Meet the Hercules™ RM46x LaunchPad Development Kit

Part Number: LAUNCHXL2-RM46

Resources
ti.com/launchpad

- Code examples
- Open Source Design Files
- Documentation
- Example projects
- Videos
- Tutorials
- Other TI products

BoosterPack Ecosystem

Sensor Hub BoosterPack
- InvenSense MPU-9150 9-axis MEMS motion sensor
  - 3-axis gyroscope
  - 3-axis accelerometer
  - 3-axis compass
- Bosch Sensortec BMP180 pressure sensor
- Sensirion SHT32 humidity & ambient temperature sensor
- Intersil ISL29023 light & IR

DRV8301 Motor Driver BoosterPack
- Spin Any Three Phase Motor!
- 6-24V Supply Input
- 10A Continuous/14A Peak

>> See them all @ ti.com/boosterpacks

Software Tools

HALCoGEN
A powerful GUI based code generation tool that allows users to configure peripherals and other MCU parameters.

Easily import code into CCS and other IDEs.
www.ti.com/tool/halcogen

Professional Software tools
LaunchPad is also supported by professional IDEs that provide industrial-grade features and full debug-capability. Set breakpoints, watch variables & more with LaunchPad.

Code Composer Studio™ IDE
www.ti.com/ccs

Below are the pins exposed @ the 2x BoosterPack connector sites.

Mapping to the booster pack standard is shown. In some cases a function can be either a GIO or another function, and may be listed twice (color coded as both GIO and again as the function). Additional functions beyond the booster pack standard may be available. For details consult the launchpad schematic.

(!) Denotes I/O pins that are interrupt-capable.

When using some BoosterPacks, JP2,3,4, or 5 may need to be removed. For example, using this LaunchPad with BoosterPack BOOSTXL-DRV8301 that includes a 3.3V regulator. To avoid conflict between the LaunchPad's 3.3V regulator and the regulator on the BoosterPack, JP2 (or JP4) should be removed.

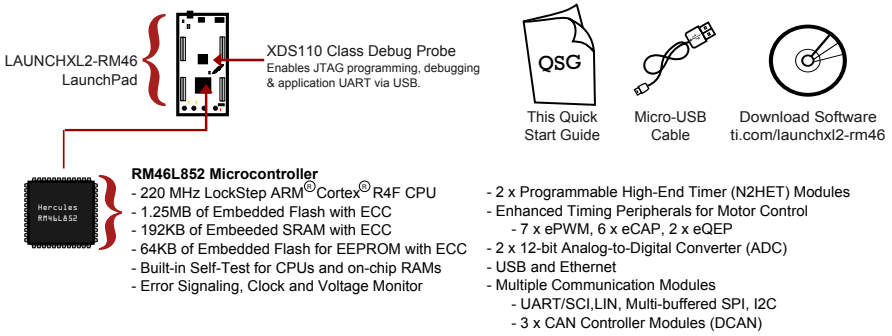
A closer look at your new LaunchPad Development Kit

Featured microcontroller: Hercules RM46L852

This LaunchPad is great for...

- Starting evaluation with Hercules RM MCUs designed for IEC61508 functional safety industrial and medical applications.
- Getting hands-on experience with the MCU's hardware integrated safety and diagnostic features.
- Getting familiar with SafeTI software and development tools that ease development of functional safety applications.

What comes in the box?



RM46L852 Microcontroller

- 220 MHz LockStep ARM® Cortex® R4F CPU
- 1.25MB of Embedded Flash with ECC
- 192KB of Embeeded SRAM with ECC
- 64KB of Embedded Flash for EEPROM with ECC
- Built-in Self-Test for CPUs and on-chip RAMs
- Error Signaling, Clock and Voltage Monitor
- 2 x Programmable High-End Timer (N2HET) Modules
- Enhanced Timing Peripherals for Motor Control
  - 7 x ePWM, 6 x eCAP, 2 x eQEP
- 2 x 12-bit Analog-to-Digital Converter (ADC)
- USB and Ethernet
- Multiple Communication Modules
  - UART/SCI,LIN, Multi-buffered SPI, I2C
  - 3 x CAN Controller Modules (DCAN)

Out-of-box Demo

Find more information @ ti.com/launchxl2-rm46

1. (Optional) Installing Code Composer Studio (CCS)
The virtual COM port drivers that are required to see the console output of the out of box demo are bundled with CCS. If you wish to see this part of the demo, install CCS v6.0.1 or later before connecting the LaunchPad to the PC.

2. Connecting to a Computer and Powering the LaunchPad
The LaunchPad is configured by default to be USB powered (JP6 must be installed), which can be done by connecting the LaunchPad to a computer using the included USB cable. If you skipped the optional step 1, ignore any error/warning messages about missing drivers during this step.

3. (Optional) Opening a Terminal Program
If you completed step 1 and wish to see the console output of the demo, this is the time to configure the terminal program of your choice:
> Select COM port identified as "XDS Class Application/User UART" from your computer's device manager.
> Configure Baud Rate: 19200, Data Bits: 8, Stop Bits: 2 and Parity: None.

4. Running the Out-of-box Demo
This LaunchPad comes pre-programmed with a demo set that highlights several of MCU's safety features. When powered the LaunchPad will start blinking USER LEDs.

Demo 1: An on-board Ambient Light Sensor is connected to the MCU's Analog Input 1. The USER LED B blinks according to the light intensity and a change in light intensity will cause it to blink faster or slower.

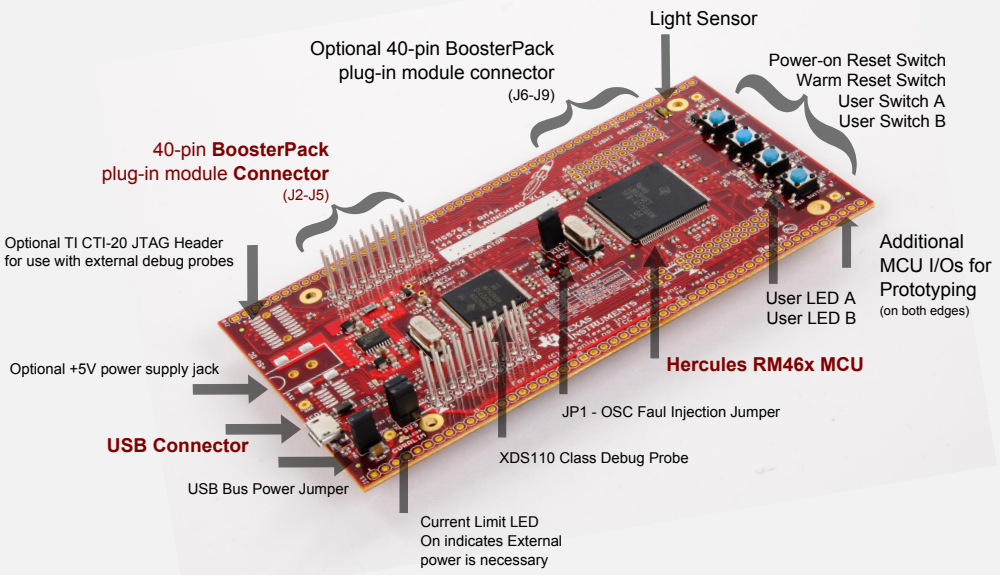
Demo 2: Shorting jumper JP1 will short the OSC to GND and cause an Oscillator Fault in the MCU. The on-chip monitor will detect and trigger an error singal causing the ERR LED to light up. **Note:** JP1 should be open during normal operation.

Demo 3: The push-button USER SWITCH B will inject a core compare error (CPU mismatch). An on-chip monitor will detect the fault and trigger an error signal causing the ERR LED to light up.

Demo 4: The push-button USER SWITCH A will inject a single bit error in the MCU's flash on every push. ECC logic corrects single bit errors in flash and counts them. The USER LED A blinks faster with every error detected. When a pre-programmed limit (6) is reached, the error signal is triggered and the ERR LED lights up.

When you are ready to take the next step, complete *Project 0*. For more information go to www.ti.com/launchpad and click on the Project 0 link for Hercules RM46x LaunchPad.

LAUNCHXL2-RM46 Overview



SafeTI™ Design Packages for Functional Safety

Find more information @ ti.com/safeti

SafeTI™ design packages help designers meet industry standard functional safety requirements while managing both systematic and random failures. Using SafeTI components helps make it easier for designers to achieve applicable end-product certification and get to market quickly with their safety critical systems which are pervasive in our world today.

- Complementary embedded processing and analog products that work together to help designer meet safety standards
- Safety development process certified suitable for use in development of IEC61508 and ISO26262 compliant semiconductors
- Safety related documentation: *Safety Analysis Report, Safety Manual and Safety Report*
- Safety Tools and Software (See below)

SafeTI Diagnostic Library

Software library of functions and response handlers for various safety features of the Hercules Safety MCUs.
Download: ti.com/tool/safeti_diag_lib

SafeTI Compiler Qualification Kit

Assists developers in qualifying their use of the TI ARM Compiler to functional safety standards such as IEC 61508 and ISO 26262.
Learn more: ti.com/tool/safeti_cqkit

SafeTI Compliance Support Packages

SafeTI Compliance Support Packages for HALCoGen and SafeTI Diagnostic Library provide the necessary documentation, reports and unit test capability to assist developers who need to comply with functional safety standards such as ISO 26262 and IEC 61508.

TI E2E™ Community

Hercules MCU E2E Support Forum:
>> ti.com/hercules-support

Hercules Training Videos:
>> ti.com/herculestraining

SPNU610

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services per JESD46, latest issue, and to discontinue any product or service per JESD48, latest issue. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products (also referred to herein as “components”) are sold subject to TI’s terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its components to the specifications applicable at the time of sale, in accordance with the warranty in TI’s terms and conditions of sale of semiconductor products. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by applicable law, testing of all parameters of each component is not necessarily performed.

TI assumes no liability for applications assistance or the design of Buyers’ products. Buyers are responsible for their products and applications using TI components. To minimize the risks associated with Buyers’ products and applications, Buyers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI components or services are used. Information published by TI regarding third-party products or services does not constitute a license to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of significant portions of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI components or services with statements different from or beyond the parameters stated by TI for that component or service voids all express and any implied warranties for the associated TI component or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Buyer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of TI components in its applications, notwithstanding any applications-related information or support that may be provided by TI. Buyer represents and agrees that it has all the necessary expertise to create and implement safeguards which anticipate dangerous consequences of failures, monitor failures and their consequences, lessen the likelihood of failures that might cause harm and take appropriate remedial actions. Buyer will fully indemnify TI and its representatives against any damages arising out of the use of any TI components in safety-critical applications.

In some cases, TI components may be promoted specifically to facilitate safety-related applications. With such components, TI’s goal is to help enable customers to design and create their own end-product solutions that meet applicable functional safety standards and requirements. Nonetheless, such components are subject to these terms.

No TI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed a special agreement specifically governing such use.

Only those TI components which TI has specifically designated as military grade or “enhanced plastic” are designed and intended for use in military/aerospace applications or environments. Buyer acknowledges and agrees that any military or aerospace use of TI components which have ***not*** been so designated is solely at the Buyer's risk, and that Buyer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.

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		

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265