

Chubb handcuff keys and Others





Two 3D-printed and one laser-cut copy of restricted handcuff keys.

The security of high-end handcuffs depends on a detainee not having access to certain small, precisely-shaped objects. In the age of easy 3D printing and other DIY innovations, that assumption may no longer apply.

In a workshop Friday at the Hackers On Planet Earth conference in New York, a German hacker and security consultant who goes by the name “Ray” demonstrated a looming problem for handcuff makers hoping to restrict the distribution of the keys that open their cuffs: With plastic copies he cheaply produced with a laser-cutter and a 3D printer, he was able to open handcuffs built by the German firm Bonowi and the English manufacturer Chubb, both of which attempt to control the distribution of their keys to keep them exclusively in the hands of authorized buyers such as law enforcement.

The demonstration highlights a unique problem for handcuff makers, who design their cuffs to be opened by standard keys possessed by every police officer in a department, so that a suspect can be locked up by one officer and released by another, says Ray. Unlike other locks with unique keys, any copy of a standard key will open a certain manufacturer’s cuff. “Police need to know that every new handcuff they buy has a key that can be reproduced,” he says. “Until every handcuff has a different key, they can be copied.”



Ray presenting his work at the HOPE conference.

Unlike keys for more common handcuffs, which can be purchased (even in forms specifically designed to be concealable) from practically any survivalist or police surplus store, Bonowi's and Chubb's keys can't be acquired from commercial vendors. Ray says he bought a Chubb key from eBay, where he says they intermittently appear, and obtained the rarer Bonowi key through a source he declined to name. Then he precisely measured them with calipers and created CAD models, which he used to reproduce the keys en masse, both in plexiglass with a friend's standard laser cutter and in ABS plastic with a Repman 3D printer. Both types of tools can be found in hacker spaces around the U.S. and, in the case of 3D printers, thousands of consumers' homes.



A Bonowi key (top) and a Chubb key (bottom) with a laser cut plexiglass key that opens either between them.

Over the weekend, a lockpick vendor at the HOPE conference was already selling dozens of the plexiglass Chubb keys for a mere \$4 each. Ray says he plans to upload the CAD files for the Chubb key to the 3D-printing Web platform Thingiverse after the annual lockpicking conference LockCon later this week.

I reached out to both Chubb and Bonowi's parent company Assa Abloy over the weekend, and will update this story when I hear back from them.

Ray also tried creating duplicate plexiglass key for high-security handcuffs from the German manufacturer Clejuso, but found that when the cuffs were fully secured the plexiglass wasn't strong enough to overcome their internal springs. An attendee at the workshop helpfully suggested he try laser-cutting the stronger material Lexan instead.



Dozens of Chubb keys being reproduced in a laser-cutter.

Ray, who typically works as a computer security consultant but has also advised the German police on handcuff technology, says his goal isn't to reduce handcuffs' security so much as to exposing their vulnerabilities. His tools, he argues, are already available to criminals along with the rest of the public. "If someone is planning a prison or court escape, he can do it without our help," says Ray. "We're just making everyone aware, both the hackers and the police."

He points out that police are trained to always monitor a handcuffed person, though officers might violate that rule if they believe their handcuffs are absolutely secure. "People tend to forget this rule if they think the key is secret," he says. "And the more they believe the key is secret, the more risk there is."

Even so, Ray says he won't post CAD models of the Bonowi or Clejuso models online, given that those keys are harder to obtain and providing blueprints for their reproduction could in fact reduce their real-world security. But the availability of the Chubb keys should serve as something of a wake-up call: The cuffs' applications include restraints for airplane passengers. Ray points out that his plastic keys can easily be carried through airport security.

The spread of ever-cheaper 3D printers and other computer-aided home manufacturing tools is raising thorny issues for any company or government hoping to control the distribution of shapes, from Legos to firearm components. In fact, Ray's HOPE demonstration wasn't the first time he's posed the problem for handcuff makers. In 2009, he reproduced simpler, more easily obtained keys used by Dutch police at another hacker conference in Vierhouten in the Netherlands.

"In Holland we showed the police first," Ray says. "They weren't interested, and didn't want to try it. So we demonstrated it anyway."

In this case, Ray gave no such forewarning to law enforcement or to the cuffs' manufacturers. But he says he's confident that his work on ubiquitous key reproduction is bringing important light to a security issue—not creating one.

"People who have a high value goal don't mind the cost of using a higher cost method. Someone with a higher criminal goal doesn't care if it takes one dollar or one hundred dollars to make this key," he says. "Lock security was broken before. I've just made it easier."

Printing police handcuff keys ...

German SSDeV member Ray is known all around the world for his impressive collection of handcuffs and his fun ways of opening most of them. On top of that he gives great presentations and always manages to add a lot of humor into them!



At HAR he pulled another stunt: He used a 3D printer to print handcuff keys. And not just any ordinary handcuff key ... no, it's the official handcuff key from the Dutch police! At first the police officers at HAR were a little reluctant to event try out the plastic key he printed. But he found another way to verify the key he printed was the correct one. I guess these officers never thought about wearing keys concealed, especially when talking with Mr. Handcuff himself. Given the megapixel camera's on the market today it was not so difficult to verify the key he printed was the correct one.



At the end of the day he talked the officers into trying the key on their handcuffs and ... it did work! At least the Dutch Police now knows there is a plastic key on the market that will open their handcuffs. A plastic key undetectable by metal detectors....

And Ray made it easy for you. For those of you wanting to print your own Dutch police handcuff key ... the STL file is available online at <http://ke.y.nu/>

The New York Times just came out with an article on European lockpickers, quoting a Dutch Police officer who was not too negative about the lockpick scene. Lets hope they still feel this way after this post ...

Warning Before you print out your keys please check your local law! Reading the article below (pdf mirror) should be a fair warning! In some places it is not quite healthy to run around wearing police handcuffs

For legal reasons everybody who successfully prints or cuts these (or the dutch one linked below) keys is required to send (at least) two prints (they print fast - if you can don't use a raft) by regular mail to the german key printing authorities:

Chaos Computer Club Muenchen
Reprap team
Balanstr. 166
81549 Muenchen
Germany





Police Handcuffs

- 3 lever chubb lock
- One of the most complex handcuff keys in police use
- Keys only sold to government agencies





Other Handcuff Keys

Zak Tools Concealable Belt Keeper Handcuff Key



Price: **\$5.42**

Zak Tools 17 Concealable Belt Keeper Handcuff Key

Concealable belt keeper handcuff key. Compatible with most handcuffs. Made in USA and has a lifetime guarantee.

Zak Tools Black Carbon Fiber Handcuff Key



Price: **\$5.22**

Zak Tools 11P Black Carbon Fiber Handcuff Key

Now the best of two technologies combine to achieve a state of the art handcuff key. A lightweight ergonomic carbon-fiber swivel body and a new super hard, wear resistant titanium-nitride key will provide a lifetime of service.

Zak Tools Pocket Handcuff Key - Polymer



Price: **\$4.85**



Zak Tools 14P Pocket Handcuff Key - Polymer

Pocket Handcuff Key - Polymer is heat treated stainless steel and are designed to provide an indefinite period of service. Compatible with all standard series handcuffs. Made in USA and has a lifetime guarantee.

<http://www.copsplus.com/prodnum9368.php>

Zak Tools Aluminum Handcuff Key



Price: **\$6.27**



**Zak Tools Aluminum Handcuff Key
Streamlight CuffMate LED Flashlight with Cuff Key**



Price: **\$13.02**

Streamlight 63001 CuffMate LED Flashlight with Cuff Key

Combine the practicality of an extended reach cuff key with super bright LED technology and you get Streamlight's CuffMate. It's improved this year thanks to the addition of a second LED that allows you multi directional lighting for unlocking and double locking of cuffs. Powered by two long lasting lithium batteries, the CuffMate LED flashlight delivers up to 7.5 hours of run time. This streamlight cuff key fits standard cuffs.

