FLASH LABORATORY

APPLIES TO

CAR INFOTAINMENT	CCTV - DVR	LAPTOP	SERVER	USB HDD	NAS UNIT	WORKSTATION	INDUSTRIAL MACHINE
SMARTPHONE	GPS	SIM CARD	DRONE	DASH CAM	FLASH CARDS	DIGITAL CAMERA	USB PENDRIVE

NAND FLASH memory chips can be found in many different devices from GPS navigation systems to Drones, Car dash cams, Flash cards (microSD SD cards CFcards…), digital cameras, USB pendrives, recorders and MP3 players.

BASIC FLASH LABORATORY CONFIGURATION
FLASH READER AND SOFTWARE
READER ADAPTERS WITH SOCKETS
MONOLITHIC ADAPTERS FOR FALSH READER
FLASH DATARECOVERY WORKSTATION
4 DAYS FLASH DATA RECOVERY TRAINING
3 DAYS ADVANCED FLASH DATA RECOVERY TRAINING
YEAR PREMIUM SUPPORT PRIORITY LANE

FLASH DATA RECOVERY TOOLS.

FLASH READER AND SOFTWARE and
READER ADAPTERS WITH SOCKETS
The tool is composed of a chip reader with its adapters to handle the different packages.
Among its features we can find:
- Automatic analysis functions such as XOR auto analysis, Spare area analysis, FAT/NTFS metadata analysis
- Advanced Hex and Bitmap viewer
- Scramble extractor (XOR key)
- Automatic ECC detection and virtual image correction
- SQL database of NAND chips and controllers
TSOP48, LGA52, LGA60, BGA100, BGA107, BGA152, BGA132

MONOLITHIC ADAPTERS FOR FALSH READER is a full set of adapters with socket to read FLASH monolithic devices such as MicroSD and USB thumbdrives without the need of soldering wires to a standard TSOP adapter Monolithic
chips Samsung, Sandisk, Hynix, Toshiba, Intel, Micron and others
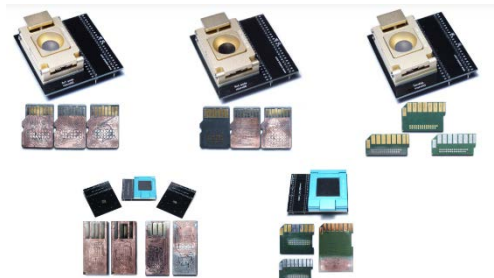
TRAINING AND SUPPORT

We can provide data recovery training based standard schedule and topics or tailor a training long term plan based on technical staff needs.

The standard offer includes 2 training levels to be held a few months apart that together with PREMIUM SUPPORT will create a fully working data recovery laboratory inside the forensics department.

FLASH READER AND SOFTWARE

NAND kit consists of reader, adapters and software. The reader reads a physical image (dump) out of a flash memory chip via special adapter. Then software processes physical image and convert it to its logical image with file system. Forensic analysis of specific blocks allows to retrieve old and "erased" data.

Tool for chip-off data recovery and digital forensic expertise of broken NAND flash storage devices.

The FLASH kit consists of NAND memory chip reader, adapters and software.

The Reader reads a physical image (dump) out of a flash memory chip via special adapter, then software processes physical image and convert it to the logical image rebuilding file system.

Forensic analysis of specific blocks allows to retrieve old and "erased" data.

- Supported devices
USB Flash disks, Solid State Drives, SD cards, Monolithic flash media, Micro SD cards, MS cards, XD cards, Digital voice recorders, MP3 players, Tablets and other NAND based data storage devices.

- Typical use
Physical damage Electrical damage Firmware failure Thermal damage
Non-recognizable disk in OS
Analysis of "non-addressed areas" of NAND

- Supported controllers
Alcor Micro (AU), Innostor (IS), Jmicron (JMF), Indilinx (IDX), ITE (IT), Lexar (FC), Phison (PS), Samsung, Sandisk, Silicon Motion (SM), Skymedi (SK), Solid State Systems (SSS), Stec, Toshiba (TC), USBest (UT), others.

- Ready to use BCH codewords for
AlcorMicro(AU), Chipsbank(CBM), Indilinx(IDX), Innostor(IS), Intel, ITEtech(IT), JMicron(JM), Marvell(88SS), Other, Phison(PS), Samsung, SanDisk(20-82), SiliconMotion(SM), Skymedi(SK), SolidStateSystem(SSS), Toshiba(TC)

- Ready to use XOR Keys for
AlcorMicro(AU), Chipsbank(CBM), Innostor(IS), ITEtech(IT), JMicron(JMF), Other, Phison(PS), Sandisk(20-82), SiliconMotion(SM), Skymedi(SK), SolidStateSystems(SSS), Toshiba(TC)

- Supported NAND memory
Micron (2Ch), Intel (89h), Toshiba (98h), Sandisk (45h), Hynix (ADh), Samsung (ECh), others ONFI and not standard.

20F64G08CBABA,	29F32G08CFABA	29F8G08MAA	FA32B08UCT1-7F
29F128G08CFAAA	29F32G08FAA	3WB12 NX637	FA32B08UCT1-B6
29F128G08CFEFB	29F32G08FAMB2	4SD22NW553	FA64B08UCT1
29F128G08CJAAA	29F32G08JAMD2	AATS4D2H0161XSD-AL-5	FA64B08UCT1-7C
29F128G08CJABA	29F32G08TAA	BSP1ACG8U0D-PCT	FA64B08UCT1-FC
29F16B08CAMEI	29F64G08AAME1	CA6GL1450D4	FAK64GHCMIF1BPS1C
29F16B08CCME3	29F64G08AATE1	D1023 04314-032G	FBAL41B8GK3W
29F16B08JAMDB	29F64G08AATE1	D2301 RYT118932	FBNL41B8GK3PG
29F16B0GJAMDI	29F64G08ACME2	D27UAG8T2MTR	FBNL63B5IK3WG
29F16G080AA	29F64G08CAMD2	D27UBGT2CTR	FCGSMMP-1Q04
29F16G08AAMC1	29F64G08CAMDB	D27UCG8T2BYR	FD16B08UCH1-0A
29F16G08CBACA	29F64G08CBAAA	D27UCG8T2ETR	FD16B08UCT1-4C
29F16G08MAA	29F64G08CFAAA	DET0128GWD8HGT5	FD32B08UCT1-FA
29F2G08AAB	29F64G08CFABA	DFT128GWD8S2GTO	FDL63AP-32U
29F32G08AAMD2	29F64G08CFACB	DT16G2LALC	FNNM29B2GK3WG
29F32G08AAMDB	29F64G08EBAAA	F064B08UCT1-8A	FR25608UCT-1
29F32G08AAMEI	29F64G08FAMCI	F4GMSAP-0S01	FR2568UCT1-0C
29F32G08CAMCI	29F64GO8CAMDA	FA16B08UCT1-01	FT16G08UCM03
29F32G08CBAAA	29F8G08DAA	FA16B08UCT1-9E	FT32G08UCM1-15

FT32G08UCT1-73	HY27UT084G2M	K9K8G08U1M	MT29F4G08
FT64G08UCH1-09	HY27UT088G2M	K9L8G08	MT29F512G08CKCABH7
FTAL41B32K3W4	HY27UU088G5M	K9L8G08U0M	MT29F512G08CMCABH7
FTAL41B8Gk3WG	HY27UU08AG5A	K9LAG08	MT29F64G08CBABAWP
FTL62AP-16G	HY27UV08AG5	K9LAG08U0A	MT29F64G08CBEFBWP
FTNM40A4GK3W2	HY27UV08AG5M	K9LAG08U0M	MT29F64G08EBAAA3W
FxxL74A81KDMABH2 PF510	HY27UV08BG5	K9LBG08U0D	MT29F8G16ADBDAH4
FxxL85A71KDBABH6 PFC13	HY27UV08BG5M	K9LBG08U0M	MT29GxxG08AxxBB
FxxL94C61KDBABWP	HY27UW08BGFM	K9LBG08U1M	SDRTNPMCHEM-032G
FZBWH27UDG8U5MYR	IF16G2GAGA	K9LC808U0W	SDTHGEHE0-1024
FZBWTC58TVG6T2JTA00	INA98 JW617	K9LCG08U1M	SDTNGAHE0-256
H08G110918BA	JS29F16B08CCMF2	K9LCG08UOA	SDTNGAHE0-256
H27QDG8VEBIR-BCB	JS29F16G08AAMDB	K9LCGD8U1M	SDTNGCHE0-2048
H27QEG8NDM	JS29F64G08CCMD1	K9LCGY8S1B	SDTNGCHEM-1024
H27QEG8YEBJR	JW224	K9LCGY8U1A	SDTNIFHSM-4096
H27QEGLUDB8R	JW391	K9MDG08U5M	SDTNIGHSM-2048
H27UAG8T2ATR	JW740	K9NBG08	SDTNIGHSM-4096
H27UCG8T2MYR	K524G2GACB	K9NBG08U5A	SDTNKEHSM-4096
H27UDG8VEMYR	K5D1213ACE	K9NCG08U5M	SDTNKGHSM-8192
H2DTDG8V01MYR	K9ABG08U0A-MCB0	K9PDG08U2E	SDTNKHHSM-16384
H2JTCG8T21BMR	K9ABGD8U0B	K9PFG08U5A	SDTNKHHSM-16384
H61AG08OI 0927	K9BCG08U1A-MCB0	K9PFG08U5M	SDTNKLAHSM-1024
H8BCS0SI0MAP	K9BDGD8U0A	K9PFG08U5M	SDTNKLBHSM-2048
H8BCS0UN0MCA	K9CDG08U5A	K9PFGY8U7A	SDTNKLCHSM-4096
HN29V1G91T_30	K9E2G08U0M	K9PFGY8U7B-HCK0	SDTNLLAHSM-2048
HU27UV08BG5A	K9F1208U0M	K9W8G08	SDTNLLBHSM-4096
HVNJ0F8	K9F1G08U0A	K9W8G08U1M	SDTNLLCHSM-8192
HVNJ0F8_v2	K9F1G16	K9WAG08	SDTNLMBHSM-4096
HVPD3F2	K9F2808	K9WAG08U1A	SDTNLMCHSM-8192
HVPE4F3	K9F2808U0C-PIB0	K9WAG08U1M	SDTNLMCHSM-8192
HVPE4F4	K9F2G08U0A	K9WBG08U1M	SDTNMMAHSM-002G
HVPF4F5	K9F2G08U0M	KA1000012M-BJTT	SDTNMMCHSM-008G
HVPG3P3	K9F4G08	KAG004003M	SDTNMNAHSM-0C4G
HVPG4F6	K9F4G08U0A	KAG00600FA-AJJY	SDTNNMBHSM-004G
HVPJYX7	K9F5808	KLMAG2GE4A eMMC	SDTNNMBHSM-008G
HVQF0F8	K9F8G08	KLMCG8GE4A eMMC	SDTNNMCHSM-016G
HVTK317	K9G8G08U0B	M12K8U11QH	SDTNNMCHSM-016G2
HW3232G0825N	K9GAG08U0D	M8XJ4S45	SDTNPMAHEM-004G
HY27UA081G1M	K9GAG08U0E	M8XJ90178	SDTNPMAHEM-008G
HY27UBG8T2ATR	K9GAG08U0M	M9SDK221	SDTNPNAHEM-008G
HY27UBG8T2MYR	K9GBG08U0M	MT29F128G08AKCABH2	SDTNPNAHEM-016G
HY27UBG8U5MTR	K9GBG08U0M	NW422	SDTNPNAHEM-016G
HY27UDG8VEAYR	K9HAG08U1M	MT29F128G08CDABA3W	SDTNPNAHEM-016G
HY27UF(G)082G2M	K9HBG08U1A	MT29F128G08CFABAWP	SDTNPNBHEM-16G
HY27UF081G2M	K9HBG08U1M	MT29F128G08CKCCBH2	SDTNPQAHEM-008G
HY27UF084G2M	K9HCG08	NQ313	SDTNQCBMA-32G
HY27UG082G	K9HCG08U2E	MT29F128G08EBAABWP	SDTNQCCMA-064G
HY27UG082G2M	K9HCGZ8U5D	MT29F16G08CBACA3W	SDTNQFAMA-004G
HY27UG082G4	K9HCGZ8U5M	MT29F1T08CUECBH8	SDTNQGAMA-008G
HY27UG084G2M	K9HDG08U1A	MT29F256G08CEECBH6	SDTNRCAMA-008G
HY27UG088G5M	K9HDGD8U5M	MT29F256G08CJAAAWP	SDTNRIAMA-008G
HY27UH088G2	K9K1G08	MT29F2G08	SDTNSCAMA-008G
HY27UH08AD5B	K9K1G08U0M	MT29F32G08	SDXNGDHE0-4096-I
HY27UH08AG5	K9K2G08	MT29F32G08CBAAAWC	SDYNMMDHSP-016G
HY27US08121M	K9K2G08U0M	MT29F32G08CBACA3W	SDZNMMDHER-032G
HY27UT084G	K9K2G16	MT29F32G08CBADA3W	T58TEG6TGLTA00
HY27UT084G2	K9K4G08	MT29F42G08CBCABH1	TC58DVG04B1FT00

TC58DVG04B1TG00	TC58TE37JDKTA03	TH58NVG6D2ELA49	TH58NVG8T2
TC58DVG14B1FT00	TC58TFG7DDLT	TH58NVG6D2ETA20	TH58TEG8TDKTA20
TC58DVM72A	TCGSMAI-1D04	TH58NVG6D2FLA49	TH58TEG9DDJBA89
TC58DVM9	TCGSTBP-0S03	TH58NVG6D2FLAM9	TH58TEG9THLTA20
TC58NVG0S3CTA00	TCGSTDP-0S03	TH58NVG6S2ELAM8	TH58TEGBDDKTA20
TC58NVG1D4BTG00	TF15G1GAHA	TH58NVG6T2ETA20	TH58TEGBDDKTA20
TC58NVG2	TF16G3GAHJ	TH58NVG6T2ETA2A	TH58TVG6D2FBA49
TC58NVG2D4CTG00	TF57G1 GAHA	TH58NVG7D1DLA87	THGSTMP-1Q06-T1421
TC58NVG3	TH58DVG2	TH58NVG7D2ELA48	THNU38N00PH07
TC58NVG3D1DTG00	TH58NVG2S33BTG00	TH58NVG7D2ELA89	TK29F32B08MAMF2
TC58NVG4D1DTG00	TH58NVG3D4BFT00	TH58NVG7D2FLA89	TP8AG51ARA
TC58NVG4D1DTGI0	TH58NVG4D4CTG00	TH58NVG7D2FLAS9	TT17G2JAJA
TC58NVG4D2FTA00	TH58NVG5D1DTG20	TH58NVG7D2FTAK0	TU69G2JAJA
TC58NVG5D2FTAIO	TH58NVG5D2ETAK0	TH58NVG7D2GTA28	TU69G2JAJA_64GB
TC58NVG5T2ETA00	TH58NVG5D4CTG20	TH58NVG7E2FTA20	TU89G5LAPA
TC58NVG6D2GTA00	TH58NVG6D1DXLM4	TH58NVG7T2JTA00	TU8AG2JAPA_64GB
TC58NVG6D2HTA00	TH58NVG6D2ELA48	TH58NVG8D2FLA89	TUABG5LASA
TC58NVG6T2H1A00	TH58NVG6D2ELA48	TH58NVG8D7EBAKO	TYA000B800C0G

FLASH READER
- Functions
Read NAND Flash chip

- Supported NAND Packages
TSOP48, LGA52, LGA60, TSOP56, BGA100, BGA152, BGA154, BGA224, Monolithic chips

- NAND architectures
SLC, MLC, TLC
- Data transfer protocols
Asynchronous ONFI, DDR, WL triple address, WL triple address with DDR

- Power adjustment
Power adjustment of Core and I/O ports of NAND chips from 1.6V to 4.0V. This feature is important for all 1.8V NAND chips. Power adjustment also helps to reduce bit errors that appear while memory chip reading under standard 3.3Volts. Voltage level can be adjusted through software, no special adapters required.

- NAND access modes
Read NAND physical image to dump file (data recovery and digital forensics) Real-time access (Bit error estimation, NAND configuration analysis)

- I/O data bus
According to ONFI and Samsung standards the reader supports 8-bit and 16-bit data bus

- Speed
Data transfer rate is 7-10 Mb/s depending on NAND chip

- Interfaces
Mini-USB 2.0 for connecting to PC
ZIF interface for adapter connection

- LED indicators
Green - USB power, Yellow - NAND power, Red - Error

SOFTWARE
- Data Recovery & Digital Forensic functionality
Physical image extraction
Physical to Logical image conversion

Wiped/obsolete blocks analysis
File system analysis

- Automatic analysis functions
XOR auto analysis, Data area analysis, Spare area analysis, Data transformation analysis, Block/Page allocation analysis, FAT/NTFS metadata analysis.

- Tools & modes
Advanced Hexi viewer, active Bitmap viewer, Structure viewer, Record viewer, Page viewer, Scrambler (XOR key) extractor, Dump Navigator, File system viewer.

- Dump operations
Physical image, ECC, Inversion, XOR (Descrambler), Pair, Separate, Rotate, Unite, Offsets, Arrange blocks, Data area, Edit, Bit verification

- Block translation
Universal adjustable Physical to Logical Block translation algorithm. Manual and automatic sorting, filtering and analysis of Main (Base) blocks,
Replacement blocks, Log blocks, Obsolete blocks, Bad blocks, Empty blocks, FW Blocks, Translation Table blocks.
Reverse Logical to Physical block translation for file system and data correction.

- Error correction codes
Automatic error correction code detection and virtual image correction.
ECC map.
Multistep reading by ECC map.

- Features
Case management system with logging.
Built-in functions for reverse engineering of new controllers.
SQL databases of NAND chips and controllers (solutions for different devices). Flexible software architecture allows to work with any number of NAND physical images and different tools in multi-window mode.
Intuitive GUI

READER ADAPTERS WITH SOCKETS
Socket adapters for the following packages: BGA152, BGA100, BGA132

SOCKET PACK FOR MONOLITHIC DEVICES
MicroSD 3×7 pads
MicroSD 6×4 pads
Sandisk monoSD
monoUFD 6×6 & 3×7 pads
monoSD 3×13 pads