

SPARC COMPLIANCE DEFINITION 1.1

**SC D
1.1**

SPARC International

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SPARC COMPLIANCE DEFINITION 1.1

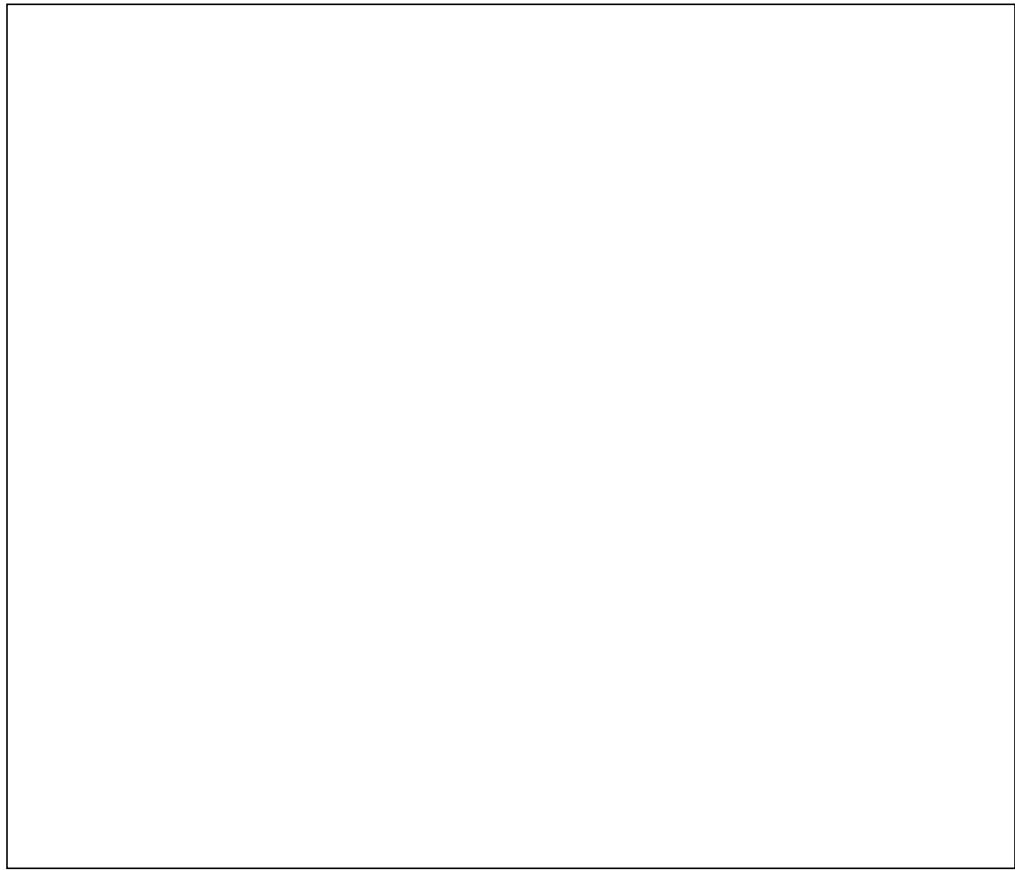


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PREFACE



Preface

Preface

Audience and Purpose

The SPARC *International Compliance Definition* (SCD) is intended for use by anyone who is committed to creating compatible SPARC/UNIX products that comply to the SPARC conformance standards.

This publication is intended to fulfill the following purposes:

- Provide reference to items necessary in SPARC SCD 1.1 compliance.
- Address ambiguous and/or loose specifications in existing documents.

Organization and Content

The SCD1.1 has been divided into two major portions and an appendix:

- Chapter 1 Introduction
- Chapter 2 System Features
- Appendix A Windowing System Options

Chapter 1 is a general introduction to the SPARC Compliance Definition and to the SCD 1.1. Chapter 2 provides detailed information on the interfaces required for a system to be deemed compliant under SCD 1.1.

Publication Conventions

This publication uses page format and typographic variances to highlight particular kinds of information. These conventions of usage are generally consistent with publication conventions used by other UNIX publications, such as the SunOS 4.1 documentation set.

Other Publication Conventions

The following typographical conventions are used within the text of this publication:

- Filenames, pathnames, and system messages are shown in:
typewriter font like this.

Preface

- Titles of chapters in this publication are shown in plain Roman font, inside quotation marks like this: "Introduction."
- Document titles are shown in plain, nonbold italic font like this: *SunOS 4.1 Release Manual*.

Changes From SCD 1.0 to SCD 1.1

Changes from SCD 1.0 to SCD 1.1

Required System Features

- Based on SunOS 4.1
- Updated SunOS Utilities Exception list
- Updated SunOS Library list
- Updated dynamically linked libraries list
- Enforce the major number of the dynamically linked libraries
- Updated the ioctl command list

Windowing System Options

- Windowing system is an option.
- If Windowing System is supported, there are three options: X11R4, OpenWindows 2.0, and SunView 1.80.
- If X11R4 is a supported windowing system, there are two types of X Window environments: run-time and development environment.

New Issues

OpenWindows provides support to SunView applications for migrating to the X Window environment. However, applications built using OpenWindows do not have interoperability in the X Window environment from MIT. This is due to the different X Toolkit headers and different font file format between the two windowing systems. SPARC International recommends that these issues be resolved so that we can achieve interoperability of the X clients between OpenWindows and X Window System.



CHAPTER 1: INTRODUCTION



Introduction

Introduction

Overview

The SPARC Compliance Definition, or SCD, defines a set of Operating System interfaces that all SPARC Compliant systems must provide to ensure the binary interoperability of SPARC compliant software.

SPARC Compliance Definition 1.1

SCD 1.1 is based upon the openly-licensed SunOS Release 4.1, its libraries, and its utilities. SPARC International has partitioned the system features into categories in order to establish a standard binary interface for application programs. Future extensions and enhancements will be added to the standard as advocated and supported by SPARC International members.

The SPARC Compliance Definition 1.1 is partitioned into two parts; the BASE System and the Optional Packages. The BASE System defines a set of Operating System interfaces that all SPARC Compliant systems must provide. All application can expect these interfaces to exist and function consistently on all SPARC Compliant systems. The Optional Packages defines a set of software that may be added to the BASE System. Each Optional Package defines a set of interfaces that the system must provide for such an option. All application which requires such an option can expect the interfaces in the Optional Package to exist and function consistently.

Introduction

SCD 1.1 BASE System

The SCD 1.1 BASE System consists of the runtime Operating System with networking and uucp utilities.

SCD 1.1 Optional Packages

The SCD 1.1 Optional Packages are individually listed below:

Development System

The Development System consists of the C compiler, system header files, system libraries, graphic libraries, networking service libraries, and shared library customization libraries. In addition, the development system supports system V and XPG 3 compatibility environments.

Desktop System

Tools and utilities specifically for a desktop system.

Text Processing System

Commands and utilities for text processing, including troff, nroff, tbl, refer, eqn.

Devices System

Tools and library for writing device drivers. Requires the Development System Package.

Sunview Runtime System

Utilities, tools and images for Sunview window interface.

Sunview Development System

Libraries and headers for developing sunview applications. Requires the Development System Package.

OpenWindow 2.0 Runtime System

Utilities, tools, and fonts for OpenWindow interface.

Introduction

OpenWindow 2.0 Development System

Libraries and headers for developing OpenWindow application. Requires the Development System Package.

MIT X Window Runtime System

X server, utilities, tools, and fonts for X11R4 interface.

MIT X Window Development System

Libraries and headers for developing X11R4 application. Requires the Development System Package.



CHAPTER 2:

REQUIRED SYSTEM FEATURES



Required System Features

Required BASE System Features

The SCD 1.1 BASE System defines a set of Operating System interfaces that all SPARC Compliant systems must provide. All application can expect these interfaces to exist and function consistently on all SPARC Compliant systems.

The SCD 1.1 BASE System consists of the runtime UNIX Operating System with networking and uucp utilities. The list of required files are listed in Appendix A. The semantics of the system commands and utilities are defined in the SunOS Reference Manual, Vol I, II, III from Sun Microsystems.

Required System Features

SCD 1.1 BASE Operating System

The kernel supplied with the SunOS 4.1 Portable SPARC SunOS Release is the reference kernel. The full operating system call interface implemented by this kernel must be supported by conformant systems.

SCD 1.1 BASE Library Suite

Dynamically linked libraries provide hardware independence and the ability to correct problems and add functionality without forcing applications and utilities to be relinked.

The shared libraries supplied by the Portable SPARC SunOS Release are mandatory in conformant systems. They are listed with their major and minor numbers as follows:

```
libc.sa.1.5  
libc.so.1.5  
libdl.so.1.0
```

Exceptions are the kvm library and the encryption subroutines in the standard C library, libc.

The kvm library is system dependent. Its functionality is required but it may have a interface other than the one released with the Portable SPARC SunOS Release Tape.

```
kvm.....kernel data structure access
```

Encryption libraries are prohibited from export from the United States. As a result these encryption library routines are **not** required in conformant systems:

```
crypt  
des_crypt  
des_setparity  
ecb_crypt  
encrypt
```

Version Numbers of Dynamically Linked Libraries

Version numbers of dynamically linked libraries can affect the execution of applications on conformant systems. Thus version numbers are recognized a part of the library interface. As such, version numbers must be consistent across vendors' platforms.

Only the minor number of the version numbers can be updated. The major number of

Required System Features

the version numbers must be as same as the SunOS 4.1 Portable SPARC SunOS Release.

Library Entry Point

The C shared library must include the functions listed in Appendix B. The syntax and the semantic of the functions must be as same as defined in the SunOS Reference Manual, Vol I, II, III from Sun Microsystems.

Required System Features

Pseudo Devices

Pseudo devices required for SCD 1.1 conformance are:

Pseudo Device	Description
clone	STREAMS driver
console	system output device
drum	paging device
ldterm	STREAMS terminal module
lo	software loopback network interface
lofs	loopback virtual file system
pty	pseudo-terminal driver
termio	general terminal interface
ttcompat	STREAMS compatibility module
tty	current terminal device
null	data sink
zero	source of zeros

ioctl

All ioctl system calls on files and pseudo devices that are machine independent must be supported in conformant systems. The following commands must be supported¹:

```
arp(4)
    SIOCSARP
    SIOCGARP
    SIOCDARP

audio(4)
    AUDIO_DRAIN
    AUDIO_GETINFO
    AUDIO_SETINFO
```

1. From *SunOS 4.1 Reference Manual* Volume II.

Required System Features

```
cdromio(4)
    CDROMPLAYMSF
    CDROMREADTOCHDR
    CDROMREADTOCENTRY
    CDROM_LEADOUT
    CDROMVOLCTRL
    CDROMSUBCHNL
    CDROMREADMODE1
    CDROMREADMODE2
    USCSICMD

console(4)
    TIOCCONS
```

Required System Features

```
dkio(4)
    DKIOCGGEOM
    DKIOCSGEOM
    DKIOCOPART
    DKIOCSPART
    DKIOCINFO
    DKIOCGCONF
    DKIOCSTYPE
    DKIOCGTYPE
    DKIOSAPART
    DKIOCGAPART
    DKIOCSBAD
    DKIOGBAD
    DKIOCSCMD
    DKIOCGDIAG
    DKIOCWCHK
    FDKIOWCHAR
    FDKIOSCHAR
    FDKEJECT
    FDKGETCHANGE
    FDKGETDRIVECHAR
    FDKSETDRIVECHAR
    FDKGETSEARCH
    FDKSETSEARCH
    FDKIOSCSCMD
    F_RAW

fbio(4)
    FBIOGTYPE
    FBIOGINFO
    FBIOGPIXRECT
    FBIOPUTCMAP
    FBIOGETCMAP
    FBIOSATTR
    FBIOGATTR
    FBIOSVIDEO
    FBIOGVIDEO
    FBIOVERTICAL
```

Required System Features

```
filio(4)
    FIOCLEX
    FIONCLEX
    FIONREAD
    FIONBIO
    FIOASYNC
    FIOSETOWN
    FIOGETOWN

fpa(4)
    FPA_ACCESS_OFF
    FPA_ACCESS_ON
    FPA_FAIL
    FPA_GET_DATAREGS
    FPA_INIT_DONE
    FPA_LOAD_OFF
    FPA_LOAD_ON
    FPA_DIAGNOSTICS_ONLY
    FPA_WRITE_STATE
    FPA_WRITE_HCP

gpone(4)
    GP1IO_PUT_INFO
    GP1IO_GET_STATIC_BLOCK
    GP1IO_FREE_STATIC_BLOCK
    GP1IO_GET_GBUFFER_STATE
    GP1IO_CHK_GP
    GP1IO_GET_RESTART_COUNT
    GP1IO_READIRECT_DEVFB
    GP1IO_GET_REQDEV
    GP1IO_GET_TRUMINORDEV
```

Required System Features

```
if(4)
    SIOCSIFADDR
    SIOCGIFADDR
    SIOCSIFDSTADDR
    SIOCGIFDSTADDR
    SIOCSIFFLAGS
    SIOCGIFFLAGS
    SIOCGIFCONF
    SIOCADDMULTI
    SIOCDELMULTI
    SIOCSPROMISC

inet(4)
    SIOCSIFNETMASK
    SIOCGIFNETMASK

kb(4)
    KIOCTRANS
    KIOCGTRANS
    KIOCSKEY
    KIOCGKEY
    KIOCTYPE
    KIOCLAYOUT
    KIOCCMD
    KIOCSLED
    KIOCCLED
    KIOCSCOMPAT
    KIOCGCOMPAT
    KIOCGDIRECT
    KIOCSDIRECT
```

Required System Features

```
ldterm(4)
    TCGETS (see termio)
    TCGETA (see termio)
    TCSETS (see termio)
    TCSETSW (see termio)
    TCSETSF (see termio)
    TCSETA (see termio)
    TCSETAW (see termio)
    TCSETAF (see termio)
    TCFLSH (see termio)
    TCXONC (see termio)

ms(4)
    MSIOGETPARMS
    MSIOSETPARMS

mtio(4)
    MTWEOF
    MTFSF
    MTBSF
    MTFSR
    MTBSR
    MTREW
    MTOFFL
    MTNOP
    MTREten
    MTERASE
    MTEOM
    MTNBSF

nit_if(4)
    SIOCGIFADDR (see if4)
    SIOCADDMULTI (see if4)
    SIOCDELMULTI (see if4)
    NIOCBIND
    NIOCSSNAP
    NIOCGSNAP
    NIOCSFLAGS
    NIOCGFLAGS
```

Required System Features

```
nit_pf(4)
    NIOCSETF

openprom(4)
    OPROMGETOPT
    OPROMSETOPT
    OPROMNXTOPT

pty(4)
    TIOCSTOP
    TIOCSTART
    TIOCPKT
    TIOCREMOTE

sockio(4)
    SIOCSPGRP
    SIOCGPGRP
    SIOCCATMARK

streamio(4)
```

Required System Features

```
termio(4)
    TCGETS
    TCSETS
    TCSETSW
    TCSETSF
    TCGETA
    TCSETA
    TCSETAW
    TCSETAF
    TCSBRK
    TCXONC
    TCFLSH
    TIOCGPGRP
    TIOCSPGRP
    TIOCGWINSZ
    TIOCSWINSZ
    TIOCMBIS
    TIOCMBIC
    TIOCMGET
    TIOCMSET
    TIOCEXCL
    TIOCNXCL
    TIOCSCTTY
    TIOCCOUNTQ
    TIOCSTI
    TIOCGSOFTCAR
    TIOCSSOFTCAR
```

Required System Features

```
ttcompat(4)
    TIOCGETP
    TIOCSETP
    TIOCSETN
    TIOCHPCL
    TIOCFLUSH
    TIOCSBRK
    TIOCCBRK
    TIOCSDTR
    TIOCCDTR
    TIOCSTOP
    TIOCSTART
    TIOCGETC
    TIOCSETC
    TIOCLGET
    TIOCLBIS
    TIOCLBIC
    TIOCLSET
    TIOCGLTC
    TIOCSLTC

vpc(4)
    VSETSTATE
```

File Formats

File formats are the same as those released with the Portable SPARC SunOS Release Tape.

File System Hierarchy

The location of commands, files and directories file formats are the same as those listed in Appendix A.

System Maintenance and Operation Commands

SCD 1.1 conformance does **not** requires any system maintenance and operation commands distributed from the Portable Sun OS Source Release Tape. Each system can

Required System Features

implement customized system maintenance and operation commands.

ONC/NFS

SCD 1.1 conformance requires this entire subsystem. The parts that make up ONC/NFS are described in the *SunOS Reference Manual* under sections referenced in other places in this document.

TCP/IP

The TCP/IP protocols and interfaces are required in conformant systems. The parts that make up the TCP/IP subsystem are described in the *SunOS Reference Manual* under sections referenced in other places in this document.

Required System Features

Hardware Compatibility

Frame Buffer

There are no SCD 1.1 requirements for frame buffer hardware. Applications are required to link graphics libraries dynamically. The system vendor's libraries will be bound to the application at run time. Dynamically bound libraries allow the hardware dependencies to be hidden in the system vendor's library.

Memory Management Unit Compatibility

The page protection and address space capabilities of the memory management unit must support the requirements of SunOS 4.1.

Address Space Compatibility

The memory management unit and operating system must preserve the address space configuration of SunOS 4.1. Conformant systems must make 512 Megabytes of virtual address space available to application programs. This address space must start at address 0. That is, the address space of 0x0 - 0x20000000 must be made available to applications.

Page Protection

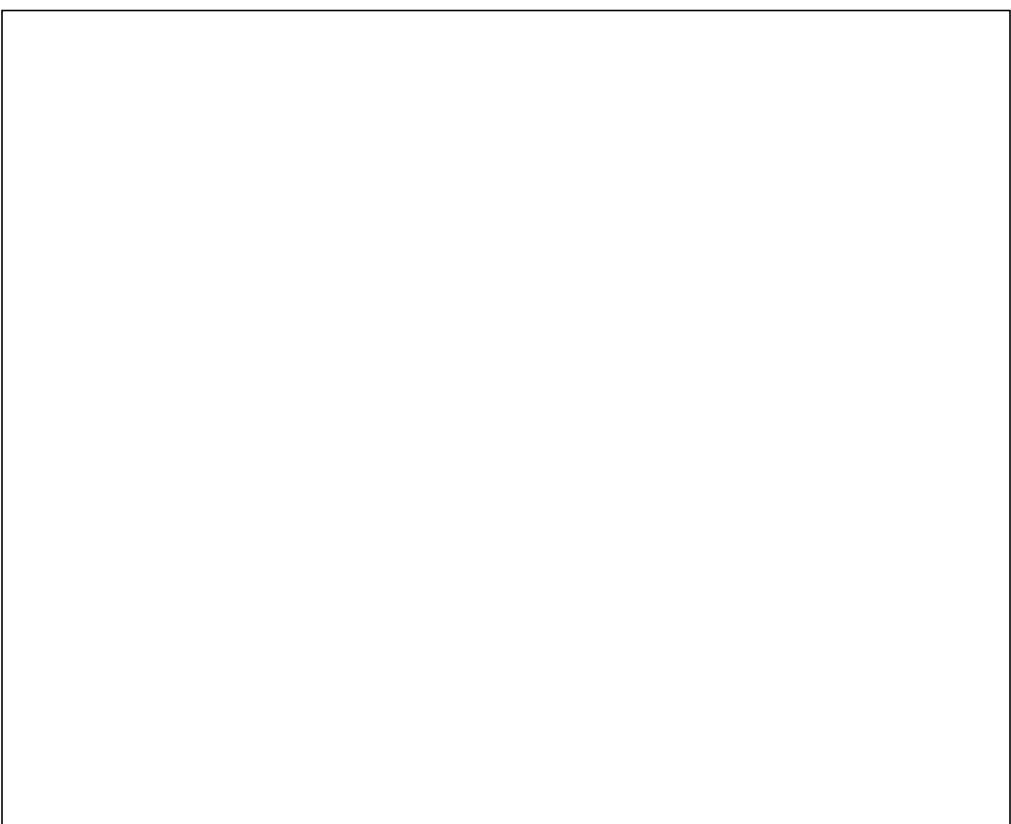
Support for the SunOS 4.1 `mmap(2)` system call requires that the conformant system's memory management unit support read-write and read-only, or read / execute-only pages.

Page Size

The hardware must support a maximum page size of 8192 bytes. The page size supported by the hardware must be an integral factor of 8192 bytes. This requirement ensures that system software will be able to support 4K and 8K page sizes.



APPENDIX A: WINDOWING SYSTEM OPTIONS



Windowing System Options

Windowing System Options

Overview

Because there are many computer systems that are designed to be file servers, SCD 1.1 does not specify window system support for computer systems. If a computer system does support a window system, that window system may be one of the following options:

- the X Window System, Version 11, Release 4 (X11R4), developed by MIT
- OpenWindows Version 2.0
- SunView 1.80

The X Window System Option

There are two types of X Window environments that a conformant system may support:

- A run-time environment
- A development environment

Run-time Environment Requirements

If the computer system has its graphic display connected to its backplane, then the system must have a X server, a set of fonts accessible by the server — including a font named `fixed`, and the following X clients: `xterm`, `xset`, `xhost`, `bdftosnf`, and `mkfontdir`.

If the system does not have its own graphic display, i.e., it uses an X terminal, then the system does not need a local X server, but still needs the fonts and X clients listed above.

Development Environment Requirements

If the computer system supports the X11R4 development environment, the X11R4 headers and the libraries must reside on the system. The content of the header and the libraries shall be based on X11R4, with patches 1 to 18 applied.

Windowing System Options

Required headers and libraries

X.h	Xmd.h	ap_keysym.h
Xatom.h	Xos.h	copyright.h
Xatomtype.h	Xproto.h	cursorfont.h
Xkeymap.h	Xprotostr.h	keysym.h
Xlib.h	Xresource.h	keysymdef.h
Xlibint.h	Xstreams.h	ks_names.h
Xlibos.h	Xutil.h	

libX11.a

The OpenWindows Option

If the system supports the OpenWindows option, SCD 1.1 conformance requires the entire OpenWindows graphics interface, as provided on the OpenWindows 2.0 Source Tape. Conformant systems must provide all files and interfaces that result from building the OpenWindows Source Tape.

The SunView Option

If the system supports the SunView option, SCD 1.1 conformance requires the entire SunView graphics interface, as provided on the SunView 1.80 Source Tape. Conformant systems must provide all files and interfaces that result from building the SunView 1.80 Source Tape.

It should be noted that future standards developments will obsolete this interface in favor of the X Window System. All new applications should be written for the X Window System, rather than SunView.



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