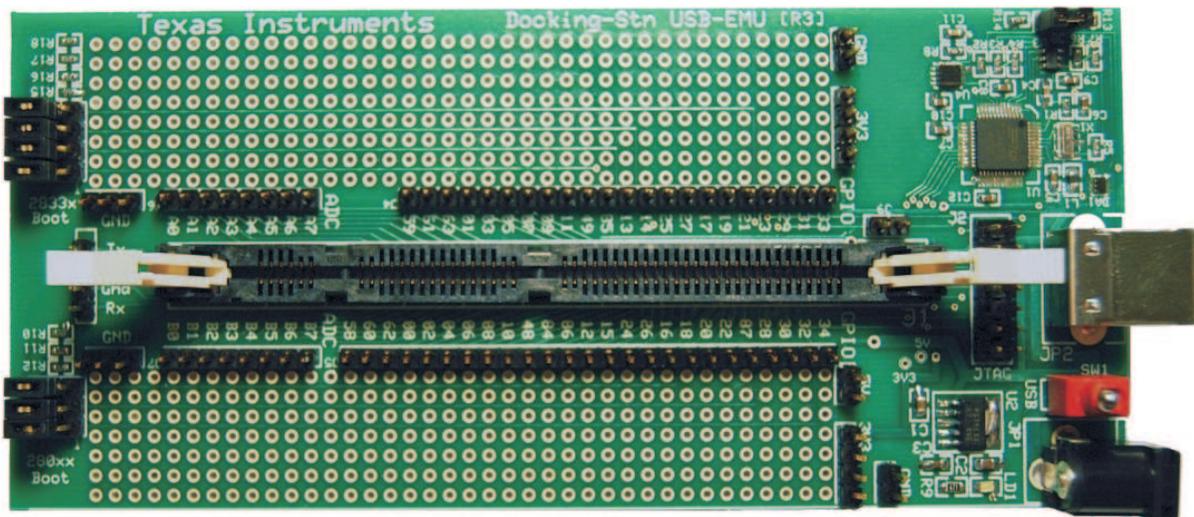# TMS320C2000 Piccolo MCU Experimenter Kit Overview

The TMS320C2000™ Piccolo™ microcontroller (MCU) Experimenter Kit is a quick, easy, low cost way to evaluate the TMS320C28x™ family of devices. The kit consists of a docking station and choice of an F28x controlCARD. The docking station is a small mother board that accepts any of the plug-in controlCARDs and gives you access to all of the F28x devices' GPIO and ADC signals. Additionally, it also provides two prototyping areas (one on each side of the DIMM100 connector) with an array of 0.1" spaced plated through holes for wire-wrapping and soldering.

Other features of the Docking Station include:

- On-board USB emulation or the ability to use an external JTAG emulator
- Ability to use the USB 5 V to power the board or use an external power supply.
- UART communications header connector
- Boot jumpers for all boot modes covered by F280xx and F2833x devices
- 5.0-V supply for prototyping area
- 3.3-V supply for prototyping area
- All key signals accessible via clearly labeled header pins

ControlCARDs are small 100-pin Dual In Line Memory Module (DIMM) style vertical plug-in boards based on the TMS320F28027 (Piccolo) MCUs. These controlCARDs have all the necessary support circuitry (clock, supply LDO, decoupling, pullups, etc.) to provide reliable operation for the DSC devices. The board design is robust and meant for operation in noisy electrical environments. It includes the following features:

- Small size – 90 mm x 25 mm (3.5" x 1")
- All GPIO, ADC and other key signal routed to gold edge connector fingers
- Extensive supply pin decoupling with L+C close to pins
- Clamping diode protection at ADC input pins
- Anti-aliasing filter (noise filter) at ADC input pins
- Ground plane
- Isolated UART communications using RS232 translator + ISO7221 isolators

Both the controlCARD and Docking Station include a "Hardware Developer's Package", a set of "soft collateral" files that make copying or deploying this technology very easy. These files include:

- Schematics (source or .PDF files)
- Bill of materials (BOM)
- Gerber files to freely use or modify
- Pin-out table, showing all key signals at the 100-pin connector
- DIMM100 pin / socket mechanical details
- PCB files done in popular Freeware tool for easy modification (docking station only)
- Template mother board PCB file created in a popular freeware tool – great way to begin a new prototype design

Trademarks

TMS320C2000, Piccolo, TMS320C28x, Code Composer Studio are trademarks of Texas Instruments.

Blackhawk is a trademark of EWA Technologies, Inc.

All other trademarks are the property of their respective owners.

1   Hardware Set Up

This guide will help you set up the board to use on-board USB emulation and use the USB 5 V to power the board. Follow the steps below 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 2 keyed notches and position the card bottom corners inside the retaining clips (see Figure 1).

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. Connect the USB cable to the USB connector JP2, then place switch 1 (SW1) n the "ON" position.

Step 6. Once you have downloaded the TI Software or are ready to run your own project, turn on the board power by putting SW1 in the "USB" position. This will allow the board to use the USB's 5 V as the supply voltage.

Step 7. For full details (schematics, pin-out table, etc.) of the Hardware, see the Hardware Developer's package, DockingStnHWdevPkg.

Note: The F28027 controlCARD pinout can be altered by changing the position of the switches SW2, SW3, and SW4. By default, all the switches on SW2, SW3, and SW4 should face toward the DIMM100 fingers

---

Figure 1. Retaining Clips
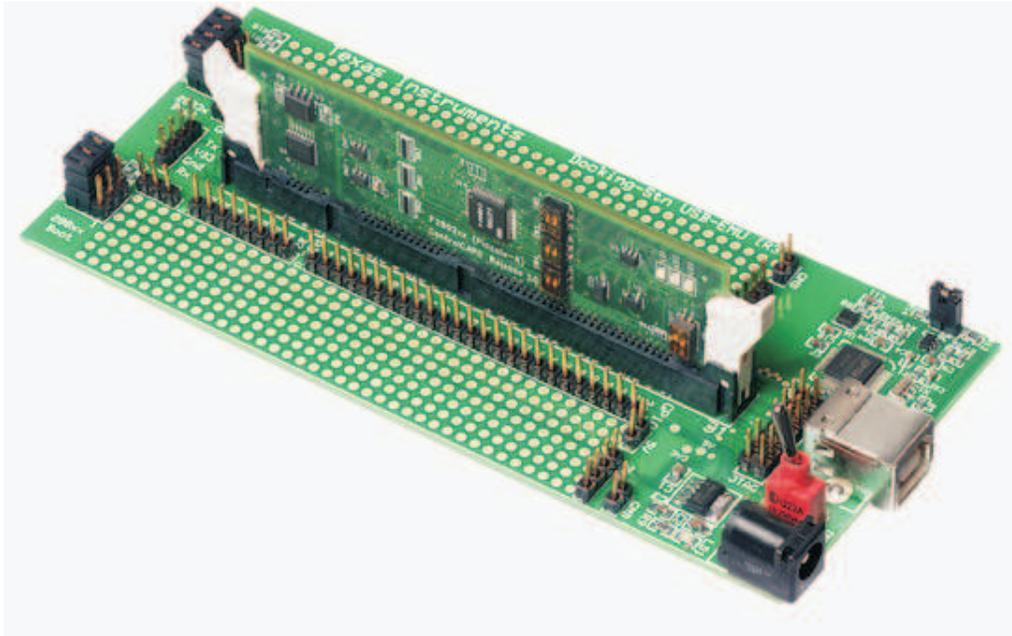
2   Software Set Up

Getting started software, latest header files, Simple C framework code example, and other useful soft collateral can all be found on the TI website. If you already have your own software project and do not require this collateral, skip this section and start up your emulator/Code Composer Studio environment.

To download the free TI software collateral follow these steps:

Step 1.   On an Internet browser type: http://www.ti.com/f28xkits

Step 2.   Scroll down to the Piccolo Experimenter's Kit table and download the Baseline Software

Step 3.   Save the .zip file to the directory of your choice

Step 4.   Unzip the file and run the install program Baseline Software Set Up

Step 5.   The installer will create the following default directories:

        C:\TI_F28xxx_SysSW

           ~Docs

           ~GeneralPurposeGUI

           ~SupportFiles

           FlashingLeds

        C:\TI_F28xxx_SysHW

           CC280xxHWdevPkg

           CC2833xHWdevPkg

           DockingStnHWdevPkg

Submit Documentation Feedback

If Code Composer Studio™ software is installed and set to use the XDS100 emulator , load the project file *FlashingLeds.pjt* found in:

C:\TI_F28xxx_SysSW\FlashingLeds\

Right-click the project name in the project window and select the proper configuration for your controlCARD. Next, compile, load and run the code on the target. If the target, emulator and downloaded software are working properly this project should flash an LED on the controlCARD.

3   Emulators

While the Experimenter's Kit has on-board emulation, it is not a high performance emulator and not all C2000 evaluation boards have this feature. The following companies provide low cost, fully-featured external emulators designed to work with C2000 controllers:

- Blackhawk™ http://www.blackhawk-dsp.com
- Spectrum Digital http://www.spectrumdigital.com

4   References

For more information, see the:

System Framework Overview, which presents more information on the system framework found in all F28xxx EVM projects

C:\TI_28xxx_SysSW\~Docs\SystemFrameworkOverview.pdf

IMPORTANT NOTICE