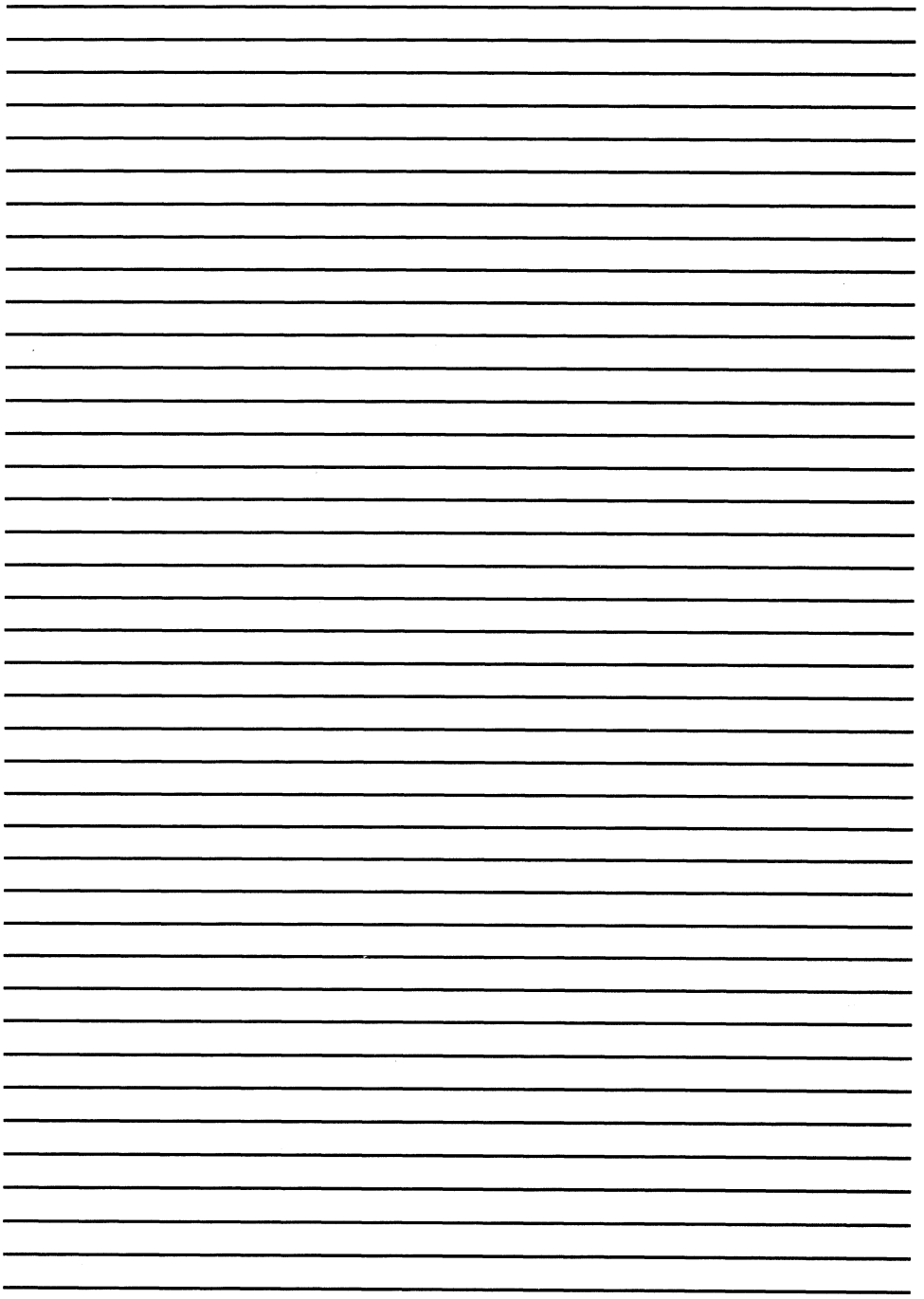
IRIS R8 *Operations Manual*



POINT 4 DATA CORPORATION

IRIS R8.2C1

OPERATIONS MANUAL

Revision 10

NOTICE

Every attempt has been made to make this manual complete, accurate and up-to-date. However, all information herein is subject to change due to updates. All inquiries concerning this manual should be directed to POINT 4 Data Corporation.

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10	Update package - revision of STBOOTM5, MTBOOT, and BLOCKCOPY procedures, and trap information	02/10/85

LIST OF EFFECTIVE PAGES

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The purpose of this manual is to guide the user in the daily operation and general maintenance of the IRIS Operating System. Those users who are experienced with IRIS may wish to use the manual as a quick reference guide and checklist for general operating procedures.

Section 1 discusses daily operations, Section 2 describes requirements for maintaining the system, Section 3 provides the procedure for verifying optional software packages, Section 4 gives recommendations for dealing with problems, and Section 5 concerns failure reporting. Additional information may be found in the IRIS Installation and Configuration and IRIS User manuals.

Standard Notations For This Manual

This manual uses the following standard writing conventions:

User Input	User input is underlined; it may be a command shown in capital letters, a variable such as a filename shown in lowercase, or locations in memory indicated by an octal number.
<RETURN>	Indicates a carriage return. It is required to activate command input. This is not shown unless it is the only command required, a second <RETURN> is required, or it follows a control character (i.e., <CTRL-Z> <RETURN>).
<CTRL-x>	Indicates a control character where x is an alpha key. It is entered by holding down the CTRL key and pressing the alpha key indicated. Both keys are then released. A <RETURN> is not required unless otherwise noted.
variable	Lowercase item in a command string represents a variable such as a filename, password, etc.
{parameter}	Lowercase item in a command string enclosed in braces represents an optional parameter.

Related Manuals

For related information see the following:

Title	Pub. Number
IRIS R8 Installation/Configuration Manual	SM-030-0009
IRIS R8 Peripherals Handbook	SM-030-0015
IRIS R8 User Manual [1984]	SM-030-0011
IRIS R8 Business BASIC Manual	SM-030-0012
LOTUS DISCUTILITY Manual	SM-035-0018
POINT 4 (MARK 5) Computer User Manual	HM-080-0003
MARK 3 Computer System Manual	HM-081-0019
MARK 8 Computer Reference Manual	HM-082-0021

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Section 1

DAY-TO-DAY OPERATION

1.1 INTRODUCTION

This section is a guide to the normal day-to-day operation of the IRIS Operating System. It steps the user through the preparations and procedures required from start-up to shutdown.

1.2 PREPARATION

Before beginning the daily housekeeping routines, the following items should be readily available:

- An accurate clock
- A calendar
- A list of logical unit assignments (supplied by the system manager)
- The device code number for the system disc controller (see the IRIS R8 Peripherals Handbook)
- A checklist and guide for backups (see Appendix A)

It is recommended that the system be backed up at regular intervals--preferably once a day. A regular schedule of backups will prevent a loss of files due to any power or hardware failure and will help to keep the IRIS system functioning at its optimum performance level.

1.3 START-UP PROCEDURES

There are two types of start-up procedures. The first is a warm start-up which can be used on a POINT 4 MARK 5/8 and certain non-POINT 4 computer systems. The second is a cold start-up.

A warm start-up is used only when the IRIS Operating System has remained in memory, i.e.,

- After a simple SHUTDOWN command
- After a power failure (if the computer has the Power Fail Auto Restart option)

A cold start-up is required when the IRIS Operating System, or any part of it, has to be read back into memory from the disc drive, e.g.,

- After a power failure if the computer does not have the Power Fail Auto Restart option
- After using DISCUTILITY or DDCOPY (e.g., after backups)
- After the system has been in stand-alone mode
- After a change has been made to the configuration

The following subsections outline these procedures for POINT 4 MARK 3, MARK 5/8 Computers, and for non-POINT 4 computers. If, however, either procedure fails to start up the system, use the appropriate IPL bootstrap procedure described in Section 1.4.

A list of logical unit numbers should be at hand.

1.3.1 WARM START-UPS

Warm start-ups are used when the IRIS Operating System has remained in memory after a simple SHUTDOWN command or a power failure if the computer has the Power Fail Auto Restart option.

1.3.1.1 POINT 4 MARK 5 and 8 Computers

If a POINT 4 MARK 5 or 8 Computer system has been shut down by means of a SHUTDOWN command sequence, press the CONTinue button. Do not press the APL button (see Figure 1-1).

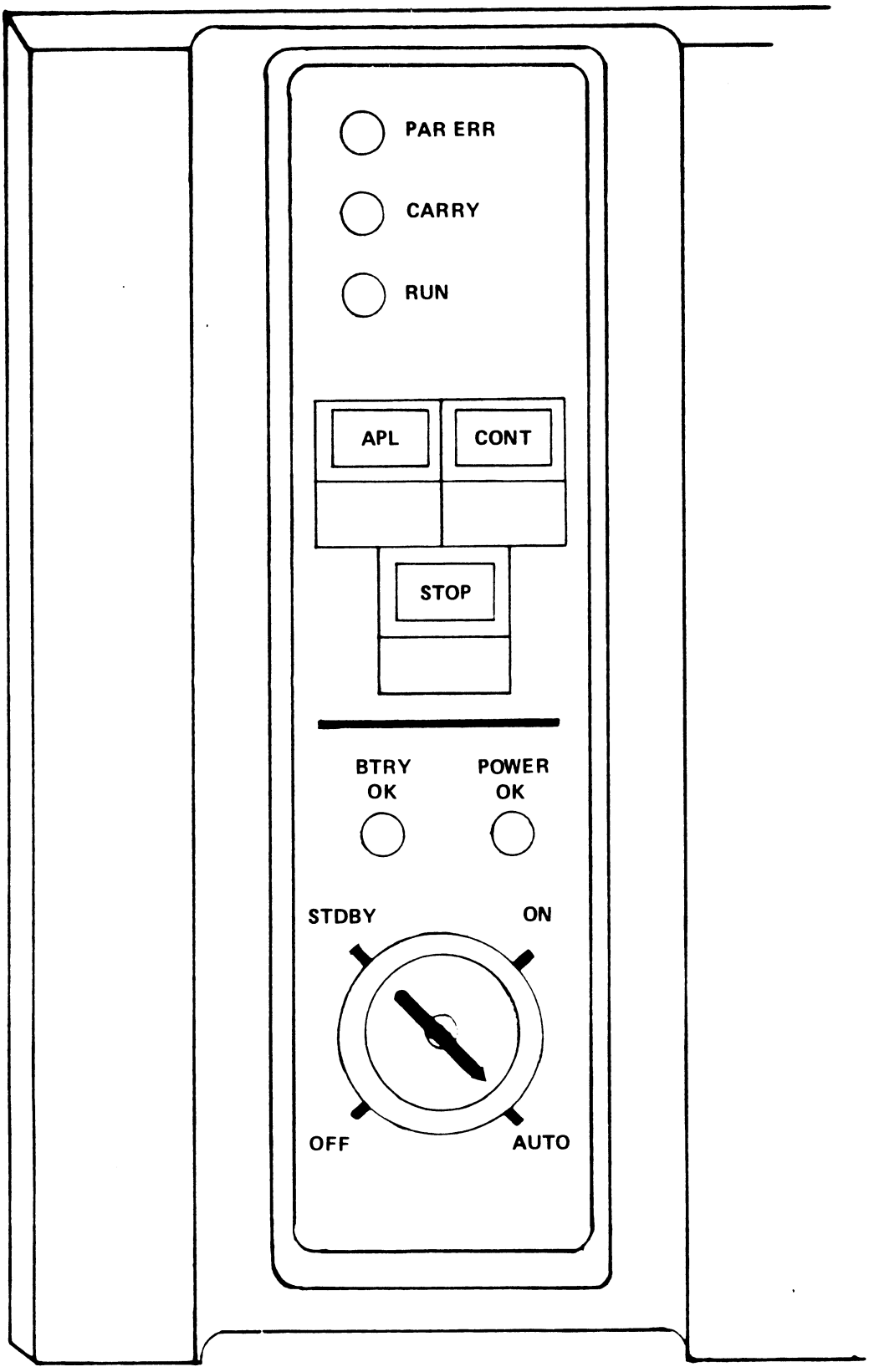


Figure 1-1. POINT 4 MARK 5 or 8 Computer Panel

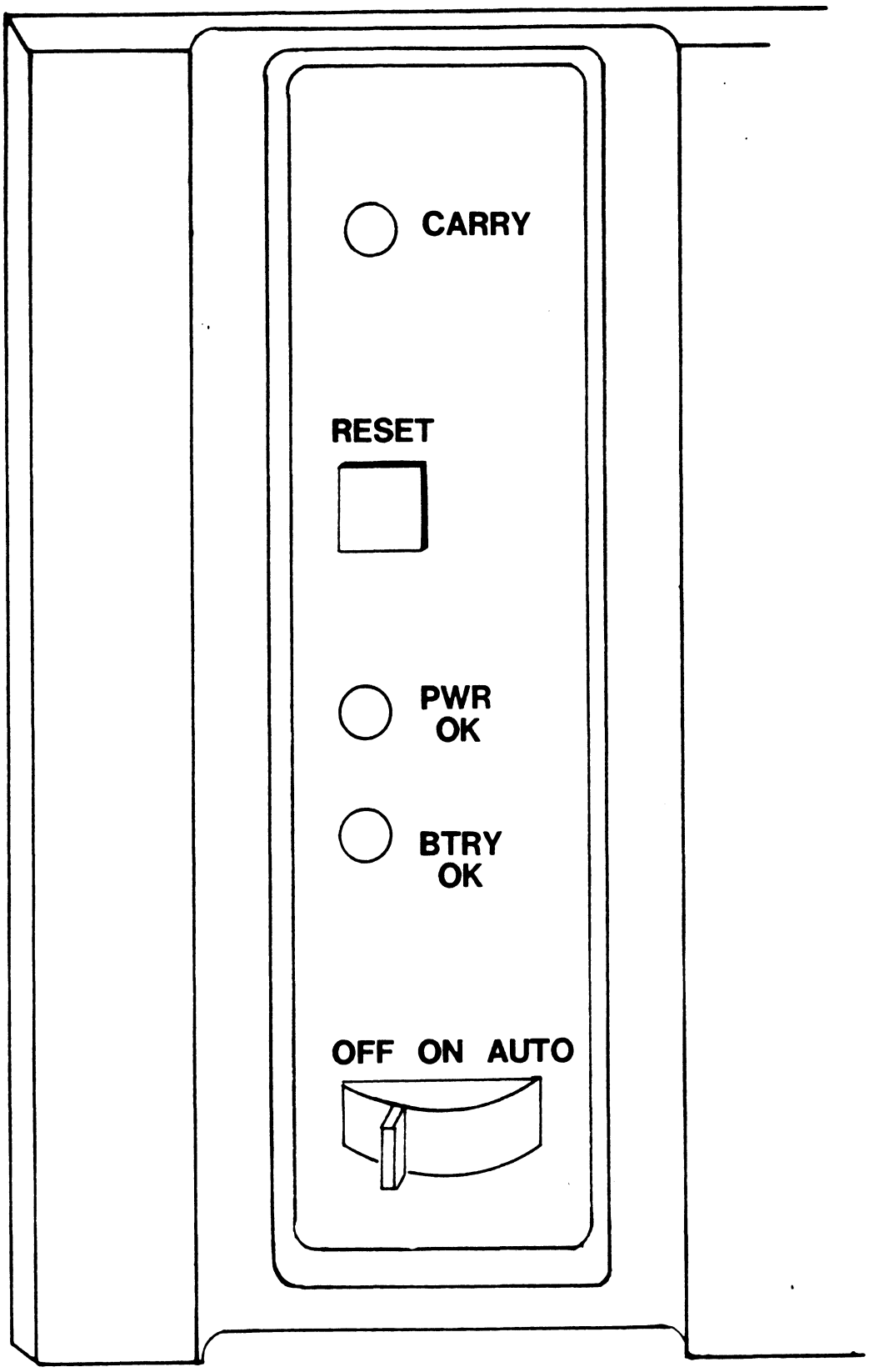


Figure 1-2. POINT 4 MARK 3 Computer Panel

1.3.1.2 Non-POINT 4 Computers

Consult the manufacturer's CPU manual for the correct start-up procedures. Most non-POINT 4 computers (except the Nova 4) may be restarted with a warm start-up if shut down by one of the following:

- A simple SHUTDOWN command
- A power failure when the computer does not have the Power Fail Auto Restart option but the CPU does have battery backup
- The power switch was not in a lock position

Generally, a warm start-up requires the following:

1. Set switches to address 000000.
2. Press the RESET button.
3. Press START.

NOTE

Do not attempt to start at location zero if the system was used in stand-alone mode, if system operation was terminated in any other manner, or if a power fail occurred and the computer has volatile semiconductor memory.

1.3.2 COLD START-UPS

A cold start-up is required if the computer was shut down by any of the following:

- After a power failure if the computer does not have a Power Fail Auto Restart option
- The IRIS Operating System has to be brought back into memory (i.e., an Initial Program Load (IPL) has to be performed; IPL options are described in Appendix B)
- After a change in the configuration
- After the system has been in stand-alone mode

1.3.2.1 POINT 4 MARK 5 and 8 Computers

1. Turn the key on the computer front panel from the AUTO to the ON position (see Figure 1-1).

2. Turn on the master terminal and the disc power switches (in some installations the disc power may go on with the computer). Wait for the disc to reach full speed. Some disc drives have a "ready" light to indicate operational speed.

3. Press the STOP button.

4. Press the APL button.

5. Turn the key back to the AUTO position.

6. If the controller can respond to NIOS (No I/O Transfer) instructions, at the master terminal enter

   Pxx

   where xx is the device code of the system disc controller which is listed in the IRIS R8 Peripherals Handbook. Otherwise, use a bootstrap program (see Section 1.4).

7. The system displays

   PRESS RETURN

   For normal, everyday operations, press

   <RETURN>

   IF a special IPL is required, refer to Appendix B for a description of available options.

NOTE

On an OCU (Operator Control Unit), halts are indicated by a data display. During IPL, halt 67077 indicates a disc read error that could not be corrected with 16 retries. Register A1 contains the real disc address of the block which could not be read.

If the system does not have an OCU, press the APL button on the computer panel once, then enter A<RETURN> at the terminal keyboard. The contents of the registers at the time of the halt will then be displayed (see Section 4.2).

1.3.2.2 POINT 4 MARK 3 Computer

1. Set the power switch on the right rear of the chassis to ON. The POWER OK indicator should be illuminated indicating that all voltages are in tolerance.

2. Turn the power-control switch on the Mini-panel to ON. Note that both the ON and AUTO positions have the same functions.

   The carry light comes on for approximately 1.5 seconds, goes off for .5 seconds, comes on again and remains illuminated.

   The master terminal displays OK, indicating that the system has run a successful CPU self-test program.

3. Check the readiness of the disc drive.

   a. If the ready light is on and the PRESS RETURN message is displayed, boot the operating system for normal operations* by pressing

      <RETURN>

   b. If the disc drive is not ready, press the RESET button on the Mini-panel. The contents of the accumulators and program counters are then displayed.

      To boot the operating system from disc for normal operations*, proceed as follows (user input in underlined):

      P<RETURN>
      PRESS RETURN
      <RETURN>

*Refer to Appendix B for other IPL options.

1.3.2.3 Non-POINT 4 Computers

If the computer is not a POINT 4, consult the manufacturer's CPU manual. Most computers supporting a system disc controller that responds to an NIOS (No I/O Transfer) instruction may be started as follows:

1. Set front panel switches to 376.
2. Press EXAMINE.
3. Set front panel switches to 601xx (where xx is the device code of the system disc controller).
4. Press DEPOSIT.
5. Set front panel switches to 377.
6. Press DEPOSIT NEXT.
7. Press RESET.
8. Set switches to 376.
9. Press START.
10. The system displays

    PRESS RETURN

    For normal, everyday operations, press

    <RETURN>

    If a special IPL is required, refer to Appendix B for a description of available options.

1.3.2.4 Computers Without NIOS Capability

For a CPU with a system disc controller which cannot respond to the NIOS instruction, see Section 1.4 for an appropriate bootstrap routine.

1.3.3 ACTIVATING THE SYSTEM DISC CONTROLLER

After the IPL sequence has been initiated by one of the procedures given in Sections 1.3.2.1 through 1.3.2.3, the system displays

R8.2

IRIS then prompts the operator for date and time. Any bad blocks should be reported at this point (see Section 1.3.3.2). The term bad block is applied to a block that the system has tried to read sixteen times without success.

NOTE

On a MARK 3, the system automatically chains to alternate tracks.

On MARK 5 and MARK 8 Computer systems, bad blocks may be chained or flagged when the disc is formatted (see Section 2.5.1).

If hard errors exceed the designated alternate tracks, the disc pack may have to be exchanged and the hardware should be checked.

Normal entry of date and time is described in Section 1.3.3.1.

1.3.3.1 Entering Date and Time

After the system has been brought up, the system prompts

ENTER DATE AND TIME (YEAR,MONTH,DAY,HOUR,MINUTE)

Date and time may be entered at this point unless there are bad blocks to report (see Section 1.3.3.2).

The time is based on the 24-hour clock; the date/time format is

yy,mm,dd,hh,min

e.g.,

82,3,17,14,33

In this example the date is March 17, 1982, and the time is 2:33 p.m.

If the time entered is earlier than the last access time of the most recently accessed file on LU/0, the system asks

"TIME RUNS BACKWARDS?"

Check your entry, if it is correct, press Y (yes). Otherwise, press N and enter the date and time again.

If the system is left running 24 hours a day, the date and time must be reset on the first day following a month with less than 31 days. Alternative procedures for resetting the system time are given in Sections 1.3.5 and 2.8.

If the system time does not have to be absolutely accurate (i.e., to the minute) or an IPL has just been performed, use the <RUBOUT> or <DELETE> key and the system will enter the last access time.

After the date and time have been accepted by the system, it responds with "!". If the CPU is other than a POINT 4 CPU, an essentially stable light pattern will be seen on the front panel. If the lights are displaying the address, they should be showing 0 predominantly. At this time only the carry light should be flashing at a rate of 1 Hz.

NOTE

> In a dark or dimly lit area it is possible to see the address and carry lights flash at a rapid rate. This is perfectly normal.

The system normally idles at location zero; therefore, a flashing carry light is the only indication that the system is up and ready for use. The carry light should flash exactly once per second; a different flash rate or lack of flashing altogether indicates a problem in the real-time clock.

NOTE

Most multiplexers supply the clock which is used for system time; a high clock rate may be due to the clock being supplied by two drivers.

Log onto the manager account by pressing <ESC> and respond to the ACCOUNT ID? message with the Manager's Account ID (the default is MANAGER).

1.3.3.2 Entering Bad Blocks For LU/0

When the system finds a bad block, a Trap 3 or (at IPL time) a Halt 67077 occurs. In either case, the RDA of the bad block is contained in Register A1. A list of the RDAs for bad blocks should be kept and used to report bad blocks to the system. The procedure for reporting bad blocks for nonzero LUs is given in Section 1.3.4.3.

To report bad blocks on LU/0, respond to the message "ENTER DATE AND TIME..." by entering ?. The system then prompts

BAD BLOCKS?

Type in the RDA (real disc address) for the first bad block on LU/0 followed by <RETURN>. Repeat this procedure until all bad blocks on LU/0 have been entered. Up to 80 bad blocks may be listed on each logical unit.

If the address entered is allocated to an existing file, the message BLOCK IN USE is printed. The file may be deleted and another IPL performed.

Certain disc blocks are required for the operation of IRIS. These blocks may not be marked as bad.

NOTE

If any blocks dedicated to the IRIS Operating System are shown as "bad" in Register A1, report this to your system manager or, if you have IRIS Subscription Service, call IRIS Customer Support.

After all bad blocks have been entered, press <RETURN> at the BAD BLOCKS prompt. Then log onto the manager account by pressing <ESC> and responding to the ACCOUNT ID? message with the manager's Account ID.

1.3.4 INSTALL LOGICAL UNITS

The installation procedures given here are for normal, daily "housekeeping" only. The first procedure is for installing previously assigned logical units when an IPL is performed. The second is for installing a specific logical unit and/or reporting bad blocks. (Refer to Section 2.1.1 for changing the LU configuration.)

In general, the daily installation of LUs is a very simple process. Refer to the list of LU assignments (supplied by the system manager) and select the appropriate procedure.

1.3.4.1 Installing All Previously Assigned LUs

To install all previously assigned logical units, at the system prompt (#), enter

INSTALL

Press <RETURN> n times (where n = the number of LUs on your system +1). For example, if there are 6 LUs on your system, press <RETURN> seven times.

1.3.4.2 Installing a Specific LU

The procedure for installing a specific LU is as follows:

At the system prompt (#), enter

    INSTALL d.p

where
- d - number of logical disc controller for the LU to be installed
- p - partition number for that LU

Thus the command

    INSTALL 0.1

refers to logical disc controller '0' and partition number '1'.

INSTALL reads from the physical unit at location d.p to determine whether it is formatted as an IRIS logical unit (i.e., whether the LU has been previously installed as an IRIS LU). If it had been previously installed, the dialogue is as follows:

```
#INSTALL 0.1
LOGICAL UNIT NUMBER = n
INSTALL  (Y/N) ? Y
```

where n is the LU number.

INSTALL checks for any DMAP errors. If a discrepancy is found, an appropriate error message is displayed (see Section 4.5). If none is found, INSTALL asks the operator to

    PLEASE WAIT . . .

INSTALL then checks the consistency of all file headers on that LU and makes sure the DMAP is accurate.

If a bad file is found, INSTALL displays an appropriate message (see Section 4.3), installation is terminated, and control is returned to SCOPE.

If no bad files are found, INSTALL asks

    BAD BLOCKS?

At this time any bad blocks not entered previously may be reported (see Section 1.3.4.3), otherwise press <RETURN> to continue. The system displays

```
LOGICAL UNIT #n IS NOW ACTIVE!
#
```

Repeat this process for each LU on the list.

1.3.4.3 Reporting Bad Blocks During an INSTALL

The system reports a bad block with a Trap 3 (i.e., Disc Error, retries exhausted). The Real Disc Address of that bad block is given in register A1. That RDA should be reported to the system when the LU is being re-INSTALLed after a backup.

To report bad blocks, at the system prompt (#), enter

```
INSTALL d.p
```

where
d - number of disc controller for the unit to be installed
p - number of partition containing bad blocks

```
INSTALL 0.1
```

refers to drive '0' and partition number '1'.

INSTALL reads from the physical unit at location d.p to determine whether it is formatted as an IRIS logical unit. If it is so formatted, the dialogue is as follows:

```
#INSTALL 0.1
LOGICAL UNIT NUMBER = n
INSTALL  (Y/N) ? Y
```

where n is the number of the LU to be installed.

The unit will be installed while the terminal displays

```
PLEASE WAIT . . .
```

The system then asks

```
BAD BLOCKS?
```

If the LU to be installed has no bad blocks, press <RETURN>.

If that LU has bad blocks, report them by entering each RDA reported in Register A1 after a Trap 3. For example, if the trap occurred at location 15, enter

```
15
```

The system prompts for other bad blocks by asking

```
ANOTHER?
```

When all bad blocks have been reported, press <RETURN> instead of entering an RDA. The system displays

```
LOGICAL UNIT #n IS NOW ACTIVE!
#
```

1.3.5 SETTIME

If the date and time was not entered when the system was brought up, or if it is the beginning of a new month, a special program may be used. At the system prompt (#), enter

SETTIME

It will guide you through the process of entering the date and time. A <RETURN> is required after each input. The format is

```
 DD MMM YYYY HH: MM: SS
(21 JAN 1982 13: 45: 15)
```

1.4 IPL BOOTSTRAP PROGRAMS

If the computer does not have the Program Load option or if the disc controller does not respond properly, it is necessary to key in a bootstrap program.

1.4.1 HEAD-PER-TRACK DISCS

For most head-per-track discs, such as with a Data General 4019 controller, an Ampex "Megastore", or a Dataram "Bulk Core", the following procedure may be used:

set data switches	then press
000376	RESET, EXAMINE
0601xx	DEPOSIT
000377	DEPOSIT NEXT
000376	START

where xx is the controller's device code (usually 20)

1.4.2 TELEFILE

For a Telefile disc controller, the bootstrap program shown in Section 1.4.1 may be used, but the device code is usually 33.

1.4.3 DATA GENERAL 4046

For any disc with a Data General 4046 or similar controller, one of the following bootstraps may be used:

If Logical Unit zero is on platter zero (usually the removable cartridge):

set data switches	then press
000376	RESET, EXAMINE
060133	DEPOSIT
000377	DEPOSIT NEXT
000376	START

If Logical Unit zero is on platter one (usually the nonremovable disc):

set data switches	then press
000376	RESET, EXAMINE
040000	DEPOSIT AC0
061133	DEPOSIT
000377	DEPOSIT NEXT
000376	START

1.4.4 DATA GENERAL 4234

For any disc on a Data General 4234 or similar controller, one of the following bootstraps may be used:

If Logical Unit zero is on platter zero (usually the removable cartridge):

set data switches	then press
000372	RESET, EXAMINE
000000	DEPOSIT AC0
000000	DEPOSIT AC1
001400	DEPOSIT AC2
071333	DEPOSIT
063077	DEPOSIT NEXT
062233	DEPOSIT NEXT
067033	DEPOSIT NEXT
061133	DEPOSIT NEXT
000377	DEPOSIT NEXT
000372	START, CONTINUE

If Logical Unit zero is on platter one (usually the nonremovable disc):

set data switches	then press
000372	RESET, EXAMINE
000000	DEPOSIT AC0
001000	DEPOSIT AC1
001400	DEPOSIT AC2
071333	DEPOSIT
063077	DEPOSIT NEXT
062233	DEPOSIT NEXT
067033	DEPOSIT NEXT
061133	DEPOSIT NEXT
000377	DEPOSIT NEXT
000372	START, CONTINUE

1.4.5 BALL (DECISION) 3150 or 3170

For any disc on a Ball (Decision) 3150 or 3170 controller one of the following bootstraps may be used:

If Logical Unit zero is the removable cartridge:

set data switches	then press
000376	RESET, EXAMINE
020000*	DEPOSIT AC0
061lxx	DEPOSIT
000377	DEPOSIT NEXT
000376	START

If Logical Unit zero is the nonremovable disc:

set data switches	then press
000376	RESET, EXAMINE
060lxx	DEPOSIT
000377	DEPOSIT NEXT
000376	START

*050000 for a 3170 controller

where xx is the controller's device code (usually 40)

1.4.6 IOMEC DISC

The bootstrap program for an Iomec disc is longer since the disc controller uses cell 20 in memory as a word counter. Use one of the following bootstrap programs for an Iomec disc controller:

If Logical Unit zero is the removable cartridge:		If Logical Unit zero is the nonremovable disc:	
set data switches	then press	set data switches	then press
000020	RESET, EXAMINE	000020	RESET, EXAMINE
177401	DEPOSIT	177401	DEPOSIT
000012	DEPOSIT AC0	000012	DEPOSIT AC0
000000	DEPOSIT AC1	000200	DEPOSIT AC1
000000	DEPOSIT AC2	000000	DEPOSIT AC2
000374	EXAMINE	000374	EXAMINE
061370	DEPOSIT	061370	DEPOSIT
066270	DEPOSIT NEXT	066270	DEPOSIT NEXT
073170	DEPOSIT NEXT	073170	DEPOSIT NEXT
000377	DEPOSIT NEXT	000377	DEPOSIT NEXT
000374	START	000374	START

1.4.7 SYSTEM INDUSTRIES 3015 or 3045

The System Industries disc controllers require longer bootstrap programs since they access some of the control parameters from memory. Use one of the following bootstrap programs for a System Industries 3015 or 3045 controller:

If Logical Unit zero is the removable cartridge:		If Logical Unit zero is the nonremovable disc:	
set data switches	then press	set data switches	then press
000365	RESET, EXAMINE	000365	RESET, EXAMINE
020405	DEPOSIT	020405	DEPOSIT
024405	DEPOSIT NEXT	024405	DEPOSIT NEXT
004405	DEPOSIT NEXT	004405	DEPOSIT NEXT
000400	DEPOSIT NEXT	000400	DEPOSIT NEXT
000000	DEPOSIT NEXT	000000	DEPOSIT NEXT
020000*	DEPOSIT NEXT	000000	DEPOSIT NEXT
000100	DEPOSIT NEXT	000100	DEPOSIT NEXT
0771xx	DEPOSIT NEXT	0771xx	DEPOSIT NEXT
0650xx	DEPOSIT NEXT	0650xx	DEPOSIT NEXT
0632xx	DEPOSIT NEXT	0632xx	DEPOSIT NEXT
000377	DEPOSIT NEXT	000377	DEPOSIT NEXT
000365	START	000365	START

*100000 for a 3045 controller

where xx is the controller's device code (usually 40)

1.4.8 KAHILI - 9500 SERIES

For a System Industries "Kahili" controller (9500 series) the following bootstrap program may be used:

```
set data
switches  then press

000371    RESET, EXAMINE, DEPOSIT AC0
000000    DEPOSIT
000400    DEPOSIT NEXT
00nnnn    DEPOSIT NEXT
000000    DEPOSIT NEXT
000000    DEPOSIT NEXT
0611xx    DEPOSIT NEXT
000377    DEPOSIT NEXT
000376    START
```

where

xx - controller's device code (usually 50)

nnnn - drive number as follows:

```
2000  for drive #1
4000  for drive #2
6000  for drive #3
```

1.4.9 DIGITAL COMPUTER SYSTEM

For a Digital Computer Controls 116446 disc system, the Program Load feature may be used if the system is on drive #0. Set the data switches to 100030 octal, press RESET, then PROGRAM LOAD, then press the colon (:) key on the master terminal. If the system is not on drive #0, then key in this bootstrap program:

```
set data
switches  then press

000376    RESET, EXAMINE
0n0000    DEPOSIT AC1
065130    DEPOSIT
000377    DEPOSIT NEXT
100376    START
```

where n is the drive number

Then press the colon (:) key on the master terminal.

1.4.10 XEBEC SYSTEM

For a Xebec XDF-50 system, the PROGRAM LOAD feature may be used if the system is on physical partition 0.0; otherwise use one of the following bootstrap programs:

If Logical Unit zero is the removable cartridge:

set data switches	then press
000376	RESET, EXAMINE
060130	DEPOSIT
000377	DEPOSIT NEXT
000376	START

If Logical Unit zero is the nonremovable disc:

set data switches	then press
000373	RESET, EXAMINE
003400	DEPOSIT AC0
001000	DEPOSIT AC1
000400	DEPOSIT AC2
000000	DEPOSIT AC3
076030	DEPOSIT
073030	DEPOSIT NEXT
067031	DEPOSIT NEXT
061130	DEPOSIT NEXT
000377	DEPOSIT NEXT
000373	START

1.4.11 TDC - 802 DISC

For a Minicomputer Technology TDC-802, use the following bootstrap program to start an IPL from drive zero:

set data switches	then press
000401	RESET, EXAMINE
060136	DEPOSIT
000400	DEPOSIT NEXT
000401	START

1.5 SYSTEM SHUTDOWN PROCEDURE

The IRIS Operating System has a system buffer pool. The SHUTDOWN command forces the contents of any buffers to be written out to the proper location on disc so that no work in progress is lost. A buffer that has been filled but has not been written to disc is called a "dirty page".

If the SHUTDOWN procedure is initiated with an LCM activated, it may take longer to complete because updated blocks stored in the LCM are written out to disc. DO NOT halt the processor during the SHUTDOWN procedure or some loss of data may occur.

Normally, the SHUTDOWN command is given by the system manager on the master terminal (port zero), but other accounts and/or other ports may be allowed to shut down the system depending on the access allowed by the system manager.

SHUTDOWN is used to perform backups or to run stand-alone programs. The general syntax of the command is

```
SHUTDOWN <CTRL-E>key<CTRL-E>
```

where key is the password assigned by the system manager (the default is X).

To shutdown to a specific stand-alone program, the command syntax is

```
SHUTDOWN <CTRL-E>key<CTRL-E>program
```

The command syntax for shutting down the system to more than one stand-alone program is shown in the following example:

```
SHUTDOWN <CTRL-E>key<CTRL-E>DISCUTILITY,STBOOT @73000 X73000
```

where

@73000 - loads DBUG into memory at location 73000 after loading other files

X73000 - specifies that execution is to begin automatically at location 73000

All users must be logged off the system before it is shut down. This ensures that all accounts have been properly updated and that there are no open files.

The general procedure for shutting down the system is as follows:

1. At the system command prompt (#), enter

   SHUTDOWN <CTRL-E>key<CTRL-E>

   SHUTDOWN checks all ports; if any port is in use, it displays

   PORT #n IS IN USE

   where n is the number of the lowest numbered port which is in use (or where the user has failed to log off). This message will be repeated for each user that is logged on after port n has logged off.

2. The MAIL command may be used to send a message to port n to request the user to log off, e.g.

   MAIL n : PLEASE LOG OFF!!

3. The PORT EVICT command may be used to force the port(s) to be logged off.

   a. To evict a single port, enter

      PORT <CTRL-E>key<CTRL-E>n EVICT

   b. To evict all ports at once, enter

      PORT <CTRL-E>key<CTRL-E>ALL EVICT

   where key is the password assigned to the PORT processor by the system manager (the default password is X).

4. If it is necessary to do backups at this point, please refer to Section 1.6.

5. Repeat the SHUTDOWN command string; the CPU will halt.

6. Write-protect and power down all disc drives. If using a POINT 4 MARK 5/8 CPU, turn the power keyswitch to STDBY. If using another CPU, turn the power switch to OFF or STDBY as appropriate.

NOTE

If a restart without a new IPL is desired on a CPU with semiconductor memory and no battery backup, the CPU MUST NOT BE POWERED DOWN.

1.6 BACKUP PROCEDURES

It is recommended that backups be performed on a regular basis (e.g., daily). Refer to Appendix A for recommended backup procedures.

In general, backups may be performed using disc packs, diskettes, streamer tape, or cassette tapes. Polyfiles should be backed up regularly on an LU (or set of LUs) basis. They must not be backed up on a file-by-file basis by using $MTA0 with either $CTUS (cassette tape) or $MTAS (magnetic tape). The appropriate programs are as follows:

- Discs - BAKUP is the recommended program (see Section 1.6.1). DISCUTILITY or DDCOPY may be used as alternatives (see Section 1.6.2).
- Diskettes - DISCUTILITY
- Cassette tape - CTUTILITY (see the IRIS Installation and Configuration Manual)
- Streamer tape - DISCUTILITY

Before starting a backup there are a number of things to remember:

- All users should be logged off when DISCUTILITY or DDCOPY is used. BAKUP suspends timesharing but users need not be logged off.
- Scratch disc pack(s) should be at hand.
- Have the appropriate Disc Specification sheet(s) from the IRIS R8 Peripherals Handbook available.
- Be sure that the copying process is done in the right direction (see Section 1.6.2).
- Make certain that the disc covers are put on the correct (i.e., matching) disc packs.
- When removing a disc pack from a disc drive, be sure to identify the pack with the drive from which it came. One way of doing this is to place the removed pack on top of, or underneath, the drive. Another way is to label the disc cover with the drive ID.
- Make absolutely certain that the WRITE-PROTECT switch or button is set on the source media. This is essential to ensure that the data to be copied (backed up) cannot be written over.

1.6.1 BAKUP UTILITY PROGRAM

BAKUP is a BASIC program supplied by POINT 4 which may be used to perform on-line, disc-to-disc copy procedures. The BAKUP utility includes a formatted parameter file called BAKUPPARAM, another BASIC program called BAKUPCONFIG, and the disc-to-disc copy module called BAKUPMAIN. The BAKUP utility is recommended for performing backups.

The BAKUPPARAM file serves as a disc driver table for the BAKUP utility. It is created and maintained by running BAKUPCONFIG (see Section 1.6.1.1). The BAKUP program calls the disc-to-disc copy module (BAKUPMAIN) and may be modified to suit the requirements of a particular installation (see Section 1.6.1.2).

Copying can be done between any two surfaces (fixed or removable) on one or more drives connected to as many as four different controllers. The number of blocks that are copied is controlled by the smaller of the two units, be it source or destination.

BAKUP units are defined in the BAKUPPARAM file. They are independent of IRIS logical units unless otherwise noted.

Two optional procedures are available:

- Read after write verify on all blocks copied.
- DMAP reconstruction. This feature permits changing logical unit sizes during the BAKUP procedure. It should not be used if the BAKUP unit (BU) specified in the BAKUPPARAM file does not have the same starting cylinder number (FCYL) as the IRIS LU to be copied (see Section 1.6.1.1).

BAKUPMAIN is called from the BAKUP program which means that the system must not be SHUTDOWN. All timesharing operations are suspended while the copying procedures are performed. When BAKUPMAIN has completed the specified backup procedure, timesharing is automatically restored.

1.6.1.1 BAKUP Parameter File

The BAKUP parameter file (BAKUPPARAM) serves as a disc driver table for the BAKUP utility. It must be set up before BAKUP is run for the first time. BAKUPPARAM is a formatted data file used to define BAKUP units (BUs) and the controller-drive combinations. The parameter file may have to be modified when the disc driver table in the CONFIG file is reconfigured (i.e., driver or partition configuration is changed and INSTALLed).

A BU may be all or part of a platter. It does not have to coincide with an IRIS LU defined in the CONFIG file's disc driver table unless the DMAP reconstruction option is to be exercised, or the BU is specified as the removable disc BU number on a given drive.

BAKUPCONFIG is used to create and maintain the BAKUPPARAM file based on user input. To use the program, at the system command prompt (#), enter

BAKUPCONFIG

The program displays three options:

(1) CONSTRUCT NEW BAKUPPARAM FILE
(2) MODIFY EXISTING BAKUPPARAM FILE
(3) PRINT CURRENT CONTENTS OF BAKUPPARAM FILE

SELECT OPTION (1, 2, OR 3)

If option one or two is selected, the program prompts for the following parameters:

Controller number - Up to four different controllers may be defined (0-3). The number entered for a particular controller must correspond to the number assigned to the controller in the disc driver table in CONFIG (see the IRIS Installation and Configuration Manual).

BAKUP unit (BU) number - Up to fifteen different BUs may be defined in the BU table.

DFLG - Disc flag word in the disc partition table. Refer to the current IRIS R8 Peripherals Handbook for the value appropriate to the controller-drive combination.

PHYU - Physical unit selection constant in the disc partition table. Refer to the current IRIS R8 Peripherals Handbook for the value appropriate to the controller-drive combination.

FCYL - First cylinder of the BU.*

NCYL - Total number of cylinders in the BU.

NTRS - Number of IRIS tracks for this disc. Refer to the current IRIS R8 Peripherals Handbook for the appropriate number.

Drives with removable discs - Total number of drives with removable discs.

BAKUP unit (BU) number of removable disc on drive #n - A BU that is defined on a removable disc of a specified drive (where n is the drive number). The starting cylinder address (FCYL) of the BU must be the same as the starting cylinder address of the IRIS LU to be copied. This is because BAKUPMAIN uses word 40 of this logical unit's ACCOUNTS file header to store a disc label. The BU number must be entered in decimal. This prompt may be displayed up to four times depending on the number of drives entered for the previous prompt.

If option three is selected, the current contents of the BAKUPPARAM file may be sent to a printer or displayed at the terminal.

Press <ESC> to abort the program or when all necessary parameters have been entered.

The following subsections give an example for each of the BAKUPCONFIG options.

*This must be the same as the first cylinder (FCYL) of an IRIS LU if the DMAP reconstruction option is to be used or the BU is specified as the "removable disc BU".

1.6.1.1.1 BAKUPCONFIG OPTION ONE

Option one allows the user to build a new BAKUPPARAM file. When the necessary parameters have been completed, the information is entered into the BAKUPMAIN program. An example of the parameter prompts and user input (underlined) is as follows:

```
#BAKUPCONFIG

(1) CONSTRUCT NEW BAKUPPARAM FILE
(2) MODIFY EXISTING BAKUPPARAM FILE
(3) PRINT CURRENT CONTENTS OF BAKUPPARAM FILE

SELECT OPTION (1,2, OR 3) 1

HOW MANY DISC CONTROLLERS WILL BAKUP BE USING
INCLUDING MAIN SYSTEM CONTROLLER (1-4)

? 2

HOW MANY BAKUP UNITS WILL BE ACCESSED THRU CONTROLLER NUMBER 0

? 2

ENTER THE FOLLOWING INFORMATION FOR BU #0

ENTER "DFLG" VALUE FOR THIS BU (IN OCTAL) 100500
ENTER PHYSICAL UNIT "PHYU" 0
ENTER STARTING CYLINDER - "FCYL" (IN OCTAL) 0
ENTER NUMBER OF CYLINDERS "NCYL" (IN OCTAL) 200
ENTER "NTRS" VALUE FOR THIS BU (IN OCTAL) 214

ENTER THE FOLLOWING INFORMATION FOR BU #1

ENTER "DFLG" VALUE FOR THIS BU (IN OCTAL) 100500
ENTER PHYSICAL UNIT "PHYU" 0
ENTER STARTING CYLINDER - "FCYL" (IN OCTAL) 200
ENTER NUMBER OF CYLINDERS "NCYL" (IN OCTAL) 426
ENTER "NTRS" VALUE FOR THIS BU (IN OCTAL) 214

HOW MANY BAKUP UNITS WILL BE ACCESSED THRU CONTROLLER NUMBER 1

? 2

ENTER THE FOLLOWING INFORMATION FOR BU #2

ENTER "DFLG" VALUE FOR THIS BU (IN OCTAL) 500
ENTER PHYSICAL UNIT "PHYU" 0
ENTER STARTING CYLINDER - "FCYL" (IN OCTAL) 0
ENTER NUMBER OF CYLINDERS "NCYL" (IN OCTAL) 140
ENTER "NTRS" VALUE FOR THIS BU (IN OCTAL) 220
```

```
ENTER THE FOLLOWING INFORMATION FOR BU #3

ENTER "DFLG" VALUE FOR THIS BU (IN OCTAL) 500
ENTER PHYSICAL UNIT "PHYU" 0
ENTER STARTING CYLINDER - "FCYL" (IN OCTAL) 140
ENTER NUMBER OF CYLINDERS "NCYL" (IN OCTAL) 1310
ENTER "NTRS" VALUE FOR THIS BU (IN OCTAL) 220

HOW MANY DRIVES WITH REMOVABLE DISCS WILL BAKUP USE (1-4) ? 2

ENTER BU NUMBER (IN DECIMAL) OF THE REMOVABLE DISC ON DRIVE #1 1

ENTER BU NUMBER (IN DECIMAL) OF THE REMOVABLE DISC ON DRIVE #2 3

CONFIGURATION IS COMPLETE - BAKUP IS NOW READY FOR USE.

PRESS RETURN TO CONTINUE
```

Press <RETURN> to select another option from the BAKUPCONFIG menu.
Press <ESC> to return to the system command prompt (#).

1.6.1.1.2 BAKUPCONFIG OPTION TWO

Option two allows the user to modify an existing BAKUPPARAM file. Before modifying the existing parameter entries, it is recommended that the current contents of the file be examined by selecting option 3 first (see Section 1.6.1.1.3) and then continuing with option 2.

At the BAKUPCONFIG menu (see Section 1.6.1.1), select option 2. The following prompts and messages are then displayed:

```
ENTER DESIRED BU NUMBER (DECIMAL) 4
IF NO CHANGE, PRESS RETURN

CONTROLLER NUMBER = 0 ? <RETURN>
DFLG = 100500 ? <RETURN>
PHYU = 0 ? <RETURN>
FCYL = 170 ? <RETURN>
NCYL = 2 ? 1
NTRS = 214 ? <RETURN>

ENTER DESIRED BU NUMBER (DECIMAL) <RETURN>

ENTER DRIVE #1'S REMOVABLE DISC BU NUMBER (RETURN IF NO CHANGE) 0
ENTER DRIVE #2'S REMOVABLE DISC BU NUMBER (RETURN IF NO CHANGE) 0
ENTER DRIVE #3'S REMOVABLE DISC BU NUMBER (RETURN IF NO CHANGE) 0
ENTER DRIVE #4'S REMOVABLE DISC BU NUMBER (RETURN IF NO CHANGE) 0
```

1.6.1.1.3 BAKUPCONFIG OPTION THREE

Option three allows the user to display or print the current contents of the BAKUPPARAM file. The following example shows the result of the parameters entered earlier.

If the parameter file is to be examined as a first step, at the system command prompt (#), enter

BAKUPCONFIG

If the parameter file is to be examined after an initial configuration or a modification, press <RETURN>.

The dialogue continues as follows:

```
(1) CONSTRUCT NEW BAKUPPARAM FILE
(2) MODIFY EXISTING BAKUPPARAM FILE
(3) PRINT CURRENT CONTENTS OF BAKUPPARAM FILE

SELECT OPTION (1,2, OR 3) 3

OUTPUT WHERE (L=LPT, <RETURN>=CRT) <RETURN>

 BU#   CNTR.#     DFLG       PHYU      FCYL     NCYL     NTRS

  0       0      100500          0       0      200      214
  1       0      100500       1000     200      426      214
  2       1         500          0       0      200      214
  3       1         500     100000     200      500      214


DRIVE #1'S REMOVABLE DISC BU NUMBER IS 1
DRIVE #2'S REMOVABLE DISC BU NUMBER IS 3
DRIVE #3'S REMOVABLE DISC BU NUMBER IS 0
DRIVE #4'S REMOVABLE DISC BU NUMBER IS 0

PRESS RETURN TO CONTINUE
```

Press <RETURN> to select another option from the BAKUPCONFIG menu.
Press <ESC> to return to the system command prompt (#).

1.6.1.2 BASIC Program For Running BAKUPMAIN

The POINT 4-supplied BAKUP program shown in Figure 1-3 contains code to meet the following specifications:

- Number of copy steps
- Copy directions (source and destination)
- Operator prompts
- Disc label verification
  (internal label placed on a disc in word 40 of the IRIS logical unit's ACCOUNTS file header for BAKUP control and used for the remove and insert messages)
- Pass a CRT "clear-screen" sequence to BAKUP for use with any CRT when using operator prompts
- Pass a switch that controls the DMAP reconstruct option (i.e., whether the DMAP header should be adjusted at the destination BU)
- Pass a switch that causes operator prompts to be issued either through a normal mux port or a TTY1011 interface
- Pass a switch that controls the read-after-write verify option

The BAKUP program may be modified to meet the requirements of a particular installation.

```
5 REM 'BAKUP' - DO A DISC COPY BASED ON A$-W$ & 'BAKUPPARAM' FILE.
6 REM
7 REM DATE LAST EDITED  6/21/83
8 REM
9 DIM P$ [ 256*12]
10 DIM W$[ 8200],A$[ 100],B$[ 100],C$[ 100],D$[ 100]
20 IF ERR 0 STOP
30 LET P$="0/BAKUPMAIN"
40 LET A$="####01**A B 10**B A ##**######" ! COMMAND STRING FOR DRIVE #1
50 LET B$="#",B$                           ! COMMAND STRING FOR DRIVE #2
60 LET C$=B$                               ! COMMAND STRING FOR DRIVE #3
70 LET D$=B$                               ! COMMAND STRING FOR DRIVE #4
80 LET W$=" ",W$
90 REM
100 LET W$[1,4]="\176\\034\\377\\377\" !CLEAR SCREEN CODE SEQUENCE
110 REM
120 REM W$[5,6]=DMAP RECONSTRUCT SWITCH (\377\\377\ = DO NOT RECONSTRUCT)
125 LET W$[5,6]="\377\\377\"
130 REM
140 REM W$[7,8]="T" OPTION SWITCH (\377\\377\ = USE "T" OPTION PORT)
150 REM
160 REM W$[9,10]= COPY VERIFY SWITCH (\377\\377\ = DO NOT VERIFY COPY)
170 LET W$[9,10]="\377\\377\"
180 REM
190 CALL 79,P$,W$,A$,B$,C$,D$
```

where

A$,B$,C$,D$ - Encoded command strings used to pass prompts, disc label, and copy direction to the BAKUPMAIN program in the following format:

A$="{RRII}SD**{RRII}SD**.....######"

RR - Optional 2-character disc label "remove" code used by BAKUPMAIN; if not used, enter ##

II - Optional 2-character disc label "insert" code used by BAKUPMAIN; if not used, enter ##

S - Source BAKUP unit to copy from

D - Destination BAKUP unit to copy to

** - Delimiter between copy steps

- String terminator indicated by six #-signs

P$ - Used to load and execute the Assembly language program BAKUPMAIN

W$ - Used as the read/write and read-back verify buffers

W$(1,4) - Used to pass up to a 4-byte CRT clear-screen sequence to BAKUPMAIN

W$(5,6) - Used to pass a DMAP header adjust switch to BAKUPMAIN (e.g., \377\\377\ means do not reconstruct DMAP)

W$(7,8) - Used to pass a Mux or TTY1011 switch to BAKUPMAIN (e.g., \377\\377\ means use T-option)

W$(9,10) - Used to pass a read-after-write verify switch (e.g., \377\\377\ means do not verify)

Figure 1-3. POINT 4-Supplied BASIC Program (BAKUP)

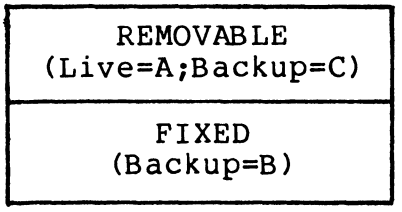
Word 40 of the ACCOUNTS file header is used for the disc label. To override the disc label check, set the console switches to 125252.

The clock is not maintained while the disc-to-disc copy operation (i.e., BAKUPMAIN) is in process.

1.6.1.3 Example of a Typical Backup Routine

This section provides a typical backup routine for a CDC 32MB drive. A complete backup of this drive will involve a total of four copies for the removable and fixed surfaces. The drive configuration is as follows:

CDC 9448



The live removable disc is labeled A and its backup disc is labeled C. The backup for the fixed disc is labeled B.

The following procedure is required for a complete backup:

1. Remove disc A and insert disc B.
2. Copy fixed to removable disc B.
3. Remove disc B and insert disc A.
4. Copy removable disc A to fixed.
5. Remove disc A and insert disc C.
6. Copy fixed to removable disc C.
7. Remove disc C and insert disc B.
8. Copy removable disc B to fixed.
9. Remove disc B and insert disc A.

A complete back-up copy now exists on discs B and C.

For example, assume that the BU table in the BAKUPPARAM file was set up as follows:

- BU/0 is the entire removable surface.
- BU/1 is the entire fixed surface and the DMAP option is not used. Therefore, it does not matter whether this BU coincides with the IRIS logical units defined for this surface.

The code for the program BAKUP would be as follows:

```
10 REM 'BAKUP' - DO A BACKUP FOR A CDC 9448 32MB DRIVE
20 REM
30 REM DATE LAST EDITED mm/dd/yy
40 REM
50 DIM P$[3072],W$[8200],A$[100],B$[100],C$[100],D$[100]
60 LET P$="0/BAKUPMAIN"
70 LET A$="A B 10**B A 01**A C 10**C B 01**B A ##########" !steps for drive #1
80 LET B$="#",B$ !drive #2 command string filled with BAKUPMAIN NOP CODES
90 LET C$="#",C$ !drive #3 command string filled with BAKUPMAIN NOP CODES
100 LET D$="#",D$ !drive #4 command string filled with BAKUPMAIN NOP CODES
110 LET W$=" ",W$
120 LET W$(5,6)="\377\\377\" !do not reconstruct DMAP
130 CALL 79,P$,W$,A$,B$,C$,D$
140 END
```

When this program is run, the following sequence of events will occur:

1. All timesharing ceases.
2. Control is passed to the internal interrupt service routine.
3. The internal LU and LUVAR tables are activated.
4. Control of all option switches is passed from BASIC to BAKUPMAIN.
5. As the copy procedure begins, the following prompt is displayed:

   REMOVE A AND INSERT B ON DRIVE #1

   The prompt is redisplayed every few seconds until disc B has been inserted.

6. The operator should take the following actions:

   a. On the drive, press the appropriate button to stop the disc from spinning.

   b. Remove disc A and insert disc B.

   c. Press the appropriate button to start the disc spinning.

7. The disc label code is read and tested against the insert code of the prompt message.

   If the codes do not agree, BAKUPMAIN displays

   WRONG CODE

   and operation returns to step 6.

   If the codes agree, the following message is displayed:

   PLEASE WAIT . . .

   Events 5 through 7 are repeated for each required backup copy step. The prompts to remove and insert discs reflect the copy step. For example, at the second copy step, the following message is displayed:

   REMOVE B AND INSERT A ON DRIVE #1

8. The IRIS logical unit table (LUT) pointers are restored.

9. BAKUPMAIN returns control to the BAKUP program.

10. All timesharing is resumed.

1.6.2 USING DISCUTILITY OR DDCOPY

This section describes a normal backup procedure using DISCUTILITY or DDCOPY for disc drives with a removable pack.

1. Log on to the manager account at the master terminal.

2. Use the MAIL processor to send a message to all users to log off.

3. If users are still logged on after a stipulated period of time, they may be notified by intercom or a check of their offices. In the event one or more users forgot to log off, the user(s) can be 'evicted' by one of the following commands:

   PORT <CTRL-E>key<CTRL-E>n EVICT

   or

   PORT <CTRL-E>key<CTRL-E>ALL EVICT

   where n is the port number and key is the password assigned to the Port-Evict processor by the system manager (the default password is X).

4. Next call up RETRY by entering

   RETRY

   This command brings in the RETRY program which does an error-count display. A high error count indicates that there is a hardware problem (i.e., a disc pack is damaged or something has gone wrong with the read/write heads).

5. SHUTDOWN to the proper backup processor, i.e.,

   SHUTDOWN <CTRL-E>key<CTRL-E> DISCUTILITY

   or

   SHUTDOWN <CTRL-E>key<CTRL-E> DDCOPY

   where key is the password assigned to the SHUTDOWN processor by the system manager (the default password is X).

6. On the source drive, set the WRITE-PROTECT switch or the READ/WRITE button to READ ONLY, depending on the type of disc drive.

7. Power down the destination drive.

8. Put the scratch pack on the destination drive.

9. Turn on the destination disc drive and wait until it has reached operational speed.

10. If using DDCOPY, go to step 11. If using DISCUTILITY, various messages and/or questions will be displayed at the terminal. DISCUTILITY is an interactive utility program (see Section 2.5.1 for a general description). It will guide the user through the procedure. On completion, go to step 14.

11. In memory, location 401 is the source constant and location 402 is the destination constant. These constants must be entered by the user via the front panel or the virtual console (i.e., MANIP on a POINT 4 MARK Series Computer). Refer to the DDCOPY listing for these constants. Be sure the copying process is done in the right direction.

12. DDCOPY's starting address is location 400. Use the front panel or virtual console to start DDCOPY at location 400.

13. Upon completion, DDCOPY should halt and the run light should go out. Halts specific to DDCOPY are as follows:

    63077 - Good Completion
    67077 - Irrecoverable Read Error on source
    73077 - Irrecoverable Write Error on destination
    77077 - Disc Time Out

NOTE

As a stand-alone program, DDCOPY runs when the IRIS Operating System is deactivated. A halt for DDCOPY may have the same code (i.e., numbers) as a halt occurring under IRIS but the cause is different.

For any halt (other than a good completion), the disc address and status word are contained in the following registers:

    A0 - Disc Status Word
    A1 - Disc Address

For a disc that is too large for a 16-bit disc address, check the following registers instead:

    A0 - Disc Status Word
    A1 - Cylinder Number
    A2 - Track and Sector Number

14. Remove the disc pack.

15. An IPL must be performed after using DISCUTILITY or DDCOPY to bring up IRIS.

CAUTION

If the CONTinue switch is pressed after any halt other than a 63077, up to a complete cylinder may be lost because the copy process will resume starting with the next cylinder of the disc.

Section 2

GENERAL MAINTENANCE

This section describes the general maintenance of the IRIS Operating System. It includes procedures for processes which are done at the special request of the system manager (e.g., REHASH, EXTRAPORT, BLOCKCOPY, etc.), the 'how-to' after a system crash, and procedures which are done only occasionally (e.g., changing logical units or porting a logical unit from another system).

2.1 CHANGING LOGICAL UNITS USING INSTALL

Occasionally it is necessary to rearrange the logical unit (LU) configuration or to install a new LU. The procedure for changing an LU is given in Section 2.1.1, for installing a new LU in Section 2.1.2, and porting a logical unit in Section 2.1.3.

If the system includes a POINT 4 LCM, refer to the IRIS R8 LCM Tech Memo for special considerations in using INSTALL.

INSTALL requires that the stand-alone disc format program, supplied by the disc controller vendor, be run first.

If INSTALL encounters a "bad" file, installation terminates. INSTALL will delete that file if location 203 in INSTALL contains the value '1' or '2'. (For explanations of these and other errors, please refer to Section 4.3.) Generally, INSTALL retains a "questionable" file that has its BUILD bit set (see below) and is otherwise correct. Location 203 in INSTALL controls the decision on "questionable" files as follows:

1. If the DELETE bit is set, INSTALL unconditionally deletes the file. INSTALL continues processing.
2. If the BUILD bit in the file's header is set to 1, and
   a. If location 203 of INSTALL is 0 or 1, the BUILD bit is reset, INSTALL retains the file and continues processing.
   b. If location 203 in INSTALL is 2, INSTALL deletes the file and continues processing.
3. If the BUILD bit in the file's header is set to 0 and location 203 in INSTALL is 1, INSTALL deletes the file and continues processing.

If cell 203 in INSTALL is other than zero, files may be detected as bad, removed from the INDEX and no warning given.

2.1.1 CHANGING A LOGICAL UNIT NUMBER

Before changing the number of a logical unit (LU), have at hand the list of disc drives and partitions as they were configured for the system. This list should be supplied by the system manager.

NOTE

LU/0 is the system logical unit. It must not be changed.

If an LU containing a polyfile volume is changed, INSTALL displays a warning message giving the name of the polyfile. The user may proceed to change the LU number, but ASSIGNPF (see Section 2.2) must be run to update the polyfile's master volume before it can be accessed. If such a warning message appears, POINT 4 recommends that ASSIGNPF be run immediately following the completion of the INSTALL procedure.

The procedure for changing an LU number is as follows:

1. Log on as Manager or to the account designated by the system manager; then enter

   INSTALL d.p

   where d is the disc drive number in the CONFIG file and p is the partition number. For example, if the drive is 0 and the partition is 1, the command is

   INSTALL 0.1

   The terminal then displays

   ```
   LOGICAL UNIT NUMBER = n
   INSTALL (Y/N)?
   ```

   where n is the previously assigned unit number

2. Enter N to change the LU number. The system asks

   CHANGE LOGICAL UNIT NUMBER (Y/N)?

   Enter Y. The system responds with a warning message if a polyfile volume resides on that LU:

   CHANGING LU# INVALIDATES POLYFILE VOLUME name@

   The user may then change the LU number but ASSIGNPF must be run before that polyfile can be accessed.

   INSTALL prompts

   NEW LOGICAL UNIT NUMBER?

Type in the desired number; for example, '12', and press <RETURN>. The system displays

```
LOGICAL UNIT NUMBER #12 IS NOW ACTIVE
#
```

All subsequent references to that LU must be by that number.

NOTE

The range of permissible LU numbers is 1 through 127.

2.1.2 CREATING A NEW LOGICAL UNIT

A new logical unit (LU) may be created on a new or an existing disc pack. Creation of a new LU on a new disc pack is discussed in Section 2.1.2.1. Creation of a new LU on an existing disc pack is discussed in Section 2.1.2.2.

2.1.2.1 Creating a New Logical Unit on a New Disc Pack

The command INSTALL causes IRIS to check whether the partition (i.e., the LU) was previously initialized. When a new disc pack is used, the system always finds that it was not formatted for IRIS LUs.

To use INSTALL, log on to the manager or designated account; at the system command prompt (#), enter

```
INSTALL d.p
```

where d is the number of the disc drive in the CONFIG file and p is the partition number. For example, assume that the unit is 0 and the partition is 1. The command to be entered is

```
INSTALL 0.1
```

When the system finds that the partition has not been previously installed, it displays:

```
NOT AN IRIS LOGICAL UNIT. . .
INSTALL (Y/N)?
```

Enter Y. INSTALL assigns a new number, formats the LU, and then displays

```
LOGICAL UNIT NUMBER #nn IS NOW ACTIVE
```

where nn is the logical unit number assigned by INSTALL.

2.1.2.2 Creating a New Logical Unit on an Existing Disc Pack

A new logical unit (LU) may be created on an existing disc pack (i.e., a disc pack formatted for IRIS LUs) provided the area on disc is not contained in any current LU.

1. Define the new LU in the Disc Driver Table in the CONFIG file (see the IRIS Installation and Configuration Manual).

2. Set location 602 in the CONFIG file's INFO table to the new total number of LUs (see the IRIS Installation and Configuration Manual).

3. Shutdown the system.

4. IPL into a full configuration.

5. Use INSTALL AND CLEAR to clear the disc partition and initialize a new LU. At the system command prompt (#), enter

   INSTALL AND CLEAR d.p

   where d is the logical disc controller and p is the partition number. If the unit at location d.p was previously installed as an IRIS LU, INSTALL will display its LU number. INSTALL then asks for confirmation that this unit is to be cleared. It then asks for a new LU number and builds a 'new' and empty LU.

2.1.2.3 Increasing the Size of an Existing LU

An LU containing data or programs can be increased in size if there are cylinders available on the disc which follow the LU and are not in use (i.e., not in any other LU).

1. Back up the system.

2. Run CLEANUPX (not CLEANUP) on the LU. CLEANUPX requires that there be 100 to 150 available blocks on the LU in order to run.

3. Modify the disc driver table in CONFIG to increase the number of cylinders in that LU.

4. SHUTDOWN and do a new IPL.

5. INSTALL the LU.

6. Run LIBR LU/?. This should show more available blocks than before.

2.1.2.4 Decreasing the Size of an Existing LU

An LU containing data or programs and some unused blocks can be installed at a smaller size. This procedure may be used to install two LUs where there was previously one LU.

1. COPY all the files to another LU.

2. INSTALL AND CLEAR the original LU at a smaller size.

3. COPY the files back to this smaller LU.

The COPY processor will display an error message if the LU is not large enough to hold all the files but all files will still be intact.

The following alternative procedure may be used by advanced system managers:

1. Back up the system.

2. Run CLEANUP (not CLEANUPX) on the LU.

3. INSTALL the LU.

4. Run LIBR LU/? and note the number of available blocks. Convert this to octal.

5. In the Peripherals Handbook, look up LRC which is the number of blocks per cylinder in octal.

6. Reduce the number of available blocks by 10% as a safety measure. Divide the result by LRC to determine the maximum number of cylinders that can be removed from the LU.

7. Modify the disc driver table in CONFIG to reduce the number of cylinders in that LU. Do not reduce it more than the limit calculated in step 6.

8. SHUTDOWN and do a new IPL.

9. INSTALL the old LU.

NOTE

If this procedure is not followed exactly, the user may get a Trap 5 when accessing files. A Trap 5 indicates that the LU was reduced by too many cylidners and some files are no longer intact. If this occurs, go back to the backup copy and recheck the calculations.

2.1.3 PORTING NONZERO LOGICAL UNITS

Nonzero logical units may be transferred from one system to another and from one type of drive to another via a number of output media and software. Table 2-1 lists the valid media and the associated utility programs.

The procedure for porting a nonzero logical unit is as follows:

1. INSTALL the logical unit to be ported (see Section 1.3.4.2).

2. Run CLEANUPX (see Section 2.7).

3. SHUTDOWN immediately to the appropriate transfer utility program. This step must follow CLEANUPX.

4. Transfer the LU to the desired destination disc. This can be done using any of the media and associateed utility programs shown in Table 2-1.

5. INSTALL the ported logical unit.

   The procedure for installing the ported logical unit is the same as for installing a specific logical unit (see Section 1.3.4.2) with one difference. The following message is displayed before the PLEASE WAIT message:

   LOGICAL UNIT ADJUSTMENT IN PROGRESS

   If CTUTILITY was used to port the logical unit, this message is not displayed.

TABLE 2-1. MEDIA FOR PORTING A NONZERO LU

Media	Software
Cassette tape*	CTUTILITY (see the IRIS Installation and Configuration Manual)
1/4-inch streamer tape*	Save, Verify and Restore (see the LOTUS DISCUTILITY Tech Memo, MARK 3 DISCUTILITY, or MARK 2 DISCUTILITY as appropriate for the computer system)
Disc	BAKUP (see Section 1.6.1)* LOTUS DISCUTILITY Convert option MARK 3 DISCUTILITY Convert option BLOCKCOPY*

*Allows porting between unlike disc drives.

2.1.4 INSTALL FAST

INSTALL FAST installs a logical unit (LU) without rebuilding the Disc Map (DMAP). INSTALL FAST is normally not allowed because of the possibility that a bad DMAP in the LU will go undetected. A bad DMAP may cause serious data corruption. Under normal circumstances, the regular INSTALL should be used so that a complete DMAP can be built.

INSTALL FAST should be used only when it is absolutely necessary to access the LU for repair or backdown operations, or to attempt to salvage files from a damaged LU (see Section 4.3).

Section 5.11.2.4.3 of the IRIS R8 Installation and Configuration Manual provides information on how to allow an INSTALL FAST from the Manager or one other account.

At the system command prompt (#), enter

INSTALL FAST d.p

where
- d - logical disc controller number
- p - partition number

WARNING!

Do not use INSTALL FAST after a system crash or if the data on the LU being installed is suspect for any reason.

It is recommended that INSTALL FAST be made inaccessible again after it has been used.

2.2 ASSIGNPF

ASSIGNPF is a BASIC program that updates the pointers in the master volume (volume 0) of a polyfile. It must be run when a logical unit containing a polyfile volume is changed during an INSTALL procedure. INSTALL displays a warning message that a polyfile volume resides on the LU to be changed (see Section 2.1.2). ASSIGNPF may be used for updating the master volume of a single polyfile or for several polyfiles in one jobstream.

The program selects only polyfiles based on the parameters entered by the user. The selection criteria entered for the main menu (Polyfile Vol 0 Selection) must be for volume 0 (the master volume) of the polyfile. Destination logical units for individual volumes are specified in a subsequent module.

The selected polyfile names are displayed in groups of 36. Each group constitutes a page. Only those files which have been reviewed by the user are reassigned. Files listed on pages that the user does not review will not be reassigned.

2.2.1 ASSIGNPF WORKFILES

ASSIGNPF uses three storage areas (workfiles) to accumulate lists of specified filenames for copying. Files listed in one temporary storage area are displayed on the terminal screen for the user to review and modify. The selected filename(s) are then written to the second storage area. Information about the selected file(s) is written to the third workfile. By incorporating the user's port number (represented by "nn") into the workfile names, each user has access to a unique set of these files as shown below:

Filename	Description
EDITSV0nn	Edit save file - Used as the output file from the LIBR function for the selected files and as the input file during the first workfile screening procedure.
EDITSWKAnn	Edit workfile A - Used as output file from the LIBR function for the first workfile screen modification, and as an input scratch file for every even-numbered pass through the file.
UTYPRCnn	Utility procedure file - A record for every file retained after the selection process is written to this file. Each record contains the following information: • Polyfile name • Source logical unit • Destination logical unit • Polyfile reassignment status

2.2.2 ASSIGNPF HELP MODULES

Two Help modules are available. The first guides the user in the selection of file parameters and offers examples of a completed set of selection criteria. The second Help module contains detailed descriptions of ASSIGNPF modification commands and aids the user in the final selection of files to be reassigned.

To exit either module, press <RETURN>. The user is then returned to the point where the Help module was invoked.

2.2.3 ASSIGNPF PROCEDURE

The following is a step-by-step description of the ASSIGNPF procedure.

1. If ASSIGNPF is resident on either LU/0 or the user's assigned LU, at the system command prompt (#) enter

   ASSIGNPF

   If the program resides on another LU, enter the command in the form

   nn/ASSIGNPF

   where nn is the number of the LU on which it is resident.

   The program builds the workfiles while displaying

   FILE INITIALIZATION IN PROGRESS, DO NOT DISTURB!

   The following selection menu is then displayed:

```
PORT NUMBER: nn  POLYFILE VOL 0 SELECTION   ASSIGNPF 1.0  mm dd yy

                    FILE(S) PREFIX:_________

                SOURCE LOGICAL UNIT:______

                     REPORT OUTPUT:____

                OPTIONAL PARAMETERS:_________


COMMENT: ENTER A QUESTION MARK (?) AT ANY TIME FOR HELP
COMMAND:
MESSAGE:
```

   The top line of the screen shows the user's port number, program name, the program's version, and release date. File selection prompts are in the center of the display.

   To access the first Help module, enter ? in the first position of any field. Options for the parameter entries are displayed.

   Pressing <ESC> at an entry field aborts the current entry and returns to the previous field. <ESC> at the first field aborts the ASSIGNPF program.

The three lines at the bottom are for system/user interaction. COMMENT provides system prompts for the user, COMMAND is for user input, and MESSAGE displays error messages from the system.

The information entered at the file selection prompts must be for the master volume (volume 0). Please note that the information about volume 0 is used but volume 0 itself may not be reassigned using ASSIGNPF.

FILE(S) PREFIX - Allows the user to specify the beginning characters of the filenames. This is particularly helpful when naming conventions have been used to group files. Only polyfiles are selected by ASSIGNPF regardless of the specified prefix.

If only one polyfile is to be processed, enter its filename. If some but not all polyfiles are to be processed, use the common prefix characters of the filenames. A <RETURN> defaults to all polyfiles on the specified or default source logical unit.

SOURCE LOGICAL UNIT - Specify the number of the LU where volume 0 (the master volume) of the polyfile(s) resides. A <RETURN> defaults to the user's assigned LU. If the master volume resides on an LU that was changed during the INSTALL procedure, the new LU number must be entered. For example, if LU/1 containing volume 0 of polyx@ was changed to LU/3, then 3 must be entered as the source logical unit number.

REPORT OUTPUT - The user may direct the report output to a printer if one is available.

To send the information to a system printer, enter a number 0-9 (for $LPT - $LPT9). If this option is selected, a report is printed upon completion of the ASSIGNPF processing.

If no printer is available, a file may be created to display the information at the terminal or print it at a later time.

To create a file, enter F; the prompt for the filename is displayed

REPORT OUTPUT FILENAME: _____

Enter a unique filename of up to 14 alphanumeric characters beginning with an alpha character.

The report provides the following information:

- polyfiles that were reassigned
- their source and destination LUs
- ASSIGNPF status information

If processing was unsuccessful, the report explains why. A CALL 91 status list may be found in the IRIS User Manual. Sample reports are shown in Section 2.2.4.

If no report is required, enter N or press <RETURN> (no is the default).

OPTIONAL PARAMETERS - Enter any valid LIBR command (except the LIBR * command; refer to the IRIS User Manual).

2. After the parameters have been selected with valid or default entries, the program displays

IS ALL THE ABOVE CORRECT ?

If an N (no) is entered, the program returns to the selection display. Entry of Y begins the file selection process. The program chains to the LIBR processor and displays

```
 LIBR * C ^ _ [<00>EDITSV01!]
BUILDING WORK FILE, DO NOT DISTURB!
```

3. When the workfile is built, the program displays the following file review menu listing the specified files in groups of 36.

```
POLYFILE SELECTION MENU              ASSIGNPF1  1.1   mm dd yy

 LOGICAL UNIT# nnn

 NO.  *  FILE NAME      NO.  *  FILE NAME      NO.  *  FILE NAME
 ==   =  =========      ==   =  =========      ==   =  =========
 01.  C  FS10FD@        13.  C  ROUTINPUT@
 02.  C  FS10FH@        14.  C  ROUTKILL@
 03.  C  FS10FHD@       15.  C  ROUTNUMCHK@
 04.  C  FS10FHE@       16.  C  ROUTOPEN@
 05.  C  FS10FHF@       17.  C  ROUTPERCENT@
 06.  C  FS10FHM@       18.  C  ROUTTRUNK@
 07.  C  FS10FHP@       19.  C  ROUTWORD@
 08.  C  FS10FHR@       20.  C  ROUTZFIL@
 09.  C  FS10FHS@       21.  C  SCAN@
 10.  C  FS10FHX@
 11.  C  POLYDATA@
 12.  C  POLYERROR@


 COMMENT: A=ALL,E=EXECUTE,P=PAGE,R=RESTART,?=HELP,nn=FILE NUMBER
 COMMAND:
 MESSAGE:
```

If <ESC> is pressed at any time after the first file list is displayed, the program aborts and the system command prompt (#) is displayed.

From the review menu, the user may access the second Help module which describes the use of the review commands. For a summary of the ASSIGNPF review commands, see Section 2.2.5.

The user should examine all pages of the selected files before entering the E (execute) command. Files listed on pages that are not reviewed are not processed. The W (wrap) command allows the user to check files selected for processing. It is usually the last command before execution. The W command renumbers those files that were not deleted during the previous selection process and displays them from the beginning. After the W command is entered, every page must be reviewed. Files listed on a page that is not reviewed are not processed.

Polyfile selection is not complete until the review is finished and the E (execute) command is entered.

4. Following the E command, the program displays the volume/LU selection screen for further specifications as follows:

```
PORT NUMBER:nn  POLYFILE VOLUME LU ASSIGNMENT  ASSIGNPF2 1.0 mm/dd/yy

          NAME OF POLYFILE: (polyfilename selected)

VOL# LU#  VOL# LU#  VOL# LU#  VOL# LU#  VOL# LU#  VOL# LU#  VOL# LU#
==== ===  ==== ===  ==== ===  ==== ===  ==== ===  ==== ===  ==== ===









COMMENT:
COMMAND:
MESSAGE:
```

The name of the first polyfile selected for reassignment is displayed at the top of the menu. Only nonzero volumes associated with the selected polyfile are then shown on the Volume/LU Menu. The LU number displayed beside the volume number refers to the LU assignment <u>before</u> it was changed during the INSTALL procedure. Enter the new number assigned to the LU during INSTALL. If no new LU assignment is required for a nonzero volume, press <RETURN> to skip to the next field.

Press <ESC> if no volumes of the polyfile displayed are to be reassigned and to proceed to the next selected polyfile. If <ESC> is pressed when the displayed file is the last one selected, the program assumes that specifications for all the selected files are complete (see step 5).

If volume 0 is the only volume of the polyfile that is assigned a new LU number, the reassignment and the updating of its header is done automatically when the new LU number is entered as the source logical unit in the main menu. No further action is required and the user may proceed to the next polyfile or, if this is the only polyfile needing reassignment, proceed to the next step by pressing <ESC>.

When all volume assignments for the displayed polyfile have been entered, the program asks

```
IS ALL THE ABOVE CORRECT?
```

An N or an <ESC> returns the cursor to the last column field for modifications.

Enter Y to initiate the reassignment process for the current file; the program displays

```
DO NOT DISTURB, ASSIGNING VOLUME "nn" OF "filename"
```

The message repeats as each volume is processed. The master volume is updated to contain the LU number and disc address for each volume. This process is repeated until all the selected polyfiles are reviewed.

5. After the specifications are complete for all volumes of the selected polyfile(s), the program asks

```
DO YOU WISH TO PROCEED WITH THE REPORT?
```

A Y response initiates the assignment of all the specified polyfiles and their volumes. If an N (no) is entered, the program returns to the selection menu.

6. If a report was requested, it is printed upon completion of the ASSIGNPF process. The report shows whether the volumes of a particular polyfile were successfully reassigned. Sample reports are shown in Section 2.2.4.

7. When the assignments and the report are complete, the following is displayed

```
NORMAL EXIT FROM ASSIGNPF
#
```

2.2.4 SAMPLE ASSIGNPF REPORT

An ASSIGNPF report shows the status of each polyfile and its volumes. The report may show the successful conclusion of the copy process or it will indicate why and at what point it was aborted with one or more of the following messages:

- ASSIGNMENT COMPLETED
- NO ASSIGNMENT SPECIFIED
- USER REQUESTED SKIP ASSIGN
- DISK SPACE UNAVAILABLE
- INVALID FILE STRUCTURE
- POLYFILE ERROR STATUS

An example of an ASSIGNPF report is shown in Figure 2-1.

```
JAN 20, 1983  11:20:26                                   PAGE NUMBER - 001
                        POLYFILE ASSIGN REPORT
                        ======================
                    POLYFILE GE1@ VOL/LU ASSIGNMENT
                       OLD          NEW
          VOLUME      LU #         LU #       ASSIGN STATUS INFORMATION
          ======     ======       ======      ========================
            00        004          004        NO ASSIGNMENT SPECIFIED
            01        007          004        ASSIGNMENT COMPLETED
            02        004          004        NO ASSIGNMENT SPECIFIED
                  ASSIGN COMPLETED AS SPECIFIED
JAN 20, 1983  11:20:31                                   PAGE NUMBER - 002
                        POLYFILE ASSIGN REPORT
                        ======================
                    POLYFILE GE2@ VOL/LU ASSIGNMENT
                       OLD          NEW
          VOLUME      LU #         LU #       ASSIGN STATUS INFORMATION
          ======     ======       ======      ========================
            00        004          004        NO ASSIGNMENT SPECIFIED
            01        007          004        ASSIGNMENT COMPLETED
                  ASSIGN COMPLETED AS SPECIFIED
JAN 20, 1983  11:20:37                                   PAGE NUMBER - 003
                        POLYFILE ASSIGN REPORT
                        ======================
                    POLYFILE GE3@ VOL/LU ASSIGNMENT
                       OLD          NEW
          VOLUME      LU #         LU #       ASSIGN STATUS INFORMATION
          ======     ======       ======      ========================
            00        004          004        NO ASSIGNMENT SPECIFIED
                  ASSIGN COMPLETED AS SPECIFIED
JAN 20, 1983  11:20:42                                   PAGE NUMBER - 004
                        POLYFILE ASSIGN REPORT
                        ======================
                    POLYFILE GE4@ VOL/LU ASSIGNMENT
                       OLD          NEW
          VOLUME      LU #         LU #       ASSIGN STATUS INFORMATION
          ======     ======       ======      ========================
            00        004          004        NO ASSIGNMENT SPECIFIED
                  ASSIGN COMPLETED AS SPECIFIED
JAN 20, 1983  11:20:47                                   PAGE NUMBER - 005
                        POLYFILE ASSIGN REPORT
                        ======================
                  POLYFILE TESTPF1@ VOL/LU ASSIGNMENT
                       OLD          NEW
          VOLUME      LU #         LU #       ASSIGN STATUS INFORMATION
          ======     ======       ======      ========================
            00        007          004        ASSIGNMENT COMPLETED
                  ASSIGN COMPLETED AS SPECIFIED
JAN 20, 1983  11:20:52                                   PAGE NUMBER - 006
                        POLYFILE ASSIGN REPORT
                        ======================
                  POLYFILE TESTPF4@ VOL/LU ASSIGNMENT
                       OLD          NEW
          VOLUME      LU #         LU #       ASSIGN STATUS INFORMATION
          ======     ======       ======      ========================
            00        007          004        ASSIGNMENT COMPLETED
            01        007          004        ASSIGNMENT COMPLETED
                  ASSIGN COMPLETED AS SPECIFIED
```

Figure 2-1. Sample ASSIGNPF Report

2.2.5 ASSIGNPF COMMAND SUMMARY

The following commands may be used on the review menu. A <RETURN> is required to activate the command.

Command	Function
A	All - Erases all filenames on the current screen. None of the files erased will be processed.
E	Execute - Processes those filenames that were left on the screen after the last pass through the workfile.
P	Page - Stores for later processing the filenames left on the screen, and displays the next 36 selected filenames until EOF (end of file).
R	Restart - Redisplays the current screen as it was before any erasure(s).
W	Wrap - Stores the remaining filenames for subsequent processing. Restarts the selection process by renumbering files that were not deleted and wrapping to the beginning of the workfile. Any files listed on a page not reviewed are not processed.
nn	nn - The number assigned to a selected file. Erases filename(s) from screen; those files will not be processed.
?	Calls out a Help module.

If the files to be erased have consecutive numbers on the screen, the range may be specified by placing a hyphen between the beginning and ending number (e.g., 3-15).

Several numbers may be entered at the same time but they must be separated by a space or comma. For example, assume that files 2, 5, 9, 12, 13, 14, and 30 are not to be processed, enter

5, 9, 12-14 30 2

2.3 EXTRAPORT

EXTRAPORT is a BASIC program which may be used to assign other programs to run on a phantom port. It is useful for running jobs in background. For example, it may be necessary to run LIBR to get a printout of all the files on the system, but the terminal is needed for other activities.

To use this program, log onto the manager account. At the system prompt (#), enter

```
EXTRAPORT
```

The system responds

```
!
```

or

```
ALL PHANTOM PORTS ARE BUSY ! ! !
```

If all ports are busy, wait a few minutes and then try again.

If the response was '!', enter the command

```
LIBR @^[$LPT]
```

The program finds a vacant phantom port, sends the command string to it, checks the status of the port selected, and displays an appropriate message. For example:

```
LIBR IS RUNNING ON PORT 1
#
```

or

```
LIBR FAILED ! ! !
#
```

If the command fails, repeat the procedure from the beginning. If the LIBR FAILED message repeats, enter the LIBR command string at the system command prompt. An appropriate error message is then displayed.

EXTRAPORT automatically finds an available phantom port on the system. Therefore, it is not necessary to change any constants in the program.

For more information on the function and uses of phantom ports, please refer to the IRIS R8 User Manual.

2.4 REHASH

REHASH should be run periodically to speed OPEN and CLOSE operations on files residing on a nonzero LU. This is especially true where files are created and deleted frequently. REHASH does this by repositioning file entries for faster access and identifying deleted entries as "NEVER USED".

The procedure for performing the REHASH operation is as follows:

1. Back up the LU.

2. Log onto the Manager or designated account.

3. INSTALL the LU.

4. Make sure that enough blocks are available on the LU by running QUERY @. The manager account must have enough blocks allotted to it to build a temporary file on that LU the size of its INDEX. The size of the INDEX may be determined by running QUERY INDEX.

5. Enter the system command REHASH; the dialogue is as follows:

   ```
   #REHASH

   LOGICAL UNIT TO REHASH?
   ```

   Enter the number of the desired LU and press <RETURN>. The system displays

   ```
   PLEASE WAIT . . .
   ```

   When the processor has completed the REHASHing it displays

   ```
   ALL DONE!
   #
   ```

   The system returns to command mode.

6. If REHASH traps or terminates abnormally, the logical unit must not be used. It must be restored from the backup and then another REHASH may be attempted.

2.5 POINT 4 DISC UTILITY PROGRAMS

The major disc utilities supported under IRIS include:

- BAKUP - copies disc-to-disc while on-line (see Section 1.6)
- DISCUTILITY - copies disc-to-disc, floppy-to-disc, streamer tape-to-disc, initializes and formats
- DDCOPY - copies disc-to-disc
- BLOCKCOPY - copies selected blocks

DISCUTILITY is available for systems using the POINT 4 MARK 3 and LOTUS 700/710 disc controllers. DDCOPY is available for those systems which do not have a POINT 4 controller. BLOCKCOPY may be used on any system.

The following utilities may be used in conjunction with DISCUTILITY to load stand-alone software supplied on diskettes or streamer tape and to write stand-alone utility programs from memory to diskette or streamer tape:

- FLBOOT - for diskettes (MARK 3B Peripheral Interface Board)
- M2FLBOOT - for diskettes (MARK 2 Peripheral Interface Board)
- STBOOTM5 - for streamer tape (LOTUS 720/730 Controller)
- STBOOTM3 - for streamer tape (MARK 2/3 Peripheral Interface Board)

2.5.1 DISCUTILITY

DISCUTILITY is a stand-alone utility package for the POINT 4 LOTUS 700 Disc Controller or the MARK 3 Computer System. It contains several program options depending on the computer in use.

DISCUTILITY programs for POINT 4 MARK 3 Computer Systems include:

- Copy* (disc-to-disc)
- Save* (copies disc-to-tape, requires streamer tape unit)
  (copies disc-to-floppy, requires floppy disc unit)
- Restore* (copies tape-to-disc, requires streamer tape unit)
  (copies floppy-to-disc, requires floppy disc unit)
- Verify* (disc-to-disc verify)
  (floppy-to-disc verify, requires floppy disc unit)
  (tape-to-disc verify, requires streamer tape unit)
- LOTUS 700 or 710 nonzero LU-to-MARK 3 nonzero LU disc-to-disc conversion* (requires same drive type on both systems)
- Format and 8-pass analyze
- Quick format and 2-pass analyze
  (for specialized hardware testing only)
- Streamer tape re-tension
- Re-IPL option
- Automatic chaining of bad disc media to alternate tracks

DISCUTILITY programs for POINT 4 LOTUS 700 or 710 Disc Controller systems include:

- Copy* (disc-to-disc)
- Verify* (disc-to-disc)
- Format and 5-pass analyze
- Quick format and 2-pass analyze
  (for specialized hardware testing only)
- MARK 3 nonzero LU-to-LOTUS 700 or 710 nonzero LU disc-to-disc conversion* (requires same drive type on both systems)
- Re-IPL option
- Automatic chaining of bad disc media to alternate tracks

*Allows selection of starting cylinder number and number of cylinders.

2.5.1.1 DISCUTILITY Procedure

DISCUTILITY operations are performed on the basis of parameters entered by the user. The program is entirely interactive, guiding the user through the required steps. If there is any doubt as to parameter entries, etc., Help modules can be invoked by entering an H in response to any question.

Command strings entered by the user are underlined. Each command is activated by a <RETURN>. The <RETURN> is not shown unless it is the only input required.

The use of DISCUTILITY requires that the system be shut down. To invoke the DISCUTILITY program, enter

SHUTDOWN <CTRL-E>key<CTRL-E>DISCUTILITY

where key is the password assigned by the system manager (the default is X).

Then follow the instructions displayed on the terminal. While in operation, the completion of various stages of the procedure are reported. Hardware failure is reported by displaying the status of the controller as well as any error messages.

2.5.1.2 DISCUTILITY Functions and Troubleshooting

This section explains some of the DISCUTILITY functions and how to deal with the most common problems that may occur.

COPY Function - The copy process copies data disc-to-disc; it does not verify that the data is correct. The verify option must be used to check that the data was transferred correctly.

If a halt occurs during the copy process, restart the process. If the halt recurs, the alternate tracks may be exhausted (i.e., too many bad blocks on the destination disc). Check the hardware.

FORMAT Function - The quick format function is reserved for specialized hardware testing. The format and 8-pass analyze is intended for formatting a new disc pack or reformatting an old one. When formatting a new disc, it is recommended that the format function be run several times. A new disc which has been formatted once only does not hold data reliably.

The last five cylinders are dedicated as alternate tracks and DISCUTILTY automatically chains bad blocks to them. Users who prefer to flag bad blocks and have IRIS Subscription Service may call POINT 4 Customer Support for assistance in removing the automatic chaining.

VERIFY Function - Verify should be run after copying disc-to-disc, tape-to-disc, or floppy-to-disc to make sure that the data has been transferred correctly.

2.5.2 DDCOPY

DDCOPY is a stand-alone utility program which copies disc-to-disc. As with DISCUTILITY, DDCOPY requires that the system be shut down.

Unlike DISCUTILITY, it does not guide the user through its various phases.

Command strings entered by the user are underlined. Each command is activated by a <RETURN>. The <RETURN> is not shown unless it is the only input required.

In general terms, the procedure for using DDCOPY is as follows:

1. To invoke DDCOPY, shut down the system to DDCOPY by entering

   SHUTDOWN <CTRL-E>key<CTRL-E>DDCOPY

   where key is password assigned by the system manager (the default password is X).

2. Enter the source constant at location 401 and the destination constant at location 402 via the front panel or the virtual console (i.e., MANIP on a POINT 4 MARK Series Computer). Refer to your DDCOPY listing for these constants.

3. Start DDCOPY at location 400.

   Upon completion, DDCOPY halts and the run light goes out. Halts specific to DDCOPY are as follows:

   63077 - Good completion
   67077 - Irrecoverable Read error on source
   73077 - Irrecoverable Write error on destination
   77077 - Disc time-out

NOTE

As a stand-alone program, DDCOPY runs when the IRIS Operating System is deactivated. A halt for DDCOPY may have the same code (i.e., numbers) as a halt occurring under IRIS but the cause is different.

For any halt (other than a good completion), the disc address and status word are contained in the following registers:

A0 - Disc status word
A1 - Disc address

For a disc that is too large for a 16-bit disc address, check the following registers instead:

A0 - Disc status word
A1 - Cylinder number
A2 - Track and sector number

4. Remove the backup cartridge or disc pack.

5. IPL to bring up IRIS.

CAUTION

If the CONTinue switch is pressed after any halt other than a 63077, up to a complete cylinder could be lost because the copy process resumes at the next cylinder of the disc.

2.5.3 BLOCKCOPY

BLOCKCOPY is a stand-alone utility which allows great flexibility in copying from any part of one disc to any part of another. BLOCKCOPY does not provide fast performance but it is useful for special cases such as:

- Copying a single LU - A single LU may be copied from one pack to another without the danger of overwriting other LUs at the destination
- Backing up large storage modules - When there are large storage modules and smaller cartridge drives on the same system, the system LU/0 can be backed up from the storage module onto a cartridge pack which can then be set aside as a dedicated system backup copy
- Backing up a special swapping disc - If the system has a special swapping disc, it can be backed up to and restored from other storage modules

BLOCKCOPY has the following limitations:

- Copying from one disc controller to another may cause addressing exceptions under IRIS
- Care must be taken not to specify a destination which physically overlaps the source on the same pack

The following BLOCKCOPY procedure assumes a POINT 4 CPU with MANIP PROM. All values shown are in octal. The steps should be performed in this sequence:

1. Run POINT 4's GUIDE program to generate the appropriate parameters for BLOCKCOPY.
2. Shutdown to BLOCKCOPY by entering

   SHUTDOWN <CTRL-E>key<CTRL-E>BLOCKCOPY

   where key is the password assigned by the system manager (the default is X).
3. Wait for the run light to go out.
4. Ensure that all switches are off (up).
5. APL.
6. Use MANIP to enter the parameters generated by the GUIDE program.

7. After the required parameters have been entered and verified, "Jump" to one of the following locations:

    410 - Start copy
    411 - Start verify
    412 - Start disc pattern generator
    413 - Start disc pattern verification
    414 - Retry current block (if successful, continue with no loss)
    415 - Skip current block (go to next block - current block lost)
    416 - Start infinite disc pattern test

    For example, to start the copying process, enter

    J410

8. Wait for the run light to go out.

9. APL.

10. In MANIP

    a. Enter A; subtract 1 from the address displayed.

    b. Dump that location or check for the correct halt (63077) as described in Sections 4.2.1 and 4.2.2.

    c. If a halt other than 63077 is indicated at that location, check the error type:

        63277 - Verify error in memory compare
        63377 - Wrong value(s) in table starting at location 200
        67077 - Read error
        73077 - Write error

    d. If applicable, select one of the recovery options (Retry/skip current block) listed in Step 7.

11. Optionally Dump locations 212, 213, and 214. These locations contain:

    212 - current RDA for the source
    213 - current RDA for the destination
    214 - current disc status

    For example, to dump, enter

    D212

NOTE

The CARRY light may remain off during most of this procedure.

No automatic retries are attempted. You may restart at location 414 or 415 (see Step 6). If these optional retries are unsuccessful after four or five attempts, inform your system manager that there may be a hardware problem.

If a Read or Write error occurs, check the following cells:

260 - Current Source RDA
261 - Current Destination RDA
262 - Current Disc Status

Make a note of the contents of these cells and restart BLOCKCOPY using the parameters indicated in the cells.

2.5.4 BOOT PROGRAMS FOR DISKETTES

M2FLBOOT is used to load stand-alone software supplied on diskettes for a POINT 4 MARK 2 Computer System; FLBOOT is used for a POINT 4 MARK 3 Computer System. These boot programs may also be used to create bootable utility programs on diskettes.

2.5.4.1 Write-Protecting a Diskette

Diskettes containing software are supplied write protected. The write-protect notches are shown in Figure 2-2.

5-1/4-inch diskettes are write protected when the write-protect notch is covered with a piece of tape.

8-inch diskettes are write protected when the write-protect notch is <u>not</u> covered.

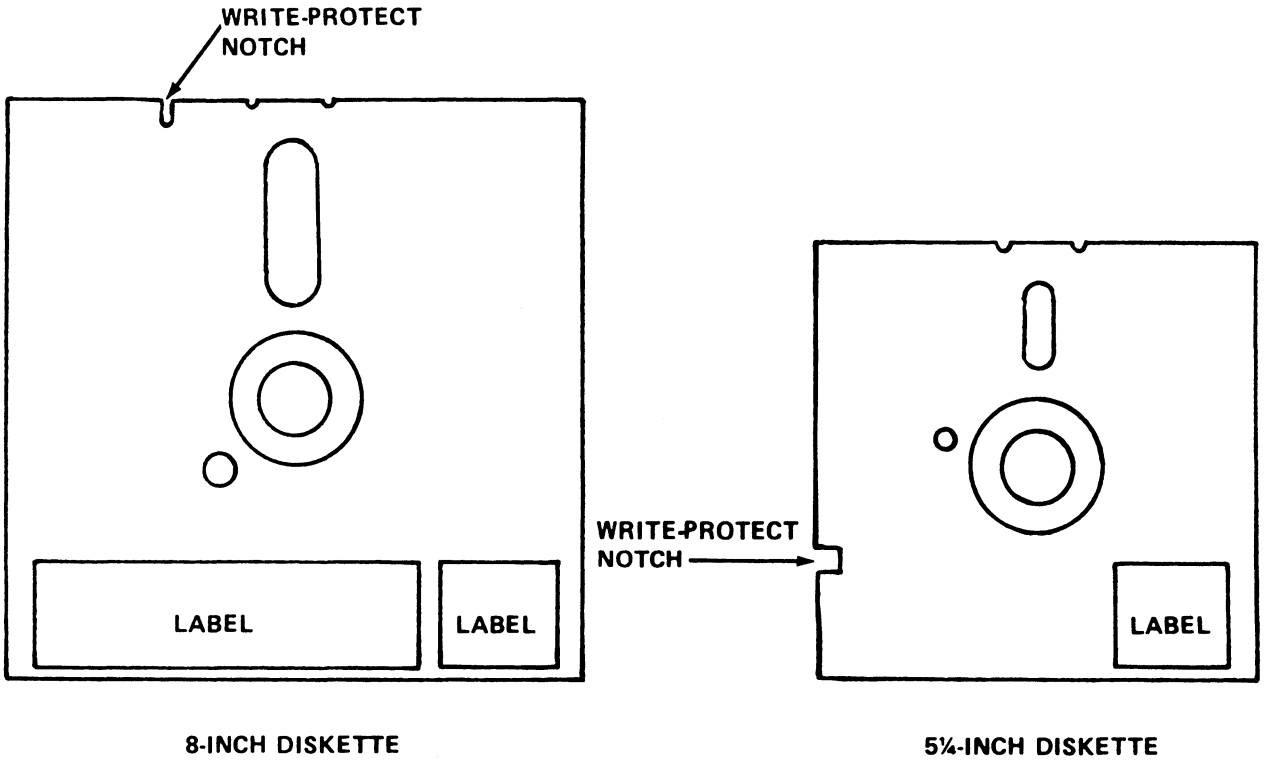


Figure 2-2. Diskette Write-Protect Notches

2.5.4.2 Loading Memory from Diskette

The diskette containing FLBOOT or M2FLBOOT, DISCUTILITY, and DBUG must be loaded into memory first. The location of DBUG is indicated on the diskette's label. The procedure is as follows:

1. Turn the power switch to the ON position.

2. Press RESET to load MANIP into memory.

3. Make sure the diskette containing stand-alone programs is write protected.

4. Insert the diskette into floppy disc drive 0.

5. To read the loader block and pass control to the loader, enter

   F

   The boot program reads the diskette blocks into memory starting at location 0 and ending with location 70377 (the boot program will reside at location 70000).

   NOTE

   A floppy disc drive is slower than a hard disc drive. Allow time for the transfer to take place.

   Upon completion, DISCUTILITY starts to run automatically as indicated by an identifying message and the prompt:

   PROGRAM NAME:

   A halt occurs if the operation is unsuccessful. On a MARK 2, the halt message is as follows:

   70042: nnnnn nnnnn nnnnn nnnnn n

   On a MARK 3, the halt message is as follows:

   70047: nnnnn nnnnn nnnnn nnnnn n

   where
   nnnnn - any octal values

   A halt may indicate hardware problems or a faulty diskette. Report the problem to the system manager.

2.5.4.3 Writing Memory to Diskette

Some installations may wish to keep backup copies of the configured system or copies of a particular program on scratch diskettes. To copy disc-to-diskette, DISCUTILITY may be used (see Section 2.5.1). To make a copy of a particular stand-alone program, FLBOOT and M2FLBOOT may be used as follows:

1. Insert a formatted write-enabled scratch diskette into floppy disc drive 0.

2. Shutdown the system to the program to be written to diskette with the boot program as the second program. The command format is

   SHUTDOWN <CTRL-E>key<CTRL-E>programname,boot @31000 X70000

   where
   key - password assigned to SHUTDOWN (the default is X)
   boot - name of boot program (FLBOOT or M2FLBOOT)

   The loader will be written to the diskette as block 1 followed by blocks containing memory locations 0-67777. When the transfer is completed, a halt message is displayed.

   On a POINT 4 MARK 2, the message is as follows:

   70013: nnnnn nnnnn nnnnn nnnnn n

   On a POINT 4 MARK 3, the message is as follows:

   70016: nnnnn nnnnn nnnnn nnnnn n

   where
   nnnnn - any octal value

   The halt message starts with 70042 on a POINT 4 MARK 2 if the operation was unsuccessful; on a POINT 4 MARK 3, the halt message starts with 70047.

   If a bad completion is indicated by the halt message, discard the diskette. Proceed as described in step 3.

3. Additional copies may be made by inserting a formatted, writed-enabled diskette into floppy disc drive number 0 and entering

   J70000

4. IPL the system.

Whenever DISCUTILITY is in memory, bootable stand-alone programs may be copied to diskette by performing step 3.

2.5.5 STREAMER TAPE BOOT PROGRAM FOR A POINT 4 MARK 2/3

A streamer tape boot program called STBOOTM3 is supplied by POINT 4 for use on a POINT 4 MARK 2 or 3 Computer System. STBOOTM3 allows users to boot stand-alone programs from 1/4-inch streamer tape to memory. The program also provides an easy method for maintaining a bootable copy of a stand-alone program.

2.5.5.1 Loading MARK 2/3 DISCUTILITY from Streamer Tape to a POINT 4 MARK 2/3

To read the loader (STBOOTM3) and DISCUTILITY into memory, use the following procedure.

1. Turn the power switch on the Mini-panel to the ON position.

2. Press RESET to load MANIP into memory from a PROM.

3. To read the loader block into memory, enter

   H

   Streamer blocks are read into memory starting at location 0 and ending at location 67777. STBOOTM3 is loaded at location 70030. When the transfer is completed, the cartridge rewinds and DISCUTILITY is started automatically at location 2.

2.5.5.2 Creating a Bootable Streamer Tape Cartridge for a MARK 2/3

Some installations may wish to keep backup copies of particular stand-alone programs on streamer tape. To make a copy of a particular stand-alone program, STBOOTM3 may be used as follows:

1. Insert a scratch cartridge into the streamer tape unit.

2. Shut down the system with the command

   SHUTDOWN <CTRL-E>key<CTRL-E>programname,STBOOTM3

   The loader will be written as block 1 on the cartridge followed by blocks containing memory locations 0-67777. The cartridge rewinds automatically and control is returned to MANIP.

3. Multiple copies may be made by loading a scratch cartridge and jumping to location 70030.

2.5.6 STREAMER TAPE LOAD PROGRAMS FOR A POINT 4 MARK 5/9

Two streamer tape load programs are supplied by POINT 4 for loading stand-alone programs into memory on a MARK 5/9 Computer System. STBOOTM5 is used for 1/4-inch streamer tape; MTBOOT is used for 1/2-inch streamer tape.

2.5.6.1 Loading LOTUS DISCUTILITY from 1/4-Inch Tape

A bootable tape supplied by POINT 4 always contains DISCUTILITY as the first program (i.e., program number 0). A user may add other programs to a 1/4-inch tape as described in Section 2.5.6.3.

The procedure for loading DISCUTILITY from 1/4-inch tape on a MARK 5/9 System is as follows:

1. Turn the power switch on the Mini-panel to the ON position.

2. Press APL to load MANIP into memory.

3. Make sure that the write-protect switch on the cartridge containing DISCUTILITY is set to SAFE. Then insert the cartridge into the tape drive unit.

4. To read the loader block into memory, enter

   P42

   The following prompt is then displayed:

   PROGRAM?

5. To read DISCUTILITY into memory, enter

   0

   When the transfer is completed, the cartridge rewinds and DISCUTILITY is started automatically at location 2.

DISCUTILITY may then be used to format the disc and to load the IRIS Operating System. Refer to the LOTUS DISCUTILITY Manual for information on the Format and Restore program procedures.

User-supplied programs may be loaded into memory by entering the appropriate program number (1 through 7) at step 5.

2.5.6.2 Creating a Loadable 1/4-Inch Tape

STBOOTM5 provides an easy method for maintaining loadable copies of up to eight stand-alone programs on a single 1/4-inch tape cartridge.

When the MANIP command P42 is entered, the load program is read in at location 0-377 (octal). A jump to location 377 is then performed automatically and the load program moves itself to location 70000 (octal).

Streamer blocks containing a desired stand-alone program such as DISCUTILITY are loaded into memory starting at location 0 and ending at location 67777 (octal) regardless of the actual addresses used.

When stand-alone programs such as DISCUTILITY and the load program are written back to tape, the load program occupies the first streamer block followed by a file mark.

When STBOOTM5 is used to create 1/4-inch tapes containing several stand-alone programs, the location on tape for each program is specified by a program number (0-7). This number is then used to read to and write from memory. At the end of each program a file mark is inserted as shown in Figure 2-3.

Programs must be written to tape sequentially. For example, to write program number 3 to tape, programs 0-2 must already exist on the tape.

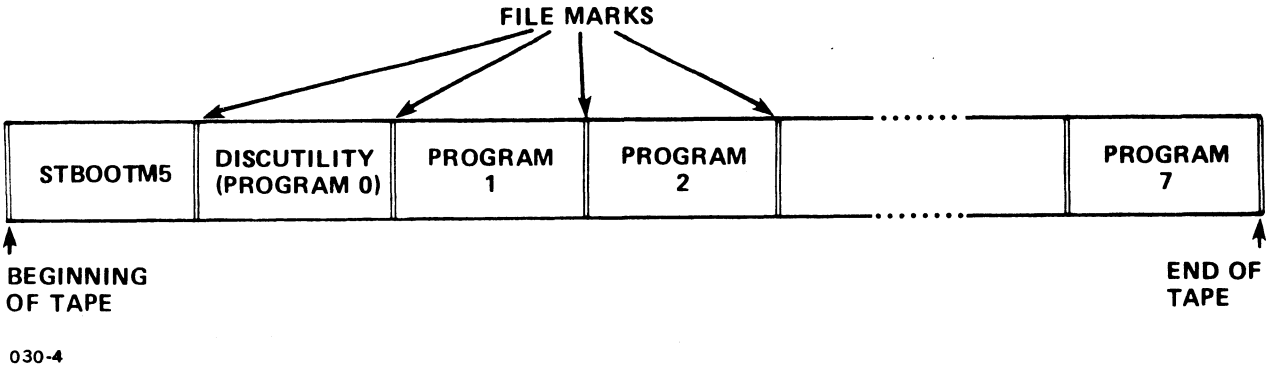


Figure 2-3. Bootable 1/4-inch Streamer Tape Format

A loadable 1/4-inch tape (i.e., a tape containing the load program) can be created provided each stand-alone program conforms to the following specifications:

- Must have a starting location of 2
- The loadable portion of the program must fit within location 0-67777 (octal) in memory
- Must be written to tape in sequence (0-7)

To create a loadable tape containing the load program and another utility, use the following procedure:

1. Insert a scratch tape that is not write-protected into the drive unit (i.e., the arrow should point away from SAFE).

2. Shut down the system by entering

   SHUTDOWN <CTRL-E>key<CTRL-E>STBOOTM5,DISCUTILITY @53000 X70000 <RETURN>

   where

   key - password for SHUTDOWN (the default is X)
   DISCUTILITY - name of the program to be written to tape
   @53000 - loads DBUG (do not use any other location)
   X70000 - starting address of load program

   The load program then prompts for the program number

   ```
   PROGRAM?
   ```

3. To write the load program to the first block of the tape, enter

   B

   If the transfer is unsuccessful, the following message is displayed

   ```
   ERROR
   ```

   If the transfer is successful, a status message and the program prompt are displayed

   ```
   XFER OK
   PROGRAM?
   ```

4. Write the stand-alone program to tape to follow the load program by entering

   W0

   This command writes DISCUTILITY to tape as program number zero and is the POINT 4 standard.

5. Another stand-alone program may be added by entering

   Wn

   where n is the next sequential program number.

   Repeat this procedure to add any additional programs (up to 7).

   The status message shown in step 3 is displayed and the program prompt is repeated.

6. Remove the cartridge from the tape unit, write-protect it, enter the new program name(s) and number(s) on the tape cartridge label, and store it in a safe place.

7. The system is now available for IPL.

Currently, no method is available to write stand-alone programs from a bootable tape to a logical unit on disc so that they can be SHUTDOWN to. If a customer desires a new version of DISCUTILITY that can be booted into memory and SHUTDOWN to, two cartridges must be ordered:

1. A bootable stand-alone DISCUTILITY cartridge.

2. A 1/2-inch tape (16 BPI) with DISCUTILITY in file format.

3. A cassette tape with a logical unit containing DISCUTILITY that can be RESTOREd to disc and then INSTALLed.

2.5.6.3 Adding a Stand-Alone Program to an Existing 1/4-inch Tape

A new stand-alone program may be added to an existing 1/4-inch tape provided the number of programs already on the tape does not exceed eight. An existing program may be updated or replaced by overwriting that section of the tape. The procedure is as follows:

1. Insert the tape to be updated.

2. Shut down the system by entering

   SHUTDOWN <CTRL-E>key<CTRL-E>STBOOTM5,name X70000 <RETURN>

   where
   key - password for SHUTDOWN (the default is X)
   name - name of the program to be added or updated
   X70000 - starting address of STBOOTM5

   STBOOTM5 then prompts for the program number to be used.

   PROGRAM?

3. Enter the program number in the following format

   Wn

   where n is the number of the program to be added or updated.

4. Remove the tape from the tape drive, write-protect it, enter the new program name and number on the cartridge label, and store it in a safe place.

5. The system is now available for IPL.

2.5.6.4 Loading LOTUS DISCUTILITY from 1/2-Inch Tape

The procedure for reading the load program (MTBOOT) and DISCUTILITY into memory is as follows:

1. Turn the power switch on the Mini-panel to the ON position.

2. Press APL to load MANIP into memory.

3. Make sure the tape containing DISCUTILITY is write-protected and insert the tape into the drive.

4. To read the loader block and DISCUTILITY into memory, enter

   P22

   When the transfer is completed, the tape stops and DISCUTILITY starts automatically at location 2.

2.5.6.5 Creating a Loadable 1/2-Inch Tape

The procedure for creating a loadable 1/2-inch tape is as follows:

1. Insert a scratch tape that is not write-protected into the drive unit.

2. Shut down the system by entering

   SHUTDOWN <CTRL-E>key<CTRL-E>DISCUTILITY,MTBOOT @53000 X70000 <RETURN>

   where

   key - password for SHUTDOWN (the default is X)
   @53000 - loads DBUG (do not use any other location)
   X70000 - starting address of load program

3. Remove the tape from the drive unit and write-protect it.

4. IPL the system.

NOTE

Only one program can be written on a 1/2-inch tape.

2.6 CLEANUP

CLEANUP is a utility program that performs file compression by relocating files and processors residing on a logical unit (LU). It may be run any time after a backup has been performed and it should be performed at regular intervals. At an installation where the system is used heavily, CLEANUP should be run once a week. CLEANUP optimizes file access and makes contiguous space available to the user.

If the system includes a POINT 4 LCM, CLEANUP may not be run while the LCM is active.

2.6.1 PREPARATIONS FOR RUNNING CLEANUP

Before running CLEANUP, the following preparations are required:

1. Backup the system. If a trap occurs while CLEANUP is being run, some blocks may have been moved to new locations while others were not, making the unit useless. If the unit is LU/0 (the system disc), an IPL may not work. In either case, it is necessary to have a copy of the system that can be used to copy files and processors back to the original unit.

2. Report bad blocks. Any known bad blocks on the unit to be cleaned up should be entered during an IPL or INSTALL sequence before CLEANUP is run.

3. INSTALL a scratch LU. A scratch LU is used by CLEANUP to reorder files and processors. A map of old and new real disc addresses (RDAs) is built and file headers are relocated. Files are then 'juggled' into a new and more sequential order.

   For the purpose of this discussion, the LU to be processed is designated LU/a, the scratch LU is LU/b.

   The size of LU/b is calculated by adding one header block to the total number of blocks on LU/a divided by 256.

   For example, assume that LU/a contains 1000 blocks. Calculate the size of LU/b as follows:

   ```
   1 + (1000/256) = 5 (LU/b size in blocks)
   ```

   Note that where the total number of blocks on LU/a is not equally divisible by 256, the result must be rounded upward.

   As a second example, assume that LU/a contains 32000 blocks. Use the same equation to calculate the size of LU/b:

   ```
   1 + (32000/256) = 126
   ```

If LU/0 (the system disc) is being cleaned up, the scratch LU should contain at least 100 blocks. If the scratch LU is too small, CLEANUP may not reallocate the active files or discsubs correctly and will produce a trap.

Once the size of LU/b (scratch LU) is determined, it must be INSTALLed (see Section 2.1.2).

4. Check ports in use. All users must be logged off before CLEANUP can be run.

5. Scheduling requirement. The time required to run CLEANUP depends on the type of disc, size, number of files, and how much reordering is required. Juggling the disc blocks requires more time than any other aspect of the CLEANUP process.

   CLEANUP should be run periodically on all LUs. An initial CLEANUP process takes more time than subsequent runs because, after an initial run, the unit is relatively well organized.

   Typically, a 5K-block moving-arm disc requires ten to twenty minutes when 50% full and one to two hours if 80% full.

2.6.2 CLEANUP FUNCTIONS

CLEANUP performs the following functions:

1. Analyzes the input command to verify that LU/a and LU/b are on-line.
2. Scans all ports to make sure all users are logged off.
3. Calculates the size of LU/a.
4. Builds a scratch file, GARBACO, on LU/b.
5. Zeroes out the DMAP on LU/a.
6. Scans the INDEX of LU/a on file type priority.
7. Relocates file headers.
8. Stores the old and new RDAs in GARBACO.
9. Repositions used disc blocks in a new and more sequential order.
10. Removes the LU if it is a nonzero LU.

The CLEANUP functions are performed in 18 phases. Phase numbers are displayed to indicate the progress of the CLEANUP process. Phases 1 through 3 are internal and are not displayed. Table 2-2 shows the filenames processed in phases 4 through 18.

TABLE 2-2. CLEANUP PHASES

Phase Number	Filename
4	BZUD
4	INDEX (header)
4	REX (page zero)
4	ACCOUNTS (header)
4	DMAP
4	Nesting Blocks
5	ACCOUNTS
5	INDEX
6	DISCSUBS, MESSAGES
7	SCOPE
7	CONFIG (header, first block)
7	SAVE
7	RUNMAT
7	BASIC
7	RUN
8	Active files
9	LIBR, ASM, EDIT
10	Contiguous and Indexed files
11	Formatted and Text files
12	Other processors
13	Enabled drivers ($-files)
14	BASIC programs, miscellaneous files
15	CONFIG (i.e., block two to the end)
15	REX
16	Updated file addresses in INDEX
17	Shuffle blocks as determined in phases 5-15
18	Correct Indexed File directories

2.6.3 USING CLEANUP

Before running CLEANUP, back up the system, make sure that all users are logged off, and that the LU to be cleaned up and the scratch LU are INSTALLed. At the system command prompt (#), enter

CLEANUP <CTRL-E>key<CTRL-E> a USING b

where
key - password assigned to CLEANUP (the default is X)
a - identifying number of LU to be processed
b - identifying number of scratch LU

Upon completion, depending on the type of logical unit that was processed, CLEANUP displays a message:

- If the logical unit is a nonzero LU, the message is:

  CLEANUP DONE. MUST RE-INSTALL LOGICAL UNIT.

  Because CLEANUP removes a nonzero LU after it has been processed, the logical unit must be INSTALLed (see Section 2.1.2).

- If the logical unit is LU/0 (the system disc), the message is:

  END OF CLEANUP - WHEN SYSTEM HALTS, RE-IPL

  When the system disc is processed by CLEANUP, it is necessary to perform an IPL to restore the system.

2.6.4 CLEANUP ERROR MESSAGES

When CLEANUP is run, certain error conditions may occur. CLEANUP error messages are described below:

ILLEGAL INPUT - Input command was entered incorrectly.

SAME LU - Logical unit to be processed and the scratch logical unit were not entered as separate logical unit numbers.

NOT ALL USERS LOGGED OFF - A port was found that was in use or not logged off.

"garbaco" FILE ALREADY EXISTS - A file with the same name as the scratch file to be created by CLEANUP already exists on the scratch logical unit.

OUT OF DISC SPACE - Not enough free disc blocks on the scratch logical unit to create a scratch file.

NO "FIXDIRECTORIES" DISCSUBS ON THE SYSTEM - Subroutine used to fix the directories of indexed files is not in the DISCSUBS file.

BAD FILE DHDR IN INDEX - A file named in the INDEX did not have a correct header address. This is a FATAL ERROR!!!

GAP IN "ACCOUNTS" FILE BLOCKS - The list of blocks in the header of the ACCOUNTS file has a gap in it. Do an IPL or INSTALL to use that unit.

2.7 CLEANUPX

CLEANUPX is an extended version of CLEANUP. It compresses files and performs the same functions as CLEANUP (see Section 2.6), but it creates a special area for the DMAP so that it can be contained on any disc. CLEANUPX does not increase the size of the logical unit or the INDEX.

CLEANUPX should only be used when an IRIS procedure calls for it. For example, CLEANUPX must be run before a logical unit is transferred to tape using the CTUTILITY program.

To invoke CLEANUPX, at the system command prompt (#), enter

CLEANUPX <CTRL-E>key<CTRL-E> x USING y

where
key - password assigned to CLEANUP (the default is X)
x - identifying number of LU to be processed
y - identifying number of scratch LU

Upon completion, depending on the type of logical unit that was processed, CLEANUPX displays a message:

- If the unit is an nonzero LU the message is:

  CLEANUPX DONE. MUST RE-INSTALL LOGICAL UNIT.

  Because CLEANUPX removes a nonzero LU after it has been processed, the unit must be INSTALLed (see Section 2.1.2).

- If the unit is LU/0 (the system disc), the message is:

  END OF CLEANUPX - WHEN SYSTEM HALTS, RE-IPL

  When the system disc is processed by CLEANUPX, it is necessary to perform an IPL to restore the system.

2.8 SYSTEM TIME (SETTIME)

The system time resides in the HRS (hours since 1-1-80) and the TSC (part of the hour in tenth-seconds) cells in the system INFO table. The TSC cell is incremented each tenth of a second. When TSC reaches 36000 (decimal) it is reset to zero, and HRS is incremented. The system assumes 31 days for each month so it is necessary to reset the system date and time when the month has less than 31 days.

The time may be represented in numerics (yy,mm,dd,hh,min,ss) as shown in Section 1.3.3.1, or it may be in the format

```
NOV 21, 1981  10:22:05
```

Seconds and leading zeros are optional.

If the date and time were not reset at the time of the daily 'setup', it can be done with a CALL 99 in a BASIC program. The program is then restricted to the manager account unless the "write memory" bit is set in the program's header via the GUARD utility. An example of such a program follows:

```
 10 REM PROGRAM TO SET OR PRINT CURRENT TIME
 20 DIM A$[25]
 30 REM PRESS RETURN TO READ TIME ONLY
 40 INPUT "NEW TIME? "A$
 50 REM NEXT LINE SETS TIME ONLY IF USER IS MANAGER
 60 CALL 99,A$
 70 REM READ AND PRINT CURRENT TIME
 80 LET A$=""
 90 CALL  99,A$
100 PRINT "\215\";A$
110 CHAIN ""
RUN
NEW TIME?
NOV 21, 1981  10:22:36
```

In this example, the user pressed <RETURN> when asked 'NEW TIME?'.

An error is indicated at line 60 if the user enters a string and is not logged onto the manager account or SETTIME is not properly GUARDed.

2.9 CHANGING DISC PACKS

Before a disc pack is removed from a drive, all logical units residing on that physical drive should be removed. If the system logical unit (LU/0) resides on the disc pack, the system must be shut down. This procedure is described in Section 2.9.1. When a disc pack is removed from an independent drive (i.e., it contains only nonzero logical units) follow the procedure given in Section 2.9.2.

If the system includes a POINT 4 LCM, refer to the IRIS R8 LCM Tech Memo for special considerations in using REMOVE.

2.9.1 REMOVING DISC PACKS CONTAINING LU/0

When a disc pack is removed from a drive that includes LU/0, the system must be shut down. Before issuing the SHUTDOWN command, all users must be logged off. The procedure is as follows:

1. Make sure all users are logged off.

2. Shut down the system with the command

   SHUTDOWN <CTRL-E>key<CTRL-E>

   where key is the password assigned to SHUTDOWN (the default is X).

3. Change the cartridge.

4. IPL.

5. Install the logical units (see Section 1.3.4).

An attempt to restart the system without an IPL may result in the loss of all the data on the disc.

2.9.2 REMOVING NONZERO LOGICAL UNITS

To change a disc pack on an independent drive (i.e., LU/0 resides on another drive), all logical units on that drive should be removed. A logical unit cannot be removed if any of its files are in use. The procedure is as follows:

1. Make sure no file is open on any LU that is to be removed.

2. For every LU that has to be removed, at the system command prompt (#), enter

   REMOVE lu/

   where lu is the appropriate logical unit number. Refer to Section 2.9.3 for a list of error messages that may be displayed.

3. Stop the drive.

4. Change the disc pack.

5. Start the drive.

6. Install the logical units (see Section 1.3.4).

2.9.3 REMOVE COMMAND ERROR MESSAGES

When REMOVE is run, certain error conditions may occur. REMOVE error messages are described below.

LOGICAL UNIT NOT ACTIVE - The specified LU is not installed.

LOGICAL UNIT NOT REMOVABLE FROM YOUR ACCOUNT - User account is not privileged to remove the specified LU. Only those accounts designated by the system manager may remove LUs.

LOGICAL UNIT IN USE - One or more files are open on the specified LU. The LU cannot be in use when it is removed.

2.10 FAULTPRINT

TO BE SUPPLIED

2.11 MAGTAPE UTILITY

MAGTAPE is used to spool files disc-to-tape and tape-to-disc. It provides an efficient method for making backup copies of files on tape. Files are selected based on parameters entered by the user. The program also has a report option which produces a list of the files that were processed.

A group of files may be processed at one time based on filename prefixes. This is particularly useful where filenames have been assigned on the basis of type and/or function. For example, all inventory-type filenames might begin with INV.

The selected files are displayed in groups of 36. Each group constitutes a page. Only those files reviewed by the user are spooled. Files listed on pages that the user does not review will not be processed.

2.11.1 MAGTAPE WORKFILES

MAGTAPE builds two storage areas (work files) to accumulate lists of specified filenames for copying. Files listed in one temporary storage area are displayed on the terminal screen for the review and selection process. Selected filename(s) are then written to the second storage area. The user's port number is incorporated into the filenames which gives access to a unique set of workfiles.

2.11.2 MAGTAPE HELP MODULES

Two help modules are available. The first guides the user in the selection of file parameters. The second help module contains detailed descriptions of MAGTAPE file selection commands.

To exit either module, press <RETURN>. The program returns to the point where the help module was invoked.

2.11.3 MAGTAPE PROCEDURE

If files are to be spooled disc-to-tape, make sure that a scratch tape is mounted with a ring protector in place. If files are to be restored to disc, make sure that the appropriate input tape is mounted without a ring protector. The input tape must have been generated by the MAGTAPE program. Also make sure the tape drive is on-line.

If MAGTAPE is resident on either LU/0 or the user's assigned LU, at the system command prompt (#), enter

MAGTAPE

If the program resides on another LU, enter the command in the form

nn/MAGTAPE

where
nn - the number of the LU on which it is resident

The device type selection menu is then displayed. All parameters must be entered in upper case characters.

```
PORT NUMBER:nn     MAGNETIC TAPE INTERFACE     MAGTAPE 1.1     07/06/81
                        DISC ----- TAPE

                  INPUT DEVICE:_____


COMMENT: ENTER A QUESTION MARK (?) AT ANY TIME FOR HELP
COMMAND:
MESSAGE:
```

Enter D to invoke the disc-to-tape module or enter T for the tape-to-disc module.

2.11.3.1 Disc-To-Tape Operation

The disc-to-tape module is invoked when a D is entered at the device selection prompt. A scratch tape with a ring protector should be mounted in the tape drive.

```
PORT NUMBER:nn    MAGNETIC TAPE INTERFACE    MAGTAPE 1.1    07/06/81
                    DISC --------> TAPE


                     INPUT DEVICE: D

                     REPORT OUTPUT: _

                   FILE(S) PREFIX: _________

                  TYPE OF FILE(S): _

               SOURCE LOGICAL UNIT: ____

               OPTIONAL PARAMETERS: _________


    COMMENT: ENTER A QUESTION MARK (?) AT ANY TIME FOR HELP
    COMMAND:
    MESSAGE:
```

The top line of the screen shows the user's port number, program name, the program's version, and release date. File selection prompts are in the center of the display.

To access the first help module, enter ? in the first position of any field. Options for the parameter entries are displayed.

Pressing <ESC> at an entry field aborts the current entry and returns to the previous field. <ESC> at the first field aborts the MAGTAPE program.

The three lines at the bottom are for system/user interaction. COMMENT provides system prompts for the user, COMMAND is for user input, and MESSAGE displays error messages from the system.

The file selection options include:

REPORT OUTPUT - To print a report containing the names of files spooled to tape, enter a number (1-9) to designate the appropriate line printer or press <RETURN> to default to $LPT. To suppress the report, enter N.

FILE(S) PREFIX - Allows the user to specify the beginning characters of the filenames. This is particularly helpful when naming conventions have been used to group files.

TYPE OF FILE(S) - Enter the IRIS file-type code. For example, enter T for text file (refer to the IRIS User Manual for a list of file type codes).

SOURCE LOGICAL UNIT - Specify the number of the logical unit where the files are resident.

OPTIONAL PARAMETERS - Enter any valid LIBR command or press <RETURN> to skip this parameter.

After the parameters have been selected with valid or default entries, the program displays the message:

```
IS ALL THE ABOVE CORRECT ?
```

If N (no) is entered, the cursor returns to the optional parameter prompt. Enter Y to begin the file selection process. The program chains to the LIBR processor and displays the following:

```
LIBR *C^@_ [<00>EDITSV01!]

WRITING SELECTED FILES, DO NOT DISTURB!
```

When the work file is built, the program displays a review menu listing the specified files in groups of 36 similar to the following example.

```
FILE REVIEW     MAGNETIC TAPE INTERFACE    MAGTAPE 1.1    07/06/81


LOGICAL UNIT# nnn

NO.  *  FILE NAME      NO.  *  FILE NAME      NO.  *  FILE NAME
==   =  =========      ==   =  =========      ==   =  =========
01.  C  FS10FD         13.  C  ROUTINPUT
02.  C  FS10FH         14.  C  ROUTKILL
03.  C  FS10FHD        15.  C  ROUTNUMCHK
04.  C  FS10FHE        16.  C  ROUTOPEN
05.  C  FS10FHF        17.  C  ROUTPERCENT
06.  C  FS10FHM        18.  C  ROUTTRUNK
07.  C  FS10FHP        19.  C  ROUTWORD
08.  C  FS10FHR        20.  C  ROUTZFIL
09.  C  FS10FHS
10.  C  FS10FHX
11.  C  POLYDATA
12.  C  POLYERROR


COMMENT: A=ALL,E=EXECUTE,P=PAGE,R=RESTART,?=HELP,nn=FILE NUMBER
COMMAND:
MESSAGE:
```

If <ESC> is pressed at any time after the first file list is displayed, the program aborts and returns to the system command prompt (#).

From the review menu, the user may access the second help module which describes the use of the review commands. For a summary of the MAGTAPE review commands, see Section 2.11.4.

The user should examine all pages of the selected files before entering the E (execute) command. Files listed on pages that are not reviewed are not processed. The W (wrap) command allows the user to check files selected for processing. The W command renumbers those files that were not deleted during the previous selection process and displays them from the beginning. After the W command is entered, every page must be reviewed. Files listed on a page that is not reviewed are not processed.

File selection is not complete until the review is finished and the E (execute) command is entered.

After the E command is entered, the program asks

```
IS THE TAPE MOUNTED (WITH WRITE RING),AND IS DRIVE TURNED ON (Y/N)?
```

If N is entered, the program pauses with the message

```
LOAD A SCRATCH TAPE, AND THEN TAP 'RETURN'
```

This enables the user to mount the tape and complete the spooling process. If a tape cannot be mounted at this time, press <ESC> to abort the program.

If Y is entered and the tape is mounted properly, the spooling process starts automatically. If the tape is not mounted, the program displays

```
UNABLE TO ACCESS TAPE DRIVE, CHECK STATUS AND TRY AGAIN!
```

To continue, check the tape drive number and make sure the tape is mounted, or abort the program by pressing <ESC>.

If a report was requested, it is printed upon completion of the MAGTAPE process. The report lists the names of the files spooled to tape.

When processing of the selected files is complete, the program displays the initial device selection screen. The user may proceed to spool other files or press <ESC> to return to the system command prompt.

```
NORMAL EXIT FROM MAGTAPE
#
```

2.11.3.2 Tape-To-Disc Operation

The tape-to-disc module is invoked when a T is entered at the device selection prompt. The tape containing the files that are to be restored to disc should be mounted in the tape drive without a ring protector.

NOTE

Only tapes generated by the MAGTAPE disc-to-tape process may be used to restore files to disc.

The program displays the following menu:

```
PORT NUMBER:nn     MAGNETIC TAPE INTERFACE     MAGTAPE 1.1     07/06/81
                        DISC <------- TAPE


                        INPUT DEVICE: T

                        REPORT OUTPUT: _

                    OUTPUT LOGICAL UNIT: ____

                      OVERWRITE MODE ? : _



COMMENT: ENTER A QUESTION MARK (?) AT ANY TIME FOR HELP
COMMAND:
MESSAGE:
```

The top line of the screen shows the user's port number, program name, the program's version, and release date. File selection prompts are in the center of the display.

To access the first help module, enter ? in the first position of any field. Options for the parameter entries are displayed.

Pressing <ESC> at an entry field aborts the current entry and returns to the previous field. <ESC> at the first field aborts the MAGTAPE program.

The three lines at the bottom are for system/user interaction. COMMENT provides system prompts for the user, COMMAND is for user input, and MESSAGE displays error messages from the system.

The file selection options include:

REPORT OUTPUT - To print a report containing the names of files transferred, enter the appropriate printer number (1 - 9). A <RETURN> defaults to $LPT. To suppress the report, enter N.

OUTPUT LOGICAL UNIT - Enter the destination logical unit number.

OVERWRITE MODE - Enter Y to overwrite existing files. Enter N if existing files on the logical unit are to be maintained. If the program finds a file with the same name, the program displays an appropriate message and continues with the next file on the tape. If there are not enough blocks available on the destination logical unit, the program halts.

When the parameter entries are completed, the program displays

```
IS TAPE MOUNTED, AND IS DRIVE TURNED ON LINE (Y/N)?
```

If no tape has been inserted into the tape drive unit, enter N; the program displays

```
LOAD THE INPUT TAPE, AND THEN TAP 'RETURN'
```

Once the program finds the tape mounted and the drive on-line, the spooling process begins. If the tape cannot be mounted at this time, press <ESC> five times to abort the program.

If the input tape is mounted, enter Y. If the program finds the tape is not mounted or the tape drive is not in a ready state, it displays

```
UNABLE TO ACCESS TAPE DRIVE, CHECK STATUS AND TRY AGAIN!
```

Once the drive is on-line with the tape mounted, the program begins the spooling process. When the process is complete, the program displays the initial device selection menu and the user may continue processing. To return to the system command prompt, press <ESC> and the program displays

```
NORMAL EXIT FROM MAGTAPE
#
```

2.11.4 MAGTAPE FILE SELECTION COMMAND SUMMARY

The following commands are used in the selection of files to be spooled disc-to-tape. The command is typed on the keyboard and activated when a <RETURN> is pressed.

Command	Function
A	All - Erases all file names on the current screen. None of the files erased will be processed.
E	Execute - Processes those filenames that were left on the screen after the last pass through the workfile.
P	Page - Stores for later processing the filenames left on the screen, and displays the next 36 selected filenames until EOF (end of file).
R	Restart - Redisplays the current screen as it was before any erasure(s).
W	Wrap - Stores the remaining filenames for subsequent processing. Restarts the selection process by renumbering files that were not deleted and wrapping to the beginning of the workfile. Any files listed on a page not reviewed, are not processed.
nn	nn - the number assigned to a selected file. Erases filename(s) from screen; those files will not be processed.
?	Calls out a HELP module.

If the files to be erased have consecutive numbers on the screen, the range may be specified by placing a hyphen between the beginning and ending number (i.e., 3-15).

Several numbers may be entered at the same time but they must be separated by a space or comma. For example, assume that files 2, 5, 9, 12, 13, 14, and 30 are to be erased from the file selection page, enter

5,9,12-14 30 2

2.12 COREMAP

COREMAP is a BASIC program that may be used after an IPL to display or print out a map of the current memory allocation. It can only be used from the Manager account.

To use COREMAP, at the system command prompt (#), enter

```
COREMAP
```

The following messages are then displayed:

```
#0/LIBR 0/@[COREMAPLIBRFIL]
#BASIC
20 RUN

CONSTRUCTING COREMAP SCRATCH FILE, PLEASE STAND BY
SORTING COREMAP SCRATCH FILE, PLEASE STAND BY

PRINT WHERE (NAME OR L OR L1 OR CR) ?

where
   NAME - any valid IRIS text filename
      L - $LPT
     L1 - $LPT1
     CR - a <RETURN> displays the contents of the scratch
          file at the terminal
```

If NAME is selected, COREMAP transfers the contents of the scratch file to the specified text file which may then be printed at a later time.

If L or L1 is selected, the contents of the scratch file are sent directly to the appropriate printer.

To display the contents of the COREMAP scratch file, press <RETURN>.

The display may be halted temporarily by pressing <CTRL-S>. To resume the display, press <CTRL-Q>.

Pressing <ESC> aborts the program.

When the COREMAP program has completed the display or printed the contents of the scratch file, the system command prompt (#) is displayed.

Figure 2-4 is an example of a partial printout of a COREMAP scratch file.

IRIS CORE MAP

```
    0  (  200) <-- REX PAGE ZERO
  200  (  400) <-- PROCESSOR PAGE ZERO
  600  (  110) <-- SYSTEM INFORMATION TABLE
  710  (   60) <-- INTERRUPT VECTOR TABLE
  770  (   20) <-- CHARACTER QUEUE USED BY PCHAR IN REX
 1010  ( 5716) <-- BEGINNING OF REX CODE
 6726  ( 2444) <-- CALL TRANSLATE TABLE FOR SYSTEM SUBROUTINES (PART OF REX)
11372  (   33) <-- BPSP (BEGINNING OF PATCH SPACE, IE. END OF REX)
11425  (  104) <-- I/O BUFFER FOR PORT # 35
11531  (  104) <-- I/O BUFFER FOR PORT # 34
11635  (  104) <-- I/O BUFFER FOR PORT # 33
11741  (  104) <-- I/O BUFFER FOR PORT # 32
12045  (  104) <-- I/O BUFFER FOR PORT # 31
12151  (  104) <-- I/O BUFFER FOR PORT # 30
12255  (  104) <-- I/O BUFFER FOR PORT # 29
12361  (  200) <-- I/O BUFFER FOR PORT # 28
12561  (  104) <-- I/O BUFFER FOR PORT # 27
12665  (  104) <-- I/O BUFFER FOR PORT # 26
12771  (  104) <-- I/O BUFFER FOR PORT # 25
13075  (  104) <-- I/O BUFFER FOR PORT # 24
13201  (  104) <-- I/O BUFFER FOR PORT # 23
13305  (  104) <-- I/O BUFFER FOR PORT # 22
13411  (  104) <-- I/O BUFFER FOR PORT # 21
13515  (  104) <-- I/O BUFFER FOR PORT # 20
13621  (  104) <-- I/O BUFFER FOR PORT # 19
13725  (  104) <-- I/O BUFFER FOR PORT # 18
14031  (  104) <-- I/O BUFFER FOR PORT # 17
14135  (  104) <-- I/O BUFFER FOR PORT # 16
14241  (  104) <-- I/O BUFFER FOR PORT # 15
14345  (  104) <-- I/O BUFFER FOR PORT # 14
14451  (  104) <-- I/O BUFFER FOR PORT # 13
14555  (  104) <-- I/O BUFFER FOR PORT # 12
14661  (  104) <-- I/O BUFFER FOR PORT # 11
14765  (  104) <-- I/O BUFFER FOR PORT # 10
15071  (  104) <-- I/O BUFFER FOR PORT # 9
15175  (  104) <-- I/O BUFFER FOR PORT # 8
15301  (  104) <-- I/O BUFFER FOR PORT # 7
15405  (  104) <-- I/O BUFFER FOR PORT # 6
15511  (  104) <-- I/O BUFFER FOR PORT # 5
15615  ( 1015) <-- $MMUX
16632  ( 2277) <-- $CTUS
21131  (  237) <-- $TRMTV950
21370  ( 1305) <-- $LCM
22675  (  275) <-- $MTAO
23172  (  101) <-- $CALLTBL
23273  (  230) <-- RUN'S CALLTABLE
23523  (  272) <-- $TERMTV912
24015  (   45) <-- I/O BUFFER FOR PORT # 4
24062  (   37) <-- INTERRUPT STACK
24121  (  104) <-- I/O BUFFER FOR PORT # 3
24225  (  104) <-- I/O BUFFER FOR PORT # 2
24331  (  154) <-- $TERMS
24505  (  234) <-- TERMINAL TYPE TABLE (PART OF $TERMS)



24741  (  620) <-- $SYS SCHED
25561  (  177) <-- DISCSUB # 27
25740  (  760) <-- DISCSUB # 61
26740  (   15) <-- LUVAR FOR LU # 0
26755  ( 1023) <-- LUFIX FOR LU # 0
30000  (  400) <-- BSA (BLOCK SWAP AREA)
30400  (  400) <-- HBA (HEADER BLOCK AREA)
31000  (  400) <-- HXA (HEADER EXTENDER AREA)
31400  (  400) <-- SSA (SUBROUTINE SWAP AREA)
32000  (  200) <-- 4 FREE NODES
32200  (11000) <-- BPS (BEGINNING OF PROCESSOR STORAGE)
43200  (    2) <-- LEPS (LOCATION OF END OF PROCESSOR STORAGE)
43202  ( 1700) <-- 30 FREE NODES
45102  ( 5000) <-- POOL BUFFER # 1 THROUGH 10
52102  ( 1271) <-- BUFFER POOL TABLE
53373  (   50) <-- INTERMEDIATE INPUT BUFFER FOR PORT # 36
53443  (   50) <-- INTERMEDIATE INPUT BUFFER FOR PORT # 35
53513  (   50) <-- INTERMEDIATE INPUT BUFFER FOR PORT # 34
53563  (   50) <-- INTERMEDIATE INPUT BUFFER FOR PORT # 33
53633  (   50) <-- INTERMEDIATE INPUT BUFFER FOR PORT # 32
53703  (   50) <-- INTERMEDIATE INPUT BUFFER FOR PORT # 31
```

Figure 2-4. Partial COREMAP Printout

2.13 MAKEBIN

MAKEBIN is a BASIC program that may be used to convert a file containing hex format data to binary format. The hex file is processed one block at a time. Progress messages indicate which block is being processed. The program can only be run from the Manager or Utility accounts.

At the system command prompt (#), enter

MAKEBIN

If the program is not on LU/0 or the applications logical unit, enter the command as follows:

lu/MAKEBIN

where
lu - number of the logical unit where MAKEBIN resides

The following example shows the messages displayed and user input required:

```
PROGRAM TO CONVERT HEX FILE TO BINARY
Hex file to process: filename1
File for binary output (must have "LU/")?: lu/filename2


Processing block 0

Processing block 1

     .       .   .

Processing block n

#
```

If filename1 is not a hex file, the 'Hex file to process:' prompt is repeated.

Approximately 30 seconds are required to process each block in the file. Upon completion, the program exits and the system command prompt is displayed.

2.14 MAKEHEX

MAKEHEX is a BASIC program that may be used to convert a file containing data in binary format to hex format. The file is processed one block at a time. Progress messages are displayed to indicate which block is being processed. The program can only be run from the Manager or Utility accounts.

At the system command prompt (#), enter

MAKEHEX

If the program is not on LU/0 or the applications logical unit, enter the command as follows:

lu/MAKEHEX

where
lu - number of the logical unit where MAKEHEX resides

The following example shows the messages displayed and user input required:

```
PROGRAM TO CHANGE A FILE TO TRANSMITTABLE HEX FORM
File to translate to hex (must have "LU/"): lu/filename1
File for hex output: filename2


Reading block 0 .... and processing

Reading block 1 .... and processing

   .      .   . ....  .      .

Reading block n .... and processing

#
```

If filename1 is not a binary file, the 'File to translate to hex (must have "LU/"):' prompt is repeated.

Approximately 30 seconds are required to process each block in the file. Upon completion, the program exits and the system command prompt is displayed.

2.15 RECEIVE - TRANSMIT

RECEIVE and TRANSMIT may be used to transmit a text file from one system to another using a tri-tail switch. The Mux ports for both CPUs must be set up for the same parity, number of stop bits, character length, and baud rate.

The RECEIVE-TRANSMIT functions must be performed in the sequence given below (user input is underlined):

1. The Receiver must be activated first:

   a. Set the tri-tail switch to the receiving CPU.

   b. At the system command prompt (#), enter

      RECEIVE

      The following messages are then displayed:

      ```
      CPU-TO-CPU TEXT FILE RECEIVER PROGRAM
      FILENAME TO BE RECEIVED INTO:
      ```

2. Enter the name of the file to receive the transmitted file. It must be a legal IRIS filename; it need not be the same name as the file to be transmitted. Add an exclamation point (!) to the filename if an existing file on the receiving logical unit is to be overlaid.

3. The Transmitter must now be activated:

   a. Set the tri-tail switch to the sending CPU.

   b. At the system command prompt (#), enter

      TRANSMIT

      TRANSMIT responds with an appropriate message and asks whether the RECEIVE program is ready on the receiving CPU:

      ```
      CPU-TO-CPU TEXT FILE TRANSMITTER
      IS "RECEIVE" PROGRAM ALREADY ON RCVG CPU (Y or N)?
      ```

      If the response is N, the RECEIVE program must be transmitted before proceeding as explained in the following messages:

      ```
      SWITCH YOUR TERMINAL TO RCVG CPU, LOG ON, ENTER BASIC.
      TYPE CTRL-E CTRL-X
      THEN SWITCH TERMINAL BACK TO XMTG CPU & PRESS RETURN
      ```

After RETURN is pressed, the following message is displayed:

```
TO TRANSFER "RECEIVE" TO RCVG CPU, CONNECT XMTG CPU TO RCVG CPU
YOU WILL HAVE TWO SECONDS AFTER YOU PRESS RETURN...
```

NOTE

To transmit the RECEIVE program, the transmitting CPU must have the text file version of the program.

Set the tri-tail switch to the receiving CPU and press <RETURN>. Proceed to step 6.

If the response is Y (the default value), the program prompts for the name of the file to be transmitted:

```
TEXT FILE TO BE TRANSMITTED:
```

4. Enter the name of the text file to be transmitted. If the name entered is not a text filename, an error message is displayed and the prompt is repeated.

   If the file is a text file, the following message is displayed:

```
CONNECT XMTG CPU TO RCVG CPU ("RECEIVE" SHOULD BE RUNNING)
IF IT HANGS UP SWITCH TO RCVR, PRESS ESCAPE, RECONNECT XMTG TO RCVR
```

5. Set the tri-tail switch to the terminal position. The file will be displayed as it is transmitted. When the transfer is completed, the following message is displayed:

```
..... END OF TRANSFER .....
```

6. Set the tri-tail switch to the sending CPU and press

   <ESC> <CTRL-C>

7. Set the tri-tail switch to the receiving CPU and press

   <ESC>

   a. If there are no more files to be transferred, press

      <CTRL-C>

   b. If more files are to be transmitted, enter

      RUN

   Repeat the procedure from Step 2.

2.16 MONITOR

MONITOR is a POINT 4 diagnostic tool and is not intended for customer use.

Section 3

VERIFICATION OF OPTIONAL SOFTWARE

Several optional software packages are available under IRIS including: FORCE, READINET, STYLUS, TYPIST and UTILITIES. POINT 4 supplies a BASIC utility program, ACS.VERIFY, which checks the integrity of any of the above packages. It should be used at the time the packages are installed on a system or when there is evidence of malfunction. ACS.VERIFY checks the selected program(s) and provides a list of errors if any damage is found.

3.1 ACS.VERIFY PROGRAM

The Application Control System VERIFY program is a utility which verifies the check codes of BASIC programs for various software systems running under IRIS (7.5 or later revisions). These systems include: FORCE, READINET, STYLUS, TYPIST, and UTILITIES.

For each of these software systems, the filenames and check codes (where applicable) are stored in a parameter file P.(systemname). ACS reads the filename from the parameter file to verify its existence. If the filename is not found, its name and a message FILE NOT FOUND are entered into the log file. If the file exists and it is a BASIC file, ACS loads it, returns to SCOPE, and executes the VERIFY processor. If the check code generated by VERIFY does not match the check code in the parameter file, then the filename, the check code from the parameter file, and the check code generated by VERIFY are entered into the log file.

Before the ACS.VERIFY utility can be run, the following requirements must be met:

- The ACS.VERIFY program must be run from the manager account
- The manager account's assigned LU must have a total of 182 blocks available for the following permanent and temporary files:

Permanent Files

ACS.WORK	2 blocks
ACS.VERIFY	12 blocks
ACS.VERIFY2	5 blocks
ACS.VERIFY3	5 blocks
ACS.VERIFY4	8 blocks

Temporary Files

PRMTR.IDX	42 blocks
PRMTR.LOG	108 or 22 blocks

3.2 ACS.VERIFY PROCEDURE

To access the program, at the system command prompt enter

```
ACS.VERIFY
```

ACS displays the Software System Selection Menu:

```
PROGRAM TO VERIFY BASIC FILES

1.  FORCE

2.  READINET

3.  STYLUS

4.  TYPIST

5.  UTILITIES

(CR = TERMINATE)
SELECT DESIRED SYSTEM (1-5):
```

Access to these software systems will depend on which ones are installed at your particular site. Enter the number representing the software system to be checked and press <RETURN>.

After the number of the selected software system has been entered, ACS verifies that the associated parameter file is resident on the specified LU. If the parameter file is not found or cannot be opened, ACS responds

```
PARAMETER FILE NOT ON SYSTEM - OPEN ERROR
```

If this message is displayed, ACS returns to the menu. A <RETURN> may be entered to terminate the program and to chain back to the system command prompt (#).

After the successful selection of a software system, ACS prompts for a logical unit number

```
ENTER BASIC FILES LU#:
```

Any valid LU number between 0 and 99 may be entered. A <RETURN> defaults to the user's assigned LU.

3.2.1 FILE SELECTION PHASE

ACS then asks which of the files resident on the LU are to be verified by displaying:

```
1.  ALL
2.  RANGE
3.  LIST

ENTER METHOD OF SELECTING FILES (1-3):
```

3.2.1.1 All

Selection 1 (ALL) will process all the files in the selected software system's parameter file.

3.2.1.2 Range

Selection 2 (RANGE) will process the files which fall within the range specified by the significant portion of the filename. ACS prompts:

```
FROM FILE PREFIX (CR = FIRST):

   TO FILE PREFIX (CR = LAST):
```

The RANGE option gives the user greater flexibility for the verifying process:

- If the verifying process was interrupted, it may be used to restart the process at the point where it was interrupted.
- It may be used for batch processing. Because of time considerations, it may be desirable to verify only certain programs belonging to an optional software package at a time.
- It may be necessary to verify programs relating to a certain function of the software package. For example, entry of

  ```
  TIP.5
  ```

  for both prompts limits the process to those programs which begin with "TIP.5". Entering "TIP." would cause all TYPIST programs to be verified.

3.2.1.3 List

Selection 3 (LIST) will process a user selected list of one or more files. ACS then displays

```
BUILDING INDEX FILE
```

followed by a prompt for the first filename

```
1.  ENTER FILENAME (CR TO END):
```

Enter the first file to be verified; ACS then prompts for additional filenames. When all the desired filenames have been entered, a <RETURN> completes the listing. All filenames must be in the parameter file and on the disc.

3.2.2 VERIFYING PROCESS

When the file selection phase is complete, ACS builds an Error Logging Index File and displays

```
BUILDING LOG FILE
```

ACS proceeds to the actual verifying process. If a file is not found or if a program check code does not match the code in the parameter file, ACS logs that file as an error.

3.2.3 ERROR FILE

When the verifying process is finished, the log file is checked for errors.

If the file is empty, the following is displayed

```
NO ERRORS HAVE BEEN FOUND
PROCESS COMPLETED
```

ACS then returns to the Selection Menu.

If any errors have been written to the log file, the listing can be output to the terminal, a printer, or a file. ACS prompts

```
 < n > ERRORS HAVE BEEN LOGGED INTO THE LOG FILE
SELECT OUTPUT: 1=CRT 2=PRINTER 3=DISC (1-3)
```

where n is the number of errors in the log file.

1. Selection 1 (CRT) displays the report on the terminal.

2. Selection 2 (PRINTER) outputs the report to a specified printer; ACS prompts

   ```
   ENTER PRINTER DEVICE CODE
   ```

   The device code name must begin with a dollar sign ($). If the name is entered incorrectly, the device code question is repeated. A <RETURN> may be entered to return to the output selection screen.

3. Selection 3 (DISC) writes the report to a specified text file; ACS prompts

   ```
   ENTER FILENAME
   ```

   ACS attempts to build the requested file. If the filename already exists, an error number is displayed with the message

   ```
   TRY AGAIN
   ```

   The prompt for a filename is then repeated. To overlay an existing file (e.g., a filename used for an existing error file), add an exclamation mark (!) to the end of the filename and the program will accept it.

   A <RETURN> will return to the output selection prompt.

After the error listing has been completed, a <RETURN> will return to the system command prompt (#).

Section 4

TROUBLESHOOTING

This section includes procedures that may be used to prevent or solve some of the more common problems that may occur.

4.1 EXERCISER

EXERCISER is an interactive BASIC program providing a simple and convenient test for the CPU, memory, and disc. The program may be run while the system is being used (i.e., SHUTDOWN is not required).

To use the program, at the system command prompt (#), enter

EXERCISER

If the program resides on an LU other than the user's, enter

lu/EXERCISER

where lu is the number of the logical unit on which it resides.

The program displays instructions for its use. Once initiated, the program continues to run until it finds an error condition or is aborted by pressing <CTRL-C>.

EXERCISER does not pinpoint the problems that may exist in the CPU, memory or on disc. It does detect subtle but potentially serious, intermittent hardware problems at an early stage.

POINT 4 recommends that EXERCISER be run overnight or on weekends at regular intervals. It is provided with the standard IRIS Operating System on disc, diskette, streamer tape, cassette tape, or paper tape.

4.2 SYSTEM HALTS

A system halt may be caused by a power failure, a hardware, or a software problem as indicated by a halt code contained in memory. The various halt codes are described in Table 4-1.

4.2.1 DISPLAYING HALT CODES ON A POINT 4 MARK 5/8 SYSTEM

On a MARK 5/8, a system halt is signalled when the run light goes off. The procedure for displaying the halt code contained in memory on a MARK 5/8 system is as follows:

1. Press the APL button on the computer panel. This brings the MANIP program into memory and starts it running.

2. At the master terminal, enter

   A

   The contents of the program counter and accumulators are displayed in the following format:

   ```
   PC:    A0   A1   A2   A3     C
   ```

   where
   - PC - program counter
   - A0-A3 - accumulators
   - C - carry state

3. Subtract one (octal) from the contents of the program counter (PC) and dump the contents of the resulting memory location. Press <ESC> to halt the display. The word following the colon (:) contains the halt code.

The following example illustrates this procedure:

Press the APL button on the computer front panel. At the master terminal, enter

```
A
2462:   76742   76742   0   2454    0
D2461
2461:   73377   16024   <ESC>
```

In this example, 73377 is the halt code which indicates insufficient free nodes (see Table 4-1).

TABLE 4-1. IRIS OPERATING SYSTEM HALTS

Halt Code	Description
63077	Good halt from DDCOPY and other stand-alone programs. Not used when running under IRIS.
63377	An interrupt mask hardware problem or some device's mask bit is incorrectly specified in its driver.
67077	Power fail restart. A Power Fail Auto Restart was attempted, and one or more disc drives require operator intervention. Ready all disc drives, and re-IPL.
67277	Fatal memory management halt # 1, 2 or 3. Record the location of the halt and the values in each of the four accumulators and the carry state (1=on, 0=off).
67377	Interrupt not acknowledged. Some hardware device has interrupted but did not present its device code to an INTA instruction. This indicates a hardware problem, most likely improper routing of the interrupt priority line on the computer backplane (pins A95 and A96).
73077	Power fail halt. A power failure occurred, and there was a failure in the Power Fail Auto Restart hardware or the key was not in the AUTO or LOCK position. Ready all disc drives, and re-IPL.
73277	Reserved
73377	Insufficient free nodes. Not enough free nodes available for task queuing, etc. Do a minimum configuration IPL and increase the number of free nodes in CONFIG. Then do a full configuration IPL.
77077	Double Trap (see Section 4.2.3).
77177	Serves the same function as 77377 but only used in a Software Change Order (SCO).

TABLE 4-1. IRIS OPERATING SYSTEM HALTS (Cont)

Halt Code	Description
77277	Attempted to do a TRAPFAULT when FAULT could not be executed. For example • In CLEANUP after discsubs were relocated • At IPL-time if there are more physical mux ports on the system than have been identified to IRIS in $MMUX's Port Definition Table. The accumulators contain: A0 - 25 (POINT 4 Mux device code) A2 - PCB address of the first port physically present but not configured in $MMUX.
77377	Unknown halt. Unused areas of memory are usually filled with 77377 halt instructions. Such a halt usually indicates an abnormal jump in the software.
xxxxxx	Any other value is probably not a halt. The system may have been in an infinite loop or hang condition. Be sure to check the RUN light before touching the front panel. If the RUN light is out but the halt code is not one of the above, the problem may be in the CPU, front panel, or power monitor hardware.

4.2.2 DISPLAYING A HALT CODE ON A POINT 4 MARK 3 SYSTEM

When a halt occurs on a MARK 3 system, MANIP is brought into memory automatically and the contents of the program counter are displayed in the following format:

```
PC:    A0   A1   A2   A3     C
```

where

PC - program counter
A0-A3 - accumulators
C - carry state

The procedure for displaying the halt code is as follows:

1. Subtract one (octal) from the contents of the program counter (PC).

2. Dump the contents of the resulting memory location followed immediately by an <ESC>.

   The word following the colon (:) contains the halt code.

   The following example illustrates this procedure:

```
2462:   76742   76742   0   2454    0
D2461
2461:   73377   16024  <ESC>
```

   where 73377 is the halt code contained at address 2461.

4.2.3 DOUBLE TRAPS

When a double trap occurs as indicated by halt code 77077, it is important to obtain and record both sets of halt information.

4.2.3.1 Double Traps on a MARK 3 System

On a MARK 3 system, MANIP is brought into memory automatically when a halt occurs and the first line of halt imformation is displayed. To display the halt code, use the procedure described in Section 4.2.2. Then proceed as follows:

1. Issue a jump to the PC address displayed in the first line of the halt information (see step 4 in Section 4.2.3.2).

   The system halts, brings in MANIP and displays the second set of halt information automatically.

2. Make a record of all the halt information displayed by the system. Be sure to include the date and time of each occurrence.

3. IPL the system.

If the problem occurs repeatedly, call POINT 4 Customer Support and report all the halt information displayed by the system.

4.2.3.2 Double Traps on a MARK 5/8 System

On a MARK 5/8 system, the procedure for displaying both sets of halt information is illustrated by the following example:

1. Press the APL button to bring MANIP into memory.

2. At the master terminal, enter

```
A
11142:   0   756   66140   74627    1
```

3. Subtract one from the memory location given in the PC and dump the contents of accumulator A0, e.g.

```
D11141
11141:   77077   5462 <ESC>
```

   The first set of halt information consists of the values displayed in steps 2 and 3. The value 77077 indicates a double trap.

4. Jump to the original location of the halt, e.g.

```
J11142
```

   The system halts again.

5. Press APL.

6. At the master terminal, enter

```
A
11146:   0   762   66200   2452    0
```

   The second set of halt information is displayed.

7. Make a record of all the information displayed by the system in steps 2, 3, and 6. Include the date and time of each occurrence.

8. IPL the system.

If the problem occurs repeatedly, call POINT 4 Customer Support and report all the halt information obtained by this procedure.

4.3 RECOVERY OF BAD FILES FOUND BY INSTALL

If a bad file is encountered during an INSTALL and cell 203 is 0 (see Section 2.1), a message in the following format is displayed:

```
BAD FILE ENCOUNTERED
FILE NAME xxxxx
INDEX BLOCK # nnn
ERROR CODE c
INSTALLATION TERMINATED
```

where

xxxxx - name of bad file in INDEX
nnn - displacement into the INDEX block
c - error code (see Table 4-2)

NOTE

If a block of the INDEX has been damaged, the filename displayed may be meaningless and terminal control characters (e.g., Clear Screen) may cause the screen to be unintelligible.

INSTALL terminates when the first bad file is encountered. Thus, one bad file condition may be resolved only to have INSTALL terminate at a subsequent bad file.

The following method may be used to salvage the bad file:

1. Back up the system.

2. Prevent other users from logging on.

3. Do an INSTALL FAST.

NOTE

After an INSTALL FAST, the LU is in a vulnerable condition. The more the LU is used, the greater the danger of spreading the damage over the whole LU. Use only the procedures described in this manual.

4. COPY the bad file to a good LU.

5. If the COPY fails, write a small BASIC program to read data out of the bad file and write it to a good file on another LU.

6. If both steps 4 and 5 fail, the only alternative is to restore the file from a backup and reenter any missing data.

7. If either step 4 or step 5 is successful, in whole or in part, the possibility exists that some of the data is bad. A knowledgeable applications programmer may be able to write a small program which checks the file(s) record by record for damaged data.

NOTE

The above procedures are inherently risky. The most secure course is to recover the file from a good backup and reenter any missing data.

TABLE 4-2. INSTALL ERROR CODES

Error Code	Description
1	File being built or deleted.
2	File restrictions violated.
3	Filename at offset NAME (see DEFS listing, Appendix B of the IRIS R8 Installation and Configuration Manual) in header block does not match entry in the INDEX.
4	Real disc address at offset DHDR in the file's header does not match entry in the INDEX.
5	The RDA list in the file's header block does not contain enough entries as indicated by NBLK.
6	File is attempting to claim a block which is already marked in DMAP as in use by a previous file.

4.4 ERRORS DURING AN INSTALL

DMAP (disc map) is a system file on each logical unit. It records which real disc addresses (RDAs) are in use for files on that logical unit. If INSTALL finds that DMAP is not the proper DMAP for the logical unit, one of the following messages is displayed:

```
DMAP HEADER NOT IN HBA
NCYL IS TOO LARGE
NTRS OR DHDR IS INVALID
NTRS OR NRPB IS INVALID
```

where (in this context)

NCYL - Total number of cylinders
NTRS - Number of IRIS tracks/sectors for LU to be INSTALLed
DHDR - Real disc address of the DMAP file header
NRPB - Number of records per block in DMAP header

DMAP Header Not in HBA - indicates that the real disc address for the DMAP INDEX entry was not at IRIS track 1, sector 0. This may occur if an LU was ported to a different type of drive without first running CLEANUPX.

NCYL is Too Large - can occur if a user attempts to INSTALL an LU at a larger size than it was previously but did not run CLEANUPX before INSTALLing at the new size (see Section 2.1.2.4).

The other messages may indicate that an LU was ported to a different type of drive without running CLEANUPX, or that a possible discrepancy exists between the DMAP header and the partition's attributes as defined in the disc driver table in CONFIG. Check the IRIS R8 Peripherals Handbook for the correct values and compare them to the entries in the disc driver table.

4.4.2 EXAMPLE OF A FILE RECOVERY PROCEDURE

File recovery requires copying the latest functioning disc pack containing the file(s), copying the system disc (LU/0), and restoring the system to its normal operational mode.

The recovery procedure given below assumes the following:

- A cartridge module
- Files to be recovered are not polyfiles
- Files to be copied are on disc pack A
- Files will be copied to a fixed surface
- Files reside on LU/4
- Files will be copied to LU/99
- Files are to be used on LU/6 when the recovery process is complete. LU/6 resides on a fixed surface.

The steps in the recovery procedure are:

1. Perform a backup.
2. Load disc pack A containing the needed file(s) onto a removable surface (0).
3. Copy removable surface (0) to destination surface (fixed).
4. Remove disc pack A and set it aside.
5. Load current LU/0 onto removable surface (0).
6. IPL the system.
7. INSTALL LU/4 (LU/4 resides on a fixed surface and contains the files).
8. INSTALL LU/99 onto removable surface (0).
9. Copy files from LU/4 to LU/99 by using the COPY command. At the system command prompt (#), enter

   COPY 99/filename=4/filename

10. SHUTDOWN either to the LOTUS DISCUTILITY or the copy program appropriate for your controller.
11. Load LU/6 (where files are to be used) onto removable surface (0).
12. Copy removable surface 0 to destination surface (fixed).
13. Load LU/0 onto removable surface (0) and IPL the system.
14. INSTALL LU/99 and LU/6.

15. Copy files from LU/99 to LU/6. At the system command prompt (#), enter

    COPY 6/filename=99/filename

16. SHUTDOWN the system as before (i.e., to DISCUTILITY or the copy program appropriate for your disc controller).

17. Restore all LUs to normal system requirements.

18. IPL the system.

NOTE

This procedure may be used for polyfiles but the polyfiles must be copied using the COPYPF program (see the IRIS R8 User Manual).

4.5 DMAP ERRORS DURING AN INSTALL

DMAP (disc map) is a system file on each logical unit. It records which real disc addresses (RDAs) are in use for files on that logical unit. If INSTALL finds that DMAP is not the proper DMAP for the logical unit, one of the following messages is displayed:

```
DMAP HEADER NOT IN HBA
NCYL IS TOO LARGE
NTRS OR DHDR IS INVALID
NTRS OR NRPB IS INVALID
```

where (in this context)

```
NCYL - Total number of cylinders
NTRS - Number of IRIS tracks/sectors for LU to be INSTALLed
DHDR - Real disc address of the DMAP file header
NRPB - Number of records per block in DMAP header
```

DMAP Header Not in HBA - indicates that the real disc address for the DMAP INDEX entry was not at IRIS track 1, sector 0. This may occur if an LU was ported to a different type of drive without first running CLEANUPX.

NCYL is Too Large - can occur if a user attempts to INSTALL an LU at a larger size than it was previously but did not run CLEANUPX before INSTALLing at the new size (see Section 2.1.2.4).

The other messages may indicate that an LU was ported to a different type of drive without running CLEANUPX, or that a possible discrepancy exists between the DMAP header and the partition's attributes as defined in the disc driver table in CONFIG. Check the IRIS R8 Peripherals Handbook for the correct values and compare them to the entries in the disc driver table.

Section 5

FAILURE REPORTING

This section outlines procedures for analyzing and reporting any problems found in POINT 4 Data Corporation's hardware or software. The use of these procedures assures efficient processing of bug reports by POINT 4 so that the problem can be fixed with a minimum delay. A list of trap numbers and descriptions is given in Appendix C.

5.1 TRAP MESSAGES

A trap message is printed when an error indicating a hardware or software fault is detected. A hardware fault is most commonly caused by a disc malfunction which, after a number of tries (usually sixteen), cannot be corrected. A software fault occurs if one of the cross checks built into the software detects an illegal condition, such as an illegal disc or memory address.

Trap messages give comprehensive information to help pinpoint the error. They are output as follows:

```
    Fault Record: ___xxx___   ___x___
    Trap #: __n__     At:  __nnnn__
    On (date):mm dd, yyyy (time): hh:mm:ss
    Registers: __A0__  __A1__  __A2__  __A3__  cb
    Processor: _____________________________
    User Program: _____________________________
    Account #: _____________________________
```

where

```
  xxx - Fault record number
    x - Fault record number
    n - Trap number
 nnnn - Location (an octal number)
   A0 - Contents of register A0
   A1 - Contents of register A1
   A2 - Contents of register A2
   A3 - Contents of register A3
   cb - Carry bit (0 = off, 1 = on)
```

If the fault was detected by a disc-resident subroutine, a third line will be printed giving the address in the discsubs assembly listing. If disc-resident subroutines were nested at the time of the fault, then the address in the discsubs listing will be printed for each nested call.

An asterisk preceding a discsub address indicates that the trap did not occur within the discsub itself. The address is an absolute memory address where the trap occurred. This is usually the address of a resident routine within REX that was called by the discsub.

If the user is regnant at the time the trap occurred, the error message is displayed at the user's terminal. At the same time, the message is written to the Fault History file and the user's active file is cleared. The active file is cleared because the trap may have been caused by an error in that file.

If the user was not logged on at the time the trap occurred, the message is written to the Fault History file and displayed at the terminal the next time the user logs on.

Time-sharing is inhibited during the short time it takes to set up the trap message. Any input or output in progress at the time may continue, but there will be no response after that input or output until the trap message is completed.

All trap messages should be saved until they have been analyzed to determine the cause of the fault. If a software problem is suspected, the trap message should be forwarded to POINT 4 along with a Bug Report (see Section 5.3) so that the problem can be corrected.

5.2 ERRORS AND OTHER PROBLEMS

This category includes software problems which do not cause a trap message, as well as all hardware problems. Any problem with hardware which is under a POINT 4 warranty or service contract should be documented by running the diagnostic test routine and submitting a copy of its printout along with the bug report.

Software problems are harder to diagnose since they may occur within a complex application program. To make a diagnosis possible, it is usually necessary to isolate the problem to a single statement or a small group of statements which may cause the error. Since this is most easily done by the person who wrote the application program, it is best to attempt to pinpoint the problem before sending the bug report. Include a complete listing and a sample run of the smallest program that will cause the problem.

Many "software" problems occur because of a transient hardware error or because the memory copy of the operating system has somehow been changed. In such a case, the problem may not recur or may be cured by doing an IPL. For this reason it is best to try an IPL first, especially if the problem occurs in a program that previously ran without errors. Even if the problem is not immediately repeatable, the documentation should be retained in case the same problem happens again at a later time. Information in memory can be changed by a hardware failure, a power line transient, static electricity, or by another software bug which may be completely unrelated to the symptom.

5.3 BUG REPORTING PROCEDURE

Please report any bug found in a POINT 4 Data Corporation product (software or hardware) by filling out a POINT 4 BUG REPORT form (a sample form is shown in Appendix D). If this has been lost, be sure to include the following information:

1. Date of report

2. Your name

3. Your company name

4. The name and address of the facility where you can be contacted

5. Date the problem occurred

6. The name of the POINT 4 product. Include any date, revision number, or serial number. For example

   a. Software package, e.g.,

      DBUG 1-30-82

   b. Hardware, e.g.,

      POINT 4 310 MULTIPLEXER (Serial #405)

   c. Processor

      BASIC 7-15-81

Use a separate BUG REPORT for each problem encountered. If you feel that two or more bugs may be related, refer to the related report. Sign the report, keep a copy, and send the original to POINT 4 Data Corporation at the address shown on the title page of this manual.

Software problems should be reported as outlined below:

- Trap Message - results from either a hardware failure or from a cross-check in the software. Attach the trap message printout and, if available, the data leading up to the trap. Describe any other symptoms noted and the effect, if any, on other users.

- Incorrect Operation - system continues normal operation but behaves erratically or gives the wrong answer in a particular instance. Include hard copy of the error with the BUG REPORT form (see Appendix D).

- Computer Stalls - RUN light is on, but does not respond to any user:

  - For a POINT 4 MARK Series Computer, unlock the front panel, press STOP, press APL once, and then type A and press <RETURN> on the master terminal. Copy down the resulting display.

  - For another computer, record the state of the ION light, press RESET, and record the values displayed in the ADDRESS, DATA, and CARRY lights. Also examine and record the contents of registers A0 through A3 as well as the contents of memory at ADDRESS-1.

- Computer Stops (RUN light out).

  - For a POINT 4 MARK Series Computer, refer to the procedures described in Section 4.2.

  - For another computer, record both the values displayed in the ADDRESS and DATA lights and the state of the CARRY and ION lights; then press RESET. Examine and record the contents of registers A0 through A3.

The type of problem is indicated by the halt code (see Table 4-1).

In any case (other than a power failure), state whether the problem is recurrent or happened only once. Describe the last action by the user at each terminal and include any other information which could be pertinent.

If a trap occurs, the system behaves erratically, a halt 67077, or a halt 73077 occurs, the problem may resolve itself and the system should continue normal operations. In all other cases it will be necessary to do an IPL (see Section 1) to restore system operations.

A trap message by itself, without background data, or an out-of-context statement is virtually impossible to diagnose. The more information you can give POINT 4 regarding a problem, the less time it will take us to fix it.

Section 6

PATCHING THE SYSTEM

TO BE SUPPLIED

APPENDICES

Appendix A

BACKUP PROCEDURES GUIDE

It is good practice to perform backups on a regular basis to ensure optimum performance of your IRIS system and as insurance against user files and accounting information being lost. The procedure outlined here is used to create file copies of user files. The mechanics for performing a backup are discussed in Section 1.6.

A frequently used method for backups is to maintain three generations of daily file copies with a fourth copy used as the current disc pack. File copies consist of the system disc and disc packs containing user files which were in working order at the end of the day. These are used as the 'source' discs and are then set aside.

WARNING!

> Use the previous day's disc pack as the backup disc. Use the copy as the new working pack. If the copy is found to be defective, recopy the previous day's disc pack.

The number of file copy generations depends on the size of your installation and the requirements of its software systems. In some installations (e.g., accounting or inventory systems), monthly file copies are retained for a year until the twelfth month becomes the annual copy.

A.1 DISC PACK ROTATION FOR 96-MEGABYTE SYSTEM

An example of backup generations and disc pack rotation is given for a 96-megabyte system (i.e., a system with multiple disc packs).

Specifications for the example require that file copies be maintained as follows:

- Daily: three generations of file copies plus one used as the current disc set
- Semi-monthly
- Monthly
- Semi-annually
- Annually

The annual copy is to be retained for a year.

Eight sets of disc packs are required to meet these specifications. However, only six sets of disc packs need be available for the first six months. Figure A-1 illustrates the rotational flow of the various disc packs.

Each new file copy, whether it is a daily, weekly, or monthly is modified in some way. This week's copy contains more data in some files, new files, and new programs than the copy designated as semi-monthly two weeks ago. At the same time some files or programs may have been deleted but the old information may be required to settle a legal question or make projections for future sales. By keeping the monthly copy, it is possible to recover the required information.

The difference between the semi-annual and annual file copies is similar. The most recent semi-annual file copy is more up-to-date by six months than the annual file copy.

The semi-monthly and monthly file copies reenter the rotation once a month, the semi-annual and annual file copies once a year. Before recycling the annual copy, it may be advisable to dump its contents to magnetic tape and to keep this as a permanent record.

It is very important to label and date the disc packs in the backup rotation each time they are used.

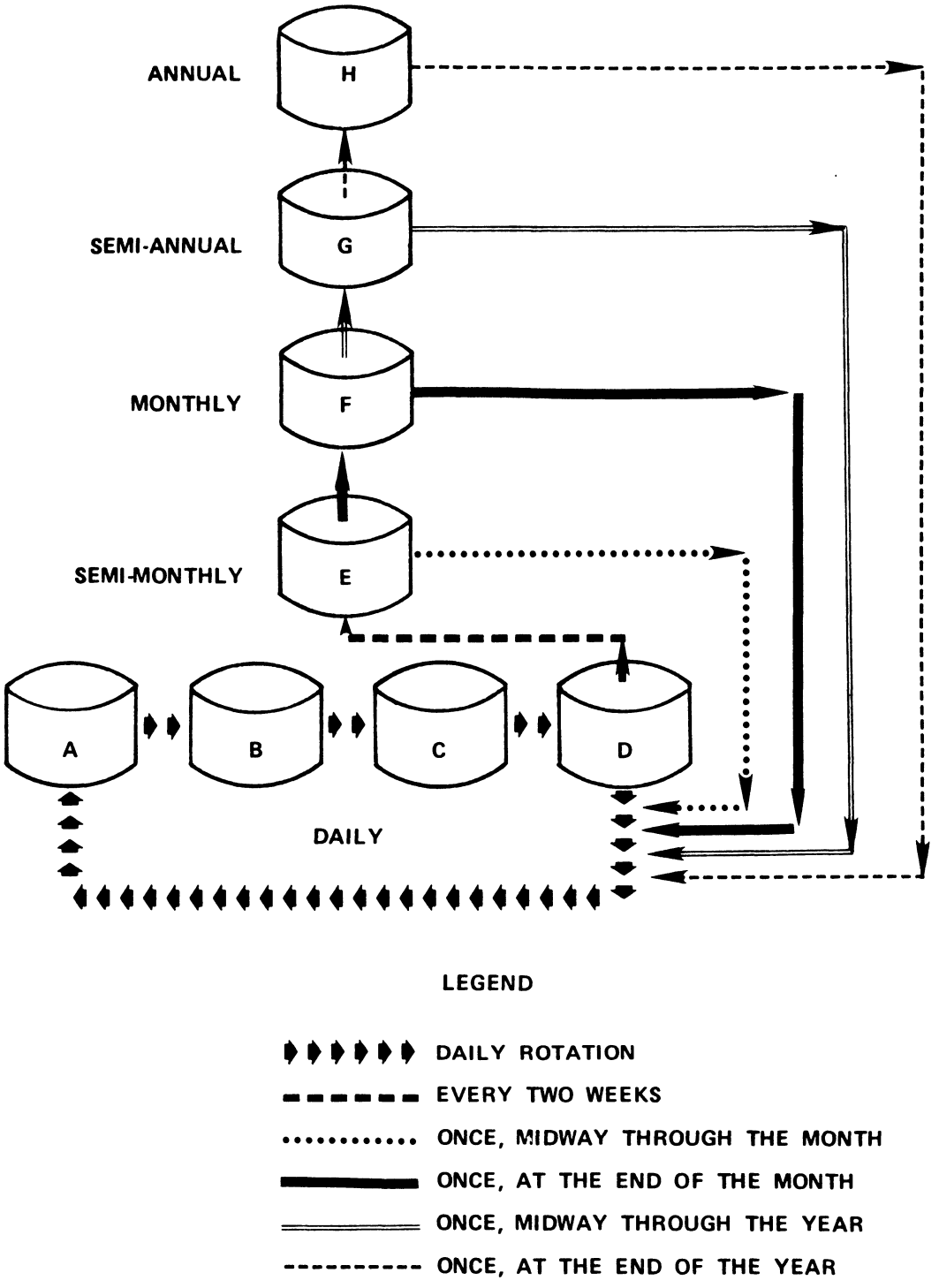


Figure A-1. Rotational Flow of Backup Disc Packs

A.2 DISC PACK ROTATION FOR A SMALL SYSTEM

A smaller installation (e.g., one that has only two disc packs) may also need to keep records and file copies on a semi-monthly, monthly, semi-annual, and annual basis. This can be done by using multiple disc packs for the daily rotation and adding four more disc packs for the semi-monthly, monthly, etc. file copies. The rotation is similar to the sequence shown for a large system (see Figure A-1).

A.3 BACKING UP TO 1/4-INCH STREAMER TAPE

Cylinder numbers and ranges must be entered during each back-up session. An individual logical unit should not be backed up unless a back-up copy of the entire disc is made first because a wrong cylinder value could conceivably be entered. Generally, the subsequent save and verify operations would report no errors but the logical unit would not have been completely backed up.

The procedure given below is based on the assumption that back-ups are done frequently but individual logical units are restored from tape infrequently. The recommended procedure for restoring a single logical unit is as follows:

1. Save the current contents of disk to tape.

2. Restore the back-up tape to disk.

3. Save the logical unit to be restored individually to tape.

4. Restore the current contents of disk from the tape made in Step 1.

5. Restore the desired logical unit from the tape made in Step 3.

This procedure has the following advantages:

- Requires fewer tapes
- Takes less time
- Prevents errors in entering parameters and the resulting loss of data

Of course, the specific conditions will dictate what kind of back-up procedure is best at any site.

Appendix B

IPL OPTIONS

Initial Program Load (IPL) is a procedure that reads the IRIS Operating System from disc into memory. Several options are available that determine how the operating system is loaded.

Option	Description
0	Loads two blocks containing BZUD and BTUP. Transfers control to BTUP.
1	Brings the system up into a full configuration. Retains DBUG, BTUP, BZUD, and the BZUD buffer area in memory.
2	Brings the system up into a minimum configuration. Retains DBUG, BTUP, BZUD, and the BZUD buffer area in memory.
3	Loads REX, SIR, BTUP, DBUG, and BZUD. Transfers control to DBUG.
<RETURN>	Brings the system up into a full configuration. Does not retain DBUG, BTUP, or BZUD in memory.

Appendix C

IRIS SYSTEM TRAPS

This appendix illustrates a typical trap and provides tables of traps showing the associated descriptions and the contents of the registers.

A trap message is displayed as follows:

```
Fault Record: __xxx__   ___x__
Trap #: 3   At: 4410
On (date):mm dd, yyyy (time): hh:mm:ss
Registers:  A0  A1  A2  A3  cb
Processor:  COPY
User Program: __name__
Account #: __lugguu___
```

where

```
   xxx - Fault record number
     x - Fault record number
     3 - Trap number in this example
  4410 - Octal location in this example
    A0 - Contents of register  A0
    A1 - Contents of register  A1
    A2 - Contents of register  A2
    A3 - Contents of register  A3
    cb - Carry bit (0 = off,1 = on)
  COPY - Name of processor in this example
lugguu - Logical unit, group, and user numbers
```

A Trap #3 at 4410 in COPY indicates a disc error (data check error, seek error, data channel late, or address check error) which was not recoverable in 16 retries and which occurred at location 4410 while running the COPY processor. In the case of a TRAP #3, the actual location in the calling processor (COPY in this example) is given in register A0.

In Tables C-1 thru C-4, the following notation is used:

```
a( ) - memory address of
d( ) - disc address of
==>  - implies
X    - register contains no useful information
```

Trap numbers 100 and greater occur only during an IPL, an INSTALL, or a Sysgen; the computer halts after any such trap unless it determines that a retry is possible.

TABLE C-1. TRAPS FROM REX

Trap No.	Reason	Contents of Registers		
		A0	A1	A2
0	Any JUMP or JSR to loc. 0, @0, or any soft fault.	(indeterminate, refer to listing)		
1	Disc is write protected.	Return address	RDA	Memory address
2	No such disc drive.	Return address	RDA	Memory address
3	Irrecoverable disc error.	Return address	RDA	Memory address
4	Disc timed out.	Return address	RDA	Memory address
5	Illegal disc address (RDA).	Return address	RDA	Memory address
6	Disc busy before transfer started.	Return address	RDA	Memory address
7	Inactive or illegal LU.	Return address	RDA	Memory address
10	Illegal memory address in a disc transfer.	Return address	RDA	Memory address
11	Writing HBA; but given LU or RDA do not match values in HBA.	Return address	RDA	Memory address
12	Error detected by DATAPUMP in a file header.	Return address	RDA	Memory address
13	Not enough blocks on LU #0 to expand an active file as required.	No. of blocks needed	X	X
14	Discsub calls nested too deep.	DISCSUB keyword	stack limit	a(keyword)
15	No such discsub number.	DISCSUB Subroutine no.	177777	a(keyword)
16	Bad directory in an indexed file.	Directory flags		
17	DATAPUMP latching or unlatching error or attempt to modify an unlatched buffer.	Return address	X	Memory address
20	BASIC not on the system disc (LU #0).	X	X	X

TABLE C-1. TRAPS FROM REX (Cont)

Trap No.	Reason	Contents of Registers		
		A0	A1	A2
21	BASIC has been given the wrong file type. File type for BASIC must be 33702.	X	Actual file type	a(BASIC header)
22	RUN not on system disc (LU #0).	X	X	X
23	RUN has been given wrong file type. File type for RUN must be be 33602.	X	Actual file type	a(RUN header)
24	RUNMAT has been given wrong file type. File type for RUNMAT must be 33402.	X	Actual file type	a(RUNMAT header)
25	User area is too small for the necessary stacks. Should not occur.	Required end of user area	End of user area	Start of user area
26	Illegal DATAPUMP command word.	Return address	X	X
27	Reserved			
30	Channel # specified in a CLEAR or ALLCLEAR call is illegal.	Channel no.	X	X
31	Reserved			
32	OUTBYTE called while output was active.	Return address	Return address from OUTTEXT	a(offending port)
33	Reserved			
34	Processor has run 25.6 seconds overtime.	X	X	X
35	RUN has detected a bad token. Impossible statement code from clobbered partition.	X	X	X
36	Illegal priority given in a call to QUEUE.	Return address	X	a(node used by QUEUE)
37	Attempt to dequeue the scheduler.	Return address	X	X
40	An attempt was made to wake up or extract a node which was not on any queue.	Return address	X	a(node)

TABLE C-1. TRAPS FROM REX (Cont)

Trap No.	Reason	Contents of Registers		
		A0	A1	A2
41	An attempt to put the scheduler to sleep.	Pause value	a(scheduler task node)	a(scheduler task node)
42	An attempt to return a node to the FREE chain which was still in a queue.	NSTS node	X	a(node)
43	Processor is requesting a partition size greater than can be supplied by the current system.	Requested partition size	maximum partition size	X
44	LOADUSER failed to select an area for the regnant user and end of area was reached.	0	X	0
45	$LUSR.LCM unable to swap Active File due to invalid LCM block # retrieved from Active File header.	Active File Size	Invalid LCM block # of Active File	RUS
46	Reserved			
47	RUP contents do not match user's PCB in partition area's table.	0	X	a(RUP.DFT)
50	BSACF set but BSA has been cleared.	X	X	X
51	Reserved			
52	LOADUSER has given away all of partition area.	0	X	a(partition entry)
53	Reserved			
54	Partition Linkage Error	File Header's Disc Address (DHDR)	Active File's Header Address (AHA)	Active File Header Buffer
55	Reserved			
56	I/O error on LCM	Block count	Block #	Error code: 4= I/O error 5= Power Fail 6= D.C. late 7= Illegal block 10= Time out

TABLE C-1. TRAPS FROM REX (Cont)

Trap No.	Reason	Contents of Registers		
		A0	A1	A2
57	Entire file not on LCM	X	X	X
60	Not enough blocks remaining on LCM	LCM block #	FUDA	a(new range table entry)
61	$LCM not active	X	X	X
62	Reserved			
63	A "BASIC" program is not in R8 format	X	X	X
64	Reserved			
65	Reserved			
66	Block flagged as being in fixed buffers cannot be located in any fixed buffer	Return address	X	X
67	Not on record boundary when doing channel function 100	X	X	X
70	Reserved			
71	Buffer pool has run out of buffers	X	X	X
72	Processor does not fit entirely within processor storage area (MEPS probably set too low)	X	X	X
73	Reserved			
74	Reserved			
75	Reserved			
76	Reserved			
77	Reserved			

TABLE C-2. TRAPS FROM SIR

Trap No.	Reason	Contents of Registers		
		A0	A1	A2
100	More than 16 sectors per track.	NTRK	20	a(LUVAR)
101	System disc or account out of space.	X	X	X
102	Block is already marked in DMAP.	x	RDA of block being marked	X
103	Bad INDEX header.	X	X	X
104	Config driver table >1 block in size.	X	X	X
105	Improper or illegal subroutine selected in residency list. (It is included when another is made resident.)	Subroutine no.	X	X
106	SCOPE not on disc or not a processor.	X	X	X
107	ACCOUNTS not on disc or not at block 3.	X	X	X
110	BYE not on disc or not a processor.	X	X	X
111	Insufficient memory as configured.	Memory address at overflow	X	Return address
112	PCA overlaps 'DBUG' or 32K.	a(end of port control area)	X	a(port control area)=PCA
113	No DISCSUBS, or DISCSUBS has a damaged header.	X	X	X
114	Two discsubs with same number.	X	X	Subroutine no.
115	Illegal discsub #.	X	X	Subroutine no.
117	Not enough memory for SYSGEN.	Memory request overflow	X	Return address
121	Insufficient memory for minimum configuration IPL.	X	X	X
122	Topword not there.	X	X	TOPW

TABLE C-2. TRAPS FROM SIR (Cont)

Trap No.	Reason	Contents of Registers		
		A0	A1	A2
123	Illegal value for EPS (end of processor storage)	X	X	X
124	PCA overlaps SIR	a(end of SIR)	PCA=a(port control area)	Size of PCA
125	Negative patch space size	Amount of overflow	ENDP	BPSP
127	Partition area (PSIZ) too small or too large (<4006 octal or >77406 words octal)	Partition size	Maximum size	Minimum size
130	LU (not 0) is too large (>65536 blocks); occurs during INSTALL	FUDA	FUDA overflow	X
132	Number of available blocks greater than number of blocks in logical unit	FUDA	AVBC	X
141	Cannnot allocate sufficient buffers	0	X	X
142	Insufficient memory to allocate adequate number of pool buffers	X	X	X
143	Active file size too large (>201 blocks, including header)	No. of blocks in active file	200	X
160	CONFIG driver uses assigned device code	X	a(in CONFIG of driver)	X
161	FAULTPRINT not on disc or not a processor	0	RDA of FAULTPRINT	33401
162	FAULTHISTORY not on disc or not contiguous	X	X	X
163	Reserved			

TABLE C-3. TRAPS FROM SYSGEN

Trap No.	Reason	Contents of Registers		
		A0	A1	A2
100	More than 16 sectors per track.	NTRK	20	a(LUVAR)
101	Not enough room to allocate the disc blocks.	X	X	X
102	Block is already marked in MAP.	X	RDA of block being marked	X
122	Topword not there.	X	X	TOPW
124	PCA overlaps SIR.	a(end of SIR)	PCA=a(port control area)	size of PCA
125	Negative patch space size.	Amount of overflow	ENDP	BPSP
131	LU #0 is too large (>32768).	FUDA for LU/0	100000	X
176	Reserved			
177	Patches overlap SOV.	BPSP	ENDP	X

TABLE C-4. TRAPS FROM PLOAD AND SYSGEN

Trap No.	Reason	Contents of Registers		
		A0	A1	A2
116	Gap in DISCSUBS tape.	177777	0==> Gap in tape	X
126	Disc full reading discsubs.	177777	X	X

Appendix D

BUG REPORT FORM

This appendix contains an IRIS "BUGFORM". The form may be copied and used to report any IRIS problems that may occur.

BUGFORM

(IRIS Problem Form)

PLEASE COMPLETE AND MAIL TO: POINT 4 Data Corporation
2569 McCabe Way, Irvine, CA 92714

INSTALLATION: _____ DATA: _____

PERSON REPORTING: _____ DATE OCCURRED: _____

PROCESSOR NAME: _____ DATE DUE: _____

PROBLEM DESCRIPTION:

HALT ADDR: HALT DATA:

ac0: ac1: ac2: ac3:

ac0: ac1: ac2: ac3:

CORRECTIVE ACTION TAKEN:

Corrected by: _____ Date: _____

COMMENT SHEET

MANUAL TITLE IRIS Operations Manual

PUBLICATION NO. SM-030-0010 REVISION 10

FROM: NAME/COMPANY: _____

BUSINESS ADDRESS: _____

CITY/STATE/ZIP: _____

COMMENTS: Your evaluation of this manual will be appreciated by POINT 4 Data Corporation. Notation of any errors, suggested additions or deletions, or general comments may be made below. Please include page number references where appropriate.

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