README for XFree86 4.0 on LynxOS

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1. What and Where is XFree86?

XFree86 is a port of X11R6.4 that supports several versions of Intel-based Unix. It is derived from X386 1.2, which was the X server distributed with X11R5. This release consists of many new features and performance improvements as well as many bug fixes.

See the Copyright Notice.

The sources for XFree86 4.0 are available by anonymous ftp from:

ftp://ftp.XFree86.org/pub/XFree86/4.0

Binaries of XFree86 for LynxOS x86 are available from:

ftp://ftp.XFree86.org/pub/XFree86/4.0/binaries/LynxOS

A list of mirror sites is provided by ftp://ftp.XFree86.org/pub/XFree86/MIRRORS

The binaries on the FTP site were built on the latest released LynxOS version at the time XFree86 4.0 was released. In this case it is 'LynxOS x86 3.0.1'. Because of changes made to the object format they don't run on LynxOS versions earlier than 3.0.0.

Building of this XFree86 version has never been tested on LynxOS versions earlier than 2.5.1.

XFree86 4.0 supports LynxOS on the x86 and on the PowerPC platform. X servers are currently available only on the x86 platform. The X server may work with some PowerPC platforms supported by LynxOS though this has not (yet) been thoroughly tested.

If you need binaries for other platforms than the one on the XFree86 FTP server or if you have comments or suggestions about this document contact me (<tmueller@sysgo.de>).

2. Installing the Binaries

Please refer to the Installation Document for detailed installation instructions.

It may be necessary to increase the process stack limit in order to run XFree86 on your system. Edit `/etc/startab` and reboot your system to make the changes active before you begin the installation.

Also, be sure to include `/usr/X11R6/bin` in your PATH environment variable.

Refer to the next section *Running XFree86* (section , page) for further information on necessary configuration steps before running XFree86 on LynxOS.

2.1 Accessing XFree86 manual pages

Include `/usr/X11R6/man` in the MANPATH environment variable or add the directory `/usr/X11R6/man` to `/usr/Lib/man.config`

3. Running XFree86

This section describes the changes to the LynxOS environment which may be necessary to successfully run XFree86.

3.1 System tuning

3.1.1 Tunable parameters

To reasonably run XFree86 you may have to adjust a few system parameters.

On LynxOS 2.5.x and 3.0.x include a line

```
#define X_WINDOWS
```

in `/sys/lynx.os/uparam.h`.

3.1.2 Adjustment for "nv" driver for NVidia graphics cards

If you're using the "nv" driver (Riva 128, nVidia TNT, TNT2, GeForce), you will have to increase the value of the SMEMS parameter in `/sys/lynx.os/uparam.h` from 10 to 20.

3.1.3 Increase number of ptys

You should also increase the number of ptys to be able run a couple more xterms. You may replace `/sys/cfg/pty.cfg` with `/usr/X11R6/lib/X11/etc/pty.cfg`.

3.1.4 MTRR device driver

If you're using an Intel PentiumPRO or Pentium II (or higher) class CPU you might want to install the MTRR device driver. This driver enables the XFree86 X server to manipulate the CPU memory type range registers which may improve performance on certain systems.

To install the driver (on LynxOS x86 2.5.0 systems an higher) follow these steps:

```
# cd /
# bash /usr/X11R6/lib/X11/etc/MTRR-Lynx.shar
# cd sys/drivers/mtrr
# make install
```

Then add a line

```
I:../drivers/mtrr/mtrr.cfg
```

to `/sys/lynx.os/CONFIG.TBL` and rebuild the kernel (see next section).

3.1.5 Kernel build

If you plan to use a PS/2 mouse to the following sections before rebuilding the kernel, if not, you should rebuild the kernel now:

```
# cd /sys/lynx.os
# make install
# reboot -N
```

3.2 Mouse support in XFree86

XFree86 includes support for PnP mice (see also Mouse Support in XFree86). The current LynxOS TTY device driver doesn't allow the necessary manipulation of the RTS line and therefore the support for PnP mice has been disabled for LynxOS.

3.3 PS/2 mouse drivers

LynxOS x86 comes with a PS/2 mouse driver. If it is not currently installed on your system install it with `/usr/bin/Install.ps2mouse`. Older versions of this driver contained code to translate the PS/2 mouse protocol to the format of a serial mouse, thus you'll have to specify "Microsoft" as the mouse protocol format. The mouse driver contained in LynxOS x86 patchlevel 015 (and higher) does no longer perform the protocol translation an therefore can be defined as "PS/2" protocol format.

3.4 ATC console driver and VT switching

Currently there is no support for virtual terminal switching once the server has started. Support for this feature may be added in future versions (it requires a patch to the vt100 LynxOS terminal driver).

You will need a free console which the X server will use for keyboard input. You must disable login on at least one of the four virtual terminals in `/etc/ttys`, e.g. `/dev/atc3`:

change

```
/dev/atc3:1:default:vt100at:/bin/login
```

to

```
/dev/atc3:0:default:vt100at:/bin/login
          ^
```

3.5 X Server debug diagnostics output and other VT peculiarities

Output made by the XFree86 X on its stdout or stderr will be lost after the server switches to graphics mode. The XFree86 4.0 server stores its output in `/usr/adm/XFree86.n.log` (where `n` is the screen number).

When the X server is running output made to other consoles will be lost. After server shutdown the screen contents of other consoles may be inconsistent with what one would expect (i.e. random).

4. Compiling the XFree86 Distribution

The next sections contain LynxOS specific notes with respect to the build process.

4.1 Disk space requirements

Currently there is no support for shared libraries in the LynxOS XFree86 port. A complete binary installation along with manual pages will require approximately 100 MBytes of disk space. To compile the system you will need at least 250 MBytes of free disk space.

4.2 Changes to system environment (LynxOS x86)

Before compiling the XFree86 distribution you will have to make a few little adjustments to your system:

- If not already installed on your system create a shell script named `/lib/cpp` as follows:

```
#!/bin/sh
/usr/lib/gcc-lib/i386-unknown-lynxos2.5/2.7-96q1/cpp \
   -traditional "$@"
```

On other platforms than the x86 the paths for the compiler support programs are different. You may use

```
gcc -v
```

to find out the correct path. Set the file mode of `/lib/cpp` with

```
# chown root /lib/cpp
# chmod 755 /lib/cpp
```

- Modify `/lib/liblynx.a`. The X servers need the `smem_create()` system call to map the frame buffer into their address space. The system call is in `liblynx` library along with other Lynx proprietary calls which (unfortunately) overlap with calls in `libc`. To reduce confusion you should modify `liblynx` as follows:

```
# mv /lib/liblynx.a /lib/liblynx.a.ORG
# mkdir /tmp/xx; cd /tmp/xx
# ar xv /lib/liblynx.a.ORG
# ar rv /lib/liblynx.a *smem*
# ranlib /lib/liblynx.a
```

4.3 make World

If you have the MTRR device driver installed, add a line

```
#define HasMTRRSupport YES
```

to the `config/cf/host.def` file.

You may then issue a

```
make World
```

to compile XFree86. After a few hours (and hopefully a successful build of the XFree86 system) you can install the software using

```
make install
```

You must be logged in as super-user (root) when you invoke 'make install'.

On LynxOS x86 2.5.0 you may encounter problems with `make` in deeply nested subdirectories (eg core dumps, hangups). In this case update to GNU make version 3.75 or higher.

4.4 Installing XFree86 manual pages

LynxOS uses cat-able manual pages, and because a doc preparation system is definitely not a vital component of a real-time operating system you must first install groff-1.09 (or newer).

XFree86 manual pages may be installed using

```
make install.man
```

The index and whatis database for the XFree86 manual pages will be created automatically. If you already have a whatis database or index file in the destination directories you should perform a sort/uniq operation to remove duplicate entries:

```
for i in 1 3 5
do
  rm -f /tmp/tmpfile
  sort /usr/X11R6/man/cat$i/LIST$i | uniq > /tmp/tmpfile
  mv /tmp/tmpfile /usr/X11R6/man/cat$i/LIST$i
done
sort /usr/X11R6/man/whatis | uniq > /tmp/tmpfile
mv /tmp/tmpfile /usr/X11R6/man/whatis
```

CONTENTS

`$XFree86: xc/programs/Xserver/hw/xfree86/doc/sgml/LynxOS.sgml,v 3.19 2000/03/03 21:28:08 dawes E`