# CircuitGlue: A Software Configurable Converter for Interconnecting Multiple Heterogeneous Electronic Components

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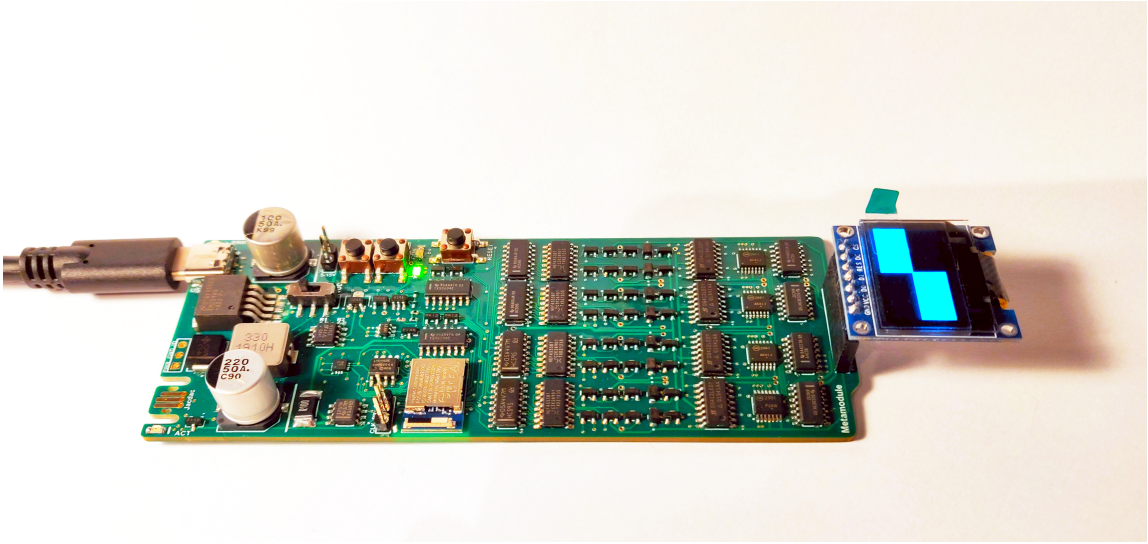

Fig. 1. CircuitGlue is a new electronic prototyping system that allows interconnecting various heterogeneous modules and electronic components with the same ease as using integrated modular systems.

When prototyping wearables, makers often use breadboarding as well as crafting techniques to embed electronics in various materials. While this approach allows seamless embedding of various electronic components, the process is tedious and only reserved for makers and engineers. This makes it harder for designers with backgrounds different from engineering, such as fashion or jewelry designers, to experiment with embedding novel technologies in their creations. On the other hand, integrated modular systems exist that offer modules specifically designed to work together. While these modules simply interconnect and are thus more fool-proof, the designer's freedom is oftentimes limited by the functionality of the modules supported by the toolkit. In our research, we developed a new electronic prototyping system called CircuitGlue (see figure 1), that allows for interconnecting various heterogeneous modules and electronic components with the same ease as using integrated modular systems. CircuitGlue is a new electronic prototyping board that allows for interconnecting heterogeneous electronic components and modules from various manufacturers with the same ease as using integrated modular systems. We propose a novel electronic prototyping board that exposes universal header pins for connecting electronic modules or components. In contrast to breadboarding, CircuitGlue is configured in software and supports various voltage ranges and digital protocols. As such, heterogeneous electronic components are connected to CircuitGlue boards

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and directly intercommunicate. Although CircuitGlue boards take up additional space and are thus harder to embed directly in wearable prototypes, they enable electronic novices to experiment with electronic functionalities (a.k.a. works-like prototypes) without being limited to modules offered by a single integrated modular system. Additionally, as the CircuitGlue board drives all connected components through software, it knows the specific characteristics of connected components and can help in creating a high-fidelity wearable prototype by assisting designers in manually wiring their electronic circuit or by outputting a custom circuit board. Figure 2 demonstrates the typical workflow using CircuitGlue. By participating in the discussions in this workshop, we hope to get early insights on potential uses and future extensions and optimizations of CircuitGlue. More specifically, we are highly interested in how people with various backgrounds can benefit from our novel system, during which stages of wearable prototyping our system offers use, how our system impacts the design and prototyping workflow of wearables, and how CircuitGlue potentially facilitates the tedious process of transitioning from an early prototype into a wearable system that can be deployed.

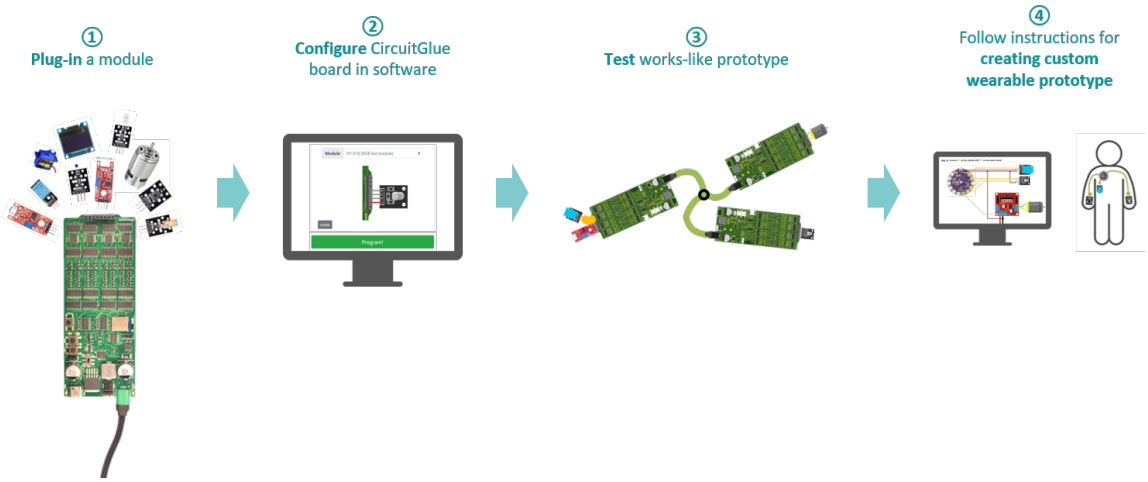


Fig. 2. The typical workflow when using CircuitGlue. (1) Pick your module or component and plug it in on the CircuitGlue board. (2) Configure the CircuitGlue board to drive the module or component. (3) Test the prototype. (4) CircuitGlue helps in creating a high-fidelity wearable prototype.