Build Your Own LaunchPad™ or LaunchPad BoosterPack™ Development Tool

ABSTRACT

This standard defines the physical and electrical specifications of all TI MCU LaunchPad™ evaluation platforms.

Follow these guidelines to maximize success when creating a LaunchPad that supports the BoosterPack ecosystem. Alternatively, these guidelines can also maximize success when creating a BoosterPack that can be plugged into the LaunchPad evaluation kits.

Contents

List of Figures

1 Introduction

1.1 Disclaimer

It is important to note that this standard ensures only physical and electrical compatibility between a LaunchPad baseboard and a BoosterPack plugin module. This standard does not ensure full support in terms of firmware availability, nor does it ensure that the embedded processor on the LaunchPad can support the functions of a given BoosterPack. In addition, this document does not ensure compatibility between BoosterPack kits or support for stacking of multiple BoosterPack kits. Review the specific BoosterPack pinouts to determine support for stacking.

TI recommends that you use the smallest footprint that fits the requirements when creating a new BoosterPack to ensure maximum reusability. For example, it is better to create a 20-pin BoosterPack rather than a 40-pin BoosterPack if only 20 pins are needed. The inner 20 pins found in the 40-pin or 80-pin LaunchPad variants can be made as pass through connectors so that 40-pin BoosterPacks can be stacked on top.

1.2 Definitions

LaunchPad – A baseboard that is based on a TI embedded processor. LaunchPad evaluation kits can be based on MSP430, C2000, Stellaris, or other embedded processors from Texas Instruments. LaunchPad evaluation kits are available in different pin counts:

- 20 pins
- 40 pins
- 80 pins (future)

LaunchPad headers should be male and face up. All pins are placed at 100 mil (2.54 mm) spacing.

Required for LaunchPad kits:

- On-board emulation for programming, debugging, and serial communication to PC
- Reset button
- General-purpose buttons and LEDs

BoosterPack – A plugin module that fits on top of a LaunchPad evaluation kit. BoosterPack kits are available in different pin counts:

- 20 pins
- 40 pins
- 80 pins (future)

BoosterPack headers should be female and face down. To enable BoosterPack stacking, stackable headers can be used, which provide downward facing female headers and upward facing male headers. To ensure proper stacking of several BoosterPack kits, pay special attention to the pin assignments of each BoosterPack.

Stackable Headers – Headers that enable multiple plug-in modules or BoosterPacks to stack on top of each other. If you are interested in making your BoosterPack stackable, the part number below can be used.

Part Number: Samtec SSW-110-23-S-D

Other sources:

www.4uconnector.com (Part number: 19950)

Also available from 453oh.com

1.3 BoosterPack Design Guide

To supplement this standard, a BoosterPack Design Guide is available at http://processors.wiki.ti.com/index.php/BoosterPack_Design_Guide.

The BoosterPack Design Guide is a resource to help BoosterPack developers see the various pinouts on the available LaunchPad kits. This information, in addition to this BoosterPack standard, gives developers the information needed to design a new BoosterPack that is compatible with the available LaunchPad evaluation kits.

1.4 BoosterPack Combinations

If this standard is followed, several different combinations of BoosterPack kits can be added to an accompanying LaunchPad board. Different BoosterPack kits can be plugged into separate "docks" in the case of the 80-pin LaunchPad. In addition, BoosterPack kits can be stacked vertically. This allows BoosterPack kits to share common pins and is especially useful when creating an SPI or I2C bus.

Figure 1 and Figure 2 show examples of how BoosterPack kits can be plugged into a LaunchPad. Note that a 20-pin BoosterPack can also stack on a 40-pin LaunchPad.
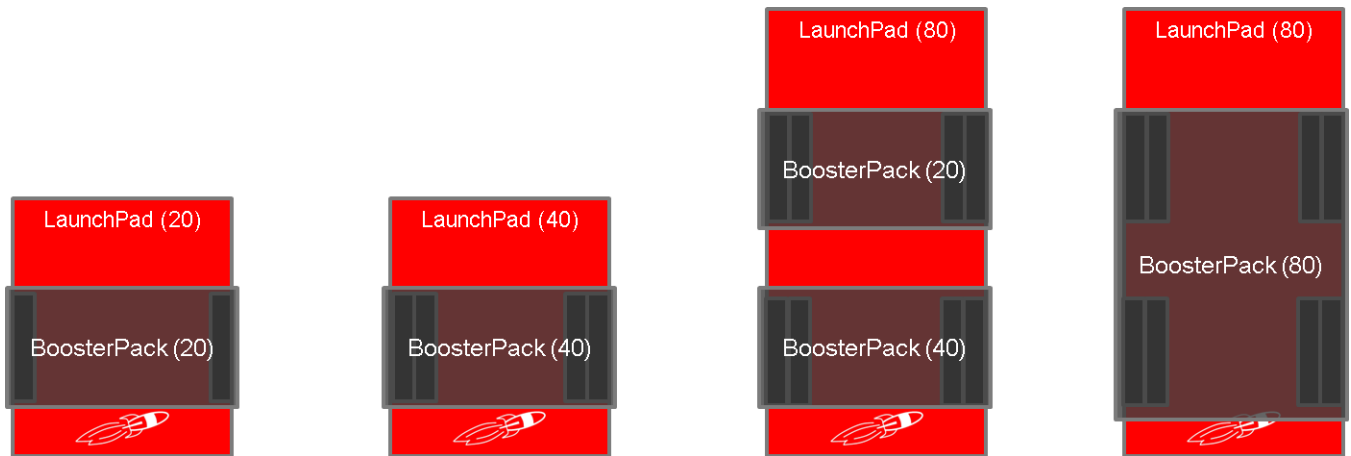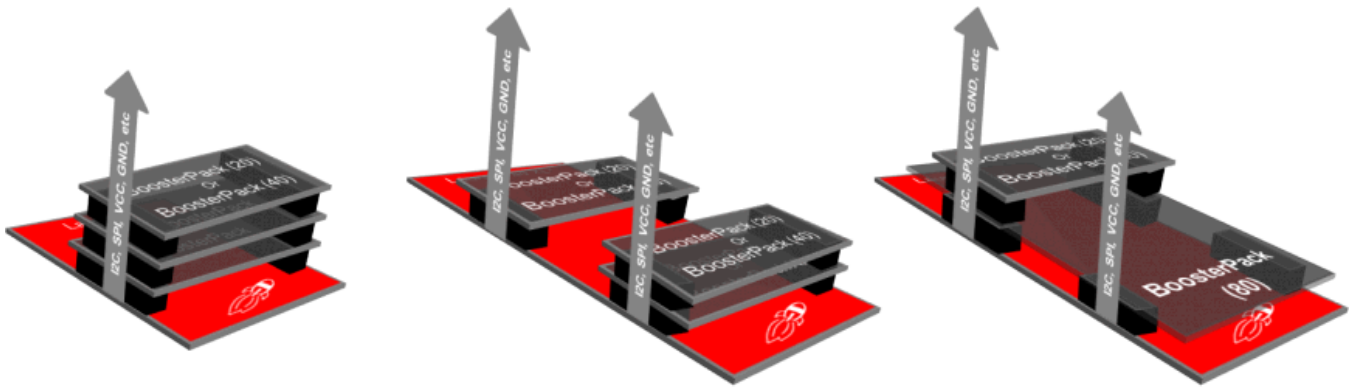
Figure 1. BoosterPack Docking

Figure 2. BoosterPack Stacking

Copyright © 2012, Texas Instruments Incorporated

2 Electrical and Physical Specifications

2.1 20-Pin LaunchPad and BoosterPack Standard

Figure 3 shows the pinout and dimensions for the 20-pin standard.
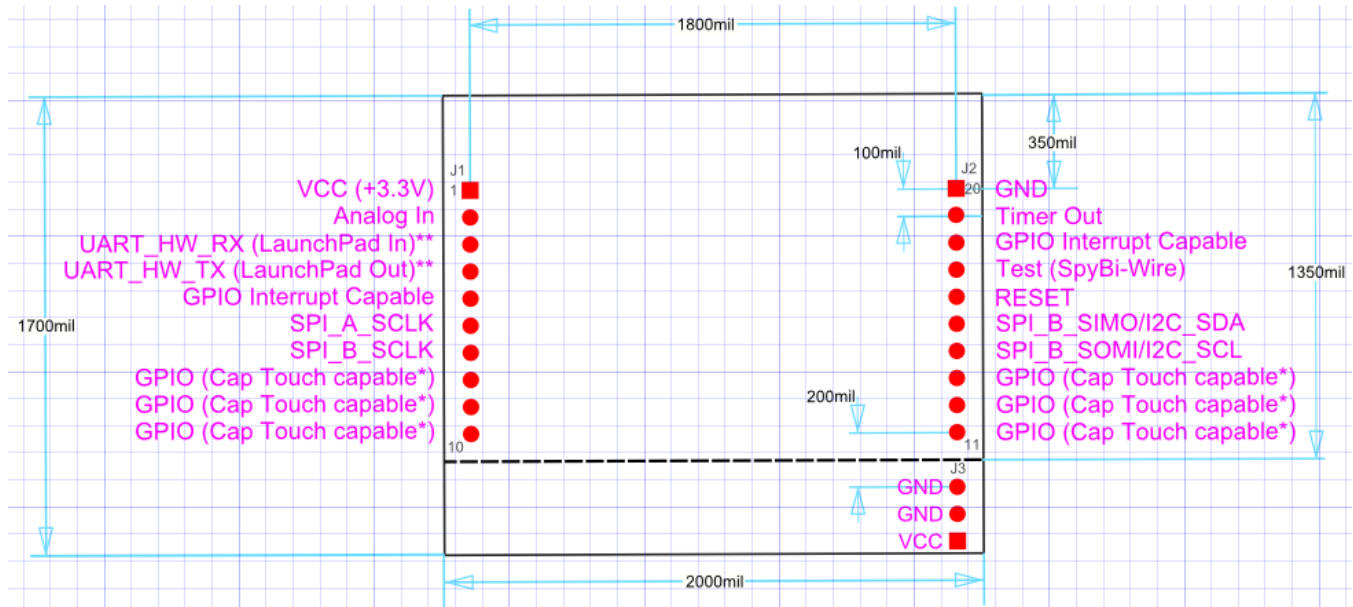
NOTE: All pins are on a 100 mil (2.54 mm) grid.

Figure 3. 20-Pin LaunchPad Standard

Considerations

The maximum height of a BoosterPack is 1700 mil. The maximum is 1350 mil if there is no need to access the 3-pin GND, GND, VCC header (J3).

All pins can be used as GPIOs except VCC, GND, TEST, and RESET. It is highly recommended to first use the six dedicated GPIO ports and to save special function pins for other BoosterPacks that may be stacked.

Note that most ports are multiplexed for dual functionality. See the microcontroller data sheet for details. TI recommends that the pins are used as shown to allow maximum compatibility with other systems. Of course, this is only a recommendation and should not restrict design if changes are necessary.

** Note that TX and RX are in respect to LaunchPad. If you are building a BoosterPack, the RX and TX lines are reversed.

* Capacitive Touch Sense-enabled I/O ports are available only on select devices. If this feature is not available on a specific device, these are standard GPIOs.

2.2   40-Pin LaunchPad and BoosterPack Standard

Figure 4 shows the pinout and dimensions for the 40-pin standard.
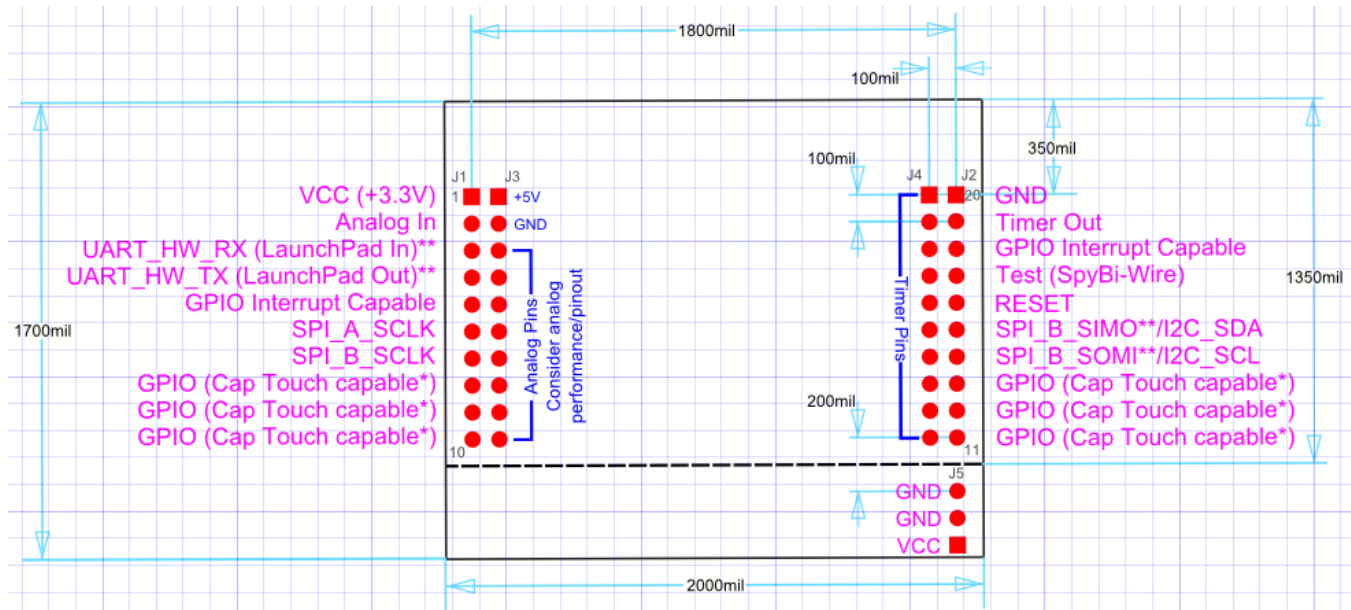
NOTE: All pins are on a 100 mil (2.54 mm) grid.

Figure 4. 40-Pin LaunchPad Standard

Considerations

The maximum height of a BoosterPack is 1700 mil. The maximum is 1350 mil if there is no need to access header J5.

There is no detailed standard for the inner 20 pins (header J3 and J4). Use with care to ensure maximum compatibility with the various LaunchPad evaluation kits and improve success of stacking additional BoosterPacks.

All pins can be used as GPIOs except VCC, GND, TEST, and RESET. It is highly recommended to first use the six dedicated GPIO ports to save special function pins for other BoosterPacks that may be stacked.

Note that most ports are multiplexed for dual functionality. See the microcontroller data sheet for details. TI recommends that the pins are used as shown to allow maximum compatibility with other systems. Of course, this is only a recommendation and should not restrict design when necessary

** Note that TX and RX are in respect to LaunchPad. If you are building a BoosterPack, the RX and TX lines are reversed.

* Capacitive Touch Sense-enabled I/O ports are available only on select devices. If this feature is not available on a specific device, these are standard GPIOs.

2.3 80-Pin LaunchPad and BoosterPack Standard

Note that an 80-pin LaunchPad board is not available from TI. However, this standard shows how an 80-pin LaunchPad could be implemented.

Figure 5 shows the pinout and dimensions for the 80-pin standard.
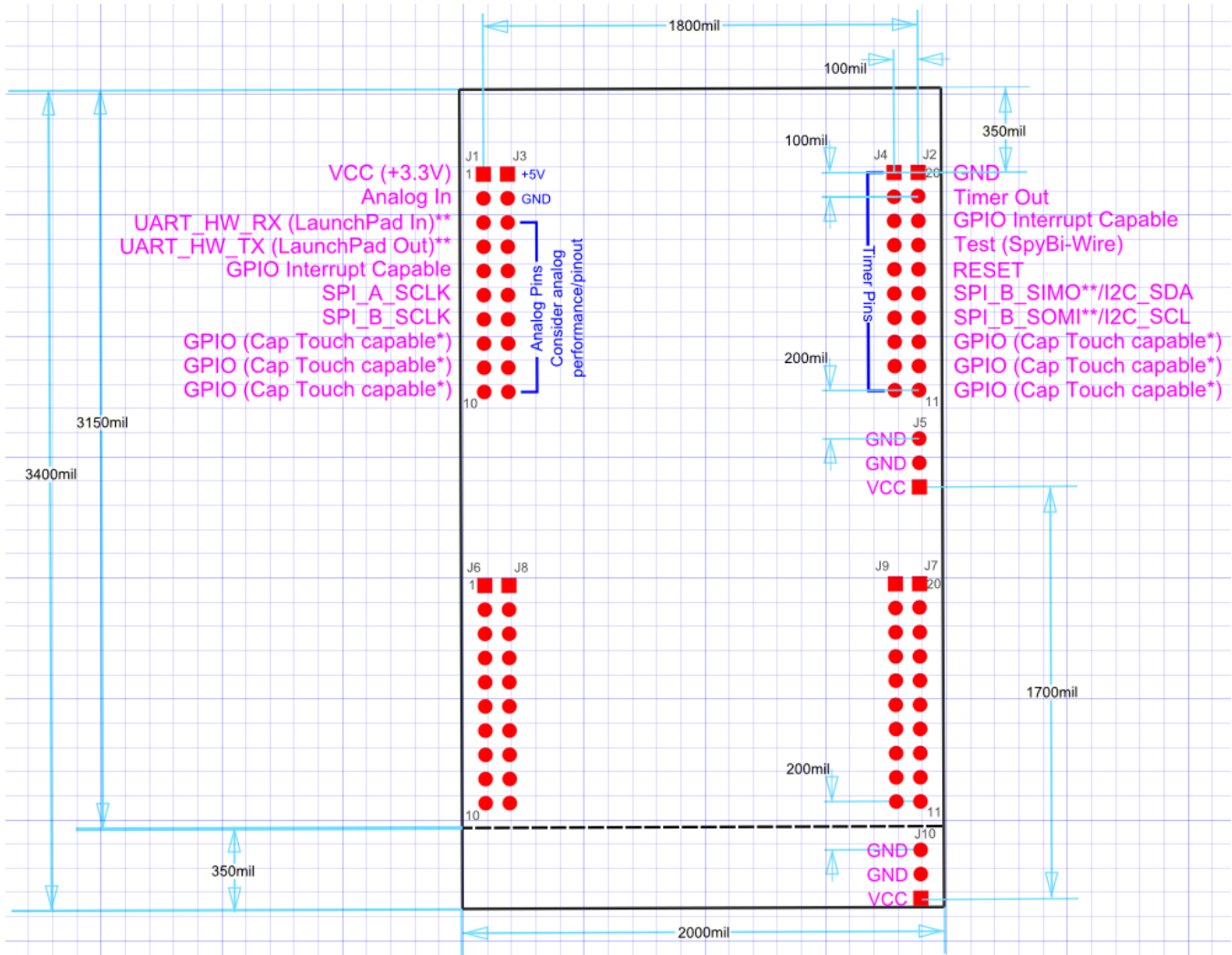
NOTE: All pins are on a 100 mil (2.54 mm) grid.

Figure 5. 80-Pin LaunchPad Standard

Considerations

The maximum height of a BoosterPack is 3400 mil. The maximum is 3150 mil if there is no need to access header J10.

The jumpers on the bottom (J6, J7, J8, and J9) have the same pinout functions as the headers on the top.

There is no detailed standard for the inner 20 pins (headers J3, J4, J8, and J9). Use with care to ensure maximum compatibility with the various LaunchPad evaluation kits and improve success of stacking additional BoosterPacks.

All pins can be used as GPIOs except VCC, GND, TEST, and RESET. It is highly recommended to first use the six dedicated GPIO ports and to save special function pins for other BoosterPacks that may be stacked.

Note that most ports are multiplexed for dual functionality. See the microcontroller data sheet for details. TI recommends that the pins are used as shown to allow maximum compatibility with other systems. Of course, this is only a recommendation and should not restrict design when necessary.

** Note that TX and RX are in respect to LaunchPad. If you are building a BoosterPack, the RX and TX lines are reversed.

* Capacitive Touch Sense-enabled I/O ports are available only on select devices. If this feature is not available on a specific device, these are standard GPIOs.

3   Useful Links and Resources

BoosterPack Design Guide (http://processors.wiki.ti.com/index.php/BoosterPack_Design_Guide)

LaunchPad and BoosterPack Eagle footprints (http://www.43oh.com/forum/viewtopic.php?f=35&t=1684)

IMPORTANT NOTICE

Products		Applications	
Audio	www.ti.com/audio	Automotive and Transportation	www.ti.com/automotive
Amplifiers	amplifier.ti.com	Communications and Telecom	www.ti.com/communications
Data Converters	dataconverter.ti.com	Computers and Peripherals	www.ti.com/computers
DLP® Products	www.dlp.com	Consumer Electronics	www.ti.com/consumer-apps
DSP	dsp.ti.com	Energy and Lighting	www.ti.com/energy
Clocks and Timers	www.ti.com/clocks	Industrial	www.ti.com/industrial
Interface	interface.ti.com	Medical	www.ti.com/medical
Logic	logic.ti.com	Security	www.ti.com/security
Power Mgmt	power.ti.com	Space, Avionics and Defense	www.ti.com/space-avionics-defense
Microcontrollers	microcontroller.ti.com	Video and Imaging	www.ti.com/video
RFID	www.ti-rfid.com		
OMAP Applications Processors	www.ti.com/omap	**TI E2E Community**	e2e.ti.com
Wireless Connectivity	www.ti.com/wirelessconnectivity		