WANG

TC Support Utilities 1
User Manual

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WANG LABORATORIES, INC.
ONE INDUSTRIAL AVENUE, LOWELL, MASSACHUSETTS 01851, TEL. (617) 459-5000, TWX 710 343-6769, TELEX 94-7421

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WANG LABORATORIES, INC.
ONE INDUSTRIAL AVENUE, LOWELL, MASSACHUSETTS 01851, TEL. (617) 459-5000, TWX 710 343-6769, TELEX 94-7421

PREFACE

Wang's TC Support Utilities 1 Package may be obtained on a Model 2270-type diskette, a Model 2240-type flexible disk, or as a disk image on cassette package for systems with hard disks only. Package numbers for all three media are as follows:

Model 2240-type flexible disk	195-0026-2
Model 2270-type diskette	195-0026-3
Disk image on cassette	195-0026-7

The version received should be checked to determine its compatibility with the disk units in the Wang system for which the TC Support Utilities 1 package was obtained.

> NOTE:
>
> The disk image on cassette package must be copied from cassette to disk before it can be used. Instructions are given in Appendix B.

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CHAPTER 1
GENERAL INFORMATION

1.1 TC SUPPORT UTILITY PROGRAMS

Wang's TC Support Utilities 1 package contains programs designed to perform special functions associated with telecommunications applications where data or program files, or both, are to be transmitted from or received to disk. The programs are described briefly in Table 1-1. As indicated in the Preface, the package is available on three media. A copy of this manual is included with each package.

Collectively the programs in the TC Support Utilities 1 package are referred to as the Telecommunications Support System or, for convenience, the TCS system. However, each program in the system is essentially standalone in nature and has its own operating instructions. To access a particular program, the system must be loaded in the central processor using some general operating instructions which produce a "menu" on the CRT. The menu gives the names of the available programs and the special function key by which each program is accessed.

General operating instructions for the TCS system are given in this chapter. Specific operating instructions for particular programs in the system are given in other chapters. During execution of the TCS system, prompts appear on the CRT indicating action to be taken or information to be furnished. Thus, operational simplicity and success are assured if the prompts are read and proper action or responses follow.

Table 1-1. Programs and Purposes

Program	Purpose
Data Entry 1	Allows the user to create a new disk data file in TC format, or to edit, delete, rearrange, create, and list records in an existent TC formatted disk data file. (The TC format is defined in Appendix A. See Chapter 2 for specific operating instructions.)
De-atomize	Allows the user to de-atomize* a BASIC language program currently stored on disk in Wang's standard program file format, and also convert the program file into a TC formatted disk data file suitable for subsequent transmission to a remote system. (See Chapter 3 for specific operating instructions.)
Atomize	Allows the user to atomize* a BASIC language program previously received from a remote system and currently stored as a TC formatted disk data file; furthermore, the TC format is automatically converted into Wang's standard program file format. (Caution: Unless at least one program statement is known to exist in a TC formatted disk data file, do not attempt to atomize the file. If uncertain about the existence of program statements in a particular file, first use the Data Entry 1 program to list the data file on a printer and examine the contents. See Chapter 3 for specific operating instructions.)
Initialize Atom Table	Though available, this program should not be needed if a backup copy of the TCS system is maintained in accordance with recommended practice. The program can be used to recover from accidental destruction of the atom table on the TCS system disk, but the preferred recovery method is to use the TCS system backup disk to copy the entire system to a new disk.

*By defining a set of "text atoms" (i.e., special 8-bit codes) corresponding to most BASIC language words such as SAVE, INPUT, PRINTUSING, GOSUB, etcetera, Wang systems employ a unique and efficient "atomization" technique requiring less user memory than systems which store all program text character-by-character. For example, the word PRINTUSING requires one byte when atomized, rather than ten bytes if not atomized.

1.2 CPU AND PERIPHERAL REQUIREMENTS

The TC Support System requires a 2200T or equivalent central processor with 16K bytes of memory, and a dual disk drive (either a hard disk or diskette drive.)

1.3 GENERAL OPERATING INSTRUCTIONS

The TCS system can be loaded by using or not using Wang's Integrated Support System (ISS), as preferred.

Using ISS

Anyone familiar with the Integrated Support System and wishing to use the Telecommunications Support System in conjunction with ISS should follow the normal ISS procedure. However, when asked to select an address for the application disk, select B10, B20 or B30. Then, mount the TCS system disk at the selected application disk address at the appropriate time.

Not Using ISS

To load the TCS system independently, proceed as follows:

1. Mount the TCS system disk at an R location corresponding to an F disk address 310, 320 or 330.

2. Key the following commands if disk units 310/B10 are used:

   ```
   :CLEAR [EXEC]
   :LOAD DC R "START" [EXEC]
   :RUN [EXEC]
   ```

   Key the following commands if disk units 320/B20 or 330/B30 are used:

   ```
   :CLEAR [EXEC]
   :COM S1 [EXEC]
   {:S1=5 [EXEC]   if units 320/B20 are used, or}
   {:S1=6 [EXEC]   if units 330/B30 are used.   }
   :LOAD DC R /xyy, "START" [EXEC] , where xyy is 320 or 330.
   :RUN [EXEC]
   ```

3. If the following display appears on the CRT:

   ```
   MOUNT SYSTEM DISK IN REMOVABLE DRIVE.
   KEY RETURN(EXEC) TO RESUME.
   ```

   remount the TCS system disk if not already properly mounted in an R disk location. Then, key RETURN(EXEC).

4. When the following display appears:

```
                TELECOMMUNICATIONS SUPPORT SYSTEM

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
FN KEY   PROGRAM NAME                    FN KEY   PROGRAM NAME
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
  00 - DATA ENTRY 1                        02 - ATOMIZE
  01 - INITIALIZE ATOM TABLE               03 - DE-ATOMIZE
                                           15 - RETURN TO ISS

STOP
:
```

press the special function key corresponding to the desired program -- if already familiar with operation of the particular program. If not familiar with a program, read the chapter describing operation of the program.

1.4 REMARKS

If the TCS system is loaded without using ISS, ignore S.F.'15 (RETURN TO ISS) in the system menu. Pressing S.F.'15 when not operating under ISS, produces an †ERR 64 message and then returns control to the operator. To recover use of the TCS system, key RUN EXEC ; then, follow the instructions in Section 1.3 beginning with Step 3. On the other hand, if the TCS system is no longer needed after the †ERR 64 message appears, clear the system and remove the TCS system disk.

Whether operating the TCS system under ISS or independently, ignore S.F.'1 (INITIALIZE ATOM TABLE) in the system menu. See the reason given in Table 1-1.

If S.F.'0 (DATA ENTRY 1) is pressed while the TCS system menu is displayed, the menu disappears and is replaced briefly by the following display:

```
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                                                         *
*                    SYSTEM NOW LOADING                   *
*                       DATA ENTRY 1                      *
*                                                         *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
```

Alternatively, if S.F.'2 (ATOMIZE) or S.F.'3 (DE-ATOMIZE) is pressed, a similar asterisk bordered rectangle appears and shows the name of the program being loaded. Afterwards, the first prompt related to the loaded program appears on the CRT.

CHAPTER 2
OPERATING THE DATA ENTRY 1 PROGRAM

2.1 SPECIAL FEATURES

The Data Entry 1 program can be used to create a TC formatted disk data file, or to edit, delete, rearrange, create, and list records in an existent TC formatted disk data file. (See Appendix A for a definition of the TC format.)

During operation of the Data Entry 1 program, the F disk location is used for the edit work file -- a cataloged file named EDITAREA with 1002 sectors reserved. The file may be cataloged on a disk platter prior to execution of the program, thereby permitting reuse of a previously used "work disk"; otherwise, the Data Entry 1 program automatically catalogs the EDITAREA file on the platter mounted at the designated F disk device address -- if sufficient space is available. Any information currently in an EDITAREA file is overwritten when the Data Entry 1 program is initially used, or terminated and then used again.

> NOTE:
>
> If using a diskette or flexible disk type unit for execution of the Data Entry 1 program, be sure the platter mounted at the F location has sufficient space to open the EDITAREA file. The maximum number of sectors available on each diskette or flexible disk platter is 1024, numbered from 0 through 1023; however, some sectors must be utilized for the catalog index. Keep in mind that a SCRATCH DISK statement automatically reserves 24 sectors for the catalog index if the 'LS' parameter is not specified. Therefore, when initializing the catalog on a platter to be used as a work disk, ensure sufficient space for the 1002 sectors required by the EDITAREA file by assigning a value less than or equal to 22 for LS. For example, use
>
> ```
> SCRATCH DISK F LS=5, END=1023
> ```

All record editing and/or creation takes place within the edit work file. To create a new data file in TC format, records are entered in the edit work file, record-by-record, beginning with record number 1. On the other hand, to edit an existing TC file, the entire file is first loaded into the edit work file by using Data Entry 1's LOAD command; then, other commands are used to alter the contents or positions of single records or groups of records.

The Data Entry 1 program utilizes two sets of "command level" operations called "TC file operations" and "edit area operations". The TC file operations affect only named TC files on a disk mounted at an R location; the edit area operations affect only the records currently in the edit work file.

Records in the edit work file are accessed and referenced by their sequential location within the edit file. Thus, at any given time, the first record in the edit file is record number 1, the second record is record number 2, the twenty-fifth record is record number 25, etcetera. If two or more TC files are sequentially loaded into the edit work file, records are identified by their position in the entire edit file rather than their positions in the original files.

When execution of the Data Entry 1 program begins, the operator is asked to specify the maximum number of bytes per record. Once specified, the maximum record length cannot be changed without terminating execution and returning to the TCS system menu stage.

The edit area, i.e., the edit work file, can hold a maximum of 3000 records at any given time if the maximum record length is 80 bytes. Similarly, the edit area can hold a maximum of 2000 records at any given time if the maximum record length is 128 bytes.

Keep in mind that the operator-specified value (80 or 128) determines the number of bytes reserved for processing each record. If the specified record length is 128 and an existing file containing 80-byte records is loaded into the edit area, the system automatically appends 48 space characters to the end of each record loaded into the edit work file. On the other hand, if the specified record length is 80 and an existing file containing 128-byte records is loaded into the edit area, the system automatically truncates each record loaded into the edit work file and thus processes only the first 80 bytes.

> NOTE:
>
> When an existing TC formatted disk file is loaded into the edit work file, the original file is not destroyed or altered. However, in those cases where Data Entry 1's SAVE command is used to save the edit work file back into the original file, any truncated record information is lost permanently.

2.2 DISPLAYS AND PROMPTS

As indicated in Chapter 1, the Data Entry 1 program can be accessed by pressing S.F.'0 when the TCS system menu is displayed on the CRT. If S.F.'0 is pressed, the following display briefly replaces the menu.

```
* * * * * * * * * * * * * * * * * * * * * * * * * *
*                                                   *
*                  SYSTEM NOW LOADING               *
*                     DATA ENTRY 1                  *
*                                                   *
* * * * * * * * * * * * * * * * * * * * * * * * * *
```

Then, the first prompt appears as follows:

```
ENTER THE NUMBER OF COLUMNS IN THE CARD IMAGE.  (80 OR 128)
?_
```

After a valid reply (80 or 128) is keyed and the operator keys RETURN(EXEC), the following instruction appears:

```
MOUNT WORK DISK IN FIXED DRIVE.
KEY RETURN(EXEC) TO RESUME.
```

Now a disk containing an already cataloged EDITAREA file with 1002 sectors reserved, or a disk with sufficient space for the Data Entry 1 program to automatically open such a file, should be mounted at the F location. When mounted, key RETURN(EXEC). Then, the following display briefly appears:

```
LOADING COMMAND MODULE
```

Next, the Data Entry 1 program displays the first one of its "command level" prompts; each command level prompt shows the number of records currently in the edit work file (the edit area), and also shows the previous command given by the operator, if any. Initially, the number of records is zero and the previous command is none as shown here:

```
NUMBER OF RECORDS IN EDIT AREA = 0
PREVIOUS COMMAND WAS   (NONE)
KEY  '0 FOR HELP
KEY '31 TO TERMINATE

ENTER COMMAND?
```

Before responding to the first command level prompt, the TCS system disk can be removed from its R location to permit the mounting of a disk containing a TC file to be edited, or mounting a disk onto which a new TC file is to be saved after its creation in the edit area file at the F location.

If using the Data Entry 1 program for the first time, or desiring detailed information about the action associated with the available command level operations, Section 2.3 is recommended reading. The command level operations are summarized for convenience in Tables 2-1 and 2-2.

Also, whenever the program is at the command level, the operator can press S.F.'0 (HELP) to obtain a two-part display showing the format and brief descriptions of the available commands. For completeness, the two-part display is reproduced in Section 2.5.

As indicated in the note in Section 2.3, keep in mind that Data Entry 1 commands must be entered character-by-character. Do not use a BASIC language keyword key to enter a Data Entry 1 command.

2.3 COMMAND LEVEL OPERATIONS

Whenever the prompt "ENTER COMMAND?" appears, the Data Entry 1 program is at the "command level" from which any one of many different operations can be initiated. While at the command level, the display shows the previous command and the number of records currently in the edit area; furthermore, S.F. '0 can be pressed to obtain a list of the acceptable commands -- the general forms and brief descriptions of the commands are given in the resulting display.

Commands are entered by keying the appropriate characters followed by [EXEC]. Spaces may be entered as desired; spaces are automatically deleted unless within quotation marks.

> NOTE:
>
> Commands must be entered character-by-character whenever the Data Entry 1 program is at the command level. For example, key L, I, S, T to enter a LIST command; do not use the BASIC keyword LIST key.

The commands shown in Table 2-1 operate only on a cataloged TC file mounted at the R drive. Items within brackets are optional. The symbols i, j represent record numbers such that $i \leq j$.

The commands shown in Table 2-2 operate only on the edit area. Items within brackets are optional. The symbols i, j, k represent record numbers such that $i \leq j < k$ or $k < i \leq j$.

To examine the contents of an existing TC file, use the LIST command described in Table 2-1. To edit one or more existing TC files, use the LOAD command; then, use the edit area commands described in Table 2-2.

To create a new TC file, begin with the EDIT command in Table 2-2. The procedure is outlined in Section 2.6.

Whether editing existing files or creating a new file, the SAVE or SAVE N command in Table 2-1 must be used before terminating execution of the Data Entry 1 program. When the program is terminated, information in the edit area is destroyed.

Table 2-1. TC File Operations

Command	Operation
LIST "name"	Prints the contents of the named TC file -- "name" must be the catalog name of a TC formatted data file mounted at the R disk location. The printer (address 215) must be ready, and must have 8 1/2" x 11" paper mounted for 80-byte TC files, or 15" x 11" paper mounted for 128-byte files.
LOAD "name"	Loads the named TC file into the edit work file area -- "name" must be the catalog name of a TC formatted data file mounted at the R disk location. The records are appended to those already in the edit area; therefore, if desiring to edit files one at a time, use the DEL command to clear the edit area before loading another file.
SAVE [i/j] "name"	Saves all or selected sequential records from the edit area onto the existing file specified by "name". If selected records are to be saved, i specifies the starting record number, j the ending record number. Records are saved beginning at the first sector of the cataloged file; therefore, any records already in the file are lost. Any trailing space characters in each record, except the first record, are truncated; all 80 or 128 bytes of the first record are saved. If the named file is too small to contain all the specified records, the Data Entry 1 program saves records until the named file is full, and then displays a message indicating the record number of the last record saved. Since the edit area is not altered by SAVE, any excess records can be saved into another file, or the original SAVE can be reexecuted on a larger file.
SAVE N [i/j] "name"	Establishes a new cataloged file on the disk mounted at the R location, and then saves all or selected sequential records from the edit area into the new file -- "name" specifies the name of the new file. If record numbers are specified, only records i through j are saved. Any trailing space characters in each record, except the first record, are truncated; all 80 or 128 bytes of the first record are saved. The number of sectors in the new file is determined by the following formula: S = INT((N+2)/M) + 4 where: S = number of sectors to be cataloged. N = number of records to be saved. M = 3 for 80-byte-record files, or = 2 for 128-byte-record files. If there is insufficient space in the catalog area to open a file of S sectors at the R location, an error message appears. Also, it is possible for the cataloged file to be too small to receive all the records if the edit area contains many records close to the 128-byte maximum length. In such a case, the program saves records until the file is full, and then displays a message indicating the record number of the last record saved. The edit area is not altered by SAVE N.

Table 2-2. Edit Area Operations

Command	Operation
COPY i/j/k	Copies records i through j and inserts the copied records in front of record k. Records i through j are unchanged by the operation; however, records are automatically renumbered sequentially after the COPY operation is completed. To copy records to the end of the file, specify k as one greater than the highest record number.
DEL i[/j]	Deletes record i, or all records i through j inclusive. All remaining records are automatically renumbered sequentially after the operation is completed. The DEL command can be used to clear the edit area prior to creating a new file or prior to loading a file to be edited separately (rather than in sequence with other files).
EDIT [O] i	Accesses record i for editing, and puts the program at the "record-display" level (see Section 2.3). If the optional O (uppercase O) parameter is specified, i denotes the original ith record prior to any automatic renumbering by previously executed commands. The edit display shows not only record i but also the preceding and following records. To begin creating a new file, use the EDIT command without the O parameter and specify i as 1.
INS [O] i	Allows insertion of a record or records, and puts the program at the "record-display" level (see Section 2.3) in front of record i. If the optional O (uppercase O) parameter is specified, i denotes the original ith record prior to any automatic renumbering by previously executed commands. The insert display shows the preceding record (if any), the space where the insertion is to take place, and the following record (if any). To insert records at the end of the file, specify i as one greater than the highest record number.
LIST [i[/j]]	Prints records i through j. If j is omitted, only record i is printed. If both i and j are omitted, all records in the edit area are printed. At the time the command is issued, the printer (address 215) must be ready (8 1/2" X 11" paper for 80-byte TC files, 15" X 11" paper for 128-byte TC files).
LOC [i/j] "character string"	Locates and prints all records containing the specified character string. If i and j are specified, the search is restricted to records i through j. The character string cannot exceed 16 characters and must be enclosed in quotation marks. Furthermore, if a comma is to appear in the character string, the comma must be entered by pressing S.F. '6; do not use the alphanumeric keyboard comma. (For some CRT's pressing S.F. '6 may cause an underlined comma to appear; the underlining is not significant for the LOC operation.) The following special characters can be included in the character string by pressing the key shown: [SIN( ] COS(\ π ← EXP(
MOVE i/j/k	Removes records i through j from their current location and inserts the records in front of record k. To move records to the end of the file, specify k as one greater than the highest record number. Records are automatically renumbered after the MOVE takes place.

2.4 RECORD-DISPLAY LEVEL OPERATIONS

Execution of an EDIT or INS command automatically puts the program into the record-display level. The display shows the record currently being operated upon, also the preceding and following records (if any), and the current column position of the cursor. When entering new records or editing records, special significance is given to the keys shown in Table 2-3.

Table 2-3. Record-display Operations for EDIT or INS Commands

Key	Significance
RETURN (EXEC)	Causes the current record to be accepted as shown, including any changes made to the record. Also, automatically advances the operation to the next record.
S.F '0	Returns the program to the command level. Any changes or entries in the current record are disregarded.
S.F. '8 - '14	These keys perform the normal editing functions indicated on the standard Special Function strip. Specifically : S.F.'8 Erases all characters from the cursor position to the end of the record. S.F.'9 Deletes the character at the cursor position. S.F.'10 Inserts a space at the cursor position. S.F.'11 Moves the cursor five positions right. S.F.'12 Moves the cursor one position right. S.F.'13 Moves the cursor one position left. S.F.'14 Moves the cursor five positions left.
S.F.'15	Makes the preceding record the current record. Any changes or entries made prior to keying S.F.'15 are disregarded.
SIN(	Enters a left bracket, [.
COS(	Enters a right bracket,].
π	Enters a back slash, \.
EXP(	Enters a back arrow, ←.

2.5 THE HELP DISPLAY

If S.F.'0 (HELP) is pressed when the Data Entry 1 program is at the command level, the available commands are presented with brief descriptions in the two-part display shown here. Detailed descriptions of the commands are given in Tables 2-1 and 2-2.

Part 1 of the help display is as follows:

```
                        ACTIVE COMMANDS

EDIT I              ALLOWS RECORD NUMBER I TO BE CHANGED.
INS I               ALLOWS INSERTION OF RECORDS IN FRONT OF NUMBER I.
DEL I [/J]          DELETES RECORD(S) I (THROUGH J).
MOVE I/J/K          REMOVES RECORDS I THROUGH J AND RE-INSERTS
                    THEM IN FRONT OF RECORD K.
COPY I/J/K          MAKES A COPY OF RECORDS I THROUGH J AND INSERTS
                    THEM IN FRONT OF RECORD K.
LIST [I/J]          PRINTS RECORDS I THROUGH J.
LOC [I/J] "STRING"      LOCATES AND PRINTS RECORDS CONTAINING
                        THE SPECIFIED CHARACTER STRING.

KEY RETURN(EXEC) TO RESUME.
```

After the operator keys RETURN(EXEC), the second part of the display appears as follows:

```
                        ACTIVE COMMANDS

LOAD "NAME"             LOADS FILE INTO EDIT AREA
SAVE [I/J] "NAME"       SAVES I THROUGH J INTO AN EXISTING FILE
SAVE N [I/J] "NAME"     SAVES I THROUGH J INTO A NEW FILE
LIST "NAME"             PRINTS CONTENTS OF A FILE

THE COMMANDS EDITO AND INSO PERFORM AS EDIT AND INS EXCEPT
THAT THE RECORD NUMBER IS TAKEN TO MEAN THE ORIGINAL
NUMBER PRIOR TO ANY MOVE, COPY, ETC.

KEY RETURN(EXEC) TO RESUME.
```

Now, upon keying RETURN(EXEC) the program returns to the command level again. Assuming no commands have been used to load an existing TC file in the edit area or to create new records, the following display would appear:

```
NUMBER OF RECORDS IN EDIT AREA =  0
PREVIOUS COMMAND WAS   HELP
KEY  '0  FOR HELP
KEY '31  TO TERMINATE

ENTER COMMAND?
```

2.6 CREATING A NEW TC FILE

To create a new TC file using the Data Entry 1 program, the operator should proceed as follows:

1. Load the TCS system as outlined in Section 1.3.
2. When the TCS system menu appears, press S.F.'0 to access the Data Entry 1 program.
3. Respond to the first prompt by entering the number of columns in the card image (80 or 128), i.e., specify the maximum record length as 80 or 128 bytes and then key RETURN(EXEC).
4. Mount the work disk in the F location when instructed to do so; then key RETURN(EXEC).
5. When the prompt "ENTER COMMAND?" appears, key EDIT1 and then RETURN(EXEC).

The following display appears showing the record number and the current column position where a character can be supplied or altered.

```
KEY '0 TO RETURN TO COMMAND MODULE
KEY RETURN(EXEC) TO ACCEPT RECORD



----------( RECORD 1 )--------------------

----------( COLUMN 1 )--------------------
```

Now the operator can begin supplying data for the record. As each character is keyed, it is also displayed between the dashed lines; furthermore, the column count is incremented as each character is added or changed. For example, the sample case shown in the following display shows that the next column into which a character is to be supplied is number 17.

```
KEY '0 TO RETURN TO COMMAND MODULE
KEY RETURN(EXEC) TO ACCEPT RECORD



----------( RECORD 1 )--------------------
THIS IS A TEST R

----------( COLUMN 17 )-------------------
```

As indicated at the top of the display, the operator should key RETURN(EXEC) to enter the record in the edit work file after the data has been supplied. If so, a similar display appears indicating the next record for which data can be supplied. The process continues until the operator presses S.F.'0 to return to the command level.

For example, upon pressing S.F.'0 after editing the fourth record in a five record file, the following display would occur:

```
NUMBER OF RECORDS IN EDIT AREA =  5
PREVIOUS COMMAND WAS   EDIT4
KEY  '0  FOR HELP
KEY '31  TO TERMINATE

ENTER COMMAND?
```

Now, assume that no additional records are to be created or edited; therefore, the operator is ready to save the contents of the edit area.

Before saving the records in the edit area, the disk platter on which the TC file is to be saved should be mounted at the R location. Next, a name for the new file should be chosen; for example, if the name TEST9 is desired, key SAVE N "TEST9" and then RETURN(EXEC).

When the command level display again appears, the Data Entry 1 program can be terminated, if desired, by pressing S.F.'31. Then, the following display appears:

```
MOUNT SYSTEM DISK IN REMOVABLE DRIVE.
KEY RETURN(EXEC) TO RESUME.
```

> CAUTION:
>
> Do not press S.F.'31 until after the entire edit work file or a desired portion of the file has been saved into a new or existing TC file using Data Entry 1's SAVE N or SAVE command.

> NOTE:
>
> If S.F.'31 is inadvertently pressed before the edit work file contents have been saved entirely or partially, recover by keying X -- even though the instruction on the CRT indicates the system disk should be mounted in the R location.

2.7 ERROR MESSAGES

Data Entry 1 has error detection logic designed to display a diagnostic message under most error conditions. However, some errors have not been assigned a unique error message. Such errors display a message of the form INVALID OPERATION (xxyyyy), where xx is a standard System 2200 error code and yyyy is the program line number at which the error occurred; then the Data Entry 1 program returns to the command level.

2.8 RECOMMENDATIONS FOR EDIT AREA OPERATIONS

When using edit area operations, keep in mind that the sequential position of the records is altered by the following commands: COPY, DEL, INS, and MOVE. Only the EDIT and INS commands have an optional parameter (i.e., the parameter 0) by which records can be accessed with respect to their original position in the edit area. Therefore, the following recommendations are made.

1. If editing some records and deleting others, execute the edit operations first; then, execute the delete operations in accordance with the second recommendation given here.

2. If deleting several different sections of successive records in the edit work file (e.g., records 10 through 12, and also records 72 through 87), delete the sections having the highest record numbers first.

If uncertain about the current position of particular records, use the LIST and/or LOC commands to examine all or part of the edit work file.

CHAPTER 3
OPERATING THE ATOMIZE AND DE-ATOMIZE PROGRAMS

3.1 GENERAL PURPOSES

Wang systems use the USASCII (United States of America Standard Code for Information Interchange) as their native code set. In this code set, all graphic and control characters are represented by 8-bit codes in the range of hexadecimal values from HEX(00) through HEX(7F).

Additionally, Wang systems use a set of "text atoms" represented by 8-bit codes in the range of hexadecimal values from HEX(80) through HEX(FF). Each text atom represents a particular BASIC language word such as PRINT, GOTO, DATA, LOAD, etcetera.

When program statements are entered in a Wang system, most BASIC language words are automatically atomized to conserve user memory. Additionally, when a program is saved on disk, a standard program file format is used.

Neither the program file format nor the text atoms are acceptable for transmission to a remote computer using a utility system such as Wang's 3780 Emulation for the Model 2228 Communications Controller. However, the De-atomize program in the TCS system can be used to convert the text atoms to the appropriate character-by-character USASCII codes and also convert the program file format to the required TC format.

Similarly, if files containing BASIC language program statements are received to disk by a Wang system using a utility system such as the 3780 Emulation, the files are output to disk in the TC format; furthermore, no text atoms are present in the received file. However, the Atomize program in the TCS system can be used to convert most of the BASIC language words into text atoms and also convert the TC format into the standard program file format. The following restrictions on use of the Atomize program apply:

1. Only source programs, not compressed programs, can be atomized (i.e., program lines should be single statement lines).

2. The maximum line length for source statements is 192 characters.

3. Everything after the word REM is considered a remark, even if a valid statement. For example, in the line

```
40 REM BEGIN CALCULATION:  GOTO 170
```

the statement GOTO 170 is ignored.

3.2 THE ATOMIZE PROGRAM

As indicated in Chapter 1, the Atomize program can be accessed by pressing S.F.'2 when the TCS system menu is displayed on the CRT. If S.F.'2 is pressed, the following display briefly replaces the menu.

```
* * * * * * * * * * * * * * * * * * * * * * * * *
*                                               *
*                SYSTEM NOW LOADING             *
*                     ATOMIZE                   *
*                                               *
* * * * * * * * * * * * * * * * * * * * * * * * *
```

Then, the first prompt appears as part of the following display:

```
ENTER THE NUMBER OF THE DESIRED INPUT ADDRESS
? -/


                        ATOMIZE 'BASIC' TEXT

FILE NAME =                                INPUT  ADDRESS =
                                           OUTPUT ADDRESS =

                        ADDRESSES AVAILABLE
                         1 - 310   5 - B10
                         2 - 320   6 - B20
                         3 - 330   7 - B30
                         4 - 350   8 - 360
```

A valid reply to the first prompt is any number corresponding to the available addresses shown at the bottom of the display. For example, if the operator keys 1 and RETURN(EXEC), the second prompt appears and the selected input address is also shown as follows:

```
ENTER THE NUMBER OF THE OUTPUT ADDRESS.
? -/


                        ATOMIZE 'BASIC' TEXT

FILE NAME =                                INPUT  ADDRESS = 310
                                           OUTPUT ADDRESS =

                        ADDRESSES AVAILABLE
                         1 - 310   5 - B10
                         2 - 320   6 - B20
                         3 - 330   7 - B30
                         4 - 350   8 - 360
```

After the operator responds by supplying the number corresponding to the desired output address, for example, if the operator keys 5 and RETURN(EXEC), the address appears in the display and the available addresses are no longer shown. Also, the operator is instructed to mount the input and output disks as shown in the following sample display:

```
MOUNT INPUT AND OUTPUT DISK.
KEY RETURN(EXEC) TO RESUME ?
```

```
                ATOMIZE 'BASIC' TEXT

FILE NAME =                          INPUT  ADDRESS = 310
                                     OUTPUT ADDRESS = B10
```

The input disk is the disk on which a TC formatted file (known to contain program statements) now resides. The output disk is the disk onto which the file is to be stored after the text is atomized and the file format is converted to the standard program file format by the program.

As soon as the input and output disks are mounted at the designated locations, key RETURN(EXEC). The next prompt appears as follows:

```
ENTER THE NAME OF THE FILE TO BE PROCESSED.
? --------
```

```
                ATOMIZE 'BASIC' TEXT

FILE NAME =                          INPUT  ADDRESS = 310
                                     OUTPUT ADDRESS = B10
```

Now, key the name of the file to be atomized, and key RETURN(EXEC). The program checks the validity of the name in the input disk catalog and also checks the output disk catalog to determine if such a name already exists and would thus prevent storage of the atomized file. If the input and output disks are suitable, the operator-supplied file name appears in the display, and the operator is instructed to remount the TCS system disk if it has been removed. For example, if the operator-supplied name is PAT1, the display appears as follows:

```
RE-MOUNT SYSTEM PLATTER IF REMOVED.
KEY RETURN(EXEC) TO RESUME ?
```

```
                ATOMIZE 'BASIC' TEXT

FILE NAME = PAT1                     INPUT  ADDRESS = 310
                                     OUTPUT ADDRESS = B10
```

After remounting the TCS system disk (if not currently mounted) and keying RETURN(EXEC), the operator is again instructed to mount the input and output disks since one of the disks may have been removed. The instruction appears as follows for our sample case:

```
MOUNT INPUT AND OUTPUT DISK.
KEY RETURN(EXEC) TO RESUME ?
```

```
                ATOMIZE 'BASIC' TEXT

FILE NAME = PAT1                     INPUT  ADDRESS = 310
                                     OUTPUT ADDRESS = B10
```

Now, upon keying RETURN(EXEC), the Atomize program processes the named file line-by-line. As each line is processed, the contents of the line and the BASIC language keyword to be atomized are displayed at the top of the CRT. For example,

```
REM         _STRING BEING TESTED FOR KEYWORD

LINE BEING PROCESSED
10  REM  BEGINNING OF PROGRAM


                    ATOMIZE 'BASIC' TEXT

FILE NAME = PAT1                    INPUT  ADDRESS = 310
                                    OUTPUT ADDRESS = B10
```

Without operator intervention the upper lines of the display change automatically as the numbered program lines in the designated file are processed. After all numbered lines have been processed, the lower portion of the display disappears and the following instruction appears:

```
RE-MOUNT SYSTEM DISK IF REMOVED.
KEY RETURN(EXEC) TO RESUME ?
```

The output disk now contains an atomized file in standard program file format. The input disk still contains the TC formatted file, as before.

If additional files on the input disk are to be atomized, the Atomize program can be accessed again. To do so, remount the TCS system disk if removed; then key RETURN(EXEC). When the system menu appears, press the appropriate special function key to access the desired program; otherwise, clear the system or return to ISS, as preferred.

NOTES:

1. Any non-numbered line is not atomized; thus, any JCL (Job Control Language) code stored in a disk file is not atomized when the numbered program lines are atomized.

2. The following dual-usage characters:

   DA, BA, DC

   are not atomized since the characters are valid hexadecimal codes used in $GIO statements, as well as being part of several disk statements.

3. The characters BT (used in cassette, card reader, and punched tape reader statements) are not atomized.

4. The $ character used in a read-after-write statement (e.g., DATASAVE DC $ #4, END) is not atomized.

5. Characters such as those indicated in Notes 2, 3, and 4 can produce error messages when an atomized disk file is subsequently loaded into the central processor. However, by using the normal EDIT and RECALL keys (to recall the numbered line producing an error) and then keying RETURN(EXEC), the characters not previously atomized are atomized automatically.

3.3 THE DE-ATOMIZE PROGRAM

As indicated in Chapter 1, the De-atomize program can be accessed by pressing S.F.'3 when the TCS system menu is displayed on the CRT. If S.F.'3 is pressed, the following display briefly replaces the menu.

```
* * * * * * * * * * * * * * * * * * * * * * * *
*                                               *
*                SYSTEM NOW LOADING             *
*                    DE-ATOMIZE                 *
*                                               *
* * * * * * * * * * * * * * * * * * * * * * * *
```

Then, the first prompt appears as part of the following display:

```
ENTER THE NUMBER OF THE DESIRED INPUT ADDRESS
? -/

                    DE-ATOMIZE 2200 PROGRAM

FILE NAME =                              INPUT  ADDRESS =
                                         OUTPUT ADDRESS =

                    ADDRESSES AVAILABLE
                     1 - 310   5 - B10
                     2 - 320   6 - B20
                     3 - 330   7 - B30
                     4 - 350   8 - 360
```

The prompts which follow the first one occur in the same sequence as those shown in Section 3.2 for the Atomize program; hence, no further presentation of the prompts should be necessary for readers who have familiarized themselves with the previous section.

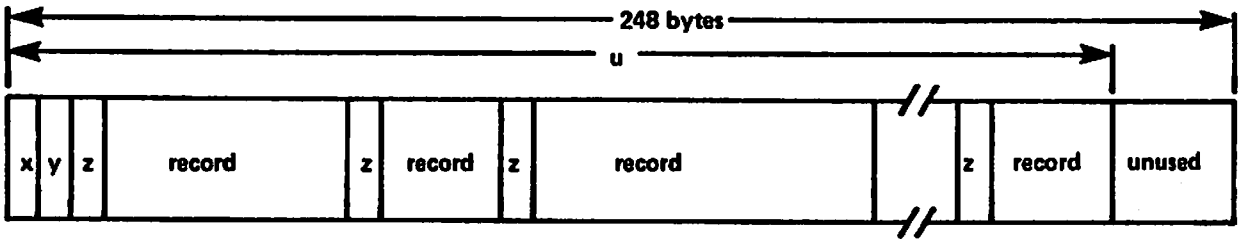
APPENDIX A
THE TC FILE FORMAT

The "telecommunications (TC) file format" for disk data files is defined as follows:

1. Records are packed into a one-dimensional alphanumeric array having four elements, each 62 bytes long, e.g., DIM A$(4)62. The array is saved into a single sector by using the DATA SAVE DC or DATA SAVE DA statements.

2. In packing the TC records into the array, element boundaries are ignored; the array is treated as if it were simply 248 contiguous bytes of storage.

3. Within the 248 bytes of storage, three types of control bytes are used (see x, y and z in the following diagram).



x = a one-byte hexadecimal code indicating whether the sector is or is not the last sector in the file; in particular, x = HEX(F0) denotes "is the last sector", x = HEX(00) denotes "not the last sector".

y = a one-byte hexadecimal value denoting "the number of used bytes plus one" in the array. For example, in the diagram, y is the hexadecimal equivalent of u + 1.

z = a one-byte hexadecimal value preceding each record to denote "the record length in bytes". For example, if the record contains 39 bytes, z = HEX(27) since $(27)_{16} = (39)_{10}$.

record = one complete record with trailing spaces truncated (except in the first record) -- individual records do not overlap from one 248-byte array to the next.

Data Entry 1's SAVE or SAVE N command does not truncate trailing spaces in the first record of a file. Thus, the length of the first record is always 80 or 128 bytes.

APPENDIX B
COPYING A DISK IMAGE ON CASSETTE PACKAGE TO DISK

If Wang's TC Support Utilities 1 Package is obtained as a disk image on cassette package, the version must be copied to a disk before use. A standardized procedure is used whether a disk image on cassette package consists of one or more cassettes.

A special loader program is recorded at the beginning of the single cassette, or at the beginning of cassette number one if there is more than one cassette. The loader program provides prompts to simplify the operation of copying (or updating) from cassette to disk.

For initial copying, indexed disks are mounted at both the F and R locations of a disk unit -- as indicated in Step 3 of the instructions which follow. For updating, an indexed disk is mounted at the F location and the disk containing the software system to be updated is mounted at the R location.

> NOTE:
>
> The copy/update procedure implemented by the special loader program in the cassette package uses the fixed disk as a scratch disk. Therefore, if the disk at the F location currently contains any valuable files, make a backup copy of the disk before copying or updating a disk-image-on-cassette software system from cassette to disk.

	DISPLAY	INSTRUCTIONS
1.	(None)	1. If updating a software system, first make a backup copy of the disk to be updated. Now, to copy/update, mount cassette one at address 10A. Then key: CLEAR (EXEC) LOAD (EXEC) RUN (EXEC)
2.	ENTER THE DESIRED DISK ADDRESSES ?_/ 0 - 310/B10 1 - 320/B20 2 - 330/B30	2. Enter the number corresponding to the disk addresses to which files are to be copied/updated.

3.	MOUNT DISK TO BE UPDATED IN REMOVABLE DRIVE. KEY RETURN(EXEC) TO RESUME	3. For initial copying, mount indexed disks in both the F and R locations corresponding to the addresses selected in Step 2. For updating, mount the disk to be updated at the R location and an indexed disk at the F location corresponding to the addresses selected in Step 2.
4.	DO YOU HAVE A BACK-UP COPY (YES/NO)	4. Enter YES if a backup copy of the software system to be updated, as well as a backup copy of valuable files at the fixed disk location, have already been made. Otherwise, enter NO.
5.	(processing displays)	5. Several displays indicating the operation currently being performed appear; however, no operator intervention is required.
6.	MOUNT NEXT TAPE - UNIT 10A KEY RETURN(EXEC) TO RESUME.	6. If this message appears, mount the next cassette at address 10A. Then, key RETURN(EXEC).
7.	END PROGRAM	7. The copying/updating operation is complete. Both mounted disks contain complete copies of the copied/updated files.

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