

Enable BDE-BW3301NP1 with AM243x

1. Description

This guide describes how to enable the BDE-BW3301NP1 module with TI's Sitara™ high performance MCU AM243x series. Below are the instructions for building and running the Wi-Fi example (named Network Terminal) from the CC33xx MCU package. The MCU package is a plugin which is based on content (such as TI drivers for peripherals, LWIP network stack, FreeRTOS OS adaptation) available in the base SDK (MCU-PLUS-AM243X-SDK).

2. Get Ready

2.1. Software and Tools

- [MCU-PLUS-AM243X-SDK](#) (version 08.00.00.21)
- CC33XX-MCU-Package (Need to gain access from BDE)
- [CCS 10.3 and up](#)
- [TI_Clang 1.3.0 LTS](#)
- [Python](#) 3.7 (see instructions in [Sitara™ LP Manual](#))

2.2. Hardware

- [BDE-BW3301NP1](#) module
- BDE-EVM-3301NP1
- [LP-AM243](#)

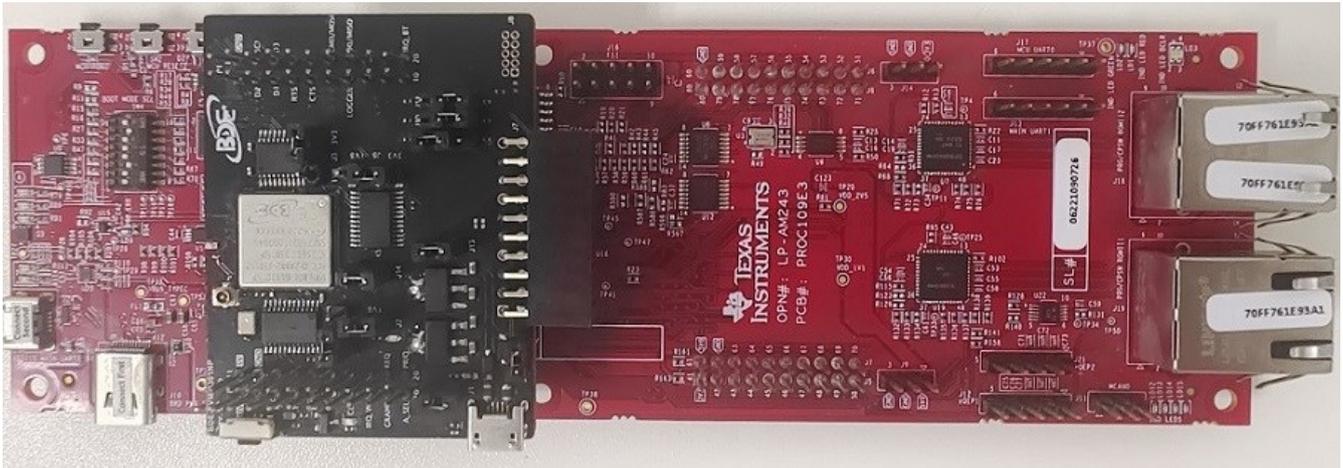
3. MCU-Package Folder Structure

- **docs/** - User guides and API references
- **examples/** - Example applications
 - CC3xx_thick_mac_network_terminal
- **source/** - Drivers and libraries source code and pre-built images
 - cc33xx driver is under source/ti/drivers/net/wifi_host_driver
 - Bluetopia BLE stack is under source/ti/bluetopia
- **tools/** -
 - programing - flash programming (Python) scripts
 - cc33xx_firmware

4. Setup - Sitara™ AM243x and BDE-EVM-3301NP1

For Information on the Sitara™ LaunchPad please refer to [LP-AM243_EVM-SETUP](#).

Plug the BDE-EVM-3301NP1 to the Sitara™ LaunchPad LP-AM243. When connecting the boards please remember to check the alignment of the 5V and GND pins of both boards to ensure right connection.



The table below shows the connections being made between the AM243x Launchpad and the BDE-EVM-3301NP1:

LP-AM243 Pin	BDE-EVM-3301NP1	Description
21	P2.11	5V
22	P2.12	GND
3	P2.3	LP-AM243:RX / BDE-EVM-3301NP1: TX
4	P2.4	LP-AM243:TX / BDE-EVM-3301NP1: RX
5	P2.5	nRESET
7	P2.7	SPI CLK
8	P2.8	WLAN IRQ
14	P1.17	SPI MISO
15	P1.16	SPI MOSI
18	P1.13	SPI CS
36	P1.5	BDE-EVM3301NP: CTS
37	P1.4	BDE-EVM3301NP: RTS

Power Connections:

- Connect the LP-AM243 to its power supply and to the PC.
- When Disconnecting/Connecting the LP-AM243, always make sure you do it in the following sequence:

PLUG IN	Connect Power (USB-C), then Connect Data (micro USB)
PLUG OUT	Disconnect Data (Micro USB), then Disconnect Power (USB-C)

5. Import projects and compile in CCS

- Go to **File->Import**
- Choose **C/C++ -> CCS Projects**
- Browse... -> **<CC33xx_MCU_package>/**
- Choose both - **wifi_driver** and **CC3xx_thick_mac_network_terminal**
- First compile the **wifi_driver** project, then compile the **network_terminal** application

6. Program the Flash

Before running the example, the RAM bootloader, CC33xx Firmware and Static Calibration data file need to be programmed to the flash on the AM243. The content of the 3 files can be found under **<CC33xx_MCU_package>/tools/cc33xx_firmware/**.

1. The image is loaded and executed from the AM243x MSRAM. To save RAM space the binaries are stored in the flash and read during the FW init.
2. The binaries should be programmed to a pre-defined offsets in the flash, as shown below:

Binary Name	Description	Location	Offset
<app-name>.appimage	Application Image(see 3)	under app project output folder	0x00080000
cc33xx_fw.bin	CC33XX Firmware	under tools/cc33xx_firmware/	0x00800000
cc33xx_2nd_loader.bin	RAM Bootloader	under tools/cc33xx_firmware/	0x00900000
Static_calibration.bin	Static Calibration info (see 5)	under tools/cc33xx_firmware/	0x00a00000

3. The application image are executed from flash (see run from flash).
4. After a successful compilation of the application, the binary image (.appimage file, e.g. cc3xxx_network_terminal.appimage) can be found in the Release/ (or Debug/) folder inside the project.
5. The Static Calibration is a temporary patch. It should be used until the run-time calibrations be functional.

7. Programming Instructions

1. Configure the LaunchPad to UART boot according to [AM243x UART Boot Mode](#).



2. Browse to `<CC33xx_MCU_package>/tools/programming` in a command line.
3. Set up the programmer's configuration file (if needed, see below)

In the `tools/programming/`, there is a pre-configured file:

`program_application_and_wifi_fw.cfg` - contains both the Firmware binaries and the application image.

The configuration files will just work when the programming script is executed from the `tools/programming/` folder (see step 4).

All the paths are based on default locations of the files inside the SDK folder structure. When changing any of the default configuration (e.g. using an application other than the reference one or trying to use a special firmware binary that was not part of the SDK), you may need to manually edit the `program_application_and_wifi_fw.cfg` file and update the file path.

4. Run the `uart_uniflash.py` python script:

➤ In Windows:

```
- > python uart_uniflash.py -p COM[XDS uart number] --cfg=<config-file-edited-in-step-3>.cfg
```

➤ In Linux:

```
- $ python3 uart_uniflash.py -p /dev/ttyACM[XDS uart number] --cfg=<config-file-edited-in-step-3>.cfg
```

➤ example:

```
- >python uart_uniflash.py -p COM28 --cfg=program_application_and_wifi_fw.cfg
```

Below is a screenshot of a successful execution:

```
C:\ti\cc33xx_mcu_package_R1_2\tools\programming>python uart_uniflash.py -p COM28 --cfg=program_application_and_wifi_fw.cfg
Parsing config file ...
Parsing config file ... SUCCESS. Found 7 command(s) !!!

Executing command 1 of 7 ...
Found flash writer ... sending ./sbl_uart_uniflash.debug.tiimage
Sent flashwriter ./sbl_uart_uniflash.debug.tiimage of size 361212 bytes in 35.05s.

Executing command 2 of 7 ...
Command arguments : --operation=flash-phy-tuning-data
Sent flash-phy-tuning-data command of size 32 bytes in 2.69s.
[STATUS] SUCCESS !!!

Executing command 3 of 7 ...
Command arguments : --file=./sbl_ospi.debug.tiimage --operation=flash --flash-offset=0x0
Sent ./sbl_ospi.debug.tiimage of size 365052 bytes in 35.75s.
[STATUS] SUCCESS !!!

Executing command 4 of 7 ...
Command arguments : --file=../../examples/CC3xx_thick_mac_network_terminal/Release/cc3xxx_network_terminal.appimage --operation=flash --flash-offset=0x80000
Sent ../../examples/CC3xx_thick_mac_network_terminal/Release/cc3xxx_network_terminal.appimage of size 495596 bytes in 47.5s.
[STATUS] SUCCESS !!!

Executing command 5 of 7 ...
Command arguments : --file=./cc33xx_firmware/cc33xx_fw.bin --operation=flash --flash-offset=0x800000
Sent ./cc33xx_firmware/cc33xx_fw.bin of size 437204 bytes in 42.24s.
[STATUS] SUCCESS !!!

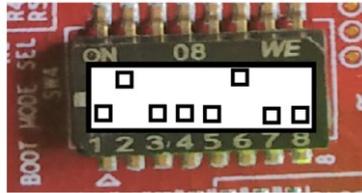
Executing command 6 of 7 ...
Command arguments : --file=./cc33xx_firmware/cc33xx_2nd_loader.bin --operation=flash --flash-offset=0x900000
Sent ./cc33xx_firmware/cc33xx_2nd_loader.bin of size 68276 bytes in 9.14s.
[STATUS] SUCCESS !!!

Executing command 7 of 7 ...
Command arguments : --file=./cc33xx_firmware/static_calibration.bin --operation=flash --flash-offset=0xa00000
Sent ./cc33xx_firmware/static_calibration.bin of size 36598 bytes in 6.29s.
[STATUS] SUCCESS !!!

All commands from config file are executed !!!
```

8. Run the example from flash

When loading the code from flash (make sure to follow step 4 in the Programming instructions), configure the LP for [AM243x QSPI Boot Mode](#).



1. Open a serial terminal.
2. Pressing the reset button on the LaunchPad, this will trigger the application.

The following menu should appear on the terminal.

```
Starting OSPI Bootloader ...

DMSC Firmware Version 21.5.0--v2021.05 (Terrific Llam)
DMSC Firmware revision 0x15
DMSC ABI revision 3.1

INFO: Bootloader_loadSelfCpu:199: CPU r5f0-0 is initialized to 800000000 Hz !!!
INFO: Bootloader_loadSelfCpu:199: CPU r5f0-1 is initialized to 800000000 Hz !!!
INFO: Bootloader_runCpu:147: CPU m4f0-0 is initialized to 400000000 Hz !!!
INFO: Bootloader_runCpu:147: CPU r5f1-0 is initialized to 800000000 Hz !!!
INFO: Bootloader_runCpu:147: CPU r5f1-1 is initialized to 800000000 Hz !!!
INFO: Bootloader_runSelfCpu:216: All done, resetting self ...

Starting FW download....
*****
*****      Osprey Network Terminal      *****
*****      Version 1.0.1.7              *****
*****
=====
Available commands:

help          clear          wlan_ap_role_up   wlan_ap_role_down
wlan_sta_role_up  wlan_sta_role_down wlan_connect       wlan_disconnect
wlan_scan      wlan_get_mac    wlan_set_mac      wlan_get_ps
wlan_set_ps    wlan_start      wlan_stop         send
recv          socket_show     kill

=====

user: █
```

- Type **help** to show this help menu.
- Type the name of a command to show the required parameters.
- The role (AP or station) should be started before any other command, e.g. with **wlan_sta_role_up** or **wlan_ap_role_up** (only one role can be up at a single time).
- Starting an access-point will enable mobile devices to connect to the module.
- Starting a station role will enable commands such as **scan** and **wlan_connect**.
- Once connected to an access point, you can use **send** and **receive**.

By now, you should have successfully enabled the module on AM243x.

9. Revision History

Revision	Date	Description
V0.1	25-July-2023	Preliminary version, draft

You can find the latest documentations with this [Link](#).

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