Forensic Data Recovery and Examination of Magnetic Swipe Card Cloning Devices

By

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Presented At

The Digital Forensic Research Conference

DFRWS 2007 USA Pittsburgh, PA (Aug 13th - 15th)

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Forensic Data Recovery and Examination of Magnetic Swipe Card Cloning Devices

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Magnetic Swipe Cards

- Capable of storing digital data by recording a magnetic pattern within a stripe on the reverse of the card
- Cards used as a form of identification and personal authentication
- Typical uses:
  - Credit cards
  - Debit cards
  - Store loyalty cards
  - Mobile phone ‘top-up’ cards
  - Security ID cards

Magnetic Stripe Card Standards

- ISO 7810 – Physical characteristics of credit cards
- ISO 7811 (1-6) – Embossing, Track location, Lo / Ho coercivity
- ISO 7813 – Financial Transaction Cards
- ISO 4909 – Card Data Format – Track 3

Track 1 Information

- Track 1 – 76 alphanumeric characters
  - Start Sentinel = %
  - Format Code, B = Bank/financial format
  - Primary Account Number (PAN), upto 19 digits
  - Name, 2-26 characters
  - Expiry Date

  Example

  %B0123456789123456^MR A SMITH^0612…?

Track 2 Information

- Track 2 – 37 numeric characters
  - Start Sentinel = ;
  - Primary Account Number (PAN), upto 19 digits
  - Expiry Date – 4 characters
  - Service Code – 3 characters (sss)
  - Discretionary Data (DD) - PIN / Card Verification Value

  Example

  ; 0123456789123456=0612sssDD…?

Track 3 Information

- Not usually used for financial transaction cards
- Track 3- 104 numeric data characters
  - Start Sentinel = +
  - Field Code (FC)
  - Primary Account Number (PAN), upto 19 digits

  Example

  + FC0123456789123456=…?

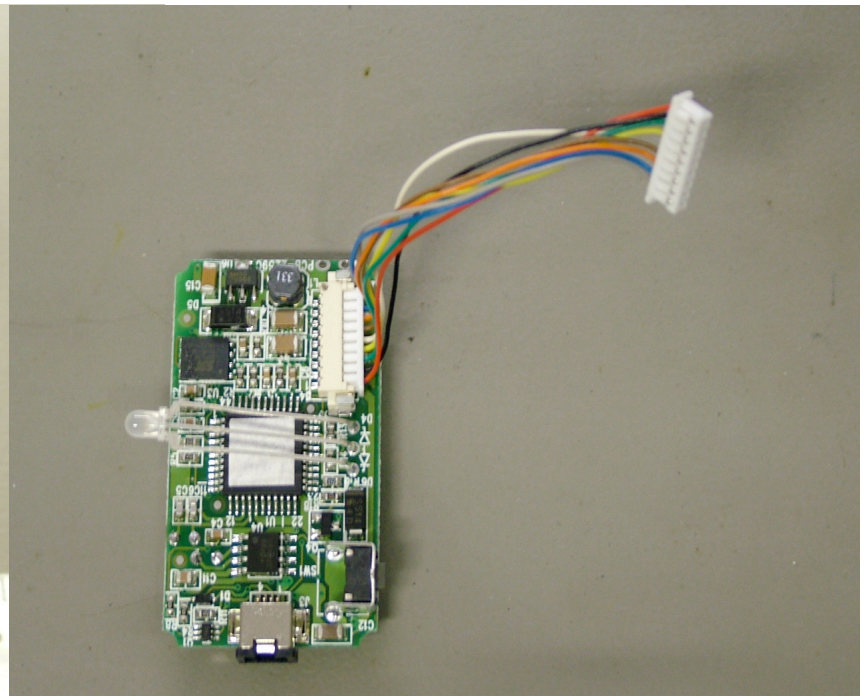
Magnetic Stripe Encoders

- Ability to read and write magnetic track data
- Track reading/writing options 1,2&3, 1&2, 2
- Hi / Lo Coercivity
- Serial / USB / PS/2 Connection types
- Can be used to clone magnetic stripe cards

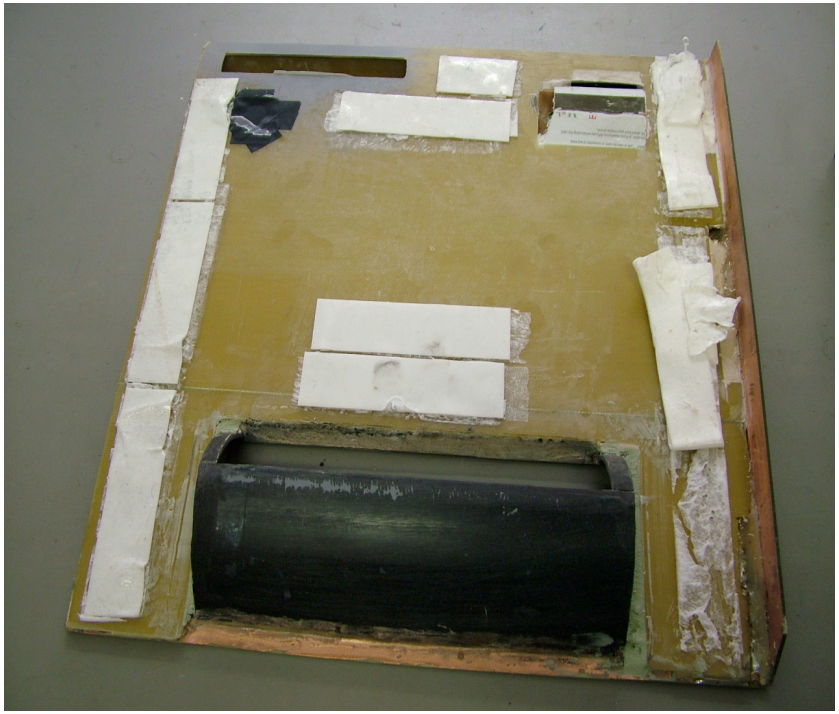
Magnetic Stripe Readers – Mini 123 (1)

- Standalone, battery powered – CR2032 button cell
- Size - L50 x W30 x H38 mm
- 3 Track
- 512K bytes memory – up to 2048 records
- RS232 / USB interface – simple communication protocol
- PIN protected – 4 digit
- Software deletes records/wipes information from device when saved

Magnetic Stripe Readers – Mini 123 (2)



Magnetic Stripe Readers – Mini 123 (3)

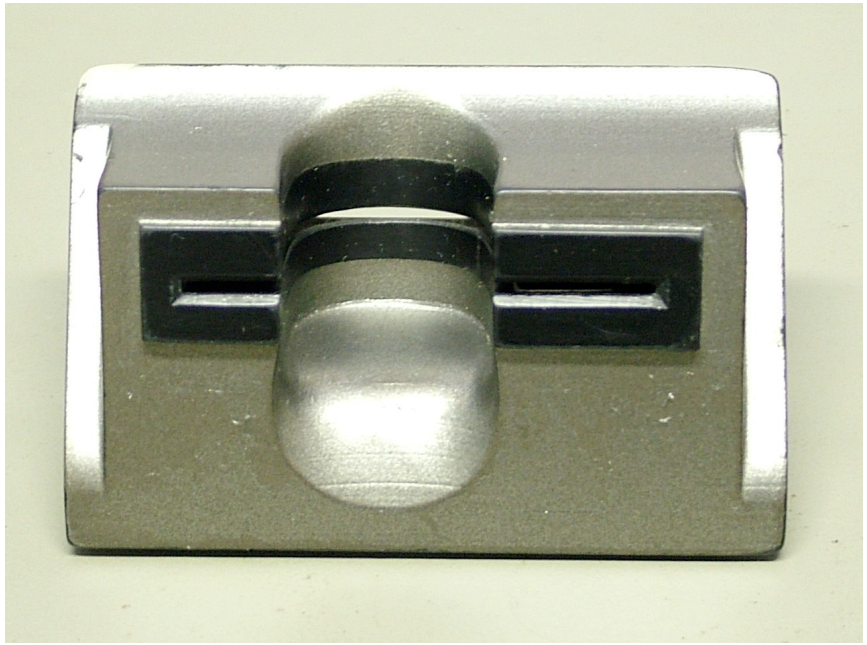


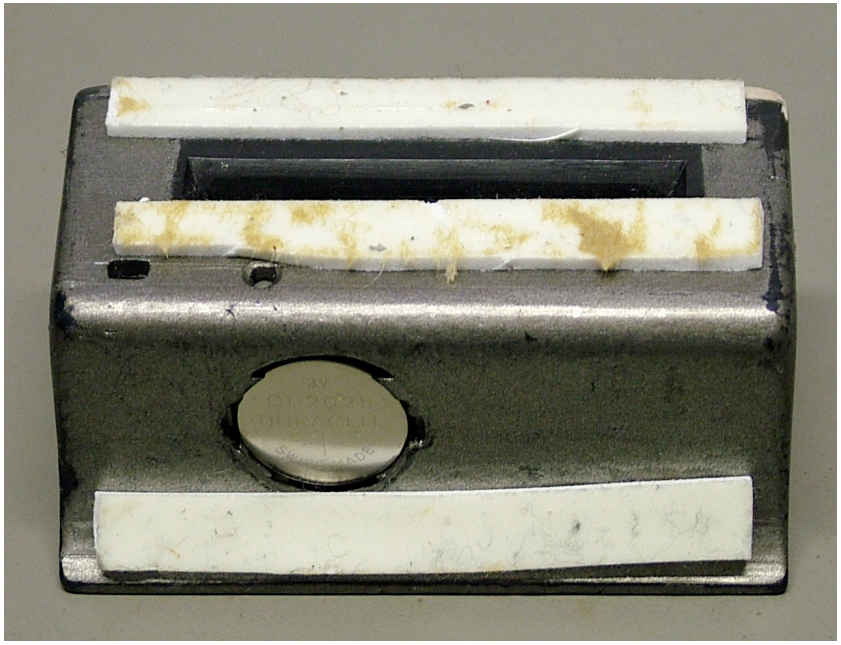
Magnetic Stripe Readers – Mini 123 (4)

- Amazing what you can do with a bit of sticky tape !

Magnetic Stripe Readers – Mini 123 (5)

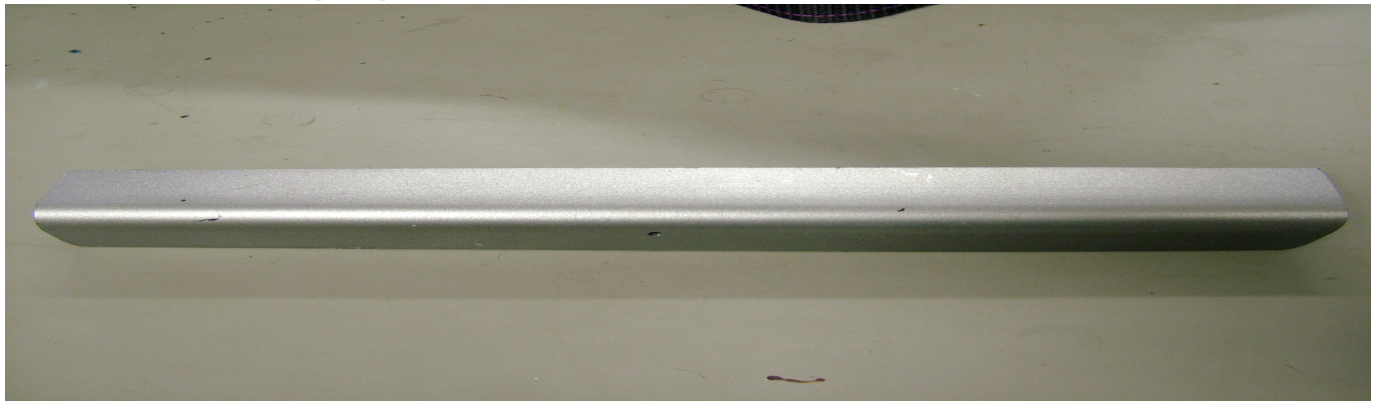
- Other forms…

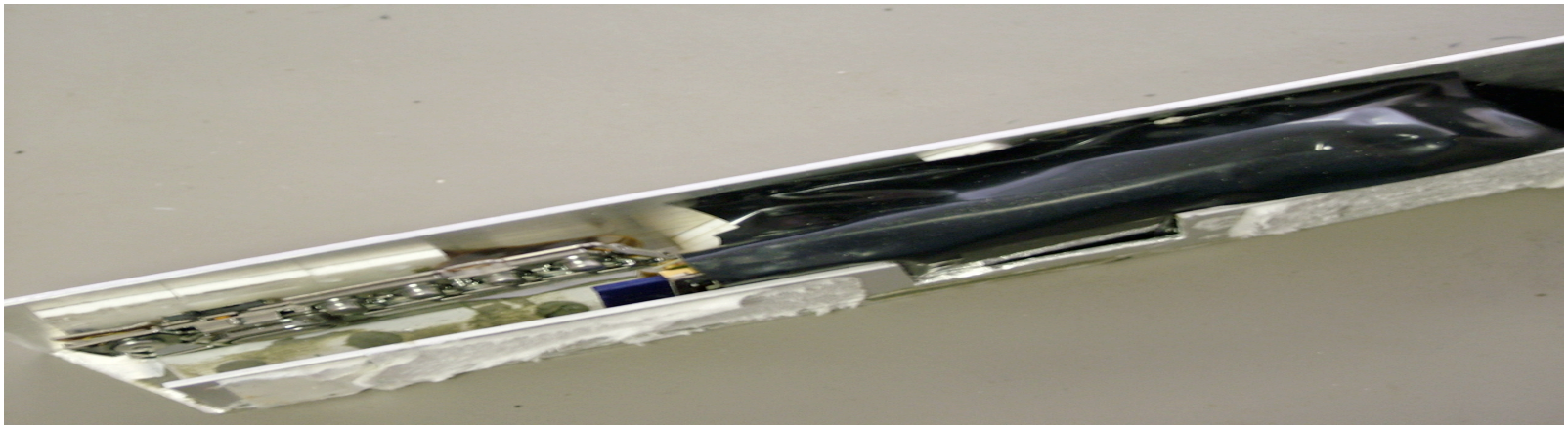




Magnetic Stripe Readers – Cameras

- Associated equipment !





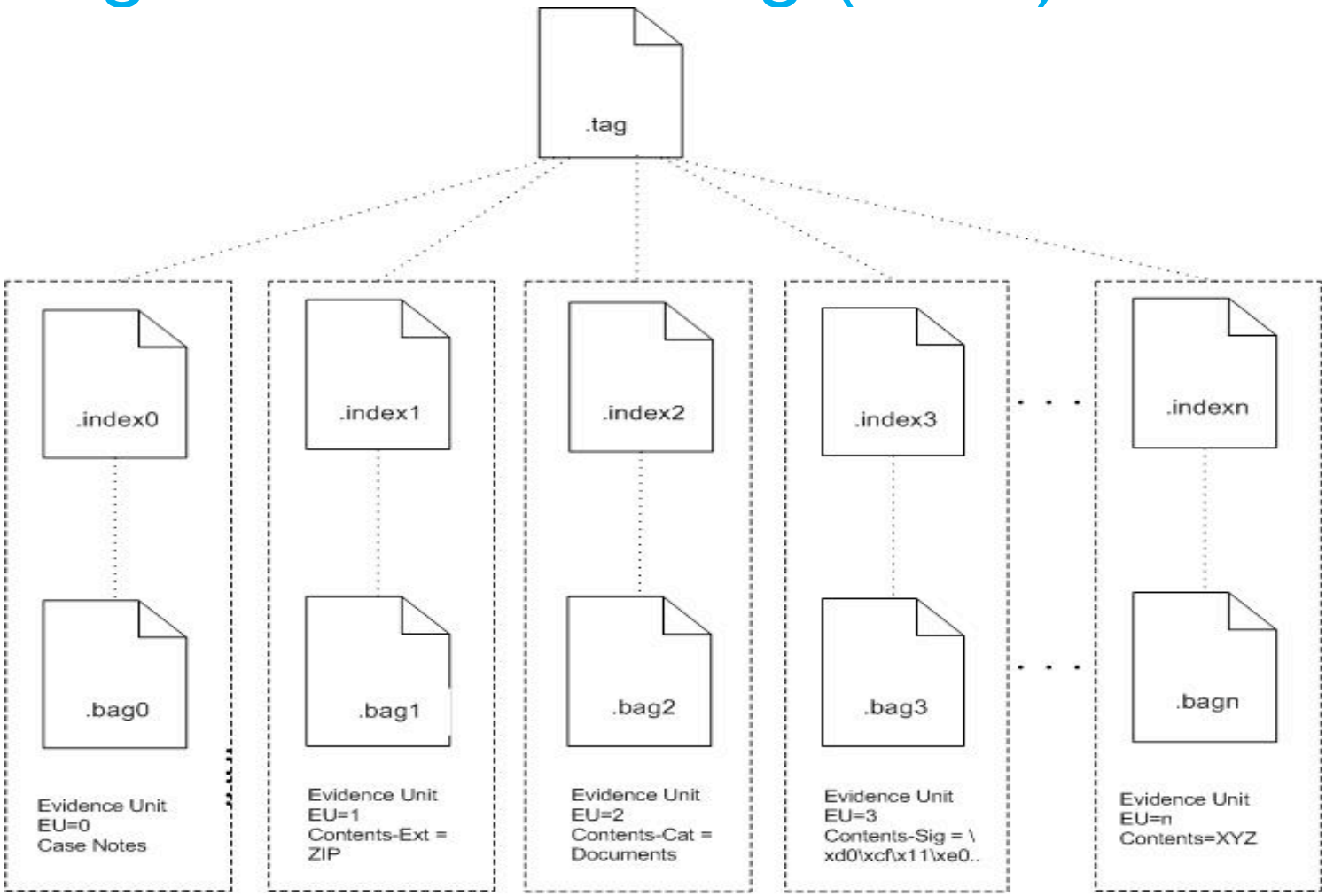
Mini 123 –Forensic Data Extraction

- Simple text data strings in a record format, e.g:

  000,;89441299901234567 89=99121010000000000?2006/11/09 09:35:39 53F

- Other information– product version, unit date & time,number of records,
- The problem:
  - No forensic provenance or continuity of extracted information
  - No integrity assurance information
  - No facility to record associated device metadata e.g. PIN used to access device

Digital Evidence Bag (DEB) structure

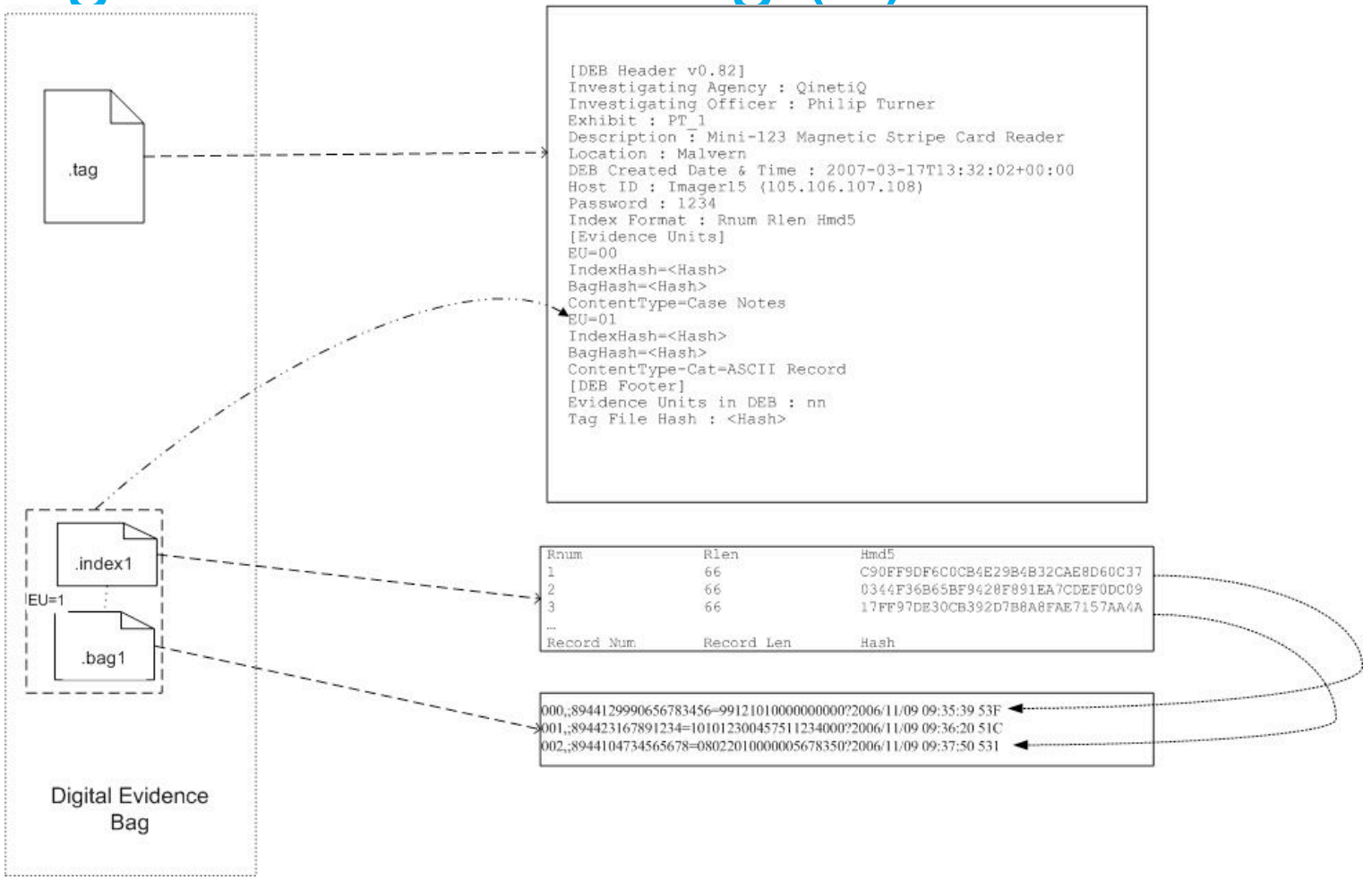


Digital Evidence Bag (DEB)

Mini 123 –Forensic Data Extraction into a Digital Evidence Bag (1)

- Benefits of using a DEB:
  - record provenance
  - track continuity
  - integrity assurance information
  - additional device specific metadata e.g. device login PIN, photographs

Mini 123 –Forensic Data Extraction into a Digital Evidence Bag (2)



Summary

- Overview of Magnetic swipe card standards and types of devices used to read and write magnet swipe data
- These devices are forensically unfriendly
- Proposed solution – the use of Digital Evidence Bags to store extracted information in a forensically sound manner

Questions???