LMLBT4x Installation and User Manual

Linux Media Labs

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Contents

1 General Description

The LMLBT4x board is a multi-channel PCI board based on the BT878 chip. These are the general LMLBT4x board's features:

- Video digitized using YUV 4:2:2 color format: NTSC 640x480 60 fps, PAL 758x576 50 fps
- 1 full rate or 4 multiplexed (LMLBT4M)
- 4 full rate or 8 multiplexed (LMLB44) composite video inputs
- 4 sensor inputs and 3 relay alarm outputs

LMLBT44 and LMLBT4M video capture function is fully supported in the shipping Linux kernel (version 2.6 and above) and does not require any additional patching or kernel modifications.

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.

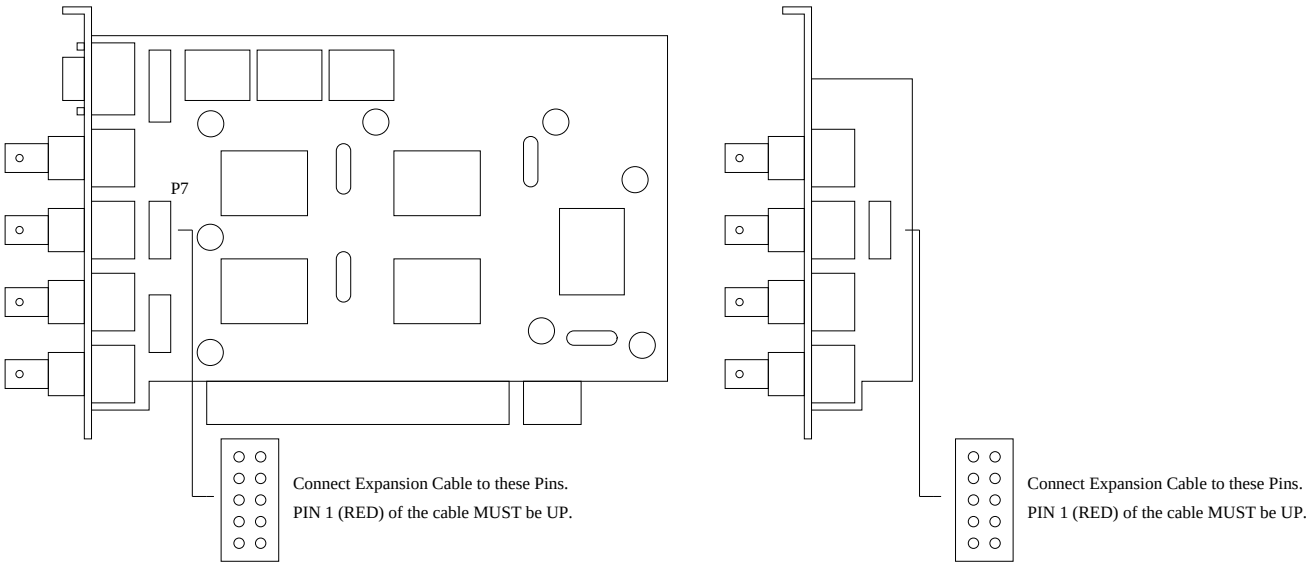
3 System Requirements

- Any modern Linux distribution based on 2.6 series kernels supports LMLBT44 as card number 118
- Works with 2.4 series with patches available from LML's website
- CPU PIII 866MHz or better
- RAM 64M or more
- EIDE, SATA disk drives
- Any Video Display card compatible

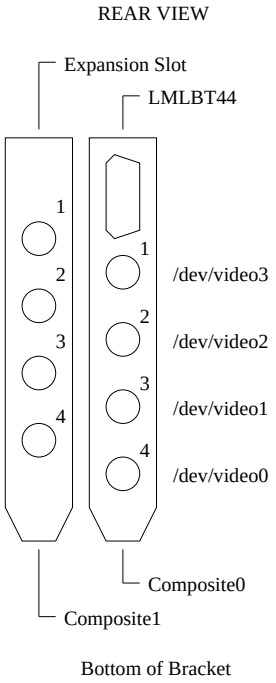
4 Physical Installation

Open computer case. Install LMLBTx card into available PCI slot.

Video inputs on the main board are numbered IN1, IN2, IN2, IN4 counting from top. The video inputs on the expansion board are labeled in the same fashion. Connection of the Expansion Cable is simple. It must be connected to the main card to PINS labeled P7 with PIN 1 (Red Cable) UP. On the expansion card, the cable must also be connected with PIN 1 (Red Cable) UP.



The Video Inputs on the back of the LMLBT44 Card, LMLBT4M Card and the Expansion Slot for the LMLBT44 are labeled from Top to bottom. **NOTE:** Channels in xawtv do not reflect the numbers etched on the back of either the LMLBT44card or its expansion slot. Instead, xawtv labels the channels from the bottom, in reverse to the etched numbers. However, if you have the LMLBT4M card, the numbers on the back of the card are the same as the xawtv channels (Composite0,1,2 and 3) : with Composite0 being the same as IN1 on the back of the card.



Pin assignments on a 15-ping sensor/alarm IO connector are as follows:

Pin	Name	Comment
1	IN1+	sonsor 1
2	IN2+	sensor 2
3	IN3+	sensor 3
4	IN4+	sensor 4
5	GND1	sensor 1
6	GND2	sensor 2
7	GND3	sensor 3
8	GND4	sensor 4
9		
10	COM_3	relay 3
11	NO_1	relay 1
12	COM_1	relay 1
13	NO_2	relay 2
14	COM_2	releay 2
15	NO_3	releay 3

Sensor's GND1,2,3,4 are all connected together and to PCI bus ground. Sensor inputs (IN1,2,3,4) are optically decoupled. Sensor produces signal, when input and ground are connected with less then 100 Ohm resistance, i.e. some kind of a switch is required.

Relay outputs are all floating, there is no connection to ground on either COM or NO side.

5 Video4Linux Driver LMLBT4x overview

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

Make sure to install driver when no X11 is running, or restart X11 after inserting the driver. Otherwise V4L X11 module caches video card settings, preventing kernel driver from using LML patches provided features.

There is no need to patch the 2.6 series kenels, unless you want to take advantage of LMLBT44 sensor/alarm I/O capabilities. If you want to take advantage of sensor/alarm I/O follow the procdure in the patch file.

5.1 Manually Loading Driver Module

To manually load the driver:
$ su
enter the password and then for LMLBT4M type**:**
/sbin/modprobe bttv card=118

or for LMLBT44:
/sbin/modprobe bttv card=118,118,118,118

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 -

Append the following lines to file **/etc/modules.conf** for LMLBT4M:

```
alias char-major-81 videodev
alias char-major-81-0 bttv
alias char-major-81-64 bttv
options bttv card=118
```

for LMLBT44 make sure to provide card code for ALL channels:

```
options bttv card=118,118,118,118
```

run depmod to update system configuration:
depmod -a

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

6 Video monitoring Application (xawtv)

Xawtv software allows you to test LMLBT44 card operation at rather low level.

6.1 Building

6.2 Installation

6.3 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 directory 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]

[defaults]
norm = NTSC
input = Composite1
key = 1

[Camera2]
input = Composite2
key = 2
```

You may manually edit this file using your favorite text editor.

7 Sample Applicationlm

LMLBTTV.tgz archive contains example application lmlbt4x_test. In order to use the application you need to build it:

$make -f Makefile.test

This would create executable lmlbt4x_test. There are the following command line options:

Device and channel selection:

- -f <device name> - use /dev/video0, /dev/video1,/dev/video2, /dev/video3 for LMLBT44 capture devices
- -c <channel name> - channel number. Numbers are 0,1,2,3 for LMLBT4M and 0 or 1 for LMLBT44.

Alarm/sensor control:

- -A <alarm no> - select individual alarm (relay) to control, they are numbered 0,1,2
- -x <value> - alarm setting. 0 means to have the switch open, 1 means to close it
- -X <alarm bits> - group alarm control. bits from LSM to MSB control alarms 0,1,2. For instance to turn on alarm 2, use -X 4, to turn on alarm 0 and 1 use -X 3
- -S <sensor no> - read sensor status

Video capture options, captured data as ppm on standard output. You can't do alarm/sensort control and capture by same command.

- -W capture area width
- -H capture area height

For example:

./lmlbt4x_test -A 0 -x 64

to activate relay number 0

./lmlbt4x_test -c 1 -W 640 -H 480 > image.ppm

to capture video frame from input1 into image.ppm file

8 ZoneMinder Video Surveillance software

Although it's an excellent package, installing it may be rather tricky. Therefore we're providing LiveCD with Zoneminder pre-installed. In order to use that ZM-LiveCD you need to make sure your computer boot sequence is set (in BIOS settings) to boot from the CD if it is inserted. After that, rebooting the system with ZM-LiveCD would bring you to the ZoneMinder control interface with all LMLBT44 or LMLBT4M channel(s) operational.