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# 2016

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## PC-3000 Flash

Top-level Technology for  
Top-level Tasks.

# PC-3000 Professional Systems

	Repairing	Recovering data
SATA/IDE HDD	PC-3000 Express	PC-3000 Express + Data Extractor Express
	PC-3000 UDMA	PC-3000 UDMA + Data Extractor UDMA
	PC-3000 Portable	PC-3000 Portable + Data Extractor Portable
SAS/SCSI HDD	PC-3000 SAS	PC-3000 SAS + Data Extractor SAS
RAID	PC-3000 Express	PC-3000 Express + Data Extractor Express RAID Edition
	PC-3000 UDMA	PC-3000 UDMA + Data Extractor UDMA RAID Edition
	PC-3000 SAS	PC-3000 SAS + Data Extractor SAS RAID Edition
SSD	PC-3000 SSD + PC-3000 Express	PC-3000 SSD + PC-3000 Express + Data Extractor Express (or Data Extractor Express RAID Edition)
	PC-3000 SSD + PC-3000 UDMA	PC-3000 SSD + PC-3000 UDMA + Data Extractor UDMA (or Data Extractor UDMA RAID Edition)
	PC-3000 SSD + PC-3000 Portable	PC-3000 SSD + PC-3000 Portable + Data Extractor Portable
<b>Flash drives*</b>		<b>PC-3000 Flash</b>

\* – USB Flash drives, SD, microSD, Memory Stick (MS), xD, MMC, CF, Voice Recorder, etc.

# PC-3000 Flash (ver.4.0)

Fast, state-of-the art solution with convenient automatic modes for the most efficient Flash recovery possible



The **PC-3000 Flash** is a professional hardware-software system intended for recovering data from all **NAND**-based devices (**USB Flash drives, SD, microSD, Memory Stick (MS), xD, MMC, CF, Voice Recorder, etc.**) even if there is no access through the authorized drive interface.

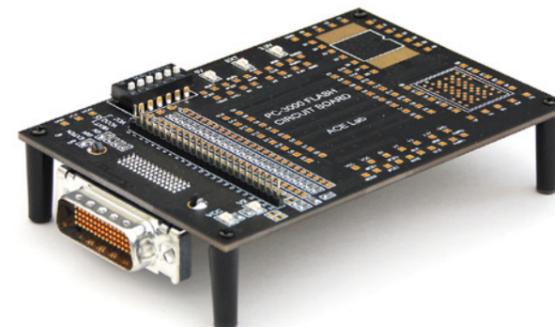
The PC-3000 Flash Reader (ver.4.0), which has a built-in power control adapter, has been eagerly anticipated by our customers, and finally it is available.

## PC-3000 Flash adapters

The System's functionality and the range of adapters have been consistently developed to comply with the latest challenges.

### Circuit Board adapter (for monoliths)

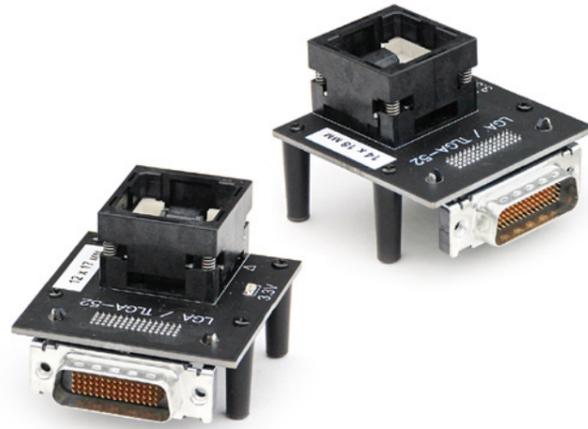
- ▶ Compatible with Flash Reader ver.3.0/4.0
- ▶ Buffered signals
- ▶ Buffers with double power supply (1.2-3.6V)
- ▶ Capabilities for protocol analysis
- ▶ Mounting spots for TSOP/TSSOP-48, TLGA-52 microchips
- ▶ Output recommutation
- ▶ Optional buffer disabling
- ▶ Duplicate rows of soldering pins for more convenience



LGA/TLGA-52 (14x18) adapter

LGA/TLGA-52 (12x17) adapter (optional)

- ▶ Compatible with Flash Reader ver.3.0/4.0
- ▶ ZIF Socket
- ▶ Designed for LGA/TLGA-52 chips



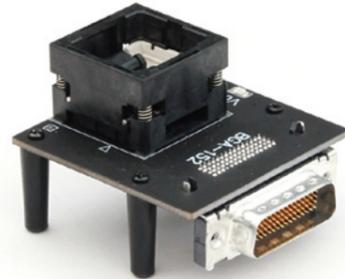
TSOP-48 adapter

- ▶ Compatible with Flash Reader ver.4.0
- ▶ ZIF Socket



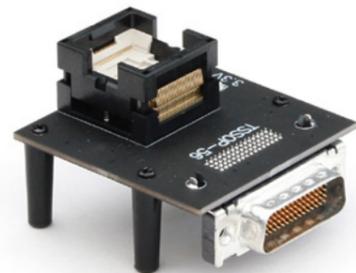
BGA-152 adapter

- ▶ Compatible with Flash Reader ver.3.0/4.0
- ▶ ZIF Socket
- ▶ Designed for BGA-152 chips



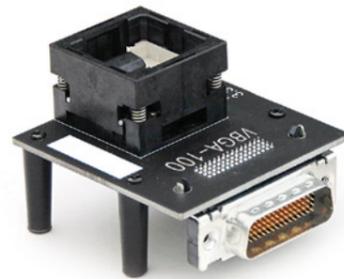
TSSOP-56 adapter (optional)

- ▶ Compatible with Flash Reader ver.3.0/4.0
- ▶ ZIF Socket
- ▶ Designed for TSSOP-56 chips



VBGA-100 adapter (optional)

- ▶ Compatible with Flash Reader ver.3.0/4.0
- ▶ ZIF Socket
- ▶ Requires no reballing



Main advantages

- ▶ «One-click» solutions can be easily found in the PC-3000 Flash Global Solution Centre, where over 4500 efficient solutions are ready for you
- ▶ An extensive database of analysis and data recovery algorithms
- ▶ A large database of algorithms for bit error correction (ECC)
- ▶ Hardware Retries mode helping to read out damaged memory chips
- ▶ The unique opportunity to recover data from various monoliths
- ▶ Monolith Database
- ▶ Online services helping to update the resources and to find optimal solutions
- ▶ A group of experienced engineers ready to help with any Flash recovery case
- ▶ At [forum.ancelaboratory.com](http://forum.ancelaboratory.com), you can find a section dedicated to NAND data recovery technologies

The PC-3000 Flash Kit:

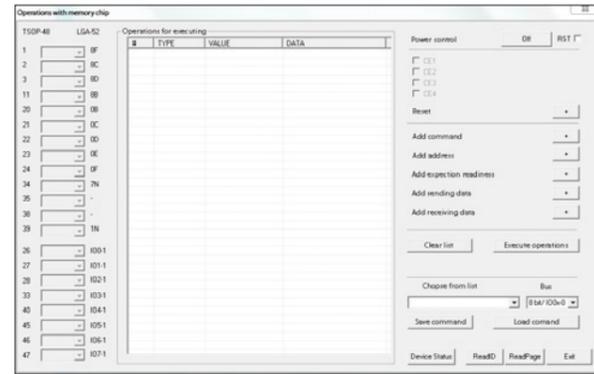
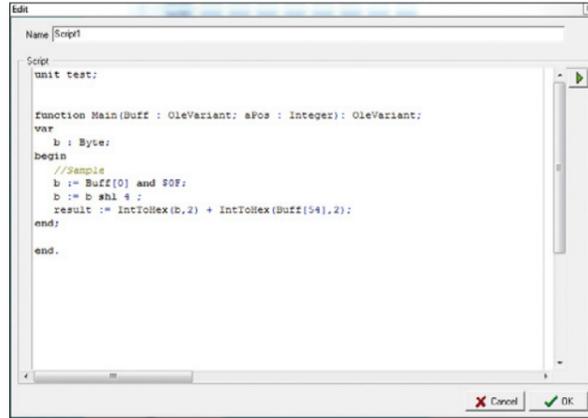


1. PC-3000 Flash Reader (ver.4.0)	– 1 pc.	5. Circuit Board adapter	– 1 pc.
2. TSOP-48 adapter	– 1 pc.	6. USB 2.0 Defender Cable	– 1 pc.
3. LGA/TLGA-52 (14x18) adapter	– 1 pc.	7. PC-3000 Flash software	– 1 DVD
4. BGA-152 adapter	– 1 pc.	8. User manual	– 1 book

The PC-3000 Flash software is being constantly updated, providing the users with new opportunities to recover data from the most modern NAND-based drives. The PC-3000 Flash software provides you with unique modes and tools to solve the most complicated and time-consuming tasks, which are seemingly unsolvable with a standard approach.

**1. Scripting Mode**

Custom functionality tailored for specific tasks. Pascal syntax is supported.

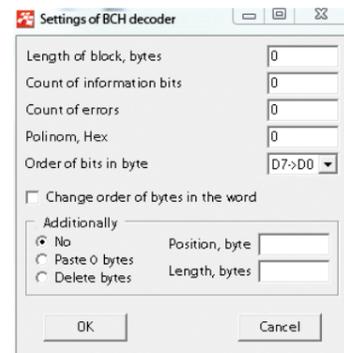
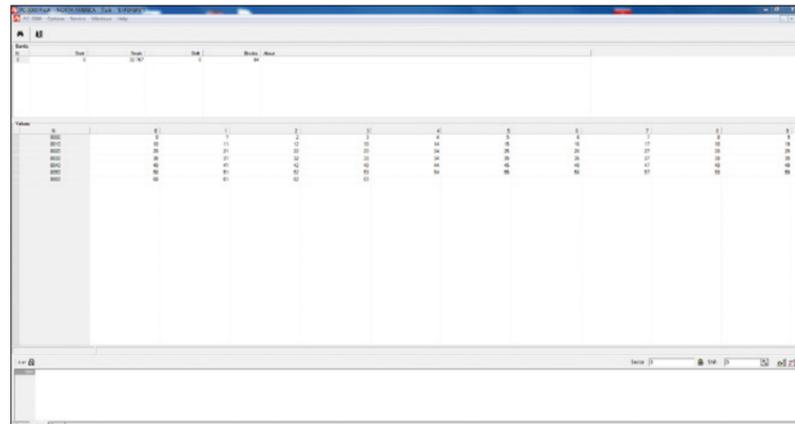


**2. Direct Command Mode for interaction with memory chips**

This mode helps to investigate the task on the lowest level and identify the cause of memory chip problems.

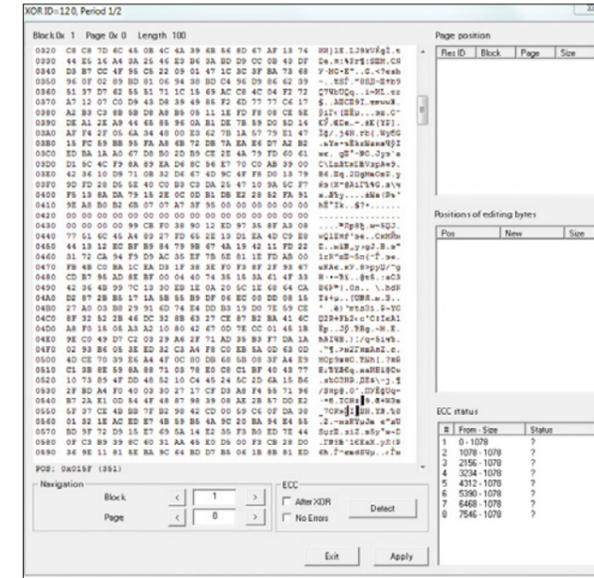
**3. Translator Addition Mode**

This mode helps to generate the target image by filling the virtual translator table sequentially, and reveal the pattern of marker sequence.



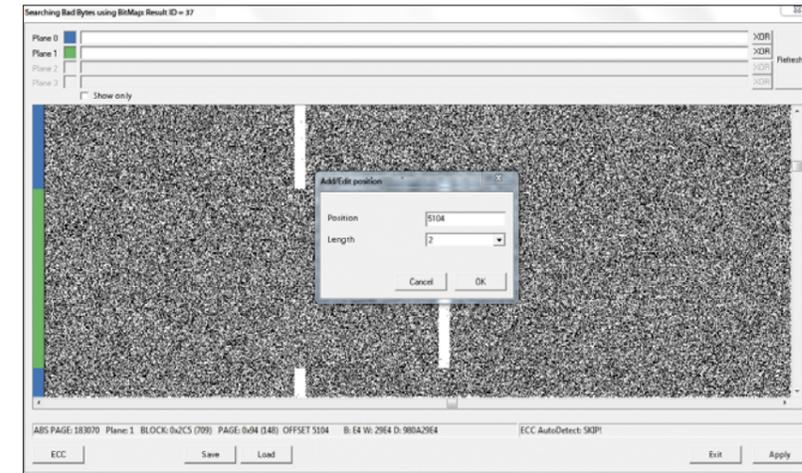
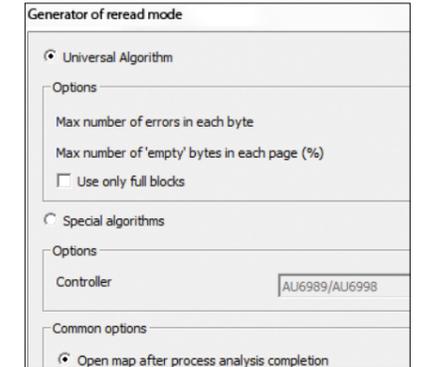
**4. Custom ECC Code Addition Mode**

The originally unsupported formats and types of ECC can be added into the System.



**6. Map Generation tool**

In some cases with malfunctioning chips, the volume of data that has to be re-read can be considerably reduced.



**7. Removal Mode for visible «inserts» with constant values**

The System allows to remove both hardware and software «inserts» in a fully automatic, semi-automatic, or manual mode. It is possible to extract the BadColumn table directly from the memory chip.

To enhance your skills of working with NAND-based drives and to expand your knowledge, you are welcome to use the following resources:

- ▶ Our YouTube channel at <http://www.youtube.com/PC3000datarecovery> with helpful video training available
- ▶ Our dedicated technical support Forum at <http://forum.ancelaboratory.com>, where your questions can be answered both by the Technical Support engineers and by experienced PC-3000 users
- ▶ Much-needed articles and video tutorials are available at our Blog: <http://blog.ancelaboratory.com>
- ▶ Our Technical Support engineers will help the authorized users of the [ACE Lab Technical Support](http://www.ancelaboratory.com) to find optimal solutions to any complicated case and to understand the principles of PC-3000 operation.

# Working with Monoliths

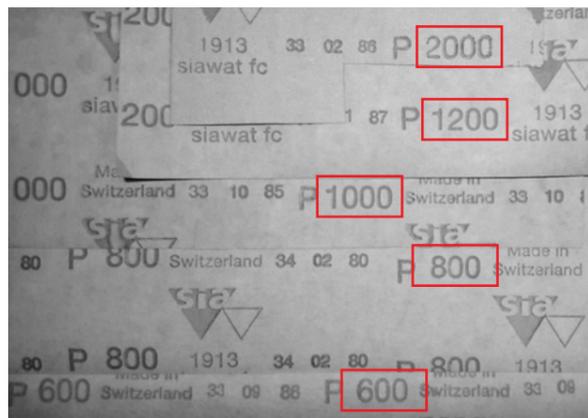
In the 21st century, the technological trends have been towards fewer size and weight of devices, to make them as convenient and user-friendly as possible. The same trend can be observed in the NAND-based storage devices, and this is how a new class of devices has emerged – monolithic flash devices.

These devices are technologically complex and can be easily damaged, so it may well be required to recover data. The ACE Lab engineers can equip you with all the necessary tools for recovering data from monolithic flash devices. At the ACE Lab conference, you'll have an opportunity to get a lot of useful information about the tools and about the methods of working with monolithic flash devices.

## How to prepare a monolithic flash device for reading

Successful data recovery from a monolithic flash device requires a specific sequence of steps. Correct preparation of your workstation, as well as the quality of the materials and tools, directly affect the results of recovery and the time you spend working with a drive.

For example, sandpaper is used to grind off the protective layer coating the debug contacts (hidden pinout). We recommend special **sandpaper** used in jewelry manufacturing.



To grind off the layers coating a monolithic flash device, you will need several kinds of sandpaper. The most important distinction is in the grit sizes (the coarser grit particles are used, the deeper material layer will be removed in a single pass). Primary sanding can be performed using sandpaper sheets with grit sizes from 800 to 1000, then you can proceed to finer 2000 grit size sheets and finish the surface with 2500 grit size sheets. Higher sheet grade numbers mean more delicate results and lower risk of damaging the drive. This is important because any mistake at this stage will be irreparable. Therefore, please choose your sandpaper carefully.

During the next stage, you will need to solder wires to the monolithic flash device. To do that, you will need a soldering iron, wire, solder, and flux material.

Please choose your soldering iron and wire carefully. Inconvenient and poor quality tools are incompatible with quick and good results. Operations with monolithic flash devices require a fairly specific soldering iron. You have to deal with very thin wires, which need to be soldered extremely close to each other. Modern powerful soldering stations with thick tips tend to heat both the monolith itself (which may cause damage to the internal structure of memory chips) and a large area around it. Wires soldered earlier may come off, lose contact with the soldered point, and accidentally short-circuit the conducting tracks. Main criteria for choosing a soldering iron for monolithic flash devices are as follows:

- ▶ ceramic heater (the tip will heat up and cool down faster);
- ▶ the thinnest tip available;
- ▶ low power.



Portable USB-powered soldering irons conforming to these requirements are becoming increasingly popular. 8 W power is quite enough to melt the solder in a fraction of a second and sufficiently heat the soldering location, the tin, and the wire. USB power and small size make such soldering irons very convenient for manipulations with tiny electronic components and wires.

Selection of the wire for drive soldering also requires a serious attitude. We recommend using only high-quality insulated 0.1 mm and 0.05 mm wire. A couple of wire spools would be optimal. Each spool contains approximately 1000 meters of 0.1 mm wire and approximately 2000 meters of 0.05 mm wire. Wires are among the main consumables used in the work with monolithic flash devices, and a single spool should be sufficient for several hundreds of orders. Clear insulation will help avoid accidental short circuits between the wires, thus making this wire type the best for operations with monolithic flash devices.



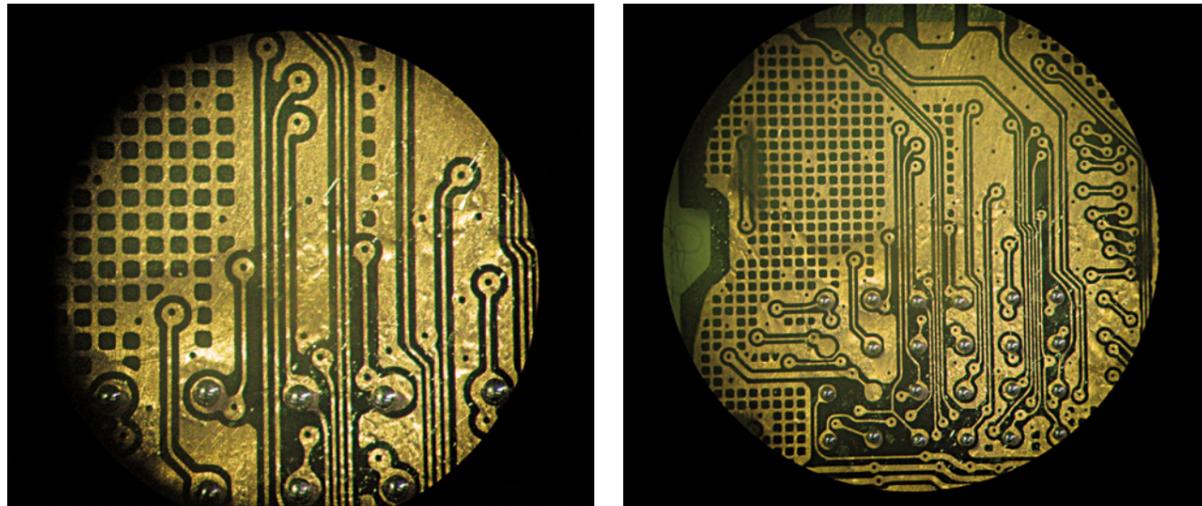
## Solder

This is probably the main know-how in our methods of working with monolithic devices. Whenever solder is mentioned, typically spools of quite thick (at the monoliths' scale) solder are implied. However, even the 0.5 mm solder wire won't fully meet your needs. Our methods are based on using BGA balls of varied diameters. Their composition is no different from the solder in spools, but they offer a huge advantage in terms of size.

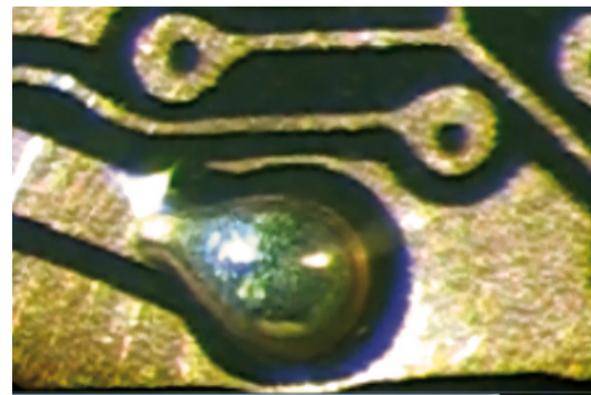
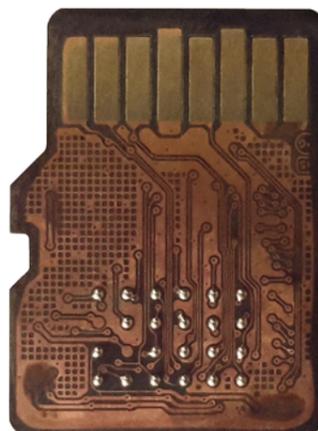
To achieve good contact quality, you need to have a collection of various ball sizes. Solder balls ranging in diameter from 0.25 mm to 0.5 mm are the most convenient for our purposes.



Fixed solder amount is ideal for precision soldering.  
The balls perfectly fit to the contact that the wire will be soldered to.



When heated, they form a practically ideal semisphere where you will later solder a tinned wire.



Today, soldering is hardly possible without fluxes. High-quality soldering requires two flux types: a rosin-alcohol activated flux for preparatory work, and BGA gel for final steps.  
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These are the main consumables and tools for working with monolithic flash devices, but you will also need tweezers, rosin, a microscope, adhesive tape, and alcohol, which are also essential. Experienced engineers definitely have all these materials. The specialists who just start doing data recovery can find a complete list of necessary equipment and materials in the special documentation available to all PC-3000 Flash users in their Personal Update Boxes.

## Circuit Board Adapter

The prepared monolith is soldered on a special adapter - Circuit Board adapter, developed by the ACE Lab engineers. It allows to work with any integrated circuit or NAND-based media. The adapter is compatible with hardware versions 3.0 and 4.0 of the PC-3000 Flash Reader.

Experienced data recovery engineers are aware of numerous problems one is likely to encounter while restoring data from modern flash drives. They include such challenges as Bad bytes, Read Retries, and floating voltage. Solving a task may take longer than anticipated. To avoid having to resolder monoliths all the time switching them on your only adapter, you need to have several PC-3000 Flash Circuit Board adapters. One adapter should be used with each monolith until you receive a good error-free dump. Then the adapter can be used for another case – another monolithic flash device.

## How to determine exact locations where each wire should be soldered

To assist you, we have created an online resource for the PC-3000 Flash users, namely the specialized Monolith Database section of our Global Solution Center.

It contains systematized information about known monolith pinouts. They are arranged in accordance with their respective package types.

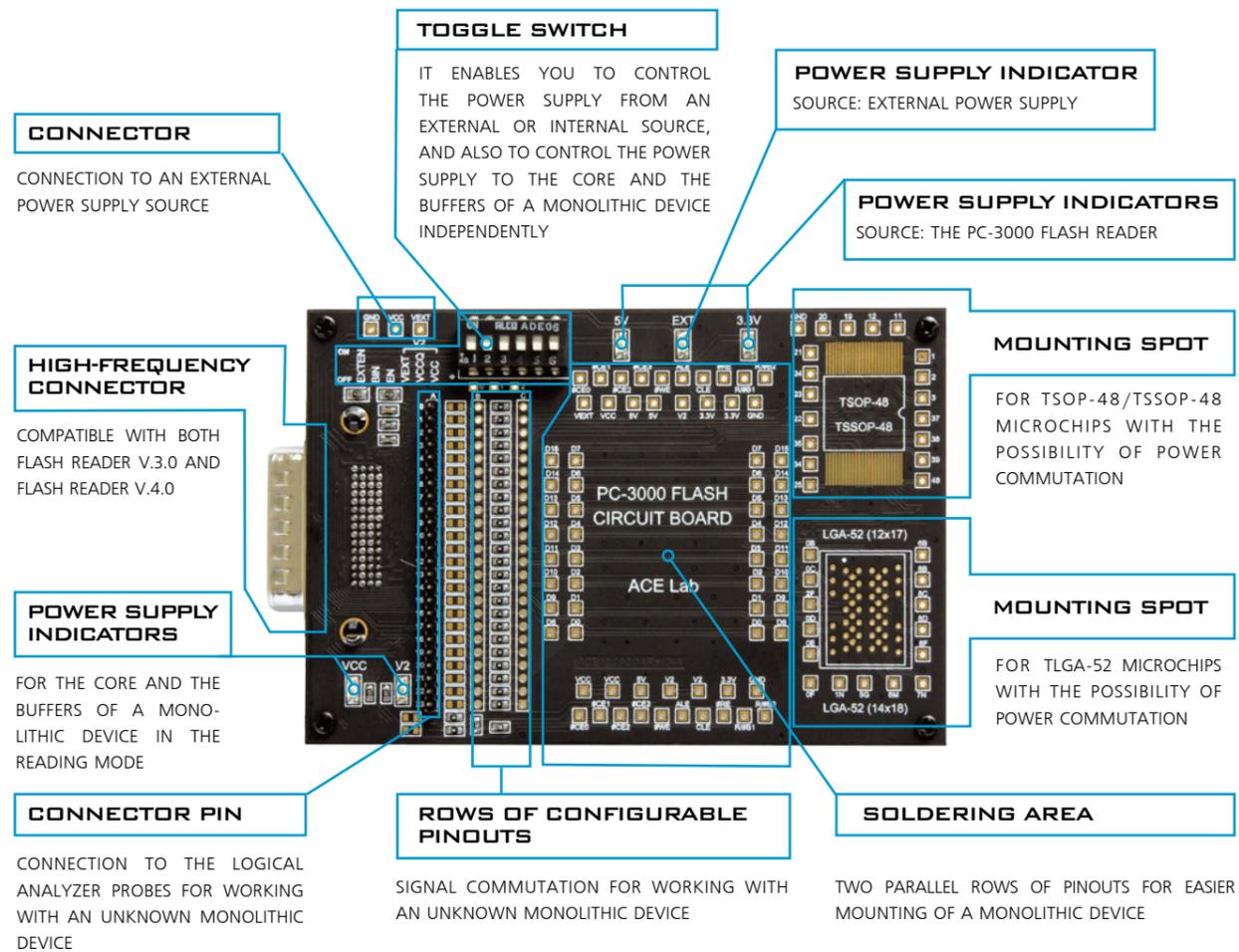
The knowledge database already contains the majority of the most popular monolith schemes; however, research work and addition of new components never stops. We want our users to have the latest and most complete information available in the industry of data recovery from monolithic devices.

For each monolithic device, the database contains a pinout scheme with indicated locations of necessary contacts where wires should be soldered.



The contacts are numbered, and pin values are summarized in a table. The latest version of the PC-3000 Flash System offers a powerful tool for data recovery both from memory chips of popular formats and from monolithic devices. The PC-3000 Flash users will also get professional technical support and access to the information not available for unauthorized viewing.

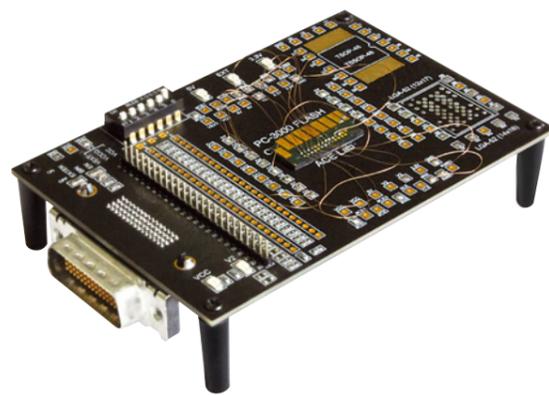
# PC-3000 Flash Circuit Board



## Circuit Board. Use in practice



A microSD monolithic device is soldered



An SD monolithic device is soldered

# Professional Training

These days, every leading professional data recovery company is familiar with the PC-3000 technologies and is successfully using PC-3000 products in its daily business. In-depth knowledge of the PC-3000 has become a requirement for every well-qualified data recovery specialist.

We are ready to share our knowledge, experience and skills accumulated over the last 24 years with everybody who works with or takes an interest in data recovery.



Training class in Prague, Czech Republic

## Why PC-3000 Training?



New Training class in Norwalk, USA

- ▶ Three-day training can substitute for several months of persistent self-learning in the PC-3000 technologies
- ▶ Efficient combination of theoretical knowledge and practical cases of data recovery
- ▶ Individual approach to every student
- ▶ An up-to-date training classroom with specially equipped workplaces for data recovery specialists
- ▶ Official certificates upon completion of the courses
- ▶ Bundle offers and bonuses for getting the training, products and service at once

## Types of training seminars

- ▶ PC-3000 Technologies for SSD Data Recovery
- ▶ PC-3000 Technologies for Monolith Recovery
- ▶ PC-3000 Technologies for Flash Data Recovery
- ▶ PC-3000 Technologies for HDD Data Recovery
- ▶ Advanced Seagate Recovery Course
- ▶ Advanced PC-3000 Flash Training



Training class in Rostov-on-Don, Russia

More information at [www.aceconsulting.eu.com/training.php](http://www.aceconsulting.eu.com/training.php)

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