



2000B:
TIME-SHARED BASIC SYSTEM
OPERATOR'S GUIDE

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TIME SHARED BASIC SYSTEM
OPERATOR'S GUIDE



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PREFACE

This OPERATOR'S GUIDE is the instructional text for operating the HP 2000B Time Shared BASIC System. It is not a user's manual or a reference text for the BASIC language. The OPERATOR'S GUIDE contains information necessary for the management and control of the 2000B System.

Operator commands and important concepts are formatted in frames for easy reading, quick reference, and maximum usefulness. The book is divided into an introduction, eight chapters, and two appendices.

The Introduction presents the software and hardware elements of the 2000B. Section I describes the responsibilities of the system operator. The commands controlling user access to the system are covered in Section II, and the commands that monitor and change user files are discussed in Section III. Section IV defines the hardware configuration commands; and Section V defines the ROSTER, SLEEP, and STATUS commands. Logging on and off is discussed in Section VI. Section VII demonstrates how a system library of public programs can be established. Section VIII includes all phases of loading and restarting the 2000B software. Appendix A summarizes the operator command formats, and Appendix B summarizes error messages. A glossary and index follow the text.

A comment card is provided at the back of this book for your convenience. Please use it to let us know of any errors or omissions in the OPERATOR'S GUIDE or for general comments and suggestions.

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INTRODUCTION

OVERVIEW OF THE TIME SHARED BASIC SYSTEM

The 2000B Time shared BASIC System consists of an HP 2116B computer, a fixed-head mass storage device, an operator console, a photoreader, an HP 2114B computer with two multiplexors for up to 32 simultaneous users, and a software program to supervise the system. The TSB System can operate without attendance, but an operator console is provided for orderly start-up, shut-down, and response to special situations.

Figure I-1 diagrams the logical organization of the TSB System (figures are symbolic, not drawn to scale).

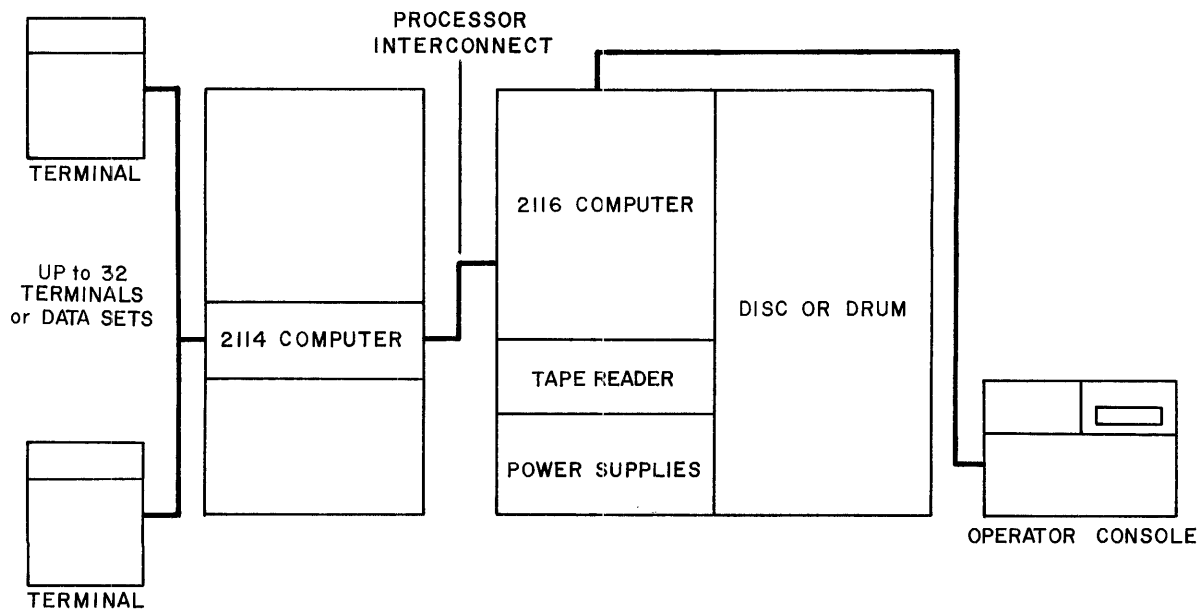


Figure I-1. Organization of HP 2000B Time Shared BASIC System

INTRODUCTION

THE SYSTEM OPERATOR

The operator has commands to modify the hardware configuration on-line, to enter, monitor and remove users of the TSB System, to supervise the mass storage and hardware status, and indirectly, to establish the System Library. The TSB System, without attendance, logs users on and off the system, receives and maintains their active BASIC programs, keeps track of the time and mass storage used by each user, and maintains a personal library of BASIC programs for each user.

REQUIRED MINIMUM HARDWARE

The Time Shared BASIC System operates on an HP 2116B computer with the following options:

- ▣ 16K Memory
- ▣ Power Supply Extender
- ▣ Direct Memory Access
- ▣ Extended Arithmetic Unit
- ▣ Power Fail/Auto Restart
- ▣ Memory Parity Check

and an HP 2114B computer with the following options:

- ▣ 8K Memory
- ▣ Memory Parity Check
- ▣ Power Fail/Auto Restart

In addition, the following peripheral equipment is required:

- ▣ Photoreader
- ▣ Processor Interconnect Kit
- ▣ Two Teleprinter Multiplexors (the system will operate with only one multiplexor and 16 users)
- ▣ Operator Console (ASR-35)

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- || One Fixed-Head Disc Storage Unit (see "Mass Storage Devices")
- || Time Base Generator
- || Up to 32 teleprinters with modifications for data-set compatibility

The required hardware is assigned as follows:

	<u>I/O Channel</u>	<u>Contents</u>
2116B	10-11 ₈	Processor Interconnect
	12 ₈	System Console
	13 ₈	Photoreader
	14-15 ₈	First mass storage device
	16 ₈	Time Base Generator
2114B	10 ₈	First Multiplexor
	11 ₈	Second Multiplexor
	12-13 ₈	Processor Interconnect
	14 ₈	First Disconnect (see <u>Phones</u>)
	15 ₈	Second Disconnect (see <u>Phones</u>)

OPTIONAL EXPANDED CONFIGURATIONS

There are three classes of optional equipment that can be added to the Time Shared BASIC System. Each provides a specific useful capability. Each class has an operator command that gives the TSB System information about the option if it is included. (See Section IV.)

Phones

For each disconnect board in the 2114B, up to 16 data sets can be added to the system in the place of hardwired teleprinters. This allows users to phone into the TSB System over regular phone lines. Using the PHONES command, the operator specifies the number of seconds allowed a user to sign on before the system hangs up. The first disconnect board corresponds to the first multiplexor board.

INTRODUCTION

Magnetic Tape Unit

An HP 3030 or 7970 magnetic tape unit can be connected to the TSB System through two adjacent I/O channels in the 2116B. The TSB System uses the magnetic tape to dump a copy of itself whenever the operator requests a SLEEP operation.

Mass Storage Devices

The TSB System requires a minimum of 750,000 words of mass storage and is expandable to 256 tracks. Each track contains between 90 and 128 sectors (64 sixteen-bit words per sector), depending on the device. The first physical disc must be in locations 14-15, but subsequent discs may be in any free pairs of I/O locations.

The TSB System treats each 64 tracks as a logical disc unit; a device of 128 tracks is treated logically as two discs of 64 tracks each. The first 64 tracks are called Disc-0. Be sure to check Section IV dealing with the DISC command; this command notifies the TSB System that a mass storage device is connected to the computer.

The TSB System will accept six different models of mass storage device -- three discs and three drums. Although a particular TSB System may mix discs and drums, they will all be treated logically as disc units. Throughout this book, any reference to discs also refers to drums. Table I-1 lists the mass storage devices available.

INTRODUCTION

Table I-1.
Mass Storage Devices

<u>Device</u>	<u>Type</u>	<u>Sectors/Track</u>	<u>No. of Tracks</u>
2770A-01	disc	90	64*
2771A	disc	90	64*
2771A-01	disc	90	128
2773A	drum	128	48*
2774A	drum	128	96
2775A	drum	128	192

Since the drums are 48, 96 and 192 tracks each and the TSB System is designed for discs of 64-track multiples, the operator must lock the missing tracks after entering the drum. (See Section IV.)

*Not large enough to be used alone on 2000B.

SECTION I

SYSTEM OPERATOR'S CONSOLE

The operator communicates with the HP 2000B Time Shared BASIC System through an ASR-35 teleprinter. From this console the operator controls and monitors user access to the system, modifies or examines the directory of disc usage, changes the hardware configuration on-line, checks who is using each terminal, and systematically shuts down the system. The computers, disc, and photo-reader reside in a locked cabinet.

CONSOLE OPERATION

When the Time Shared BASIC System is loaded into the computer, the operator checks that the ASR-35 teleprinter is set to ON LINE. See Figure 1-1.

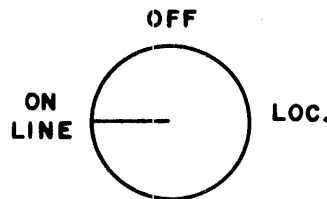


Figure 1-1. On-Off Switch

Three Mode Switch settings on the teleprinter are used with the Time Shared BASIC System. These are the K, T and KT positions. When set to the K position the teleprinter will print only, not punch. When set to T, the teleprinter will both print and punch everything that goes through it. The KT

SYSTEM OPERATOR'S CONSOLE

position is the normal setting; in this position only the LOG ON* and LOG OFF messages are punched. See Figure 1-2.

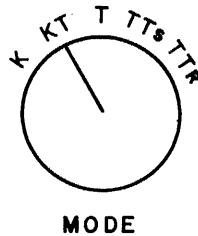


Figure 1-2. Teleprinter Mode Switch Settings

If Switch Register bit 0 on the front panel of the computer is in the up position, all input from the console will be ignored by the system. With this feature, if the cabinet door is kept locked, unauthorized persons can be prevented from tampering with the operation of the Time Shared Basic System.

OPERATOR COMMANDS

The operator controls the system by operator commands. The format of all these commands is identical. Only the first three letters of each command are significant; the remainder are superfluous and need not be included. If the command requires parameters, a dash ("-") must separate the command and the parameters. Parameters are separated by commas (",") and blanks are ignored, except in the SLEEP command. Each command is terminated by a carriage return. If the system does not understand a command, it will print ???.

* See Section VI LOGGING

SYSTEM OPERATOR'S CONSOLE

The character ← acts as a backspace key. Typing this key causes the computer to delete the previous character. For example, the sequence:

ABC←←DE←F

is equivalent to the sequence:

ADF

Either of the characters ALT-MODE or ESCAPE deletes the entire line being typed. When the system senses such a character, it automatically responds with the character "\", followed by a CARRIAGE-RETURN and LINEFEED.

All numerical communication with the Time Shared BASIC System is in decimal, except for the I/O select codes necessary for the hardware configuration commands. These are always in octal. Disc track numbers are in decimal.

Printed output produced by commands can be terminated by pressing any key. Printing then terminates at the end of the line.

Table 1-1 lists the operator commands alphabetically, their functions and where they are documented in this manual.

SYSTEM OPERATOR'S CONSOLE

Table 1-1
Operator Commands

<u>Command</u>	<u>Function</u>	<u>Reference</u>
CHANGE	Modifies password, time or disc limit of a user.	Section II
DIRECTORY	Lists library programs and files by user.	Section III
DISC	Informs system that a new disc has been added or an old one removed.	Section IV
FAST	Sets specified ports "fast."	Section IV
KILLID	Removes a user from the system.	Section II
LOCK	Prevents the system from using specified tracks of the disc.	Section IV
MAGTAPE	Informs system of the addition or removal of a magnetic tape unit.	Section IV
NEWID	Enters a new user into the system.	Section II
PHONES	Sets number of seconds allowed user to sign on.	Section IV
PURGE	Removes library programs and files which have not been used since a specified date.	Section III
REPORT	Prints a list of all users with time and disc used to date.	Section II
RESET	Resets terminal time clock of any user.	Section II
ROSTER	Lists all active users.	Section V
SLEEP	System shut down command. Prints a specified message on each active terminal.	Section V
SLOW	Resets specified ports to normal speed.	Section IV
STATUS	Returns information about system status.	Section V
UNLOCK	Makes specified tracks of a disc available for use.	Section IV

SECTION II

ID COMMANDS

The Time Shared BASIC System provides five commands for the operator to use to modify or examine the system ID table. The ID table contains one entry for each user recognized by the system, consisting of the following information:

- User's IDcode
- Password
- Total terminal time used to date (in minutes)
- Maximum terminal time allowed the user
- Amount of disc used for library storage (in sectors)
- Maximum amount of disc storage allowed

The IDcode A000 is reserved for the system operator. The programs saved by user-A000 become the publicly accessible library. User-A000 also has access to special library commands, PROTECT and UNPROTECT. (See Section VII for complete details.)

Use of ID Commands

The ID commands control who has access to a particular Time Shared BASIC System and how much of the system's facilities each user is allowed. Each user's history with the system can be traced logically in the ID commands referencing his ID code. The user is entered into the system and assigned a password with the NEWID command. That password can be changed with a CHANGE command if the user finds that unauthorized persons have learned his password and are using his IDcode. The user also uses a CHANGE command to request more disc storage space or terminal time.

At some point an accounting process takes place and the user is charged for his total time and disc space used (REPORT command). At that time the user's terminal time clock is probably turned back to reflect his payment for time used to date (RESET command). If the user no longer desires the services of the system, his IDcode is removed using a KILLID command.

NEWID

The NEWID command is used to enter a new user into the system. The command establishes a unique IDcode and password for each user, plus maximum limits on terminal time and disc storage.

NEWID *-IDcode,password,time,disc*

IDcode - Consists of a letter followed by three decimal digits.

password - Consists of 0 to 6 characters other than NULL (^C@), RUBOUT, ALT-MODE, ESCAPE, COMMA, "^C←", space, RETURN (^CM), LINEFEED (^CJ) or XOFF (^CS). Non-printing characters other than these are allowed. Some characters can be made into non-printing characters by depressing the CONTROL KEY while striking the character. This allows the user to define a secret password which is never printed out on the teleprinter. Such a combination is symbolized by superscript "c" following the character, for example Z^C.

time - Specifies the maximum number of minutes of terminal time the user is allowed. This number may not exceed 65535.

disc - Specifies the maximum number of disc sectors that the user is allowed for storage of his library programs and files. This number may not exceed 65535.

Examples of NEWID Commands

NEWID-A000, MASTER,1000,500

establishes user-A000 with the password MASTER, 1000 minutes of terminal time and 500 sectors (i.e., 32000 words) of disc storage.

ID COMMANDS

NEWID-Q123,BA^CSI^CC^C,100,200

establishes user-Q123 with the actual password BA^CSI^CC^C where the A, I, and C are non-printing characters. (Remember that A, I, and C are actually typed after the B and the S, but with the control key depressed.) User-Q123 is allowed 100 minutes of time and 200 sectors (i.e., 12800 words) of disc storage.

The following diagnostic messages may be printed in response to a NEWID command.

<u>Message</u>	<u>Meaning</u>
ILLEGAL FORMAT	Indicates that one of the parameters was illegal or missing.
DUPLICATE ENTRY	Indicates that the specified IDcode already exists within the system.
ID TABLE FULL	Indicates that the ID-table cannot accommodate any more entries.

ID COMMANDS

CHANGE

The operator may use the CHANGE command to modify any or all of the parameters of a particular ID code.

CHANGE-IDcode, [password], [time], [disc]

The parameters have the same meaning as in the NEWID Command. Those in brackets may be missing, in which case they are not changed. However, the commas must be present if they are necessary to keep the place of missing items (i.e., trailing commas are not required).

Examples of CHANGE Commands

CHANGE-Q123,BASIC

changes the password of user-Q123 from BA^CSI^CC^C to BASIC. The time remains at 100 minutes and the disc storage at 100 sectors.

CHANGE-Q123,,1000

changes the terminal time allotment of user-Q123 from 100 minutes to 1000 minutes. The other parameters remain unchanged.

CHANGE-Q123,,,500

changes the disc storage allotment of user-Q123 from 100 sectors to 500 sectors. The other parameters remain unchanged.

The following diagnostics may be printed in response to a CHANGE Command:

ID COMMANDS

<u>Message</u>	<u>Meaning</u>
ILLEGAL FORMAT	Indicates that one of the parameters of the CHANGE command was illegal or missing.
NO SUCH ID	Indicates that the specified IDcode could not be changed because it had not been previously entered into the system via a NEWID command.

Allotment of disc storage via the CHANGE or NEWID commands does not actually reserve a particular area of disc for the user at that time, nor does it guarantee that he will be able to obtain that much when he wants it. The amount assigned is merely a limit which he is not permitted to exceed. When the user requests storage beyond his allotment, the following message is printed on the user teleprinter:

FILE SPACE FULL

When the user goes over his allotted terminal time, the system makes a note of the fact but does not abort the user. However, the next time that this user attempts to log onto the system, he will get the following message:

NO TIME LEFT

ID COMMANDS

KILLID

KILLID-*IDcode*

The KILLID command gives the operator power to remove a user from the system completely. User-A0000 may not be killed. Any disc files or library programs assigned to the user are removed and the space is returned to the system. If the specified user is currently logged in at a terminal and executing, he will be forcibly disconnected from the system. If the user is connected via data phone, the system hangs him up. If the user attempts to log in with his old IDcode, the following message will be printed:

ILLEGAL ACCESS

Examples of KILLID Commands

KILLID-Q123

KILLID-S356

RESET

RESET-IDcode,time

The system maintains a clock of total terminal time used for each user. The operator may change the value recorded in the clock with the RESET command. If no time is specified, it is assumed to be zero. If IDcode equals "ALL", all users are reset.

Examples of RESET Commands

If user Q123 had accumulated 100 minutes of terminal time, the command

RESET-Q123,20

would reset his clock to 20 minutes of terminal time used.

If user S356 had used 157 minutes of terminal time, the command

RESET-S356,0

would reset his clock to zero. Or,

RESET-S356

would accomplish the same thing.

RESET-ALL,20

would reset all IDcodes to 20 minutes of terminal time used.

REPORT

The format for a REPORT command is simply the word REPORT. The REPORT command causes a list of users to be printed out giving the total terminal time and disc storage used by each. The output is in the following form:

IDcode time disc

where *time* is in minutes and *disc* is the number of sectors.

IDcodes are printed in alphabetic order and in ascending numerical order when more than one *IDcode* begins with the same letter.

Example of a REPORT Command

REPORT

ID	TIME	DISC	ID	TIME	DISC	ID	TIME	DISC
A000	07851	00112	K456	00023	00232	S356	00001	00000

SECTION III

DISC DIRECTORY COMMANDS

The Disc Directory is a table of all library programs and files, giving the name, disc location and last date referenced for each. The Disc Directory resides on the disc. One track of directory space is reserved per disc defined logically in the system. (These tracks might all reside on the same disc.) The location and length of the disc directory tracks are given by the STATUS command. (See Section V.)

DIRECTORY

The Directory command is initiated by the word

DIRECTORY [-IDcode]

This causes the system to print a list of library programs and files according to user IDcode. If the optional IDcode appears, listing starts at that point in the directory. The following information is listed for every program or file.

NAME	the program name (1 to 6 characters)
DATE	last date this item was referenced (day of year/last two digits of year)
DISC ADR.	location of program on disc (disc number/track/sector) in decimal
LENGTH	length of program in decimal words
"C" or "F" (optional)	If "C" appears in the last column of the entry, the entry is a program in semi-compiled form. If "F" appears, the entry is a file. If neither, the entry is a program in uncompiled form.

DIRECTORY COMMANDS

EXAMPLES OF DIRECTORY

Example 1

DIR ID	NAME	DATE	DISC ADR	LENGTH
A000	B	114/70	0/53/081	2688 F
	B1	114/70	0/54/000	8192 F
	B2	114/70	0/55/000	8192 F
	CHANGE	104/70	0/47/000	3238
	CLASS	104/70	0/53/048	2055
	CURRIC	111/70	0/40/024	1055
	DAILY	104/70	0/53/000	3018 C
	DATE	069/70	0/39/104	0455 C
	DEBUG	111/70	0/39/061	0188
	DUMP 1	111/70	0/41/002	0791
	FDUMP	111/70	0/43/017	0393
	FLOAD	111/70	0/46/000	0409
F398	1	114/70	0/61/000	8192 F
	10	114/70	0/39/010	0064 F
	2	114/70	0/62/000	8192 F
	3	114/70	0/63/000	8192 F
	4	114/70	0/39/009	0064 F
	SAM	099/70	0/39/003	0045
	SAM1	099/70	0/41/000	0101
	TEST	069/70	0/39/002	0044
	TEST1	069/70	0/39/000	0102
	XXC	099/70	0/42/000	0128 F

Example 2 (assumes same directory)

DIR-F398	NAME	DATE	DISC ADR	LENGTH
F398	1	114/70	0/61/000	8192 F
	10	114/70	0/39/010	0064 F
	2	114/70	0/62/000	8192 F
	3	114/70	0/63/000	8192 F
	4	114/70	0/39/009	0064 F
	SAM	099/70	0/39/003	0045
	SAM1	099/70	0/41/000	0101
	TEST	069/70	0/39/002	0044
	TEST1	069/70	0/39/000	0102
	XXC	099/70	0/42/000	0128 F

DIRECTORY COMMANDS

Example 3 (different directory)

DIRECTORY				
ID	NAME	DATE	DISC ADR	LENGTH
A000	ABOUT	100/69	0/23/037	0090
	F3	072/69	0/23/035	0087
	FORGET	100/69	0/23/033	0090
	HELLO	100/69	0/23/032	0027
	PROGN	072/69	0/23/030	0101
	RFET	070/69	0/23/028	0073
	RGET	064/69	0/23/027	0027
	ROOTS	064/69	0/23/024	0147
	TGET	064/69	0/23/023	0050
	THAT	072/69	0/23/021	0073
	THIS	101/69	0/23/019	0090
	ZAP	101/69	0/23/017	0093
C111	CCC	072/69	0/23/015	0093
	CCCC	072/69	0/23/013	0101
E444	ELECT	100/69	0/23/011	0127
	EPROG	064/69	0/23/010	0032
	ERUPT	100/69	0/23/008	0104
Q123	QPROG	070/69	0/23/006	0111
	QUICK	072/69	0/23/004	0113
Z987	THIS	101/69	0/23/002	0090
	Z!!	101/69	0/23/000	0090

PURGE

With the PURGE command, the operator can remove user library programs and files from the system if they have not been used since a specified time; this releases disc space that would otherwise be unavailable. The format of the PURGE command is:

PURGE-day-of-the-year/year

where

day-of-the-year is the day of the year starting with 1 and counting in decimal.

year is the last two digits of the year (i.e., 69 for 1969).

DIRECTORY COMMANDS

Examples

PURGE-32/69 Removes all programs and files which have not been referenced since February 1, 1969. (Programs which were last used on February 1, will remain in the system.)

If the date given in the PURGE Command has not yet occurred, then the system prints:

ILLEGAL PARAMETER

Example of PURGE and DIRECTORY Commands

Below, the PURGE command is repeatedly applied to the third Directory example (page 3-3) to show how the command works.

PURGE-65/69

DIRECTORY				
ID	NAME	DATE	DISC ADR	LENGTH
A000	ABOUT	100/69	0/23/037	0090
	F3	072/69	0/23/035	0087
	FORGET	100/69	0/23/033	0090
	HELLO	110/69	0/23/032	0027
	PROGN	072/69	0/23/030	0101
	RFET	070/69	0/23/028	0073
	THAT	072/69	0/23/021	0073
	THIS	101/69	0/23/019	0090
	ZAP	101/69	0/23/017	0090
C111	CCC	072/69	0/23/015	0093
	CCCC	072/69	0/23/013	0101
E444	ELECT	100/69	0/23/011	0127
	ERUPT	100/69	0/23/008	0104
Q123	OPROG	070/69	0/23/006	0111
	QUICK	072/69	0/23/004	0113
Z987	THIS	101/69	0/23/002	0090
	Z!!	101/69	0/23/000	0090

All the programs with dates 64/69 have been removed (RGET, ROOTS, TGET, EPROG), but the programs with dates later than 65/69 are still in the system. The date of HELLO has been changed from 100/69 to 110/69

DIRECTORY COMMANDS

(the current date). HELLO is updated only when a PURGE command is given, instead of whenever the HELLO program is referenced, thus making it impossible to PURGE the HELLO program. (See Section VI.)

PURGE-75/69

DIRECTORY

ID	NAME	DATE	DISC ADR	LENGTH
A000	ABOUT	100/69	0/23/037	0090
	FORGET	100/69	0/23/033	0090
	HELLO	110/69	0/23/032	0027
	THIS	101/69	0/23/019	0090
	ZAP	101/69	0/23/017	0090
E444	ELECT	100/69	0/23/011	0127
	ERUPT	100/69	0/23/008	0104
Z987	THIS	101/69	0/23/002	0090
	Z!!	101/69	0/23/000	0090

The programs with date 70/69 (RFET, QPROG) and 72/69 (F3, PROG, THAT, CCC, CCCC, QUICK) have been deleted from the system. User-C111 and User-Q123 are no longer listed in the directory because they have no library.

PURGE-100/69

DIRECTORY

ID	NAME	DATE	DISC ADR	LENGTH
A000	ABOUT	100/69	0/23/037	0090
	FORGET	100/69	0/23/033	0090
	HELLO	110/69	0/23/032	0027
	THIS	101/69	0/23/019	0090
	ZAP	101/69	0/23/017	0090
E444	ELECT	100/69	0/23/011	0127
	ERUPT	100/69	0/23/008	0104
Z987	THIS	101/69	0/23/002	0090
	Z!!	101/69	0/23/000	0090

The PURGE command caused no change in the directory. Programs last used on the PURGE date (100/69) are not purged.

DIRECTORY COMMANDS

PURGE-101/69

DIRECTORY

ID	NAME	DATE	DISC ADR	LENGTH
A000	HELLO	110/69	0/23/032	0027
	THIS	101/69	0/23/019	0090
	ZAP	101/69	0/23/017	0090
Z987	THIS	101/69	0/23/002	0090
	Z!!	101/69	0/23/000	0090

All 100/69 programs have been purged, but 101/69 programs still remain.

PURGE-110/69

DIRECTORY

ID	NAME	DATE	DISC ADR	LENGTH
A000	HELLO	110/69	0/23/032	0027

This PURGE command specifies the current date (110/69) and eliminates all programs last used on 101/69. However, the HELLO program still remains; it cannot be purged by the operator.

SECTION IV

HARDWARE CONFIGURATION COMMANDS

When a Time Shared BASIC System is first loaded in the computer (Section VIII), the software assumes that the minimum hardware configuration exists. The required channel assignments are listed in the Introduction. They can be expanded on-line without restarting the TSB System from scratch. For example, a magnetic tape unit can be added or moved from one channel to another, or a supplemental disc storage unit can be added. Only the minimum hardware configuration cannot be altered with hardware configuration commands.

The operator uses various commands to notify the TSB System of hardware changes: MAGTAPE, DISC, PHONES, LOCK and UNLOCK. The TSB System has no means of checking on the validity of the specified I/O channels. If used improperly, these commands can cause TSB System failure; thus, they should only be used with extreme care.

If the operator specifies an incorrect disc I/O channel, the first attempt to write on that disc causes a TSB system failure. If the magnetic tape is introduced incorrectly, the TSB System does not complete the SLEEP operation; instead it attempts indefinitely to dump onto a non-existent magnetic tape.

The hardware commands are the only TSB exception to decimal numbering. The select codes (I/O channels) used as parameters in these commands are octal (base eight) numbers. All other numbers, including disc track numbers are decimal (base ten).

MAGTAPE

An HP 3030 or 7970 magnetic tape unit can be added as a hardware option. Once the TSB System is aware of the magnetic tape, a copy of the software is dumped whenever a SLEEP Command is executed. This copy can be reloaded if the TSB System is destroyed on disc or in core.

The format for the MAGTAPE command is as follows:

MAGTAPE-*sc*[*]

where *sc* is the high priority (lower numbered) select code in octal of the magnetic tape unit. A select code of zero tells the TSB System that the magnetic tape unit has been removed.

* is included if the magnetic tape interface board is number 18131.

HARDWARE COMMANDS

DISC

Up to 256 tracks of 90 or 128 sectors each are defined in the TSB System. The 256 tracks are allocated into four logical discs of 64 tracks each, numbered 0 through 3. A physical disc unit of 128 tracks is defined for the TSB System as two logical discs of 64 tracks each; 96 (drum) tracks are defined as 64 and 32; and 192 (drum), as three 64 track discs. A drum of 48 tracks must be defined as a disc of 64 tracks with tracks 48 through 63 locked. Disc units of less than 384,000 words (64 tracks) are not allowed.

The DISC command informs the TSB System that a new disc has been added or an old disc removed. Since Disc-0 is always assumed to reside in I/O channels 14₈ and 15₈, only 1 through 3 can be disc number parameters in the DISC command. DISC commands are also accepted by the TSB Loader. (See Section VIII.)

The format of the DISC command is as follows:

DISC-disc number, select code, track length

where *disc no.* is a number from 1 to 3 indicating the disc logical number,
select code is an octal number indicating the high priority I/O channel of the disc, and
track length is a decimal number (90 or 128) indicating the number of sectors per track.
See Table I-1.

If the select code is 0, the specified disc is removed from the TSB System. This is allowed only if all tracks on the disc have previously been LOCKed. A disc is removed this way if the track length or select code is to be changed.

HARDWARE COMMANDS

For the drum, logical track n refers to physical track $4n$ through $4n + 3$. (For example, logical track 0 is physical tracks 0 to 3; logical track 1 is physical tracks 4 to 7.)

When a disc has more than 64 logical tracks and is used as more than one logical disc, the order of entering DISC commands determines the relation of disc numbers to disc tracks. Each DISC command assigns the lowest available block of 64 tracks to the disc number specified in the command. For example, the following commands are entered:

```
DISC-1,14,96  
DISC-2,16,128  
DISC-3,16,128  
LOCK-3,32,63
```

Where channels 14-15 contain a 128 track disc and channels 16-17 contain a 96 track drum, then disc-0 refers to tracks 0-63 of the disc, disc-1 refers to tracks 64-127 of the disc, disc-2 refers to tracks 0-63 of the drum, and disc-3 refers to tracks 64-95 of the drum.

If the system contains only a 192 track drum, it is defined as 3 discs of 64 tracks each:

```
DISC-1,14,128  
DISC-2,14,128
```

PHONES

When one or two disconnect boards are connected to channels 14-15_g of the 2114B, the operator uses the PHONES command to set or change the number of seconds allowed the user to log on through a data set.

PHONES-*n*

where *n* is the number of seconds (255 maximum). If the PHONES command is not used, the TSB System allows the user 120 seconds to log-on after connecting to the system.

LOCK

The LOCK Command allows the operator to make certain disc tracks unavailable to the TSB System. The format of the LOCK Command is as follows:

LOCK-*n*,*track*[,*track*]

where *n* is the disc logical number (0 through 3) and *track* is a decimal quantity specifying a track on that disc (0 through 63). If only one track is specified, just that one track will be locked. If two track parameters are given, they determine the first and last tracks to be locked.

If a LOCK Command specifies an area containing user programs, these will be lost. If the area contains TSB System tables, the command is rejected. TSB System tables cannot be removed without destroying the TSB System. Track 0 of disc 0 cannot be locked.

The LOCK Command can be used to replace a disc in the TSB System, by locking all the tracks of the disc. When the new disc is installed, the tracks can be unlocked. The LOCK Command is also used to eliminate tracks that are believed to be physically faulty.

Discs which do not have exactly 64 tracks can be used by LOCKing those tracks which do not physically exist (i.e., locking tracks 32-63 of the second logical disc of a 96 track drum).

When the system is reloaded from magnetic tape (see Section VIII), any tracks can be locked without loss of information.

HARDWARE COMMANDS

UNLOCK

The function of the UNLOCK Command is the opposite of the LOCK Command. The operation makes the specified tracks available to the TSB System. The format is identical to that for LOCK:

`UNLOCK-n,track [,track]`

Examples:

<u>Command</u>	<u>Action</u>
LOCK-3,5,23	Locks disc-3 tracks 5 through 23 inclusive.
UNLOCK-3,5,10	Unlocks disc-3 tracks 5 through 10 inclusive.
UNLOCK-3,11,23	Unlocks disc-3 tracks 11 through 23 inclusive.

FAST

The FAST Command tells the system to operate the terminals on the specified ports at 220 baud, 20 characters per second (rather than the normal 10 characters per second). If the command contains a format error, the list of terminal numbers is processed up to the illegal terminal number. The format of the FAST command is:

FAST-terminal number[,terminal number....]

NOTE: This command should only be used on ports with terminals capable of operation at this speed.

SLOW

The SLOW Command changes the specified terminals back to 110 baud, 10 characters per second. All terminals begin as SLOW terminals. If the command contains a format error, the list of terminal numbers is processed up to the illegal terminal number. The format of the SLOW Command is:

SLOW-terminal number[,terminal number....]

NOTE: The 2114 can only handle 320 characters per second maximum. Therefore, for every port that is made FAST, a port is lost.

SECTION V

MISCELLANEOUS SYSTEM COMMANDS

There are three other system commands which have not been previously mentioned: ROSTER, SLEEP and STATUS.

ROSTER

Up to 32 user terminals (or data sets) are logged on to the TSB System at one time. These terminals are numbered 0 through 31 by the TSB System. The ROSTER command, allows the operator to know which user IDcode is logged on at each terminal.

The output from ROSTER is formatted into four lines of eight items each. The first line lists, from left to right, the users logged on to terminals 0 through 7. The second line lists terminals 8 through 15; the third 16 through 23; and the fourth, 24 through 31. An active terminal is denoted by the user's IDcode; an inactive terminal is denoted by four dots (....). The same ID code can be active on more than one terminal.

EXAMPLES

ROSTER

```
.... .... .... .... .... .... A000 ....  
.... .... .... .... .... .... A000 ....  
.... .... .... .... .... .... .... ....  
.... .... .... .... .... .... .... ....
```

User A000 is logged on terminal 6 and terminal 14. The remaining terminals are inactive.

MISCELLANEOUS COMMANDS

ROSTER

```
.... B453 .... B555 .... Q123 Z999 ....  
A000 .... .... .... .... .... A000  
.... .... .... T707 T708 T709 .... ....  
F913 .... .... .... .... .... J325
```

User B453 is on terminal 1, B555 on terminal 3, Q123 on 5, Z999 on 6, A000 on 8 and 15, T707 on 19, T708 on 20, T709 on 21, F913 on 24, and J325 on 31. The other terminals are inactive.

ROSTER

```
.... .... .... .... ....  
.... .... .... .... ....  
.... .... .... .... ....  
.... .... .... .... ....
```

This response indicates that no one is using the TSB System.

MISCELLANEOUS COMMANDS

SLEEP

The SLEEP command is used whenever the Time Shared BASIC System is to be shut down. The command provides a systematic shut down procedure that allows easy start-up at a later time.

The format of the SLEEP command is:

SLEEP-*character string*

where *character string* is a message to be sent to all users.

SLEEP causes the following actions to be taken by the TSB System:

- a. The *character string* message is sent to all active users.
- b. All users are disconnected from the TSB System.
- c. The entire current TSB System is dumped onto the disc.
- d. The packing routine is run on the library portion of the TSB System.
- e. If a magnetic tape unit is available, the entire TSB System will be dumped onto that tape for later reloading. When complete, the system prints: VERIFY?

The operator responds YES to read back and compare the tape, or NO to bypass verification.

- f. After a successful dump or verify, the message

DONE

is printed and the 2116 halts. (The 2114 does not halt.) If the operator wants another dump, he mounts a new magnetic tape and presses RUN.

If a write error occurs, the message

TAPE BAD OR TOO SHORT

is printed and the 2116 halts. The operator can then mount a new magnetic tape and press RUN: then the entire magnetic tape dump procedure is restarted. (Or, the operator can move the load point on the tape.)

Examples of SLEEP Commands

SLE

SLEEP-GOOD BYE. TSB IS SHUT DOWN FOR REPAIRS.

To resume operations after sleeping, consult Procedure 4 (Reloading from Magnetic Tape) or Procedure 6 (Reloading from the Disc) in Section VIII.

STATUS

The STATUS command gives the operator information about the system hardware and disc storage. STATUS should be used at least once a day to record the location of the essential parts of the TSB System. (For diagnostic purposes in case of TSB System failure, see Section VIII.)

Disc addresses are printed as three decimal numbers, separated by slashes, which specify the disc logical number, the track number, and the sector number. The disc address format is D/TT/SSS. For example, 0/22/013 means disc 0, track 22, sector 13.

The following information is output by STATUS:

<u>Output Heading</u>	<u>Information Supplied</u>
IDT	The location of the TSB System IDcode table and the decimal number of words stored there. Each distinct user IDcode recognized by the TSB System requires an eight-word entry in the IDT. This table is essential to the TSB System.
ADT	The location of the available disc table, and the decimal number of words used. This table is essential to the TSB System. Every two words in the ADT represent a block of available disc storage.
DIREC	Up to four disc locations of each track, each containing a portion of the directory of user library programs. The number of directory tracks allocated equals the number of discs that have been defined on the TSB System (although there is no requirement that the directory tracks be distributed throughout all four discs, i.e., they all could be on the same disc). The total directory consists of an alphabetic list, ordered first by IDcode and then by program or file

MISCELLANEOUS COMMANDS

Output Heading

Information Supplied

DIREC (Cont.)	name, of all the library programs which have been saved by users. Each program requires an eight-word entry.
SYSTEM	The location of the five disc tracks containing the TSB system modules. These tracks may be regenerated without loss of information.
USERS	The location of the 32 disc tracks allocated to the 32 possible simultaneous users. Output is organized similarly to that of ROSTER. These tracks are not essential to the TSB System (i.e., they may be locked during loading if faulty).
MAG	The octal I/O channels of the magnetic tape unit. An entry of 00 indicates the absence of the device.
DISC	The octal I/O channels of discs 0 through 3. An entry of 00 indicates the absence of the disc. The track length in sectors is recorded for each disc.
TRACKS	Four rows of 64 items each, corresponding to the maximum possible four discs of 64 tracks each. A zero indicated the track is available, and a 1 indicates that the track is inaccessible (either LOCKED or not defined).

SECTION VI

LOGGING

OPERATOR CONSOLE MESSAGES

Whenever a user gives a HELLO or BYE Command at a terminal, the System Operator Console will print a message recording the event. The format is as follows:

LOGON, LOGOFF

```
**LOGON IDcode time terminal #
      or
**LOGOFF IDcode time terminal #
```

where

IDcode is the users IDcode.

time is the time (on a 24-hour clock).

terminal # is a decimal number from 0 to 31 identifying the terminal.

Examples:

```
**LOGON  A000 0905 #05
**LOGOFF A000 0905 #05
```

The printing of the LOGON and LOGOFF messages will interrupt any printing currently being done on the System Operator Console. If the mode switch is set to "KT" or "T", the message will be punched as well as printed.

LOGGING

EXAMPLE:

```

DIRECTORY
  ID   NAME   DATE   DISC ADR   LENGTH
A000  BARREL  069/69  0/14/032  0383
      CAR   069/69  0/14/026  0383
      FIG   066/69  0/14/000  0128

**LOGOFF A000 0905 #05
        GETH 069/69  0/14/014  0383
        H123 069/69  0/14/008  0383
        VANPO 069/69  0/14/002  0383
        YTELL 069/69  0/14/020  0383
  
```

A user may log on with a HELLO Command when the previous user has not logged off with a BYE Command. In this case the system will automatically log off the previous user before logging on the current user.

Figure 6-1 represents the sequence of events occurring when users log on and off two user terminals. Note that user-A000 logs on to terminal #14 while user-H909 has not logged off.

<u>TERMINAL #14</u>	<u>SYSTEM OPERATOR CONSOLE</u>	<u>TERMINAL #5</u>
	**LOGON B434 0814 #05	HELLO-B434,FRGH READY
HELLO-H909,JKIL READY	**LOGON H909 0818 #14	
	**LOGOFF B434 0820 #05	BYE 006 MINUTES OF TERMINAL TIME
HELLO-A000,A READY	**LOGOFF H909 0824 #14 **LOGON A000 0824 #14	
	**LOGON C555 0825 #05	HELLO-C555,C READY

Figure 6-1. Logging

LOGGING

HELLO LIBRARY PROGRAM

When the user logs on with a HELLO Command, the system will search through the system library to see if a program exists with the name HELLO. If one does exist, this program will be executed. User-A0000 can use the HELLO program to pass information about the system to other users. The HELLO program runs only once and is removed from the user area when it terminates. If no HELLO program exists, the message READY will be printed on the user terminal. After a BYE Command the system prints on the user terminal the elapsed time since the HELLO Command.

SECTION VII

SYSTEM LIBRARY

The TSB System Library makes useful BASIC Language programs available to all users. Programs in the System Library provide the user with information about the status of the system, give him training, provide him with mathematical subroutines, or carry out any other useful operations. Library programs may be left unprotected, or they may be protected. An unprotected program can be fetched, executed, listed, punched and saved by the general user. Protected programs can only be fetched and executed ("run only").

The general user cannot modify the System Library. Programs are entered and removed from the System Library through a user terminal, not through the operator console. To make this possible, the TSB System recognizes a special user IDcode as privileged to modify the System Library. Consult 2000B: *A Guide to Time Shared BASIC* (HP 02000-90010) for reference on the 2000B Time Shared BASIC Language.

THE PRIVILEGED USER - A000

The user IDcode A000 in the TSB System has a special status: only programs saved by A000 become part of the System Library and only A000 can modify the System Library. A000 might be considered the system operator's IDcode. A000 has two special user commands, PROTECT and UNPROTECT, which allow him to make library programs "run only" and library files inaccessible to other users.

THE SEMI-PRIVILEGED USERS

All users with IDcodes beginning with "A" (e.g., A001, A002) are semi-privileged users: they can write on their files even when the files are being accessed from more than one terminal.

PROTECT

The PROTECT command is a user command, available only from a user terminal and only to user-A000. The format is as follows:

PROTECT-*name*

where *name* is either a program name or a file name.

A protected program can not be listed, punched, or saved by any user except A000. A protected program may, however, be fetched and executed by any user. A protected file cannot be accessed at all by another user. These restrictions, of course, do not apply to user-A000.

UNPROTECT

The format of the UNPROTECT command is similar to that of the PROTECT command.

UNPROTECT-*name*

The program or file specified is made available to all users.

NOTE: Remember that when a program file is updated by a GETting and modifying it, KILLing the old version, and SAVing the new version, the new version is unprotected.

SECTION VIII

LOADING THE TSB SYSTEM

The software for 2000B Time Shared Basic System includes two TSB System tapes -- TSB BINARY (PART I) and TSB BINARY (PART II) -- and two short tapes, the 2114 system, and the TSB Loader. TSB Loader loads the TSB System tapes and relocates them on the disc. In addition, the Basic Binary Disc Loader (BBDL), a protected 64-word program, is always resident in high core. BBDL is used to load absolute punched tape programs (such as the TSB Loader) and disc-resident software systems (such as the TSB System or the Disc Operating System) into core memory.

The TSB Loader is used to generate an initial TSB System on the computer, to update the TSB System software, to reload a dumped TSB System from magnetic tape and to attempt emergency recovery when a TSB System fails.

This section consists of twelve procedures or groups of operating instructions, a discussion of system halts, and a list of TSB Loader halts. The procedures cover:

- Procedure 1: Turning on all equipment.
- Procedure 2: Loading the 2114 System.
- Procedure 3: Generating an Initial TSB System.
- Procedure 4: Updating the TSB System--retaining user files.
- Procedure 5: Reloading from Magnetic Tape.
- Procedure 6: TSB Loader Patch Option.
- Procedure 7: Reloading from the Disc.
- Procedure 8: Emergency Recovery.
- Procedure 9: BBDL loading of paper tape.
- Procedure 10: Reloading the 2116 BBDL.
- Procedure 11: Reloading the 2114 BBL.
- Procedure 12: Shutting down the TSB System.

LOADING THE TSB SYSTEM

CONVENTIONS USED IN THIS SECTION

Information printed on the teleprinter by the computer or the operator appears in the text as

INPUT EXAMPLE

OUTPUT EXAMPLE

except that special, non-printing characters appear in underlined italics (eg., return).

The contents of registers on the 2114 and 2116 computers (i.e., switch registers, memory data registers, etc.) appear as a series of 16 binary digits (bits) organized into octal digits:

```
  0/000/000/000/000/000
  ↑                   ↑
Bit 15                Bit 0
```

0 means the bit is off or down (equal to a binary 0).

● means the bit is on or up (equal to a binary 1).

/000 represents an octal digit (e.g., /0●0 = 2_8).

For example, ●/000/0●0/000/●●●/●●● = 102077_8 .

LOADING THE TSB SYSTEM

PROCEDURE 1 TURNING ON ALL EQUIPMENT

First, turn on the master power switch of the system cabinet, then:

1. 2116 Computer:
Press POWER button on front panel.
2. System console (ASR-35 teleprinter):
Turn LOCAL-OFF-ONLINE switch to ON LINE. (See Section I.)
3. 2114 Computer:
Open cabinet front panel.
Turn POWER switch to ON.
Check that all mode switches are set to NORMAL.
4. Tape Reader:
Press POWER button.
Sensing light should go on.
After Loading is completed, tape reader
can be turned off (press POWER).
5. Disc Memory:
Turn POWER ON.
Wait for status lights to go off.
Open 2116 cabinet door, set switch on disc interface board
down.
6. Drum Memory:
Turn AC POWER switch to ON.
Turn DC POWER switch to ON.
Set HEADS switch up for heads IN.

LOADING THE TSB SYSTEM

Wait for READY light to go off.

Open 2116 cabinet door, set switch on drum interface board down.

7. 3030 Magnetic Tape Unit:

To start unit and mount tape:

- a. Open door in the back of the cabinet.

On the floor of the cabinet there are two switches:

TRANSPORT POWER AND DATA ELECT. Turn them both to ON.

Close the cabinet door and turn the handle to start the ventilation fans.

- b. Slide the front window door down to the bottom.
- c. If you want to write on the magnetic tape, check that the magnetic tape contains a Write Enable Ring.
- d. Slide the magnetic tape reel onto the right hub with the tape unwinding on the right side. Hold the reel on the hub (press down in the middle of the reel, not along the outside, as this may damage the tape) and turn the hub to the right until it locks.
- e. Hold the BRAKES switch down and unwind the tape until it reaches the floor.
- f. Put the tape around the guide so that the dull side is facing up.
- g. Thread the tape through the read/write mechanism.
- h. Holding the BRAKES switch down, tighten the tape around the takeup reel on the left hub. The tape should be wrapped around the reel about three times.
- i. Raise the BRAKES switch to START.
- j. Raise the front door to protect the operator.
- k. Press LOAD POINT.

LOADING THE TSB SYSTEM

1. Press AUTO.
- m. Check that the Write Enable light is on if the magnetic tape contains a Write Enable Ring.

8. 7970 Magnetic Tape:

To start unit and mount tape:

- a. Open the front door on the unit and set the POWER switch to ON (up). The POWER switch is in the lower, left-hand corner.
- b. Pull out the quick release latch on the upper reel hub.
- c. Slide the source reel onto the upper hub (with the Write Enable Ring present and facing the back); the tape should unwind from the reel on the right.
- d. Hold the reel flat against the hub; then flip down the latch. The reel should be locked in place.
- e. Unwind about three feet of tape from the source reel. Thread this tape according to the tape diagram. Be sure that the tape always is threaded to the left of the tape guide posts.
- f. Pull the tape across the top of the takeup reel and wind until taut. Then give the takeup reel another two turns.
- g. Close the front door.
- h. If the tape is to be written on, check that the Write Enable light is lit. If it is not, the Write Enable Ring is missing from the source reel; press REWIND and remove the source reel. Insert the Write Enable Ring and start over.
- i. Press LOAD, ONLINE, and the 0 (zero) switch.
- j. When the LOAD light is on, the unit is ready for use by the computer

CAUTION: DO NOT OPEN THE DOOR OF THE MAGNETIC TAPE WHILE THE UNIT IS OPERATING ON LINE TO THE COMPUTER. THIS CAUSES THE UNIT TO RETURN TO MANUAL MODE.

LOADING THE TSB SYSTEM

PROCEDURE 2 LOADING THE 2114 SYSTEM

If the 2114 System has been loaded already but has been HALTED, restart the 2114 at Step 7. If the power was turned off, the 2114 will restart when the power is turned on.

1. Turn on all equipment (Procedure 1) and check that the 2114 CONSOLE LOCK and LOADER ENABLE switches are set to NORMAL. Halt both machines and press PRESET on the 2116.
2. Load the 2114 tape in the reader.
3. Load the first program on the tape using BBDL (Procedure 9).
4. Set the switch register of the 2116 to 2_8 and press LOAD ADDRESS and RUN on the 2116. (0/000/000/000/000/000 = 2_8) Press CLEAR REGISTER on 2114.
5. Press LOAD and PRESET on the 2114 at the same time. The 2114 tape should be read through the Photoreader and the 2114 should halt. If it doesn't, reload the 2114 BBL (Procedure 11).
6. Press HALT on the 2116. The 2114 is now loaded.
7. The 2114 program can now be started by simply pressing RUN on the 2114. However, if the 2114 memory is altered or examined, start the 2114 at 2_8 .
8. Press the ESC key on any user terminal that is connected to the 2114 multiplexors. If the teleprinter does not respond with "\ " and a return-linefeed reload the 2114 System (Step 1).
9. Set the CONSOLE LOCK switch inside the door of the 2114 to LOCK so that buttons on the front panel are disabled. This will keep unauthorized persons from tampering with the system. The computer panel should be kept locked. When shutting down the TSB System, simply turn off the 2114 power; then to restart, turn power on again..

LOADING THE TSB SYSTEM

PROCEDURE 3 GENERATING AN INITIAL SYSTEM

1. Turn on all equipment (Procedure 1).
2. Load and start the 2114 (Procedure 2).
3. Make sure that the DISC PROTECT switch on the disc interface board (inside the computer) is off (unprotected). Proper switch setting is down.
4. Load the TSB Loader tape using BBDL (Procedure 9).
5. Set the switch register on the 2116 to 2000 (0/000/000/000/000 = 2000₈).
6. Press LOAD ADDRESS and RUN on the 2116.
7. Place the first system tape (2000B, Part 1) into the photoreader.
8. The computer prints LIBRARY? on the teleprinter.
Type NO return on the keyboard.
9. The computer prints SECTORS/TRACK ON DISC Ø?
Type in 90 or 128. (See Table I-1.)
10. The computer prints DISC MODIFICATIONS? If the 2116B contains more than one disc of 64 tracks, enter DISC commands to define their location, number, and size. (Section IV.) Each command uses a separate line, and the sequence is terminated by typing a single return or NO return.
11. The computer prints GIVE LOCK, UNLOCK, OR LOAD COMMAND on the teleprinter.

LOCK any tracks on the disc that are faulty, (Section IV), then type LOAD return.
12. The computer prints DISC OPERATING SYSTEM PRESENT?

Type YES if DOS is present on the disc, otherwise NO.

LOADING THE TSB SYSTEM

13. The computer reads in the system tape (2000B, Part 1) from the photoreader, halts with 102077 in the T-Register ($(\bullet/000/0\bullet0/000/\bullet\bullet\bullet/\bullet\bullet\bullet = 102077_8)$), and prints END OF TAPE.

Place the second system tape (2000B, Part 2) in the photoreader and press RUN.

14. After reading in the tape, the computer prints DATE?

Respond with two decimal integers separated by a slash, where the first is the day of the year, and second is the year of the century. For example, 36/70 return.

NOTE: The operator is responsible for changing the day and year at the beginning of a new year.

15. The computer prints TIME?

Respond with a four-digit decimal integer giving the current hour and minute on a 24-hour clock. For example, 1:15 p.m. would be 1315 return.

16. The computer prints READY and will now accept any legal commands from the operator. At this point, the photoreader can be turned off.

LOADING THE TSB SYSTEM

PROCEDURE 4 UPDATING THE TSB SYSTEM

Retaining user files, reloading the system from paper tape while saving the user files.

The system must be in the SLEEP condition. Turn on all equipment (Procedure 1). Check the 2114; if not running, use Procedure 2.

1. Load the TSB Loader tape using the BBDL (Procedure 9).
2. Set the Switch Register of the 2116 to 2000
(0/000/0●0/000/000/000 = 2000_g).
3. Press LOAD ADDRESS on the 2116.
4. Place the first system tape (2000B Part 1) in the photoreader.
5. Press RUN on the 2116.
6. The computers prints LIBRARY? on the teleprinter.
Type YES return on the keyboard.
7. The computer prints MAGTAPE SELECT CODE?
Type only a return.
8. The computer prints GIVE LOCK, UNLOCK, OR LOAD COMMAND on the teleprinter.

LOCK or UNLOCK any tracks (except user library tracks, table tracks, or track zero), desired at this time. (See LOCK Command and UNLOCK Command, Section IV.) Then type LOAD return.
9. The computer prints DISC OPERATING SYSTEM PRESENT?
Type YES if DOS is present on the disc, otherwise NO.
10. The computer reads in the system tape (2000B Part 1) from the photoreader, halts with 102077 in the T-Register
(●/000/0●0/000/●●●/●●● = 102077_g) and prints END OF TAPE. Place the second (of two) system tape (2000B Part 2) in the photoreader and press RUN.

LOADING THE TSB SYSTEM

11. After reading in the tape, the computer prints DATE?

Respond with two decimal integers separated by a slash, where the first is the day of the year and the second is the year of the century. For example, 36/70 return.

NOTE: The operator is responsible for changing the day and year at the beginning of a new year.

12. The computer prints TIME? Respond with a four-digit decimal integer giving the current hour and minute on a 24-hour clock. For example, 1:15 p.m. would be 1315 return.
13. The computer prints READY and will now accept commands from the operator or previously defined users. At this point, the photo-reader can be turned off.

LOADING THE TSB SYSTEM

PROCEDURE 5 RELOADING FROM MAGNETIC TAPE

When updating or reloading from magnetic tape, track lengths and select codes of the discs may be modified without first LOCKing all the tracks on the disc, as would be necessary while the system is running. Disc-0 can also be changed in length, but it must remain select code 14₈. In addition, faulty tracks may be LOCKed without loss of information.

To reload the TSB System and user files from a magnetic tape dump generated by a SLEEP Command:

1. Be sure that all equipment is on and mount the magnetic tape on the tape unit (Procedure 1).
2. Check the 2114; if not running, use Procedure 2.
3. Load the TSB Loader using BBDL (Procedure 9).
4. Set the switch register of the 2116 to 2000₈ (0/000/000/000/000/000 = 2000₈).
5. Press LOAD ADDRESS and RUN on the 2116.
6. The computer prints LIBRARY? on the teleprinter.
Type YES return.
7. The computer prints MAGTAPE SELECT CODE? on the teleprinter.
Type the high priority select code (octal) of the controller.
If the interface board is Number 18131, follow this by an "*" . For example:
17 return or
17* return
8. The computer prints DISC MODIFICATIONS? on the teleprinter.
If any changes have been made in the disc configuration since the magnetic tape was dumped, enter DISC commands now to define the location and size of discs. Each DISC Command is on a separate line and the sequence is terminated by typing a single return or NO return.

LOADING THE TSB SYSTEM

9. The computer prints GIVE LOCK, UNLOCK, OR LOAD COMMAND.

LOCK or UNLOCK any tracks (except track zero) desired at this time; then type LOAD return.

10. The computer prints DISC OPERATING SYSTEM PRESENT?

Type YES if DOS is present on the disc, otherwise NO.

11. The computer reads in the magnetic tape and prints DATE?

Respond with two decimal integers separated by a slash, where the first is the day of the year and second is the year of the century. For example, 36/70 return.

NOTE: The operator is responsible for changing the day and year at the beginning of a new year.

12. The computer prints TIME?

Respond with a four-digit decimal integer giving the current hour and minute on a 24-hour clock. For example, 1:15 p.m. would be 1315 return.

13. The computer prints READY and will now accept any legal commands.

At this point, the magnetic tape unit and the photoreader can be turned off.

LOADING THE TSB SYSTEM

PROCEDURE 6 TSB LOADER PATCH OPTION

If the Switch Register bit 15 of 2116 is up (on) while loading the TSB System from either punched tape or magnetic tape (this can be done by putting it up just before pressing RUN after setting the TSB Loader address in the P-Register), the loader executes a halt with 102015_8 in the T-Register ($0/000/000/000/000/000 = 102015_8$) just prior to transferring each module of the system to the disc. The first halt is for the core-resident part of the TSB System. Each subsequent halt is for a disc-resident module of the system.

This option is convenient when it is necessary to patch or alter one or more of the modules. If the system module is as desired, pressing RUN loads it onto the disc. The computer will halt again when the next module is ready in core. Putting Switch Register bit 15 down eliminates the halts on all subsequent modules. If patches are performed, the restart address to resume loader operation must be noted before patching (in the P-Register). After patching is completed, it is placed in the P-Register before pressing RUN.

LOADING THE TSB SYSTEM

PROCEDURE 7

RELOADING FROM THE DISC

The system must have been previously shut down with the SLEEP command.

1. Make sure that all equipment is on (Procedure 1).
2. Check the 2114; if not running, use Procedure 2.
3. Set the LOADER switch of the 2116 to ENABLED.
4. Set the Switch Register of the 2116 to 077760_8
($0/000/000/000/000/000 = 077760_8$).
5. Press LOAD ADDRESS and RUN on the 2116.
6. The contents of track 0, sector 0 of disc 0 (a bootstrap program) are placed into memory locations $2-77_8$. The 2116 should halt with 102077 in the T-Register.
 - a. A halt with 102000 in T ($0/000/000/000/000/000 = 102000_8$) means a disc error on sector 0, track 0. Start over at step 1.
 - b. A halt with 102002 or 102001 ($0/000/000/000/000/000$ or $0/000/000/000/000/000$) indicates a disc error. Press RUN again. If the halt occurs repeatedly or DISC FAILURE is printed, start over from step 1. If this fails again, the disc is unreadable or track 0, sector 0 has been altered. Reload the TSB System from paper tape, saving the library files (Procedure 4).
 - c. If the 2116 loops with 024077 in the T-Register, the disc has not completely transferred sector 0 of track 0. Check the disc for readiness and start over at step 1.
7. If the BBDL doesn't function properly, it must be reloaded (Procedure 10).
8. If the computer halted with 102077 in T, ($0/000/000/000/000/000 = 102077_8$), set the LOADER switch to PROTECTED, set all switch register bits to 0, and press RUN.

LOADING THE TSB SYSTEM

9. The computer prints DATE?

Respond with two decimal integers separated by a slash, where the first is the day of the year and the second is the year of the century. For example, 36/70 return.

NOTE: The operator is responsible for changing the day and year at the beginning of a new year.

10. The computer prints TIME?

Respond with a four-digit decimal integer giving the current hour and minute on a 24-hour clock. For example, 1:15 p.m. would be 1315 return.

11. The computer prints READY and will now accept any legal commands from the operator or users.

LOADING THE TSB SYSTEM

PROCEDURE 8 EMERGENCY RECOVERY

If the TSB System should halt for any reason during operation (see "System Halt Conditions"), it may still be possible to salvage the user library if certain portions of core memory and disc storage are intact. This procedure cannot be guaranteed to work, nor if it seems to work, can it be guaranteed to have successfully recreated the TSB System without loss. However, it will revive the TSB System if the system tables and user files were not disturbed.

1. Check that all equipment is turned on (Procedure 1).
2. Check the 2114; if not running, use Procedure 2.
3. Load the TSB Loader tape using BBDL (Procedure 9).
4. Set the switch register of an 2116 to 3000_8
(0/000/000/000/000/000 = 3000_8).
5. Press LOAD ADDRESS and RUN on the 2116.
6. Place the first system tape (2000B Part 1) in the photoreader.
7. The TSB Loader attempts to use the core resident system status.
8. The loader skips to LOCK, UNLOCK option and prints GIVE LOCK, UNLOCK, OR LOAD COMMAND on the teleprinter.

At this point enter LOCK commands to lock any system or swap tracks that are faulty.

NOTE: User library tracks, the directory, the ADT, or the IDT cannot be locked during loading, and track zero of disc zero can never be locked.

9. Each LOCK or UNLOCK command uses a separate line, and the sequence is terminated by typing LOAD return.

LOADING THE TSB SYSTEM

10. The computer prints DISC OPERATING SYSTEM PRESENT?

Type YES if DOS is present on the disc, otherwise NO.

11. The computer reads in the system tape (2000B Part 1) from the photoreader, halts with 102077 in the T-Register

(●/000/000/000/000/000 = 102077_g), and prints END OF TAPE.

Place the second system tape (2000B Part 2) in the photoreader and press RUN on the 2116.

12. After reading in the tape, the computer prints DATE?

Respond with two decimal integers separated by a slash, where the first is the day of the year, and the second is the year of the century. For example, 36/70 return.

NOTE: The operator is responsible for changing the day and year at the beginning of a new year.

13. The computer prints TIME?

Respond with a four-digit decimal integer giving the current hour and minute on a 24-hour clock. For example, 1:15 p.m. would be 1315 return.

14. The computer prints READY and will now accept any legal commands from the operator.

15. At this point, user library tracks that are faulty should be locked. If a faulty track contains the IDT, ADT, or DIRECTORY (see STATUS, Section V), the only recovery is to reload from magnetic tape, being sure to lock the offending track while loading (Procedure 5). If a magnetic tape copy of the system does not exist, all user library information is lost and the TSB System must be regenerated (Procedure 3).

LOADING THE TSB SYSTEM

PROCEDURE 9

BBDL LOADING OF PAPER TAPE

Check that the tape is in the reader and all equipment is turned on (Procedure 1).

1. Set the switch register of the 2116 to 077700_8 ($0/000/000/000/000/000 = 077700_8$).
2. Press LOAD ADDRESS on the 2116.
3. Set the 2116 LOADER switch to ENABLED and press RUN.
4. The BBDL should read the paper tape and halt with 102077 ($0/000/000/000/000/000 = 102077_8$) in the T-register. Set the LOADER switch to PROTECTED.
5. If the 2116 halts with 102011 ($0/000/000/000/000/000 = 102011_8$) in the T-register, a checksum error has occurred. If the 2116 halts with 102055 ($0/000/000/000/000/000 = 102055_8$) in the T-register, an illegal address has been read. Check for a tear in the paper tape and clean any dust out of the photoreader with an air brush. Then reposition the tape and reread the record. If this does not work, restart at step 1.
6. If the BBDL does not function as described after several tries, it may be destroyed. Reload the BBDL (Procedure 10).

LOADING THE TSB SYSTEM

PROCEDURE 10 RELOADING THE 2116 BBDL

1. Compare memory locations 037700 through 037777 (or 077700 through 077777 for the 32K computer) with the listings on the following two pages. Set the LOADER Switch to ENABLED. Set the switch register to 037700 (or 077700), press LOAD ADDRESS, DISPLAY MEMORY, and examine the T-register.
2. If any locations are in error, correct them.
3. Attempt to load a tape (Procedure 8) or a system on the disc (Procedure 6) to determine if the BBDL is working.

LOADING THE TSB SYSTEM

BASIC BINARY DISC LOADER
FOR 16,384 WORD MEMORIES

<u>Octal Address</u>	<u>Octal Contents</u>	<u>Octal Address</u>	<u>Octal Contents</u>
037700	107700	037740	102055
037701	002401	037741	027700
037702	063726	037742	000000
037703	006700	037743	006600
037704	017742	037744	103713
037705	007306	037745	102313
037706	027713	037746	027745
037707	002006	037747	107413
037710	027703	037750	002041
037711	102077	037751	127742
037712	027700	037752	005767
037713	077754	037753	027744
037714	017742	037754	000000
037715	017742	037755	140100
037716	074000	037756	020014
037717	077757	037757	000000
037720	067757	037760	107700
037721	047755	037761	063756
037722	002040	037762	102606
037723	027740	037763	002700
037724	017742	037764	102615
037725	040001	037765	001500
037726	177757	037766	102602
037727	037757	037767	063777
037730	000040	037770	102702
037731	037754	037771	102602
037732	027720	037772	103706
037733	017742	037773	102714
037734	054000	037774	067776
037735	027702	037775	074077
037736	102011	037776	024077
037737	027700	037777	177700

LOADING THE TSB SYSTEM

BASIC BINARY DISC LOADER
FOR 32,768 WORD MEMORIES

<u>Octal Address</u>	<u>Octal Contents</u>	<u>Octal Address</u>	<u>Octal Contents</u>
077700	107700	077740	102055
077701	002401	077741	027700
077702	063726	077742	000000
077703	006700	077743	006600
077704	017742	077744	103713
077705	007306	077745	102313
077706	027713	077746	027745
077707	002006	077747	107413
077710	027703	077750	002041
077711	102077	077751	127742
077712	027700	077752	005767
077713	077754	077753	027744
077714	017742	077754	000000
077715	017742	077755	100100
077716	074000	077756	020014
077717	077757	077757	000000
077720	067757	077760	107700
077721	047755	077761	063756
077722	002040	077762	102606
077723	027740	077763	002700
077724	017742	077764	102615
077725	040001	077765	001500
077726	177757	077766	102602
077727	037757	077767	063777
077730	000040	077770	102702
077731	037754	077772	102602
077732	027720	077772	103706
077733	017742	077773	102714
077734	054000	077774	067776
077735	027702	077775	074077
077736	102011	077776	024077
077737	027700	077777	177700

LOADING THE TSB SYSTEM

PROCEDURE 11

RELOADING THE 2114 BBL

1. Set the 2114 CONSOLE LOCK switch to NORMAL.
2. Check memory locations 017700 through 017777 against the listing on the next page. Set the LOADER ENABLE Switch to ON, set the switch register to 017700 (0/000/000/000/000 = 017700_g), press LOAD ADDRESS, CLEAR REGISTER, and DISPLAY MEMORY. Examine the contents of the Memory Data Register. Repeat DISPLAY MEMORY for each location.
3. Correct any locations that are in error: Set the switch register to the address of the incorrect word, press LOAD ADDRESS and CLEAR REGISTER. Then set the switch register to the correct value and press LOAD MEMORY.
4. Set the LOADER ENABLE switch to NORMAL.

LOADING THE TSB SYSTEM

BASIC BINARY LOADER FOR 8,094 WORD MEMORIES

<u>Octal Address</u>	<u>Octal Contents</u>	<u>Octal Address</u>	<u>Octal Contents</u>
017700	107700	017740	102000
017701	063770	017741	037775
017702	106501	017742	037774
017703	004010	017743	027730
017704	002400	017744	017753
017705	006020	017745	054000
017706	063771	017746	027711
017707	073736	017747	102011
017710	006401	017750	027700
017711	067773	017751	102055
017712	006006	017752	027700
017713	027717	017753	000000
017714	107700	017754	017762
017715	102077	017755	001727
017716	027700	017756	073776
017717	017762	017757	017762
017720	002003	017760	033776
017721	027712	017761	127753
017722	003104	017762	000000
017723	073774	017763	103712
017724	017762	017764	102312
017725	017753	017765	027764
017726	070001	017766	102512
017727	073775	017767	127762
017730	063775	017770	173775
017731	043772	017771	153775
017732	002040	017772	160100
017733	027751	017773	177765
017734	017753	017774	000000
017735	044000	017775	000000
017736	000000	017776	000000
017737	002101	017777	000000

LOADING THE TSB SYSTEM

PROCEDURE 12

SHUTTING DOWN THE SYSTEM

1. Issue a STATUS command and save the output (Section V).
2. Mount a magnetic tape on the unit (if available). (Procedure 1)
3. Issue a SLEEP command (Section V).
4. Remove and store the magnetic tape:
 - For 3030:
 - a. Press REVERSE until the tape comes off the takeup reel.
 - b. Slide down the front window door.
 - c. Hold down the BRAKES switch.
 - d. Rewind the tape onto the original reel.
 - e. Hold the tape reel near the middle and turn the hub to the left.
 - f. Remove the magnetic tape reel.
 - g. Raise the window door.
 - h. If another copy is desired, mount a fresh tape (Procedure 1) and press RUN on the 2116.
 - i. Open the door in the back of the cabinet. On the floor of the cabinet there are two switches: TRANSPORT POWER and DATA ELECT. Turn them both to OFF.
 - For 7970:
 - a. Wait for the LOAD light to come on, indicating that the unit has been rewound. CAUTION: DO NOT OPEN THE DOOR OF THE MAGNETIC TAPE UNIT WHILE THE UNIT IS ON LINE TO THE COMPUTER. THIS CAUSES THE UNIT TO RETURN TO MANUAL MODE.
 - b. Press REWIND. This causes the tape to wind completely onto the source reel.
 - c. Open the front door.
 - d. Pull out the quick release latch on the source reel hub. Remove the reel and push down the latch.
 - e. Turn the power off. Close the door.
5. Turn the master power switch off. Do not press HALT on the 2114.
6. The system is now shut down. It can be restarted from the disc (Procedure 7) or from the magnetic tape dump if the disc contents are destroyed (Procedure 5).

LOADING THE TSB SYSTEM

SYSTEM HALT CONDITIONS

During the operation of the TSB System the 2114 or 2116 computers halt when certain hardware failures occur.

2114

If the computer halts and the T-register reads 102005 ($\bullet/00/0\bullet0/000/000/0\bullet0 = 102005_8$), then a memory parity error has occurred. Start the 2114 at location 100_8 , and immediately try to SLEEP the TSB System and check the 2114 for hardware problems. The terminals are cut off if this emergency procedure is followed.

2116

If the computer halts and the T-register reads 102005 ($\bullet/000/0\bullet0/000/000/0\bullet0 = 102005_8$), then a memory parity error has occurred. Check the 2116 for hardware problems.

If the computer halts and the T-register reads 103004 ($\bullet/000/0\bullet\bullet/000/000/0\bullet0 = 103004_8$), then a disc error has occurred. The A-Register contains the logical address on the disc where the error occurred. The B-Register contains the memory address related to the transfer. Depending on what information the faulty disc contained, this halt may be recoverable. The register formats are:

A: Bits 15,14 = Disc Number; 13-8 = Track Number;
6-0 = Sector Number.

B: Bit 15 = Read(1) or Write(0); Bits 14-0 = Memory address.

By comparing the disc number and track number of the error with the output of the STATUS command (Section V), the operator can determine what type of track the error occurred on. The system recovery procedure depends upon this type:

LOADING THE TSB SYSTEM

For IDT, ADT, or DIREC tracks: the only recovery is a magnetic tape reload (Procedure 4). If a magnetic tape copy of the system and user files does not exist, the system must be regenerated from scratch; all user files are lost.

For SYSTEM or USER tracks: carry out the emergency recovery procedure (Procedure 7) and lock the faulty track during loading.

For track zero (track number = 0, disc number = 0): there is no recovery.

For any other tracks: carry out the emergency recovery procedure (Procedure 7), but lock the faulty track after the TSB System is operating again. Any user files or programs on the track are lost. The operator can check a previous DIRECTORY command to determine what will be lost.

NOTE: *If a magnetic tape copy of the system is available, the system can be restarted with faulty tracks locked and no information will be lost. Any changes in the files since the dump are lost, however.*

Power Failure

If the primary power to the computer system fails during loading or during the magnetic tape sleep, the 2116 halts with the P-register equal to 5_8 and the T-register equal to 103004_8 . When power is restored, the loading or dumping process must be restarted from the beginning. A magnetic tape dump can be restarted by reloading the system from the disc and typing SLEEP again. The 2114 will always restart when power is restored.

If the primary power fails during the operation of the system, the 2000B resumes operation automatically when power is restored. Users who were connected through data sets are logged off, however, and a few users may not be restarted properly due to loss of communication between the 2114 and 2116. These users must press carriage return and break on their terminals before they can restart their programs.

LOADING THE TSB SYSTEM

TSB LOADER DIAGNOSTIC AND HALTS

Common errors, such as an illegal response to a TSB Loader question, are diagnosed on the teleprinter and the question is repeated. Other errors, such as a disc failure, require the re-initiation of the entire loading sequence.

Serious errors, which require some operator action, cause a halt. The T-register will contain a $1020XX_8$ where XX is a two-place octal number identifying the error condition. ($0/000/000/000/xxx/xxx = 1020XX_8$)

A number of error halts may be corrected. Errors which cause halts are listed below, with the corresponding teleprinter diagnostics and recovery procedure, if any.

HALT

MESSAGE & INTERPRETATION

HLT 1 Loading cannot be continued. There may be various causes:

(000/000)

UNEXPECTED END-OF-FILE/END-OF-TAPE

The format and/or number of records on magnetic tape is not as expected. There is no obvious correction of the tape if it is the correct one.

TAPE CANNOT BE READ

Tape unit may be malfunctioning, or there may be faulty interface cards or a bad tape. The remedy will correspond to the cause.

OUT OF DISC SPACE

This error can be corrected only by unlocking some disc tracks on a subsequent load attempt.

LOADING THE TSB SYSTEM

HLT 4 There has been a power failure during loading. Restart the
(000/000) loading procedure from the beginning.

HLT 11 The following error message is printed:

(000/000)

 TAPE BAD OR TOO SHORT

Writing of the dump tape may be attempted again by pressing RUN.
The tape unit may require repair or cleaning, or the tape may
need replacing (SLEEP error message).

HLT 15 Put switch register bit 15 down and press RUN. (Patch option)

(000/000)

HLT 22 Load TSB Loader Tape using BBDL.

(000/000)

HLT 33 The following message is printed:

(000/000)

 WRITE NOT ENABLED

Put the write ring into the tape reel. Restart the magnetic
tape and press RUN. (SLEEP error message)

HLT 44 The following message is printed:

(000/000)

 CHANGE MAG TAPE TO AUTO

Do so, then press RUN.

HLT 55 The following message is printed:

(000/000)

 ILLEGAL ADDRESS

The address read from the paper tape (displayed in the A-Register)
cannot belong to the TSB System. The cause may be a dirty tape
or photoreader. Reposition the offending tape record under the
photoreader and press RUN. Alternatively, restart the loading
procedure from the beginning.

LOADING THE TSB SYSTEM

HLT 66 The following message is printed:

(●●●/●●●)

CHECKSUM ERROR

The checksum read from the tape (which is displayed in the A-Register) does not match that calculated from the tape record as it was read in (this sum is displayed in the B-Register). The corrective action is the same as for HLT 55.

HLT 77 The following message is printed:

(●●●/●●●)

END OF TAPE

If the TSB System tape is actually on several different binary tapes, place the next one in the photoreader and press RUN. Otherwise, restart the loader procedure from the beginning.

APPENDIX A

SUMMARY OF COMMANDS

<u>Command</u>	<u>Meaning</u>
CHANGE- <i>IDcode</i> , [<i>password</i>], [<i>time</i>], [<i>disc</i>]	Modifies password, time, or disc limit of a user.
DIRECTORY [- <i>IDcode</i>]	Lists library programs and files by user (optional: start list at specified ID code).
DISC- <i>disc number</i> , <i>select code</i> , <i>track length</i>	Informs TSB that a disc has been added or removed.
FAST- <i>list of ports</i>	Sets specified ports "fast."
KILLID- <i>IDcode</i>	Removes a user from TSB.
LOCK- <i>n</i> , <i>track</i> [, <i>track</i>]	Prevents TSB from using specified tracks of the disc.
MAGTAPE- <i>sc</i> , <i>type</i>	Informs TSB that magnetic tape unit has been added or removed.
NEWID- <i>IDcode</i> , <i>password</i> , <i>time</i> , <i>disc</i>	Enters a new user into TSB.
PHONES- <i>n</i>	Sets number of seconds allow user to sign-on after phoning into system
PURGE- <i>day-of-the-year/year</i>	Removes library programs and files which have not been used since a specified date.
REPORT	Prints a list of all users with time and disc used to date.

<u>Command</u>	<u>Meaning</u>
RESET- <i>IDcode,time</i>	Resets terminal time clock of any user.
ROSTER	Lists all active users.
SLEEP- <i>character string</i>	Sends message to all active users and shuts down TSB.
SLOW- <i>list of ports</i>	Resets specified ports to normal speed.
STATUS	Returns information about hardware status.
UNLOCK- <i>n,track[,track]</i>	Makes specified tracks of a disc available for use.

APPENDIX B

SYSTEM ERROR MESSAGES

ILLEGAL FORMAT is printed whenever an operator command does not conform to the format rules given in this text.

<u>COMMAND</u>	<u>MESSAGE</u>	<u>MEANING</u>
CHANGE	NO SUCH ID	The user specified is not within the system; therefore, he cannot be CHANGED.
NEWID	ID TABLE FULL	The system does not have room for any more users
	DUPLICATE ENTRY	The user specified already exists within the system.
KILLID	NOT ALLOWED	User A000 cannot be KILLED.
	NO SUCH ID	The specified user is not within the system; therefore, he cannot be KILLED.
UNLOCK	NONEXISTENT	Operator has attempted to UNLOCK a track on a disc or drum that is not defined.
	ILLEGAL PARAMETERS	The numbers specified in the UNLOCK command are not legal.
LOCK	CAN'T LOCK TRACK	The specified track cannot be LOCKed (e.g., it is a track containing essential system tables).
	NO SUCH DISC	The disc specified does not exist within the system.
	ILLEGAL PARAMETERS	The numbers specified in the UNLOCK command are not legal.

SYSTEM ERROR MESSAGES

PURGE

ILLEGAL PARAMETER

A date specified in the PURGE command is not legal (e.g., it may not have occurred yet).

BUSY FILES

PURGE cannot be used if any current user program contains a FILES Statement. Operator must wait until system is inactive.

GLOSSARY

Underlined words are defined elsewhere in the glossary.

<u>WORD</u>	<u>DEFINITION</u>
DIRECTORY	A table within the TSB System that records all library programs and files, including for each the name, <u>disc</u> location, and last date referenced. To determine the location of the directory tracks on the <u>disc</u> , use the STATUS command.
DISC	Mass storage device used to store the TSB System and <u>user</u> files; a disc is a fixed-head rotating disc memory or a fixed-head rotating drum memory.
IDCODE	An alphanumeric code consisting of one letter and three digits that acts as an accounting vehicle within the TSB System. Each IDcode has associated with it a <u>pass-word</u> , the amount of <u>terminal</u> time allowed, the amount of <u>disc</u> space used, and the maximum amount of <u>disc</u> space allowed. Each <u>user</u> on a <u>terminal</u> must have an IDcode, although more than one <u>user</u> can use the same IDcode at the same time.
ID TABLE	A table within the TSB System that records the information associated with each <u>IDcode</u> . To determine the location of the ID table on the <u>disc</u> , use the STATUS command. To modify the ID table, use the commands in Section II.
LOGGING ON (AND OFF) THE SYSTEM	Whenever a <u>user</u> types a HELLO command on his <u>terminal</u> , he is logged onto the system and time begins accumulating on his <u>IDcode</u> . Whenever a <u>user</u> types a BYE command, he is

GLOSSARY

<u>WORD</u>	<u>DEFINITION</u>
	logged off the system. Messages are printed on the <u>operator console</u> to record these events.
OPERATOR	The person who is responsible for starting, monitoring, controlling access to, and shutting down a TSB System and carries out these functions by entering <u>operator commands</u> through an <u>operator console</u> .
OPERATOR COMMANDS	On-line commands that the <u>operator</u> types on the <u>operator console</u> to control operation of a TSB System. Commands modify the <u>ID table</u> , <u>directory</u> , hardware configuration, system status, and terminal usage.
OPERATOR CONSOLE	An HP 2754 Teleprinter (ASR-35) that the <u>operator</u> uses to communicate with the TSB System.
PASSWORD	A unique combination of up to six characters, printing or non-printing, that is associated with each <u>IDcode</u> . When a <u>user logs on to the system</u> , he must give his password. This keeps unauthorized persons from using a particular <u>IDcode</u> .
PRIVILEGED USER	One <u>user IDcode</u> , A000, is privileged; i.e., programs that are stored in the library files by A000 become <u>system library</u> programs and can be accessed by all <u>users</u> regardless of <u>IDcode</u> . A000 has two system commands, PROTECT and UNPROTECT, that allow him to control access to his programs.
SEMI-PRIVILEGED USER	Any <u>user IDcode</u> beginning with an "A" (e.g., A067) is semi-privileged. When a semi-privileged <u>IDcode</u> is <u>logged on</u> to more than one <u>terminal</u> , the current <u>users</u> with that <u>IDcode</u> can all alter their files simultaneously.

GLOSSARY

<u>WORD</u>	<u>DEFINITION</u>
	Non-privileged <u>users</u> , however, can only access their files simultaneously; they cannot alter them simultaneously.
SLEEP THE SYSTEM	To issue a SLEEP command through the <u>operator console</u> that causes the system to dump a copy of itself on a magnetic tape (if available), <u>log</u> all the current <u>users off the system</u> , and halt the system. The system can be restarted from the disc or from the magnetic tape copy.
SYSTEM LIBRARY	A collection of BASIC language programs stored by <u>user A000</u> , the privileged user, which can be used by all <u>user IDcodes</u> .
TERMINALS	An HP 2752 Teleprinter (ASR-33) or equivalent device through which a <u>user</u> communicates with the TSB System. Terminals are connected to the system through direct wiring or over telephone lines. Up to 32 terminals can be <u>logged on the system</u> at a time, and each has an assigned number between 0 and 31.
USER	A person with access to a legal <u>IDcode</u> and a <u>terminal</u> . More than one user can use the same <u>IDcode</u> at the same time.

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READER COMMENT SHEET

**2000B: TIME-SHARED BASIC SYSTEM
OPERATOR'S GUIDE**

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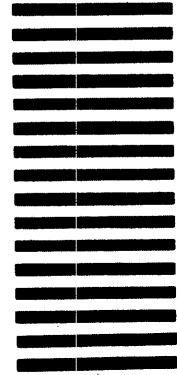
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