



Solaris 8 Source, Foundation Release Installation Guide

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Preface

The *Solaris 8 Source, Foundation Release Installation Guide* introduces the Solaris™ 8 Source, Foundation Release for SPARC™ and IA based systems.

Note - In this guide the term “IA” refers to the Intel 32-bit processor architecture, which includes the Pentium, Pentium Pro, Pentium II, Pentium II Xeon, Celeron, Pentium III, Pentium III Xeon processors and compatible microprocessor chips made by AMD and Cyrix.

This guide provides the information and procedures required to successfully install, modify, and build the Solaris source code.

Note - The Solaris operating environment runs on two types of hardware, or platforms—SPARC and IA. The Solaris environment also runs on both 64-bit and 32-bit address spaces. The information in this guide pertains to both platforms and address spaces unless called out in a special chapter, section, note, bullet, figure, table, example, or code example.

Who Should Use This Book

This guide is for experienced UNIX® system administrators or skilled UNIX professionals who have previously installed and built system software.

How This Guide Is Organized

This guide is structured in the following manner:

- Chapter 1, Product Overview, introduces the Solaris 8 Source, Foundation Kit. It describes the content of the Solaris 8 Source, Foundation Release CD and provides information on installation and build requirements with notes on U.S. export control regulations related to this release.
- Chapter 2, Installation and Build Procedures, provides information on building components of the Solaris 8 Source, Foundation Release.
- Chapter 3, Release Media Assembly, provides procedures for creating Solaris 8 CD and netinstall images.

More Information

For more information on the Solaris 8 source products, point your browser to <http://www.sun.com/solaris/source>.

Ordering Sun Documents

Fatbrain.com, an Internet professional bookstore, stocks select product documentation from Sun Microsystems, Inc.

For a list of documents and how to order them, visit the Sun Documentation Center on Fatbrain.com at <http://www1.fatbrain.com/documentation/sun>.

What Typographic Conventions Mean

The following table describes the typographic changes used in this book.

TABLE P-1 Typographic Conventions

Typeface or Symbol	Meaning	Example
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your <code>.login</code> file. Use the <code>lp</code> command to print the file from a command line.
AaBbCc123	What you type, contrasted with on-screen computer output	% lp myfile request id is default-1 (1 file)
<i>AaBbCc123</i>	Command-line placeholder: replace with a real name or value	To remove a file, type rm <i>filename</i> .
<i>AaBbCc123</i>	Book titles, new words, or terms, or words to be emphasized.	Read Chapter 6 in <i>User's Guide</i> . These are called <i>class</i> options. You must be <i>root</i> to do this.

Shell Prompts in Command Examples

The following table shows the default system prompt and superuser prompt for the C shell, Bourne shell, and Korn shell.

TABLE P-2 Shell Prompts

Shell	Prompt
C shell prompt	%
C shell superuser prompt	#
Bourne shell and Korn shell prompt	\$
Bourne shell and Korn shell superuser prompt	#

Information in the Examples

While every effort has been made to present displays of information just as they appear on your terminal, your system might produce slightly different output. Some displays depend on a particular machine configuration that might differ from yours. It's also possible that changes between releases of the Solaris system software might cause small differences in what appears on your terminal. Every attempt has been made to ensure that all completed code samples compile and work as represented.

Product Overview

This chapter introduces the Solaris 8 Source, Foundation Kit. It describes the content of the Solaris 8 Source, Foundation Release CD and provides information on installation and build requirements with notes on U.S. export control regulations related to this release.

Solaris 8 Source, Foundation Kit

The Solaris 8 Source, Foundation Kit offers source files and procedures you can use to build and modify much of SunOS 5.8. With the kit you can recreate the Solaris 8 Operating Environment and assemble netinstall and CD images of: Solaris 8 Software 1 of 2, 2 of 2, and the English Installation CDs.

The Solaris 8 Source, Foundation Kit is comprised of three packages:

- Solaris 8 Source Foundation: SPARC™/Intel Platform Edition™
- Sun™ Workshop™ 5 (known as Sun Workshop 5.0 *Try and Buy* when used with a 30 day license)
- Solaris 8 Operating Environment, February 2000, Revision A

Note - The Sun Workshop 5.0 compilers and the Solaris 8 Operating Environment, February 2000, Revision A are the only versions of these products supported for use with the Solaris 8 Source, Foundation Release.

Note - To build CD images, you need CD mastering equipment and MakeDisc, Young Minds premastering software for UNIX. Pre-release testing was done with MakeDisc, Versions 1.20B and 1.30B2

Product Warnings

Important Licensing Information

Please note that the use of this source code is restricted only to those individuals who have signed and returned the Foundation Source License Agreement. This agreement explains important terms of use and discussion regarding this product. For further information, please visit:

<http://www.sun.com/software/solaris/source/faq.html>

Include Files

Modifying include files is not advisable. This is because some parts of the system are distributed in object module form. If you change an include file in a way that requires recompilation of an object module, the module would fail to work correctly. A change to the size of a structure in an include file, for example, could trigger this condition. The result might be a system that is unsafe or impossible to boot.

Undocumented Interfaces

Undocumented interfaces are found throughout Solaris. They are undocumented for a reason: You should never use them. In patches, updates, or new releases of Solaris, undocumented interfaces could change or vanish completely. Always make sure an interface is documented before using it.

Two utilities could assist you in using an undocumented interface:

- `appcert`—This tool may help with user applications. You can find it in the EA (Early Access) directory of the Solaris 8 Operating Environment, February 2000, Revision A: Solaris 8 Software 2 of 2 CD.
- `ddict`—The DDI Compliance Tool may help with device drivers. For further information, visit the Driver Development site at:

<http://solderc.sun.com/developer/support/driver>

make clobber

Do not run `make clobber`. It will destroy precompiled object modules.

CD Contents

Tables in this section show the content of the Solaris 8 Source, Foundation Release CD.

TABLE 1-1 Solaris 8 Source, Foundation Release: CD contents

Component	Description
Copyright	Copyright file
admin_cd0	System and network administration
i386	objects/tools
osnet_volume	OS and networkng component
sparc	objects/tools
source_product_documentation	PDF version of this guide

TABLE 1-2 Solaris 8 Source, Foundation Release: `sparc` and `i386` CD directory contents

Component	Description
internal_packages	Binaries
patches	Compiler patches
osnet_objects	OS and networking objects

TABLE 1-2 Solaris 8 Source, Foundation Release: `sparc` and `i386` CD directory contents *(continued)*

Component	Description
stage	CD build files
tools	CD build tools

Installation and Build Requirements

To install and build the Solaris source, you must meet the hardware, software, and disk space requirements described in this section. You must also properly set source tree permissions and ownership.

SPARC: Hardware

The minimum hardware requirements are:

- SPARC system, 128 Mb RAM
- CD drive

For information on disk space requirements, see “Disk Layout” on page 13.

SPARC: Software

Before you begin building the source, load the following software:

- Solaris 8 Operating Environment, February 2000, Revision A: Entire Distribution software group
- Patches 107311-05, 107357-02, 107390-04
- Sun Workshop 5.0, SPARC

IA: Hardware

The minimum hardware requirements are:

- IA based system, with 128 Mb RAM
- CD drive

For information on disk space requirements, see “Disk Layout” on page 13.

IA: Software

Before you begin building the source, load the following software:

- Solaris 8 Operating Environment, February 2000, Revision A: Entire Distribution software group
- Patches 107312-05 and 107830-02
- Sun Workshop 5.0, Intel

Disk Layout

Each CD requires at least 640 Mb of disk storage. If you intend to extract and build the source code, you need additional disk storage. It is also useful to have at least 512 Mb of swap space.

Table 1-3 shows the recommended sizes for specific file systems. The estimates shown assume that you will be extracting and building the source and printing the documentation.

TABLE 1-3 Disk Storage Requirements

Directory	Contents	File System Size (Mb)
/	Solaris 8	2000
/source	System source area	2000
/build	System build area-all consolidations (except OpenWindows)	2000
/pkgs	Package area	2000
swap	Swap space	512

For best results, assign `/source`, `/build`, and `/pkgs` directories to separate disk partitions. If you need to restart a build, it is faster to unmount an individual file system and run `newfs(1)` to wipe the disk clean rather than using `rm(1)` to remove everything from the entire file system.

Permissions and Ownership of the Source Tree

A number of build steps require you to set user and group ownerships. Always log in as `root` when building the source.

Solaris and U. S. Export Control Regulations

United States export control laws regulate the export of source code files that contain encryption algorithms.

Encryption source files support a number of Solaris 8 features. To comply with export regulations, precompiled objects were added to this release to replace encryption-related source files. These object files enable features such as Secure RPC and `login` to function correctly.

Exportable source is available with this release. Affected files have been renamed with `.export` extensions and should be used for reference only.

Installation and Build Procedures

This chapter presents information on configuring your build system and on building components of the Solaris 8 Source, Foundation Release.

SPARC: Before You Begin

Before you starting a build, you must complete all steps in the next procedure to configure the build machine.

▼ SPARC: How To Configure the SPARC Build System

1. **Set up a SPARC base system as your build machine, using disk storage requirements referenced in the previous chapter.**
2. **Install the Solaris 8 Operating Environment, February 2000, Revision A: Entire Distribution software group on your build machine.**
3. **Install Sun Workshop 5.0 for SPARC platforms according to product installation instructions.**
4. **Remove the `SPROlibma` package.**

```
# pkgrm SPROlibma
```

5. Load the Solaris source from the Solaris 8 Source, Foundation Release CD into the `/source` directory. Your system will need to have `vold(1M)` running so that the CD will be mounted automatically.

```
# cd /cdrom/sol_foundation_8_src_en
# find . | cpio -pdum /source
# cd /; eject cdrom
```

6. Install the Sun Workshop 5.0 compiler patch 107357-02, followed by patches 107311-05 and 107390-04:

```
# patchadd /source/sparc/patches/107357-02
# patchadd /source/sparc/patches/107311-05
# patchadd /source/sparc/patches/107390-04
```

7. Modify the environment variables in your `.profile` and `.cshrc` to the following:

```
.profile:
umask 2
PATH=/opt/SUNWspro/SC5.0/bin:/usr/sbin:/usr/bin:/usr/ccs/bin:.
export PATH
.cshrc:
umask 2
setenv PATH /opt/SUNWspro/SC5.0/bin:/usr/sbin:/usr/bin:/usr/ccs/bin:.
```

IA: Before You Begin

Before you start a build, you must complete all the steps in the following procedure to configure the build machine.

▼ IA: How To Configure the IA Build System

1. Set up an IA base system as your build machine, using disk storage requirements referenced in the previous chapter.
2. Install the Solaris 8 Operating Environment, February 2000, Revision A: Entire Distribution software group on your build machine.
3. Install Sun Workshop 5.0 for IA platforms according to product installation instructions.
4. Remove the `SPROlibma` package.

```
# pkgrm SPROlibma
```

5. Load the Solaris source from the Solaris 8 Source, Foundation Release CD into the `/source` directory. Your system should have `vold(1M)` running so the CD is mounted automatically.

```
# cd /cdrom/sol_foundation_8_src_en
# find . | cpio -pdum /source
# cd /; eject cdrom
```

6. Install the Sun Workshop 5.0 compiler patches 107312-05 and 107830-02:

```
# patchadd /source/i386/patches/107312-05
# patchadd /source/i386/patches/107830-02
```

7. Modify the environment variables in your `.profile` or `.cshrc` files to the following:

```
.profile:
umask 2
PATH=/opt/SUNWspro/SC5.0/bin:/usr/sbin:/usr/bin:/usr/ccs/bin:.
export PATH
.cshrc:
umask 2
setenv PATH /opt/SUNWspro/SC5.0/bin:/usr/sbin:/usr/bin:/usr/ccs/bin:.
```

Build Procedures

You can use the procedures in this section to build the `admin_cd0` and `osnet_volume` components, or to modify the `build_osnet` script for a distributive make in parallel mode.

Before you begin, log in as `root`:

```
login: root
Password: <root password>
```

▼ How To Build the `admin_cd0` Component

1. **Change to the `source` directory and use the `cpio` command to copy the sources to your build directory:**

```
# cd /source
# find admin_cd0 | cpio -pdum /build
```

2. **Change to the `build` directory:**

```
# cd /build/admin_cd0
```

3. Run the build_admin_cd0 script:

```
# chmod +x ./build_admin_cd0
# ./build_admin_cd0
```

▼ How to modify the build_osnet script for distributed make in parallel mode

The build_osnet script is provided to help create individual source builds. By default, the script is set up to build the source using the serial make bundled in Solaris. You can change the script to take advantage of the parallel mode of the distributed make (dmake) in Sun's TeamWare v2.1. To use dmake, Sun's TeamWare v2.1 must be installed on the build host system. Performing a make in parallel will greatly reduce the time you need to complete a source build.

Complete the following steps to modify build_osnet after you install TeamWare v2.1 and download all files onto the local disk of the build host.

1. Locate the following lines in the build_osnet script.

```
MAKE=/usr/ccs/bin/make; export MAKE
# MAKE=dmake; export MAKE
```

Note - To change to a parallel make using dmake, uncomment **MAKE=dmake; export MAKE** and add a "#" before **MAKE=/usr/ccs/bin/make; export MAKE** in the other line.

The SC5.0 version of dmake can help you do faster builds. If you have problems, however, return to using the serial make option.

2. Remove the "#" for the appropriate MAKE line and ensure that the other MAKE line is commented out. Run the script with only one line uncommented
3. Save the edited script file to your hosts build environment.

4. Ensure that the environment variables `SPRO_ROOT` and `JAVA_ROOT` have been set. See the appropriate installation guides for how to accomplish this.

The script is now ready to perform a build.

▼ How To Build the `osnet_volume` Component

1. Change to the `source` directory and use the `cpio` command to copy the sources to your build directory:

```
# cd /source
# find osnet_volume | cpio -pdum /build
```

2. Copy the binary to top of the `osnet_volume` source directory:

```
# cd /source/`uname -p`/osnet_objects
# find . | cpio -pdum /build/osnet_volume
```

3. Change to the `build` directory:

```
# cd /build/osnet_volume
```

4. Set the environment variable `SPRO_ROOT`.

```
SPRO_ROOT: Compiler location
( /opt/SUNWspro is default. The location on your system may vary.)

csh:
# setenv SPRO_ROOT /opt/SUNWspro
ksh or sh:
# SPRO_ROOT=/opt/SUNWspro; export SPRO_ROOT
```

5. Run the `build_osnet` script:

Note - By default the `build_osnet` script sends output to screen. It is recommended to send screen output to a file for future reference.

```
# chmod +x ./build_osnet
csh
# ./build_osnet >& \
/build/makeout/makeout.build_osnet_volume.`uname -p`.log
ksh or sh
# ./build_osnet > \
/build/makeout.build_osnet_volume.`uname -p`.log 2>&1
```

The recommended filename format for source product make output logs is:

/build/makeout—location of source product make output logs

`makeout.build_<product><build_type>.<platform>.log`

`<product>=osnet`

`<build_type>=volume`

`<platform>=[i386 | sparc]`

6. Copy the packages to /pkgs directory:

```
# cd /build/osnet_volume/packages/`uname -p`
# find . | cpio -pdum /pkgs
```


Release Media Assembly

The two sections in this chapter provide information on preparing and assembling the Solaris 8 CD and netinstall images.

Because it is not possible to fully recreate the Solaris 8 Operating Environment from the source components built in the previous chapter, you must complete the instructions in the next section to compress the newly built packages and combine them with packages extracted from the Solaris 8 Operating Environment, February 2000, Revision A CDs. You can use the combined set of packages with the steps in the assembly section to create the Solaris 8 images.

Solaris 8 Images: Preparation

Complete all instructions related to the following before attempting to build Solaris 8 CD or netinstall images:

- Create file systems according to the recommendations in the next section, “Suggested Configuration” on page 24.
- Compress the source packages you built in the previous chapter.
- Run the `extract_pkgs` script as root to extract all the packages from Solaris Software 1 of 2, 2 of 2 and languages CDs or netimages of the Solaris 8 Operating Environment, February 2000, Revision A release.
- Run the `comb_pkgs` script as root to combine the source packages you built in the previous chapter with those extracted from Solaris Software 1 of 2, 2 of 2 and languages CDs or netimages of the Solaris 8 Operating Environment, February 2000, Revision A release. Then create a new directory for the combined packages.
- Connect your CD mastering equipment to a Sun workstation.

- Confirm that you are using MakeDisc, Young Minds premastering software for UNIX.

Suggested Configuration

This section offers suggestions on how to set up the file systems and provides you disk requirements for CD build tools and packages.

All disk configuration and file system recommendations in this section are based on the structure used in pre-release assembly testing. The CD mastering equipment was connected to the Solaris 8 SPARC build machine.

For the IA source, you need a separate SPARC system to run the Young Minds software tools for CD image creation. The SPARC system should be installed with Solaris 2.5 or later.

File System Recommendations

This table lists the file systems you create before compressing, extracting and combining packages prior to assembling Solaris 8 images. The second column shows file systems defined during pre-release testing.

<build_pkgs>	/pkgs	Packages built from the Solaris 8 Source, Foundation Release CD.
<extracted_pkgs>	/packages/ extracted_packages	Packages extracted from Solaris 8 Operating Environment, February 2000, Revision A CDs.
<combined_pkgs>	/packages/ combined_packages	Packages combined from <build_pkgs> and <extracted_pkgs>
<netimage_dir>	/netimage	The netinstall images you download from the net server
<image_dir>	/images	Directory where the netinstall and CD images are built

Note - In addition to the above file systems, you also need a 1 GB disk drive for CD image creation.

Following are the disk space requirements for your file systems:

/packages	4000 MB
/netimage	4000 MB
/images	4000 MB

▼ Copy the CD build tools

Copy the tools and stage directories into the /build directory:

```
SPARC:
# cd /source/sparc
# find tools stage | cpio -pdum /build
IA:
# cd /source/i386
# find tools stage | cpio -pdum /build
```

▼ Compress the newly built source packages

```
# cd /<build_pkgs>
# /build/tools/faspac -x \
"SUNWsibi,SUNWcddb,SUNWjpwmm,SUNWswmt,SUNWbtx86,\
CDKcdboot,SUNWvcd2,SUNWvcdln" /<build_pkgs>/[A-Z]*
```

▼ Extract all packages from CDs or netimages

To extract packages from the Solaris Software 1 of 2, 2 of 2 and languages CDs or netimages of the Solaris 8 Operating Environment, February 2000, Revision A release, go to one of the following sections:

- “Extract packages from CDs” on page 26
- “Extract packages from netimages” on page 26

Extract packages from CDs

Confirm that `vold(1M)` is running to mount each CD automatically and extract the packages to the destination directory.

```
# chmod +x /build/tools/extract_pkgs
# /build/tools/extract_pkgs cdrom <extracted_pkgs>
```

Extract packages from netimages

Download or copy the netinstall images into the following directories:

Note - If you download your images to another location, create a symbolic link to the following SPARC or IA directories.

SPARC:

```
/netimage/sol_8_sparc
/netimage/sol_8_sparc_2
/netimage/sol_8_lang_sparc
```

IA:

```
/netimage/sol_8_ia
/netimage/sol_8_ia_2
/netimage/sol_8_lang_ia
```

Extract the packages into the destination directory.

```
# chmod +x /build/tools/extract_pkgs
# /build/tools/extract_pkgs netimage <extracted_pkgs>
```

▼ Combine the packages

Run the `comb_pkgs` script to combine the compressed Solaris 8 Source, Foundation Release packages with the packages extracted from Solaris Software 1 of 2, 2 of 2 and languages CDs or netimages of the Solaris 8 Operating Environment, February 2000, Revision A release. The script compares the `<build_pkgs>` and `<extracted_pkgs>` directories. It then moves packages from `<build_pkgs>` to the `<combined_pkgs>` directory. Finally, it adds missing packages from the `<extracted_pkgs>` directory.

```
# chmod +x /build/tools/comb_pkgs
# /build/tools/comb_pkgs -r <extracted_pkgs> \
-s <build_pkgs> -d <combined_pkgs>
```

Once the script has completed, you can review the `xfer_status.out` file in destination directory to make sure it completed without errors. The `xfered.list` file shows packages transferred from the `<extracted_pkgs>` directory to the `<combined_pkgs>` directory.

Solaris 8 Images: Assembly

▼ Setup Steps

1. Copy the internal packages from the `internal_packages` directory in the source tree to combined packages pool:

```
# cd /source/internal_packages
# find . | cpio -pdm <combined_pkgs>
```

2. Set up the stage area:

```
# cd /build/stage/solaris
# ln -s <combined_pkgs> pkgpool
# ln -s <combined_pkgs> all
SPARC:
# ln -s <combined_pkgs> sparc
IA:
# ln -s <combined_pkgs> i386
```

3. Install Young Minds premastering software in `/export/YMI` on your build machine.

If the software is installed at another location, create the following symbolic link on your SPARC build machine:

```
# ln -s <your YMI path> /export/YMI
```

4. For IA builds, the following setups need to be done on the build system:

Note - <sparc_server> represents the SPARC system that has the YMI software running:

a. Share file system <image_dir> to give the Young Minds system read-write permissions:

Add the following to the /etc/dfs/dfstab file:

```
share -F nfs -o rw=<sparc_server>,anon=0 <image_dir>
```

Then execute the shareall command to execute the share:

```
# shareall
```

Now make sure the nfs server is running:

```
# /etc/init.d/nfs.server start
```

b. Set environment variable BUILD_SERVER:

```
# BUILD_SERVER=<sparc_server>; export BUILD_SERVER
```

- c. Add <hostname> root to the .rhosts file on <sparc_server> to make the IA build system a trusted host for the remote system with the YMI software. During CD image build, the IA system needs to have root access to the Young Minds system to generate the Rockridge image.



Caution - Remove this line when you have finished CD image assembly. Otherwise, root login with no password will be permitted on the <sparc_server> from <hostname>.

▼ Build Steps

1. Build the netinstall and CD images:

```
# /build/tools/cdkit BuildImage -d <drive> \  
/build/stage/solaris <image_dir>/solaris \  
solaris1of2 solaris2of2 cd0en &
```

Note - In the above example, <drive> represents the 1 GB disk you need for CD image creation.

Note - Upon successful completion of the above step, the netinstall images and CD image components will be created in <image_dir>/solaris. The log files for the build can be located in <image_dir>/solaris/logs.

2. Assemble final CD images for solaris1of2 and the cd0en installers:

```
SPARC:
# cd <image_dir>/solaris
# cat solaris1of2.rr solaris1of2.miniroot solaris1of2.s2 \
solaris1of2.s3 solaris1of2.s4 solaris1of2.s5 > solaris1of2.image
# cat cd0en.rr cd0en.miniroot cd0en.s2 \
cd0en.s3 cd0en.s4 cd0en.s5 > cd0en.image
```

```
IA:
# cd <image_dir>/solaris
cat solaris1of2.rr solaris1of2.miniroot > solaris1of2.image
# cat cd0en.rr cd0en.miniroot > cd0en.image
```

Note - The Solaris 2 of 2 CD image is `solaris2of2.rr`. You can rename it if you wish.
