IEI Integration Corp.

MODEL:

HDC-701EL SDK (Linux)

Software Development Kit (SDK) that Facilitates Development of Linux-based Application for HDC-701EL

User Manual

Rev. 1.00 – December 23, 2015

RoHS Lead Free

Revision

Date	Version	Changes
December 23, 2015	1.00	Initial release

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CAUTION

Cautionary messages should be heeded to help reduce the chance of losing data or damaging the product.

NOTE

These messages inform the reader of essential but non-critical information. These messages should be read carefully as any directions or instructions contained therein can help avoid making mistakes.

HOT SURFACE

This symbol indicates a hot surface that should not be touched without taking care.

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Chapter

1

Driver and SDK Installation

1.1 Overview

The IEI HD Capture AP SDK is a video capture tool that allows the user to capture video through the input port in Linux environment.

1.2 System Requirements

The following program must be installed in order to use the IEI HD Capture AP SDK in Linux:

- Kernel: Ubuntu 14.04.1 Distribution (based on Kernel 3.13.0)

1.3 Software Installation

To install the IEI HD Capture AP SDK to a system running Linux, please follow the steps in the following sub-sections.

1.3.1 Bin File Only (Ubuntu 14.04.1 kernel 3.13.0-32-Generic 64-bit)

Step 1: Copy the

IEI_hdcxxx_0_0_3_2_bin_3.13.0-32-generic_x86_64_20151109_5959.tar.gz

(0_0_3_2 release version, 20151109 release date, 5959 svn version,

3.13.0-32-generic kernel version) file from the utility CD to the system hard drive.

The user can also get the latest version from IEI website.

Step 2: Unzip the file by typing:

```
$ tar zxvf IEI_hdcxxx_ (version)_bin_(kernel version) (date)(svn version).tar.gz
$ tar zxvf
IEI_hdcxxx_0_0_3_2_bin_3.13.0-32-generic_x86_64_20151109_5959.tar.gz
```

Step 3: Change to SDK directory by typing:

```
$ cd IEI_hdcxxx_ (version)_bin_(kernel version) (date)(svn version)
$ cd IEI_hdcxxx_0_0_3_2_bin_3.13.0-32-generic_x86_64_20151109_5959
```

Step 4: Login as root by typing:

```
$ sudo su
```

Step 5: Enter the password:

```
password: ******
$
```

Step 6: Install the IEI HD Capture AP SDK by typing:

```
#sh env.sh

root@ubuntu:/home/test/PL330/Linux/trunk/driver/fellini-linux/api/linux# sh env.sh

Reading package lists… Done

Building dependency tree

Reading state information… Done

…………………………………………………………………………………………………………………………………………………………

Setting up libxext-dev:amd64 (2:1.3.2-1ubuntu0.0.14.04.1) …

Setting up x11proto-xf86vidmode-dev (2.3.1-2) …

Setting up libxxf86vm-dev:amd64 (1:1.1.3-1) …

Setting up x11proto-dri2-dev (2.8-2) …

Setting up x11proto-gl-dev (1.4.17-1) …

Setting up libgl1-mesa-dev (10.1.3-0ubuntu0.5) …

Setting up libglu1-mesa-dev (9.0.0-2) …

Setting up libpulse-dev:amd64 (1:4.0-0ubuntu11.1) …

Setting up libsdl1.2-dev (1.2.15-8ubuntu1.1) …

Setting up libx11-doc (2:1.6.2-1ubuntu2) …

Processing triggers for libc-bin (2.19-0ubuntu6) …

Reading package lists… Done

Building dependency tree

Reading state information… Done

vlc is already the newest version.

0 upgraded, 0 newly installed, 0 to remove and 537 not upgraded.

 ----- check OS version ------

ubuntu-14.4-64

x64

/lib/libieiaes.so: ELF 64-bit LSB shared object, x86-64, version 1 (SYSV), dynamically

linked, not stripped
```

```
#sh load_pldev300usb.sh


#ls -al /dev/video0
crw-rw----+ 1 root video 81, 0 2015-04-23 00:39 /dev/video0
```

1.3.2 Source Code

Step 1:   Copy the **IEI_hdc301xx_(SDK VERSION)_(RELEASE DATE)_(SVN**

VERSION).tar.gz file from the utility CD to the system hard drive. The user can

also get the latest version from IEI website.

Step 2:   Unzip the file by typing:

```
tar zxvf IEI_hdcxxx_(SDK VERSION)_(RELEASE DATE)_(SVN VERSION).tar.gz
tar zxvf IEI_hdcxxx_0_0_3_2_5959.tar.gz
```

Step 3:   Change to SDK directory by typing:

```
$ cd hdcxxx_(version) /api/linux/
$ cd hdcxxx_0_0_3_2/api/linux/
```

Step 4:   Login as root by typing:

```
$ sudo su
```

Step 5:   Enter the password:

```
password: ******
$
```

Step 6:   Install the IEI HD Capture AP SDK by typing:

```
# sh build.sh
```

Step 7:   The system starts to install the SDK and shows:

```
Reading package lists... Done
Building dependency tree
Reading state information... Done
libsdl1.2-dev is already the newest version.
```

```
0 upgraded, 0 newly installed, 0 to remove and 513 not upgraded.

 ----- check OS version ------

ubuntu-14.4-64

x64

/lib/libieiaes.so: ELF 64-bit LSB shared object, x86-64, version 1 (SYSV), dynamically

linked, not stripped

pldev300usb            565183   0

videodev                40486   1 pldev300usb#
```

Chapter

2

Using the SDK in Linux

2.1 Launch IEI HD Capture AP SDK

Step 1: To launch the IEI HD Capture AP SDK in Linux, type "hdctest" as below:

```
$ hdctest
```

Step 2: The system starts to launch the SDK.

When the main menu appears, it is ready to use.

```
-----------------------------------
Build Nov  9 2015 09:59:21

 SW_VERSION 0.0.3.2

-----------------------------------

BOARD   DEV      MODEL        FW_VER   IN_HDMI_RES    IN_AUDIO_FREQ   COLOR SPACE      ENC_RES

[ 0]     [ 0]    HDB301L       0.5       I1920X1080P60    A_48K          RGB_LIMITED     O1920X1080P30

[ 1]     [ 2]    HDC301EL      0.1       I1920X1080P60    A_48K          YCRCB_601       O1920X1080P30

[ 2]     [ 3]    HDC301MS      1.0      I1920X1080P60   A_48K          RGB_LIMITED    O1920X1080P30

[ 3]     [ 4]    HDC_701E-2    0.8       I1920X1080P60   A_NA           RGB_FULL        O1920X1080P30
```
←----- **2 is HDC-701EL card id**

```
[97] to capture all video

[99] exit

Select Board Or CMD: 0   ←-----   select Board
```

```
-----------------------------------
BOARD    DEV     MODEL    FW_VER   IN_HDMI_RES    IN_AUDIO_FREQ   COLOR SPACE     ENC_RES

[ 0]      [ 0]    HDB301L   0.5      I1920X1080P60   A_48K            RGB_LIMITED    O1920X1080P30

-----------------------------------

SW INFO

-----------------------------------

 VIDEO:
```

VIDEO SOURCE: ←----- **HDC-701EL only, support 1080P and 720P, see 2.3.5 Set Scaler Resolution**

SOURCE_TYPE   **HDMI**

Source-InWidth   **1920**

Source-InHeight   **1080**

Source-ScanFormat   **progressive**

Source-InFrameRate   60

ENCODE INPUT:

PictureResolution-InPicWidth   1920

PictureResolution-InPicHeight   1080

InputControl-ScanFormat   progressive

InputControl-InFrameRate   60

 ENCODE OUTPUT:

PictureResolution-OutPicWidth   1920

PictureResolution-OutPicHeight 1080

InputControl-Fmt   progressive

InputControl-OutFrameRate   30

 AUDIO:

AudioControlParam-SampleRate   NA

 SETTING:

35. SCALER Function   **←----- HDC-701EL only, see 2.3 HDC-701EL Function**

41. AES Check

42. AES CID Check

50. Update HDMI Resolution (if you change source resolution)

 CAPTURE:

58. Change Output Resolution

60. Capture Video

62. Live Mode (use VLC)

 OTHER:

97. Update Board Information

98. Select Other Board

99. Exit Program

Please enter the choice>>

2.2 Video Capture

To configure the encoding settings and capture the video, please refer to the procedures described in the following sections.

2.2.1 Encoding Settings

Before capturing the video, please connect the hardware and follow the instructions below to configure the encoding settings.

Step 1: Launch the IEI HD Capture AP SDK (refer to **Section 2.1**).

Step 2: Type **60** to select "60. CAPTURE VIDEO" from the main menu.

```
60
```

Step 3: The following message shows.

```
cmd 60
-- CTRL C to Stop -----------------------------
plstrm video 0 enc config Config0
ofile ./B0_A_HDB301L_I1920X1080P60_O1920X1080P30_RGB_LIMITED_A_48K_20151109_142433_
F0.5_S0.0.2.0.mpg > tmp.log &


 plstrm encoder
-----------------------------------
MCU INFO
SW_VERSION 0.0.2.0
Build Apr 28 2015 14:15:41
-----------------------------------
BOARD   DEV    MODEL   FW_VER   IN_HDMI_RES    IN_AUDIO_FREQ   COLOR SPACE      ENC_RES
[ 0]      [ 0]     HDB301L 0.5        I1920X1080P60    A_48K            RGB_LIMITED   O1920X1080P30
-----------------------------------
SW INFO
-----------------------------------
 VIDEO:
 INPUT:
PictureResolution-InPicWidth           1920
```

```
PictureResolution-InPicHeight        1080

InputControl-ScanFormat                progressive

InputControl-InFrameRate               60
 OUTPUT:

PictureResolution-OutPicWidth        1920

PictureResolution-OutPicHeight       1080

InputControl-Fmt                     progressive

InputControl-OutFrameRate             30


 AUDIO:

AudioControlParam-SampleRate          48k


-----------------------------------
61. STOP VIDEO

Please enter the choice>>
```

Type **61** to stop "61. STOP VIDEO".

2.2.2 Live

Before capturing the video, please connect the hardware and follow the instructions below to configure the encoding settings.

Step 1: Launch the IEI HD Capture AP SDK (refer to **Section 2.1**).

Step 2: Type **62** to select "Live Mode (use VLC)" from the main menu.

```
62
```

Step 3: The following message shows.

```
cmd 62

plstrm video 2 enc config /tmp/iei_conf2 oudp 127.0.0.1 oport 4562 > /dev/null &


vlc-iei --network-caching=800 udp://@127.0.0.1:4562 > /tmp/vlc2.log 2>&1   &


2736

2738
```

```
 plstrm live

-----------------------------------

MCU INFO

-----------------------------------

BOARD   DEV   MODEL   FW_VER   ENCODE_IN       IN_AUDIO_FREQ COLOR SPACE   ENCODE_OUT

[ 2]      [ 2]   HDC_301MS   1.0    I1920X1080P60  A_48K              YCRCB_709O1920X1080P30

-----------------------------------

SW INFO

-----------------------------------

 VIDEO:

 ENCODE INPUT:

PictureResolution-InPicWidth     1920

PictureResolution-InPicHeight   1080

InputControl-ScanFormat            progressive

InputControl-InFrameRate     60


 ENCODE OUTPUT:

PictureResolution-OutPicWidth        1920

PictureResolution-OutPicHeight        1080

InputControl-Fmt          progressive

InputControl-OutFrameRate   30


 AUDIO:

AudioControlParam-SampleRate     48k


-----------------------------------

 SETTING:


41. AES     Check

42. AES     CID Check

50. Update HDMI Resolution (if you change source resolution)

-----------------------------------

 CAPTURE:

61. Stop Video
```

 OTHER:

97. Update Board Information

98. Select Other Board

99. Exit Program

Please enter the choice>>

Type **61** to stop "61. STOP VIDEO".

2.2.3 Update HDMI Source

To update HDMI source resolution, type **50**.

2.2.4 Select Other Board

To display main menu, type **98**.

2.2.5 Change Output

To change output resolution, type **58**.

```
cmd 58

---------- SELECT OUTPUT  -----------

 3 . 640X480P60

 4 . 720X480P60

 5 . 720X576P50

 6 . 800X600P60

 7 . 1024X768P60

 8 . 1280X720P50

 9 . 1280X720P60

10 . 1280X768P60

11 . 1280X800P60

12 . 1280X1024P30

13 . 1360X768P50

14 . 1440X900P30

15 . 1680X1050P30

16 . 1920X1080P25
```

```
17 . 1920X1080P30

18 . 1920X1080P24

99 . Not Select


99 . Not Select

3


-----------------------------------

MCU INFO

SW_VERSION 0.0.1.9

Build Apr 23 2015 00:46:01

-----------------------------------
```

BOARD	DEV	MODEL	FW_VER	IN_HDMI_RES	IN_AUDIO_FREQ	COLOR SPACE	ENC_RES
[0]	[0]	HDB301L	0.5	I1920X1080P60	A_48K	RGB_LIMITED	O640X480P60

2.2.6 AES

Step 1: Type **80** to proceed with board AES check.

```
cmd 80

  - PublicKey:      67 45 8b 6b

  - vid1 :     c6 23 7b 32

  - vid2 :     69 98 3c 64

  - AES pass 0
```

Step 2: Type **81** to input custom AES CID Key.

```
please input company id ****:xxxx


  - cid:       x x x x

  - PublicKey:      73 48 33 66

  - vid1 :     51 dc b0 74

  - vid2 :     ff 5c 49 19

  - AES pass 0
```

2.3 HDC-701EL Function

Step 1: Launch the IEI HD Capture AP SDK (refer to **Section 2.1**).

Step 2: Type **35** to set up HDC-701EL scaler function.

```
cmd 35

 =========SCALER FUNCTION SHOW CMD =========
[   1] SET_MAIN_INPUT_SOURCE  :   HDMI
[ 44] SET_ASPECT_RATIO       :   DOT_BY_DOT
[ 61] AUDIO ENABLE           :   AUDIO DISABLE
[ 64] GET_SAMPLE_RATE        :   RATE_NA
[ 65] SET_SCALER_RESOLUTION  :   RES_720P


[99] EXIT
```

2.3.1 Set Main Input Source

Type **1** to set up the main input source.

```
#1


[ 0]DVI_VGA
[ 1]DVI_DIGITAL
[ 2]DVI_HDMI
[ 3]HDMI
[ 4]DP
#
```

2.3.2 Set Aspect Ratio

Type **44** to set up the aspect ratio.

```
#44


[ 0]FULL_SCREEN
[ 1]KEEP_ASPECT_RATIO
[ 2]DOT_BY_DOT
```

2.3.3 Enable/Disable Audio Input

Type **61** to enable or disable audio input.

```
#61


 [ 0]AUDIO ENABLE

 [ 1]AUDIO DISABLE

 #
```

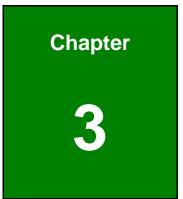### 2.3.4 Get Sample Rate

Type **64** to get the sample rate.

```
#64


[ 64] GET_SAMPLE_RATE      :   RATE_48KHz
```

2.3.5 Set Scaler Resolution

Type **65** to set up the scaler output resolution.

```
#65


 [ 0]RES_720P

 [ 1]RES_1080P

 #
```

Chapter

3

Linux

Open Source Code

Linux Open Source Code

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<one line to give the program's name and a brief idea of what it does.>
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