Hardware Migration From CC26x0 to CC26x2R

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ABSTRACT

This application report describes the required hardware changes when moving from the CC26x0 to the CC2642R or CC2652R SimpleLink™ wireless MCUs.

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1 Changes Between CC26x0 and CC26x2R

CC26x2R is the latest generation of ultra-low power wireless MCUs for 2.4 GHz operation from Texas Instruments. The CC2642R supports *Bluetooth*® low energy as well as proprietary RF while the CC2652R additionally supports 802.15.4 based protocols. Compared to the CC26x0 devices, the CC26x2R have more memory, 80 kB of RAM and 352 kB of flash; more capable processors, ARM Cortex M4F as well as updated Sensor Controller Engine, and updated peripherals.

From an external point of view, the CC26x2R is very similar to the CC26x0. In the 7x7 QFN package (RGZ), which is the only option for the CC26x2R, the devices are pin compatible and a PCB design made for the CC26x0 can be reused for the CC26x2R.

There are a few considerations that has to be made regarding external circuitry, these are discussed in the following sections. The CC26x2R LaunchPad design files should also be reviewed.

NOTE: The CC26x2R devices do not support External Regulator Mode (VDDS and VDDR tied together and supplied from 1.8 V). Hardware designs configured for this mode of operation cannot be migrated directly to CC26x2R.

NOTE: The CC26x2R devices do not support separate voltages on the VDDS pins. VDDS2 and VDDS3 must always be at the same potential as VDDS.

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2 Crystal

The CC26x2R devices require a 48 MHz crystal, whereas, the CC26x0 requires a 24 MHz crystal. This change makes it easier to source physically small crystals with specifications within the CC26xx requirements. 48 MHz crystals are available in all the most commonly used crystal packages, and while the CC26x2R reference designs are using 2016 size, 2520 and 3225 sizes are available from all the major crystal manufacturers.

As with the CC26x0, the load capacitance is handled internally on the IC with a user-adjustable load capacitance array, which ranges from 2 pF to 10 pF. No external capacitors are required.

When selecting a crystal for the CC26x2R, it is important to refer to the crystal requirements outlined in the *CC26x2R Data Manual* (SWRS207) and making sure the crystal fulfills these.

3 DCDC Regulator Components

The DCDC regulator components, the output inductor and capacitor values used with the CC26x2R are updated to 6.8 µH and 22 µF, respectively. This is done to reduce the current consumption even further. It is highly recommended to use the same components as in the CC26x2R reference designs, or components with similar parameters. This is to ensure optimum efficiency and low energy consumption.

4 Decoupling

The bulk decoupling capacitor on the CC26x2R is changed from 10 µF to 22 µF. This change is done due to the output capacitor of the DCDC regulator being increased.

5 Similarities Between the CC26x2R and the CC26xx

While the CC26x2R is very similar to CC26x0 from an RF perspective, there are several updates to the device (for example, clock frequencies), which typically triggers the need for new regulatory compliance certification.

RF certification of the customer's application and end equipment is the customer's responsibility. The customer is solely responsible for the design, validation, and testing of its applications as well as for compliance with all legal and regulatory requirements concerning its applications. Industry best practices generally require that the customer conducts qualification tests on actual applications taking into account possible environmental and other conditions that the customer's application may encounter. TI recommends consulting with a test house if in doubt on regulatory matters.

6 Summary

A PCB designed for the CC26x0 can be reused for the CC26x2R as the devices (in the 7x7 QFN package) are pin to pin compatible. Updates have been done on the CC26x2R, which require external components to be changed: the high frequency crystal, the DCDC regulator output inductor and capacitor and the bulk decoupling capacitor.

7 References

- Texas Instruments: *CC2642R Data Sheet*
- Texas Instruments: *CC2652R Data Manual*
- *CC26x2R LaunchPad Design Files*

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Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from A Revision (May 2019) to B Revision	Page
• Update was made in Section 1.	1

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