Stellaris® EM2 Expansion Board Supported Wireless Protocols

Reference Guide

DK-LM3S9B96-EM2-RG-00

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CHAPTER 1

Stellaris® Supported Wireless Protocols Overview

The *Stellaris® EM2 Expansion Board Supported Wireless Protocols Reference Guide* provides information for each of the wireless protocols supported by the EM2 expansion board (DK-LM3S9B96-EM2) from Texas Instruments. The EM2 expansion board is an optional expansion board which connects directly to the External Peripheral Interface (EPI) port of the Stellaris® LM3S9B96 development board to demonstrate the machine-to-machine (M2M), high-bandwidth, parallel interface capability of the Stellaris microcontroller. Right out of the box, users are able to control and display the EM2 expansion board's video on the DK-LM3S9B96 development board's large, 3.5" touchscreen display.

This document provides information the following wireless protocols that are compatible with the Stellaris® EM2 Expansion Board and Stellaris microcontrollers:

- "SimpliciTI™ Low Power RF Protocol" on page 6
- "13.56 MHz RFID Low Power RF Protocol" on page 7
- "Z-Stack ZigBee® Low Power RF Protocol Stack" on page 8

SimpliciTI™ Low Power RF Protocol

SimpliciTI is a simple, connection-based, peer-to-peer communication protocol intended to allow radio communication to be implemented quickly and inexpensively in an application using one of Texas Instruments' low power radio transceivers.

The protocol supports three types of devices:

- End devices
- Access points
- Range extenders

These devices allow users to implement direct peer-to-peer and star network topologies. Simple example applications are provided illustrating networks using each of these types of devices.

The Stellaris implementation of SimpliciTI 1.1.1 supports the following radio transceivers and frequency bands (see Table 1-1). The SimpliciTI protocol is also supported on TI's System-on-Chip (SoC) radio/MCU products which interoperate with the SimpliciTI software running on a Stellaris® LM3S9B96 Development Kit (DK-LM3S9B96) with the Stellaris® EM2 Expansion Board (DK-LM3S9B96-EM2) and compatible transceiver evaluation module.

Table 1-1. Supported Transceivers

Transceiver	Frequency Band
CC1101	433 MHz
CC1101	868 MHz
CC1101	915 MHz
CC2500	2.4 GHz (proprietary)
CC2520	2.4 GHz (802.15.4)

SimpliciTI is provided royalty-free in source code format.

References

In addition to this document, the following references are available for download at www.ti.com/stellaris:

- *Stellaris LM3S9B96 Microcontroller Data Sheet*
- *Stellaris LM3S9B96 Development Kit User's Manual*

The following web sites may also be useful:

- SimpliciTI RF protocol information — www.ti.com/simpliciti
- SimpliciTI-compliant protocol stack — http://focus.ti.com/docs/toolsw/folders/print/simpliciti.html

13.56 MHz RFID Low Power RF Protocol

The 13.56 MHz RFID is a protocol based on the ISO14443-A specification used to access ISO/IEC 14443A (MIFARE® 1K Classic) contactless smart cards. On the Stellaris® LM3S9B96 Development Kit (DK-LM3S9B96), the 13.56 MHz RFID protocol is used with the Texas Instruments' TRF7960 Multi-Standard Fully Integrated 13.56-MHz RFID AFE and Data Framing Reader System, which is available on the TRF7960 EM module.

The protocol supports reading and writing the ISO/IEC 14443A standard-formatted cards and can handle multiple cards being present in the RF field at that same time. The development kits that use the Stellaris® EM2 Expansion Board provide an example application that allows cards to be read and written from the application.

Although the 13.56 MHz RFID standard is provided in source code format, export controls are required due to the cryptographic portions of the 13.56 MHz RFID software.

References

In addition to this document, the following references are available for download at www.ti.com/stellaris:

- *Stellaris LM3S9B96 Microcontroller Data Sheet*
- *Stellaris LM3S9B96 Development Kit User's Manual*

Additional references are available at www.ti.com:

- *TRF7960EVM User's Guide*

The following web site may also be useful:

- MIFARE® protocol information — www.mifare.net

Z-Stack ZigBee® Low Power RF Protocol Stack

ZigBee is a wireless specification and protocol for low-power, low-cost, and low bit-rate applications. ZigBee supports self-organizing star and mesh network topologies with devices designated as coordinators, routers, and end devices. A network has one coordinator and multiple routers and end devices. ZigBee devices can also form an ad-hoc network of nodes.

Z-Stack™ is TI's ZigBee-compliant protocol stack for TI IEEE 802.15.4 radio products and platforms. Z-Stack™ is compliant with the ZigBee® 2007 (ZigBee and ZigBee PRO) specification, supporting both ZigBee and ZigBee PRO feature sets.

References

In addition to this document, the following references are available for download at www.ti.com/stellaris:

- *Stellaris LM3S9B96 Microcontroller Data Sheet*
- *Stellaris LM3S9B96 Development Kit User's Manual*

These documents are available on the DK-LM3S9B96-EM2 Documentation and Software CD:

- *Z-Stack Developer's Guide* (document number SWRA176)
- *Z-Stack Application Programming Interface* (document number SWRA195)
- *Simple API for Z-Stack* (document number SWRA196)

The following web sites may also be useful:

- ZigBee Alliance — www.zigbee.org
- ZigBee-Compliant Protocol Stack — www.ti.com/z-stack

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