Compact Flash (CF) Support on DVEVM

Juan Gonzales

ABSTRACT
The TMS320DM6446 device has a rich set of peripherals; however, many of these peripherals are multiplexed with each other, and only one is available at a time.

Perhaps the best example of a multiplexing scenario found on the TMS320DM6446 device is the asynchronous external memory interface (EMIFA). The pins that make up this interface are multiplexed to service NAND flash, NOR flash, CF, hard disk drive (HDD), Multi-Media Card (MMC), Secure Digital (SD), and Smart Media peripherals. By default, the digital video evaluation module (DVEVM) software enables the HDD, but CF support may be enabled as well.

This application report outlines the necessary steps for enabling CF support on the DVEVM. The lessons learned in this process can be extended to other peripherals; however, this document focuses strictly on the case of enabling CF support.

Contents
1 Building Linux™ Kernel With CF Support ................................................................. 1
2 Mounting CF Partition ............................................................................................... 2
3 Reference .................................................................................................................... 4

List of Figures
1 Xconfig Application Showing How to Enable CF Support................................. 2
2 Tera Term Capture Showing u-boot Configuration for Loading Kernel via TFTP .... 3
3 Tera Term Capture Showing Mounted CF Card..................................................... 4

1 Building Linux™ Kernel With CF Support
This section assumes that you are familiar with the DVEVM Software Setup section from the DVEVM Getting Started Guide (SPRUE66) that is included in the DVEVM kit. It also uses the same directory structure defined in that document. The following steps demonstrate the process to build a Linux kernel with CF support.

1. Go to the directory where the Linux Support Package (LSP) is found, on the host Linux workstation.
   host $ cd /home/user/workdir/lsp/ti-davinci

2. Bring up the Linux kernel configuration utility.
   host $ make ARCH=arm CROSS_COMPILE=arm_vSt_le- xconfig

Linux is a trademark of Linux Torvalds in the U.S. and other countries.
3. Go to System type and features → TI DaVinci Implementations and check the DaVinci CF Card Support box (see Figure 1).

4. Save the settings and exit the xconfig application.

5. If not already logged in as user, log in as user prior to building Linux kernel in the next step (similar to the steps in the DVEVM Getting Started Guide).

   ```
   host $ su user
   ```

6. Perform a make clean.

   ```
   host $ make clean
   ```

7. Build the Linux kernel.

   ```
   host $ make ARCH=arm CROSS_COMPILE=arm_v5t_le- uImage
   ```

   You now have a Linux kernel with a CF driver support instead of ATA HDD support.

## 2 Mounting CF Partition

This section requires that you complete Section 1.

1. Log in as user on the host machine. Copy the Linux kernel image with CF support to the TFTP directory and change the permissions to the image file.

   ```
   host $ cp ~/workdir/lsp/ti_davinci/arch/arm/boot/uImage /tftpboot
   host $ chmod a+r /tftpboot/uImage
   ```

   **Figure 1. Xconfig Application Showing How to Enable CF Support**

   ![Xconfig Application Screenshot](image-url)
2. Configure the u-boot parameters such that the DVEVM uses the TFTP service to load the Linux kernel from the host machine and the NFS service to mount the file system from the host machine as shown in Figure 2. Note that all the remaining steps in this section take place on the terminal applications window instead of the host workstation. With the terminal application running, power on the DVEVM and press any key on your terminal window to stop the u-boot's autoboot sequence. At the u-boot prompt, type the following commands:

   Note: Replace 00:0E:99:02:51:F4 with the MAC address found on your DVEVM board and all instances of 192.168.1.103 with the IP address on your host workstation.

```
EVM # setenv ethaddr 00:0E:99:02:51:F4
EVM # setenv serverip 192.168.1.103
EVM # setenv ipaddr dhcp
EVM # setenv bootfile uImage
EVM # setenv bootcmd 'dhcp;bootm'
EVM # setenv bootargs 'console=ttyS0,115200n8 noinitrd rw ip=dhcp root=/dev/nfs
nfsroot=192.168.1.103:/home/user/workdir/filesys,nolock mem=120M'
EVM # saveenv
```

Figure 2. Tera Term Capture Showing u-boot Configuration for Loading Kernel via TFTP

3. Turn off the DVEVM and insert the CF card.
4. Turn on the DVEVM and log in as root on your terminal window. The DVEVM should be running the Linux kernel with CF support from the host workstation’s /tftpboot directory. To verify this, invoke the following command on the terminal application window and make sure this device is found, see Figure 3.

```
$ ls /dev/hda1
```

5. Create a mount directory for the CF.
6. Mount the directory.
7. You should now be able to see the contents of the CF card.

![Tera Term Capture Showing Mounted CF Card](image)

**Figure 3. Tera Term Capture Showing Mounted CF Card**

3. **Reference**
   - *DVEVM Getting Started Guide (SPRUE66)*
IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI’s terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their applications, and that they have independently determined the suitability of TI products for use in combination with other devices and applications in such applications, and that they have included adequate fail-safes and other protective measures. Buyers acknowledge and agree that they assume responsibility for and will indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or “enhanced plastic.” Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

<table>
<thead>
<tr>
<th>Products</th>
<th>Applications</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amplifiers</td>
<td>Audio</td>
<td><a href="http://www.ti.com/audio">www.ti.com/audio</a></td>
</tr>
<tr>
<td>Data Converters</td>
<td>Automotive</td>
<td><a href="http://www.ti.com/automotive">www.ti.com/automotive</a></td>
</tr>
<tr>
<td>DSP</td>
<td>Broadband</td>
<td><a href="http://www.ti.com/broadband">www.ti.com/broadband</a></td>
</tr>
<tr>
<td>Interface</td>
<td>Digital Control</td>
<td><a href="http://www.ti.com/digitalcontrol">www.ti.com/digitalcontrol</a></td>
</tr>
<tr>
<td>Logic</td>
<td>Military</td>
<td><a href="http://www.ti.com/military">www.ti.com/military</a></td>
</tr>
<tr>
<td>Power Mgmt</td>
<td>Optical Networking</td>
<td><a href="http://www.ti.com/opticalnetwork">www.ti.com/opticalnetwork</a></td>
</tr>
<tr>
<td>Microcontrollers</td>
<td>Security</td>
<td><a href="http://www.ti.com/security">www.ti.com/security</a></td>
</tr>
<tr>
<td>RFID</td>
<td>Telephony</td>
<td><a href="http://www.ti.com/telephony">www.ti.com/telephony</a></td>
</tr>
<tr>
<td>Low Power</td>
<td>Video &amp; Imaging</td>
<td><a href="http://www.ti.com/video">www.ti.com/video</a></td>
</tr>
<tr>
<td>Wireless</td>
<td></td>
<td><a href="http://www.ti.com/wireless">www.ti.com/wireless</a></td>
</tr>
</tbody>
</table>

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2007, Texas Instruments Incorporated