Chapter 4

TOSS DATA MANAGEMENT PACKAGES

Three data management packages are available for PTS:

- Extended Data Management (EDM)
- Standard Data Management (SDM)
- Abridged Data Management (ADM)

A system may contain either EDM or SDM. ADM may be included on its own or together with EDM or SDM, to handle the file types that EDM or SDM cannot handle (library files and undefined files).

The data management package required is selected during Monitor generation.

4.1 EXTENDED DATA MANAGEMENT

Extended Data Management is a data management package for indexed file handling. EDM supports transaction control and file recovery by means of function logging.

EDM supports the following features:

- Standard files and indexed files of E-type are handled.
- Up to 10 indexes may be defined for one data file
- Symbolic record keys consisting of up to 16 separate items (concatenated keys)
- Conditional indexing
- Re-use of deleted records in indexed files
- Transaction control functions COMMIT and ROLLBACK to take care of file consistency
- Transaction logging
- Automatic transaction rollback in the case of deadlock or fatal I/O errors.
- Function logging
- The possibility to create, delete and extend files

4.1.1 Versions of EDM

Three versions of EDM are available:

- Version 1
  A complete EDM package, disk resident, which includes all the functions listed above.

- Version 2
  A complete EDM package, primary memory resident.

- Version 3
  A primary memory resident subset, not segmented, which does not include transaction logging and function logging.

4.2 STANDARD DATA MANAGEMENT

Standard Data Management (SDM) is a separate data management package. It is primary memory resident. Indexed files are supported but index handling is less powerful than in the EDM package.

SDM supports the following features:

- Standard files and indexed files of S-type are handled
- Up to four indexes are allowed per data file
- Keys consist of one data item
- Two levels of indexing
- The possibility to create and extend indexed and non-indexed data files
- The possibility to delete files.

SDM is upward compatible with EDM in that the instruction set supported by SDM is a subset of the instructions available in EDM.

An indexed file structure for SDM, however, can not be handled by EDM, unless it is converted into an EDM file structure with the TOSS utility Copy File to File, copying the data file of S-type to a previously defined E file. The index part of the E file will be built according to the definition of a I file.

4.3 ABRIDGED DATA MANAGEMENT

Abridged Data Management is a data management package for file handling on logical sector level.
Record length + 1 must be a multiple of 256.
In ADM the following features are implemented:

- Standard files, L files and X files can be handled
- Files can be opened for exclusive access
- Files can be created, extended and deleted.
- Direct access on files.
- Sequential access only for Write instructions on Standard files.

The instructions available for ADM are a subset of the instruction set for SDM.

4.4 COMPARISON

Which data management package is used depends on the application requirements, memory space available, and the organisation of the files to be processed.

SDM - EDM

The main reasons for using EDM are:
- Logging and recovery functions
- Powerful index handling
- Support of large indexed files and a high updating frequency without the need for reorganizing the files.

SDM may be preferred to EDM when rather static files with up to four indexes are handled, for performance reasons: it may be faster and requires less memory space.

The CPU load of EDM is approximately 3 times as much as the CPU load of SDM for similar functions. The number of disk accesses is about the same for SDM and EDM without logging functions. However, EDM needs more disk accesses for direct access instructions because it does not have a common block buffer pool.

The logging functions of EDM increase the number of disk accesses. Transaction logging on the simulated disk in primary memory will improve the performance of EDM.

SDM - ADM

ADM is used for standard files when the application itself does the record handling and access on logical sector level is sufficient. ADM must be used to handle L and X files.

Compared to SDM, Abridged Data Management has the following restrictions:

Not supported are:

- Physical I/O. Only basic write, without checking, is implemented.
- Sequential access, except Write Sequential for Standard files.
- Current access. ADM does not maintain a currency.
- The POSIT instruction to position the currency.
- Indexed files.
- Record protection.
  File protection however is supported, it is possible to open a file with sharability Exclusive.
- The Delay option

- Transaction control functions. However, it is allowed to use dummy COMMIT instructions for compatibility with SDM.
- No file recovery is possible after a disk failure or a system halt.

The aproximate memory space requirements of each package are found in Appendix A.

4.5 SUMMARY

This diagram gives an overview of the file types and functions supported by ADM, SDM and EDM.

Y = supported
- = not supported.

	ADM	SDM	EDM1,2	EDM 3
FILE TYPES				
E file	-	-	Y	Y
indexed fileof S-type	-	Y	-	-
Standard file	Y	Y	Y	Y
L file	Y	-	-	-
X file	Y	-	-	-
FILE HANDLING INSTRUCTIONS				
OPEN FILE				
for: input	Y	Y	Y	Y
input-output	Y	Y	Y	Y
output sequential	Y	Y	Y	Y
output direct	Y	Y	Y	Y
output extend	Y	Y	Y	Y
SHARABILITY				
unprotected	Y	Y	Y	Y
protected	-	Y	Y	Y
exclusive	Y	Y	Y	Y
CLOSE FILE				
lock	Y	Y	Y	Y
discard	Y	Y	Y	Y
POSITION currency				
direct	-	Y	Y	Y
indexed direct	-	Y	Y	Y
COMMIT	-	Y	Y	Y
protected	-	-	Y	Y
with release	-	Y	Y	Y
ROLLBACK	-	-	Y	Y
release to prevent deadlock	-	Y	Y	Y
LOGGING				
transaction	-	-	Y	
function	-	-	Y	

	ADM	SDM	EDM1,2	EDM 3
RECORD HANDLING INSTRUCTIONS				
READ				
sequential	-	Y	Y	Y
direct	Y	Y	Y	Y
indexed sequential	-	Y	Y	Y
indexed direct	-	Y	Y	Y
WRITE				
sequential	Y	Y	Y	Y
direct	Y	Y	Y	Y
indexed sequential	-	-	Y	Y
indexed direct	-	Y	Y	Y
REWRITE				
current	-	Y	Y	Y
direct	Y	Y	Y	Y
indexed direct	-	Y	Y	Y
DISCARD				
current	-	Y	Y	Y
direct	Y	Y	Y	Y
indexed direct	-	Y	Y	Y
READ FILE PARAMETERS	Y	Y	Y	Y
READ STATUS	Y	Y	Y	Y