

UNISYS

**BTOS
System
Performance
Accelerator
(SPA)**

**Installation
Guide**

Relative to Release
Level 2.0

Priced Item

February 1987
Distribution Code SA
Printed in U S America
5026073

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Detroit, Michigan 48232

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About This Guide

This guide contains procedural and status code information for the BTOS System Performance Accelerator (SPA). To understand the information in this guide, you must be familiar with BTOS.

How to Use This Guide

If you are using SPA for the first time, you should read section 1. It contains basic information you will need for using SPA. In addition, you may want to read parts of the *BTOS Standard Software Operations Guide* for an overview of the operating system and user operations.

In any case, if you scan the contents of this guide before you start, you may find the guide easier to use.

To locate specific information, you can use the Index.

Configuration

Section 2 contains the configuration information you must know before you install SPA. It also contains installation and deinstallation information.

In addition, appendix B contains information on SPA memory, hardware, and software requirements.

Conventions

When two keys are used together for an operation, the keys are hyphenated (for example, **ACTION-FINISH**). (This means you press **FINISH** while holding down **ACTION**.)

Reference Material

This guide includes a glossary, an index, and three appendixes with reference information:

- For status code information, refer to appendix A.
- For SPA memory, hardware, and software requirements, refer to appendix B.
- For recommended files to be cached when performing various operations, refer to appendix C.

Related Material

For an explanation of Sysinit.jcl files, refer to the *BTOS Standard Software Operations Guide*.

For a description of BTOS Context Manager, which provides a swap file you can use with SPA, refer to the *BTOS Context Manager System Administration Guide*.

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Overview

General

The BTOS System Performance Accelerator (SPA) is an installed system service that dramatically improves the response time for both master and cluster workstations performing file-system operations. You can install SPA on B 28 or B 38 master and cluster workstations that:

- use the multipartition version of BTOS version 8.0 or higher
- are equipped with a hard disk
- contain 2Mb to 4Mb of Random Access Memory (RAM), with optimum results requiring the full 4Mb configuration

You can alternatively download SPA from an XE 520 master system to clustered workstations. You cannot execute SPA on an XE 520 master system.

SPA uses the workstation's extended RAM (that is, the memory above 1Mb) to store (or cache) read-only files, including run files. Read-only files are files you do not expect to modify once you load them into the SPA cache. You can modify a cached file; however, doing so removes that file from the cache.

By keeping frequently read files in the workstation's extended memory, cache gives workstations faster access to the files than they have without SPA because the workstations do not use the hard disk. In this way, SPA reduces the hard-disk overhead, improving the response time for disk-related operations. Appendix C recommends files you may want to cache when performing various operations.

In addition to caching read-only files, SPA provides a second, write-through cache, which stores information about frequently used files. The cached information includes file-system structures needed to open and close files. This lets the system perform many disk-intensive file operations (such as opening files), with much less physical disk activity. For example, SPA reduces the overhead when several clustered workstations are opening many shared files.

System services and applications software continue to operate normally and do not require alteration, recompilation, or relinking to operate properly with SPA.

SPA Components

SPA consists of three major components:

- the SPA Memory Manager (Mover.run/Mover.img)
- the RunFile Cacher (RamDisk.run)
- the File Structure Cache Manager (Cacher.run)

The SPA Memory Manager allocates and monitors extended memory and serves as a transfer agent for memory.

The RunFile Cacher provides for caching of any read-only file. This cache is located above the first megabyte (Mb) in the B 28 and B 38 workstation's memory.

Examples of typical cache contents are contained in the SPA>Sample.flc file, provided on the SPA distribution diskette. The SPA>Sample.flc file contains standard default file names (such as Exec.Run, Editor.Run, and tlEditor.Run) that are to be cached when you install the RamDisk.run server. You can modify the SPA>Sample.flc file or create a new file to include files you want to cache. When a clustered workstation requests a file that is in the cache, the SPA Memory Manager intervenes and supplies the requested information to the workstation.

The File Structure Cache Manager creates and maintains the cache containing file system information (such as file handles) of the frequently used files stored on the hard disk. The system updates the on-disk data stored in this cache whenever the in-memory data changes. This preserves the integrity of the file system if the system malfunctions or loses power.

Section 2 provides additional information about SPA components.

Loading, Installing, and Deinstalling SPA

General

This section describes how to load the SPA software from the distribution disk to a B 28 or B 38 workstation, or an XE 520 master system. This section also describes how to install the SPA Run files onto your system and how to deinstall the SPA memory mover.

SPA Distribution Diskette

The distribution diskette accompanying this guide is your master copy of the SPA program. It has been shipped to you write-protected; you should not write-enable it.

Contents of the Distribution Diskette

The SPA distribution diskette contains the directory <Unisys> with the following files:

- Mover.run
- Mover.img
- RamDisk.run
- Cacher.run
- DeInstallSPAMover.run
- Request.SPA.sys
- SPA>Sample.fl5
- t2MstrMpSPA.run

Note: You can have SPA support up to 11 clustered workstations by copying the t2MstrMpSPA.run file from the distribution diskette to your [SYS]<SYS>SysImage.sys file, overwriting your file. You will be asked whether you want to copy this file as part of the installation process.

It also contains the directory <Sys> with the following files:

- BadBlk.sys
- CrashDump.sys
- FileHeader.sys
- Log.sys
- Mfd.sys
- SysImage.sys
- FdSys.Version
- Install.sub
- XEInstall.sub

Note: The SPA>Sample.fls file contains standard default file names (such as Exec.Run, Editor.Run, and tlEditor.Run) that the system caches when you install the RamDisk.run server. You can create a new file or modify the SPA>Sample.fls file via the BTOS Editor to include files that you want to cache.

Run Files

The following text describes these Run files that the SPA distribution diskette contains in the <Unisys> directory:

- Mover.run/Mover.img
- RamDisk.run
- Cacher.run
- DeInstallSPAMover.run

Mover.run and Mover.img Files

The Mover.run file loads and executes the Mover.img file. Mover.img manages the workstation's extended memory. Specifically, Mover.img:

- determines the size of the extended memory (above 1 Mb)
- performs a memory diagnostic on the extended memory
- moves information to and from extended memory
- allocates and deallocates portions of the extended memory, as necessary, for client programs

You can install the Mover.run file on B 28 and B 38 workstations with extended memory to use the extended memory for certain system applications. For BTOS Context Manager, you can use extended memory as a storage area for swap files. Refer to Using Extended Memory as a BTOS Context Manager Swap File, in this section.

Refer to the *BTOS Context Manager System Administration Guide* for more information about swap files.

You install the Mover.run file by entering **Install SPA Memory Mover** in the Executive command field or by including Mover.run in the Sysinit.jcl file.

Note: If you will be installing the Protected Mode Operating System Server (PMOSS) and SPA on the same workstation, do not install the Mover.run file. PMOSS includes the Mover.run file's functionality and supports the same request interface as Mover.run; therefore, Mover.run's clients (including RamDisk.run and BTOS Context Manager) run without Mover.run when PMOSS is installed (refer to the *BTOS Protected Mode Operating System Server [PMOSS] Installation Guide* for more information).

RamDisk.run File

The RamDisk.run file provides the read-only file cache. It reads files, named by you, that you want to cache. It then uses the Mover.run file to transfer the data contained in the named files into the workstation's extended memory.

You install the RamDisk.run file with the command **INSTALL SPA RAMDISK** or by including RamDisk.run in the Sysinit.jcl file. You can install the RamDisk.run file only on B 28 and B 38 workstations that use BTOS version 8.0 or higher. Furthermore, you must install the Mover.run file (described in this section) before you install the RamDisk.run file.

The Mover.run file does not execute until you load the Request.SPA.sys file from the distribution diskette to the [Sys]<Sys> directory and then reinitialize the system.

Note: If you will be installing the Protected Mode Operating System Server (PMOSS) and SPA on the same workstation, you must install the PMOSS server (PmAgent.run) before installing SPA's RamDisk.run file (refer to the *BTOS Protected Mode Operating System Server [PMOSS] Installation Guide* for more information).

Cacher.run File

The Cacher.run file is a program that caches file-system structures needed to open and close files. In this way, Cacher.run reduces the overhead when files are opened many times; this occurs when numerous clustered workstations are opening many shared files.

You install the Cacher.run file when you initialize the system by including Cacher.run in the Sysinit.jcl file (refer to *BTOS Standard Software Operations Guide*). If you install both the RamDisk.run and Cacher.run files, you must install Cacher.run first.

Note: You install the Cacher.run file on master or standalone workstations only.

DeinstallSPAMover.run File

The DeinstallSPAMover.run file deinstalls the Mover.run file only when the system is not using the Mover.run file (that is, when you have deallocated all of the extended memory). You perform the deinstallation with the command
DEINSTALL SPA MEMORY MOVER.

You cannot deinstall the RamDisk.run file. As a result, whenever you install the RamDisk.run file, you cannot deinstall the Mover.run file because the system considers it to be in use.

Loading Procedures

The following paragraphs tell you how to load the SPA software onto your B 28 or B 38 system. Included are instructions for B 28 and B 38 workstations and for XE 520 master systems that download the SPA software.

Prerequisites to Loading the SPA Software

Before you load the SPA software, make sure your system complies with the following prerequisites:

- You can use SPA only with B 28 and B 38 workstations equipped with hard disks (or B 28 or B 38 clustered workstations, with SPA downloaded from an XE 520 master system).
- Your system must have BTOS version 8.0 or higher.
- SPA occupies approximately 105Kb to 125Kb within the first megabyte of physical memory and uses from 1Mb to 3Mb of extended memory.
- SPA requires approximately 155 sectors on the hard disk.
- Installing the Cacher.run file is optional. Not installing it saves 54 sectors on the hard disk and 61Kb of memory. Install Cacher.run only if you open and close the same file frequently.

Loading SPA onto B 28 and B 38 Workstations

To load SPA onto B 28 and B 38 workstations equipped with a hard disk drive, use the following procedure:

- 1 Insert the distribution diskette in drive f0.
DO NOT press the RESET button.
- 2 Enter SOFTWARE INSTALLATION in the Executive command field.
- 3 Press GO.
- 4 Follow the instructions that appear on the display.
When you finish loading the SPA software, the Executive command prompt reappears.
- 5 Remove the distribution diskette from drive f0 and resume normal cluster operations.

Downloading SPA from an XE 520 Master System

To download SPA from an XE 520 master system to a B 28 or B 38 workstation, use the following procedure:

- 1 Insert the distribution diskette in drive f0 of any BTOS workstation connected to the XE 520 master system.
DO NOT press the **RESET** button.
- 2 Enter **XESOFTWARE INSTALLATION** in the Executive command field.
- 3 Press **GO**.
- 4 Follow the instructions that appear on the display.
When you finish downloading the SPA software, the Executive command prompt reappears.
- 5 Remove the distribution diskette from drive f0 and resume normal operations.

Installing the SPA Run Files

After you load the SPA software, you must install the **Mover.run**, **Cacher.run**, and **RamDisk.run** files.

You install the run files in three ways:

- by including the SPA software files in the **Sysinit.jclfile**, in which case the system automatically loads these files each time you reboot
- by using the **INSTALL** command at the Executive level to install the **Mover.run** and **RamDisk.run** files
- by using the **RUN** command at the Executive level to install the **Cacher.run** file (refer to the *BTOS Standard Software Operations Guide* for more information)

Using the **INSTALL** and **RUN** commands requires you to load the Run files each time you reboot the system.

Note: If you will be installing the Protected Mode Operating System Server (PMOSS) and SPA on the same workstation:

- Do not install **Mover.run** because PMOS includes the **Mover.run** file's functionality.
- Install the Protected Mode server (**PmAgent.run**) before installing the SPA **RamDisk.run** file.

For more information, refer to the *BTOS Protected Mode Operating System Server (PMOSS) Installation Guide*.

Installing SPA Run Files From the Executive

You must install the `Mover.run`, `Cacher.run`, and `RamDisk.run` files after you load SPA software.

Note: You must install the files in the order named in the procedure.

To load these run files from the BTOS Executive, use the following procedure:

- 1 Enter **INSTALL SPA Memory Mover** in the Executive command field.
- 2 Press **GO**.

The system displays the messages:

Installing the SPA Memory Mover

Testing Expanded Memory...

There are X.X Megabytes of external memory available
X.X indicates the available amount of extended
memory in megabytes.

- 3 Enter **Run File** in the Executive command field.
- 4 Press **RETURN**.
- 5 Enter **[Sys]<Sys>Cacher.run** in the File name field.

Note: You install the `Cacher.run` file on master or standalone workstations only.

- 6 Press **GO**.
- 7 Enter **INSTALL RamDisk** in the Executive command field.
- 8 Press **RETURN**.
- 9 In the Cache file name field, enter **SPA>Sample.fl**s or the list of files you want to cache.
- 10 Press **GO**.

Note: You can also use the BTOS Editor to directly edit the file `[Sys]<Sys>SPA>Sample.fl`s, as described in this section.

Editing Sysinit.jcl to Install SPA Run Files

To automatically install SPA when the system is booted, you edit the Sysinit.jcl file to include the lines shown in figure 2-1.

Note: For more information on including run files in the Sysinit.jcl file, refer to the *BTOS Standard Software Operations Guide*.

Figure 2-1 Sample Sysinit.jcl File

```
$JOB Sysinit
$RUN[SYS]<SYS>Mover.run
$RUN[SYS]<SYS>Cacher.run
$RUN[SYS]<SYS>RamDisk.run,[SYS]<SYS>SPA>Sample.Fls
$END
```

Using the BTOS Editor with SPA

To edit the list of files contained in the file [Sys]<Sys>SPA>Sample.flS with the BTOS Editor, use the following procedure:

- 1 Enter **EDIT** in the Executive command field.
- 2 Press **RETURN**.
- 3 When the **File** prompt appears, enter the name of the file that contains the list of files you want to edit. For example, you could enter [Sys]<Sys>SPA>Sample.flS.
- 4 Press **GO**.
- 5 Edit the list of files contained in the file you specified in step 3.
- 6 Press **FINISH** when you finish editing,
- 7 When the **Save?** prompt appears, enter **Y** to save the changes you made or **N** to cancel the changes (in which case the system reverts to the original file contents).
- 8 Press **GO**.

Modifying Cached Files

SPA lets you cache read-only files. You should not expect to modify these files once SPA reads them into the cache.

Nevertheless, you can modify a cached file using the BTOS Editor (refer to the *BTOS Standard Software Operations Guide*) or applications that write to the cached file; however, doing so removes the file from the cache. Subsequent access to the file is from the hard disk.

After you modify a file, you must reboot the system and reinstall the Ramdisk.run file to cache the file. Be sure you have a proper working set of files for caching.

The files cached are referenced at the memory-access speed. All other files must be read from the hard disk at the disk-transfer speed.

Removing the SPA Memory Mover

To remove the SPA extended memory manager, you must deinstall the SPA memory mover, which the Mover.run file provides. You can deinstall the SPA memory mover only when you have not installed the RamDisk.run file and when a system application is not using the extended memory.

To deinstall the SPA memory mover, use the following procedure:

- 1** Enter **DEINSTALL SPA Memory Mover** in the Executive command field.
- 2** Press **GO**.

Using Extended Memory as a BTOS Context Manager Swap File

To save time and disk space, you can configure your BTOS Context Manager configuration file to swap memory partitions to SPA's extended memory (instead of to the hard disk).

To use extended memory as a Context Manager swap file, use the following procedure:

- 1** Enter **CM EDIT** in the Executive command field.
 - 2** Press **GO**.
The CM Configuration Editor display appears.
 - 3** Press **F8 (Swap)**.
The cursor appears at the top left corner of the display.
The prompt **Enter Name or Size in sectors** appears.
 - 4** Press **GO**.
The name of the current swap file appears.
 - 5** Enter the number of sectors of SPA extended memory for your swap file (for example, enter **2000** to set aside 1Mb of RAM).
- Note:** Do not indicate the name of the swap file.
- 6** Press **GO**.
The CM Configuration Editor display appears.
 - 7** Press **GO** to save the configuration or **FINISH** to retain the old swap file.

Status Codes

General

The SPA software includes status codes to help you install and operate SPA.

The system displays status codes at the Executive level to inform you of error conditions that occur during SPA operations.

Status Codes

A status code is a five-digit number that indicates a problem within the system.

The SPA status codes pertain to three software files provided on the distribution diskette: Cacher.run, Mover.run, and RamDisk.run. These status codes fall within the following ranges:

- Cacher.run 12500 to 12567
- Mover.run 13350
- RamDisk.run 13300 to 13315

The following tables list the status codes:

- Table A-1. Cacher.run Status Codes
- Table A-2. Mover.run Status Code
- Table A-3. RamDisk.run Status Codes

Table A-1 Cacher.run Status Codes

Status Code	Explanation
12500	Cacher has already been installed.
12501	File Home Block garbage collection found empty queue.
12502	Inconsistency in File Home Block queue size.
12503	Inconsistency in File Name Record queue size.
12504	Inconsistency in File Name Record device number.
12505	Inconsistency in Device Control Block lists.
12506 -12518	Error in File Name Record queue.
12519-12525	Error detected in checking queue integrity integrity.
12526	Attempt to close an inactive remote file handle.
12527	Too many characters in specified volume name.
12528	Improper character in numeric string.
12529 -12531	Queue structure error encountered in dequeue attempt.
12532	Reentrant attempt to expand file name.
12533	Missing local handle value encountered.
12534 -12535	Erroneous response exchange in request block.
12536	Unknown request type in request block.
12537	Unknown File Name Record state found in opening file.
12538	Error locating user.
12539-12540	Error in File Header Block queue garbage collection.
12541	Error in queue garbage collection.
12542-12543	Error in remote File Header Name entry.
12544	Incorrect number of served requests.

Table A-1 Cacher.run Status Codes (continued)

Status Code	Explanation
12545	Installation not allowed on cluster workstation.
12546	Bad File Name Record state for invalidating cache.
12547	Illegal response type returned by mass I/O operation.
12548	Inconsistency in mass I/O request list.
12549	Error dequeuing mass I/O request.
12550	Illegal request in attempt to find old server.
12551	Illegal device number in File Control Block.
12552	Bad File Name Record state in open attempt.
12553 -12555	Bad file handle generated in file open.
12556	Illegal device number in File Control Block.
12557	Hashing prime number table too short.
12558	Erroneous queue pointer in queuing attempt.
12559	Queue pointer in error for removal attempt.
12560	Attempt to remove entry from empty queue.
12561	Timer server passed bad request block.
12562	Illegal user number for setting user activity.
12564	Error in vacating dormant Device Control Block.
12565	Illegal mass I/O request count.
12566	Cacher is only allowed on B 28s and B 38s.
12567	Cacher requires multipartition.

Table A-2 Mover.run Status Code

Status Code	Explanation
13350	Mover.run has failed to install. The reason for the failure appears on the screen.

Table A-3 RamDisk.run Status Codes

Status Code	Explanation
13300	The RamDisk.run program failed to install. The reason that the installation failed appears on the screen.
13310	An internal record that describes a cached file has been corrupted. The cache is no longer valid, and no recovery is possible.
13311	An internal consistency check has revealed that internal data is no longer valid. No recovery is possible.
13312	The queuing logic has discovered an internal error. No recovery is possible.
13313	The system has detected an internal error. The RamDisk.run exchange has incorrectly received a request. No recovery is possible.
13314	The system has discovered an internal inconsistent state. The most likely cause is an SPA version with an expanded table size whose corresponding table in RamDisk.run has not been increased synchronously. No recovery is possible.
13315	An internal table has overflowed. No recovery is possible.

Memory, Hardware, and Software Requirements

This appendix defines the SPA memory, hardware, and software requirements.

Memory Requirements

Standard Configuration Memory Requirements

SPA version 2.0 requires approximately 105Kb to 125Kb within the first megabyte of physical memory.

SPA uses from 1Mb to 3Mb of extended memory.

Hard Disk Requirements

SPA version 2.0 requires approximately 155 sectors on the hard disk.

Run File Memory Requirements

The Mover.run, RamDisk.run, and Cacher.run files have the following memory requirements:

File Name	Approximate Memory Required (Kb)
Mover.run	14
RamDisk.run	30 to 50 (200 bytes of memory are required for each cached file)
Cacher.run	61

Note: Installing the Cacher.run file is optional. Not installing it saves 54 sectors on the hard disk and 61Kb of memory. Install Cacher.run only if you open and close the same file frequently.

Hardware and Software Requirements

SPA version 2.0 works with the multipartition version of BTOS 8.0 or higher.

You can install SPA version 2.0 on B 28 and B 38 workstations that use BTOS version 8.0 or higher, are equipped with a hard disk, and contain 2Mb to 4Mb of Random Access Memory (RAM); optimum results require the full 4Mb configuration. You can alternatively download SPA from an XE 520 master system to clustered workstations; you cannot execute SPA on an XE 520 master system.

Recommended Files to be Cached

This appendix recommends files that you may want to cache when performing various operations. Caching the recommended files speeds up the operations associated with the cached files.

Logging-in and Logging-out of Workstations

If you and other users log in and out of workstations frequently, cache the following files:

[Sys]<Sys>Exec.run	[Sys]<Sys>Sys.cmds
[Sys]<Sys>Signon.run	[Sys]<Sys>(name).user
[Sys]<Sys>t1Sys.font	[Sys]<Sys>Submit.run
[Sys]<Sys>Subcmd.run	

Logging-in with BTOS Context Manager

If you log in to a workstation that has BTOS Context Manager installed, include the following files in the cache (in addition to the files mentioned above):

[Sys]<Sys>CMInstall.run	[Sys]<Sys>CMNull.run
[Sys]<Sys>CmInvoker.run	[Sys]<Sys>CM.run

Clustered Workstations That Use PWP and SWP

If you frequently use the PWP and SWP operations in a clustered workstation configuration, caching the following files associated with PWP and SWP provides fast access to the word processing operation:

[Sys]<Sys>Wp.fmt	[Sys]<Sys>OWP4.run
[Sys]<Sys>Wp.whl	[Sys]<Sys>Wp.msg

Note: If your workstation is using a wheels file other than [Sys]<Sys>Wp.whl or a format file other than [Sys]<Sys>WP.fmt, make appropriate entries in your [Sys]<Sys>(name).user file and cache the alternate files.

Glossary

Cache. Cache is an area in memory into which you can store files you never or seldom have to change.

Cacher.run File. The Cacher.run file is a program that caches file-system structures needed to open and close files.

DeinstallSPAMover.run File. The DeinstallSPAMover.run file deinstalls the Mover.run file only when you have deallocated all of the extended memory (that is, when the system is not using the Mover.run file).

Extended Memory. Extended memory is the workstation's memory above 1Mb.

File Handle. A file handle is an index that the file system uses to identify an open file.

File Structure Cache Manager. File Structure Cache Manager creates and maintains the cache containing directories, headers, and other file information about the frequently used files stored on the hard disk. It consists of the Cacher.run file.

Memory Manager. Memory Manager allocates and maintains extended memory, and serves as a transfer agent for memory. It consists of the Mover.run and Mover.img files.

Mover.img File. The Mover.img file manages the workstation's extended memory.

Mover.run File. The Mover.run file loads and executes the Mover.img file.

RAM. Random Access Memory.

RamDisk.run File. The RamDisk.run file provides the read-only file cache.

RunFile Cacher. RunFile Cacher allows read-only files to be cached. It consists of the RamDisk.run file and is located above the first megabyte of memory.

Sysinit.jcl File. The Sysinit.jcl file is a special file with default entries that install utilities when you turn on or reset your system.

Write-through Cache. Write-through cache stores directories and information about frequently used files, such as file-system structures needed to open and close files.

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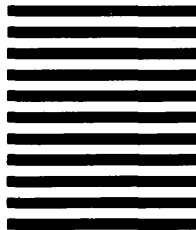
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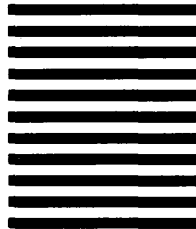
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