

S H A R P   A P L   *for*   U N I X

*Administrator Library*

*Installation Guide*  
Version 6.0



© 2000 by Soliton Associates Limited–Printed in Canada  
44 Victoria Street, Suite 2100, Toronto, Ontario, Canada M5C 1Y2

All rights reserved. No part of this work may be reproduced in any form or by any means without prior written permission of the copyright owner.

Soliton Associates Limited shall not be liable for errors contained herein or for incidental consequential damages in connection with the use of this material. The information contained within this document is subject to change without notice.

### **Acknowledgments**

SHARP APL is a registered trademark of Soliton Associates Limited.

SVP and NSVP are trademarks of Soliton Associates Limited.

UNIX is a registered trademark of UNIX System Laboratories, Inc.

IBM and AIX are registered trademarks of International Business Machines Corporation.

Sun, Solaris, SunOS are trademarks of Sun Microsystems, Inc.

All other products referred to in this document are trademarks or registered trademarks of their respective trademark holders.

# Contents

---

---

<i>Preface</i> .....	v
Introduction.....	v
SHARP APL for UNIX Platforms .....	v
Chapter Outlines.....	v
Conventions.....	vi
Documentation Summary.....	vii
Contacting Soliton Associates .....	vii
<i>Introduction</i> .....	1
Prerequisites and Background Information .....	1
Release Library Naming Conventions .....	1
Version .....	2
Local Customization.....	2
Distribution Materials .....	3
<i>Installation Procedure</i> .....	5
Special Considerations .....	5
Packing List .....	5
The Steps .....	5
Discussion Section .....	5
Procedure Section .....	6
Precautions .....	6

Step 1.Preparation .....	7
Step 2. System Configuration .....	8
Step 3.Preparing the System .....	10
Step 4.Running the Installation Script.....	11
Step 5.Managing Configuration Files.....	15
Step 6. Making <code>sax</code> and <code>wys</code> Scripts Available .....	16
Step 7.Login Test .....	19

# *Preface*

---

---

## *Introduction*

This document describes the steps necessary to properly configure and install SHARP APL on an AIX, Linux, or Solaris operating system. The person responsible for performing this installation should read it thoroughly.

## *SHARP APL for UNIX Platforms*

SHARP APL is currently supported on following levels of UNIX operating systems:

- AIX Release 4.2 and 4.3
- SunOS 5.6 and 5.7 (Solaris 2.6 and 2.7)
- Linux - the minimum kernel version supported is 2.0.36

## *Chapter Outlines*

This Install Guide is organized into the chapters described below.

Chapter 1, “Introduction,” describes the prerequisites and background information necessary for performing the installation.

Chapter 2, “Install Procedure,” details the special considerations and systematic instructions necessary for performing this installation.

## Conventions

The following conventions are used throughout this Guide.

$\Box i o \leftarrow 0$	Although the default value $\Box i o$ in a clear workspace is <i>one</i> , all examples in this manual assume that the index origin is <i>zero</i> .
$\alpha$ and $\omega$	Two APL symbols are used in syntax descriptions of monadic and dyadic functions; <i>alpha</i> ( $\alpha$ ) identifies the left argument and <i>omega</i> ( $\omega$ ) identifies the right argument.
constant width	Examples of non-APL input and output (e.g., system commands) are represented in a <b>constant width</b> typeface.
<i>passno</i>	Argument variables appear in <i>sans-serif italic</i> type.
<code>[]</code>	Optional arguments are shown between square brackets. For example, in the following APL statement, the argument <i>passno</i> is optional:

`'filename'  $\Box st i e$  tieno [ ,passno ]`

These default environment variables represent frequently used pathnames in SHARP APL for UNIX documentation and scripts:

<code>\$SAXLIB</code>	$\rightarrow$	<code>/usr/sax</code>
<code>\$SAXDIR</code>	$\rightarrow$	<code>/usr/sax/rel</code>
<code>\$SAXCNF</code>	$\rightarrow$	<code>/usr/sax/local</code>
<code>\$HOME</code>	$\rightarrow$	home directory of the current user
<code>\$CDROM</code>	$\rightarrow$	your CDROM location, or location of source files if not using a CDROM for the installation

## *Documentation Summary*

The SHARP APL for UNIX reference documentation is published in several volumes. One or more of the following may be referenced in this document. Please view the `README.ver` and `README.history` files on the distribution CDROM or in `$SAXCNF` for the latest information.

The SHARP APL for UNIX documentation set includes the following books:

- Handbook, publication code UW-000-0401
- Auxiliary Processors Manual, publication code UW-033-0501
- File System Manual, publication code UW-037-0501
- Intrinsic Functions Manual, publication code UW-007-0501
- Language Guide, publication code UW-000-0802
- System Guide, publication code UW-000-0902
- SVP Manual, publication code UW-001-0501

Together with this guide and the `README` file included with the distribution, these books provide a complete description of the facilities available with SHARP APL for UNIX version 6.0.

For a complete list of Soliton product publications, please visit the Soliton Associates website at <http://www.soliton.com>.

## *Contacting Soliton Associates*

Problems or questions regarding your SHARP APL system or this guide should be directed to the Soliton Associates Technical Support group:

`support@soliton.com`

Requests for additional technical documentation should be directed to the Soliton Associates Sales group:

`sales@soliton.com`

# *Introduction*

---

---

## *Prerequisites and Background Information*

SHARP APL for UNIX is currently supported on the following operating systems and release levels:

- AIX Release 4.2 and 4.3
- SunOS 5.6 and 5.7 (Solaris 2.6 and 2.7)
- Linux - the minimum kernel version supported is 2.0.36

The installation must be performed from the superuser account (`root`) with a recommended `umask` setting of `022` on all platforms.

The SHARP APL for UNIX product requires UNIX system configuration options to accommodate an eight Kb shared memory segment and one semaphore for every SAX process using AP124.

## *Release Library Naming Conventions*

The default name of the root directory for SHARP APL distribution files is `/usr/sax/rel`. You may install the files into any directory. You will be prompted for your choice during the installation. The root directory will be referenced as `$SAXDIR` throughout this document. Substitute your choice where `$SAXDIR` is found as a path reference.

## Version

Throughout this document **ver** is used to designate the version number for this release of SHARP APL for UNIX. Use 600 for all occurrences of **ver**.

## Local Customization

The following is a list of configuration files which you may choose to customize for your system.

Step 4 in this Guide provides instructions for managing the configuration files.

\$SAXDIR/etc/site.svp	Configuration parameters for the Shared Variable Processor.
\$SAXDIR/etc/site.nsdp	Configuration parameters for the Network Shared Variable Processor.
\$SAXDIR/etc/site.btask	Configuration parameters for the Btask Scheduler.
\$SAXDIR/etc/saxfs.cnf	Configuration parameters for the SHARP APL File Server. (New with release 6.0.0).
\$SAXDIR/etc/.saxif	This document can be used to build intrinsic functions that are unique to your SHARP APL for UNIX system. Soliton recommends the use of alternative techniques described in the <i>Intrinsic Functions Manual</i> .
\$SAXDIR/etc/conf/rc_local.sax	Control file for automating the start-up of the SVP, NSVP, and the Btask Scheduler.
\$SAXDIR/etc/nsvp.hosts	The local list of valid hosts for NSVP (hosts not found in the system /etc/hosts file).
\$SAXDIR/etc/nsvp.shells	A list of valid UNIX shells recognized by NSVP.

---

\$SAXDIR/etc/apd.tab	Start-up file for the AP daemon, apd.
\$SAXDIR/etc/apd_nsdp.tab	Defines which Auxiliary Processors are started when a task logs in via NSVP.
\$SAXDIR/etc/apd_t.tab	Start-up file for the AP daemon (Sun asynch variation – apdt).
\$SAXDIR/lib/wss6/NsvpX.sf	Information on remote systems for this application of NsvpX. (Note: NsvpX is a separately licensed product and may not be installed on your system.)
\$SAXDIR/lib/btask/btasks.sf	Btask Scheduler data file that contains the details of requests submitted.
\$SAXDIR/lib/btask/blog.sf	Logging file used by the Btask Scheduler facility.

## *Distribution Materials*

SHARP API for Unix is distributed on CD-ROM which is readable on platforms that support the ISO-9660 standard for CD-ROMs. The directory structure is as follows:

\$CDROM/tools	Scripts and README files.
SAXinstall.600	Script to use for installing SHARP API for UNIX 6.0.0
SAXinstall.600	Script to use for a new installation of SHARP API for UNIX 6.0.0
README.600	Description of the changes in SHARP API for UNIX 6.0.0.
README.history	Description of the changes included in previous releases.

\$CDROM/documentation	SAX 6.0.0 documentation in portable document format (PDF).
SAX6_Doc.pdf	Full set of documentation for SHARP APL for UNIX 6.0.0
SAX6_Install.pdf	Installation Guide for SHARP APL for UNIX 6.0.0.
\$CDROM/emulators/	Instructions, fonts, and software for PCs intending to access SAX with APL characters and keyboards.
\$CDROM/aix_42/	SAX 6.0.0 for AIX 4.2
\$CDROM/aix_43/	SAX 6.0.0 for AIX 4.3
\$CDROM/solaris_6/	SAX 6.0.0 for SunOS 5.6/Solaris 2.6
\$CDROM/solaris_7/	SAX 6.0.0 for SunOS 5.7/Solaris 2.7
\$CDROM/linux/	SAX 6.0.0 for Linux

In each of the Operating System directories (\$CDROM/**os**), in addition to the directories required for SAX 6.0.0, you will also find the following file:

packingList	Contains checksums for all files in this distribution
-------------	---

# *Installation Procedure*

---

---

## *Special Considerations*

- A system reboot may be required on a SunOS system.

## *Packing List*

SHARP API for UNIX includes the file, `packingList`. This contains checksums for all files in this distribution.

## *The Steps*

The installation procedure is divided into numbered steps, each of which indicates a logical stage in the installation process. Each step is comprised of a discussion, and a procedure, as described below.

## *Discussion Section*

This section describes the action to be taken and provides any necessary background information. It should be read before executing the procedure.

## Procedure Section

This section provides the sequence of actions that comprise the complete step. These may be UNIX commands, the execution of a UNIX script, or instructions on how to edit a module.

*Discrete actions* are indicated by a box symbol (□), and *action choices* are indicated by a circle symbol (○). For reference purposes, please place a check mark in the box or circle beside each action that has been completed successfully.

Some scripts in the procedure prompt for a response. Values in the parenthesis ( ) indicate possible responses. The value in square brackets [ ] is the default value. This default is used if you don't enter a response.

## Precautions

We recommend that the instructions in this guide be executed in the order in which they are presented. Contact Soliton Support ([support@soliton.com](mailto:support@soliton.com)) before attempting to execute any step out of sequence.

## *Step 1. Preparation*

### *Discussion*

This step helps you prepare for the installation. Reviewing the necessary documentation before you start is the most important preparation you can make. Completing this step also helps ensure that your system is configured appropriately before you start the installation.

### *Procedure*

- Review the SHARP API for UNIX Documentation Suite distributed with this release. The Suite has been grouped according to potential readers.
- Review and become familiar with this Install Guide before continuing.

Questions about any of the instructions in this guide should be directed to the Soliton Technical Support group ([support@soliton.com](mailto:support@soliton.com)).

- Read the `README.ver` found in `$CDROM/tools` (or in `$SAXDIR` upon completion of the installation).
- Ensure that all prerequisites identified in the Introduction section "Prerequisites and Background Information" are satisfied.

## *Step 2. System Configuration*

### *Discussion*

The SHARP APL for Unix product requires UNIX system configuration options to accommodate shared memory segments for the Shared Variable Processor, the File Server 3, 1 semaphore for every SAX process using AP124, and the Message Queue facility.

On the AIX and Linux platforms, the default values are usually sufficient. If you have problems on an AIX system, you may have to set EXTHSM=ON. If you have problems on a Linux system, you may have to rebuild your kernel with increased values.

On the SunOS platform, the default values are only sufficient for a very small configuration (for example, SVP users=10). We recommend the following minimum settings for the listed values. These values may need to be increased depending on your projected system load. Note that even though we recommend a minimum setting for the maximum size of the shared memory segment, it should not exceed the virtual memory available on your system.

### *Procedure*

#### *\*\*\* For SunOS Only \*\*\**

- Log on to the superuser account (root)
- cd /etc and using standard procedures, edit the file /etc/system as follows.

*Continued*

## Step 2. (Continued)

- ❑ Add these statements to the appropriate section. The `forceunload` statements should precede the `set` statements.

```
forceunload: sys/semsys
forceunload: sys/shmsys
forceunload: sys/msgsys

set maxusers=96
set npty=128
set pt_cnt=128
set tune:tune_t_flckrec=4000

set semsys:seminfo_semmni=1000
set semsys:seminfo_semmns=6000
set semsys:seminfo_semmnru=6000
set semsys:seminfo_semume=80
set semsys:seminfo_semmssl=6000
set semsys:seminfo_semopm=80

set shmsys:shminfo_shmmax=320000000
set shmsys:shminfo_shmseg=64
set shmsys:shminfo_shmmni=128

set msgsys:msginfo_msgmap=100
set msgsys:msginfo_msgmax=2048
set msgsys:msginfo_msgmnb=4096
set msgsys:msginfo_msgmni=128
set msgsys:msginfo_msgssz=8
set msgsys:msginfo_msqtql=40
set msgsys:msginfo_msgseg=1024
```

- ❑ You must schedule a system reboot with reconfiguration (-r) before releasing the upgraded SHARP APL for UNIX to your users.

## *Step 3. Preparing the System*

### *Discussion*

In preparation for the installation of SHARP APL for UNIX on your system, some housekeeping duties are required. The initial directories chosen for this product must be created.

Note, throughout these instructions, environmental variable references are used. There is a table in the Introduction providing defaults.

### *Procedure*

- Log onto the superuser account (root).

The entire installation must be performed from this account. The recommended umask setting is 022.

- Create the directory for this product.

```
mkdir -p $SAXLIB (default /usr/sax)
```

- Create the directory to be used for some back up activities.

```
mkdir -p $SAXCNF (default /usr/sax/local)
```

## Step 4. Running the Installation Script

### Discussion

This step describes running the UNIX shell script, `SAXinstall.ver`. The script uses the Bourne shell and performs the installation of SHARP APL distribution files and APL X-Windows fonts.

There are a number of prompts, which can be issued by this script. Most are self-explanatory, or require only a yes or no answer. If you are unsure of any of the answers, contact Soliton Technical Support. The script prompts you to answer questions regarding the installation. Default answers for questions are displayed in square brackets at the end of the prompt. To accept the default value, press ENTER.

The Install script uses the two UNIX commands `cp` and `rm`. If you alias these commands on your system to verify each request (`cp -i` or `rm -i`) you may want to unalias these before executing the script.

The Installation script executes `$SAXDIR/etc/tinit.install`. This script updates output table names in the terminal initialization files. It will change the hard-coded pathnames (`/usr/sax/rel`) in these files to `$SAXDIR`. If you are installing in a non-default library, this ensures the terminal and keyboard features reference the proper library.

The script also attempts to install APL X-Window fonts by executing `$SAXDIR/etc/xfonts.install`. These fonts are only required if you intend to use SHARP APL in a UNIX X-Window. The fonts `saxlarge`, `saxmedium`, and `saxsmall` are added to the `misc` subdirectory for the appropriate X-Windows library for your UNIX/Linux version. If your system runs an X Font Server (for example, `xfs` on most Linux systems), an additional step is required after the completion of the installation script and before the fonts will be available. You must send the signal `SIGUSR1` to cause the server to re-read its configuration file. (For example, find the `pid` of the `xfs` task and issue the UNIX command `kill -USR1 pid`).

*Continued*

## Step 4. (Continued)

### Procedure

- Log on to your superuser account (root).
- Insert the CD-ROM in the CD drive. Depending on how your workstation is configured, your CD drive may be mounted automatically. If the CD drive is not mounted, you must mount it before continuing.
- To run the SHARP APL for UNIX install script, change to `tools` directory on the CD-ROM and start the script.

```
cd $CDROM/tools  
sh SAXinstall.ver
```

The product installation prepares for the procedure by determining your UNIX operating system and verifying that it is a supported system.

This is the installation procedure for Version **x.0** of SHARP APL for UNIX on *operating\_system\_and\_release\_level*.

Do you wish to continue (Y/N) ? [Y]

- Press ENTER if the correct operating system has been detected and go to the next prompt.
- Press N if this is not the correct operating system. The installation will be cancelled.

If any problems are detected during this determination, an error message is displayed and, usually, the installation is cancelled.

**Continued**

## *Step 4. (Continued)*

If you accept the operating system, the procedure verifies you are using the root user id, have the recommended umask setting, and that it can find the required system tools. If a discrepancy is found, an error message prints and the installation is cancelled.

Now the procedure needs to determine the location of your source files.

Are your source files located on a cdrom (Y/N) ? [Y]

- Press ENTER if you are installing from CD-ROM. You are asked to enter the name of the mounted CD drive.
- Press N if you have the source code on disk. You are asked to enter the complete directory path containing the source file and go to the next prompt. Note: you must enter the parent directory of the bin and etc directories included in the distribution.

You will be asked to verify the chosen location of your source files directory. If installing from a CDROM, the location will be \$CDROM/ [**platform**].

If you are installing to a Linux system, you will be asked to read and agree to the terms of the license.

Your preference for the location of the installation is now determined.

Would you like to install the new version in the default (/usr/sax/rel) directory (Y/N) ? [Y]

- Press ENTER if you want to install in /usr/sax/rel.
- Press N if you do not want to use this directory. You are asked to enter the pathname for the release library files. This pathname is validated before going to the next prompt.

You will be asked to verify your choice of installation directory.

*Continued*

## ***Step 4. (Continued)***

The procedure now uses all information you have provided to perform the installation. At the end of the installation procedure, you should see messages similar to the following:

```
file size (blocks)      unlimited
SVP initialization complete
[UNIX Prompt]# detach begins
detach ends (setpgid rc=0)
```

These messages are expected. You may have to press ENTER to get your next UNIX prompt.

## *Step 5. Managing Configuration Files*

### *Discussion*

This step allows you to customize the various configuration files. Although these files can be used without any modifications, substitution of values more suited to your local requirements is suggested. A list of configuration files is provided earlier in this document in the section "Local Customization".

### *Procedure*

- Refer to the list of configuration files (see "Local Customization" section).
- Using standard system procedures, make any changes that you've determined should be implemented for your system.

## **Step 6. Making sax and wys Scripts Available**

### *Discussion*

The provision of the scripts `sax` and `wys` to users can be done in a manner appropriate for your system. Suggested methods include linking frequently used scripts into a standard path such as `/usr/bin/`, advising users to amend their shell login files, or amending a global user profile script.

To automate loading the SVP and starting the NSVP facility during system startup, the SHARP APL startup script should be added to the boot sequence. For Solaris and Linux installations, this is linked into the level 3 script; for AIX installations this must be added to `rc.local`.

In addition, if you are not using the default location of the SHARP APL for UNIX product (i.e., `$SAXDIR` is not `/usr/sax/rel`) you must edit some files including `rc_local.sax` to reflect this change.

### *Procedure*

- ❑ Log on to the superuser account (root).
- ❑ If necessary, edit `SAXDIR` in `$SAXDIR/etc/conf/rc_local.sax` to reflect the directory in use on your system.
- ❑ If you have installed in a non-default directory, check the following documents for references to the path `/usr/sax/rel` and change them:

```
$SAXDIR/etc/apd.tab  
$SAXDIR/etc/apd_nsdp.tab  
$SAXDIR/etc/apd_t.tab  
$SAXDIR/etc/nsdp.script  
$SAXDIR/etc/samit.script  
$SAXDIR/etc/conf/rc_local.sax
```

Note that these won't be a problem when started from a UNIX session where `$SAXDIR` is defined, but there is a problem when started by a detached task or as part of an automated start-up procedure.

*Continued*

## *Step 6. (Continued)*

- Examples for provision of the scripts `sax` and `wys` to users for your environment.

Link the scripts into a standard path included in all user's profile, for example `/usr/bin`:

```
ln -s $SAXDIR/bin/sax  /usr/bin/sax
```

```
ln -s $SAXDIR/bin/wys  /usr/bin/wys
```

Amend the individual user shell or the global user shell login files to define the following global values.

Substitute your path for `/usr/sax/rel`.

```
set SAXDIR=/usr/sax/rel
```

```
set PATH=$PATH:$SAXDIR/bin
```

- If necessary, edit `SAXDIR` in `$SAXDIR/etc/conf/rc_local.sax` to reflect the directory in use on your system.

*Select only the actions that are appropriate for your operating system:*

- Solaris:*

- Link into the level 3 script:

```
cd /etc/rc3.d
ln -s $SAXDIR/etc/conf/rc_local.sax S99sax
```

*Continued*

## Step 6. (Continued)

- *AIX:*

- Place the following commands at the end of a system boot script (e.g. /etc/rc.local)

```
SAXDIR=/usr/sax/rel; export SAXDIR  
$SAXDIR/etc/conf/rc_local.sax
```

- *Linux:*

- Link into the level 3 script using commands similar to the following which are appropriate for your version of Linux:

```
cd /etc/rc.d/rc3.d  
ln -s $SAXDIR/etc/conf/rc_local.sax S99sax
```

## Step 7. Login Test

### Discussion

This step ensures the SHARP APL interpreter has been correctly installed. It involves logging into your system as an ordinary user, and typing `sax`.

### Procedure

- ❑ **NOTE:** If this is a SunOS system and you updated the `/etc/system` file as described in Step 2, a system reboot with reconfiguration should have taken place prior to running this test.
- ❑ **NOTE:** If you are running an X Font Server on your system, ensure you have refreshed the server so APL fonts are available.
- ❑ Log on to your UNIX system as an ordinary user (Soliton recommends that you do not run SAX from the `root` account).
- ❑ Type:

`sax`

The following message should display on your sign-on screen:

*SHARP APL for UNIX Version ver*

If a version number **ver** other than the newly released version number appears on your sign-on screen, please contact Soliton support ([support@soliton.com](mailto:support@soliton.com)).

- ❑ To ensure you have APL characters, type:

`□av`

- ❑ To ensure the Shared Variable Processor is working properly, type:

```
)load 1 hostap
pwd
```

- ❑ `)off`

***End of SHARP APL for UNIX Installation Procedure***