

The DEFCON 18 Badge: Fifth Time's the Charm

A lot has happened since DEFCON's first electronic badge five years ago.

The badges have blinked patterns of LEDs, allowed you to create your own custom scrolling text messages, turned off your television, transferred files from a SecureDigital card over infrared, and pulsed to music using Fast Fourier transforms. People have hacked their badge to become a flame thrower, an audio VU meter, a password generator, an amusement park game, an anti-surveillance system, a blue box, and a polygraph, just to name a few. One group even turned my *Ode to the DEFCON 15 Badge* poem into a rap song.

We've used technologies like capacitive touch sensors, jumbo LEDs, RGB LEDs, MEMs-based microphones, and microcontrollers ranging in size from tiny 6-pin devices to powerful 64-pin behemoths. We've used small coin cell batteries and large camera batteries. We've supported accelerometer and 802.15.4/ZigBee wireless features along with a bunch of hidden and secret modes that most people never took advantage of.

Badge development has happened on airplanes, in shuttle buses, on my honeymoon, in hotel rooms, and while on safari. Badges have arrived with plenty of time before DEFCON and twice they've arrived the first day of DEFCON, much to the chagrin of thousands of people who had to stand in line to exchange their temporary paper badge for the real deal. And, we've run out of badges every time (contrary to popular belief, estimating the number of people who will be coming to DEFCON is not a trivial matter).

The DEFCON 18 Badge is a culmination of prior years' experiences, both good and bad.

The pièce de résistance is a 128-by-32 reflective cholesteric LCD by Kent Displays. This module was originally designed for use in Verbatim InSight USB Portable Hard Drives and has since been made available to other customers. A key feature of the display is that it requires no power to retain the image on the screen, making it ideal for battery-life challenged applications like the badge.

A Freescale MC56F8006 Digital Signal Controller (<http://tinyurl.com/mc56f8006-info/>) serves yet again as the heart of the unit. For those keeping score, these are the pieces we tried to get through Chinese Customs last year for DEFCON 17 after our original quantity was detained. These were also held, but eventually released to me two months after the conference. Firmware development is done with CodeWarrior for 56800/E Digital Signal Controllers Special Edition (<http://tinyurl.com/mc56f8006-dev/> and on the DEFCON CD).

In our quest to create a never-been-done-before artistic element, we laser engraved the DEFCON 18 artwork onto aluminum substrate printed circuit boards, a feat questioned even by e-Teknet, our trusted fabrication and assembly facility. We avoided Customs delays by shipping through Macau, a special administrative region with different rules and regulations than mainland China. We reached out to the DEFCON community to invite people and groups to hide functionality or chunks of data within the badge. We've listened to your comments and provided a USB connection for simple firmware reprogramming via static bootloader, a JTAG footprint for those who accidentally brick their badge during hacking, and a command-based API for controlling the LCD to make it easier for non-hardware people to get involved in badge experimentation.

My *Making the DEFCON 18 Badge* presentation covers the entire design and development process of the badge, along with details of badge functionality. All engineering documentation,

including schematics and source code, is available on the DEFCON CD and my web site (<http://www.grandideastudio.com/portfolio/defcon-18-badge/>)

Whether this is your first time at DEFCON or you're a seasoned regular, I strongly encourage you to poke around and see what your badge can do. Modify it, break it, learn something new with it. Participate in the Badge Hacking Contest where the most ingenious, obscure, mischievous, or technologically astounding hacks will win prizes and fame. Use it to teach your friends or your kids about electronics. Design a new product with it. Sell it to someone else. Just don't let it go to waste.

A lot has happened since DEFCON's first electronic badge five years ago.

Within the hacker community, conferences and parties using electronic badges have become the norm. What used to be a unique exception is now the rule. As one who doesn't like to follow trends, I don't know what next year will bring. Just expect the unexpected.



Joe
\$KINGPIN\$