TivaWare™ for C Series Release Notes

SW-TM4C-RLN-2.0

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Revision Information

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Table of Contents

Copyright **2**
Revision Information **2**
1 Release Notes for Version 2.0 (August 29, 2013) **5**
1.1 Summary 5
1.2 New Features in TivaWare Boot Loader 5
1.2.1 CRC checking option added to boot_loader 5
1.3 New Features in TivaWare Peripheral Driver Library 6
1.3.1 Software CRC module moved into DriverLib 6
1.3.2 Added support for the TM4C129 family 6
1.4 Bug Fixes in TivaWare Peripheral Driver Library 6
1.4.1 SysCtlClockGet() returns an incorrect value in some configurations. 6
1.4.2 Incorrect ASSERT in HibernateClockConfig() 6
1.5 New Features in TivaWare Graphics Library 6
1.5.1 Add On Screen Keyboard to Graphics Library 6
1.6 New Features in TivaWare Sensor Library 7
1.6.1 Added driver for the L3GD20H 7
1.6.2 Added driver for the LSM303DLHC 7
1.6.3 Added driver for the KXTI9 7
1.6.4 Added driver for the LSM303D 7
1.6.5 Added utility functions for working with quaternions. 7
1.6.6 Added driver for the TMP100 7
1.7 Bug Fixes in TivaWare Sensor Library 7
1.7.1 Fixed soft reset sequence for MPU6050/MPU9150 7
1.7.2 Added error resiliency to CompDCM 7
1.7.3 Corrected error handling in I2C driver 8
1.7.4 Corrected conversion factors for ST L3GD20H gyro 8
1.8 New Features in TivaWare Host Tools 8
1.8.1 Tool, binpack, added to embed CRC32 values inside application binaries 8
1.8.2 Added tools document 8
1.9 Bug Fixes in TivaWare Host Tools 8
1.9.1 Cell width error in ftrasterize corrected 8
1.9.2 Memory leak in lmusbdll fixed. 9
1.10 New Features in TivaWare USB Library 9
1.10.1 USB HID vendor-specific usage macros added 9
1.11 Bug Fixes in TivaWare USB Library 9
1.11.1 Report disconnect events in device mode 9
1.11.2 Bulk Only Mass Storage Reset Issue 9
1.11.3 USB Library Not Properly Resetting Data Toggle 9
1.11.4 USB_EVENT_UNKNOWN_CONNECTED Event Returning Incorrect Data 9
1.11.5 USB Library Incorrectly Clearing Endpoint status 10
1.11.6 USB library not releasing configuration descriptor on disconnect. 10
1.12 New Features in TivaWare Utility Library 10
1.12.1 Added utils document 10
1.13 New Features in DK-TM4C129X Firmware Package 10
1.13.1 Added DK-TM4C129X development kit 10
1.14 New Features in DK-TM4C123G Firmware Package 10
1.14.1 Added support for DK-TM4C123G 10
1.15 Bug Fixes in EK-TM4C123GXL Firmware Package 10
1.15.1 usb_dev_serial does not enumerate 10

1.16 New Features in TivaWare Firmware Development Package 11
1.16.1 Updated FatFS to version 0.09 11
2 Release Notes for Version 1.0 (April 11, 2013) 13
2.1 Summary 13
IMPORTANT NOTICE 14

1 Release Notes for Version 2.0 (August 29, 2013)

Summary 5
New Features for TivaWare Boot Loader 5
New Features for TivaWare Peripheral Driver Library 6
Bug Fixes for TivaWare Peripheral Driver Library 6
New Features for TivaWare Graphics Library 6
New Features for TivaWare Sensor Library 7
Bug Fixes for TivaWare Sensor Library 7
New Features for TivaWare Host Tools 8
Bug Fixes for TivaWare Host Tools 8
New Features for TivaWare USB Library 9
Bug Fixes for TivaWare USB Library 9
New Features for TivaWare Utility Library 10
New Features for DK-TM4C129X Firmware Package 10
New Features for DK-TM4C123G Firmware Package 10
Bug Fixes for EK-TM4C123GXL Firmware Package 10
New Features for TivaWare Firmware Development Package 11

1.1 Summary

This version of TivaWare for C Series adds support for the new TM4C129 series of devices (the Snowflake class) and the DK-TM4C129X development kit.

Tool Chains Used

- IAR EW-ARM 6.60.1
- Keil RV-MDK 4.72
- Mentor CodeBench 2011.07-52
- Texas Instruments CCS 5.40

1.2 New Features in TivaWare Boot Loader

1.2.1 CRC checking option added to boot_loader

A new feature has been added to the boot loader that allows an image's embedded CRC32 to be verified on each system reset. When CHECK_CRC is defined in bl_config.h, the boot loader only transfers control to a main application image if it can find a header structure above the application vector table and if the CRC32 value embedded in that header matches the value calculated for the image by the boot loader. Please refer to the Boot Loader Users' Guide for more details.

A new tool, binpack, has been added to the tools directory of the release that allows CRC32 values to be calculated and embedded into application images. This tool is described in greater detail in the tools user's guide.

1.3 New Features in TivaWare Peripheral Driver Library

1.3.1 Software CRC module moved into DriverLib

The software CRC module has been moved from the utils directory into the Peripheral Driver Library.

1.3.2 Added support for the TM4C129 family

Drivers have been added and updated to support the new TM4C129 family of microcontrollers. New drivers have been added for the EPI, Ethernet, LCD, and CCM modules.

1.4 Bug Fixes in TivaWare Peripheral Driver Library

1.4.1 SysCtlClockGet() returns an incorrect value in some configurations.

The SysCtlClockGet() function was not properly breaking out of the internal oscillator cases and returned the incorrect processor speed in some configurations. The two failing configurations occurred when SysCtlClockSet() is called with either the SYSCTL_RCC_OSCSRC_INT or SYSCTL_RCC_OSCSRC_INT4 parameter selected for the system clock.

1.4.2 Incorrect ASSERT in HibernateClockConfig()

The ASSERT in HibernateClockConfig was incorrectly causing a debug assert when valid values were passed in to the function. The values HIBERNATE_OSC_HIGHDRIVE and HIBERNATE_OSC_LOWDRIVE were also defined incorrectly and have been changed to match the correct hardware definitions.

1.5 New Features in TivaWare Graphics Library

1.5.1 Add On Screen Keyboard to Graphics Library

There is a new configurable on screen keyboard to the graphics library. The current keyboard supports only a US keyboard mapping, but is customizable to any number of keys in any size or mapping. This allows an application to define its own keyboard or simply use the standard keyboard provided with the graphics library. Details on using and customizing the keyboard are provided in the graphics library documentation.

1.6 New Features in TivaWare Sensor Library

1.6.1 Added driver for the L3GD20H

Added a driver for the ST L3GD20H gyroscope.

1.6.2 Added driver for the LSM303DLHC

Added a driver for the ST LSM303DLHC accelerometer/magnetometer.

1.6.3 Added driver for the KXTI9

Added a driver for the Kionix KXTI9 accelerometer.

1.6.4 Added driver for the LSM303D

Added a driver for the ST LSM303D accelerometer/magnetometer.

1.6.5 Added utility functions for working with quaternions.

Added functions for generating a quaternion from a set of Euler angles, calculating the inverse and magnitude of a quaternion, for multiplying two quaternions, and for finding the angle between two quaternions.

1.6.6 Added driver for the TMP100

Add a driver for the Texas Instruments TMP100 digital temperature sensor.

1.7 Bug Fixes in TivaWare Sensor Library

1.7.1 Fixed soft reset sequence for MPU6050/MPU9150

The soft reset sequence in the MPU6050 and MPU9150 drivers have been made more robust.

1.7.2 Added error resiliency to CompDCM

The update function for the complementary DCM algorithm now checks for NaN (not a number) values in the resulting matrix and replaces the entire matrix with the unity matrix in this case. While

the resulting attitude is momentarily incorrect, it recovers proper attitude estimation after a period of time. Previously, the NaN values would stick and the attitude estimation was forever invalid.

1.7.3 Corrected error handling in I2C driver

The error handling in the I2C driver has been adjusted to be more robust and better handle the various error conditions that can occur during an I2C transaction.

1.7.4 Corrected conversion factors for ST L3GD20H gyro

The conversion of raw angular velocity into radians per second was incorrect yielding angular velocities that were orders of magnitude too small. The effect of reporting incorrectly (small) rotations is a long settling time as the complimentary filter fusion algorithm corrects the device orientation with the accelerometer (assuming the gyro is weighted much heavier than the accelerometer).

1.8 New Features in TivaWare Host Tools

1.8.1 Tool, binpack, added to embed CRC32 values inside application binaries

A new utility, binpack, has been added to the tools directory of the TivaWare release. This tool can be used to embed CRC32 values into application images that are intended for use with CRC-enabled boot loaders.

1.8.2 Added tools document

A document has been added that describes the contents of the tools directory within TivaWare. Previously, this content had been provided in the individual board documents.

1.9 Bug Fixes in TivaWare Host Tools

1.9.1 Cell width error in ftrasterize corrected

The ftrasterize tool has been updated to fix a problem that could cause the font cell width to be reported as smaller than the widest character in the font. Because this change causes the reported dimensions of some fonts to change, a new switch, -x, has been added to revert to the old behavior. This new switch may be used by existing applications that rely upon the incorrectly reported sizes.

In addition, the -m option has been updated to allow monospaced fonts to be created in all supported output formats. Previously this option was limited to basic ASCII fonts created without the -r or -u switches.

1.9.2 Memory leak in lmusbdll fixed.

In previous versions of lmusbdll, calls to OpenDevice() or OpenDeviceByIndex() contained a memory leak which would occur if no compatible device was connected. This has been corrected.

1.10 New Features in TivaWare USB Library

1.10.1 USB HID vendor-specific usage macros added

Two new macros, UsageVendor() and UsagePageVendor(), have been added to usbdhid.h. These macros allow vendor-specific usages and usage pages to be easily included in a HID device's report descriptor.

1.11 Bug Fixes in TivaWare USB Library

1.11.1 Report disconnect events in device mode

Fixed an issue in the device mode code that prevented delivery of disconnect events.

1.11.2 Bulk Only Mass Storage Reset Issue

The USB library was not properly handling the USB Bulk Only Mass Storage Reset and causing mass storage devices to not enumerate. The USB library now responds to this and has added better support to stall unknown requests to non-zero endpoints.

1.11.3 USB Library Not Properly Resetting Data Toggle

The USB library was not properly resetting the data toggle when reassigning USB pipes to new devices. The library now always resets the data toggle when allocating a new USB data pipe.

1.11.4 USB_EVENT_UNKNOWN_CONNECTED Event Returning Incorrect Data

The USB library was returning incorrect data when the USB_EVENT_UNKNOWN_CONNECTED event occurred. The USB_EVENT_UNKNOWN_CONNECTED now returns instance data that can be used with other USB library APIs.

1.11.5 USB Library Incorrectly Clearing Endpoint status

The USB library was incorrectly clearing Host IN status bits when clearing Host OUT endpoint status. The library now properly masks off only the IN or OUT status bits depending on which type of request is being handled.

1.11.6 USB library not releasing configuration descriptor on disconnect.

The USB library is not releasing the configuration descriptor when a device is disconnected from the controller in host mode. This caused devices with larger configuration descriptors to not enumerate after devices with smaller configuration descriptors were already connected.

1.12 New Features in TivaWare Utility Library

1.12.1 Added utils document

An API document has been added that describes the contents of the utils directory within TivaWare. Previously, this content had been provided in the individual board documents.

1.13 New Features in DK-TM4C129X Firmware Package

1.13.1 Added DK-TM4C129X development kit

Board support and example applications have been added for the new DK-TM4C129X development board.

1.14 New Features in DK-TM4C123G Firmware Package

1.14.1 Added support for DK-TM4C123G

Support has been added for the DK-TM4C123G development kit.

1.15 Bug Fixes in EK-TM4C123GXL Firmware Package

1.15.1 usb_dev_serial does not enumerate

The usb_dev_serial example was not properly configuring the USB library to operate in device only mode. This caused the application to fail to enumerate when attached to a USB host controller.

1.16 New Features in TivaWare Firmware Development Package

1.16.1 Updated FatFS to version 0.09

FatFS in third_party/fatfs has been updated to version 0.09.

2 Release Notes for Version 1.0 (April 11, 2013)

Summary 13

2.1 Summary

This is the initial version of TivaWare for C Series.

Tool Chains Used

- IAR EW-ARM 6.40.1
- Keil RV-MDK 4.54
- Mentor CodeBench 2011.07-52
- Texas Instruments CCS 5.30

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