Migrating From TMS320DM6446 594 MHz to 810 MHz

Paul Yin

ABSTRACT

This application report is intended to provide an overview of changes necessary to upgrade a DM6446-based design from the 513 MHz or 594 MHz device to an 810 MHz device. The changes listed below are required by the 810 MHz device for proper operation; other system changes may be required to accommodate new speeds or capabilities in the system.

Contents

1 Board Hardware Changes ............................................................... 2
2 Software/Firmware Changes ............................................................ 3
3 References .................................................................................. 3

List of Tables

1 Minimum Required Changes ............................................................ 2
2 Other Potentially Required Changes .................................................. 3
3 Minimum Required Changes ............................................................ 3

Trademarks

All trademarks are the property of their respective owners.
1 Board Hardware Changes

Table 1 summarizes the minimum changes required for the 810 MHz operation. These changes are required in all systems, unless the current design already meets or exceeds the new requirement.

Table 1. Minimum Required Changes

<table>
<thead>
<tr>
<th>Component</th>
<th>Change To</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV&lt;sub&gt;DD&lt;/sub&gt; Power Supply</td>
<td>Need 1.3 V instead of 1.2 V. Furthermore, the core power will nearly double (former 1.5W applications will now be in the 2.5W range), so the power supply design needs to account for the additional current.</td>
<td>810 MHz operation will have higher CV&lt;sub&gt;DD&lt;/sub&gt; power demands than the 513 or 594 MHz parts. In systems where the power supply was barely adequate to supply 513 or 594 MHz parts, a larger power supply is required for 810 MHz operation. 810 MHz maximum power consumption is estimated at 2.5W. Until the final power data can be obtained, designers should allow a large capacity (&gt;2 A) for the CV&lt;sub&gt;DD&lt;/sub&gt; supply. Note that the VDAC requires a 1.2 V power supply; a level shifter might be required to convert the 1.3 V to 1.2 V if no additional power supply (1.2 V) is placed on the board when the CV&lt;sub&gt;DD&lt;/sub&gt; power supply is changed to 1.3 V.</td>
</tr>
</tbody>
</table>
Table 2 summarizes other changes that may be required in some systems. These changes are not required in all systems; therefore, they should be evaluated to determine if they are necessary for any given design.

**Table 2. Other Potentially Required Changes**

<table>
<thead>
<tr>
<th>Component</th>
<th>Change To</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat Sink</td>
<td>Larger capacity heat sink</td>
<td>Systems where the heat sink was barely adequate to cool a 594 MHz device will require a larger heat sink for 810 MHz operation. For more information, see TMS320DM644x Thermal Considerations (SPRAAE4).</td>
</tr>
</tbody>
</table>

**NOTE:** Video processing back end (VPBE) pixel clock for HDTV output has always been sourced externally for DM644x devices; therefore, no additional hardware modification is needed.

2 **Software/Firmware Changes**

Table 3 summarizes the minimum changes required for the 810 MHz operation. These changes are required in all systems, unless the current design already meets or exceeds the new requirement.

**Table 3. Minimum Required Changes**

<table>
<thead>
<tr>
<th>Component</th>
<th>Change To</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>UBL</td>
<td>Correct PLL1 and PLL2 multipliers</td>
<td>TI will supply a new UBL with the correct programming for the 810 MHz DSP and 189 MHz DDR, as well as keeping the VPBE digital-analog converter (DAC) system clock set at 54 MHz. Users of other frequencies need to change the phase-locked loop (PLL) multiply, divide, and DDR timing parameters as appropriate.</td>
</tr>
</tbody>
</table>

3 **References**

- TMS320DM644x Thermal Considerations (SPRAAE4)
IMPORTANT NOTICE FOR TI DESIGN INFORMATION AND RESOURCES

Texas Instruments Incorporated ("TI") technical, application or other design advice, services or information, including, but not limited to, reference designs and materials relating to evaluation modules, (collectively, "TI Resources") are intended to assist designers who are developing applications that incorporate TI products; by downloading, accessing or using any particular TI Resource in any way, you (individually or, if you are acting on behalf of a company, your company) agree to use it solely for this purpose and subject to the terms of this Notice.

TI's provision of TI Resources does not expand or otherwise alter TI's applicable published warranties or warranty disclaimers for TI products, and no additional obligations or liabilities arise from TI providing such TI Resources. TI reserves the right to make corrections, enhancements, improvements and other changes to its TI Resources.

You understand and agree that you remain responsible for using your independent analysis, evaluation and judgment in designing your applications and that you have full and exclusive responsibility to assure the safety of your applications and compliance of your applications (and of all TI products used in or for your applications) with all applicable regulations, laws and other applicable requirements. You represent that, with respect to your applications, you have all the necessary expertise to create and implement safeguards that (1) anticipate dangerous consequences of failures, (2) monitor failures and their consequences, and (3) lessen the likelihood of failures that might cause harm and take appropriate actions. You agree that prior to using or distributing any applications that include TI products, you will thoroughly test such applications and the functionality of such TI products as used in such applications. TI has not conducted any testing other than that specifically described in the published documentation for a particular TI Resource.

You are authorized to use, copy and modify any individual TI Resource only in connection with the development of applications that include the TI product(s) identified in such TI Resource. NO OTHER LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE TO ANY OTHER TI INTELLECTUAL PROPERTY RIGHT, AND NO LICENSE TO ANY TECHNOLOGY OR INTELLECTUAL PROPERTY RIGHT OF TI OR ANY THIRD PARTY IS GRANTED HEREIN, including but not limited to any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information regarding or referencing third-party products or services does not constitute a license to use such products or services, or a warranty or endorsement thereof. Use of TI Resources 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.

TI RESOURCES ARE PROVIDED “AS IS” AND WITH ALL FAULTS. TI DISCLAIMS ALL OTHER WARRANTIES OR REPRESENTATIONS, EXPRESS OR IMPLIED, REGARDING TI RESOURCES OR USE THEREOF, INCLUDING BUT NOT LIMITED TO ACCURACY OR COMPLETENESS, TITLE, ANY EPIDEMIC FAILURE WARRANTY AND ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT OF ANY THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

TI SHALL NOT BE LIABLE FOR AND SHALL NOT DEFEND OR INDEMNIFY YOU AGAINST ANY CLAIM, INCLUDING BUT NOT LIMITED TO ANY INFRINGEMENT CLAIM THAT RELATES TO OR IS BASED ON ANY COMBINATION OF PRODUCTS EVEN IF DESCRIBED IN TI RESOURCES OR OTHERWISE. IN NO EVENT SHALL TI BE LIABLE FOR ANY ACTUAL, DIRECT, SPECIAL, COLLATERAL, INDIRECT, PUNITIVE, INCIDENTAL, CONSEQUENTIAL OR EXEMPLARY DAMAGES IN CONNECTION WITH OR ARISING OUT OF TI RESOURCES OR USE THEREOF, AND REGARDLESS OF WHETHER TI HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

You agree to fully indemnify TI and its representatives against any damages, costs, losses, and/or liabilities arising out of your non-compliance with the terms and provisions of this Notice.

This Notice applies to TI Resources. Additional terms apply to the use and purchase of certain types of materials, TI products and services. These include: without limitation, TI's standard terms for semiconductor products (http://www.ti.com/sc/docs/stdterms.htm), evaluation modules, and samples (http://www.ti.com/sc/docs/sampters.htm).

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2018, Texas Instruments Incorporated