

**DATA MODIFICATION OPERATIONS
METHODS, PROCEDURES, AND INTERFACES
NETWORK ADMINISTRATION
DIGITAL MULTIPLEX SYSTEM-10**

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NOTICE

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1. INTRODUCTION

1.01 This section describes the methods, procedures, and interfaces involved with Data Modification (DMO) Operations performed by the Network Administration Center (NAC) for the Digital Multiplex System-10 (DMS-10). The operations described include those for the Recent Change Memory Administration Center (RCMAC). Data Modification Order functions involving Network Maintenance are covered only if they are also performed by Network Administration.

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

1.03 The title of each figure includes a number(s) in parentheses which identifies the paragraph(s) in which the figure is referenced.

1.04 It is not intended that this section replace the Northern Telecom Practices (NTPs) as a "stand alone" practice. Sections of the NTPs are paraphrased or quoted only where it clarifies or facilitates the understanding or continuity of the section.

1.05 This section is intended to cover the Bell System Network Administration organizational applications of DMS-10 DMO procedures.

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2. DOCUMENTATION

A. Terminology

2.01 There are numerous instances of differences in terminology between the Bell System and NTI to describe identical or similar functions or equipment. These differences will be noted as they occur in this section.

B. Performance Oriented Practices

2.02 As the name implies, Performance Oriented Practices (POPs) are instructional procedures written to support:

- The task or job directly
- Various levels of experience the craft person has or develops on the job.

C. Data Modification—General

2.03 The general information regarding Data Modification is contained in NTP 297-3001-304. It includes the methods, procedures, purpose, hardware, and software involved in DMO operations.

D. Data Modification Manual

User Guidelines

2.04 The DMO Manual (NTP 297-3001-311) includes a checklist with latest issue and date of each procedure. The subsections of the DMO Manual are arranged as follows:

(a) **Order Tasks (OTs)** which are referred to as the "Access Level." It is a list of tasks with references telling the user where information to do the task can be found in the "Director" and "Support" Levels.

(b) **Order Procedures (OPs)** are referred to by NTI as the "Director Level." They contain sequential step-by-step subtasks stating what has to be done, with appropriate references to the detailed "Support Level."

(c) **Detailed Procedures (DPs)** are included with the "Support Level." It contains detailed instructions on how to perform a subtask. These detailed instructions may reference other DPs.

2.05 Depending on the experience level, the user may have to go to:

- (a) Access Level (OT)
- (b) Access Level (OT), then to the Director Level (OP)
- (c) Access Level (OT), then to the Director Level (OP), and then to the Support Level (DP) to perform the task.

2.06 An Index (IX) of OTs, OPs, and DPs is included as the last subsection of the Data Modification Manual.

Tasks Normally Performed by the NAC

2.07 A complete list of Order Tasks are included in NTP 297-3001-311. Table A lists the tasks ordinarily performed by the NAC along with the NTP Procedure Number. Tasks involving Operational Measurements (OPMs) are covered later in this section.

E. Output Message Manual

2.08 There is an Output Message Manual provided for each DMS-10 generic, eg, Generic 207.3. A copy of the manual for each generic administered should be maintained for use by NAC and Service Provision/Support (SP/S) personnel. The output messages for the Operational Measurement System are contained in NTP 297-3001-456 as well as the Output Message Manual.

3. INPUT/OUTPUT SYSTEM

A. General

3.01 A detailed explanation of the Input/Output (I/O) system is contained in NTP Section 297-3001-300. The information provided here is excerpted from that section.

3.02 The DMS-10 office is a stored program, computer-controlled system. The programs operate in response to "input signals" and stored data that define the system. The input signals take the form of line switch changes and digits dialed. The system processes these signals according to instructions stored in memory that forms part of the machine. The instructions are organized into programs that provide an orderly response to the signals. To respond correctly to the signals, the programs are supplied data that describe the physical make-up of

the system, directory numbers, line and trunk characteristics, and other information appropriate to an installed DMS-10. The data requires frequent updating to keep it in step with changes to the system configuration. One of the functions of the I/O system is to provide a mechanism for the modification of the data.

B. Storage Media

3.03 The DMS-10 stores the programs and data by using two different media:

- (a) A **solid-state memory** within the DMS-10 control unit is used to store the programs and data that must be available for immediate use. These are "resident" programs and data. The resident programs control the operation of the switch.
- (b) **Magnetic tape.** A duplicate copy of the resident programs and data are stored on the magnetic tape to provide back-up. If a failure results in the loss of the contents of the solid-state memory, the programs stored on the back-up magnetic tape can be written into the control unit memory. This permits restoration of the resident programs and data, and a return to service of the switch. The magnetic tape is also used to store "overlay" programs and other data.

C. Overlay Programs

3.04 A number of system programs are stored on tape rather than being kept resident. Upon request, these programs are loaded into resident memory one at a time. One area of the control is loaded when it is required to be executed. An overlay supervisor program arbitrates between the various possible requests for overlay program execution. If a request is accepted, the overlay supervisor program loads the overlay program into the overlay area. Overlay program execution can be requested either automatically by the system or manually via a terminal. The system functions implemented by overlay programs are those functions used relatively seldom and which allow relatively slow response time. These functions include:

- (a) Updating of the data to reflect changes in system configuration including changes to directory numbers, trunking, and similar items.
- (b) Testing to detect system troubles before they result in any deterioration of service seen by

the subscriber. These include both hardware and software diagnostics and audits.

- (c) Software aids for use during repair activities.

D. Overlay Program Types

3.05 There are two types (or modes) of overlay programs: (1) interactive and (2) free-running. Interactive programs are structured in dialogue form, that is, they require an exchange of information between the program and the program's user. Interactive programs alternate between accepting and outputting messages containing the exchanged information. Typical tasks performed by interactive overlay programs include:

- (a) Data modification and verification
- (b) Maintenance testing
- (c) Operational measurement output.

3.06 The free-running programs require no dialogue between the user and the programs. Outputs from the free-running programs are presented on the terminal.

E. Data Terminals

Terminal Characteristics and Options

3.07 The I/O system permits assignment of functional classes to terminals and may be assigned any one or a combination of functional classes such as maintenance, traffic, or data modification. The I/O system can operate with terminals having the following characteristics.

Interface:	RS-232C
Code:	American Standard Code for Information Interchange (ASCII)
Speed:	110, 300, 1200, 2400, 4800 baud
Loop Current:	20 mA

3.08 The DMS-10 can operate with a maximum of eight terminals. The terminals may be operated locally (within 500 feet of the system) or remotely through modems.

Baud Speed

3.09 If there are substantial output requirements such as with OPMs or Office Data Query (ODQ), the output reports need to be delivered at a high baud speed. The slower the baud speed, the less time available for other input/output requirements. This is critical because only one of the eight possible terminals can utilize an overlay program at a time.

3.10 The eight terminals can operate at differing baud speeds, but if the Monitor (MON) system command is utilized to allow one terminal to monitor another, the output will be at the baud rate of the slowest terminal.

3.11 Baud rate for Network Administration terminals is discussed in more detail in paragraph 3.15.

User Class

3.12 User class is part of the Configuration (CNFG) Record Logical Unit (TTY and TAPE) assignments. They are initially entered on Translation Form CNFG 05, OVLY-CNFG and designate the user class of the TTY terminals. Changes in user class are made by the Switching Control Center (SCC) as part of the Overlay Program procedures. These entries determine the class of message(s) output on the TTY, eg, which data block outputs will go to each TTY. Valid classes are DMO, Maintenance (MTC), and Traffic (TRAF).

3.13 It is important to distinguish between user class and password. The password has no effect on scheduled or system output reports directed to a TTY.

Terminal Selection

3.14 The selection of the proper type terminal depends upon several considerations such as:

- Dial up or dedicated facilities
- Need for "quiet room" operation
- Baud speed required by users
- Input only, output only, or both
- Overlay usage requirements
- External data retrieval system

- Computer interfaces.

3.15 As stated previously under "Baud Speed," it is desirable that output reports be delivered at high baud speed to ensure that there is adequate time for all input/output functions.

3.16 Based on the preceding considerations, the following are the recommendations for NAC DMS-10 terminals.

(a) **RCMAC Considerations and Recommendations**

- The RCMAC, if collocated with the NAC, may either share the administration terminal or have a separate terminal.
- If a separate terminal is provided, the facilities may be either dial up or dedicated.
- It is recommended for typical RCMAC operations that a separate 1200 baud or higher terminal with dial up facilities be provided. This will minimize report distribution problems involved with sharing and will provide a backup for the Network Administration (TRAF) terminal. If a separate terminal is provided for the RCMAC, it should be assigned user class DMO.

(b) **Network Administration (Other than RCMAC) Considerations and Recommendations**

- Dedicated facilities *should* be provided if there is no external data measurement system such as the Engineering and Administrative Data Acquisition System (EADAS).
- If external data measurements are available, dial up facilities may be used.
- If no external data measurement system is utilized, the terminal should normally be 1200 baud or higher.
- With an external measurement system being utilized, 110 baud may be used if there are no requirements for substantial system outputs, eg, ODQ or OPMs.
- The terminal may be shared with RCMAC.
- It is recommended for typical NAC operations without an external measurement sys-

tem that a separate 1200 baud or higher terminal be provided with dedicated facilities. With an external measurement system, it is recommended that dial up facilities be utilized. The Network Administration terminal should be assigned user class TRAF.

F. **Passwords**

Purpose

3.17 Passwords are required to gain access to the DMS-10 through an interactive terminal. Attempts to access the system through the use of an unauthorized password results in the user being blocked. Passwords are also used to control the classes of tasks that may be performed by the I/O system.

Allowances and Restrictions

3.18 It is necessary to enter a password as part of the log in (LOGI) procedure. As indicated in the preceding paragraph, passwords restrict access to the system and determine what resident system commands may be used.

3.19 Table B specifies what functions may be performed by a particular password.

Administration and Security

3.20 Passwords are part of the CNFG Record Overlay Program. The initial passwords at the turnover of the DMS-10 will be the digits "0000" for all users. Network Administration should be assigned the "TRAF" password and the RCMAC should be assigned the "DMO" password.

3.21 Network Administration and the RCMAC group should have their passwords changed from "0000" to any 4-digit number of their choosing. The new passwords should be forwarded to the SCC for input into the Configuration Record Area. This is covered in NTP 297-3001-304 under Configuration Record Manipulation.

3.22 A record of passwords *must* be maintained by Network Administration and the RCMAC as there are no established procedures for retrieving the passwords from the system should they be lost and forgotten.

3.23 Any DMS-10 TTY can be used to perform the functions permitted by a particular password provided the password is properly entered.

3.24 It is important that only those trained in the operation of the I/O system and DMO Orders be permitted to operate the Network Administration and/or RCMAC terminals. Passwords should be given only to those who have a "need to know" and will be operating or administrating the terminals.

G. Interactive Program Input Format

General

3.25 Interactive programs proceed on the basis of successful exchange of information between the user and the programs. The dialogue is organized to assist the user. Each message that is output to the user and has an anticipated response is structured to guide the user in answering.

I/O System Input Mode Prompts

3.26 Table C lists the I/O system prompts, uses, and responses.

Special Data Input Characters

3.27 See Table D for the special data input characters and the uses for these characters.

Responses to Incorrect Input

3.28 When incorrect input (incorrect form) is detected by the program, the program rejects the input and responds by repeating the prompt or outputting an error message.

Input/Output System Time-Out Feature

3.29 To prevent excessive idle time, the time between prompt and response is monitored. If this time period exceeds 1 minute, the machine enters the output mode and provides any messages it has for the user.

H. Overlay User Priority

Overlay Area Arbitration

3.30 The machine has space in its resident memory for only one overlay program to be run at a time. Requests to run an overlay program can come from either of two sources—an interactive terminal or the system. The system may request a program as a result of detecting a fault or because the time at

which a scheduled program is to be run has arrived. In addition, the system requests a "background" overlay to be run whenever all other requests for use of the overlay area have been satisfied.

3.31 When a manual request enters the I/O system while the overlay program is occupied, the overlay supervisor program sends a message to the requesting terminal indicating which program is being run and the user of that program. (The overlay supervisor program is built into the DMS-10 and is automatically generated when a manual request enters the I/O system.)

3.32 If the receiver of the message is using a terminal that has a higher user class priority than the present user, the receiver can then elect to override the program in the overlay area by issuing an appropriate command. These commands are detailed in the Supplement to NTP 297-3001-300.

3.33 The preempted user will automatically receive a message on the terminal that the overlay program has been aborted.

3.34 The priority of user classes (in descending order) are:

- Debug
- Maintenance
- Traffic
- DMO.

3.35 If the user of the overlay program is the system that is preempted, the system automatically reschedules the program after the new user has freed the overlay area.

System Overlay Area Requests

3.36 Overlay programs requested by the system are classified as follows:

- (a) **Background:** The background program is run when the overlay area is idle and the requests for all other programs have been satisfied. The Background Overlay Program should be aborted by using the **OVLY (mnemonic) IMED** command.
- (b) **Scheduled:** A number of overlay programs are run on a scheduled basis. A scheduled pro-

gram is run when the overlay area is idle and there are no higher priority requests pending. Aborted, scheduled programs are rescheduled.

(c) **High priority:** High priority program requests are generated when a fault is detected and the system requires fast response. If the overlay area is being used to run a scheduled or background program, the program is aborted and the high priority request is then satisfied. If the overlay area is being used to run a manually requested program, the system forwards a request to the user to abort the program.

3.37 The system places the overlay program requests into three queues, one for each of the preceding classes. The requests remain in the queues until the overlay area supervisor program is able to satisfy the requests.

I. Output Messages

3.38 Each output message begins on a new line. The two basic types of output messages are **alarm** and **nonalarm**. Alarm messages are the responsibility of Network Maintenance and are directed to the MTC TTY.

3.39 Output messages are formatted in a 6-character code consisting of three alpha characters followed by three numerics. The specific meaning of the codes is contained in the Output Message Manual for the Generic Program of the transmitting office.

3.40 Detailed information concerning output messages is provided in NTP 297-3001-300 under System Hardware and DMS-10 Switching Planning Introduction.

J. Courtesy

3.41 Since there are up to eight terminals sharing one access to the DMS-10 Overlay Programs, it is essential that priority be established among the users and that courtesy be observed. The Message Forwarding Command (MSG) is one means of communication when a conflict exists. All users should be familiar with this procedure which is detailed in paragraph 4.07.

3.42 Except in an emergency, an urgent situation, or Background Overlay Programs, the com-

mand to abort the Overlay Program of another user should not be utilized without prior consultation. This command, **OPLY** (*mnemonic*) **IMED**, is described in NTP 297-3001-300.

4. DATA MODIFICATION PROCEDURES

A. Terminal Operations Performed by Both Network Administration and RCMAC

Input Forms

4.01 Input forms have been developed by NTI to aid those using the Line Administration Overlay programs. The prompt is provided and the entry (response) is indicated by numbered dashes. A complete set of these input forms is shown in Fig. 1, 2, and 3. These forms are provided as part of the Northern Telecom Course 230, Line Administration, which will be described later in this section.

4.02 Until experience is gained in terminal operation, the input forms can be utilized and may be prepared in advance of the terminal session.

System Commands

4.03 The LOGI procedures are covered in NTP 297-3001-311. In the following example, <CR> is carriage return.

Example:

- (1) Turn terminal on-line
- (2) Enter ****
- (3) ! LOGI
- (4) Pass ? Enter the 4-digit password <CR>
- (5) # System is logged in and ready to receive commands

4.04 After all activity is completed, log out (LOGO) using the following procedure.

System Prompt	User Input
REQ	****
#	LOGO <CR>
!	System logged out

SECTION 241-120-030

4.05 The following example is a terminal session to add a single party 1FR line with DIGITONE* service (TOUCH-TONE† service). It is assumed in this example that the system is already logged in.

System Prompt	User Input
#	OVLY DN <CR>
REQ	NEW <CR>
TYP	STN <CR>
DN	529 6447 <CR>
BSPU	PE 01 1 12 4 <CR>
OPT	1FR RCO RNG DGT <CR>
REQ	

4.06 The MON command is used whenever a user wishes to see all input and output messages sent and received by another terminal. In order to execute this command, the number of the other terminal (0-7) must be known.

PROMPT	USER INPUT	DISPOSITION
#	MON (N)<CR>	Repeat at this terminal whatever is printed at terminal N (where N is the remote terminal number).
	####	Cancels MON (N) command.

4.07 The MSG command is used to forward a message from one terminal to another. The command is entered and then the carriage return key is depressed. Depressing the key causes the message to be forwarded. The message destination is entered by typing a terminal (TTY) number (0-7). Storage restrictions imposed by the I/O system limit messages of this type to 80 characters. This command can also

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be used to determine the user's (sender's) terminal number. If **MSG <CR>** is entered, the user's terminal number (0-7) is printed.

PROMPT	USER INPUT	DISPOSITION
#	MSG (N) (message) <CR>	Send message to terminal N (0-7).
#	MSG<CR>	Prints user's terminal number.

4.08 The following list gives the user input and the use for the query commands.

PROMPT	USER INPUT	DISPOSITION
#	QUE LOGI<CR>	Queries user's password classes.
#	QUE CLAS<CR>	Gives all classes of messages assigned to this terminal.
#	QUE CSEL<CR>	Prints message classes selected by CSEL (XXXX) command.

4.09 The ODQ command is used to obtain a TTY printout of data associated with directory numbers (DNs), lines (terminal numbers [TNs]), trunks, trunk groups, carrier groups, and the remaining free words in program store. The ODQ command is used to print out data associated with a single DN, a range of DNs, or all DNs. This is covered in detail in NTP 297-3001-304 under Office Data Query.

4.10 The following is a sample terminal session to list a range of DN.

```

****
#  OVLY  ODQ

ODQ000  ODQ

REQ      LIST
TYP      DN
RNGE     685   7838   685   7847
STAT     ALL
    
```

System Output:

DN 685 7838 EDNE PE 03 3 10 02 2T43
OPT 1FR RCO RNG NRML RTP 0

DN 685 7839 EDNE PE 03 4 10 02 2T43
OPT 1FR RCO RNG NRML RTP 0

DN 685 7840 EDNE PE 09 6 14 03 2T43
OPT SUS 1FR SPB 685 8891
RCO RNG NRML RTP 0

DN 685 7841 ROUT DNIC

DN 685 7842 EDNE PE 03 5 10 02 2T43
OPT DNH 3 FRST 1FR RCO RNG
NRML RTP 0

DN 685 7843 EDNE PE 03 6 10 02 2T43
OPT DNH 3 685 7842 1FR SPB
685 7842 RCO RNG NRML RTP 0

DN 685 7844 EDNE PE 08 3 11 01 2T43
OPT 2FR RCO TIP NRML RTP 0

DN 685 7845 EDNE PE 07 5 05 01 2T43
OPT 2FR RCO RNG NRML RTP 0

DN 685 7846 TO DN 685 7847 ROUT DNIC
REQ

Note: The options Normal (NRML) and Rate Treatment Package (RTP) 0 do not have to be entered as options on RCMAC input. If Fixed Line (FIXL) is not entered, there is a default to RTP 0. They will be output on Query or ODQ LIST as shown above. See NTP 297-3001-304 under Lines and Numbers.

B. Terminal Operations Performed Primarily by Network Administration

Line Load Control

4.11 This feature provides the capability to restrict originating service to designated essential users under *extreme emergency conditions*. The

activation and deactivation of line load control (LLC) is accomplished using the TTY and the administrative password. Activation of LLC is a shared responsibility with Network Maintenance who will input the message to activate (**ACT LLC**) or deactivate line load control (**DACT LLC**) from the Maintenance terminal.

Note: As defined by NTI, the administrative password is used for performing primarily Maintenance functions.

4.12 Designated essential users will be assigned line circuits on pack positions 12, 13, and 14. Line circuit packs in positions 1 through 11 are nonservice-protected. Trunk circuit packs will not be affected by the operation of LLC.

4.13 Circuit packs in a Remote Equipment Module (REM) will have the same pack positions service protected.

4.14 All calls that are in progress (dial tone and beyond) at the time of activation of LLC are not affected. *Nonservice-protected lines will remain without originating service* and will receive no indication other than no dial tone until LLC is deactivated. Terminating calls are not affected by LLC.

4.15 To protect essential services in the event of a line circuit failure, line circuit used for manual standby lines must also be located in positions 12, 13, and 14.

4.16 In the event of a system reload (SYSLOAD), LLC will be dropped and must be activated again via the TTY. During an initialization, LLC will remain activated.

4.17 While LLC is activated, the message **LLC001 ACT** will be printed every 15 minutes.

4.18 The following list gives the commands and uses for LLC. (It is understood that every line of input is followed by <CR>.)

Command	Use
ACT LLC <CR>	Activate line load control
DACT LLC <CR>	Deactivate line load control
STAT LLC <CR>	Request status of line load control

Output Message Select

4.19 The Output Message Select (CSEL) commands and uses are as follows.

Command	Use
CSEL <CR>	Print messages assigned to this terminal
CSEL (XXXX)<CR>	Print only messages appropriate to the indicated class or classes where (XXXX) is any of DMO, MTCE, TRAF

Directory Number Hunt Groups—Establishment

4.20 It will be the responsibility of Network Administration to assign directory number hunt (DNH) groups. To complete an incoming call, DNH permits a search for an idle DN within a group of DNs. The DMS-10 can have 256 DNH groups numbered 001 through 256.

4.21 A DNH group may be established in advance of the service order by request of the Residence Service Center. It may also be at the request of the RCMAC based on information contained in a service order. There is a dual responsibility for establishing DNH groups. Line and Number Administration will assign the DNH groups, but RCMAC will complete the TTY input to establish the DNH groups and to add, change, or remove members in a new or existing group.

4.22 There are four search (SRCH) types available for DNH:

- (1) First (FRST)
- (2) Sequential (SEQ)
- (3) Circular (CIRC)
- (4) Round Robin (RR).

There are also choices regarding overflow. A description of DNH groups is contained in NTP 297-3001-304 under Lines and Numbers. Procedures for establishing DNH groups are covered in NTP 297-3001-311.

C. Terminal Operations Performed Primarily by RCMAC

Line and Number Procedures

4.23 All recent change input by the RCMAC must be done on a real-time basis utilizing overlay programs. There is no provision for batch entry on an ongoing basis after the initial line translations have been entered by NTI.

4.24 The basic training of RCMAC management and clerical personnel is contained in the NTI Line Administration Course No. 230 and Traffic Administration Course No. 231. This course material is obtained through the Area, Company, or Headquarters Training Coordinator. They are self-paced courses which are designed to allow the student to progress through the subject matter with no formal instruction.

4.25 The RCMAC procedures are part of the DMO Orders and Utilize the Overlay Programs and Procedures described in NTPs 297-3001-304 and 297-3001-311.

4.26 The DMS-10 does not utilize line class codes (LCCs). All lines are assigned a line equipment location (TN) and a DN. The characteristics and features utilized by the station are provided for by DN options.

Directory Number Overlay Program

4.27 All new subscriber service and changes to existing service must be entered into the DMS-10 using overlay program DN.

4.28 As mentioned previously, input forms have been developed by Northern Telecom, Incorporated. Other forms are included with the Line Administration Course No. 230 and Traffic Administration Course No. 231 material. (See Fig. 1, 2, and 3 for examples of the input forms.)

4.29 The following is the DN overlay format.

SYSTEM PROMPT	USER INPUT	DESCRIPTION
(REQUEST) REQ:	NEW	New
	DEL	Delete
	ADO	Add Options
	DLO	Delete Options
	CHDN	Change Directory Number
	SUS	Suspend Service
	RES	Resume Service
	QUE	Query
(TYPE) TYP:	STN	
(DIRECTORY NUMBER) DN:	Enter 7-digit directory number (If CHDN is used above in request REQ).	
(TERMINAL NUMBER) BPSU:	Enter PE bb s pp u <i>Note:</i> Where bb = PE Bay Number (Range 01-24) Where s = Shelf Number (Range 1-6) Where pp = Pack Position Number (Range 01-14) Where u = Unit Number (Range 1-4)	
(LINE OPTIONS) OPT:	Enter compatible options as applicable.	

4.30 The DMO input operations can be of different lengths depending upon the amount of prompting the user requires. That is, a short form of input may be used by listing several data items on one line. The corresponding prompts for the items listed are suppressed. Following is an example of adding a new station with maximum system prompting. (In this example and in all other examples of input/output throughout this document, items shown under *printout* are machine output and items shown under *enter* are user input. It is understood that every line of input is followed by <CR>.)

Printout	Enter
REQ	NEW <CR>
TYP	STN <CR>

Printout	Enter
DN	475 8061 <CR>
BSPU	PE 05 2 13 3 <CR>
OPT	1FR TDN DGT <CR>

4.31 This same operation could be done with minimum prompting.

Printout	Enter
REQ	NEW STN 475 8061 PE 05 2 13 3 1FR RCO RNG DGT TDN <CR>

4.32 This same operation could also be done with in-between prompting.

Printout	Enter
REQ	NEW STN 475 8061 <CR>
BSPU	PE 05 2 13 3 1FR RCO RNG DGT TDN <CR>

4.33 However, any entry that belongs on one line using maximum prompting cannot be split over two lines using the short method of input. Thus, an entry such as the following will not be accepted.

Printout	Enter
REQ	NEW STN 475 <CR> 8061 <CR>

4.34 Also, each input item must be separated from other input items by one or more spaces. An entry such as the following will not be accepted.

REQ	NEWSTN4758061 <CR>
-----	--------------------

4.35 There is a specific sequence which *must* be followed for DMO operations.

SEQUENCE NUMBER	DMO OPERATION	OVERLAY PROGRAM MNEMONIC
1	Configuration Record	CNFG
2	Loops	NTWK
3	Shelves	NTWK
4	Packs	NTEK
5	Routes	ROUT
6	Destinations	ROUT
7	Automatic Message	AMA

8	HOME Number Plan Area and HNPA OUTWATS Bands	AREA
9	Rate Center OUTWATS Bands	AREA
10	Rate Treatment Package	AREA
11	Central Office Codes	AREA
12	Thousands Groups	THGP
13	Prefix Translators	TRNS, QTRN
14	Address Translators	TRNS, QTRN
15	Screening Translators	TRNS, QTRN
16	Directory Number Hunt Groups	HUNT
17	Directory Numbers	DN
18	Trunk Groups	TRNK
19	Trunk Groups	TG
20	trunks	TRK
-	Alarm System	ALRM
-	Office Data Query	ODQ

4.36 As shown in the previous listing, DNs cannot be established in hunt groups until the hunt groups have been established through Overlay Program Mnemonic HUNT, Sequence Number 16. Verification of existing hunt groups and their members can be accomplished through Query (QUE) or ODQ procedures.

Physical Changes Required Prior to Input

4.37 Physical changes to the machine may have to be performed in conjunction with data modification. For example, a station assignment requires the use of a circuit pack, such as a single party line circuit pack, to complete the circuit to a telephone set. A single party line circuit pack has the capacity to service four single party lines (ie, four directory numbers). If no circuit is available to serve a new station, a circuit pack will have to be added **prior** to inputting the data for the new station.

Precompletion of Service Orders

4.38 Precompletion input can take place from a data terminal (RCMAC or other) provided that the required storage areas have been identified and entered via the necessary Overlay Programs. (See the DMO operation sequence in paragraph 4.35.)

Line Circuit Packs

4.39 Line circuit interfaces are described in NTP 297-3001-181. The purpose, features, and location in the PE Bay Slots are detailed in NTP 297-3001-150 under System Hardware.

4.40 Station class of service, options, and line circuit pack compatibility are detailed in NTP 297-3001-304 under Line and Numbers, Fig. 12-2.

Station Options

4.41 A complete list of Station Options along with their mnemonic, explanation, and description is contained in NTP 297-3001-304, Table 12-A.

4.42 Certain option information **must** be input when performing the service order recent change procedure to add a new station. Each office is different and option entries required depend on several factors such as:

- (a) Number of parties on a line
- (b) Type of line circuit packs installed
- (c) 911 service requirements
- (d) Line transmission characteristics
- (e) Local calling area
- (f) Type of ringing required
- (g) Message Rate Calling.

4.43 The Rate Treatment Package (RTP) is initially defined to make all calls toll. To provide toll free, message, and coin service in a given RTP, the RTP is redefined to make calls between specific toll regions toll free, message rate, or coin. An RTP which has been redefined to provide one or more of the preceding features between specific toll regions may be subsequently redefined to delete these features from or to add toll regions to the RTP.

4.44 With Generic 207.3 and later, the RTP field specifies option RTP 0 through 3 of the station (STN) thousands group as defined in the DMO area. An RTP defines the rate treatment given calls from originating lines to different terminating destinations. If no RTP is entered as part of the option (OPT)

input of the directory number overlay (OVLY DN), there is a default to RTP 0. Therefore, it is not necessary to enter RTP 0. It will be printed out on QUE or ODQ as if it had been entered. This is covered in detail in NTP 297-3001-304 under Switching Planning Introduction, Switching Planning Areas, and Lines and Numbers.

4.45 It is necessary for each office to determine the required option entries for each class of service for that office. The class of service (eg, 1FR) **must** be the first entry made. All other station options made may be entered in any sequence as long as they are separated by a space.

4.46 Not every STN option is compatible with every other STN option. All options assigned to an STN must be compatible. The STN option compatibility is detailed in NTP 297-3001-304, Figure 12-1.

4.47 As previously discussed, it will be the responsibility of the RCMAC to add, change, and remove DNH group members.

4.48 A description of DNH groups is contained in NTP 297-3001-304. Procedures for altering members are covered in NTP 297-3001-311.

Office Tape Updates

4.49 The DMS-10 is supplied with three system tapes: two working tapes and one backup tape. All tapes are updated on a regular basis to include new or changed office data including recent change service order activity. The tapes are updated by transferring data from system memory onto tape using the overlay program command Equipment Data Dump (**EDD**). Usage is distributed evenly between the two working tapes. The backup tape is kept up-to-date but is not used except in the event of a working tape failure.

4.50 Office data are stored in system memory and on tape. The data are entered onto the office tape following each **EDD** operation.

4.51 The DMO Overlay Programs use two commands to control the storing of data on tape. They are Tape (**TP**) and No Tape (**NOTP**).

(a) The **TP** command transfers data from system memory onto tape immediately following each DMO operation. To enter this mode, the user in-

puts the **TP** command in response to the first prompt following the loading of each Overlay Program. With this mode, it is not necessary to enter the **EDD** command on completion of input.

(b) The **NOTP** command inhibits transfer of office data from system memory onto tape. The data are entered into the system memory only. To enter this mode, the user inputs the **NOTP** command in response to the first prompt following the loading of each Overlay Program. This is the preferred mode where several DMO operations are being performed during one session as time is not taken up by tape operations. If neither **TP** or **NOTP** is specified, the system will default to **NOTP**. Therefore, if the preferred mode is **NOTP**, the command is required. The **NOTP** command is the method to be used by the RCMAC when several service orders are being entered.

4.52 If the **NOTP** command is used, the data must be transferred from the system memory onto the tape when all DMO operations are finished. The data are transferred by using the **EDD** program. The user loads Overlay Program **EDD** into system memory and enters **DUMP <CR>** in response to the first prompt. Specifying **NOTP** for DMO operations and transferring data onto tape following DMO operations minimizes tape activity.

4.53 If for some reason the tapes are not updated, an accurate record must be kept of the time and date of the last tape update and of any DMO activity since the last tape update. The time period between the tape update is the time during which new or changed office data could be lost because of simultaneous failure of the tape and system memory.

4.54 The following example is a terminal session using the TP procedures to transfer each service order input to system memory. This transfer occurs after the carriage return at the end of the OPT entry.

Prompt	User Entry
!	#### <CR>
PASS?	XXXX (Password) <CR>
#	OVLY DN <CR>
REQ	TP <CR>
REQ	(Proceed with input)

4.55 The following example is a terminal session using **EDD** to load the office tape after completion of the service order input when the TP mode has *not* been utilized (system is in NOTP mode).

Prompt	User Entry
REQ	**** <CR>
#	OVLY EDD <CR>
REQ	DUMP <CR>
DONE	**** <CR>
!	LOGO <CR>

5. SAMPLE TERMINAL SESSIONS— NAC (INCLUDING RCMAC)

A. General

5.01 The information contained in this part is derived from NTP 297-3001-304 and NTP 297-3001-311. The following are cautions which must be observed to ensure that input will be accepted and correct.

- (a) The sequence of DMO Operations as shown in NTP 297-3001-304, Table 2-A, must be followed.
- (b) The circuit pack to which a DN is assigned must be of the proper type for the class of service and options required (NTP 297-3001-304, Table 4-B).
- (c) The station options must be compatible with other station options (NTP 297-3001-304, Figure 12-1).
- (d) The station options must be compatible with circuit pack (NTP 297-3001-304, Figure 12-2).
- (e) There are a maximum of 80 characters and spaces that can be entered per line including prompts. Each carriage return (<CR>) brings up the next prompt. As was mentioned previously, **the information which follows a prompt cannot be split between two lines.** (See NTP 297-3001-304, Data Modification Orders.)
- (f) All required options must be entered.

B. Terminal Session Examples

5.02 After the user becomes familiar with the input format, it will probably no longer be necessary to input from the Input Forms or to use the entire prompting sequence. The following are examples of input using "All Prompts" and "Minimum Prompts."

ALL PROMPTS	
Printout	Enter
#	OVLY DN <CR>
REQ	NEW <CR>
TYP	STN <CR>
DN	321 1826 <CR>
BSPU	PE 05 2 13 3 <CR>
OPT	1FR RCO RNG DGT <CR>

MINIMUM PROMPTS	
Printout	Enter
#	OVLY DN <CR>
REQ	NEW STN 321 1826 PE 05 2 13 3 1FR RCO RNG DGT <CR>

5.03 The terminal session examples shown on the following pages are for a particular office and the options shown may not apply to another office. In addition, there may be other options not shown in the examples which will apply to another office.

5.04 The following are examples of typical RCMAC and/or NAC input utilizing All Prompts.

Task #1: To add a 1FR or 1FB line with TOUCH-TONE service in an office with Rate Treatment Package (RTP) O. The Directory Number is 788-2164 and the BSPU is PE 02 6 10 3.

Prompt	Enter
#	OVLY DN <CR>
REQ	NEW <CR>

Prompt	Enter	Printout
TYP	STN <CR>	DN 788 2164
DN	788 2164 <CR>	BSPU PE 02 6 10 3
BSPU	PE 02 6 10 3 <CR>	OPT 1FR RCO RNG NRML 3WC RTP O
OPT	1FR RCO RNG DGT <CR>	

Task #2: To add 3-way calling to the station added in Task #1.

Task #5: To suspend service to the station added in Task #1.

Prompt	Enter	Prompt	Enter
#	OVLY DN <CR>	#	OVLY DN <CR>
REQ	ADO <CR>	REQ	SUS <CR>
TYP	STN <CR>	TYP	STN <CR>
DN	788 2164 <CR>	DN	788 2164 <CR>
OPT	3WC <CR>		

Task #6: To restore service to the station added in Task #1 and suspended in Task #5.

Task #3: To delete TOUCH-TONE service from the station added in Task #1.

Prompt	Enter	Prompt	Enter
#	OVLY DN <CR>	#	OVLY DN <CR>
REQ	DLO <CR>	REQ	RES <CR>
TYP	STN <CR>	TYP	STN <CR>
DN	788 2164 <CR>	DN	788 2164 <CR>
OPT	DGT <CR>		

Task #7: To disconnect the station added in Task #1 without reference of calls. Calls routed to DNIC.

Task #4: To determine the BSPU and options associated with the station added in Task #1 using the Query Command.

Prompt	Enter	Prompt	Enter
#	OVLY DN <CR>	#	OVLY DN <CR>
REQ	QUE <CR>	REQ	DEL <CR>
TYP	STN <CR>	TYP	STN <CR>
DN	788 2164 <CR>	DN	788 2164 <CR>

Task #8: To change the intercept route for the number disconnected in Task #7 from DNIC to DNCH for reference of calls.

Prompt	Enter
#	OVLY DN <CR>
REQ	QUE <CR>
TYP	STN <CR>
DN	788 2164 <CR>

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Prompt	Enter
#	OVLY DN <CR>
REQ	ICP <CR>
TYP	DN <CR>
ON	788 2164 <CR>
ROUT	DNCH <CR>

Task #9: To change Directory Number 788 2020 to 788 2000 and route the old number to DNIC.

Prompt	Enter
#	OVLY DN <CR>
REQ	CHDN <CR>
TYP	STN <CR>
DN	788 2020 <CR>
DNTO	788 2000 <CR>

Task #10: To create a new Directory Number Hunt Group (DNH) with Circular (CIRC) Hunting.

Prompt	Enter
#	OVLY HUNT <CR>
REQ	NEW <CR>
TYP	DNH <CR>
HTGP	005 <CR>
SRCH	CIRC <CR>
OVFL	NORM <CR>

Task #11: To add a station to the DNH Group established in Task #10.

Prompt	Enter
#	OVLY DN <CR>
REQ	NEW <CR>
TYP	STN <CR>

Prompt	Enter
DN	788 1511 <CR>
BSPU	PE 04 5 09 2 <CR>
OPT	1FR RCO RNG DNH 005 FRST <CR>

Task #12: To add a second station to the DNH Group established in Task #10.

Prompt	Enter
#	OVLY DN <CR>
REQ	NEW <CR>
TYP	STN <CR>
DN	788 1509 <CR>
BSPU	PE 06 3 07 4 <CR>
OPT	1FR RCO RNG DNH 005 788 1511 <CR>

Task #13: To query a vacant number using Overlay DN.

Prompt	Enter
#	OVLY DN <CR>
REQ	QUE <CR>
TYP	DN <CR>
DN	378 4103 <CR>

Task #14: To query the control data items for data measurement block, ie, update and print-out options, and schedules.

Prompt	Enter
#	OVLY OMC <CR>
REQ	QUE OMC <CR>
BLK	(Specific block number or ALL) <CR>

Task #15: To query a line location using the ODQ command.

Prompt	Enter
#	OVLY ODQ <CR>
REQ	LIST LINE <CR>
RNGE	UNIT <CR>
LOC	(Enter BSPU, ie, PE 10 5 10 1) <CR>

6. REFERENCES

6.01 The following Bell System Practices will aid the network administrator in accomplishing the required administrative functions. See Section 780-100-027 for a complete list of recommended documents.

SECTION	TITLE
241-120-010	Manual Office Records
241-120-011	Line and Number Administration
241-120-020	Translations
241-120-040	Data Management
241-120-050	Service Analysis
241-120-060	Machine Capacity Management
780-200-014	Determination of Line and Number Requirements
780-200-031	Busy Hour Determination—End Office

6.02 In addition, the following Northern Telecom Practices may be of use to the network administrator.

SECTION	TITLE
297-3001-060	Performance Oriented Practices User's Guide
297-3001-100	General Description
297-3001-105	Features and Services Description
297-3001-150	Equipment Identification
297-3001-181	Line Circuit Interface
297-3001-182	Trunk Circuit Interface
297-3001-200	System Growth Practices
297-3001-300	Input/Output System
297-3001-304	Data Modification—General
297-3001-307	Line Load Control
297-3001-311	Data Modification Manual
297-3001-456	Operational Measurements

DMS-10 DIRECTORY NUMBER HUNT GROUP (DNH)		
FORM DNH	OVLY: HUNT	
ITEM	PROMPT	ENTRY
REQUEST	REQ	1 - 3
TYPE	TYP	D N H 5 7
HUNT GROUP NO	HTGP	10 11
SEARCH TYPE	SRCH	13 - 16
OVERFLOW TYPE	OVFL	18 - 21
DIRECTORY NUMBER (OVFL = DN)	DN	23 - 25 27 - 30
ROUTE (OVFL = ROUT)	ROUT	32 - 35
ITEM	PROMPT	ENTRY
REQUEST	REQ	1 - 3
TYPE	TYP	D N H 5 7
HUNT GROUP NO	HTGP	10 11
SEARCH TYPE	SRCH	13 - 16
OVERFLOW TYPE	OVFL	18 - 21
DIRECTORY NUMBER (OVFL = DN)	DN	23 - 25 27 - 30
ROUTE (OVFL = ROUT)	ROUT	32 - 35

Fig. 1—DMS-10 Directory Number Hunt Group (DNH) Input Form (4.01, 4.28)

DMS-10 STATION		
		OVLY: DN
ITEM	PROMPT	ENTRY
REQUEST	REQ	1 - - 4
TYPE OF OPERATION	TYP	S I N 6 - 8
DIRECTORY NUMBER	DN	10 - 12 14 - - 17
DN CHANGED TO	DNTO	19 - 21 23 - - 26
TERMINAL NUMBER	BSPU	P E 19 20 22 23 25 27 28 30
OPTIONS	OPT	32 - - 35 - - - 40 - - - 45 - - - 50 - - - 55 - - - 60 - - - 65 - - - 70
REQUEST	REQ	1 - - 4
TYPE OF OPERATION	TYP	S I N 6 - 8
DIRECTORY NUMBER	DN	10 - 12 14 - - 17
DN CHANGED TO	DNTO	19 - 21 23 - - 26
TERMINAL NUMBER	BSPU	P E 19 20 22 23 25 27 28 30
OPTIONS	OPT	32 - - 35 - - - 40 - - - 45 - - - 50 - - - 55 - - - 60 - - - 65 - - - 70
REQUEST	REQ	1 - - 4
TYPE OF OPERATION	TYP	S I N 6 - 8
DIRECTORY NUMBER	DN	10 - 12 14 - - 17
DN CHANGED TO	DNTO	19 - 21 23 - - 26
TERMINAL NUMBER	BSPU	P E 19 20 22 23 25 27 28 30
OPTIONS	OPT	32 - - 35 - - - 40 - - - 45 - - - 50 - - - 55 - - - 60 - - - 65 - - - 70

Fig. 2—DMS-10 Station Input Form (4.01, 4.28)

DMS-10 INTERCEPT		
		OVLY: DN
ITEM	PROMPT	ENTRY
REQUEST	REQ	$\frac{I}{1} \frac{C}{2} \frac{P}{3}$
TYPE OF INTERCEPT (THGP/HGP/TGP/DN)	TYP	5 --- 8
THOUSAND GROUP NO (FOR TYPE THGP ONLY)	THGP	9 --- 11 13
HUNDRED GROUP NO (FOR TYPE HGP ONLY)	HGP	15 --- 17 19 20
TENS GROUP NO (FOR TYPE TGP ONLY)	TGP	22 --- 24 26 28
DIRECTORY NUMBER (FOR TYPE DN ONLY)	DN	30 --- 32 34 --- --- 37
ROUTE	ROUT	39 --- 42

Fig. 3—DMS-10 Intercept Input Form (4.01, 4.28)

TABLE A
ORDER TASKS PERFORMED BY THE NAC

ORDER TASK	PROCEDURE NUMBER	
ADD	Coin line service	OP 0022
	A directory number hunt group	OP 0006
	Multiparty line service	OP 0022
	LCDR to a station	OP 0005
	An option to a station	OP 0005
	Custom calling service options to a station	OP 0005
	Single- or two-party line service	OP 0022
	A new station to a directory number hunt group	OP 0024
	An existing station to a directory number hunt group	OP 0008
	Stop line hunting to a directory number hunt group	OP 0027
	Random make busy to a directory number hunt group	OP 0027
	A standby line circuit	OP 0231
	CHANGE	The directory number assigned to a station
Data assigned to a directory number hunt group		OP 0017
OPMS		OP 0237
INTERCEPT	OVLY	OP 0200
	To a single directory number or to a group of directory numbers	OP 0018
	To a suspended station	OP 0019

TABLE A (Contd)
ORDER TASKS PERFORMED BY THE NAC

ORDER TASK	PROCEDURE NUMBER		
LIST OFFICE DATA	Directory numbers	DP 1092	
	Carrier groups	DP 1119	
	Line(s)	DP 1093	
	Analog trunk(s)	DP 1094	
	Digital trunk(s)	DP 1100	
	Trunk group(s)	DP 1095	
	Free memory spaces, data, call, or program	DP 1145	
	Available storage, data, call, or program	DP 1145	
	QUERY	Directory number hunt group(s)	DP 1019
		Station(s)/directory number	DP 1018
A key stop hunt/random make busy		DP 1147	
A CAMA position		DP 1109	
Route(s)		DP 1034	
Analog trunk(s)		DP 1042	
Digital trunk(s)		DP 1013	
Trunk group(s)		DP 1039	
Address translator(s)		DP 1051	
Alarm point assignment(s)		DP 1120	
Signal distribution point assignment(s)		DP 1143	
AMA billing control table(s)		DP 1006	
AMA message rate pulsing		DP 1152	
AMA tariff tables	DP 1153		

TABLE A (Contd)
ORDER TASKS PERFORMED BY THE NAC

ORDER TASK		PROCEDURE NUMBER
REMOVE	Coin line service	OP 0009
	A directory number hunt group	OP 0011
	Multiparty line service	OP 0009
	An option from a station	OP 0010
	Single- or two-party line service	OP 0009
	A station from a directory number hunt group	
	Station remains in service	OP 0012
RESTORE	Station removed from service	OP 0013
	Service to a suspended station	OP 0015
SUSPEND	Service to a station	OP 0014
TRANSFER	Station to a new location	OP 0026

TABLE B
PASSWORD FUNCTIONS

PASSWORD CLASSES	TASKS ALLOWED
All	All tasks
Administrative (assigned to Maintenance only)	Administrative tasks such as setting time and date, and changing passwords
Maintenance	Maintenance tasks
Data Modification	Data modification
Traffic	Traffic measurement and data modification
Debug	Debug tasks (installer programming aid)

TABLE C

I/O SYSTEM INPUT MODE PROMPTS

PROMPT	USE	NORMAL RESPONSE
!	Request log in.	LOGI (proceed with log in).
#	Request system task.	LOGO OVLY LLC MSG CSEL QUE LOGI QUE CLAS QUE CSEL
>	General prompt used in interactive programs	Dependent on program selected.
Others	Special prompts peculiar to overlay programs	Dependent on program selected.

TABLE D

SPECIAL DATA INPUT CHARACTERS

CHARACTER	USE
@	Delete last input character in input buffer. Commencing with Generic 203, a backspace character will also delete the last input character.
<CR>	Indicates carriage return and is used to end a line.
[Delete previous input on the current line.
One or more spaces	Separate words.
####	Aborts the current command and can be entered with the machine operating either in the input or output mode; leaves terminal in input mode.
****	Aborts the user's overlay program and can be entered with the machine operating in either input or output mode; leaves terminal in input mode.