



# **FireWire Audio on Linux**

A users point of view

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# Overview



- FireWire
- FireWire on Linux
- FireWire Audio on Linux
  - FreeBoB 1.x
  - FreeBoB 2
- Features
- Demo's
- Wishlist

# FireWire on Linux



- FireWire
  - a.k.a. IEEE1394
  - a.k.a. iLink (Sony)
  - High-performance, peer-to-peer, serial bus
- FireWire stack on Linux ( [linux1394.org](http://linux1394.org) )
  - Kernel modules
  - Userspace libraries
    - Hide kernel ABI from applications

# FireWire on Linux



- Kernel modules
  - ohci1394: Host controller access (hardware)
  - ieee1394: General bus & link management
  - raw1394: Application layer (transactions, iso, ...)
- Userspace libraries
  - libraw1394
    - Userspace counterpart of raw1394 module
  - libavc1394 (depends on libraw1394)
    - Basic implementation of some 1394TA AV/C standards
  - libiec61883 (depends on libraw1394)
    - Basic implementation of the IEC61883-x standards

# FireWire on Linux



- Userspace libraries
  - libraw1394
    - Userspace counterpart of raw1394 module
    - Implements low-level 1394 operations (Async R/W, Iso, ...)
  - libavc1394
    - Basic implementation of some 1394TA AV/C standards
    - Depends on libraw1394
  - libiec61883
    - Implementation of the IEC61883-x standards
      - Connection & resource management
      - Audio & midi, video streaming
    - Depends on libraw1394

# FireWire Audio on Linux

- Current status (FreeBoB 1.x)
  - Low level device support
    - BeBoB platform
  - Audio & midi streaming @ all samplerates
    - Jack backend (stable)
    - ALSA plugin (existing but unusable)
    - Jack-MP backend (beta)
  - Limited support for multi-device setups

# FireWire Audio on Linux

- Future: FreeBoB 2
  - Driver framework for all FireWire audio devices
    - BeBoB, DICE-II, Motu, Metric Halo, ...
    - Device agnostic
  - Provides
    - Device detection and configuration (“all features supported”)
    - Audio & midi streaming
  - Userspace library
  - Audio API's:
    - JACK, JACK-MP
    - ALSA plugin
    - ...

# FreeBoB 2.x



- Work done:
  - Low level device interfaces
    - BeBoB platform
    - DICE-II platform
    - MOTU Traveller & 828mkII
  - Audio & midi streaming @ all samplerates
    - Jack backend
- Work being done:
  - Device control (mixer, sync setup, ...)
    - Low level code (almost) ready
    - External control API being designed (OSC?)
    - Configuration persistence

# FreeBoB 2.x



- Work to be done
  - Device interfaces:
    - Metric Halo
  - Device control
    - Mixer/control application
  - Streaming
    - SPDIF/AC3/DTS pass-through
    - Jack-MP backend port from 1.x
    - ALSA plugin
  - Port to new 1394 “JUJU” kernel stack

# Demo: FreeBoB 1.x



- Prerequisites
  - RT-patched kernel (2.6.??)
  - Non-root realtime privileges
    - PAM, rlimits, realtime\_lsm, ...
  - Libraries
    - libraw1394  $\geq$  1.2.1
    - libiec61883  $\geq$  1.1.0
    - libavc1394  $\geq$  0.5.3
    - alsa  $\geq$  1.0.0
    - libxml-2.0  $\geq$  2.6.0
  - Jackd  $\geq$  0.100.11 (preferred: 0.103.00)