

# LinTV Users Manual

Linux Media Labs

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## 1 General Description

The LinTV board is a PCI board based on the BT878 chip. These are the general LinTV board's features:

- Video digitized using YUV 4:2:2 color format: NTSC 640x480 60 fps, PAL 758x576 50 fps
- Video capture(software compression) at 320x240 at 15 fps from a TV or any external video source
- Built-in cable or antenna TV tuner : a 125-channel TV tuner with automatic channel scan
- FM radio tuner
- Auxiliary audio and composite video IN
- Audio OUT can go to the sound card's Line-IN connector or to self-powered speakers
- Videoconferencing capability by using OpenH323 open source based package

## 2 Notational Conventions

You input is designated with \$, for the command shell input prompt, and with # for superuser mode input. Your input and system response are presented in **bold face**. Filenames and URLs are underlined. System commands (line `uname -r`) are using San Serif font.

## 3 System Requirements

- RedHat Linux 6.2, 7.1 (other modern distributions should work as well)
- Tested with Kernels 2.2.14, 2.2.16, 2.4.2, 2.4.9 (use `uname -r` to find your kernel version)
- CPU 200MHz or more
- RAM 32M or more
- EIDE or SCSI-2
- Any Video card

## 4 Physical Installation

There are five connections on the back of the LinTV card. They offer a variety of different options that you may use depending on your needs. The connections go as follows, from the top of the PCI card to the bottom:

- FM Antenna (IN): Used by the Radio Application to allow FM reception.
- TV Antenna (IN): Used by `xawtv` for reception and on-screen output of local TV channels.
- S-Video (IN): This can be used for any additional video source you may wish to view on your system.
- Audio (OUT): Used audio output for FM or TV signal recieved by the LinTV card. You may connect this directly to your speakers or to your Line In connection on your sound card.
- Audio (OUT): This can be used for any additional audio source you may wish to connect to your system.

## 5 Video4Linux Driver (bttv)

If you're on kernel version below 2.4.x (find it with `uname -r`) you may need to update your `bttv` driver to the latest release (see Appendix B). It's not an apparent process and requires an understanding of Linux kernel compile process.

You may load the `bttv` driver after each reboot manually, or modify the `/etc/modules.conf` to let this happen automatically.

## 5.1 Manually Loading Driver Module

To manually load the driver:

```
$ su -
```

If your Linux is running on kernel 2.2.x type:

```
# /sbin/modprobe tuner type=1
# /sbin/modprobe bttv card=13 radio=1
```

If your Linux is running on kernel 2.4.x type:

```
# /sbin/modprobe bttv card=13 radio=1
```

Do not forget to exit superuser mode:

```
# exit
```

## 5.2 Configuring the System to Load Driver Module Automatically

In order to load bttv.o module automatically you need to do the following:

```
# su -
```

If your Linux is running kernel version 2.2.x, append the following lines to file `/etc/conf.modules`:

```
alias char-major-81 videodev
alias char-major-81-0 bttv
alias char-major-81-64 bttv
options bttv card=13 radio=1
pre-install bttv /sbin/modprobe tuner type=1
```

If your Linux is running kernel 2.4.x, append the following lines to file `/etc/modules.conf` :

```
alias char-major-81 videodev
alias char-major-81-0 bttv
alias char-major-81-64 bttv
options bttv card=13 radio=1
```

run depmod to update system configuration:

```
# depmod -a
```

now, you should be able to autoload the driver when a program requests it.

# 6 TV Application (xawtv)

## 6.1 Installation

You may also install xawtv application from LML CD-ROM. Insert LML CD-ROM into your CD-ROM drive. If you don't have an automount running, mount it manually:

```
$ mount /mnt/cdrom
```

Install xawtv application (or just the components that you need):

```
$ su -
```

```
# cd /mnt/cdrom/contrib/v4ltools/xawtv
# rpm -i xawtv-3.60-1.i586.rpm
# rpm -i xawtv-misc-3.60-1.i586.rpm
# rpm -i xawtv-radio-3.60-1.i586.rpm
# rpm -i xawtv-webcam-3.60-1.i586.rpm
# exit
```

If you want the latest stable xawtv version, then download it from <http://www.strusel007.de/linux/xawtv/> using your favorite web browser, untar & ungzip it:

```
$ lynx http://www.strusel007.de/linux/xawtv/
```

Download the latest xawtv-n.nn (3.60 as of 2001-08-15)

```
$ tar zxvf xawtv_3.60.tar.gz
```

Compile & install it:

```
$ cd xawtv-3.60
$ ./configure
$ make
$ su -
# make install
# exit
```

Now you have installed the xawtv application and you may run it by typing:

```
$ xawtv
```

## 6.2 Configuration file

You should configure presets and defaults for xawtv. When xawtv starts, it attempts to read the `~/.xawtv` file. This file is not created during the installation process. You will need to create it in the home director of the user(s) that will be using the application.

This is an example of the `~/.xawtv` file (for US, NTSC):

```
# this is a comment
# empty lines are ignored too
[global]
freqtab = us-bcast

[defaults]
norm = NTSC
input = Television
key = T

[FOX]
channel = 22
fine = +16

[Camera]
input = Composite1
key = V
```

You may manually edit this file using your favorite text editor. Note, that you need to enter offsets to get better reception of a video signal, since freq. table in xawtv is not perfect.

## 7 Radio Application

The xawtv distribution also contains a ncurses-based radio application. After the xawtv installation procedure you may run the radio application by typing:

```
$ radio
```

The radio application controls are simple, it isn't necessary to describe the radio's abilities here. For help see the man pages.

In order for FM stereo to work you need to untar [lintvradio.tgz](#) from LMLCD/contrib/v4ltools and follow installation instructions (FIXME - move instructions here, also fix Makefile to install into proper /lib/modules subdirectory for up/smp). You may need later i2c driver for lintvradio to work (see Appendix B).

## 8 Appendix B: Later bttv driver installation

Video4Linux behavior can be improved using the latest i2c and bttv drivers.

You can get the very latest bttv driver from <http://www.strusel007.de/linux/bttv/>. It is highly recommended to use stable driver versions. However we're including bttv driver version that works well with kernel 2.2.14 (RedHat 6.2 Update 7) and kernel 2.2.18 (latest update of 2.2.x series kernels).

Also, later version of these drivers is included on LMLCD in the LinTV directory. Insert LMLCD disk (or download LMLCD from <http://linuxmedialabs.com/src/LMLCD.tgz>), make sure it's mounted on /mnt/cdrom (or use mount /mnt/cdrom command if you don't have an automount).

Untar files [i2c-2.6.0.tar.gz](#) and [bttv-0.7.76.tar.gz](#) from LMLCD disk, directory LinTV:

```
$ cd
```

```
$ tar zxvf /mnt/cdrom/LinTV/bttv-0.7.76.tar.gz
```

```
$ tar zxvf /mnt/cdrom/LinTV/i2c-2.6.0.tar.gz
```

If you have not compiled the kernel on your machine yet, you must configure it first:

```
# su-  
#cd /usr/src/linux  
# make menuconfig  
# make depend
```

Check that file [/usr/src/linux/include/linux/version.h](#) contains UTS\_RELEASE corresponding to the kernel you're building for (i.e. check smp suffix if building for SMP kernel). Edit the file if needed.

Now you can cd back to your home and compile i2c and bttv drivers( you need to be root to do that). Also, keep in mind, that

```
# cd <yourhome>/i2c-2.6.0  
# make  
# make install  
# cd <yourhome>/bttv-0.7.59  
# make  
# make install  
# depmod -a
```

FIXME: There are a few problems there in the area of SMP support under 2.2.x kernel. LML should patch i2c-xxx.tgz and bttv-xxx.tgz Makefiles and figure out why 'make menuconfig' does not set UTS\_RELEASE properly.

1. kernel configuration with 'make clean; make menuconfig; make depend;' does not set UTS\_RELEASE with 'smp' suffix. Edit manually
2. i2c-2.6.0 Makefile (line 67) comes with LINUX\_INCLUDE\_DIR := /usr/local/include/linux whereas it should be set to /usr/src/linux/include/linux, it results in new i2c header NOT installed into the kernel source tree. Edit Makefile (comment line 67, uncomment 68)
3. bttv 'make install' does not install .o files into proper (per non-smp/smp) location. Move bttv driver components from /lib/modules/misc to /lib/modules/\$UTS\_RELEASE/misc, for example - /lib/modules/2.2.16-3/misc for non-smp kernel, /lib/modules/2.2.16-3smp/misc for smp kernel

Do not forget to exit superuser mode:

```
# exit
```