C2000Ware v3.04.00.00 Release Notes

Introduction

C2000Ware is a cohesive set of development tools for C2000 real-time controllers. It includes device-specific drivers, bit-fields, libraries (math, DSP, Control, Signal Generation), peripheral examples, utilities, hardware files, and documentation. Application specific software and hardware files are delivered through additional Software Development Kits (SDK).

Device Support

The following devices are supported with this release

- MCU's
  - F28002x
  - F2838x
  - F28004x
  - F28x7x
  - Prior to F28x7x
- Hardware Platforms
  - ControlCARDs and LaunchPAD's

What Is Supported

- Driverlib:
  - Driverlib for C28x and CM (F2838x) peripherals
  - Driverlib for prior devices similar to C2000ware V2.01.00.00
  - F28002x and F2838x - All content in EABI only
  - F28004x and F28x7x - All contents in both COFF and EABI. Recommendation is to use EABI for all new development.
- Bitfields :
  - Headers and examples for F2838x - All content in EABI only
  - F28004x and F28x7x - In COFF only
  - Bitfield support for prior devices similar to previous C2000ware release.
- EtherCAT:
  - F2838x CPU1/CM HAL EtherCAT Drivers
  - F2838x CPU1/CM Stack Configuration file for Beckhoff's Slave Stack Code Tool
  - F2838x CPU1/CM HAL test examples
  - F2838x CPU1/CM Slave Stack demo examples
- FPU DSP and FastRTS Library
  - Single Precision FPU DSP library consisting of various optimized FFT, filter, math and vector assembly routines
  - Double Precision FPU DSP library consisting of various optimized FFT, filter and vector assembly routines
  - Examples demonstrating the usage of single (F28002x/F2838x) and double precision (F2838x) FPU DSP assembly routines including those running with ADC
  - Single and double precision FastRTS libraries consisting of various optimized math routines
  - Examples demonstrating the usage of single (F28002x/F2838x) and double (F2838x) precision FastRTS math routines
  - RAM, FLASH and ROMTABLE configurations are supported for examples
  - F2837xD examples are also supported same as in the previous release without any modification.
- IQMath Library:
  - Examples on F2837x – COFF and EABI support
  - Examples on F28002x, F2838x - EABI support
- FASTINTDIV :
  - F28002x, F2838x examples to showcase the usage of fast division intrinsic
- Scale Factor Optimization (SFO) Library
  - Migrated to use driverlibs instead of bitfields
- Fixed Point DSP Library
- VCRC Library and examples
  - Added support for F2838x

- Digital Control Library (DCL)
  - Examples demonstrating library capabilities
  - Non-Linear PID support on F28002x
- AES Software Library
  - Publicly available software AES encryption and decryption APIs implemented for C28x core
- PMBus slave stack
  - F28004x, F2838x, F28002x: Master/slave example demonstrating PMBus v1.2 capability
- Flash API
- Tools and Utilities
  - CLB Tool for F28002x, F2838x, F28004x and F28x7x
  - DCSM security tool
- Software Diagnostic Library
  - Library and examples for F28004x and F28002x
  - Demonstrates software diagnostics and software tests of hardware diagnostics
- Bug fixes and enhancements

What Is Not Supported

- In general, features or drivers not mentioned as part of "What Is Supported" section are not supported in this release.
- Driverlib & bitfields:
  - Bitfield examples in EABI for F28x7x and F28004x.
- SGEN on F2838x

These features which are not supported currently are planned to be supported in upcoming quarterly releases.

New In This Release

- CLB Type 3 support for F2838x and F28002x
- DCSM Security tool updates
- F28002x Launchpad support
- MCAN driver and examples on C28x - F2838x
- Compiler migration for legacy device (F2802x/3x/6x, F2823x, F2833x) to v20.2.1.LTS
- Software Diagnostic Library (SDL) v2.01.00
- Flash API libraries in EABI format are added for F2837xD, F2837xS and F28004x devices
- New Examples
    - ERAD new examples - non-intrusive diagnostics on F28004x, F2838x and F28002x
    - FSI - PWM sync example on F28002x and F28004x
    - ACI motor control signal chain benchmark application on F2837xD and F28004x

Fixed In This Release

Key	Summary	severity
F2838x-169	Missing #ifdef CPU1 around Emif2Regs in f2838x_emif.c	S2-Major
F2838x-167	IPC Example - Incorrect syntax and flag	S3-Minor
F2838x-166	verifyXTAL function uses uint32_t param. Should be float instead	S2-Major
F28X7X-428	f2837xd dual core examples do not have Flash configuration	S2-Major
F28X7X-377	Comments for InitFlash() need to be modified as per latest TRM	S3-Minor
F28004X-167	Missing EALLOW in InitSysPll	S2-Major
F28002X-5	Update the LPM examples to use Flash_wakeFromLPM in wakeupISR	S2-Major
C2000WAREPKG-339	missing CLB trigger in DMA and CLA bitfield header file	S2-Major
C2000WAREPKG-334	Update isPLLValid function to use the correct DCC error value as per the updated formula	S2-Major

C2000WAREPKG-329	TIREX - Import of f2837xs projects fails in C2000Ware ver3.03.00	S2-Major
C2000WAREPKG-326	Missing INPUTXBAR enums in xbar.h for F2838x	S3-Minor
C2000WAREPKG-322	Missing check of X1CNT when switching to XTAL	S1-Critical
C2000WAREPKG-318	device_headers_nonBIOS_cpu1.cmd and device_headers_BIOS_cpu1.cmd is swapped	S2-Major
C2000DRIVERS-2444	SysCtl_setClock writes to invalid memory location for TMR2CLKCTL	S2-Major
C2000DRIVERS-2437	Expose INTOSC1/2 as DCC clock sources in f28004x	S2-Major
C2000DRIVERS-2426	DCC : update the examples to use the new formula for DCC error calculations	S2-Major
C2000DRIVERS-2408	Add DCC errata workaround in isPLLvalid function	S2-Major
C2000DRIVERS-2407	update NOPs needed after clearing PLLEN bit	S2-Major
C2000DRIVERS-2405	Defines for CMPSS8 missing in F2838x XBAR header file	S3-Minor
C2000DRIVERS-2404	CLA macros defined under __TMS320C28XX_CLA2__ which is not defined for f28x7x devices	S2-Major
C2000DRIVERS-2402	Initialize interrupts in IPC example	S3-Minor
C2000DRIVERS-2398	BOOT related registers are missing from Zone2 DCSM software	S2-Major
C2000DRIVERS-2396	F2838x Ethernet Receive FIFO Overflow not handled properly	S2-Major
C2000DRIVERS-2371	MCAN example doesnt work if bit rating feature enabled	S3-Minor
C2000DRIVERS-2369	ECAP_clearInterrupt and ECAP_forceInterrupt need not do read modify write to the register	S2-Major
C2000DRIVERS-2364	LWIP Webserver example does not work properly while operating in Standalone mode	S2-Major

C2000DRIVERS-2351	FSI driverlib initialization function update	S3-Minor
C2000DRIVERS-2346	Driverlib html documentation search yields broken links	S3-Minor
C2000DRIVERS-2048	Flash_wakeFromLPM missing from flash driver	S2-Major
C2000DRIVERS-1976	CAN_writeDataReg need not check for dataReg inside the loop	S2-Major
C2000DRIVERS-1722	Ethernet driver fails when fast+continuous clicks are registered on lwIP 2.1.2 webserver example	S3-Minor
C2000DL-282	Flash ECC test code should be run from RAM	S3-Minor

Known Issues And Limitations

There are few limitations and known issues associated with this release

Limitations

- Few examples cannot be exercised on ControlCard due to specific peripherals/pin outs not being available on that platform - CM-UART echoback, CM-DCAN, Ethernet Rev-MII . HIC
- A few of the ECC related driverlib APIs and the message, Rx FIFO and Error Counter Status APIs have not been validated on F2838x.
- CM – Ethernet Driver: Auxiliary Time Stamp, Pulse Per Second Output features has not been validated on the driver.
- Only compile check has been done on the Examples for legacy device (F2802x/3x/6x, F2823x, F2833x) migrated to v20.2.1.LTS using CCS v10.1
- F2838x ERAD examples are not validated with Flash build configuration because of the known issue DBGTRC-6023

Known Issues

Key	**Summary**	**severity**	**workaround**

VCUDSP-31	Build issues with VCU0 examples when using newer versions of compiler	S2-Major	None.
F2838x-159	FlashPumpSemaphoreRegs structure is missing from header file	S2-Major	The register is present in the IPC section. In case of bitfields, it is not possible to expose the same register in 2 different structs. It would cause linker errors. It is recommended to use the register from the IPC struct. Another workaround is to define FlashPumpSemaphoreRegs as a macro of Cpu1toCpu2IpcRegs in one of the common header files #define FlashPumpSemaphoreRegs Cpu1toCpu2IpcRegs So, any legacy code that refers to the register as FlashPumpSemaphoreRegs.PUMPREQUEST gets converted to Cpu1toCpu2IpcRegs.PUMPREQUEST.
IQMATH-31	Indexed library will result in build failure for some legacy device projects	S3-Minor	None
IQMATH-20	script to view wave forms of example (setupDebugEnv.js) not correct	S2-Major	view the Dlog variables using the graph on CCS and provide the start and end address of the variables to be plotted.

FPUDSP-75	rfft_adc_f32, rfft_alt_f32. rfft_alt_f32_windowed failures due to tolerance mismatch	S3-Minor	rfft_adc_f32, rfft_alt_f32 – examples will indicate fail = 1, pass = 513. 1 failure is due to phase being computed as 0 while we are looking for 6.28 (is same as phase 0). rfft_alt_f32_windowed - pass 334/fail 51 - the tolerance have to be made 0.012 to make the fail to pass.
FPUDSP-74	cfft_f32_windowed,irfft_f32, rfft_adc_f32_windowed,rfft_alt_f32_unaligned examples do not work	S3-Minor	cfft_f32_windowed - use the RAM_ROMTABLES configuration. irfft_f32 - use the RAM_EABI configuration. rfft_alt_f32_unaligned - use the RAM_EABI configuration.
FPUDSP-73	Benchmarks results in the User guide don't match with measured values	S2-Major	
FPDSP-45	FIR16 and FIR32 Flash configurations and FIR32_Alt example do not work	S3-Minor	Please use the RAM_EABI configuration for FIR16 and FIR32 examples.
FPDSP-43	Latest compiler tools will result in build failure for some legacy 2833x Fixed point DSP Projects	S3-Minor	None.

F28X7X-437	While loop after Erase command in F2837xD and F2807x Flash Kernels not present	S3-Minor	The following statement needs to be added in Shared_Erase.c for CPU1 and CPU2 after the erase command, and in Shared_Erase.c for the F2807x kernel after the erase command:
			
			while (Fapi_checkFsmForReady() != Fapi_Status_FsmReady)
			{
			}

F28X7X-400	flash_programming_dcsm example doesn't work for f2837xS	S3-Minor	Customers can refer to f2837xS flash_programming example for changes required.
F28002X-19	FSI: Issue in Flash configuration of driverlib example fsi_ex3_loopback_epwmtrigger	S2-Major	Optimization updated to level 0 for flash configuration
DBGTRC-6023	ERAD Support on F2838x, Debugger changes owner when debugging from Flash even when ERAD is not needed.	S3-Minor	
C2000WARE PKG-257	F280049C LaunchPad is not available as a filter in Resource Explorer	S2-Major	

C2000WARE PKG-237	indexed library leades to build issues for 28035 (2803x), 28069 (2806x), 28235 (2823x), 28335(2833x) projects	S3-Minor	C example 2803x – delete the index library IQmath.lib and rename the coff library IQmath_coff.lib as the IQmath.lib C example 2806x – delete the index library IQmath_fpu32.lib and rename the coff library IQmath_fpu32_coff.lib as the IQmath_fpu32.lib C example 2823x – delete the index library IQmath.lib and rename the coff library IQmath_coff.lib as the IQmath.lib C example 2833x – delete the index library IQmath_fpu32.lib and rename the coff library IQmath_fpu32_coff.lib as the IQmath_fpu32.lib C++ example 2803x - delete the index library IQmath.lib and rename the coff library IQmath_coff.lib as the IQmath.lib C++ example 2806x – build fails

C2000WARE PKG-198	TIREX: Build failure for 28035_IQsampleCpp	S3-Minor	C example 2802x – delete the index library IQmath.lib and rename the coff library IQmath_coff.lib as the IQmath.lib C example 2803x – delete the index library IQmath.lib and rename the coff library IQmath_coff.lib as the Iqmath.lib C example 2806x – delete the index library IQmath.lib and rename the coff library IQmath_coff.lib as the IQmath.lib Cpp example 2833x – delete the index library IQmath_fpu32.lib and rename the coff library IQmath_fpu32_coff as the IQmath_fpu32.lib
C2000DRIVERS-2445	CLA registers SOFTINTEN / SOFTINTFRC not defined for CLA type 1	S2-Major	
C2000DRIVERS-2435	F2823x - C2000WARE: Linking error	S2-Major	
C2000DRIVERS-2040	Reference interrupt handlers provided in driverlib can be in infinite loop	S2-Major	None. The interrupt handler to be updated to avoid this condition

Dependencies

This release has dependency on the following tools

- CCS v10.1
- TI C2000 Compiler v20.2.1.LTS
- TI ARM Compiler v20.2.1.LTS

References

1. Getting Started with C2000™ Software, get an overview of Software development and various Software releases available - C2000™ Software Guide
2. C28x Software development and optimization guide – C2000™ C28x optimization Guide
3. Adding SYSCONFIG support to C2000 Driverlib Projects - E2E FAQ
4. Control Law Accelerator Software development – C2000™ CLA Software Development Guide
5. C2000 EABI Migration
6. C28x Compiler v20.2.1 LTS User's Guide
7. C28x Assembler Tools v20.2.1 LTS User's Guide
8. ARM Compiler v20.2.1 LTS User's Guide
9. ARM Assembler Tools v20.2.1 LTS User's Guide
10. controlSUITE To C2000Ware Transition Guide
11. Programming TMS320x28xx and 28xxx Peripherals in C/C++

Technical Support

C2000 microcontroller e2e forum