CV181x Startup Screen User Guide

Version: 1.2.3

Release date: 2023-07-28

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Revision History

Revision	Date	Description
1.0.0	2021/04/20	First Draft
1.1.1	2021/06/04	Fix Updated
1.2.0	2021/10/26	Fix Updated
1.2.1	2022/02/07	Add LVDS and I80 interfaces
1.2.1.0	2022/06/13	Update for CV181x
1.2.2	2022/06/23	Fix Updated
1.2.3	2023/07/28	Add alios

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2 Startup Screen User Guide

This guide explains how to display the boot screen under uboot and alios.

3 uboot

Uboot provides the following functions:

- Provide the switch of VO equipment in boot environment, including different VO interfaces and timing.
- Provide VL video layer switch in boot environment.
- Provide the setting of VO device background color in boot environment.
- The default format of VL video layer is YUV420 PLANAR.

3.1 Uboot Command

- **startvo: start VO device** Parameters: equipment number, interface type, timing.

```
cv1835# help startvo
startvo - open vo device with a certain interface.
```

  - <dev> equipment number. Please refer to Table 1-1.
  - <intf-type> Interface type. Please refer to Table 1-1.
  - <timing> Timing.

  <> MIPI_TX, LVDS, I80 Without reference to timing variable, timing will be set according to the current corresponding driver.

  The standard timing on CV181X is as follows:

```
2(1080P24), 3(1080P25), 4(1080P30), 5(720P50) , 6(720P60) ,
7(1080P50) , 8(1080P60), 9(576P50), 10(480P60), 11(800x600)
```

- **stopvo: Turn off VO device** Parameter: equipment number

```
cv1835# help stopvo
stopvo - close interface of vo device.
```

  - <dev> equipment number. Please refer to Table 1-1.

- **startvl: Start VL video layer** Parameters: video layer number, image file address, video address, image file size, VO alignment.

```
cv1835# help startvl
startvl - open video layer of the vo
```

  - <layer> video layer number. Please refer to Table 1-1.
  - <addr_in> Image file address
  - <addr_out> Video address
  - <size> image file size
  - <alignment> VO alignment

- **stopvl: Turn off VL video layer** Parameter: video layer number

```
cv1835# help stopvl
stopvl - close video layer of the vo
```

  - <layer> video layer number. Please refer to Table 1-1.

- **setvobg: Set VO device background color** Parameters: equipment number, background color.
  - <dev> equipment number. Please refer to Table 1-1.
  - <bgcolor> background color (10bit RGB array, bit[29:20] is R, bit[19:10] is G, bit[9:0] is B).

Table 1-1

Processor Type	Equipment	Video layer	Graphics Layer	Interface Type
CV181X	[0]	[0]	[0]	64(BT.1120), 1024(LCD_18BIT), 2048(LCD_24BIT), 4096(LCD_30BIT), 8192(MIPI_TX), 65536(I80)

Table 1-2

Processor type	Maximum resolution of video layer	Graphics library maximum image resolution
CV181X	1280x720	1280x720

3.2 Code related to uboot function

```
cmd/Makefile
cmd/cvi_vo.c
drivers/video/Makefile
drivers/video/cvitek/ (Include the following subdirectories)
include/cvi_disp.h
include/cvi_mipi.h
```

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```
include/cvi_lvds.h
include/cvi_i80.h
include/cvi_panels/ (Include the following subdirectories)
```

3.3 Uboot Command Example

The following is to operate with CV181X processor, configure the timing of device DHD MIPI_TX 720*1080@60 output as an example.

The address of the picture placed by each DDR is different. Please use the DDR address according to the processor.

- Load JPEG files into memory

```
fatload mmc 1:1 0x84080000 logo.jpg
```

- Decode JPEG to memory (jpg_buf_addr dest_buf_addr jpg_size)

```
cvi_jpeg 0x84080000 0x82080000 0x80000
```

- DHD0 device start

```
startvo 0 8192 0  (MIPI_TX)
startvo 0 1024 0  (Single 6bit LVDS)
startvo 0 2048 0  (Single 8bit LVDS)
startvo 0 4096 0  (Single 10bit LVDS, not supported temporarily)
startvo 0 65536 0  (I80)
```

- Video layer startup

```
startvl 0 0x84080000 0x82080000 0x80000 16
```

- Set VO background color to black

```
setvobg 0 0x00000000
```

- VL video layer off

```
Stopvl 0
```

- DHD0 equipment shutdown

```
Stopvo 0
```

3.4 Use equipment and open machine screen

1. Turn on the image file logo.jpg (BMP format drawing file is required for I80 screen) Copy to $BOOTLOGO_PATH(Default is /build/tools/common/bootlogo/logo.jpg).
2. Modify build/boards/cv18xx/cv18xx_defconfig.The screen required for defconfig configuration is y, others need to be commented out.
3. Modify build/boards/cv18xx/u-boot/cv18xx_defconfig .The screen required for defconfig configuration is y, others need to be commented out, and configure CONFIG_BOOTLOGO is y.
4. Use the following command to compile BSP.

```
export ENABLE_BOOTLOGO=1; source build/envsetup_soc.sh
Build_all
```

3.5 Precautions

- Configure boot screen, When displayed through BT.1120/656 interface,the driver of the external processor needs to be transplanted by itself.
- If the boot screen uses MIPI_TX, LVDS or I80 interfaces, if there is an unsupported mipi_dsi, lvds or i80 panel, refer to headers in include/cvi_panels, add the corresponding header. Just refer to include/cvi_panels/cvi_panels.h other modification ,immediately available for mipi_dsi, lvds or i80 panel.
- When using the storage device and saving the boot screen, it is necessary to save the boot screen in CV181x_asic.dtsi configures a memory space (Default is0x82080000), and ensure the LOGO_RESERVED_ADDR in u-boot/include/configs/CV181x-asic.h set to the same memory space.

4 alios

- Alios startup screen currently only supports MIPI DSI interface, we provide the same mipi_tx_xx api as Linux(you can refer to Screen_Docking_Guide.pdf chapter MIPI_DSI).Users can initialize VO devices by calling these api in solution.

4.1 Adding and initializing panels

1. Add the config option in mars_alios/solutions/helloworld/package.yaml and enable it, for example:

```
CONFIG_PANEL_HX8394: 1
```

2. Add the panel's header in mars_alios/components/cvi_mmf_sdk/cvi_middleware/include/panel, you can refer to Screen_Docking_Guide.pdf or supported panel to implement data structures such as combo_dev_cfg_s。

3. Implement the structure of panel_desc_s for a new panel in mars_alios/components/cvi_mmf_sdk/cvi_middleware/include/panel/dsi_panels.h。

4. To use the reset, power, and backlight functions, you need to add gpio related information yourself, such as:

```
#define VO_GPIO_POWER_PORT 5
#define VO_GPIO_POWER_INDEX 2
```

5. Quote dsi_panels.h in solution code and get panel_desc_s and gpio information.

6. Call csi_gpio_xx() to set power, backlight, reset. such as:

```
csi_gpio_t gpio = {0};
csi_gpio_init(&gpio, VO_GPIO_POWER_PORT);
csi_gpio_dir(&gpio, (1 << VO_GPIO_POWER_INDEX), GPIO_DIRECTION_
↪OUTPUT);
csi_gpio_write(&gpio, (1 << VO_GPIO_POWER_INDEX), 1);
```

7. Call mipi_tx_init(), mipi_tx_cfg(), mipi_tx_set_hs_settle(), mipi_tx_enable() to initialize mipi_tx device. To send dcs cmd, you also need to call mipi_tx_send_cmd().

4.2 Enable startup screen

1. Copy the startup image file logo.jpg to build/tools/common/bootlogo/logo.jpg and compile the SDK.
2. In the solution code, build VDEC_STREAM_S structure, and specify that pu8Addr is equal to the macro definition CVIMMAP_BOOTLOGO_ADDR which stores logo. jpg data.
3. Call CVI_VB_Init() to initialize VB.
4. Initialize VDEC device(You can refer to MediaProcessingSoftwareDevelopmentReference_en.pdf chapter 8).
5. Call CVI_VDEC_SendStream() Send jpeg data to VDEC for decoding.
6. Call CVI_VDEC_GetFrame() Obtain the decoded VIDEO_FRAME_INFO_S structure.
7. Call CVI_VO_SendLogoFromIon() Send to VO display, This api currently only supports NV21 format.