



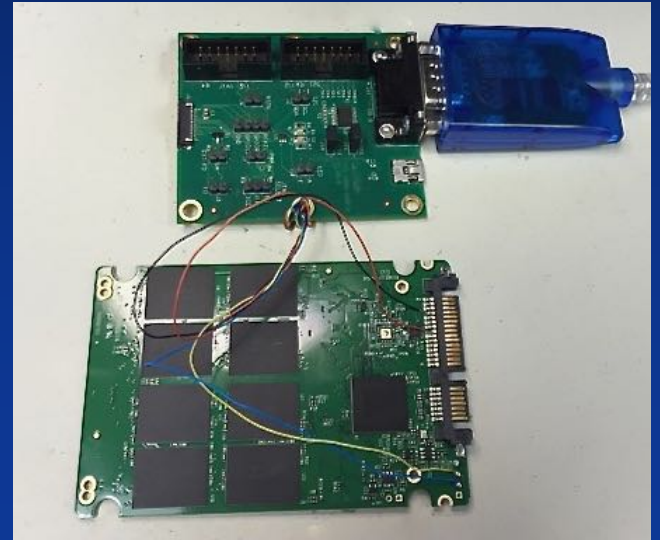
# Data Recovery Tool Development for SSD

Chris Bross

DriveSavers Data Recovery

# Agenda

- Maximizing Data Recovery from SSD
  - Multi-phase approach of data recovery labs partnering with manufacturers to provide solutions
- It's All About the Tools
  - Diagnostic
  - Firmware
  - Imaging
  - Forensic
- The Challenges Ahead



# Justifying Data Recovery on SSD

- Working With Manufacturers
  - Understanding the Value Proposition for partnering with data recovery providers
- Isn't this Protected Information?
  - We don't need the "keys to the kingdom"
- CSAT
  - Can be measured in many ways...



# Diagnostic Tools

- Goal
  - To provide quick diagnostic failure analysis of SSD
- Tools & Technology Utilized
  - Diagnostic workstation used by FAE or RMA at manufacturer or component supplier
  - Triage failed SSD and extract FA data
  - Reference documentation for FA codes
  - Determine if hardware or firmware
  - Repair/replace/re-flash and hopefully recover

# Firmware Tools

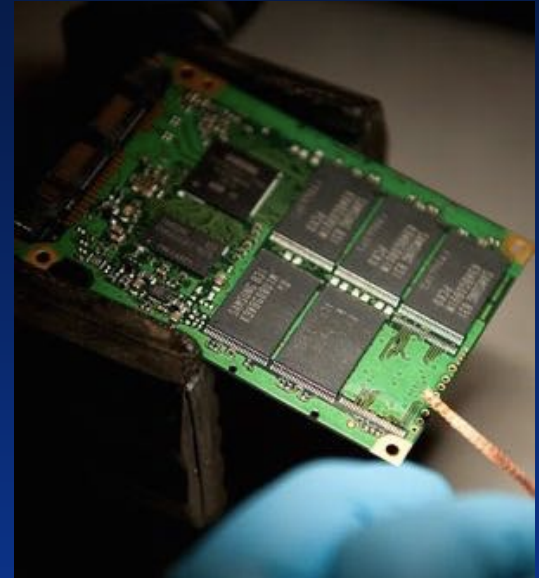
- Goal
  - Load special diagnostic or development firmware in attempt to recover failed SSD
- Tools & Technology Utilized
  - Special fault-tolerant (non-release) firmware
  - Non-volatile process to replace problem firmware
  - Force drive into read-only “best effort” state
  - Attempt to image LBA or extract critical data
  - Recycle/reboot/try again

# Imaging Tools

- Goal
  - To create “best effort” LBA image of SSD where diagnostics and firmware fail to resolve
- Tools & Technology Utilized
  - Software to extract LBA via data interface regardless of state of device or FTL
  - Next, a extraction tool to read all bands of data via data or serial interface
    - Requires heavy post-processing and reassembly

# Imaging Tools (cont)

- Goal
  - To extract NAND from PCB for imaging in non-encrypting SSDs
- Tools & Technology Utilized
  - NAND programmer/reader
  - JTAG pin and decoding info if relative
  - If multiple images, tool to reassemble LBA
    - Requires even more post-processing
    - Last ditch effort to recover any data



# Forensic Tools

- *I'll leave it to Jeff from Guidance...*



# The Future & Challenges Ahead

- SNIA sig Approach
  - Industry standard driven adoption of requirements would be easier and better for all
- Security and Data Protection Advances
  - Will make user data more secure, and data recovery more difficult
- New NVM Technologies
  - Will next-gen NVM still need data recovery?



Thank You!

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