C2000Ware v4.01.00.00 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
  - F28003x
  - F28002x
  - F2838x
  - F28004x
  - F28x7x
  - Prior to F28x7x
- Hardware Platforms
  - ControlCARDs and LaunchPad's

What Is Supported

- Driverlib:
  - Driverlib for F28003x, F28002x and F2838x - All content in EABI only
  - Driverlib for C28x and CM (F2838x) peripherals
  - F28004x and F28x7x - All contents in both COFF and EABI. Recommendation is to use EABI for all new development.
- SysConfig:
  - Support for Control Peripherals such as EPWM/HRPWM, HRCAP
  - Support for Board View (Launchpad and ControlCard)
  - Support for DMA, McBSP, SysCtl, CLA, PMBus, BGCRC, PGA, MEMCFG
- Bitfields:
  - Headers and examples for F28003x, F28002x and F2838x - All content in EABI only
  - F28004x and F28x7x - In COFF only
- EtherCAT:
  - F2838x CPU1/CM EtherCAT HAL drivers and test examples
  - F2838x CPU1/CM Stack Configuration file for Beckhoff's Slave Stack Code Tool
  - 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 and F28003x - EABI support
- FASTINTDIV:
  - F28003x, 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 F28003x
- Digital Control Library (DCL)
  - Examples demonstrating library capabilities
  - Non-Linear PID support on F28002x
- Crypto Software Library
  - Publicly available software AES encryption and decryption APIs implemented for C28x core
- PMBus slave stack
  - F28003x, F28004x, F2838x, F28002x: Master/slave example demonstrating PMBus v1.2 capability
  - PMBus over I2C support for F28003x, F28004x, F2838x, F28002x.
- Flash API
- Tools and Utilities
  - SysConfig support for C2000 analog and digital modules
  - CLB Tool for F28003x, F28002x, F2838x, F28004x and F28x7x
  - DCSM security tool
- Software Diagnostic Library
  - Library and examples for F28004x, F28002x, and F2838x
  - Demonstrates software diagnostics and software tests of hardware diagnostics
- Bug fixes and enhancements

Note: The minimum version of Code Composer Studio required is CCSv11 and compiler version is 21.6.0.LTS. Please refer to the Dependencies section for the download links.

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

- F28003x Launchpad support
- SYSCFG - Added support for following peripherals -
  - CMPSS
  - MEMCFG
  - CLA
  - PMBus
  - ePWM/HRPWM
  - HRCAP
- SYSCFG - Added board view support
- DCSM Tool for F28003x
- Provided APIs for configuring LFU registers on F28003x
- New examples
  - SD FATFS Library Example
    - Added FatFS update and exFAT support, SPI SD card demo
  - ADC example for open/short detect feature
  - DCC Continuous clock monitoring
- Flash API for F28003x updated with functional safety features

Fixed In This Release

Key	Summary	severity
C2000WAREPKG-405	Incorrect compiler version for CM F2838x project in C2000Ware v4.00.00.00	S3-Minor
C2000WAREPKG-368	DMACH6BurstConfig function parameter srcbstep should be int16 instead of Uint16	S2-Major
C2000DRIVERS-2646	EMIF: Add generic headers in emif.h	S3-Minor
C2000DRIVERS-2644	NVIC Interrupt_setPriority function does not set the bits correctly	S2-Major
C2000DRIVERS-2640	MISRA issues present in ASSERT and __error__ functions	S2-Major
C2000DRIVERS-2639	Need an IPC init function in F2838x driverlib	S3-Minor
C2000DRIVERS-2622	ADC defines in f28003x_adc_defines.h	S3-Minor

C2000DRIVERS-2614	LPM example fails in F2837x	S2-Major
C2000DRIVERS-2610	F28003x Flash kernels use Sector erase instead of Bank Erase	S3-Minor
C2000BROM-476	MCAN bootloader performance impact F28003x: The CPU runs at 20MHz from external crystal clock. There was not sufficient bandwidth available to process the packet before the next one is received causing overrun of the data.	S2-Major

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 v21.6.0.LTS using CCS v11.0

Known Issues

Key	**Summary**	**Workaround**	**severity**
VCUDSP-31	Build issues with VCU0 examples when using newer versions of compiler	None.	S2-Major

F2838x-159	FlashPumpSemaphoreRegs structure is missing from header file	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.	S2-Major
IQMATH-31	Indexed library will result in build failure for some legacy device projects	None	S3-Minor
IQMATH-20	script to view wave forms of example (setupDebugEnv.js) not correct	view the Dlog variables using the graph on CCS and provide the start and end address of the variables to be plotted.	S2-Major

FPUDSP-75	rfft_adc_f32, rfft_alt_f32. rfft_alt_f32_windowed failures due to tolerance mismatch	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 has to be made 0.012 to make the fail to pass.	S3-Minor
FPUDSP-74	cfft_f32_windowed, irfft_f32, rfft_adc_f32_windowed, rfft_alt_f32_unaligned examples do not work	cfft_f32_windowed - use the RAM_ROMTABLES configuration. irfft_f32 - use the RAM_EABI configuration. rfft_alt_f32_unaligned - use the RAM_EABI configuration.	S3-Minor
FPUDSP-73	Benchmarks results in the User guide don't match with measured values		S2-Major
FPDSP-46	Magnitude of FFT is being scaled compared to the input waveform amplitude		S2-Major
FPDSP-45	FIR16 and FIR32 Flash configurations and FIR32_Alt example do not work	Please use the RAM_EABI configuration for FIR16 and FIR32 examples.	S3-Minor
FPDSP-43	Latest compiler tools will result in build failure for some legacy 2833x Fixed point DSP Projects	None.	S3-Minor
F28X7X-441	SDFM_configComparator incorrect input in C2000Ware example 1		S3-Minor

F28X7X-400	flash_programming_dcsm example doesn't work for f2837xS	Customers can refer to f2837xS flash programming example for changes required.	S3-Minor
F28002X-19	FSI: Issue in Flash configuration of driverlib example fsi_ex3_loopback_epwmtrigger	Optimization updated to level 0 for flash configuration	S2-Major
C28XECAT-126	Potential WORD_ALIGN Bug for CM Examples		S3-Minor
C2000WAREPKG-257	F280049C LaunchPad is not available as a filter in Resource Explorer		S2-Major

C2000WAREPKG-237	indexed library leads to build issues for 28035 (2803x), 28069 (2806x), 28235 (2823x), 28335(2833x) projects	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	S3-Minor

C2000WAREPKG-198	TIREX: Build failure for 28035_IQsampleCpp	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	S3-Minor
C2000DRIVERS-2626	Update Temperature Sensor function to account for internal voltage reference		S3-Minor

C2000DRIVERS-2609	GEL Files with F2838x Flash Kernel Examples compatible with only CCS v10.1	Add the following line in the Program memory maps section of the CPU1 GEL file you are running the CPU1-CPU2 example: GEL_MapAddStr(0x0003A400,0, 0x400, "R|W|AS2",0); /* CPU1TOCPU2MSGRAM1 Message RAM (with PARITY) (2 KBytes) */ Add the following line in the Program Memory Maps section of the CPU1 GEL file if you are running the CPU1-CM example: GEL_MapAddStr(0x00039400,0, 0x400, "R|W|AS2",0); /* CPU1TOCMMSGRAM1 Message RAM (with PARITY) (2 KBytes) */	S3-Minor
C2000DRIVERS-2435	F2823x - C2000WARE: Linking error		S2-Major
C2000DRIVERS-2040	Reference interrupt handlers provided in driverlib can be in infinite loop	None. The interrupt handler to be updated to avoid this condition	S2-Major

Dependencies

This release has dependency on the following tools

- CCS v11
- TI C2000 Compiler v21.6.0.LTS
- TI ARM Compiler v20.2.5.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 v21.6.0 LTS User's Guide
7. C28x Assembler Tools v21.6.0 LTS User's Guide
8. ARM Compiler v20.2.5 LTS User's Guide
9. ARM Assembler Tools v20.2.5 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