Tracking Device Teardown

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Teardown
Teardowns provide a look inside a device and should not be used as disassembly instructions.

Featured Guide
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We partnered with Wired to bring you a peek inside an FBI car-tracking device. The device is similar to the one Yasir Afifi found underneath his car. If you're curious where this one came from, Wired has posted a writeup about Karen Thomas, the woman who found this tracker under her car.

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Tracking Device

There is not yet a Tracking Device repair manual, but you can start one!

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Step 1 — Tracking Device Teardown

Edit

We finally have one of these on the teardown table! Being in its presence, we can almost *feel* our civil liberties being flushed down the toilet.

Before we whip out the blowtorches and jackhammers, here's a look at the entire tracking system.

Clockwise from the top, the system consists of:

- Battery pack
- GPS antenna
- Transmitter/receiver unit
- Magnetic mounting bracket

The components of the system are all attached to the tracked vehicle with extremely powerful magnets. Some were so stubbornly attached that they ripped out of the mounting brackets to forever remain stuck on the undercarriage of the host vehicle.

Step 2

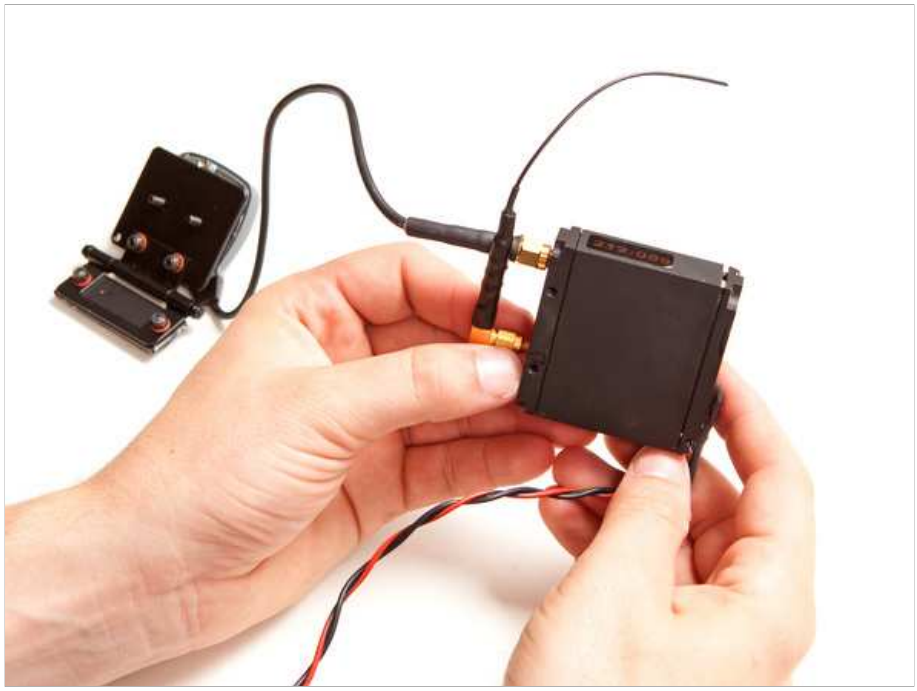
Edit

Wondering what kind of technology keeps the tracking device powered? Let's remove the battery pack's end cap and find out.

The device is powered by four lithium-thionyl chloride (Li-$SOCl_2$) D cell batteries.

> Each cell is good for 13,000 mAh! That's about double the capacity of the iPad 2's battery.

These cells are suited for extremely low-draw applications where longevity is needed, making them ideal for powering an always-on transmitter/receiver. Their service life is rated at 10 to 20 **years**.



Step 3

Edit

To begin tearing the device apart, we detached the two antennas from their screw-in mounts on the transmitter/receiver module.

The short antenna we disconnected in the first picture is responsible for transmitting the location signal to transponders that the FBI would use to find you.

The larger antenna is for receiving GPS signals from satellites orbiting far above the earth's surface.



Step 4

Edit

Removing a few Phillips screws allows us to access the innards of the GPS antenna.

In keeping with the non-permanent mounting solutions, the GPS antenna is attached to its bracket with a hefty piece of Velcro.

A quick peek at the antenna board indicates it was manufactured by SIgem, a company that partnered with Tyco in the early 2000s to make GPS components.


Step 5

Edit

Let's turn our attention back to the transmitter/receiver module.

A few screws are all that remain between us and the innards of this invasive device.

It seems that this rear cover is simply a method to connect the module to power. Presumably, power sources (batteries) of different shapes/sizes /capacities can be connected through the same plate to make the tracking device more universally installable.

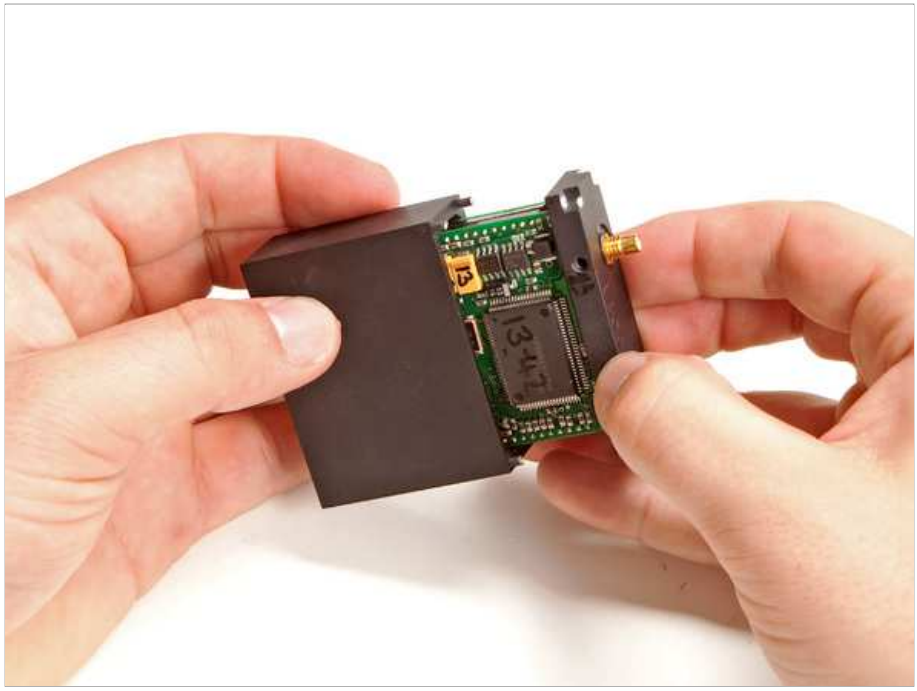


Step 6

Edit

To get to the brains of the module, we focus on the other end cap.

The FBI really did not want anyone tampering with the innards of their tracking devices. The screws were coated with so much threadlocker that we had to break out the power drill and eliminate the screw heads.





Step 7

Edit

Upon successfully drilling out all the screw heads, the outer case slides right off the transmitter/receiver assembly.

The two modules can be split apart to examine their circuits.

The small blue wire connects the GPS antenna to the GPS receiver board.

After disconnecting the GPS board, we can take a closer look at both components.

Step 8

Edit

The module providing the GPS signal processing on this device is a µ-blox GPS-MS1 that's sort of ancient in the realm of modern electronics.

It was released June 29, 1999!

It features an astonishing 0.125 MB of SRAM and 1 MB of flash memory.

The backup battery on its reverse side powers a real time clock and maintains the GPS connection should the main power supply be interrupted.

The slightly imperfect alignment of the SMD components on the board indicates that the FBI hand-soldered them to the board and tailored the component choices to their specifications.

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Step 9

Edit

The larger of the two boards contains the connections for both antennas and is responsible for the RF side of the tracking device. Its notable chips include:

XEMICS XE1201 Ultra low power single chip transceiver

The XE1201 allows for data transmission and data reception in half duplex mode.

RFM RF1172 SAW (surface-acoustic-wave) filter

The RF1172 provides front-end selectivity (the capability to separate signals in one frequency from all other frequencies) in 433.92 MHz receivers.

Typical applications of this filter include wireless remote-control and security devices operating in Europe under ETSI I-ETS 300 220.

Step 10

Edit

Tracking device Repairability Score: -10 out of 10 (10 is easiest to repair)

The FBI will find you if you find their tracking device.

You cannot choose to be not tracked by the FBI.

You can legally be tracked by one of these units.

We'll be right back, the FBI is knocking on our door.

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