Chapter 10

RETURN INFORMATION

10.1   INTRODUCTION

After every instruction, the result is reported by a value in the
Condition Register, the Status Word and the Return Status. If EDM is
used more detailed information is also returned in the Supplementary
Return Status.

In addition, the relative key of the record currently accessed is
returned in the Control Word. This can be obtained by the application
with the GETCW instruction.

The possible values of the condition Register, Status Word, Return
Status and Supplementary Return Status are listed in the following
sections.

10.2   CONDITION REGISTER

10.2.1   Condition Register

The Condition Register may have one of the following values:

0 = The instruction was successfully completed (but see NOTE).

1 = End of file.
The last used record of the file has been read (LRN reached) by Read Sequential instructions, or the end of the file has been reached by Write Sequential instructions and the Growth Factor is zero.

2 = Error. The instruction was not successfully completed because of sequence errors, illegal parameters or options, or permanent I/O errors.

3 = End of device, or End of medium. This indicates that the application tries to access disk space outside the physical area reserved for the file. This occurs, for example, when the relative record key supplied in an instruction is negative or higher than the total number of records in the file.

The Status Word and in some cases the Return Status and Supplementary Return Status may contain more information.

NOTE: Under EDM it is possible that a fatal error has occurred but the Condition Reigster is zero. Bit 8 is set in the Status Word, and the Return Status and Supplementary Return Status may be read to obtain more information.

10.2.2   Condition Register and Status Word

The relation between the values of the Condition Register and the bits set in the Status Word is as follows:

Condition Register Value	Status Word Bits
2	0 + any other bit, except bit 2 or 3
2	any of the bits 9 − 15
1	3 or 0 + 3
3	2 or 0 + 2
0	in all other cases

NOTE: If bit 8 is set in the Status Word to indicate that more information can be obtained from the Return Status, this is not necessarily indicated by the value of the condition register; this may still have the value zero.

10.3   STATUS WORD

The Status Word is a value set by the TOSS Monitor, to give more information about the result of an instruction. The Status Word is obtained by the Extended Status Transfer instruction (XSTAT).

If bit 8 is set in the Status Word, indicating that a data management rule has been violated, more information may be obtained by reading the Return Status.

Bits set in the Status Word indicate:

No bits set : Successful completion

Bit 0   Request Error
                   This bit may be set in combination with bits 2, 3, 4, 5
                   and any of the bits 8 - 15.
                   An error is detected in the order option, in the
                   instruction or in the parameters in the File Parameter
                   block, or the file access could not be completed because
                   of hardware errors (indicated by bits 13 - 15).

Bit 1   Not used by data management.

Bit 2   End of Medium
                   The application tries to access space outside the
                   physical file space. Bit 0 is also set.
                   When this error occurs for an indexed file, file
                   consistency may be lost.

                   If during a Write instruction the end of the file is
                   reached and a Growth Factor has been specified, but it is
                   not possible to enlarge the file any more, this bit is
                   set and the value 3, Overflow, is set in the Return
                   Status.

                   It is not possible to enlarge the file any more, if there
                   is no free VTOC entry or no space left on the volume, and
                   no next volume is specified on the File Parameter block
                   where to continue the file, or if the maximum number of
                   file sections and file extents has been reached.
                   In SDM files can not be automatically enlarged into a new
                   file section (on another volume).

Bit 3   End of File
                   During a Read Sequential instruction the record indicated
                   by the LRN has been reached. This need not be the
                   physical end of the file, there may be "free" records
                   after it.

                   During a Write instruction for an indexed file the last
                   free record in the file has been written, and the Growth
                   Factor is zero or further enlargement is not possible.
                   Bit 0 is also set.

During a write instruction for a standard file the end of the file has been reached and the file is enlarged by the percentage defined in the Growth Factor. No other bits are set.

During Read Indexed Sequential instructions the data record associated with the last entry in the index has been read.

Bit 4   No Data
A Read, Rewrite or Discard request has been issued for a record with status "free".

Bit 5   Key not found
The requested record key is not present in the index file.

Invalid key
The prime key of a record to be written by a Write Indexed Sequential instruction has a value not higher than the prime key of the preceding record (only for EDM).

Bit 6   Duplicate Key
A duplicate key has been detected in an index where duplicate keys are allowed.
During Read Indexed Sequential, a record is read with the same symbolic key as the next record.

Under EDM only:
During Indexed Write or Rewrite functions, a record has been written and one of its keys, for which duplicates are allowed, exists already in the index.

Bit 7   Retries performed
When this bit is set the driver has performed up to the maximum number (disk driver dependent) of retries to perform the I/O. If the I/O was not successful, one of the bits 13, 14 or 15 will be set. If the I/O was successful, one of the other bits may still be set to indicate another error.

Bit 8   Data Management Rule violated
If this bit is set, more information can be found in the Return Status and the Supplementary Return Status.
Bit 8 may be set together with any other bit (except bit 1).

Bit 9   Duplicate Key Error
The relative key specified for a Write Direct, points to a record with status "used".

Under EDM only:
During an Indexed Write or Rewrite instruction a record must be written to the file, and a key for which duplicates are not allowed exists already in the index.

Bit 10   New Volume Loaded
          This indicates that a new volume has been loaded after
          the file had been opened. Close File is the only order
          which will be accepted after this error message. All the
          files must be closed and opened again before they can be
          accessed. For more information on the New Volume Loaded
          situation, see the description of the disk drivers in the
          Device Drivers Reference manual, module M5A.

          If not carefully handled by the application, the New
          Volume Loaded situation may result in corrupt files.

Bit 11   Automatic Rollback
          In SDM, this indicates that the task has tried to access
          a record already held exclusive for another task. All
          records that the requesting task had under exclusive
          access, are released, to prevent a deadlock situation.

          In EDM, a deadlock situation or another error has been
          detected and automatic Rollback is performed for the
          requesting task. This means that all records under
          protected access for the task are released. If
          transaction logging is done, the before images of the
          records involved are written back to the files and the
          currencies are reset to the values at the last Commit
          (only for EDM).

Bit 12   Incorrect length
          The requested length set by the application was not
          correct. In most cases, this indicates that the requested
          length is shorter than the record length.

Bit 13   Data error
          Transmission unsuccessful because of parity check errors.

Bit 14   Throughput error
          Transmission unsuccessful because the system is
          overloaded or a seek error has occurred on the disk.

Bit 15   Not operable
          Bit 15 is set in the case of a disk failure or when an
          EDM segment has not been loaded.

If one of the status bits 2, 10, 13, 14 or 15 are set after accessing
an indexed file, file consistency may be lost (file corrupt), because
then it is possible that the data file has been updated but not the
index file(s).

10.4   RETURN STATUS

The Return Status is a value set by Data Management to give more
information on the result of an instruction.

If bit 8 is set in the Status Word, the Read Status instruction (RSTAT)
may be used to obtain the Return Status value in a binary data item.

The errors indicated by the Return Status will normally only occur when
an application is being tested. Most of them are not recoverable by the
application. If transaction logging is done (only for EDM) the
transaction will be rolled back. In all other cases these errors result
in corrupt files which have to be recovered from the back-up copies.

If any type of overflow is indicated by the Return Status, this must be
solved by generating a new Monitor and/or a reorganisation of the files
or of the disk volumes.

The Return Status may have binary values from 0 up to 10, each
indicating a number of possible error situations:

1   Memory Overflow

     There is not enough work space to open the file.
     - In EDM and SDM, this may mean that there is no free File Work
       Table (FWT) available.
     - In SDM it may also mean that there is not enough space to read
       the master index into memory.
       The system must be reorganised and a new Monitor generated. An
       estimate of the work space needed by EDM is found in Appendix A

2   Input-output error

     When a new file is created this may indicate:
     - Index file descriptor incorrect
     - Error during formatting

     When a file is opened, it may indicate:
     - One or more file descriptors are not supplied. The file can not
       be opened.
     - File or index file corrupt.
       The file status indicates "corrupt" and the file can not be
       opened.
       The data file and the index file do not match. This may occur
       when the files reside on different volumes and the volumes that
       are on line do not match.

     - Index block corrupt
       The index file is corrupt. The files must be recovered from
       back-up copies.

- Prime key d sturbed
  A Rewrite is issued and the value of the prime key has been changed.

- Transaction log file disturbed.
  The transaction log file can no longer be accessed.

- Function log file full
  Perform system close down, make backup of files if necessary, and restart system.

- Write error on function log file.

- File disturbed during ROLLBACK
  The file is now disturbed. Perform System close down and recover the files from back-up copies.

- File Management detected error

3   Overflow when a file is opened

- File Control Area Table overflow
- File identification table overflow
- Too many files for logging
- Protected record administration table full
- No free Currency buffer (only for SDM)
- Disk overflow
- Transaction log file is full.

- Free space exhausted on the I-file:
  When this message is returned, the I-file is corrupt and can no longer be accessed. A new I-file must be created by the TOSS utility Reorganise EDM file, by copying the D-file into a new E-file by the application. The utility Maintain EDM Indexed File (MEF) may also be used to rebuild the indexes to a data file.

4   Wrong File Parameter

   One or more file parameters specified when the file is opened or created, are not correct.

- Wrong file organization
- Wrong record length
- Wrong blocking factor
- Illegal number of key items
- Index descriptor too large
- Illegal device type
- The file organization has been specified as "Indexed", but the index specification is not present in the File Parameter block

- Illegal number of indexes
- Invalid key definition
- Conditional index specified for prime key
- Too many extents

5   Illegal instruction

The instruction issued by the application is not allowed for
the file or in this sequence, for example an indexed access is
requested for a non-indexed file, or a Write request for a file
opened for input only.

- Transaction logging not allowed
  Transaction logging is not allowed when version 3 of EDM is
  used.

- Illegal statement sequence

6   Illegal function option

- Illegal Open mode
- Illegal Sharability
- Illegal Close option (CLOSE .DROP for a file not opened
  Exclusive)
- File is opened exclusive by another task
- Illegal type of logging specified

7   Illegal file code

- Illegal index identification
- Illegal file identification
- Illegal file number
- Illegal file code

8   Illegal ECB parameter

- Incorrect File Parameter Block length (too small)

- Incorrect key length specified
  Only for the Posit instruction is it allowed to specify a
  keylength shorter than the actual key length. Incorrect key
  length is also returned if the key length specified is greater
  than the actual keylength.

- Illegal record address
  The record buffer address specified by the application is not
  valid.

- Incorrect key value
  Illegal characters in symbolic key.

9   Name not found

   - File unknown
      The file with the specified name is not found on the volume on-
      line.

   - Volume unknown
      The volume with the specified name is not on-line.

10   EDM error (only for EDM)

   - Too many index levels
      The I-file has reached too many levels. If transaction logging
      is done, the current transaction is rolled back. If not, the E-
      file is now corrupt and can not be accessed any more. The files
      must be recovered from back-up copies, and the I-file must be
      reorganised by the TOSS utility Reorganise EDM File (REF).

   - Internal EDM error.
      These will only occur during testing of EDM itself, for example
      when a special version has been generated.

10.5   SUPPLEMENTARY RETURN STATUS (EDM only)

The Supplementary Return Status is a binary value giving more detailed information about a situation already indicated by the value of the Return Status. The value of the Supplementary Return Status is only significant if EDM is used and the value of the Return Status is not zero.

The Supplementary Return Status is returned together with the Return Status after a Read Status (RSTAT) instruction.

Binary Code	Meaning
000	No Supplementary Status information available
185	Incorrect EDM version. This message is returned when, for example, logging is requested while EDM version 3 is used, or a incorrect non-standard version of EDM has been generated.
186	File identifier table overflow The MAX NUMBER OF OPEN STANDARD FILES and/or the MAX NUMBER OF OPEN INDEXED FILES specified during Monitor generation was too small.
187	Memory overflow. Generate a new Monitor, reserving no more space for block buffers, currency buffers and protection table than strictly necessary.
188	No free buffer available The maximum number of user tasks or the number of index buffers specified during Monitor generation was too small.
189	The index part of an E-file has been enlarged
190	Function log file on disk has been enlarged.
191	Function log file almost full; all opened files must be closed.
192	System Operator's Panel error
193	Tape mark detected
194	Other error on function log tape Run the recovery (RCF), mount a new tape and restart the system.
195	Function log tape not operable
196	Function log tape write protected

197   Begin or end of tape detected on function log tape.
            Close all the files, ask the operator to change the tape
            and continue.

198   Not used

199   No-Wait option not allowed

200   Error detected by File Management
            For example, no free FWT available, or too many file
            extents or file sections. Close all the files, run the
            recovery (RCF) and restart the system.

201   Not used

202   Illegal close option

203   Conditional primary index not allowed

204   File corrupted during Roll-Back
            It is recommended to close all the files, run the
            recovery (RCF), and restart the system.

205   Log file corrupt
            It is recommended to close all the files, if possible,
            run the recovery (RCF), rename the function log file and
            restart the system.

206   Duplicates not allowed for prime key

207   Duplicate file descriptor

208   File descriptor not present

209   Invalid key definition

210   Sequential write not allowed

211   Direct write not allowed

212   Incorrect key value
            A Write Indexed Sequential request has been issued and
            the prime key of the record to be written has a lower
            value than that of the preceding record.

213   Not used

214   Prime key disturbed

215   Not used

216   Not used

217   Incorect key length

218   Record not free

219	Illegal internal index identifier For example, a file has 2 indexes but internal index identifier 3 has been specified for the instruction.
220	Illegal internal file identifier or file number This is an internal EDM error. It is recommended to close all the files, run the recovery and restart the system. Describe the situation, take a memory dump and dump the function log file and transaction log file if possible, and send a problem report.
221	Illegal internal index identifier. The internal index identifier has been set to a higher value than the number of indexes that have been opened for the file, or an internal index identifier has been set for access on a standard file.
222	Illegal function option
223	Posit not allowed
224	Delete not allowed
225	Rewrite not allowed
226	Write not allowed
227	Read not allowed
228	Logging not allowed
229	Illegal number of indexes
230	Index block corrupt It is recommended to close all files and run the recovery (RCF).
231	File Descriptor area too small The File Descriptor block length specified for an Open instruction is too short.
232	Specified index not found in file descriptor
233	Incorrect file descriptor parameter
234	Illegal function code. The function specified is not allowed, or the function code is non-existent.
235	Protection error Protection Table overflow. Generate a new Monitor with a larger MAXIMUM NUMBER OF USERS, and /or use COMMIT instructions to reduce the number of records held protected per transaction.
236	Exclusive access error

237   Illegal logging parameter

238   Not used

239   Incorrect device type parameter

240   Illegal file organisation parameter

241   Error during move
            This is an internal EDM error. It is recommended to run
            the recovery (RCF) and restart the system. Describe the
            situation, take a dump and send a problem report.

242   Incorrect File Descriptor Block length

243   Illegal open mode

244   Illegal protection parameter

245   Illegal open mode parameter

246   Function log file full
            It is recommended to run the recovery (RCF) and restart
            the system. This error can be avoided by defining a
            larger function log file or specify automatic
            enlargement of the function log file, during Monitor
            generation.

247   I/O error on function log
            It is recommended to run the recovery, use another
            volume for the function log file and restart the sytem.

248   Index descriptor too large

249   Illegal number of key items

250   Illegal blocking factor

251   Incorrect record length

252   Incorrect file organisation. The file organisation
            specified is illegal or incorrect.

253   File Control Area Table overflow
            The maximum number of open standard or indexed files
            specified during Monitor generation was too small.

254   File corrupt
            The file can not be opened.
            It is recommended to run the recovery (RCF).

255   Core space exhausted
EDM has not enough workspace to open the file. The
maximum number of open standard or indexed files
specified during Monitor generation was too small.
Generate a new Monitor, specifying a larger number for
one or more of the following SYSGEN parameters: MAX
NUMBER OF USER TASKS, NUMBER OF EXTRA INDEX BLOCK
BUFFERS, SIZE OF RECORD BUFFER AREA and SIZE OF BLOCK
BUFFER AREA. The minimum size of the record and block
buffer area required is obtained by taking the sum of
the record lengths and the sum of the block lengths of
all files open simultaneously.