



**Cellebrite**

Digital intelligence  
for a safer world

# 4PC/Touch/UFED InField

Practical guide: Qualcomm EDL extractions

November 2017

# 1. Practical Guide for Qualcomm EDL Physical Extractions

## 1.1. Introduction

Cellebrite UFED includes several methods that can potentially extract Qualcomm-based devices, using a chipset feature known as EDL (Emergency Download) mode. This mode is designed to allow low-level access to the chipset for device analysis, repair or re-flashing. Extraction using EDL is generally easier and faster than most ISP, JTAG or Chip-off methods. More importantly, in the future UFED will introduce breakthrough user-data decryption capabilities based on the EDL mode (reachable as a lock-bypassing method), which are otherwise impossible via alternative low-level ISP or Chip-off processes.

While several common conventions exist, there is no predefined standard to enter EDL and device manufacturers can define how their devices enter the emergency download mode, if at all.



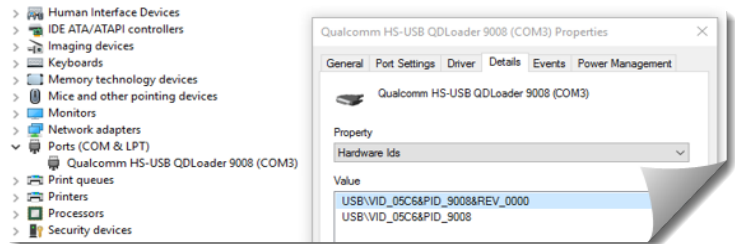
Some manufacturers have implemented their own flashing/repair mode protocols (e.g., Samsung's Odin, LG's LAF), and completely avoid any standardized access to EDL.

An interesting feature of the Qualcomm chipset is that on many boot failures the chipset will unavoidably default into EDL mode (to allow repair). This opens a window of opportunity for advanced forensics examiners to intentionally introduce faults into the boot process and trigger EDL, gaining a physical extraction as enabled by UFED. In the general case, UFED will attempt to automatically detect, trigger or recommend several known methods to enter EDL, but in some cases hardware intervention is required.

## 1.2. Detecting EDL

Determining a device has successfully entered EDL mode is not always straightforward, as often the device screen will remain off or black with no visible indication of a mode change. EDL is typically identifiable by a USB device with hardware IDs VID/PID [05C6/9008] (with some rare exceptions<sup>1</sup>), observable in the device properties on Windows or lsusb on Linux.

On Windows machines with the appropriate driver installed, you may detect a “Qualcomm HS-USB QDLoader 9008” device or similar in the Device Manager. In the absence of a matching driver the device may appear as “QHSUSB\_Bulk”.



## 1.3. Known software techniques to enter EDL

- **Key combinations:** This is the first method to try. Manufacturers can choose any button combination that makes sense on their device. The most common option to try from a powered off state is: Hold Vol Up + Vol Down while connecting USB  
 Although other combinations may apply (Vol Up, Vol Up + Vol Down + Power, etc). Some vendors have added early boot menus that allow the user to explicitly enter a mode (recovery, fastboot, download).
- **ADB:** A nearly ubiquitous method to enter EDL resides in a command available from an authorized ADB session (you can simply try: `adb reboot edl`). This is mostly interesting and useful for obtaining a physical extraction of an unlocked device.  
 This is what UFED attempts when trying ‘Generic Qualcomm ADB’.
- **fastboot:** An alternative vendor-specific method exists from the fastboot mode, which is sometimes reachable by other key combinations (usually Vol Down + Power).  
 Try `fastboot oem edl` or sending the `reboot:edl` command using a custom fastboot client.
- **FTM:** Some vendors have implemented the FTM mode (hold Vol Down while connecting the USB) which in fact exposes an ADB interface. UFED can usually detect this mode and continue to extract normally using ‘Generic Qualcomm ADB’.

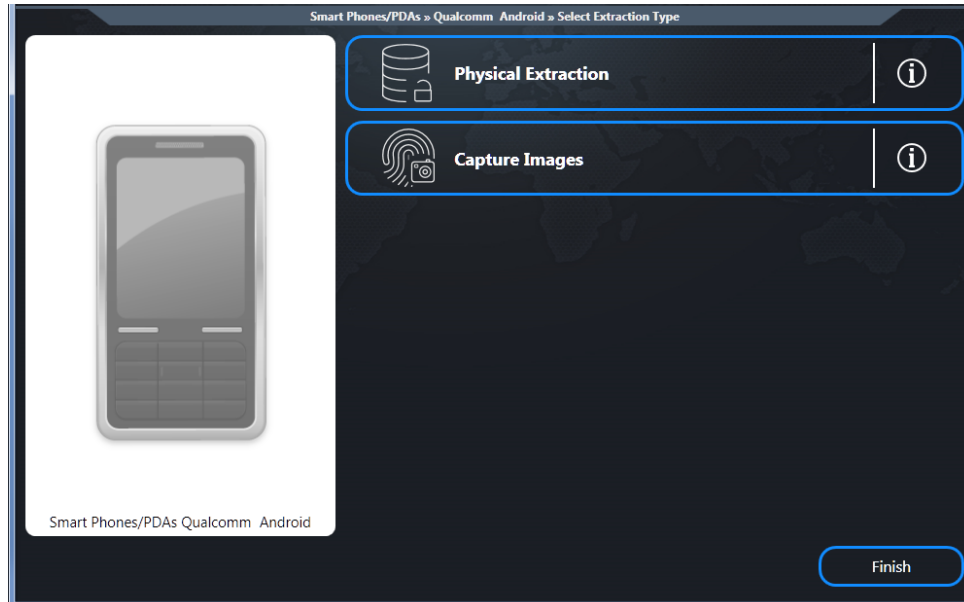
<sup>1</sup> Notably: ZTE has an EDL-like mode detected as VID/PID [19D2/0112].

## 1.4. Known hardware techniques to enter EDL

- **EDL Cable:** Some devices will detect a special cable that will signal the device to enter EDL. Such cables can be obtained in various stores, and will be supplied by Cellebrite to all customers.
- **Test points:** Some vendors have added test points that, when shorted to ground, will put a device into EDL. Depending on the board, they may be easily reachable, even without significant disassembly.
- **eMMC faults:** The advanced examiner (skilled with ISP/Chip-Off techniques) can utilize any non-destructive method to introduce faults to the eMMC chip reading on boot. Given a pinout chart for the specific board, you may short either of the CMD, CLK, D0 lines to ground temporarily during power on. Shorting the power lines is not recommended, although accurately timed VCC glitching may achieve similar results as experimented in Cellebrite labs.

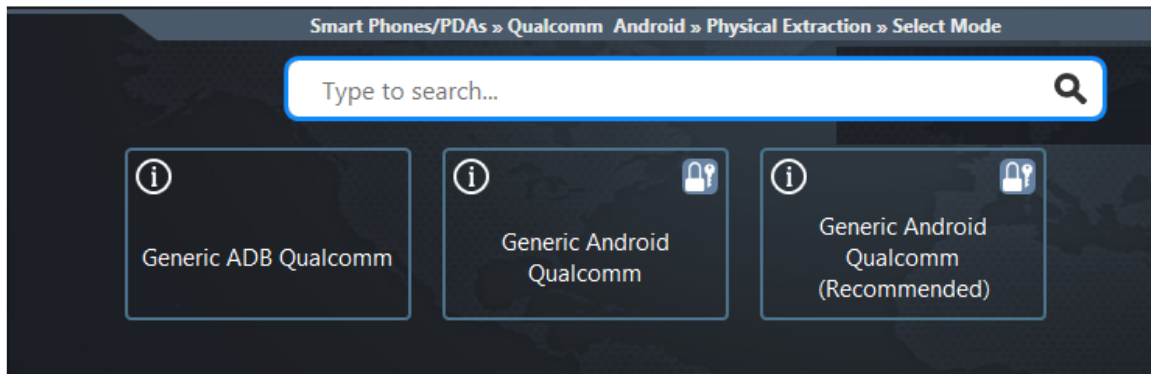
UFED supports dozens of confirmed and tested devices, but may support hundreds more in a generic fashion<sup>2</sup>. Extended generic support is provided (but not strictly limited) to these chipsets: MSM8909, MSM8916, MSM8936, MSM8939, MSM8952.

The related method appears under some device profiles in UFED and also as a Generic method: From the home screen select **Mobile device** and search for the keyword "Qualcomm" then select **Smart Phones/PDAs Qualcomm Android > Physical Extraction**. Under this extraction you will find the EDL methods offered by UFED (including ADB and Bypass lock capabilities). See examples below:



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<sup>2</sup> Generic support is provided on a best-effort basis. Device model variance, firmware versions and security patch level limitations may apply.



If you have learned of additional methods to enter EDL please share them with the community. If you have a suggestion on how to detect it and make UFED better, please contact us at [support@cellebrite.com](mailto:support@cellebrite.com) with "EDL extractions" in the title.