Michigan State Police

Vehicle Forensics

Digital Evidence from Infotainment Systems

GENIVI Virtual AMM

October 2020

D/F/Lt. Jim Ellis

Michigan State Police

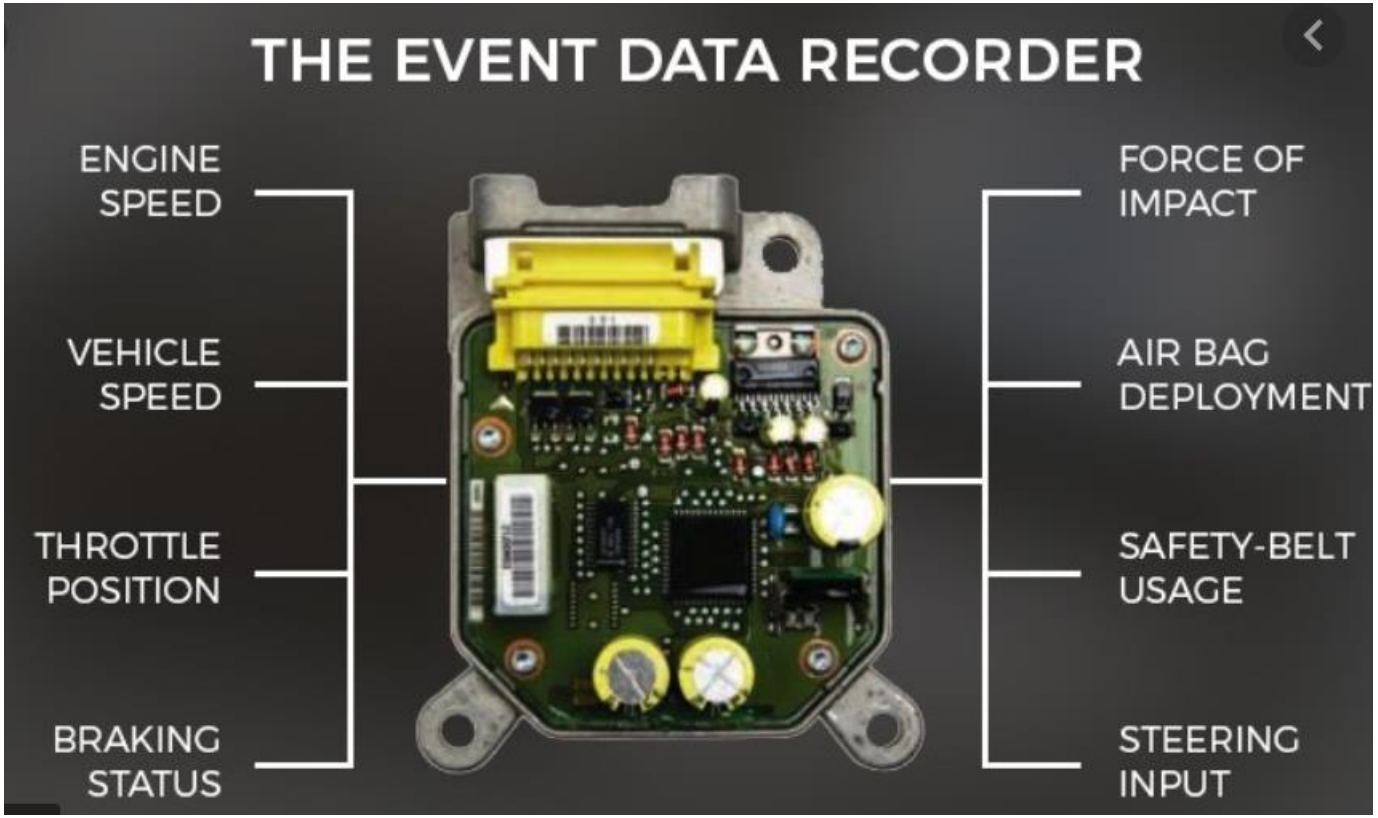
MSP Cyber Overview – Office Locations

Lansing
Livonia
Bridgeport
Coldwater
Grand Rapids
Traverse City
Marquette

Topics

- Infotainment & Telematics
- Recoverable Evidence
  - Vehicle Events
  - Driver Events
- Methods of Acquisition
- Case Examples
- Summary

Event Data Recorder - EDR



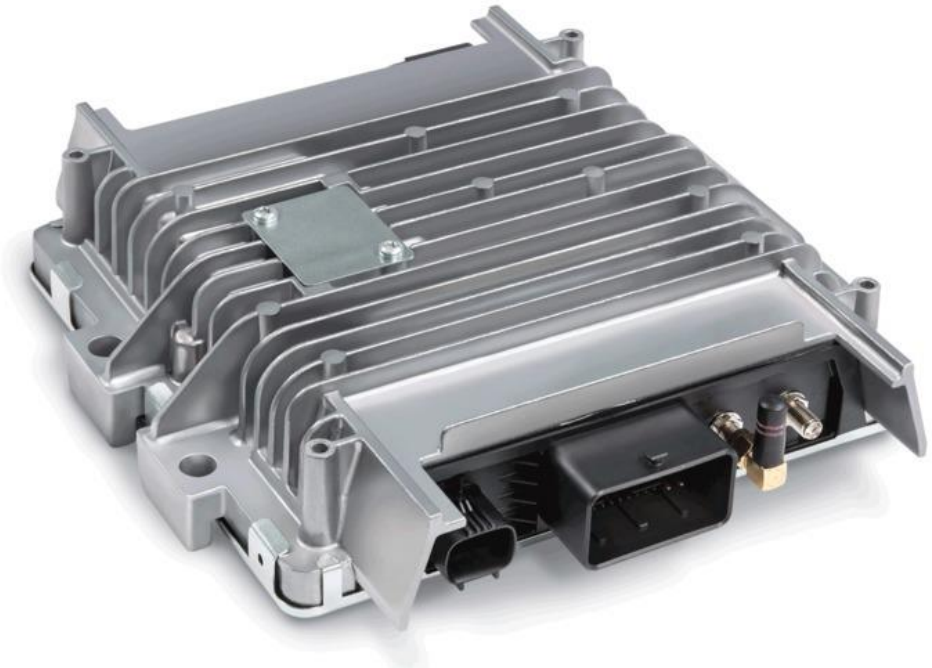
The Original Black Box

Infotainment Systems

Entertainment & Information Systems
for Vehicle Occupants

Telematic Systems

Telecommunications & Informatics
Vehicle Tracking, Fleet Management, and More



What Data can be Extracted – Vehicle Events

- Vehicle Events – sampling*
  - Doors Opening/Closing
  - Acceleration/Deacceleration
  - Odometer Readings
  - Ignition Cycles
  - Speed Logs
  - Gear Shifts
  - Braking
  - Seat Belts
  - Cruise Control Usage
  - Wipers/Headlights On/Off
  - Passenger Air Bag Status On/Off

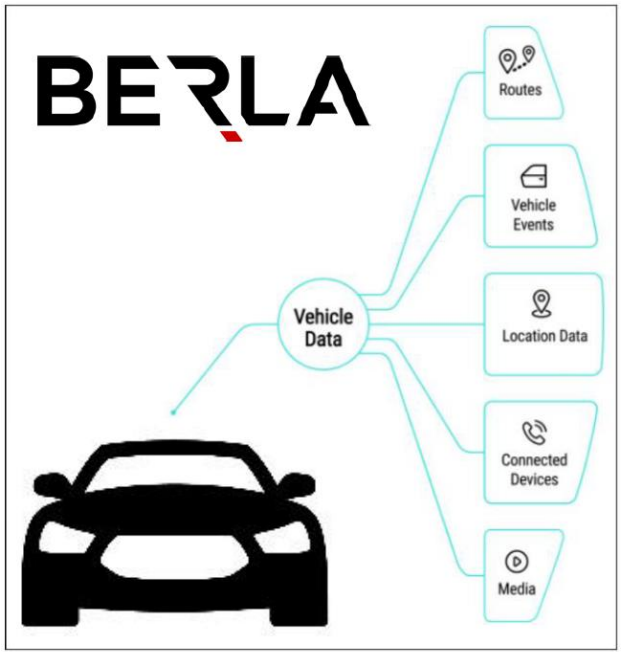
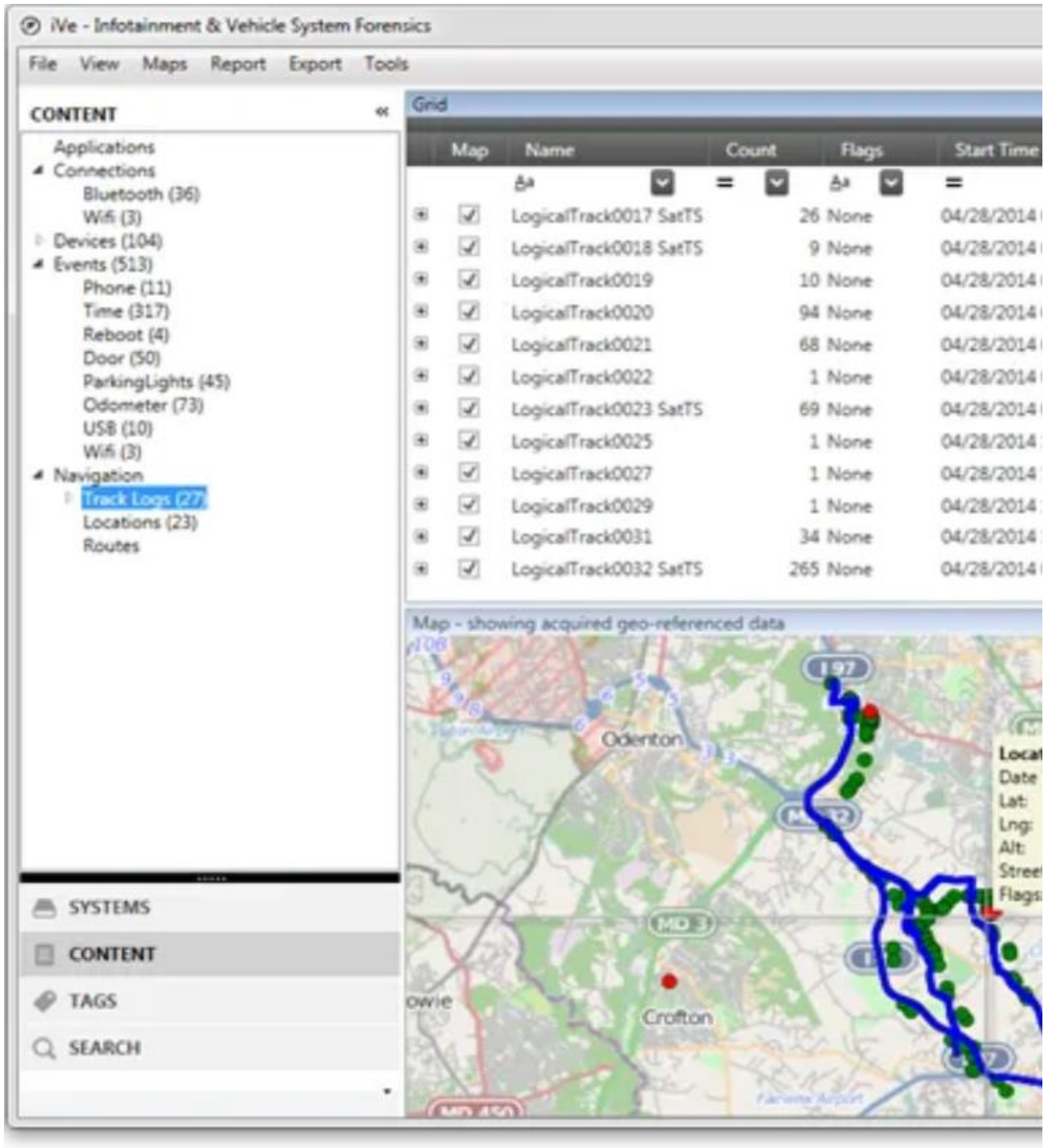


Image Source: berla.co

** Logged Events are dependent on Vehicle Year, Make, Model, Options*

What Data can be Extracted – Driver Events

- Driver Events
  - Connected Devices
  - Call Logs
  - Location & Navigation Data
  - Emails
  - SMS/MMS Messages
  - Photos
  - Social Media Data
  - Contact Lists
  - Bluetooth Connections
  - WiFi Connections

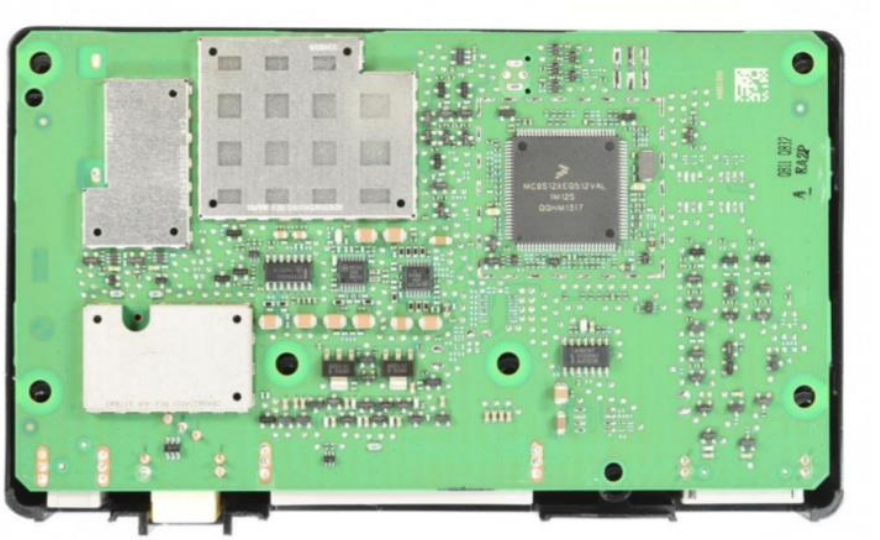


Data (Evidence) Retrieval

- Software/Hardware capable of interrogating “The Box”
- Retrieval of Infotainment and Telematic system data
- Extraction and Analysis Tools
  - Non-Invasive
  - Invasive
  - Destructive
- Often Key Evidence or Only Evidence
- Patterns of Life

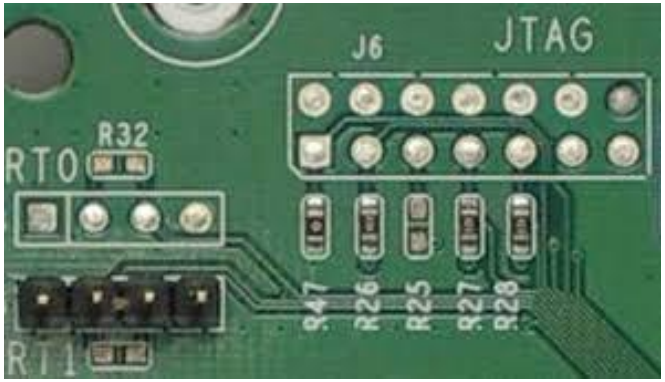
Advanced Retrieval Methods

- JTAG
- ISP
- Chip-Off

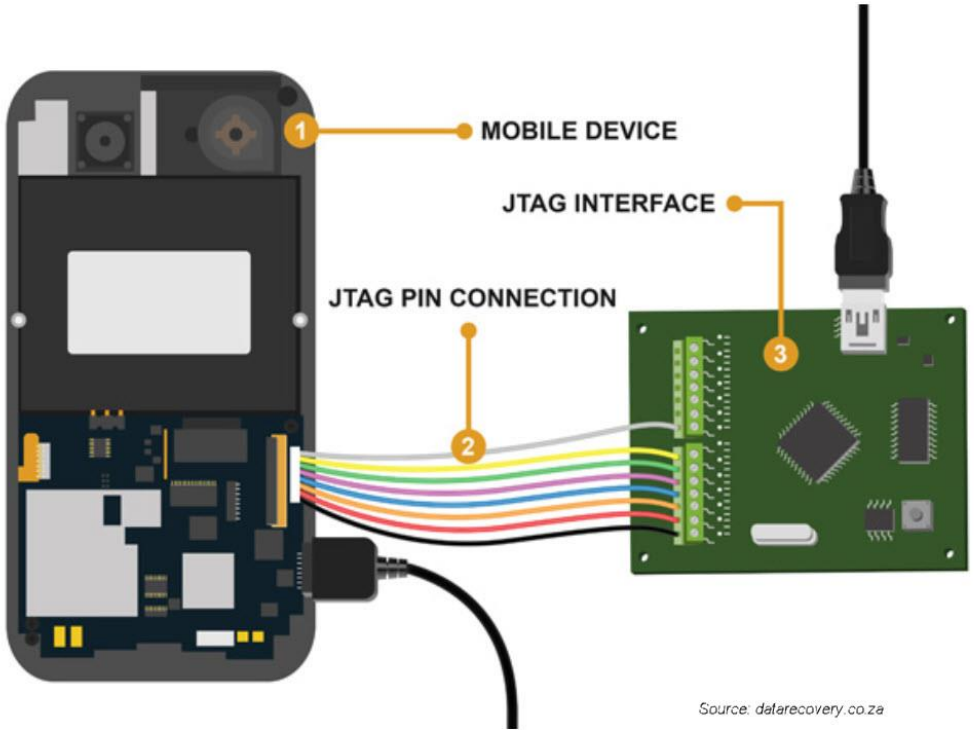


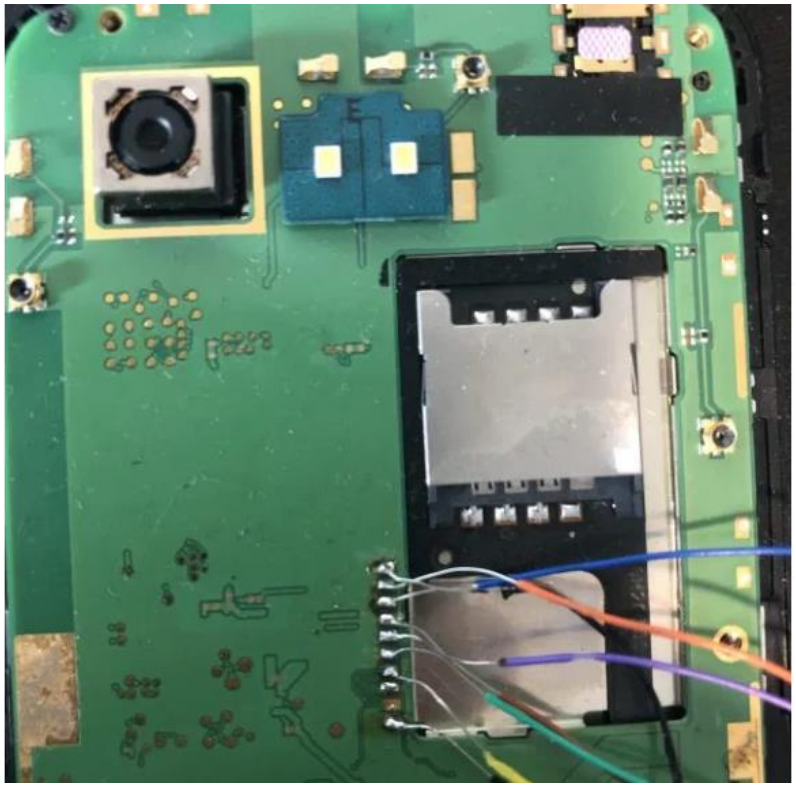
JTAG TAPS

- Circuit Board Ports or Test Access Ports (TAPS)
- Communicate w/processor and memory

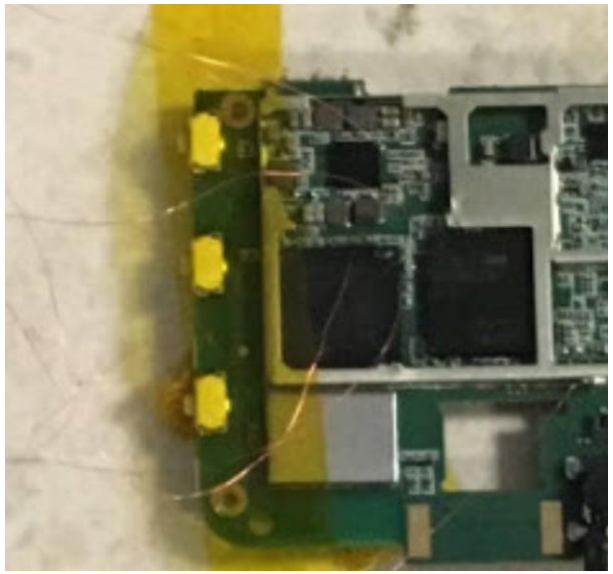


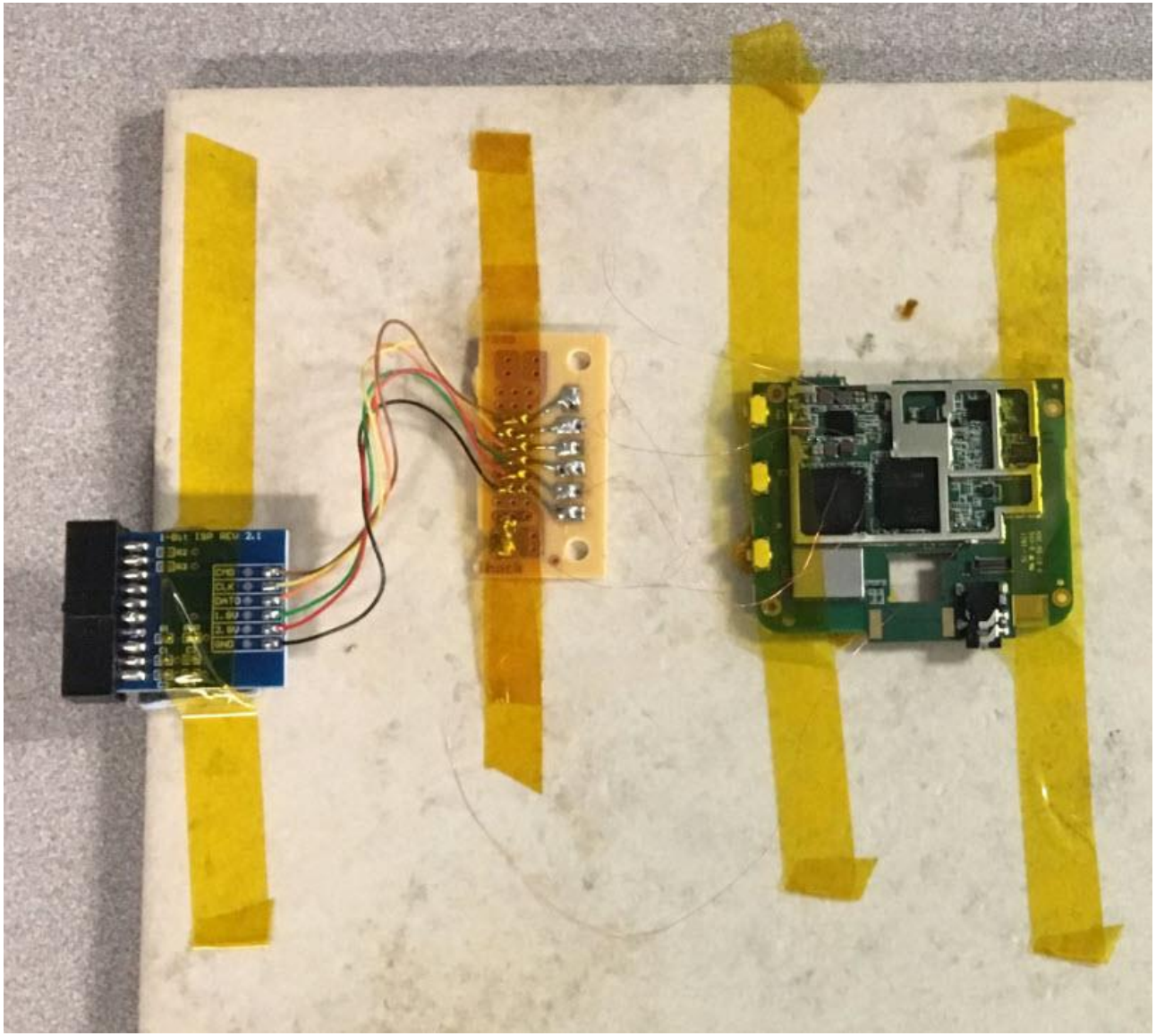
JTAG Example



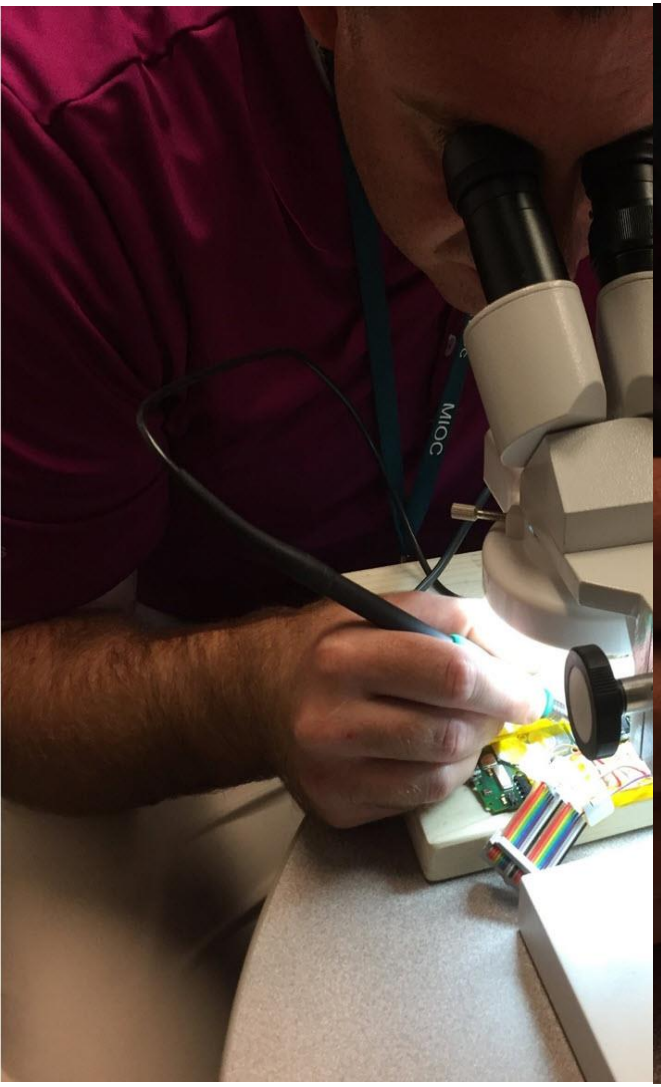


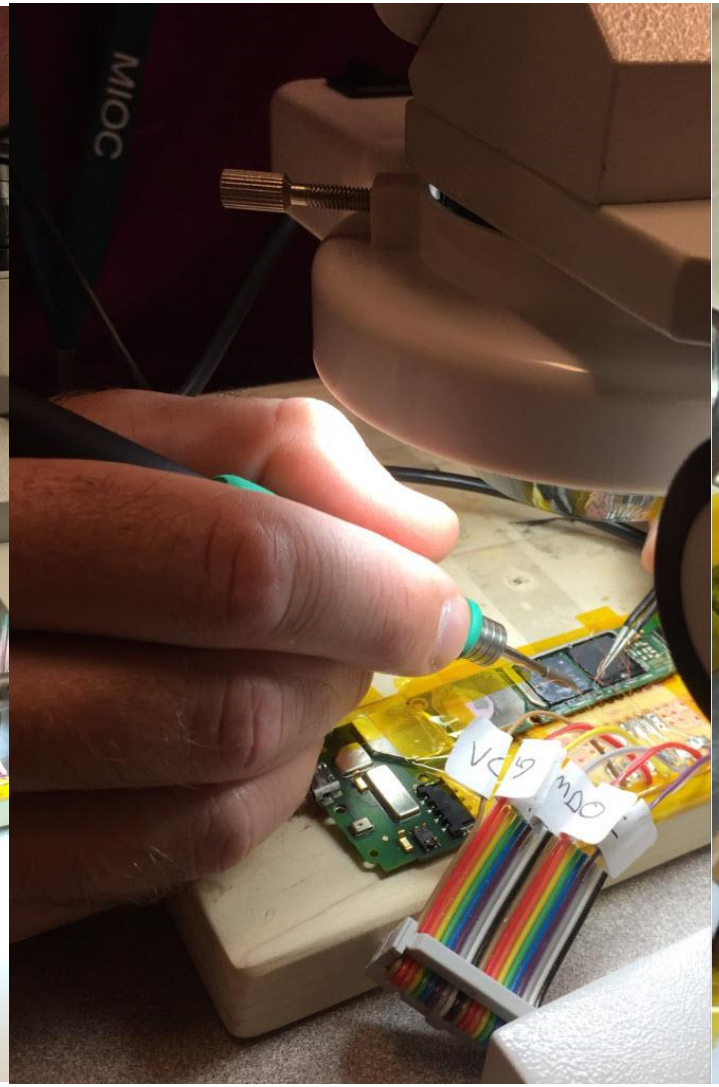
ISP Example

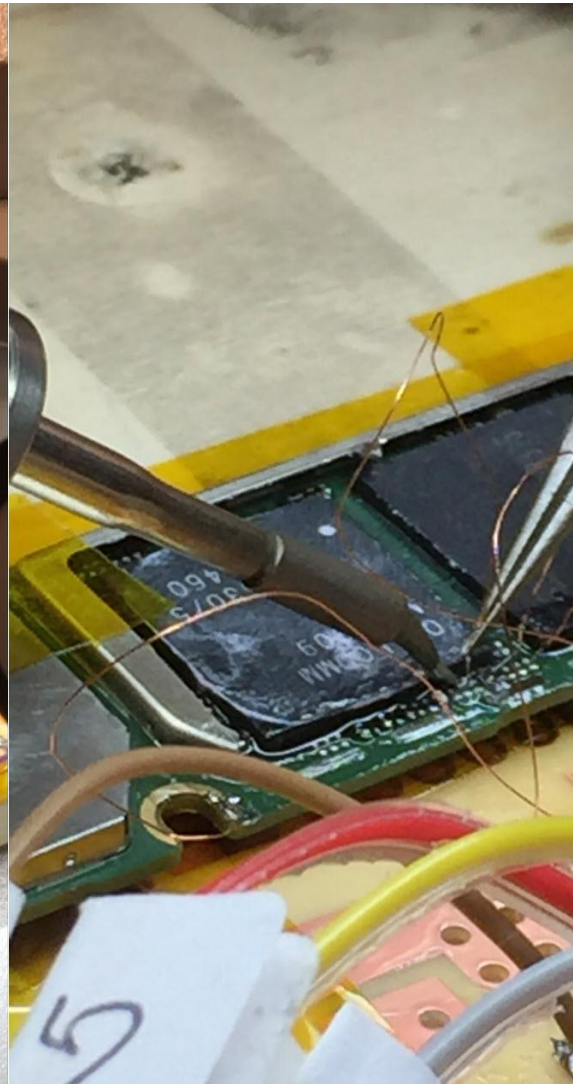




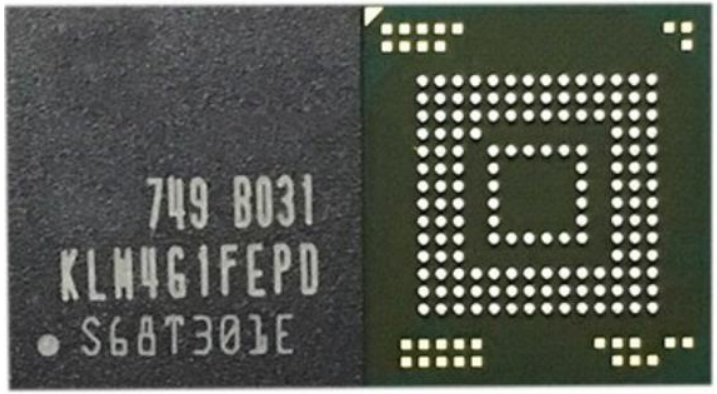
ISP





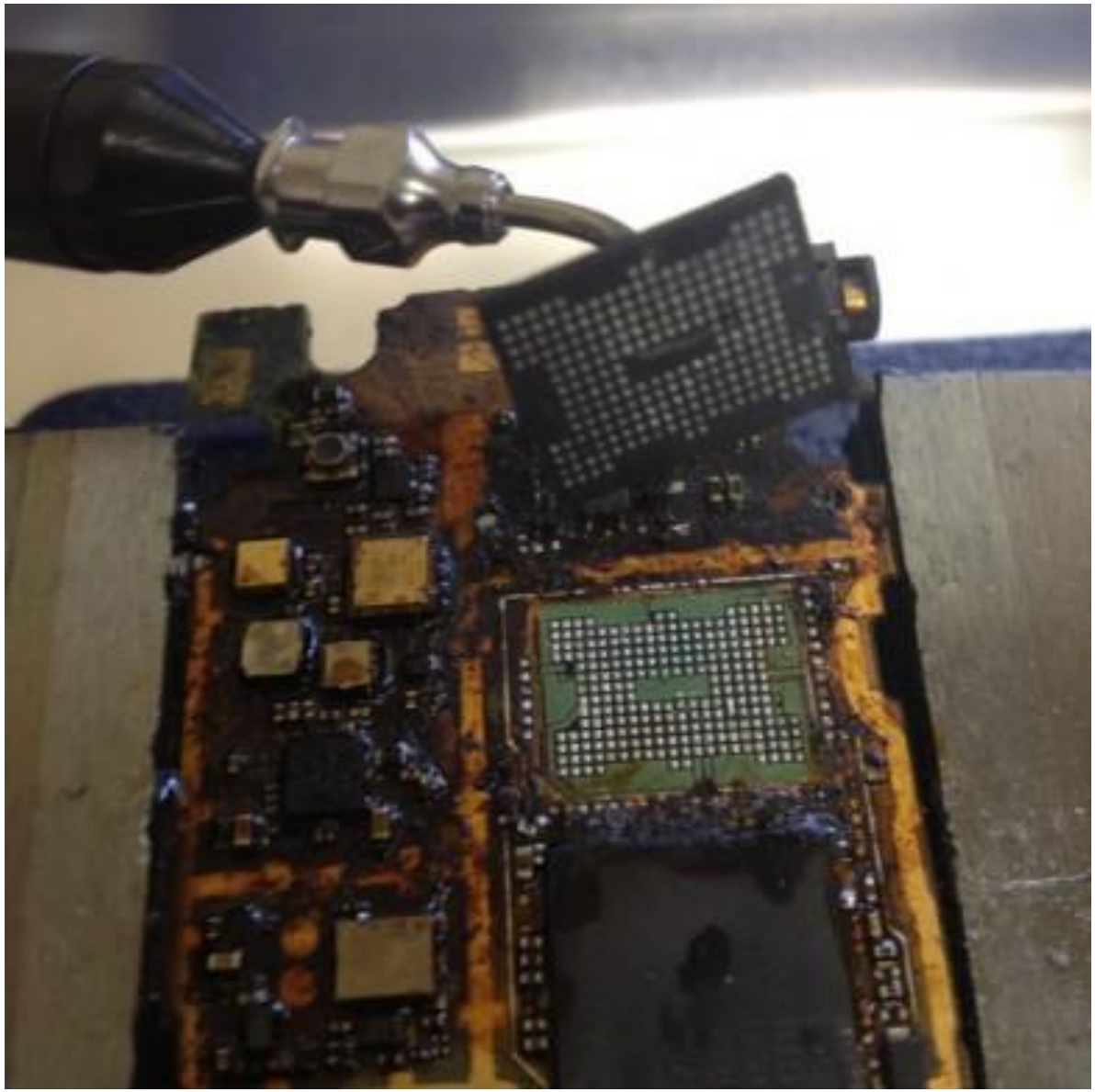


CHIP-OFF



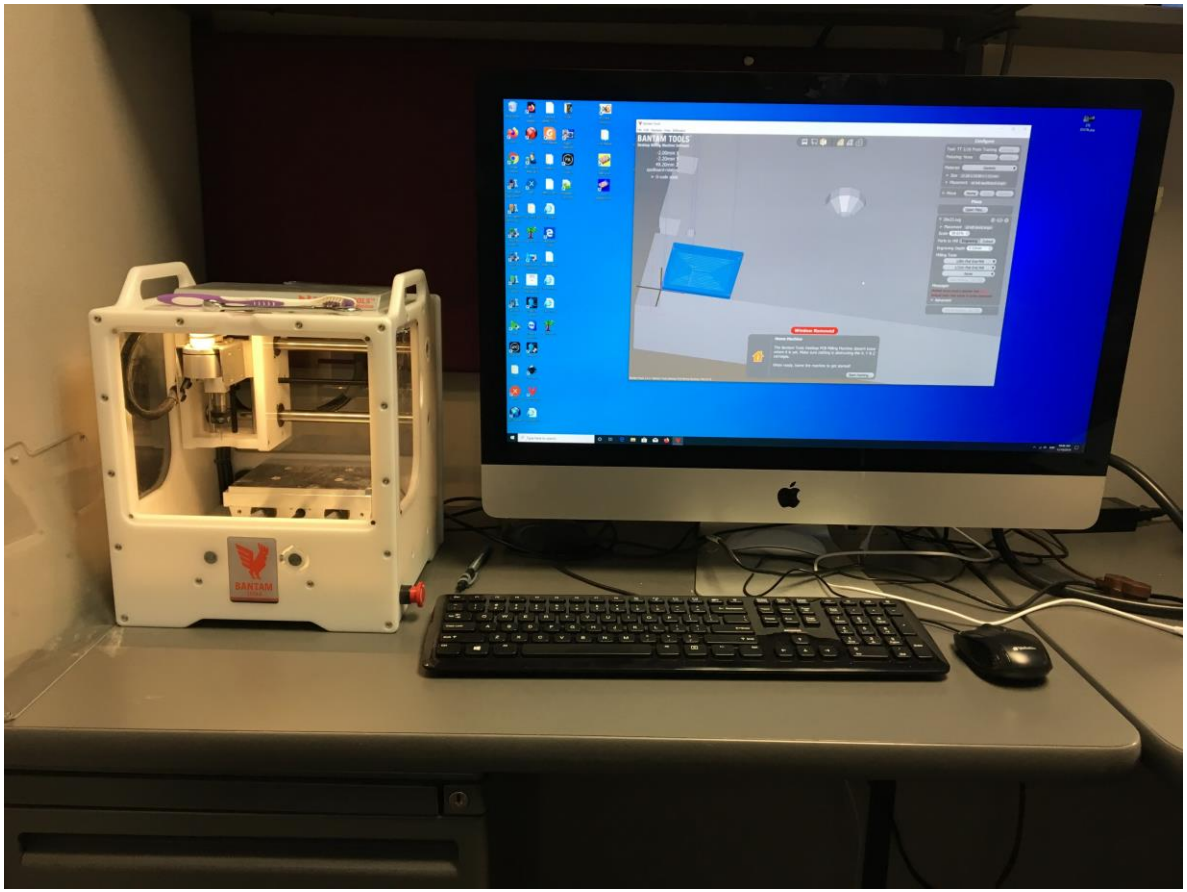
CHIP-OFF

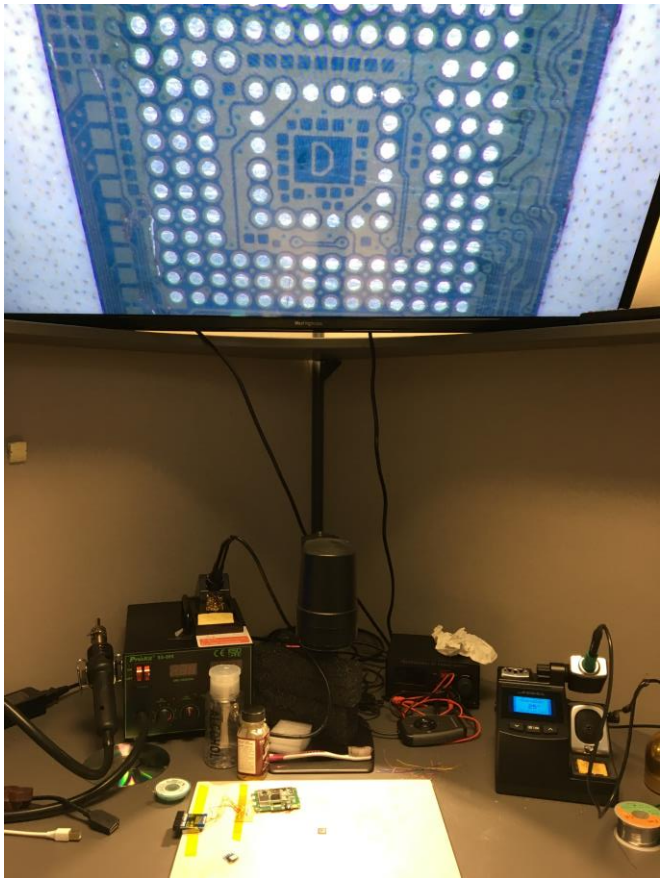
- Heat



CHIP-OFF

- Milling





Forensic Case Examples

- West Michigan Crime Spree – 2012 Ford, No Initial Evidence
- Submerged Device Found – 14 months
- Arson – Ford Navigation, 2010 Lincoln
- Motor Vehicle Theft – Ford Sync Gen 2, 2013 Ford F-150
- Missing/Homicide – Ford Sync Gen 3, 2018 Ford Escape
- Homicide – GM HMI, 2016 Chevy Silverado
- VCSA - Ford Sync Gen 3, 2019 Ford F-150

Summary

- Vehicle Events
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  - Braking
  - Seat Belts
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  - Audio Commands
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Questions?

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Computer Crimes Unit (CCU)
Internet Crimes Against Children (ICAC)