For STELLARIS

In association with TEXAS INSTRUMENTS

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ZigBee Member

Prepare to take off with AIR

Check out the other available *BoosterPack* kits, available at
http://www.anaren.com/air-boosterpack

IMPORTANT NOTE: The *BoosterPack* is designed to comply with regulations in the following regions:

US *(default)*: USA FCC / Canada IC EU: Europe ETSI

If the intended location of use is not within these regions, you must **first** check with local regulatory agencies to determine if any permissions / license / etc. are required prior to operation.

See *Disclaimers and Regulatory Information* included with the kit for more information.

Caution! The AIR-BoosterPack contains ESD sensitive components. Precautions should be used when handling the device in order to prevent permanent damage.

TEXAS INSTRUMENTS
Design Network

67150-0004

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http://www.anaren.com/air

CC2530 *BoosterPack* Quick Start Guide (Stellaris®)

The Anaren Integrated Radio *(AIR) BoosterPack* kit is designed to provide instant wireless connectivity for the TI *LaunchPad* Development Tool. Just follow the simple instructions below and you'll be 'on the *AIR*' in minutes.

This kit contains:

BoosterPack with MCU (3)

Software CD

You will also need:

Computer *(terminal emulation)*

LaunchPad (3)

You may also want:

Laptop
Soldering iron
Solder
IC puller
USB battery

Tools / supplies

Layout & Function: See User's Manual for full description of all features

A AIR radio module
B Control switches
C "LaunchPad" switches & LEDs
D Sensors
(IR temperature, RGB light)
E EEPROM
F Tri-color LED
G Current sensor
(module or full-board)
H MCU (*removed for Stellaris use*)
I I^2C and SPI external connection
J AIR module LEDs (2)

Network Overview: The *AIR BoosterPack* kit includes three *BoosterPacks*, each of which can be configured to one of the three basic roles of a mesh network:

Coordinator (C): A node that assigns the network ID to other nodes, and routes data to/from nodes on the network; for proper operation there must be one, and ***only one***, Coordinator on the network

Router (R): Like the Coordinator, but does NOT assign network IDs

End Point (E): Sends information to/ from a Coordinator or Router, capable of sleep mode

Typical

Two End Points

Additional nodes added to network

Individual *BoosterPacks* are assigned their role on the network by the firmware flashed on the *LaunchPad* MCU. Their role may be changed (or returned to default) by loading the desired image from the CD. *BoosterPacks* may also be added to the network from additional kits. See User's Manual for more information.

Continue on to get your kit running…

Example Code Overview: The *AIR BoosterPack* kit includes dozens of useful pre-developed code examples, for quick development and implementation. Think of the code examples as building blocks - snapping functionality together to achieve a desired performance. Simply determine the desired functionality, browse through the code examples, select the applicable building blocks, snap them together, flash the compiled code to the *BoosterPacks* via USB connection, and start the network.

Some building block examples:

Network: (Get module version, Get MAC address, Read radio GPIO, RF tester, Range test, Packet error rate test)

Sensors & Indicators: (Read button push, Blink LED, Read light sensor, Read IR temp sensor)

Other Functions: (Send text to USB port, Read/write non-volatile memory)

Startup Application Overview: To help familiarize users with the *AIR BoosterPack* kit, pre-compiled startup applications are included based on the code example building blocks. A simple network is set up to read *BoosterPack* sensor values, and display the results on a PC connected via USB cable. In this example, the *BoosterPacks* function as follows:

Coordinator (C):
- Sends text data packets received from the Router and/or End Point module(s) to a terminal emulation program
- Shows Router or End Point sensor status on RGB LED
  - Router temperature sensor: Shows color ranging from blue='cold' to red='hot'
  - End Point color sensor: Shows color representing light incident on the sensor
- Blinks LED D1 when communicating with the Router or End Point

Router (R):
- Sends IR temperature sensor data over the RF network to the Coordinator, and to local USB port for display on a terminal emulation program
- Displays link status on the green segment of the RGB LED
- Displays communication with the Coordinator or End Point by blinking the blue segment of the RGB LED

End Point (E):
- Sends RGB color sensor data over the RF network to the Coordinator, and to local USB port for display on a terminal emulation program
- Displays communication with the Coordinator or Router by blinking the blue segment of the RGB LED

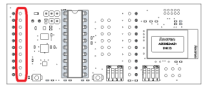
Installation & Launch (Stellaris): Follow these steps to launch the startup application. **Note:** Instructions below are for the **Stellaris LaunchPad.** If using the MSP430™ Value Line LaunchPad, see supplied instructions.

<15:00

1. Insert the CD provided in the Anaren *BoosterPack* kit, and if prompted, click the "AIR BoosterPack Installation" icon. If the CD menu does not automatically appear, click "autorun.exe" in the CD root menu. Then click the "Stellaris" menu option.

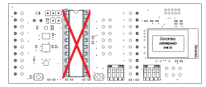
2. If using on a computer where the *LaunchPad* drivers have not been previously installed, click the "Install *LaunchPad* USB Driver" menu option. The drivers are automatically installed.

3. If **hardware I2C** communication is preferred, this is accomplished by adding the J3 connector to the *BoosterPack*, and removing two components from the *LaunchPad*. See User's Manual for more information.



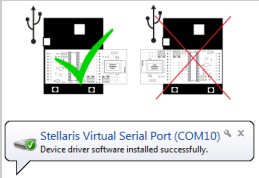
Installation & Launch: (continued)

4. Remove the pre-mounted MSP430 20-pin MCUs from each *BoosterPack*. A pocket for MCU storage is provided in the *BoosterPack* plastic packaging.



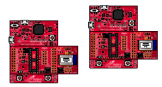
5. If a terminal emulation program is not already installed on the computer, open the CD Additional Resources menu, and select the "Go To Tera Term Home Page" option.

6. Plug a *BoosterPack* into each *LaunchPad*, ensuring proper orientation. Then connect the *LaunchPad* - *BoosterPack* combo with the label marked **Coordinator** to the computer, using the USB cable provided in the *LaunchPad* kit. A message is displayed confirming successful driver installation.

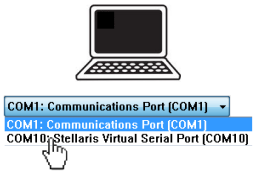


7. Load the Coordinator firmware onto the *LaunchPad* - *BoosterPack* combo, using the instructions provided in the BoosterPack User's Manual.

8. Disconnect the Coordinator *LaunchPad* - *BoosterPack* combo, and repeat step 7 to load the firmware on the Router and End Point *LaunchPad* - *BoosterPack* combos.



9. Reconnect just the Coordinator *LaunchPad* - *BoosterPack* combo, and launch the terminal emulation program. Select the "Stellaris Virtual Serial Port" created in step 6 from the list of available ports, and set communication to (115200, 8, N, 1). Press the *LaunchPad* reset switch to display the initialization message in the window.



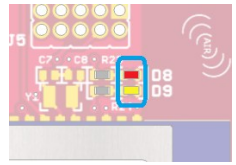
10. Connect the **Router** *BoosterPack* - *LaunchPad* combo to a computer by USB cable. Data packets start displaying in the Coordinator terminal window; example data packets shown below. Repeat this step for the **End Point**. Separate terminal windows may be opened to locally display Router and End Point data by following step 9.

Router (temperature):
From:00124B0001FE4710, LQI=BA, 2 KVPs received:
OID_VCC_MV(0x02) = 3535 (3.535V)
OID_TEMPERATURE_REMOTE(0x12) = 2306 (23.06C)

End Point (color):
From:00124B0001FE47CB, LQI=93, 5 KVPs received:
OID_VCC_MV(0x02) = 3505 (3.505V)
OID_COLOR_SENSOR_RED(0x22) = 127
OID_COLOR_SENSOR_BLUE(0x23) = 8278
OID_COLOR_SENSOR_GREEN(0x24) = 316
OID_COLOR_SENSOR_CLEAR(0x25) = 4401

11. Router and End Point sensor readings are shown on the Coordinator RGB LED, toggled by pressing Coordinator switch S2. Coordinator diodes D8 & D9 show the data displayed:

Sensor	D8 (red)	D9 (yellow)
None	OFF	OFF
Router temperature	OFF	ON
End Point color	ON	OFF



NEXT STEPS: Now that the *BoosterPack* network is operating, start exploring the many other development options. See User's Manual and CD for more information.

Still not connected? See User's Manual for troubleshooting!