

LML26415 configuration, setup and testing manual

Prerequisite 0 – initial test and configuration bench

This phase requires

- test bench power supply (TBPS),
- PCI card adapter for TBPS,
- PC with Linux distribution (we test under Ubuntu, kernel 2.6.20),
- Altera Programmer (AP) application installed
- JTAG cable (with adapter, can be either parallel port or USB version), plugged into the PC

AP can run on the same computer PCI and functional tests of the card are done later.

Phase 0 – initial power up from the lab. power supply

Start AP (need not be restarted for subsequent cards). Check that max. current on TBPS to 280 mA. **!!! CHECK THAT TBPS VOLTAGE IS SET TO 3.3V !!!**

Plug card into TBPS adapter. Make sure **orientation is right, the key on the adapter connector facing the rear side** of the LML26415 card.

1. connect JTAG cable to LML26415, **red marking on the cable facing the front side** of the card (bracket, RCA connectors side)
2. Turn on TBPS power, check that current is < 280mA
3. click JTAG “auto detect” button (AP), make sure EP2C8 shows as first device in the chain
4. select EP2C8 device line and click “replace programming file” button, select HDL26415_83V4.jic file. This needs to be done **only for the first card** during volume testing.
5. check box “program/configure device” on EPCS4 line (2nd line from the top now). This also needs to be done **only for the first card**.
6. click the “Start” button
7. wait till programming is complete (approx. 25 seconds), make sure there were no errors (no messages in red or popups, “Successfully performed operation(s)” message is last but one in the messages window)
8. Turn off TBPS, wait 2 sec, turn on TBPS, make sure LEDs are blinking now – green faster than red
9. Power down TBPS, disconnect JTAG cable, unplug the card from TBPS adapter.

This completes PHASE 0, now move to testing the card on the PC.

Prerequisite 1 – installing LML26415 drivers and test software

Test environment for LML26415 cards. This needs to be done only once.

1. Download test application binary package:
`wget http://linuxmedialabs.com/LMLCD/LML26415/lml26415_test_bin.tgz`
2. Unpack it into your home directory:
`tar zxf lml26415_test_bin.tgz`
3. Download test video stream, move it to `lml26415_test_bin` directory
`wget http://linuxmedialabs.com/LMLCD/LML26415/x1.qbx`
`mv x1.qbx lml26415_test_bin`
4. Download driver source package:
`wget http://linuxmedialabs.com/LMLCD/LMLQHAL/LMLQHAL_839.tgz`
5. Unpack it into your home directory:
`tar zxvf ../LMLQHAL_839.tgz`
6. Change directory to LMLQHAL
`cd LMLQHAL`
7. Make sure you have Linux kernel sources **installed and configured** on your system
8. build lml26415 driver:
`./build.sh`

The output should look similar to this:

```
Building loadble kernel module
CC [M] /home/vleo/tmp/LMLQHAL/qhal/linuxdrv/qhal_host.o
CC [M] /home/vleo/tmp/LMLQHAL/qhal/linuxdrv/qhal_wrapper.o
CC [M] /home/vleo/tmp/LMLQHAL/qhal/linuxdrv/i386/I2CBus.o
CC [M] /home/vleo/tmp/LMLQHAL/qhal/linuxdrv/i386/platform.o
CC [M] /home/vleo/tmp/LMLQHAL/qhal/seve1/qhal_bs.o
CC [M] /home/vleo/tmp/LMLQHAL/qhal/seve1/qhal_em.o
CC [M] /home/vleo/tmp/LMLQHAL/qhal/seve1/qhal_mbox.o
CC [M] /home/vleo/tmp/LMLQHAL/qhal/seve1/qhal_pm.o
CC [M] /home/vleo/tmp/LMLQHAL/qhal/seve1/qhal_qcc.o
LD [M] /home/vleo/tmp/LMLQHAL/qhal/qhal.o
Building modules, stage 2.
MODPOST 1 modules
CC /home/vleo/tmp/LMLQHAL/qhal/qhal.mod.o
LD [M] /home/vleo/tmp/LMLQHAL/qhal/qhal.ko
```

9. copy the `qhal.ko` file into `lml26415_test_bin`
`cp qhal.ko ../lml26415_test_bin`

Phase 1 – PCI tests

LML26415 has to be plugged into the system.

1. Change directory to `lml26415_test_bin` (created in the previous step)
`chdir ../lml26415_test_bin`
2. run command to make sure that LML26415 is recognized by PCI subsystem:
`lspci | grep 264`
should return line similar to this (xx may vary):
`00:xx.0 Class 4000: Linux Media Labs, LLC Unknown device 2644 (rev 01)`
3. insert kernel module for 26415 support:
`sudo insmod qhal.ko`
4. check dmesg output:
`sudo dmesg | tail`
the output will look similar to this:

```
[16854.641343] QHAL: QHAL linux driver for kernel 2.6.20-15-generic, SVN revision sdk4.x-r10728
[16854.647156] cs_paddr[0]= febff400 cs_paddr_size[0]= 1024 conf.iv = 11 ivect[0]= 11
[16854.647784] qhalhost_interrupt_connect(), IRQ ctl reg v.addr 0xe0ab4400 == 0x0000
[16854.648171] qhalhost_interrupt_clear_enable(), IRQ ctl == 0x0100
[16854.648180] QHAL: QHAL initialized properly.
```
5. run preliminary test:
`sudo lml26415test_pci_i2c.sh`
that should produce output

```
lulddk dirver present
conf D[16] = 0xfebff400
mem D[284] = 0x6415831a
PCI I2C TEST PASSED OK
```

Prerequisite 2 – connecting audio/video cables

LML26415 PCI bracket I/O connector assignment is as follows, from top to bottom:

1. audio 3.5 mm input
2. audio 3.5 mm output
3. DB-15 for audio mic, S-Video, optically decoupled inputs, RS-485
4. RCA for video input
5. RCA for video output

Cables should be connected as follows:

1. Cable from audio input to audio source output (DVD player or video camera) – RCA to 3.5mm cable
2. Cable from video input to audio source output (DVD player) – RCA to RCA
3. Cable from audio output to audio amplifier input (3.5mm to RCA)
4. Cable from video output to TV monitor input (RCA to RCA)

Phase 2 – functional tests

1. Color bars
 - NTSC:
sudo ./video_bypass.pl -N -b -c
 - PAL:
sudo ./video_bypass.pl -P -b -c
2. Video playback
 - NTSC
sudo ./do_playback
 - PAL
sudo ./do_playback _PAL
3. Video capture/playback test
 - NTSC
 1. record 30 sec of video from your video source:
sudo ./do_recordtest
 2. playback recorded MP4 clip:
sudo ./do_playbacktest
 - PAL
sudo ./do_recordtest_PAL
sudo ./do_playbacktest_PAL

Appendix – sudo facility setup

1. Become superuser (or use sudo, if installed)
2. install sudo (depends on distribution)
3. edit /etc/sudoers files as follows, we assume tests would be done under user “tester”, and host name is “myhost”
 1. /usr/sbin/visudo
 2. add this line to the end:
tester myhost,localhost = (root) NOPASSWD: ALL
 3. save the file and exit (ZZ)

This will allow to execute SUDO commands exactly as written in the manual, without further requests for password.