HiMPP Startup Screen

User Guide

Issue **03**

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About This Document

Purpose

This document provides the basic functions and U-boot command lines that are used to implement the startup screen function. Customers can configure the functions and command lines.

Related Version

The following table lists the product version related to this document.

Product Name	Version
Hi3531	V100
Hi3532	V100
Hi3521	V100
Hi35320A	V100
Hi3520D	V100
Hi3515A	V100
Hi3515C 芯片	V100

Intended Audience

This document is intended for:

- Technical support engineers
- Software development engineers

Conventions

General Conventions

The general conventions that may be found in this document are defined as follows.

Convention	Description
Times New Roman	Normal paragraphs are in Times New Roman.
Boldface	Names of files, directories, folders, and users are in **boldface**. For example, log in as user **root**.
Italic	Book titles are in *italics*.
`Courier New`	Examples of information displayed on the screen are in `Courier New`.

Command Conventions

The command conventions that may be found in this document are defined as follows.

Convention	Description
Boldface	The keywords of a command line are in **boldface**.
Italic	Command arguments are in *italics*.
[ ]	Items (keywords or arguments) in square brackets ([ ]) are optional.
{ x | y | ... }	Optional items are grouped in braces and separated by vertical bars. One item is selected.
[x | y | ...]	Optional items are grouped in brackets and separated by vertical bars. One item is selected or no item is selected.
{ x | y | ... } *	Optional items are grouped in braces and separated by vertical bars. A minimum of one item or a maximum of all items can be selected.
[x | y | ...] *	Optional items are grouped in brackets and separated by vertical bars. Several items or no item can be selected.

Table Conventions

The table conventions that may be found in this document are defined as follows.

Convention	Description
–	The cell is empty.

Convention	Description
*	The contents in the cell are configurable.

Change History

Changes between document issues are cumulative. Therefore, the latest document issue contains all changes made in previous issues.

Issue 03 (2013-06-21)

This issue is the third official release, which incorporates the following changes:

The descriptions related to the Hi3515C are added.

Issue 02 (2013-05-09)

This issue is the second official release, which incorporates the following changes:

Chapter 1 Overview

The descriptions of the Hi3520D and Hi3515A are added.

Issue 01 (2012-08-30)

This issue is the first official release, which incorporates the following changes:

Chapter 1 Overview

In Table 1-1, the descriptions of the Hi3521 and Hi3520A are combined.

Issue 00B01 (2012-06-30)

This issue is the first draft release.

Contents

Tables

1 Overview

1.1 New Functions

The U-boot code has the following new functions:

- Enables or disables the video output (VO) device in the U-boot environment. All the typical VO interfaces and timings are covered.
- Enables or disables the VO graphics layer in the U-boot environment.
- Outputs red-green-blue (RGB) data after JPEG decoding in the U-boot environment. Currently, only RGB1555 is supported.

1.2 U-boot Command Lines

- startvo: starts the VO device.

  Parameters: device ID, interface type, and timing

```
hisilicon # help startvo
startvo - startvo   - open interface of vo device.
    - startvo [dev type sync]
-<dev>: device ID. See Table 1-1.
-<type>: interface type. See Table 1-1.
-<sync>: timing type
    0(PAL),1(NTSC),2(1080P24)
    3(1080P25),4(1080P30),5(720P50),6(720P60),
7(1080I50),8(1080I60),9(1080P50),10(1080P60)
11(576P50),12(480P60),13(800x600),14(1024x768)
15(1280x1024),16(1366x768),17(1440x900),18(1280x800)
19(1600x1200),20(1680x1050),21(1920x1200)
```

- stopvo: stops the VO device.

  Parameter: device ID

```
hisilicon # help stopvo
stopvo - stopvo   - close interface of vo device.
    - stopvo [dev]
```

```
-<dev>: device ID. See Table 1-1.
```

- startgx: enables the graphics layer.

  Parameters: graphics layer, picture address (after decoding), picture stride, and display area (x, y, w, h)

```
hilinux # help startgx
args: [layer, addr, stride, x, y, w, h]
-<layer>: graphics layer ID. See Table 1-1.
-<addr>: picture address
-<stride>: picture stride
-<x,y,w,h>: display area
```

- stopgx: disables the video layer.

  Parameter: graphics layer

```
hisilicon # help stopgx
stopgx - stopgx   - close graphics layer.
    - stopgx [layer]
-<layer>: graphics layer ID. See Table 1-1.
```

- setvobg: sets the background color of the device.

  Parameter: graphics layer

```
hisilicon # help setvobg
setvobg - setvobg   - set vo backgroud color.
    - setvobg [dev color]
-<dev>: device ID. See Table 1-1.
-<color>: rgb color space
```

- decjpg: starts JPEG decoding.

  Parameter: none. The environment variables *jpeg_addr*, *jpeg_size*, and *vobuf* (output after decoding) need to be set.

  Jpeg_addr is the address for storing the JPG pictures to be decoded, *jpeg_size* is the size of decoded JPG pictures, and *vobuf* is the address for storing the decoded RGB pictures. For example:

```
hisilicon #setenv jpeg_addr 0x90000000
hisilicon #setenv jpeg_size 0xb85f9
hisilicon #setenv vobuf 0x94000000
```

Table 1-1 Chip differences

Chip	Device	Layer	Type	Sync
Hi3531	[0, 3]	[0, 3]	1 (CVBS), 2 (YPBPB), 4 (VGA), 8 (BT.656),16 (BT.1120), 32 (HDMI) Support multiple types, such as 52 (VGA|BT.1120|HDMI)	[0, 18]
Hi3521/Hi3520A	[0, 2]	[0, 2]	1 (CVBS), 4 (VGA), 8	[0, 18]

Chip	Device	Layer	Type	Sync
			(BT.656),16 (BT.1120), 32 (HDMI), 64 (LCD) Support multiple types such as 52 (VGA|BT.1120|HDMI)	
Hi3520D/Hi3515A /Hi3515C	[0, 2]	[0, 2]	1(CVBS),4(VGA), ,32(HDMI) support multi type eg: 52(VGA|HDMI)	[0, 21]

1.3 U-boot Functions

The following functions are provided for encoding under the U-boot:

- startvo

  ```
  int start_vo(unsigned int dev, unsigned int type, unsigned int sync);
  ```

  NOTE

  Only the devices with the device IDs listed in Table 1-1 are supported.

- stopvo

  ```
  int stop_vo(unsigned int dev);
  ```

- strartgx

  ```
  int start_gx(unsigned int layer, unsigned addr, unsigned int strd, unsigned int x, unsigned int y, unsigned int w, unsigned int h);
  ```

  Note:

  - strd can be obtained from the decoded JPEG picture. In addition, the picture stride (namely, linebytes) is displayed when the decjpg function is called.
  - The stride must be 16-byte aligned; otherwise, pictures cannot be displayed properly.
  - addr indicates the address of the decoded picture and can be obtained from the vobuf parameter.

- stopgx

  ```
  int stop_gx(unsigned int layer);
  ```

- setvobg

  ```
  int set_vobg(unsigned int dev, unsigned int rgb);
  ```

  Note:

  - Calling this function takes effect only before startvo is called. If you call this function after calling startvo, the calling operation takes effect when you call startvo again.
  - It is recommended to set the RGB format to 0xRRGGBB, which makes pictures more clear.

- decjpg

  ```
  int load_jpeg(void);
  int jpeg_decode(void);
  ```

Note:

- load_jpeg is used to load pictures from the flash or other storage spaces to the memory.
- jpeg_decode is used to decode pictures and store the decoded pictures in the memory.
- When load_jpeg and peg_decode are called, the following three parameters are required: jpeg_addr, jpeg_size, and vobuf. jpeg_addr indicates the memory address for storing source pictures; jpeg_size indicates the picture size (in bytes); vobuf indicates the address for storing decoded pictures, that is, the start display position of graphics layers.
- The decoding function can be customized. Ensure that the size, width, height of the modified picture are consistent with those of the source picture.

1.4 New Code or Modified Code

Only basic functions relevant to the startup screen are provided. You can configure the functions according to the actual conditions, especially for the decoding function.

```
Makefile
arch/arm/lib/cache-cp15.c
arch/arm/lib/mmu.s
include/hi35xx_vo.h;include/godarm_vo.h;include/godnet_vo.h
common/cmd_vo.c
common/cmd_dec.c
common/Makefile
product//hiosd/*
```

1.5 Samples of Command Lines

This section describes how to set VGA +DHMI 1080p@60 output for high-definition 0 (HD0) and CVBS PAL output for standard-definition (SD).

- Configure jpeg decoding parameters.

```
setenv jpeg_addr 0x90000000;
setenv jpeg_size 0xb85f9;
setenv vobuf 0x94000000;
saveenv
```

- Decode .jpeg pictures and store the decoded pictures to the memory.

```
decjpg
```

- Start the HD0 device.

```
startvo 0 36 10
```

- Start the SD device.

```
startvo 2 1 0
```

- Enable graphics layer 0.

```
startgx 0 0x94000000 3840 0 0 1920 1080
```

- Enable graphics layer 2.

```
startgx 2 0x94000000 3840 0 0 720 576
```

- Disable graphics layer 0.

  ```
  stopgx 0
  ```

- Disable graphics layer 2.

  ```
  stopgx 2
  ```

- Stop the HD0 device.

  ```
  stopvo 0
  ```

- Stop the SD device.

  ```
  stopvo 2
  ```