VISUAL NAND RECONSTRUCTOR

Product specification

VISUAL NAND RECONSTRUCTOR

NAND READER   NAND ADAPTERS   SOFTWARE

VISUAL NAND RECONSTRUCTOR is a tool for chip-off data recovery and digital forensic expertise of broken NAND flash storage devices. The VNR 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 with file system. Forensical analysis of specific blocks allows to retrieve old and "erased" data.

Supported data storage 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, Smartphones 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.

Supported NAND memory

Micron (2Ch), Intel (89h), Toshiba (98h), Sandisk (45h), Hynix (ADh), Samsung (ECh), others ONFI and non-standard.

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NAND 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 tripple address, WL tripple 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
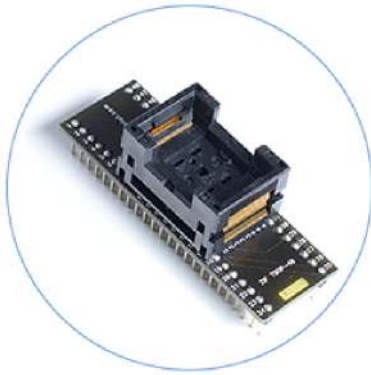Green - USB power, Yellow - NAND power, Red - Error

Operating System requirements
Windows driver for x64/x86 platforms.
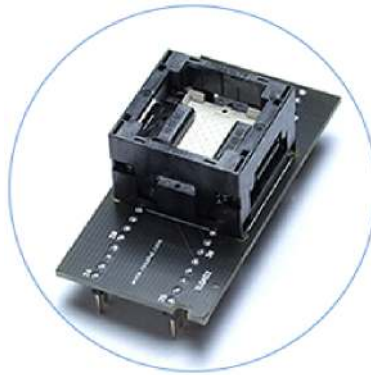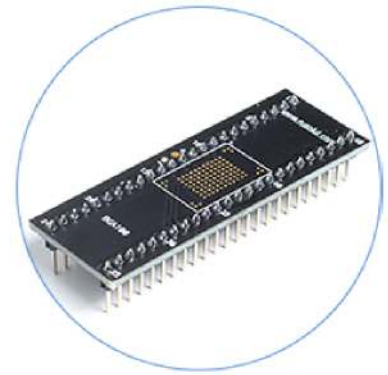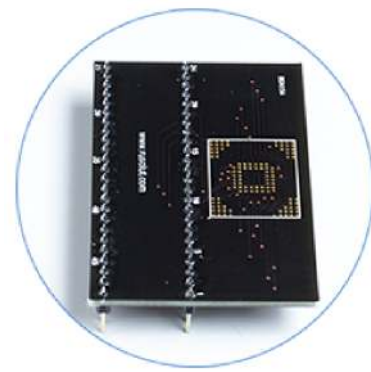Recommended operating system is Windows 8/7 x64.
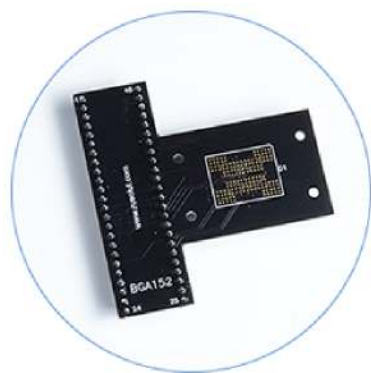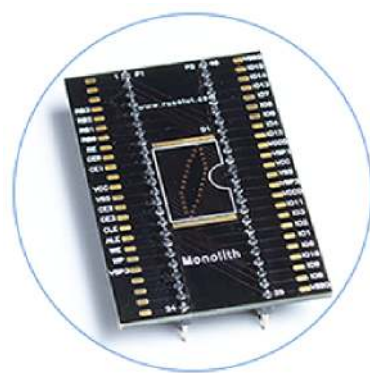
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NAND ADAPTERS

TSOP48

TLGA52

BGA100

TSOP56

BGA154

BGA224
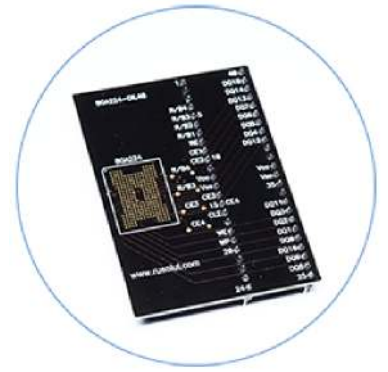
BGA152

Monolith

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SOFTWARE

Data Recovery & Digital Forensic functions

Physical image extraction
Physical to Logical image conversion
Wiped/obsolete blocks analysis
File system analysis

Automatic analysis functions

XOR autoanalysis, Data area analysis, Spare area analysis, Data transformation analysis, Block/Page allocation analysis, FAT/NTFS metadata analysis.

Tools & modes

Advanced Heximal 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.
Multipass 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 with Drag&Drop concept.

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