Display Service Overview

PlayStation®Vita Programmer Tool Runtime Library Release 3.50

Document serial number: 000004892117

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1 Library Overview

Overview

The display service is a service to perform PlayStation®Vita display output.

It provides VBLANK synchronization, setting of the address of the frame buffer to be output to the display, flip control of the display frame buffer synchronized to VBLANK, etc.

Files

The files required for using the display service are as follows.

Filename	Description
libSceDisplay_stub.a	Stub library file
display.h	Header file

2 Usage Procedure

Basic Usage Procedure

(1) Initialize the library

Since the display service runs as the default module, it does not need to be explicitly initialized.

An organic light-emitting diode display is used as the display device of the current Development Kit. Display resolution is 960 x 544.

(2) Set the frame buffer type

Use the `sceDisplaySetFrameBuf()` function to set the start address, horizontal pixel count, and display pixel format of the frame buffer to display. Allocate the frame buffer on the CDRAM and set the start address to an integer multiple of 256 bytes and horizontal pixel count to an integer multiple of 64.

Rendering resolutions can be set to either 480 x 272, 640 x 368, 720 x 408 or 960 x 544. For example, input as follows to set the rendering resolution to 960 x 544 and the horizontal pixel count of the frame buffer to 1024.

```
int res;
SceDisplayFrameBuf framebuf;

memset(&framebuf, 0x00, sizeof(SceDisplayFrameBuf));
framebuf.size            = sizeof(SceDisplayFrameBuf);
framebuf.pBaseAddress    = pFrameBufAddress;
framebuf.uiFrameBufPitch  = 1024;
framebuf.uiPixelFormat   = SCE_DISPLAY_PIXELFORMAT_A8B8G8R8;
framebuf.uiFrameBufWidth  = 960;
framebuf.uiFrameBufHeight = 544;
res = sceDisplaySetFrameBuf(&framebuf, SCE_DISPLAY_UPDATETIMING_NEXTVSYNC);
```

(3) Wait for VBLANK

Use the `sceDisplayWaitVblankStartCB()` function to synchronize processing with the VSYNC (vertical synchronization) interval. A number of peripheral device services run in multiple threads on the PlayStation®Vita, so you must not use polling to wait for the start of the VBLANK (vertical blanking) interval. The thread which calls the `sceDisplayWaitVblankStartCB()` function will enter a WAIT state until the start of the next vertical blanking interval, so execution rights can be passed to another thread.

```
// Main loop
while (1) {

        // Wait until the start of a VBLANK interval
        sceDisplayWaitVblankStartCB();

        // Controller input, calculation, drawing etc,.
}
```

(4) Schedule when to flip the display frame buffer

Use the `sceDisplaySetFrameBuf()` function to specify the start address of the frame buffer to display. The *`iUpdateTimingMode`* argument can be used to select whether to have the display address update performed immediately upon the next HSYNC (`SCE_DISPLAY_UPDATETIMING_NEXTHSYNC`), or to schedule the update for the next VBLANK interrupt (`SCE_DISPLAY_UPDATETIMING_NEXTVSYNC`).

However, if the frame buffer's horizontal pixel count or pixel format are modified, it will not be possible to perform the update immediately with `SCE_DISPLAY_UPDATETIMING_NEXTHSYNC`. In this case, make sure to specify `SCE_DISPLAY_UPDATETIMING_NEXTVSYNC` for *`iUpdateTimingMode`* so that the frame buffer switch will happen at the next VBLANK.

Non-Display Area During 640 x 368 Output Mode

Note that if the frame buffer resolution is set to 640 x 368, approximately up to the 362nd line will be displayed on the screen (touchscreen).

This is because the 640 x 368 resolution has a different aspect ratio from the native resolution of the screen (touchscreen), which is 960 x 544. (The pixel is a square pixel whose aspect ratio is 1:1, and thus, 960:544 equals to 640:362.6666...)

However, since the scaler for the screen (touchscreen) display uses the bilinear filter, the data in the 363rd line will be referenced. Also, with regard to the hardware, data access will be performed up to the 368th line, so the memory amount of 640 x 368 is required as the memory size of the frame buffer.

Display Output Mode

The Development Kit can output a 720p signal through the HDMI interface. In this case, the 960 x 544 display frame buffer is displayed dot-by-dot at the center of the screen or scaled to full screen. In the case of HDMI output, it is possible to visually recognize the area that is not displayed on the screen (touchscreen) with the above-described 640 x 368 resolution.

There is no time lag in VSYNC units between the video displayed on the screen (touchscreen) and the video output by the HDMI interface. However, delays may sometimes occur after entering the HDMI sink device.

Vertical sync frequency is 59.94005995Hz (theoretical value) both when outputting to the screen (touchscreen) and to the HDMI interface.