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3100/3150/3170  
3200/3300/3500  
COMPUTER SYSTEMS**

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**MSOS UTILITY  
REFERENCE MANUAL**

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REFERENCE MANUAL**



# PREFACE

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The MSOS peripheral equipment UTILITY operates under the Control Data Mass Storage Operating System (MSOS). The reader is assumed to have a basic knowledge of the CONTROL DATA®† 3100/3150/3200/3300/3500 Computer Systems under MSOS.

UTILITY gives the operator and the programmer the ability to control a variety of operations on tapes, card readers, card punches, and printers.

Other Control Data manuals pertinent to UTILITY are:

<u>Title</u>	<u>Pub. No.</u>
MSOS Installation Handbook	60237300A
MSOS Operator's Guide	60176100A
MSOS/RTS Diagnostic Handbook	60236700
SFP/MSOS Reference Manual	60207200
MSOS Reference Manual	60173000B

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## 1.1 ACCESS TO MSOS UTILITY ROUTINES

MSOS UTILITY processes control statements from peripheral devices such as card readers, typewriters, or magnetic tape. The control statement has the following format.

name, parameter list

The name must be a routine name as given in Chapter 2 of this manual. The parameter list contains the specific parameters required by the routine.

When execution is complete, control returns to the unit from which the routine was called.

## 1.2 LOGICAL UNITS

The equipment referenced by MSOS UTILITY is specified in terms of logical unit numbers 1-53 and 60-62 inclusive. The following are the logical unit numbers initially assigned in the MSOS UTILITY; all other logical units are undefined unless previously equipped.

<u>Logical Unit Number</u>	<u>Assignment</u>
58 (CFO)	Standard control unit
59 (CTO)	Standard comments-to-operator unit
60, 61, 62	Standard units assigned to MSOS (not required unless referenced)





The functions available for controlling the peripheral I/O equipment are given in the following sections.

## 2.1 TAPE CONTROL FUNCTIONS

The user may specify the following tape movement and/or tape density functions.

<u>Routine Name</u>	<u>Function</u>
REWIND, u.	Rewinds logical unit u to load point
REWIND, u <sub>1</sub> , u <sub>2</sub> .	Rewinds logical units u <sub>1</sub> and u <sub>2</sub> to load point
UNLOAD, u.	Rewinds and unloads logical unit u
FORWSPCE, u.	Spaces forward one record on unit u
FORWSPCE, u, n.	Spaces forward n records on unit u
BACKSPCE, u.	Backspaces one record on unit u
BACKSPCE, u, n.	Backspaces n records on unit u
SKFF, u.	Skips forward past one end-of-file mark on unit u
SKFF, u, n.	Skips forward past n end-of-file marks on unit u
SKFB, u.	Skips backward past one end-of-file mark on unit u
SKFB, u, n.	Skips backward past n end-of-file marks on unit u
WREOF, u.	Writes an end-of-file mark on unit u
ERASE, u.	Erases bad spot on unit u
ERASE, u, n.	Erases n times on unit u
CHKDNS, u.	Checks the density of unit u and transmits one of the following statements to the message unit:

  

<u>Statement</u>	<u>Density of Unit u</u>
I UTIL 010 LOW	200 bpi
I UTIL 010 MEDIUM	556 bpi
I UTIL 010 HIGH	800 bpi

SETDNS, u, d.

Sets the density of logical unit u, where:

<u>d</u>	<u>Density</u>
L	200 bpi
M	556 bpi
H	800 bpi

Complete discussions of these control functions are contained in the MSOS Reference Manual and the MSOS Operator's Guide.

## 2.2 I/O FUNCTIONS

The following functions may be called by MSOS UTILITY.

COPYS

COPYT

VERIFY

The formats for these functions are free form. Embedded blanks are acceptable; however, parameters must be separated by commas and the final parameter must be terminated by a period.

A discussion of each of the functions follows.

### 2.2.1 COPYS

The function COPYS transfers card images from unit  $u_1$  to unit  $u_2$ .

The format is:

COPYS,  $u_1$ ,  $u_2$ , r.

The input unit ( $u_1$ ) may be tape or card reader; the output unit ( $u_2$ ) may be tape, printer, or punch. Copying terminates when the  $r^{\text{th}}$  end-of-file is read on unit  $u_1$ .

When tapes are used, no rewinding occurs before or after execution. If an end-of-tape is encountered on output unit  $u_2$ , the function terminates and the next control statement is read.

Output to a printer is in BCD format with no carriage control supplied.

A record count and the parity mode for each sequence of records of like parity are written on the message unit in the format:

```
I UTIL 110 n BIN RECORDS COPIED
I UTIL 110 n BCD RECORDS COPIED
      where n = number of records in decimal
```

The appropriate message above is also written when an end-of-file is read on unit  $u_1$ . Furthermore, an end-of-file message is written for each occurrence of an end-of-file on unit  $u_1$ .

```
I UTIL 108 EOF
```

COPYS is restricted to 40-word binary records, or up to 136-character BCD records. No checks are made for records that exceed the maximum allowable size. If such a record is encountered for processing, only the first 40 words are processed; the remainder of the record is truncated. Processing continues normally.

COPYS may be terminated by setting SELECT JUMP 2. The input unit is always one record ahead of the output unit; that is, there is always one more record accessed than processed by the function.

### 2.2.2 COPYT

The function COPYT copies  $r$  records or files from unit  $u_1$  to unit  $u_2$  and lists each record copied on unit  $u_3$ .

The format is:

```
COPYT, $u_1$ , $u_2$ , $u_3$ , $r$ .
```

The input unit ( $u_1$ ) can be either a card reader or magnetic tape, and the output unit ( $u_2$ ) must be tape. The unit used to list the copied records ( $u_3$ ) may be tape or printer. The parameter  $r$  gives the record or file counter for the COPYT operation. If this parameter is followed by an F, the specified number of files will be copied; otherwise, the specified number of records will be copied. Omission of parameter  $u_2$  or  $u_3$  results in the suppression of the copy or the list, respectively.

The records copied may be variable in length but are limited by available storage. After the COPYT function has been entered successfully and before processing begins, the function defines the maximum allowable record length as follows.

```
I UTIL 100 MAX REC SIZE n B
      where n = allowable record length in octal
```

A diagnostic is generated during execution if the maximum record size is exceeded. The excess of the record is truncated and processing continues normally.

Both the list unit ( $u_3$ ) and the message unit ( $u_2$ ) receive record counts and end-of-file messages as described for the COPYS function (section 2.2.1).

Reads on input unit  $u_1$  and writes on output unit  $u_2$  are character operations; writes on  $u_3$  are in the format of the mode of the data. BCD print images representing BCD records are 119 characters per line; octal images representing binary records are 8 information words per line plus the octal word count which begins each line. An end-of-file mark is not written on the last unit  $u_3$  upon completion of the task.

COPYT is terminated if an end-of-tape condition occurs on either unit  $u_2$  or  $u_3$ . It may also be terminated by setting SELECT JUMP 2, in which case the input unit is always one record ahead of the output unit. An end-of-file mark is written on the tape unit with the end of tape condition.

The following are examples of acceptable formats.

1. To copy  $n$  records without list:

COPYT, $u_1,u_2,0,n$ .  
or  
COPYT, $u_1,u_2,,n$ .

2. To list  $n$  records:

COPYT, $u_1,0,u_3,n$ .  
or  
COPYT, $u_1,,u_3,n$ .

3. To copy and list one file:

COPYT, $u_1,u_2,u_3,1F$ .

### 2.2.3 VERIFY

The VERIFY function compares records from unit  $u_1$  with records from unit  $u_2$  and lists any differing records on unit  $u_3$ .

The format is:

VERIFY, $u_1,u_2,u_3,r$ .

Units  $u_1$  and  $u_2$  may be card reader or tape, and unit  $u_3$  may be tape or printer. The variable  $r$  gives the number of records to be verified unless followed by an F which designates file.

Upon successful entrance to the VERIFY function, the maximum record size is computed from available core and the following message is written on the message unit.

I UTIL 100 MAX REC SIZE  $n$  B

where  $n$  = allowable record length in octal

A diagnostic is generated during execution if this maximum record size is exceeded.

During processing, a diagnostic is written on the list unit ( $u_3$ ) and on the message unit ( $u_2$ ) describing the record pairs that differ in mode, content, or length. The diagnostics are, respectively:

```
I UTIL 102 MODE ERROR RECORD n
I UTIL 103 CONTENT ERROR RECORD n WORD x
I UTIL 104 LENGTH ERROR RECORD n
      where n = record number (decimal)
            x = word number (octal)
```

No more than six content messages will be written for any one record pair.

For each sequence of records of like parity, or each file, a message indicating the number of records verified is sent to the message unit and to  $u_3$ .

```
I UTIL 109 n BIN RECORDS VERIFIED
I UTIL 109 n BCD RECORDS VERIFIED
```

If an end-of-file is encountered on either unit  $u_1$  or  $u_2$ , but not both, the following is sent to the message unit.

```
I UTIL 105 EOF ABSENT u RECORD n
      where u =  $u_1$  or  $u_2$ 
            n = record number
```

Processing continues as if it were a matching end-of-file. If an end-of-file is encountered on both units, the end-of-file message and the record count are sent to the message unit and to  $u_3$ .

An end-of-tape condition on unit  $u_3$  causes termination of the list but the verification continues. An end-of-file mark is written on the unit only if the list is terminated by an end-of-file condition. Verification also may be terminated by setting SELECT JUMP 2 on the console.

The following are examples of acceptable formats.

1. To verify and list one file:

```
VERIFY, $u_1$ , $u_2$ , $u_3$ ,1F.
```

2. To verify n records without list:

```
VERIFY, $u_1$ , $u_2$ ,,n.
```

## 2.2.4 SAMPLE DECKS

Copy cards to tape.

```
7 SEQUENCE, 001
9
7 JOB, , , ,
9
7 EQUIP, 01=MT
9
7 UTILITY, 60, 61.
9
  COPYS, 60, 1, 2.
      card deck with two end-of-files
  REWIND, 1.
  SCOPE.
77 end-of-file
88
```

Copy a tape with 25 files and verify the results.

```
7 SEQUENCE, 002
9
7 JOB, , , ,
9
7 EQUIP, 01=MT, 02=MT
9
7 UTILITY, 60, 61.
9
  COPYT, 1, 2, , 25 F.
  REWIND, 1, 2.
  VERIFY, 1, 2, 61, 25 F.
  UNLOAD, 1.
  UNLOAD, 2.
  SCOPE.
77 end-of-file
88
```

## 3.1 ENTERING THE SYSTEM

The MSOS UTILITY routine is called from the library with the following calling sequence.

<sup>7</sup>UTILITY, u, m.                      (on card reader or tape)  
<sub>9</sub>

CALL, UTILITY, u, m.                (on CFO)

where u = control unit

m = message unit

The control unit (u) reads the tape and I/O control statements as defined in Chapter 2 of this manual. This unit may be a card reader, magnetic tape, or the console typewriter.

The message unit (m) writes the messages associated with any control statements following the call to UTILITY. The values m may assume are 59 or 61; any other value will select 59 as a default condition.

Both the control unit (u) and the message unit (m) can be changed by the user with the following control statements.

CONTROL, u.

MESSAGE, m.

where u = new control unit

m = new message unit

## 3.2 EXITING THE SYSTEM

Program control is returned to the system by the following statement.

SCOPE

## 3.3 ERROR RECOVERY

All error recovery is handled by the RTS/MSOS Standard Error Recovery routines. In general, when these routines request action from the operator, an ABANDON or a DOWN response terminates the current task and the next control statement is accepted. In addition, a DOWN response on the control unit causes control to be returned to MSOS.



When an ABANDON response has been given for irrecoverable input errors, UTILITY requests logical error recovery. For errors on an input device, the following message is typed on the console typewriter (unit 59).

A UTIL 007 READ ERROR

The operator responds with one of the following.

<u>Response</u>	<u>Meaning</u>
ACCEPT	Accept the record in error
BYPASS	Bypass the record in error
ABANDON	Abandon the task and process the next control statement

The BYPASS response on a verify operation assumes the same meaning as ACCEPT. If an irrecoverable error occurs on an output device, the task is terminated with the following message.

I UTIL 008 TASK TERMINATED

### 3.4 DIAGNOSTICS

All UTILITY messages appear in the following format.

Type Source No. Message

Type	A	Action message; operator action necessary
	D	Destructive; fatal error occurred
	I	Informative; verifies that the system initiated or completed an action or that a nonfatal error occurred
Source		Four-character code indicating the task which initiated the message
No.		Three-digit number which identifies message
Message		Description of the type of error encountered, action which was initiated or completed, or action required by operator

Messages 000 through 011 are written on the typewriter regardless of the assignment of the message unit if control is at the typewriter.

The diagnostics herein are listed in numerical order.

<u>Message</u>	<u>Meaning</u>
I UTIL 000 BEGIN UTILITY	UTILITY loaded and ready for input
I UTIL 001 PARAM ERR	Error in the parameter list of a control statement
I UTIL 002 LONG NAME	Routine name more than 8 BCD characters
I UTIL 003 NO PERIOD	No period on a control statement
I UTIL 004 NAME MISSING	Routine name not legal
D UTIL 005 EOF ON CTL	An end-of-file has been read from the control unit; control returns to MSOS
I UTIL 006 ILLEGAL I/O LU no. UD	Illegal call to CIO on specified logical unit (e. g. , backspace on the card reader); UD appears if the unit is undefined
A UTIL 007 READ ERROR	Irrecoverable I/O error on an input device. Logical recovery is requested as follows: <ol style="list-style-type: none"> <li>1. Type one of the following: <ul style="list-style-type: none"> <li>ACCEPT</li> <li>BYPASS</li> <li>ABANDON</li> </ul> </li> <li>2. Press: FINISH</li> </ol>
I UTIL 008 TASK TERMINATED	Task requested in the control statement terminated due to an error
I UTIL 009 REPEAT	Repeat switch detected
I UTIL 010 density	Response to the CHKDENS control statement

where density = HIGH       (800 bpi)  
                  MEDIUM     (556 bpi)  
                  LOW         (200 bpi)

I UTIL 011 TASK COMPLETED	Task, other than CHKDNS, successfully completed
I UTIL 100 MAX REC SIZE no. B	Maximum allowable record size in octal
I UTIL 101 RECORD no. TOO LONG	Record specified exceeded the maximum allowable size
I UTIL 102 MODE ERROR RECORD no.	Record number (decimal) of record differing in mode
I UTIL 103 CONTENT ERROR RECORD no. <sub>1</sub> WORD no. <sub>2</sub>	Content of RECORD no. <sub>1</sub> (decimal) WORD no. <sub>2</sub> (octal) in error
I UTIL 104 LENGTH ERROR no.	Length of the specified record (decimal) in error
I UTIL 105 EOF ABSENT LU u RECORD no.	Specified record on logical unit u not an end-of-file
I UTIL 106 no. mode RECORDS VERIFIED where mode = BIN = BCD	Number (decimal) of records of the specified mode verified
I UTIL 108 EOF	An end-of-file on the input device
I UTIL 109 EOT LU no.	An end-of-file detected on the specified logical unit (generally, the current task is terminated)
I UTIL 110 no. mode RECORDS COPIED	Number (decimal) of records of the specified mode copied

where mode = BIN  
          = BCD

I UTIL 111 THE INTERVENING CELLS CONTAIN  
content

Repeated lines of an octal list

content = octal representation  
          of deleted words





**COMMENT AND EVALUATION SHEET**  
**3100/3200/3300/3500 COMPUTER SYSTEMS MSOS UTILITY**  
**Reference Manual**

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