

bindings-linux-videodev2

Claude Heiland-Allen

2011–2015

Contents

1	bindings-linux-videodev2.cabal	2
2	generate/generate.sh	3
3	generate/videodev2.h.diff	6
4	.gitignore	10
5	LICENSE	10
6	README	11
7	Setup.hs	11

1 bindings-linux-videodev2.cabal

Name: bindings-linux-videodev2
Version: 0.2.0.1
Synopsis: bindings to Video For Linux Two (v4l2) kernel interfaces

5 Description:
Bindings for Video For Linux Two (v4l2), wrapping:
<file:///usr/include/linux/videodev2.h>
Upstream documentation at:
<http://linuxtv.org/downloads/v4l-dvb-apis/>
10 .
Kernel development headers are required to build this package.
On Debian-based systems these can be found in linux-libc-dev.

Homepage: http://code.mathr.co.uk/bindings-linux-videodev2
15 License: BSD3
License-file: LICENSE
Author: Claude Heiland-Allen
Maintainer: claud@mathr.co.uk
Category: Graphics

20 Build-type: Simple

Extra-source-files:
README
25 generate/generate.sh
generate/videodev2.h.diff
Bindings/Linux/videodev2.h

Cabal-version: >=1.2

30 Library
Exposed-modules: Bindings.Linux.VideoDev2
C-sources: Bindings/Linux/videodev2_cinline.c
Include-dirs: Bindings/Linux/

```

35  Build-depends:
      base >= 3 && < 5,
      bindings-DSL >= 1.0.7 && < 1.1,
      ioctl >= 0.0.1 && < 0.1
  Build-tools:      hsc2hs

```

2 generate/generate.sh

```

#!/bin/bash
ME="$(dirname "$(readlink -f "$0")")"
mkdir -p "${ME}/../Bindings/Linux"
patch -s -p0 -o "${ME}/../Bindings/Linux/videodev2.h" "/usr/include/linux/✓
↳ videodev2.h" "${ME}/videodev2.h.diff"
5  (
    cat <<EOF
#include <bindings.cmacros.h>
#define __OLD_VIDIOC_
#include "videodev2.h"
10  BC_INLINE4(v4l2_fourcc, __u8, __u8, __u8, __u8, __u32)
    BC_INLINE1(V4L2_FIELD_HAS_TOP, enum v4l2_field, int)
    BC_INLINE1(V4L2_FIELD_HAS_BOTTOM, enum v4l2_field, int)
    BC_INLINE1(V4L2_FIELD_HAS_BOTH, enum v4l2_field, int)
    BC_INLINE1(V4L2_CTRL_ID2CLASS, __u32, __u32)
15  BC_INLINE1(V4L2_CTRL_DRIVER_PRIV, __u32, __u32)
    EOF
) > "${ME}/../Bindings/Linux/videodev2_cinline.c"
(
( cat <<EOF
20  {-# LANGUAGE DeriveDataTypeable, ForeignFunctionInterface, MultiParamTypeClasses ✓
    ↳ , StandaloneDeriving, TypeSynonymInstances #-}
    -- ...edit the generating script instead of this machine-generated file...
#include <bindings.dsl.h>
#include <sys/time.h>
#define __OLD_VIDIOC_
25  #include "videodev2.h"
    -- | Bindings for Video For Linux Two (v4l2), wrapping:
    -- <file:///usr/include/linux/videodev2.h>
    -- Upstream documentation at:
    -- <http://linuxtv.org/downloads/v4l-dvb-apis/>
30  module Bindings.Linux.VideoDev2 where
    import System.Posix.IOctl
    #strict_import
    import Foreign(unsafePerformIO)
    import Data.Typeable (Typeable)
35  deriving instance Typeable C' timeval
    deriving instance Typeable C' v4l2_rect
    deriving instance Typeable C' v4l2_fract
    deriving instance Typeable C' v4l2_capability
    deriving instance Typeable C' v4l2_pix_format
40  deriving instance Typeable C' v4l2_fmtdesc
    deriving instance Typeable C' v4l2_frmsize_discrete
    deriving instance Typeable C' v4l2_frmsize_stepwise
    deriving instance Typeable C' v4l2_frmsizeenum
    deriving instance Typeable C' v4l2_frmsizeenum_u
45  deriving instance Typeable C' v4l2_frmival_stepwise
    deriving instance Typeable C' v4l2_frmivalenum
    deriving instance Typeable C' v4l2_frmivalenum_u

```

```

    deriving instance Typeable C'v4l2_timecode
    deriving instance Typeable C'v4l2_jpegcompression
50  deriving instance Typeable C'v4l2_requestbuffers
    deriving instance Typeable C'v4l2_buffer_u
    deriving instance Typeable C'v4l2_buffer
    deriving instance Typeable C'v4l2_framebuffer
    deriving instance Typeable C'v4l2_clip
55  deriving instance Typeable C'v4l2_window
    deriving instance Typeable C'v4l2_captureparm
    deriving instance Typeable C'v4l2_outputparm
    deriving instance Typeable C'v4l2_cropcap
    deriving instance Typeable C'v4l2_crop
60  deriving instance Typeable C'v4l2_standard
    deriving instance Typeable C'v4l2_input
    deriving instance Typeable C'v4l2_output
    deriving instance Typeable C'v4l2_control
    deriving instance Typeable C'v4l2_ext_control
65  deriving instance Typeable C'v4l2_ext_controls
    deriving instance Typeable C'v4l2_ext_control_u
    deriving instance Typeable C'v4l2_queryctrl
    deriving instance Typeable C'v4l2_querymenu
    deriving instance Typeable C'v4l2_tuner
70  deriving instance Typeable C'v4l2_modulator
    deriving instance Typeable C'v4l2_frequency
    deriving instance Typeable C'v4l2_hw_freq_seek
    deriving instance Typeable C'v4l2_rds_data
    deriving instance Typeable C'v4l2_audio
75  deriving instance Typeable C'v4l2_audioout
    deriving instance Typeable C'v4l2_enc_idx_entry
    deriving instance Typeable C'v4l2_enc_idx
    deriving instance Typeable C'v4l2_vbi_format
    deriving instance Typeable C'v4l2_sliced_vbi_format
80  deriving instance Typeable C'v4l2_sliced_vbi_cap
    deriving instance Typeable C'v4l2_sliced_vbi_data
    deriving instance Typeable C'v4l2_mpeg_vbi_itv0_line
    deriving instance Typeable C'v4l2_mpeg_vbi_fmt_itv
    deriving instance Typeable C'v4l2_format
85  deriving instance Typeable C'v4l2_mpeg_vbi_fmt_itv_u
    deriving instance Typeable C'v4l2_streamparm
    deriving instance Typeable C'v4l2_dbg_match
    deriving instance Typeable C'v4l2_dbg_register
    deriving instance Typeable C'v4l2_dbg_chip_ident
90  deriving instance Typeable C'v4l2_format_u
    deriving instance Typeable C'v4l2_encoder_cmd_u
    deriving instance Typeable C'v4l2_encoder_cmd
    deriving instance Typeable C'v4l2_dbg_match_u
    deriving instance Typeable C'v4l2_streamparm_u
95  #starttype struct timeval
    #field tv_sec , CLong
    #field tv_usec , CLong
    #stoptype
    #synonym.t v4l2_std_id , Word64
100 #cinline v4l2_fourcc , Word8 -> Word8 -> Word8 -> Word8 -> IO Word32
    #cinline V4L2.FIELD.HAS.TOP , <v4l2_field> -> IO CInt
    #cinline V4L2.FIELD.HAS.BOTTOM , <v4l2_field> -> IO CInt
    #cinline V4L2.FIELD.HAS.BOTH , <v4l2_field> -> IO CInt
    #cinline V4L2.CTRL.ID2CLASS , Word32 -> IO Word32

```

```

105 #cinline V4L2_CTRL_DRIVER_PRIV , Word32 -> IO Word32
EOF
cat "${ME}/../Bindings/Linux/videodev2.h" |
tr '\n' '?' |
sed 's|\\|?|g' |
110 sed 's|/|*|n|*|g' |
sed 's|*|/|*|n|g' |
sed 's|^|/|*.*|/|g' |
tr '?' '\n' |
tr '\t' ' ' |
115 tr -s '\n' |
grep -v '^#if' |
grep -v '^#else' |
grep -v '^#endif' |
grep -v '^#include' |
120 grep -v '^typedef' |
sed 's|^#define \([A-Z0-9_]*\) \(_IO[RW]*([^\,]*, [0-9]*, struct \([A-Z0-9a-z_]*\)|
↳ ]*)\)\)$|#num \1\n#opaque_t \1\ninstance IOControl C""""\1 C""""\3 where ↵
↳ ioctlReq _ = c""""\1|g' |
sed 's|^#define \([A-Z0-9_]*\) \(_IO[RW]*([^\,]*, [0-9]*, enum \([A-Z0-9a-z_]*\))\)$|#num \1\n#opaque_t \1\ninstance IOControl C""""\1 C""""\3 where ↵
↳ ioctlReq _ = c""""\1|g' |
sed 's|^#define \([A-Z0-9_]*\) \(_IO[RW]*([^\,]*, [0-9]*, \((v4l2_std_id)\))\)$|#num \1\n#opaque_t \1\ninstance IOControl C""""\1 C""""\3 where ↵
↳ _ = c""""\1|g' |
sed 's|^#define \([A-Z0-9_]*\) \(_IO[RW]*([^\,]*, [0-9]*, int)\)$|#num \1\n#opaque_t \1\ninstance IOControl C""""\1 CInt where ↵
↳ ioctlReq _ = c""""\1|g' |
↳ g' |
125 sed 's|^#define \([A-Z0-9_]*\) \(_IO[RW]*([^\,]*, [0-9]*)\)$|#num \1\n#opaque_t \1\ninstance IOControl C""""\1 CInt where ↵
↳ _ = c""""\1|g' |
sed 's|^enum \([a-z0-9_]*\) .*$|#integral_t enum \1|g' |
sed 's|^ \([A-Z0-9a-z_]*\) = .*$|#num \1|g' |
sed 's|^#define \([A-Z0-9a-z_]*\) (.*)$|g' |
sed 's|^#define \([A-Z0-9a-z_]*\) .*$|#num \1|g' |
130 grep -v '^#num --' |
while read line ; do
    if [[ "${line}" =~ 'struct' || "${line}" =~ 'union' ]] ; then
        u=""
        if [[ "${line}" =~ 'union' ]] ; then
135 u="union_"
        echo "${line}" | sed 's|^union \([A-Za-z0-9_]*\) .*$|#starttype union \1|g'
        else
        echo "${line}" | sed 's|^struct \([A-Za-z0-9_]*\) .*$|#starttype struct \1|g'
        ↳ g'
        fi
140 while read line ; do
        if [[ "${line}" =~ '}' ]] ; then
            echo '#stoptype'
            break
        else
145 f=""
            if [[ "${line}" =~ '[' ]] ; then
                f="${u}array_field"
            else
                f="${u}field"
150 fi
            if [[ "${line}" =~ '...s32' ]] ; then

```

```

        t="Int32"
        elif [[ "${line}" =~ '__u32' ]] ; then
            t="Word32"
155     elif [[ "${line}" =~ '__le32' ]] ; then
            t="Word32"
        elif [[ "${line}" =~ '__s64' ]] ; then
            t="Int64"
        elif [[ "${line}" =~ '__u64' ]] ; then
160     t="Word64"
        elif [[ "${line}" =~ '__u16' ]] ; then
            t="Word16"
        elif [[ "${line}" =~ '__u8' ]] ; then
            t="Word8"
165     elif [[ "${line}" =~ 'int' ]] ; then
            t="CInt"
        elif [[ "${line}" =~ 'char' ]] ; then
            t="CChar"
        elif [[ "${line}" =~ 'unsigned long' ]] ; then
170     t="CULong"
        elif [[ "${line}" =~ 'v4l2_std_id' ]] ; then
            t="<v4l2_std_id>"
        elif [[ "${line}" =~ 'struct' ]] ; then
            t="$(echo "${line}" | sed 's|^.*struct \([A-Za-z0-9_]*\) .*$|<1>|g')"
175     elif [[ "${line}" =~ 'union' ]] ; then
            t="$(echo "${line}" | sed 's|^.*union \([A-Za-z0-9_]*\) .*$|<1>|g')"
        elif [[ "${line}" =~ 'enum' ]] ; then
            t="$(echo "${line}" | sed 's|^.*enum \([A-Za-z0-9_]*\) .*$|<1>|g')"
        elif [[ "${line}" =~ 'void' ]] ; then
180     t="()"
        else
            t="FIXME"
        fi
        if [[ "${line}" =~ '*' ]] ; then
185     t="Ptr ${t}"
        fi
        echo "${line}" | sed 's|.*[ *]\([A-Za-z0-9_]*\) .*$|#'"$f"' \1 , '"${t}↵ }"'|g'
    fi
done
190     elif [[ ! "${line}" =~ '};' ]] ; then
        echo "${line}"
    fi
done ) |
tr -s "\n"
195 ) > "${ME}/../Bindings/Linux/VideoDev2.hsc"

```

3 generate/videodev2.h.diff

```

--- /usr/include/linux/videodev2.h      2011-04-21 00:30:06.000000000 +0100
+++ ../bindings-linux-videodev2/Bindings/Linux/videodev2.h      2011-07-03 ↵
    ↵ 14:35:44.000000000 +0100
@@ -396,16 +396,15 @@
    __u32                                step-height;    /* Frame height step size [pixel↵
5      ↵ ] */
};

+union v4l2_frmsizeenum_u {                                /* Frame size */

```

```

+      struct v4l2_frmsize_discrete    discrete;
+      struct v4l2_frmsize_stepwise    stepwise;
10 +};
+      struct v4l2_frmsizeenum {
+          __u32                index;          /* Frame size number */
+          __u32                pixel_format;    /* Pixel format */
+          __u32                type;           /* Frame size type the device */
+          ↪ supports. */
15 -
-      union {
-          struct v4l2_frmsize_discrete    discrete;
-          struct v4l2_frmsize_stepwise    stepwise;
-      };
20 -
+      union v4l2_frmsizeenum_u u;
+      __u32    reserved[2];                /* Reserved space for future use */
+          ↪ */
+      };
25 @@ -424,18 +423,17 @@
+      struct v4l2_fract            step;          /* Frame interval step size [s] */
+          ↪ */
+      };
+
+union v4l2_frmivalenum_u {
+    ↪ interval */
30 +      struct v4l2_fract            discrete;
+      struct v4l2_frmival_stepwise    stepwise;
+};
+      struct v4l2_frmivalenum {
+          __u32                index;          /* Frame format index */
35          __u32                pixel_format;    /* Pixel format */
+          __u32                width;          /* Frame width */
+          __u32                height;         /* Frame height */
+          __u32                type;           /* Frame interval type the */
+          ↪ device supports. */
-
40 -      union {
-          struct v4l2_fract            discrete;
-          struct v4l2_frmival_stepwise    stepwise;
-      };
-
45 +      union v4l2_frmivalenum_u u;
+      __u32    reserved[2];                /* Reserved space for future use */
+          ↪ */
+      };
+      #endif
@@ -488,6 +486,7 @@
50
+      * The presence of the APP and COM marker
+      * is influenced by APP_len and COM_len
+      * ONLY, not by this property! */
+};
55 #define V4L2_JPEG_MARKER_DHT (1<<3) /* Define Huffman Tables */
#define V4L2_JPEG_MARKER_DQT (1<<4) /* Define Quantization Tables */
@@ -495,7 +494,6 @@
#define V4L2_JPEG_MARKER_COM (1<<6) /* Comment segment */

```

```

60     #define V4L2_JPEG_MARKER_APP (1<<7)    /* App segment, driver will
                                              * always use APP0 */
    -};

    /*
     *      M E M O R Y - M A P P I N G   B U F F E R S
65    @@ -507,6 +505,10 @@
        __u32                                reserved[2];
    };

    +union v4l2_buffer_u {
70    +        __u32                                offset;
    +        unsigned long                        userptr;
    +};
    struct v4l2_buffer {
        __u32                                index;
75    @@ -519,10 +521,7 @@
        enum v4l2_buf_type                    type;

        /* memory location */
        enum v4l2_memory                      memory;
80    -        union {
    -            __u32                                offset;
    -            unsigned long                        userptr;
    -        } m;
    +        union v4l2_buffer_u u;
85    +        __u32                                length;
    +        __u32                                input;
    +        __u32                                reserved;
    @@ -789,15 +788,16 @@
        __s32                                value;
90    };

    +union v4l2_ext_control_u {
    +    __s32 value;
    +    __s64 value64;
95    +    char *string;
    +} __attribute__((packed));
    struct v4l2_ext_control {
        __u32 id;
        __u32 size;
100    __u32 reserved2[1];
    -        union {
    -            __s32 value;
    -            __s64 value64;
    -            char *string;
105    -        };
    +    union v4l2_ext_control_u u;
    +} __attribute__((packed));

    struct v4l2_ext_controls {
110    @@ -1336,14 +1336,16 @@
        /* Flags for V4L2_ENC_CMD_STOP */
        #define V4L2_ENC_CMD_STOP_AT_GOP_END    (1 << 0)

    +struct v4l2_encoder_cmd_u_s {
115    +        __u32 data[8];

```

```

+};
+union v4l2_encoder_cmd_u {
+    struct v4l2_encoder_cmd_u_s raw;
+};
120     struct v4l2_encoder_cmd {
+        __u32 cmd;
+        __u32 flags;
-        union {
-            struct {
125 -                __u32 data[8];
-            } raw;
-        };
+    union v4l2_encoder_cmd_u u;
+};
130
+    #endif
@@ -1460,12 +1462,13 @@
+    #define V4L2_MPEG_VBI_IVTV_MAGIC0    "itv0"
+    #define V4L2_MPEG_VBI_IVTV_MAGIC1    "ITV0"
135
-struct v4l2_mpeg_vbi_fmt_itv {
-    __u8 magic[4];
-    union {
+union v4l2_mpeg_vbi_fmt_itv_u {
140     struct v4l2_mpeg_vbi_itv0 itv0;
+    struct v4l2_mpeg_vbi_ITV0 ITV0;
-    };
+} __attribute__((packed));
+struct v4l2_mpeg_vbi_fmt_itv {
145 +    __u8 magic[4];
+    union v4l2_mpeg_vbi_fmt_itv_u u;
+} __attribute__((packed));

/*
150 @@ -1474,27 +1477,30 @@

/*      Stream data format
*/
-struct v4l2_format {
155 -    enum v4l2_buf_type type;
-    union {
+union v4l2_format_u {
+    struct v4l2_pix_format      pix;          /* ↯
+        ↪ V4L2_BUF_TYPE_VIDEO_CAPTURE */
+    struct v4l2_window         win;          /* ↯
+        ↪ V4L2_BUF_TYPE_VIDEO_OVERLAY */
160     struct v4l2_vbi_format     vbi;          /* ↯
+        ↪ V4L2_BUF_TYPE_VBI_CAPTURE */
+    struct v4l2_sliced_vbi_format sliced;    /* ↯
+        ↪ V4L2_BUF_TYPE_SLICED_VBI_CAPTURE */
+    __u8      raw_data[200];                /* user-defined */
-    } fmt;
+};
+
165 +struct v4l2_format {
+    enum v4l2_buf_type type;
+    union v4l2_format_u fmt;

```

```

};
170
/*      Stream type-dependent parameters
*/
-struct v4l2_streamparm {
175 -     enum v4l2_buf_type type;
-     union {
+union v4l2_streamparm_u {
                struct v4l2_captureparm capture;
                struct v4l2_outputparm output;
180                __u8    raw_data[200]; /* user-defined */
-     } parm;
+};
+struct v4l2_streamparm {
+     enum v4l2_buf_type type;
185 +     union v4l2_streamparm_u parm;
+};

/*
@@ -1511,12 +1517,13 @@
190 #define V4L2_CHIP_MATCH_I2C_ADDR    2 /* Match against I2C 7-bit address */
#define V4L2_CHIP_MATCH_AC97        3 /* Match against anciliary AC97 chip */

-struct v4l2_dbg_match {
-     __u32 type; /* Match type */
195 -     union { /* Match this chip, meaning determined by type */
+union v4l2_dbg_match_u { /* Match this chip, meaning determined by type */
                __u32 addr;
                char name[32];
-     };
200 +} __attribute__((packed));
+struct v4l2_dbg_match {
+     __u32 type; /* Match type */
+     union v4l2_dbg_match_u u;
+     } __attribute__((packed));
205
struct v4l2_dbg_register {

```

4 .gitignore

dist
Bindings

5 LICENSE

Copyright (c)2011, Claude Heiland-Allen

All rights reserved.

5 Redistribution and use in source and binary forms, with or without
modification, are permitted provided that the following conditions are met:

* Redistributions of source code must retain the above copyright
notice, this list of conditions and the following disclaimer.

10

* Redistributions in binary form must reproduce the above

copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

15

* Neither the name of Claude Heiland-Allen nor the names of other contributors may be used to endorse or promote products derived from this software without specific prior written permission.

20

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

25

30

6 README

These bindings are semi-automatically generated, see:
./generate/generate.sh

7 Setup.hs

```
import Distribution.Simple
main = defaultMain
```