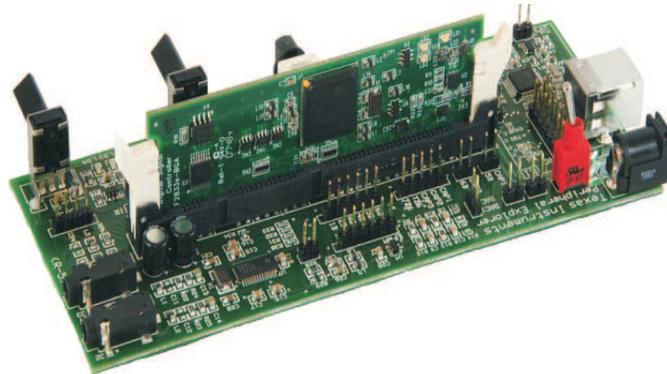


Peripheral Explorer Kit Overview



The Peripheral Explorer Kit is an evaluation board designed to allow for experimentation with many of the peripherals available in the C2000™ F28x family of microprocessors. The board is designed to accept any of the DIMM100 plug-in controlCARDS™ and contains all hardware (controlCARD, power supply, etc) required for normal usage. The kit is self-contained and contains multiple experiments in which external equipment, such as oscilloscopes, are not required. Commonly in these examples one peripheral read the output of a different peripheral, confirming the operation of both.

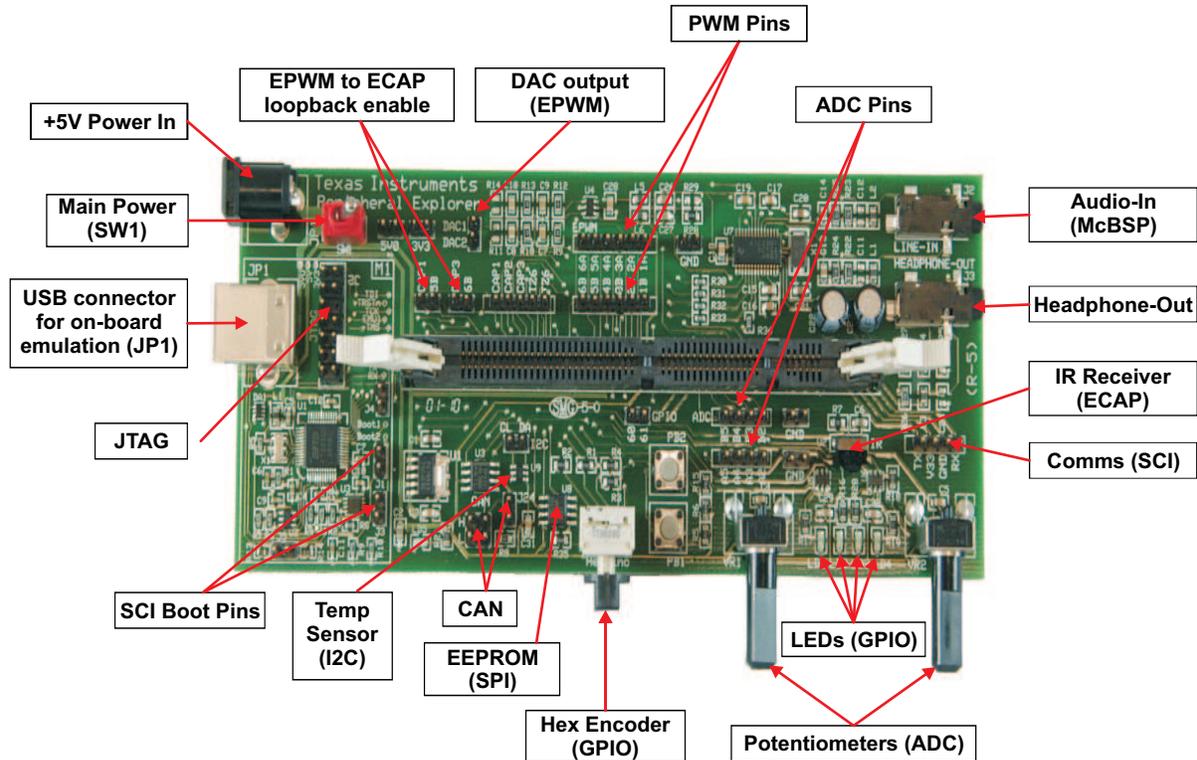
Features of the Peripheral Explorer Kit include:

- Multiple peripheral-based examples
 - EPWM-based sinusoidal output based on a sine table
 - DAC via filtered ePWM module and then read by an ADC
 - CAP-based IR receiver reading
 - SPI-based EEPROM
 - UART communications header available for host control
 - ADC-based potentiometers
 - GPIO-based components such as pushbuttons, hex encoder, and LEDs
 - McBSP/DMA-based AIC23 codec software (F28335 only)
 - I2C header for external use and communication with TMP100 temperature sensor
 - CAN header for external use
- Quick Start GUI, a friendly way to control / demo the application, based on open source C# freeware
- The Hardware Developer's Package is available and includes full hardware documentation such as schematics, bill of materials, Gerber files, etc.
<http://focus.ti.com/docs/toolsw/folders/print/tmdsprex28335.html>

1 Hardware Overview

The Peripheral Explorer Kit consists of multiple peripheral-based components. Figure 1 shows a diagram of the Peripheral Explorer board and some of its key features.

Figure 1. Key Features of EVM Board



Note: For full details (schematics, pin-out table, etc) of the hardware please refer to the Hardware Developer's Package, PeripheralExplorer-HWdevPkg available at: <http://focus.ti.com/docs/toolsw/folders/print/tmdsprex28335.html>

Table 1. Hardware Components

| Component | Description |
|---------------------------------|---|
| +5V Power In | DC power supply from plug pack (5V supply may be used as well) |
| Main Pwr | SW1 - Master power switch for entire EVM |
| USB Connector | USB connection for on-board emulation and power |
| JTAG | Connector for external JTAG emulator |
| SCI Boot Pins | Controls how the controlCARD will boot If no jumpers are placed the target boots from flash If a jumper is placed at "J1", a F2808 controlCARD will boot from SCI If a jumper is placed at "J3", a F28335 controlCARD will boot from SCI |
| Temp Sensor | TMP100 temperature sensor connected to I2C |
| CAN | External pins available for connection to two parallel CAN devices |
| EEPROM | Uses the SPI peripheral to read/write to a 256K EEPROM |
| Hex Encoder | The position of the 4-bit hex encoder sets the values of GPIOs 12-15 |
| Potentiometers | Divide a 3.3V input into a voltage value to be read by ADC-A0 and ADC-A1 |
| LEDs | LED1 and LED2 controlled by GPIO-09 and GPIO-11 |
| Comms | Serial communications UART (connects to the optional GUI) |
| IR Receiver | Uses the eCAP module to read signals sent by an IR transmitter. The software included with this kit is configured to work with the Sharp TV protocol. |
| Headphone-Out | Output from the TI AIC23B codec which is controlled by the F28x MCU (headphones not included in this package) |
| Audio-In | Input to the TI AIC23B codec (line-in audio cable not included in this package) |
| ADC pins | ADC pins available to be connected as desired |
| PWM pins | PWM pins available to be connected as desired |
| DAC output | Output of a filtered ePWM. The ePWM output is connected to a second-order passive filter, then connected to these pins |
| EPWM to ECAP loopback enable | Connecting a jumper across these headers allows for an experiment to be done where the eCAP module reads the duty cycle and period of the ePWM output. |

2 Software Setup

The Peripheral Explorer Kit application software, step-by-step lab style documentation, and other useful soft collateral can all be found on the TI website and on the included C2000 Teaching Materials CD.

To begin using the Peripheral Explorer Kit, first install Code Composer Studio V4.1 using the included DVD. Code Composer Studio can also be downloaded from www.ti.com/ccs.

Once Code Composer Studio has been installed, insert the C2000 Teaching Materials CD. The CD should automatically launch the install program. If it does not, run the "start" program found on the CD. Install the F2833x(CCS4) and follow the instructions provided by the install program. The C2000 Teaching Materials can also be downloaded from <http://www.ti.com/lit/zip/ssqc019>.

3 Hardware Set Up

All the hardware needed to get started is included in this package. Since on-board emulation is available using the USB, an external emulator is not needed, but suggested emulators are listed near the end of this document. Install Code Composer Studio V3.3 or V4.1 before connecting the board to a PC.

Please follow these steps to set up the hardware:

- Step 1. Unpack the DIMM style controlCARD.
- Step 2. Spread open the winged retaining clips on connector J1.
- Step 3. Sit the DIMM card loosely in the connector slot. Make sure to align the two keyed notches and position the card bottom corners inside the retaining clips (see the figure below).
- Step 4. Push vertically down using even pressure from both ends of the card until the clips snap and lock. (Note: To remove or eject the card, simply spread open the retaining clips with thumbs).
- Step 5. Ensure switch 1 (SW1) is in the Off position and connect the USB cable.
- Step 6. Turn on the power and proceed.



4 Emulators

The following companies provide low cost, full featured emulators designed specifically for C2000™ controllers. However, an emulator is not required as the Peripheral Explorer has onboard USB JTAG emulation.

| | | |
|---|---|-------|
| Blackhawk™ http://www.blackhawk-dsp.com | USB2000 Controller (part number BH-USB-2000) | \$299 |
| Spectrum Digital http://www.spectrumdigital.com | XDS510LC JTAG Emulator (part number 701902) | \$249 |

5 References

For more information, see the following guides:

- C2000 Teaching Materials – <http://www.ti.com/lit/zip/ssqc019> provides detailed information on the Peripheral Explorer projects
- TI University Homepage - www.ti.com/university provides additional university support and information
- PeripheralExplorer Tool Folder - <http://focus.ti.com/docs/toolsw/folders/print/tmdsprex28335.html>

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