Make Cool Things With Microcontrollers!

Abstract
Anyone can learn how to make cool things with microcontrollers! Even if you've never even sewn a button, you can actually make a fun, intriguing project at this studio. Blink lights, hack your brain, play video games, turn off TVs in public places -- microcontrollers can do it all. This is for all skill and experience levels. Ages 5 to 100. You can even learn to solder! Learn all this and more from Mitch Altman, a maker/hacker with decades of teaching experience.

Keywords
Hardware (e.g., sensors, actuators, displays); Input / Interaction; Interactive Art.

ACM Classification Keywords
B.7.m. Hardware: Integrated Circuits: Microprocessors and microcomputers.

General Terms
Design, Experimentation, Human Factors.

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**Studio Proposal**

This Studio will provide a friendly, fun environment where people of all skill levels can successfully make a microcontroller project to take home. All participants will all leave this Studio knowing how to solder confidently, and knowing the basics of microcontroller projects. More advanced topics can also be learned as time permits for each individual. Participants will be able to choose amongst the following projects, all in the form of easy to make kits (which will be described in more detail later in this proposal):

- TV-B-Gone universal remote control kit
- Brain Machine kit
- Trippy RGB Waves kit
- Mignonette Game kit
- MiniPOV3 kit
- BoArduino kit
- Mash-up

The Studio will follow this schedule:

- Introduction – everyone introduces themselves, we find out what skill level people are at, and completed versions of the projects are shown so people can see the projects available to make in the Studio.
- Very brief, intuitive (for everyone) introduction to basic electronics.
- Very brief, easy, introduction to microcontrollers.
- Mitch shows everyone one good solder connection, which is all that is necessary for everyone to finish their project successfully.
- Everyone chooses the kit that intrigues them the most.
- Mitch gives one-on-one attention to each participant so that each is guaranteed to successfully finish their project.
- Mitch helps people to re-program their kit if they so desire.
- Some people may be totally satisfied at this point, but if there are more advanced people in the Studio, Mitch will teach each person anything they wish to know about microcontrollers, including firmware (which is technical term for the program that controls the microcontroller), and creating mash-ups from the kits available and some extra parts that Mitch will bring).

**Studio Learning Goals**

After taking this Studio, all participants will know that they can make cool things with electronics and with microcontrollers. This one Studio is all that it will take for each participant to feel confident in their soldering abilities. These skills are fun and useful – they are the skills used for making anything in electronics, for repairing all electronics, and for bringing a project from an idea into reality.

**Studio Project Descriptions**

All of the projects in this Studio are open-source, meaning that the complete plans are available and open for anyone to use in any way they like.

**TV-B-Gone universal remote control kit**: TV-B-Gone is a remote control with only one button that makes it fun to turn off TVs in public places. The TV-B-Gone kit can turn off TVs from up to 50 yards! [1]
**Brain Machine kit:** The Brain Machine is a project that Mitch wrote up for MAKE Magazine. It is a pair of glasses with blinking lights and pulsing sound at a sequence of brain wave frequencies for meditation. The user’s brain synchronizes to the sequence, and the user meditates. Along the way the user hallucinates beautiful colors and patterns from their imagination. [2]

**Trippy RGB Waves kit:** If there are a bunch of these kits on a table, waves of colors follow your hand as you wave it over the kits. Very trippy! [3]

**Mignonette Game kit:** This is a simple, fun, hand-held game console that comes pre-programmed a low-resolution version of PacMan, called Munch. Once built, the firmware can be hacked so that people can create their own games. [4]

**MiniPOV3 kit:** This is a small kit that you wave back and forth in your hand. It has a column of little lights blinking at such a rate so that it displays a message or picture through the space you wave it across. The message or picture can be easily programmed. This kit is also a great platform for hacking other projects from. Mitch hacked this kit to create the Brain Machine project. [5]

**BoArduino kit:** This kit is a clone of the very popular Arduino microcontroller platform. This project does nothing on its own, but Arduino was created so that people who know nothing about microcontrollers can get a project from idea to reality in a very short amount of time. There are hundreds of thousands of open-source projects to draw from online to help with just about any project anyone can imagine. [6]

**Mash-Up:** Mitch will have some extra kits and extra parts available, so more advanced participants can hack together their own projects from the kits and parts available.

**Citations**