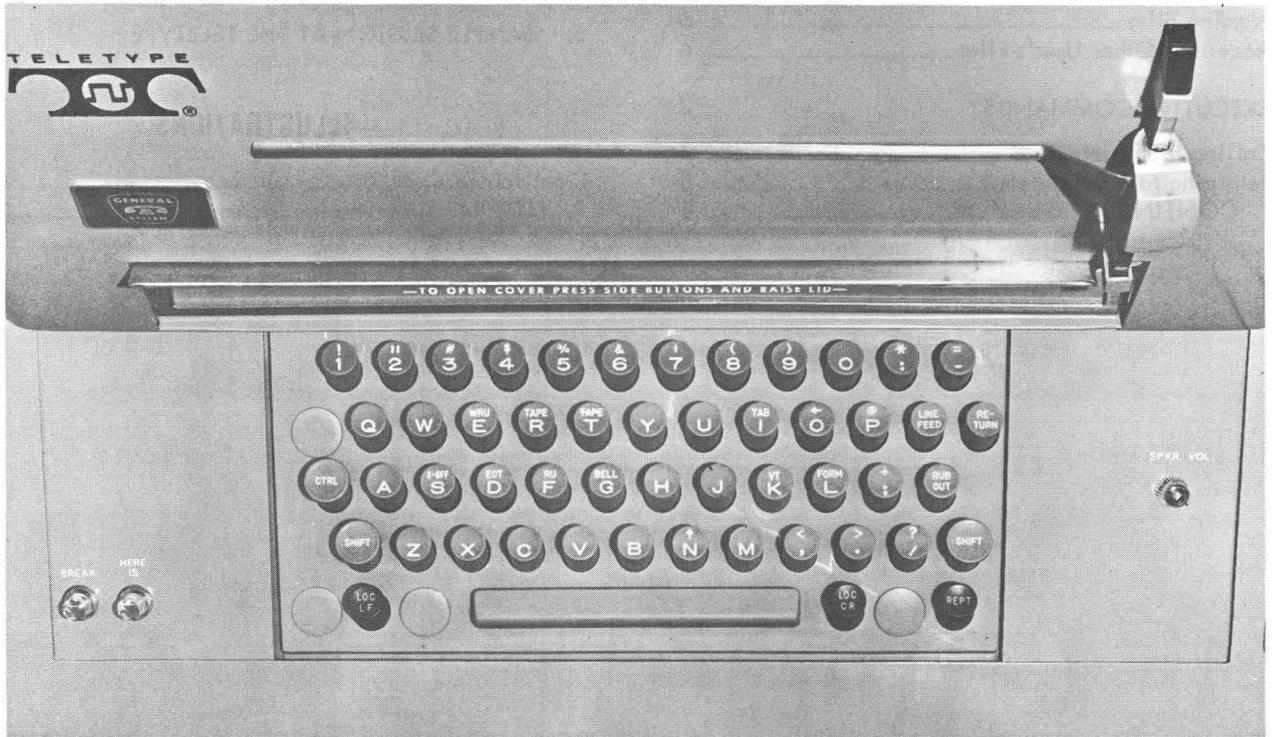SDS

SCIENTIFIC DATA SYSTEMS

Reference Manual

SDS 940 Terminal User's Guide

EXECUTIVE COMMANDS

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-F2C (RET)

-F2R (RET)

-BASIC (RET)

-CAL (RET)

-FORTRAN (RET)

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1. INTRODUCTION

The SDS 940 Time-Sharing System is a complete operating system enabling many users to access an interactive, user-oriented computer, remotely. Each user has the capability of using compilers, assemblers, and other system features as though he had control of the console of a powerful conversational machine.

The system is divided into three basic parts:

1. Monitor

2. Executive

3. Subsystems

THE MONITOR

The Monitor is a sizeable group of routines dealing mainly with the actual machine hardware. It includes all interrupt and peripheral driver routines, teletype routines, plus all buffering and addressing logic for user disc file I/O. Finally, the Monitor contains the scheduler and memory allocator, which makes decisions regarding who should be executing and who should remain in core storage.

THE EXECUTIVE

The Executive, described in this manual, provides the interface between the Monitor and the user. Its function is to communicate the user's desires to the computer via a command language. This permits the user to request the service best suited to his individual problem requirements and programming capabilities. The user can log in and out, create and manipulate files, call subsystems, and save and restore programs, all from his own teletype.

One of the Executive's important jobs is to organize files. A file is simply an area on a large storage disc where the user may save programs, data, or text from one session to another. The Executive accepts commands to create new files, copy the contents of one file to another or to the teletype, and so on. Additionally, the Executive keeps accounting records. All connected time, compute time, and disc storage are kept by user (by account) to facilitate billing and to provide statistics to aid in system optimization.

The Executive makes it possible for both novice and expert to use the 940 Time-Sharing System. It is suggested that the user familiarize himself with this manual before he begins to use the many languages and routines available in the system.

SUBSYSTEMS

A subsystem is a program, permanently connected to the system, that may be called by name through the Executive. The 940 Time-Sharing System has a variety of conversational languages, compilers, and assemblers, and one text editor.

The following is a brief summary of each of the subsystems available in the 940 system. They are fully described in separate reference manuals.

QED

QED (Quick Editor) is a powerful system editor that allows the user to enter text via the teletype (by paper tape or manually) or from any previously constructed disc file. The user may then alter his text by editing, deleting, inserting, or rearranging lines. Any or all occurrences of a string of text may be changed to another string with one command. When complete, the text may be saved on a file, printed, or punched on paper tape or cards.

CAL

CAL (Conversational Algebraic Language) is a simple but complete conversational compiler language. Its features include formatted input and output to both teletype and disc files, conditional branches, iteration loops, subprograms, and standard functions. In addition, CAL may be used in direct execution mode with commands such as TYPE SQRT (1.4 + 9.8).

BASIC

BASIC (Beginner's All-Purpose Symbolic Instruction Code) is a precise, easy-to-use compiler language that allows the user to solve a wide variety of problems quickly and effectively. A beginner can write programs in BASIC long before he becomes proficient as a programmer.

Some features of BASIC are iteration loops, file and teletype input and output, and standard and programmer-defined functions. BASIC also has a direct execution mode that makes the teletype act like a high-powered desk calculator.

CONVERSATIONAL FORTRAN

The Conversational FORTRAN compiler is a subsystem that provides a highly interactive environment under which programs may be written. It permits the programmer to define N dimensional arrays, identifiers of any length, and generalized subscripts. Conversational FORTRAN also includes dynamic storage allocation and generalized file I/O capabilities.

FORTRAN II

The 940 FORTRAN II compiler allows programs to be input from a file normally created via QED. When a source error appears during compilation or execution, the user reverts to QED to correct the symbolic code. Since the symbolic and object codes are stored on disc, large programs can be edited on-line and recompiled in a fraction of the time required by systems that involve laborious input/output operations. During runtime, FORTRAN II allows considerable user

interaction with the program, thereby expanding the conversational features of time-sharing to facilitate debugging.

TAP

The 940 Time-Sharing Assembler Program (TAP) is a versatile machine language macro-assembler with capabilities ordinarily present only in the most sophisticated systems. It includes instructions for forking (subprogram running concurrently with a main program), dismissing programs for specified lengths of time, and creating files with optional read/write protections.

DDT

DDT (Digital Debugging Tool) makes it possible for the user to perform on-line debugging of machine language programs. With DDT, he may examine, search, and change the contents of core storage, load absolute or relocatable programs, and link external symbols of separately assembled programs.

The structural relationship of the Monitor, Executive, and subsystems is illustrated in Figure 1.

TYPOGRAPHIC CONVENTIONS

For clarity, several conventions have been used throughout this manual:

1. Underscored copy in an example represents copy produced by the Executive system or the subsystem in control of the computer. Copy that is not underscored in an example must be typed by the user.

2. Non-printing control characters are represented by an alphabetic character and a superscript c (e.g., D^c). To obtain a non-printing character, the user simultaneously depresses the specified alphabetic key and the Control (CTRL) key.

3. The (RET) notation appearing after some lines in the examples represents the carriage return key. This key is labeled RETURN on the teletype keyboard. The user must depress the carriage return key after each command to inform the computer that the current command is terminated and a new one is to begin. The computer then upspaces the paper automatically.

4. The (LF) notation represents the LINE FEED key. This key can be used to continue commands from line to line.

5. The (ESC) notation represents the ESCAPE key or the ALT MODE key. It causes the subsystem in control to abort the current operation and ask for a new command. Depressing the key several times in succession causes computer control to return to the Executive.
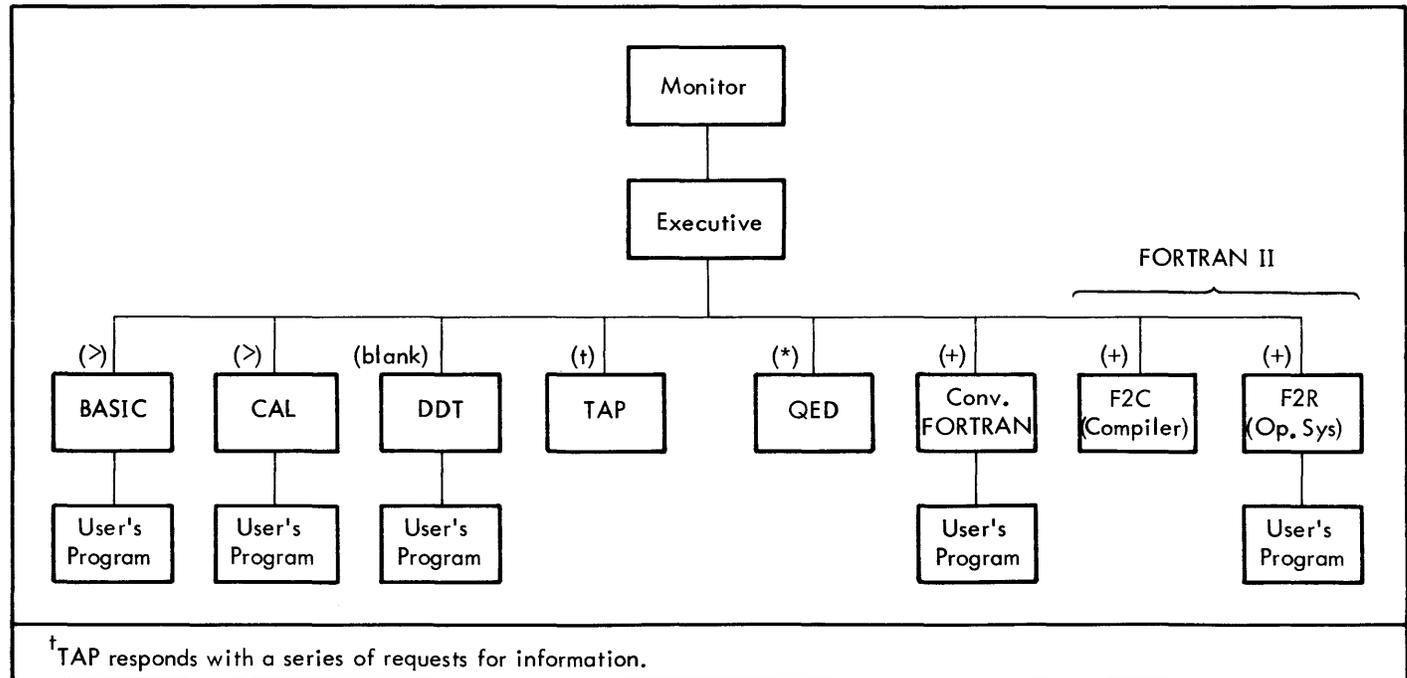

Figure 1. SDS 940 Time-Sharing System

2. LOG-IN AND LOG-OUT PROCEDURES

All communication with the computer takes place via a teletype terminal. Connection can be made from any location accessible by telephone. The user sends his data or program to the computer by typing on his teletype according to the specific rules or commands. The computer responds by typing its answers on the teletype paper. The connecting link between the teletype and the computer is a data set.

Two teletype models, the 33 and 35, are available. Both are easy to operate since they have a keyboard similar to that of a standard typewriter. Each teletype consists of a keyboard, control panel, and optional paper tape reader and punch. The Model 35, a heavy duty version of the 33, permits greater flexibility in tape and keyboard operations.

LOG-IN

The user must log into the 940 Time-Sharing System before he can use the Executive or any of the subsystems. To establish a connection with the computer, follow the procedures given below.

1. If the teletype has an FD-HD (Full Duplex-Half Duplex) switch, turn it to FD. When the teletype is not connected to the computer (sometimes called the local mode), this switch must be in the HD position.

2. Press the ORIG (originate) key, which is located at the lower right corner of the console, directly under the dial. This key is depressed to obtain a dial tone before dialing the computer center.

3. Dial the computer center number. When the computer accepts the call, the ringing will change to a high-pitched tone.

4. If the terminal is a 35/ASR, press the button marked K located at the lower left of the teletype.

If the phone keeps ringing, the system is temporarily not available. If a busy signal is heard, the system is temporarily loaded to capacity. In either case, the dial-in procedure will have to be repeated.

If the answered tone has been heard, the system will type

PLEASE LOG IN:

and wait for the user to identify himself.

The 940 Time-Sharing System provides a flexible and protective accounting mechanism that gathers and records information about each user. For this purpose, each person using the system is assigned a "user identifier" consisting of an account, password, user name, and an optional project code. An account is regarded as a grouping of users all identified by a common alphanumeric representation. Each user has his own unique identification within an account, consisting of a password and user name. The account, password, and user name must all be assigned by the computer center and are checked for validity whenever a user logs in. The project code may be changed at will by the user and is not checked for validity.

A user identifier is required for two purposes:

1. To insure that only valid users have access to the system. Correct log-in requires that the account/password/user name (not project code) be exactly correct as registered with the computer center.

2. To control user files. Each file that a user creates has his account and user name (not password or project code) associated with the file name. This means that access to a file for reading or writing can only be gained by logging in with the account and user name specified when the file was originally created. Sharing files between users, within the same account or between different accounts, is discussed in Chapter 3.

Account

An account is represented by an alphabetic character (A-Z) followed by a digit (0-9).

Password

A password can be any combination of characters on the teletype keyboard, excluding semicolon, with a maximum length of 12 characters. For security purposes passwords do not print.

User Name

The user name can be any combination of characters on the teletype keyboard, excluding semicolon, with a maximum length of 12 characters. Non-printing control characters may be included. There may be a maximum of 11 users on one account.

Project Code

A project code is optional. If present it may be any combination of characters on the teletype keyboard, with a maximum length of 12.

Examples of proper log-in procedures are:

PLEASE LOG IN: Z9WEST;APW;CODE1 (RET)
                            └─────── nonprinting

PLEASE LOG IN: X8OUT;DLC;   (RET)
                     │   └──── Project code is
                     │   optional
                     └──── nonprinting

Semicolons are required as shown; blanks are not allowed in any part of the user identifier.

The log-in procedure is successful when the system responds with

> READY date time
>
> -

The dash (-) tells the user two things:

1. That he is in contact with the Executive.

2. That the Executive is ready to accept commands.

The user may now do utility jobs, manipulate files, or call subsystems.

Encountering an error in the log-in procedure will cause the Executive to print error messages and/or lead the user through the proper sequence.

If the user is unable to correctly log in within 1.5 minutes, the system will type a message requesting that the user call the computer center for assistance.

If several persons are sharing the same user identifier (account, password, and user name), an attempt to log in when one person is currently using the system will result in the following message:

> ALREADY ENTERED

Only one person at a time may be logged in under a single user identifier.

LOG-OUT

The user may disconnect himself from the computer by typing

> -LOGOUT

or

> -EXIT

The Executive responds with

> TIME USED in hours:minutes:seconds
>
> PLEASE LOG IN:

The teletype is disconnected from the computer if the user does not log in within 1.5 minutes.

If LOGOUT is specified, any files created at the Executive level or in any of the subsystems are added to the user's file directory (see Chapter 3). If EXIT is specified, the user will lose any new files created since logging in or giving the WRITE FD command.

Turning off the teletype, disconnecting the phone line, or being accidentally disconnected before TIME USED has been printed causes the contents of memory (up to 48K bytes) to be dumped onto the /$/ file that the user has previously created (see the COPY command).

Example:

Assume that the correct user identifier is A1PASS;USER;PROJECT1

System Prints	User Types	Error
PLEASE LOG IN:	A2PASS	Account should be A1.
ERROR, TYPE: PASSWORD		Since the account is incorrect the system does not recognize the password.
	A1PASS (RET)	When the account and password are correctly typed, the system will guide the user through log-in procedure.
USER NAME:	USED (RET)	User name should be USER.
ERROR, TYPE: USER NAME	USER (RET)	User name is reentered correctly.
PROJ CODE:	PROJECT2 (RET)	The system does not check the project code for validity and, therefore, would not output an error message. Further, if a semicolon and (RET) follow the user name, this message is not presented; i.e., A2PASS;USER;(RET) is acceptable.
READY 9/1 13:41		The READY and the dash (-) indicate that the Executive is ready to accept commands.
-		

---

3. FILES

Files are the primary means by which the user establishes continuity between one computer session[†] and the next. A file is any named block of information that the user finds convenient to regard as a single entity, the most common example of which is a program.

FILE DIRECTORY

Files created by the Executive or any of the subsystems are added to the user's file directory, in a manner to be explained later. The file directory for each user contains the name of each file he has created, the size (in words) of the file, and the file type.

Whenever the Executive is requested to create a file, it scans the user's file directory to determine if the specified file name has already been entered in the directory. If the file name is found in the directory, the Executive types

OLD FILE

and replaces the contents of the old file with new data when the confirming carriage return (RET) is read.

Similarly, the Executive types

NEW FILE

when the file name is not found in the user's directory and creates a new file when the confirming carriage return is read.

In either case, the user can abort the file creation process by depressing (ESC) rather than (RET).

This facility is intended to prevent the user from inadvertently destroying old files or creating new ones.

FILE TYPES

To provide a check against inappropriate use, files created by the Executive and subsystems are classified, according to the nature of the information in them, into one of five types each associated with a type number. This type number is carried along with the information content and is checked whenever the file is referenced. If the file is found to be of a type inappropriate to the context, the command is not executed and an error is indicated.

The file types are:

1. SAVE - information originates from specified segments of core memory.

2. Binary - information has the form of an assembled but unloaded program.

3. Symbolic - information is in a form that can be listed on some printing device.

4. DUMP - information in memory necessary to restart the user from the situation at the time of creation of the dump file.

5. Subsystem - information originates from core memory and is normally executable as an assembled and loaded program; comprises up to eight 2K blocks that can be read into shared memory.

SAVE Files

A SAVE file, which is created only by the Executive SAVE command, is a sequential binary file of a special format. The purpose in creating a SAVE file is that it may be executed directly with the Executive GO TO command.

Binary Files

Binary files are normally created as the output from one of the subsystems or as the data output of a program. There are two classes of binary files: program and data. A binary program file contains the actual steps of a program. A binary data file contains data to be read by a program or information that is output by a program.

Symbolic Files

Symbolic files are created by Executive commands or by the subsystems. All symbolic files may be passed from subsystem to subsystem; e.g., a file created by an Executive command may be edited in QED and executed by BASIC. Similarly, a file created in CAL may be printed by an Executive command.

Like binary files, a symbolic file may be either a program file or data file. Normally a program file is created by using:

1. the COPY command in the Executive

2. the WRITE command in QED

3. the DUMP command in CAL and BASIC

4. the SAVE command in Conversational FORTRAN

A typical symbolic data file can be created by using:

1. the COPY command in the Executive

2. the WRITE command in QED

3. the PRINT FILE in BASIC

[†]A "session" being that sequence of activities, mutual to the computer and the user, between LOG IN and the next LOGOUT or EXIT command.

4. the WRITE ON command in CAL

5. the WRITE command in FORTRAN II and Conversational FORTRAN

6. the BIO, WIO, and CIO commands in TAP or DDT.

When the information in symbolic files comes directly from the teletype or is output on the printer, it may be referred to by using the name of the peripheral device:

TELETYPE

PRINTER

These names are built into the system and are always appropriately recognized. Another built-in file name is

NOTHING

whose function is to act as an unlimited disposal area into which unwanted output can be placed.

DUMP Files

A DUMP file is a file generated by the Executive DUMP command. Such a file is used for dumping the contents of user memory for later recovery. In addition, the user can create a DUMP file by using the DBI, DBO, DWI, and DWO commands in TAP and DDT.

Subsystem Files

A subsystem is typically one of the major programs already mentioned (FORTRAN, BASIC, etc.) but it may be any commonly used routine. Subsystems are written as reentrant programs so that it is possible for them to be shared by more than one user. This reduces the amount of core storage necessary for users since only one copy of the subsystem exists in memory for all of them.

NAMING FILES

A user may give his file an arbitrary name containing the following characters:

Alphabetic: A-Z

Numeric: 0-9

Special: any special character on the teletype keyboard

The /, ', $, @ and control characters have special significance as explained below.

The names the user may assign to files are of three types:

1. Slash names (/)

2. Quoted names (')

3. Unslashed names

Slashed names are reserved for disc files; quoted names are reserved for magnetic tape files, while unslashed names may be of either type. Tape files may be created and used only by users that are assigned peripheral status so that the use of quoted file names is also restricted to these users. By the use of the RENAME command to be described later, slashed and quoted file names may be renamed into unslashed names.

When reference is made to an unslashed file name, the Executive considers the name to be fully delivered as soon as it has received sufficient characters to distinguish the name from all others currently defined by the user. This also applies to slashed and quoted names when the file is used for input. Note that a new name can never be introduced in its unslashed form, and that slashed and quoted names must be typed in their entirety when the name is used for an output file.

Note that ' may be used as a character in a disc file name; similarly / may be used as a character in a magnetic tape file name.

The $ character, when used alone as a file name, refers to a special system file on which the Executive dumps user memory when the log-out procedure has not been properly completed. However, when combined with other characters, it has no special significance.

The use of @ and the control characters is explained in the next section.

ACCESSING OTHER USERS' FILES

A file from another user's file directory can be copied by using the COPY command, if the file name contains the @ character (@FILE) or a control character (F^cFILE). The account number and user name of the owner of the file must also be known. For example,

-COPY (T2WW) /@SQRT/ TO /MYSQRT/ ⊛

         └─────── user name

    └─────── account number

copies disc file @SQRT onto another disc file and assigns it the name MYSQRT.

It is also possible to refer to a file belonging to another user in the same account without indicating the account number:

-COPY (WA) /S^{c}SQRT/ TO /SQRT/ ⊛

4. EXECUTIVE COMMANDS

This chapter describes the Executive commands that any remote terminal user may issue. Other Executive commands, which require special status, are described in the SDS 940 Time-Sharing System Technical Manual.

All Executive commands contain a one-word command identifier. Identifiers may be abbreviated to one, two, or three characters, depending on how many characters are required to distinguish a particular command from the others in the set. All characters typed by the user are checked for accuracy. When the system does not recognize a command it prints

?

and aborts the command.

Some commands require that the user specify file names, addresses, etc. When the required information is omitted, the Executive guides the user through the command.

All Executive commands, except Full Quote, must be terminated by ⊛.

The commands have been grouped according to function.

Command	Function
QED F2C F2R BASIC CAL FORTRAN DDT TAP	Calling a subsystem
CONTINUE	Returning to a subsystem
COPY DELETE RENAME	Creating and deleting files
FD: FILES: WRITE FD	Interrogating and changing the file directory
DUMP RECOVER SAVE PLACE GO TO BRANCH	Dumping and reloading user memory
STATUS MEMORY KILL PROGRAM RELEASE RESET	Manipulating user memory
LINK BREAK ACCEPT REFUSE	Linking

Command	Function
DATE TIME Full Quote	Documenting sessions

CALLING A SUBSYSTEM

Each subsystem provided in the SDS 940 Time-Sharing System must be called by the Executive. The subsystem will acknowledge the call with an identifying character that indicates it is ready to accept commands.

No.	Form
1	−subsystem name ⊛
	Examples
1	−QED ⊛ * −F2C ⊛ + −F2R ⊛ + −BASIC ⊛ ≥ −CAL ⊛ ≥ −FORTRAN ⊛ + −DDT ⊛ (blank) −TAP ⊛ INPUT:

To return to the Executive from a subsystem, the user depresses ⊛ several times in succession. If a user program is running under a subsystem, the ⊛ will interrupt the program and return to the subsystem. Using the ⊛ at the subsystem level will return the user to the Executive.

Returning to the Executive does not destroy the user's subsystem, program, or data. If, after performing some functions at the Executive level, the user wants to return to his program, he may do so by using the CONTINUE command.

Only one subsystem plus the user's program and data can reside in user memory at any one point in time. Thus, calling a subsystem or logging out has the effect of erasing the previous subsystem along with the user's program and data residing in user memory.

Methods of saving programs and data are described in the various subsystem manuals and later in this chapter under SAVE and DUMP.

Example:

```
PLEASE LOG IN: C2;AW;EBE (RET)    The password which is
                                  typed in between the
READY  9/30  10:30                account number (C2)
                                  and the user name
                                  (AW) does not print on
                                  the teletype listing.
                                  EBE is the optional
                                  project code. (RET) must
                                  terminate the log-in
                                  procedure.

-QED (RET)                        The Executive prints a
                                  dash when the user has
                                  logged in properly.
                                  In response to the dash,
                                  the user types in an
                                  Executive command.
                                  In this example, the
                                  user calls the QED
                                  subsystem.

*                                 QED responds with *,
                                  indicating that it is
                                  ready to accept
                                  commands.
```

RETURNING TO A SUBSYSTEM

Control can be transferred from a subsystem to the Executive and then back to a subsystem using the CONTINUE command.

CONTINUE Command

The CONTINUE command transfers control from the Executive to a previously loaded subsystem.

No.	Form
1	-CONTINUE (RET)
	Example
1	-CONTINUE ⟲
	TAP
	INPUT:

This command causes the Executive to type the name of the subsystem and return to it without initialization. Meanwhile nothing in user memory is destroyed.

If the user calls another subsystem while at the Executive level, he cannot return to the first subsystem. For example, the following sequence is acceptable:

```
-FORTRAN (RET)
    .
    .  .
(ESC)
(ESC)
-STATUS (RET)
    .
    .
-CONTINUE (RET)
FORTRAN
+
```

while

```
-FORTRAN (RET)
    .
    .
-STATUS (RET)
    .
    .
-QED (RET)
    .
    .
-WRITE FD (RET)
-CONTINUE (RET)
QED
*
```

will not return the user to FORTRAN IV but to QED.

CREATING AND DELETING FILES

The user may create, delete, and rename files by issuing the COPY, DELETE, and RENAME commands.

COPY Command

The COPY command is used to create, read, and write files.

No.	Forms
1	-COPY source file TO destination file (RET)
2	-COPY TELETYPE TO /$/ (RET)
3	-COPY (account user) file TO file (RET)
4	-COPY (RET)
	Examples
1	-COPY /ALPHA/ TO /BETA/ (RET)
	NEW FILE (RET)
2	-COPY TELETYPE TO /$/ (RET)
	NEW FILE (RET)

No.	Examples (cont)
3	–COPY (A7AL) /@B/ TO /CD/ (RET)
	NEW FILE (RET)
4	–COPY (RET)
	FROM FILE: /ABC/ (RET)
	TO /DEF/ (RET)
	OLD FILE (RET)
	–

This command causes the Executive to scan the user's file directory for the name of the destination file and to type

   OLD FILE

or

   NEW FILE

If the destination file is an old file, the Executive replaces the contents of the old file with the new data as delivered from the source file. If the destination file is a new file, this command creates a new file in the user's directory. The user may confirm the file status by depressing (RET), or abort the command with (ESC).

Example:

–COPY /THIS/ TO /THAT/ (RET) NEW FILE (RET)	Copies data from file THIS to a new file named THAT. The contents of the file are not typed on the teletype. The user now has two copies of the same material.
–	Indicates that copying is completed.

This command can also be used to read from or write on peripheral devices . The peripheral devices are assigned names that may be thought of as system files:

Device	File Name
Remote Terminal	TELETYPE
Line Printer	PRINTER

If the destination file is a peripheral device, the Executive outputs the contents of the source file as soon as the confirming (RET) is ready; no old or new file comment is made. Output may be stopped before completion by depressing (ESC) .

If the source file is the teletype, the user must wait for the Executive to give a line feed. D^c must terminate input from the teletype.

Example:

–COPY /REPORT/ TO PRINTER (RET)	Contents of REPORT are output on the printer.
–	The dash indicates that the printing is completed.
–COPY TELETYPE TO /PTFILE/ (RET)	Reads data input from the teletype keyboard or the teletype paper tape reader.
OLD FILE (RET) : :	Input replaces contents of old file.
D^c . . .	D^c must terminate input from the teletype.
–COPY /SUBR/ TO TELETYPE (RET)	Allows user to see content of disc file SUBR.
–	Copying is completed.

Using the second form, the user can create a /$/ file. The Executive will automatically dump the contents of memory onto this file when the user is disconnected from the computer before he can log out. See the RECOVER command for more information about this file.

A user may access a file that is not in his file directory, using the third form of the command. To do so, he must know the account number and user name of the person who has the file in his directory. The source file must contain a control character or the @ character. Users within the same account do not need to enter the account number into the command.

All input and output data files used by CAL, BASIC, FORTRAN II, and Conversational FORTRAN programs must be named in the user's file directory before the program is executed. These can be created as follows:

   –COPY TELETYPE TO destination file (RET)

   NEW FILE (RET)

   D^c No text material required.

DELETE Command

The DELETE command deletes the specified file name from the user's file directory.

No.	Forms
1	–DELETE file name Ⓡ
2	–DELETE Ⓡ
	Examples
1	–DELETE /BETA/ Ⓡ
2	–DELETE Ⓡ
	<u>FILE</u> /DELTA/ Ⓡ
	<u>–</u>

If "file name" is not in the user's file directory, the Executive prints

ERROR, TYPE: FILE

The user should either retype the file name or issue the FILES command to ascertain the file names in his directory.

RENAME Command

The RENAME command changes the name of the specified file and deletes the old name from the file directory.

No.	Forms
1	–RENAME old file AS new file Ⓡ
2	–RENAME Ⓡ
	Examples
1	–RENAME /OLD/ AS /NEW/ Ⓡ
	–RENAME /OLD/ AS /O^{c}OLD/ Ⓡ
	–RENAME /OLD/ AS /@OLD/ Ⓡ
	–RENAME /OLD/ AS OLD Ⓡ
	–RENAME OLD AS /OLD/ Ⓡ
	–RENAME 'OLD' AS OLD Ⓡ
2	–RENAME Ⓡ
	<u>FROM FILE</u> /OLD/ AS /NEW/ Ⓡ
	<u>–</u>

If a user wants to allow another user to access a file that is entered in his file directory, he may rename the file using this command. The new file name must contain at least one control character or @ character.

Note that a disc file can never be renamed as a tape file; i.e.,

   –RENAME /OLD/ AS 'OLD'

is not allowed.

If "old file name" is not in the user's directory, the Executive prints

   ERROR, TYPE: FILE

INTERROGATING THE FILE DIRECTORY

Information concerning the user's file directory can be requested and updated with the FD:, FILES:, and WRITE FD commands.

FD: Command

The FD: command prints at the teletype the type and size of a specified file in the user's file directory.

No.	Forms
1	–FD: file name Ⓡ
2	–FD file name Ⓡ
3	–FD: Ⓡ
4	–FD Ⓡ
	Examples
1	–FD: /MORT/ Ⓡ
	<u>23, 512 /MORT/</u>
	<u>–</u>
2	–FD /MORT/ Ⓡ
	<u>23 /MORT/</u>
	<u>–</u>
3	–FD: Ⓡ
	<u>FILE</u> /INTR/ Ⓡ
	<u>22, 1536 /INTR/</u>
	<u>–</u>
4	–FD Ⓡ
	<u>FILE</u> /INTR/ Ⓡ
	<u>22 /INTR/</u>
	<u>–</u>

On receiving this command, the Executive responds with either

    file type, size   file name

or

    file type   file name

where

    file type is one of the following:

Disc		Magnetic Tape
21	SAVE file	11
22	binary disc file	12
23	symbolic disc file	13
24	DUMP file	14

    size   is the file size in words (decimal).

Note that the absence of the : character causes the Executive to print only the file type and file name.

FILES: Command

The FILES: command lists the type, size and name of all files in the user's file directory.

No.	Forms
1	-FILES: (RET)
2	-FILES (RET)
	Examples
1	-FILES: (RET)
	24,6144 /$/
	23,1024 /TAX)
	22,3048 /PITI/
	21,4096 /LOAN/
	=
2	-FILES (RET)
	24 /$/
	23 /TAX/
	22 /PITI/
	21 /LOAN/
	=

File type and size have the same meaning as described for the FD: command.

Note that the absence of the : character causes the Executive to print only the file type and file name.

WRITE FD Command

The WRITE FD command allows the user to update his file directory.

No.	Form
1	-WRITE FD (RET)
	Example
1	-WRITE FD (RET)
	=

This command adds to the user's directory all files created since the current log-in procedure. A file may have been created using the Executive COPY, SAVE, or DUMP command, or the appropriate command in the various subsystems.

Files that have been created are automatically added to the user's file directory when he logs out using LOGOUT (see LOGOUT and EXIT in Chapter 2). However, to guard against inadvertent disconnection from the computer before logging out, and subsequent loss of files, the user may update his directory with this command.

DUMPING AND RELOADING MACHINE CONTENTS

Occasionally the user will need to dump the entire contents of memory onto disc. When the user returns to the terminal, he can then reload the computer with the contents of the dumped or saved file and continue. The DUMP, RECOVER, SAVE, PLACE, BRANCH, and GO TO commands fill this need.

DUMP Command

The DUMP command causes the entire status of user memory to be preserved for later restarting.

No.	Forms
1	-DUMP file name (RET)
2	-DUMP (RET)
	Examples
1	-DUMP /RESTART/ (RET)
	NEW FILE (RET)
	=
2	-DUMP (RET)
	TO FILE: /DUMP/ (RET)
	OLD FILE (RET)
	=

This command causes all user memory plus additional status information to be written onto disc or tape and to be given the specified file name. The subsystem in control is not saved. Note is taken of the fact that it was present and it will be restored properly when the file is subsequently reloaded.

When the Executive receives this command, it scans the user's file directory and responds with

OLD FILE

or

NEW FILE

If "file name" is an old file, the Executive replaces the contents of the old file with the new data. If "file name" is a new file, this command creates a new file in the user's directory. The user may confirm the file status by depressing ⒭ or abort the command with ⒠.

RECOVER Command

The RECOVER command restores the status of user memory according to the information on the specified DUMP file.

No.	Forms
1	-RECOVER file name ⒭
2	-RECOVER /$/ ⒭
3	-RECOVER ⒭
	Examples
1	-RECOVER /RESTART/ ⒭
	-CONTINUE ⒭
	BASIC
	≥
2	-RECOVER /$/ ⒭
	-CONTINUE ⒭
	CAL
	≥
3	-RECOVER ⒭
	FROM FILE: /DIGIT/ ⒭
	-CONTINUE ⒭
	QED
	*

The first form is used to recover from a file that the user has previously created with a DUMP command. The second form is used to recover when the user has been disconnected from the computer before he logs out. The /$/ file is a special system file and must have been previously created (see the COPY command).

After recovering, dumped files should be deleted or rewritten as minimum length files, since they are very large (up to 48K bytes). The /$/ file should be re-established immediately after deletion in preparation for future emergencies.

In order to reenter the subsystem that was in control when the dumped file was created, a CONTINUE should be typed.

Example:

```
(log in)

-RECOVER /$/ ⒭          The user is recovering from an
                         emergency dump.

-COPY TELETYPE TO /$/ ⒭  This command will reestab-
                         lish the /$/ as a minimum
OLD FILE ⒭               length file (512 words).

Dᶜ

-CONTINUE ⒭              CONTINUE reenters the sub-
                         system that had control when
                         the dump occurred.

QED                      The Executive types the name
                         of the subsystem and returns
                         control to it.

*                        * indicates that QED is ready
                         to accept commands.
```

SAVE Command

The SAVE command saves the contents of the specified range of user memory and associates it with the given file name.

No.	Forms
1	-SAVE address$_1$ TO address$_2$ ON file name ⒭
2	-SAVE ⒭
	Examples
1	-SAVE 250 TO 750 ON /SUB/ ⒭
	NEW FILE ⒧
	STARTING LOCATION 300 ⒭
	≞

No.	Examples (cont)
2	-SAVE 1000 TO 5000 (RET)
	TO FILE: /SAVE/ (RET)
	OLD FILE (RET)
	-
3	-SAVE (RET)
	FIRST LOC. 1000 (RET)
	LAST LOC. 5000 (RET)
	TO FILE: /SAVE/ (RET)
	OLD FILE (LF)
	STARTING LOCATION 1234
	-

This command causes the Executive to scan the user's file directory and to respond with

OLD FILE

or

NEW FILE

If "file name" is an old file, the Executive replaces the contents of the old file with the new data. If "file name" is a new file, this command creates a new file in the user's directory. The user may confirm the file status by depressing (RET) or (LF), or abort the command with (ESC).

If the user confirms the file type with (RET), the command is immediately executed. If the user depresses (LF), the Executive types

STARTING LOCATION

The user must then type in a number to indicate the starting location to be used when the program is later called with a GO TO command. If the starting address is not specified (as in Example 2 above), the subsequent GO TO command will be the same as a PLACE command.

Typically the program that is to be saved has been loaded in core by DDT and the user knows the starting and ending locations. However, if he does not know the range, he can issue the STATUS command.

The Executive will lead the user through the command if the second form is used.

PLACE Command

The PLACE command loads the specified file into the area of user memory designated at the time of its creation.

No.	Forms
1	-PLACE file name (RET)
2	-PLACE (RET)
	Examples
1	-PLACE /TODAY/ (RET)
2	-PLACE (RET)
	FROM FILE: /NOW/ (RET)
	-

The file must have been previously saved using the Executive SAVE command.

The file is transferred into user memory; however, the Executive maintains control. The BRANCH command (see below) must be used to transfer control to the user's program.

If the file is not in the user's file directory, the Executive responds with

ERROR, TYPE: FILE

and aborts the command. The command will also be aborted if the transfer to user memory results in data transfer errors.

BRANCH Command

The BRANCH command transfers control to the specified address in the user's environment.

No.	Forms
1	-BRANCH address (RET)
2	-BRANCH (RET)
	Examples
1	-BRANCH 275 (RET)
2	-BRANCH (RET)
	CORE LOC. 310 (RET)
	-

The address is interpreted as an octal number.

If the user does not have the page containing the address under his relabeling[†], he will receive a memory trap. If he has a blank page (containing the illegal instruction HLT), he will receive an instruction trap.

_____

[†]See the SDS 940 Time-Sharing System Technical manual for an explanation of relabeling.

GO TO Command

The GO TO command loads the specified file into the area of user memory designated at the time of its creation.

No.	Forms
1	-GO TO file name (RET)
2	-GO TO (RET)
	Example
1	-GO TO /DETAIL/ (RET)
2	-GO TO (RET)
	TO FILE: /MORE/ (RET)
	=

The file must have been previously saved using the Executive SAVE command.

The file is loaded into user memory, and control is transferred to the starting location designated at the time it was saved. If the starting address was zero or if the address was not specified, the Executive retains control. In this case GO TO has the same effect as PLACE.

If the file is not in the user's file directory, the Executive responds with

?

and aborts the command. The command will also be aborted if the transfer to core results in data transfer errors.

MANIPULATING USER MEMORY

Each user is assigned 30,720 words of memory when he logs in. The user can request status information about memory and erase the contents by issuing STATUS, MEMORY, KILL, RELEASE and RESET commands.

STATUS COMMAND

The STATUS command prints the status of user memory at the teletype.

No.	Form
1	-STATUS (RET)
	Example
1	-STATUS (RET)
	PROGRAM: 62 63 64 65/66 67 70 71
	DDT: 61 - - -/- - 20 21
	M.S. 30K, U.M. 12K
	=

This command causes the Executive to respond with a message in the following format:

PROGRAM: - - - -/- - - -

subsystem name: - - - -/- - - -

M.S. 30K, U.M. size

where

PROGRAM: - - - -/- - - - represents the eight pages of memory available to a user program at any one time. For example, if user page zero is being used, a number will appear instead of the first dash. Numbers 57 and below represent pages that are shared with other users. Numbers above 57 represent pages that are unique to the user.

subsystem name: is the name of the subsystem that was in control before this command was initiated. This line is omitted when a subsystem has not been previously called.

- - - -/- - - - represents the eight pages of memory available to a subsystem. A dash will be replaced with a number when a page is being used. The numbers have the same meaning as those described for the PROGRAM line.

M.S. 30K is the virtual memory assigned to each user when he logs in.

U.M. size is the number of words of unused memory in user memory.

MEMORY Command

The MEMORY command prints the number of words in user memory that are not currently being used.

No.	Form
1	-MEMORY (RET)
	Example
1	-MEMORY (RET)
	26K
	=

KILL PROGRAM Command

The KILL PROGRAM command erases all memory assigned to the subsystem in control before this command was initiated.

No.	Form
1	-KILL PROGRAM ⒭ⓔⓣ
	Example
1	-KILL PROGRAM ⒭ⓔⓣ
	-CONTINUE ⒭ⓔⓣ
	DDT
	_

The subsystem is still available to the user and can be re-entered by typing CONTINUE.

RELEASE Command

The RELEASE command releases the subsystem in control before this command was initiated.

No.	Form
1	-RELEASE ⒭ⓔⓣ
	Example
1	-RELEASE ⒭ⓔⓣ
	DDT
	_

The Executive prints the name of the released subsystem on the teletype. Any programs or data in user memory are still available.

RESET Command

The RESET command erases from user memory all programs and data plus the subsystem in control before this command was initiated.

No.	Form
1	-RESET ⒭ⓔⓣ
	Example
1	-RESET ⒭ⓔⓣ
	_

Any information in user memory is irretrievable.

LINKING

The 940 Executive provides a "linking" command as well as associated commands for breaking, refusing, and accepting linkage with the operator or another user.

LINK Command

The LINK command permits the user to link to the computer operator or to any other user on the 940 system.

To link his teletype with the operator's teletype, the user types

-LINK OPERATOR ⒭ⓔⓣ

or

-LINK OPE ⒭ⓔⓣ

This permits him to communicate with the operator to get assistance. When the two teletypes are linked, everything typed by the operator and the user appears on both teletypes. The user may type commands as usual, but these will affect only his own operation. Text that is not to be interpreted as a command but only as a message to the operator begins with a quotation mark ("). For example,

-LINK OPE ⒭ⓔⓣ

A1 234

-"THIS IS TEXT AND ⒭ⓔⓣ
IS NOT MEANT AS A COMMAND. ⒠ⓢⓒ

where

A1   is user's account number

234   is user's name

⒠ⓢⓒ is used to terminate the message mode and return to the Command mode.

Similarly, a user may link to another user by typing that user's account number and code name. The user to be linked must be currently entered on the system. If, for example, you are attempting to link to user 987 in account Z9, you type

-LINK   Z9987

If Z9987 is not currently on the system, the Executive prints

NOT ENTERED

If Z9987 is linked to someone else, the Executive prints

BUSY

If Z9987 is refusing all links, the Executive prints

NOT ACCEPTING LINKS

BREAK Command

To terminate a LINK, the user types

-BREAK ⓡⓔⓣ

REFUSE Command

If a user does not want to be interrupted by the linking process, he may type

-REFUSE ⓡⓔⓣ

This command puts the user in a condition where he cannot receive links. If someone tries to link while the recipient is in the REFUSE state, the link is refused with the message

NOT ACCEPTING LINKS

ACCEPT Command

To be able to accept links after having issued the REFUSE command, the user must issue the command

-ACCEPT ⓡⓔⓣ

This is the normal mode assigned to every user when he logs on the system.

DOCUMENTING A SESSION

Three commands useful for documenting a session at the teletype are DATE, TIME, and Full Quote.

DATE Command

The DATE command prints the day of the month and the time in hours and minutes at the teletype.

No.	Form
1	-DATE ⓡⓔⓣ
	Example
1	-DATE ⓡⓔⓣ
	8/16 13:00
	<u>=</u>

The clock is a 24-hour clock.

TIME Command

The TIME command prints the computer (CPU) and hook-up time used since the log-in operation at the teletype.

No.	Form
1	-TIME ⓡⓔⓣ
	Example
1	-TIME ⓡⓔⓣ
	TIME USED 0:0:05 IN 0:52:15
	<u>=</u>

Full Quote Command

The Full Quote command enables the user to insert comments on his teletype listing.

No.	Form
1	-"text D^c
	Example
1	-"USEFUL FOR COMMENTS D^c
	<u>=</u>

The " character must initiate the text and D^c must terminate it.

5. SAMPLE SESSION AT THE TELETYPE

The following example is designed to illustrate typical use of the Executive commands.

PLEASE LOG IN: C8;PM3;MANUAL (RET)
READY 7/25 14:47
-"BY TYPING "WE GO INTO A CONVERSATION MODE. IN THIS EXAMPLE (RET)
WE WILL DEMONSTRATE THE USE OF SOME OF THE MORE FREQUENTLY USED (RET)
EXECUTIVE COMMANDS. D^C
-QED (RET)

*APPEND (RET)
THIS IS A DEMONSTRATION FILE TO ILLUSTRATE THE USE OF THE 940 (RET)
EXECUTIVE COMMANDS. D^C
*" BY TYPING SEVERAL (ESC'S) WE WILL GO BACK TO THE EXEC. D^C
* (ESC)
* (ESC)
-" 'FILES:' IS THE COMMAND TO OBTAIN A FILE DIRECTORY PRINTOUT. D^C
-FILES: (RET)

23,512 /$/

-" NOTICE, THE ONLY FILE IN OUR FILE DIRECTORY IS /$/-- THE (RET)
EMERGENCY FILE. BY TYPING 'CONTINUE' WE WILL GO BACK INTO (RET)
QED AND WRITE OUR TEXT ONTO A FILE. D^C
-CONTINUE (RET)
QED
*WRITE ON /DEMO/ (RET)
 NEW FILE (RET)
28 WORDS.
*" WE NOW GO BACK TO THE EXEC. D^C
* (ESC)
* (ESC)
-FILES: (RET)

23,512 /$/
23,512 /DEMO/

-" FILE /DEMO/ IS NOW PART OF OUR DIRECTORY. NEXT WE WILL SHOW (RET)
THE FOLLOWING COMMANDS -- 'FD:', 'COPY', 'RENAME', 'MEMORY', 'STATUS', (RET)
'DUMP', 'RESET', 'DELETE', 'RECOVER', 'RELEASE' AND 'LOGOUT'. D^C
-FD: /DEMO/ (RET)
23,512 /DEMO/
-COPY /DEMO/ TO TELETYPE (RET)

THIS IS A DEMONSTRATION FILE TO ILLUSTRATE THE USE OF THE 940
EXECUTIVE COMMANDS.

-RENAME /DEMO/ AS /NEWDEMO/ (RET)

-FILES: (RET)

23,512 /$/
23,512 /NEWDEMO/

-" NOTICE FILE /DEMO/ IS NO LONGER IN THE USER'S FILE DIRECTORY. (RET)
HOWEVER, /NEWDEMO/ IS. D^C
-MEMORY (RET)
26K
-STATUS (RET)

QED: 61 - - -/62 - 22 23
M.S. 30K, U.M. 26K
-" SINCE WE HAVEN'T CALLED ANY OTHER SUBSYSTEM -- WE COULD STILL (RET)
RETURN TO QED. Dᶜ
-DUMP /OUT/ (RET)
  NEW FILE (RET)

-FILES: (RET)

23,512 /$/
24,4608 /OUT/
23,512 /NEWDEMO/

-RESET (RET)

-STATUS (RET)

  M.S. 30K, U.M. 30K
-" 'RESET' CLEARED THE USER'S MEMORY . THEREFORE, EVERYTHING (RET)
ASSOCIATED WITH THE USER (EXCEPT THOSE FILES THAT WERE WRITTEN (RET)
AWAY ON THE DISC) HAS BEEN CLEARED. Dᶜ
-DELETE /NEWDEMO/ (RET)

-FILES (RET)

23 /$/
24 /OUT/

-RECOVER /OUT/ (RET)

-CONTINUE (RET)
QED
*/
THIS IS A DEMONSTRATION FILE TO ILLUSTRATE THE USE OF THE 940
EXECUTIVE COMMANDS.
*WRITE ON /DEMO2/ (RET)
  NEW FILE (RET)
28 WORDS.
* (ESC)
* (ESC)
-FILES: (RET)

23,512 /$/
24,4608 /OUT/
23,512 /DEMO2/

-RELEASE (RET)
QED
-STATUS (RET)

  M.S. 30K, U.M. 30K
-LOGOUT (RET)

TIME USED 0:0:25   IN   0:23:31

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