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Mark II Time-Sharing Service



Information
Systems

World Leader
In Time-Sharing
Service

Reference Manual

Command System

JAN 70

GENERAL  ELECTRIC

INFORMATION SERVICE DEPARTMENT

Command System

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INFORMATION SYSTEMS



Preface

The information in this publication describes the Mark II Time-Sharing Service provided by the Information Service Department of General Electric Company.

This manual is designed to provide both orientation material for a new user as well as reference material for an experienced one. The latest versions of other manuals referenced in the text may be obtained by contacting your local General Electric Time-Sharing Representative.

This revision includes several new and expanded sections, as well as descriptions of some recent innovations and improvements to the Time-Sharing Service. However, although this revision is intended to eventually replace previous printings, those previous editions may still be used.

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INTRODUCTION

The General Electric Mark II Time-Sharing Service is the result of General Electric's continuing effort to provide you with increased problem solving convenience and power. Time-Sharing Service provides you with the following benefits:

1. Capability for storing large files containing programs or data
2. Capacity for executing large complex programs
3. Efficient handling of programs
4. Capability to run and store previously compiled programs (object programs).
5. Capability to retrieve, modify, and manipulate information with line and string edit functions.
6. Capability to share files with other users.
7. Capability of sequential processing of ASCII¹ files and binary files, and random processing of binary files.
8. Extensions and additions to the versatile BASIC² language, such as:
 - String processing, which permits manipulation of alphanumeric data
 - Liberal definitions of variables in a function statement
 - Capability for formatting output
 - Ability to initialize all variables, lists and tables to zero
9. BASIC instructions, such as a compound version on LET; ON, which provides a powerful conditional branch; and RANDOMIZE for initializing the random number generator.
10. Such important FORTRAN features as: Adjustable Dimensioning, Chaining, Decision Programming, Mixed Modes, Simplified Input/Output, Simplified Statement Form, Subprograms, and Variable Names are available.

This manual introduces you to the Mark II Time-Sharing Service and provides you with an easy reference to the system commands and other useful information.

¹ American Standard Code for Information Interchange, used internally by the Mark II Systems.

² Developed by Dartmouth College.

A variety of other materials such as manuals, booklets, and code cards is available to help you learn about and use the Time-Sharing Service. Your General Electric Information Service Department representative will be happy to discuss Time-Sharing Service with you.

1. USING THE SERVICE

ACCESSING THE SYSTEM

The General Electric Time-Sharing Service is remarkably easy to use. To connect your teletypewriter to the system, press the ORIG key. You will then hear a dial tone. Dial your time-sharing telephone number. This initiates a series of questions and answers which identify you and the work you want performed. Specifically, you supply your user number and password when required, the name of the programming system you wish to use, whether the file you are about to name is new or old, and the name of the file. Typical introductory conversations between you and the system are illustrated below. The example on the left shows the complete sign-on. The example on the right shows an abbreviated sign-on in which the file name is typed on the same line as the response to NEW OR OLD. This causes the system to bypass the request for a file name and respond with READY.

Normal Sign-On

```
USER NUMBER--R41822,PASSWORD  
PROJECT ID--ANY 18 CHARACTERS  
SYSTEM--BASIC  
NEW OR OLD--OLD  
ENTER FILE NAME--SAVING
```

READY

RIIN

Abbreviated Sign-On

```
USER NUMBER--R41822,PASSWORD  
SYSTEM--BASIC  
NEW OR OLD--OLD SAVING
```

READY

RIIN

Sample Introductory Conversations

In the illustration, and in succeeding examples, the underlining identifies the words that you type; the non-underlined words are typed by the time-sharing system.¹ In addition, throughout this manual, system commands, requests, responses, and teletypewriter keys are identified by capital letters. Some of these terms are defined in future chapters, and others in the glossary (Appendix B).

¹ The system will request a Project Identification if you indicate to your General Electric Representative that you want this option. The Project Identification is then printed on your billing invoice along with all charges accumulated under that Project Identification. Any 18 printable characters may be used for your Project Identification.

If you wish to use a program file which you had previously saved in the file system, simply indicate OLD in answer to the system request NEW OR OLD. Give the file name of the saved program file when requested, and the computer will retrieve it from the file system. If you wish to enter an entirely new file, simply type NEW and give the new file name when requested.

ENTERING YOUR PROGRAM

A program file consists of statements (lines) beginning with line numbers as labels. Line numbers may be 1 to 5 digits and are separated by one or more spaces from the text of the statement. For example, in the statement 230 READ D(J, 3), D(J, 2) the number 230 is the line number.

The system always edits the program file before responding to the system commands LIST, RUN, or SAVE and sorts the lines in sequence according to the numerical value of the line numbers.

Typing your own line numbers makes it convenient to insert new lines in the program, to delete unnecessary lines, or to correct lines simply by retyping them. If your original sequence of line numbers is by an increment greater than one (e.g., 10), then you can insert new lines simply by giving intermediate line number values to the lines you wish to insert. For example, if the original sequence reads 10, 20, 30, 40, etc., and you wish to insert new lines between 30 and 40 and between 50 and 60, you can add 32 and 52. In addition, automatic renumbering is available (see EDIT RESEQUENCE in Mark II Edit Commands Manual). You can also delete lines simply by typing the line number followed by a carriage return.

When the program has been completed, simply type RUN without a line number. This command causes the system to compile your source program, run it, and type out the answer.

SIGNING OFF

You will be disconnected from the system if a valid user number is not established within approximately one minute, or if you have been in idle status for ten minutes. When you are disconnected from the system, an X types out.

When you type the system commands BYE or GOODBYE, the system types out the following message:

USED XXXX.XX CRUS - XXXX.XX TCH - XXXX.XX KC

where: CRU = Computer Resource Unit
TCH = Terminal Connect Hours
KC = I/O Characters in Thousands

The system then shuts off the teletypewriter. Chapter 5 presents more detail covering use of the teletypewriter.

2. SYSTEM DESCRIPTION

MAJOR COMPONENTS

The major components of this time-sharing system are as follows:

- Multiple data communications processors.
- An advanced design central processor.
- Multiple random access storage subsystems for providing permanent storage.

DATA COMMUNICATIONS INTERFACE

Executive programs in the data communications processors monitor communications lines, collect user input, perform character and line deletion, transmit user input to the central processor, receive output from the central processor, and transmit the output to the users.

TIME-SHARING EXECUTIVE

The time-sharing executive program in the central processor receives user input from the data communications processor. User commands are processed in a multiprogramming mode of operation by resident re-entrant command processing routines. Compilers, edit routines, and generated user programs are loaded into core memory when required, and swapped out when necessary to effect a time-sharing balance.

FILE SYSTEM

The file system utilizes random access storage devices for permanent storage of the program library, user catalogs, and saved files.

All source program files in the file system are stored in ASCII character code. File names may be up to 8 characters in length. Files may be protected by an 8-character password (not to be confused with the user number password).

DATA FILES

System capabilities include sequential processing of ASCII data files and binary data files and random processing of binary data files. Sequential files cannot exceed 250 storage units. The maximum size of a random file varies, and at times may exceed 250 storage units. Refer to the BASIC and FORTRAN manuals for specific applications.

FILE NAMES

User files in the file system are identified by discrete file names stored in the user catalog. Naming conventions for file names are described later in this section.

FILE PROTECTION

User files in the file system may be protected against unauthorized access by specifying a password at the time a file is saved. (See the description of the OLD, SAVE, and UNSAVE commands in Section 4.) A password, if specified, becomes a part of the user catalog entry for the file, and must be provided to gain access to the file.

FILE NAMES AND PASSWORDS

For consistent effective operation, the following rules for file names and passwords must be observed:

1. File names and passwords may each be one to eight characters in length.
2. The first character must be alphabetic.
3. The remaining characters may be any combination of alphabetic or numeric characters (See file sharing for exceptions.)
4. Both upper and lower case alphanumeric characters may be used in a file name if your terminal has this feature. You may also use the "\$", "*", and period in a file name.
5. CONTROL/Shift/L, CONTROL/Shift/M, CONTROL/Shift/N, and CONTROL/Shift/O are the only "invisible" characters you can use in a file name.

USER NUMBERS

The primary element of user control in the time-sharing system is the user number. User numbers are composed of three alphabetic characters, followed by five numeric digits. The first two characters are inserted by the system if omitted. The three alphabetic characters plus the two high order digits identify the subscription to which the user number belongs. See "Additional System Capabilities" section for more information.

NOTE: If you are a user connected to a remote DATANET-30, you will have to enter the complete eight digit number.

USER NUMBER PASSWORD

An additional element of user protection is provided by the use of passwords. These passwords can consist of from one to eight characters. When a user number is protected by a password, the response to USER NUMBER must consist of the user number, followed by a comma and the password. The user number must be separated from the password by a comma. Your General Electric Information Service Department representative will be happy to arrange password protection for your user number.

FILE SHARING

When you enter a file into the system, the file can ordinarily be accessed only from your user number. However, as the owner of a file, you may share it with other users of the system. The highest level of file sharing is within a subscription, i. e., you may share files with all users in your subscription. The section on "ADDITIONAL SYSTEM CAPABILITIES" explains how you may establish file sharing for any of your files through use of the PERMIT command.

Other users can be permitted to execute, read, write, and append to one of your files. You must specify exactly how each of these users is allowed to process your file.

Another type of shared program is the run only program. All such programs contain a dollar sign (\$) as the sixth character of the file name. These programs can be run by anyone having access to the catalog in which these files reside. They may not be listed.

TIME-SHARING LANGUAGES

Three programming languages, BASIC, FORTRAN, and REMAPT are available. These languages permit you to interact with your program as it is being executed. Not only can you obtain results printed by your teletypewriter, but by using on-line input statements you can read-in values of integers and floating point numbers to control the course of the program execution.

BASIC

BASIC is a relatively easy language to learn and use, yet it permits complete and precise specification of your problems. A complete description of this language may be found in the Mark II BASIC Language: Reference Manual (711224).

FORTRAN

This FORTRAN language matches the speed and flexibility offered by third-generation time-sharing equipment. Taking maximum advantage of powerful system features, FORTRAN extends your problem-solving capability. It permits you to handle large programs, easily, with fast processing and rapid turn-around time. This language is compatible with ASA standards. A complete description of this language may be found in the FORTRAN Language: Reference Manual (IND-910703).

REMAPT

REMAPT is a powerful part-programming language which is compatible with the APT vocabulary except for a few post-processor words. A complete description of this language may be found in the REMAPT Reference Manual (805220).

PROGRAM LIBRARIES

A program library of program files available to all users is maintained in the file system. These program files may be accessed by appending three asterisks as a suffix to the file name of the program file you wish to access. For example, assume you wish to access from the library a program file with the file name SAVING. Your response to the system request ENTER FILE NAME would be SAVING***. The asterisks instruct the system to retrieve the file from the program library, rather than from your catalog.

After you have obtained a program file from the program library, you can change it to suit your needs, and save it under your own user number if you wish. To save a library program file, simply type SAVE. (The asterisks are ignored by the system after initial retrieval.) Program files cannot be inserted into the program library from the customer terminal.

A list of files in the program library can be obtained by listing the program library file CATLOG***.

There are also private and subscription libraries. Your private library contains those files which only may be accessed by your user number. The subscription library contains files which you and other users in your subscription have decided to share.

Private Libraries

You may create your own private library of programs and data files on the Mark II system. Your users catalog contains one entry for each of these permanent files. The catalog entry contains the attributes of a file (file name, password, permissions, file structure, and file type), the history of a file (date last modified, date last used) and number of times used. For a random file, the additional attributes of record size and number of records are also maintained in the catalog entry.

An entry is added to your catalog when you save a new file with the `SAVE` command or create an empty file with the `CREATE` command. An entry is also added to your catalog when you define an alternate file name (see "ADDITIONAL SYSTEM CAPABILITIES").

An `UNSAVE` or `PURGE` command deletes an entry from your catalog.

The `CATALOG` command lists all files and alternate file names in your catalog. Your catalog is fully protected from other users. Only you can add or delete entries.

Subscription Libraries

A subscription is made up of many users. You may share your files with the other users in your subscription by entering the file in your subscription library.

With the `PERMIT` command you may specify explicitly how the other users in your subscription can access your file, and the file will be entered into the subscription library.

When you attempt to access a permanent file, both the private catalog and subscription catalog are searched for the file name. In this sense, the subscription library catalog is an extension of the private catalogs in the subscription. Therefore, all files added to the subscription library catalog must have file names which are unique to the entire subscription.

3. COMMUNICATING WITH THE SYSTEM

Communication between you and the time-sharing system is established and controlled through the commands, requests, responses and messages listed below:

- System Commands
- System Requests For Information
- User Responses To System Requests
- System Messages

System commands are those that you give which direct the system to perform specific actions. System requests for information are made from time to time to assist you in your use of the time-sharing system. User responses to system requests enable the system to perform the required actions.

The system commands presently available are described below, in a logical learning sequence for users unfamiliar with the system. Commands are summarized alphabetically for easy reference in Appendix A. System requests and user responses are described under subsequent headings. When a "*" appears after an explanation, that command is further defined in the section "ADDITIONAL SYSTEM CAPABILITIES".

SYSTEM COMMANDS

ACTIVITY (ACT)	Outputs number of computer resource units, terminal connect hours, and I/O characters transmitted since login.
APPEND	Adds your current file to the end of a designated permanent file. See section on "File Commands" for further explanation, including an example.*
Back-Arrow(-) Control H Backspace Key (on some other system compatible terminals)	The Back-Arrow (-) command enables you to delete the last character of an input line prior to depressing the RETURN key. To accomplish character deletion, depress the SHIFT key and strike the - key (above the letter O) once for each character to be deleted. For example, the input sequence 110 LET X1 = A + B + Y + Z would enter the system as 110 LET X1 = Y + Z
BREAK (key) STOP	These commands cause the system to terminate execution of the command in process.

BREAK (key) STOP (Continued)	The BREAK key functions at any time. However, it also causes the keyboard to lock up; it must be reset by depressing the Break Release (BRK-RLS) key.
	This command is also used to exit DSM mode. If a LIST, OLD, SAVE command, etc. is issued subsequently and it is desired to append to file, it will be necessary to reissue the DSM command.
	The STOP command is effective only when no teletypewriter input or output sequence is in process. If entered in response to a call for teletypewriter input, it will be treated as input.
BYE GOODBYE	These commands (used interchangeably) disconnect your teletypewriter from the time-sharing system. If another user is waiting to use the teletypewriter, this command should not be used; instead, the next user simply types HELLO.
CAPALOG	This command lists the file names and first six characters of the project identification. It is terminated at any time by using a BREAK function.
CASALOG	This command lists the file names, file type and the length of each file in storage units for all files saved under your user number.
CATALOG	This command lists the file names and the dates the files were last accessed for all files saved in the file system under your user number.
CLASSIFY	This command restricts the access that all users, including the owner, have to a file. It may also be used to change an existing classification.*
COMPILE, filename	The COMPILE, filename command permits you to compile (but not execute) a source program and retain the executable code as your temporary file. The name of this file will be as specified by the command. This file can be saved in the usual manner and run.

COMPILE, filename
(Continued)

Each time a file is RUN it will be executed directly resulting in a saving of processor time (since it is not necessary to compile before executing it). Only saved files in permanent storage can be thus compiled. Therefore each COMPILE command must be preceded by an OLD or SAVE command. Once compiled the resulting binary file can be saved, unsaved, run, and renamed. However, it cannot be compiled, listed or edited.

Control X

This command enables you to delete the current input line at any time prior to depressing the RETURN key. If the terminal is in the key mode, the message "DELETED" is printed. This function is enabled by pressing the Control key and X key simultaneously.

COPY

Use this command to copy data from one file to another file. All prior contents of the second file will be destroyed when the COPY command is issued.

You must have READ access to the first file and WRITE access to the second file to utilize this command. *

COPY does not recognize library file names appended with three asterisks (***) .

CREATE

This command is used to enter a new file in your user's catalog. The system will respond with requests for file name, password, and file structure. If the file structure is random, the system will request the record size in words and the number of records. *

If you type only a carriage return in response to a question, CREATE assumes a default value. The default values for each question are:

PASSWORD?	No Password
SEQUENTIAL OR RANDOM?	SEQUENTIAL ASCII
RECORD SIZE IN WORDS?	1
NUMBER OF RECORDS?	945

DESCRIBE

This command will output a description of a saved file. There are two types of description.

If you do not own the file, you will be given the following information: system name, time and date last modified, file type, data file size, access granted to you, and the real file name if you requested an alternate file name.

If you own the file, you will be given all of the above information in addition to: subscription access, general access, maximum file size, project id, time and date last accessed, accesses since last modification, permission file size.

See the section on "File Commands" for examples of user interface for this command. *

DSM

This command allows you to input data files into the data storage mode which may not contain line numbers. To enter the data storage mode simply type the command DSM. If your input is from paper tape, type TAPE immediately before typing DSM.

If your line exceeds 118 characters, the message: "LINE TOO LONG, RETYPE IT" will be output on the terminal.

If you input alter information to an existing file, that information will be appended to the file.

Exit DSM by depressing the BREAK key.

EDIT

EDIT, followed by a carriage return, is interpreted as a request for instruction in the use of EDIT. This command supplies you with the name of a file which you may list to obtain a description of the current EDIT capabilities and instruction in their use.

EQUATE

This command will enter an alternate file name (AFN) in your user's catalog. You will be asked to respond to the following requests: ALTERNATE FILE NAME, REAL LIBRARY, REAL FILE NAME, and SUBSCRIPTION LIBRARY.

If you type in YES to the SUBSCRIPTION LIBRARY request, or if the file name has a '\$' or '*' as the sixth character, EQUATE will place an AFN on your subscription library. In this case, the file name must be unique within the entire subscription library.

Placing an AFN in a user's catalog does not imply that the user is permitted access to the file. Only the owner of a file controls its permissions.*

EXCLUDE

This command establishes a specific or subscription permission of no access. It can also be used to change an existing permission to no access.*

FRIDEN

Allows the user to inform the system he is using a FRIDEN 7102 terminal.

HELLO

Use this command to change from one user number to another. This command initiates a new user validation sequence.

KEY

System command KEY resets teletypewriter operation to the normal (key input) mode after inputting from paper tape.

LENGTH

This command is used to obtain file length information. For a source program the length represents the number of characters in the file. For a compiled program, however, length represents the number of words.

LIST

LISTNH

LIST--nnn

LISTNHnnn

The LIST command causes the current program file to be listed by line number at your teletypewriter. A LIST operation may be terminated by using a BREAK command.

LIST will list the entire file, preceded by a heading line which specifies the file name, date, and time of day.

LISTNH will list the entire file without a heading line.

LIST (continued)

LIST--nnn will list the file with a header line, beginning with the line number specified by "nnn".

LISTNHnnn will list the file without a header line, beginning with the line number specified by "nnn".

LIST filename

LIST, with all of the above options, can also be used to list files other than the current file. This command will not affect the current file.

MODIFY

MODIFY can change the file name and the password. For a random file, it can change the record size and number of records. If the new record size exceeds the old record size, the file is enlarged and the additional storage only is zeroed out. If the new file size is less than the old size, the file is truncated so that higher position data elements are lost. When a carriage return is typed in response to a question, that attribute is not changed. *

NEW

The **NEW** command is a request to enter a new file into the time-sharing system. The system will request **ENTER FILE NAME**. You then supply the new file name and enter your program statements (lines).

NEW filename

Can be used to enter the file name on the same line as the command, and avoid conversational delay.

OLD

In response to the command **OLD**, the system will request **ENTER FILE NAME**. If your file has a password associated with it, you have the option of inputting the password with the program name (file name, password), or waiting for the system to request the password.

In order to delete a password from a permanent file you must input the file name and the correct password separated by a forward slash (file name/ password).

The **OLD** command may also be used to retrieve a file from another user's catalog. This is accomplished by giving the catalog name along with the file name or by giving the name of an alternate file which points to a real file in another catalog.

OLD filename	Can be used to enter the file name on the same line as the command, and avoid conversational delay.
PERMIT	Use this command to establish or add to permissions for a given private file. The established or add to permissions for a given private file. The system will request ACCESS TYPES, of which there are four: EXECUTE, READ, WRITE, and APPEND. After this information is typed in, a request for USER'S will type out. A list of user numbers, separated by commas, can be given in response to the USER'S request. In this way, one call on PERMIT can establish several permissions.*
PURGE	This command performs the same function as the UNSAVE command, except that the file being unsaved does not have to be the current file. Also, a single PURGE command can unsave several files; PURGE filename, password;filename2, password2 The only way to unsave a random file or an alternate file name is with the PURGE command.*
RENAME	This command enables you to change the current file name of your temporary file. The system will request ENTER FILE NAME, just as if the NEW command had been given; however, the contents of the current file in temporary storage are not affected. RENAME enables you to create multiple copies of a file: you can retrieve a file from the file system using the OLD command, modify it if you desire, rename it, and save the file under a new file name.
RENAME filename	Can be used to enter new file name on the same line as the command, and avoid conversational delay.
REPLACE REPLACE, password	This command performs the same function as the SAVE command except that previously saved files will be replaced. If the file to be replaced is protected by a password, that password must be provided in order to replace that copy with the new one. You may optionally enter

REPLACE
(continued)

the password with the REPLACE command (REPLACE, password), or the system will request that you enter the password when it is needed. In either event, the new copy of the file will be protected by the same password.

REPLACE filename

The current file replaces the data on the designated old file. Your temporary file is not affected by this command.

RETURN (key)

The RETURN (Carriage Return) key terminates a line of input, and causes the system to interpret and act upon the input entered.

REVOKE

This command will delete the permission established by a PERMIT or EXCLUDE.

A response of "ALL" to the USER'S request will delete all permissions for a file.*

RUN

The RUN command causes the current program file to be compiled (translated into computer instructions) and executed. During execution, the results of PRINT statements will be printed by your teletypewriter.

If your program is already compiled it will be executed.

Execution of a RUN command is terminated either by completion of the program or by your issuing one of the execution-termination commands (BREAK, or STOP).

When RUN is typed during execution the elapsed units are printed.

During the execution of a RUN command, the system will still respond to the STATUS, TTY, TAPE, and KEY commands; as well as the execution-termination commands.

RUN-XXXX

This command limits the program run time as specified by XXXX (maximum 9999 units).

The dash (-) must precede the units.

Only whole units may be specified; thus RUN-02, RUN-0002, or RUN-2 all limit the run time to 2 units.

Blanks after RUN are not permitted.

SAVE
SAVE, password

SAVE is used to store the current temporary copy of a file in the file system. If the current file name did not previously exist), a new entry will be made in the catalog. However, if the current file name is already in your catalog the following message will be printed, **DUPLICATE FILE NAME; REPLACE OR RENAME.**

If you type **REPLACE**, the current file replaces the old file of the same name in permanent storage; if your response is **RENAME**, you are asked for a new name and the current file is stored without affecting the file which already exists in permanent storage.

If a copy of the file did not previously exist and you want the new file to be protected by a password, that password must be entered with the **SAVE** command (**SAVE, password**).

When you desire to change a password on an existing file in the file system, you must first delete the old password from the file using the password deletion option specified under the **OLD** command; then use **SAVE, password** to apply the new password to the file.

SAVE filename

Stores the current file in the file system with the specified file name and optional password. Your temporary file is not affected by this command.

SCRATCH

The **SCRATCH** command causes the system to release the temporary copy of the current file. The current file name remains in effect, and any permanent copy of the file in the file system is not affected.

SET CX

Where **X** is the new user defined character delete character.

SET SX

Where **X** is the new user defined sentence delete character.

SET NORMAL
or **SET N**

Will set the character delete and line delete characters back to the normal ones.

SORT

This command will place a save'd or current working file into numerically ascending order.

SPEED XX

Where **XX** is 10, 15, or 30 characters per second, indicating the desired character rate. The TN-300 Terminal must log-in at 110 baud.

STATUS

This command causes the system to print your present status with respect to the system i. e., idle, run, old, list, save, etc.

SYSTEM

Use this command to indicate that you want to change the computer language. After the computer responds with **NEW SYSTEM NAME**, you simply type the name of the language you wish to use.

TAPE

TAPE informs the system that subsequent input will be read from paper tape, instead of being keyed in. The system normally acknowledges receipt of each line of input by transmitting back a line feed in response to each **RETURN** character. This is suppressed in the **TAPE** input mode to avoid fouling the printing. If the **TAPE** mode is busy, a message to that effect will be sent to your terminal.

TTY

The **TTY** command causes the system to print the terminal number to which you are connected, your user number, your current file name, your current compiler (system) name, and your status.

UNSAVE

UNSAVE removes the current file name from your catalog of permanent (saved) files, and releases the file system storage occupied by the file. This file must have previously been accessed by an **OLD**, **SAVE**, or **REPLACE** command. The **SAVE** or **REPLACE** commands must not have specified a new file name.

To minimize the file system storage assigned to you, you should **unsave** files when they are no longer needed.

SYSTEM REQUESTS FOR INFORMATION

The following system requests are depicted as you would see them at your teletypewriter.

USER NUMBER This is a request for you to enter the eight character user number, and password if applicable, which uniquely identifies you to the time-sharing system. This request is made each time a new user requests to use the time-sharing system.

PROJECT ID This request is made if the above user number has been validated for project identification.

SYSTEM This is a request to enter the name of the language you wish to use. This request is usually made after your user number has been entered into the system. Valid responses are listed elsewhere in this section.

NEW OR OLD NEW OR OLD requests you to specify whether you want to enter a new file into the system (in this case respond with NEW), or whether you want the system to retrieve a previously saved file from the file system (in this case respond with OLD).

ENTER FILE NAME This is a request to enter a file name for the new, old, or replace file which you indicated a desire to enter by issuing a NEW, OLD, or REPLACE command.

ENTER PASSWORD ENTER PASSWORD is a request to enter the password for a file in the file system that you desire to retrieve, save, or replace.

NEW SYSTEM NAME Is a request to enter the name of the language you wish to use. This request is made in response to the entry of the SYSTEM command, indicating that you want to change the language being used.

RESPONSES TO SYSTEM REQUESTS

In the following discussion, verbatim responses are shown in upper case, while symbolic indications of responses are shown in lower case.

user number This response is made to the system request **USER NUMBER** which occurs when a new user requests to use the time-sharing system. This response consists of the six-character user number which you have been assigned.

project id This information is given in response to the system request **PROJECT ID** and consists of up to eighteen characters.

user number, password	This response is made when the user number is protected by a password. The response consists of the six-character user number followed by a comma(,) and the appropriate password.
BASIC	BASIC is the response made to the system request SYSTEM or NEW SYSTEM NAME when you want to use the BASIC language.
FORTRAN	Make this response when you wish to use the FORTRAN language.
REMAPT	Make this response when you wish to use the REMAPT system.
NEW	The response NEW is made to the system request NEW OR OLD when you want to enter a new file.
OLD	OLD is the response made to the system request NEW OR OLD. Use this response to retrieve a previously saved file.
file name	This response is made to the system request ENTER FILE NAME or OLD FILE NAME. You should enter the name of the file you wish to process.
password	This response is made to the system request ENTER PASSWORD. This occurs because you have requested to retrieve, save, or unsave a file in the file system that is protected by a password, and you did not enter the password with the request.
file name, password	This response should be made to the system request ENTER FILE NAME when the file that you want to retrieve from the file system is protected by a password. You should enter the name of the file you want to retrieve, and the password that protects it.
file name/password	This response should be made to the system request ENTER FILE NAME when you want to delete a password associated with the file in the file system. You must enter the file name of the file and the password protecting the file, separated by a forward slash (/). The file is also made the current temporary file.

CATALOG*** This response should be made to the system request **ENTER FILE NAME** when you want a list of the files in the program library. **CATALOG***** is the name of a file in the program library which contains a directory of the files in the library. After you have entered **CATALOG***** and the system has responded with **READY**, type **LIST** to print the directory.

file name*** This response should be made to the system request **ENTER FILE NAME** when you wish to retrieve a program file from the program library. The three asterisks (***) instruct the system to retrieve the file from the program library.

SYSTEM MESSAGES

These messages are printed when the computer does not fully understand the input or some corrective action is required.

ALTERNATE FILE NAME, COMMAND NOT PERFORMED The command you issued will work only on a real file name.

CURRENT FILE NOT ASCII This message is self explanatory.

COMMAND WAS COMPLETED HOWEVER, FILENAME INVALID PLEASE CHANGE FORMAT The file name is not consistent with the file naming connections. Unless the file name is changed, you will not be allowed to enter this file into your catalog.

DELETED This message is self explanatory.

DUPLICATE FILE NAME: REPLACE OR RENAME Warns that you have a file saved with that identical name.

EDIT NOT PERFORMED Unrecoverable system error.

EDIT NOT PERFORMED NONEXISTENT LINES REFERENCED BY: Your **DELETE EXTRACT**, or **LIST** command specifies a line number(s) not present in the file.

— etc.
—

EDIT NOT PERFORMED NON-SOURCE FILE REFERENCED	You tried to INSERT, MERGE or WEAVE into a binary or data file.
EDIT NOT PERFORMED RESEQUENCE LONGEST FILE AND TRY AGAIN	Your file(s) exceeds system capacity during a MERGE operation.
EDIT NOT PERFORMED-"RUN ONLY" FILE REFERENCED	You have attempted to edit a "run only" file which is not your own.
EXECUTE-ONLY CURRENT FILE	You tried to mainpulate a file without permission to do so.
EXECUTION ABORTED, SORTED FILE LENGTH EXCEEDS LIMITS	Issued when user's file exceeds limit defined by system.
FILE EXCEEDS 43 BLOCKS	Resultant file of a RESEQUENCE, MERGE, WEAVE or INSERT command exceeds limit defined by system.
FILE IN USE	Another user is using this file.
FILE _____ IN USE. TO TRY AGAIN, RETYPE COMMAND	You have attempted to INSERT, MERGE, or WEAVE with a file currently in use.
FILE ON UNAVAILABLE DEVICE	Your file is residing on a device which is currently inoperable. It will be available when the hardware malfunction is corrected.
FILE TOO LARGE, APPEND PARTIALLY COMPLETED	This message is self explanatory.
FILE TOO LARGE RESEQUENCE IN PARTS AND MERGE	Your file exceeds system capacity during a RESEQUENCE operation.
FILE NOT SAVED	This message is self explanatory.

FILE MUST BE SAVED	Before compiling, (but not execution) or chaining to a file it must be saved in permanent storage.
FORMAT ERROR-LIST EDITINST*** FOR EDIT INSTRUCTION	This message is self explanatory.
GE TIMESHARING	The system responds with this when it receives a "Who-are-you" character e.g., you may have pressed the WRU (control E) key on your tele--typewriter.
IDLE	In response to STATUS this message indicates that no action is being taken on your problem.
ILLEGAL CATALOG NAME	This message is self explanatory.
INCORRECT FORMAT, RETYPE IT--	The user number that you have just given the system does not conform to the format.
INPUT FILE TOO LONG SAVE AND CONTINUE	This message is self explanatory.
INVALID EDIT TYPE LIST FILE EDITINST*** FOR EDIT INFORMA- TION	Issued if you misspell or give an otherwise unacceptable edit command.
INVALID SYSTEM NAME, RETYPE IT--	This message is self explanatory.
LINE NUMBER EXCEEDS 99999	Your last command has produced statement numbers greater than 99999.
LIST FILE EDITINST*** FOR EDIT INFORMA- TION	This message is self explanatory.
MORE THAN TWO ALTERNATE FILE NAMES IN SEQUENCE	The second alternate file name must point to a real file name.

NO EDIT. MISSING LINE(S):____, etc. ____	This indicates that you have specified a line number(s) not present in your temporary file.
NO FILE NO FILE ACTIVE, TYPE NEW OR OLD	Trying to save a file without any data. This message is self explanatory.
NO FILE NAME, USE RENAME	This message is self explanatory.
NO FILE SAVED	In response to a CATALOG command whenever there are no files saved for the user.
NON-SOURCE FILE SPECIFIED	You tried to append to a binary or data file.
PASSWORD INVALID	This password does not match the password saved with the file name.
RENAME FILE	Indicates that you have already used that file name.
RUN TIME LIMIT	The execution of a program was terminated because the time allocated by the RUN-XXXX command was exceeded.
SOURCE FILE NOT PRESENT	You have attempted to DELETE, EXTRACT, LIST or RESEQUENCE a binary or data file.
STORAGE FULL	Permanent storage is inoperative or temporarily filled to capacity.
SYSTEM ERROR- LAST COMMAND NOT COMPLETE-	Unrecoverable system error.
BUSY	The system is currently handling the maximum amount of TAPE input activity. Proceed with non- tape functions and try TAPE at a later time.
XXX NOT PER- FORMED	You tried to LIST, EDIT, SAVE, UNSAVE or RE- NAME a run only file which was not your own.
VALIDATION FAULT, RETYPE IT--	The Password and/or Answer-Back-Drum that you have just given the system is incorrect.

**YOU HAVE NOT
ISSUED A COM-
MAND FOR 8
MINUTES. PLEASE
RESPOND!!!**

Self explanatory.

**NOTE: You will be disconnected from the System 2
min. after message if no new command is
issued.**

USED XX.XX UNITS

The number of resource units used in the RUN
command.

**USER DOES NOT
HAVE APPEND
ACCESS**

This message is self explanatory.

FILE TRUNCATED

In response to a **RENAME** command whenever an
abnormal termination is sensed.

**NOT PERMITTED ON
RUN-ONLY FILES!!!**

Some commands will result with the issuance of
this message if used is attempted on a "run-only"
file.

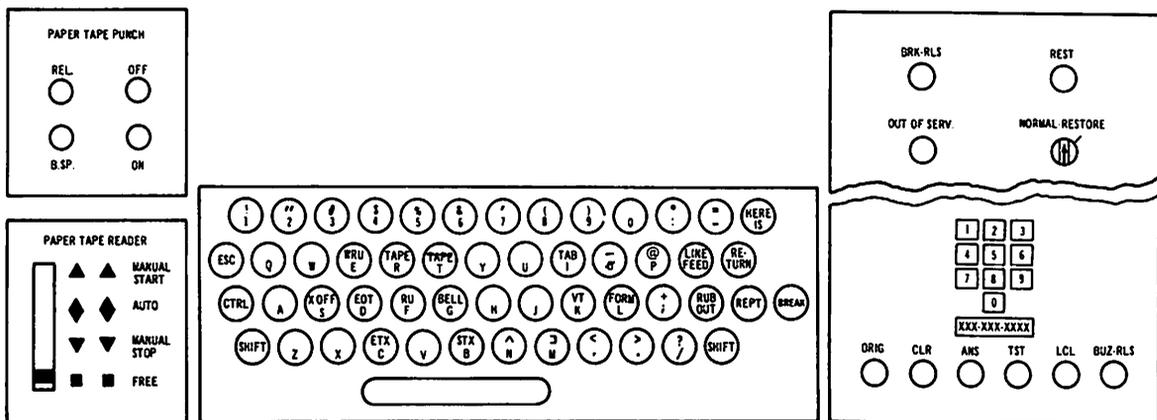
4. Use of Teletypewriters

GENERAL

Time-Sharing Service is easy to use because the teletypewriter keyboard used for input is similar to an ordinary typewriter keyboard without lower case letters. Both the Model 33 and Model 35 teletypewriters are currently being used with the Time-Sharing Service.

MODEL 33 TELETYPEWRITER

The principal parts of the teletypewriter are the Control Unit, Keyboard, Paper Tape Punch (optional), and Paper Tape Reader (optional).



Model 33 Keyboard and Controls¹

Control Unit

Control Unit operating features include the following:

- | | |
|------------------|---|
| Telephone Dial | For dialing telephone numbers. |
| ORIG (Originate) | Button is depressed to obtain a dial tone. |
| CLR (Clear) | Button is depressed to turn off teletypewriter. |
| LCL (Local) | Button is depressed to perform local off-line work such as tape punching. During local operation, you cannot connect with the system. |

¹ On some Model 33 teletypewriters the upward arrow (↑) is replaced by the caret (^) and the backward arrow (←) with the underline (_).

BUZ-RLS (Buzzer Release)	Buzzer sounds when paper supply is low. Depress key to silence buzzer then replace paper roll.
NORMAL-RESTORE	Should always point to NORMAL.
ANS and TST	Not used by the system.
BRK-RLS (Break Release)	Depress to free keyboard after a break signal. (Break signal causes keyboard to lock.)
Loudspeaker	Usually located under the keyboard at the right. A volume control knob permits you to adjust the volume. When knob is turned fully counterclockwise the dial tone will not be audible.

Keyboard

The teletypewriter keyboard is used like a standard typewriter keyboard with the following exceptions (those keys on the keyboard not used by time-sharing are not discussed):

Letters	Letters of the alphabet are printed in capital letters only.
SHIFT and Control keys	These keys are nonlocking and must be held depressed when typing.
RETURN	Returns the carriage to the left margin.
LINE FEED	Moves the paper up one line at a time.
REPT (Repeat)	To repeat a teletypewriter character, you must hold this key depressed while the desired character key is operated. Release the latter and hold the REPT key until the desired number of characters have been typed. (If it is an upper case character, the SHIFT key must be held along with the REPT key.)
RUBOUT	Use this non-printing key, following operation of the RETURN key, to end a program line of paper tape input. You may also use it in conjunction with the backspace button on the tape punch to delete errors in punching tape.
HERE IS	Transmits and prints whatever is on the answer-back drum.
BREAK	See list of commands.

Paper Tape Punch

The paper tape punch is used to produce one inch (8 level) fully perforated tape. To prepare a tape the punch generates a row of holes for each teletypewriter key character including the non-printing keys. The punch may be controlled from the local keyboard or from a remote location.

The following describe the paper tape punch controls and the preparation of a paper tape.

ON and OFF Buttons	Any typed or printed information may be punched on paper tape simply by turning the punch unit on (depressing the ON button). It continues to punch until the OFF button is depressed.
B.SP (Backspace)	Each time you depress this button, the paper tape moves backwards one character. This button is used with the RUBOUT key to delete errors in the tape. The character (or characters) in error are each moved back under the punch and then for each character to be deleted, the RUBOUT key is hit.

REL (Release) This button frees the tape so that you can manually pull blank tape through the punch. (This tape cannot be read through the tape reader.)

Preparation of a Paper Tape

Observe the following when punching a paper tape:

1. Always hit the RUBOUT key several times to generate a leader before starting to punch any tape.
2. To punch a paper tape off-line, depress the LCL key to turn on the teletypewriter and then depress the paper tape ON key.
3. When preparing a paper tape off-line, you must press at the end of each line the CR (Carriage Return), LF (Line Feed), and RUBOUT key in that order or the message may not send accurately.
4. When sending data to the computer via tape, you must indicate this fact by typing the command TAPE. To tell the computer to return to normal keyboard operation, type the command KEY.
5. Only RUBOUT characters may precede the first character of a file or follow the last character of a file stored on paper tape.

Paper Tape Reader

The paper tape reader is located at lower left side of the teletypewriter and is used for transmitting information from paper tape. The tape reader has one four-position control switch with the positions marked below.

1. **MANUAL START** This non-locking position is used to start the tape moving through the tape reader.
2. **AUTO** The tape reader is in this position when the X-ON feature is used.
3. **MANUAL STOP** This non-locking position stops the tape reader. (Used primarily with LCL)
4. **FREE** Permits the tape to be pulled manually through the reader.

The following information describes how to operate the tape reader.

1. Open the clear plastic tape gate by pushing the gray lock on the right side to the right.
2. Place the tape surface facing upward with the tape feed holes (small holes) over the tape feed wheel (the smaller side of the tape to the left).
3. Place the code holes of the first character to be Read slightly behind the sensing pins, preceded by any number of RUBOUT characters.
4. Close and lock the tape gate by pushing down. When ready to Read, move the tape reader control switch to the MANUAL START position. Start the tape for each transmission to the computer. (Before starting, you must type the command TAPE.)

The tape will stop when the last punched character is read.

X-ON FEATURE. On requests for input to a running program, the question mark is followed by an X-ON. This allows the computer to activate the paper tape reader on all Model 35 ASR and some Model 33 ASR teletypewriters. The method of using this feature is shown in the following example:

It is desired to compute and print the sum of four numbers input to the program on paper tape. A BASIC program to do so might take the following form:

```

5      LET B = 0
10     FOR I = 1 to 4 STEP 1
20     INPUT A(I)
30     LET B = B + A(I)
40     NEXT I
50     PRINT B
60     END
    
```

Assuming the input numbers are 1,1.5,2,2.5, then the paper tape input to the above program is punched as follows:

1 LF (X)(R) RO 1.5 LF (X)(R) RO 2 LF (X)(R) RO 2.5 LF (X)(R) RO

Where:

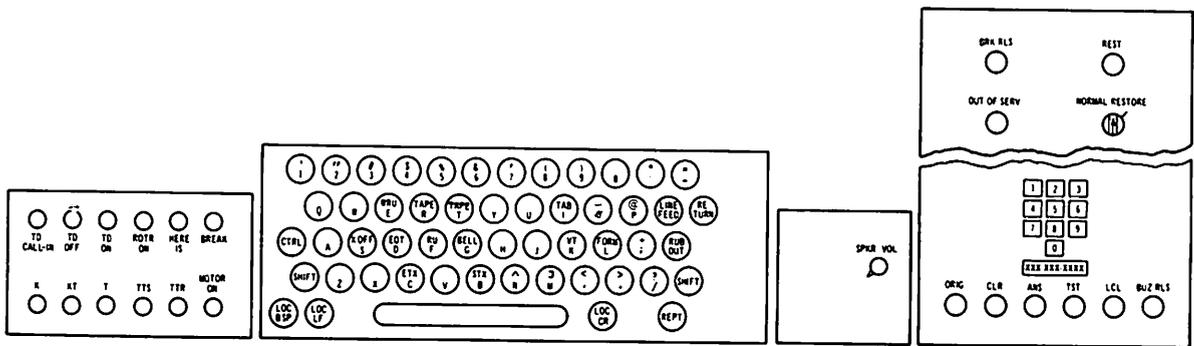
- LF = Line Feed
- X = X-OFF
- R = Carriage Return
- RO = Rubout

The sequence of characters after each number assures that the paper is spaced after each line, and that the reader is turned off after each number is read in.

If teletypewriter is not set for paper tape input (KT button pushed on the Model 35) the X-ON will have no effect.

MODEL 35 TELETYPEWRITER

The principal parts of this teletypewriter are the Control Unit, Keyboard, Paper Tape Punch, and Paper Tape Reader. The keyboard and controls of the Model 35 teletypewriter are shown on next page.



Model 35 Keyboard and Controls¹

Control Unit

The control unit of the Model 35 is similar in appearance and function to the Model 33 teletypewriter previously described.

¹On some Model 35 teletypewriters the upward arrow (↑) is replaced by the caret (^) and the backward arrow (←) with the underline (_).

The controls and indicators listed below are identical on both the Model 33 and Model 35 teletypewriters.

Telephone Dial	BRK-RLS
ORIG	NORMAL-RESTORE
CLR	Loudspeaker
LCL	ANS and TST
BUZ-RLS	

The following six lights, located on the upper right side of the Model 35 teletypewriters, are not used by the time-sharing system:

DIAL, BY, INCPT, NO CON, SVE, PA.

Control Buttons

The following control buttons are located to the left of the keyboard and are all equipped with lights.

TD CALL IN	Not used.
TD OFF	Turns local tape reader off (in KT, T, or TTS modes).
TD ON	Starts local tape reader (in KT, T, or TTS modes).
ROTR ON	Not used.
HERE IS	Transmits and prints whatever is on your answer-back drum.
BREAK	See list of System Commands.

Control Modes

The following controls are listed in the order that they appear on the panel to the left of the keyboard.

K (Keyboard)	For obtaining page copy only.
KT (Keyboard-Tape)	For obtaining page copy and perforating tape simultaneously or for transmitting, punching a copy tape, and printing a page copy simultaneously.
T (Tape)	For perforating tape only or transmitting tape with page copy.
TTS (Tape-to-Tape Send)	Transmits tape without page copy.
TTR (Tape-to-Tape Receive)	Perforates tape from a remote source without page copy.
MOTOR ON	Permits punching tape locally (without page copy) without placing station in the Local mode.

When originating a call, the station is automatically switched to the Tape (T) mode. If a request to the computer is made, the user must depress the K button before any transmission can be effected, and must depress K to release the keyboard after a break.

Keyboard

The keyboard operates like a standard typewriter with the following exceptions: (keys on the keyboard which are not used by the system are not discussed):

- Column Indicator** Located at upper right side of keyboard, this metal pointer indicates which column has just been printed (typed/punched).
- End of Line (Red Light)** Indicates when end of line is approached and has no effect on computer or the teletypewriter.
- Letters** Letters of the alphabet are printed in capital letters only.
- SHIFT (Key)** The SHIFT key is nonlocking and must be held depressed when typing characters in upper case positions.
- RETURN** Returns the carriage to the left margin.
- LINE FEED** Moves the paper up one line at a time.
- REPT (Repeat)** To repeat any character this key must be held depressed while the desired character key is operated. The latter is released and the REPT key is held until the desired number of characters have been typed. (If it is an upper case character, the shift key must be held along with the REPT key.)
- RUBOUT** This key has a nonprinting function and is used following operation of the RETURN key to end a program line of paper tape input. It can also be used in conjunction with the backspace button on the tape punch to delete errors in punching tape.
- X OFF (Key)** This key is operated in conjunction with the control key. It is a nonprinting function activated by holding the CTRL (Control) key while striking the X OFF key.

X OFF, when perforated in tape, turns tape reader off at the time it is read by the tape reader. X OFF must always be followed by at least one RUBOUT character. This function has no effect when typed "on-line." Control and Q can be used to turn on the tape reader.

Four red keys, two on each side of the space bar, are used only during local operation. These keys do not generate any code on a paper tape or transmit a code to the computer.

From left to right:

- LOC
B.SP.** Backspaces the paper tape in the punch, one space for each time it is depressed.
- LOC
LF** Spaces the carriage up one line.
- LOC
CR** Returns the carriage to the left margin.
- REPT** Repeats teletypewriter keyboard characters.

Paper Tape Punch

For perforating tape from the local keyboard or from a remote location, the punch generates a row of holes for each character (including the nonprinting functions) on the teletypewriter. It produces one inch (8 level) fully perforated tape. The eighth level is punched with a keyboard generated code.

The following information describes how to operate the paper tape punch effectively.

1. Place the teletypewriter in Local (LCL) and in the KT mode for punching tape. (It also punches tape in the T mode but does not generate a page copy.)
2. Always hit the RUBOUT key several times to be sure that there is clean tape when starting to punch every tape.
3. To punch a paper tape off-line, depress LCL key to turn on the teletypewriter and then depress the paper tape ON key.
4. To prepare a paper tape off-line, press RETURN (Carriage Return) and LINE FEED at the end of each line. For clean copy, follow LINE FEED with RUBOUT.
5. When transmitting information from tape to the computer, indicate this by typing TAPE. Type KEY to tell the computer to return to keyboard operation after transmission is completed.
6. To delete errors on the tape, press the LOC B.SP. button for each character to be deleted, then hit the RUBOUT key for each character. (The RUBOUT generates a row of eight punches which is ignored by the tape system.)

Paper Tape Reader

The paper tape reader is located on the far left of the teletypewriter and is used for transmitting information from paper tape. The tape reader is controlled by a tape read switch which has two positions.

1. FREE - for freewheeling, to insert tape without raising the tape gate. This is a nonlocking position of the switch. It must be held in this position.
2. RUN - Normal position of the switch.

Control of the tape reader is by means of the buttons TD ON and TD OFF. The teletypewriter must be in the KT, T, or TTS mode to operate the tape reader.

The following information describes the operation of the tape reader.

1. Press the square button to release the tape gate.
2. Place the tape surface facing upward with the tape feed holes (small holes) over the tape feed wheel (the smaller section of tape facing away from the operator).
3. Place the code holes of the first character to be read slightly behind the sensing pins; these must be preceded by any number of RUBOUT characters.
4. Close and lock the tape gate by pushing down. When ready to READ, press the TD ON button. You must start the tape for each transmission to the computer. (Before starting you must type the command TAPE.)

The tape will stop when the last punched character is read.

X-ON (See page 21.)

5. ADDITIONAL SYSTEM CAPABILITIES

Many commands have been added to the system to provide you with capabilities of defining sequential and random files, sharing files with other users, and controlling access to files.

These commands process cataloged (SAVED) files, while the old commands are still available to manipulate the current file. All previous Mark II features have been retained in order for you to use the system in your accustomed manner, should the new capabilities not serve your needs.

In addition to the commands, several new concepts and terms have been introduced to the system. These will all be discussed in this section.

FILE SHARING AND PERMISSIONS

When you enter a file into the system, the file name is entered into your user catalog. Unless you specified a "\$" or "*" as the sixth character, the file will remain private and can only be accessed from your user number. However, you may share your files if you wish to do so and still control the accessing of your files by other users with the system commands which are discussed later in this section.

There are four ways you may permit other users to access your files. They are: EXECUTE, READ, WRITE, and APPEND. These access types operate independently except that WRITE access implies APPEND, and READ access implies EXECUTE.

You may wish to give different users different access capabilities. EXCLUDE and PERMIT allow you to do this.

Permissions can only be established or deleted by you as the file owner through use of the PERMIT, EXCLUDE, and REVOKE commands. You may grant specific permissions by user number and subscription permissions by your subscription number.

1. Specific Permissions

A specific permission for a single user is established when you specify another user's number to the PERMIT or EXCLUDE commands. EXCLUDE establishes a permission of no access. You may change a specific permission by issuing another PERMIT or EXCLUDE. You may delete a permission of this type with a REVOKE command.

2. Subscription Permissions

A subscription permission is established when you specify your subscription number to the **PERMIT** or **EXCLUDE** commands. Subscription permissions are deleted with **REVOKE**. A subscription permission specifies how all users in a subscription can access the file, with the exception of those specific permissions which override the subscription permission for some users.

When you establish a subscription permission, the file is placed on your subscription library. When you **SAVE** or **CREATE** a file which has a **\$** or ***** in the sixth character of your file name, the file is also placed on your subscription library. A **\$** implies **EXECUTE** access and a ***** implies **EXECUTE** and **READ** access for your subscription. If you **REVOKE** permission for your subscription, the file is removed from the subscription library and placed in your private library.

Some important things to remember about permissions are listed below:

- The **REPLACE** and **MODIFY** commands may alter data and file attributes, but do not change permissions.
- **PURGE** and **UNSAVE** will delete permissions along with the catalog entry and data for the file.
- The **DESCRIBE** command will provide you with a complete list of permissions.

FILE NAMING CONVENTIONS

To access another user's files, the file name will be specified in the following manner: **Library:file, password**.

EXAMPLE: A10234:USFILE, PASS

The password and preceding comma are only required for a file which has been assigned a password. The library designator and colon are only required for other user's files which are within your subscription but are not on your subscription library.

All existing file naming conventions will be maintained. If you require access to your own file, you need give only the file name. You may gain access to files on the program library by appending three asterisks as a suffix to the file name.

USER NUMBERS

You ordinarily type a six character user number during the login sequence. The Mark II system adds two characters as a prefix to your user number, creating an eight character number.

For file-sharing purposes, the Mark II will also add the two character prefix to any six character number which is input as part of the file designator or as input in response to the USERS? request from PERMIT, REVOKE, or EXCLUDE. You may also input the eight character number.

Remote DATANET-30 Users will have to type the entire 8 digit user number.

ACCESSING OTHER USER'S FILES

To gain access to another user's files, you must give the file name and library name as described under "FILE NAMING CONVENTIONS," and the password if one is assigned to the file. You will then gain the types of access specified for you by the file owner.

You must have EXECUTE or READ access before the system will allow a file to become the current working file. The allowable system commands are then limited by the access types permitted to you. The following access types required to issue each of the commands affecting the current file are summarized below:

	EXECUTE	READ	WRITE
RUN	x		
LIST		x	
RENAME		x	
EDIT		x	
COMPILE		x	
SAVE		x	
REPLACE		x	x
UNSAVE		x	x

For example, RENAME is allowed only if you have READ access.

If you have APPEND access to another user's file, you may add to the file with the APPEND command.

If you have WRITE access, you may modify the file only with a running program.

If you have WRITE but not READ access to another user's file, a running program can only write to the file after the file has been emptied. In BASIC, this means that the program must SCRATCH the file before writing. In FORTRAN, the program must ENDFILE the file before writing.

You may also gain access to another user's files within your subscription with the help of alternate file names, which are discussed in the next section.

ALTERNATE FILE NAMES

You may place an alternate file name (AFN) in your catalog with the EQUATE system command. EQUATE establishes a name which can be used instead of a real file name to reference the file. For example, user B99999 could equate the AFN "BATTLE" to the real file name B01234:USFILE. Then user B99999 could refer to the file as either BATTLE or B01234:USFILE. An AFN can be placed on your subscription library.

There are many reasons for establishing AFN's. It is difficult to remember another user's user number and file names. You may create a name which is shorter, more meaningful, and easy to remember, to suit your own purposes. With the AFN in your catalog, you have a handy reminder that another user's file is available to you.

Some important things to remember about AFN's are listed below:

- An AFN has no permissions and no attributes except for the name itself.
- Permission and file attributes are carried in the real catalog and are controlled by the owner.
- When an AFN is given in response to OLD FILE NAME, the real file name will be made known to the user and the system will make the real file into the current file.
- MODIFY, PERMIT, EXCLUDE, REVOKE, and CLASSIFY are illegal commands for an AFN since the AFN has no permissions.
- An AFN may be equated to another AFN, but the second AFN must be equated to a real file name. Otherwise, the message: TOO MANY ALTERNATE FILE NAMES IN SEQUENCE will be issued.
- AFN's are deleted with PURGE.

RANDOM FILES

A random file utilizes the random access capabilities of Mark II permanent storage so that a running program can quickly access any data on a random file, regardless of the file's size.

Some important things to remember when using random files are listed below:

- A random file must be preallocated on permanent storage with the **CREATE** Command before it is accessed by a running program. The file size cannot be changed by a running program.
- The only means of changing the size of a random file is to use the **MODIFY** command. If you change the file to a greater size, the file is enlarged and additional storage is zeroed out. If you change the file to a smaller size, the file is truncated and higher position data elements are lost. The new attributes are recorded in the catalog entry.
- A random file must be of binary data type.
- Random files are unsaved with **PURGE**.

UPPER AND LOWER CASE USAGE

System commands will accept both upper and lower case ASCII input. However, prior to storage in catalogs or permission files, all ASCII input will be converted to upper case.

The following rules apply to input and output regardless of which language you are working in (**BASIC**, **FORTTRAN**, or **REMAPT**):

File input is received in upper and lower case.

File output is in upper and lower case.

File Names may be entered in either case but are converted to upper case before filing in a catalog.

File Passwords are treated in the same manner as File Names.

Conversational input is received in upper and lower case.

Conversational output is converted to upper case.

User Number prefixes are received in mixed case but converted to upper case before validating a user.

User Number passwords, received in mixed case but converted to upper case.

FILE COMMANDS

Many of the system commands require several parameters. The parameters can be input on the same line as the command itself. However, you may find it easier to use the commands if you type only the command and place the system in a conversational mode. This will result in a series of questions which request the parameters one at a time.

```
EXCLUDE  
FILE NAME? HOMRIN  
PASSWORD? NONE  
USERS? BAA90111
```

If you remember only a few of the parameters, you may enter them with the command and the system will request the remaining parameters.

```
CREATE RINFIL  
PASSWORD? SDAR  
SEQUENTIAL OR RANDOM? SEQUENTIAL
```

Null parameters are entered with two commas on a string entry or a carriage return on conversational entries.

```
CREATE HOMRIN,,SEQUENTIAL
```

In this case the file HOMRUN has no password.

The following commands which require several parameters will be discussed in this section: CREATE, EQUATE, APPEND, COPY, DESCRIBE, MODIFY, EXCLUDE, REVOKE, PERMIT, PURGE, CLASSIFY.

All of the standard vocabulary input to the system commands can be abbreviated if it is more convenient to you.

CREATE

This command enters a new file in your catalog. A newly created sequential file is empty. For a random file, space is allocated on permanent storage and initialized to zeroes. The size of a random file is equal to the product of record size times number of records.

EXAMPLE:

```
CREATE  
FILE NAME? BIFILG  
PASSWORD? SECDAT  
SEQUENTIAL OR RANDOM? SEQUENTIAL
```

For RANDOM file structure, the following information is requested.

```
RECORD SIZE IN WORDS?  
NUMBER OF RECORDS?
```

When only a carriage return (null parameter) is typed in response to a question, CREATE assumes a default value. The default values for each question are:

```
PASSWORD? No Password  
SEQUENTIAL OR RANDOM? SEQUENTIAL ASCII  
RECORD SIZE IN WORDS? 1  
NUMBER OF RECORDS? 945
```

In the example that follows, the parameters are entered on the same line as the command:

```
CREATE BIFILG,SECDAT,SEQUENTIAL
```

EQUATE

EQUATE enters an alternate file name (AFN) in your catalog. The AFN serves as an abbreviation for referencing a file name in another library.

EXAMPLE:

```
EQUATE  
ALTERNATE FILE NAME?HBACKS  
REAL LIBRARY? A90000  
REAL FILE NAME? RUSHER  
SUBSCRIPTION LIBRARY? YES
```

READY

```
LIST HBACKS  
REAL FILE NAME IS : RUSHER
```

RUSHER

```
001 NAME RUSHES YARDS  
002  
003 JONES 28 106
```

In the example, the AFN was equated to the Real File Name RUSHER. RUSHER resides in the A90000 library. The user placed it in the subscription library. Note that when the AFN HBACKS was given with the LIST command, the system referred to the real file name RUSHER. The file was then listed under the real file name.

In the example below, the parameters are entered on the same line as the command:

```
F QUATE HBACKS, A90000, RUSHER, YES
```

APPEND

This command appends the current file to the designated permanent file. Ordinarily the current file will be a NEW file. The current file will be sorted unless it was entered in DSM mode. If the current file is an OLD file, you must have READ access to that file. In any case, you must have APPEND or WRITE access to the designated permanent file. Both the current file and the designated permanent file must be ASCII.

In the example, the current file POWER is appended to the permanent file HITTER.

There is only one parameter or question from the system; TO FILE? The system will also request the file's password if it has one.

```
ENTER FILE NAME-POWER  
READY  
APPEND  
TO FILE?   HITTER
```

```
READY
```

```
LIST HITTER
```

```
HITTER
```

001	PLAYER	TEAM	HRS
002			
003	SMITH	CATS	50
004	JONES	BATS	40
005	BROWN	OWLS	35
001	PLAYER	TEAM	HRS
010			
020	WHITE	ACES	48
030	THOMAS	BEEB	34

In the example that follows, the parameters are entered on the same line as the command:

APPEND HITTER,PASSWORD

COPY

The COPY command will copy data from one file to another. You must have READ access to the first file to use the COPY command. You must also have WRITE access for the second file.

The data on the second file is replaced with the data from the first file. The second file is given the same structure, data type, record size, and number of records as the first file. Other attributes of the second file, such as password and permissions are retained.

In the example, the information from the file POWER was copied to the file HITTER.

POWER

001	PLAYER	TEAM	HRS
010			
020	WHITE	ACES	48
030	THOMAS	BEES	34

COPY

FROM FILE? POWER
TO FILE?HITTER

READY

USED .01 UNITS

LIST HITTER

HITTER

001	PLAYER	TEAM	HRS
010			
020	WHITE	ACES	48
030	THOMAS	BEES	34

In the following example the parameters are entered on the same line as the command:

COPY POWER,PASSWORD;HITTER,PASSWORD

DESCRIBE

DESCRIBE outputs a description of a SAVED file. There are two types of description:

1. If you own the file you are describing, the following information is given to you:

- System name
- Time and date last modified
- File type
- Data file size
- Access granted
- Maximum file size
- Project identification
- Time and date last accessed
- Accesses since last modification
- Permission file size

2. If you do not own the file you will only receive:

- System name
- Time and data last modified
- File type
- Data file size
- Access granted

In the example below, the owner of the file POWER has requested a description of his file as it appears in catalog BAA90000. The ;P after the file name tells the system to output the permission list.

DESCRIBE BAA90000:POWER;P

MODIFY

This command can change the file name and password of a file. For a random file, MODIFY can also change the record size and number of records.

When using MODIFY with random files, the file data is not changed unless the size of the file is changed. When a new record size or new number of records is specified, the command calculates a new file size. If the new size exceeds the old size, the file is enlarged and the additional storage only is zeroed out. If the new size is less than the old size, the file is truncated so that higher position data elements are lost.

In the example below, an ASCII Sequential file with no password is modified to a file with a password. The system types READY when the modification has been completed.

```
MODIFY
FILE NAME?  ESBALL
NEW FILE NAME?  HOMRIN
NEW PASSWORD?  CIRCUIT
```

READY

If the new file structure was random, the system would have requested the following information:

RECORD SIZE IN WORDS?

NUMBER OF RECORDS?

When only a carriage return is typed in response to a question, that attribute is not changed.

MODIFY cannot be used on the current file.

In the example that follows, the parameters are entered on the same line as the command:

```
MODIFY ESBALL;HOMRIN,CIRCUIT
```

PERMIT

PERMIT will establish a specific permission, or a subscription permission for a file. This command may also be used to change an existing permission. When a subscription permission is established, the file is placed in your subscription library. In this case, the file name must be unique within the entire subscription.

There are four parameters associated with the PERMIT command. They are: File name, password, access types, and users. If you type the command and follow with a carriage return, the system will request the parameters one at a time. You may type either one or more user numbers in response to the user's request.

In the example below, all four access types have been granted to three user numbers for the file HOMRUN. All user numbers must be within the same subscription.

```
PERMIT  
FILE NAME? HOMRUN ("NONE is the password for "HOMRUN")  
PASSWORD? NONE  
ACCESS TYPES? EXECUTE, READ, WRITE, APPEND  
USERS? BAA90111, BAA90112, BAA90113
```

READY

In the example that follows, the parameters are entered on the same line as the command:

```
PERMIT HOMRUN, NONE, E, R, W, A, BAA90111, BAA90112, BAA90113
```

EXCLUDE

EXCLUDE will establish a specific or a subscription permission of no access. It can be used to change an existing permission to no access.

The parameters are the same as those for PERMIT except that no access types are requested.

A list of user numbers, separated by commas, can be given in response to the USERS? question.

In the following example, two users have been given a permission of no access to the file HOMRUN.

```
EXCLUDE  
FILE NAME? HOMRUN ("NONE is the password for "HOMRUN")  
PASSWORD? NONE  
USERS? BAA90112, BAA90113
```

READY

In the example that follows, the parameter are entered on the same line as the command:

```
EXCLUDE HOMRUN, NONE, BAA90112, BAA90113
```

REVOKE

The REVOKE command deletes a permission which was previously established by a PERMIT or EXCLUDE.

The parameters are similar to those for PERMIT. With REVOKE you have the option of typing ALL after the USERS? request. All deletes all permissions for a file.

EXAMPLE:

```
REVOKE  
FILE NAME? HOMRUN  
PASSWORD? CIRCUIT  
USERS? BAA90111, A90012  
  
READY
```

In the example, the user numbers BAA9011 and A90012 had their permission for file HOMRUN deleted by the owner.

The following example shows how the parameters are entered on the same line as the command:

```
REVOKE HOMRUN, CIRCUIT, BAA90112, BAA90113
```

PURGE

PURGE will delete a list of files and alternate file names from your catalog.

You need only type the command followed by the files you wish to purge for this command to work.

However, you must remember to enter the password for a file if it has one. If you do not enter a password the system will request the correct password from you.

The system will not purge a file if the password given is incorrect or if the file you want to purge is in use.

If no file names are given, the system will request them.

EXAMPLE OF PURGE:

```
PURGE  
ENTER FILE NAME-POWER  
READY
```

```
PURGE RUSHER;HØMRUN  
READY
```

In the example below, the parameters are entered on the same line as the command:

```
PURGE RUSHER,PASSWORD;HØMRUN,PASSWORD
```

CLASSIFY

CLASSIFY can be used to restrict the access within your subscription that all users including the owner have to a file.

CLASSIFY can also be used to change an existing classification. You can protect your file from your own mistakes by classifying it. Other users are restricted both by the file's classification and by their permissions, so that CLASSIFY can be used to temporarily restrict all permissions.

EXAMPLE:

CLASSIFY
FILE NAME? HITTER
ACCESS TYPES? EXECUTE, READ

READY

PURGE
ENTER FILE NAME-HITTER
DO NOT HAVE WRITE ACCESS-COMMAND NOT PERFORMED
READY

In the following example, the parameters are entered on the same line as the command:

CLASSIFY HITTER, EXECUTE, READ

APPENDIX A SYSTEM COMMANDS

ACT	Outputs number of computer resource units, terminal minutes, and characters transmitted since login.
APPEND	Sorts your altered file and adds it to the end of your current file and a named SAVE'd file.
Back Arrow (←)	Deletes the last character typed. The SHIFT key must be depressed. This is the character on the O key.
BREAK	Causes the system to stop whatever it is doing during printing.
BYE	Disconnects from the system.
CAPALOG	Lists a user catalog of the file names and project id.
CASALOG	Lists a user catalog of files, giving file names and file length.
CATALOG	Lists a user catalog of files, giving file names and data of last access.
CLASSIFY	Restricts the access that all users have to a file. Use also to change an existing classification.
COMPILE, file name	Compiles a source program and produces a binary program file.
Control X	Deletes the current input line as if nothing has been typed.
COPY	Copies data from one file to another.
CREATE	This command enters a new file in your user's catalog.
DESCRIBE	Outputs a description of a SAVE'd file.
DSM	Data storage mode input.
EQUATE	Enters an alternate file name in your user catalog.

APPENDIX A (Continued)

EXCLUDE	Establishes a permission of no access.
GOODBYE	Disconnects from the system.
HELLO	Initiates the validation sequence.
KEY	Resets terminal operation to keyboard after reading in paper tape.
LENGTH	Gives length of temporary file.
LIST	Lists the current temporary file.
LISTNH	Lists the current temporary file without heading information.
LIST--nn	Lists the current temporary file beginning at line nnn, where nnn is a one to five digit line number.
LISTNHnnn	Lists the current temporary file without heading information, beginning at line nnn.
NEW	Introduces a new temporary file.
OLD	Retrieves from the file system a previously saved file.
PERMIT	Establishes permissions for a private file.
PURGE	Deletes the catalog entry, permission list, and file storage of a specified shared file.
RENAME	Changes the file name of the current temporary file.
REPLACE	Stores the current temporary file in the file system.
REPLACE, password	Stores the current temporary file in the file system protecting that file by a password.
RETURN	Terminates a program line, causes the system to take action based upon input entered, and acts as a normal carriage return.

APPENDIX A (Continued)

REVOKE	Deletes a permission established by a PERMIT or EXCLUDE command.
RUN	Compiles and executes the current program file.
RUN-XXXX	Limits run time to XXXX units.
SAVE	Similar to REPLACE, password
SCRATCH	Eliminates from the current temporary file everything out the file name.
SET	Used to define sentence delete and character delete characters.
SPEED	Used to indicate desired character rate of transmission.
STATUS	Used to request present relationship to the system (idle, run, old, list, etc.)
STOP	Causes the system to stop whatever it is doing (a BREAK character must be used when printing is occurring).
SYSTEM	Initiates a change in system.
TAPE	Informs the system that paper tape will be read in.
TTY	Requests the data communications processor number, channel number, user number, file name, system name, and status.
UNSAVE	Used to release and destroy a previously saved file.
UNSAVE, password	Unsave a previously saved file protected by a password.

APPENDIX B GLOSSARY OF TIME-SHARING TERMS

Alternate File Name	A file name used to reference a real file name. For file sharing purposes you may assign an alternate file name to another users file as a handy reminder that his file is available to you. An AFN is established with the EQUATE command.
Central Processor	This is the central computer of the time-sharing system whose functions are to receive user input from the data communications processor; process user commands; execute user programs; and transmit user output to the data communications processor... all in a multi-programmed, time-sharing mode of operation.
Character	A numeric digit, letter of the alphabet, or special symbol.
Data Communications Processor	One of the group of peripheral computers attached to the time-sharing system used to monitor the telephone lines for which it is responsible; collect user input lines; form messages; transmit the messages to the central processor; receive output messages from the central processor; and transmit lines of message output to the user.
Data File	A user file composed of data records to be processed by user programs in the time-sharing system. At present, data must be entered as part of the source program file; as updates to the source program file (by replacing lines of the source program file); or as input to the executing program (via calls for input generated from input statements in the program). Planned extensions to the time-sharing system will enable users to enter data files and save them in the file system.
Executive Program	The computer program which controls time-sharing system operation.
File	A generic term for all data stored within and processed by the time-sharing system. Files are of two major classifications: system files and user files. User files may be any of the following: source program files, object program files or data files.

APPENDIX B (continued)

File System	The repository for all permanent files kept within the time-sharing system.
Input Line	A group of characters ending with a carriage return (RETURN), which are entered into the data communications processor by the user from his teletypewriter.
Line Feed	Rotation of the teletypewriter platen up one line, accomplished either by striking the LINE FEED key, or by receipt of a "line feed" character from the data communications processor.
Message	A group of characters having meaning as a whole and processed as an entity by the time-sharing system. A message consists of one or more input lines.
Object Program File	A user file composed of computer instructions which have been compiled from a source program file in the course of executing a RUN command or a COMPILE command.
Permanent Files	Permanent files are files which are stored in the file system by explicit user command (SAVE). They are maintained in the file system until explicitly removed by user command (UNSAVE), although the user is not connected to the time-sharing system.
Real File Name	The actual name given to a file by its owner. This is the name which is stored in the owners private library.
Real Library	The private library in which the real file name of a file is stored.
Source Program File	A user file composed of program statements written in one of the time-sharing compiler languages. Each program statement is entered as a line of input via the teletypewriter. Input lines begin with a one to five digit line number, and end with a carriage return character.
Subscription	A set of user numbers identified by the first three characters of a six character user number. If your user number is B90000, you are in subscription B90 and may share files with other users in that subscription.

APPENDIX B (Continued)

System Files	System files include the program files (such as the executive modules, compilers, command processing routines, and supporting subroutines) which control time-sharing system operation, and the data files (such as catalogs, tables, and libraries) used by the time-sharing system to support its operation.
Temporary Files	Temporary files are files which are processed by the time-sharing system under the direction of a user connected to the system. Temporary files may be new files entered into the time-sharing system by the user; or they may be copies of permanent files which have been called out of the file system by the user for processing. They are stored in the file system only by explicit command from the user (SAVE). Temporary files are created and released dynamically in the time-sharing system in the course of user command processing. Temporary files in existence when the user signs off are released.
Teletypewriter	The user's mechanism for communicating with the time-sharing system. At present, Model 33 or 35 teletypewriters are used for this purpose.
User Files	User files include both temporary and permanent source program files, object program files, and data files entered into the time-sharing system by the user.

APPENDIX C TABLE OF ASCII CHARACTERS

7 BIT CODE	ASCII CHAR						
000	NUL	040	SP	100	@	140	ASCII at sign
001	SOH	041	!	101	A	141	a
002	STX	042	"	102	B	142	b
003	EXT	043	#	103	C	143	c
004	EOT	044	\$	104	D	144	d
005	ENQ	045	%	105	E	145	e
006	ACK	046	&	106	F	146	f
007	BEL	047	'or'	107	G	147	g
010	BS	050	(	110	H	150	h
011	HT	051	)	111	I	151	i
012	LF	052	*	112	J	152	j
013	VT	053	+	113	K	153	k
014	FF	054	,	114	L	154	l
015	CR	055	-	115	M	155	m
016	SO	056	.	116	N	156	n
017	SI	057	/	117	Ø	157	o
020	DLE	060	0	120	P	160	p
021	DC1	061	1	121	Q	161	q
022	DC2	062	2	122	R	162	r
023	DC3	063	3	123	S	163	s
024	DC4	064	4	124	T	164	t
025	NAK	065	5	125	U	165	u
026	SYN	066	6	126	V	166	v
027	ETB	067	7	127	W	167	w
030	CAN	070	8	130	X	170	x
031	EM	071	9	131	Y	171	y
032	SUB	072	:	132	Z	172	z
033	ESC	073	;	133	[	173	{
034	FS	074	<	134	\	174	~
035	GS	075	=	135	]	175	}
036	RS	076	>	136	'	176	|
037	US	077	?	137	-	177	RUB OUT

LEGEND

NUL	Null	DC1	Device Control 1
SOH	Start of Heading	DC2	Device Control 2
STX	Start of Text	DC3	Device Control 3
ETX	End of Text	DC4	Device Control 4 (Stop)
EOT	End of Transmission	NAK	Negative Acknowledge
ENQ	Enquiry	SYN	Synchronous Idle
ACK	Acknowledge	ETB	End of Transmission Block
BEL	Bell (audible or attention signa	CAN	Cancel
BS	Backspace	EM	End of Meduim
HT	Horizontal Tabulation	SUB	Substitute
LF	Line Feed	ESC	Escape
VT	Vertical Tabulation	FS	File Separator
FF	Form Feed	GS	Group Separator
CR	Carriage Return	RS	Record Separator
SO	Shift Out	US	Unit Separator
SI	Shift In	DEL	Delete
DLE	Data Link Escape		

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