ABSTRACT

The video scaling example demonstrates the real time video rescaling on DM642 EVM. The input video frames are scaled in different sizes and displayed on a VGA monitor. Project collateral discussed in this application report can be downloaded from the following URL: http://www.ti.com/lit/zip/SPRAA57.

Contents

1 Software Architecture/Data Flow ...................................................................1
2 System Requirements/Configuration ............................................................ 2
3 Demonstration Code and Build Procedure ..................................................3

List of Figures

1 Software Architecture and Data Flow ...........................................................1
2 Example Location and Directory Structure ..................................................3

1 Software Architecture/Data Flow

DVD/camera -> acquire frame -> scaling -> color space conversion -> display frame.

1.1 Dataflow diagram for the demonstration

The data flow in the demonstration follows the following sequence:

- Stage 1: A frame is captured from the input source (DVD/camera).
- Stage 2: The acquired frame data which is in YUV4:2:2 is rescaled horizontally/vertically.
- Stage 3: The rescaled data which is in YUV4:2:2 format is converted to RGB565 format.
- Stage 4: The RGB565 data is send to the VGA monitor for display.

Figure 1. Software Architecture and Data Flow
1.2 **Framework flowchart**

The demonstration uses a single unified task to handle video capture, video rescaling, color space conversion, and video display.

Before coming to the BIOS task scheduler, the demonstration code performs initialization of various modules used in the system. These include:

**Board and processor initialization:**
- The system performs BIOS initialization and CSL initialization.
- The L2 cache mode is set to 128K cache.
- EMIF CE0 and EMIF CE1 space are enabled for caching.
- Sets the DMA priority queue low.
- DMA manager is initialized with allocated internal and external heap.

**Creation of capture and display channels:**
- An instance of capture channel is created and started.
- An instance of display channel is created and started.

After these initializations, the system enters the processing task.

- "FVID_exchange" provided by the driver acquires a frame from the NTSC input device. The acquired frame is in YUV4:2:2 format.
- Rescaling ratio is updated every four frames.
- Rescale the video frame.
- Convert the rescaled video frame from YUV4:2:2 format to RGB565 format.
- "FVID_exchange" provided by the driver displays a frame on the VGA monitor.

2 **System Requirements/Configuration**

2.1 **Software Requirements**
- Microsoft Window XP NT (SP6)/Microsoft Windows 2000 (SP1 and SP2)
- Code Composer Studio™ Integrated Development Environment (IDE) version 2.21 or greater

2.2 **Hardware Requirements**
- Pentium Machines with 450 MHz, 64 MB RAM (minimum)
- DM642 EVM
- Computer monitor for VGA display
- Camera/DVD for NTSC captures purpose
- XDS 510/560 emulator
3 Demonstration Code and Build Procedure

3.1 Directory Structure

This example is located at:

![Directory Structure Diagram]

Figure 2. Example Location and Directory Structure

3.2 Build Procedure

2. Open the "scaling" project (scaling.prj) in the examples\video\scaling folder.
3. Go to Project -> Build and rebuild the project.
4. Build the project and load the executable from the VGA_LOOPBACK directory "video_vga_loopback.out".
5. Press F5 to run.
IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES “AS IS” AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, or other requirements. These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI’s products are provided subject to TI’s Terms of Sale (www.ti.com/legal/termsofsale.html) or other applicable terms available either on ti.com or provided in conjunction with such TI products. TI’s provision of these resources does not expand or otherwise alter TI’s applicable warranties or warranty disclaimers for TI products.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2019, Texas Instruments Incorporated