**Best of Custom Design**

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# Create Custom Capes Fast and Easy

**Gumstix has taken its Geppetto build-to-order system to the next level. It can now handle platforms like the BeagleBone, as well as standalone microcontrollers and Gumstix COM modules.**
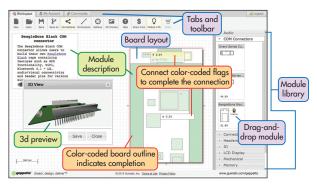
A few years ago Gumstix came out with Geppetto, a web-based designer and build-to-order system *(see "Game Changing Geppetto Builds ARM-based Systems" on electronicdesign.com)*. I was contemplating giving it an *Electronic Design* Best of award, but at the time it was limited to the company's own ARM-based COM modules. This year, Gumstix turned the corner and started supporting third-party platforms such as the popular BeagleBone *(see "Arduino, Raspberry Pi or BeagleBone?" on eletronicdesign.com)*, as well as standalone microcontrollers.

The web-based design tool is the key *(Figs. 1 and 2)*. It is similar to the drag-and-drop interface used by other printed-circuit-board (PCB) design tools for placement, albeit with two major differences. First, there is no routing involved. That part of the PCB design is automatic and hidden from the designer. The other difference is the logical linking between chips and connectors. It is only possible to connect a USB interface on a COM module or processor to a matching USB connector or header. Those can be placed anywhere on the board.

A working board can be designed in an afternoon. Production boards can be delivered within three weeks. This is not a blank PCB: These boards have all the components installed. There is a fixed set-up charge of $2000, and the price of a board is available as the design progresses. Each component also has a price so that a designer can see what it will cost to add a new item.

Components change from red to yellow to green as they are connected. For example, a microcontroller or COM module requires power. Some may also need boot memory and an external reset. The system even tracks power sources and utilization so one cannot skimp on a voltage regulator.

Most systems are designed to run Linux. The system also generates files that work with the Yocto Project tools *(see "Interview: Mike Woster Discusses The Yocto Project" on electronicdesign.com)*, so the proper drivers are configured and ready to work with the customized design.



**1. Geppetto is a web-based design system and service tailored for COM platforms from Gumstix as well as third party platforms like BeagleBone.**



**2. These are some BeagleBone capes created using Geppetto stacked on a standard BeagleBone COM module.**

Geppetto has many limitations. It cannot be extended except by Gumstix, so a board can only include components in Geppetto's menu. Right now, there is only one GPS and one nine-axis sensor to choose from. There are a number of LCD displays, but only one gigabit Ethernet connector. Still, Gumstix continues to expand the menu of components.

Geppetto costs nothing to use, so it is easy to determine whether the system can complete a design to meet your needs. The set-up charge is for the initial run, and additional boards can be ordered as needed.

Many engineering design companies can help turn just about any design into a product, but it will usually take a bit longer and cost a bit more than using Geppetto. The advantage is the ability to add almost anything to the design. Custom designs make sense when building a million boards, but the dynamics change when there's fewer boards and reduced design complexity. ed