TivaWare™ for C Series Release Notes

Copyright

Copyright © 2009-2013 Texas Instruments Incorporated. All rights reserved. Tiva and TivaWare are trademarks of Texas Instruments Instruments. ARM and Thumb are registered trademarks and Cortex is a trademark of ARM Limited. Other names and brands may be claimed as the property of others.

⚠Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this document.

Texas Instruments
108 Wild Basin, Suite 350
Austin, TX 78746
www.ti.com/tiva-c

Revision Information

This is version 2.0.1.11577 of this document, last updated on October 08, 2013.

Table of Contents

1 Release Notes for Version 2.0.1.11577 (October 8, 2013)

1.1 New Features in TivaWare Boot Loader

1.1.1 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.

1.2 New Features in TivaWare Peripheral Driver Library

1.2.1 Software CRC module moved into DriverLib

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

1.2.2 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.

1.2.3 Added support for Tamper feature of Hibernate module

To support the Tamper feature on TM4C129 family, new APIs have been added to the hibernate driver.

1.3 Bug Fixes in TivaWare Peripheral Driver Library

1.3.1 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.

1.3.2 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.

1.4 New Features in TivaWare Graphics Library

1.4.1 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.

1.5   New Features in TivaWare Sensor Library

1.5.1   Added driver for the L3GD20H

Added a driver for the ST L3GD20H gyroscope.

1.5.2   Added driver for the LSM303DLHC

Added a driver for the ST LSM303DLHC accelerometer/magnetometer.

1.5.3   Added driver for the KXTI9

Added a driver for the Kionix KXTI9 accelerometer.

1.5.4   Added driver for the LSM303D

Added a driver for the ST LSM303D accelerometer/magnetometer.

1.5.5   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.

1.5.6   Added driver for the TMP100

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

1.6   Bug Fixes in TivaWare Sensor Library

1.6.1   Fixed soft reset sequence for MPU6050/MPU9150

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

1.6.2   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.

1.6.3 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.

1.6.4 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).

1.7 New Features in TivaWare Host Tools

1.7.1 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.

1.7.2 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.

1.8 Bug Fixes in TivaWare Host Tools

1.8.1 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.

1.8.2 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.

1.9 New Features in TivaWare USB Library

1.9.1 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.

1.10 Bug Fixes in TivaWare USB Library

1.10.1 Report disconnect events in device mode

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

1.10.2 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.

1.10.3 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.

1.10.4 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.

1.10.5   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.

1.10.6   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.

1.10.7   Registering Tick handlers allocating incorrectly

The InternalUSBRegisterTickHandler() was allocating all handlers when a request was made to allocate a single handler. This could have affected applications that used more than one device class.

1.10.8   Incorrect ASSERT() in uDMAUSBUnitSizeSet()

The ASSERTs in uDMAUSBUnitSizeSet() were incorrectly using define values for a DriverLib API and not the correct numerical values in the ASSERT. This affected any builds of the USB library with DEBUG defined.

1.11   New Features in TivaWare Utility Library

1.11.1   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.

1.11.2   Updated lwIP Wrapper Module to support FreeRTOS

The lwIP wrapper module is updated to support FreeRTOS. To use FreeRTOS, define NO_SYS to 0 and RTOS_FREERTOS to 1 in lwipopts.h project- specific file.

1.12   New Features in DK-TM4C129X Firmware Package

1.12.1   Added DK-TM4C129X development kit

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

1.13   Bug Fixes in DK-TM4C129X Firmware Package

1.13.1   Checksum offload enabled in lwIP examples applications

An error in the lwipopts.h configuration header used by the enet_lwip, enet_io and qs_weather example applications resulted in the lwIP TCP/IP stack using software to calculate all IP, UDP, TCP and ICMP packet checksums even though the hardware was also configured to calculate and insert these values. This resulted in a reduction in performance but, more seriously, caused all ICMP packets to be transmitted with 0 inserted as their checksum. As a result, attempts to "ping" boards running these example applications would fail.

Following this fix, all lwIP examples now perform checksum calculations only in hardware and ICMP packets are now correct.

1.13.2   DMA transactions are now stopped when udma_demo ends

In the previous version of udma_demo, DMA transactions continued even after the application indicated that it was finished. The example has now been updated to stop the transactions when the application ends.

1.13.3   Minor text clipping fixed in lang_demo

A minor widget sizing error caused the bottom line of German and Italian text in the lang_demo example to be clipped. This problem has now been fixed.

1.13.4   UART baud rate corrected

Various example applications in the previous build instructed the user to set the UART to 115000bps when, in fact, 115200bps is the correct value. These have been updated to show the expected rate.

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.

1.14.2 Graphics library example application added

A new example application, grlib_demo, has been added to the dk-tm4c123g release of TivaWare. This example illustrates the use of the low level graphics primitive functions in the TivaWare Graphics Library.

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)

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

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services per JESD46, latest issue, and to discontinue any product or service per JESD48, latest issue. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products (also referred to herein as "components") are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

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

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

TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI components or services are used. Information published by TI regarding third-party products or services does not constitute a license 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 significant portions 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. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

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

Buyer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of TI components in its applications, notwithstanding any applications-related information or support that may be provided by TI. Buyer represents and agrees that it has all the necessary expertise to create and implement safeguards which anticipate dangerous consequences of failures, monitor failures and their consequences, lessen the likelihood of failures that might cause harm and take appropriate remedial actions. Buyer will fully indemnify TI and its representatives against any damages arising out of the use of any TI components in safety-critical applications.

In some cases, TI components may be promoted specifically to facilitate safety-related applications. With such components, TI's goal is to help enable customers to design and create their own end-product solutions that meet applicable functional safety standards and requirements. Nonetheless, such components are subject to these terms.

No TI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed a special agreement specifically governing such use.

Only those TI components which TI has specifically designated as military grade or "enhanced plastic" are designed and intended for use in military/aerospace applications or environments. Buyer acknowledges and agrees that any military or aerospace use of TI components which have *not* been so designated is solely at the Buyer's risk, and that Buyer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.

Products		Applications	
Audio	www.ti.com/audio	Automotive and Transportation	www.ti.com/automotive
Amplifiers	amplifier.ti.com	Communications and Telecom	www.ti.com/communications
Data Converters	dataconverter.ti.com	Computers and Peripherals	www.ti.com/computers
DLP® Products	www.dlp.com	Consumer Electronics	www.ti.com/consumer-apps
DSP	dsp.ti.com	Energy and Lighting	www.ti.com/energy
Clocks and Timers	www.ti.com/clocks	Industrial	www.ti.com/industrial
Interface	interface.ti.com	Medical	www.ti.com/medical
Logic	logic.ti.com	Security	www.ti.com/security
Power Mgmt	power.ti.com	Space, Avionics and Defense	www.ti.com/space-avionics-defense
Microcontrollers	microcontroller.ti.com	Video and Imaging	www.ti.com/video
RFID	www.ti-rfid.com		
OMAP Applications Processors	www.ti.com/omap	**TI E2E Community**	e2e.ti.com
Wireless Connectivity	www.ti.com/wirelessconnectivity		