

README for XFree86® 4.5.0 on NetBSD

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1. What and Where is XFree86?

XFree86 is an Open Source version of the X Window System that supports several UNIX(R) and UNIX-like operating systems (such as Linux, the BSDs and Solaris x86) on Intel and other platforms. This version is compatible with X11R6.6.

See the Copyright Notice.

The sources for XFree86 are available by anonymous ftp from:

<ftp://ftp.XFree86.org/pub/XFree86/4.5.0>

Binaries for NetBSD 1.5 and later are available from:
<ftp://ftp.XFree86.org/pub/XFree86/4.5.0/binaries/NetBSD>

A list of mirror sites is provided by <http://www.xfree86.org/MIRRORS.shtml>

XFree86 also builds on other NetBSD architectures. See section *Building on other architectures* (section 8.4, page 6) for details.

XFree86 also supports NetBSD on PC98 machines.

2. Bug Reports for This Document

Send email to <herrb@XFree86.Org> (Matthieu Herrb) or <XFree86@XFree86.org> if you have comments or suggestions about this file and we'll revise it.

3. New OS dependent features

See the Release Notes for non-OS dependent new features in XFree86 4.5.0.

3.1 New OS dependent features in 4.2.0

- Support of client side on NetBSD/sparc64
- Support for in-kernel MTRR and AGP support in NetBSD 1.5Y

3.2 New OS dependent features in 4.1.0

- Enable wide characters support in NetBSD 1.5P and later.

3.3 New OS dependent features in 4.0.2

- A fix for libXmu OS detection which was broken since `unix` isn't defined anymore by the C preprocessor.

- (limited) native wscons support. This is not activated by default.
- Updates to the aperture driver
- Support for multithread libraries with GNU pthread
- Add `/usr/pkg/bin` to the default user path.

3.4 New OS dependent features in 4.0.1

- Support for NetBSD 1.5_ALPHA
- The Xsun server can be built on NetBSD/sparc

3.5 New OS dependent features in 4.0

- Preliminary APM support.

3.6 New OS dependent features in 3.9.18

- Soft-booting secondary cards through the int10 BIOS interface is now possible using the x86emu real mode emulator.

3.7 New OS dependent features in 3.9.17

- Support for *silken mouse* with the wsmouse protocol has been added.
- A new version of the XFree86 Aperture driver which provides MTRR support is included.

4. Installing the Binaries

Refer to the Installation Document for detailed installation instructions.

5. Configuring X for Your Hardware

The `/etc/X11/XF86Config` file tells the X server what kind of monitor, video card and mouse you have. You *must* create it to tell the server what specific hardware you have.

You'll need info on your hardware:

- Your mouse type, baud rate and its `/dev` entry.
- The video card's chipset (e.g. ET4000, S3, etc).
- Your monitor's sync frequencies.

The recommended way to generate an `XF86Config` file is to use the `xf86cfg` utility. The `xf86config` text utility is still there for the (few) cases where `xf86cfg` can't be used. Also, there is a sample file installed as `/usr/X11R6/lib/X11/XF86Config.eg`, which can be used as a starting point.

For details about the `XF86Config` file format, refer to the *XF86Config(5)* manual page.

Once you've set up a `XF86Config` file, you can fine tune the video modes with the `xvidtune` utility.

5.1 About mouse configuration

XFree86 4.5.0 has support for the mouse driver included in the **wscons** console driver introduced by NetBSD 1.4. Specify `"wsmouse"` as the protocol and `"/dev/wsmouse0"` as the device in `/etc/X11/XF86Config` if you're using NetBSD 1.4 or later with a PS/2 mouse.

For older releases, the NetBSD **pms** mouse driver handles PS/2 style mice as `Busmouse`. Specify the protocol as `"busmouse"` in the mouse section of your `XF86Config` file if you're using a PS/2

mouse with NetBSD 1.3 or former releases.

Only standard PS/2 mice are supported by this driver. Newest PS/2 mice that send more than three bytes at a time (especially Intellimouse, or MouseMan+ with a wheel) are not supported by NetBSD 1.3 and former releases.

See README.mouse for general instruction on mouse configuration in XFree86.

6. Running X

The easiest way for new users to start X windows is to type:

```
startx >& startx.log
```

Error messages are lost unless you redirect them because the server takes over the screen.

To get out of X windows, type: “exit” in the console xterm. You can customize your X by creating .xinitrc, .xserverrc, and .twmrc files in your home directory as described in the xinit and startx man pages.

6.1 Starting Xdm, the display manager

To start the display manager, log in as root on the console and type: “xdm -nodaemon”.

You can start xdm automatically on bootup by changing the line

```
xdm=NO                xdm_flags=""          # x11 display manager
```

to:

```
xdm=YES                xdm_flags=""          # x11 display manager
```

in /etc/rc.conf.

Under NetBSD 1.4 and later with the wscons console driver, you must enable a virtual console for the X server first. To do this follow these steps:

- Make sure the device file exists. If not, “cd /dev ; ./MAKEDEV wscons”.
- Next, make sure your kernel wants to do wscons. (see *below* (section 7.1, page 4)).
- Next, make sure “wscons=YES” in /etc/rc.conf.
- Next, make sure /etc/wscons.conf exists. The relevant bits:

```
#screen 0      -      vt100
screen 1      -      vt100
screen 2      -      vt100
screen 3      -      vt100
screen 4      -      -
screen 5      -      vt100
```

(Thanks to Mason Loring Bliss <mason@acheron.middleboro.ma.us> for this explanation)

Note that the binary distributions of XFree86 for NetBSD don’t include support for the XDM-AUTHORIZATION-1 protocol.

7. Kernel Support for X

To make sure X support is enabled under NetBSD, the following line must be in your config file in /sys/arch/i386/conf:

```
options XSERVER, UCONSOLE
```

7.1 Console drivers

The server supports the standard NetBSD/i386 console drivers: `pccons`, `pcvt` and `wscons` (in `pcvt` compatibility mode). They are detected at runtime and no configuration of the server itself is required.

The `pccons` driver is the most widely tested and is the console driver contained in the NetBSD binary distribution's kernels.

The `pcvt` console driver was bundled with NetBSD until 1.4. The `pcvt` X mode is compatible with the `pccons` driver X mode. It offers several virtual consoles and international keyboard support. In order to use this driver, change the line:

```
device      pc0      at isa? port "IO_KBD" irq 1
```

to

```
device      vt0      at isa? port "IO_KBD" irq 1
```

in your kernel config file, and rebuild and install your kernel.

`Wscons` is the current console driver, included in NetBSD 1.4 and later. For now, XFree86 supports `wscons` using the `pcvt` compatibility mode, so be sure to have the lines:

```
options      WSDISPLAY_COMPAT_PCVT      # emulate some ioctl's
options      WSDISPLAY_COMPAT_SYSCONS    # emulate some ioctl's
options      WSDISPLAY_COMPAT_USL       # VT handling
options      WSDISPLAY_COMPAT_RAWKBD     # can get raw scancodes
```

in your kernel configuration file if you're using `wscons`. Refer to the `wscons(4)` and `wsmouse(4)` manual pages for information on how to configure `wscons` into the kernel.

7.2 Aperture Driver

By default NetBSD include the BSD 4.4 kernel security feature that disable access to the `/dev/mem` device when in multi-users mode. But XFree86 servers can take advantage (or require) linear access to the display memory.

Most XFree86 4.5.0 card drivers require linear memory access. There are two ways to allow XFree86 to access linear memory:

The first way is to disable the kernel security feature by adding "`option INSECURE`" in the kernel configuration file and build a new kernel.

The second way is to install the aperture driver, included in source form in `xc/programs/Xserver/hw/xfree86/etc/apNetBSD.shar` in the XFree86 4.5.0 source distribution. Unpack it in a new directory of your choice by running:

```
sh apNetBSD.shar
```

By default the aperture driver will be installed in `/usr/local/aperture`. You can change this default directory by editing `Makefile.inc` before building it.

Then run "`make build`" as root to install it. To enable it, add the following line to `/etc/lkm.conf`:

```
/usr/local/aperture/lkm/xf86.o - - /usr/local/aperture/lkm/xf86_mod_install - -
```

and set "`lkm=YES`" in `/etc/rc.conf`

Reboot your system. XFree86 will auto-detect the aperture driver if available.

Warning 1: if you boot another kernel than `/netbsd`, loadable kernel modules can crash your system. Always boot in single user mode when you want to run another kernel.

Warning 2: the aperture driver only allows one access at a time (so that the system is in the same security state once X is launched). This means that if you run multiple servers on multiples VT, only the first one will have linear memory access. Use “option INSECURE” if you need more than one X server at a time.

Starting with XFree86 3.9.17, the XFree86 aperture driver also supports MTRR write combining on Pentiums II and AMD K6 class processors.

7.3 MIT-SHM

NetBSD 1.0 and later supports System V shared memory. If XFree86 detects this support in your kernel, it will support the MIT-SHM extension.

To add support for system V shared memory to your kernel add the lines:

```
# System V-like IPC
options      SYSVMSG
options      SYSVSEM
options      SYSVSHM
```

to your kernel config file.

8. Rebuilding the XFree86 Distribution

You should configure the distribution by editing `xc/config/cf/host.def` before compiling. To compile the sources, invoke “`make World`” in the `xc` directory.

8.1 Perl support

Starting with XFree86 4.0.2, perl is needed to build the fonts in XFree86. Since perl is not included with standard NetBSD installation, fonts that need perl are not built by default.

If you have installed perl (from the NetBSD packages, for instance), add the line

```
#define HasPerl YES
```

in `xc/config/cf/host.def` before rebuilding XFree86.

8.2 Aperture driver

To build the XFree86 server with the Aperture driver enabled, you should unpack `apNetBSD.shar` and install it first.

Then edit `xc/config/cf/host.def` and add the line

```
#define HasNetBSDApertureDriver YES
```

to it before rebuilding XFree86.

8.3 Console drivers

XFree86 has a configuration option to select the console drivers to use in `host.def`:

- if you’re using `pccons` put:

```
#define XFree86ConsoleDefines -DPCCONS_SUPPORT
```

- if you're using pcvt put:

```
#define XFree86ConsoleDefines -DPCVT_SUPPORT
```

If you don't define **XFree86ConsoleDefines** in `host.def` the `pccons` and `pcvt` drivers will be supported by default.

Experimental native support for the `wscons` console driver can be built by adding:

```
#define XFree86ConsoleDefines -DWSCONS_SUPPORT
```

to `xc/config/host.def` before rebuilding the server. This has not been thoroughly tested, except on the `macppc`.

For the `i386`, you should include both `pcvt` and `wscons` support in order to use the `pcvt` compatibility mode of `wscons`:

```
#define XFree86ConsoleDefines -DPCVT_SUPPORT -DWSCONS_SUPPORT
```

8.4 Building on other architectures

Note that the NetBSD project has now its own source tree, based on the XFree86 source tree, with some local modifications. You may want to start with this tree to rebuild from sources. The NetBSD `xsrc` source tree is available at: <ftp://ftp.netbsd.org/pub/NetBSD/NetBSD-current/xsrc/>

9. Building New X Clients

The easiest way to build a new client (X application) is to use `xmkmf` if an `Imakefile` is included in the sources. Type `"xmkmf -a"` to create the Makefiles, check the configuration if necessary and type `"make"`. Whenever you install additional man pages you should update `whatis.db` by running `"makewhatis /usr/X11R6/man"`.

When porting clients to *BSD systems, make use of the symbol **BSD** for code which is truly BSD-specific. The value of the symbol can be used to distinguish different BSD releases. For example, code specific to the Net-2 and later releases can use:

```
#if (BSD >= 199103)
```

To ensure that this symbol is correctly defined, include `<sys/param.h>` in the source that requires it. Note that the symbol **CSRG_BASED** is defined for *BSD systems in XFree86 3.1.1 and later. This should be used to protect the inclusion of `<sys/param.h>`.

For code that really is specific to a particular `i386` BSD port, use `__FreeBSD__` for FreeBSD, `__NetBSD__` for NetBSD, `__OpenBSD__` for OpenBSD, and `__bsdi__` for BSD/386.

10. Thanks

Many thanks to all people who contributed to make XFree86 work on *BSD, in particular: **David Dawes, Todd Fries, Rod Grimes, Charles Hannum, Amancio Hasty, Christoph Robitschko, Matthias Scheler, Michael Smith, Ignatios Souvatzis, Jack Velte, Nate Williams and Pace Willison.**

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\$XFree86: xc/programs/Xserver/hw/xfree86/doc/sgml/NetBSD.sgml,v 3.69 2004/12/08 22:27:11 dawes Exp \$