

HDD Data Recovery Training

Forensics Laboratory Based Hard Drive Data Recovery Course



Duration: 3 days

Venue: On demand

Seat availability: On demand (recommended no more than 12)

Language: English/Cantonese/Mandarin

Trainer: Computer forensics consultant, member of High-Tech Crime Investigation Associate (US)

DataExpert HDD Data Recovery Training is a comprehensive course covering all common hard drive failures' recovery solutions. It enables students to acquire practical experience on intermediate to advanced level hard drive data recovery techniques and basic computer forensic skills in digital evidence preservation.

Learning Objectives

- To know all firmware components of HDD and how they operate and interact.
- To understand how the recovery tools can be used to read & diagnose each component to determine the cause of failure.
- To develop a strategy to fix the HDD based on diagnostic results gained from recovery tools and special design criteria of the make and model of the HDD.
- To develop and understand cleanroom procedure revolving physical HDD problems.

DataExpert Forensics Laboratory includes:

- Class 100 clean room
- Platter and head exchanging workstation
- Data Recovery Workstation with various type of cables and hard drive components
- Data recovery tools and related equipment: write blocker, forensic level duplicator, integrated password recovery tool, intelligence analysis tool, degaussers and media shredder etc.

This course is an unparalleled starting point for:

- Police and law enforcement staff
- Defense and Military staff
- Legal professional
- System administrators and IT department staff
- Information security officers
- Anyone who involved or interested in data recovery field

Prerequisites

- Basic understanding of the computer operating system
- Basic understanding of computer hardware

Customization

In order to meet different customer needs and help learners best achieve their learning goals, we provide opportunities for our clients to customize the course attributes, including time, place, language, close-door requirements, etc.



Course Outline (3 days)

Day 1 0845 -1800

To get start with course introduction and a full breakdown of hard drive anatomy. This is great learning experience for beignners and a strong refresher for veterans.

Hard Disk Anatomy – Design principals and concepts

- History of Hard Disk
- Theory of operation
- Basic components of a disk drive
- Overview of disk interfaces (ST506 to SATA, SAS)
- Types of magnetic media
- Data Recovery sucessful percentage
- Structure of data on the platters
- Servo information: Tracks locating, heads fine positioning, sturcture of servo data.
- Types of head, flying heights and their relationship to bit density

Introduction to common file systems

- DOS
- FAT 16 and 32
- HTFS, Ext2, HFS+

Disk Geometry

- Track/ Sector Data Format
- Physical/ Logical Geometry: PCHS/LCHS/LBA addressing. Disk System Area (SA), Zone Geometry, BIOS Geometry. Negative cylinders.
- Sector/ Track/ Cylinder/ Zone/ Head Tables.
- Types of mapping bad sectors. G-List/ P-List/ U-List. LBA alignment.
- Translator:LBA addressing (LBA 28/ LBA48). Static/ Dynamic translator types.

HDD Firmware Sturcture

- Embedded ROM
- External Flash ROM/NV-ROM
- SA raw overlay
- Zone Table

Introduction to Hard Disk Subsystem

- Master/ User Password
- High/ Maximum Security
- Unlock/Erase/ Clear commands
- Procedures to unlock an ATA drive
- Principles of Hard Disk with FDE (Full Disk Encryption) feature

Examination of various storage devices

- Hard Disks (2.5" & 3.5", ATA, SATA, SCSI, SAS)
- Zip disk and LS120
- Magneto optical disks
- Removable hard disks
- Flash disk (thumb drives, SD card)

Introduction to Printed Circuit Boards (PCB)

- Brief overview of PCB layout on different brand of hard disk
- Board layer and function
- Board layout and composition
- Type of components and their function

Introduction to diagnosis physical error on hard disk

- External visual and measurement diagnosis
- Identifying type of major components and memory devices.
- Basic use of an oscilloscope
- To determine functions of device

Introduction to components surface mount technology

- Operation of surface mount hot air rework station
- Extensive training on removal of surface mount IC's
- Hands on practice on resoldering of surface mount IC's

Introduction to common data recovery hardware tools in market

- **Hardware**
 - Atola Insight Forensic
- **Software**
 - R-Studio

An intense day packed with lectures, tutorials and practice sessions revolving around physical hard drive and clean room procedure.

Physical Data Recovery Flow

- Proper HDD diagnostics
- Platter swap
- ATA password removal
- PCB recovery
- Head stack issues
- HDD firmware recovery
- PCB replacement
- Preamplifier issues
- Motor issues
- Error prevention

Logical Recovery Case

- MBR and EBR recovery
- GPT disk introduction
- HDD backup/ duplication
- File extraction

Hands on Demonstration of clean room procedure

- Clean room procedures and explanation of HEPA micro filtration
- Techniques for removal of heads
- Re-engineering of hard disk assemblies

Participant Hands on training with practice on

- 1.8", 2.5", 3.5" ATA/ SATA Hard Disks
- 2.5" SAS Hard Disk