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RT-11 FORTRAN MAGNETIC TAPE HANDLER MTHDLR

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SUBJECT RT-11 Fortran Magnetic Tape Handler MTHDLR

MTHDLR consists of a set of assembly language coded subroutines written to facilitate data manipulation of magnetic tapes written in hardware format in a FORTRAN program. It is stored in RT-11 system library and can be called in a usual way using the FORTRAN CALL (arguments) statement. A logical unit number must first be associated to a tape drive using the 'OPENMT' routine of 'MTHDLR' before any operation can be performed on it. Unit numbers in the range of 10-17 are reserved for magnetic tape use. All the operations on magnetic tape are done synchronously (that is, control will not return to calling program until the operation is completed). MTHDLR can be called to handle either 7-track or 9-track magnetic tape drive. There are eight modules in MTHDLR and these are described below. In the following the symbol 'M \bar{U} ' is a FORTRAN variable in the range 10-17 inclusive standing for a logical unit number associated to a tape drive using routine OPENMT. Arguments inside brackets are optional.

1. Subroutine OPENMTFormat: CALL OPENMT (M \bar{U} , MDVNUM, \emptyset , MSTATS)

Function: To associate a logical unit number to a magnetic tape drive and to put it into hardware operating mode. A rewind will be done automatically.

MDVNUM: Tape drive unit number

MSTATS: Upon return this will be set to either \emptyset or 1 indicating the operation has been completed or failed. If it is equal to 1 a message will be typed out to indicate the error condition.2. Subroutine MTPSTFormat: CALL MTPST (NUMFLE, M \bar{U})

Function: To skip forward certain number of files starting from current position or to rewind first and then skip forward. The tape will be positioned at the beginning of the corresponding file.

NUMFLE: Number of files to be skipped forward. If it is negative the tape will be rewound first before it is skipped. Thus if NUMFLE = -9 the tape will be positioned at the beginning of file number 1 \emptyset . If zero, a rewind will be performed.3. Subroutine READRC, WRTRECFormat: CALL name (MARRAY(I), MRECLN, M \bar{U} , <MSTATUS>)

Function: To read or write a mag-tape record into or from an array.

MARRAY(I): The I element of array 'MARRAY'. In a read the data will be stored starting from that element. In a write the data will be taken starting from that element.

MRECLN: Record length of the mag-tape. In a read, upon return, this will contain the number of BYTES read from that record. It has no effect on reading of the record. In a write this denotes the number of bytes to be written on the mag-tape.

MSTATUS: Upon return this argument will contain a number indicating the condition code of the operation.

- Ø : An end of file is encountered when reading. A message 'MTS = EOF' will be typed out.
- 1 : Parity error in reading or writing. In a read five rereads will be made before accepting the error as permanent. In a write no retry will be made. A message 'MTS = PAE' will be typed out.
- 2 : Hardware errors. A message 'MTS = IOE' will be typed out. Check write ring.

4. Subroutine REWIND

Format: Call REWIND(MU)

Function: To rewind a magnetic tape.

5. Subroutine ENFIMT

Format: Call ENFIMT(MU)

Function: To write an end of file mark on mag-tape. A message 'MTS = EOF' will be typed out.

6. Subroutine FRDREC, BCKREC

Format: Call name (MU)

Function: To space the magnetic tape one record forward or backward.

Since MTHDLR is assembly language coded and is not written so that USR (user service routine in RT-11 system) may swap over it, the /U switch must be specified to disable swapping of USR at runtime when the main program, which requires service of MTHDLR, is compiled by RT-11 FORTRAN compiler. By default, USR is always swapped. When linking the main

program, MTHDLR must be specified in input source so that linker will search through RT-11 system library, pick out the relevant modules in MTHDLR and link them to main program.

Example: To compile and link a program on system disk file
TEST.FOR which uses routines of MTHDLR.

```
. R FORTRAN                               ; call compiler  
  
* TEST, TT: = TEST/U                   ; output object file  
                                      ; TEST.OBJ on disk, listing source  
                                      ; and storage map on teletype
```

To link test

```
. R LINK  
  
* TEST = TEST, MTHDLR/F ; link TEST.OBJ to relevant  
                         ; modules of MTHDLR.OBJ and  
                         ; search through FORTRAN library  
                         ; output file is TEST.SAV
```

Those underlined are typed by computer.

A programming example to read in 1 data file from file 1, tape drive
Ø and write it on file 1, tape drive 1.

```
C   I/O BUFFER IS MDATA, EACH ELEMENT CONTAINS 1 BYTE OF DATA  
    LOGICAL * 1   MDATA(4096)  
    MREAD = 11  
    MRITE = 12  
C   LOGICAL UNIT 11 IS TAPE DRIVE Ø  
    CALL OPENMT (MREAD, Ø, Ø, MSTATUS)  
C   LOGICAL UNIT 12 IS TAPE DRIVE 1  
    CALL OPENMT (MRITE, 1, Ø, MSTATUS)  
C   READ 1 RECORD INTO MDATA  
    5 CALL READRC (MDATA(1), MRECLN, MREAD, MSTATUS)  
C   IF END OF FILE GO TO STATEMENT 1Ø  
    IF (MSTATUS.EQ.Ø) GO TO 1Ø  
C   WRITE WHAT IS READ  
    CALL WRTREC (MDATA(1), MRECLN, MRITE, MSTATUS)  
    GO TO 5  
C   DONE, WRITE END OF FILE  
    1Ø CALL ENFIMT (MRITE)  
      STOP  
      END
```

References:

- RT-11 System Reference Manual
- RT-11 Fortran Compiler and Object Time System
 User's Manual
- RT-11 Fortran Language Reference Manual
- Digital Software News, February 1975
 Interfacing Assembly Language Routines to Fortran