Ode to the DEFCON 15 Badge
Joe Grand (Kingpin)

170 hours of total time spent
2 nights of my honeymoon (oh, how I lament!)
3 circuit board revisions to get it all right
863,600 total components bring them to light
6,800 hackers wearing the badge in all its glory
If you want to learn more, please read this fine story

A matrix of 95 LEDs (5 columns by 19 row)
Two coin cell batteries make the current flow
Six text cutouts and soldermask colors to show
If you're a human, speaker, goon, vendor, press, or uber bro

On power up the badge will not make a peep
But fear not, that's by design, it is only asleep
Touch the top icon (it's a button, really)
And get a scrolling text message intended for thee

Touch the top icon yet again (just trust me)
And you'll move to the next mode for custom text message entry
Hit the bottom icon to begin your noble quest
Then use either icon to cycle through the list
Tap both icons to save a character to your queue
16 letters long is the maximum we can do
When you're all done, seek out the solid block
Tap both icons again and on the screen your message will walk

The next mode sets the speed of your inscription
You can change it like a baud rate or a doctor's drug prescription
Select the scroll velocity between the numbers 1 and 5
Which goes from slow and boring to a thrilling autobahn drive
(Remember to tap both icons for the badge to come alive)

Next we arrive at our last badge state (finally)
A special treat known as persistence-of-vision or POV
Wave the badge in front of your eyes in one direction
And a secret message appears magically like the morning's first erection
If all you see is a jumbled mess of bright lights
Try hiding in the darkness, squinting your eyes, or changing those hard-coded bytes
(When your badge is not in use, set the mode back to snooze)

The source code is open and the schematics are free (as in beer)
So now you can be a hardware hacking engineer
Unpopulated footprints for a wireless transceiver and accelerometer
If you don't like how the badge acts, then hack it and make it better
(You might even win some development tools, a T-shirt, or a scarlet letter)

For the blood, sweat, and tears behind the scenes of the DEFCON badge
Come to my talk on Friday morning, it’s sort of like the hajj (ok, not really)
Business in front, party in back (yeah, that's a mullet)
I’m Joe Grand aka Kingpin from the L0pht, a hacker not a poet

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This year's badge is based around a Freescale MC9S08QG8 microcontroller and contains a matrix of 95 surface-mount LEDs (5 columns by 19 rows) to allow user-customizable scrolling text messages. It requires two CR2032 3V Lithium coin-cell batteries. Optional circuitry (fully designed, but unpopulated on the final badge circuit board) supports a Freescale MMA7260QT Triple-Axis Accelerometer for motion-control applications and MC13191FC 2.4GHz RF Transceiver for 802.15.4 or ZigBee applications. It's completely hackable. Wear it, use it, modify it, break it, learn from it.

Complete source code and schematics are on the DEFCON CD and also available at: http://www.grandideastudio.com

The software development environment, Codewarrior Development Studio for HC(S)08 Microcontrollers, is available for free (up to 16KB) from: http://www.freescale.com/codewarrior

Hardware debugging can be done with the SPYDER08 module (http://www.freescale.com/webapp/sps/site/prod_summary.jsp?code=USBSPYDER08) or P&E Micro HCS08 MultiLink USB-ML-12 (http://www.pemicro.com/products/product_viewDetails.cfm?product_id=33)

The top three most obscure, obscene, mischievous, or interestingly hacked badges will be recognized and awarded at the DEFCON Award Ceremonies on Sunday. Yes, it's purely subjective and I'm the judge. We'll have a table set up in the vendor area with a soldering iron, tools, and extra components for your hardware hacking pleasure, a development station set up for your firmware hacking pleasure, some folks from Freescale and e-Teknet for your engineering support and social interaction pleasure, and some t-shirts for your styling pleasure.

See you there.

Kingpin
