LSP 1.20 DaVinci Linux Video Sysfs

User's Guide

Literature Number: SPRUEL6
March 2008

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SPRUEL6–March 2008

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This guide introduces the DaVinci Linux Video Sysfs interface. For LSP 1.20, the Sysfs interface is supported on the following EVMs: DM644x, DM355.

1 Overview

In the DaVinci Video Driver, Sysfs driver attributes are used for configuring the *encoder* in the driver to work for a specific display. The *Encoder Manager* is shared by both the FBDev and V4L2 drivers. Encoders register with the manager and implement a set of API calls to configure the display hardware for a specific output and mode. In addition to this, they also provide control functions like enable/disable display, control brightness, hue, and contrast. Sysfs attributes are defined to allow you to control these operations from your applications.

The following are the Sysfs attributes defined in the DaVinci Video Driver for DM355 and DM6446:

- *Output*

  ```
  /sys/class/davinci_display/ch0/output
  ```

  You use this attribute to select a display output. Each of the encoder modules defines a set of outputs; applications can use this attribute to set the output to one of the supported outputs. At any time only one encoder is active in the driver. This encoder is selected when an output that is defined by the encoder is selected as the current output of the driver.

- *Mode*

  ```
  /sys/class/davinci_display/ch0/mode
  ```

  You use this attribute to select a display mode. Each of the encoder modules defines a set of modes; the application can use this attribute to set the mode to one of the supported modes. When an encoder is selected as the current encoder (selected based on the current output), application can set the current display mode to one of the supported modes of the current encoder.

- *Enable*

  ```
  /sys/class/davinci_display/ch0/enable
  ```

  You use this attribute to enable or disable the display. Write “on” to this file to enable the display and “off” to disable the display. Use the output names and mode names listed in next section for writing to output and mode attributes.

In addition the following Sysfs attributes are defined for fine tuning the system. You may have to fine tune these values for the end system being developed.

- *reg*

  ```
  /sys/class/davinci_system/system/reg
  ```

  You use this for fine tuning the PBBPR register in EMIF. This is a system level knob you can adjust if noise appears on the displayed image.

- *vpbe_osd_basepx*

  ```
  /sys/class/davinci_system/system/vpbe_osd_basepx
  ```

  You use this for adjusting the OSD BASEPX value. This would need to be adjusted if the video displayed is not properly aligned to the display area.

- *vpbe_osd_basepy*

  ```
  /sys/class/davinci_system/system/vpbe_osd_basepy
  ```

  You use this for adjusting the OSD BASEPY value. This would need to be adjusted if the video displayed is not properly aligned to the display area.

2 Supported Encoders

2.1 VPBE Encoder

This encoder is used for displaying Standard Definition (SD) video outputs and modes using built-in DAC and VENC in the VPBE. The following table lists the supported output and mode names that can be used for writing into the Sysfs attribute when using this encoder.

Table 1. VPBE Encoder: Supported Output and Mode Names

Output Names	Mode Names	Supported Platforms
COMPOSITE	NTSC, PAL	DM355 and DM6446
SVIDEO	NTSC, PAL	DM6446 only
COMPONENT	NTSC, PAL, 480P-60, 576P-50	DM6446 only

2.2 Logic PD Encoder

This encoder is used for displaying to a Logic PD LCD monitor. The following table lists the supported output and mode names that can be used for writing into the Sysfs attribute when using this encoder.

Table 2. Logic PD Encoder: Supported Output and Mode Names

Output Names	Mode Names	Supported Platforms
LCD	640 x 480 640 x 400 640 x 350	DM355 and DM6446

Note: The Enable attribute is not implemented for the Logic PD Encoder.

2.3 THS8200 Encoder

This encoder is used for displaying High Definition (HD) video outputs and modes using the THS8200 daughter card. The component output connector available on the THS8200 daughter card is used for this display. The following table lists the supported output and mode names that can be used for writing into the Sysfs attribute when using this encoder.

Table 3. THS8200 Encoder: Supported Output and Mode Names

Output names	Mode names	Supported platform/s
COMPONENT1	720P-60 1080I-30	DM355 and DM6446

3 Boot Arguments/Module Parameters for Encoder Manager

The desired output and mode selected by the Encoder Manager at initialization time can also be controlled using boot arguments. The following boot arguments are used for setting the default output and mode at boot up.

The Encoder Manager will start up using these defaults:

```
davinci_enc_mngr.ch0_output=<output name>
davinci_enc_mngr.ch0_mode=<mode_name>
```

If the Encoder Manager is built as a module, then the following applies:

```
>insmod davinci_enc_mngr.ko ch0_output=<output_name>
ch0_mode=<mode_name>
>rmmod davinci_enc_mngr.ko
```

where `output_name` and `mode_name` are given in Section 2.

4 Example Code

This section shows how to set/get Sysfs attributes from the console as well as from a C application.

4.1 From The Console

From the console, you can set an attribute using the echo command. For example to set output to LCD, type the following command:

```
>echo "LCD" >/sys/class/davinci_display/ch0/output
```

To display the current output, you can use the cat command as follows:

```
>cat /sys/class/davinci_display/ch0/output
```

To disable display from the console, you can enter the command

```
echo "off" >/sys/class/davinci_display/ch0/enable
```

To enable display from the console, you can enter the command

```
echo "on" >/sys/class/davinci_display/ch0/enable
```

To write a value into the PBBPR register in EMIF, you can enter the command

```
echo "20000020 30" >/sys/class/davinci_system/system/reg
```

To read a value from the PBBPR register you can enter the command

```
echo "20000020" >/sys/class/davinci_system/system/reg
```

To write a value into the OSD BASEPX and BASEPY registers you can do the following:

```
echo "120" >/sys/class/davinci_system/system/vpbe_osd_basepx
echo "120" >/sys/class/davinci_system/system/vpbe_osd_basepy
```

To read the above values you can do the following:

```
cat >/sys/class/davinci_system/system/vpbe_osd_basepx
cat >/sys/class/davinci_system/system/vpbe_osd_basepy
```

4.2 From a C Application

The following sample code shows how to set the output and mode of the driver from a C application.

```
int file_fd;
file_fd = open("/sys/class/davinci_display/ch0/output",O_RDWR);
if (file_fd < 0)
{
    perror("Error in opening /sys/class/davinci_display/ch0/output\n");
    exit(1);
}
    if (write(file_fd,"COMPOSITE",10) <= 0)
{
    perror("Error switching output to COMPOSITE\n");
    exit(1);
}
lseek(file_fd,0,SEEK_SET);

bzero(output_str,15);
if (read(file_fd,output_str,10) < 0 )
{
    perror("Error reading output\n");
    exit(1);}
printf("output : %s\n",output_str);
if (!strcmp(output_str,"COMPOSITE\n"))
{
    printf("Successfully changed output to %s\n",output_str);
}
else
{
    printf("Failed to switch output to Composite\n");
    exit(1);
}
if (close(file_fd) <0)
{
    perror("error closing \n");
    exit(1);
}
file_fd = open("/sys/class/davinci_display/ch0/mode",O_RDWR);
if (file_fd < 0)
{
    perror("Error in opening /sys/class/davinci_display/ch0/mode\n");
    exit(1);
}
if (write(file_fd,"NTSC",5) <= 0)
{
    perror("Error switching mode to NTSC\n");
    exit(1);
}
lseek(file_fd,0,SEEK_SET);

bzero(output_str,15);
if (read(file_fd,output_str,5) < 0 )
{
    perror("Error reading mode\n");
    exit(1);
}
printf("mode: %s\n",output_str);
if (!strcmp(output_str,"NTSC\n"))
    printf("Successfully changed mode to %s\n",output_str);
else
{
    printf("Failed to switch mode to NTSC\n");
    exit(1);
}
if (close(file_fd) <0)
{
    perror("error closing \n");
    exit(1);
}
```

IMPORTANT NOTICE

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Products		**Applications**	
Amplifiers	amplifier.ti.com	Audio	www.ti.com/audio
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Interface	interface.ti.com	Medical	www.ti.com/medical
Logic	logic.ti.com	Military	www.ti.com/military
Power Mgmt	power.ti.com	Optical Networking	www.ti.com/opticalnetwork
Microcontrollers	microcontroller.ti.com	Security	www.ti.com/security
RFID	www.ti-rfid.com	Telephony	www.ti.com/telephony
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