LPD 4-APR-72 9:27 9919

WYLBUR and TENEX from another viewpoint

replies to 9837

WYLBUR and TENEX from another viewpoint

There are several reasons why we should expect the present implementation of TNLS to be more expensive than WYLBUR. 1

First, WYLBUR is actually a special-purpose system: all scheduling and paging functions are performed from within the editor. Modules of the editor must request loading and unloading of pages. The CPU is not scheduled in the usual sense: all tasks run to completion. 1a

Second, WYLBUR files tend to be much smaller than NLS files. The WYLBUR document says that more than half are less than 7000 characters (3 PDP-10 pages). This means that searching operations and storage management are inherently less expensive than in NLS. 1b

Third, although WYLBUR is supposed to be "open-ended", it is clear that the organization of NLS to allow user-written code (content analyzers, sequence generators, output compilers, ...) entails some overhead not required in a relatively unstructured system like WYLBUR. 1c

Likewise, WYLBUR files are structured only by line; there is no structure within files and none of the linking capability of NLS. 1c1

Fourth, the extremely low cost of WYLBUR ($4.00/terminal hour) clearly indicates that the operation of WYLBUR must be subsidized by someone, since no commercial time-sharing service offers rates within a factor of 2 of this figure for terminal time alone 1d

While this indicates why WYLBUR is so cheap, it does not indicate why TNLS is so expensive. 2

First, TENEX has numerous sources of overhead (network, general users, demand paging and automatic working set maintenance, sophisticated scheduler, ...) not present or needed in WYLBUR. 2a

Second, no attempt has been made to optimize NLS for the unsophisticated user, e.g. by grouping a core subset of the functions onto a few pages, by giving the TENEX monitor swapping advice for the most frequent commands, ... 2b

Third, the organization of NLS files favors structural operations over textual, since the space overhead for structure information is substantial and must be consulted and updated even on textual edits whereas the converse is not true. 2c

Fourth, interaction with WYLBUR is on a line-by-line basis. The plethora of wakeups in TNLS is a severe source of overhead. This could be remedied by some changes in the TENEX monitor to allow a class of small, fast-response user programs to be resident and service inputs almost at interrupt level; other organizational changes could have the same effect. 2d

The main reason for this speedy reply is to emphasize my belief that we should not be hurried into compromising the structure of NLS in order to satisfy some constraints whose urgency and magnitude is still ill-defined. 3

Numerous people have noted, however, that TNLS is not as easy to learn as a number of other typewriter-oriented editors and is certainly not as convenient to use. This suggests biting the bullet and contemplating a complete divorce of the TNLS command language from the DNLS language. 3a

This might have the advantage of being able to unify DEX (about which I know essentially nothing) with TNLS. 3a1

If NLS is really as modular as claimed, this should not be a difficult task. If it turns out to be difficult, we will learn something. 3a2

There is room for a great deal of improvement in the implementation both of NLS and TENEX. 3b

We also have to face seriously the question of what kinds of service we feel it is important to provide to what kinds of users, since we can't have everything. 3c

Richard W. Watson
Augmentation Research Center
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Menlo Park, California 94025

To:
Access Copy

9922

RWW 4-APR-72 11:51 9922

Initial Ground Rules for Dialog Using Common Files

(J9922) 4-APR-72 11:51; Title: Author(s): Richard W. Watson/RWW;
Distribution: Jacques F. Vallee, Jeanne B. North, James E. White/JFV JBN
JEW; Sub-Collections: SRI-ARC; Clerk: RWW;
Origin: <WATSON>RULES.NLS;2, 4-APR-72 11:49 RWW ;

RWW 4-APR-72 11:51 9922

Initial Ground Rules for Dialog Using Common Files

The NIC planning team is going to try to work from a common set of files in its planning, the initial file being <watson>framework. Others may probably come into existence as time goes on. 1

The following ground rules were set up for working with the common dialog files. 2

Anybody can read and modify these files if the following rules are adhered to. 2a

New statements commenting on or adding to material in the file can be added at appropriate points, normally down from statements commented on. The initial characters of the top statement of a new branch must start with the following syntax ID ': . 2b

This convention was added even knowing that it is redundant with information in the signature because files are hard to read with signatures turned on (maybe if this convention really proves useful it could be created automatically by an appropriate viewspec) and because there is much precedent in published conversations for this type of format as being useful. 2b1

Statements or other structure cannot be deleted,but a comment one level down at an appropriate place requesting deletion can be made. 2c

Statements cannot be replaced in whole or in part, but appropriate text and structure which is a candidate for replacement should be placed one level down from the appropriate place. 2d

Once a week someone from the NIC planning team will perform any appropriate cleanup leaving useful dialog intact or summarized. 2e

LPD 4-APR-72 9:27 9919

WYLBUR and TENEX from another viewpoint

(J9919) 4-APR-72 9:27; Title: Author(s): L. Peter Deutsch/LPD; Distribution: James G. Mitchell, L. Peter Deutsch, Diane S. Kaye, Don I. Andrews, Walter L. Bass, William S. Duvall, Mary S. Church, J. D. Hopper, Charles H. Irby, Harvey G. Lehtman, John T. Melvin, Bruce L. Parsley, William H. Paxton, Don I. Andrews, Donald C. Wallace, Jacques F. Vallee, James C. Norton, Douglas C. Engelbart, Richard W. Watson, Michael D. Kudlick/NPG DIA DCW JFV JCN DCE RWW MDK; Sub-Collections: NIC NPG; Clerk: LPD;

your file is ready -- <msr>empty.nls;21 (April 4, 1972) 1

(J9920) 4-APR-72 9:29; Author(s): Priscilla Lister/PL; Distribution: William S. Duvall, Don I. Andrews/WSD DIA; Sub-Collections: SRI-ARC; Clerk: PL;

Kenneth E. Victor
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To:
Access Copy

9921

KEV 4-APR-72 11:51 9921

next cedar pod meeting

(J9921) 4-APR-72 11:51; Title: Author(s): Kenneth E. Victor/KEV; Distribution: Martin E. Hardy, Linda L. Lane, Harvey G. Lehtman, Jeanne B. North, Bruce L. Parsley, Jeffrey C. Peters, Paul Rech, Ed K. Van De Riet, Kenneth E. Victor/CEDAR; Sub-Collections: SRI-ARC CEDAR; Clerk: KEV;

KEV 4-APR-72 11:51 9921

next cedar pod meeting

cedar pod will meet tommorow (4/5) at 1pm in the cafateria

1

Initial Ground Rules for Dialog Using Common Files

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NWG/RFC# 336 CXP 5-MAY-72 12:09 9929
Level 0 Graphic Input Protocol

,17 MAY 72 15-MAR-72 8:40 IWC ;

1a Level 0 Graphic Input Protocol

1a1 At its meeting on April 16-18 the network Graphics working group began to consider the definition of levels of protocol for graphic input Protocol. The following describes the Level 0 graphics input protocol.

1a2 The philosophy guiding the establishment of this protocol is the same as suggested in RFC #178, "Network Graphic Attention Handling." Briefly, all input will be described by type, origin, and length, followed by the actual data.

1a3 Only two types of input are defined at Level 0: text and simple position.

1a3a Text Input

Text input will be conveyed in the following format:

TEXTIN : DEVICE : COUNT: Text String

1a3a1 TEXTIN is a protocol code indicating the nature of this input string. For the present this code is defined to be 1.

1a3a2 DEVICE is a code indicating the device from which the input originated. The following codes are presently defined:

0 - unspecified device
1 - primary keyboard
2 - tablet
3 - mouse
4 - joystick
5 - lightpen
6 - cursor
7 - keyset
8 - mouse & keyset

1a3a3 Count is an integer number indicating the number of characters (bytes) which follow.

1a3a4 Text String is a string of "Count" bytes of characters in network ASCII.

1a3b Position Input

Simple position data will be conveyed in the following format:

POSIT : DEVICE : COUNT : x : y

1a3b1 POSIT is a protocol code indicating that this string contains position data. For the present this code is defined to be 2.

1a3b2 DEVICE is a code indicating the input device on which this data was generated. The codes are as defined above.

1a3b3 COUNT is an integer number indicating the number of bytes of data which follow. This includes data for both x and y coordinates. Thus, the number of bytes of x coordinate data is COUNT divided by 2. At level 0, COUNT should always be 4, since at this level all coordinates are expressed in 2 bytes of data.

1a3b4 X and y coordinate data are represented as signed fractions in the same fashion that position data is represented in the Level 0 graphic output protocol.

1a4 It should be emphasized that input data from a level 0 graphics user which is not in a format described above should be sent on a different link than the graphics input link. This may be desireable for certain applications to avoid the overhead of the protocol.

DEFERRED EXECUTION (DEX) USER GUIDE

Augmentation Research Center
Stanford Research Institute
Menlo Park, California 94025

PREFACE

3

This user guide is written for the user who has no experience with computers. Its basic approach is as non-technical as accuracy permits. As such, the descriptions and definitions contained herein may appear simplistic and belabored to computer-experienced personnel. These users are referred to Appendix A. DEX Summary, for a synopsis of the features of the Deferred Execution System. 3a

CONTENTS

Section 1. INTRODUCTION

5

THE DEFERRED EXECUTION SYSTEM 5a

Deferred Execution (DEX) is a system that provides a means by which information may be prepared offline for processing by the computer at the Augmentation Research Center (ARC). 5a1

Definitions: 5a1a

system - simply stated, a procedure for performing a specific task, e.g., people have "systems" for balancing check books, betting on horses, and getting to work on time (or late as the case may be). 5a1a1

offline - pertaining to peripheral devices not under direct control of or connection to the computer. A teletypewriter is a peripheral device which may be used off- or online, i.e. not connected or connected to the computer. 5a1a2

information - data, text, or any literature in general. In the remainder of this document, the term text means any type of information other than computer instructions. 5a1a3

DEX itself consists of a set of special instructions which when combined with text produce a file that can be processed and maintained by the ARC computer. 5a2

Definition: 5a2a

file - a set of information (text) structured so that it can be "understood" by the computer. 5a2a1

9934 21 JUN 72 SRI-ARC
INTRODUCTION

DEX is designed to be used with devices such as teletypewriter terminals (Models 33, 35, 37). At such a terminal the user types as at a conventional typewriter (the keyboards are almost identical) to produce a paper tape containing the file destined for computer processing. (Other types of terminals have magnetic tape recording features.) When a key is pressed at the terminal, a character is printed as on a standard typewriter, but also, a code is punched into paper tape or "written" onto magnetic tape. A detailed description of the actual mechanism of offline paper tape preparation is contained in Appendix C of this document; a description of magnetic tape preparation is contained in Appendix D. 5a3

ENVIRONMENT 5b

DEX was designed for use with the Augmentation System at SRI as a complement to NLS (an online system). Whereas DEX allows the user to work independently of the computer, NLS relies totally on computer interaction for creating files. DEX allows the use of many NLS facilities as well some of its own special features. It operates with greater system-use efficiency since actual computer time can be deferred to periods of low usage - "off-hours", when the load is greatly reduced. 5b1

The end result of files created by DEX and files created by NLS is the same. Once created by either system, no distinction is made - they are all NLS files. Also, an NLS file created offline by DEX may be modified (edited) online by NLS and vice versa. 5b2

DEX PROCESSING OVERVIEW 5c

The following pages in this section outline the process detailed in this user guide for the successful creation of an NLS file. Note that there are actually two stages of the DEX process - offline, when the file is actually created, and online, when the file is submitted to the computer. 5c1

5c2

5c3

Section 2. ELEMENTS OF DEX

6

INTRODUCTION 6a

This section describes the individual parts of DEX that are used in creating an NLS file. At this level, creating a file is comparable to typing a letter on a typewriter. When using a typewriter, two kinds of tasks are actually being performed. One is simply entering the information that is to constitute the content of the letter. In addition there are several "command" type keys that control the format of the letter and enable the user to correct errors, e.g. the Carriage Return, the backspace key, the Tab key, and the Shift key. The latter are not actually part of the letter being typed, but control the way in which the letter is produced. 6a1

Most of the tools discussed in this section are comparable to the special keys found on a standard typewriter. These tools are simply characters which when received by the computer are interpreted as commands. 6a2

LOCATION NUMBERS 6b

When text is entered on a standard typewriter, statements (paragraphs or single sentences) are organized sequentially, in the order in which they are typed. However, when entering text from a terminal, the user has the advantage of being able to "tell" the computer the final order in which statements should be arranged in the resultant file. 6b1

OVERALL FILE STRUCTURE 6b2

Every NLS file is made up of STATEMENTS, entities that may contain any sort of text (every paragraph and heading in this document is a statement). 6b2a

The highest level statement shown on the next page is called a "1st-level" statement. The statements immediately below the 1st-level statements are 2nd-level statements, and so forth to arbitrary depth. 6b2a1

NLS files have a hierarchical, tree, or outline structure.

```
1 ...
   1a ...
   1b ...
      1b1 ...
      1b2 ...
      1b3 ...
2 ...
3 ...
   3a ...
   3b ...
   3c ...
      3c1 ...
   3d ...
      3d1 ...
      3d2 ...
         3d2a ...
         3d2b ...
         3d2c ...
4 ...
   4a ...
   4b ...
5 ...
   5a ...
      5a1 ...
      5a2 ...
         5a2a ...
   5b ...
```

FIGURE 1. Hierarchical File Structure

6b2e

Every statement in a file has a "location number." This is a string of alternating fields of numbers and letters. The location number is a primary means of referencing parts of the file in DEX commands. 6b2f

The first field always contains a number. 6b2f1

The number of fields is equal to the level of the statement. 6b2f2

The location number (and its following space) is NOT part of the text of the statement; it is associated with the position of the statement in the file and is subject to change when the file structure is modified by adding or deleting statements. 6b2f3

When necessary, the @ character is used in the letter fields of statement numbers as an "alphabetical zero." Thus the 26 letters and the @ can be used to form a sequence: a, b, c, ... x, y, z, a@, aa, ab, ac, ... az, b@, ba, bb, ... 6b2g

REPEATS 6b3

In the event that the user mistakenly uses the same location number for more that one statement, DEX provides for "repeat" statements. If the user specifies two or more statements with the same location number, the second, third, etc. statements will be inserted immediately following and at the same level as the first statement. These repeat statements will be given unique numbers when the file is renumbered by DEX later in the process. 6b3a

Such repeat statements may be referenced by their location number followed by a digit in parentheses indicating the first, second, etc. repeat of the original location number. 6b3b

Examples:. 6b3b1

If the user had entered the following series of statements: 6b3b2

1 animal 6b3b2a

1a cow 6b3b2a1

```
      1b chipmunk                                          6b3b2a2

   2 vegetable                                             6b3b2b

   1 mineral                                               6b3b2c

It would be interpreted as:                                6b3b3

   1 animal                                                6b3b3a

      1a cow                                               6b3b3a1

      1b chipmunk                                          6b3b3a2

   1(1) mineral                                            6b3b3b

   2 vegetable                                             6b3b3c

If the user had entered the following series of
statements:                                                6b3b4

   1 alpha                                                 6b3b4a

   2 beta                                                  6b3b4b

   3 gamma                                                 6b3b4c

"alpha" may be referenced as 1 or 1(1).                    6b3b5

"beta" may be referenced as 1(2).                          6b3b6

"gamma" may be referenced as 1(3).                         6b3b7
```

6b3b8

CAPITALIZING 6c

Some of the terminals that are used to produce DEX tapes do not have upper and lower case characters. The two characters that enable capitalization on these terminals are similar to the shift and shift lock keys on the typewriter. If capitalization is not meaningful for any character (e.g., numbers and punctuation marks), the command is ignored. 6c1

CAPITALIZE NEXT CHARACTER 6c2

Whenever the "forward slash" character "/" is pressed, the next character typed is capitalized. This command applies to both visible as well as invisible characters. However, this command has no effect when used with an invisible character. 6c2a

Example: 6c2a1

If the user types: 6c2a2

a b c d /f/ /g/h/j/k 6c2a2a

It will be interpreted as: 6c2a3

a b c d F GHJK 6c2a3a

CAPITALIZE NEXT VISIBLE 6c3

Whenever the "back slash" character " " is pressed, the next series of printing characters typed is capitalized. Capitalization is turned off when the first invisible character following the " " is typed. 6c3a

Example: 6c3a1

If the user types: 6c3a2

hichory, dickory dock-the mouse ran up the clock 6c3a2a

It would be interpreted as: 6c3a3

hichory, dickory DOCK-THE mouse ran up the clock 6c3a3a

LITERAL ESCAPE 6d

Most of the characters described in this section have special meaning to the computer. They are in general, the least-frequently used characters on the keyboard. However, instances will arise when the user will want to use them literally, as characters for content. This is enabled by preceding the control character to be interpreted literally by the literal escape character, an apostrophe ('). 6d1

Example: 6d1a

If the user types: 6d1b

```
/a /b /c '/d '/e '/f
```  6d1b1

It will be interpreted as:  6d1c

```
A B C /d /e /f
```  6d1c1

"'" is interpreted as a control character only when it precedes another control character. In cases where a literal "'" is desired before a control character, the user must specify an additional "'" to indicate literal "'".  6d2

For example:  6d2a

If the user types:  6d2a1

```
'' baby
```  6d2a1a

It will be interpreted as:  6d2a2

```
'BABY
```  6d2a2a

CARRIAGE RETURNS AND LINE FEEDS 6e

Normally, when typing text on a standard typewriter, the typist must hit the Return key to cause the print head to begin a new line. Using an offline terminal similarly requires that an "end-of-line" (EOL) command is used to prevent unreadable overprinting when the physical end of the terminal print line is reached. The EOL command or signal consists of pressing the Carriage Return (CR) key immediately followed by the Line Feed (LF) key. However, this command is necessary only for the purposes of the typist at the terminal; when the tape is made into a file all EOL's are replaced by a (SP) unless the user has specified otherwise (in a manner described below) and the computer takes care of general line-by-line formatting. Thus, the user may continue typing (and overtyping) at the end of the terminal print line without affecting the way text is actually written onto the tape. 6e1

Definitions: 6e1a

(LF)=Line Feed key (identical to Index key on typewriter) 6e1a1

(CR)=Return key. Unlike the Return key on a typewriter, the terminal's Return key only moves the print head to the beginning of the current line. To simulate the Return key on a typewriter, an (EOL) must be used. 6e1a2

(EOL)=a (CR) immediately followed by a (LF). The term EOL means "end of line". EOL is treated as one character by DEX commands. 6e1a3

Throughout the rest of this document, non-printing characters, such as those defined here, will be referred to by name and enclosed in parentheses. 6e1a4

Example: 6e1b

If the user types: 6e1b1

now is the(CR)(LF)time for(CR)(LF)all good 6e1b1a

It would appear at the terminal as: 6e1b2

now is the
time for
all good 6e1b2a

It would be interpreted as: 6e1b3

now is the(SP)time for(SP)all good 6e1b3a

Or: 6e1b3b

now is the time for all good 6e1b3c

Although general line-by-line formatting is taken care of by the computer, there are situations where the user might want to override the convention of filling a line before beginning a new line, e.g., for constructing tables that require special formatting. There are two special commands called escape characters that allow the user to override the default of substituting spaces for EOL's. The first is the "Return Escape Character", the percent character "%", which applies only to EOL's. Whenever this character appears before the terminating character of a statement, ALL EOL's in the same statement will remain in the NLS file. Note that whenever the percent character appears at any location other than the end of a statement, it is interpreted literally. A Literal Escape is required only when the user desires to have a statement end with the character "%". 6e2

The second is the "literal Escape Character", the apostrophe character "'", which may be applied to any character. Whenever this character appears, the following character is interpreted "literally". Thus if the user wanted to use the character "/" as part of the text and not as a control character, typing "'/" would cause the actual character to appear in the file. Specifically, when the literal escape caracter precedes an EOL, the computer does not substitute a space for that EOL. 6e3

Example: 6e3a

If the user types: 6e3b

mary had(CR)(LF)a little lamb'(CR)(LF)its fleece was 6e3b1

It will appear at the terminal as: 6e3c

9934 21 JUN 72 SRI-ARC
ELEMENTS OF DEX

```
mary had
a little lamb'
its fleece was                                        6e3c1
```

It will be interpreted as: 6e3d

```
mary had(SP)a little lamb(CR)(LF)
its fleece was                                  6e3d1

Or:                                             6e3d2

mary had a little lamb
its fleece was                                  6e3d3
```

BACKSPACING 6f

The backspacing operations allowed by DEX are comparable to using a typewriter's backspace key. When the backspace key is used on a typewriter, the print head is physically repositioned to the immediately preceding character; the typist must then use some means to erase the unwanted character and enter another character in its place. In DEX, the basic operation is not only simplified but also allows a wider range of specific tasks. 6f1

In DEX it is not necessary to remove the unwanted character, word, etc. The error remains on the tape until processed by the computer; the special delete key that follows the error causes the computer to delete the specified entity when the file is actually processed. 6f2

Whereas the backspace key on a typewriter pertains only to the immediately preceding character typed, DEX provides several types of deletion characters which pertain to specific entities, i.e., characters, words, and lines. 6f3

Definitions: 6f3a

gap - any series of any combinations of spaces, returns, line feeds, and tabs. In general, any invisible series of characters in the text. 6f3a1

(SP)=space bar key 6f3a1a

(LF)=Line Feed key (identical to Index key on typewriter) 6f3a1b

(CR)=Return key. Unlike the Return key on a typewriter, the terminal's Return key only moves the print head to the beginning of the current line. To simulate the Return key on a typewriter, an (EOL) must be used. 6f3a1c

(EOL)=a (CR) immediately followed by a (LF). The term EOL means "end of line". EOL is treated as one character by the "backspace character" key. 6f3a1d

line - any series of combinations of visible characters and gaps that begins and ends with a Carriage Return or Line Feed character. 6f3a2

DELETE CHARACTER 6f4

A character is deleted when the "greater than" character key ">" is pressed. One character is deleted each time this key is pressed. An EOL (CR followed by LF) is treated as one character. 6f4a

The first character to be deleted is always the most recent character typed. A series of characters may be deleted by typing a series of ">'s". 6f4b

Example: 6f4b1

If the following series of characters were typed at the terminal: 6f4b2

abcdefg(SP)(EOL)hi>>>>>12345 6f4b2a

It would appear at your terminal as: 6f4b3

abcdefg
hi>>>>>12345 6f4b3a

It would be interpreted as: 6f4b4

abcdef12345 6f4b4a

DELETE WORD 6f5

The "less than" character key "<" is used to delete words. Each time this key is pressed it will delete any number of printing characters (including zero characters) followed by any number of non-printing characters (including zero characters). The user is returned to the preceding gap, i.e., the last character to the left of the gap immediately preceding the deleted word. One word and its preceding gap is deleted each time this key is pressed. The first word to be deleted is always the most recent word typed. A series of words may be deleted by typing a series of "<'s". 6f5a

Example: 6f5a1

If the following series of words were typed at the terminal: 6f5a2

now(SP)is(SP)the(SP)time(SP)for<<<(SP)all(SP)good<
(SP)men(SP)to(SP)come(SP)to(SP)the< 6f5a2a

It would appear at the terminal as: 6f5a3

now is the time for<<< all good< men to come to
the< 6f5a3a

It would be interpreted as: 6f5a4

now(SP)is(SP)all(SP)men(SP)to(SP)come(SP)to 6f5a4a

DELETE LINE 6f6

A line is deleted whenever the "up arrow" character key "↑" is pressed. The user is returned to the last character to the left of the gap containing an (EOL) immediately preceding the deleted line. One line and its preceding gap is deleted each time this key is pressed. The first line to be deleted is always the most recent line typed. A series of lines may be deleted by typing a series of "↑'s". 6f6a

Example: 6f6a1

If the following series of lines were typed at the terminal: 6f6a2

twinkle,(SP)twinkle,(SP)little(SP)star(CR)(LF)
how(SP)I(SP)wonder(SP)what(SP)you(SP)are(CR)(LF)
up(SP)above(SP)the(SP)↑↑(SP)like(SP)a(SP)diamond(S
P) 6f6a2a

It would appear at the terminal as: 6f6a3

twinkle, twinkle, little star
how I wonder what you are
up above the ↑↑ like a diamond 6f6a3a

It would be interpreted as: 6f6a4

twinkle,(SP)twinkle,(SP)little(SP)star
like(SP)a(SP)diamond(SP) 6f6a4a

DELETE CLUSTERS AND ORDER OF DELETIONS 6f7

A delete cluster is a series of any number or any type of delete characters bounded by spaces. When delete characters are grouped in this manner, the actual deletions performed follow a specific order regardless of the order of the characters within the cluster. 6f7a

Lines are deleted before words and characters. 6f7a1

Words are deleted before characters. 6f7a2

Only the rightmost set of any type of delete characters within a cluster will have effect, e.g. in the cluster "↑↑↑<↑", only one line (and one word) will be deleted. 6f7a3

Thus the clusters "<<>>>↑" and ">>>↑<<" and "<<<<>>↑<<>>>" are equivalent and are interpreted as: first delete current line, then two words in the previous line and then three characters. 6f7b

Example: 6f7b1

If the user types: 6f7b2

```
now is the time for(CR)(LF)
all good men to(CR)(LF)
come to <<>>>↑ the aid of their party
```
6f7b2a

It will be interpreted as: 6f7b3

```
now is the time for(CR)(LF)
all go the aid of their party
```
6f7b3a

The advantage of clustering delete characters in this manner (i.e., bounded by spaces with no intervening spaces) is that the cluster may be treated as a word of text by any subsequent cluster in a statement. This allows the user to delete the cluster in the event of an error. 6f7c

Example: 6f7c1

If the user types: 6f7c2

```
alpha beta charlie dog << << delta
```
6f7c2a

It will be interpreted as: 6f7c3

```
alpha beta charlie delta
```
6f7c3a

In this example, the user meant only to delete the word dog but accidently typed an extra "<" which would have deleted the word charlie as well; following it with a new cluster deletes the original cluster as well as the intended word. 6f7c4

COMMAND CONTROLS 6g

The following special characters are used with the commands discussed in the following sections of this user guide. 6g1

COMMAND INDICATOR 6g2

The colon character ":" is used to indicate to the computer that the following visible is a command and not part of the text. The use of this character will be clarified under the discussion of individual commands. 6g2a

COMMAND TERMINATION 6g3

The exclamation mark character " " is used to indicate the termination of a particular command as well as to cause it to be executed by the computer when the file is processed. 6g3a

COMMAND ABORTION 6g4

The dollar sign character "$" causes the foregoing command to be ignored by the computer. "$" must appear immediately before the command terminator ( ). Otherwise it is interpreted literally. This character enables the user to effectively erase any command. When this command key is pressed the user is returned to the most previous command terminator ( ). 6g4a

END OF FILE 6g5

The control character CTRL Z (type the letter z while holding down the CTRL button) writes a special character on the tape that indiates the end of the file. DEX stops processing when it receives this character. This character may written directly on the tape when the user is offline, or entered from the terminal when the user is online and submitting the tape for processing. 6g5a

When creating a file that, because of its length, requires more than one tape, this character must appear only on each tape in the series. 6g5b

Section 3. ENTERING TEXT

7

INSERT STATEMENT 7a

Statements are created by entering text from the terminal keyboard. Statements must consist of a location number, GAP, the text or content of the statement, and a terminator ( ). A GAP is required to distinguish between the location number and the text of the statement. 7a1

The text of each statement may consist of anywhere from 0 to 1800 characters. 7a1a

Any of the control characters >,<,/, ,↑,%, and ' may be used within the text of a statement. 7a1b

When statements are entered one after the other, any information typed between the terminator of a statement and the location number for the next statement is ignored. 7a1c

Statements may be entered in any order; the location number determines the actual position in the file. If the user specifies a new location number which does not immediately follow a location already specified, dummy statements will be inserted. If a new location number is later specified that "fits" the dummy, the dummy will be replaced by the actual statement. After the user has completed the process of entering and editing text, the file will be "cleaned-up" before it becomes an NLS file. This cleanup includes putting the statements in numerical order, deleting dummy statements and renumbering as appropriate, and substituting a series of asterisk characters for each dummy statement with substructure. 7a2

Example: 7a2a

If the user enters a series of statements with the following location numbers: 7a2b

```
1 ...
3c ...
3a ...
5 ...
5a1 ...
1 ...
```
7a2b1

9934 21 JUN 72 SRI-ARC
ENTERING TEXT

The statements will be arranged as : 7a2c

```
1 ...
1(1) ...
dummy
dummy
  3a ...
  dummy
  3c ...
4 ...
  dummy
    4a1 ...                                    7a2c1
```

After cleanup (note renumbering), it will be interpreted as: 7a2d

```
1 ...
2 ...
3 Dummy***
  3a ...
  3b ...
4 ...
  4a Dummy***
    4a1 ...                                    7a2d1
```

ERRORS 7b

Any information entered by the user that cannot be processed by DEX will be placed in a special section of the finished file called "ERRORSTRINGS". The last highest-level statement in every DEX file is always "ERRORSTRINGS", whether or not the file actuallly contains any errors. 7b1

Section 4. TEXT EDITING COMMANDS

8

INTRODUCTION 8a

Several tools for editing text have already been discussed in this user guide. The Delete character/word/line and Command Abort characters enable the user to edit text as it is being entered from the terminal. There are two other editing functions available to the user that enable the deleting and undeleting of previously entered statements. These commands may be used in conjunction with inserting statements as long as any command references a previously created location number. References to non-existent location numbers are ignored. 8a1

DELETE COMMAND 8b

The delete command allows the deletion of a previously inserted statement. The command simply consists of the location number of the statement to be deleted followed immediately by ":d" and the command terminator " ". 8b1

The colon character is the command indicator which signals "d" as a command and not a new statement. 8b1a

":d" may be optionally followed by a GAP (before the command terminator). 8b1b

If the statement specified by the location number has any substructure, the substructure is not deleted and a dummy replaces the original statement. 8b2

This command may be rescinded at any time before the file is put into final form by using the Undelete Command, described below. 8b3

Example: 8b3a

If the user enters the following statements: 8b3b

1 the quick 8b3b1

2 brown fox 8b3b2

3 jumped 8b3b3

2:d 8b3b4

It will be interpreted as: 8b3c

1 the quick 8b3c1

3 jumped 8b3c2

UNDELETE COMMAND 8c

The Undelete command enables the user to rescind a previously entered Delete command for a statement. The command simply consists of the location number of the statement to be deleted followed immediately by ":ud" and the command terminator " ". 8c1

The colon character is the command indicator which signals "ud" as a command and not a new statement. 8c1a

":ud" may be optionally followed by a GAP (before the command terminator). 8c1b

If the Undelete command specifies a location number that was not deleted, it is ignored. 8c2

Example: 8c2a

If the user enters the following statements: 8c2b

1 the quick 8c2b1

2 brown fox 8c2b2

3 jumped 8c2b3

4 over the 8c2b4

5 sleepy 8c2b5

2:d 8c2b6

4:d 8c2b7

5:d 8c2b8

2:ud 8c2b9

It will be interpreted as: 8c2c

1 the quick 8c2c1

2 brown fox 8c2c2

3 jumped 8c2c3

Section 5. FILE COMMANDS

9

OUTPUT COMMAND 9a

The Output File command is necessary only if the user wants a specific name associated with the file after it is processed other than the name given the text file produced when the tape is read. A name is always assigned to the file when it is actually submitted for processing. Specifying a different filename via the Output File command causes the system, at the end of processing, to generate a filename other than the name specified when the file was submitted. 9a1

Output File may appear at any point on the tape. 9a2

The Output File command consists of typing ":o", any GAP, the name of the file, and the command terminator ( ). 9a3

The colon character is the command indicator which signals "o" as a command and not a new statement. 9a3a

":o" must be followed by a GAP. 9a3b

NLS file names are of the following form: 9a3c

<DIRECTORY>FILENAME.EXTENSION;VERSION # 9a3c1

where DIRECTORY=1-39 alphanumeric characters, excluding control characters, non-printing characters, period (.), and semicolon (;). This element is a TENEX user name and is required only when a user references a file belonging to a directory other than his own. 9a3d

FILENAME=1-39 alphanumeric characters, excluding control characters, non-printing characters, period (.), and semicolon (;) 9a3e

EXTENSION=1-39 alphanumeric characters, excluding characters control, non-printing characters, period (.), and semicolon (;) 9a3f

VERSION #=a numeric value (1 to 131071) 9a3g

The length of the entire filename (including the delimiters . and ;) must not exceed 39 characters. Otherwise, there are no restrictions on the length of any field within the total filename. 9a3h

DIRECTORY is optional and if not specified, the directory of the filename specified when the output file is processed is used. 9a3i

EXTENSION is optional and if not specified, "NLS" is assumed. 9a3j

VERSION is optional and if not specified, "1" is used if the file is new, otherwise "current version # +1" is used. 9a3k

PRINT COMMAND 9b

After a DEX file is processed by NLS, the system automatically produces a text file that may be listed on a device such as line printers. By default the name of this text file is the same as the corresponding NLS file. The user however, may change the default by using the DEX Print command. This command consists of typing ":p" followed by any GAP, the name of the print file, and the command terminator ( ). 9b1

Section 6. DEX PROCESSING PROCEDURES

10

PROCESSING A SINGLE PAPER TAPE 10a

This section describes the procedures required for the actual online processing of a file. The following describes the procedure for a single file on paper tape. For processing several files at the same time, first read the following then refer to the additional procedure described afterwards. 10a1

1. Load paper tape onto a paper tape reader connected to the terminal OR connected to the computer. 10a2

2. Connect to the computer by turning the terminal on "online" and typing CTRL C. 10a3

When the terminal is connected to the ARC PDP-10 computer, the TENEX system will print the message: 10a3a

ARC-TENEX xxxxx date EXEC xxx 10a3a1

where: xxxxx = information that identifies the current version of the system 10a3a2

3. LOGIN 10a4

TENEX responds that it is ready to accept information by typing the character '@'. Before the user can perform any tasks on the system he must first identify himself using the LOGIN command and typing: 10a4a

log SP USERNAME SP PASSWORD SP ACCOUNT NO. CR 10a4a1

where: 10a4b

USERNAME = 1-39 alphanumeric characters (excluding the characters ; and .)
PASSWORD = 1-39 alphanumeric characters (excluding the characters ; and .) that are not echoed by the system
ACCOUNT NO.=1-39 characters; (#1 is currently used for all users on the NLS system) 10a4b1

When the user has successfully logged in to the system the following message is printed: 10a4c

JOBxx ON TTYyy date time 10a4c1

where: 10a4d

xx = job number assigned to terminal during terminal session 10a4d1

yy = terminal identification number 10a4d2

4a. If the tape reader is directly connected to the terminal: 10a5

1. Copy the contents of the tape to a filename. 10a5a

type: "COPY TTY: (name of file) (CR)" 10a5a1

The name of the file should have an extension name of "DEX" to differentiate it from the sequential (text) file that is created from the input file by DEX processing. 10a5a2

2. Turn the reader control to START 10a5b

3. After all the tape is read, type CTRL Z to signal an end of file if there is no CTRL Z on the tape. 10a5c

4b. If the tape reader is connected to the computer: 10a6

1. Activate the computer's reader with the Assign command. Type: ASSIGN PTR: (CR) 10a6a

2. Copy the tape from the reader to a filename. Type: "COPY PTR: (name of file) (CR)" 10a6b

3. Deactivate the computer's reader with the Deassign command: Type: "DEASSIGN PTR: (CR)" 10a6c

5. At any time after the tape has been read, it may be processed. Enter NLS. Type: NLS (CR) 10a7

The system then asks for the user's identification code and the type of terminal used. Respond to "id:" with user initials; respond to "device:" by typing the letter "o" for OFFLINE DEX-1. 10a7a

[id:] USER IDENTIFICATION (CR)
[device:] o[ffline dex-1]
[terminal type:] t[i terminal] 10a7a1

6. DEX will print "INPUT FILENAMES:". Specify the name of the file to be processed: 10a8

type: filename from step 4a2 or 4b2 above) 10a8a

While DEX is processing the files specified, it will display the message: 10a8b

DEX IN PROGRESS 10a8b1

Wait until the character "@" is printed at the terminal before proceeding. The system has returned to the EXEC level. 10a8c

7. LOGOUT 10a9

The LOGOUT command enables the user to leave the system and causes certain accounting information to be printed at the terminal. 10a9a

type:LOGOUT (CR) 10a9a1

When this command is executed the system prints the message: 10a9b

KILLED JOBxx,USER username, ACCT account no.,TTY yy, AT date time
USED time1 IN time2 10a9c

where: 10a9d

time1 = total computer time used
time2 = total terminal time used 10a9d1

PROCESSING A SINGLE MAGNETIC TAPE 10b

1. Load magnetic tape cartridge as described in Appendix D. of this dcument. 10b1

2. Connect to the computer by turning the terminal on "online" and typing CTRL C. 10b2

When the terminal is connected to the ARC PDP-10 computer, the TENEX system will print the message: 10b2a

ARC-TENEX xxxxx date EXEC xxx 10b2a1

where: xxxxx = information that identifies the current version of the system 10b2a2

3. LOGIN 10b3

TENEX responds that it is ready to accept information by typing the character '@'. Before the user can perform any tasks on the system he must first identify himself using the LOGIN command and typing: 10b3a

log SP USERNAME SP PASSWORD SP ACCOUNT NO. CR 10b3a1

where: 10b3b

USERNAME = 1-39 alphanumeric characters (excluding the characters ; and .)
PASSWORD = 1-39 alphanumeric characters (excluding the characters ; and .) that are not echoed by the system
ACCOUNT NO.=1-39 characters; (#1 is currently used for all users on the NLS system) 10b3b1

When the user has successfully logged in to the system the following message is printed: 10b3c

JOBxx ON TTYyy date time 10b3c1

where: 10b3d

xx = job number assigned to terminal during terminal session 10b3d1

yy = terminal identification number 10b3d2

4. Turn the TermiCette device to "online". 10b4

5. Signal EXEC that a file will be copied to the EXEC from a Temicette device. Type "CASSET (CR)" 10b5

EXEC will respond by printing the message: 10b5a

CASSETTE TO SEQUENTIAL FILE UTIITY 10b5a1

Once the user has signalled the EXEC, the system will interrogate the user as follows: 10b5b

[special?] n 10b5b1

This prompt asks the user if there are any special characer definitions require for the system to read the file being input. In the case of the TermiCette terminal, the answer should be "n" (no). 10b5b1a

[copy to file:] FILENAME CR CR 10b5b2

where FILENAME consists of the name of the DEX file followed by ".dex". Thus, if the file is named "test" the resonse to this prompt shold be "test.dex". 10b5b2a

[input from file:] tty: CR [confirm] CR 10b5b3

The user must indicate that the DEX file will be read in from the terminal by typing "tty" followed by a colon. The system will requests the user to confirm the command by an additional carriage return. 10b5b3a

[type space when ready] SP 10b5b4

[rewind? (y or n)] y
n 10b5b5

The system asks whether the tape needs to be rewound. The user should respond by typing "y" (yes) or "n" (no). 10b5b5a

[more files? (y or n)] y
n 10b5b6

The system asks if there are more files to be read from the tape. 10b5b6a

6. At any time after the tape has been read, it may be processed. Enter NLS. Type: NLS (CR) 10b6

The system then asks for the user's identification code and the type of terminal used. Respond to "id:" with user initials; respond to "device:" by typing the letter "o" for OFFLINE DEX-1. 10b6a

```
[id:] USER IDENTIFICATION (CR)
[device:] o[ffline dex-1]
[terminal type:] t[i terminal]
```
10b6a1

7. DEX will print "INPUT FILENAMES:". Specify the name of the file to be processed followed by the character " ".:
10b7

While DEX is processing the files specified, it will display the message: 10b7a

```
DEX IN PROGRESS
```
10b7a1

Wait until the character "@" is printed at the terminal before proceeding. The system has returned to the EXEC level. 10b7b

8. LOGOUT 10b8

The LOGOUT command enables the user to leave the system and causes certain accounting information to be printed at the terminal. 10b8a

```
type:LOGOUT (CR)
```
10b8a1

When this command is executed the system prints the message: 10b8b

```
KILLED JOBxx,USER username, ACCT account no.,TTY yy, AT
date time
USED time1  IN  time2
```
10b8c

where: 10b8d

```
time1 = total computer time used
time2 = total terminal time used
```
10b8d1

PROCESSING MULTIPLE TAPES 10c

The procedure for processing multiple tapes is much the same as for a single tape. Multiple tapes require multiple tape mounting and copying procedures, i.e. the user must repeat steps 1 and 4 as many times as there are tapes. In addition, when the user is in DEX (after entering NLS) he may specify multiple filenames when asked to "INPUT FILENAMES:". Filenames may be separated by commas if there is a one to one correspondence between tapes and files. However, in the event that one file consists of more than one tape, the user must tell the system to "concatenate" (join together) the tapes as one file. This is indicated by using the character "+" between filenames. Only the last name specified will apply to all the tapes. 10c1

Example: 10c1a

If in response to INPUT FILENAMES:, the user types: 10c1b

TAPE1, TAPE2, TAPE3+TAPE4+TAPE5 10c1b1

Three files will be created by DEX: TAPE1, TAPE2, and TAPE5. 10c1c

Appendix A. DEX SUMMARY

11

SYNTAX CONVENTIONS 11a

Lowercase and control characters must be entered exactly as shown. 11a1

Uppercase entities represent variable input. 11a2

Optional entities are shown enclosed in squarebrackets. 11a3

DEFINITIONS 11b

LN - location number (as for TNLS addresses) 11b1

GAP - any series of spaces, LF's and/or CR's 11b2

LIT - (literal input) a series of text and control characters 11b3

EOL - end-of-line (CR followed immediately by a LF) 11b4

NOTE: DEX converts all EOL's to spaces unless escape characters are used. 11b4a

CONTROL CHARACTERS 11c

> - delete previous character 11c1

< - delete previous word (through preceding GAP) 11c2

↑ - delete previous line (through preceding CR or LF) 11c3

: - command indicator (for all commands except INSERT) 11c4

/ - capitalize next character 11c5

- capitalize up to next GAP 11c6

- command terminator (equivalent to NLS CA) 11c7

$ - command abort ($ is a control character only before a terminating) 11c8

' - literal escape 11c9

% - return escape (% is a control character only before a to literalize all EOL's) 11c10

CTRL Z - end-of-file (may be on tape or typed after copy in EXEC) 11c11

COMMANDS

(spaces used here are for clarity and are not part of the syntax) 11d

INSERT statement - LN GAP LIT 11d1

DELETE statement - LN:d [GAP] 11d2

UNDELETE statement- LN:ud [GAP] 11d3

OUTPUT file - :o GAP FILENAME (same as NLS Output File) 11d4

PRINT file - :p GAP FILENAME (same as NLS Output Device Printer File) 11d5

9934 21 JUN 72 SRI-ARC
DEX SUMMARY

```
PROCESSING PROCEDURE FOR PAPER TAPE                                    11e
  1. Mount tape on terminal or computer                                11e1
  2. LOGIN                                                             11e2
  3a. If tape mounted at terminal -                                    11e3
     (for each tape to be processed):                                  11e3a
     @ copy ptr: TENEX FILENAME CR                                     11e3b
     (Use name of "DEX" for the input file)                            11e3c
  3b. If tape mounted on computer -                                    11e4
     @ assign ptr: CR                                                  11e4a
     (for each tape to be processed):                                  11e4b
     @ copy ptr: TENEX FILENAME CR                                     11e4c
     @ deassign ptr: CR                                                11e4d
  4. Enter NLS and specify "o" (OFF-LINE DEX-1) for device             11e5
  5. DEX will print "INPUT FILENAMES:". Specify TENEX
     filenames from step 3a or 3b.                                     11e6
       TENEX FILENAME1, TENEX FILENAME2, ... TENEX FILENAMEn           11e6a
     Commas are used to delimit individual files. The character
     "+" may be used to concatenate tapes for one file. When "+"
     is used only the name of the last file (tape) in the series
     will be used.                                                     11e6b
  6. Wait for DEX to process and return user to EXEC.                  11e7
     DEX will display the message DEX IN PROGRESS until the EXEC
     herald "@" is printed.                                            11e7a
  7. LOGOUT                                                            11e8
PROCESSING PROCEDURE FOR MAGNETIC TAPE                                 11f
  1.  Load magnetic tape cartridge.                                    11f1
  2.  LOGIN                                                            11f2
  3.  Turn TermiCette device to "online".                              11f3
  4.  Type "CASSET (CR)"
      [cassette to sequential file utility]
      [special?] n
      [copy to file:] FILENAME CR CR
      [input from file:] tty: CR [confirm] CR
      [type space when ready] SP
      [rewind? (y or n)] y
                         n
      [more files? (y or n)] y
                             n                                         11f4
  4. Enter NLS and specify "o" (OFF-LINE DEX-1) for device             11f5
  5. DEX will print "INPUT FILENAMES:". Specify TENEX
     filenames used in step 4.                                         11f6
       TENEX FILENAME1, TENEX FILENAME2, ... TENEX FILENAMEn           11f6a
     Commas are used to delimit individual files. The character
     "+" may be used to concatenate tapes for one file. When "+"
     is used only the name of the last file (tape) in the series
     will be used.                                                     11f6b
  6. Wait for DEX to process and return user to EXEC.                  11f7
```

DEX will display the message DEX IN PROGRESS until the EXEC herald "@" is printed. 11f7a

7. LOGOUT 11f8

Appendix B. SAMPLE DEX SESSION

12

This sample DEX session covers most of the features of DEX described in this user guide. The terminal being used here is a Model 33 Teletypewriter Terminal with a paper tape punch and reader mechanism attached. 12a

1. Turn the teletypwriter's LINE/OFF/LOCAL knob to the LOCAL position. 12b

2. If paper tape is not already mounted, load a reel of paper tape into the paper tape punch mechanism. 12c

   Grip the plate on which the buttons for the punch mechanism are mounted. A slight pulling will lift this plate from the mechanism. Place the reel of tape into the holder and feed the end of the tape through the holders under button set. 12c1

3. Turn on the paper tape punch. Produce a paper tape leader by pressing the "HERE IS" key on the teletypewriter keyboard for a few seconds. This causes a series of holes to be punched on the tape. These are null characters which are ignored when the tape is processed. A leader is not absolutely necessary, but prevents the possibility of text being lost when the tape is mounted for reading. 12d

4. Start entering the text shown here. The first thing to appear on the tape should be a location number. Any preceding text that is not a location number will be ignored. 12e

   Type the following exactly as shown (including spaces): 12e1

```
1 /this is the first statement of a  dex test
tape (EOL)                                          12e1a
2  this  is  how  to  capitalize  words (EOL)       12e1b
2a and /ca/pi/ta/li/ze single characters (EOL)      12e1c
3 try(EOL)some(EOL)formatting% (EOL)                12e1d
3b you need a % right before '  for it to work (EOL) 12e1e
3d or else '(EOL) before each one (EOL)             12e1f
4 a '  is not a terminator when it is preceded by a
'' (EOL)                                            12e1g
5 you don't really want this statement$ (EOL)       12e1h
6 but this is ok $. (EOL)                           12e1i
8 this is a mistako>e << ok (EOL)                   12e1j
9 but this(EOL)
is much(EOL)
better' worse                                       12e1k
1 /this is how text is inserted and edited (EOL)    12e1l
12 this statement will be deleted (EOL)             12e1m
13 this statement will be deleted and then
undeleted (EOL)                                     12e1n
13:d                                                12e1o
12:d                                                12e1p
```

```
      13:ud                                                    12e1q
      :p test                                                  12e1r
      Type CTRL Z (This signals the end of the file).
                                                               12e1s
5.  Press the Paper Tape Punch's OFF button.  Then press the
REL button and pull the tape through the punch for a few
inches to produce a trailer.  Tear the tape from the
mechanism.                                                     12f
6.  When the tape is to be processed, turn the teletypewriter
LINE/OFF/LOCAL knob to the LINE position.                      12g
7.  LOGIN                                                      12h
8.  When "@" is printed at the terminal, type:                 12i
   "copy tty: TAPE1.DEX CR CR"                                 12i1
 9.  Read in the paper tape by inserting the beginning of the
tape in the tape reader and turning the tape reader switch to
start.                                                         12j
10.  Enter NLS and specify "o" when asked for device.          12k
11.  When the system prints "INPUT FILENAMES:" type: "TAPE1 .  12l
12.  The system will print "DEX IN PROGRESS".  Wait until the
system prints the character "@" before proceeding.             12m
13.  If a line printer is accessible, copy the text file
"test" created by the DEX print command to the line printer.
Type:                                                          12n
   "copy test.txt;  lpt:   CR"                                 12n1
   The resulting copy should contain the following:            12n2
      This is the first statement of a DEX test tape      1    12n2a
      This is how text is inserted and edited             2    12n2b
      THIS IS HOW TO CAPITALIZE WORDS                     3    12n2c
         and CaPiTaLiZe characters                        3a   12n2c1
      try
      some
      formatting                                          4    12n2d
         you need a % right before   for it to work      4a   12n2d1
         or else
         before each one                                  4b   12n2d2
      but this is ok $.                                   5    12n2e
      this is ok                                          6    12n2f
      but this is much worse                              7    12n2g
      (ERRORSTRINGS)                                      8    12n2h
   Note that location numbers are printed to the right of the
   page.                                                       12n3
14.  LOGOUT.                                                   12o
```

Appendix C. MODEL 33 TELETYPEWRITER TERMINAL

13

INTRODUCTION 13a

The Model 33 Teletypwriter Terminal consists of a control unit, keyboard, and optionally, a paper tape punch and paper tape reader mechanism. 13a1

(FIGURE OF KEYBOARD AND CONTROLS HERE) 13b

9934 21 JUN 72 SRI-ARC
MODEL 33 TELETYPEWRITER TERMINAL

CONTROL UNIT 13c

The configuration of the control unit depends on how the terminal may be connected to the computer. However, all terminals have the basic LINE/OFF/LOCAL knob (see Figure C-1). 13c1

LINE 13c1a

If the control is in the LINE position, the terminal should be on and connected to the computer (online) unless the terminal has been automatically disconnected. In this case turn the knob first to the OFF position, and then to the LINE position to establish a connection. 13c1a1

OFF 13c1b

The terminal is off and incapable of communicating with the computer. 13c1b1

LOCAL 13c1c

The terminal is on but not connected to the computer. When the terminal is in this mode (offline), operations such as punching paper tape may be performed. 13c1c1

KEYBOARD 13d

The teletype keyboard (see Figure C-1) is used as a standard typewriter keyboard with the exception of the keys described below. 13d1

SHIFT 13d1a

Only those keys underlined in Figure C-1 have a shift position. The shift key is non-printing and must be depressed while typing. Characters are printed as they appear on the upper half of the key. However, on some terminals: 13d1a1

K shift is not marked but appears as a [13d1a1a

L shift is not marked but appears as a \ 13d1a1b

M shift is not marked but appears as a ↑ 13d1a1c

The keyboard locks whenever an attempt is made to use the shift with a key with no shift position. 13d1a2

CTRL (Control) 13d1b

Any alphabetic character may be pressed in conjunction with CTRL. (CTRL is non-locking.) The resulting character is not always printed at the terminal. These characters are described where appropriate in this user guide. Control characters not recognized by the system are ignored but cause a bell to ring once for each ignored character. 13d1b1

ESC or ALT MODE 13d1c

This key has special significance when the terminal is connected to the computer. It is discussed where appropriate in this user guide. 13d1c1

LINE FEED 13d1d

Each time the LINE FEED key is pressed, the paper is advanced one line. 13d1d1

RETURN or CARRIAGE RETURN 13d1e

This key positions the print head to the beginning of the line. When the terminal is connected to the computer, the system automatically supplies a Line Feed for each Carriage Return. When used offline, it must be followed by at least one Line Feed. 13d1e1

REPT (Repeat) 13d1f

This key causes any character key pressed while the REPT key is depressed to be repeated for as long as the REPT key is pressed. 13d1f1

HERE IS 13d1g

This key produces a series of null characters as long as it is depressed. It is used to produce leaders and trailers on paper tape. 13d1g1

RUBOUT 13d1h

Not used by DEX. 13d1h1

9934 21 JUN 72 SRI-ARC
MODEL 33 TELETYPEWRITER TERMINAL

BREAK 13d1i

Not used by DEX.

13d1i1

PAPER TAPE PUNCH 13e

The paper tape punch is used to produce a perforated tape that can be used as input to the computer. 13e1

OFF and ON 13e1a

The ON button initiates and continues paper tape punching until the OFF button is pressed. Information punched on paper tape is also printed at the terminal. 13e1a1

REL 13e1b

The release button frees the paper tape so that the user can manually pull blank tape through the punch mechanism. 13e1b1

BKSP 13e1c

The backspace button moves the paper tape backwards one position (frame) each time the button is pressed.

13e1c1

PAPER TAPE READER 13f

The paper tape reader is used to transmit information stored on paper tape to the computer. 13f1

START 13f1a

This control initiates and continues paper tape reading. 13f1a1

STOP 13f1b

This key terminates paper tape reading 13f1b1

FREE 13f1c

This control frees the reader mechanism so that the tape can be pulled through the reader manually. 13f1c1

Appendix D. MODEL 3100 TERMICETTE

14

INTRODUCTION 14a

This appendix describes the TermiCette Model 3100, a magnetic tape cassette data terminal memory unit. It is used in conjunction with the standard keyboard-type terminals at ARC to produce DEX tapes. The only parts of this unit described here are those that are necessary to the production of DEX tapes - the indicators and controls which are used for day-to-day operations, controls which govern the speed, interface, etc. of the device, and the mechanism for loading and winding magnetic tape. 14a1

CONTROLS 14b

Power -- On/Off 14b1

Controls primary power to the TermiCette 14b1a

Line -- Local/on-line/on-line(non-print) 14b2

Controls the line connection between the TermiCette and the Computer. 14b2a

LOCAL mode - 14b2a1

the TermiCette is connected to the terminal for off-line data preparation. 14b2a1a

ON-LINE mode - 14b2a2

the terminal and Termicette are connected to the computer 14b2a2a

ON-LINE(NON-PRINTING) mode - 14b2a3

not used for DEX production 14b2a3a

Record 14b3

a momentary push button which conditions the Termicette to write data on tape character by character as received. Record mode may be terminated by: 14b3a

Pushing the STANDBY button 14b3a1

9934 21 JUN 72 SRI-ARC
MODEL 3100 TERMICETTE

Pushing the FAST REVERSE button 14b3a2

Pushing the REWIND button 14b3a3

Play 14b4

a momentary push button which conditions the Termicette to read the tape and output data character by character incrementally at the selected rate. Play mode may be terminated by: 14b4a

Pushing the STANDBY button 14b4a1

Pushing the FAST REVERSE button 14b4a2

Pushing the FAST FOWARD button 14b4a3

Pushing the REWIND button 14b4a4

Standby 14b5

a momentary push button which conditions an "idle". 14b5a

FAST FORWARD/REVERSE, SKIP/BACKSKIP, and REWIND can be performed in this mode. 14b5a1

"Idle" mode may also be initiated by: 14b5b

Pushing the REWIND button 14b5b1

Pushing the FAST REVERSE button 14b5b2

Pushing the FAST FORWARD button (Play mode only) 14b5b3

Remote control 14b5b4

Rewind 14b6

a momentary push button which sets the TermiCette to STANDBY and initiates a tape rewind. 14b6a

Fast Forward 14b7

causes high speed tape motion (400 characters per second) as long as the button is depressed. This button may be used to erase the tape. 14b7a

Fast Reverse 14b8

causes medium speed tape motion (150 characters per second) as long as the button is depressed. 14b8a

Forward Skip 14b9

A momentary pushbutton used to index the tape forward until the character or code selected by the STOP CODE SELECTOR switch is encountered. 14b9a

Back Skip 14b10

A momentary pushbutton used to index the tape backward until the character or code selected by the STOP CODE SELECTOR switch is encountered. 14b10a

Stop Code Selector 14b11

a rotary switch which determines what code or character, when read from tape, will terminate the PLAY mode or a FOWARD/BACK SKIP. The STOP CODE SELECTOR has meaning only in the PLAY and SKIP modes. When in the RECORD mode, the FORWARD and BACK SKIP buttons skip one character at a time (without erasing the characer) independent of the STOP CODE SELECTOR switch position.. 14b11a

FRONT PANEL INDICATORS 14c

The following indicate the current TermiCette operational mode. 14c1

Record 14c1a

Play 14c1b

Standby 14c1c

Rewind 14c1d

BACK PANEL VIEW 14d

The following are situated on the back panel of the TermiCette unit starting from the left. 14d1

A.C. power cord, Fuse, and Power on/off switch 14d1a

Control A.C. power to TermiCette 14d1a1

9934 21 JUN 72 SRI-ARC
MODEL 3100 TERMICETTE

Terminal socket 14d1b

terminates the data cable from any serial EIA device to be used as the off-line communicator 14d1b1

Modem socket 14d1c

terminates the data cable from any serial EIA device to be used as the on-line communicator. 14d1c1

Speed switch 14d1d

Determines the character rate of TermiCette. 14d1d1

Record switch 14d1e

Positions	Responds to	
---------	----------:	14d1e1
REM	(↑R) Recorder on from keyboard or line	14d1e2
REM	(↑T) Recorder off. From keyboard only.	14d1e3
MAN	Manual buttons only	14d1e4
OFF	Inhibits recording.	14d1e5

Code switch 14d1f

Position 1	Responds to	
----------	----------	14d1f1
	(↑Q) (Start Play Mode) from keyboard or computer	14d1f1a
	(↑S) (End Play Mode) from keyboard only	14d1f1b
	(↑Z) (End of Transmission) will terminate play mode from terminal or computer	14d1f1c
	(↑H) (Backspace) to next stop code from terminal or computer	14d1f1d
	(↑W) (Rewind) tape from terminal or computer	14d1f1e

(↑V) If in Record mode, record a (record gap) from terminal or computer 14d1f1f

(↑R) (Start Record Mode) from terminal or computer 14d1f1g

(↑T) (End Record Mode) from terminal only. 14d1f1h

Position 2 Responds to: 14d1f2

(↑Z) (End of Transmission) from tape only. 14d1f2a

(↑H) (Backspace) to next stop code from terminal or computer 14d1f2b

(↑W) (Rewind) from terminal or computer 14d1f2c

(↑V) (Rewind) from terminal or computer 14d1f2d

Position 3 (Responds to 14d1f3

Manual Controls only 14d1f3a

DUPLEX SWITCH 14d1g

If Full Duplex and 14d1g1

ON-LINE, play and record from computer only. 14d1g1a

OFF-LINE, play and record from terminal only; echo terminal data. 14d1g1b

If Half Full and 14d1g2

ON-LINE, play and record from terminal and computer; suppress computer echo. 14d1g2a

OFF-LINE, play and record from terminal; suppress terminal echo. 14d1g2b

Carriage returns delay switch 14d1h

ON=TermiCette will insert fixed 100 ms delay time after each detected carriage return read from tape. 14d1h1

OFF=no carriage returns delay time. 14d1h2

REMOTELY CONTROLLED FUNCTIONS 14e

The following functions may be controlled from the data terminal or communications channel: 14e1

Function	Controlling Code (ASCII)	
		14e1a
Reader ON (Play Mode)	DC-1 (Control Q)	14e1b
Recorder ON (Record Mode)	DC-2 (Control R)	14e1c
Recorder OFF (Standby Mode)	DC-4 (Control T)	14e1d
	Break	14e1e
Backspace	BS (Control H)	14e1f
Rewind	Strappable (Control H)	14e1g
Gap (Record Mode only)	Strappable (Control V)	14e1h

OFFLINE OPERATING INSTRUCTIONS 14f

Preparing to Record or Play. 14f1

Insure back panel switches are properly selected. (See description of back panel). 14f1a

Switch terminal to (ON-LINE). Actual online functions will be controlled by the TermiCettes [LOC-LINE-LNP] switch. 14f1b

Select (LOC-LINE-LNP] switch to desired position. 14f1c

LOC =connect keyboard, TermiCette 14f1c1

LINE=Connect keyboard, TermiCette, computer 14f1c2

LNP = Connect keyboard, TermiCette, computer and suppress computer echo to keyboard. 14f1c3

ONLINE OPERATING INSTRUCTIONS 14g

Set back panel switches properly. 14g1

Set Terminal to ON-LINE 14g2

Select termicette's LOC-LINE-LNP switch to LINE. This connects the keyboard and TermiCette to the computer. All data from the keyboard will go directly to the computer. All echos from the computer will go to both the terminal and TermiCette. In other words, if the user is working on-line and the computer echos any code that is a TermiCette function, the TermiCette will perform that function. 14g3

Push open the cassette holder unit as if to remove the cassette, or remove cassette then close holder unit. 14g4

This will inhibit TermiCette from responding to functions code echoed from the computer. 14g4a

LOCATING END OF LAST FILE (↑Z). 14h

Press FAST-FORWARD button until data light on TermiCette stops flashing. This light indicates the last file. 14h1

Select STOP CONTROL switch to (.). This will cause TermiCette to stop on (↑Z) when in PLAY mode. 14h2

Press BACKSPACE or send (↑H). TermiCette will do a high speed reverse search until it locates a (↑Z), the last recorded data record. 14h3

Select STOP CONTROL switch to LINE. This will cause TermiCette to stop on each carriage return when in PLAY mode. 14h4

The user is now located at the end of the last recorded file. To verify this, the user could issue a CONTROL H (↑H) or press BACKSPACE which would step the tap back one record. By then pressing the PLAY button or issuing a CONTROL Q (↑Q) the user may output the last record in the file for verification. It may be necessary to step back two records as the last record on the tape should have been "↑Z C" which are not printing characters. 14h5

INITIATING RECORD MODE 14i

First Record 14i1

9934 21 JUN 72 SRI-ARC
MODEL 3100 TERMICETTE

Press REWIND, or send a Control W (↑W) from the keyboard. This will insure that the tape is at beginnning. TermiCette should revert STANDBY when finished and red leader lamp should be on. 14i1a

Press RECORD or issue a Control R (↑R). Record buttons should light up varifying record mode 14i1b

NOTE: Leader lamp on and buzzer sound indicates that the user must move off leader before recording valid data. 14i1c

Issue a Control V (↑V) to record gap and move off leader. The buzzer sound will stop. 14i1d

The user may now record data. 14i1e

Next Record 14i2

If not already at end of last file follow introduction step [3.2] to locate. 14i3

Don't forget to end each record with a (carriage return). 14i4

INTERRUPTING AND RESUMING RECORD MODE 14j

To stop (interrupt) recording before the end of a file: 14j1

Type the characters ↑s CR LF ↑V 14j1a

Rewind the tape 14j1b

To resume recording: 14j2

Turn knob to DC-3 (↑s) 14j2a

Press SKIP button 14j2b

Turn knob to word 14j2c

Move SKIP button to backspace and hit the BACKSKIP button until the tape is positioned to the last word preceding ↑s. 14j2d

Turn on recorder and continue writing the file. 14j2e

TERMINATING RECORD MODE 14k

The last record should contain a Control Z (↑Z) to signify to DEX and cassette program the end of file. 14k1

After the last record a record gap should be recorded. This will allow the user to high speed search on Control Z (↑Z) successfully if needed. 14k2

Press STANDBY to terminate record mode without rewinding. Press REWIND or issue a Control W (↑w) from the keyboard to terminate mode and rewind. 14k3

INDEX

(J9934) 19-JUN-72 14:58; Title: Author(s): S.R.I. - Augmentation Research Center/&SRI-ARC; Distribution: Joy A. Glenn, Kay F. Byrd, Ralph Prather, James E. White, Augmentation Research Handbook, Jacques F. Vallee, Diane S. Kaye, Paul Rech, Michael D. Kudlick, Donald R. Cone, Don Limuti, William R. Ferguson, Priscilla Lister, Linda L. Lane, Marilyn F. Auerbach, Walt Bass, Mary S. Church, William S. Duvall, Douglas C. Engelbart, Beauregard A. Hardeman, Martin E. Hardy, J. D. Hopper, Charles H. Irby, Mil E. Jernigan, Harvey G. Lehtman, Jeanne B. North, James C. Norton, Cindy Page, William H. Paxton, Jeffrey C. Peters, Jake Ratliff, Barbara E. Row, Ed K. Van De Riet, Dirk H. van Nouhuys, Kenneth E. Victor, Donald C. Wallace, Richard W. Watson, Don I. Andrews/SRI-ARC; Sub-Collections: SRI-ARC; Clerk: MFA;
Origin: <AUERBACH>JDEX.NLS;2, 16-JUN-72 17:05 MFA ;

JCN 4-APR-72 17:25 9935

Possession Schedule for Motorola "Page-boy" communicator

The purpose of this document is to record the present procedure for the physical handling of a special ARC communication device, the Motorola "Pageboy" serial 514. 1

This device is used to provide continuous communications capability from our operations at ARC (and therefore the system users) to our software system maintenance people. 2

There are three people who will normally have possession of the device away from SRI premises. They are: 3

Donald C. Wallace (DCW) 3a

Charles H. Irby (CHI) 3b

Kenneth E. Victor (KEV) 3c

The daily schedule for use is as follows: 4

Sunday: DCW 4a

Monday: DCW to 6pm; CHI to 7pm ; KEV on 4b

Tuesday: KEV 4c

Wednesday: KEV 4d

Thursday: KEV to 6pm ; DCW on 4e

Friday: DCW 4f

Saturday: DCW 4g

This schedule will be in effect until further notice. 5

Significant departures from this pattern will be communicated by the persons concerned above to Jim Norton, ARC operations. 6

This schedule and any specially noted pattern changes will serve as our sign-out process for this equipment. 7

JCN 4-APR-72 17:25 9935

Possession Schedule for Motorola "Page-boy" communicator

(J9935) 4-APR-72 17:25; Title: Author(s): James C. Norton/JCN;
Distribution: Donald C. Wallace, Charles H. Irby, Kenneth E. Victor,
Linda L. Lane, Ed K. Van De Riet, William R. Ferguson/DCW CHI KEV LLL
EKV WRF; Sub-Collections: SRI-ARC; Clerk: JCN;
Origin: <NORTON>BEEPER.NLS;1, 4-APR-72 16:50 JCN ; ID=XXX;

ARC Visitor Log system: Requirements, Design - Some Ideas

I would appreciate any ideas ARC people may have on this subject. The following is intended to get such a system started. 1

INTRODUCTION 2

We need to make the recording of information about the many ARC visitors and other contacts easier and more organized so that reference to such data will be of use to ARC and others in SRI in the future. 2a

The best time to record such information appears to be at the time of the visits rather than later when many details may be forgotten. 2a1

The most appropriate person to start the recording process is the primary ARC contact person. 2a2

The use of online and offline pre-organized forms may be of help here. 2a3

We should try to keep the minimum amount of detail down to that really required for future use. 2a4

Use of DEX and other system aids for input seems appropriate. 2a5

SYSTEM DEVELOPMENT IDEAS 3

Start a Baseline task off with these requirements and suggestions.. find a pusher. 3a

Design an online and offline form 3b

See (norton,arcvisit,) for a proposed version. 3b1

Procedures: 3c

The ARC contact person will submit the appropriate information either online or offline as he feels best, by filling out the form and submitting to the Journal either directly or through PSO. 3c1

In Journal entry: the title should include text such as: 3c2

VISIT LOG: name, organization, date of visit 3c2a

Such Journal-entered items will be addressed as the sender feels appropriate. Summaries of these log entries will be prepared for ARC and ISE (Bart Cox) use. These log entries

will also serve to keep SRI informed of ARC visitors and other contacts. 3c3

There will be a Log Binder that contains the documents submitted to the Journal and indices of such entries. This will be available on the Handbook shelf or nearby. 3c4

Indices by Name, Company, and/or date will be made periodically. 3c5

User programs will be written that scan the log entry forms for needed data. 3c5a

In addition, other Journal indices will be scanned for entries that were not made in the usual way.. with the VISIT LOG title. 3c5b

JCN 4-APR-72 17:43 9936
ARC Visitor Log system: Requirements, Design - Some Ideas

(J9936) 4-APR-72 17:43; Title: Author(s): James C. Norton/JCN;
Distribution: Augmentation Research Handbook, Jacques F. Vallee, Diane S. Kaye, Paul Rech, Michael D. Kudlick, Donald R. Cone, Don Limuti, William R. Ferguson, Priscilla Lister, Robert L. Dendy, Linda L. Lane, Marilyn F. Auerbach, Walter L. Bass, Mary S. Church, William S. Duvall, Douglas C. Engelbart, Beauregard A. Hardeman, Martin E. Hardy, J. D. Hopper, Charles H. Irby, Mil E. Jernigan, Harvey G. Lehtman, John T. Melvin, Jeanne B. North, James C. Norton, Cindy Page, Bruce L. Parsley, William H. Paxton, Jeffrey C. Peters, Jake Ratliff, Barbara E. Row, Ed K. Van De Riet, Dirk H. van Nouhuys, Kenneth E. Victor, Donald C. Wallace, Richard W. Watson, Don I. Andrews/SRI-ARC; Sub-Collections: SRI-ARC; Clerk: JCN;
Origin: <NORTON>VISITPLAN.NLS;3, 4-APR-72 7:55 JCN ;
HJournal="*** DRAFT *** JCN 26 APR 72 4:53AM xxxx";

Visit Date:	1
Visitor name(s):	2
Position:	2a
Organization name(s):	3
Address:	3a
Location of visit: ARC (unless otherwise specified)	4
ARC participants:	5
Purpose:	6
Action (if any):	7
Comments:	8

VISIT LOG: xxx

(J9937) 4-APR-72 17:46; Title: Author(s): James C. Norton/JCN; Distribution: Augmentation Research Handbook, Jacques F. Vallee, Diane S. Kaye, Paul Rech, Michael D. Kudlick, Donald R. Cone, Don Limuti, William R. Ferguson, Priscilla Lister, Robert L. Dendy, Linda L. Lane, Marilyn F. Auerbach, Walter L. Bass, Mary S. Church, William S. Duvall, Douglas C. Engelbart, Beauregard A. Hardeman, Martin E. Hardy, J. D. Hopper, Charles H. Irby, Mil E. Jernigan, Harvey G. Lehtman, John T. Melvin, Jeanne B. North, James C. Norton, Cindy Page, Bruce L. Parsley, William H. Paxton, Jeffrey C. Peters, Jake Ratliff, Barbara E. Row, Ed K. Van De Riet, Dirk H. van Nouhuys, Kenneth E. Victor, Donald C. Wallace, Richard W. Watson, Don I. Andrews/SRI-ARC; Sub-Collections: SRI-ARC; Clerk: JCN;
Origin: <NORTON>ARCVISIT.NLS;1, 23-MAR-72 18:56 JCN ;
HJournal=" xxx 26 APR 72 xxxx";

DCE 4-APR-72 17:53 9938

Visit Log: 3 Apr 72, Cmdr. Richard L. Martin, F14 Computer Managed Training

Cmdr. Richard L. Martin, Project Manager, F14 Computer Managed Training (CMT), c/o F14 Cadre, COMFAIRMIRAMIR (Commander Fleet Air, Miramar), NAS, Miramar, Calif 92145. (714) 454-1037 (Alt., sec'y answering -- 271-2239). He had visited us about a month ago, during an intensive tour of the country's research activities. Today and tomorrow he is a guest of SRI (Goldberg/Waxman), and we spent from lunch until about 1615 together. DCW and DVN went to lunch with us. 1

Discussed his current assignment of developing a Computer Managed Training System (CMT) for the Navy's new F14 Squadrons. This CMT will be installed in the training squadron, permanently established at Miramar. Martin is slated to command one of the first two operational, fleet squadrons after the Miramar training squadron begins to turn out trained staff (and after F14 delivery). 2

Since his last visit, he has settled on the computer support for their system -- a Burroughs 3500. This is the machine that was selected by the Armed Forces as the standard "buy" for apparently a very large number of applications, and there will be many of them available in the field. 2a

They have also settled on using AFOLDS, an "Air Force On-Line Data System," programmed for the Burroughs 3500, under development by the Data Systems Design Center, Gunter AF Base, Montgomery, Ala. Joseph B. Bishop, Deputy Director of Systems Technology, is in charge of its development at Gunter. 2b

This group is responsible for data systems on the 160 or so AF Burroughs 3500 computers. Involves recommendations for updating and enhancing the operating system for the 3500s. 2b1

CMT will use this; it will be installed on a 3500 located at Hughes, sometime this summer, and Miramar's evolving CMT will be served over a 4800-baud communication line to a minicomputer (Burroughs DC1200) installed at Miramar that will serve 14 terminals (initially). Within a year there will be a 3500 complex at North Island, San Diego, to which the CMT system will transfer. 2b2

Martin has a formal arrangement with the Gunter people now, which helps both parties; there will be some 16 AF systems people assigned to help install and checkout AFOLDS on the Hughes machine (apparently this is a windfall for the AF people, who get a checkout machine sooner this way). 2b3

Visit Log: 3 Apr 72, Cmdr. Richard L. Martin, F14 Computer Managed Training

Burroughs has volunteered to donate some of the software associated with this installation, having to do with the Datacom link, involving the Burroughs DC1200 minicomputer. 2b3a

Martin might find it interesting to talk with Dean Bergstrom (315) 330-3857 at RADC, who is doing quite a bit of analysis and developmet of DBMS' for the AF. 2c

Also, Col. Leo Danielian, Plans and Ops, Office of AF Chief of Staff, Pentagon. 2d

Martin has introduced the idea of building into this Miramar CMT operation some kernel of what he calls a "Center for Applied Naval Research," where extra resources can perhaps be harnessed toward gaining exploraory knowledge about evolution of training and management systems (including organization evolution, cultural accommodation, computer techniques, etc.) 2e

Martin organized a session down at La Jolla last week, where he brought together different people who might be interested in the CMT. 2f

Among them was Prof. Richard O. Mason, of the UCLA Grad. School of Business Administration, who a a student of Wes Churchman's. 2f1

Martin showed me a paper by Mason that looks interesting: "A Dialectical Approach to Strategic Planning,", a reprint from Management Science, v. 15, No. 8, April 69 2f1a

Mason expressed interest in possibly incorporating study of the CMT project in research going on at UCLA. 2f1b

Also, Dr. S. B. Sells, Professor of Pschology and Director, Institute of Behavioral Research, Texas Christian University, Ft. Worth, Texas -- who apparently does consulting with major corporations on such as "the social structure of orttanizatins." 2f2

Drs. Blood and Roberts from Berkeley (415-642-7137) attended the conference, and are modifying a new ONR contract to conduct their research using an F4 squadron at Miramar as a test site. Along with conducting their basic research they intend to develop the methodology for interfacing with these operational units and to test the feasability of a "Center for Applied Naval Research." 2f3

DCE 4-APR-72 17:53 9938

Visit Log: 3 Apr 72, Cmdr. Richard L. Martin, F14 Computer Managed Training

Marshall J. Farr, Ph.D., Associate Director, Personnel and Training Research Programs, ONR, 800 N. Quincy St., Arlington, Va. 22217 (202) 692-4504; apparently interested. (Farr's Programs comver the following, and he lists his reports distribution under these headings:) 2f4

Personnel Measurement and Evaluation 2f4a

Personnel Selection, Assignment and Retention Research 2f4b

Job Structuring and Analysis (Improving man-job-organization interaction) 2f4c

Learning and Training Technology 2f4d

Manpower Planning 2f4e

Dr. Bert T. King, Associate Director, Group Psychology Programs, ONR, 800 N. Quincy St., Arlington, Va. 22217 (202) 692-4503 2f5

Lyman Porter, Assistant Dean of the Graduate School of Administration, UC Irvine. (Does work on Motivationa Theory, Organization-structure effects on Motivation, etc.) 2f6

Burroughs has a "network-oriented" project management system called PROMIS. Burroughs has a manual on it. They say that it carries beyond the facility offered by PERT and CPM. (Asking Martin to help us get descriptive literature about it.) 2g

CUBE (Computer Users of Burroughs Equipment) has a meeting in Wash. this week. RLM will get proceedings, and special info. having to do with CUBE and PROMIS. 2h

Martin has his eye on the ARPANET, as a future thing for their nucleus activity to tie into. 2i

Martin showed me an editoial in Aviation Week & Space Technology, March 20, 1972, about "Flexible Contracting Approach", having to do with what Lt. Gen. James T. Stewart, AF Sys Command Aero Sys Div outlined in a speech...). He said that many of the approaches they've inaugurated in the CMT have anticipated ideas outlined here. 2j

Discussed the Bootstrap Community (BC) that we are aiming to set up and support: 3

DCE 4-APR-72 17:53 9938

Visit Log: 3 Apr 72, Cmdr. Richard L. Martin, F14 Computer Managed Training

I outlined to Martin how some of the DSS and SDIS features could help both the opeational CMT system, and the "system development/analysis" activity of the Center for Applied Naval Research; also how the later activity is the type that we are aiming at for our direct clientele in the BC, tying such together via a computer network, a DSS, an SDIS, etc., into an augmented, discipline-oriented community. (Emphasized that we aren't yet ready to offer such service.) 3a

Gave him copies of the following: 4

OSR1 3906, RADC71 5255; NASA70 5140; FJCC68 3954; Dinosaur70 5255; RADC70 5139. 4a

Promised to send him a packet of documents giving a sort of overview of the ARPANET. 5

DCE 4-APR-72 17:53 9938

Visit Log: 3 Apr 72, Cmdr. Richard L. Martin, F14 Computer Managed Training

(J9938) 4-APR-72 17:53; Title: Author(s): Douglas C. Engelbart/DCE; Distribution: Douglas C. Engelbart/DCE; Sub-Collections: SRI-ARC; Clerk: DCE;

RWW 5-APR-72 14:13 9939

Some Further Thoughts on NLS Costs

The little note on WYLBUR (9837,)has gotten some very useful discussion as well as LPD's reply (9919,) as feedback. What Peter said about why WYLBUR is cheaper to operate than NLS is all true (except it is my understanding that WYLBUR is not subsidized, but runs in the foreground while the 360 grinds on batch stuff paying part of the freight in the background), but misses the main point of interest to me dealng with ARC's research and "business" strategy, which I did not make at all clear. 1

It is true that NLS runs under a relatively expensive timesharing system, is written in a relatively inefficient object code producing (as I understand),but easily changed higher level language, has structure etc., but except for the structure (and even here not for all classes of problems of common use) most of these reasons for more expense maybe irrelevant to the user. To the user the system is a black box and he is primarily at any point in time interested in the features available to him to do his job and the cost of doing that job (some users are also interested in the ease with which the system can be changed to meet his needs). The user could care less that it is implemented with gold threaded helixes etc. unless it shows up somehow in value at a price he is willing to pay in his dailey work. 2

The above statement is not the main point that I want to make, the point is, what is the nature of our research and development and business strategy? 3

In my discussions with people about this problem there seem to be two points of view which get represented, both equally valid, but each having quite different implicationss for allocating resources for the short term and quite different strategies for longer range funding goals, etc.. 4

One point of view, which seems predominent in ARC at this time is the conventional R&D view that what we are doing is just building a prototype system to experiment with different features and, subsystems and except for the level of effort to measure the system as at present and a willingness to make minor changes in NLS, we should not be concerned much with cost. To make crude estmates that it costs $15 to $25 per hour to run NLS and compare that with a system such as WYLBUR is irrelevant. To consider that NLS might need major restructuring to cut the cost of the heavily used text editing features could compromise our R&D goals and could compromise the implementation strategies we have become accustomed to prefer. 4a

Our main goal at this time is to remain very flexible with a system easy to change or make additions to. 4b

The above point of view as mentioned above is a valid one and is one we could adopt (or maybe it is the one in existence and I just need to recognize this fact). 4b1

The other point of view recognizes the prototype nature of many aspects of our work and the need for flexibility, but says that cost is important for those aspects of NLS like editing that are heavily used and quite well developed. Some of the reasons why cost is important seem to me to be the following: reasons why I believe cost is important are the following: 4c

1) We want to have other groups run NLS on their systems and use it in their daily work, come to like it, want to learn more and collaborate with us on its further evolution. 4c1

Resources in these other systems are usually scarce and the people involved have their own priorities for the allocation of these resources. They therefore are not going to want NLS hogging their system even if time is free to their users. Other systems such as BBN or Tymmshare actually bill their users and it isn't going to take the users long to figure out some rough hourly cost of using NLS instead of their local brand X editer. Now we know NLS is much more than an editer, but most of what we do around here is simple editing and that is what they are going to be doing, probably in TNLS for several years to come. 4c1a

2) We want other system development groups to join with us on further evolution of NLS , probably using facilities we provide and charge for, but even here these highly motivated tolerant people will be operating under cost constraints and will be examining NLS costs directly or indirectly. We hope to provide these groups with classes of information services based on NLS which will compete in many instances with methods presently in existence for doing much the same thing, therefore we must show enough benefit relative to cost for them to maintain enthusiastic interest. 4c2

3) There has been talk of wanting to make the NIC more self sufficient financially which will require direct charging of end users for NLS usage and I frankly am not sure we could get many customes at our present level of estimated expense. 4c3

4) We would like in the not too distant future to see other

organizations offer commercial NLS based services to end users, but to get off the ground some main pieces of NLS need to be cost effective enough for them to get launched so that they can go on to work further at cutting the cost of other needed parts with further development. 4c4

It may be that my crude estimates of NLS usage costs are way off and both points of view above are compatible. It is clear that there are many dimensions in the design of a system like NLS of which cost is only one, but it is one which could make a big difference in our planning, for example, it is my guess now that at present costs NIC is only viable as a completely or very heavily subsidized effort and the correct understanding of our strategy is required for our future planning now going on. 5

RWW 5-APR-72 14:13 9939

Some Further Thoughts on NLS Costs

(J9939) 5-APR-72 14:13; Title: Author(s): Richard W. Watson/RWW; Distribution: James G. Mitchell, L. Peter Deutsch, Diane S. Kaye, Don I. Andrews, Walter L. Bass, William S. Duvall, Mary S. Church, J. D. Hopper, Charles H. Irby, Harvey G. Lehtman, John T. Melvin, Bruce L. Parsley, William H. Paxton, Don I. Andrews, Donald C. Wallace, Michael D. Kudlick, Paul Rech, James C. Norton, Douglas C. Engelbart, Jacques F. Vallee/NPG DIA DCW MDK PR JCN DCE JFV; Sub-Collections: SRI-ARC NPG; Clerk: RWW;
Origin: <WATSON>MORE.NLS;5, 5-APR-72 14:12 RWW ;

ADO 5-APR-72 17:51 9940

We have recieved our first shipment of documentation. Thanx 1

I am in great need of the complete set of RFC's. I gather that a set of these is due to be sent to SAAC, and wonder if you could have them sent as soon as possible. 2

It seems to be the case that the SAAC user idents (ado,vrb,auk) are not set up for on-line reciept of NIC messages. Could you change this? 3

Are you going to wait for our TIP to be installed to create SAAC's directory? 4

..Buz OWEN 5

(J9940) 5-APR-72 17:51; Author(s): Buzz Owens/ADO; Distribution: Cindy Page/CXP; Sub-Collections: NIC; Clerk: ADO;

Richard W. Watson
Augmentation Research Center
Stanford Research Institute
Menlo Park, California 94025

To:
Access Copy

9943

RWW 6-APR-72 8:33 9943

A Suggested NIC Planning Strategy for the Next Couple of Weeks

(J9943) 6-APR-72 8:33; Title: Author(s): Richard W. Watson/RWW; Distribution: Jeanne B. North, Jacques F. Vallee, James E. White/JBN JFV JEW; Sub-Collections: SRI-ARC; Clerk: RWW;

RWW 6-APR-72 8:33 9943

A Suggested NIC Planning Strategy for the Next Couple of Weeks

NIC Planning Needs 1

NIC planning is an ongoing process, it seems to me at this point our strategy ought to be to accomplish the following in the next couple of weeks or so. 1a

Keep adding ideas comments to <watson>framework as a file for the holding of ideas. 1a1

Work at developing the matrix of products and their needs being drafted by JBN. 1a2

There are two kinds of products, products that now exist and those we would like to offer. 1a2a

As we fill in the matrix we should distinguish between those features which we feel are needed to really make the product operational and those which are desired as enhancement (even here maybe there should be a couple of categories) 1a2b

After we are reasonably happy with the matrix then we should probably do some ordering of the tasks which need to be done. 1a3

We then probaly need to determine staffing needs to accomplish the job defined. 1a4

In parallel with the above we should be taking a more detailed look at the Information Management System needs which are required to support NIC, and to try to define a clearer idea of what a novice mode NLS would look like. 1a5

Delivery and Marketing: I

Purpose: Discussions and Plans in the area of "Delivery and Marketing" 1

Participants; MDK, DCW, CHI, DIA, KEV 2

Objectives: 3

To determine bases upon which to charge paying customers for the services provided by the SRI-ARC TENEX/NLS System. This includes billing algorithms and prices per unit billed; it includes establishment of "privileged customer" classes, to give "better" service to those willing to pay more; it includes novel methods of allocating resources, for example by guaranteeing 1/n of the system to each of n users. 3a

To determine the primary and secondary hardware and software components of the SRI-ARC TENEX/NLS System which need upgrading and/or replacement, in order to attain a state of reliability and responsiveness that makes the system acceptable from the point of view of paying customers. 3b

To determine feasible alternatives to those present hardware and/or software components that are "shaky". 3c

To determine how to alleviate the potential conflict in sharing the SRI-ARC TENEX/NLS System between ARC R&D types, and outside-world types (like NIC users). 3d

Suggested Procedures: 4

Study the existing TENEX configurations, determining components, reliability, costs, billing procedures,etc. 4a

Study the literature to determine current innovative ideas in the areas of accounting, scheduling and allocation of resources, display configurations, hard-copy output, etc. 4b

Investigate the possibility of contracting with TYMSHARE to do facilities management of a PDP-10 TENEX System for SRI-ARC's "customers" (other than ARC R&D work). This is already underway. See (KUDLICK,TYMSHARE,1:w) 4c

Initial Tasks (decided April 5) 5

In the following list, the tasks are to write up a page or so describing the problem area and possible ways to resolve it. These will be discussed at the next meeting, April 19 3:00 PM. 5a

Delivery and Marketing: I

DIA,DCW	Drums' Future UNIVAC,BRYANT; role of RPO-2's, and RPO-3's. Sector Address Readout Hdw Modification.	5b
CHI	Terminals CRT; Alpha-Numeric only; Minicomputers. Mouse, Keyboard, and Keyset upgrading	5c
KEV	Large-Capacity File Storage UCSB and NASA-AMES Systems	5d
DCW	Bryant Disk Contract Relationship with Bryant Refurbishment Costs Paperwork required to get rid of Bryant Disk.	5e
	TENEX Developments	
DCW...	BSYS (Backup System)	
...	Multi-Processor	
DIA.....	Scheduler	
.....	Page Management	
CHI.....	Sequential Display Area	
.....	Literal Collection in Monitor	5f
MDK	Hardware Monitors Alternative Makes and Costs	5g
DIA	User Profiles Statistics and Distributions of NLS Command usage, core and disk size requirements, working set sizes, etc.	5h
MDK	Accounting Methods Bidding; Fixed Charging; Resource Allocation Acct'g Demo of Unique Aspects of NLS	5i
MDK	TYMSHARE Facilities Management	5j
CHI	TNLS (DNLS?) at RAND	5k
KEV	Requested New Capabilities e.g., speech-recognition use of DNLS	5l
Other Areas Needing Attention:		5m
Memory Parity Problems		5m1

Delivery and Marketing: I

Delivery and Marketing: I

(J9944) 6-APR-72 8:46; Title: Author(s): Michael D. Kudlick/MDK; Distribution: Don I. Andrews, Charles H. Irby, Donald C. Wallace, Richard W. Watson, Kenneth E. Victor, John T. Melvin, Michael D. Kudlick/DIA CHI DCW RWW KEV JTM MDK; Sub-Collections: SRI-ARC; Clerk: MDK;
Origin: <KUDLICK>DELIVERY.NLS;4, 6-APR-72 8:41 MDK ;

RWW 6-APR-72 11:10 9945

Notification of a NIC Planning File for Needs Possibilities and other Ideas

The NIC planning team is going to try to work from a common set of files in its planning, the initial file being (watson,framework,). Others may come into existence as time goes on. 1

The following ground rules were set up for working with the common dialog files. 2

Anybody can read and modify these files if the following rules are adhered to. 2a

New statements commenting on or adding to material in the file can be added at appropriate points, normally down from statements commented on. The initial characters of the top statement of a new branch must start with the following syntax ID ': . 2b

This convention was added even knowing that it is redundant with information in the signature because files are hard to read with signatures turned on (maybe if this convention really proves useful it could be created automatically by an appropriate viewspec) and because there is much precedent in published conversations for this type of format as being useful. 2b1

Statements or other structure cannot be deleted,but a comment one level down at an appropriate place requesting deletion can be made. 2c

Statements cannot be replaced in whole or in part, but appropriate text and structure which is a candidate for replacement should be placed one level down from the appropriate place. 2d

Once a week someone from the NIC planning team will perform any appropriate cleanup leaving useful dialog intact or summarized. 2e

Please update the file when you make any changes. 2f

RWW 6-APR-72 11:10 9945

Notification of a NIC Planning File for Needs Possibilities and other Ideas

(J9945) 6-APR-72 11:10; Title: Author(s): Richard W. Watson/RWW; Distribution: Augmentation Research Handbook, Jacques F. Vallee, Diane S. Kaye, Paul Rech, Michael D. Kudlick, Donald R. Cone, Don Limuti, William R. Ferguson, Priscilla Lister, Robert L. Dendy, Linda L. Lane, Marilyn F. Auerbach, Walter L. Bass, Mary S. Church, William S. Duvall, Douglas C. Engelbart, Beauregard A. Hardeman, Martin E. Hardy, J. D. Hopper, Charles H. Irby, Mil E. Jernigan, Harvey G. Lehtman, John T. Melvin, Jeanne B. North, James C. Norton, Cindy Page, Bruce L. Parsley, William H. Paxton, Jeffrey C. Peters, Jake Ratliff, Barbara E. Row, Ed K. Van De Riet, Dirk H. van Nouhuys, Kenneth E. Victor, Donald C. Wallace, Richard W. Watson, Don I. Andrews/SRI-ARC; Sub-Collections: SRI-ARC SRI-ARC; Clerk: RWW;
Origin: <WATSON>RULES.NLS;4, 6-APR-72 11:03 RWW ;

Groups for Directory, Complete List, and Some Descriptions

Please give us writeups of purpose, activities, meeting times, present membership of the following Groups: 1

- Network Facilitators 1a
- Network Liaison Group 1b
- Network Working Group 1c
- Network Working Group Steering Committee 1d
- Speech Understanding Research Group 1e
- and Principal Investigators, for LGR 1f

Please check to see whether we have overlooked any groups. 2

JBN 6-APR-72 15:20 9967

Groups for Directory, Complete List, and Some Descriptions

(J9967) 6-APR-72 15:20; Title: Author(s): Jeanne B. North/JBN;
Distribution: Steve D. Crocker, Richard W. Watson/SDC2 RWW;
Sub-Collections: NIC; Clerk: BER;
Origin: <ROW>JCROCKER.NLS;1, 6-APR-72 15:18 BER ;

1

A first cut at an archival system for ARC

2

BSYS (the tenex Backup SYStem) has reached a stage in its long and not so eventful history that would allow us to provide meaningful archival of ARC tenex files. Basically BSYS is a file system utility that has routines for "running" the file system structure. Routines are available for dumping (archiving) of user files on magnetic tape. 2a

2b

Effective friday april 17,1972 at 6:00pm P.S.T. a primitive archiving system will be in operation. 3

facilities are provided for: 3a

specific archive requests 3a1

automatic file deletion (after archival) 3a2

automatic archival of files not referenced in "n" days (30) 3a3

automatic notification of an operator for manual retrieval 3a4

inquiry for specific file archive information 3a5

The following commands have been implemented in the EXEC (later in NLS) to support archiving and retrieving of user files. 3b

EXEC command to invoke archiving of a specific file 3b1

@ARCHIVE filename [,] optional comma invokes subcommands 3b1a

's are allowed in all fields and a null filename equals <connected-directory>.*;* 3b1a1

subcommands: ($ means normal defaults) 3b1b

@@DEFERRED($) - archive this file at next regular

archival (initally on a nightly basis after the regular dump)

3b1b1

@@IMMEDIATE - (to be implemented soon)
copy this file to directory <ARCHIVE> with a funny name and when regular archiving done archive it in original directories archive with the original name.

3b1b2

@@DON'T ARCHIVE - do not archive this file (BSYS will ignore this file for all archival functions)

3b1b3

This should include deletion of the funny named file in <ARCHIVE> if one exists

3b1b4

@@DELETE($) - delete this file once it is archived

3b1b5

@@DON'T DELETE - dont delete this file once it is archived

3b1b6

@@RESET - resets all archival attributes of this file

3b1b7

@@STATUS - type the current "archival status" of the specified file(s)

3b1b8

3b1b9

3b1c

EXEC command to interrogate the archive directory file

3b2

@INTERROGATE (archive) filename

3b2a

either types "THAT FILE IS NOT ARCHIVED" "

3b2a1

or "ARCHIVED ON ARC TAPES NNN AND MMM"

3b2a2

if the file is found in the archive directory file "DO YOU WANT IT RETRIEVED?" will be asked. If the answer is yes a message will be logged on a special logger. The message would contain

filename, tape nos., requestors name, tty, and job number 3b2a2a

The ARC operator will periodically check the special logger for retrieval requests. Immediate or special requirements should be prearranged or manual notification should be used in conjuction with the logger. 3b2a2b

When the file has been retrieved the user will be notified via the LINK or NOTIFY facilities if he is still on the system, otherwise the operator will use SNDMSG (the MESSAGE.TXT file in your directory) to leave a confirmation message. 3b2a2c

The actual lookup portion of this command will be implemented via a high segment file (ala L10) allowing NLS or any subsystem to interrogate the archive directory file.

3b2b

BSYS dumps a file on two (2) different tapes before it is considered archived. When it has been archived an entry is made in an archived files directory file. Entries are made in the form of a doubly strung list containing Backup Descriptor Blocks (BDB) plus name,extension and account strings.

3c

3d

DCW 6-APR-72 15:55 9968

A First cut at an archival system for ARC

(J9968) 6-APR-72 15:55; Title: Author(s): Donald C. Wallace/DCW; Distribution: Charles W. Rose, David W. Shipman, James A. Moorer, Stan L. Mantiply, Rainer W. Schulz, Bob Van Tyul, Jeanne B. North, Robert L. Dendy, John T. Melvin, Kenneth E. Victor, John W. McConnell, Peggy M. Karp, Dan L. Murphy, Rod M. Fredrickson, Peter H. Lipman, Donald C. Wallace, Carl M. Ellison, Ted R. Strollo/TUG; Sub-Collections: SRI-ARC TUG; Clerk: DCW;
Origin: <WALLACE>ARCHIVE.NLS;4, 6-APR-72 14:16 DCW ;

JTM 6-APR-72 22:25 9969

blurb to Jon

Jon, John McConnell spoke to me about the possibility of our getting together sometime around the 20th (??) to talk about getting traffic up on the net and getting the service centers off their back. As you may know, I'll be at Rand by then and would like to contribute, though at present I don't know what my exact responsibilities, etc. will be. Be in touch and let me know whats to happen about the meeting, ok?...John 1

JTM 6-APR-72 22:25 9969

blurb to Jon

(J9969) 6-APR-72 22:25; Title: Author(s): John T. Melvin/JTM; Distribution: Jonathan B Postel, John W. McConnell, Alex A. McKenzie, James E. White, Steve D. Crocker/JBP JWM AAM JEW SDC2; Sub-Collections: SRI-ARC; Clerk: JTM;