

## I. INTRODUCTION

### 1.1 THE MARK 2/4 DISUTILITY (DU.WDI)

The MARK 2/4 DISUTILITY (DU.WDI) is supplied by POINT 4 Data Corporation for use with the MARK 2/4 Peripherals Interface Board (PIB). The PIB uses Western Digital's WD1002-5 disk controller to interface the ST506-type disk drives.

DU.WDI is a stand-alone utility that is run when IRIS is not in memory. The utility contains interactive disk, diskette, and 1/4-inch tape program options, which are used to format disks and diskettes, perform backups, and to load IRIS or other software to and from the disk.

The DU.WDI utility can be supplied on cassette tape, 1/4-inch streamer tape, diskette, or as part of the system disk. This document describes procedures for loading the utility from tape or diskette. The procedure for loading a stand-alone utility from cassette tape is described in the CTUTILITY section of the IRIS R8 Installation and Configuration Manual.

The following writing conventions are used in this document:

- |                       |  |
|-----------------------|--|
| <u>User Input</u>     | User input is underlined; to enter user input, press <RETURN> at the end of the input                                |
| <u>&lt;RETURN&gt;</u> | Indicates a carriage return; this is <u>not</u> shown unless it is the only command or a second <RETURN> is required |
| <u>&lt;CTRL-x&gt;</u> | Indicates a control character where x is an alpha key; a <RETURN> is not required unless otherwise noted             |

## 1.2 LOADING THE DU.WDI UTILITY INTO MEMORY FROM DISKETTE OR TAPE

The procedure for loading the DU.WDI utility into memory is as follows:

1. Turn on the power switches at the rear of the computer.
2. Turn the OFF/ON/AUTO switch on the Mini-Panel to ON or AUTO.
3. Insert the diskette or the tape into the drive and latch the drive.
4. Press the RESET button on the Mini-Panel.
5. To load the DU.WDI utility from diskette, at the keyboard, enter

F

To load the DU.WDI utility from 1/4-inch tape, at the keyboard, enter

H

The DU.WDI utility is loaded into memory starting at location 0 and ending at location 67777 octal. When the program has been loaded, the following messages are displayed:

```
MARK 2T/4 DISC UTILITIES  
VERSION n.n mm dd, yyyy
```

```
- - - - NOTICE - - - -  
ALL NUMBERS ARE IN OCTAL  
TYPE 'H' FOR HELP ANYTIME
```

```
PROGRAM NAME:
```

where

```
          n.n - revision number  
mm dd, yyyy - revision date
```

6. Remove the diskette or tape from the drive.

### 1.3 INVOKING THE DU.WDI UTILITY

If the DU.WDI utility has been loaded onto the disk and IRIS is in memory, the system must be shut down before the program can be used.

To shut down the system and invoke the DU.WDI utility, at the IRIS system command prompt (#), enter

```
SHUTDOWN <CTRL-E>key<CTRL-E>DU.WDI
```

where

key - password assigned by the system manager;  
the default is X

The program displays the following identifying messages:

```
MARK 2T/4 DISC UTILITIES  
VERSION n.n mm dd, yyyy
```

```
- - - - NOTICE - - - -  
ALL NUMBERS ARE IN OCTAL  
TYPE 'H' FOR HELP ANYTIME
```

```
PROGRAM NAME:
```

where

n.n - revision number  
mm dd, yyyy - revision date

## 1.4 DU.WDI PROGRAMS

The DU.WDI utility includes the following program options:

- **FORMAT** - formats a specified disk or diskette, then makes a five-pass analysis. The program writes a unique header at the beginning of each sector. Surface analysis is then performed to detect bad sectors. If any bad sectors are found on the hard disk, they are reported as hard errors and chained to alternate tracks. If a hard error is detected on a diskette, no chaining takes place and the diskette should be discarded.
- **QUICK FORMAT** - formats a specified disk or diskette, then makes a two-pass analysis to detect sectors with hard errors. Any bad sectors found on a hard disk are chained to alternate tracks. No chaining takes place if a hard error is detected on a diskette. The Quick Format program should not be substituted for the Format program because it is less reliable. Quick Format should only be used by a technician to format a disk or diskette for hardware testing. The regular Format program should be run before a disk or diskette is used to store data.
- **COPY** - writes a specified source disk to a destination disk and then performs a data-verify on the destination.
- **VERIFY COPY** - reads the source and the destination disks specified and compares them word by word in memory to ensure that the data on the source disk and the data on the destination disk are the same.
- **IPL** - allows the user to load the IRIS System into memory.
- **SAVE** - transfers data from disk to diskette or streamer tape.
- **RESTORE** - transfers data from diskette or streamer tape to disk.
- **TAPE RETENSION** - rewinds the streamer tape.
- **STREAMER VERIFY** - compares the data on tape and the data on disk to ensure that they are identical.

The programs and certain options, such as prescan and entering bad sectors, can be suppressed by setting the appropriate bits in the the DU.WDI utility Program Option Word. The Program Options Word is described in Section IV.

## 2.2 DISK AND DISKETTE DRIVE PARAMETER HELP SCREEN/MESSAGE

A hard disk or diskette drive is identified by a numeric or mnemonic code. The disk and diskette drive parameter Help screen and message provide information for the identification codes, possible drive numbers, and the disk surfaces that may be used. These parameters are not required for a tape drive.

### 2.2.1 DRIVE TYPE

To display the numeric and mnemonic codes appropriate for the hard disk and diskette drives on the system, at the TYPE prompt, enter

H

An example of the resulting display is shown in Figure 2.

TYPE:H

ST506 WINCHESTER DRIVES

CODE	MNEMONIC	TYPE	CAPACITY	CYL'S	HEADS	SECT'S	MODEL
1	ATI20	WIN	20MB	1206	3	20	3020
2	ATI46	WIN	46MB	1206	7	20	3046
3	CM119	WIN	19MB	462	2	20	5619
4	CM112	WIN	12MB	462	4	20	5412
5	FUJ86	WIN	86MB	1362	13	20	M2243A5

5 1/4" FLOPPY DISKETTE DRIVES

CODE	MNEMONIC	TYPE	CAPACITY	CYL'S	HEADS	SECT'S	MODEL
12	F52D	FLOPPY	1MB	115	2	20	

TYPE:

Figure 2. Disk Drive Codes and Mnemonics Help Screen

The first column shows the numeric code appropriate for a drive type; the second column shows the mnemonic. Either the code or the mnemonic can be entered. For example, if the system is equipped with an Atasi 46-megabyte drive, enter either 2 or ATI46.

### 2.2.2 DRIVE NUMBER

The NUMBER prompt requests the drive number for a source and destination hard or floppy disk drive. The associated Help message indicates that the following four parameters can be entered:

NUMBER:H

0 THRU 3 FOR DISC

NO DEFAULT ALLOWED !! NUMBER:

A POINT 4 MARK 4 system may have up to three hard disk drives and, optionally one floppy disk drive. A POINT 4 MARK 2 has one hard disk and, optionally, one floppy disk drive.

Appropriate drive number parameters can be 0, 1, or 2 for the hard disk. Drive number 3 is physically assigned to the floppy disk drive. However, when formatting a diskette, enter 0 for the drive number. For systems with one hard disk and one floppy disk drive, the appropriate parameter is 0 for both types of drive.

### 2.2.3 SURFACE(S)

The SURFACE(S) prompt requests parameters for the disk or diskette surfaces that are to be used. The associated Help message indicates that the following parameters can be entered:

'ALL' FOR ALL SURFACES

'OPT,ALL' FOR SELECTIVE CYLINDERS ALL SURFACES

Enter ALL if the operation requires that the entire disk be used.

Enter OPT,ALL if only certain cylinders are to be processed. If OPT,ALL is entered, programs such as Verify Copy display the starting cylinder number and the total number of cylinders on the disk as shown in the following example:

THERE ARE A TOTAL OF 1206 CYLINDERS IN THIS DISC  
FIRST CYLINDER # IS 0

A starting cylinder number and the total number of cylinders to be used for the operation are then requested.

ENTER -

THE STARTING CYLINDER #:  
FOR HOW MANY CYLINDERS?

If the user invokes the Help module at the STARTING CYLINDER # prompt, the following message is displayed:

STARTING CYL # MUST BE LESS OR EQUAL TO LAST CYL #.  
DEFAULT INPUT IS NOT ALLOWED

These parameters must be entered in octal. If the number is not an octal number, the program asks

WHAT?

If the starting cylinder number or the total number of cylinders entered exceeds the number available, one of the following messages is displayed:

STARTING CYL # > THAN LAST CYL  
CYLINDER RANGE TOO GREAT

The STARTING CYLINDER # prompt is then displayed and the operation can be restarted.

Use care in entering these numbers. If a decimal number is entered in the range of 0-7, 10-17, 20-27, etc., the program accepts it as an octal number. An incorrect number can cause the program to overwrite the wrong portion of the disk.

## 2.3 PROGRAM REPORTS

Some of the DISCUTILITY programs display a report on the terminal that informs the user of the program's progress. At the end of the progress report, an error and status report is displayed. The format and content of the status report depend on the program being executed. Examples of error reports and messages are provided in the sections describing each individual program.

### 2.3.1 COPY PROGRAM REPORT

The Copy program displays a progress report in the following format:

```
COPYING  
CURRENT CYLINDER = nnnnn
```

where

nnnnn - current cylinder number

### 2.3.2 FORMAT PROGRAM REPORTS

The Format and Quick Format programs display two progress reports: one for format operation, and one for surface analysis operations. The cylinder number is incremented in 40-octal segments for each report in the following format:

```
FORMATTING  
CURRENT CYLINDER = nnnnn  
FORMAT DONE
```

```
SURFACE ANALYSIS  
WRITING  
CURRENT CYLINDER = nnnnn  
READING  
CURRENT CYLINDER = nnnnn  
DONE PASS 1  
WRITING  
CURRENT CYLINDER = nnnnn  
READING  
CURRENT CYLINDER = nnnnn  
DONE PASS 2
```

•  
•  
•

where

nnnnn - current cylinder number



### 2.3.3 VERIFY COPY PROGRAM REPORT

The Verify Copy program displays a progress report in the following format:

VERIFYING DESTINATION DISC DATA

CURRENT CYLINDER = nnnnn

where

nnnnn - current cylinder number

### 2.3.4 STREAMER TAPE VERIFY PROGRAM REPORT

The Streamer Verify program compares the data on the tape and disk based on checksums and record counts. A checksum is a mechanism for ensuring the accuracy of the data transmitted.

The checksums and record counts are displayed in the following format:

CHECKSUMMING TAPE

CHECKSUMS = 136005 65250 102075  
RECORD COUNT = 11320

CHECKSUMMING DISC

CHECKSUMS = 136005 65250 102075  
RECORD COUNT = 11320

### III. USING THE DISCUTILITY PROGRAMS

#### 3.1 FORMAT AND QUICK FORMAT PROGRAMS

The Format and Quick Format programs format a hard disk or diskette and then analyze the cylinders to check for bad media in the following sequence:

1. Format the disk
2. Write the headers of all sectors to disk
3. Prescan headers
4. Perform surface analysis

Format makes five passes to analyze the disk whereas Quick Format makes only two passes and thus may not detect all media errors. Each pass consists of writing a different data pattern out to disk, then reading it back to check for errors. On each pass, three read attempts are made before a sector is rejected as containing a hard error.

Prescan is a mechanism for ensuring that the previously chained blocks are subsequently chained following the format operation.

Hard errors are reported at the end of the formatting operation. An option is provided for entering hard errors found on a hard disk into the system. This option can also be used to enter the locations of bad sectors from the disk log supplied by the disk manufacturer. After the locations of the hard errors have been entered, they are chained to alternate sectors as described in Section 3.1.2.

Hard errors found on a diskette cannot be chained. The diskette should be discarded because any data written to it would not be reliable.

#### NOTE

Quick Format is generally used by a technician in the field for hardware testing. The regular Format program should be run before the disk or diskette is used to store data.

For the Format and five-pass analyze program, at the prompt, PROGRAM NAME, enter

F

For the Quick Format program, at the prompt, PROGRAM NAME, enter

Q

The sequence of parameter prompts for the Format and Quick Format programs is as follows:

TYPE OF DRIVE:  
DRIVE NUMBER:  
SURFACE(S):

The appropriate parameters are described in Sections 2.2.1 through 2.2.3.

A sample Format procedure on a hard disk with a good completion is shown in Figure 3. User input is underlined.

Figure 4 shows an example of formatting a diskette.

PROGRAM NAME: E  
TYPE OF DRIVE: 2  
DRIVE NUMBER: 0  
SURFACE(S): ALL

WHEN DRIVE IS READY, HIT RETURN TO START <RETURN>

READING ALTERNATE SECTOR INFORMATION

FORMATTING

CURRENT CYLINDER = nnnnn  
FORMAT DONE

SURFACE ANALYSIS

WRITING

CURRENT CYLINDER = nnnnn

READING

CURRENT CYLINDER = nnnnn

DONE PASS 1

WRITING

•

•

•

WRITING

CURRENT CYLINDER = nnnnn

READING

CURRENT CYLINDER = nnnnn

DONE PASS 5

ANALYSIS DONE

THIS OPTION ALLOWS MARGINAL OR KNOWN BAD SECTORS TO BE RE-ASSIGNED.

TYPE 'Y' TO ENTER BAD SECTORS OR RETURN. <RETURN>

TOTAL DISC ERRORS: HARD = 5 SOFT = 0

COUNT	SURFACE	TRACK	PHYSICAL SECTOR	LOGICAL SECTOR	DRIVE
HARD 1	1	401	11	3	1
HARD 1	1	611	4	7	1
HARD 1	2	253	10	15	1
HARD 1	2	263	20	13	1
HARD 1	4	11	21	0	1

HARD ERROR CHAINING COMPLETE

where

nnnnn - current cylinder in 40-octal segments

Figure 3. Sample Format Procedure on a 46MB Atasi Hard Disk

Note that the disk error log is displayed. If more hard errors are found than can be chained, an error message is displayed.

PROGRAM NAME: F  
TYPE OF DRIVE: F52D  
DRIVE NUMBER: 0  
SURFACE(S): ALL

WHEN DRIVE IS READY, HIT RETURN TO START <RETURN>

FORMATTING  
CURRENT CYLINDER = nnnnn  
FORMAT DONE

SURFACE ANALYSIS  
WRITING  
CURRENT CYLINDER = nnnnn  
READING  
CURRENT CYLINDER = nnnnn  
DONE PASS 1  
WRITING  
CURRENT CYLINDER = nnnnn  
READING  
CURRENT CYLINDER = nnnnn  
DONE PASS 2  
WRITING  
CURRENT CYLINDER = nnnnn  
READING  
CURRENT CYLINDER = nnnnn  
DONE PASS 3  
WRITING  
CURRENT CYLINDER = nnnnn  
READING  
CURRENT CYLINDER = nnnnn  
DONE PASS 4  
WRITING  
CURRENT CYLINDER = nnnnn  
READING  
CURRENT CYLINDER = nnnnn  
DONE PASS 5

ANALYSIS DONE

TOTAL DISC ERRORS: HARD = 0 SOFT = 0

where

nnnnn - current cylinder in 40-octal segments

Figure 4. Sample Format Procedure on a Diskette

Note that the program does not prescan alternate sector information and that there is no option for entering bad sectors. The diskette should be discarded if any hard errors are found.

### 3.1.1 ERROR MESSAGES

In addition to the hard and soft error reports, the Format programs may display a number of error messages.

- **READING ALTERNATE SECTOR INFO. UNSUCCESSFUL PRESS 'C' TO CONTINUE** - the disk error list supplied by the manufacturer has not been entered into the disk error map or the map has been cleared. Therefore, bad sectors have not been chained. Any of the following conditions may cause the error log to be cleared:

- Prescan has been inhibited
- Format or Quick Format has been aborted before the program completed
- Diagnostics program has been aborted before it completed

The procedure for entering bad sector information is described in Section 3.1.2.

- **TOO MANY HARD ERRORS !!** - more bad sectors were found than could be chained to alternate sectors. This may be an indication that the disk has become unusable or that a hardware problem (e.g., head positioning) exists.

### 3.1.2 ENTERING BAD SECTORS INTO THE DISK ERROR MAP

Bad sector information can be entered into the disk error map if the user wishes to chain sectors that have developed bad surfaces, or the following message is displayed:

READING ALTERNATE INFO. UNSUCCESSFUL PRESS 'C' TO CONTINUE

At the keyboard, enter

C

The program proceeds to format and analyze the disk. Upon completion, the user is given the option to enter bad sectors into the disk error map. The system manager can suppress this option as described in Section IV.

For IRIS systems, bad sector information must be entered in octal.

When using this option, make sure that the surface, track, and sector information entered is correct before logging the information. Entry of an incorrect location can result in unreliable data or a waste of disk space.

A sample procedure for entering bad sectors into the disk error map is shown in Figure 5.

ANALYSIS DONE

THIS OPTION ALLOWS MARGINAL OR KNOWN BAD SECTORS TO BE RE-ASSIGNED.

TYPE 'Y' TO ENTER BAD SECTORS OR RETURN. **Y**

ERROR LOG PRINTOUT & INSERTION IN DECIMAL ? (Y OR CR, CR INDICATES OCTAL) <RETURN>

TOTAL DISC ERRORS: HARD = 5 SOFT = 0

RULES FOR ENTERING BAD SECTORS.

ENTER SURFACE TRACK AND SECTOR FOR EVERY BAD AREA.

\*\*\*\*\* NOTE: SECTOR NUMBERS ENTERED ARE PHYSICAL RATHER THAN LOGICAL.

DO YOU WISH TO INPUT SECTOR INFO AS A BYTE OFFSET ? (N= INPUT AS SECTOR #):**N**

SURFACE 1  
TRACK 401  
SECTOR 11  
OK TO LOG? **Y**

SURFACE 1  
TRACK 611  
SECTOR 4  
OK TO LOG? **Y**

SURFACE 2  
TRACK 253  
SECTOR 10  
OK TO LOG? **Y**

SURFACE 2  
TRACK 263  
SECTOR 20  
OK TO LOG? **Y**

SURFACE 4  
TRACK 11  
SECTOR 21  
OK TO LOG? **Y**

SURFACE <RETURN>

TOTAL DISC ERRORS: HARD = 5 SOFT = 0

			PHYSICAL	LOGICAL	
COUNT	SURFACE	TRACK	SECTOR	SECTOR	DRIVE
HARD 1	1	401	11	3	1
HARD 1	1	611	4	7	1
HARD 1	2	253	10	15	1
HARD 1	2	263	20	13	1
HARD 1	4	11	21	0	1

HARD ERROR CHAINING COMPLETE

WARNING

FORMAT has encountered tracks with multiple HARD errors. These errors have been CHAINED to good sectors. However, Do NOT use this format option if your operating system is not IRIS 8.2C1 or later.

Using this format with 8.2C or earlier versions may cause serious data loss!!

Figure 5. Example of Entering Bad Sectors



### 3.2 COPY PROGRAM

The disk-to-disk Copy program reads data from a specified source and writes it to a specified destination. The program can be used to copy data from a specified cylinder number to another on the same drive or to copy data from one disk drive to another drive of the same type on a multidrive system. The program aborts if the source and destination drives are not the same type of drive.

If the program is used to copy data from one location on disk to another on the same drive, care must be taken not to overwrite cylinders that contain needed data. This procedure can be used for making a spare copy of the system logical unit.

The program requests drive type, drive number, and surface parameters for the source drive and, as appropriate, for the destination drive. Valid parameters for these prompts are described in Sections 2.2.1 through 2.2.3.

A sample procedure for copying data to the same drive is shown in Figure 6. Figure 7 provides a sample procedure for copying data to another drive.

```
PROGRAM NAME: C
SOURCE DRIVE -
TYPE: CMI12
NUMBER: 0
SURFACE(S): OPT.ALL

THERE ARE TOTAL OF 462 CYLINDERS IN THIS DISC.
FIRST CYLINDER # IS 0

ENTER -
  THE STARTING CYLINDER #: 0
  FOR HOW MANY CYLINDERS? 53

TO THE SAME DRIVE? Y
SURFACE(S): OPT.ALL
ENTER -
  THE STARTING CYLINDER #: 406

WHEN DRIVE IS READY, HIT RETURN TO START <RETURN>

COPYING
CURRENT CYLINDER = nn

TOTAL DISC ERRORS: HARD = 0   SOFT = 0
COPY DONE

where
  nn - current cylinder in 40-octal segments
```

Figure 6. Sample Procedure for Copying Data to the Same Drive

```

PROGRAM NAME: C
SOURCE DRIVE -
TYPE: 2
NUMBER: 0
SURFACE(S): ALL

TO THE SAME DRIVE? N

DESTINATION DRIVE -
TYPE: 2
NUMBER: 1
SURFACE(S): ALL
COPYING
CURRENT CYLINDER nnnn

TOTAL DISC ERRORS: HARD = 0   SOFT = 0
COPY DONE

```

where

nnnn - current cylinder in 40-octal  
segments

Figure 7. Sample Procedure for Copying Data  
to Another Drive

The Copy program reports any hard and soft errors that were found. The user can determine on which drive the errors occurred because the error count is displayed by drive number.

A report of a hard error indicates a sector that could not be read in three attempts, or could not be written to. A report of a soft error indicates that data was successfully read from a marginal sector.

A soft error could have been found while reading from the source disk and corrected by the error correction code (ECC) capability of the hardware. The ECC capability is in effect only during the read phase of the program; it is not in effect for the write phase of the program.

ECC writes a trailer containing a code to the destination disk, the data is written successfully to the destination, and the program reports a soft error for the source. The questionable sector on the source disk is not chained to an alternate sector. The write phase of a subsequent Copy or Restore operation will probably report a nonrecoverable hard error for that sector on the disk. The user should create a backup copy of the disk and then reformat the disk before using it again.

If a recent backup copy on another disk or other media is not available, it is advisable to create a backup of any disk reporting a hard error. The disk should then be reformatted before data is copied or restored to it.

### 3.3 VERIFY COPY PROGRAM

The Verify Copy program reads data from a specified source disk into memory. The data in memory is then compared to the data on a specified destination disk. The source and destination can be on the same disk drive.

A sample procedure for verifying data on different drives is shown in Figure 8. Figure 9 provides an example of verifying data on the same drive.

```
PROGRAM NAME: Y
SOURCE -
TYPE: 2
NUMBER: 0
SURFACE(S): OPT.ALL

THERE ARE A TOTAL OF 1206 CYLINDERS IN THIS DISC
FIRST CYLINDER # IS 0

ENTER -
  THE STARTING CYLINDER #: 0
  FOR HOW MANY CYLINDERS? 40

TO THE SAME DRIVE? Y

SURFACE(S): OPT.ALL
ENTER -
  THE STARTING CYLINDER #: 1140
VERIFYING DESTINATION DISC DATA
CURRENT CYLINDER = 37
VERIFY DONE
```

**Figure 8. Sample Procedure for Verifying Data  
on Different Drives**

PROGRAM NAME: Y  
SOURCE -  
TYPE: 2  
NUMBER: 0  
SURFACE(S): OPT.ALL

THERE ARE A TOTAL OF 1206 CYLINDERS IN THIS DISC  
FIRST CYLINDER # IS 0

ENTER -  
THE STARTING CYLINDER #: 0  
FOR HOW MANY CYLINDERS? 40

TO THE SAME DRIVE? N

DESTINATION DRIVE -  
TYPE: 2  
NUMBER: 2  
SURFACE(S): OPT.ALL

ENTER -  
THE STARTING CYLINDER #: 0  
VERIFYING DESTINATION DISC DATA  
CURRENT CYLINDER = 37  
VERIFY DONE

**Figure 9. Sample Procedure for Verifying Data  
on the Same Drive**

The Verify Copy program displays the cylinder, head, and sector numbers for any data compare error that is found.

Data compare errors indicate that there are problem areas on the disk. However, the user may have specified the wrong location on the source or destination. It is advisable to rerun the Copy and the Verify Copy programs before deciding that the disk has developed bad areas.

The user can press <ESC> to stop the display.

Figure 10 provides an example of data compare error messages.

PROGRAM NAME: Y  
SOURCE -  
TYPE: 2  
NUMBER: 0  
SURFACE(S): DPT,ALL

THERE ARE A TOTAL OF 1206 CYLINDERS IN THIS DISC  
FIRST CYLINDER # IS 0

ENTER -  
THE STARTING CYLINDER #: 0  
FOR HOW MANY CYLINDERS? 40

TO THE SAME DRIVE? N

DESTINATION DRIVE -  
TYPE: 2  
NUMBER: 2  
SURFACE(S): DPT,ALL  
ENTER -

THE STARTING CYLINDER #: 0  
VERIFYING DESTINATION DISC DATA

DATA COMPARE ERROR  
CYL 0 HEAD 0 SECT 0  
DATA COMPARE ERROR  
CYL 0 HEAD 1 SECT 0  
DATA COMPARE ERROR  
CYL 0 HEAD 2 SECT 0  
DATA COMPARE ERROR  
CYL 0 HEAD 3 SECT 0  
DATA COMPARE ERROR  
CYL 0 HEAD 4 SECT 0  
DATA COMPARE ERROR  
CYL 0 HEAD 5 SECT 0  
DATA COMPARE ERROR  
CYL 1 HEAD 0 SECT 0  
DATA COMPARE ERROR  
CYL 1 HEAD 1 SECT 0

•  
•  
•

Figure 10. Example of Verify Copy Error Messages

### **3.4 SAVE DISK PROGRAM**

The Save Disk program reads from a specified hard disk and writes to diskette or 1/4-inch tape. The user can save all the data on the hard disk or specify a cylinder range.

Verification of the data is done automatically for a disk-to-diskette operation. For disk-to-tape operations, data verification is an option. It is advised that this option be used to avoid problems caused by bad data.

The DU.WDI utility also offers a separate program, Streamer Verify, for verifying the data on tape. The Streamer Verify program is described in Section 3.6.

The Save program prompts for source drive parameters in the following sequence:

Type of drive (TYPE)  
Drive Number (NUMBER)  
Surface(s)

Destination drive parameters are requested only for saving to diskette.

Valid parameters for these prompts are described in Sections 2.2.1 through 2.2.3. The user can invoke Help messages at any of these prompts.

Make sure that the destination media is not write-protected. The write-protect notch on diskettes and the write-protect switch on streamer tapes are described in the MARK 2 User Guide.

#### **3.4.1 SAVING TO DISKETTE**

Diskettes that are used in a Save operation must be formatted. Two or three extra formatted scratch diskettes should be at hand to avoid restarting the program if a diskette has bad surfaces. The procedure for formatting diskettes is described in Section 3.1.

The program informs the user when to remove a diskette and how to label it. If more than one diskette is required for a Save operation, the user is informed when to insert the next diskette.

Although the prompts use the term, DISC, for both the hard disk and the diskette, prompts referring to the source (i.e., hard disk) are clearly distinguishable from the destination (i.e., diskette).

If the Save operation did not complete successfully, and any hard errors are displayed for the source, the data on the hard disk could not be read. Try the program with a backup copy of that disk.

Figures 11 and 12 show examples of disk-to-diskette operations. The example in Figure 11 shows the procedure required for saving all the data on the hard disk; Figure 12 shows the procedure for saving a specified range of cylinders.

PROGRAM NAME: S  
SAVE TO TAPE OR DISC (T/D) ? D  
SOURCE DRIVE -  
TYPE: A  
NUMBER: 0  
SURFACE(S): ALL

DESTINATION DRIVE -  
TYPE: 12

KEY IN CREATION DATE MM-DD-YY 04-01-85

NUMBER OF FORMATTED DISCS REQUIRED 16

WHEN DRIVE IS READY, HIT RETURN TO START <RETURN>

SAVING SOURCE DISC

REMOVE DISC & LABEL AS FOLLOWS:  
CREATION DATE 04-01-85 SEQUENCE 1 OF 16

MOUNT DISC 2 AND PRESS RETURN <RETURN>

REMOVE DISC & LABEL AS FOLLOWS:  
CREATION DATE 04-01-85 SEQUENCE 2 OF 16

•  
•  
•

REMOVE DISC AND LABEL AS FOLLOWS:  
CREATION DATE 04-01-85 SEQUENCE 16 OF 16

TOTAL DISC ERRORS: HARD = 0 SOFT = 0  
OPERATION COMPLETED

Figure 11. Example of a Save Operation for Multiple Diskettes

PROGRAM NAME: S  
SAVE TO TAPE OR DISC (T/D) ? D  
SOURCE DRIVE -  
TYPE: CMI12  
NUMBER: 0  
SURFACE(S): DPT,ALL

THERE ARE A TOTAL OF 462 CYLINDERS IN THIS DISC.  
FIRST CYLINDER # IS 0

ENTER -  
THE STARTING CYLINDER #: 0  
FOR HOW MANY CYLINDERS? 2

DESTINATION DRIVE -  
TYPE: F52D

KEY IN CREATION DATE MM-DD-YY 04-01-85

NUMBER OF FORMATTED DISCS REQUIRED 1

WHEN DRIVE IS READY, HIT RETURN TO START

SAVING SOURCE DISC

REMOVE DISC & LABEL AS FOLLOWS:  
CREATION DATE 04-01-85 SEQUENCE 1 OF 1

TOTAL DISC ERRORS: HARD = 0 SOFT = 0  
OPERATION COMPLETED

**Figure 12. Example of a Save Operation  
for a Single Diskette**



### 3.4.2 SAVING TO 1/4-INCH TAPE

The disk-to-tape operation includes the option to verify the data. A checksum is the result of calculations performed on the data to ensure its accuracy. The program first checksums the data written to tape and then checksums the data on the hard disk. It is advised that the Verify option be used.

The checksums displayed at the completion of the Save operation should be noted on the streamer tape label. When the tape is used for a Restore operation, the checksums displayed by the Restore program should match the checksums noted on the label.

If the checksums displayed at the completion of the Save program do not match, the tape may be worn out. Rerun the program using a new tape.

The program requests that the user enter both a creation date and a descriptor. The descriptor is intended to indicate the contents of the tape and can be up to 50 characters in length. If more than one tape is required for a Save operation, the program writes the sequence information automatically on the tape itself. The sequence information and the information entered by the user is displayed when the end-of-tape mark is detected. The sequence information, the date, and descriptor should be written on the streamer tape label when the tape is removed from the drive. The program informs the user when to remove a tape, how to label it, and when to mount the next tape.

Figure 13 shows an example of a disk-to-tape operation.

PROGRAM NAME: S  
SAVE TO TAPE OR DISC (T/D) ? I  
SOURCE DRIVE -  
TYPE: 2  
NUMBER: 0  
SURFACE(S): ALL

Y KEY IN CREATION DATE MM-DD-YY 04-01-85  
DESCRIPTOR: SYSTEM LU/0

WHEN BOTH DISC AND TAPE ARE READY, HIT RETURN TO START <RETURN>

STREAMING TO TAPE

REMOVE TAPE & LABEL AS FOLLOWS:  
CREATION DATE 04-01-85 SEQUENCE 1  
DESCRIPTOR: SYSTEM LU/0

MOUNT TAPE 2 AND PRESS RETURN  
STREAMING TO TAPE

TRANSFER COMPLETE

TOTAL DISC ERRORS: HARD = 0 SOFT = 0  
NO TAPE ERROR

REMOVE TAPE & LABEL AS FOLLOWS:  
CREATION DATE 04-01-85 SEQUENCE 2 OF 2  
DESCRIPTOR: SYSTEM LU/0

VERIFY TAPE AGAINST DISC ? Y  
MOUNT TAPE 1 AND PRESS RETURN <RETURN>

CHECKSUMMING TAPE

REMOVE STREAMER TAPE CARTRIDGE  
MOUNT TAPE 2 AND PRESS RETURN <RETURN>

CHECKSUMMING TAPE

CHECKSUMS= 52473 37470 3  
RECORD COUNT= 0000215240

CHECKSUMMING DISC

CHECKSUMS= 52473 37470 3  
RECORD COUNT= 0000215240

GOOD VERIFY - RECORD CHECKSUMS FOR FUTURE REFERENCE

Figure 13. Example of a Disk-to-Tape Save Operation

### 3.4.3 SAVE PROGRAM ERROR MESSAGES

The Save program may display the following error messages:

TAPE (or DISC) IS WRITE PROTECTED OR NO TAPE (or DISC).  
HIT 'C' TO CONTINUE

Check whether the tape or diskette has been inserted properly in the drive. If the medium was inserted properly, check the write-protect switch on the streamer tape or the write-protect notch on the diskette. When the problem has been corrected, at the keyboard, enter

C

DISC CANNOT RECEIVE DATA RELIABLY

REMOVE DISC

MOUNT FORMATTED DISC & PRESS RETURN

Insert another formatted scratch diskette and press <RETURN>.

### **3.5 RESTORE DISK PROGRAM**

The Restore Disk program reads from 1/4-inch tape or diskette and writes to the hard disk. The user can restore data to the whole disk or specify a range of cylinders.

Verification of the data is done automatically for a diskette-to-disk operation. For a tape-to-disk operation, data verification is an option. It is advised that this option be used to avoid problems with bad data.

The program prompts for destination drive parameters in the following sequence:

Type of Drive (TYPE)  
Drive Number (NUMBER)  
Surface(s)

Source drive parameters are requested only for diskette-to-disk operations.

Valid parameters for these prompts are described in Sections 2.2.1 through 2.2.3. The user can invoke Help messages at any of these prompts.

The program requests the user to enter the creation date for both diskette and tape operations. A descriptor is requested only for the tape-to-disk operation. The creation date and descriptor must be entered exactly as noted on the exterior label of the media.

Make sure that the source medium is write-protected. The write-protect notch on diskettes and the write-protect switch on streamer tapes are described in the MARK 2 User Guide.

#### **3.5.1 RESTORING FROM DISKETTE**

Data is verified automatically. If the program reports hard errors for the source, use an earlier backup diskette. If the diskette is supplied by POINT 4, report the problem to your supplier.

The user is informed when to remove a diskette and how to label it. If more than one diskette is required for a Restore operation, the user is informed when to insert the next diskette.

Although the prompts use the term, DISC, for both the hard disk and the diskette, prompts referring to the source are clearly distinguishable from the destination.

Figure 14 shows an example of a diskette-to-disk operation using a single diskette. Figure 15 shows an example of a diskette-to-disk operation using multiple diskettes.

PROGRAM NAME: R  
RESTORE FROM TAPE OR DISC ? D  
SOURCE DRIVE -  
TYPE: 12

DESTINATION DRIVE -  
TYPE: 2  
NUMBER: 1  
SURFACE(S): DPT,ALL

THERE ARE A TOTAL OF 1206 CYLINDERS IN THIS DISC  
FIRST CYLINDER # IS 0

ENTER -  
THE STARTING CYLINDER #: 0  
FOR HOW MANY CYLINDERS? 2

KEY IN CREATION DATE MM-DD-YY 02-26-84

WHEN DRIVE IS READY, HIT RETURN TO START <RETURN>

RESTORING DISC

TOTAL DISC ERRORS: HARD = 0 SOFT = 0  
OPERATION COMPLETED

Figure 14. Example of a Diskette-to-Disk Operation  
Using a Single Diskette

PROGRAM NAME: R  
RESTORE FROM TAPE OR DISC ? D  
SOURCE DRIVE -  
TYPE: 12

DESTINATION DRIVE -  
TYPE: 4  
NUMBER: 0  
SURFACE(S): ALL

KEY IN CREATION DATE MM-DD-YY 10-26-84

WHEN DRIVE IS READY, HIT RETURN TO START

RESTORING DISC

REMOVE DISC  
MOUNT DISC 2 AND PRESS RETURN <RETURN>  
REMOVE DISC  
MOUNT DISC 3 AND PRESS RETURN <RETURN>  
REMOVE DISC

•  
•  
•

TOTAL DISC ERRORS: HARD = 0 SOFT = 0  
OPERATION COMPLETED

Figure 15. Example of a Diskette-to-Disk Operation  
Using Multiple Diskettes

### 3.5.2 RESTORING FROM 1/4-INCH TAPE

The tape-to-disk operation includes the option to verify the data. The option first checksums the data read from tape and then checksums the data written to the hard disk. It is advised that the Verify option be used to avoid problems caused by bad data.

The checksums displayed by the Restore program should match the checksums written on the cassette tape label.

If the checksums displayed at the completion of the Restore program do not match the checksums written on the label or the checksums for the tape do not match the checksums for the disk, the tape may be worn out. Rerun the program using an earlier backup tape. If the tape was supplied by POINT 4, report the problem to your supplier.

The program requests that the user enter both a creation date and a descriptor. These must be entered exactly as noted on the tape label.

If more than one tape is required for a Restore operation, the user is informed when to mount the next tape in sequence.

The tape-to-disk Restore program allows the user two options and an override of error conditions. The options are the validation of the creation date and descriptor, and the verification of the data. It is advised that both options be used to ensure the proper transfer of data.

#### CAUTION

If an error condition results from the failure of label validation, or from a discrepancy in the disk parameters, the override will allow the user to continue. However, the override should be used only with extreme caution.

Figure 16 shows an example of a tape-to-disk operation. Included in that example are two errors. The first error is caused by an incorrect entry of the descriptor. Because this error involved spacing and not an incorrect tape label, the error condition is overridden.

The second error concerns disk parameters. When a tape is created, the tape header label contains the parameters of the disk under which the tape was created. For example, a user creates a tape of a logical unit for transport to another system. When the tape is Restored on the other system (which is different from the original system, e.g., type of disk starting cylinder number of cylinders, etc.), the error message shown in the example will be displayed. Before overriding any error messages, the user should make sure that the correct tape is used and that the correct location on disk is specified.

PROGRAM NAME: R  
RESTORE FROM TAPE OR DISC ? I

DESTINATION DRIVE -

TYPE: 2

NUMBER: 0

SURFACE(S): ALL

IF VALIDATION OF DESCRIPTION AND DATE IS NOT DESIRED ENTER A "1" <RETURN>

KEY IN CREATION DATE MM-DD-YY 02-13-85

DESCRIPTOR: POINT 4

WHEN BOTH DISC AND TAPE UNITS ARE READY, HIT RETURN TO START <RETURN>

THE FOLLOWING TAPE LABEL IS IN ERROR:

VOLUME SEQUENCE #: 1

CREATION DATE 02-13-85

DESCRIPTOR: POINT 4

TO CONTINUE WITH THIS TAPE ENTER A ! (EXCLAMATION POINT) I

THE DISC PARAMETERS USED WHEN THIS TAPE WAS CREATED DISAGREE  
WITH THOSE YOU HAVE SPECIFIED FOR THIS OPERATION:

	<u>WHEN CREATED</u>		<u>YOUR INPUT</u>
STARTING CYLINDER:	00000		00000
NO. OF CYLINDERS:	00053	DIFFERS FROM	01206
NO. OF HEADS:	00007		00007
NO. OF SECTORS/TRACK:	00020		00020
NO. CYLS ON THIS DISC:	01206		01206
DISC UTILITY:	WDI		WDI

TO CONTINUE THIS OPERATION USING YOUR INPUT, ENTER A '!' (EXCLAMATION POINT) I  
STREAMING FROM TAPE  
TRANSFER COMPLETE

TOTAL DISC ERRORS: HARD = 0 SOFT = 0

NO TAPE ERROR

VERIFY TAPE AGAINST DISC ? X

CHECKSUMMING TAPE

CHECKSUMS= 136005 65250 102075

RECORD COUNT= 11300

CHECKSUMMING DISC

CHECKSUMS= 136005 65250 102075

RECORD COUNT= 11300

GOOD VERIFY - RECORD CHECKSUMS FOR FUTURE REFERENCE

Figure 16. Example of a Tape-to-Disk Operation



### 3.5.3 RESTORE PROGRAM ERROR MESSAGES

The Restore program may display the following error messages:

THE FOLLOWING TAPE LABEL IS IN ERROR:  
VOLUME SEQUENCE #: n  
CREATION DATE: mm-dd-yy  
DESCRIPTOR: xxxxxxxx

TO CONTINUE WITH THIS TAPE ENTER A ! (EXCLAMATION POINT)

The label information displayed by the Restore program is read from the internal tape label (i.e., label written by the Save program). Check your input, which should be visible on the terminal before using the override.

KEY IN DATE mmddy  
DATE FROM DISC mm-dd-yy DO NOT AGREE !!!!

The first line repeats the user input. The second line displays the creation date read from the internal diskette label (i.e., date written by the Save program). Before entering the date displayed on the second line, make sure it identifies the correct diskette. No override is allowed.

DISC (or TAPE) JUST INSERTED IS OUT OF SEQUENCE !!  
MOUNT DISC (or TAPE) n AND PRESS RETURN

Remove the diskette or tape and insert the correct one before pressing <RETURN>.

THE DISC PARAMETERS USED WHEN THIS TAPE WAS CREATED DISAGREE  
WITH THOSE YOU HAVE SPECIFIED FOR THIS OPERATION:

	<u>WHEN CREATED</u>	<u>YOUR INPUT</u>
STARTING CYLINDER:	00000	00000
NO. OF CYLINDERS:	aaaaa DIFFERS FROM	bbbbbb
NO. OF HEADS:	aaaaa DIFFERS FROM	bbbbbb
NO. OF SECTORS/TRACK:	aaaaa DIFFERS FROM	bbbbbb
NO. CYLS ON THIS DISC:	aaaaa DIFFERS FROM	bbbbbb
DISC UTILITY:	WDI	WDI

TO CONTINUE THIS OPERATION USING YOUR INPUT, ENTER A '!' (EXCLAMATION POINT)

This type of message may indicate that the tape was created on a different type of disk drive. Nonzero logical units can be transferred from one type of disk drive to another. This procedure is described in the IRIS R8 Operations Manual and in the IRIS R8 Release Notes. Do not use the override unless this is a deliberate transfer of data from one type of drive to another.

## 3.6 STREAMER VERIFY PROGRAM

The Streamer Verify program reads data from tape and from disk, calculates checksums, and accumulates a record count. The data is verified if the checksums and the record counts match.

The Streamer Verify program can be used at any time to verify the data on the tape using the tape checksums and block count written on the tape label. This information must have been written on the tape label by the person who created the tape.

Figure 17 shows an example of a Streamer Tape operation with a successful completion.

```
PROGRAM NAME: STR
SOURCE DRIVE -
TYPE: 2
NUMBER: 0
SURFACE(S): OPT.ALL

THERE ARE A TOTAL OF 1206 CYLINDERS IN THIS DISC
FIRST CYLINDER # IS 0

ENTER -
  THE STARTING CYLINDER #: 0
  FOR HOW MANY CYLINDERS? 53
IF VALIDATION OF DESCRIPTION AND DATE IS NOT DESIRED ENTER A '!' <RETURN>

KEY IN CREATION DATE MM-DD-YY 02-13-85
DESCRIPTOR: POINT 4

WHEN BOTH DISC AND TAPE UNITS ARE READY, HIT RETURN TO START <RETURN>

CHECKSUMMING TAPE

CHECKSUMS= 136005 65250 102075
RECORD COUNT= 11320

CHECKSUMMING DISC

CHECKSUMS= 136005 65250 102075
RECORD COUNT= 11320

GOOD VERIFY - RECORD CHECKSUMS FOR FUTURE REFERENCE
```

Figure 17. Example of a Streamer Verify with a Successful Completion

Figure 18 shows an example of an unsuccessful completion. The program failed to verify the data because the data on the whole disk was specified but the tape contained data saved from only a portion of that disk. Care must be taken to specify the correct starting cylinder and number of cylinders to be verified.

PROGRAM NAME: STR  
SOURCE DRIVE -  
TYPE: 2  
NUMBER: 0  
SURFACE(S): ALL

IF VALIDATION OF DESCRIPTION AND DATE IS NOT DESIRED ENTER A '!' <RETURN>

KEY IN CREATION DATE MM-DD-YY 02-13-85  
DESCRIPTOR: POINT 4

WHEN BOTH DISC AND TAPE UNITS ARE READY, HIT RETURN TO START <RETURN>

CHECKSUMMING TAPE

CHECKSUMS= 75052 37520 107440  
RECORD COUNT= 00176

CHECKSUMMING DISC

CHECKSUMS= 33041 67024 3  
RECORD COUNT= 0000215240

BAD VERIFY

Figure 18. Example of a Streamer Verify with an Unsuccessful Completion

### 3.7 TAPE PROGRAM

The Tape program winds the tape forward and then rewinds it to adjust the tension for optimum performance.

It is advisable to retension the tape after it has been used three or four times. The procedure takes very little time and can prevent time-consuming tape malfunction.

Upon completion of the procedure, the PROGRAM NAME prompt is displayed. Figure 19 shows an example of using the Tape program.

PROGRAM NAME: TAPE

WHEN TAPE UNIT IS READY, HIT RETURN TO START <RETURN>

RETENSIONING TAPE

PROGRAM NAME:

Figure 19. Sample Procedure for Using the Tape Program

### 3.8 IPL PROGRAM

The IPL program loads the IRIS Operating System into memory from a specified disk drive. After IRIS is loaded into memory, the user should proceed with entering the date and time and installing logical units as described in the IRIS R8 Operations Manual.

Figure 20 shows an example of using the IPL program.

```
PROGRAM NAME: IPL  
TYPE OF DRIVE: 2
```

```
WHEN DRIVE IS READY, HIT RETURN TO START <RETURN>
```

```
PRESS RETURN <RETURN>
```

```
IRIS 8.2C1
```

```
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```

```
COPYRIGHT (C) 1984, POINT 4 DATA CORPORATION
```

```
ENTER YEAR, MONTH, DAY, HOUR, MINUTE
```

Figure 20. Sample Procedure for Using the IPL Program

#### IV. THE DISCUTILITY PROGRAM OPTIONS WORD

The DU.WDI utility contains a Program Options Word that can be set to disable selected options and functions.

Upon delivery, every bit in the Program Options Word is set to zero. This means that every program and function is enabled. Any program and function defined in the Program Options Word can be disabled by setting the appropriate bit to 1. Programs and functions that are disabled are not displayed in the Help screens and the associated messages are suppressed.

POINT 4 recommends that the following options and functions be disabled for end user sites:

- Quick Format Program (bit 1)
- Copy Program (bit 2)
- Verify Disk Program (bit 5)
- Hard Error Entry (bit 15)

To disable these options and functions, proceed as follows:

1. To invoke DSP, at the system command prompt (#), enter

DSP <CTRL-E>key<CTRL-E>  
FDU.WDI

where

key - password assigned to DSP by the system manager; the default is X

2. To dump the contents of location 200, enter

D200

3. To stop the display, press

<ESC>

4. To set bits 1, 2, 5, and 15, enter

200:100046

5. To check that the bits have been set correctly, enter

D200

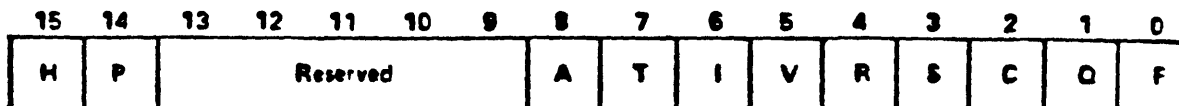
6. To stop the display, press

<ESC>

7. To exit DSP, enter

X

The Program Options Word is at location 200 (octal) in the DU.WDI file. The 16 bits that make up the word are defined as shown in Figure 21.



Bit	Option	Description
15	H	HARD ERROR ENTRY OPTION
14	P	PRESCAN DISC PRIOR TO FORMATTING
13		RESERVED
12		RESERVED
11		RESERVED
10		RESERVED
9		RESERVED
8	A	STREAMER TAPE VERIFY
7	T	STREAMER TAPE RETENSION
6	I	IPL IRIS SYSTEM DISC
5	V	VERIFY DISC COPY
4	R	RESTORE DISC
3	S	SAVE DISC
2	C	COPY DISC TO DISC
1	Q	QUICK FORMAT DISC IN TWO PASSES
0	F	FORMAT DISC IN FIVE PASSES

**NOTE**

BE CAREFUL WHEN SETTING THE OPTIONS FLAG WORD.  
DO NOT USE ANY RESERVED BITS.

035-2

**Figure 21. DISCUTILITY Program Options Word**