

CC2650 Size Benchmark

November 7, 2017

A benchmark application was created for CC26xx to allow a quick relative comparison of sizes between different kernel and driverlib releases. This application includes a representative set of SYS/BIOS kernel modules and API calls as used in a typical BLE application. This includes the Power management module and its APIs. The application isn't intended to be functional – it includes several Power API calls for no purpose other than to have them linked into the application. Also, the absolute sizes shown aren't meant to be analyzed, but the relative differences from release to release are the focus of this benchmark.

The total Flash and RAM sizes for recent releases are listed in tables below, in reverse chronological order. In each case, the application is built to use the kernel in ROM, and uses the default tool optimizations of that release.

coresdk_cc13xx_cc26xx_3_40_00_06_eng (Build date: November 5, 2017)

bios_6_53_00_11

tidrivers_full_3_40_00_08_eng

driverlib_cc13xx_cc26xx_3_03_01_18037a

xdctools_3_50_03_33_core_eng

IAR tools version: 8.11.3.53

TI tools version: 16.9.6.LTS

GCC tools version: gcc-arm-none-eabi-6-2017-q1-update

	RCOSC Calibration	Flash	RAM
IAR	Disabled	13416	7401
	Enabled	14866	7401
TI	Disabled	14589	7397
	Enabled	16217	7397
GNU	Disabled	13992	8497
	Enabled	15816	8497

coresdk_cc13xx_cc26xx_3_30_00_07_eng (Build date: July 29, 2017)

bios_6_52_00_07_eng

tidrivers_full_3_30_00_10_eng

driverlib_cc13xx_cc26xx_3_01_03_17842

xdctools_3_50_02_20_core_eng

IAR tools version: 8.11.1.47

TI tools version: 16.9.3.LTS

GCC tools version: gcc-arm-none-eabi-6-2017-q1-update

	RCOSC Calibration	Flash	RAM
IAR	Disabled	13364	7401
	Enabled	14818	7401
TI	Disabled	14521	7397
	Enabled	16149	7397
GNU	Disabled	13999	8505
	Enabled	15825	8505

coresdk_cc13xx_cc26xx_3_20_00_13_eng (Build date: May 3, 2017)

bios_6_51_00_08_eng

tidrivers_full_3_20_00_13_eng

driverlib_cc13xx_cc26xx_3_01_00_17751

xdctools_3_50_02_18_core_eng

IAR tools version: 8.11.1.47

TI tools version: 16.9.3.LTS

GCC tools version: gcc-arm-none-eabi-6-2017-q1-update

	RCOSC Calibration	Flash	RAM
IAR	Disabled	13297	7401
	Enabled	14755	7401
TI	Disabled	14493	7397
	Enabled	16121	7397
GNU	Disabled	13874	8497
	Enabled	15700	8497

Changes in this release known to significantly affect size:

- Usage of Driver Porting Layer (DPL) to enable usage with other RTOS or no-RTOS
- New toolchain versions for IAR, TI, GNU
- GNU now using newlib-nano

coresdk_cc13xx_cc26xx_3_10_00_05_eng (Build date: February 5, 2017)

bios_6_50_00_05_eng

tidrivers_full_3_10_00_09_eng

driverlib_cc13xx_cc26xx_3_00_03_17619

xdctools_3_50_00_08_core_eng

IAR tools version: 7.80.1

TI tools version: 16.9.0

GCC tools version: gcc-arm-none-eabi-4_9-2015q3

	RCOSC Calibration	Flash	RAM
IAR	Disabled	13146	7391
	Enabled	14454	7391
TI	Disabled	14341	7385
	Enabled	15865	7385
GNU	Disabled	15456	9625
	Enabled	17196	9625

Changes in this release known to significantly affect size:

- Default system stack size is now 1024 bytes for each toolchain; was previously 2048 for TI and IAR, and 1024 for GNU
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coresdk_cc13xx_cc26xx_3_01_00_07_eng (Build date: October 22, 2016)

bios_6_46_02_44_eng

drivers_3_01_00_07_eng

ccware_cc13xx_cc26xx_1_00_00_17405

xdctools_3_32_01_22_core

IAR tools version: 7.60.1

TI tools version: 16.9.0

GCC tools version: gcc-arm-none-eabi-4_9-2015q3

	RCOSC Calibration	Flash	RAM
IAR	Disabled	13039	8375
	Enabled	14344	8375
TI	Disabled	14317	8369
	Enabled	15841	8369
GNU	Disabled	16040	9581
	Enabled	17788	9581

tirtos_2_20_00_01_eng (Build date: June 8, 2016)

bios_6_46_00_22_eng

drivers_2_20_00_03_eng

cc26xxware_2_24_02_17202

xdctools_3_32_00_06_core_eng

IAR tools version: 7.50

TI tools version: 5.2.5

	RCOSC Calibration	Flash	RAM
IAR	Disabled	13102	8375
	Enabled	14385	8375
TI	Disabled	14757	8407
	Enabled	16337	8407
GNU	Disabled	17764	9856
	Enabled	19484	9856

tirtos_2_16_01_12_eng (Build date: April 19, 2016)

bios_6_45_02_30_eng

drivers_2_16_01_12_eng

cc26xxware_2_23_02_16941

xdctools_3_32_00_06_core_eng

IAR tools version: 7.50

TI tools version: 5.2.5

	RCOSC Calibration	Flash	RAM
IAR	Disabled	12892	8395
	Enabled	14143	8395
TI	Disabled	14838	8443
	Enabled	16402	8443

tirtos_2_16_00_00_eng (Build date: January 25, 2016)

bios_6_45_01_23_eng

drivers_2_16_00_00_eng

cc26xxware_2_23_01_16606

xdctools_3_32_00_06_core_eng

IAR tools version: 7.50

TI tools version: 5.2.5

	RCOSC Calibration	Flash	RAM
IAR	Disabled	12914	8395
	Enabled	14161	8395
TI	Disabled	14798	8443
	Enabled	16354	8443

Changes in this release known to affect size:

- Driverlib size increases (chipinfo.o, osc.o, adi.o, setup.o)
 - Improvements for RCOSC calibration
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tirtos_2_15_00_12_eng (Build date: December 3, 2015)

bios_6_45_00_16_eng

drivers_2_15_00_21_eng

cc26xxware_2_23_00_16374

xdctools_3_32_00_01_core_eng

IAR tools version: 7.50

TI tools version: 5.2.2

	RCOSC Calibration	Flash	RAM
IAR	Disabled	12841	8395
	Enabled	13972	8395
TI	Disabled	14744	8443
	Enabled	16196	8443

Changes in this release known to affect size:

- Newer IAR tools

- Driverlib function HapiTrimDeviceShutdown() Flash increased by 102/100 bytes for IAR/TI

Note: With the move of the Power module from the kernel module to a TI-RTOS driver in TI-RTOS 2.15.00, the benchmark application is now being built as a full TI-RTOS application. The table immediately below shows the sizes for the new application.

tirtos_2_15_00_07_eng (Build date: November 11, 2015)

bios_6_45_00_11_eng

drivers_2_15_00_10_eng

cc26xxware_2_22_01_16290

xdctools_3_31_01_33

IAR tools version: 7.40.1a

TI tools version: 5.2.2

	RCOSC Calibration	Flash	RAM
IAR	Disabled	13028	8375
	Enabled	14075	8375
TI	Disabled	14644	8427
	Enabled	15968	8427

Changes in this release known to affect size:

- Driverlib libraries for TI are now built to optimize for size (as has been the case for IAR)

Note: The benchmark application was improved for the bios_6_42_03 release, with the following changes:

- The application now uses the aggressive Standby power policy, versus a single explicit call to Power_sleep()
- Calls to Power_shutdown(), Power_getTransitionState(), and Power_getXoscStartupTime() are now included
- The SysCallback System provider is now used, to eliminate debugger I/O support
- System stack sizes are now equalized (previously the system stack for IAR was 2K, versus 1K for TI)

The table immediately below shows the sizes for the new application and the new kernel and driverlib releases. The next table below that shows for comparison purposes the sizes using the new benchmark application, with the previous kernel and driverlib releases.

bios_6_42_03_32 (Build date: October 5, 2015)

xdctools_3_31_01_33

cc26xxware_2_22_00_16101

	RCOSC Calibration	Flash	RAM
IAR	Disabled	13024	8331
	Enabled	14082	8387
TI	Disabled	15052	8375
	Enabled	16252	8431

Changes in this release known to affect size:

- Use the LF clock source to determine the startup delays for enabling the LF clock qualifiers (SDOCM00119402)
- Driverlib enhancements, including new functions for clock loss event control, and adding temperature compensation for VDDR sleep trim.

bios_6_42_02_24 (Build date: August 4, 2015)

xdctools_3_31_01_33

cc26xxware_2_21_03_15980

	RCOSC Calibration	Flash	RAM
IAR	Disabled	12781	8331
	Enabled	13842	8387
TI	Disabled	14748	8375
	Enabled	15952	8431

Note: The following tables show earlier comparisons, using the earlier size benchmark application, with earlier kernel and driverlib releases.

bios_6_42_02_24 (Build date: August 4, 2015)

xdctools_3_31_01_33

cc26xxware_2_21_03_15980

	RCOSC Calibration	Flash	RAM
IAR	Disabled	13287	8123
	Enabled	14352	8179
TI	Disabled	17254	7667
	Enabled	18458	7723

Changes in this release known to affect size:

- No longer use Clock_stop() from ROM; use new enhanced function that can trigger immediate reschedule of next tick (SDOCM00117544)
- Support VIMS RAM as GPRAM (SDOCM00117547)

bios_6_42_01_15 (Build date: June 19, 2015)

xdctools_3_31_01_33

cc26xxware_2_21_02_15830

	RCOSC Calibration	Flash	RAM
IAR	Disabled	13267	8091
	Enabled	14341	8147
TI	Disabled	17170	7635
	Enabled	18374	7691

Changes in this release known to affect size:

- Reworked RCOSC calibration to reduce interrupt latency (SDOCM00115902)
 - Optimizations for cc26xx and cc13xx should favor size (SDOCM00116205)
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bios_6_42_00_07 (Build date: April 30, 2015)

xdctools_3_31_01_33

cc26xxware_2_21_01_15600

	RCOSC Calibration	Flash	RAM
IAR	Disabled	13520	8035
	Enabled	14418	8091
TI	Disabled	18098	7583
	Enabled	19474	7635

Changes in this release known to affect size:

- Removed PG1, PG2.0, and PG2.1 workarounds
- Removed backdoor recovery mechanism
- Eliminate all RSOSC calibration code when the feature is disabled

bios_6_41_02_41 (Build date: February 9, 2015)

xdctools_3_30_06_67

cc26xxware_2_20_06_14829

	RCOSC Calibration	Flash	RAM
IAR	Disabled	14173	8063
	Enabled	15201	8087
TI	Disabled	18310	7611
	Enabled	19386	7635