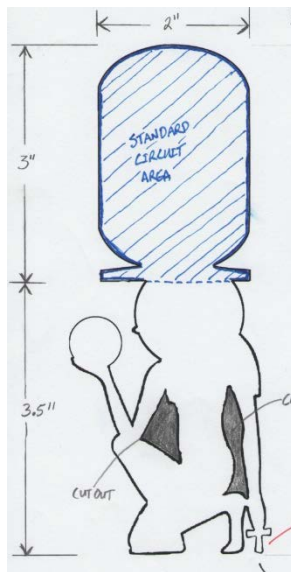


The making of the DEFCON 20 Badge

My goal for this year's DEF CON badge was to bring the elements of the crypto game from last year, and combine it with previous year's successes in an electronic design. I attempted to identify all the issues that were encountered in the fabrication previous years, and bring something great to the table for the 20 year reunion.

To combat the import issues we had encountered in the past I elected (with Jeff's blessing) to go with a U.S. fabricator. Having in years past worked for Parallax, who are based in California, I approached them with the idea of fabrication of this year's badges.

The design process of a printed circuit board that is also a badge and a crypto puzzle was atypical. Each design began with a sketch. Details of the crypto puzzle were kept separate. The total number of



designs is being kept a secret (as it functions as a part of the crypto game), but it is greater than 20. (There are multiple variants of the HUMAN badges, as was the case last year.) Attendees will be forced to interact with others to determine if and how their badge differs from their own. (Consequently this is not the only place that variant designs play a part in fostering social interactions...)

The circuit design was intended as a 'development platform' rather than a predefined circuit. In the past purpose-built circuits were produced, and hacks intended- this year I hope to see more hacks of OTHER things WITH the badges. As such the general purpose I/Os are pulled out at the top, and the badges are handed out without attaching the PS/2 or VGA connectors. (This was also to give a lighter badge for wearing during the conference, and these parts can be added later. Here also is a chance for those new to soldering to have through hole parts to solder to the board for practice.) The badge is capable of generating video, VGA, and terminal emulation.

The only requirements for programming the badge are a USB connection to a computer and a programming environment. The USB connection can also be utilized as a serial communications port (for debugging, message output, etc.). RAM on the badge can be loaded for code testing, without

blowing out the program contained in the EEPROM. This allows for attendees to play with programs without losing the pre-programmed firmware on the badge. (Of course the EEPROM can be written to as well, freely.)

Programming can be in ASM, C, or SPIN (a higher level language that is chip specific).

Each badge has eight 32-bit processors, which can all run concurrently, allowing for parallel processing. (This also removes the need for interrupts, time slicing, etc.) Each of these processors can be run at various speeds, and a common memory area is shared among processors allowing for inter-processor communications.

The badges went through a redesign at least for times (requiring ALL design files to be updated each time!).

I was tracking total design and build hours, but stopped once the number of hours per week began exceeding that of a second full time job.



In the end DEF CON has a badge that was fully produced in the U.S., a multi-tiered, complex crypto puzzle game, and a take home μ controller development board. In the end I just hope everyone has a good time this year at DEF CON- if they do, I'll consider my work successful.

-Ryan "LostboY 1o57" Clarke

