Application Note AN2018

POD and Feet Basics

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Associated Project: No
Associated Part Family: CY8C29x66, CY8C27x43, CY8C24x94, CY8C24x23A, CY8C21x34, CY8C21x23
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Associated Application Notes: AN2014 In-System Serial Programming
PSoC Application Notes Index

Abstract
Each PSoC® In-Circuit Emulator (ICE) consists of two parts: a base station and a pod. This Application Note contains helpful information about component, assembly, and powering of pods. Drawings of pods and feet drawings can be downloaded from www.cypress.com/design/MR10161.

Components - CY3250 Generation
A complete pod is made of three parts: the pod, a "foot" for connecting to a target circuit, and a plastic mask for orienting the foot. See Figure 1 and Figure 2.

An OCD (on-chip debugger) pod contains a complete bondout version of the PSoC device. Analog and digital functions perform just like a standalone PSoC when the pod is plugged into a target circuit.

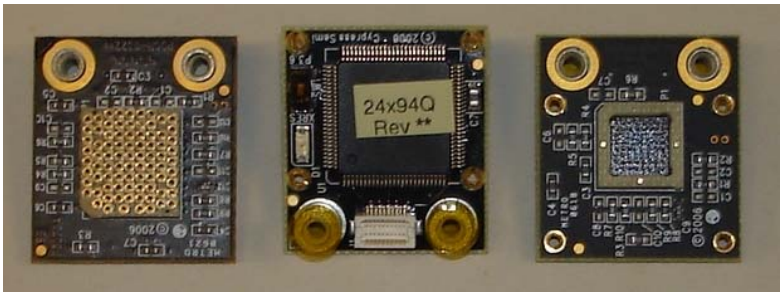
A flex cable is used to connect the ICE-Cube to the pod main board. Earlier generations use a RJ-45 connection.

Pods connect to target circuits via "feet." Each foot has a pinout that models a PSoC, for example, a 28-pin SSOP. Feet that emulate surface-mount components must be soldered to target circuits. The main board of the pod can then be attached or removed, as desired.

Plastic masks are provided to expose only the pins that connect to the foot. The bottom of each mask is stamped with a number that indicates the number of pins on the feet that use that mask. Masks marked "28" will take 28-pin DIP feet, 28-pin SOIC feet, or 28-pin SSOP feet. Masks marked with "8/20" will take any 8- or 20-pin foot. Feet with 44 or 48 pins do not require a plastic mask.

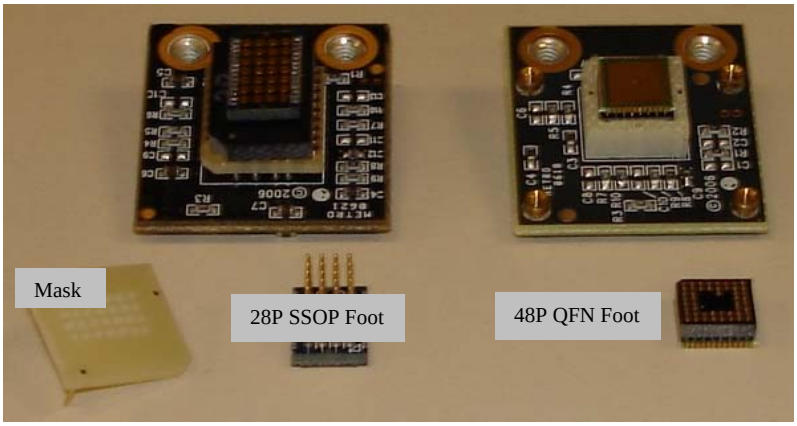
The main board has a power LED and two screws to secure the flex cable. The CY8C24x94 pod board has a small switch that controls the XRES pin for the CY8C24794 and CY8C24894 parts. See Figure 1.

Figure 1. Bottom View Non-QFN Pod, CY8C24x94 Family Pod (Top View), Bottom View QFN Pod



Pods are available in non-QFN and QFN packages. All PDIP, SOIC, SSOP, and TQFP parts can be emulated on a non-QFN pod. QFN parts are restricted to QFN pods.

Figure 2. Assembled Non-QFN Pod, Assembled QFN Pod



Assembly

Before using a pod, assemble the three pieces as shown in figures 2-4.

To assemble, execute the following steps:

1. First, select a foot. The foot should match the pinout of the PSoC device used in the target circuit.
2. Next, select a mask that matches the desired foot.
3. Insert the mask into the bottom of the pod, aligning the chamfered corners of the mask to the pin-1 triangle on the pod.
4. Insert the foot through the plastic mask. Use the alignment triangles to orient the foot to the pod.
5. Finally, plug the pod into your target circuit.

Figure 3. Flexcable

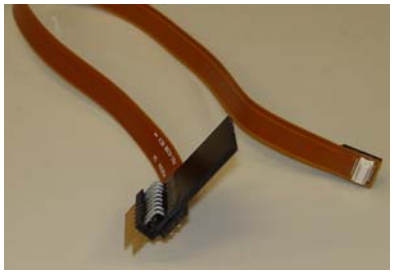


Figure 4. Assembled Pod with Flexcable

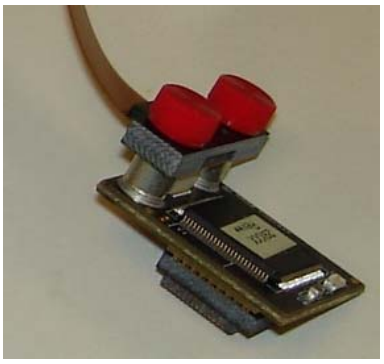
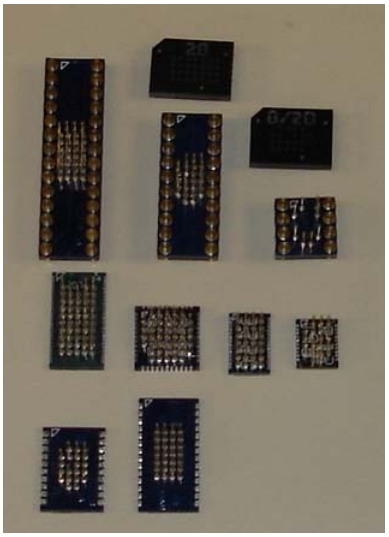


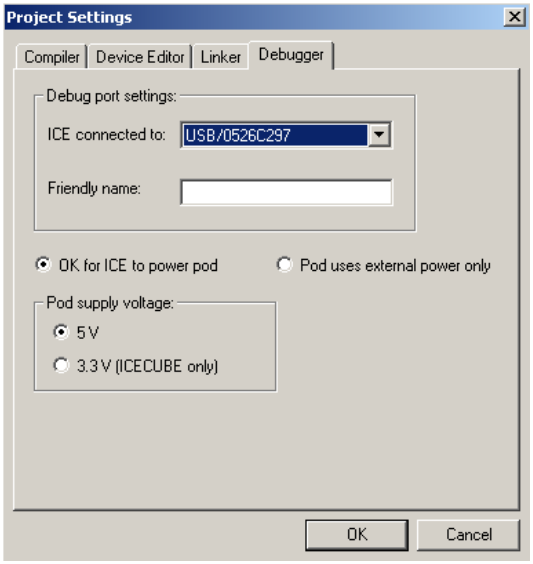
Figure 5. Various Feet



Powering the Pod

Pods can draw power from a target circuit or from the ICE-base station. Power source options can be changed in the **Project** >> **Settings** dialog box in PSoC Designer™. The three options within this dialog are: Pod uses external power, Pod uses ICE supplied power of 5V, and Pod uses ICE supplied power of 3.3V.

Figure 6. Project Settings Dialog



To run a pod from target board power, insert a pod into the target circuit. Make sure that the alignment marks line up with pin 1. Turn on power to the target circuit. The supply voltage should be between 2.7V and 5.5V. **Connect to ICE** . The ICE and pod will detect that the pod is externally powered and use this power supply.

The ICE-base station is capable of supplying 5V or 3.3V to the pod, with a maximum current. This is further detailed in the Application Note AN2014, "In-System Serial Programming". The ICE will turn on the 5V supply when the **Connect** icon is clicked and the pod is not powered externally.

Caution: Users with **3.3V** systems should never click the **Connect** icon without externally powering their pod, or changing the supply voltage within the **Project** >> **Settings** dialog box to **3.3V**.

Cool Tricks

Because each pod contains a fully functional PSoC bondout device, pods may be used in place of devices for test purposes. Simply plug a pod into the circuit without connecting it to an ICE-base station. The pod power LED will light up when it is powered and operational.

PSoC Designer separates code development into three main parts: device configuration, code editing, and debugging. Each part is represented by a PSoC Designer subsystem: Device Editor , Application Editor , and Debugger . Designers switch subsystems frequently when modifying code. In particular, it is common to make a code change and compile it in Application Editor, then switch to Debugger to test the change. When switching back and forth between Application Editor and Debugger, it is not necessary to keep re-connecting to the ICE by following the pod power-on procedures. As long as the **Download to Emulator** icon is visible (or the Connected status in the lower-right corner is green), it is possible to simply download the new code and begin debugging.

Pod Notes

- Pods have a power-on LED that will draw additional current from the power supply.
- Do not enable PLL mode with a pod. There will be a large amount of clock jitter. The pod will work with an external crystal, however. The pod will also work in PLL mode if it is operating as a standalone unit (no connection to an ICE-base station).
- Pods may be noisier than standalone PSoC devices, especially for analog operations.
- When the debugger is halted, the pod will act as if its CPU frequency is 3 MHz. Normal CPU frequencies will return when code execution resumes. This will be apparent if the CPU clock is used to drive a user module that toggles external pins; a clock generator, for example. This is normal operation and does not affect code execution.

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