

# **PC-3000 Portable**

**HARDWARE-SOFTWARE SYSTEMS**  
FOR RECOVERING DATA FROM SATA/PATA/USB HDD,  
SATA/M.2 PCIe (NVMe/AHCI) SSD, RAID,  
USB Flash drives, SD/MicroSD cards



**TECHNICAL SPECIFICATION**



# The PC-3000 Portable III Product Overview

The PC-3000 Portable III is the most universal tool for damaged storage media. It is a hardware-software solution intended for diagnostics, repair, and data recovery from SATA/PATA/USB HDD, SATA/M.2 PCIe (NVMe/AHCI) SSD, RAID, USB Flash drives, SD/MicroSD cards. More types of devices such as SAS drives are to get support in the future.

## Types of damages

**Physical HDD malfunctions:** damaged PCB, problems with magnetic disks, reading/writing heads, preamplifier, firmware, and service data.

**Physical SSD malfunctions\*:** damaged PCB, controller, degradation of the NAND Flash memory cells, corruption of firmware, service data, etc.

**Logical problems:** corruption of volume structures, damaged file system structures, and combinations of those problems.

**Logical problems with NAND Flash devices:** partition corruption, deleted files, damaged File System, etc.

## What's special about the PC-3000 Portable III

**4-port  
controller**

**3 SATA/1 USB**  
ports with speed up to  
**490 MB/s**

+

**Fast imaging  
SATA/USB**  
drives

**3 HDD/SSD/RAID  
members**

can be connected to the PC-3000 Portable at the same time.  
The total number of connected RAID members can be increased  
with motherboard ports and image files.

**Write protection**

a special jumper on the device blocks any alteration of data during  
the extraction or imaging with SATA 0 and USB ports.



### Compact size & Standalone Mode

Size: 15,35 x 8,4 x 4,65 cm.  
No need for a host computer to  
diagnose, image and erase drives.



### Few-clicks solutions & Easy Mode

Almost all daily cases with logically  
damaged HDDs can be solved with  
a few buttons.



### Maximum data & Full-Featured Mode

The highest success rates of data  
recovery no matter how difficult  
the case is.



### Drives condition check-up & reports

Automatic check-up of the drives'  
condition and generation of reports  
about it.



### Damaged M.2 PCIe (NVMe/AHCI) Support

The world's first and only tool to  
recover data from DAMAGED M.2  
PCIe (NVMe/AHCI) SSDs.\*



### Faster work with USB HDD/SSD/Flash

Easy and reliable connection of  
USB HDD/SSD. Support of logically  
damaged NAND Flash drives and  
SD/micro SD cards.

\* to work with Solid-State drives the PC-3000 solution which supports SSD is needed: PC-3000 Portable SSD or Ultimate Systems



HDD/SSD/Flash drives under examination containing data to be recovered should be connected directly to the PC 3000 Portable controller via its SOURCE ports: USB and SATA0. TARGET ports (SATA1 and SATA2) are used to connect the destination HDD/SSD for data image copying. In certain modes of the suite, SATA1 and SATA2 ports may also be used to connect the drives being examined/restored increasing the number of HDD/SSD handled simultaneously to three.

SOURCE ports (both USB and SATA0) support protection against accidental recording; to enable the functionality, use the Write Protection switch. Enabled write protection is indicated by the corresponding yellow LED.

The PC-3000 Portable controller is powered by an external -19V power supply unit; if used with a host computer, the device is connected to it via the USB 3.0 interface. Current revision of the PC-3000 Portable controller supports connection of SATA III HDD/SSD (compatible with SATA I/II) and USB devices compliant with the Mass Storage Device specification, i.e. external USB 2.0/3.0 HDD and USB Flash drives. PATA (IDE) drives can be connected using a special optional PC-SATA-PATA adapter.

When an operating system of the Windows family works with damaged data media, it uses its internal software tools for data recovery. Quite often, it just makes worse the situation with data corruption on a malfunctioning drive. The PC-3000 Portable excludes OS access to a malfunctioning HDD. However, the suite includes a driver, which allows to mount a drive under examination connected to the PC-3000 Portable port as a disk drive visible in the operating system, if necessary.

With some drives you can enable the HDD/SSD techno mode used at manufacturing factories during their production. The mode provides advanced opportunities to access and/or copy user data.

# The PC-3000 Portable III Systems:

Together with the ACE Lab's software products, the PC-3000 Portable III forms the systems to recover data from SATA/PATA/USB HDD, NVMe/SATA/USB SSD, USB Flash drives, SD/MicroSD memory cards, and RAID both in the lab and on-site:

## HDD & USB devices data recovery



**PC-3000 Portable System**  
(PC-3000 Portable III + Data Extractor Portable III)

## HDD & USB devices & SSD data recovery



**PC-3000 Portable SSD System**  
(PC-3000 Portable III + Data Extractor Portable III  
+ PC-3000 SSD Extended)

## HDD & USB devices & RAID data recovery



**PC-3000 Portable RAID System**  
(PC-3000 Portable III + Data Extractor Portable III RAID Edition)

## HDD & USB devices & SSD & RAID data recovery



**PC-3000 Portable Ultimate System**  
(PC-3000 Portable III + Data Extractor Portable III RAID Edition  
+ PC-3000 SSD Extended)

# Supported devices:

<b>HDD</b> (3.5", 2.5", 1.8")	Supported interfaces:	<p>SATA (Serial ATA) and USB devices compliant with the Mass Storage Device specification, i.e. external USB 2.0/3.0 HDD and USB Flash drives with logical issues (File System corruption, deleted data).</p> <p>SSHD (Solid State Hybrid Drive).</p> <p>PATA (IDE) - via a special PC SATA-PATA adapter from ACE Lab which can be bought optionally.</p>
	Supported vendors:	Seagate, Western Digital, TOSHIBA, HITACHI / IBM (HGST), Samsung, Maxtor
	Supported capacities:	From 40 GB and more (without upper limit)
<b>SSD*</b>	Supported interfaces:	<p>SATA II/III</p> <p>M.2 PCIe NVMe and M.2 (NGFF) - via a special universal M.2 PCIe NVMe SSD/M.2 SATA SSD adapter included in the delivery kit</p> <p>mSATA — via a special SATA-mSATA adapter from ACE Lab which can be bought optionally</p> <p>Micro SATA, PATA, LIF, ZIF, Apple proprietary interface - via additional adapters from third-party vendors</p> <p>The Apple MacBook SSD M.2 NGFF PCI-e NVMe.AHCI Macbook SSD 2013-2019 (12+16 pin) - via the PCIe NVMe/AHCI Adapter for Apple Macbook SSD which can be bought optionally from ACE Lab</p> <p>PCI-E x1-x16 - via the PCIe x16 SSD Adapter from ACE Lab which can be bought optionally</p>
	Supported vendors:	OCZ, Corsair, Crucial, RunCore, A-DATA, G.Skill, Micron, Plextor, Intel, Samsung, Seagate, SanDisk, Kingston, Smartbuy, Silicon Power, PNY, AMD, Lexar, Transcend, Patriot, GoodRam, Kingspec, Toshiba, Apacer, DEXP, KingDian, Lite-On, QUMO, RevuAhn, Western Digital, HP, etc. More manufacturers are added with the updates
	Supported capacities:	From 32 GB and more (without upper limit)
<b>USB Flash**</b>	Supported interfaces:	<p>USB devices that comply with the Mass Storage Device specification, i.e., external USB 2.0 / 3.0 Flash.</p> <p>SD/MicroSD Memory Cards via the special 2-in-1 Card Reader Adapter included in the delivery kit</p>
	Supported vendors:	A-DATA, Apacer, Corsair, Goodram, Kingston, Lexar, Samsung, Sandisk, Silicon Power, Smartbuy, Toshiba, Transcend, Verbatim and others
	Supported capacities:	<p>From 256 MB and more (without upper limit)</p> <p>Up to 1 TB for SD/MicroSD Memory Cards</p>
<b>RAID***</b>	Supported virtual RAID levels:	<ul style="list-style-type: none"> <li>▶ 0 (Stripe), 1 (Mirror), 1E Offset and Adjacent, JBOD, 4, 5, 5E, 5EE, 6 and 6-Adaptec</li> <li>▶ Various combined levels: 10, 50, 51, 60 and others (due to the possibility to use virtual RAID array as a member)</li> <li>▶ Software-based RAID and multi-disk storage systems: LDM and mdadm structure analysis, WSS (Windows Storage Spaces), ZFS RAID-Z, Btrfs RAID, Apple Fusion Drive (HFS+, APFS);</li> <li>▶ Custom configurations that are set by user with the tabular (matrix) presentation</li> </ul>
<b>Files Systems</b>		FAT, exFAT, NTFS, HFS+, APFS, EXT2/3/4, XFS, ReiserFS, Btrfs, VMFS, UFS1/2, ZFS, DHF4.1, WFS0.x (for video recorders) and virtual machine images

\* to work with Solid-State drives the PC-3000 solution which supports SSD is needed: PC-3000 Portable SSD or Ultimate Systems

\*\* the PC-3000 Portable III is able to recover data only from logically damaged (partition corruption, deleted files, damaged File System and etc) Flash drives

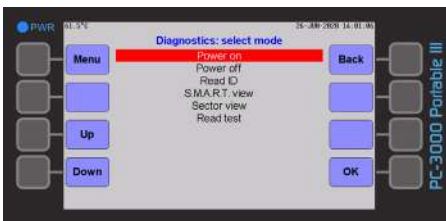
\*\*\* to work with RAID the PC-3000 solution which supports RAID arrays is needed: PC-3000 Portable RAID or Ultimate Systems

# Operating modes in the new PC-3000 Portable III:

## Standalone Mode

The brand-new Standalone Mode allows solving some of the data recovery tasks without a host computer! The users can easily diagnose the HDD's condition and create data images from USB Flash, SATA/PATA/USB HDD, NVMe/SATA/USB SSD! All the information is displayed in the built-in 4" Screen and controlled with the 8-button keyboard.

### Main features of the Standalone Mode:



▶ Drive Diagnostics



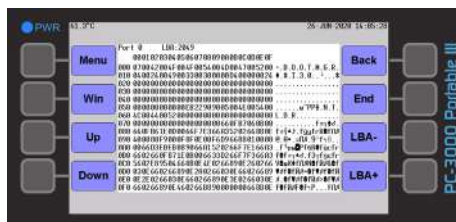
▶ Creation of the sector-by-sector copy



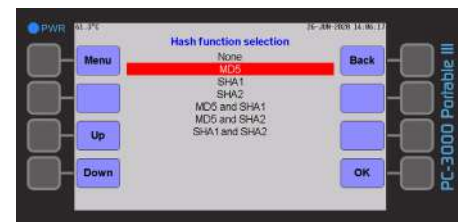
▶ Erasing (cleaning) drives



▶ S.M.A.R.T. View



▶ Sector View



▶ Hash sum calculation

More functions are to be added with software updates.

## Easy Mode

An Easy Mode intended specially for the experts who do not want or need to deeply engage in the principles of working, HDD structures and many aspects of data recovery. This mode will be helpful to recover data in simple cases.

It allows performing a lot of routine, but necessary steps in automated mode: managing drive power, reading and analyzing drive identification data, reading and analyzing drive SMART data, performing quick drive test to check the drive's condition, performing complex test for comprehensive examination, removing password if a drive is security-locked, viewing Data (a DE task without copy creation), creating Data copy (a DE task with copy creation), working with previously created tasks, etc.

The Easy Mode interface helps to solve simple cases quickly by saving time on many routine operations. It can be used when the drive is not physically damaged. For physically damaged drives, it's still highly recommended to use the full PC-3000 functionality.

## Full-Featured mode

A Full-Featured mode that is similar in its functionality to the PC-3000 Express and the PC-3000 UDMA. The users can recover data from HDD, SSD, RAID with almost all the functions available in our flagship products. The differences affect just the number of diagnostic ports available on the corresponding controllers and their data exchange rates.

As a host computer, a desktop or a laptop can be employed. The PC-3000 Portable connects to the computer via the USB 3.0 interface; thus, the suite can be used as a mobile data recovery station for work on site.

# Recommended system requirements:

**CPU:** Intel Core i5 (4 cores, 4 threads) or AMD Ryzen 5

**RAM:** 8 Gb

**Available disk space:** 60 Gb of available disk space (for installation of software and HDD/SSD resources)

**Operating system:** Windows 7 (SP), 8, 10, x86, x64

**Display:** Widescreen Full HD 1920x1080 display

**Ports:** USB 3.0 Type-A port for connection of the PC-3000 Portable (an Intel xHCI HOST controller is recommended) USB 3.0 Type-A or USB 2.0 port for PC-USB-TERMINAL connection.

Data recovery process may additionally require:

- ▶ a spare HDD for destination copy of the recovered data;
- ▶ an additional USB 3.0 port for an external HDD connection if a copy of recovered data must be saved to an external USB HDD.

## PC-3000 Portable III System delivery kit



1. PC-3000 Portable III controller	- 1 pc.	11. ATCS, ATDA probe unlock	- 1 pc.
2. PC USB TERMINAL 3 adapter	- 1 pc.	12. M.2 PCIe NVMe/AHCI SSD & M.2 SATA SSD adapter	- 1 pc.
3. SATA-micro SATA adapter	- 1 pc.	13. 2-in-1 SD/microSD Card Reader Adapter	- 1 pc.
4. PC-FUJ.SATA adapter	- 1 pc.	14. USB 2.0 cable	- 1 pc.
5. PC-SAMSUNG adapter	- 1 pc.	15. USB 3.0 cable	- 1 pc.
6. PC-SEAG.SATA adapter	- 1 pc.	16. SATA/POWER cable	- 3 pcs.
7. PC-SEAGATE adapter	- 1 pc.	17. IDC10 (30 cm) cable	- 1 pc.
8. PC-TOSH.SATA adapter	- 1 pc.	18. Power supply unit	- 1 pc.
9. PC-WD 3.5" adapter	- 1 pc.	19. PC-3000 Portable III software, resource database	- 1 pc.
10. PC-WD 2.5" adapter	- 1 pc.	20. User manual	- 1 book





## PC-3000 Portable III RAID System delivery kit



1.	PC-3000 Portable III controller	- 1 pc.	12.	M.2 PCIe NVMe/AHCI SSD & M.2 SATA SSD adapter	- 1 pc.
2.	PC USB TERMINAL 3 adapter	- 1 pc.	13.	2-in-1 SD/microSD Card Reader Adapter	- 1 pc.
3.	SATA-micro SATA adapter	- 1 pc.	14.	USB 2.0 cable	- 1 pc.
4.	PC-FUJ.SATA adapter	- 1 pc.	15.	USB 3.0 cable	- 1 pc.
5.	PC-SAMSUNG adapter	- 1 pc.	16.	SATA/POWER cable	- 3 pcs.
6.	PC-SEAG.SATA adapter	- 1 pc.	17.	IDC10 (30 cm) cable	- 1 pc.
7.	PC-SEAGATE adapter	- 1 pc.	18.	Power supply unit	- 1 pc.
8.	PC-TOSH.SATA adapter	- 1 pc.	19.	PC-3000 Portable III software, resource database	- 1 pc.
9.	PC-WD 3.5" adapter	- 1 pc.	20.	User manual	- 1 book
10.	PC-WD 2.5" adapter	- 1 pc.	21.	Data Extractor RAID manual	- 1 book
11.	ATCS, ATDA probe unlock	- 1 pc.			

## PC-3000 Portable III Ultimate System delivery kit



1. PC-3000 Portable III controller	- 1 pc.	13. 2-in-1 SD/microSD Card Reader Adapter	- 1 pc.
2. PC USB TERMINAL 3 adapter	- 1 pc.	14. USB 2.0 cable	- 1 pc.
3. SATA-micro SATA adapter	- 1 pc.	15. USB 3.0 cable	- 1 pc.
4. PC-FUJ.SATA adapter	- 1 pc.	16. SATA/POWER cable	- 3 pcs.
5. PC-SAMSUNG adapter	- 1 pc.	17. IDC10 (30 cm) cable	- 1 pc.
6. PC-SEAG.SATA adapter	- 1 pc.	18. Power supply unit	- 1 pc.
7. PC-SEAGATE adapter	- 1 pc.	19. PC-3000 Portable III software, resource database	- 1 pc.
8. PC-TOSH.SATA adapter	- 1 pc.	20. User manual	- 1 book
9. PC-WD 3.5" adapter	- 1 pc.	21. Data Extractor RAID manual	- 1 book
10. PC-WD 2.5" adapter	- 1 pc.	22. PC-3000 SSD Extended Manual	- 1 book
11. ATCS, ATDA probe unlock	- 1 pc.	23. Equipment Hard Case	- 1 pc.
12. M.2 PCIe NVMe/AHCI SSD & M.2 SATA SSD adapter	- 1 pc.		

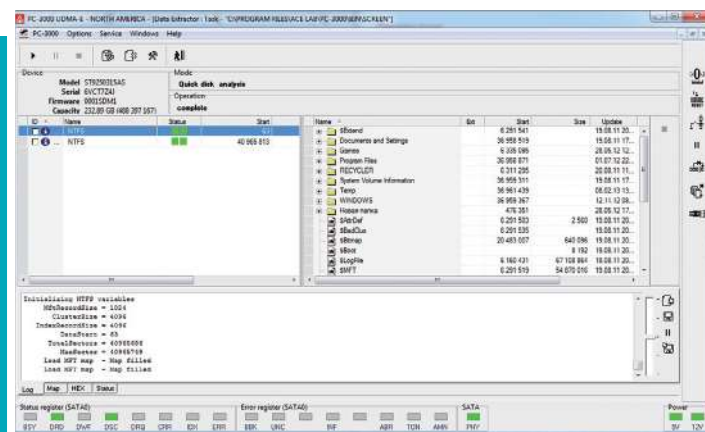
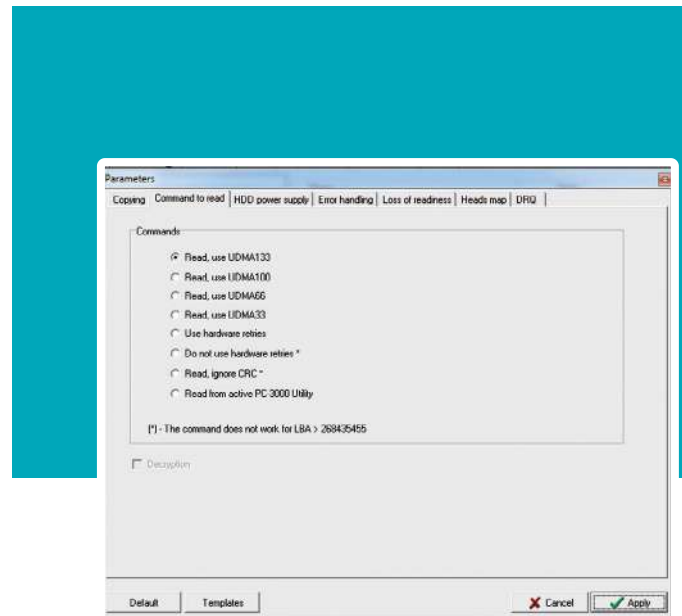
# Key Features of PC-3000 Portable III Systems to Deal with Damaged Storage Media

The PC-3000 Portable III Systems consist of hardware-software and software parts: Data Extractor (for HDDs), Data Extractor RAID Edition (for RAID), and PC-3000 SSD Extended (for SSD). Depending on the system, it is possible to use different features to recover data from the widest range of damaged storage media.

## Key Features to deal with Hard Disk Drives:

The PC-3000 hardware-software system allows users to create a «shadow» copy of the read data and use this copy for further work. It minimizes the handling of bad drives. Moreover, the Data Extractor has an extended functionality for working with damaged HDD:

- ▶ Reading HDD in technological mode
- ▶ Reading by head map
- ▶ Reading mode selection (UDMA 133/100/66/33, PIO 4/3/2/1/0)
- ▶ Read forward and backward
- ▶ Read ahead (cache function) disabling
- ▶ Autorelocation disabling
- ▶ Reading with hardware and software retries
- ▶ Reading with ignoring ECC
- ▶ Power supply control
- ▶ Software and hardware resets
- ▶ Virtual translator mode for recovering data from HDDs with corrupted dynamic translators
- ▶ Flexible map operation functionality



## Quick Disk Analysis mode

This mode allows to find the partitions which are not available anymore because the disk structure is lost: MBR, GPT, Apple partition table, etc. It enables to estimate the partition integrity and view a file/folder tree.

## Advanced RAW Recovery mode

The mode allows recovery of the most part of user data even if the file system is catastrophically damaged. The RAW Recovery mode searches and analyses the integrity of files irrespective of the file system structure. It supports a broad range of user data (images, audio/video files, archives, etc.) and file system metadata. The regular expression mechanism allows to add the personal search settings.

## Key Features to deal with RAID:

The hardware-software combination enables to solve the most complex RAID cases when one or several drives have not only logical (deleted partitions, virus attacks, etc.) but also serious physical damages.

## Working with built RAID array

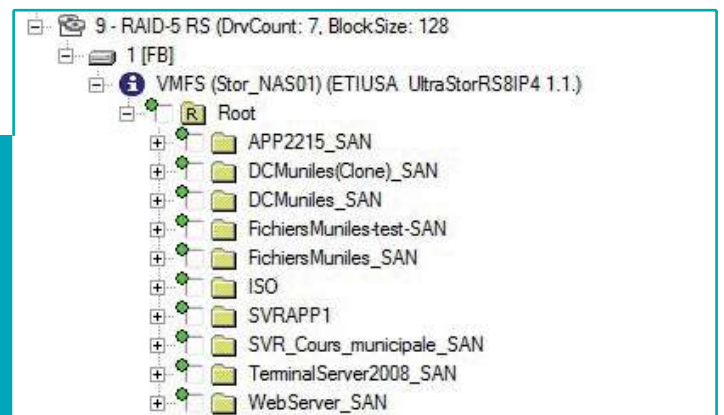
Features:

Ability to work with a virtual RAID array on-the fly (as with a conventional drive without need for imaging of virtual RAID):

- ▶ Reviewing all supported file systems
- ▶ Various logical recovery modes
- ▶ Mounting of virtual RAID to Operating System

Specialized features:

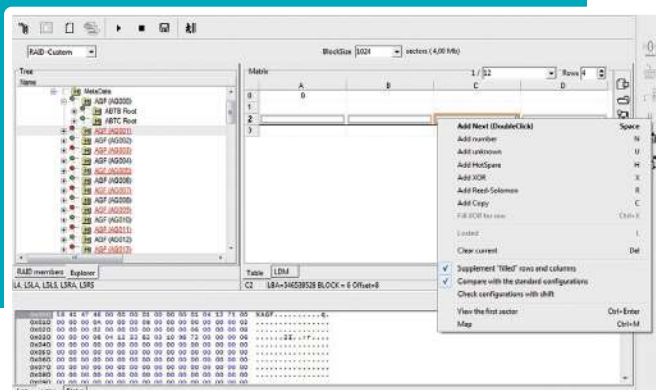
- ▶ Recovering data from redundant RAID arrays (block copies, XOR, Reed-Solomon)
- ▶ Checking the integrity of data for RAID arrays with redundancy
- ▶ Building various «Sub-maps» for specific RAID members



## Determining the array configuration

Specialized features make it easier to determine the RAID configuration:

- ▶ Auto-detection mode based on the analysis of RAID metadata (mdamd, LDM, etc.).
- ▶ Unique auto-detection mode based on the analysis of file systems and user data
- ▶ Powerful interactive mode helping to easily determine even the unusual configurations.
- ▶ RAID member statistics is effective and robust way that allows to determine RAID parameters.
- ▶ Flexible automatic operations enabling the user to control the process.
- ▶ Useful search tools help to define numerous RAID parameters (detecting the size, reviewing the file system structures, metadata with disk structure, analysis of the information from LDM, etc.).
- ▶ The possibility to determine the array parameters without any effect on the damaged HDDs.



## Working with damaged HDDs in RAID

The Data Extractor RAID Edition software can work with several damaged HDDs connected to the PC-3000 ports within one task at the same time. The total number of connected HDDs can be increased by using motherboard ports and image files.

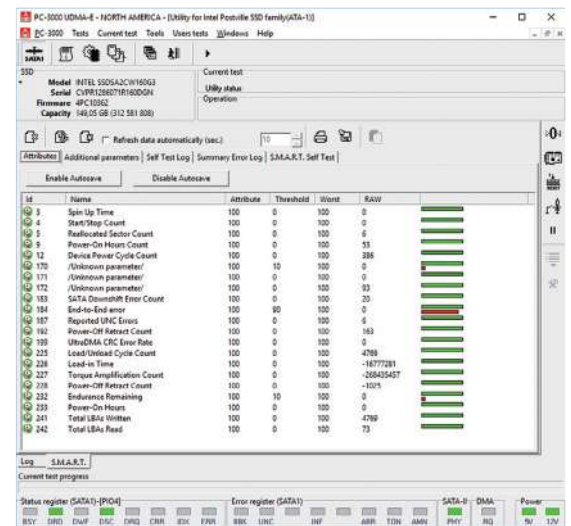
Key features:

- ▶ A full or partial data copy from any HDD included in the RAID
- ▶ It is possible to create and use a virtual translator for any HDD in the RAID or the whole virtual RAID
- ▶ Efficient interaction with the specialized PC-3000 Utilities for HDDs connected to the PC-3000 ports (power supply management, reset commands, choice of reading command, work in technological mode, etc.)
- ▶ Redundancy usage with the purpose of data recovery from the damaged HDDs
- ▶ The possibility to skip a damaged HDD while determining the array configuration or to use the data taken from a copy
- ▶ Integrated logical analysis features that allow to read only the minimally necessary amount of data from the storage device, thus reducing the workload and increasing the chances of successful recovery
- ▶ Advanced features for working with SCSI and SAS storage devices (full control over reading parameters, choice of reading command, building the head map, etc.)

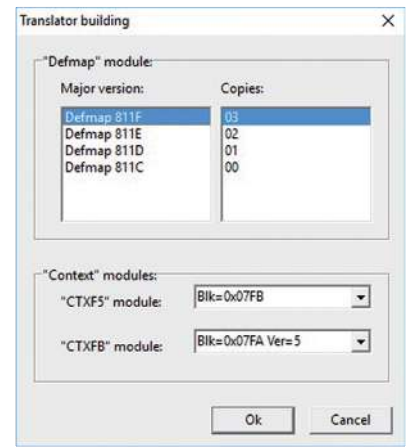
## Key Features to deal with SSD:

The PC-3000 SSD Extended Software contains a set of specialized utilities which enable to deeply diagnose SSDs, perform service operations, rewrite the drive microcode, get a direct access to memory chips, carry out low-level formatting blocking the damaged cells and placing their addresses into the defect table, as well as perform many other useful operations. The PC-3000 SSD Extended Software is launched from the main window of the PC-3000 Portable III System by clicking the button on the toolbar.

- ▶ Diagnose an SSD in technological mode
- ▶ View the logs of hidden defects (P-page, G-page)
- ▶ Perform low-level formatting to hide the discovered defects
- ▶ Reset the logs and S.M.A.R.T. parameters
- ▶ Search for the damaged memory chips
- ▶ Provide direct access to the content of memory chips so that you do not need to unsolder the chips



- ▶ Emulate the translator operation in order to get an access to user data
- ▶ Load the microcode into the drives RAM
- ▶ Read and write the content of the SSD ROM
- ▶ Verify and restore the SSD service information
- ▶ View the password and reset the password that was earlier set on the SSD
- ▶ Turn off background processes in the SSD to prevent data damage
- ▶ Work with the Data Extractor

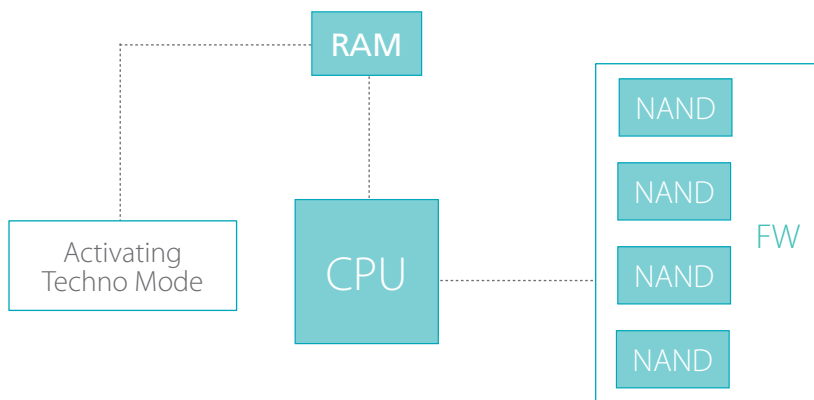


## How the Techno Mode works

Almost all present-day SSDs have the hardware data encryption. So, the chip-off method becomes useless to access the data on a damaged device. In this case, the Techno Mode is the only possible way to restore logical access to data on the SSD.

### How the Techno Mode works:

#### 1. Loader uploading in SSD RAM



- Drive works in Techno Mode
- CPU is working in single Channel mode
- SSD is using custom Translator
- Extended capacity is available
- TRIM is disabled
- Service Area is unlocked

#### 2. Access to NAND chips

## M.2 PCIe NVMe SSD Support

With the PC-3000 Portable III Systems, it is possible to recover data not only from SATA-based SSDs but also from the NVMe/AHCI ones!

The special universal M.2 PCIe NVMe SSD/M.2 SATA SSD adapter included in the delivery kit helps to diagnose the condition of a drive and recover data from healthy and damaged NVMe/AHCI SSDs.

Supported PCIe SSDs:

**Silicon Motion Family** (SM2260, SM2263XT, HPH8068):

- ▶ ADATA XPG SX7000;
- ▶ Radeon R5;
- ▶ HP EX900;
- ▶ Lexar NM600;
- ▶ Zion NFP03;
- ▶ Transcend MTE110S.

**Phison Family** (PS5007/PS5008):

- ▶ Patriot Helfire;
- ▶ Kingston KC1000;
- ▶ Mostly all other PS5007-based SSDs;

**Marvell Family** (88SS1093):

- ▶ Plextor M9Pe;
- ▶ WD Black G1

To see the list of supported SSDs, please follow this link:

<https://blog.ancelaboratory.com/pc-3000-ssd-list-of-supported-ssd-drives-regularly-updated.html>

More utilities for different vendors will appear with future updates.