
NETWORK OPERATIONS SYSTEM

**BUSINESS NETWORK
MANAGEMENT**

ISDN LMOS (THROUGH CRAS) INTERFACE

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1. INTRODUCTION

1.01 The station administration (SA) update to remote systems group of feature packages provide an interface between the DNC*-500 and the following systems (see also Fig. 1-1):

- the Network Administration System (NAS*) resident on an IBM mainframe
- the computer system for mainframe operations (COSMOS)
- the Cable Repair Administration System (CRAS) for relaying information to the Loop Maintenance Operating System (LMOS)

NAS Interface

1.02 The NAS interface provides the link between the NAS database and the DNC-500 for the telephone company (Telco) to administer their ISDN packet mode services using the business network management (BNM) man-machine interface. See Appendix 1 to 450-1021-311 for details of the BNM* menus for access to station administration.

COSMOS Interface

1.03 The COSMOS interface uses the host mediation service (HMS*) as its interface system. Details of HMS and how it interfaces with COSMOS can be found in 450-1021-142.

ISDN LMOS (through CRAS) Interface

1.04 The ISDN LMOS (through CRAS) interface collects information on directory number (DN) swaps (also called telephone number (TN) swaps), from BNM, and updates the LMOS computers with this information.

1.05 LMOS computers, used by Telco maintenance personnel to track line equipment number (LEN) to DN associations, are updated with DN swap information using CRAS as an interface.

1.06 The updates to CRAS are made in a predetermined order, once a day, and beginning at a time specified by the Telco.

* DNC, NAS, BNM, and HMS are trademarks of Northern Telecom.

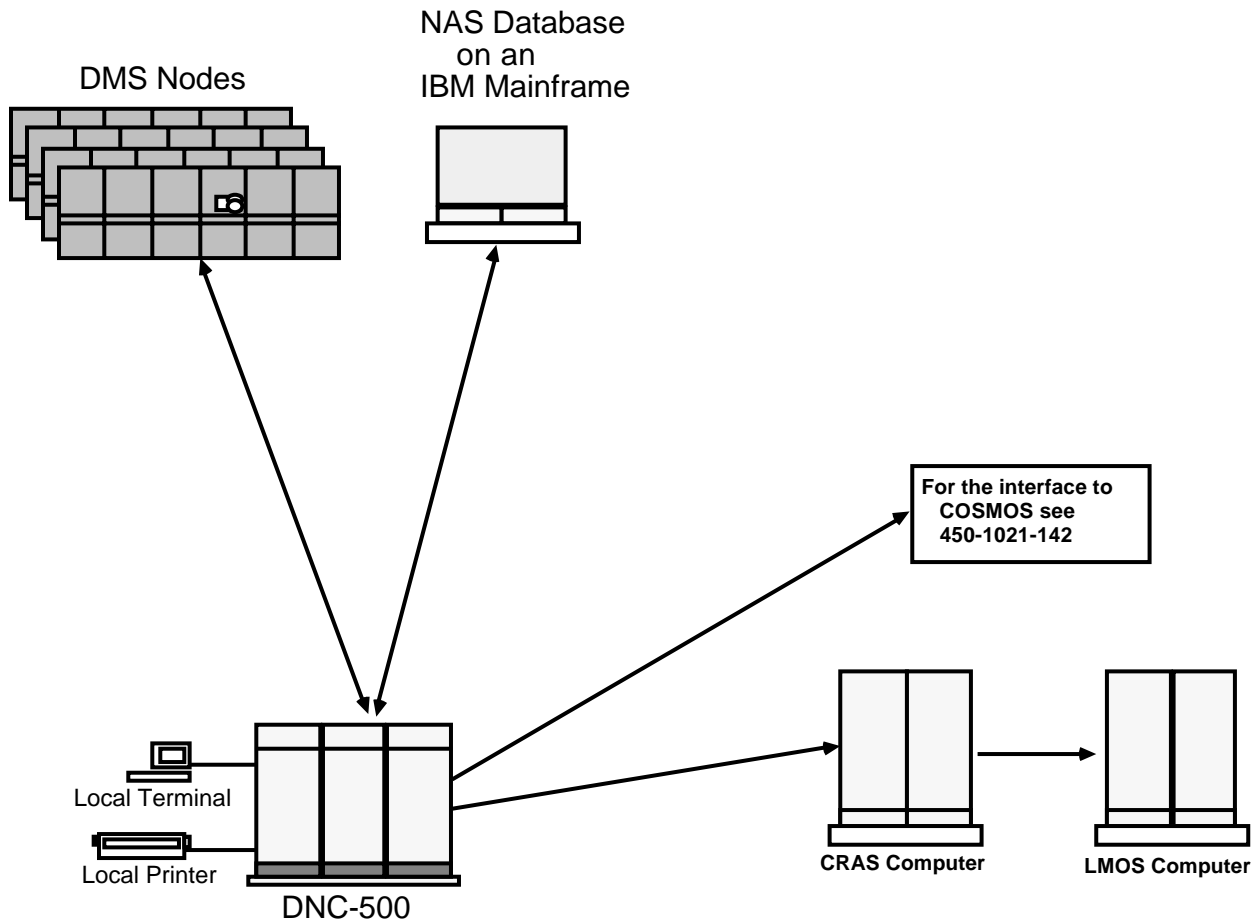


Fig. 1-1
General Layout Of A System Using The ISDN LMOS (through CRAS) Interface

**Structure Of This
Publication**

1.07 This publication contains information that applies to the ISDN LMOS (through CRAS) interface. For information concerning other functions of BNM based on a DNC-500 please refer to the index in 450-1021-001.

1.08 This publication is divided into the following chapters:

- (a) **Introduction.** This chapter presents an overview of the feature package, its applicability, and its change history.
- (b) **Feature Description.** This chapter contains a description of the interface features, and how they interface with the BNM system.
- (c) **CRAS Administration For Telco.** This chapter contains procedures for the Telco to maintain and administer the CRAS interface.
- (d) **Datafill.** This chapter contains a procedure for configuring the link interface unit (LIU) port.
- (e) **Error and Progress Messages.** This chapter lists and describes log messages and alarms associated with this feature package. For the log and alarm messages that are part of other systems, a reference to the appropriate publication is given.

Applicability

1.09 The BNM software associated with the feature package described in this publication, is identified as the NSR28 release.

**CONVENTIONS USED
IN THIS PUBLICATION**

1.10 A uniform system of notation is used throughout this publication to illustrate input from the keyboard, commands, and system responses. Where the conventions are not used, an explanation is given in the text.

- (a) The names of keyboard function keys are printed in plain upper case characters.
- (b) The names of softkeys are printed in plain mixed case characters, bounded by caret marks.
- (c) Data input and commands are printed in bold italic characters.
- (d) Menu options are printed in mixed case characters, followed by the word option.
- (e) System responses are identified by the symbol ==> placed on the left of the response. The part of the response that is displayed, is reproduced in italics.
- (f) System generated variables are represented by alpha-numeric characters bounded by square brackets.
- (g) The term RETURN is used throughout to identify information options from the keyboard (as used on an M4030 terminal). It has the same meaning as ENTER or the return arrow on other terminals.

1.11 In addition, the following conventions are used:

- (a) The a stands for a letter from A to Z.
- (b) The n stands for a digit from 0 through 9.
- (c) The N stands for a digit from 2 through 9 (telephone numbering system).
- (d) The x stands for an alpha-numeric character.
- (e) The X stands for a digit from 0 through 9 (telephone numbering system).

CHANGE HISTORY

1.12 This section provides information on the additions and deletions to this publication. It is arranged by software releases starting with the current release.

NSR28

1.13 This is the initial release of this publication.

2. FEATURE DESCRIPTION

OVERVIEW

2.01 This chapter describes the main features which implement the CRAS interface part of the station administration update to remote systems. The BNM features that are a requirement for these features are described in 450-1021-101 and its appendix.

CRAS INTERFACE

2.02 The CRAS Interface emulates a manual log on sequence and data submission session to transfer information pertinent to directory number (DN) swaps from a DNC-500 to CRAS computers. This information is contained in the BNM station administration recent change (SARC) files.

2.03 The update sequence and parameters necessary for each computer are specified in the BNM update control file. This file is administered by the Telco because certain data in the file must be changed periodically (such as the log on ID and password for different switches), to maintain confidentiality.

2.04 The update sequence is executed once a day, usually outside of the busy periods of the DMS-100 switches, by a software timer in the DNC-500. The update is initiated routinely by the timer, but can be initiated on demand by a Telco administrator. A transaction file is generated whenever an update is being made. This file contains a record of the progress of the update. A Telco administrator can subsequently use this file to determine what corrective actions to use in the event of an update failure. Errors are also sent to the DNC-500 logger and the DVIX (distributed UNIX) console for operator correction. The DNC-500 logger produces log reports on the local printer.

CRAS Update Session Description

2.05 The CRAS system is updated, by the system, using the following procedure:

- (1) Log on to the CRAS system.
- (2) Invoke a process called CSR on the CRAS system.
- (3) Transmit an 80 character ASCII string which contain the two directory numbers that were swapped. This is repeated until all swapped directory numbers have been transmitted.
- (4) Transmit the word "end" to signal end of data.
- (5) Log off.

3. CRAS ADMINISTRATION FOR TELCO

INTRODUCTION

3.01 The CRAS interface is administered by the Telco from an M4000 terminal. A user logged in as a Telco is able to (see also Fig. 3-1):

- show the daily transaction files that have been updated
- perform a manual update to files that were not completed during an automatic update
- make administrative changes to the update control file
- change the time at which CRAS updates are performed each day

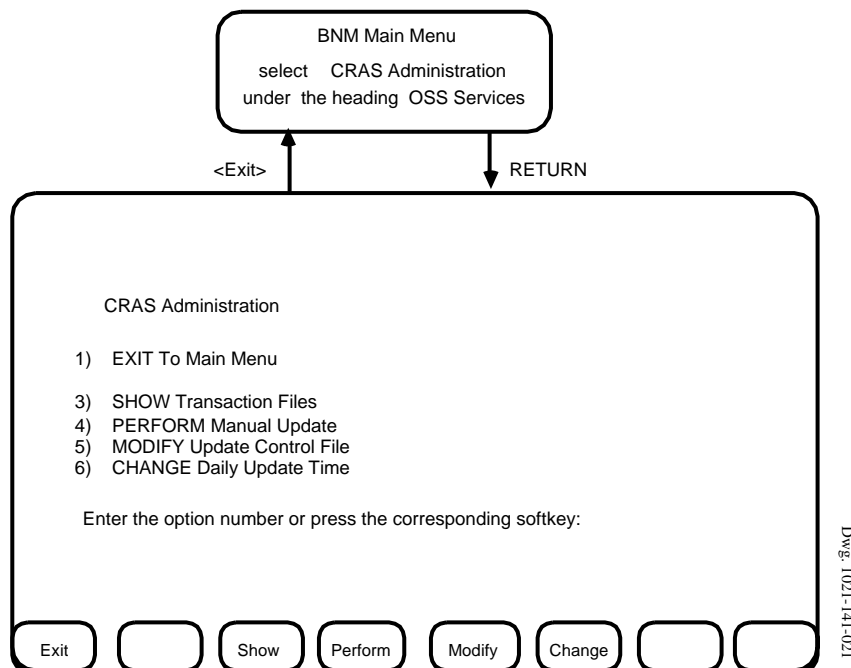


Fig. 3-1
Opening Menu Of The CRAS Administration

Display CRAS Daily Transaction Files

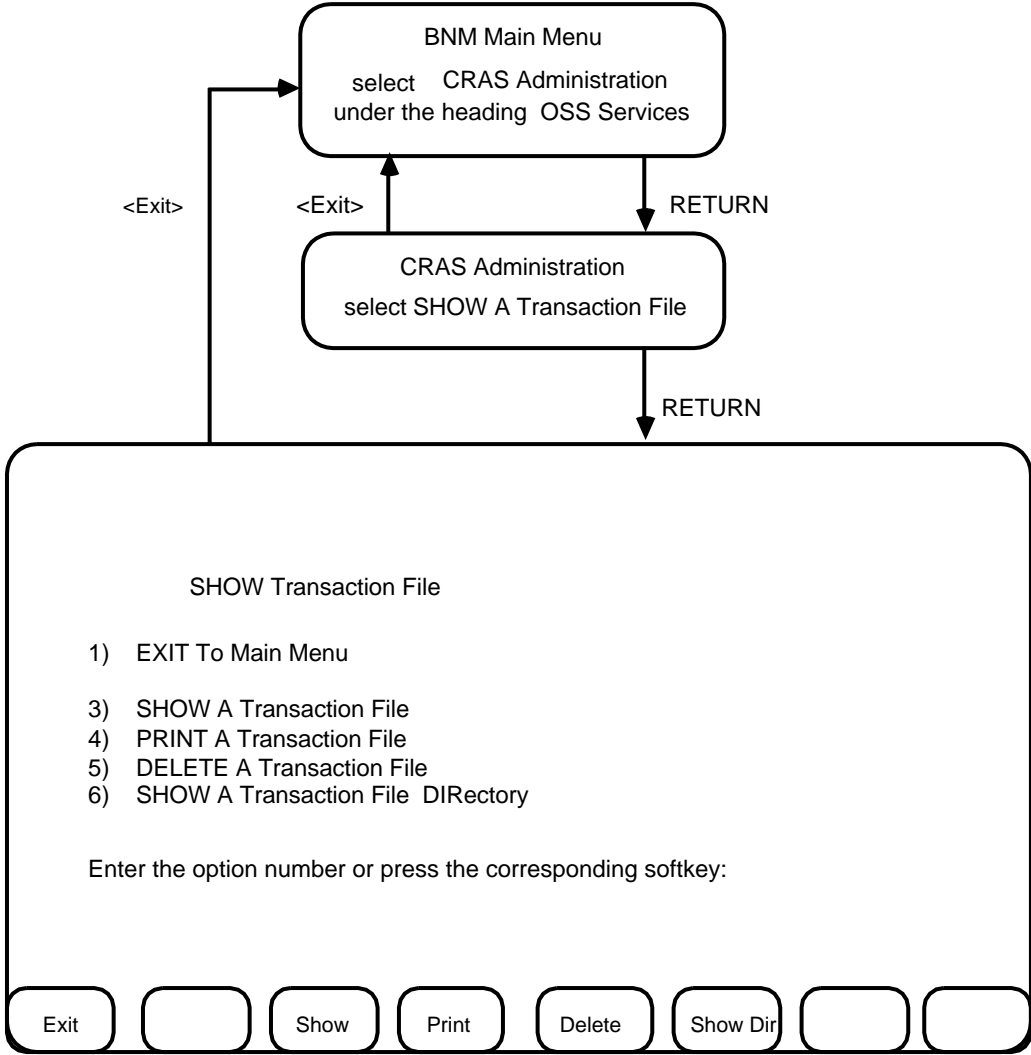
3.02 A list of the CRAS daily transaction files can be displayed to verify the completeness of the latest automatic update. The Show Transaction Files option, when selected, causes a directory (in the form of a list of file names) of the daily transaction files to be displayed. From this list the user can select a file for viewing. The procedure for displaying this file follows:

- (1) Log in to the DNC-500 using a valid telco ID and password.
==> The system responds by presenting the BNM main menu.
- (2) Select the CRAS Administration option under the heading OSS Services.
==> The system responds by displaying the CRAS Administration menu.
- (3) Use <Show>, or enter **3** followed by RETURN, to display the Show Transaction Files Menu (see Fig. 3-2).
- (4) Use <Show File>, or enter **3** followed by RETURN, to display the directory of available transaction files, one page at a time (see Figs. 3-3 and 3-4). Each file is displayed in the format YYMMDDHHMM, where YY is the year, MM is the month, DD is the day, HH is the hour (24 hour clock), and MM is the minute. Fig. 3-3 is the first page of a large directory, there are additional pages because the last line on the display contains only a colon. Use RETURN to display next and subsequent pages of the list.
- (5) When the last page is displayed, EOF is used as the last line of the list. When on the last page (or the only page of a list), press RETURN. Fig. 3-4 is an example of a directory after return has been pressed, and the system has responded.
==> The system responds with
ENTER NAME OF TRANSACTION FILE TO BE SHOWN
(Note: DVIX shell wildcard characters will function)

(format: YYMMDDHHMM)

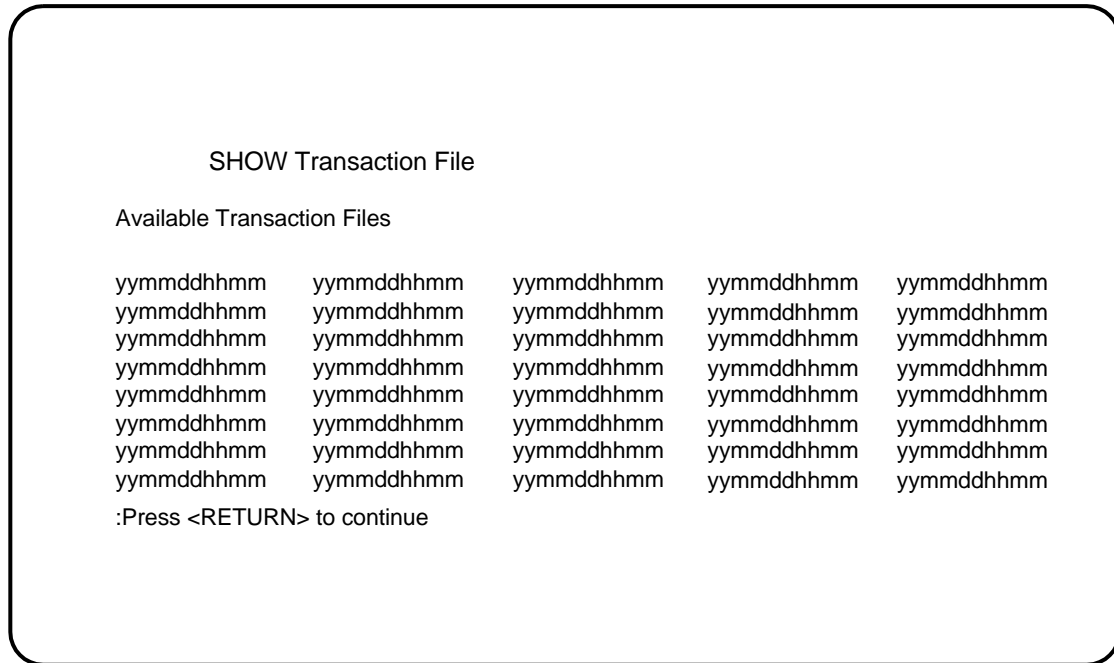
Note: You can cancel this procedure, after the last page has been displayed, by using the quit command ESC RETURN, the system will return to the previous menu for a new selection.

- (6) From the list you have viewed, enter the name of the file that you wish to display for verification.
- (7) The file, in standard ASCII text format, is displayed one page at a time. If the file contains only successful updates no action is required. If the file contains unsuccessful updates, use the Perform Manual Update option to rerun the update process for the days that contain unsuccessful updates. An example file is shown in Fig. 5-1.



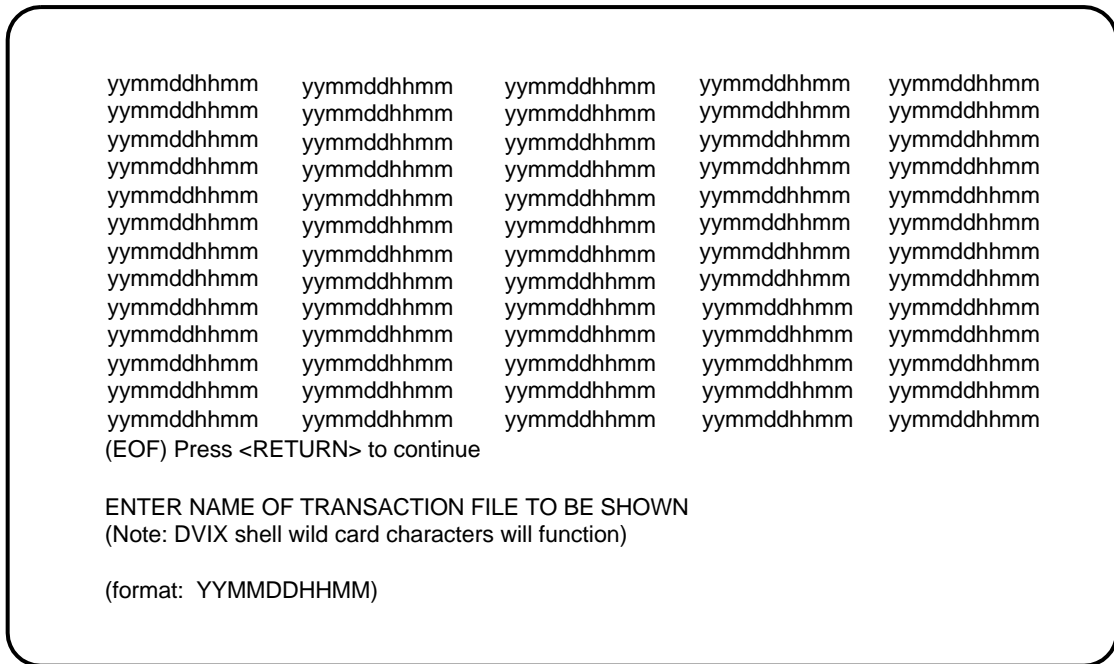
Dwg. 1021-141-022

Fig. 3-2
Show Transaction File Menu



Dwg. 1021-141-023c

Fig. 3-3
First Page Of A Transaction File Directory



Dwg. 1021-141-024c

Fig. 3-4
Last Page Of A Transaction File Directory, After Return Is Pressed

Print A CRAS Transaction File

3.03 The daily transaction files can be printed for use as a tool for verifying the completeness of the latest automatic update. The Print Transaction Files option, when selected, causes a directory (in the form of a list of file names) of the daily transaction files to be displayed. From this directory the user can select a file for printing. The procedure for printing this file follows:

- (1) Log in to the DNC-500 using a valid telco ID and password.
==> The system responds with the BNM main menu.
 - (2) Select the CRAS Administration option under the heading OSS Services.
==> The system responds by displaying the CRAS Administration menu.
 - (3) Use <Show>, or enter **3** followed by RETURN, to display the Show Transaction Files Menu (see Fig. 3-2).
 - (4) Use <Print>, or enter **4** followed by RETURN, to display a list of available transaction files, one page at a time (see Figs. 3-3 and 3-5). Each file is displayed in the format **YYMMDDHHMM**, where YY is the year, MM is the month, DD is the day, HH is the hour (24 hour clock), and MM is the minute. The example shown in Fig. 3-3 is the first page of a large directory, there are additional pages because the last line on the display contains only a colon. Use RETURN to display next and subsequent pages.
 - (5) When the last page is displayed, an EOF is used as the last line of the list. When on the last page (or the only page of a file), press RETURN. Fig. 3-5 is an example of a directory after return has been pressed, and the system has responded.
==> The system responds with:
ENTER NAME OF TRANSACTION FILE TO BE PRINTED
(Note: DVIX shell wildcard characters will function)

(format: YYMMDDHHMM)
- Note:** You can cancel this procedure, after the last page has been displayed, by using the quit command ESC RETURN, the system will return to the previous menu for a new selection.
- (6) From the list viewed, enter the name of the file for printing. The file, in standard ASCII text format, is printed one page at a time. An example file is shown in Fig. 5-1.
 - (7) When the system has sent the file to the printer, it displays the Show Transactions Files menu.

Delete A CRAS Transaction File

3.04 A daily CRAS transaction file can be deleted when the user has no further use for the file. The Delete a Transaction File option, when selected, causes a directory of the daily transaction files (in the form of a list) to be displayed. From this directory the user can select the file for deleting. The procedure for deleting this file follows:

- (1) Log in to the DNC-500 using a valid telco ID and password.
==> The system responds with the BNM main menu.
 - (2) Select the CRAS Administration option under the heading OSS Services.
==> The system responds by displaying the CRAS Administration menu.
 - (3) Use <Show>, or enter **3** followed by RETURN, to display the Show Transaction Files Menu (see Fig. 3-2).
 - (4) Use <Delete>, or enter **5** followed by RETURN, to display a directory of available transaction files, one page at a time (see Figs. 3-3 and 3-6). Each file is displayed in the format YYMMDDHHMM, where YY is the year, MM is the month DD is the day, HH is the hour (24 hour clock), and MM is the minute. Fig. 3-3 is the first page of a large directory, there are additional pages because the last line on the display contains only a colon. Use RETURN to display next and subsequent pages.
 - (5) When the last page is displayed, an EOF is used as the last line of the directory. When on the last page (or the only page of a list), press RETURN. Fig. 3-6 is an example of a directory after return has been pressed, and the system has responded.
==> The system responds with:
ENTER NAME OF TRANSACTION FILE TO BE DELETED
(NOTE: DVIX shell wildcard characters will function)

(format: YYMMDDHHMM)
- Note:** You can cancel this procedure, after the last page has been displayed, by using the quit command ESC RETURN, the system will return to the previous menu for a new selection.
- (6) From the directory, enter the name of the file to be deleted.
==> The system responds with:
ARE YOU SURE?
 - (7) Input *yes* to ask the system to delete the file. After the file has been deleted the system displays the Show Transaction Files menu. If *no* is entered, the procedure is aborted and the system re-displays the Show Transaction Files menu.

**Show The CRAS
Transaction File
Directory**

3.05 The CRAS daily transaction files can be inspected without printing or deleting the files. The Show Transaction File Directory command causes the system to display a listing of all available transaction files. The display of files is similar to those shown in Figs. 3-3 and 3-4 (without the system response).

- (1) Log in to the DNC-500 using a valid telco ID and password.
==> The system responds by displaying the BNM main menu.
- (2) Select the CRAS Administration option under the heading OSS Services.
==> The system responds by displaying the CRAS Administration menu.
- (3) Use <Show>, or enter **3** followed by RETURN, to display the Show Transaction Files Menu (see Fig. 3-2).
- (4) Use <Show Dir>, or enter **6** followed by RETURN, to display a directory of available transaction files, one page at a time (see Figs. 3-3 and 3-4). Each file is displayed in the format YYMMDDHHMM, where YY is the year, MM is the month DD is the day, HH is the hour (24 hour clock), and MM is the minute. Fig. 3-3 is the first page of a large file, there are additional pages because the last line on the display contains only a colon. Use RETURN to display next and subsequent pages.
- (5) When the last page is displayed (see Fig. 3-4), an EOF is used as the last line of the directory. When on the last page (or the only page of a directory), press RETURN to return to Show Transaction Files menu.

Note: One can only page forward in the directory. To view files on a previous page, quit the option and start again.

**Perform A Manual
Update On A CRAS
Transaction File**

3.06 This procedure starts from the BNM log in sequence. If you have logged in as a Telco you can use this procedure from the BNM main menu, or any other OSS Service option that is displayed. This procedure is to update the CRAS computer only.

- (1) Log in to the DNC-500 using a valid Telco ID and password.
==> After validation the system displays the BNM main menu containing the OSS Services applicable to a Telco.
- (2) Select the CRAS Administration option under the heading OSS Services.
==> The system responds by displaying the CRAS Administration menu (see Fig. 3-1).
- (3) Use <Perform>, or enter 4 followed by RETURN.
==> The system responds with:
MANUAL UPDATE
Press ESC RETURN to quit

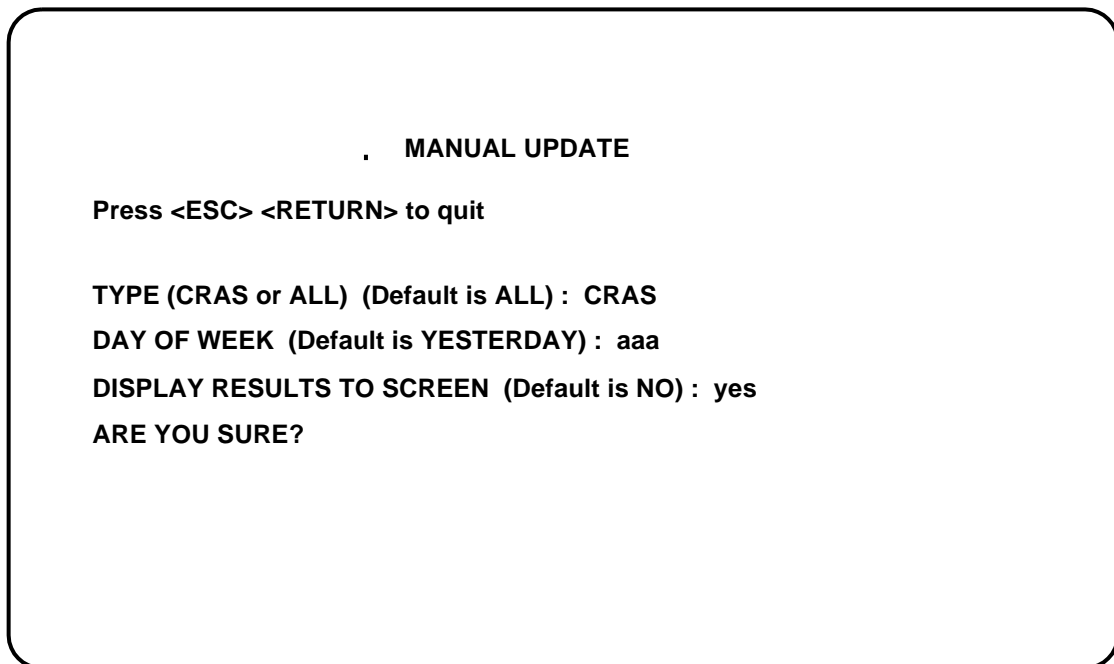
TYPE (CRAS or ALL) (Default is ALL) :

Note: This procedure can be cancelled from tstep 3 by using the quit command ESC RETURN, the system will return to the previous menu for a new selection.

- (4) Input CRAS or ALL. The system is not case concious, therefore it can be entered in upper or lower case.
==> If the system accepts it the choice is echoed adjacent to the colon on the prompt line, and the next parameter prompt is added to the display.
DAY OF WEEK (Default is YESTERDAY) :
- (5) Input the first three characters of the day of the week on which updates will be made.
==> If the system accepts the day, it will be echoed adjacent to the colon on the prompt line, and the next parameter prompt is added to the display.
DISPLAY TRANSACTION FILE TO SCREEN (Default is NO) :
- (6) Input *yes* to display the transaction file , or press RETURN to invoke the default (if you do not want the file displayed).
==> If the system accepts the parameter, it will be echoed adjacent to the colon on the prompt line, and the next parameter is added to the display.
ARE YOU SURE?

At this stage the display is similar to the example shown in Fig. 3-7.

- (7) Input *yes*, to inform the system to commence the update. The system retrieves the update file requested and sends it to the CRAS computer. When the system completes the transmission of the file the display is cleared and the CRAS Administration menu is displayed for you to make another selection.
- If you input *no* (or press RETURN, as no is the default), the system will abort the update and return immediately to the CRAS Administration menu.
- The internal update files are retained for seven days after their creation, after this time they are overwritten or deleted.



. MANUAL UPDATE

Press <ESC> <RETURN> to quit

TYPE (CRAS or ALL) (Default is ALL) : CRAS
DAY OF WEEK (Default is YESTERDAY) : aaa
DISPLAY RESULTS TO SCREEN (Default is NO) : yes
ARE YOU SURE?

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Fig. 3-7
Manual Update Parameter Display

Modify The Update Control File

3.07 The response to a selection of this option is to invoke the DVIX vi editor on the update control file. The telco should modify this file periodically to reflect changes in CRAS system user login IDs, passwords, etc. Note that entering the file using the vi editor enables the user to modify any part of the file. It is important to verify that changes have been made correctly.

- (1) Log in to the DNC-500 using a valid Telco ID and password.
==> After validation the system displays the BNM main menu containing the OSS Services applicable to a Telco.
- (2) Select the CRAS Administration option under the heading OSS Services.
==> The system responds by displaying the CRAS Administration menu (see Fig. 3-1).
- (3) Use <Modify>, or enter 5 followed by RETURN.
==> The system responds by displaying the update control file.

Caution: The update control file is case sensitive. All changes to the file must be case correct.

- (4) Make the changes to the file as required. When you are satisfied that the changes are correct, input **wq** to save and quit from the file. If you do not want to make changes, input **q!** to quit from the file. The system responds to these commands by displaying the CRAS Administration menu.

Note: DVIX commands are in lower case as shown in step 4.

Change The Daily Update Time

3.08 The DVIX "cron" facility controls the time at which daily updates are made. Cron is a daemon (a process running continually) which invokes other processes that have been named in special files located in the DVIX crontab directory. To change the time at which daily updates are to be carried out, use the following procedure:

- (1) Log in to the DNC-500 using a valid Telco ID and password. After validation the system displays the BNM main menu containing the OSS Services applicable to a Telco.
- (2) Select the CRAS Administration option under the heading OSS Services. The system responds by displaying the CRAS Administration menu (see Fig. 3-1).
- (3) Use <Change>, or enter 6 followed by RETURN, to display the prompts for the manual update option (see Fig. 3-8).

Note: This procedure can be cancelled after step 3 by using the quit command ESC RETURN, the system will return to the previous menu for a new selection.

- (4) Input the new start time in hours and minutes. When you press the enter key the system will return you to the CRAS Administration menu indicating that the new start time was accepted or rejected.

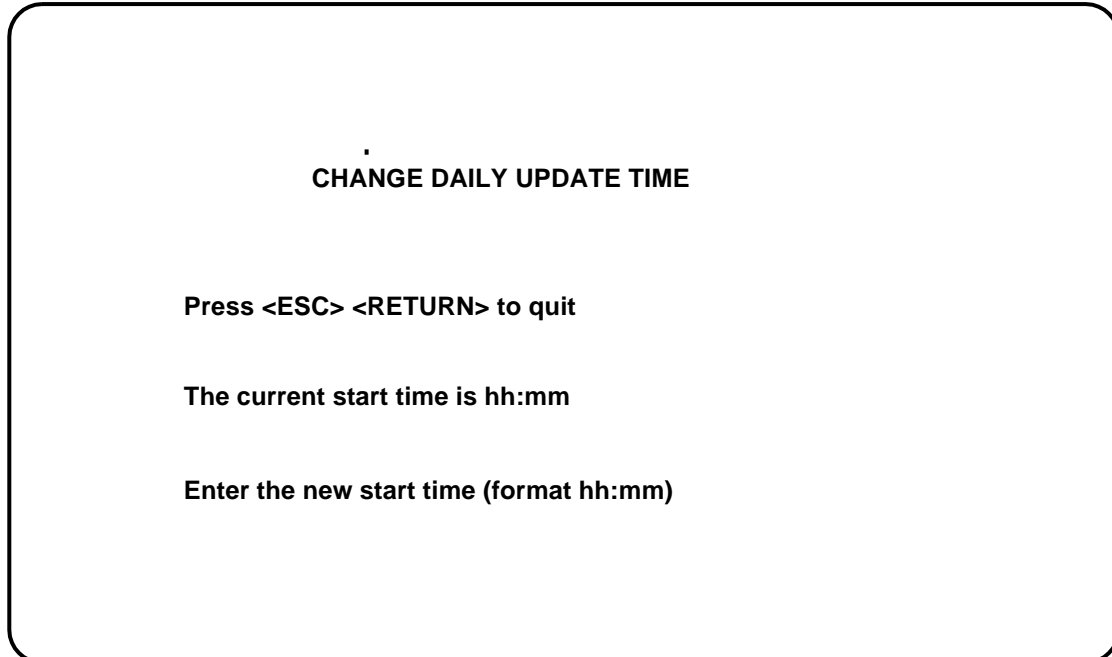


Fig. 3-8
Change Daily Update Time Display

4. DATAFILL

Configuring The LIU Port

4.01 The LIU port used by the LMOS feature must be configured using set parameters, prior to use. The parameters are placed in the batch configuration file in the DNC-500. This chapter defines the parameters and how to verify that the port is configured correctly. The method of configuring the LIU port is contained in 450-1011-301, under the heading, Configuring ASCII Device Services. Please refer to that publication if you wish to configure the LIU port, or to make changes to the parameters.

4.02 The LIU port parameters are contained in the following list, and illustrated as they would appear in the batch configuration file, in Fig. 4-1

NAME	dialout	This is a customer defined name, in this list and Fig. 4-1 dialout has been used.
MODEM	hayes1200	This is an option that requires a modem that operates at 1200 baud. Any other modem that is hayes compatible can be used.
DATA	7	
ECHO	off	
FLOW	xoff	
LINEMODE	full	
PARITY	even	
TRANSMIT	1200	
RECEIVE	1200	
STOP	1	
BUFFER	256	
PACKET	128	

\$D PORTDAT:

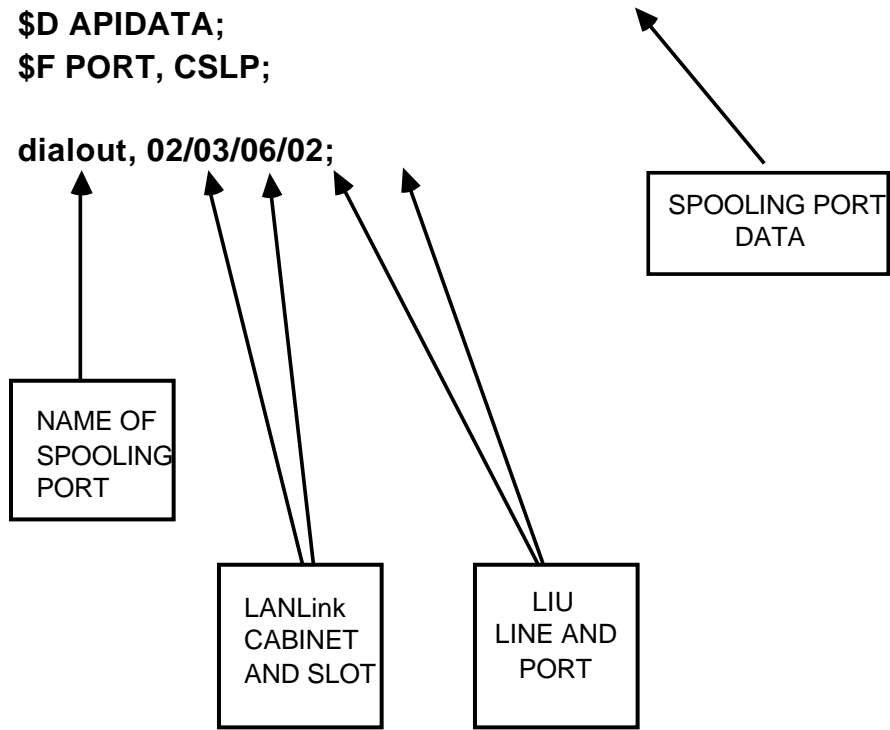
**\$F NAME, MODEM, DATA, ECHO, FLOW, LINEMODE, PARITY, TRANSMIT,
RECEIVE, STOP, BUFFER, PACKET;**

dialout, hayes1200, 7, off, xoff, full, even, 1200, 1200, 1, 256, 128;

\$D APIDATA;

\$F PORT, CSLP;

dialout, 02/03/06/02;



1021-141-27

Fig. 4-1

Example Of A Batch Configuration File For A TTY Port Configured For LMOS

To Verify The LIU Port

4.03 You should verify that the LIU port has been updated, after it has been configured, or if you suspect that the LIU port is not configured correctly. The following procedure allows you to verify that the correct LIU port has been configured:

- (1) From the BNM main menu, select the Administrative Services option.

==> the system responds by displaying the options available under this heading

- (2) Select the SAS Maintenance option.

==> the system responds by displaying the Maintenance Service-Faulty Units screen.

- (3) Use <Cabinet State> to locate the required SRU.

==> the system responds by displaying the Maintenance Service-SRU State Display.

If the required device is not listed, use the <Next Cabinet> or <Previous Cabinet> softkeys to locate the correct screen

- (4) Select one of the LANLink options, and use the <Next Level> softkey to obtain information on the lines that use the LANLink you have selected.

==> the system responds by displaying the Maintenance Service RRU State Display. This display lists the users for this LANLink. You are looking for a device type called LIU - Async Personalities with a name as defined in the batch configuration file. If the device type is not contained in this LANLink, return to step 3, and select another LANLink.

- (5) When the correct screen is displayed, use <Next Level> to locate the required PRU parameters.

==> the system responds by displaying the Maintenance Service-Program Replaceable Unit Details screen.

Verify that the User Configured Label is the name used in the batch configuration file, then locate and record the Device Number. You will use this number later in the verification process.

- (6) Use the <Return>, <Exit Level>, and <Exit Service> softkeys to return to the Administrative Services main menu.
- (7) At the Administrative Services main menu, select the SAS Configuration option.

==> the system responds by displaying the Configuration Service Main Menu.
- (8) Select the Online Update option, to obtain the required operating system.

==> the system responds by displaying the Configuration Services menu.
- (9) Select the Foreign Operating Systems option to access the DVIX setup screens.

==> the system responds by displaying the FOS Configuration Main Menu.
- (10) Use <Select Setup> to obtain the next DVIX setup screen.

==> the system responds by displaying the FOS Available Configurations screen.
- (11) Place the cursor on the DVIX Setup option, and use <Change Setup> to list the PRUs and their ports.

==> the system responds by displaying the FOS Configuration DVIX Setup Other Devices screen.
- (12) Verify that /dev/tty01 (the tty01 port is normally used for LMOS) is associated with the PRU device number identified in step 5. If the information in this screen is incorrect, use <Change Device> to correct the entry.
- (13) Use the <Save and Exit>, <Exit Level>, <Exit Service>, and <Exit Screen> softkeys to return to the BNM main menu. If changes were made in step 12, the FOS Manager PRU must be rebooted to make the changes effective.

5. ERROR AND PROGRESS MESSAGES

CRAS INTERFACE

5.01 The user has two methods of monitoring the progress of an ISDN Mate feature, they are Log Reports and Transaction File messages.

Log Reports

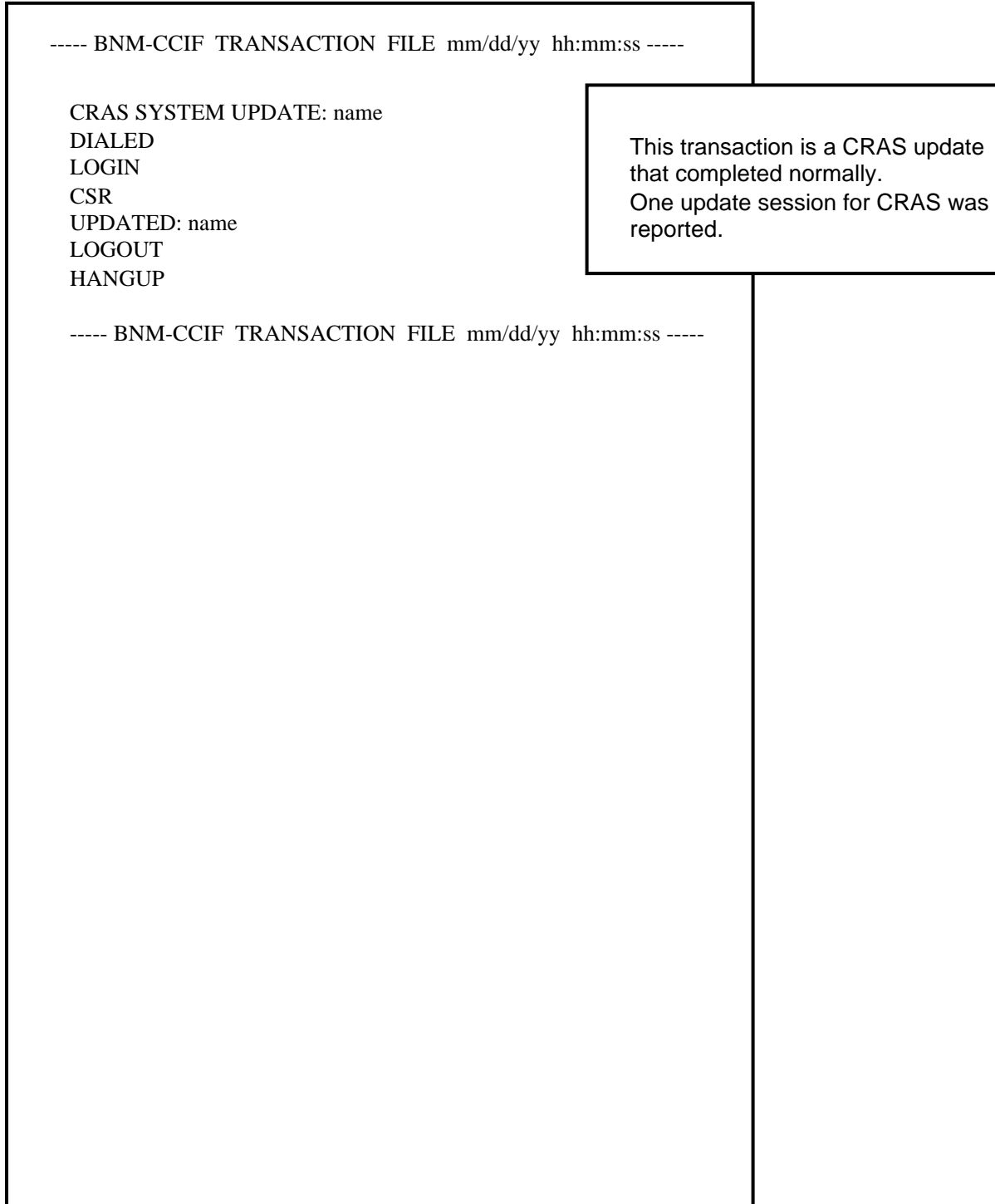
5.02 Log reports are generated for error situations. The reports are sent to the DNC logger and the DVIX console. Details of these log reports can be found in Appendix 1 to 450-1021-511.

Transaction File

5.03 Transition file messages are generated for every CRAS update session. The file contains messages that record the progress of each portion of the update. The order of messages in the file follow the sequence of each update specified in the update control file. The Telco administrator can use the transaction file to match the events listed with those contained in the update control file. Errors or omissions, when discovered, can be manually updated to the CRAS computers.

5.04 An example of a successful transaction file message is shown in Fig. 5-1. The first line of the file is a banner stating the date and time the transaction started. Then follows the updates and finally the end of transaction banner showing the date and time the transaction completed.

5.05 Error messages are listed in Table 5-A.



Dwg. 1021-141-001d

Fig. 5-1
Example Of A Transaction File

Table 5-A
ERROR MESSAGES FOR THE CRAS COMPUTER

Message	System Action	User Action
* Ccif: CRAS [nnn] NO RESPONSE FROM HOST	The CRAS computer failed to respond correctly to a command.	There was a loss of communication between the CRAS interface and the CRAS computer. Reissue the command. There is a minor alarm associated with this message, a log is also generated.
* Ccif: CRAS [nnn] NO RESPONSE TO DIAL-IN	The system failed to get a response from the CRAS computer. It will try once more, and if it fails, the update will be aborted.	Verify that the modem is functional, that the CRAS computer is active, and that the CRAS computer is identified in the update control file. There is a minor alarm associated with this message, a log is also generated.
* Ccif: CRAS [nnn] NO RESPONSE TO LOGIN	The system failed to log in to a CRAS computer. It will try once more, and if it fails, the update will be aborted.	Verify the accuracy of the login name and password in the update control file. There is a minor alarm associated with this message, a log is also generated.
** Ccif: UPDATE CONTROL FILE ERROR	The system was unable to start an update session. The session was aborted due to a file format problem.	Verify the contents of the update control file, and check names of the CRAS computers. There is a major alarm associated with this message. A log is also generated with this message.
** Ccif: UPDATE CONTROL FILE NOT FOUND	The system was unable to start an update session. The session was aborted because there was no update file.	Verify the existence of the update control file. There is a major alarm associated with this message. A log is also generated with this message.

6. ABBREVIATIONS

6.01 The following abbreviations are used in this Practice.

Acronym	Meaning
BCS	Batch change supplements
BNM	Business network management
BNM-CCIF	The ISDN CRAS interface
BNM-CPIF	Is the custom programmed terminal interface to IBT OSS systems
COSMOS	Computer system for mainframe operations
CRAS	Cable Repair Administration System
CRIS	Customer Record Information System
CTX	Centrex
DMS	Digital Multiplex System
DMS node	A member of the DMS-100 family of digital switches. BNM uses only the variant DMS-100.
DN	Directory number
DNC	Dynamic Network Control system
DPO	Data processing office
DVIX	Distributed UNIX
EBCDIC	IBM standard character set
HMS	Host mediation service
IBM	International Business Machines
IBT	Illinois Bell Telephone company
ISDN	Integrated services digital network
LEN	Line equipment number
LMOS	Loop Maintenance Operating System
MDC	Meridian Digital Centrex
MMI	Man-machine interface
NAS	Network Administration System

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NCOS	Network class of service
NSR	Network system release
OSS	Operations Support System
SARC	Station administration recent change
SCCS	Switching Control Center System
TELCO	Telephone company
WQ	Write quit
