

Burroughs Corporation



BUSINESS MACHINES GROUP
SMALL SYSTEMS PLANT

B1700 CANDE

PRODUCT SPECIFICATION

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INTRODUCTION

The B1700 CANDE program provides generalized file preparation and updating capabilities in an interactive, terminal oriented environment. The B1700 CANDE has been designed and implemented to conform in its functional behavior to the existing B6700 CANDE system.

The B1700 CANDE is an MCS that runs in conjunction with the B1700 NDL system. The NDL generated network controller performs all the data communication related functions, while CANDE performs file updating and text editing functions. CANDE can support a maximum of sixteen terminals and is tailored to make optimum use of the model 33 teletype and the TD800 terminals; however, any terminal that has been qualified with NDL is capable of interfacing with CANDE.

A basic usercode/password type of security is available with the system. The user logs-on with a usercode and password and may access any files that are associated with his usercode. A recovery system is also provided.

RELATED DOCUMENTATION

NUMBER	TITLE
P.S. 2212 5223	B1700 Network Definition Language
P.S. 2212 5215	B1700 NDL/Library
P.S. 2212 5412	B1700 Data Comm Audit
1073715	B1700 NDL Reference Manual

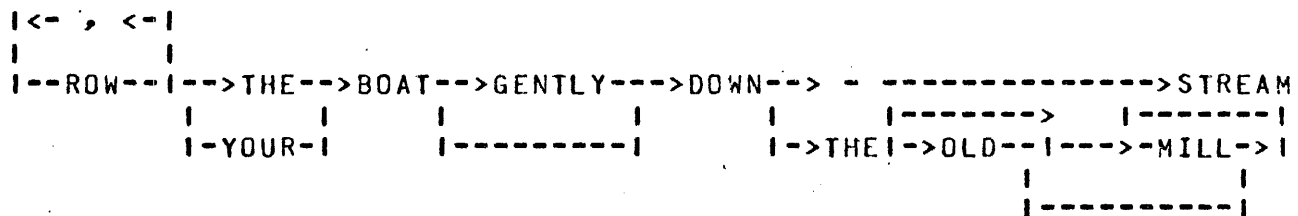
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SYNTAX SPECIFICATIONS

SYNTAX DIAGRAMS

The principle means of displaying CANDE command syntax is the syntax diagram. This method has been chosen because it affords a very concise and lucid exposition of syntax involving defaults, alternatives, and iterations; it is rigorous without being cumbersome. There are few formal rules to remember: The basic rule is that any path traced along the forward directions of the arrows will produce a syntactically valid command. The following examples illustrate the technique:



Valid productions of this diagram are:

```

ROW THE BOAT DOWN-STREAM
ROW, ROW, ROW, YOUR BOAT GENTLY DOWN THE STREAM
ROW, ROW, ROW, ROW THE BOAT GENTLY DOWN THE OLD STREAM
ROW YOUR BOAT DOWN THE MILL STREAM
ROW THE BOAT DOWN THE OLD MILL STREAM

```

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The following convention is used to control the number of iterations:

```
ACROSS THE ----->MISSOURI
      |
      | <----- , <----- 1 -----> |
      |
      | ----->BIG -----> |
      |
      | ----->WIDE -----> |
      |
      | ----->MUDDY -----> |
```

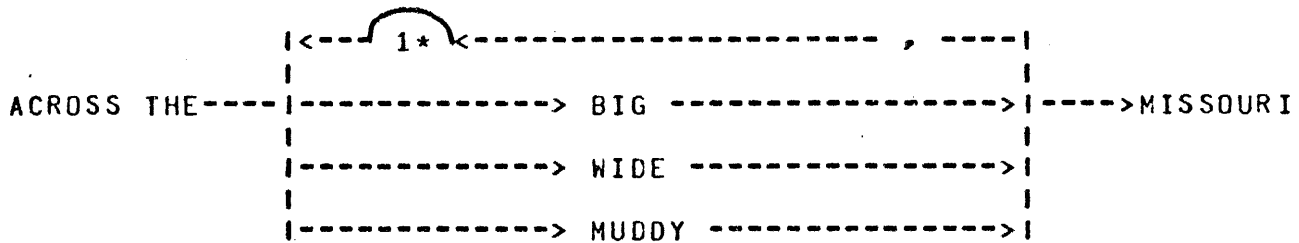
The "bridge" over the "1" can be crossed only one time, so a maximum of one comma may appear. Valid productions are:

ACROSS THE MISSOURI
 ACROSS THE WIDE MISSOURI
 ACROSS THE BIG, MUDDY MISSOURI
 ACROSS THE MUDDY, WIDE MISSOURI
 ACROSS THE BIG, BIG MISSOURI

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An "*" associated with the number under the bridge indicates that the path must be crossed at least one time. If the previous example is changed to the following:



Then proper syntax is obtained by crossing the bridge exactly one time. Valid productions are:

ACROSS THE BIG, WIDE MISSOURI

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SYNTAX CONVENTIONS

CANDE commands are constructed of letters, digits, special characters, and blanks. Letters and digits are alphanumeric characters; all other non-blanks are delimiters. Alphanumeric characters may be separated into such items as integers, keywords and identifiers. All integers, keywords and identifiers must be entered in upper case characters.

Keywords

Upper-case letters in syntax diagrams indicates keywords which appear literally in the command. In many cases it is permissible to abbreviate the keyword by its initial or first few letters. In the syntax presentation, underscores mark the letters which must appear, the rest are optional.

Blanks

Blanks in CANDE commands serve to separate syntactic items and may appear freely except within certain text fields, where they become significant characters. Blanks are optional on either side of a delimiter. Whenever one alphanumeric item (keyword, identifier, integer, etc.) follows another with no separating delimiter, they must be separated by at least one blank.

End of statement

End of statement is indicated by the following notation:

----->|

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SYNTACTIC VARIABLES

Lower-case letters, words, and phrases in the syntax diagrams are syntactic variables, which represent information to be supplied by the user. A particular variable may represent a single character, a simple construct such as an integer or text string, or a relatively complicated construct. Most variables are defined where used. Several variables and types of variables which are frequently encountered are defined here.

Identifier

An identifier is a string of characters used to represent some entity, such as a file, or a usercode. Identifiers in CANDE may vary in length from one to nine characters, and are composed of characters and digits only, with the first characters being a non-integer.

Integer

An integer is specified by a string of digits which represent the decimal value of the integer. Syntactic variables of this type occur frequently in CANDE. Some common examples are <s> (sequence number), <col> (column number), and <base> and <inc> (sequence base and increment).

Delimiters

The delimiters may be any non-alphanumeric character except one that occurs in the field being delimited or one that might have special meaning in the context of its appearance, these instances are detailed with each use of <delim>. (NOTE: "." (PERIOD) is not considered a delimiter).

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Text fields

A text field, denoted by <text> or <newtext>, is a sequence of characters to be sought or placed in a file. In most text fields, all characters are significant and any character may appear except a specific delimiter.

Sequence Range

A <sequence range> specifies an inclusive range of sequence numbers which define a line or lines to be included (or excluded) in a particular operation.

Syntax:

```

----->---<S1> -----> |-----> <S2> ----->
                          |                               |
                          |                               |
                          |-----> END ----->|
                          |                               |
                          |----->
  
```

Semantics:

The integers <S1> and <S2> represent sequence numbers. If both <S1> and <S2> appear, the sequence range includes both those values and all values between; <S2> must exceed <S1>. If <S1> appears alone, it defines a range comprising that single number. The keyword "END", in place of <S2> represents the largest sequence number in the file.

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Column Range

A column range specifies an inclusive range of columns, defining a portion of a line.

Syntax:

```
-----> <col 1> -----> -----> <col 2> ----->
                |----->|
```

Semantics:

The integers <col 1> and <col 2> represent positions on a line. If both appear, <col 2> must exceed <col 1>, and they define the group of columns including both and all between. If <col 1> appears alone, it defines a range comprising that single column.

Logical Station Number

The logical station number <lsn> is a unique integer reference assigned by the DATACOMM system to each station in the DATACOMM network. This value is normally used when CANDE commands pertain to stations.

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OPERATING PROCEDURES

Before a user can make use of the system capabilities, he must first present to the system his usercode and password. If the user is using a hardcopy device such as a teletype, the password may be typed into an area that the teletype has blacked out. For screen devices, a similar degree of password security may be obtained by turning down the screen brightness before entering the password.

CANDE checks the user's identification against the system's file of authorized users. If the usercode/password entered is not correct, the user is informed and asked to re-enter the information. If the usercode/password is correct, CANDE responds with an appropriate message and considers the station to be a valid user. The user cannot use the system until a successful log-in has occurred.

Log-In

The user may log-in to the system in any one of three ways. He may simply enter his usercode and password and thus get logged-on. He may enter HELLO <usercode><password> and be logged-on or he may enter HELLO and the system will lead the user through the log-on sequence.

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The log-on sequence consists of the following steps:

- a. The system sends the following:

ENTER USERCODE PLEASE.

The user should respond by entering his usercode, either by itself or followed by a blank and his password.

- b. If the user enters a usercode but not password, the system then responds with:

ENTER PASSWORD PLEASE.

For hardcopy terminal devices, the system then blocks out ten characters on the text line into which the user should enter his password.

- c. If the system recognizes the usercode and password, it proceeds to Step d. If it does not recognize the usercode and password it displays:

SECURITY ERROR, ENTER USERCODE PLEASE.

and the log-in procedure begins again.

- d. On successful log-ins the system displays to the user the following:

STATION <logical station number>
USER <usercode> LOGGED-IN at <time><date>

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- e. If the user's previous session had been aborted due to system failure or line disconnets, CANDE informs the user about his recovery file by displaying the following message:

"RECOVERY DATA <workfile name> <date>"

Where:

<workfile name> is the name of the recovered file.

<date> is the date of the CANDE session recovered.

Recovery of the indicated workfile is achieved by responding with the RECOVER command.

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ENTERING DATA

Data and commands are entered in the form of messages from the keyboard of the terminal.

SPECIAL CONTROL CHARACTERS

The following special characters are supported by CANDE:

FOR

end-of-message (ETX)
 backspace
 line delete

USE

control-C or carriage return
 left-arrow
 rubout or control-E

Data Identification

If a message begins with one or more decimal digits it is assumed to be a data record and is added to the workfile; otherwise it is treated as a command.

CANDE Commands

The general group of commands to create and save files, to enter data and perform editing functions, are B6700 CANDE compatible commands. These inputs are processed in serial order, and are queued if they cannot be immediately executed.

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Control Commands

Control commands are a separate class of input messages preceded by the control commands character (?). These commands provide capability of controlling and interrogating the user's operating environment as explained in a later chapter. Note, however, that these commands are processed immediately and are not queued behind other commands from the terminal.

RESPONSES

CANDE will respond to every command input by the user. All commands will receive appropriate textual output as a response except for single-line entries, which receive only a "#" as acknowledgement.

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FILES

A file is a collection of records of information. It is the primary means by which the user establishes continuity between one CANDE session and the next or between CANDE and other programs.

Filename

A filename is used to identify a file in the B1700 system. When a file is created through CANDE the user supplies the file.id, an alphanumeric identifier of nine characters or less, and CANDE adds the usercode to form the complete filename; i.e., <usercode>/<file.id>.

The user may access any file under his usercode by simply specifying the <file.id> of the file. The user may access files belonging to another user, in a read only mode. To do this, the user must specify the <usercode>/<file.id> of the file being requested. Also, users may access files on user packs or user cartridges by specifying ON <pack-id> after the <file.id> or <usercode>/<file.id>.

Syntax:

```

-----> file.id ----->|
|           |           |           |
|-----> usercode/ -----|           |-----> ON -- pack.id --|
|----->                                     |----->
|----->                                     |----->

```

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Type

Possible types which may be specified for a workfile are:

BASIC	DATA	MIL	RPG	SEQ
-	-	-	-	-
COBOL	FORTTRAN	NDL	SDL	UPL
-	-	-	-	-

The BASIC, COBOL, FORTRAN, MIL, NDL, SDL, and UPL types denote files for the respective compilers. A type SEQ is arbitrary data file with sequence numbers. A type DATA file is a file without sequence numbers.

SEQUENCE NUMBERS

Files which are edited by CANDE must contain sequence numbers. A sequence number is defined as a positive integer containing a maximum of eight digits which must appear in the input data record. The length of the sequence number must be equal to or less than the sequence field width of that file. A sequence number is used to identify the line for editing and to specify the position of the line in the file. Even if the lines are input out of order, CANDE will arrange the lines in ascending order. Except for BASIC files, the sequence numbers are not considered to be a part of the data in the file. In BASIC the sequence numbers are also statement numbers and may be used in statements such as GO TO. Hence, resequencing BASIC files may cause programs to run differently. COBOL files are limited to six digits and are found in the first six columns, BASIC files are five digits and are located in the first five columns.

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RPG is also five digits and are located in the first five columns, the rest (except type DATA-see DATA files) are eight digits and are found in columns seventy-three through eighty. If the user is in doubt, he should perform "RESEQ" command immediately after the "GET" to insure that the file is properly sequenced. Unsequenced files may be sequenced by CANDE.

ERROR MESSAGES

Error messages output by CANDE will be one or two lines in length and will be self-explanatory. Unrecognized CANDE commands are noted as "NO SUCH VERB" errors.

DATA FILES

Files of type DATA are assumed to be eighty characters in length, with no sequence field. In order to edit files of type DATA, a RESEQ command should be performed immediately after loading the file. RESEQ will create "pseudo sequence numbers" in columns eighty-three through ninety of the file. The file may then be edited in a normal fashion. The SAVE command will remove the "pseudo sequence numbers", restoring the file to its original unsequenced state.

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CANDE MECHANISMS

WORKFILE

CANDE can be directed to read any file the user has access to, but at any given time changes may only be made to one file which is the workfile. The user gets a new workfile by doing a MAKE, or he may recall an existing workfile by doing a GET. Additions and corrections may be performed on the workfile by single-line entries or by using the editing commands.

A CANDE workfile consists of two parts. The "tank" (which is invisible to the user) is where additions and edited lines are placed until an update takes place. The "tank" contains a maximum of 32 entries and if an explicit update has not been issued by the time the "tank" is full, an automatic update is done, and the contents of the tank are merged with the workfile. An update incorporates all additions and corrections of the workfile creating a new copy of the workfile and a clean tank. An update does not make the users workfile a permanent file on disk. A SAVE is required to make the workfile a permanent file and to discard the original file.

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RECOVERY

Recovery of user's workfile occurs when CANDE is executed after an abnormal termination. The recovery procedure involves detection of the presence of the recovery file and communications of this fact to the user.

After log-in each user that was on the system when it aborted has the option of recovering his workfile. The user enters "RECOVER" if he wishes to get his previous workfile. If the user does not wish to recover, he merely starts another session. When a system goes down, it is possible to lose up to four records in the user's tank file.

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COMMANDS

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COMMANDS

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BREAK

The BREAK command terminates the current output to the terminal.

Syntax:

```
?BRK----->|  
-----<break key>
```

Semantics:

All output queued for the terminal is "flushed" when the BREAK command is processed.

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BYE

The BYE command terminates the user's current session.

Syntax:

BYE ----->|

Semantics:

A CANDE session is terminated by the BYE command; switched lines may be disconnected. If the workfile has not been saved or removed, the user is notified of this condition. The workfile may then be removed or saved, and the BYE command re-entered.

Example:

BYE

USER <USERCODE> LOGGED-OFF AT <TIME & DATE> (TIME = <HH:MM:SS:T>)

NOTE: Time given is CANDE processor time. (See Appendix)

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Example:

C
-

Compile the workfile using the default compiler type and associate the object file with the workfile.

COMPILE A/B AS D WITH SDL

Compile the source file A/B as object file <usercode>/D with the SDL compiler.

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DS
--

The DS command DSes the users current running user program that was executed from CANDE.

The DS capability implemented is limited in that it applies only to jobs fired-up by the EXECUTE or RUN from CANDE and opening a remote file to the terminal requesting the EXECUTE or RUN. If these are met, then CANDE obtains the mix number of that user program and the job may be DSed by entering "?DS" from the terminal.

Syntax:

?DS----->

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DCSTATUS

The DCSTATUS command provides general information regarding the status of the user's station.

Syntax:

DCSTATUS ----->
--

Semantics:

DCSTATUS will return to the user a lengthy run down of the user's station. The following is returned to the user:

1. LSN
2. NAME
3. TERMINAL TYPE
4. BUFFER SIZE
5. MAX RETRY
6. INPUT PRIORITY
7. OUTPUT PRIORITY
8. MESSAGE COUNT

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DELETE

The DELETE command discards records from the workfile.

Syntax:

```
DELETE-----> sequence range ----->
---          |                               |
              |----- ALL -----|
```

Semantics:

Those lines specified in the sequence range list are deleted from the workfile. If "ALL" is specified, the entire contents of the workfile is deleted, but the name and other attributes are preserved.

Examples:

DEL ALL

Delete the entire contents of the workfile.

DELETE 100-500

Delete lines 100 through 500 from the workfile.

DEL 200 END

Delete lines 200 through the end of the workfile.

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EDIT

The EDIT command displays a selected line from the workfile, allowing the user to edit the line. When Transmitting back to CANDE, the line will be returned to the workfile overlaying the original line. Operation will continue with display of the next selected line until the selection parameters have been satisfied.

Syntax:

```

EDIT -----> -----
-- |                                     |                                     |
  |-----> seq range ----->|         |-----> delim text delim -----> --
----->----->----->----->----->----->----->----->----->|
----->----->----->----->----->----->----->----->----->|
|
|<----->----->----->----->----->----->----->----->----->|
|-----> a <column range>----->----->----->----->----->----->|
|-----> 1----->----->----->----->----->----->----->----->|
|-----> 1----->----->----->----->----->----->----->----->|
|-----> 1----->----->----->----->----->----->----->----->|
|-----> LITERAL----->----->----->----->----->----->----->|
|----->----->----->----->----->----->----->----->----->|

```

Semantics:

The next line is selected from the workfile within a sequence range (if given) or the entire file. The line is scanned for the delimited text if necessary using the column range, if given, as the start and stop points for the scan. If no column range is given then the entire line is scanned. If the text is found in the line then the line is displayed on the terminal and the count, if any, is decremented.

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When the user transmits the line back to CANDE, the sequence field is checked to be sure it is the same displayed. If only the sequence number was transmitted then the original workfile is not overlaid. This allows the user to pass thru his workfile without overlaying each line unnecessarily.

Termination occurs either when the selection parameters have been satisfied or a "?BRK" command is returned.

Selection Parameters:

- SEQUENCE RANGE ---- Only lines with sequence numbers falling in this range (including ends) will be examined.
- DELIMITED TEXT ---- The line is scanned for this text. If a column range is given, it must be large enough to contain the given text. A certain degree of optimization can be obtained by specifying a column range that is exactly the size of the text.
- 2COLUMN RANGE ---- Text match is looked for only within this range. If only one column is given, this is taken as the starting point for the scan, the stopping point defaulting to the end of the record.
- COUNT ----- This value specifies the number of lines with at least one occurrence of the text to be selected.
- LITERAL ----- Causes the scan to be performed in literal mode rather than default token mode.

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Examples:

EDIT 30-70 /ABC/

Display those lines between sequence 30 and 70 inclusive which contain the string "ABC".

EDIT /ABCD.XYZ/ 10

Display up to 10 lines from the entire workfile (beginning at the first line) which contain the string "ABCD.XYZ".

EDIT /XYZ23/ @53-57

Display all lines which contain "XYZ23" in columns 53 through 57. Notice that this command will execute quicker than the first since the exact location for the scan has been given.

EDIT /XYZ/ LITERAL

Display all lines containing "XYZ". Use the "LITERAL" scan method. Note that this form of edit will find a match against the string "XYZA" where the token form will not.

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EXECUTE/RUN

The EXECUTE and RUN commands cause execution of an object program; the RUN command will provide for compilation of the source file prior to execution if the object file is not available.

Syntax:

```

RUN----->
-  | |      | |<-----|
  | |-----> filename -----| |-> ; -> modifier --|
  | |      | |
EXECUTE -----|-> $ ---->|
-

```

Semantics:

The workfile is assumed if no filename is provided. A "\$" is specified only with EXECUTE, and refers to an object file not created by CANDE.

A <filename> in EXECUTE may refer to any file to which the user is permitted access, but a <filename> in RUN must refer only to the user's current workfile.

Modifier specifications may be provided.

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Examples:

EX

Execute the object program associated with the workfile.

RUN ; FI LINE = REMOTE;

Execute or compile-and-go on the workfile name and label equate the output to the user's remote terminal.

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FILES

The FILES command provides a method for determining if a file is on disk.

Syntax:

```

FILE----- filename ----->
  |           | | |
  |----> OBJECT ---->| |-> $ -|
      -----

```

Semantics:

The FILES command will search disk for the specified filename and report whether or not the file is on disk. If the file is present, that fact is reported along with some general information about the file. The OBJECT parameter allows the user to search for object files created through the CANDE COMPILE or RUN commands. (i.e., the file.id of the specified filename is changed to <file.id> CAT "O"). System object files or object files not created through CANDE may be found by using the normal filename syntax and omitting the OBJECT parameter. The "\$" allows for inquiries on files not created by CANDE.

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The following is returned to the users terminal when the specified file is found on disk:

FILE	<filename>	PRESENT	
USERS	= <integer>		(0-n)
TYPE	= <file.type>		(CODE, DATA,.....etc.)
SIZE	= <integer>		(EOF pointer of file)
CREATED :	<date>		(month/day/year)
ACCESSED:	<date>		(month/day/year)

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FIND ----

The FIND command searches a file for appearances of specific text. Output indicating the result of the search may be directed to the terminal. The output of a FIND is prompt driven, that is the command will fill a screen to its page size and then the user must transmit a character to get the next page of output.

Syntax:

```
FIND -----> delim -----> text -----> delim ----->
```

```
-----|<-----|
| 1 count |
| 1 LITERAL|
|-----|
  ----
```

```
----->|
```

```
|<-----|
| 1 filename ----->|
| 1 sequence range ----->|
| 1 a column range ----->|
| 1 :TEXT ----->|
|-----|
  ----
```

Semantics:

Only one target may be sought with a FIND. The delimiters surrounding the target may be any delimiter. The text may contain any characters except the delimiter. The text field may not be empty. The text field is treated as a token string unless LITERAL is specified.

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The search is successful whenever the string of characters in the text field is found in a line of the file.

If the integer <count> appears, the search for the associated text will be terminated after it has been found in the specified number of times in the file.

If a <filename> is not specified then by default the workfile is searched. Specification of <filename> causes searching of the specified file, which may be any file the user is allowed to read. A <type> may be specified to give the location of sequence numbers in relationship to the text; if no <type> is specified, a type of SEQ is assumed, if the user does not have a workfile, otherwise the file type will default to that of the workfile. If a sequence range is specified only records falling in that range are searched. A column range, if provided, indicates that only the specified part of each record is to be examined. The option :TEXT if specified will output the entire line containing the string to the user's terminal, otherwise only the sequence numbers of those records containing the string are output. The defaults for sequence range and column range are the entire file and the entire record respectively.

Examples:

FIND / FILEID / 100-900

Search the workfile for the occurrence of "FILEID" within the lines 100 through 900 and output any lines found with the text to the terminal.

FIND 10 / STUFF /

Find the first ten occurrences of "STUFF" within the workfile and output the sequence number of the records containing the string to the terminal.

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FIX

The FIX command alters the contents of a line in the workfile, by inserting new text or replacing part of the line. The alteration may be controlled by specifying target text, column numbers, or a combination.

Syntax:

```
FIX -> s ----->delim-> text-> delim-> newtext->
      |                   |                   |
      |-- col 1 -> - col 2 -|             |-----|
      |                   |                   |
      |-----|
```

Semantics:

The integer <s> is the sequence number of the line to be modified. If there is no such line in the file, the command is disregarded.

The semantics vary for several forms of this command, depending upon the presence of column numbers and text:

1. TEXT, NO COLUMNS:

The specified line is scanned from left to right for a literal appearance of the character string specified as text. When located, the target <text> is replaced by the character string specified as <newtext>. If the target is not found, the FIX is disregarded. Only one replacement is made on the line.

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2. TEXT, ONE COLUMN:

The specified line is scanned as in 1., beginning at col 1.

3. TEXT, TWO COLUMNS:

The specified line is scanned as in 1., within the range col 1 through col 2.

4. NO TEXT, NO COLUMNS:

The newtext is inserted at the beginning of the line.

5. NO TEXT, ONE COLUMN:

The newtext is inserted at the beginning of col 1.

6. NO TEXT, TWO COLUMNS:

The characters in columns "col 1" through "col 2" are replaced by the newtext.

The <delim> which brackets the target text may be any special character. The text may contain any characters except the delimiter. All characters, including blanks, are significant in the text; the text field is empty only if the two delimiters are in adjacent columns. The newtext field begins after the second delimiter and runs to the end of the record. Blanks are significant; newtext is empty if the end of the record immediately follows the second delimiter.

If the size of <newtext> is greater than the size of the string being replaced then the data in the record to the right of the string being replaced is shifted right to make room for <newtext>. This may cause overflow. If the size of <newtext> is less than the string being replaced then the data to the right of the string is shifted left.

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There is considerable function overlap between the FIX and REPLACE commands. FIX is specialized for single replacements on single lines and has a very concise syntax. REPLACE is more general, with file-searching and output capability; its various options require a more elaborate syntax.

If a column number outside the text field is specified, or if col 1 exceeds col 2, the FIX command is rejected.

Examples:

FIX 398 1-39 /AB/ABB

Locate the target text "AB" within columns 1 through 39 of line 398, and replace it with the newtext "ABB".

FIX 500 /END;/END ELSE

For line 500, locate the text "END"; and replace it with "END ELSE".

FIX 10 40 // % ADJUST LINKAGE

Insert newtext, % ADJUST LINKAGE, beginning in column 40 of line 10.

FIX 2 1-5 // <end of statement>

Delete the first five columns of line 2, shifting the image to the left.

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GET

The GET command recalls an existing file as the workfile. If the unSAVED workfile already exists, the GET command is in error.

Syntax:

```
GET -----> filename ----->
- |   |   |   |   |   |   |   |   |   |   |   |   |
  |-> * -|   |-----> type ----->| |--> : NOCHECK ---->|
                                --
```

Semantics:

The <filename> may specify any file to which the user has access. The <usercode>/<file.id> option gives the user the ability to get a file that someone else created. The GET gives the user a copy of the file so that he will not alter the original file. The <type> specifies the file type of the file being loaded and will dictate where the sequence numbers are placed in relationship to the text. If <type> is omitted then the file is loaded as a SEQ file. If the file is one that was created by CANDE, the file will be properly sequenced, but if the file was not created by CANDE, the user is responsible for sequence errors. If "*" is specified, only a file with that filename is sought and no usercode is appended.

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If a user loads source files to system disk, and those files have only a single file-name, that user may now edit those files using CANDE. The user enters at his terminal GET *<MULTI-FILE-ID><FILE-TYPE> and CANDE will load the file for editing. When the file saved, it will be saved under that user's usercode as <USERCODE>/<NAME HE DID THE GET ON>.

Sequence checking is automatic unless the :NO CHECK option is specified.

Examples:

GET AFILE

Get an existing file named AFILE as the workfile. The type will be SEQ.

GET AFILE FORTRAN

Get an existing file named AFILE as the workfile. The type is FORTRAN.

GET HIS/NEW UPL

Get a copy of a file named NEW that belongs to usercode HIS and load it as a UPL file.

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HELLO

The HELLO command initiates a new user session without explicitly terminating the current session.

Syntax:

```
HELLO ----->
--      |                                     |
      |-----> usercode -----|-----> password -----|
```

Semantics:

The current user's session is terminated by implicitly performing the BYE command and then invoking the normal log-in process to initiate the new user's session. As with the BYE command, this command is in error if the current user's workfile has not been saved or removed. If the station is not currently logged-in, then only the normal log-in procedure is invoked.

Usercode and password may be included to complete the log-in procedure or this information will be requested in the normal log-in manner.

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Examples:

INSERT AT 3000+100

Insert the entire workfile into the workfile starting at 3000, in increments of 100.

INSERT AFILE 100-600 AT 4000

Insert the lines 100 through 600 from file AFILE into the workfile, starting at 4000 and incrementing using the default of 100.

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LIST

The LIST command displays the contents of the workfile or some other file to the user at his terminal. Options are available for selecting specific lines and columns.

Syntax:

```
LIST ----->|
- |<-----|
  | 1 |-----> filename ----->| |
  | 1 |-----> sequence range |-- type -->|
  | 1 |-----> a column range ----->|
  | 1 |-----> :PAGED ----->|
  |-----|
```

Semantics:

By default, the contents of the workfile are listed; if a <filename> is specified, it is listed if the user has access privileges. A <type> may be specified so that sequence numbers can be located in relationship to the text; if no <type> is given, a type SEQ is assumed, if the user does not have a workfile, otherwise the file type is that of the workfile.

A sequence range and a column range may be specified; otherwise, the whole file and the entire line are listed.

Lines output to a terminal have the sequence number on the left end of the record.

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The option :PAGED will give the user one page, or screen of output starting at the second line of the screen. The user may then enter NEXT to get the next page or SAME to list the same page. The user may enter any valid workfile oriented command between pages.

LIST :PAGED applies only for workfiles, that is a file the user has done GET or MAKE on, and will not be invoked for a LIST of an external file.

Example:

LIST :PAGED	NEXT	SAME
-----	----	----
100A	400D	400D
200B	500E	500E
300C	600F	600F

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MAKE

The MAKE command creates a new workfile. If an unSAVED workfile already exists, the MAKE command is in error.

Syntax:

```
MAKE -----> file.id ----->
-                                     |-----> type -----|
```

Semantics:

The <file.id> must define a new file within the user's library; it becomes the name associated with the workfile. A type SEQ file is assumed by default. The <usercode>/<file.id> option may not be used with the MAKE command.

Examples:

MAKE AFILE

Make a new workfile with the name AFILE and a default type SEQ.

M AFILE U

Make a new workfile with the name AFILE and a type of UPL.

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MARGIN/a

The MARGIN command controls the entry of text at the left margin of a line by inserting a specified number of blanks ahead of the data being entered. A margin specification may be in absolute column numbers or relative to the previous margin; it may be effective for all subsequent lines entered at the terminal, or for a single line. The "a" form must be used in automatic sequence mode.

Syntax:

```
MARGIN ----->
---      | |      |      | |
"a" -----| |-----> + --|-----> col ----->| |-----> : ----> entry ----->|
```

Semantics:

If an unsigned integer <col> appears, the margin is set to that column, relative to column one at the beginning of the line. The value of <col> must fall within the text field of the line, (e.g., should not exceed 72 for UPL files).

If a signed integer <col> appears, the margin is moved left (-) or right (+) by the number of columns specified; the resulting value must fall within the text field of the line.

If no <col> appears, the margin is set to its default position at the first column of the text field.

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If the colon and <entry> are not entered, the new margin specification applies to all subsequent entries from the terminal, until a new margin specification is entered or a GET, MAKE is performed. If a colon appears, the new margin specification applies only to the single-line entry which follows.

In automatic sequence mode, the "a" must be entered as the first character (after the system-supplied sequence number). If the colon and <entry> are not entered, the margin specification for subsequent entries is changed, and the sequence number is repeated for the next line. If a colon appears, the subsequent single-line entry is made at the sequence number provided; the user enters only the text, as in any other entry in automatic sequence mode. Line overflow may occur as a result of indentation. The user is notified at his terminal, and the resulting line is truncated.

Examples:

MAR 20: 4700 A:=B;

Enter a line with A:=B beginning at column 20 with sequence number 4700.

MARGIN+5

Change the indentation position to the current starting position plus 5 columns and retain this indentation for all following input.

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MERGE/RMERGE

The MERGE and RMERGE commands cause a specified file, or portions thereof, to be merged with the workfile, with the result becoming the new workfile. The two commands differ in precedence considerations when a record in the merge file has the same sequence number as a record in the workfile: MERGE keeps the workfile record and discards the other; RMERGE does the reverse.

Syntax:

```
MERGE-----> filename -----> sequence range ----->|
---      |                               |
RMERGE----|                               |-----|
--
```

Semantics:

The <filename> specifies any data file the user is allowed to read. If a sequence range appears, only the selected records are merged and the rest of the file is ignored. The sequence numbers of records in the merge file remain unchanged as they enter the workfile.

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Examples:

MERGE SYMBOL

Merge the workfile with the complete file SYMBOL, keeping the workfile copy of records with identical (i.e. duplicate) sequence numbers.

RM PATCHES 400-END

Merge the lines 400 to the end of file PATCHES with the workfile, discarding the workfile copy of duplicate sequence numbers.

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MOVE

The MOVE command moves lines from one point to another within the workfile, and changes their sequence numbers.

Syntax:

```
MOVE -----> sequence range -----> TO -----> base -----> |
--                                     --                                     |
                                         | - +inc - |
```

Semantics:

The lines in the sequence range are deleted after being entered in the workfile as a continuous block.

New sequence numbers are determined by assigning an initial value <base> to the first line and incrementing that value for each succeeding line.

The increment <inc> for successive sequence numbers in the block may be specified as an explicit integer. If none appears, a default value of 100 is used.

The range of new sequence numbers may not overlap any lines already in the file, nor may the number exceed the largest sequence number which may be expressed in the sequence number field. The destination may not overlap any existing records in the workfile.

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Examples:

MOVE 100-600 to 900+5

Remove lines numbered 100 through 600 and reinsert them at 900, 905.
910 ...

MOVE 1000 to 6000.

Remove line 1000 and insert it at 6000.

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PAGE

The PAGE command displays full screens of information at the terminal for editing, and accepts full screens of input from the terminal. Operations will continue until the command parameters have been satisfied or the user enters any command on the top line of the terminal.

Syntax:

```
PAGE ----->|
-----|
      |-----> SEQ RANGE ----->|
      |-----> "AUTO" ----->|
      |               |-----> base ----->|
      |               |               |-----> + inc ----->|
```

Semantics:

PAGE operates in two modes, a "LIST" mode and an "AUTO SEQUENCE MODE". Default operation is the "LIST" mode in which the users workfile is displayed screen by screen for editing. The user is free to modify any or all of the screen, and can enter new lines at any sequence number. (Note: Sequence number must be the same length as those displayed). The "AUTO SEQUENCE" mode causes CANDE to generate a screen full of sequence numbers at the specified base and increment (default base and increment is 100 and 100 respectively). If a record exists in the workfile at any sequence number generated, then that record is displayed on the terminal and may be edited.

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It should be noted that the screen input from a terminal is checked against what was previously output to the terminal, and only those records which were modified are added to the users workfile. In the "AUTO SEQUENCE" mode, an additional check is made on the sequence number fields and changes cause CANDE to output an advisory message concerning the change, since these records can possibly overwrite existing records. It is permissible to transmit partial screens, in which case CANDE will roll up the remaining records and fill out the rest of the screen with new information.

The PAGE command is terminated by satisfying the sequence range parameter in the "LIST" mode or exceeding the maximum allowable sequence number for a given file type in the "AUTO SEQUENCE" mode, or by transmitting any command from the top of the terminal.

Example:

PAGE

Causes entire workfile to be listed for editing.

PAGE 100-5000

Causes existing records in workfile in the sequence range of 100 through 5000 to be listed for editing.

PAGE AUTO

Causes the generation of sequence numbers beginning at 100 and incremented by 100 to be displayed for editing (any record which exists in a workfile at a generated sequence number will be displayed for editing).

PAGE AUTO 10+10

Same as above, except the sequence numbers generated begin at 10 and are incremented by 10.

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PASSWORD

The PASSWORD command allows the user to change his password.

Syntax:

PASSWORD--> current password --> new password --> new password-->|

Semantics:

To change passwords, a user must enter his current password, the new password, and for verification purposes, repeat the new password.

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RECOVER

The RECOVER command recalls a recovery file as the workfile. After an abnormal terminates of CANDE, those users that were logged-on the system will have the option of recovering the workfile on at that time.

Syntax:

RECOVER----->

Semantics:

By entering RECOVER after logging-on, the user can recover his workfile.

Example:

REC

Recover my previous workfile.

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REMOVE

The REMOVE command may be used to remove the workfile or any file with the user's usercode.

Syntax:

```
REMOVE ----->|
--- |           | | -> $ -| | |           | |
|           | |           |-----> file.id ----->|
|-----> OBJECT ----->|
```

Semantics:

The semantics vary with the form of the command.

1. REMOVE

The workfile is removed. No further editing can be performed until a GET or MAKE is performed.

2. REMOVE <file.id>

The user's source file <usercode>/<file.id> is removed.

3. REMOVE OBJECT

The user's object file <usercode>/<workfile name> CAT "0" is removed.

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4. REMOVE OBJECT <file.id>

The user's object file <usercode>/<file.id> CAT "0" is removed.

5. REMOVE OBJECT \$ <file.id>

The user's object file <usercode>/<file.id> is removed.

Examples:

REM

Remove the workfile.

REMOVE AFILE ON <pack.id>

Removes <usercode>/AFILE from pack <pack.id>.

REMOVE OBJECT AFILE

Removes <usercode>/AFILE if the file is of type "CODE".

REMOVE OBJECT \$AFILE

Removes <usercode>/AFILE if the file is of type "CODE".

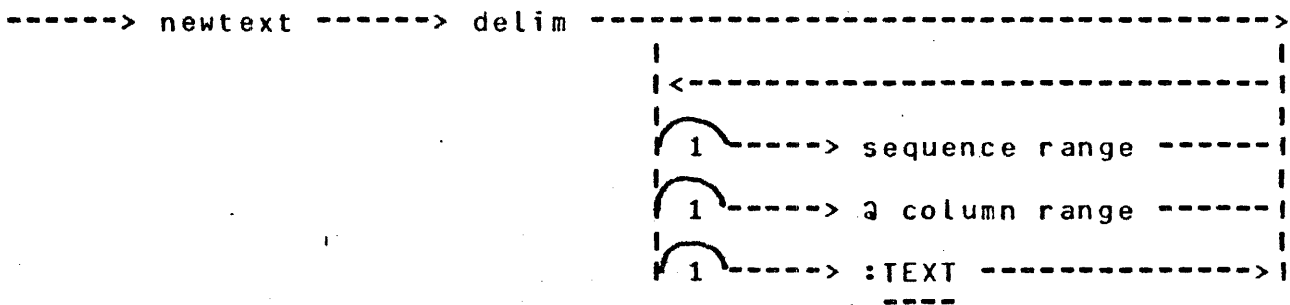
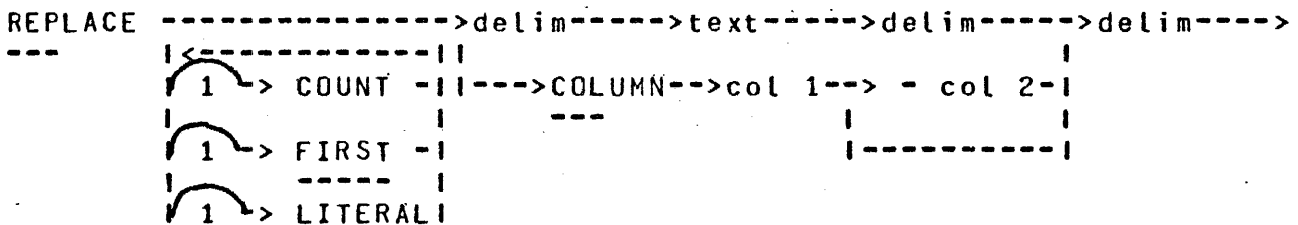
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REPLACE

The REPLACE command scans line-by-line through the workfile or selected portions, replacing certain target text with new text. REPLACE is also a prompt driven command, output comes to the terminal after transmission of any character from the home position.

Syntax:



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Semantics:

Only one replacement may be specified in one REPLACE; the replacement is defined by a target and a substitution. The target specification may contain a text field or column numbers; the substitution specification always contains a newtext field, which can be blanks. The <text> and <newtext> fields are bracketed by delimiters. The <text> or <newtext> may contain any characters except the delimiter.

TARGET SPECIFICATIONS:

The form <COLUMN col 1> causes the <newtext> to be inserted at the column specified. The form <COLUMN col 1 - col 2> means that the characters in columns col 1 through col 2 are to be replaced by <newtext>. If <text> must be present, and it specifies a target to be sought.

For purposes of the search, all strings are considered to be token strings. Each line of the file is considered as an arbitrary string of tokens, excluding blanks. The search is successful whenever the string of characters in the text fields found in a line of the file. Literal strings must be searched for in LITERAL mode.

If the keyword FIRST appears, only the first appearance of the text on any line is sought and replaced. If an integer <count> appears, the replacement will be terminated after the program has replaced <text> with <newtext> the specified <count> of times.

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The replacement may be restricted at a sequence range of the file or also to a column range of the record. The defaults are the entire record length and the entire file.

If the option <:TEXT> is specified, the entire record is output to the user's terminal. If <:TEXT> is not specified, only the sequence numbers of records affected by REPLACE are output to the terminal.

SUBSTITUTION SPECIFICATIONS:

Whenever a target is found, the <newtext> (which may be blanks) is substituted. Adjustment for different length <text> and <newtext> is made by shifting the right-hand end of the line (or column range) to the left or right, deleting or adding terminal blanks. A line overflow error is detected whenever the adjustment would shift non-blank characters off the end of the line (or column range).

Examples:

REP / AB / / ABB /

Search the entire workfile for the string "AB" and replace it with "ABB".

REPLACE COL 1-5 / / 130-180

Replace the contents of columns 1 through 5 in lines 130 through 180 with empty newtext.

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RESEQ

The RESEQ command assigns new sequence numbers to lines in the workfile, without changing the order of appearance of any lines.

Syntax:

```

RESEQ ----->|
--      |      |      |      |      |      |      |      |
      |----> S - -> S ---->| |-----> base ----| |-----> + inc ---->|
          1 |      2   |
          |-> END --|
  
```

Semantics:

An initial value is assigned as the sequence number of the first line to be re-numbered; the value is incremented for each subsequent line.

If a range of sequence numbers is provided, only the specified part of the workfile is re-numbered; by default, the entire workfile is re-numbered.

An initial value must be specified as the integer <base>. The increment <inc> for successive new sequence numbers may be specified; if none appears, the default value of 100 is assumed.

RESEQ will not change the order of appearance of the lines. S1 must be less than or equal to <base> and the <base> plus the number of lines times the <inc> must not exceed S2 + <inc>.

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Examples:

RESEQ 200

The entire workfile is re-numbered starting with the initial value of 200 and proceeding in increments of 100.

RESEQ 100-700 100+10

Reseq lines 100 through 700 starting at 100 and incrementing by 10.

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SS
 --

The SS command provides the ability to sent a message to another station or to the system SPO.

Syntax:

```
?SS -----> lsn -----> text ----->
--- |
   |-----> SPO ----->|
   |-----> <usercode> ----->|
   |-----> ALL ----->|
```

Semantics:

The receiving station may be referenced by <lsn> or by the <usercode> of a user if he is logged-on the system. The <text> may consist of any character string up to the maximum of the sending or receiving terminal's line size.

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SAVE

The SAVE command causes the current workfile to be saved.

Syntax:

```
SAVE -----|
--  |         | |         | |         |
   |--> AS --> file.id --| |--> DN <pack.id>--| |-->:patch --|
   --          --          --
```

Semantics:

If no <file.id> is specified, the workfile is SAVED under its workfile name. The workfile may be SAVED under a different name by using the "AS <file.id>" option.

The :PATCH option allows the user to create a "patch" file consisting of only those records of a source file which were changed during an editing session. Deleted records are saved in a patch file as "\$VOID" records.

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Example:

SAVE

The workfile is saved.

SAVE AS AFILE

The workfile is saved under the name AFILE.

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SEQ

The SEQ command invokes automatic sequence mode, causing the system to provide the sequence number for each new line. With the exception of @ (MARGIN), and ? (control character), no commands are recognized in automatic sequence mode.

Syntax:

```

SEQ----->
-  |-----> base -----| |-----> +inc -----|
  |-----> NEXT -----|
  -
  
```

Semantics:

An initial value is assigned as the sequence number of the next line to be entered; the value is incremented for each subsequent line. Initial values are specified by an integer <base> and <inc> or by defaulting to values 100 for the <base> and 100 for the <inc>. If NEXT is specified, the sequence numbers pick-up from where the last sequence number for that user was terminated.

Sequence mode is terminated by entering end-of-text immediately following the sequence number or by transmitting only the sequence number back. CANDE then displays a message at the terminal that automatic sequence mode is terminated.

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Normal CANDE commands are not recognized in sequence mode, since they are indistinguishable from text entries. The @ form of the MARGIN command is recognized if it is the first character in the input line. A line may begin with @ if it is entered twice as @@.

If the line begins with the control character (?), the input is processed as a control command.

Although the sequence number is generated by CANDE, the line is treated as a single-line entry: if the new sequence number matches one in the workfile, the older line is replaced.

Example:

S 10+10

Enter automatic sequence mode using an initial and increment value of 10.

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SINGLE-LINE ENTRY

Any line beginning with a digit is a "command" to enter a new line of text at the sequence number specified, or to replace or delete the line already at the sequence number.

Syntax:

```
-----> S ----->|
          |
          |-----newtext-----|
```

Semantics:

The line consists of an integer sequence number, <S>, followed immediately by an optional newtext field supplying the contents of the new line. The sequence number begins in the first column of the input line, and runs until a non-digit character is encountered, or until the maximum number of digits for a sequence number have been entered; newtext field begins in the column immediately following. If there is already a line of text at the specified sequence number, that line is replaced by the newtext or blanks.

Examples:

100 THIS IS A NEW LINE

215 AND SO IS THIS

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SPATCH

The SPATCH command allows the user to insert up to ten characters of patch identification information into columns 81-90 of the workfile records for all file types except "DATA".

Syntax:

```
SPATCH ---> delim ---> text ---> delim ----->|
                                     |
                                     |---> sequence range --->|
```

Semantics:

A delimited text string of up to 10 characters is required with the SPATCH command, and the sequence range is optional. If the sequence range is omitted, then the delimited string is saved as a permanent patch.id string and is applied to future entries to the workfile. If the sequence range is included, then the patch-is string is treated as temporary and is immediately inserted into the workfile records specified by the sequence range. This latter form of the SPATCH command does not change any previous permanent setting of the patch.id.

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TEACH

The TEACH command provides the user with the capability of requesting an explanation of CANDE commands.

Syntax:

```
TEACH ----->|
--      |
      |-----> <COMMAND> ----->|
```

Semantics:

Entering TEACH without any specific command mentioned, will cause the system to return a complete list of valid CANDE commands and their valid abbreviations in form:

<abbreviation> (<remaining letters>)

e.g.: UPDATE will appear as: UP(DATE)

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Entering TEACH <command> will cause the system to return three or more lines of text giving a full description of the semantics and syntax of the requested command. e.g.: TEACH UPDATE

COMMAND: UPDATE

SEMANTICS: CAUSES IMMEDIATE UPDATE ON THE WORKFILE

SYNTAX: UP(ATE) ----->|

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TITLE

The TITLE command changes the name of the workfile or a file on disk.

Syntax:

```
TITLE -----> filename 2 ----->|
--- |
    |-----> filename 1 -----|
        |         |
        |-----|
        |- TO -|
```

Semantics:

If <filename> is not specified, the name of the workfile is changed for any subsequent SAVE command.

The name of the file <filename 1> is changed to <filename 2>, which must be a new file name within the user's library.

Example:

TI ZAP

Change the name of the workfile to ZAP.

TITLE A TO B

Change the file named A to B.

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UPDATE

The UPDATE command forces immediate update action on the workfile. It is not necessary that the user explicitly invoke this command; it is invoked automatically whenever the tank file is filled.

Syntax:

UPDATE ----->

Semantics:

UPDATE forces all the changes/additions in the tank to be incorporated with the workfile. If the tank is empty, the UPDATE has no effect.

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WHAT

The WHAT command indicates the state of the workfile.

Syntax:

```
WHAT ----->|  
----
```

Semantics:

The amount of information provided varies depending on the current state of the workfile; as much of the information as is available is indicated. Output may include:

- a. TITLE
- b. TYPE
- c. MARGIN setting
- d. SAVED or unSAVED status
- e. BEGIN SEQ NO: of file
- f. ENDING SEQ NO: of file
- g. TIME = CANDE processor time

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Example:

WHAT

TITLE: <filename>
TYPE: <file type>
MARGIN SET AT <integer>
WORKFILE IS SAVED/UNSAVED
BEGIN SEQ NO: <integer>
ENDING SEQ NO: <integer>
TIME = <HH:MM:SS.T>

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WHERE

The WHERE command provides the <lsn> of a user.

Syntax:

```
?WHERE -----> usercode ----->|
---          |           |
              |-----> ALL -----|
```

Semantics:

If the specified usercode is currently logged-in then his <lsn> is provided; otherwise the user is so notified. The ALL option gives all users currently logged-on to CANDE.

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ZIP

The ZIP command provides for input to the MCP of certain MCP control strings through CANDE. All MCP control strings must start with a 2-letter command selected from the following:

- AD, AF, AN, AT, CA, CG, DS, DU, FI, FR, IN, LO, ME,
- MO, MS, OV, RN, SW, TC, TH, UC, UF, UN, UV, VI

Strings starting with any other text will be rejected by CANDE.

If accepted by CANDE, the string will be ZIP-ped to the MCP. The MCP will report back to CANDE whether the string had any errors and CANDE will indicate that result to the user.

The same mechanism is used to validate and handle control strings appended to COMPILE, EXECUTE and RUN commands.

Syntax:



Example:

?ZIP LO FROM MYTAPE AFILE BFILE XYZ; MO X SWO = 1;

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OPERATORS INSTRUCTIONS

This section is intended to provide the host system operator for CANDE with facts to help execute and maintain the CANDE system.

Those topics discussed will be the execution of CANDE, the network controller used and options available to the operator for maintenance of the CANDE system.

The operator should have available for his use copies of :

BURROUGHS B1700 MESSAGE CONTROL SYSTEM INFORMATION MANUAL
BURROUGHS B1700 NETWORK DEFINITION LANGUAGE INFORMATION MANUAL
BURROUGHS B1700 SOFTWARE OPERATIONAL GUIDE
BURROUGHS B1700 CANDE INFORMATION MANUAL

EXECUTION OF CANDE

To use the CANDE system, the operator executes CANDE. CANDE will in turn execute the network controller if it is not currently executing. Both CANDE and the network controller should execute at a higher priority than other programs in the mix to insure adequate response times to the user.

After CANDE is executed, it searches for a usercode/password table, and if not found, the operator is requested to load a file to system disk labeled CANDE/RECOVERY containing the usercode/password table or to submit a card deck for creation of the table. If a card deck is submitted, the deck should consist of a maximum of 38 cards containing one usercode/password pair per card. The first ten columns of each card contain the usercode, and the next ten will hold the associated password.

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After this phase of initialization, CANDE will determine if recovery is appropriate, and if so will build individual user recovery files for the previous CANDE session.

Finally, CANDE will execute the network controller if it is present on system disk, is not currently executing, and CANDE program switch 0 is not = 1. If the network controller cannot be found, the operator will be notified via the SPO. Any desired network controller can then be executed. Note that by setting CANDE's program switch 0 to 1, a file named "CANDE/HANDLER" can exist on system disk and CANDE will not attempt to ZIP-execute it.

FILENAMES

Files created or loaded by CANDE appear to the user to have but one nine character filename. To the CANDE program though, the files are named by the convention of usercode/filename, by doing this a small amount of file security is imposed on the system, and the hazard of two users creating files of the same name is eliminated. Users may have read-only access to another user's files if he knows that user's usercode. If one user wishes to GET, MERGE, RMERGE, FIND, LIST or INSERT from another user's file, the syntax of the command where filename is specified, he may have usercode/filename, where usercode is the other user's usercode.

SPO Options

CANDE has the capability for communication from the terminal to the system SPO, and from system SPO to the terminal. Messages coming from the terminal will appear as:

USER = < lsn >: < textual message >

The operator can talk to the terminal by entering:

<mix # of CANDE> AX or (usercode)<lsn of terminal to><message>

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By the communication of terminal and system SPO, the user may request that the operator load files from mag tape, user cartridge, or user pack to the system for access by CANDE. This requires that the operator be aware of what usercodes are running on the system, because files must be loaded under the user's usercode.

The system operator has certain commands that can be entered to CANDE. These commands are "WHO", "STOP", "ALL" and "MAKE". The "WHO" command will print a list of usercodes and associated logical station numbers that are currently logged-on the system. The command "STOP" will bring CANDE to a logical conclusion. This command will only be executed if there are no users logged-on the system. The "ALL" command allows the operator to broadcast a message to all terminals. The command "MAKE" is provided to allow the operator to make a station "READY" or "NOT READY".

Syntax:

MAKE <LSN> READY <INTEGER>

Where <INTEGER> is "0" or "1". "0" makes the station not ready, "1" makes it ready. A station that is not ready will not be serviced by the network controller. See Appendix for further information.

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CANDE/HANDLER

BASIC:

The interactive BASIC implemented for B1700 CANDE is like that seen on the B6700 CANDE. The user creates his file, then he says COMPILE, RUN, or EXECUTE, and CANDE handles all file equations for the task. To make use of interactive BASIC, a naming convention must be followed in the NDL handler that is generated, the filename for the station must be "F" CAT <station name> and this name must not exceed four characters on COMPILEs, RUNs, and EXECUTEs of BASIC files.

SCROLLING:

On TD820's only, users may now have the use of scrolling. Scrolling is enabled by entering a "?+S" and disabled by "?-S". In SCROLL mode, all entries are still made on the top line, but the entries are rolled to the bottom of the screen and the responses come back from the bottom-up. "?+S" or "?-S" entered on TD800's will respond with "NOT A SCROLLING DEVICE". To differentiate correctly the type of terminal, the following convention must be observed in the network controller running with CANDE:

IN THE TERMINAL SECTION:

TYPE = 14 (for teletypes)
 42 (for TD800's)
 44 (for TD820's)

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Sequence Number Zero

In both auto sequence and single-line entry mode, a sequence number zero is now accepted, and will be the first record of that file. When a user gets a file with a record at sequence zero, a warning is issued that there is a sequence error at sequence number zero and the file is loaded.

Also implemented in CANDE requests and control is an output message control procedure which prevents output messages destined for a station that is in local or otherwise unable to accept the message from being re-tried forever. After two tries, the output message is suspended until any one of the following occurs:

1. 30 seconds elapse with no transmissions from the station.

ACTION: MESSAGE IS TRIED AGAIN AS ABOVE.

2. User transmits something.

ACTION: SUSPENDED OUTPUT MESSAGE(S) RETRIED
ALSO: INPUT IS SENT TO CANDE.

3. User transmits "?".

ACTION: SUSPENDED OUTPUT RE-TRIED AND "?"
NOT SENT TO CANDE.

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This procedure prevents denied output messages from taking over the processor. The network controller executed with CANDE should be compiled using "NDL/LIBRARY" requests and controls selected from the following:

REQUESTS -----	CONTROLS -----	TERMINAL TYPE -----
CANDEPOLTD	POLSELCTL	TD800
CANDESELTD -----	AUTOPOLCTL -----	TD820
CANDEFSLTD		
CANDEIOTTY -----	CONVERCTL -----	TELETYPE

Requests and controls to user in the NDL/LIBRARY as of 2-10-76.

CANDEPOLTD
 CANDEFSLTD
 CANDESELTD
 CANDETDCNTL

INPUT REQUEST
 OUTPUT REQUEST (fast select)
 OUTPUT REQUEST (select)
 LINE CONTROL

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These requests include a number of functions specifically tailored to the output produced by CANDE in order to provide a more readable output at the terminal and to ensure recovery under terminal failure situations. See Appendix for further information.

Other requests may be used with CANDE, however, results may be undesirable.

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TERMINATION OF CANDE

After CANDE has terminated whether from a logical conclusion or a system failure, the operator may dump to tape all files associated with the CANDE system. A card deck which executes SYSTEM/LOAD.DUMP may be used. An example of such a seck follows:

DUMP TO <tape.id>		
CANDE/=	-----	Dumps all internal
		CANDE files.
<usercode>/=		
. 1		These dump all files
.		associated with the
.	-----	individual <usercode>
<usercode>/=		and should include
n		all usercodes in the
		user-code password
		table.

After the dump is complete, that state of the CANDE system is preserved on tapes. Prior to the next session of CANDE, the tape should be loaded back to system disk. This may be done by changing the "DUMP TO <tape.id>" card to a "LOAD FROM <tape.id>" card and executing the deck.

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APPENDICES

NETWORK CONTROLLER

Compilation

Following is a source listing of a typical handler to be used with CANDE.

File configuration allows user programs to open remote files to their own terminal without affecting operation at other terminals.

For example, user "A" at LSN-1 (station name = "ST1", available in file named "D1") may execute a program which opens a remote file named "D1". The program will then automatically be attached to the terminal from which the user executed the job through CANDE.

Operation

The requests specified in Section "CANDE/HANDLER" initially determine if the stations opened are on-line and responding. Those that are not will be made not ready by CANDE. Switched lines will remain in a "waiting for ring" state. If leased or direct terminal is in use with CANDE and experiences failure, such as many consecutive timeouts or loss of data-set-ready or loss of carrier, then the terminal is made not ready and recovery is initiated if appropriate.

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If a switched terminal is disconnected or the line is disconnected in any way, then the network controller will reinitiate a "wait for ring" state on the line and CANDE will recover all appropriate data and will leave the stations "ready" for the next dial-in.

Reconnecting a direct or leased terminal will not automatically cause the network controller to recognize and service it. The operator must enter a "make" command at the SPO in order to make it ready.

Re-dialing from a switched station will cause immediate service when connected.

After failure has occurred and the user has successfully re-connected, he must log on again at which time he will be advised of any recovery data he may have.

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TERMINAL TD824:%
DEFAULT = TDFLT.
TERMINAL TTY:
REQUEST = CANDEIOTTY:RECEIVE, %
CANDEIOTTY:TRANSMIT, %
TRANSMISSION = 0.
ADDRESS = 0.
TYPE = 0.
BUFFERSIZE = 80.%

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XX
XX
XX STATION SECTION XX
XX

STATION DEFAULT TD8DF: %
FREQUENCY = 2, 24.
MYUSE = INPUT, OUTPUT.
TERMINAL = TD824. %
RETRY = 4. %

STATION DEFAULT TTYDF: %
FREQUENCY = 2, 24. %
MYUSE = INPUT, OUTPUT. %
TERMINAL = TTY. %
RETRY = 4. %

% STATION ST1: %
DEFAULT = TD8DF. %
ADDRESS = "D1". % TD800

STATION ST2: %
DEFAULT = TD8DF. %
ADDRESS = "D2". %

STATION ST3: %
DEFAULT = TD8DF. %
ADDRESS = "D3". % TD800

STATION ST4: %
DEFAULT = TD8DF. %
ADDRESS = "D4". %

STATION ST5: %
DEFAULT = TD8DF. %
ADDRESS = "R3". %

STATION ST6: %
DEFAULT = TD8DF. %
ADDRESS = "R4". %

STATION ST7: %
DEFAULT = TD8DF. %
ADDRESS = "R5". %

STATION ST11: %
DEFAULT = TD8DF. %
ADDRESS = TD8DF. %

STATION ST12: %
DEFAULT = TTYDF. %
ADDRESS = "00". %

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```

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
%%
%%
%%
%%
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
LINE      DEFAULT LINEDFLT:
          CONTROL      =  AUTOPOLCTL.%
          AUTOPOLL     =  35. %

%
LINE      DIRECT01:
          DEFAULT      =  LINEDFLT.
          ADDRESS      =  1:0:6.%
          STATION      =  ST1,ST2,ST3,ST4,ST5,ST6,ST7. %

LINE SYNC01:%
          DEFAULT      =  LINEDFLT.%
          ADDRESS      =  1:0:2:.%
          STATION      =  ST11.%

LINE TTY01:%
          DEFAULT      =  LINEDFLT.%
          CONTROL      =  CONVERCTL.%
          ADDRESS      = 1:0:9.%

```


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Terminal Options

CANDE has been designed to perform optimally to Burrough's TD800 or TD820 series and Teletype series terminals. The requests specified under "Operator Instructions" are designed to handle these two types of terminals.

Other terminals to be connected to the CANDE system may not operate correctly with these requests, although any Burroughs' qualified terminal for the B1700 can be connected to the CANDE system via a user coded request which could include the special features built into the released CANDE requests.

CANDE makes use of certain control codes to effect a more readable output. Terminals should be so optioned when setup:

20D2 (CR),	2252 (LF),	20C2 (DC4),
23C2 (HOME ONLY),	2112 (DC1),	2132 (DC3)

Teletypes need only have CR, LF; TD800-820 series must have all but LF.

CANDE also relies upon "TERMINALTYPE" as set in the NDL-generated network controller. The expected values are:

Teletypes = 0
TD800-820 = any value not 0

Output is unpredictable if this convention is not observed.

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CANDE

CANDE Processor Time

A value called "TIME" appears on the screen whenever WHAT, BYE, or "HELLO" is transmitted. This value is the amount of time the user spent being serviced by the CANDE system. This time will be less than the difference of log-on and log-off times except after recovery when the previous session's time is taken as a starting time.

The time value is not strictly hardware "CPU" time. It includes IO time for both datacomm and any disk accesses. Included also are such system overhead costs as overlay, service requests, rollin/rollout of the user, and others.

It is not intended to be used directly for billing, but is an indication of the amount of time the CANDE system spent in servicing the user.

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