integrated Business Network
ISDNKSET	Integrated Services Digital Network Business Set and Data Unit
INW	INWATS
M2006	Aries M2006 Single-Line Set (with 6 keys)
M2008	Aries M2008 Set (with 8 keys, functionality MSL00003)
M2009	Meridian M2009 Sets
M2016S	Aries M2016S Secure Set (with 16 keys, functionality MSL00003)
M2018	Meridian M2018 Sets
M2112	Meridian M2112 Sets
M2216A	Aries M2216A ACD Set (with 16 keys, functionality MSL00003)
M2216B	Aries M2216B ACD Set (with 16 keys, functionality MSL00003)
M2317	Meridian M2317 Sets
M2616	Aries M2616 Set (with 16 keys)
M2616CT	Aries M2616 Cordless Terminal Set (with 16 keys)
M3000	Meridian M3000 Sets
M5008	Meridian M5008 Sets
M5009	Meridian M5009 Sets
M5112	Meridian M5112 Sets
M5208	Meridian M5208 Sets
M5209	Meridian M5209 Sets
M5212	Meridian M5212 Sets
M5216	Meridian M5216 Sets
M5312	Meridian M5312 Sets
M5316	Meridian M5316 Sets
MADO	Meridian Asynchronous Data Option
MCA	Meridian Communications Adapter
MPDA	Meridian Programmable Data Adapter (functionality MSL00003)
OWT	OUTWATS
PBM	PBX Message Rate
PBX	PBX Flat Rate
PDATA	POTS Data Unit
PSET	Proprietary Business Set
RES	Residential Enhanced Services
SPC	Semi-Permanent Connection (international)
STD	Standard Single-Party POTS (international)
TWX	Teletypewriter Exchange
VLN	Virtual Line for Remote Call Forwarding
ZMD	Zero Minus Denied
ZMZPA	Zero Minus Zero Plus Allowed

-End-

Note 1: The M2000 series of Meridian digital telephone sets provides simultaneous Integrated Voice and Data (IVD).

Note 2: The M5000 series (sometimes referred to as repackaged P-phones) replaces the original P2000 series.

Line Service Options

The following table lists line service options that, with the LCC, further define the service associated with a line or hunt group. The table also includes references to the "Options Incompatibility" table herein which lists incompatible options for each option, and to the option's corresponding section "Service Order Commands" in this article.

Line Service Options

Option	Name	Functional Group Ordering Code
3WC	Three-Way Calling	NTX106AA
3WCPUB	Three-Way Calling Public Announcement	NTX877AA
AAB	Automatic Answer Back	NTX106AA
AAK	Answer Agent Key	NTX416AC
ACB	Automatic Call Back	NTXA00AB
ACD	Automatic Call Distribution	NTX407AB, NTX415AA, NTX416AJ, NTX727AD
ACDNR	Automatic Call Distribution Not Ready	NTX416AI
ACRJ	Anonymous Caller Rejection	NTXP12AA
ADSI	Analog Display Services Interfaces	
AEMK	Answer Emergency Key	NTX416AC
AIN	Advanced Intelligent Network	NTXQ42AA
AINDN	Advanced Intelligent Network DN	NTXQ42AA
AIOD	Automatic Identification of Outward Dialing	NTX174AA
APS	Attendant Pay Station	SERVA008
ALI	Automatic Location Identification	NTXN66AA
AMATEST	Automatic Message Accounting Test Call Capability	NTX159AA
AMSG	Access to Messaging	RES00002
AMSGDENY	Access to Messaging Deny	RES00002
AR	Automatic Recall	NTXA00AB
ARDDN	Automatic Recall Dialable Directory Number	NTXP80AA
ASL	Agent Status Lamp	NTX415AA
ATC	Automatic Time and Charges	NTX049AE
AUD	Automatic Dial	NTX106AA, NTXQ59AA
AUL	Automatic Line	NTX106AA, NTX250AA
AUTODISP	Automatic Display	NTXE40AB
AVT	AUTOVON Terminating	MSLD0009
BCLID	Bulk Calling Line Identification	NTXF55AA
BLF	Busy Lamp Field for Meridian Business Sets	NTXJ97AA
BNN	Bridged Night Number	NTX007AB
CAG	Call Agent	NTX415AA
CALLOG	Call Logging	NTXP96AA
CBE	Call Forwarding Busy Internal Calls Only	NTX119AA
CBU	Call Forwarding Busy Unrestricted	NTX106AA
CCSA	Common Control Switching Arrangement	NTX100AA, NTX165AA
CCV	Call Covering	NTXE47AA
CCW	Cancel Call Waiting	NTXJ58AA
CD0	CD9 Circle Digit	NTX049AC
CDC	Customer Data Change	NTX412BA
CDE	Exclude External Calls from Call Forwarding	NTX119AA
CDI	Exclude Intragroup Calls from Call Forwarding	NTX413AB

-continued-

Line Service Options (continued)

Option	Name	Functional Group Ordering Code
CDU	Call Forwarding Do Not Answer Unrestricted	NTX106AA
CFB	Call Forwarding Busy	NTX106AA
CFBL	Call Forwarding Busy Line	NTX806AA
CFD	Call Forwarding Do Not Answer (Business Sets)	NTX106AA
CFDA	Call Forwarding Do Not Answer (Residential)	NTX806AA
CFTB	Call Forward Timed for CFB	
CFTD	Call Forward Timed for CFD	
CFDVT	Call Forwarding Do Not Answer Variable Timer	NTX415AA
CFF	Call Forwarding Fixed	NTX106AA
CFGD	Call Forwarding Do Not Answer for Hunt Group	NTX100AA
CFGDA	Call Forwarding Group Do Not Answer	NTX100AA
CFIND	Call Forward Indication MSL Call Forward Indication	
CFI	Call Forwarding Intragroup	NTX100AA
CFK	Call Forwarding on a Per Key Basis	NTXE62AA
CFMDN	Call Forwarding MADN Secondary Member	NTXA72AA
CFRA	Call Forwarding Remote Access	NTXN75AA
CFS	Call Forwarding Simultaneous/Screening	NTX806AA
CFTOD	Call Forward Time of Day	MSL00007
CFU	Call Forwarding Universal	NTX100AA
CFW	Call Forwarding	
CFWANN	Call Forward With Announcement	JPN00010
CHD	Call Hold	NTX435AA
CID	Calling Party Identification	
CIDB	Permanent Calling Identity Delivery Blocking	RES00003
CIDS	Calling Identity Delivery and Suppression	RES00003
CIF	Controlled Interflow	NTX416AF
CIR	Circular Hunt	NTX100AB, NTX007AB, NTX250AA
CLF	Calling Line Identification with Flash	NTX100AA
CLI	Calling Line Identification	NTX801AA
CLSUP	Call Supervisor	NTX416AF
CMCF	Control Multiple Call Forwarding	NTXR80AA
CMG	Call Management Group	RES00002
CNAB	Calling Name Delivery Blocking	NTXQ29AA
CNAMD	Calling Name Delivery	NTXE52AA, NTXE58AA
CND	Calling Number Delivery	NTXA01AA
CNDB	Calling Number Delivery Blocking	NTXA41AA, NTXE46AA
CNDBO	Calling Number Delivery Blocking Override	NTXK55AA
CNF	Station Controlled Conference	NTX111AA
COD	Cutoff on Disconnect	NTX101AA
COT	Customer Originated Trace	NTXA02AA
CPH	Called Party Hold	NTX007AB, NTX094AA
CPR	Critical Path Restoration	NTX250AA
CPU	Call Pickup	NTX100AA, NTXF88AB
CTD	Carrier Toll Denied	NTXA24AA
CTW	Call Transfer Warning	NTX899AA
CUG	Closed User Group	NTXE60AA
CUSD	Call Forwarding Usage Sensitive Denial	NTX045AA
CWD	Dial Call Waiting	NTX106AA
CWI	Call Waiting Intragroup	NTX106AA
CWO	Call Waiting Originating	NTX106AA
CWR	Call Waiting Ringback	NTXA32AA
CWT	Call Waiting	NTX106AA, NTX020AC
CWTACT	Call Waiting Active	MSL00003
CWX	Call Waiting Exempt	NTX106AA
CXR	Call Transfer	NTX808AA, NTX820AA
DASK	Display Agent Status	NTX416AF

-continued-

Line Service Options (continued)

Option	Name	Functional Group Ordering Code
DCBI	Directed Call Pickup Barge-In	NTX435AA
DCBX	Directed Call Pickup Barge-In Exempt	NTX435AA
DCF	Denied Call Forwarding	NTX413AA, NTX413AB
DCND	DTMF Calling Number Delivery	NTXV58AA
DCPK	Directed Call Park	NTX414AA
DCPU	Directed Call Pickup	NTX435AA
DCPX	Directed Call Pickup Exempt	NTX435AA
DDN	Dialable Directory Number	NTXE27AA
DENY	Deny Access to CLASS Features	NTXQ70AA
DGT	Digitone	NTX901AA
DIN	Denied Incoming Calls	NTXJ84AA
DISCTO	Disconnect Timeout	NTX250AA
DISP	Display	NTX108AA
DLH	Distributed Line Hunt	NTX100AA
DMCT	Denied Malicious Call Termination	NTXV56AA, NTX184AA
DNID	Dialed Number Identification Delivery	
DND	Do Not Disturb	NTX110AA
DNH	Directory Number Hunt	NTX100AA
DOR	Denied Origination	NTX901AA
DPR	Data Unit Profile	NTX250AA
DQS	Display Queue Status	NTX415AA
DQT	Display Queue Threshold	NTX416AC
DRCW	Distinctive Ringing/Call Waiting	NTXA42AA
DRING	Distinctive Ringing	NTX101AA
DSCWID	SCWID with Disposition	NTXQ91AA
DTM	Denied Termination	NTX901AA
DTMK	Data Mode Key	MSL00003
EBO	Executive Busy Override	NTX101AA, NTX106AA
EBX	Executive Busy Override Exempt	NTX101AA
ECM	Extended Call Management	NTXP96AA
ELN	Essential Line	NTX902AA
EMK	Emergency Key	NTX416AC
EMW	Executive Message Waiting	NTXE47AA
ESL	Emergency Service Line	NTX901AA
EWAL	Enhanced WATS Access Line	NTXA16AA
EXB	Extension Bridging	NTXA81AA
EXT	Extension/Add-On	NTX106AA
FAA	Forced Agent Availability	NTX416AI
FANI	Flexible Automatic Number Identification	NTX735AA
FCTDNTER	Inter-LATA Full Carrier Toll Denied	NTX901AA, NTXF69AA
FCTDNTRA	Intra-LATA Full Carrier Toll Denied	EQA00001
FDN	Feature Denied	LINSA001
FGA	Feature Group A	NTX083AA
FNT	Free Number Terminating	NTX901AA
FRO	Fire Reporting System (Origination and Termination)	NTX100AA
FRS	Fire Reporting System (Termination Only)	NTXA64AA
FSR	Frequency Selective Ringing	NTX398AA
FTRGRP	Feature Group	NTXF87AA
FTRKEYS	Feature Keys	NTXF87AA
FTS	jFAX-Thru Service	RES00002
FXR	Fast Transfer	RES00004
GIAC	Group Intercom All Calls	NTX878AC
GIC	Group Intercom	NTX106AA
GLTC	Ground Loop Test Cancel	NTX901AA
GND	Ground Start	
HLD	Permanent Hold	NTX100AA
HNDSFREE	Handsfree	

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Line Service Options (continued)

Option	Name	Functional Group Ordering Code
HOT	Hotel/Motel	NTX901AA
ICM	Intercom (Business Sets)	NTX106AA
IECFB	Internal/External Call Forwarding Busy	NTXE39AA
IECFD	Internal/External Call Forwarding Do Not Answer	NTXE39AA
ILB	Inhibit Line Busy	NTXJ84AB
IMB	Inhibit Make Busy	NTXJ84AB
INSPECT	Inspect Key	NTXE40AA
INT	Intercom (Single-Party Revertive Calling)	NTXA64AA
IRR	Inhibit Ring Reminder	NTXJ84AA
JOIN	Call Join	MSL00007
KSH	Key Short Hunt	NTX106AA
KSMOH	Key Set Music on Hold	
LCDR	Local Call Detail Recording	
LDTPSAP	Line Appearance on Digital Trunk PSAP	
LINEPSAP	Line-Ended PSAP	NTX447AA
LMOH	Line Music on Hold	AUS00015
LNR	Last Number Redial	NTX101AA
LNRA	Last Number Redial Associated with Set	NTX878AC
LOB	Line of Business	NTX991AG
LOD	Line Overflow to DN	NTX100AA, NTX107AB, NTX250AA, NTX806AA
LOR	Line Overflow to Route	NTX100AA, NTX107AB, NTX250AA
LPIC	Intra-LATA PIC	NTX901AA, NTXF69AA
LSPAO	Local Service Provider Account Owner	LOC000012
LSPSO	Local Service Provider Switch Owner	LOC000012
LVM	Leave Message	NTXE47AA
M0022	22-Key Add-On for Aries	NTX640AA
M0200	Display Option for Aries	NTX640AA
M518	18-Button Add-On for Meridian M5000 Series	NTX106AA
M536	36-Button Add-On for Meridian M5000 Series	NTX106AA
MAN	Manual Line	NTX901AA
MBK	Make Busy Key	NTXJ84AA
MBSCAMP	Meridian Business Set Station Camp-On	NTXJ98AA
MCH	Malicious Call Hold	NTX106AA
MDN	Multiple Appearance Directory Number	NTX106AA
MDNNAME	MDN Member Name	NTX946AB
MEMDISP	MDN Member Display	NTX946AC
MLAMP	MDN Lamp	NTX878AC
MLH	Multi-Line Hunt	NTX100AA
MPB	Multi-Party Bridging	NTX297AA
MPH	Multiple Position Hunt	NTX877AB
MREL	MDN Release	NTX878AC
MRF	MDN Ring Forwarding	NTXA33AA
MRFM	MADN Ring Forwarding Manual	NTXA33AA
MSB	Make Set Busy	NTX435AA
MSBI	Make Set Busy Intragroup	NTX435AA
MSGDEACT	Message Deactivation	RES00002
MSMWI	Multiple Station Message Waiting Indication	MSL00003
MWIDC	Message Waiting Indication	NTX822AA
MWQRY	Message Waiting Query	NTX822AA
MWT	Message Waiting	NTX119AA
NAME	Name Display	NTXA82AA
NCCW	No Cancel Call Waiting Without Call Waiting	MDC00001
NDC	No Double Connect	NTX250AA
NFA	Network Facility Access	NTXR25AA
NGTSRVCE	Night Service	NTX416AC

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Line Service Options (continued)

Option	Name	Functional Group Ordering Code
NHT	No Hazard Test	NTXP00AA
NLT	No Line Insulation Test	NTX195AA
NOH	No Receiver Off-Hook Tone	NTXA64AA
NPGD	Negate Partial Ground Start Diagnostics	
NRS	Network Resource Selector	NTX251AA
NSDN	Night Service Directory Number	NTX877AB
OBS	Observe Agent	NTX415AA
OFR	Overflow Register (Hardware)	NTXA64AA, NTX007AB
OFS	Overflow Register (Software)	NTXA64AA, NTX007AB
OLS	Originating Line Select	NTX878AB
ONI	Operator Number Identification	NTX901AA
PBL	Private Business Line	NTX106AA
PCACIDS	Privacy Change Allowed CIDS	NI000051
PCWT	Precedence Call Waiting Terminating	MSLD0025
PF	Power Features	NTXF88AB
PIC	Primary Inter-LATA Carrier	NTX734AA
PILOT	Pilot DN Billing	NTXJ82AA, NTX080AA
PLP	Plug-Up (Trouble Intercept)	NTXA64AA
PPL	PVN Priority Line	NTX983AB
PREMTBL	Call Preemption	MSLD0025
PRH	Preferential Hunting	NTXA64AA
PRK	Call Park	NTX106AA
PRL	Privacy Release	NTX106AA
QBS	Query Busy Station	NTX719AA
QCK	Quick Conference Key	NTXN50AA
QTD	Query Time and Date	NTX108AA
RAG	Ring Again	NTX100AA
RCD	Reverse Coin Disposal	NTX901AA
RCHD	Residential Call Hold	NTXJ69AA
RCVD	Received Digits Billing	NTXJ82AA, NTX080AA
REASDSP	Reason Display	NTXE40AA
RINGTYP	Ringing Type	
RMB	Random Make Busy	NTXA64AA
RMP	Remote Meter Pulsing	NTXA64AA
RMR	Remote Message Register (Reversal)	NTX100AA, NTXA64AA, NTX007AB
RMS	Remote Message Register (SD Point)	NTXA64AA, NTX007AB
RMT	Remote Message Register for Toll Calls	NTX100AA
RPA	Repeated Alert	NTX878AE
RSP	Restricted Sent Paid	NTXA64AA
RSUS	Requested Suspension	NTXA64AA
SACB	Subscriber Activated Call Blocking	NTXA18AA
SBLF	Set Based Lamp Field	
SC1	Speed Calling Short List	NTX020AC, NTXA64AA
SC2	Speed Calling Long List L30	NTX020AC, NTXA64AA
SC3	Speed Calling Long List L50	NTXA64AA
SCA	Selective Call Acceptance	NTXA45AA
SCF	Selective Call Forwarding	NTXA95AA
SCL	Speed Calling Long	NTX100AA, NTX106AA, NTX250AA
SCMP	Series Completion	NTXJ82AA
SCR	Selective Charge Recording	SERVA016
SCR	Selective Charge Recording	SUBSA003
SCRJ	Selective Call Rejection	NTXA96AA
SCS	Speed Calling Short	NTX100AA, NTX106AA, NTX250AA

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Line Service Options (continued)

Option	Name	Functional Group Ordering Code
SCU	Speed Calling User	NTX100AA, NTX106AA, NTX250AA
SCWID	Spontaneous Call Waiting Identification	NTXN97AA
SDN	Secondary Directory Number	NTXA64AA, NTXJ47AA
SDS	Special Delivery Service	MSA00001
SDY	Line Study	NTXA64AA
SEC	Security	NTX414AA
SECURE	Secure Set Feature For MSL Support	MSL00007
SETMODEL	Set Model	
SHU	Stop Hunt	NTX100AA, NTX007AB
SIMRING	Simultaneous Ringing	RES00002
SL	Secondary Language	NTXA64AA
SLC	Subscriber Loop Carrier	
SLQ	Single-Line Queuing	
SLU	Subscriber Line Usage	NTX106AA, NTXA64AA
SLVP	Single-Line Variety Package	NTXF82AA
SMDI	Simplified Message Desk Interface	NTX732AA
SMDICND	SMDI-SMDI Calling Number Delivery	
SMDR	Station Message Detail Recording	NTX102AA
SOR	Station Origination Restriction	NTXA74AA
SORC	Station Origination Restrictions Controller	NTXA74AA
SPB	Special Billing	NTXA64AA
SPR	Selective Suppression of MCDR/SMDR	MSLD00006
SSAC	Station Specific Authorization Codes	NTX103BA
STRD	Short Timed Release Disconnect	NTX901AA
SUPPRESS	Suppress Line Identification Information	NTXA40AA
SUPR	Supervisor	NTXE09AB
SUS	Suspended Service	NTX901AA
SVCGRP	Service Group	NTXR83AA
TBO	Terminating Billing Option	NTXE43AA
TDN	Toll Denial	NTXA64AA, NTX007AB
TDV	Toll Diversion	NTX901AA
TEENSDN	Teen Service Secondary Directory Number	SERVA022
TELECNTN	Meridian Telecenter	MSL00003
TERM	Terminating DN Billing	NTXJ82AA, NTX080AA
TES	Toll Essential	NTXA64AA
TFO	Terminating Fault Option	NTXJ84AA
TLS	Terminating Line Select	NTX878AB
TRKDISP	Trunk Member Display MSL Trunk Mem Display	
TRMBOPT	Terminator Billing Option on Hunt Group	NTX083AA
UCD	Uniform Call Distribution	NTX101AA
UCDLG	Uniform Call Distribution Login	NTXA77AA
UCDSD	Uniform Call Distribution Signal Distributor	NTXA77AA
WML	Warm Line	NTX127AA, NTXJ38AA
WUC	Wake-Up Call	NTXP57AA
XXTRG	*XX Trigger for Advanced Intelligent Networking	NTXP01AA

-End-

Line Class Codes and Compatible Options

The following table lists the LCC and compatible options. To obtain a listing of LCC-options compatibility from the DMS-100 switch, logon at a MAP terminal and enter the following commands:

>TABLE LCCOPT
>LIST ALL

The following notes apply to this table:

Note 1: PSET is the LCC used for business sets. The DISP option is added to the line for display business sets.

Note 2: M5009 is a special LCC used for Meridian M5009 business sets that have 9 keys. Compatible options are the same as for PSET.

Note 3: M5112 is the LCC for Meridian M5112 business sets that have 12 keys. Compatible options are the same as for PSET.

Note 4: International LCCs and options are not included in this table.

Note 5: M5209 and M5312 LCCs have the same compatible options as PSET.

Note 6: The VLN LCC must be used for remote call forwarding DN's, which have no associated hardware. VLN has no compatible options.

Note 7: For a list of the IBN sets that support CLASS and thus the MSMWI option, see the detailed information on MSMWI.

Line Class Codes and Compatible Options

Line Class Code	Compatible Options
1FR	3WC, AIN, AMATEST, AMSG, AMSGDENY, ATC, AUL, BCLID, BNN, CALLOG, CCW, CFBL, CFDA, CFGDA, CFW, CID, CIDB, CIDS, CIR, CLF, CLI, CMG, COD, CTD, CUSD, CWT, DCF, DCND, DGT, DLH, DMCT, DNH, DNID, DOR, DTM, ELN, ESL, FANI, FCTDNTER, FCTDNTRA FGA, FNT, FRO, FRS, FSR, FTS, GLTC, GND, HOT, ILB, IMB, INT, IRR, LCDR, LDSA, LDSO, LDSR, LDST, LOD, LOR, LPIC, LSPAO, LSPSO, MAN, MBK, MLH, MPB, MSGDEACT, NAME, NCCW, NDC, NHT, NLT, NOH, NPGD, OFR, OFS, ONI, PIC, PILOT, PLP, PRH, RCVD, RMB, RMP, RMR, RMS, RSP, RSUS, SC1, SC2, SCMP, SDN, SDS, SDY, SETMODEL, SHU, SLU, SPB, STRD, SUPPRESS, SUS, TBO, TDN, TERM, TES, TFO, TRMBOPT, WML
1MR	3WC, AIN, AMATEST, AMSG, AMSGDENY, ATC, AUL, BCLID, BNN, CALLOG, CCW, CFBL, CFDA, CFGDA, CFW, CID, CIR, CLF, CLI, CMG, COD, CTD, CUSD, CWT, DCF, DGT, DLH, DNH, DNID, DOR, DTM, ELN, FANI, FCTDNTER, FCTDNTRA, FGA, FNT, FRO, FRS, FSR, FTS, GLTC, GND, HOT, ILB, IMB, INT, IRR, LCDR, LDSA, LDSO, LDSR, LDST, LOD, LOR, LPIC, LSPAO, LSPSO, MAN, MBK, MLH, MPB, MSGDEACT, MTR, NAME, NCCW, NDC, NHT, NLT, NOH, NPGD, OFR, OFS, ONI, PIC, PILOT, PLP, PRH, RCVD, RMB, RMP, RMR, RMS, RSP, RSUS, SETMODEL, SC1, SC2, SCMP, SDN, SDS, SDY, SHU, SLU, SPB, STRD, SUPPRESS, SUS, TBO, TDN, TERM, TES, TFO, TRMBOPT, WML
2FR	AMATEST, CLI, CTD, DGT, DOR, DTM, FANI, FCTDNTER, FCTDNTRA, FRO, FRS, LCDR, LPIC, LSPSO, NAME, NCCW, NHT, NLT, NPGD, ONI, PIC, PLP, RSUS, SC1, SC2, SDY, SLU, SPB, SUPPRESS, SUS, TBO, TDN
2WW	AIOD, AMATEST, ATC, BCLID, CIR, CLF, CLI, COD, CTD, DGT, DLH, DNH, DOR, DTM, ELN, FANI, FRO, FRS, GND, LCDR, LPIC, MLH, NAME, NDC, NHT, NLT, NOH, NPGD, OFR, OFS, ONI, PIC, PILOT, PLP, PRH, RCVD, RMB, RSP, RSUS, SC1, SC2, SCMP, SDY, SHU, SLU, SPB, STRD, SUPPRESS, SUS, TERM, TES, TFO, WML
4FR	AMATEST, CLI, CTD, DGT, DOR, DTM, FANI, FCTDNTER, FCTDNTRA, FRO, FRS, LCDR, LPIC, LSPSO, NAME, NCCW, NHT, NLT, NPGD, ONI, PIC, PLP,

	RSUS, SLU, SUPPRESS, SUS
8FR	CD0 CD9, CLI, CTD, DGT, DOR, DTM, FANI, FCTDNTER, FCTDNTRA, FRO, FRS, LPIC, LSPSO, NCCW, NHT, NLT, NPGD, PIC, PLP, RSUS, SDY, SLU, SUPPRESS, SUS
10FR	CD0 CD9, CLI, CTD, DGT, DOR, DTM, FANI, FCTDNTER, FCTDNTRA, FRO, FRS, LPIC, LSPSO, NCCW, NHT, NLT, NPGD, PIC, PLP, RSUS, SDY, SLU, SUPPRESS, SUS
ATA	3WC, AAB, AAK, ACD, ACDNR, AEMK, AMATEST, ASL, ATC, AUD, AUL, AUTODISP, BLF, BNN, CAG, CBE, CBU, CCW, CDC, CDE, CDI, CDU, CFB, CFD, CFDVT, CFF, CFGD, CFI, CFMDN, CFRA, CFS, CFU, CIF, CIR, CLI, CMCF, CNF, CPU, CTD, CTW, CWD, CWI, CWO, CWR, CWT, CWX, CXR, DASK, DCBI, DCBX, DCF, DCPK, DCPU, DCPX, DIN, DLH, DND, DNH, DOR, DQS, DQT, DRING, DTM, EBO, EBX, ELN, EMK, EMW, FCTDNTER, FCTDNTRA, FNT, FTRGRP, FTRKEYS, GIC, ICM, IECFB, IECFD, INSPECT, KSH, KSMOH, LCDR, LNR, LNRA, LOB, LOD, LOR, LPIC, MCH, MDN, MDNNAME, MEMDISP, MLAMP, MLH, MREL, MSB, MSBI, MWT, NAME, NDC, NGTSRVCE, NOH, OBS, OLS, ONI, PBL, PIC, PLP, PRH, PRK, PRL, RAG, REASDSP, RINGTYP, RMB, RSP, RSUS, SCL, SCMP, SCS, SCU, SDY, SEC, SVCGRP, SHU, SL, SLU, SMDI, SMDR, SOR, SORC, SPB, SPR, SSAC, SUPPRESS, SUS, TES, TFO, TLS, UCD, UC DLG, UCDS, WUCR
CCF	AMATEST, CLF, CLI, COD, CTD, DGT, DOR, DTM, ELN, FANI, FNT, FSR, GND, LCDR, LPIC, LSPAO, MAN, NAME, NHT, NLT, NPGD, PIC, PLP, RCD, RSP, RSUS, SCMP, SDY, SLC, SLU, STRD, SUPPRESS, SUS, TDN, TES
CDF	AMATEST, CLF, CLI, COD, CTD, DGT, DOR, DTM, ELN, FANI, FNT, FSR, LCDR, LPIC, LSPAO, MAN, NAME, NHT, NLT, NPGD, PIC, PLP, RCD, RSP, RSUS, SCMP, SDY, SLC, SLU, STRD, SUPPRESS, SUS, TDN, TES
CFD	3WC, AMATEST, ATC, AUL, CCW, COD, CTD, CWT, DGT, DOR, DTM, ELN, FANI, FRO, FRS, FSR, GND, INT, LCDR, LPIC, LSPAO, NAME, NDC, NHT, NLT, NOH, NPGD, ONI, PIC, RMR, RMS, RSP, RSUS, SC1, SC2, SCMP, SDY, SLU, SPB, STRD, SUPPRESS, SUS, TES, WML
COINLCC	CIDB, LSPSO, NCCW
CSD	ATC, AUL, CIR, CLI, COD, CTD, DGT, DNH, DOR, DTM, ELN, FANI, FCTDNTER, FCTDNTRA, FNT, GND, LOD, LOR, LPIC, LSPAO, LSPSO, NAME, NCCW, NDC, NHT, NLT, NOH, NPGD, OFR, OFS, PIC, PILOT, PLP, PRH, RCVD, RMB, RSUS, SDY, SHU, SLU, SPB, STRD, SUPPRESS, SUS, TERM, TES, TFO, WML
CSP	CLF, CLI, COD, CTD, DGT, DOR, DTM, ELN, FANI, FNT, FSR, GND, LPIC, LSPAO, MAN, NAME, NHT, NLT, NPGD, PIC, PLP, RSP, RSUS, SCMP, SDY, SLU, STRD, SUPPRESS, SUS, TDN, TES
DATA	AMATEST, AUD, AUL, AVT, BNN, CBE, CBU, CDC, CDE, CDI, CDU, CFB, CFD, CFDVT, CFF, CFGD, CFI, CFRA, CFS, CFTOD, CFU, CIR, CLI, CMCF, CPR, CTD, CUG, CWX, DCF, DIN, DISCTO, DLH, DND, DNH, DOR, DPR, DTM, ELN, FCTDNTER, FCTDNTRA, FGA, FNT, FTRGRP, FTRKEYS, IECFB, IECFD, ILB, IMB, IRR, LCDR, LNR, LOD, LOR, LPIC, LSPAO, LSPSO, MBK, MLH, MSB, MSBI, NCCW, NDC, NOH, NRS, OFR, OFS, PIC, PREMTBL, PRH, RAG, RMB, RSUS, SCA, SCF, SCL, SCMP, SCRJ, SCS, SCU, SDY, SEC, SHU, SL, SLU, SMDR, SPB, SSAC, SUPPRESS, SUS, TBO, TES, TFO
EOW	AIOD, AMATEST, ATC, BCLID, CIR, CLF, CLI, COD, DGT, DLH, DNH, DOR, DTM, ELN, EWAL, FRO, FRS, GND, LCDR, LSPAO, MLH, NAME, NDC, NHT, NLT, NOH, NPGD, OFR, OFS, ONI, PILOT, PLP, PRH, RCVD, RMB, RSUS, SC1, SC2, SDY, SHU, SLU, SPB, SUPPRESS, SUS, TERM, TES, TFO, WML
ETW	AIOD, AMATEST, ATC, BCLID, CIR, CLF, CLI, COD, DGT, DLH, DNH, DOR,

	DTM, ELN, EWAL, FRO, FRS, GND, LCDR, LSPAO, MLH, NAME, NDC, NHT, NLT, NOH, NPGD, OFR, OFS, ONI, PILOT, PLP, PRH, RCVD, RMB, RSUS, SC1, SC2, SDY, SHU, SLU, SPB, SUPPRESS, SUS, TERM, TES, TFO, WML
IBN	3WC, 3WCPUB, ACB, ACD, ACDNR, ACRJ, ADSI, AIN, ALI, AMATEST, AMSG, AMSGDENY, AR, ARDDN, ATC, AUL, AVT, BCLID, BNN, CBE, CBU, CCSA, CCW, CDC, CDE, CDI, CDU, CFB, CFD, CFDVT, CFF, CFGD, CFI, CFIND, CFMDN, CFRA, CFTD, CFS, CFTB, CFTD, CFTOD, CFU, CFWANN, CHD, CID, CIDB, CIDS, CIR, CLF, CLI, CMCf, CNAB, CNAMD, CND, CNDBO, CNF, COD, COT, CPU, CTD, CTW, CWTACT, CWD, CWI, CWO, CWR, CWT, CWX, CXR, DCBI, DCBX, DCF, DCPK, DCPU, DCPX, DDN, DGT, DIN, DLH, DND, DNH, DNID, DOR, DRCW, DRING, DTM, EBO, EBX, ECM, ELN, EMW, FGA, FNT, FRO, FRS, FTRGRP, FTS, GIC, GLTC, GND, HLD, HOT, IECFB, IECFD, ILB, IMB, IRR, LCDR, LDTPSAP, LINEPSAP, LNR, LOD, LOR, LPIC, LSPSO, MBK, MDN, MDNNAME, MEMDISP, MLAMP, MLH, MPH, MREL, MRF, MSB, MSBI, MSGDEACT, MSMWI, MWT, NAME, NCCW, NDC, NFA, NHT, NLT, NOH, NPGD, NSDN, OBS, OFR, OFS, ONI, PCWT, PIC, PILOT, PLP, PPL, PREMTBL, PRH, PRK, RAG, RCVD, RMB, RMR, RMT, RSP, RSUS, SACB, SCA, SCF, SCL, SCMP, SCRJ, SCS, SCU, SCWID, SDN, SDS, SDY, SEC, SETMODEL, SVCGRP, SHU, SIMRING, SL, SLU, SMDI, SMDICND, SMDR, SOR, SORC, SPB, SPR, SSAC, STRD, SUPPRESS, SUPR, SUS, TBO, TERM, TES, TFO, TRMBOPT, UCD, UCDS, WML, WUC, XXTRG
INW	AMATEST, ATC, BCLID, CIR, CLF, CLI, COD, CTD, DGT, DLH, DNH, DOR, DTM, FANI, FRO, FRS, FSR, GND, ILB, IMB, LOD, LPIC, LSPAO, MBK, MLH, NAME, NDC, NHT, NLT, NOH, NPGD, OFR, OFS, PIC, PILOT, PLP, PRH, RCVD, RMB, RSUS, SCMP, SDY, SHU, SLU, SPB, STRD, SUPPRESS, SUS, TERM, TFO
ISDNKSET	AAB, ACOU, ACR, AFC, AMATEST, AMSG, AMSGDENY, ATC, AUD, AUL, AVT, BC, BCLID, BLOCKCDN, BLOCKCGN, BNN, BRICLID, CBE, CBI, CBU, CDC, CDE, CDI, CDU, CFB, CFD, CFDVT, CFF, CFI, CFMDN, CFTOD, CFU, CFXDNCT, CFXVAL, CHG, CIDS, CIDV, CIDSSUP, CIR, CLI, CMCf, CNDBO, CNF, COT, CPU, CTD, CWI, CWT, CXR, DCBI, DCBX, DCF, DCPK, DCPU, DCPX, DIN, DLH, DND, DNH, DOR, DPCAR, DRING, DROP, DTM, EBO, EBX, ECM, EHL, FC, FCTDNTER, FCTDNTRA, FNT, FTRKEYS, FTRGRP, GIC, HLD, ICM, IECFB, IECFD, ILB, IMB, IRR, ISDNAMA, KSH, LCDR, LNR, LNRA, LOD, LOR, LPIC, LVM, MBK, MCH, MDN, MDNNAME, MEMDISP, MLH, MREL, MRF, MRFM, MSB, MSBI, MSGDEACT, MWT, NAME, NDC, NLT, NOH, NRS, NUMC, ONI, PBL, PCACIDS, PIC, PLP, PPL, PREMTBL, PRK, PRL, PROVCGS, PROVCD, PROVLLC, PROVHLC, PRV, RAG, REASDSP, RLS, RMB, RSP, RSUS, SCA, SCF, SCL, SCMP, SCRJ, SCS, SCU, SDY, SEC, SHU, SL, SLU, SMDR, SPB, SSAC, SUPPRESS, SUS, SVCGRP, TBO, TES, TFO, 3WC, WML, XFER, XXTRG
M2006	3WC, AAB, AAK, ACD, ACDNR, AEMK, AMATEST, ASL, ATC, AUD, AUL, AUTODISP, BLF, BNN, CAG, CBE, CBU, CCW, CDC, CDE, CDI, CDU, CFB, CFD, CFDVT, CFF, CFGD, CFI, CFMDN, CFRA, CFS, CFTOD, CFU, CIF, CIR, CLI, CMCf, CNF, COT, CPU, CTD, CTW, CWD, CWI, CWO, CWR, CWT, CWX, CXR, DASK, DCBI, DCBX, DCF, DCPK, DCPU, DCPX, DIN, DLH, DND, DNH, DOR, DQS, DQT, DRING, DTM, EBO, EBX, ELN, EMK, EMW, FCTDNTER, FCTDNTRA, FNT, FTRGRP, FTRKEYS, ICM, IECFB, IECFD, INSPECT, JOIN, KSH, KSMOH, LCDR, LNR, LNRA, LOB, LOD, LOR, LPIC, MCH, MDN, MDNNAME, MEMDISP, MLAMP, MLH, MREL, MRF, MRFM, MSB, MSBI, MWT, NAME, NDC, NGTSRVCE, NOH, OBS, OLS, ONI, PBL, PCWT, PIC, PLP, PREMTBL, PRH, PRK, PRL, RAG, REASDSP, RINGTYP, RMB, RSP, RSUS, SACB, SBLF, SCF, SCL, SCMP, SCS, SCU, SDY, SEC, SVCGRP, SHU, SL, SLU, SMDI, SMDR, SOR, SORC, SPB, SPR, SSAC, SUPPRESS, SUS, TES, TFO, TLS, TRKDISP, UCD, UC, UCDS, WUC
M2008	3WC, AAB, AAK, ACD, ACDNR, AEMK, AMATEST, ASL, ATC, AUD, AUL, AUTODISP, AVT, BCLID, BLF, BNN, CAG, CBE, CBU, CCW, CDC, CDE, CDI, CDU, CFB, CFD, CFDVT, CFF, CFGD, CFI, CFK, CFMDN, CFRA, CFS,

CFTOD, CFU, CIF, CIR, CLI, CLSUP, CMCF, CNF, COT, CPU, CTD, CTW, CWD, CWI, CWO, CWR, CWT, CWX, CXR, DASK, DCBI, DCBX, DCF, DCPK, DCPU, DCPX, DIN, DLH, DND, DOR, DQS, DQT, DRING, DTM, DTMK, EBO, EBX, ELN, EMK, EMW, FAA, FCTDNTER, FCTDNTRA, FNT, FTRGRP, FTRKEYS, GIAC, GIC, ICM, IECFB, IECFD, ILB, IMB, INSPECT, IRR, JOIN, KSH, KSMOH, LCDR, LINEPSAP, LNR, LNRA, LOB, LOD, LOR, LPIC, M0200, MBK, MBSCAMP, MCH, MDN, MDNNAME, MEMDISP, MLAMP, MLH, MREL, MRF, MRFM, MSB, MSBI, MSMWI, MWIDC, MWQRY, MWT, NAME, NDC, NGTSRVCE, NOH, OBS, OLS, ONI, PBL, PCWT, PIC, PLP, PREMTBL, PRH, PRK, PRL, QBS, QCK, RAG, REASDSP, RINGTYP, RMB, RPA, RSP, RSUS, SACB, SBLF, SCF, SCL, SCMP, SCS, SCU, SDY, SEC, SVCGRP, SHU, SL, SLU, SMDI, SMDR, SOR, SORC, SPB, SPR, SSAC, SUPPRESS, SUPR, SUS, TES, TFO, TLS, TRKDISP, UCD, UC DLG, UCDS D, WML, WUC

M2009

3WC, AAB, AAK, ACD, ACDNR, AEMK, AMATEST, ASL, ATC, AUD, AUL, AVT, BCLID, BLF, BNN, CAG, CBE, CBU, CCW, CDC, CDE, CDI, CDU, CFB, CFD, CFDVT, CFF, CFGD, CFI, CFK, CFMDN, CFRA, CFS, CFTOD, CFU, CIF, CIR, CLI, CLSUP, CMCF, CNF, COT, CPU, CTD, CTW, CWD, CWI, CWO, CWR, CWT, CWX, CXR, DCBI, DCBX, DCF, DCPK, DCPU, DCPX, DIN, DLH, DND, DNH, DOR, DRING, DTM, EBO, EBX, ELN, EMK, EMW, FAA, FCTDNTER, FCTDNTRA, FNT, FTRGRP, FTRKEYS, GIAC, GIC, ICM, IECFB, IECFD, ILB, IMB, IRR, JOIN, KSH, KSMOH, LCDR, LINEPSAP, LNR, LNRA, LOB, LOD, LOR, LPIC, MBK, MBSCAMP, MCH, MDN, MDNNAME, MEMDISP, MLAMP, MLH, MREL, MRF, MRFM, MSB, MSBI, MSMWI, MWT, NAME, NDC, NGTSRVCE, NOH, OBS, OLS, ONI, PBL, PCWT, PIC, PLP, PRH, REMTBL, PRK, PRL, QBS, QCK, RAG, RINGTYP, RMB, RPA, RSP, RSUS, SACB, SBLF, SCF, SCL, SCMP, SCS, SCU, SDY, SEC, SVCGRP, SHU, SL, SLU, SMDI, SMDR, SOR, SORC, SPB, SPR, SSAC, SUPPRESS, SUPR, SUS, TES, TFO, TLS, TRKDISP, UCD, UC DLG, UCDS D, WML, WUC

M2016S

3WC, AAB, AAK, ACD, ACDNR, AEMK, AMATEST, ASL, ATC, AUD, AUL, AUTODISP, AVT, BCLID, BLF, BNN, CAG, CBE, CBU, CCW, CDC, CDE, CDI, CDU, CFB, CFD, CFDVT, CFF, CFGD, CFI, CFK, CFMDN, CFRA, CFS, CFTOD, CFU, CIF, CIR, CLI, CLSUP, CMCF, CNF, COT, CPU, CTD, CTW, CWD, CWI, CWO, CWR, CWT, CWX, CXR, DCBI, DCBX, DCF, DCPK, DCPU, DCPX, DIN, DLH, DND, DOR, DQS, DQT, DRING, DTM, EBO, EBX, ELN, EMK, EMW, FAA, FCTDNTER, FCTDNTRA, FNT, FTRGRP, FTRKEYS, GIAC, GIC, ICM, IECFB, IECFD, ILB, IMB, INSPECT, IRR, JOIN, KSH, KSMOH, LCDR, LNR, LNRA, LOB, LOD, LOR, LPIC, M0022, M0200, MBK, MBSCAMP, MCH, MDN, MDNNAME, MEMDISP, MLAMP, MLH, MREL, MRF, MRFM, MSB, MSBI, MSMWI, MWIDC, MWQRY, MWT, NAME, NDC, NGTSRVCE, NOH, OBS, OLS, ONI, PBL, PCWT, PIC, PLP, PREMTBL, PRH, PRK, PRL, QBS, QCK, RAG, REASDSP, RINGTYP, RMB, RPA, RSP, RSUS, SCF, SCL, SCMP, SCS, SCU, SDY, SEC, SECURE, SVCGRP, SHU, SL, SLU, SMDI, SMDR, SOR, SORC, SPB, SPR, SSAC, SUPPRESS, SUPR, SUS, TES, TFO, TLS, TRKDISP, UCD, UC DLG, UCDS D, WML, WUC

M2018

3WC, AAB, AAK, ACD, ACDNR, AEMK, AMATEST, ASL, ATC, AUD, AUL, AVT, BCLID, BLF, BNN, CAG, CBE, CBU, CCW, CDC, CDE, CDI, CDU, CFB, CFD, CFDVT, CFF, CFGD, CFI, CFK, CFMDN, CFRA, CFS, CFTOD, CFU, CIF, CIR, CLI, CLSUP, CMCF, CNF, COT, CPU, CTD, CTW, CWD, CWI, CWO, CWR, CWT, CWX, CXR, DCBI, DCBX, DCF, DCPK, DCPU, DCPX, DIN, DLH, DND, DNH, DOR, DRING, DTM, EBO, EBX, ELN, EMK, EMW, FAA, FCTDNTER, FCTDNTRA, FNT, FTRGRP, FTRKEYS, GIAC, GIC, ICM, IECFB, IECFD, ILB, IMB, IRR, JOIN, KSH, KSMOH, LCDR, LNR, LNRA, LOB, LOD, LOR, LPIC, MBK, MBSCAMP, MCH, MDN, MDNNAME, MEMDISP, MLAMP, MLH, MREL, MRF, MRFM, MSB, MSBI, MSMWI, MWT, NAME, NDC, NGTSRVCE, NOH, OBS, OLS, ONI, PBL, PCWT, PIC, PLP, PREMTBL, PRH, PRK, PRL, QBS, QCK, RAG, RINGTYP, RMB, RPA, RSP, RSUS, SCF, SCL, SCMP, SCS, SCU, SDY, SEC, SVCGRP, SHU, SL, SLU, SMDI, SMDR, SOR, SORC, SPB, SPR, SSAC, SUPPRESS, SUPR, SUS, TES, TFO, TLS, TRKDISP, UCD, UC DLG, UCDS D, WML, WUC

M2112

3WC, AAB, AAK, ACD, ACDNR, AEMK, AMATEST, ASL, ATC, AUD, AUL,

AVT, BCLID, BLF, BNN, CAG, CBE, CBU, CCW, CDC, CDE, CDI, CDU, CFB, CFD, CFDVT, CFF, CFGD, CFI, CFK, CFMDN, CFRA, CFS, CFTOD, CFU, CIF, CIR, CLI, CLSUP, CMCF, CNF, COT, CPU, CTD, CTW, CWD, CWI, CWO, CWR, CWT, CWX, CXR, DCBI, DCBX, DCF, DCPK, DCPU, DCPX, DIN, DLH, DND, DNH, DOR, DRING, DTM, EBO, EBX, ELN, EMK, EMW, FAA, FCTDNTER, FCTDNTRA, FNT, FTRGRP, FTRKEYS, GIAC, GIC, ICM, IECFB, IECFD, ILB, IMB, IRR, JOIN, KSH, KSMOH, LCDR, LNR, LNRA, LOB, LOD, LOR, LPIC, MBK, MBSCAMP, MCH, MDN, MDNNAME, MEMDISP, MLAMP, MLH, MREL, MFR, MRFM, MSB, MSBI, MSMWI, MWT, NAME, NDC, NGTSRVCE, NOH, OBS, OLS, ONI, PBL, PCWT, PIC, PLP, PREMTBL, PRH, PRK, PRL, QBS, QCK, RAG, RINGTYP, RMB, RPA, RSP, RSUS, SCF, SCL, SCMP, SCS, SCU, SDY, SEC, SVCGRP, SHU, SL, SLU, SMDI, SMDR, SOR, SORC, SPB, SPR, SSAC, SUPPRESS, SUPR, SUS, TES, TFO, TLS, TRKDISP, UCD, UC DLG, UCDS, WML, WUC

M2216A

3WC, AAB, AAK, ACD, ACDNR, AEMK, AMATEST, ASL, ATC, AUD, AUL, AUTODISP, AVT, BCLID, BLF, BNN, CAG, CBE, CBU, CCW, CDC, CDE, CDI, CDU, CFB, CFD, CFDVT, CFF, CFGD, CFI, CFK, CFMDN, CFRA, CFS, CFTOD, CFU, CIF, CIR, CLI, CLSUP, CMCF, CNF, COT, CPU, CTD, CTW, CWD, CWI, CWO, CWR, CWT, CWX, CXR, DASK, DCBI, DCBX, DCF, DCPK, DCPU, DCPX, DIN, DLH, DND, DNH, DOR, DQS, DQT, DRING, DTM, DTMK, EBO, EBX, ELN, EMK, EMW, FAA, FCTDNTER, FCTDNTRA, FNT, FTRGRP, FTRKEYS, GIAC, GIC, ICM, IECFB, IECFD, ILB, IMB, INSPECT, IRR, JOIN, KSH, KSMOH, LCDR, LINEPSAP, LNR, LNRA, LOB, LOD, LOR, LPIC, M0022, MBK, MBSCAMP, MCH, MDN, MDNNAME, MEMDISP, MLAMP, MLH, MREL, MRF, MRFM, MSB, MSBI, MSMWI, MWIDC, MWQRY, MWT, NAME, NDC, NGTSRVCE, NOH, OBS, OLS, ONI, PBL, PCWT, PIC, PLP, PREMTBL, PRH, PRK, PRL, QBS, QCK, RAG, REASDSP, RINGTYP, RMB, RPA, RSP, RSUS, SACB, SBLF, SCF, SCL, SCMP, SCS, SCU, SDY, SEC, SVCGRP, SHU, SL, SLU, SMDI, SMDR, SOR, SORC, SPB, SPR, SSAC, SUPPRESS, SUPR, SUS, TES, TFO, TLS, TRKDISP, UCD, UC DLG, UCDS, WML, WUC

M2216B

3WC, AAB, AAK, ACD, ACDNR, AEMK, AMATEST, ASL, ATC, AUD, AUL, AUTODISP, AVT, BCLID, BLF, BNN, CAG, CBE, CBU, CCW, CDC, CDE, CDI, CDU, CFB, CFD, CFDVT, CFF, CFGD, CFI, CFK, CFMDN, CFRA, CFS, CFTOD, CFU, CIF, CIR, CLI, CLSUP, CMCF, CNF, COT, CPU, CTD, CTW, CWD, CWI, CWO, CWR, CWT, CWX, CXR, DASK, DCBI, DCBX, DCF, DCPK, DCPU, DCPX, DIN, DLH, DND, DNH, DOR, DQS, DQT, DRING, DTM, DTMK, EBO, EBX, ELN, EMK, EMW, FAA, FCTDNTER, FCTDNTRA, FNT, FTRGRP, FTRKEYS, GIAC, GIC, ICM, IECFB, IECFD, ILB, IMB, INSPECT, IRR, JOIN, KSH, KSMOH, LCDR, LINEPSAP, LNR, LNRA, LOB, LOD, LOR, LPIC, M0022, MBK, MBSCAMP, MCH, MDN, MDNNAME, MEMDISP, MLAMP, MLH, MREL, MRF, MRFM, MSB, MSBI, MWIDC, MWQRY, MWT, NAME, NDC, NGTSRVCE, NOH, OBS, OLS, ONI, PBL, PCWT, PIC, PLP, PREMTBL, PRH, PRK, PRL, QBS, QCK, RAG, REASDSP, RINGTYP, RMB, RPA, RSP, RSUS, SACB, SBLF, SCF, SCL, SCMP, SCS, SCU, SDY, SEC, SVCGRP, SHU, SL, SLU, SMDI, SMDR, SOR, SORC, SPB, SPR, SSAC, SUPPRESS, SUPR, SUS, TES, TFO, TLS, TRKDISP, UCD, UC DLG, UCDS, WML, WUC

M2317

3WC, AAB, AAK, ACD, ACDNR, AEMK, AMATEST, ASL, ATC, AUD, AUL, AUTODISP, AVT, BCLID, BLF, BNN, CAG, CBE, CBU, CCW, CDC, CDE, CDI, CDU, CFB, CFD, CFDVT, CFF, CFGD, CFI, CFK, CFMDN, CFRA, CFS, CFTOD, CFU, CIF, CIR, CLI, CLSUP, CMCF, CNF, COT, CPU, CTD, CTW, CWD, CWI, CWO, CWR, CWT, CWX, CXR, DASK, DCBI, DCBX, DCF, DCPK, DCPU, DCPX, DIN, DND, DNH, DOR, DQS, DQT, DRING, DTM, EBO, EBX, ELN, EMK, EMW, FAA, FCTDNTER, FCTDNTRA, FNT, FTRGRP, FTRKEYS, GIAC, GIC, ICM, IECFB, IECFD, ILB, IMB, INSPECT, IRR, JOIN, KSH, KSMOH, LCDR, LNR, LNRA, LOB, LOD, LOR, LPIC, MBK, MBSCAMP, MCH, MDN, MDNNAME, MEMDISP, MLAMP, MLH, MREL, MRF, MRFM, MSB, MSBI, MSMWI, MWIDC, MWQRY, MWT, NAME, NDC, NGTSRVCE, NOH, OBS, OLS, ONI, PBL, PCWT, PIC, PLP, PREMTBL, PRH, PRK, PRL, QBS, QCK, RAG, REASDSP, RINGTYP, RMB, RPA, RSP, RSUS, SCF, SCL, SCMP, SCS, SCU, SDY, SEC, SVCGRP, SHU, SL, SLU, SMDI, SMDR, SOR, SORC, SPB, SPR, SSAC, SUPPRESS, SUPR, SUS, TES, TFO, TLS, TRKDISP, UCD,

UCDLG, UCDSO, WML, WUC

M2616 3WC, AAB, AAK, ACD, ACDNR, AEMK, AMATEST, ASL, ATC, AUD, AUL, AUTODISP, AVT, BCLID, BLF, BNN, CAG, CBE, CBU, CCW, CDC, CDE, CDI, CDU, CFB, CFD, CFDVT, CFF, CFGD, CFI, CFK, CFMDN, CFRA, CFS, CFTOD, CFU, CIF, CIR, CLI, CLSUP, CMCF, CNF, COT, CPU, CTD, CTW, CWD, CWI, CWO, CWR, CWT, CWX, CXR, DASK, DCBI, DCBX, DCF, DCPK, DCPU, DCPX, DIN, DLH, DND, DNH, DOR, DQS, DQT, DRING, DTM, DTMK, EBO, EBX, ELN, EMK, EMW, FAA, FCTDNTER, FCTDNTRA, FNT, FTRGRP, FTRKEYS, GIAC, GIC, ICM, IECFB, IECFD, ILB, IMB, INSPECT, IRR, JOIN, KSH, KSMOH, LCDR, LINEPSAP, LNR, LNRA, LOB, LOD, LOR, LPIC, M0022, M0200, MBK, MBSCAMP, MCH, MDN, MDNNAME, MEMDISP, MLAMP, MLHMSB, MSBI, MREL, MRF, MSMWI, MWIDC, MWQRY, MWT, NAME, NDC, NGTSRVCE, NOH, OBS, OLS, ONI, PBL, PCWT, PIC, PLP, PREMTBL, PRH, PRK, PRL, QBS, QCK, RAG, REASDSP, RINGTYP, RMB, RPA, RSP, RSUS, SACB, SBLF, SCF, SCL, SCMP, SCS, SCU, SDY, SEC, SVCGRP, SHU, SL, SLU, SMDI, SMDR, SOR, SORC, SPB, SPR, SSAC, SUPPRESS, SUPR, SUS, TES, TFO, TLS, TRKDISP, UCD, UC DLG, UCDSO, WML, WUC

M2616CT 3WC, AAB, AAK, ACD, ACDNR, AEMK, AMATEST, ASL, ATC, AUD, AUL, AUTODISP, AVT, BCLID, BLF, BNN, CAG, CBE, CBU, CCW, CDC, CDE, CDI, CDU, CFB, CFD, CFDVT, CFF, CFGD, CFI, CFK, CFMDN, CFRA, CFS, CFTOD, CFU, CIF, CIR, CLI, CLSUP, CMCF, CNF, COT, CPU, CTD, CTW, CWD, CWI, CWO, CWR, CWT, CWX, CXR, DASK, DCBI, DCBX, DCF, DCPK, DCPU, DCPX, DIN, DLH, DND, DNH, DOR, DQS, DQT, DRING, DTM, DTMK, EBO, EBX, ELN, EMK, EMW, FAA, FCTDNTER, FCTDNTRA, FNT, FTRGRP, FTRKEYS, GIAC, GIC, ICM, IECFB, IECFD, ILB, IMB, INSPECT, IRR, JOIN, KSH, KSMOH, LCDR, LINEPSAP, LNR, LNRA, LOB, LOD, LOR, LPIC, M0200, MBK, MBSCAMP, MCH, MDN, MDNNAME, MEMDISP, MLAMP, MLH, MREL, MRF, MSB, MSBI, MSMWI, MWIDC, MWQRY, MWT, NAME, NDC, NGTSRVCE, NOH, OBS, OLS, ONI, PBL, PCWT, PIC, PLP, PRH, PRK, PREMTBL, PRL, QBS, QCK, RAG, REASDSP, RINGTYP, RMB, RPA, RSP, RSUS, SCF, SCL, SCMP, SCS, SCU, SDY, SEC, SVCGRP, SHU, SL, SLU, SMDI, SMDR, SOR, SORC, SPB, SPR, SSAC, SUPPRESS, SUPR, SUS, TES, TFO, TLS, TRKDISP, UCD, UC DLG, UCDSO, WML, WUC

M3000 AAB, AMATEST, ATC, AUL, AUTODISP, AVT, BCLID, BNN, CBE, CBU, CCW, CDC, CDE, CDI, CDU, CFB, CFD, CFDVT, CFF, CFGD, CFI, CFK, CFMDN, CFRA, CFS, CFTOD, CFU, CIR, CLI, CMCF, CNF, CPU, CTD, CTW, CWD, CWI, CWO, CWR, CWT, CWX, CXR, DCBI, DCBX, DCF, DCPK, DCPU, DCPX, DIN, DLH, DND, DNH, DOR, DRING, DTM, EBO, EBX, ELN, EMW, FCTDNTER, FCTDNTRA, FNT, FTRGRP, FTRKEYS, GIC, ICM, IECFB, IECFD, ILB, IMB, KSH, KSMOH, LCDR, LNR, LNRA, LOD, LOR, LPIC, MBK, MCH, MDN, MDNNAME, MEMDISP, MLAMP, MLH, MREL, MSB, MSBI, MWT, NAME, NDC, NOH, OLS, ONI, PBL, PCWT, PIC, PLP, PREMTBL, PRH, PRK, PRL, QCK, RAG, REASDSP, RMB, RPA, RSP, RSUS, SCL, SCMP, SCS, SCU, SDY, SEC, SVCGRP, SHU, SL, SLU, SMDI, SMDR, SOR, SORC, SPB, SPR, SSAC, SUPPRESS, SUS, TES, TFO, TLS, UCD, UCDSO, WML, WUC

MADO AMATEST, AUD, AUL, BNN, CBE, CBU, CDC, CDE, CDI, CDU, CFB, CFD, CFDVT, CFF, CFGD, CFI, CFRA, CFS, CFU, CIR, CLI, CMCF, CTD, CUG, CWX, DIN, DISCTO, DLH, DND, DNH, DOR, DPR, DTM, ELN, FNT, FCTDNTER, FCTDNTRA, FTRGRP, FTRKEYS, IECFB, IECFD, ILB, IMB, IRR, LCDR, LNR, LOD, LOR, LPIC, MBK, MLH, MSB, MSBI, NCCW, NDC, NOH, NRS, OFR, OFS, PIC, PRH, RAG, RMB, RSUS, SCL, SCMP, SCS, SCU, SDY, SEC, SHU, SL, SLU, SMDR, SPB, SSAC, SUS, TES, TFO

MCA AMATEST, AUD, AUL, BNN, CBE, CBU, CDC, CDE, CDI, CDU, CFB, CFD, CFDVT, CFF, CFGD, CFI, CFRA, CFS, CFTOD, CFU, CIR, CLI, CMCF, CTD, CUG, CWX, DIN, DISCTO, DLH, DND, DNH, DOR, DPR, DTM, ELN, FCTDNTER, FCTDNTRA, FNT, FTRGRP, FTRKEYS, IECFB, IECFD, ILB, IMB, INSPECT, IRR, LCDR, LNR, LOD, LOR, LPIC, MBK, MLH, MSB, MSBI, NDC, NOH, NRS, OFR, OFS, PIC, PRH, RAG, RMB, RSUS, SCL, SCMP,

SCS, SCU, SDY, SEC, SHU, SL, SLU, SMDR, SPB, SSAC, SUS, TELECNTR, TES, TFO

MPDA AMATEST, AUD, AUL, BNN, CBE, CBU, CDC, CDE, CDI, CDU, CFB, CFD, CFDVT, CFF, CFGD, CFI, CFRA, CFS, CFTOD, CFU, CIR, CLI, CMCf, CTD, CUG, CWX, DIN, DISCTO, DLH, DND, DNH, DOR, DPR, DTM, ELN, FCTDNTER, FCTDNTRA, FNT, FTRGRP, FTRKEYS, IECFB, IECFD, ILB, IMB, INSPECT, IRR, LCDR, LNR, LOD, LOR, LPIC, MBK, MLH, MSB, MSBI, NCCW, NDC, NOH, NRS, OFR, OFS, PIC, PRH, RAG, RMB, RSUS, SCL, SCMP, SCS, SCU, SDY, SEC, SHU, SL, SLU, SMDR, SPB, SSAC, SUS, TELECNTR, TES, TFO

OWT AIOD, AMATEST, ATC, BCLID, CIR, CLF, CLI, COD, CTD, DGT, DLH, DNH, DOR, DTM, ELN, FANI, FRO, FRS, GND, LCDR, LPIC, LSPAO, MLH, NAME, NDC, NHT, NLT, NOH, NPGD, OFR, OFS, ONI, PIC, PILOT, PLP, PRH, RCVD, RMB, RSP, RSUS, SC1, SC2, SCMP, SDY, SHU, SLU, SPB, STRD, SUPPRESS, SUS, TERM, TES, TFO, WML

PBM AIOD, AMATEST, AMSG, AMSGDENY, ATC, BCLID, BNN, CFBL, CFDA, CFW, CIR, CLI, COD, CPH, CTD, CUSD, DGT, DLH, DNH, DOR, DTM, ELN, FANI, FNT, FRO, FRS, FSR, GND, HOT, ILB, IMB, IRR, LCDR, LOD, LOR, LPIC, LSPAO, MAN, MBK, MLH, NAME, NDC, NHT, NLT, NOH, NPGD, OFR, OFS, ONI, PIC, PILOT, PLP, PRH, RCVD, RMB, RMP, RMR, RMS, RMT, RSP, RSUS, SCMP, SDS, SDY, SHU, SLU, SPB, STRD, SUPPRESS, SUS, TBO, TDN, TDV, TERM, TES, TFO, TRMBOPT

PBX AIOD, AMATEST, AMSG, AMSGDENY, ATC, BCLID, BNN, CFBL, CFDA, CFGDA, CFW, CIDB, CIR, CLI, COD, CPH, CTD, CUSD, DGT, DLH, DNH, DOR, DTM, ELN, FANI, FCTDNTER, FCTDNTRA, FNT, FRO, FRS, FSR, GND, HOT, ILB, IMB, IRR, LCDR, LOD, LOR, LPIC, LSPAO, LSPSO, MAN, MBK, MLH, NAME, NDC, NHT, NLT, NOH, NPGD, OFR, OFS, ONI, PIC, PILOT, PLP, PRH, RCVD, RMB, RMP, RMR, RMS, RMT, RSP, RSUS, SCMP, SDS, SDY, SHU, SLU, SPB, STRD, SUPPRESS, SUS, TBO, TDN, TDV, TERM, TES, TFO, TRMBOPT

PDATA AMATEST, AUD, AUL, BNN, CBU, CDU, CFB, CFD, CFF, CFRA, CFS, CFTOD, CFU, CIR, CLI, CUG, DCF, DISCTO, DLH, DNH, DOR, DPR, DTM, ELN, FCTDNTER, FCTDNTRA, FNT, LCDR, LNR, LOD, LOR, LSPAO, LSPSO, MCH, MLH, MSB, NCCW, NDC, NOH, NRS, OFR, OFS, RMB, RSUS, SCA, SCF, SCL, SCRJ, SCS, SDY, SHU, SL, SLU, SPB, SUPPRESS, SUS, TES, TFO

PSET 3WC, 3WCPUB, AAB, AAK, ACB, ACD, ACDNR, ACRJ, AEMK, AIN, ALI, AMATEST, AMSG, AMSGDENY, AR, ARDDN, ASL, ATC, AUD, AUL, AUTODISP, AVT, BCLID, BLF, BNN, CAG, CBE, CBU, CCV, CCW, CDC, CDE, CDI, CDU, CFB, CFD, CFDVT, CFF, CFGD, CFI, CFK, CFMDN, CFRA, CFS, CFTOD, CFU, CFW, CID, CIDB, CIDS, CIF, CIR, CLI, CLSUP, CMCf, CNDBO, CNF, COT, CPU, CTD, CTW, CWD, CWI, CWO, CWR, CWT, CWX, CXR, DASK, DCBI, DCBX, DCF, DCPK, DCPU, DCPX, DIN, DISP, DLH, DND, DNID, DNH, DOR, DQS, DQT, DRCW, DRING, DTM, EBO, EBX, ECM, ELN, EMK, EMW, EXT, FAA, FGA, FNT, FTRGRP, FTRKEYS, GIAC, GIC, ICM, IECFB, IECFD, ILB, IMB, INSPECT, IRR, JOIN, KSH, KSMOH, LCDR, LINEPSAP, LNR, LNRA, LOB, LOD, LOR, LPIC, LVM, M518, M536, MBK, MBSCAMP, MCH, MDN, MDNNAME, MEMDISP, MLAMP, MLH, MREL, MRF, MRFM, MSB, MSBI, MSGDEACT, MSMWI, MWIDC, MWQRY, MWT, NAME, NDC, NGTSRVCE, NLT, NOH, NPGD, NRS, OBS, OLS, ONI, PCWT, PBL, PF, PIC, PILOT, PLP, PREMTBL, PRH, PRK, PRL, QBS, QCK, QTD, RAG, RCVD, REASDSP, RMB, RPA, RSP, RSUS, SACB, SBLF, SCA, SCF, SCL, SCMP, SCRJ, SCS, SCU, SDS, SDY, SEC, SETMODEL, SIMRING, SVCGRP, SHU, SL, SLU, SMDI, SMDR, SNR, SOR, SORC, SPB, SPR, SSAC, SUPPRESS, SUPR, SUS, TBO, TERM, TES, TFO, TLS, TRKDISP, UCD, UC DLG, UCDS D, WML, WUC, XXTRG

RES 3WC, ACB, ACRJ, ADSI, AIN, AMATEST, AMSG, AMSGDENY, AR, ARDDN,

ATC, AUL, BCLID, BNN, CALLOG, CCW, CFBL, CFDA, CFGDA, CFRA, CFW, CFIND, CID, CIDB, CIDS, CIR, CLF, CLI, CMG, CNAB, CNAMD, CND, CNDB, CNDBO, COD, COT, CPU, CTD, CWR, CWT, CXR, DCF, DDN, DENY, DGT, DLH, DNID, DNH, DOR, DRCW, DSCWID, DTM, ECM, ELN, EWAL, FANI, FGA, FNT, FRO, FRS, FTRGRP, GIC, GND, HOT, ILB, IMB, INT, IRR, LCDR, LOD, LOR, LPIC, LSPAO, LSPSO, MBK, MDN, MLH, MSB, MWT, NAME, NCCW, NDC, NFA, NHT, NLT, NOH, NPGD, OFR, OFS, ONI, PIC, PILOT, PLP, PRH, RCHD, RCVD, RMB, RMP, RMR, RMS, RMT, RSP, RSUS, SACB, SC1, SC2, SC3, SCA, SCF, SCMP, SCRJ, SCU, SCWID, SDN, SDS, SDY, SETMODEL, SHU, SIMRING, SL, SLU, SLVP, SMDI, SMDICND, SPB, STRD, SUPPRESS, SUS, TBO, TDN, TERM, TES, TFO, TRMBOPT, WML, WUC, XXTRG

TWX AMATEST, ATC, CIDB, CIR, CLF, CLI, COD, CTD, DGT, DLH, DNH, DOR, DTM, ELN, FANI, FCTDNTER, FCTDNTRAFNT, FSR, GND, LOD, LOR, LPIC, LSPAO, LSPSO, MLH, NAME, NCCW, NDC, NHT, NLT, NPGD, OFR, OFS, PIC, PILOT, PLP, PRH, RCVD, RMB, RSP, RSUS, SCMP, SDY, SHU, SLU, SPB, STRD, SUPPRESS, SUS, TBO, TDN, TERM, TES, TFO

VLN No compatible options

WATSLCC CIDB, LSPSO, NCCW

ZMD 3WC, AMATEST, ATC, BCLID, CCW, CFBL, CFDA, CFGDA, CFW, CIDB, CLF, CLI, COD, CTD, CUSD, CWT, DGT, DOR, DTM, ELN, FANI, FNT, FRO, FRS, FSR, GND, HOT, ILB, IMB, IRR, LCDR, LDSA, LDSO, LDSR, LDST, LPIC, LSPAO, LSPSO, MBK, NAME, NCCW, NDC, NHT, NLT, NOH, NPGD, PIC, PLP, RMB, RSP, RSUS, SC1, SC2, SCMP, SDY, SHU, SLU, SPB, STRD, SUPPRESS, SUS, TDN, TES, WML

ZMZPA 3WC, AMATEST, ATC, BCLID, CCW, CFBL, CFDA, CFGDA, CFW, CLF, CLI, COD, CTD, CUSD, CWT, DGT, DOR, DTM, ELN, FANI, FNT, FRO, FRS, FSR, GND, HOT, ILB, IMB, IRR, LCDR, LDSA, LDSO, LDSR, LDST, LPIC, LSPAO, LSPSO, MBK, NAME, NCCW, NDC, NHT, NLT, NOH, NPGD, PIC, PLP, RMB, RSP, RSUS, SC1, SC2, SCMP, SDY, SHU, SLU, SPB, STRD, SUPPRESS, SUS, TDN, TES, WML

-End-

Options Incompatibility

The following table lists the line service options that cannot be assigned to the same line. To obtain a listing of options and options incompatibility from the DMS-100 switch, logon at a MAP terminal and enter the following commands:

```
-----  
>TABLE OPTOPT  
>LIST ALL  
-----
```

Options Incompatibility

Option	Incompatible Options
3WC	CFD, LDTPSAP, MAN, MPB, NDC, NOH, CXR
3WCPUB	ACB, AR, ARDDN, CNAB, CNAMD, CND, CNDB, COT, DDN, DRCW, DSCWID, NDC, SACB, SCA, SCF, SCRJ
AAB	MDN, MLAMP, MREL, EHL
AAK	CALLOG, DOR, DTM, MDN, SMDI, SOR, SORC, UCD, UCSD
ACB	3WCPUB, AUL, BNN, CCSA, DOR, DTM, LDTPSAP, RAG
ACD	ACRJ, AUL, AUTODISP, BNN, CALLOG, CNAB, CNDB, COD, DLH, DNH, DOR, DTM, ECM, GIC, MDN, MLAMP, MLH, MPH, MREL, OLS, PRH, RMB, SCMP, SHU, SIMRING, SMDI, SOR, SORC, TBO, TLS, UCD, UCSD
ACDNR	Compatible with all line options
ACRJ	ACD, CCSA, DTM, GIC, LDTPSAP, UCD
ACOU	DNH, SCMP
ADSI	DLH, MLH
AEMK	AAK, CAG, CALLOG, CLSUP, DOR, DTM, SMDI, SOR, SORC, UCD, UCSD
AFC	MDN, NUMC
AIN	ESL, SKDISP
AINDN	ESL
AIOD	FGA
ALI	Compatible with all line options
AMATEST	ARDDN, ONI
AR	3WCPUB, AUL, BNN, CCSA, DOR, DTM, LDTPSAP, RAG
ARDDN	3WCPUB, AMATEST, AUL, BNN, CCSA, DOR, DTM, LDTPSAP, RAG
ASL	CALLOG
ATC	LDTPSAP, SCF

-continued-

Options Incompatibility (continued)

Option	Incompatible Options
AUD	Compatible with all line options
AUL	ACB, ACD, AR, ARDDN, CALLOG, CFBL, CFDA, CFGD, CFGDA, CFW, CNAB, CNDB, COT, CPR, CTD, CUSD, CWD, DCBI, DCPU, DOR, DTMK, HOT, LINEPSAP, LNR, MAN, MPB, MPH, NFA, ONI, PBL, RCHD, SC1, SC2, SC3, SCL, SCS, SCU, SLVP, SMDI, TDN, TDV, UCD, UCDS, WML
AUTODISP	ACD
AVT	ACB, ACRJ, AR, ARDDN, CALLOG, CNAB, CNAMD, CND, CNDB, COT, DDN, DRCW, DTM, LDTPSAP, SCA, SCF, SCMP, SCRJ
BC	ACD, CNF, CWD, CWI, CWO, CWT, DCBI, EBO, EMW, ICM, MBSCAMP, MPH, MWIDC, MWQRY, MWT, SLQ, SMDI, 3WC, 3WCPUB, UCD, UCDS
BCLID	DTM
BLF	Compatible with all line options
BNN	ACB, ACD, AR, ARDDN, CBE, CBU, CDE, CDI, CDU, CFB, CFBL, CFD, CFDA, CFDVT, CFF, CFI, CFK, CFRA, CFS, CFU, CFW, CMC, CNAMD, CPU, CUSD, CWX, DIN, DRCW, DSCWID, ECM, IECFB, IECFD, LDTPSAP, LINEPSAP, MDN, MLAMP, MPB, MREL, PBL, PLP, RAG, RCHD, RSUS, SC1, SC2, SC3, SCA, SCF, SCL, SCMP, SCRJ, SCS, SCU, SDN, SLVP, SMDI, SOR, SORC, SPB, UCD, UCDS, WUC
CAG	AAK, AEMK, CALLOG, CLSUP, DOR, DTM, SMDI, SOR, SORC, UCD, UCDS
CALLOG	AAK, ACD, AEMK, ASL, AUL, CAG, CCSA, DIN, DOR, DTM, EMW, LDTPSAP, MDN, MDNNAME, MEMDISP, MLAMP, MREL, MRF, MWT, OBS, UCD
CBE	BNN, CBI, DLH, DNH, DTM, FNT, HOT, IECFB, MLH, PRH, TBO, TRMBOPT
CBI	BNN, CBE, DLH, DNH, FNT, HOT, IECFB, MLH, PRH, TBO, TRMBOPT
CBU	BNN, DLH, DNH, DTM, FNT, HOT, MLH, PRH, TBO, TRMBOPT
CCSA	ACB, ACRJ, AR, ARDDN, CALLOG, CNAMD, CND, CNDB, COT, DDN, DRCW, DSCWID, FGA, LCDR, LDTPSAP, MAN, ONI, SCA, SCF, SCRJ
CCV	Compatible with all line options
CCW	MLH
CD0	CD1, CD2, CD3, CD4, CD5, CD6, CD7, CD8, CD9, FGA, FNT
CD1	CD1, CD2, CD3, CD4, CD5, CD6, CD7, CD8, CD9, FGA, FNT
CD2	CD1, CD2, CD3, CD4, CD5, CD6, CD7, CD8, CD9, FGA, FNT
CD3	CD1, CD2, CD3, CD4, CD5, CD6, CD7, CD8, CD9, FGA, FNT
CD4	CD1, CD2, CD3, CD4, CD5, CD6, CD7, CD8, CD9, FGA, FNT
CD5	CD1, CD2, CD3, CD4, CD5, CD6, CD7, CD8, CD9, FGA, FNT

-continued-

Options Incompatibility (continued)

Option	Incompatible Options
CD6	CD1, CD2, CD3, CD4, CD5, CD6, CD7, CD8, CD9, FGA, FNT
CD7	CD1, CD2, CD3, CD4, CD5, CD6, CD7, CD8, CD9, FGA, FNT
CD8	CD1, CD2, CD3, CD4, CD5, CD6, CD7, CD8, CD9, FGA, FNT
CD9	CD1, CD2, CD3, CD4, CD5, CD6, CD7, CD8, CD9, FGA, FNT
CDC	LDTPSAP
CDE	BNN, CDI, DLH, DTM, FNT, HOT, IECFD, MLH, PRH, TBO, TRMBOPT
CDI	BNN, CDE, DLH, DTM, FNT, HOT, IECFD, MLH, PRH, TBO, TRMBOPT
CDU	BNN, DLH, DTM, FNT, HOT, MLH, PRH, TBO, TRMBOPT
CFB	BNN, DLH, DNH, DOR, DTM, FNT, HOT, MLH, MPH, NRS, PRH, TBO, TRMBOPT
CFBL	AUL, BNN, DLH, FNT, HOT, MAN, MLH, MPB, ONI, PLP, TBO, TRMBOPT
CFD	3WC, BNN, DLH, DOR, DTM, FNT, HOT, MLH, MPH, NRS, PRH, TBO, TRMBOPT
CFDA	AUL, BNN, DLH, FNT, HOT, MAN, MLH, MPB, ONI, PLP, TBO, TRMBOPT
CFDVT	BNN, DLH, DTM, FNT, HOT, MLH, PRH, TBO, TRMBOPT
CFF	BNN, CFI, CFK, CFU, DOR, DTM, FNT, HOT, LDTPSAP, ONI, PLP, TBO, TRMBOPT
CFGD	AUL, CFGDA, CNAB, CNDB, FGA, FNT, HOT, MAN, NRS, ONI, PLP, RCHD, SCMP, SDN, SLVP, TBO, TRMBOPT
CFGDA	AUL, CFGD, FNT, HOT, MAN, MPB, ONI, PLP, RCHD, SDN, SLVP, TBO, TRMBOPT
CFI	BNN, CFF, CFK, CFU, DOR, DTM, FNT, HOT, LDTPSAP, NRS, ONI, PLP, TBO, TRMBOPT
CFIND	AUL, CFB, CFD
CFK	BNN, CFF, CFI, CFRA, CFU, DOR, DTM, FNT, HOT, LDTPSAP, ONI, PLP, TBO, TRMBOPT
CFMDN	DRCW, PRL, SCF, SCRJ
CFRA	BNN, CFK, DOR, DTM, FNT, HOT, ONI, PLP, TBO, TRMBOPT
CFS	BNN, CMC (when SIMULT is Y), DTM, FNT, HOT, LDTPSAP, TBO, TRMBOPT
CFTB	1FR-1MR, RES, 2FR-10FR, CSD, DATA-PDATA:, MADO-MPDA:, WATS LCC:, COIN LCC:, PBX LCC:, TWX LCC:, ZMD, ZMZPA
CFTD	1FR-1MR, RES, 2FR-10FR, CSD, DATA-PDATA:, MADO-MPDA:, WATS LCC:, COIN LCC:, PBX LCC:, TWX LCC:, ZMD, ZMZPA

-continued-

Options Incompatibility (continued)

Option	Incompatible Options
CFTOD	BNN, CFF, CFI, CFK, DOR, DTM, FNT, HOT, LDTPSAP, NRS, ONI, PLP, TBO, TRMBOPT
CFU	BNN, CFF, CFI, CFK, DOR, DTM, FNT, HOT, LDTPSAP, NRS, ONI, PLP, TBO, TRMBOPT
CFW	AUL, BNN, CUSD, FNT, HOT, MAN, MPB, ONI, PLP, TBO, TRMBOPT
CHD	DOR, DTM, ECM, LDTPSAP, NDC
CIF	Compatible with all line options
CIR	CWX, DLH, MPB, RCHD, SCMP, SDN, SLVP, WUC
CLF	CWT, ESL, LDTPSAP, PLP
CLI	PBL
CLSUP	AAK, AEMK, CAG, DOR, DTM, SMDI, SOR, SORC, UCD, UCDS
CMCF	BNN, CFS (when SIMULT is Y), DTM, FNT, HOT, LDTPSAP, TBO, TRMBOPT
CMG	SIMRING
CNAB	CNAB 3WCPUB, ACD, AUL, CFGD, DOR, LDTPSAP, SMDI, UCD, UCDS
CNAMD	3WCPUB, AMATEST, AVT, BNN, CCSA, DTM, LDTPSAP, MDN CACH, PCWT, PREMTBL, PRL, SCMP
CND	AMATEST, AVT, 3WCPUB, CCSA, DDN, DTM, LDTPSAP, PCWT, PREMTB, SCMP
CNDB	3WCPUB, ACD, AUL, CCSA, CFGD, DOR, EBS, LDTPSAP, MADN, SMDI, UCD, UCDS
CNDBO	Compatible with all line options
CNF	DOR, LDTPSAP, NDC, PLP
COD	ACD, LDTPSAP
COT	3WCPUB, AUL, CCSA, DOR, DTM, LDTPSAP, MDN CACH
CPH	FGA
CPR	AUL, LNR, RAG, SCL, SCS, SCU
CPU	BNN, DOR, DTM, HOT, LDTPSAP, MDN CACH
CSDO	BNN, CCSA, CD0, CD1, CD2, CD3, CD4, CD5, CD6, CD7, CD8, CD9, CFF, CFI, CFK, CFRA, CFU, CPH, CTD, ESL, FGA, FXR, HOT, LCDR, MAN, MLH, MPB, ONI, RMR, RMS, RMT, RSP, SCF, SC1, SC2, SC3, TDN, TDV, 3WC
CTD	AUL, LDTPSAP, TDN, TDV
CTW	LDTPSAP

-continued-

Options Incompatibility (continued)

Option	Incompatible Options
CUG	Compatible with all line options
CUSD	AUL, BNN, CFW, FNT, HOT, MAN, MPB, ONI, PLP, TBO, TRMBOPT
CWD	AUL, CWO, DOR, LDTPSAP, MBSCAMP
CWI	CWX, DLH, DTM, HOT, MPH, NDC
CWO	CWD, DOR, LDTPSAP, MBSCAMP
CWR	LDTPSAP
CWT	BC, CLF, DLH, DNH, DTM, FIG, LDTPSAP, MLH, MPB, NDC, RPA
	Note: Options CWT and DNH are compatible when feature package NTX007AB is in the software load.
CWACT	MLH
CWX	BNN, CIR, CWI, DLH, DNH, DTM, LOD, LOR, MLH, MPH, NDC, OFR, OFS, PRH, RMB, SHU
CXR	NDC, NOH
DASK	Compatible with all line options
DCBI	AUL, DCPU, DOR, LDTPSAP
DCBX	DCPX, DTM, LDTPSAP, NDC
DCF	LDTPSAP
DCND	CND, DTM, MADN, SCWID, UCD, DDN
DCPK	DOR, DTM, LDTPSAP
DCPU	AUL, DCBI, DOR, LDTPSAP, MLH, DLH
DCPX	DCBX, DTM, LDTPSAP
DDN	3WCPUB, AMATEST, AVT, CCSA, CND, DTM, LDTPSAP, PCWT, PREMTBL, SCMP
DENY	Compatible with all line options (but incompatible with the option denied)
DGT	MAN
DIN	BNN, CALLOG, DRCW, DTM, HOT, LDTPSAP, LINEPSAP, PBL, SCA, SCF, SCRJ
DISCTO	Compatible with all line options
DISP	Compatible with all line options

-continued-

Options Incompatibility (continued)

Option	Incompatible Options
DLH	DLH ACD, CBE, CBU, CDE, CDI, CDU, CFB, CFBL, CFD, CFDA, CFDVT, CIR, CWI, CWT, CWX, DMCT, DNH, DSCWID, ECM, GND, IECFB, IECFD, INT, MDN, MLAMP, MLH, MPB, MREL, NSDN, PRH, RAG, RCHD, RSUS, SCMP, SDN, SHU, SIMRING, SLVP, SOR, SORC, UCD, UCDSO, WUC
DMCT	DLH, DNH, DTM, FNT, MDN, MLH, PRH, SCA, SCRJ, UCD
DND	DTM, LDTPSAP, LINEPSAP, MDN, MLAMP, MREL, PBL
DNH	ACD, CBE, CBU, CFB, CWT, CWX, DLH, DMCT, ECM, IECFB, LDTPSAP, MDN, MLAMP, MLH, MPB, MPH, MREL, NSDN, RCHD, RSUS, SCMP, SDN, SIMRING, SLVP, UCD, UCDSO, WUC
	Note: Options CWT and DNH are compatible when feature package NTX007AB is in the software load.
DOR	AAK, ACB, ACD, AEMK, AR, ARDDN, AUL, CAG, CFB, CFD, CFF, CFI, CFK, CFRA, CFU, CHD, CLSUP, CNAB, CNDB, CNF, COT, CPU, CWD, CWO, DCBI, DCPK, DCPU, EMW, HLD, LNR, MBSCAMP, MLAMP, MREL, MSB, MSBI, MWIDC, MWQRY, MWT, PRK, RAG, RCHD, SACB, SCS, SIMRING, SLVP, SMDR
DPR	Compatible with all line options
DQS	Compatible with all line options
DQT	Compatible with all line options
DRCW	3WCPUB, BNN, CCSA, CFMDN, DIN, DTM, LDTPSAP, PRL
DRING	Compatible with all line options
DSCWID	3WCPUB, BNN, CCSA, DLH, DTM, LDTPSAP, MLH, MPB, NDC, NFA, PRL, RPA, SCMP, SCWID
DTM	AAK, ACD, ACRJ, AEMK, BCLID, CAG, CALLOG, CBE, CBU, CDE, CDI, CDU, CFB, CFD, CFDVT, CFF, CFI, CFK, CFRA, CFS, CFU, CHD, CLSUP, CMC, CNAMD, CND, COT, CPU, CWI, CWT, CWX, DDN, DMCT, DRCW, DSCWID, EMW, IECFB, IECFD, LDTPSAP, MLAMP, MPH, MREL, MWIDC, MWQRY, MWT, SCA, SCF, SCRJ, SDN, SMDI, TBO, TRMBOPT
DTMK	AUL
EBO	LDTPSAP
EBX	DTM, LDTPSAP
ECM	ACD, BNN, CHD, DLH, DNH, MDN, MDNNAME, MEMDISP, MLH, PRL, UCD
EHL	AAB, ACD, BNN, DLH, DND, DNH, DRCW, GIC, LDTPSAP, MLH, PBL, PREMTBL, PRH, RMB, SCA, SCF, SCRJ, SDN, SHU, SLQ, SMDI, SOR, SORC, UCD, UCDSO
ELN	MPB
EMK	Compatible with all line options

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Options Incompatibility (continued)

Option	Incompatible Options
EMW	CALLOG, DOR, DTM, LDTPSAP, MWT
ESL	CLF, FGA, MPB, RSP, SCMP
EWAL	Compatible with all line options
EXT	Compatible with all line options
FAA	Compatible with all line options
FANI	Compatible with all line options
FCTDNTER	AUL, CSDO, CTD, LDTPSAP, TDN, TDV
FCTDNTRA	AUL, CSDO, CTD, LDTPSAP, TDN, TDV
FGA	AIOD, CCSA, CD0 CD9, CFGD, CPH, ESL, FRO, FRS, HOT, INT, MAN, MCH, ONI, RCD, RMB, RMP, RMS, RMT, RSP
FIG	ACB, AR, ARDDN, CALLOG, CHD, CLF, CNF, CPH, CWD, CWI, CWT, CWX, CXR, DCPK, DSCWID, EBO, EMW, ESL, FXR, HLD, LDTPSAP, LINEPSAP, MWIDC, MWQRY, MWT, PCWT, PRK, RAG, SCWID, 3WC, 3WCPUB
FNO	APS, HOT, SCR, SCM
FNT	CBE, CBU, CDE, CDI, CDU, CD0 CD9, CFB, CFBL, CFD, CFDA, CFDVT, CFF, CFGD, CFGDA, CFI, CFK, CFRA, CFS, CFU, CFW, CMCF, CUSD, DMCT, IECFB, IECFD, MCH, SCF
FRO	FGA, FRS, LDTPSAP, MAN, MPB, RMS
FRS	FGA, FRO, LDTPSAP, MPB
FSR	Compatible with all line options
FTRGRP	SVCGRP
FTRKEYS	Compatible with all line options
FTS	ARDDN, ACB, AR, AUL, CHD, CLF, CNF, CPU, CSMI, CST, CWO, CWR, CWT, CXR, DCBI, DCPK DRCW, DRING, DSCWID, EBO, ELN, EMW, ESDN, FTRGRP, HLD, ISA, LNR, MWT, NFA, PRK, RAG, RCHD, SDN, SDS, SVCGRP, 3WC
FXR	CSDO, FIG, LDTPSAP, MAN, MPB, NDC, NOH
GIAC	Compatible with all line options
GIC	ACD, ACRJ, LDTPSAP, MDN, MLAMP, MREL, PLP, TBO, WML
	Note: Options GIC and MDN are incompatible for 2500 phones but can be assigned to the same P-phone set when assigned to separate keys.
GND	LDTPSAP
HLD	LDTPSAP, LINEPSAP, NDC

-continued-

Options Incompatibility (continued)

Option	Incompatible Options
HOT	AUL, CBE, CBU, CDE, CDI, CDU, CFB, CFBL, CFD, CFDA, CFDVT, CFF, CFGD, CFGDA, CFI, CFK, CFRA, CFS, CFU, CFW, CMCf, CPU, CUSD, CWI, DIN, FGA, IECFB, IECFD, MAN, MPB, RSP, SCF, SCU, TDV, WUC
ICM	CBC
IECFB	BNN, CBE, DLH, DNH, DTM, FNT, HOT, MLH, PRH, TBO, TRMBOPT
IECFD	BNN, CDE, CDI, DLH, DTM, FNT, HOT, MLH, PRH, TBO, TRMBOPT
ILB	IMB
IMB	ILB
INSPECT	Compatible with all line options
INT	DLH, FGA, MDN, MLH, MPB, SCMP
IRR	Compatible with all line options
JOIN	Compatible with all line options
KSH	MDN CACH, PBL, SIMRING, SLQ, SMDI, UCD, UCDS
KSMOH	Compatible with all line options
LCDR	CCSA, CSO, MAN, ONI
LDSA	DLH, FIG, MPB, NDC
LDSO	DLH, FIG, LDSR, LDST, MPB, NDC
LDSR	DLH, FIG, LDSO, LDST, MPB, NDC
LDST	DLH, FIG, LDSO, LDSR, MPB, NDC
LDTPSAP	3WC, ACB, ACRJ, AR, ARDDN, ATC, BNN, CALLOG, CCSA, CDC, CFF, CFI, CFK, CFS, CFU, CHD, CLF, CMCf, CNAB, CNAMD, CND, CNDB, CNF, COD, COT, CPU, CTD, CTW, CWD, CWO, CWR, CWT, DCBI, DCBX, DCF, DCPK, DCPU, DCPX, DDN, DIN, DND, DNH, DRCW, DSCWID, DTM, EBO, EBX, EMW, FRO, FRS, GIC, GND, HLD, LINEPSAP, LNR, LPIC, MBSCAMP, MDN, MEMDISP, MLAMP, MREL, MRF, MSB, MSBI, MWT, NAME, NHT, NLT, NPGD, OFR, OFS, PIC, PRH, PRK, PRL, RCHD, SCA, SCF, SCMP, SCRJ, SEC, SLVP, SMDR, SPB, SSAC, SUPPRESS, TES, UCDS
LINEPSAP	AUL, BNN, DIN, DND, HLD, LDTPSAP, NOH, RCHD, SCMP, SLVP
LNR	LNR AUL, CPR, DOR, LDTPSAP, LNRA
LNRA	LNR
LOB	Compatible with all line options
LOD	CWX, LOR, MPB, RCHD, SCMP, SDN, SLVP
LOR	CWX, LOR, MPB, RCHD, SCMP, SDN, SLVP

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Options Incompatibility (continued)

Option	Incompatible Options
LPIC	CWX, LOD, MPB, RCHD, SCMP, SDN, SLVP
LSPA0	Compatible with all line options
LSPSO	Compatible with all line options
LVM	Compatible with all line options
M0022	Compatible with all line options
M0200	Compatible with all line options
M518	Compatible with all line options
M536	Compatible with all line options
MAN	3WC, AUL, CCSA, CFBL, CFDA, CFGD, CFGDA, CFW, CUSD, DGT, FGA, FRO, HOT, LCDR, MPB, RMS, RSP, SC1, SC2, SC3, SPB, WML
MBK	RMB
MBSCAMP	CWD, CWO, DOR, LDTPSAP
MCH	FGA, FNT
MDN	AAB, AAK, ACD, BNN, CALLOG, DLH, DMCT, DND, DNH, ECM, GIC, INT, LDTPSAP, MLH, MPH, PBL, PRH, RMB, SDN, SHU, SIMRING, SLVP, SMDI, SOR, SORC, UCD, UCDS, WUC
	Note: Options GIC and MDN are incompatible for 2500 phones but can be assigned to the same P-phone set when assigned to separate keys.
MDNNAME	CALLOG, ECM
MEMDISP	CALLOG, ECM, LDTPSAP
MLAMP	AAB, ACD, BNN, CALLOG, DLH, DND, DNH, DOR, DTM, GIC, LDTPSAP, MLH, PBL, PRH, RMB, SDN, SHU, SMDI, SOR, SORC, UCD, UCDS
MLH	ACD, CBE, CBU, CCW, CDE, CDI, CDU, CFB, CFBL, CFD, CFDA, CFDVT, CWX, DLH, DMCT, DNH, DSCWID, ECM, IECFB, IECFD, INT, MDN, MLAMP, MPB, MREL, NSDN, PRH, RAG, RCHD, RSUS, SCMP, SDN, SIMRING, SLVP, SOR, SORC, UCD, UCDS, WUC
MPB	3WC, AUL, BNN, CFBL, CFDA, CFGDA, CFW, CIR, CUSD, CWT, DLH, DNH, DSCWID, ELN, ESL, FRO, FRS, HOT, INT, LOD, LOR, MAN, MLH, NDC, PRH, SC1, SC2, SC3, SCMP, SDN, SHU, WML
MPH	ACD, AUL, CFB, CFD, CWI, CWX, DNH, DTM, MDN, RAG, RMB, SCMP, SHU, SIMRING, SOR, SORC, UCD
MREL	AAB, ACD, BNN, CALLOG, DLH, DND, DNH, DOR, DTM, GIC, LDTPSAP, MLH, PBL, PRH, RMB, SDN, SHU, SMDI, SOR, SORC, UCD, UCDS
MRF	CALLOG, LDTPSAP
MRFM	Compatible with all line options

-continued-

Options Incompatibility (continued)

Option	Incompatible Options
MSB	DOR, DTM, LDTPSAP, MSBI
MSBI	DOR, DTM, LDTPSAP, MSB
MSGDEACT	Compatible with all line options
MSMWI	CALLOG, DOR, DTM, EMW, LDTPSAP
MWIDC	BC, FIG
MWQRY	BC, FIG
MWT	BC, CALLOG, FIG, EMW, LDTPSAP
NAME	LDTPSAP, ONI
NCCW	CCW
NDC	3WC, 3WCPUB, CHD, CNF, CWI, CWT, CWX, CXR, DCBX, DSCWID, HLD, MPB, PRK
NFA	AUL, DSCWID
NGTSRVCE	NGTSRVCE Compatible
NHT	LDTPSAP
NLT	LDTPSAP
NOH	3WC, CXR, LINEPSAP
NPGD	LDTPSAP
NRS	CFB, CFD, CFGD, CFI, CFU
NSDN	DLH, DNH, MLH, PRH
NUMC	AFC
OBS	CALLOG
OFR	CWX, LDTPSAP, RCHD, SCMP, SDN, SLVP
OFS	CWX, LDTPSAP, RCHD, SCMP, SDN, SLVP
OLS	ACD
ONI	AMATEST, AUL, CCSA, CFBL, CFDA, CFF, CFGD, CFGDA, CFI, CFK, CFRA, CFU, CFW, CUSD, FGA, LCDR, NAME, RSP, SCF, SPB
PBL	AUL, BNN, CLI, DIN, DND, MDN, MLAMP, MREL, RMB, RSUS, SDY, SEC, SHU, SLU, SPB
PCWT	ACB, AR, ARDDN, CNAMD, CND, COT, CWX, DDN, DLH, DRCW, FGA, FIG, MLH, NDC, SCA, SCF, SCRJ
PIC	LDTPSAP

-continued-

Options Incompatibility (continued)

Option	Incompatible Options
PILOT	RCHD, SCMP, SDN, SLVP
PLP	BNN, CFBL, CFDA, CFF, CFGD, CFGDA, CFI, CFK, CFRA, CFU, CFW, CLF, CNF, CUSD, GIC, PRK, SCF
PPL	Compatible with all line options
PREMTBL	ACB, ACD, AR, ARDDN, CNAB, CNAMD, CND, CNDB, COT, DDN, DRCW, DTM, EHLN, LDTPSAP, MDN, MLAMP, MREL, SCA, SCF, SCRJ, SLQ, SMDI, UCD, UCDS
PRH	ACD, CBE, CBU, CDE, CDI, CDU, CFB, CFD, CFDVT, CWX, DMCT, DLH, IECFB, IECFD, LDTPSAP, MDN, MLAMP, MLH, MPB, MREL, NSDN, SDN, SMDI, UCD, UCDS
PRK	DOR, DTM, LDTPSAP, NDC, PLP
PRL	DRCW, DSCWID, ECM, LDTPSAP, SCA, SCF, SCRJ
QBS	Compatible with all line options
QCK	Compatible with all line options
QTD	Compatible with all line options
RAG	ACB, AR, ARDDN, BNN, CPR, DLH, DOR, DTM, MLH, MPH
RCD	FGA, SLC
RCHD	AUL, BNN, CFGD, CFGDA, CIR, DLH, DNH, DOR, LDTPSAP, LINEPSAP, LOD, LOR, MLH, OFR, OFS, PILOT, SLVP, TERM, TFO, TRMBOPT, UCD
RCVD	SCMP, SDN
REASDSP	Compatible with all line options
RINGTYP	Compatible with all line options
RMB	ACD, CWX, FGA, MBK, MDN, MLAMP, MPH, MREL, PBL, SDN, SMDI, UCD, UCDS
RMP	FGA
RMR	CSDO
RMS	CSDO, FGA, FRO, MAN
RMT	CSDO, TDN, TDV
RPA	CWT, DSCWID
RSP	CSDO, ESL, FGA, HOT, MAN, ONI, TDN, TDV
RSUS	BNN, DLH, DNH, MLH, PBL
SACB	3WCPUB, DOR, SOR, TDN

-continued-

Options Incompatibility (continued)

Option	Incompatible Options
SC1	AUL, BNN, CSDO, MAN, MPB, SCL, SCS
SC2	AUL, BNN, CSDO, MAN, MPB, SC3, SCL, SCS, SCU
SC3	AUL, BNN, CSDO, MAN, MPB, SC2, SCL, SCS, SCU
SCA	3WCPUB, BNN, CCSA, CFMDN, DIN, DMCT, DTM, LDTPSAP, MDN CACH, PRL
SCF	3WCPUB, ATC, BNN, CCSA, CFMDN, DIN, DTM, FNT, HOT, LDTPSAP, MDN CACH, ONI, PLP, PRL, TRMBOPT
SCL	AUL, BNN, CPR, SC1, SC2, SC3, SCU
SCMP	ACD, BNN, CFGD, CIR, DLH, DMCT, DNH, DSCWID, ESL, INT, LDTPSAP, LINEPSAP, LOD, LOR, MLH, MPB, MPH, OFR, OFS, PILOT, RCVD, SL, SMDI, TERM, TFO, TRMBOPT, UCD, UCDS
SCRJ	3WCPUB, BNN, CCSA, CFMDN, DIN, DTM, LDTPSAP, MDN CACH, PRL
SCS	AUL, BNN, CPR, DOR, SC1, SC2, SC3
SCU	AUL, BNN, CPR, HOT, SC2, SC3, SCL
SCWID	DCND, DSCWID
SDN	BNN, CFGD, CFGDA, CIR, DLH, DNH, DTM, LOD, LOR, MDN, MLAMP, MLH, MPB, MREL, OFR, OFS, PILOT, PRH, RCVD, RMB, SHU, TBO, TERM, TFO, TRMBOPT, UCD
SDS	Compatible with all line options
SDY	PBL, ONI
SEC	LDTPSAP, PBL
SECURE	Compatible with all line options
SETMODEL	AAK, BNN, DLH, DNH, MLH, MPH, SUPR
SHU	ACD, CWX, DLH, MDN, MLAMP, MPB, MPH, MREL, PBL, SDN, SMDI, UCD, UCDS
SIMRING	ACD, CMG, DLCM, DLH, DNH, DOR, KSH, MDN, MLH, MPH, UCD
SKDISP	AIN
SL	SCMP
SLC	FGA, RCD
SLQ	AAK, ACD, ACRJ, AEMK, AUL, BC, BNN, CAG, CALLOG, CLSUP, CNAB, CNDB, CWT, DCND, DLH, DMCT, DNH, ECM, EHLD, KSH, MDN, MLAMP, MLH, MPH, MREL, PREMTBL, PRH, RCHD, RMB, SCMP, SDN, SHU, SLVP, SMDI, TBO, UCD
SLU	PBL

-continued-

Options Incompatibility (continued)

Option	Incompatible Options
SLVP	AUL, BNN, CFGD, CFGDA, CIR, DLH, DNH, DOR, DTM, LDTPSAP, LINEPSAP, LOD, LOR, MDN, MLH, OFR, OFS, PILOT, RCHD, TERM, TFO, TRMBOPT, UCD
SMDI	AAK, ACD, AEMK, AUL, BNN, CAG, CLSUP, CNAB, CNDB, DTM, KSH, MDN, MLAMP, MREL, PRH, RMB, SCMP, SHU
SMDICND	AAK, ACD, AUL, BC, BNN, CAG, CLSUP, CNAB, CNDB, CPU, DTM, EHLD, KSH, MDN, MLAMP, MPH, MREL, PREMTBL, PRH, RMB, SCMP, SHU, SLQ
SMDR	DOR, LDTPSAP
SNR	Compatible with all line options
SOR	AAK, ACD, AEMK, BNN, CAG, CLSUP, DLH, MDN, MLAMP, MLH, MPH, MREL, SACB
SORC	AAK, ACD, AEMK, BNN, CAG, CLSUP, DLH, MDN, MLAMP, MLH, MPH, MREL
SPB	BNN, LDTPSAP, MAN, ONI, PBL
SPR	Compatible with all line options
SSAC	LDTPSAP
STRD	Compatible with all line options
SUPPRESS	LDTPSAP
SUPR	Compatible with all line options
SUS	SETMODEL
SVCGRP	FTRGRP
TBO	ACD, CBE, CBU, CDE, CDI, CDU, CFB, CFBL, CFD, CFDA, CFDVT, CFF, CFGD, CFGDA, CFI, CFK, CFRA, CFS, CFU, CFW, CMCF, CUSD, DTM, GIC, IECFB, IECFD, SDN, TRMBOPT, UCD, UCDS
TDN	AUL, CTD, RMT, RSP, SACB, TDV, TES
TDV	AUL, CTD, HOT, RMT, RSP, TDN, TES
TELECNT	Compatible with all line options
TERM	RCHD, SCMP, SDN, SLVP
TES	LDTPSAP, TDN, TDV
TFO	RCHD, SCMP, SDN, SLVP
TLS	ACD
TRKDISP	All CLASS features

-continued-

Options Incompatibility (continued)

Option	Incompatible Options
TRMBOPT	CBE, CBU, CDE, CDI, CDU, CFB, CFBL, CFD, CFDA, CFDVT, CFF, CFGD, CFGDA, CFI, CFK, CFRA, CFS, CFU, CFW, CMCF, CUSD, DTM, IECFB, IECFD, RCHD, SCF, SCMP, SDN, SLVP, TBO
UCD	AAK, ACD, ACRJ, AEMK, AUL, BNN, CAG, CALLOG, CLSUP, CNAB, CNDB, DLH, DMCT, DNH, DTM, ECM, KSH, MDN, MLAMP, MLH, MPH, MREL, PRH, RCHD, RMB, SCMP, SDN, SHU, SIMRING, SLVP, TBO
UCDLG	Compatible with all line options
UCDSD	AAK, ACD, AEMK, AUL, BNN, CAG, CLSUP, CNAB, CNDB, DLH, DNH, DTM, KSH, LDTPSAP, MDN, MLAMP, MLH, MREL, PRH, RMB, SCMP, SHU, TBO
WML	AUL, GIC, MAN, MPB
WUC	BNN, CIR, DLH, DNH, HOT, MDN, MLH
XXTRG	Compatible with all line options

-End-

Introduction to DMS–100 Ten Digit Translations

The primary function of the 10–digit dial plan, otherwise known as the North American numbering plan or the *Standard Numbering Plan*, is the handling of Plain Ordinary Telephone System (POTS) traffic. This traffic occurs when a source, called an *originator*, dials digits that represent a *destination*.

The digits dialed must conform to the *Standard Numbering Plan*. This plan consists of two basic parts: a three–digit Numbering Plan Area (NPA) code that identifies a geographical area and a seven–digit Directory Number (DN), which is made up of a three–digit Central Office (CO) code and a four–digit line number as follows:

NXX - NXX - XXXX

(NPA) - (CO) - (Line Number)

Long distance dialing is made possible by the addition of a *toll digit* (1) being dialed before the above dialing sequence.

1 - NXX - NXX - XXXX

(Toll) - (NPA) - (CO) - (Line Number)

where in each example, **N** is a digit from 2 to 9 and **x** is a digit from 0 to 9.

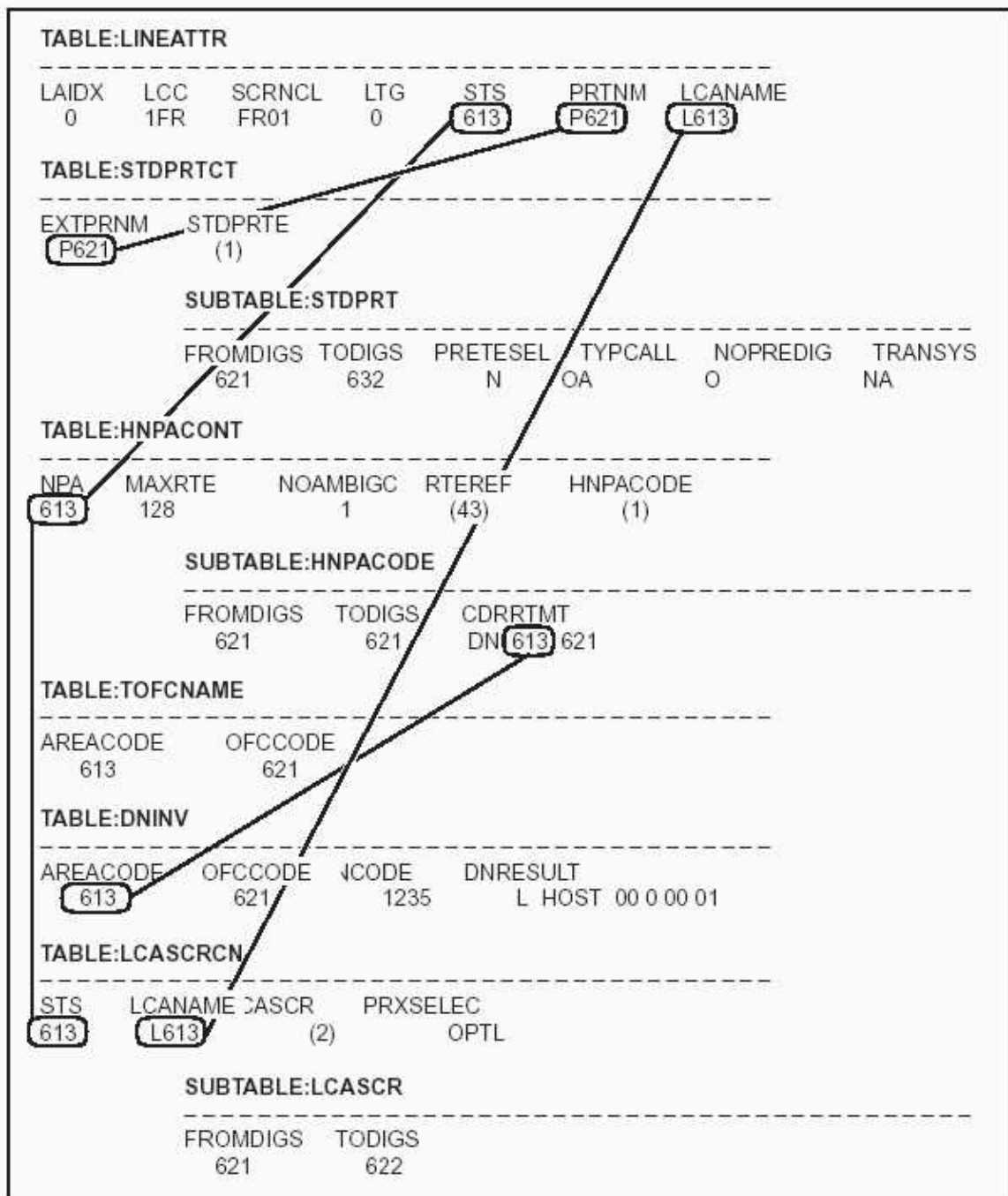
Preparing to Datafill 10–Digit Translations

Translation is the process of determining where a call is destined based on the digits the subscriber dials and who the subscriber is, since different subscribers have different calling plans and feature capabilities.

The processing of this call involves the reading of specific tuples (horizontal rows) and fields (vertical rows) in designated data tables to determine the termination point of a call or the path a call takes to its final destination.

The interrelationship of tuples and fields to the data tables is shown in the following example:

Example of tuple and field interrelationships



Call Processing

Call processing can be divided into two phases: the *originating phase* and the *terminating phase*.

The originating phase consists of such functions as the origination of the call, giving a dialtone or a start signal, the collection of digits, and determining the route and the charge (billing) treatment.

The terminating phase includes such functions as establishing a connection through the network, starting and giving audible ringing, handling the answer, supervising the talking state, and disconnecting the call.

The following is a list of the steps involved in call processing:

1. Collect data from the line record associated with the physical circuit from which an off-hook signal was received.
2. Map the translation path that the call will follow by collecting the key field of a tuple in each table to be accessed and translating the destination digits.
3. Screen the digits to identify calls that do not go to normal translations.
4. Translate the first three digits of the call (NPA for a 10-digit call, NXX for a 7-digit call) to identify the call destination.
5. Translate the secondary digits (the third, fourth, and fifth digits, or NXX), which is only required for calls to either:
 - ◆ a NPA where the call is routed differently based on the destination NXX.
 - ◆ a NXX where the call is routed differently based on the first three digits of the local number.
6. Final screening of the call for local dialing requirements (*Were 1 + 7-digit calls correctly dialed?*) and class-of-service restrictions.

Digit Manipulation

Digit manipulation is the process by which digits are translated, or read and routed through the system. In order to fully understand the digit manipulation process, knowledge of the following key terms is required.

- Functions must be performed by the Central Control Complex (CCC) before any entry into program or data store areas of information is permitted.
- The node number is a distinct number allocated to each device in the system that is capable of handling a message. This number is used to identify the Peripheral Processor (PP) that originates or receives a message.
- The Call Processing Identification (CPID) structure contains information used for call processing. It contains the Agent Identification (AID), the Call Process Selector (CPS) fields, and forms part of the Call Condense Block (CCB).
- The path end is used to identify an end point in a network. It contains such terminal information as the network module channel, the network module port, and the network module pair number. The path end is entered in the CCB.
- The agent (originator or terminator of a call) is associated with specific hardware terminals. The agent lists data that is unique to that particular hardware terminal.
- The agency is a group of agents with similar, but not necessarily identical, features. The agency is also responsible for the sequence of run time commands and process calls through the various stages of call progression. Agencies implement features, provide program code, and support data for each major class-of-service, as well as provide unique data for each of its agents.

Each hardware terminal has a unique hardware terminal identifier (NODE) that consists of the peripheral module controller and the line or trunk terminal number. This number allows the index into and out of the I/O utility module.

When a terminal has received an off-hook signal, or a seizure on a trunk, a message is sent to the CCC with the following information:

- The NODE number, which is the index into the NODE table.
- The terminal number, which is the index into the Terminal Identification Map (TIDMAP) and TSM.

The I/O utility module converts the off-hook signal or trunk seizure (hardware terminal identification) into an agency identification. It then relates the activity to the software data structure associated with the terminal.

Each entry specifies an agent identification, including the agency number. This agent identification points to the data associated with the particular hardware terminal or call process identification.

The call process identification, in the TIDMAP, has the CP selector and the agent identification, which contains the index into table LENLINES.

The CCC must then associate a Call Data Block (CDB) and a CCB with the call process that has been seized by the CCC after it has analyzed the message sent by the terminal.

The CDB is the private data area for the call process. It is used to store any information relevant to the handling of a call such as a customer class, digit translation results, and options and features that the line or trunk can have. This information is updated as the call progresses.

The CCB is used to store the call process type, the run time of the program code, and the data required to execute a given task. The CPID and the path end are stored here as well.

As mentioned previously, a call is originated by a source dialing digits, in the form of a DN that represents a destination. These digits must be translated and this is accomplished by using database tables that are contained in the digit translations utility. These tables are used for one-, two-, and three-digit interpretation, or translations, of the digits dialed. They are referred to as databases A, B, C, D, E, F, and G.

Each call processing agency module in an office has a digit translation pointer associated with it that indicates which of the two specific databases, A and B, is to be used by that particular module. The A database is a one-digit translator and the B database is a two-digit translator. They contain only the central office codes and service codes that represent local calls for that particular agency.

The A and B databases point to either C and D or E and F databases where subsequent digits are translated. These four databases are shared by all the other agencies in the office. The E, a one-digit base, and the F, a two-digit base, contain all the NPA codes that can be served from here, as well as the toll codes that are within the home NPA. The A and B databases are used for three-digit translations of toll calls while the C and D and E and F are used for six-digit translations of toll calls.

Databases C (a one-digit base) and D (a three-digit base) are used for translations of the last four digits, or line number portion, of the DN in order to find where the subscriber or trunk is located in the office.

Database G is used for listing the operator codes that are used to reach the operators.

Decoding of the first three digits results in one of the following outputs from databases A and B:

- Route pattern identification (trunk group) that specifies all possible routes that can be used to complete the particular type of call.
- Digit translation pointer (intra-office call) that points to other databases where subsequent digits are sent for translations.
- Nil (no route) and the digits are recycled through the E and F databases (six-digit translations) to verify the toll code for this area.
- Number of digits required to complete a call that includes 7-digits (intra-office or local), 8-digits (home route – HRTE), and 11-digits (foreign route – FNPA or FRTE).
- Charge or No Charge indication.

Routes

For outgoing calls, once the route pattern is decided from A and B or A and B and E and F, then the route utility is seized. All the trunk groups available are listed here. The first choice route of a particular route pattern is identified and an attempt is made to terminate on one of the idle trunks within the group. If all the trunks are busy, then a second or alternate route is identified and an attempt is made to terminate again on one of the idle trunks. If there are no idle trunks in the second group, then another route is identified. This process is continued until the final route is reached. There can be up to a maximum of eight routes for a call, but it is not necessary that they all be used.

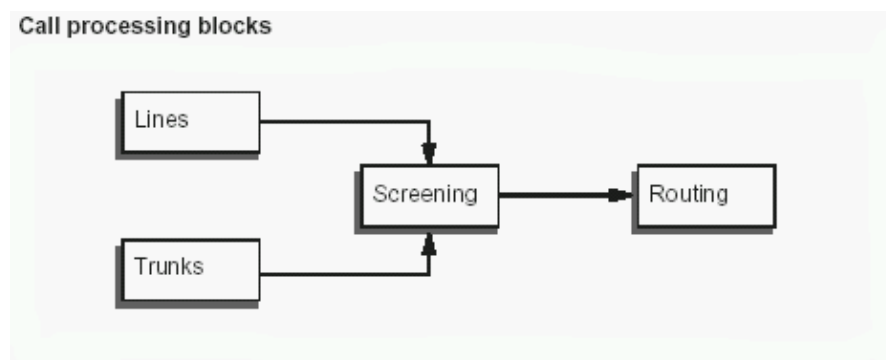
Data Tables

In call processing, tables from both program store and data store are used. The manner in which these tables are accessed and the route selected for completion of a call is subject to data received from the operating company.

The tables are categorized into the following areas:

- Lines
- Screening
- Routing
- Trunks
- Treatment

Most calls can be traced using a simplified block diagram as illustrated in the following figure:



The call originates from either a line or a trunk. When a call originates from a line, the associated line tables are read and interpreted. If the call originates on an incoming trunk, the appropriate trunk tables are used. In either case, these tables provide information about the hardware location, the type of signaling to expect, and where to send the call to analyze the dialed or received digits.

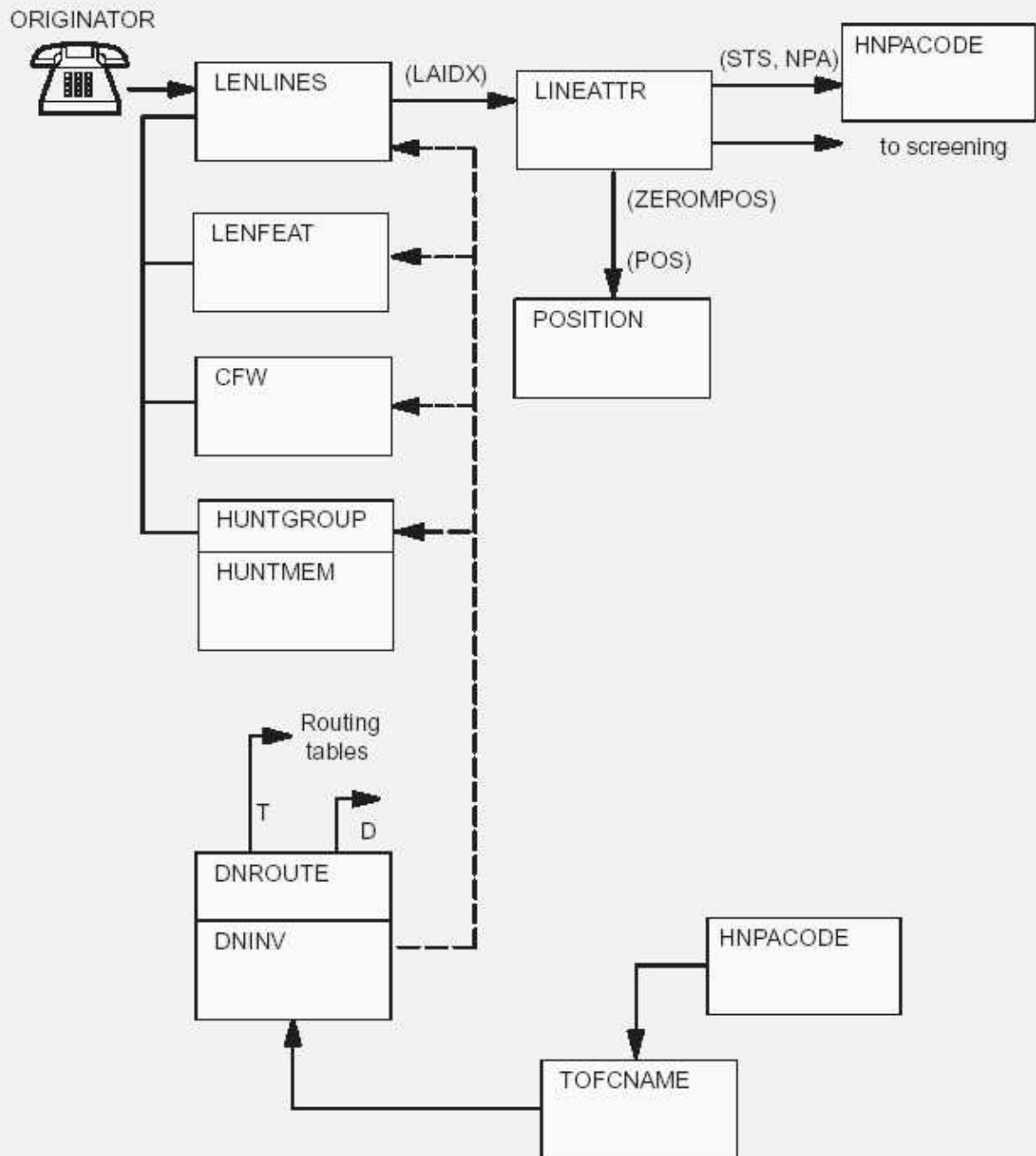
To accomplish the analysis of the digits, the call enters the screening tables, as directed from the line or trunk tables. After some general pre-screening or pre-translation is performed, the call may progress into more detailed screening based on NPA/NXX digits to determine the path into the designated routing tables for defining the final destination or termination of the call.

Line Tables

The line tables match a seven-digit DN with a hardware location as well as the options and custom calling features that are recorded. The following tables are used:

- LENLINES
- LINEATTR
- LENFEAT
- CFW
- HUNTGRP
- HUNTMEM
- DNROUTE
- DNINV
- TOFCNAME

Table flow for lines

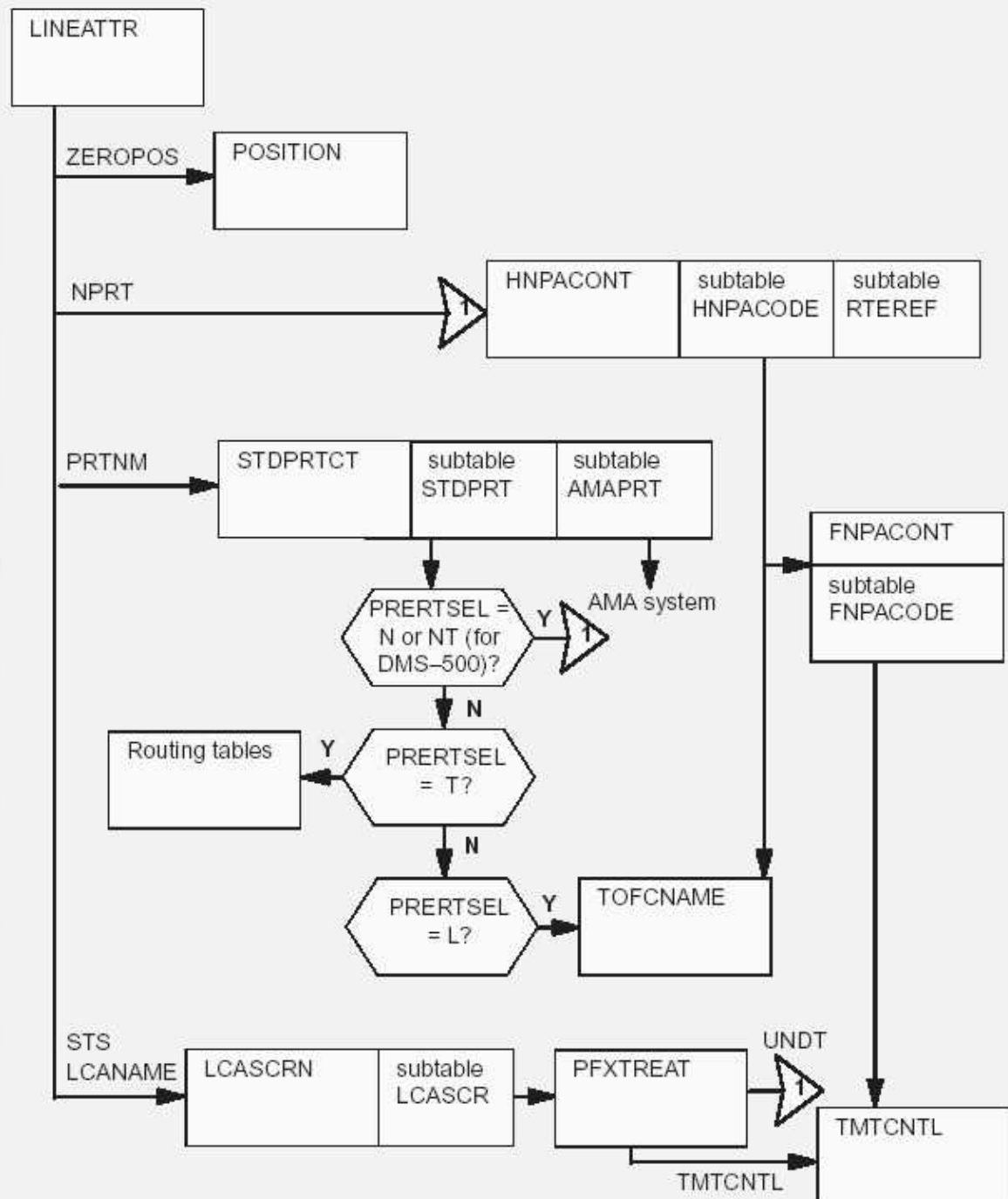


Screening Tables

Screening tables are used to screen dialed digits against originator characteristics and to change the normal pattern of call progression through an office. The following tables are used:

- POSITION
- STDPRTCT
- HNPACONT
- FNPACONT
- LCASCRN
- PFXTREAT

Table flow for screening



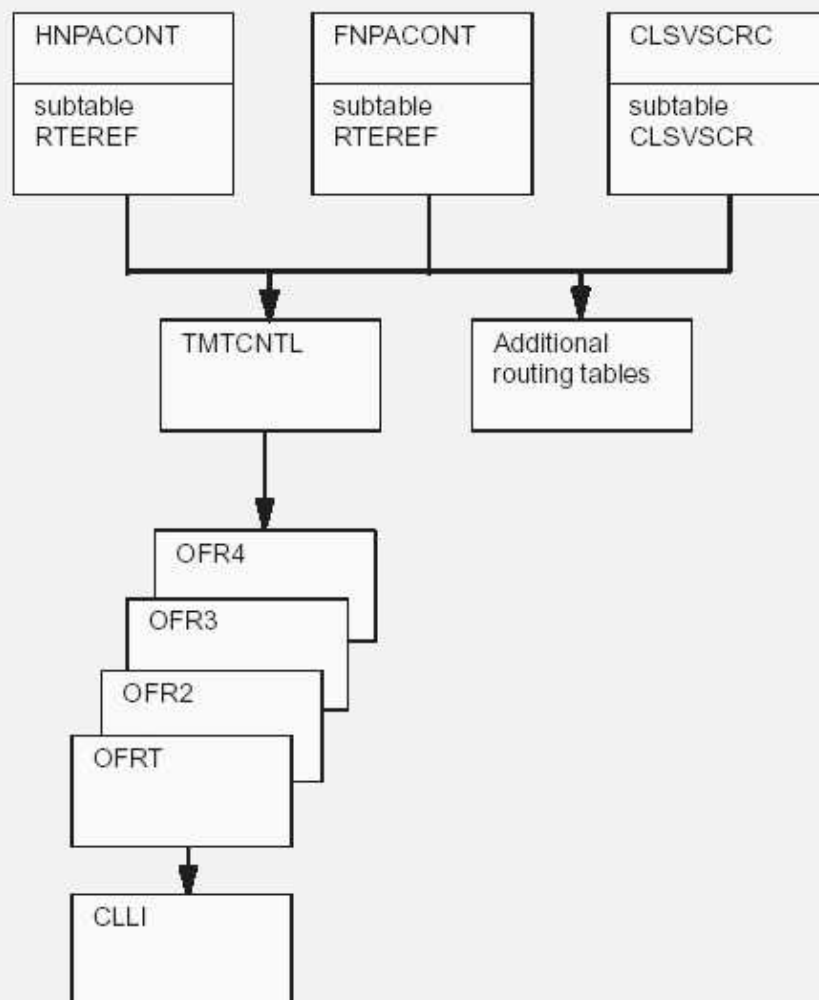
Routing Tables

Routing tables provide a path to be taken when a proper code has been dialed. If digits need to be added or deleted, this occurs during the routing stages. The following tables are used:

- OFRT
- HNPACONT.RTEREF
- FNPACONT.RTEREF

These tables are used if an originating call is being translated and a preceding stage identifies a route reference index. A route reference index can point to a list of up to eight alternate routes or a treatment list.

Table flow for routing



Trunk Tables

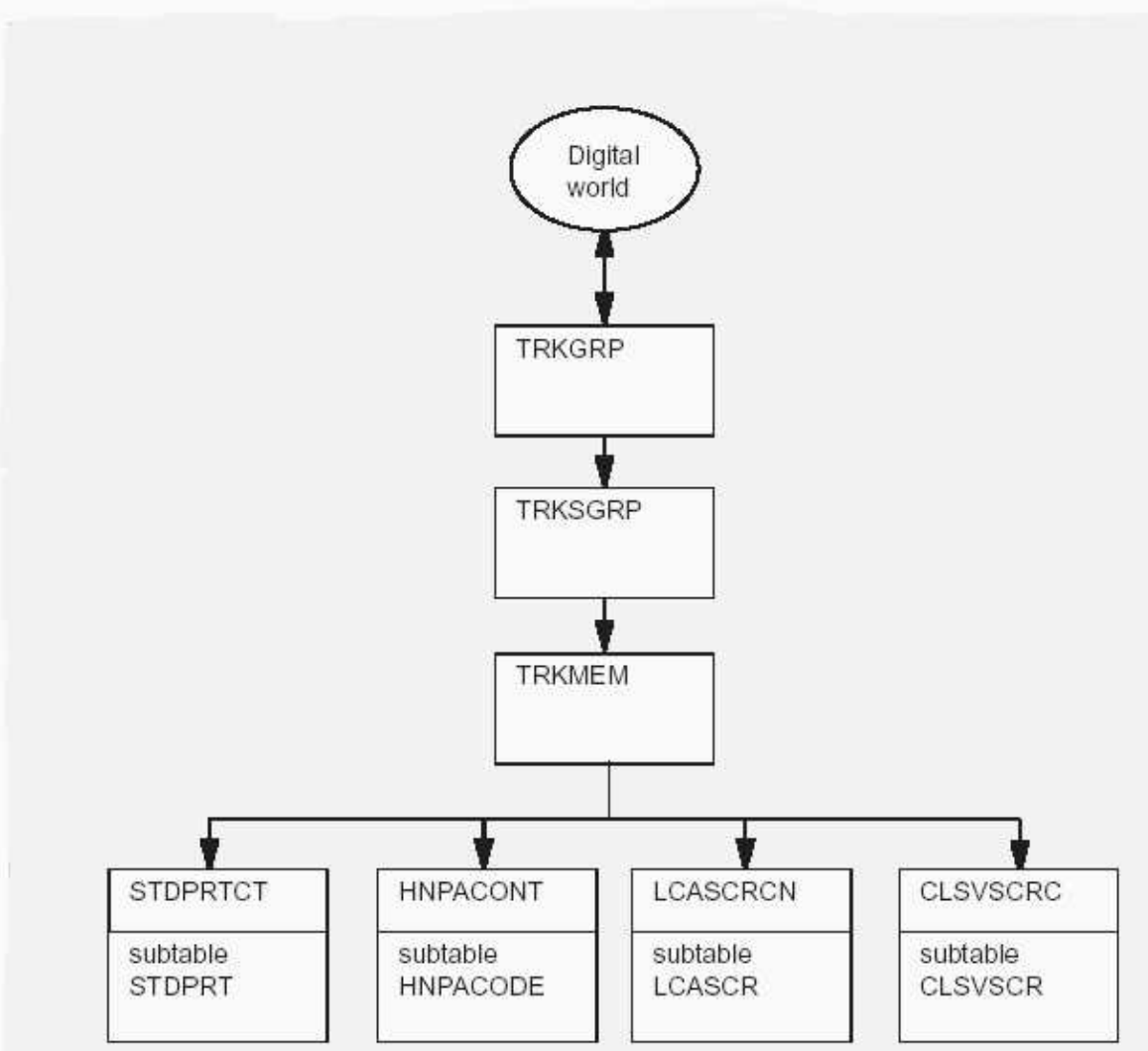
Trunk tables contain detailed information about trunks originating and terminating in the switch. Each trunk connected to the office is represented by entries in the trunk tables. These tables include information about the following:

- Type of trunk group
- Type of signaling
- Hardware location of each trunk
- Screening information for the incoming call from trunks to define the next logical step in translation

The following tables are used:

- CLLI
- TRKGRP
- TRKSGRP
- TRKMEM

Table flow for trunks



Treatment Tables

Treatment tables provide an event path when some unusual or wrong condition occurs. These paths route to recorded announcements or tones.

The treatment routes for tones and announcements must be datafilled in table CLLI. Table TONES lists specific tones and identifies the type, pattern, and duration of each tone. Table STN (or table SVRCKT) contains additional tone data. The DMS-100 sends the tone information to the originating peripheral module (PM), and the PM generates and sends the tone out over the originating line or trunk.

Announcements are datafilled in tables ANNS and ANNMEMS. Table ANNS identifies the type of announcement, the maximum number of simultaneous connections for the announcement, and the maximum length of the announcement. Table ANNMEMS identifies the hardware location for the announcement. The hardware can be a Digital Recorded Announcement Machine (DRAM), located on a Maintenance Trunk Module (MTM), or an Audichron located on a Trunk Module (TM8).

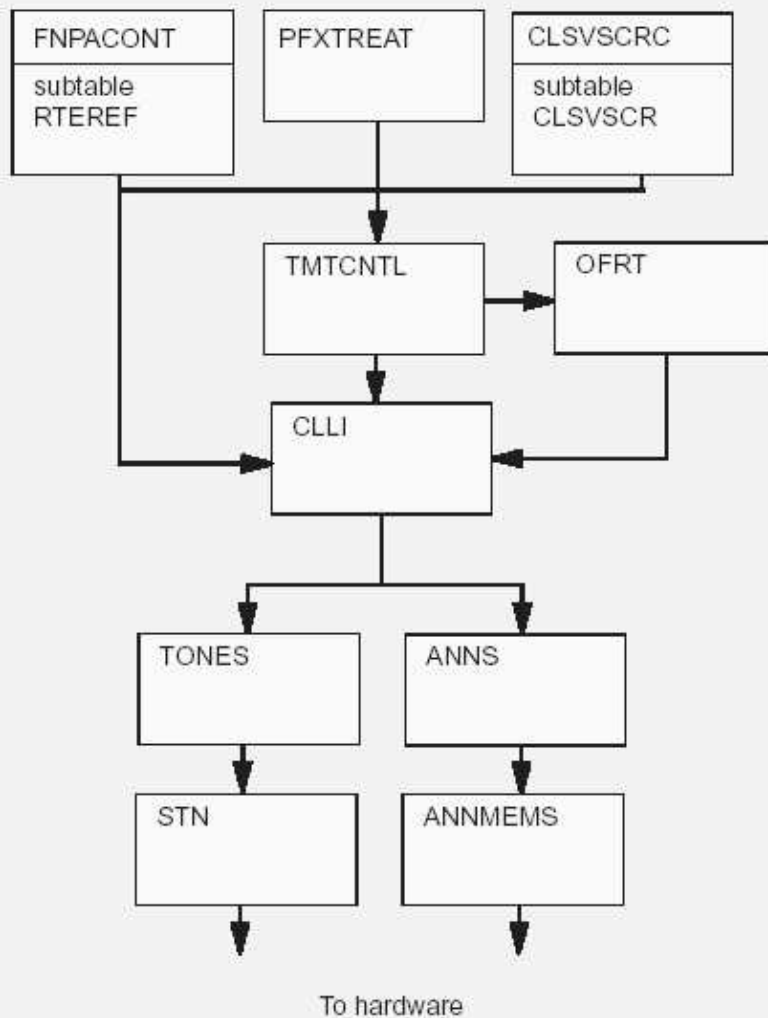
There are a number of specific subtables that can be used for particular types of originators. The default subtable is OFFTREAT.

Table DRAMS or table EDRAM (Enhanced Digital Recording Announcement Machine) is datafilled by Northern Telecom with the information for the trunk cards.

The following tables are used:

- TMTCNTL
- CLLI
- TONES
- STN
- ANNS
- ANNMEMS

Table flow for treatment



Call Processing Functional Areas

Data tables can be grouped into the following five call processing functional areas:

- Data Collection
- Digit Pre-Screening
- Digit Interpretation
- Final Digit Screening
- Routing

Data Collection

Once the off-hook signal is received and the digits are dialed, the first step is the collection of data from the line record associated with the originator's physical circuit. This includes the DN and the line attribute associated with the call.

Table LENLINES

Line equipment number	Directory number	Line attribute index
01 1 04 06	S 0 7251668 DP	4 3WC

A path is then mapped through translations for the call. This includes the keys of the tuples used in the pre-screening and digit translation processes.

Table LINEATTR is used to associate a group of calling lines with a:

- Home area code called a Serving Translation Scheme (STS)
- Local (free calling) Area Name (LCANAME)
- Pre-Translator Class Name (PRTNM)
- Class-of-Service Name (SCRNL)

Table LINEATTR

Line attribute index	Line class code	Screening class	Line T group	Serving translation scheme	Pretrans name	Local area name
4	1FR	FR01	0	613	P621	OTT1

Partial key to table CLSVSCRC

Key to tuple in table HNPACONT

Key to tuple in table STDPRTCT

Digit Pre-Screening

The digit pre-screening process compares the destination digits with a digit range. Any unmatched calls go forward for further translation.

Table STDPRTCT does the following operations:


- Checks for partial dialing or excess digits
- Sends calls for further translation classified as:
 - ◆ Direct Dial (DD) 1+
 - ◆ Operator Assisted (OA) 0+
 - ◆ No Prefix (NP) 10-digits or 7-digits
- Points to a specific route, line, or trunk
- Sends call for special handling

Table STDPRTCT


Pretrans name
↓
P621 (1)

Subtable STDPRT

First digits From	To	Preroute selection	Type of call	Number of prefix digits	Treatment	Digits Min	Max
000	010	D			VACT		
011	011	S	DD	1	TOLLTRK	12	15
012	019	S	OA	0	TOLLTRK	11	14
02	09	N	OA	1	NA		
1	1	N	DD	1	NA		
611	611	R	NP	0	NA 2642350	3	3
7371111	7371111	R	NP	0	NA 7271230	7	7



Send call for routing
on TOLLTRK trunk



Send call for
further translation

Digit Interpretation

The 10-digit interpretation plan is made up of primary and secondary digit translations.

Primary digit translations compares the first three destination digits (NPA on a 10-digit call and NXX on a 7-digit call). The call is then pointed to a route or to a secondary digit translation table.

Table HNPACONT, and its associated subtables, points calls to one of the following:

- A route number (where the immediate destination can be determined from the first three destination address digits)
- Table FNPACONT

Table HNPACONT

Serving transl scheme						
↓						
613	280	0	(219)	(1)	(0)	(0)

Subtable HNPACODE

First digits		Route reference	
From	To		
825	825	HRTE	15
416	416	FRTE	16
819	819	FNPA	0

↓
 Send call for further translation

Subtable RTEREF

Route reference	Route selector	External route ID
↓		
15	T	OFRT 131
16	T	OFRT 142

↘
 Send call for routing on OFFICE ROUTE 131

Secondary digit translations points a call to a route based on the fourth, fifth, and sixth destination digits. A separate tuple for each destination NPA is required within the subtable for calls routed by office codes (NXX).

The foreign number plan table is comprised of a subtable for each destination area code where the routing or handling of the call differs depending on the NXX (destination digits 4 to 6). By accessing the appropriate subtable tuple using digits 4 to 6, calls are pointed to a route number based on six-digit translation.



Table FNPACONT

(NPA)					
819	22	-	(320)	(1)	(5)

Subtable FNPACODE

First digits		Route reference
From	To	
221	226	4
227	227	1
228	321	4

Subtable RETEREF

Route reference	Route selector	External route ID
	T	OFRT 164
	T	OFRT 191
 <p>Send call for routing on OFFICE ROUTE 164</p>		

Final Digit Screening

Final digit screening can be based on class-of-service or seven- or eight-digit calls.

Class-of-service screening applies class-of-service requirements and limitations. Table CLSVCRC allows an STS (origin NPA) and call type (DD, OA, or NP) combined parameter to be used to point specific calls to an operator, to a treatment, or to a route. Additionally, the action may be varied depending on digits dialed by accessing a subtable (instead of pointing directly to an operator, treatment, or route).

Table CLSVSCRC

Serving translation scheme	Screening class	Type of call	Number of results	Treatment or office route
↓ 613	FR01	OA	0	T OFRT 621
613	FR01	DD	0	D VACT
613	FR01	NP	2	N NONE

Requires subtable CLSVSCR processing

Subtable CLSVSCR

First digits From	To	Treatment or office route
↓ 976	976	D T120
		↓ Send call to treatment

The seven- or eight-digit screening compares call classification (DD, OA, or NP) to calls with local area requirements for 1+ and 0+ dialing.

Table LCASRCRN

Serving translation scheme	Local area name	Local screening area	Prefix selector	Prefix only for 10-digit calls
613	OTT1	(2)	MAND	N
	To subtable LCASCR		↓ To table PFXTREAT	

Subtable LCASCR

NXX digits (range)	
From	To
↓	
221	226
229	231

Table PFXTREAT

Prefix selector	Type of call	Local	Update call type	Treatment
↓				
MAND	NP	N	NP	MSLC
MAND	NP	Y	NP	UNDT
			Send call to treatment	Send call to routing

850 – 870 MHz PLL RF Oscillator

Overview

This is a project for a simple 850 – 870 MHz PLL RF oscillator. It is frequency agile, using DIP switch parallel programming to choose any frequency between 850 and 870 MHz, in 25,000 Hz steps. You can use an old cellular phone's RF power module and antenna to increase the RF output power to around 3 Watts ERP. You can also salvage old cellular phone's PC boards for SMT resistors, capacitors, and other useful components.

The VCO used in this circuit is a [Z-Communications](#) V580MC05. This exact model VCO isn't made anymore, but a suitable model is the V580ME10 or V708ME01. The PLL frequency synthesizer IC is the trusty Motorola MC145152. This PLL synthesizer IC uses *parallel* programming, so it doesn't require any microcontroller for frequency loading, just some DIP switches. The dual-modulus prescaler which divides the VCO's RF output, is a Fujitsu MB501. This particular divide-by-64/65 prescaler can be hard to find. A suitable replacement is the Motorola MC12022B. The main reference crystal is a 12.8 MHz Temperature Compensated Crystal Controlled Oscillator (TCXO). This is a bit of overkill, but helps maintain the oscillator's stability during any dramatic temperature changes. The PLL's loop filter is based around a OP27 op-amp, the LM351 or MC33171 will also work. Also, the loop filter's component values are determined from the characteristic of the V580MC05 VCO. If you use a different VCO (with a different MHz/V value) you may have to adjust the loop filter values. E-mail GBPPR staff if you need any help doing that. The other support components are not really critical.

PLL Synthesizer Programming

Note: You'll want to study the datasheet for the Motorola MC145152 before reading this section.

Programming the Motorola MC145152 *Divide-by-N* and *Divide-by-A* counters looks complicated at first, but really isn't that hard. Here an example of what to do:

The VCO RF output frequency you want : 857.750 MHz

Your **Reference Crystal** is : 12.8 MHz

You want a **Reference Frequency** of 25,000 Hz, so you divide the **Reference Crystal** by 512 (see datasheet).

Now it is time to determine the PLL's **N-Counter** and **A-Counter** ratios.

Divide 857.750 MHz by 25,000 Hz:

$$857,750,000 / 25,000 = 34,310$$

This is the **Main Divide-by-Ratio** you will use during loop filter calculations (not covered here).

Now divide 34,310 by 64, the MB501 prescaler's divide-by-ratio:

$$34,310 / 64 = 536.093$$

Round 536.093 down to 536.

The **N-Counter's** divide-by-ratio needs to be set to: 536

Multiply 536 by 64, the MB501 prescaler's divide-by-ratio:

$$536 * 64 = 34,304$$

Subtract 34,304 from 34,310:

$$34,310 - 34,304 = 6$$

The **A-Counter's** divide-by-ratio needs to be set to: 6

Verify the math:

$$(N * PRESCALE) + A = \text{Main Divide-by-Ratio}$$

$$(536 * 64) + 6 = 34,310$$

$$34,310 * 25,000 = 857,750,000 \text{ Hz (857.750 MHz)}$$

Now, to actually program these values into the Motorola MC145152, all you need to do is toggle the pins on the MC145152 either *high* (1) or *low* (0). Since the MC145152's divide-by-ratio pins are already pulled-high, when they are left open, they will be a logic "1". When they are grounded, they will be a logic "0".

So, to program our example N-Counter value of 536 and A-Counter value of 6, the programming would look like this:

PLL's N-Counter Programming Inputs									
	512	256	128	64	32	16	8	4	2 1
536	1	0	0	0	0	1	1	0	0 0

or mathematically: $512 + 16 + 8 = 536$

MC145152 Pin #	N-Counter Programming Inputs		(Datasheet Label)
11	1		(N0)
12	2		(N1)
13	4		(N2)
14	8		(N3)
15	16		(N4)
16	32		(N5)
17	64		(N6)
18	128		(N7)
19	256		(N8)
20	512		(N9)

In this example:

Pins 20, 15, 14 would be left "Not Connected" (high or logic 1).

Pins 11, 12, 13, 14, 16, 17, 18, 19 would be "Grounded" (low or logic 0).

Now, for our example A-Counter value of 6, the same basic thing:

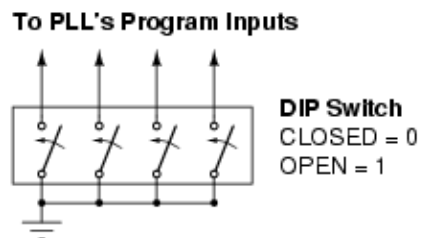
```
PLL's A-Counter Programming Inputs
32 16 8 4 2 1
-----
6   0  0  0  1  1  0
-----
```

or mathematically: $4 + 2 = 6$

MC145152 Pin #	A-Counter Programming Inputs (Datasheet Label)	
23	1	(A0)
21	2	(A1)
22	4	(A2)
24	8	(A3)
25	16	(A4)
10	32	(A5)

In this example:

Pins 21, 22 would be left "Not Connected" (high or logic 1).
Pins 23, 24, 25, 10 would be "Grounded" (low or logic 0).



Here is an example of using DIP switches, or even regular SPST switches, to load the divide-by-ratio programming inputs on the MC145152.

Datasheets

12.8 MHz TCXO can be ordered from [Mouser](http://www.mouser.com), (<http://www.mouser.com>) or [Digi-Key](http://www.digikey.com) (<http://www.digikey.com>).

- [Z-Comm V580MC05](http://gbppr.digitaldropbox.com/mil/ccecm/V580mc05.pdf) (<http://gbppr.digitaldropbox.com/mil/ccecm/V580mc05.pdf>)
- [Fujitsu MB501 Dual-Modulus Prescaler](http://gbppr.digitaldropbox.com/mil/non/mb501.pdf) (<http://gbppr.digitaldropbox.com/mil/non/mb501.pdf>)
- [Motorola MC145152](http://gbppr.digitaldropbox.com/mil/non/MC145151-2.pdf) (<http://gbppr.digitaldropbox.com/mil/non/MC145151-2.pdf>)
- [Texas Instruments OP27 Op-Amp](http://gbppr.digitaldropbox.com/mil/non/op27.pdf) (<http://gbppr.digitaldropbox.com/mil/non/op27.pdf>)

Pictures



Picture #1

Overview of the entire oscillator assembly. It is built into an old Motorola "bag"-style cellular phone case. The stock cellular phone PCB is shown on top for comparison. The large black IC on the lower left is the MC145152. The large blue thing is the RF power module, with its shielding removed. The blue rectangle on the right side are the DIP switches. RF output is on the top right via the phone's stock mini-UHF connector and stock antenna.

Picture #2

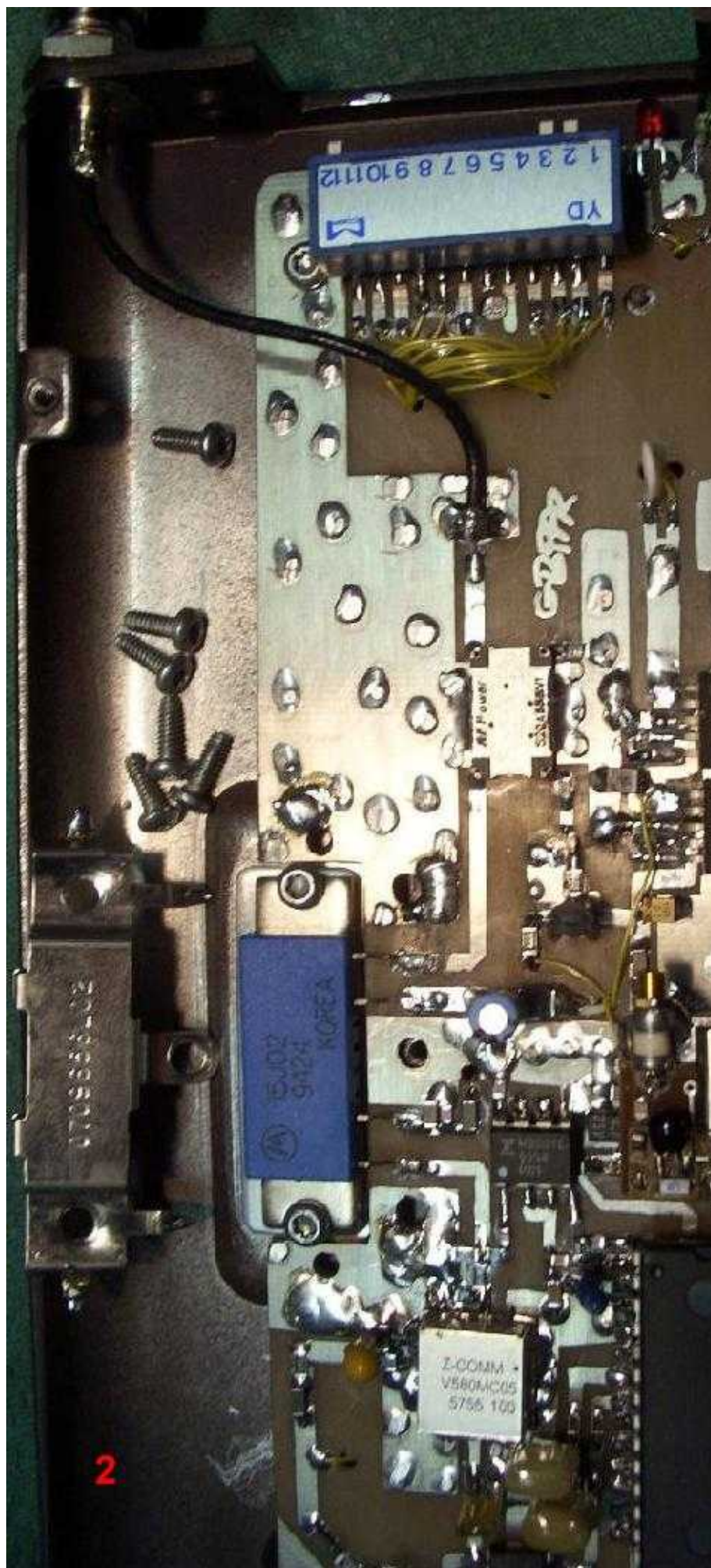
Close up picture of the RF power amplifier module and the RF output section. The RF output is going through an Anaren S20A888N1 20 dB directional coupler. The coupled side is then sent to a diode detector and transistor buffer to light an LED. This makes a useful "RF Output" detector, and is optional.

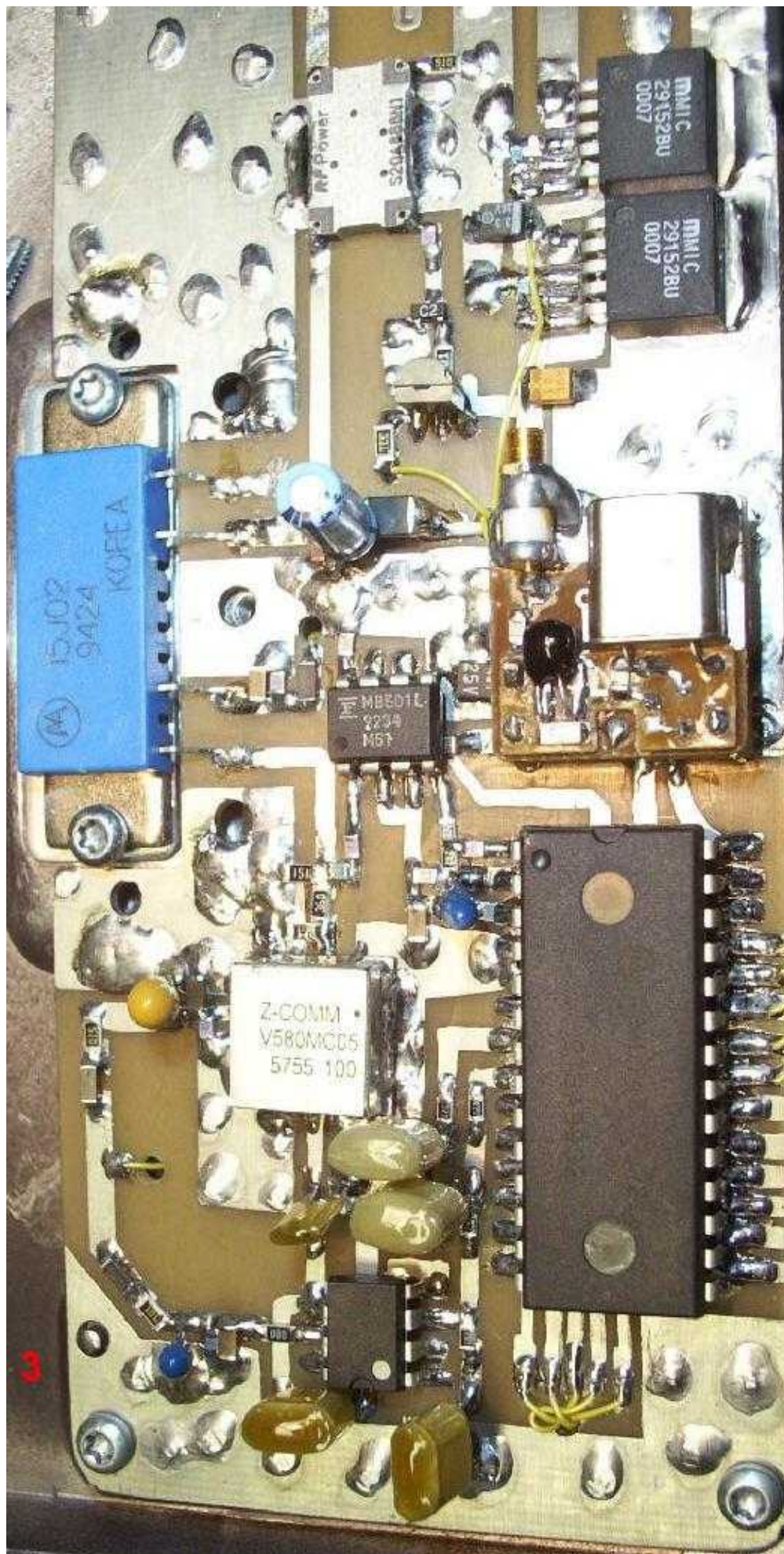
Picture #3

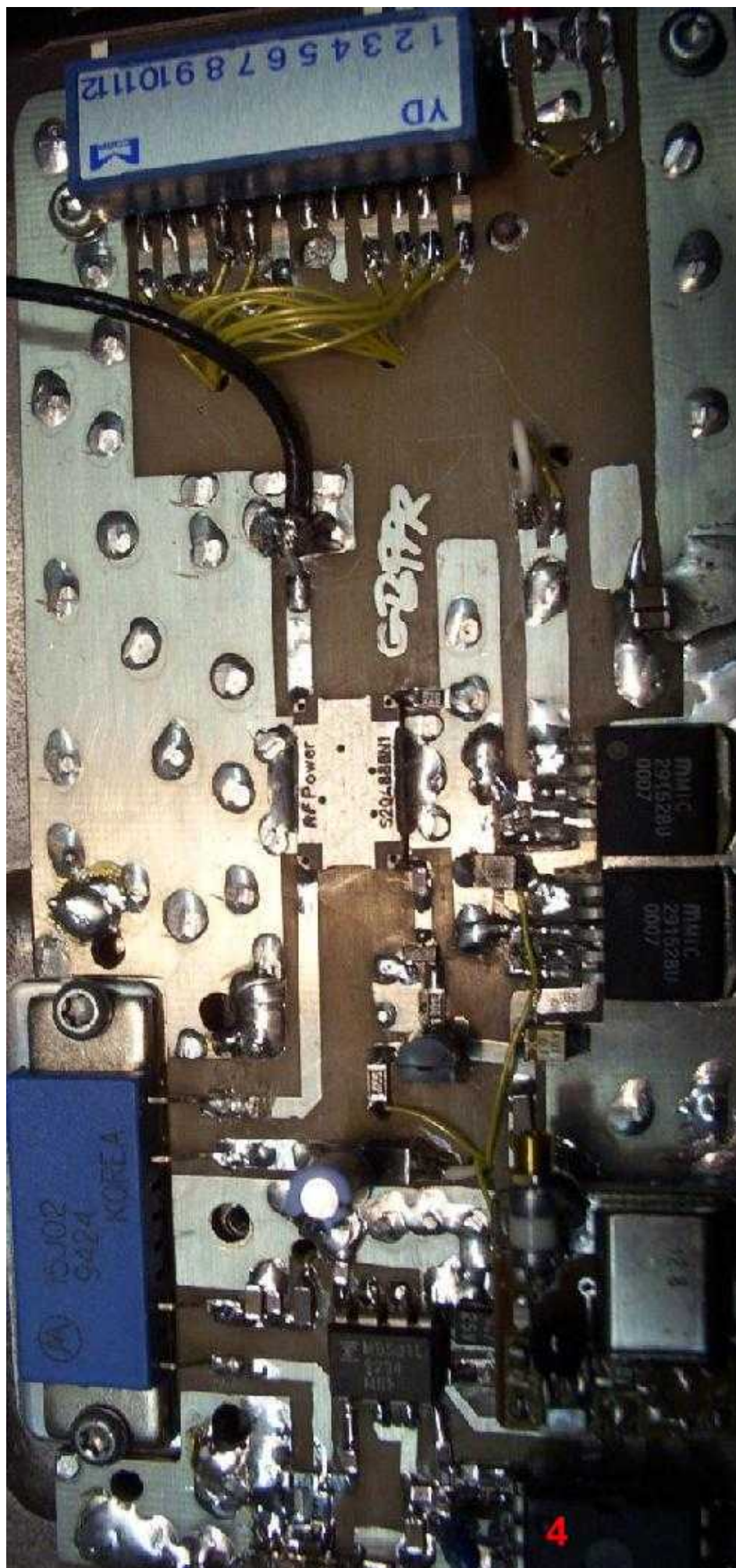
Close up of the synthesizer and VCO sections. Note that I took apart the TCXO to add a new, hi-Q variable capacitor. This also allows the frequency to be "tweaked" so the oscillator can tune inbetween frequencies. This modification is also optional. The two MIC29152s are the voltage regulators.

Picture #4

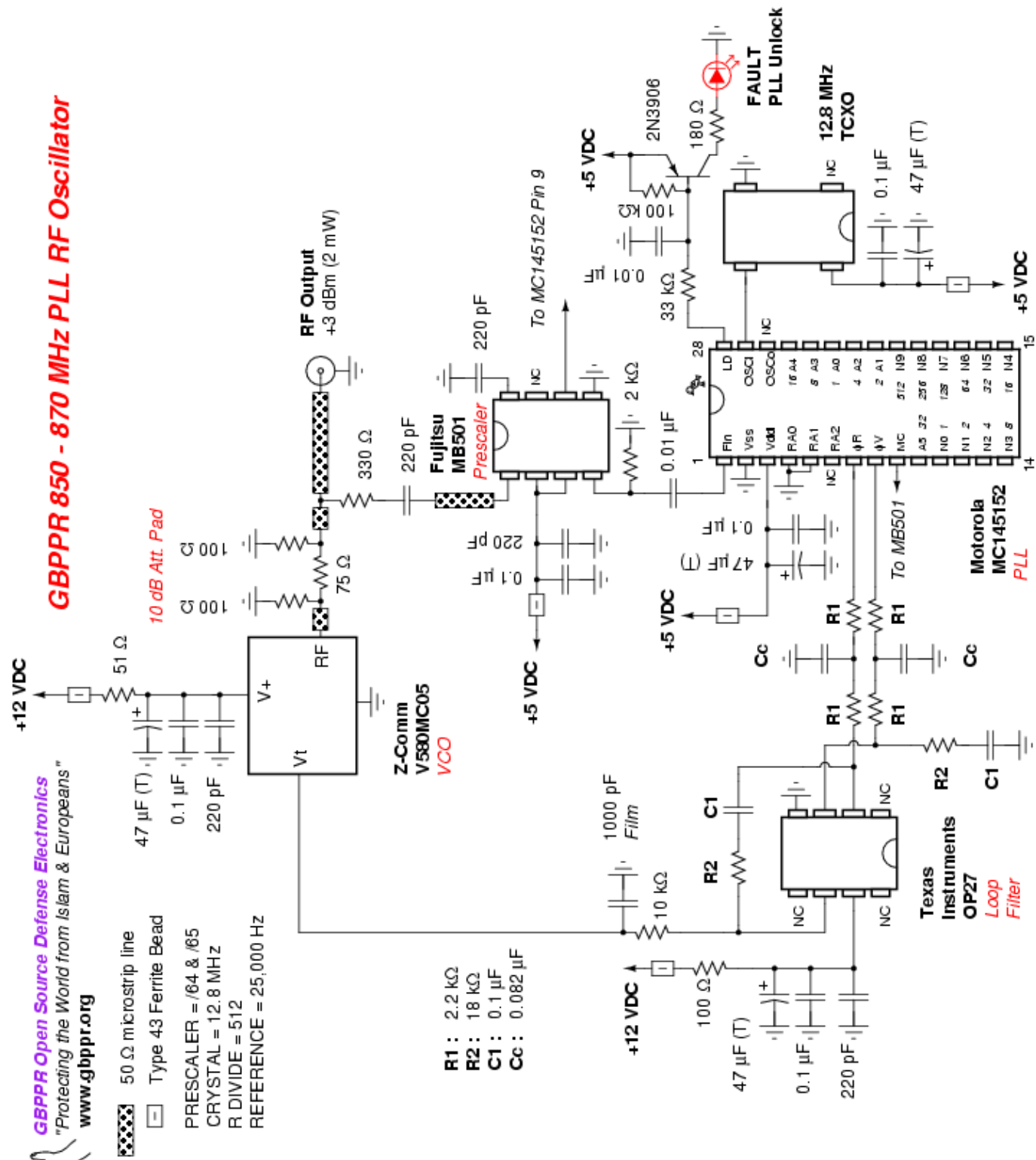
Additional picture of the RF output section, the programming DIP switches, and the "PLL Fault" and "RF Output" LEDs.

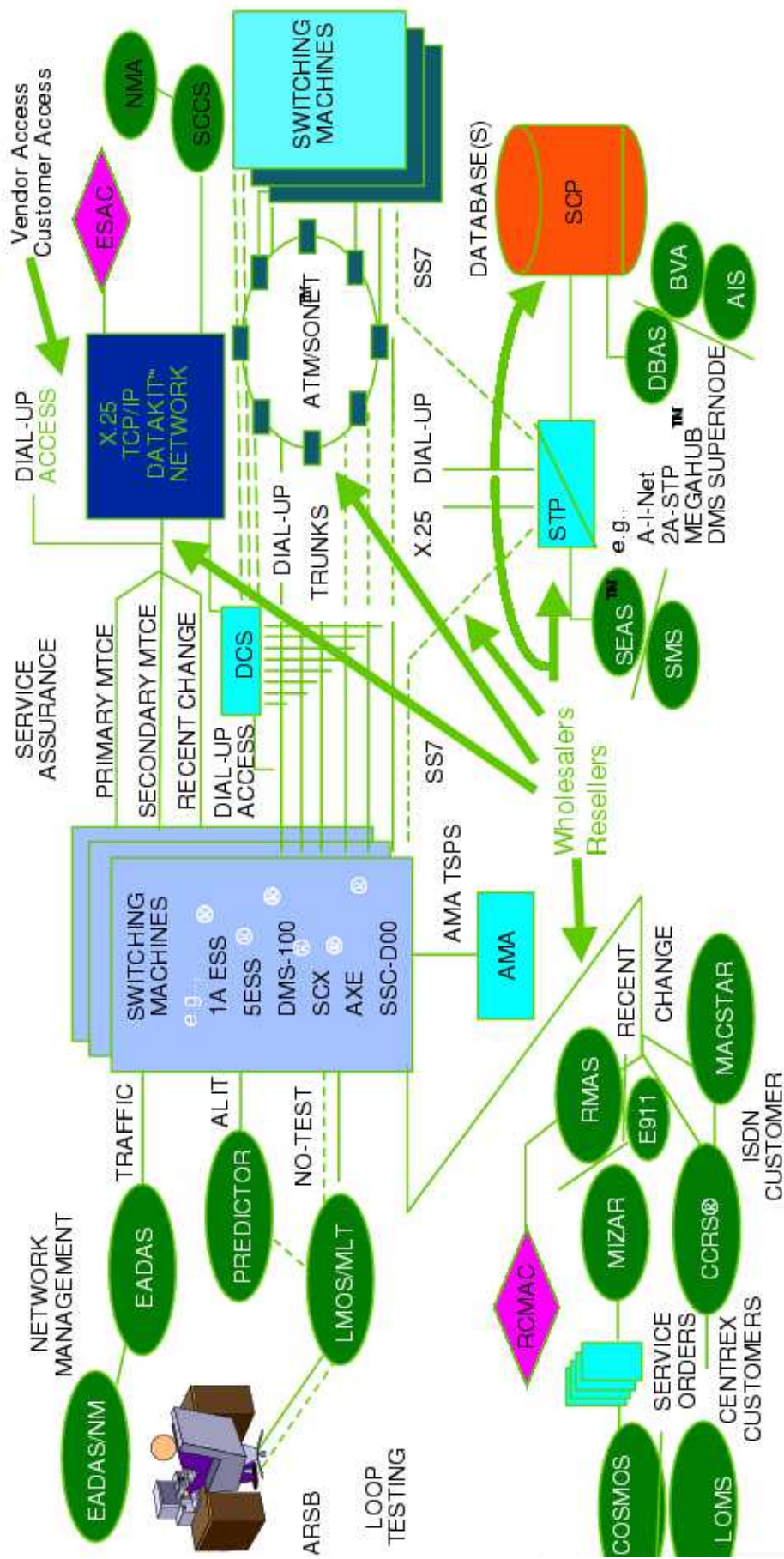






GBPPR 850 - 870 MHz PLL RF Oscillator





NORTEL
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End of Issue #11



Any Questions?

Editorial and Rants

According to the U.N.–ordered inquiry led by Paul Volcker, these are the top 10 countries that purchased oil from Iraq under the *Oil-for-Food* program from 1996 until 2003:

1. Russia \$19.259 billion
2. France \$4.394 billion
3. Switzerland \$3.480 billion
4. Britain \$3.380 billion
5. Turkey \$3.343 billion
6. Italy \$2.718 billion
7. China \$2.625 billion
8. Liechtenstein \$2.468 billion
9. Spain \$1.644 billion
10. Malaysia \$1.485 billion

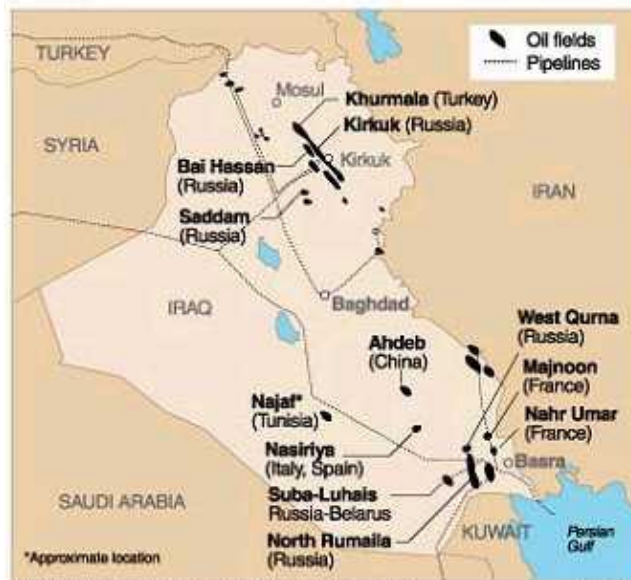
The United States is listed in 26th place at \$482.826 million.

Also, the United States has embargoed oil imports from Iran since 1979. Royal Commonwealth countries (U.K., Canada, Australia, New Zealand, etc.) continue to suck Iran's cock, as they get their oil from Iran. Iran then funds terrorists. The E.U. and the U.N. just look the other way. Thanks!

Boycott Europe

The thirst for Iraqi oil

While U.S. oil firms have stood on the sidelines, Iraq has negotiated contracts or had serious talks with oil companies from many other nations to develop its vast oil reserves. The map shows some of the major fields and the countries involved.



Source: U.S. Department of Energy, American Petroleum Institute

Times art



Death to Europe