EK-TM4C1294XL-BOOST-CC3000 Firmware Development Package

USER'S GUIDE

SW-EK-TM4C1294XL-BOOST-CC3000-UG-2.1.0.12573

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1 Introduction

The Texas Instruments® Tiva™ EK-TM4C1294XL-BOOST-CC3000 evaluation board (Tiva C Series TM4C1294 Connected LaunchPad) is a low cost platform that can be used for software development and prototyping a hardware design. A variety of BoosterPacks are available to quickly extend the LaunchPad's features.

The EK-TM4C1294XL-BOOST-CC3000 includes a Tiva ARM® Cortex™-M4-based microcontroller and the following features:

- Tiva™ TM4C1294NCPDT microcontroller
- Ethernet connector
- USB OTG connector
- 2 user buttons
- 4 User LEDs
- 2 booster pack connectors
- On-board In-Circuit Debug Interface (ICDI)
- Power supply option from USB ICDI connection, USB OTG connection or external power connection
- Shunt jumper for microcontroller current consumption measurement

This document describes the example applications that are provided for the EK-TM4C1294XL when paired with the BOOST-CC3000 BoosterPack.

2 Example Applications

The example applications show how to utilize features of the EK-TM4C1294XL development board. Examples are included to show how to use many of the general features of the Tiva microcontroller, as well as the feature that are unique to this development board.

A number of drivers are provided to make it easier to use the features of the EK-TM4C1294XL. These drivers also contain low-level code that make use of the TivaWare peripheral driver library and utilities.

There is an IAR workspace file (`ek-tm4c1294xl-boost-cc3000.eww`) that contains the peripheral driver library project, along with all of the board example projects, in a single, easy-to-use workspace for use with Embedded Workbench

There is a Keil multi-project workspace file (`ek-tm4c1294xl-boost-cc3000.mpw`) that contains the peripheral driver library project, along with all of the board example projects, in a single, easy-to-use workspace for use with uVision.

All of these examples reside in the `examples/boards/ek-tm4c1294xl-boost-cc3000` subdirectory of the firmware development package source distribution.

2.1 CC3000 Basic WiFi Example (cc3000_basic_wifi_application)

This is a basic WiFi application for the CC3000 BoosterPack. This application is a command line wrapper for various functions that the CC3000 can provide. Please refer to the CC3000 wiki at `http://processors.wiki.ti.com/index.php/CC3000` for more information on the commands provided.

To see available commands type “help” at the serial terminal prompt. The terminal is connected in 8-N-1 mode at 115200 baud.

This example defaults to using BoosterPack2. If you would like to use BoosterPack1 instead please change the define CC3000_USE_BOOSTERPACK2 in the project settings to CC3000_USE_BOOSTERPACK1 and rebuild.

To use this example you must first connect to an existing unencrypted wireless network. This can be done by using the “smartconfig” command with the associated smartphone application. Alternatively, the connection can be made manually by using the ’connect’ command. Once connected you can do any of the following.

Configure an IP address:

1. To use DHCP to allocate a dynamic IP address “ipconfig” or “ipconfig 0 0 0” or,
2. To allocate a static IP address use “ipconfig a.b.c.d” where “a.b.c.d” is the required, dotted-decimal format address.

Send and receive UDP data:

1. Open a UDP socket “socketopen UDP”.
2. Bind the socket to a local port “bind 8080”.
3. Send or receive data “senddata 192.168.1.101 8080 helloworld” or “receivedata”. In the senddata case, the provided parameters identify the IP address of the remote host and the remote port number to which the data is to be sent.

Send and receive TCP data:

1. Open a TCP socket “socketopen TCP”.
2. Bind the socket to a local port “bind 8080”.
3. Send a request to the remote server “senddata 192.168.1.101 8080 helloworld”. On the first “senddata” after opening the socket, the socket is connected to the specified remote host and port. On further “senddata” requests, the remote address and port are ignored and the existing connection is used.
4. Receive data from the remote server “receivedata”.

Note that, in the current implementation, the application only supports acting as a TCP client. The CC3000 also supports incoming connections as required to operate as a TCP server but this example does not yet include support for this feature.

Send mDNS advertisement:

1. “mdnsadvertise cc3000”

Close the open socket:

1. “socketclose”

Disconnect from network:

1. “disconnect”

Reset the CC3000:

1. “resetcc3000”

Delete connection policy:

This deletes the connection policy from CC3000 memory so that the device won’t auto connect whenever it is reset in future.

1. “deletepolicy”

2.2 CC3000 Firmware Patch Programmer (cc3000_patch_programmer)

This is the Patch Programmer tool for the CC3000 BoosterPack running on an EK-TM4C1294XL LaunchPad. Run the application to download new firmware and driver patches to the CC3000 processor. Status is output via UART0 which is available via the virtual COM port provided by the ICDI debug interface.

Two patches are downloaded using this tool with the patch data is linked directly into the application binary. The driver patch can be found in an array named “wlan_drv_patch” and the firmware patch can be found in “fw_patch”. When new patches are available, these arrays must be replaced with versions containing those new patches and then the application rebuilt and run to apply the patches to the CC3000 hardware.

To view output from the application, set your host system's serial terminal to use 115200bps, 8-N-1.

By default, the application is configured to expect the CC3000 BoosterPack to be connected to the BoosterPack 2 connector on EK-TM4C1294XL. It may, however, be rebuilt to support a CC3000 connected to the board's BoosterPack 1 connector by replacing the label "CC3000_USE_BOOSTERPACK2" in the build environment with "CC3000_USE_BOOSTERPACK1".

For information on the CC3000 software stack and API, please consult the wiki at `http://processors.wiki.ti.com/index.php/CC3000`.

2.3 CC3000 WiFi Access Point SSID Scanning Example (cc3000_ssid_scan)

This example requires a CC3000 WiFi BoosterPack attached to the BoosterPack 2 connector of the EK-TM4C1294XL LaunchPad. After booting and initializing the CC3000, the application initiates a WiFi scan for access points. When the scan completes, the SSID, BSSID and security protocol supported by each detected access point are output on the UART0 connection available over the virtual COM port connection provided by the board's ICDI debug interface.

To view output from the application, set your host system's serial terminal to use 115200bps, 8-N-1.

The application may be rebuilt to support a CC3000 connected to the board's BoosterPack 1 connector by replacing the label "CC3000_USE_BOOSTERPACK2" in the build environment with "CC3000_USE_BOOSTERPACK1".

For information on the CC3000 software stack and API, please consult the wiki at `http://processors.wiki.ti.com/index.php/CC3000`.

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