Indian Linux Users' Group, Chennai (ILUGC)
in association with
Crescent Engineering College, Chennai

presents

Embedded GNU/Linux Labs HOWTO

by

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Classification of Labs

- Embedded Labs
- Hardware Labs
- VLSI Labs
Embedded Labs

- Firmware
- Device drivers
- Operating systems
Hardware

- Desktop Systems
  - High-end for development
  - Low-end for testing

- LAN

- Development boards
  (Based on development needs, processors/micro-controllers)
Embedded Labs

**Hardware**

- Debuggers/emulators

- Cables
  - (Ethernet, power, serial, USB, JTAG, “domain-specific” cables, etc.)

- Power supply units
LART with Digital VT220 Terminal

Source: http://www.lart.tudelft.nl/gallery/vt220.jpg
Samsung 2410 Evaluation Board

Source: http://www.simtec.co.uk/products/EB2410ITX/plan-sml.jpg
Embedded Labs

Software

- GNU/Linux distros
  (CDs, floppy, USB, etc.)

- GNU toolchains

- Simulators

- Emulators

- Source-code cross-referencing tools

- Editors
  (GNU emacs, vi, etc.)
Embedded Labs

Software

• Bootloaders
  (redboot, u-boot, blob, etc.)

• Kernels
  (Linux, uclinux, GNU Mach GNU Hurd, L4 etc.)

• GDB

• DDD

• PDF viewers

• LaTeX
GNU Emacs

GNU Emacs is one component of a Linux-based GNU system. You can do basic editing with the menu bar and scrollbar using the mouse.

Important Help menu items:
- Emacs Tutorial: Learn-by-doing tutorial for using Emacs efficiently
- Emacs FAQ: Frequently asked questions and answers
- (Non)Warranty: GNU Emacs comes with absolutely no warranty
- Copying Conditions: Conditions for redistributing and changing Emacs
- Ordering Manuals: How to order Emacs manuals from the Free Software Foundation

This is GNU Emacs 21.3.1 (i686-pc-linux-gnu, Motif Version 2.1.30) of 2004-04-20 on linuxguru
Copyright (C) 2001 Free Software Foundation, Inc.

For information about the GNU Project and its goals, type C-h C-p.
Qtopia PDA

Source: http://www.trolltech.com/screenshots/qtopia.html
Qtopia Phone

Source: http://www.trolltech.com/screenshots/qtopia.html
Hardware Labs

Hardware

- Desktop Systems
  High-end and low-end configurations

- Large displays
  17”, 19”, 21” onwards

- Cables
  (Ethernet, power, serial, USB, JTAG, “domain-specific” cables, etc.)

- Power supply units

- Antistatic mat, wristband
Hardware Labs

Hardware

- Instrumentation equipment
- Soldering equipment
- Magnifying glass
- Debuggers/emulators
- Oscilloscopes
- Analyzers
Hardware Labs

Software

• GNU/Linux distros
  (CDs, floppy, USB, etc.)

• PCB Tool

• Gerbv

• Emulation software

• GNU toolchains

• PDF viewer
Source: http://bach.ece.jhu.edu/~haceaton/pcb/pcb_screen.gif
GNU/Linux Simulators/Emulators

- DOSBox
- Bochs
- xmame
- PearPC
- MESS
- MAMEoX
- gsim51
- qucs

Source: http://www.mess.org/messscrs.html
M621 Digital Storage Oscilloscope

VLSI Labs

Hardware

• Desktop Systems (high-end)
  • Sun
  • Intel PCs

• Large screen displays
  17”, 19”, 21” onwards

• Analyzers

• Oscilloscopes

• LAN
Software

- GNU/Linux distros/clusters
- Alliance VLSI CAD Tools
- Icarus verilog
- Spice
- Magic VLSI
- gEDA
- TkGate
Source: [http://www.tkgate.org/fig/scopewin.gif](http://www.tkgate.org/fig/scopewin.gif)
Welcome to TkGate 2.0

Copyright (C) 1987-2004 by Jeffrey P. Hansen
TKGate comes with ABSOLUTELY NO WARRANTY; see 'Help...Licence' menu for license and warranty details. Report problems to hansen@tkgate.org

Click on a link below to start using tkgate!

Go to the tutorial

Edit a new circuit

See the documentation at http://www.tkgate.org

Source: http://www.tkgate.org/fig/2.0/main.gif
gEDA

Source: http://www.geda.seul.org/screenshots/screenshot-qschem1.png
LAN

- Ethernet-based LAN
- Servers:
  - FTP, sshd, mail, apache, mysqld, ircd
- Client software:
  - ftp, ssh, scp, firefox, xchat, gaim
- CVS, Sub Version
- Project management
  - mrproject, bugzilla, netoffice
- Internet access
Server Cage, CE, RIT

Source: http://gallery.ce.rit.edu/Cage/DCP_0861
Roadmap

Step 1: Throw your marks in the trash

Step 2: Setup Embedded GNU/Linux labs

Step 3: Prove yourselves:
Do practical projects
http://www.opencores.org
http://sourceforge.net
http://savannah.gnu.org
http://freshmeat.net

Step 4: Invite FLOSS companies for placements
Links

- http://www.opencores.org
- http://www.linuxdevices.com
- http://www.uclinux.org
- http://free-electrons.com
- http://kegel.com
- http://www.debian.org/ports
Contact

- N Shakthi Kannan
- E shaks@shakthimaan.com
- W shakthimaan.com
- IRC nickname “mbuf”
  #kernel
  #kernelnewbies
  #gnu-india
  #linux-india
  #linuxforum
- linuxforum.com “x86processor”
Question Answer Session

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