

Part I - Video for Linux API

This part describes the Video for Linux API version 2 (V4L2 API) specification.

Revision 4.5

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\linux-master\Documentation\userspace-api\media\v4l\linux-master [Documentation] [userspace-api] [media] [v4l]v4l2.rst, line 14)

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.. only:: html

.. class:: toc-title

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```
.. toctree::
    :numbered:
    :maxdepth: 5

    common
    pixfmt
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    videodev
    capture-example
    v4l2grab-example
    biblio
```

Revision and Copyright

Authors, in alphabetical order:

- Ailus, Sakari <sakari.ailus@iki.fi>
 - Subdev selections API.
- Carvalho Chehab, Mauro <mchehab+samsung@kernel.org>
 - Documented libv4l, designed and added v4l2grab example, Remote Controller chapter.
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 - Original author of the V4L2 API and documentation.
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 - Documented the memory-to-memory decoder interface.
 - Documented the memory-to-memory encoder interface.
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 - Original author of the V4L2 API and documentation.
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 - Documented the Digital Video timings API.
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 - Documented the memory-to-memory decoder interface.
 - Documented the memory-to-memory encoder interface.
- Osciak, Pawel <pawel@osciak.com>
 - Designed and documented the multi-planar API.
- Palosaari, Antti <crope@iki.fi>
 - SDR API.
- Ribakda, Ricardo
 - Introduce HSV formats and other minor changes.

- Rubli, Martin
 - Designed and documented the VIDIOC_ENUM_FRAMESIZES and VIDIOC_ENUM_FRAMEINTERVALS ioctls.
- Walls, Andy <awalls@md.metrocast.net>
 - Documented the fielded V4L2_MPEG_STREAM_VBI_FMT_IVTV MPEG stream embedded, sliced VBI data format in this specification.
- Verkuil, Hans <hverkuil@xs4all.nl>
 - Designed and documented the VIDIOC_LOG_STATUS ioctl, the extended control ioctls, major parts of the sliced VBI API, the MPEG encoder and decoder APIs and the DV Timings API.

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Except when explicitly stated as GPL, programming examples within this part can be used and distributed without restrictions.

Revision History

revision: 4.10 / 2016-07-15 (*rr*)

Introduce HSV formats.

revision: 4.5 / 2015-10-29 (*rr*)

Extend VIDIOC_G_EXT_CTRL; Replace ctrl_class with a new union with ctrl_class and which. Which is used to select the current value of the control or the default value.

revision: 4.4 / 2015-05-26 (*ap*)

Renamed V4L2_TUNER_ADC to V4L2_TUNER_SDR. Added V4L2_CID_RF_TUNER_RF_GAIN control. Added transmitter support for Software Defined Radio (SDR) Interface.

revision: 4.1 / 2015-02-13 (*mcc*)

Fix documentation for media controller device nodes and add support for DVB device nodes. Add support for Tuner sub-device.

revision: 3.19 / 2014-12-05 (*hv*)

Rewrote Colorspace chapter, added new enum `:c:type:'v4l2_ycbcr_encoding'` and enum `:c:type:'v4l2_quantization'` fields to struct `:c:type:'v4l2_pix_format'`, struct `:c:type:'v4l2_pix_format_mplane'` and struct `:c:type:'v4l2_mbus_framefmt'`.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\linux-master\Documentation\userspace-api\media\v4l\linux-master [Documentation] [userspace-api] [media] [v4l]v4l2.rst, line 134); [backlink](#)

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revision: 3.17 / 2014-08-04 (*lp*, *hv*)

Extended struct `xtype:v4l2_pix_format`. Added format flags. Added compound control types and VIDIOC_QUERY_EXT_CTRL.

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revision: 3.15 / 2014-02-03 (*hv, ap*)

Update several sections of "Common API Elements": "Opening and Closing Devices" "Querying Capabilities", "Application Priority", "Video Inputs and Outputs", "Audio Inputs and Outputs" "Tuners and Modulators", "Video Standards" and "Digital Video (DV) Timings". Added SDR API.

revision: 3.14 / 2013-11-25 (*rr*)

Set width and height as unsigned on `v4l2_rect`.

revision: 3.11 / 2013-05-26 (*hv*)

Remove obsolete VIDIOC_DBG_G_CHIP_IDENT ioctl.

revision: 3.10 / 2013-03-25 (*hv*)

Remove obsolete and unused DV_PRESET ioctls: VIDIOC_G_DV_PRESET, VIDIOC_S_DV_PRESET, VIDIOC_QUERY_DV_PRESET and VIDIOC_ENUM_DV_PRESET. Remove the related `v4l2_input/output` capability flags `V4L2_IN_CAP_PRESETS` and `V4L2_OUT_CAP_PRESETS`. Added VIDIOC_DBG_G_CHIP_INFO.

revision: 3.9 / 2012-12-03 (*sa, sn*)

Added timestamp types to `v4l2_buffer`. Added `V4L2_EVENT_CTRL_CH_RANGE` control event changes flag.

revision: 3.6 / 2012-07-02 (*hv*)

Added VIDIOC_ENUM_FREQ_BANDS.

revision: 3.5 / 2012-05-07 (*sa, sn, hv*)

Added `V4L2_CTRL_TYPE_INTEGER_MENU` and `V4L2` subdev selections API. Improved the description of `V4L2_CID_COLORFX` control, added `V4L2_CID_COLORFX_CBCR` control. Added camera controls `V4L2_CID_AUTO_EXPOSURE_BIAS`, `V4L2_CID_AUTO_N_PRESET_WHITE_BALANCE`, `V4L2_CID_IMAGE_STABILIZATION`, `V4L2_CID_ISO_SENSITIVITY`, `V4L2_CID_ISO_SENSITIVITY_AUTO`, `V4L2_CID_EXPOSURE_METERING`, `V4L2_CID_SCENE_MODE`, `V4L2_CID_3A_LOCK`, `V4L2_CID_AUTO_FOCUS_START`, `V4L2_CID_AUTO_FOCUS_STOP`, `V4L2_CID_AUTO_FOCUS_STATUS` and `V4L2_CID_AUTO_FOCUS_RANGE`. Added VIDIOC_ENUM_DV_TIMINGS, VIDIOC_QUERY_DV_TIMINGS and VIDIOC_DV_TIMINGS_CAP.

revision: 3.4 / 2012-01-25 (*sn*)

Added [ref](#) JPEG compression control class. `<jpeg-controls>`

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\linux-master\Documentation\userspace-api\media\v4l\linux-master [Documentation] [userspace-api] [media] [v4l]v4l2.rst, line 204); [backlink](#)

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revision: 3.3 / 2012-01-11 (*hv*)

Added `device_caps` field to struct `v4l2_capabilities`.

revision: 3.2 / 2011-08-26 (*hv*)

Added `V4L2_CTRL_FLAG_VOLATILE`.

revision: 3.1 / 2011-06-27 (*mcc, po, hv*)

Documented that VIDIOC_QUERYCAP now returns a per-subsystem version instead of a per-driver one. Standardize an error code for invalid ioctl. Added `V4L2_CTRL_TYPE_BITMASK`.

revision: 2.6.39 / 2011-03-01 (*mcc, po*)

Removed VIDIOC_*_OLD from videodev2.h header and update it to reflect latest changes. Added the [ref](#) multi-planar API `<planar-apis>`.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\linux-master\Documentation\userspace-api\media\v4l\linux-master [Documentation] [userspace-

revision: 2.6.37 / 2010-08-06 (*hv*)

Removed obsolete vtx (videotext) API.

revision: 2.6.33 / 2009-12-03 (*mk*)

Added documentation for the Digital Video timings API.

revision: 2.6.32 / 2009-08-31 (*mcc*)

Now, revisions will match the kernel version where the V4L2 API changes will be used by the Linux Kernel. Also added Remote Controller chapter.

revision: 0.29 / 2009-08-26 (*ev*)

Added documentation for string controls and for FM Transmitter controls.

revision: 0.28 / 2009-08-26 (*gl*)

Added V4L2_CID_BAND_STOP_FILTER documentation.

revision: 0.27 / 2009-08-15 (*mcc*)

Added libv4l and Remote Controller documentation; added v4l2grab and keytable application examples.

revision: 0.26 / 2009-07-23 (*hv*)

Finalized the RDS capture API. Added modulator and RDS encoder capabilities. Added support for string controls.

revision: 0.25 / 2009-01-18 (*hv*)

Added pixel formats VYUY, NV16 and NV61, and changed the debug ioctls VIDIOC_DBG_G/S_REGISTER and VIDIOC_DBG_G_CHIP_IDENT. Added camera controls V4L2_CID_ZOOM_ABSOLUTE, V4L2_CID_ZOOM_RELATIVE, V4L2_CID_ZOOM_CONTINUOUS and V4L2_CID_PRIVACY.

revision: 0.24 / 2008-03-04 (*mhs*)

Added pixel formats Y16 and SBGGR16, new controls and a camera controls class. Removed VIDIOC_G/S_MPEGCOMP.

revision: 0.23 / 2007-08-30 (*mhs*)

Fixed a typo in VIDIOC_DBG_G/S_REGISTER. Clarified the byte order of packed pixel formats.

revision: 0.22 / 2007-08-29 (*mhs*)

Added the Video Output Overlay interface, new MPEG controls, V4L2_FIELD_INTERLACED_TB and V4L2_FIELD_INTERLACED_BT, VIDIOC_DBG_G/S_REGISTER, VIDIOC_(TRY)_ENCODER_CMD, VIDIOC_G_CHIP_IDENT, VIDIOC_G_ENC_INDEX, new pixel formats. Clarifications in the cropping chapter, about RGB pixel formats, the mmap(), poll(), select(), read() and write() functions. Typographical fixes.

revision: 0.21 / 2006-12-19 (*mhs*)

Fixed a link in the VIDIOC_G_EXT_CTRLs section.

revision: 0.20 / 2006-11-24 (*mhs*)

Clarified the purpose of the audioset field in struct v4l2_input and v4l2_output.

revision: 0.19 / 2006-10-19 (*mhs*)

Documented V4L2_PIX_FMT_RGB444.

revision: 0.18 / 2006-10-18 (*mhs*)

Added the description of extended controls by Hans Verkuil. Linked V4L2_PIX_FMT_MPEG to V4L2_CID_MPEG_STREAM_TYPE.

revision: 0.17 / 2006-10-12 (*mhs*)

Corrected V4L2_PIX_FMT_HM12 description.

revision: 0.16 / 2006-10-08 (*mhs*)

VIDIOC_ENUM_FRAMESIZES and VIDIOC_ENUM_FRAMEINTERVALS are now part of the API.

revision: 0.15 / 2006-09-23 (*mhs*)

Cleaned up the bibliography, added BT.653 and BT.1119. capture.c/start_capturing() for user pointer I/O did not initialize the buffer index. Documented the V4L MPEG and MJPEG VID_TYPEs and V4L2_PIX_FMT_SBGGR8. Updated the list of reserved pixel formats. See the history chapter for API changes.

revision: 0.14 / 2006-09-14 (*mr*)

Added VIDIOC_ENUM_FRAMESIZES and VIDIOC_ENUM_FRAMEINTERVALS proposal for frame format enumeration of

digital devices.

revision: 0.13 / 2006-04-07 (*mhs*)

Corrected the description of struct v4l2_window clips. New V4L2_STD_ and V4L2_TUNER_MODE_LANG1_LANG2 defines.

revision: 0.12 / 2006-02-03 (*mhs*)

Corrected the description of struct v4l2_captureparm and v4l2_outputparm.

revision: 0.11 / 2006-01-27 (*mhs*)

Improved the description of struct v4l2_tuner.

revision: 0.10 / 2006-01-10 (*mhs*)

VIDIOC_G_INPUT and VIDIOC_S_PARM clarifications.

revision: 0.9 / 2005-11-27 (*mhs*)

Improved the 525 line numbering diagram. Hans Verkuil and I rewrote the sliced VBI section. He also contributed a VIDIOC_LOG_STATUS page. Fixed VIDIOC_S_STD call in the video standard selection example. Various updates.

revision: 0.8 / 2004-10-04 (*mhs*)

Somehow a piece of junk slipped into the capture example, removed.

revision: 0.7 / 2004-09-19 (*mhs*)

Fixed video standard selection, control enumeration, downscaling and aspect example. Added read and user pointer i/o to video capture example.

revision: 0.6 / 2004-08-01 (*mhs*)

v4l2_buffer changes, added video capture example, various corrections.

revision: 0.5 / 2003-11-05 (*mhs*)

Pixel format erratum.

revision: 0.4 / 2003-09-17 (*mhs*)

Corrected source and Makefile to generate a PDF. SGML fixes. Added latest API changes. Closed gaps in the history chapter.

revision: 0.3 / 2003-02-05 (*mhs*)

Another draft, more corrections.

revision: 0.2 / 2003-01-15 (*mhs*)

Second draft, with corrections pointed out by Gerd Knorr.

revision: 0.1 / 2002-12-01 (*mhs*)

First draft, based on documentation by Bill Dirks and discussions on the V4L mailing list.