

PROGRAMMING STAFF NOTE 42

FROM: R.C. Daley
SUBJECT: User Interface to the File I/O System
DATE: JAN. 22, 1965

The following calls form the interface between the user and the I/O system. Some calls are of a control nature and as such may only be available to the supervisory system (marked by *) or a small number of privileged users (marked by +). The parameter "-0" may be used in any calling sequence to specify a missing parameter.

UPDMFD- is used to place a new user in the MFD.

+ UPDMFD.(\$PROBNO\$, \$PROGNO\$)

Error codes:

- 03. User already in M.F.D.
- 04. Machine or System error

DELMFD- is used to remove a user from the MFD.

+ DELMFD.(\$PROBNO\$, \$PROGNO\$)

Error codes:

- 03. User not found in M.F.D.

ATTACH- is used to attach a user to the U.F.D. specified by 'PROBNO' and 'PROGNO'.

+ ATTACH.(\$PROBNO\$, \$PROGNO\$)

Error codes:

- 03. User not found in M.F.D.
- 04. Machine or System error

UPDATE- is used to update all pertinent information concerning the user currently attached.

UPDATE.

Error codes:

03. Machine or System error

SETPRI- is used to assign priorities to certian I/O tasks which would otherwise be processed in the order in which they were received.

SETPRI.(PRIOR)

PRIOR is an integer from 1-7. The higher the value of PRIOR, the lower the priority. When files are opened for reading and/or writing, they will be assigned the priority set by the last call to SETPRI. If there was no previous call to SETPRI, all files will be treated with equal priority.

Error codes:

Only the standard error codes, see below

OPEN- is used to declare a file open for subsequent reading and/or writing.

OPEN.(\$STATUS\$, \$NAME1\$, \$NAME2\$, MODE, DEVICE)

Error codes:

- 03. File is already in active status
- 04. Too many active files
- 05. \$STATUS\$ is illegal
- 06. 'LINKED' file not found
- 07. File to which link is made is not 'LINKABLE'
- 08. File in 'PRIVATE' mode
- 09. Attempt to write a 'READ-ONLY' file
- 10. Attempt to read a 'WRITE-ONLY' file
- 11. Machine or System error
- 12. File not found in U.F.D.
- 13. Illegal device specified
- 14. No space allotted for this device
- 15. Space exhausted for this device
- 16. File currently being restored from tape
- 17. Input/Output error, see codes below

BUFFER- is used to assign a buffer for use in reading or writing an active file (must be used after call to OPEN). This call will be eliminated on the GE 635.

BUFFER.(\$NAME1\$, \$NAME2\$, BUFF(450)...450)

Error codes:

- 03. File is not an active file
- 04. previous i/o out of bounds (membnd changed)
- 05. Buffer too small
- 06. Input/Output error, see codes below

RDFILE- is used to read from a file which has been opened for reading.

RDFILE.(\$NAME1\$, \$NAME2\$, RELLOC, A(N)...N, EOF, EOFCT)

Error codes:

- 03. File is not an active file
- 04. File is not in read status
- 05. No buffer assigned to this file
- 06. Previous I/O out of bounds (MEMBND changed)
- 07. Input/Output error, see codes below

WRFILE- is used to write into a file which has been opened for writing.

WRFILE.(\$NAME1\$, \$NAME2\$, RELLOC, A(N)...N, EOF, EOFCT)

Error codes:

- 03. File is not an active file
- 04. File is not in write status
- 05. No buffer assigned to this file
- 06. Allotted space exhausted for this device
- 07. Previous I/O out of bounds (MEMBND changed)
- 08. Input/Output error, see codes below

TRFILE- is used to truncate a file which has been previously opened for writing.

TRFILE.(\$NAME1\$, \$NAME2\$, RELLOC)

The file will be truncated immediately before the relative address RELLOC.

Error codes:

- 03. File is not an active file
- 04. File is not in write status
- 05. No buffer assigned to this file
- 06. Previous I/O out of bounds (MEMBND changed)
- 07. RELLOC larger than file length
- 08. Input/Output error, see codes below

FCHECK- is used to check if a previous read or write on a file has been completed.

FCHECK.(\$NAME1\$, \$NAME2\$, FINISH)

Error codes:

- 03. File is not an active file
- 04. Previous I/O out of bounds (MEMBND changed)
- 05. Input/Output error, see codes below

CLOSE- is used to close an active file and return it to inactive status.

CLOSE.(\$NAME1\$, \$NAME2\$)

If NAME1 is ALL and NAME2 is not specified, all active files will be closed.

Error codes:

- 03. File is not an active file
- 04. Previous I/O out of bounds (MEMBND changed)
- 05. Input/Output error, see codes below
- 06. Machine or System error

RESETF- is used to remove all active files from active status when the user's core image is no longer available. This call will normally only be used by the supervisory system (CTSS).

RESETF.

Error codes:

- 03. Machine or System error

CHFILE- Is used to change the name and/or mode of a file.

CHFILE.(\$OLDNM1\$, \$OLDNM2\$, NEWMOD, \$NEWM1\$, \$NEWM2\$)

Error codes:

03. Attempt to change M.F.D. or U.F.D. file
04. File not found in U.F.D.
05. 'LINKED' file not found
06. File to which link is made is not 'LINKABLE'
07. Attempt to change 'PRIVATE' file
08. Attempt to change 'PROTECTED' file of another user
09. Temporary file would overflow space allotted for device
10. File already exists with name 'NEWM1 NEWM2'
11. Machine or System error

DEFILE- is used to delete a file.

DEFIL.(\$NAME1\$, \$NAME2\$)

Error codes:

03. File not found in U.F.D.
04. 'LINKED' file not found
05. file to which link is made is not 'LINKABLE'
06. File is 'PROTECTED'
07. Machine or System error

ESTATE- is used to determine the present status of an active or inactive file.

ESTATE.(\$NAME1\$, \$NAME2\$, A(8)...8)

Upon return from this call the array "A" will contain the following information.

- A(8)= length of file
- A(7)= MODE of file
- A(6)= STATUS of file (1-4)
- A(5)= DEVICE on which file resides (1-3)
- A(4)= Address of next word to be read from file
- A(3)= Address of next word to be written into file
- A(2)= Date and time file was created or last modified
- A(1)= Date file was last referred to and 'AUTHOR' of file

Error codes:

03. File not found in U.F.D.
04. 'LINKED' file not found

05. File to which link is made is not 'LINKABLE'

MOVFIL- is used to move a file from the current user's file directory to the file directory specified by 'PROBNO PROGNO'.

+ MOVFIL.(\$NAME1\$, \$NAME2\$, \$PROBNO\$, \$PROGNO\$)

Upon return from this call, the file will no longer exist in the current user's file directory.

Error codes:

- 03. File not found in current U.F.D.
- 04. File is a 'LINKED' file
- 05. File is 'PROTECTED'
- 06. File already exists in 'PROBNO PROGNO'
- 07. Machine or System error

SETFIL- is used by the file load and retrieval systems to create an entry in a file directory with a specific date and time.

+ SETFIL.(\$NAME1\$, \$NAME2\$, DAYTIM, DATELU, MODE, DEVICE)

DAYTIM is the date and time to be used as the date and time last modified. DATELU contains the date last used and the 'AUTHOR' of the file.

Error codes:

- 03. Illegal device number
- 04. Machine or System error

LINK- is used to create a link to a file contained in another user's file directory.

+ LINK.(\$NAME1\$, \$NAME2\$, \$PROBNO\$, \$PROGNO\$), N3, N4, MODE)

Error codes:

- 03. Machine or System error
- 04. 'PROBNO PROGNO' not found in M.F.D.

UNLINK- is used to delete the association set up by LINK.

UNLINK.(\$NAME1\$, \$NAME2\$)

Error codes:

- 03. File not found in U.F.D.
- 04. File is not a 'LINKED' file
- 05. Machine or System error

ALLOT- is used to set the number of records allotted for and used on a particular DEVICE.

+ ALLOT.(DEVICE,ALLOT,USED)

Normally USED is not specified. The parameter USED should only be used to correct an error in the number of records used.

Error codes:

- 03. Illegal device specified

STORGE- is used to determine the number of records allotted and used for a particular DEVICE.

STORGE.(DEVICE,ALLOT,USED)

Error codes:

- 03. Illegal DEVICE specified
- 04. Machine or System error

The following calls concern TAPE files only.

MOUNT- is used to direct the file system to mount a set of reels on the unit specified by the logical tape drive UNITNO.

MOUNT.(CHANNO,UNITNO,MESSAG(20)...20 *60485*)

CHANNO specifies the number of the channel to be used. If CHANNO is zero or not specified, the file system will select a channel for the user. This call must be used prior to reading or writing a tape file. The array MESSAG is a BCD comment that will be sent to the console operator with the mounting directions.

Error codes:

- 03. No tape available on specified channel

CHANNO = 1 = A
 CHANNO = 2 = B
 CHANNO = 3 = A+B (Two different reels)

UMOUNT- is used to unmount a set of reels and free the corresponding tape drive for other use.

UMOUNT.(UNITNO,MESSAG(20)...20)

Error codes:

03. Tape file currently in use

VERIFY- is used to verify the label of a tape file after it has been mounted but before it may be opened for reading or writing.

VERIFY.(UNITNO,LABEL(4)...4)

Error codes:

03. Label is incorrect, try again up to five times

04. Label is unreadable

05. Tape file does not exist

06. Tape file cannot be mounted at this time (operations)

LABEL- is used to write a label on a new tape file before it may be opened for writing.

LABEL.(UNITNO,^{same word}LABEL(4)...4)

Error codes:

03. Tape will not write

04. Tape file does not exist

05. Tape file cannot be mounted at this time (operations)

TAPFIL- is used to inform the file system that a file exists or is to be created on the set of reels specified by UNITNO.

TAPFIL.(\$NAME1\$, \$NAME2\$, UNITNO, FILENO) ~~subsequent~~

FILENO is used to specify which file on the set of reels specified by UNITNO. If a user wishes to add a file to the end of a set of reels, he may specify a FILENO of zero. When this file is opened for writing, the tape strategy module will assign the file number automatically. This procedure may be used to add a file to the end of a set of reels when the number of files is unknown.

Error codes:

03. Machine or System error

ERROR PROCEDURE:

In all calls to the file system, an additional 2 parameters may be added to the end of the calling sequence. The first of these parameters is taken to be the label of a statement to be transferred to in case of an error. The second is taken to an integer variable in which the file system will store the error code. In addition, the following call is provided to obtain more specific information about an error condition.

IODIAG.(A(7)...7)

Upon return from this call, the array "A" will contain the following information,

- A(7)= Location of call causing the error
- A(6)= BCD name of entry resulting in error
- A(5)= Error code
- A(4)= Input/Output error code (1-7)
- A(3)= NAME1 of file involved in error
- A(2)= NAME2 of file involved in error
- A(1)= Location in file system where error was found

STANDARD ERROR CODES:

- 001. Illegal calling sequence or Protection violation
- 002. Unauthorized use of privileged call
- 100. Error reading or writing U.F.D or M.F.D.
- 101. U.F.D. or M.F.D. not found, Machine error

INPUT/OUTPUT ERROR CODES:

- 1. Parity error reading or writing file
- 2. Fatal error reading or writing file, cannot continue
- 3. Available space exhausted on this device
- 4. Tape file not mounted or not available

SUPERVISOR ENTRIES TO FILE SYSTEM:

SETUSR- is used to set the I/O system to operate for one of several active users (DUSER1= CTSS, DUSER2= current CTSS user).

* SETUSR.(DUSER,RCODE,AUTHNO,LIMITS,RELLOC,PRIOR)

RCODE is the user restriction code and is described later. PRIOR is an integer from 1-7 which specifies the user's I/O priority. The higher the value of PRIOR, the lower the priority. AUTHNO is the programmer no. (in BCD) of the user who is about to use the file system. AUTHNO is used to determine the authorship of files in 'PRIVATE' or 'PROTECTED' mode. LIMITS is the user protection bounds and RELLOC is the user relocation. All of the above parameters to SETUSR are optional.

Error codes:

03. Illegal user number

SETRAP- is used to set the supervisory interrupt procedure.

* SETRAP.(IFUNCT,)

The I/O system will reflect interrupts to the supervisory system by means of the following call.

EXECUTE IFUNCT.(USERNO,ICODE,IR4,ILC,INFO(N)...N)

ICODE is the interrupt code. The following interrupt codes have been assigned.

1. User attempting to initiate I/O
2. I/O task initiated
3. I/O task completed
4. File interlocked
5. File no longer interlocked
6. User I/O queue full or waiting on I/O

USTAT- is used to assign an area of protected storage to be used by the I/O system in servicing the current user.

* USTAT.(Y(N)...N,Q1...Q1L,Q2...Q2L, ..., QN...QNL)

The array 'Y' will be used by the file system to store all information pertaining to a particular user of the file system. Q1 specifies storage for queueing all I/O requests for the device 'i'. If Q1L is zero, all attempts to use the device 'i' will be rejected.

USAVE- is used to save the status of all active files for the current user.

* USAVE.(COUNT,Z(M)...M)

Upon return from this call, the contents of COUNT will contain the number of words saved in the array 'Z'.

Error codes:

03. The array 'Z' is too small

IOINIT- is used to initialize the I/O system.

* IOINIT.(ERRLOC,DATLOC,TIMLOC,ENBLOC)

IOSTOP- is used to terminate all I/O for the user specified by 'USERNO'.

* IOSTOP.(USERNO)

If USERNO is zero, all I/O currently in process will be terminated.

IOSTRT- is used to restart I/O processing after a call to IOSTOP.

* IOSTRT.(USERNO)

SETAB- is used to set the I/O system to operate on the correct memory units (1=A, 2=B).

* SETAB.(CALLER,BUFFER,MEMORY)

This call is used to specify the memory containing the calling program (CALLER), the memory containing the buffer storage (BUFFER), and the memory to which all subsequent I/O will be directed. If MEMORY, BUFFER or CALLER are negative, all references to the specified memory (1 or 2) will be checked for protection mode violations.

I/O DEVICES:

1. LOW-SPEED DRUM
2. DISK
3. TAPE

RESTRICTION CODES:

The LOGIN command will set the low-order 6 octal digits of the user restriction code.

00000001	User may use common files.
00000002	User may use restricted calls to the I/O system.
00000004	User may modify "PROTECTED" file of other users.
00000010	User may refer to "PRIVATE" files of other users.
00000020	User may modify the supervisory and I/O systems.
01000000	User is Background system.
02000000	User is Foreground.
04000000	User is FIB.
10000000	User is Incremental dumper
20000000	User is priveleged command