The ivtv driver

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This is a v4l2 device driver for the Conexant cx23415/6 MPEG encoder/decoder. The cx23415 can do both encoding and decoding, the cx23416 can only do MPEG encoding. Currently the only card featuring full decoding support is the Hauppauge PVR-350.

Note

1. This driver requires the latest encoder firmware (version 2.06.039, size 376836 bytes). Get the firmware from here:

   https://linuxtv.org/downloads/firmware/#conexant

2. 'normal' TV applications do not work with this driver, you need an application that can handle MPEG input such as mplayer, xine, MythTV, etc.

The primary goal of the IVTV project is to provide a "clean room" Linux Open Source driver implementation for video capture cards based on the iCompression iTVC15 or Conexant CX23415/CX23416 MPEG Codec.

Features

- Hardware mpeg2 capture of broadcast video (and sound) via the tuner or S-Video/Composite and audio line-in.
- Hardware mpeg2 capture of FM radio where hardware support exists
- Supports NTSC, PAL, SECAM with stereo sound
- Supports SAP and bilingual transmissions.
- Supports raw VBI (closed captions and teletext).
- Supports sliced VBI (closed captions and teletext) and is able to insert this into the captured MPEG stream.
- Supports raw YUV and PCM input.

Additional features for the PVR-350 (CX23415 based)

- Provides hardware mpeg2 playback
- Provides comprehensive OSD (On Screen Display: ie. graphics overlaying the video signal)
- Provides a framebuffer (allowing X applications to appear on the video device)
- Supports raw YUV output.

IMPORTANT: In case of problems first read this page:
https://help.ubuntu.com/community/Install_IVTV_Troubleshooting

See also

https://linuxtv.org

IRC

irc://irc.freenode.net/#v4l

Devices

A maximum of 12 ivtv boards are allowed at the moment.

Cards that don't have a video output capability (i.e. non PVR350 cards) lack the vbi8, vbi16, video16 and video48 devices. They also do not support the framebuffer device /dev/fbx for OSD.

The radio0 device may or may not be present, depending on whether the card has a radio tuner or not.

Here is a list of the base v4l devices:

System Message: WARNING/2 (`D:\onboarding-resources\sample-onboarding-resources\linux-master\Documentation\admin-guide\media\[linux-master][Documentation][admin-guide][media]ivtv.rst`, line 80)

Cannot analyze code. No Pygments lexer found for "none".

```
.. code-block:: none

        crw-rw----    1 root     video     81,   0 Jun 19 22:22 /dev/video0
        crw-rw----    1 root     video     81,  16 Jun 19 22:22 /dev/video16
        crw-rw----    1 root     video     81,  24 Jun 19 22:22 /dev/video24
        crw-rw----    1 root     video     81,  32 Jun 19 22:22 /dev/video32
        crw-rw----    1 root     video     81,  48 Jun 19 22:22 /dev/video48
        crw-rw----    1 root     video     81,  64 Jun 19 22:22 /dev/radio0
        crw-rw----    1 root     video     81, 224 Jun 19 22:22 /dev/vbi0
        crw-rw----    1 root     video     81, 228 Jun 19 22:22 /dev/vbi8
        crw-rw----    1 root     video     81, 232 Jun 19 22:22 /dev/vbi16
```

Base devices

For every extra card you have the numbers increased by one. For example, /dev/video0 is listed as the 'base' encoding capture device so we have:

- /dev/video0 is the encoding capture device for the first card (card 0)
- /dev/video1 is the encoding capture device for the second card (card 1)
- /dev/video2 is the encoding capture device for the third card (card 2)

Note that if the first card doesn't have a feature (eg no decoder, so no video16, the second card will still use video17. The simple rule is 'add the card number to the base device number'. If you have other capture cards (e.g. WinTV PCI) that are detected first, then you have to tell the ivtv module about it so that it will start counting at 1 (or 2, or whatever). Otherwise the device numbers can get confusing. The ivtv 'ivtv_first_minor' module option can be used for that.

- /dev/video0

  The encoding capture device(s).

  Read-only.

  Reading from this device gets you the MPEG1/2 program stream. Example:

  System Message: WARNING/2 (D:\onboarding-resources\sample-onboarding-resources\linux-master\Documentation\admin-guide\media\[linux-master][Documentation][admin-guide][media]ivtv.rst, line 120)

  Cannot analyze code. No Pygments lexer found for "none".

  ```
  .. code-block:: none

        cat /dev/video0 > my.mpg (you need to hit ctrl-c to exit)
  ```

- /dev/video16

  The decoder output device(s)

  Write-only. Only present if the MPEG decoder (i.e. CX23415) exists.

  An mpeg2 stream sent to this device will appear on the selected video display, audio will appear on the line-out/audio out. It is only available for cards that support video out. Example:

  System Message: WARNING/2 (D:\onboarding-resources\sample-onboarding-resources\linux-master\Documentation\admin-guide\media\[linux-master][Documentation][admin-guide][media]ivtv.rst, line 135)

  Cannot analyze code. No Pygments lexer found for "none".

  ```
  .. code-block:: none

        cat my.mpg >/dev/video16
  ```

- /dev/video24

  The raw audio capture device(s).

  Read-only

  The raw audio PCM stereo stream from the currently selected tuner or audio line-in. Reading from this device results in a raw (signed 16 bit Little Endian, 48000 Hz, stereo pcm) capture. This device only captures audio. This should be replaced by an ALSA device in the future. Note that there is no corresponding raw audio output device, this is not supported in the decoder

firmware.

- /dev/video32

  The raw video capture device(s)

  Read-only

  The raw YUV video output from the current video input. The YUV format is a 16x16 linear tiled NV12 format (V4L2_PIX_FMT_NV12_16L16)

  Note that the YUV and PCM streams are not synchronized, so they are of limited use.

- /dev/video48

  The raw video display device(s)

  Write-only. Only present if the MPEG decoder (i.e. CX23415) exists.

  Writes a YUV stream to the decoder of the card.

- /dev/radio0

  The radio tuner device(s)

  Cannot be read or written.

  Used to enable the radio tuner and tune to a frequency. You cannot read or write audio streams with this device. Once you use this device to tune the radio, use /dev/video24 to read the raw pcm stream or /dev/video0 to get an mpeg2 stream with black video.

- /dev/vbi0

  The 'vertical blank interval' (Teletext, CC, WSS etc) capture device(s)

  Read-only

  Captures the raw (or sliced) video data sent during the Vertical Blank Interval. This data is used to encode teletext, closed captions, VPS, widescreen signalling, electronic program guide information, and other services.

- /dev/vbi8

  Processed vbi feedback device(s)

  Read-only. Only present if the MPEG decoder (i.e. CX23415) exists.

  The sliced VBI data embedded in an MPEG stream is reproduced on this device. So while playing back a recording on /dev/video16, you can read the embedded VBI data from /dev/vbi8.

- /dev/vbi16

  The vbi 'display' device(s)

  Write-only. Only present if the MPEG decoder (i.e. CX23415) exists.

  Can be used to send sliced VBI data to the video-out connector.