



# PC-3000 FLASH DATA RECOVERY EXPERT TRAINING

seminar program

## 1. Introduction. Concept

- ▶ Structure flowchart of NAND memory devices
- ▶ Classification of damages of Flash memory based devices. Features

## 2. Memory chips

- ▶ Types of memory chip cases
- ▶ Memory chip internals
- ▶ Memory chip identification. Degrees of importance
- ▶ Characteristics of reading algorithm. SDR and DDR chips

## 3. Organization of information storage in NAND memory based drives

- ▶ Tendencies in drive development
- ▶ Page and Block in memory chip. Application
- ▶ Memory chip ID

## 4. PC-3000 Flash system

- ▶ Structure and application
- ▶ Main strategy and structure of PC-3000 Flash
- ▶ Task structure

## 5. Stages of working on data recovery task

## 6. Reading of memory chip

- ▶ Readout circuit chip dump
- ▶ Reference memory chips
- ▶ "Direct" readout chip. Application
- ▶ What PC-3000 Flash can do during chip reading into dump

## 7. Block diagram of controller operation

## 8. Data preparation algorithm

- ▶ Methods of data preparation:
- ▶ Join by bytes
- ▶ Bitwise inversion
- ▶ XOR elimination
- ▶ Page transformation
- ▶ Internal Interleave elimination
- ▶ External Interleave elimination
- ▶ Additional operations

**9. ECC. Bit error correction**

- ▶ Causes of errors
- ▶ ECC type Auto detection
- ▶ Additional ways of improving data quality result

**10. Verification of applied data preparation steps**

- ▶ Raw Recovery
- ▶ Verification of applied data preparation steps
- ▶ Data preparation implementation. Ways to check if data preparation is done correctly

**11. Algorithms of image generation**

- ▶ Block Number
- ▶ Different types of markers
- ▶ Translators
- ▶ Image building based on data analysis

**12. Data recovery in automatic mode**

- ▶ Global Solution Center
- ▶ Additional research modes

**13. Analysis and improvement of built image**

- ▶ Data quality analysis
- ▶ Versions for block
- ▶ Shifts between banks
- ▶ Disk analysis
- ▶ Partition analysis
- ▶ Addition of virtual partition

**PRACTICE:**

At this training seminar you will be taught to solve wide variety of tasks: from the easiest to very complex and even unusual ones. Each attendee can choose difficulty level and try to solve this type of task. The technique of drive dismantling, memory chip unsoldering and their preparation for reading process will be demonstrated at training. The training will take place on the last version of PC-3000 Flash. 1 month of free Technical Support is provided for PC-3000 Flash for all students who completed the "Data recovery technologies for NAND based drives" training seminar.