

Chip-off Car Digital Forensics. Data Recovery case studies.

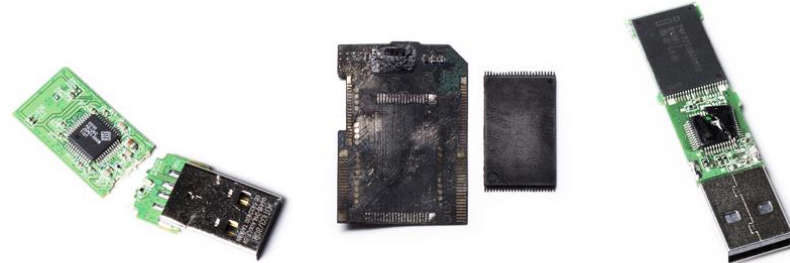
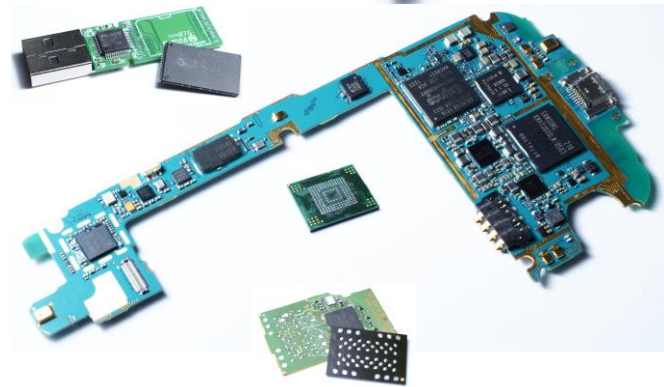
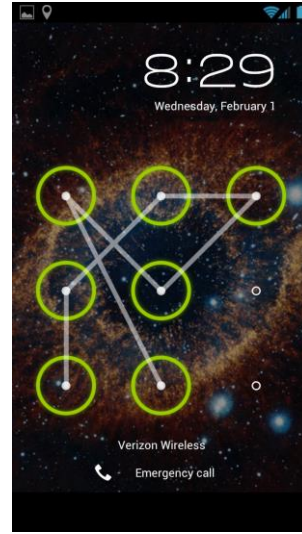
Michał Gmurek, Rusolut

NAND FLASH MEMORY IS EVERYWHERE

- **CAR INFOTAINMENT SYSTEM**
 - PORTABLE STORAGE (CARDS, FLASHDRIVES, ETC)
 - SMARTPHONES
 - TABLETS
 - DRONES
 - SATNAV SYSTEMS
 - WEARABLES/SMARTWATCH
 - LAPTOPS
 - SOLID STATE DRIVES
 - VOICE RECORDERS
 - MULTIMEDIA PLAYERS
 - SMART TV
 - INTERNET OF THINGS
- ...AND MUCH MORE...



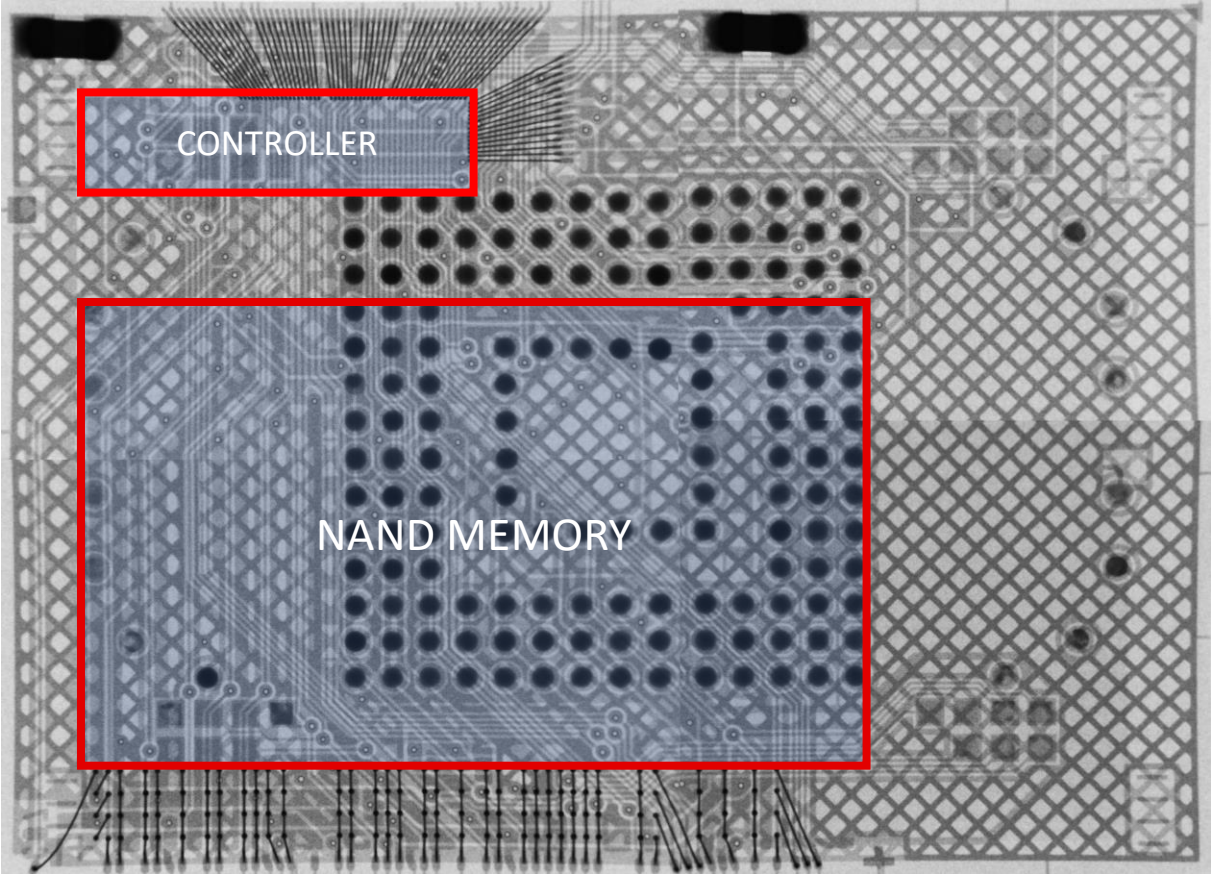
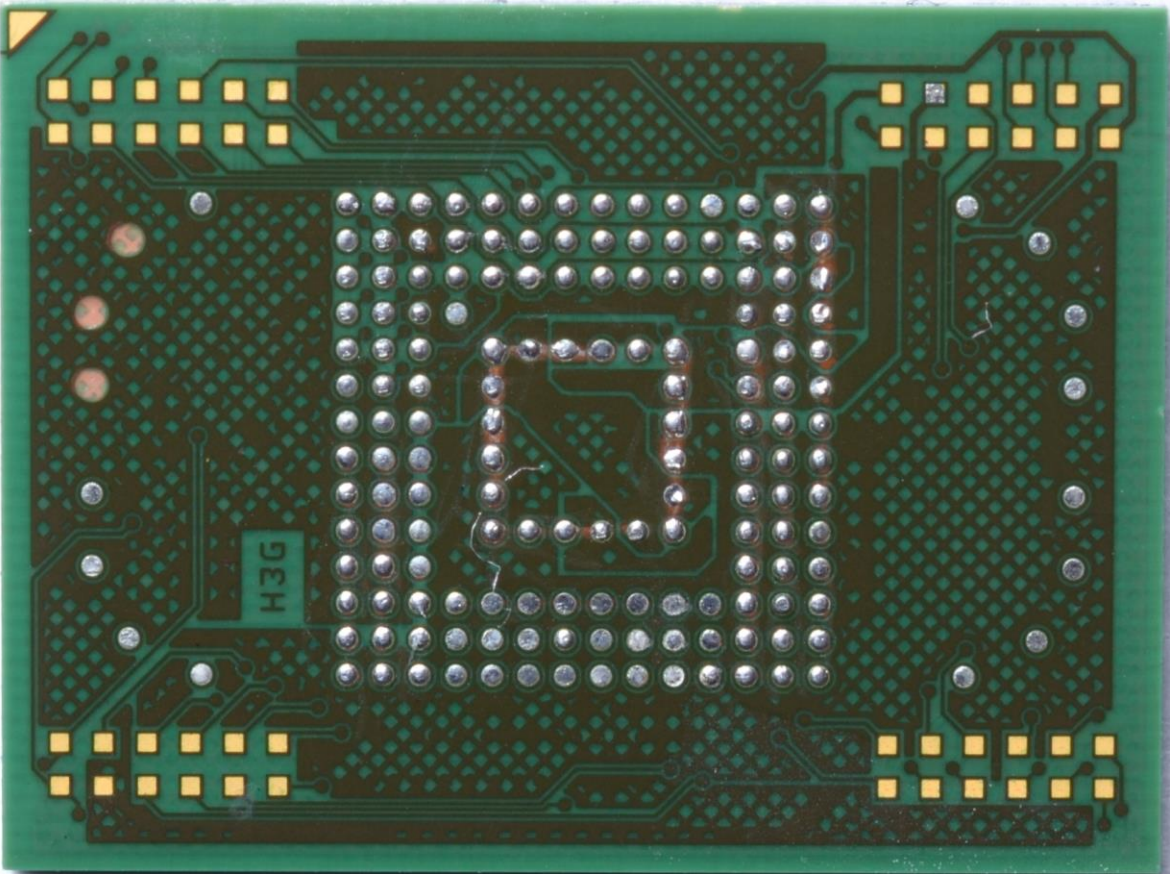
FLASH MEMORY DEVICES AND THEIR PROBLEMS



- USB FLASH DRIVES
- SMARTPHONES
- TABLETS
- MEMORY CARDS (SD, MICROSD, CF, ETC)
- SSD
- SSHD
- DVR
- GPS NAVIGATION SYSTEMS
- DRONES
- OTHER DEVICES

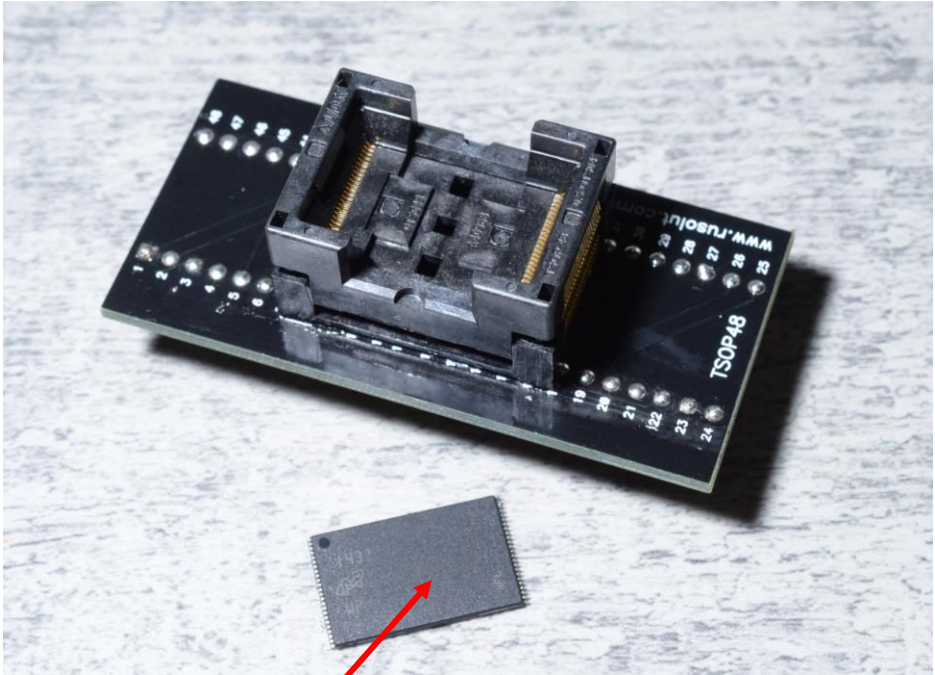
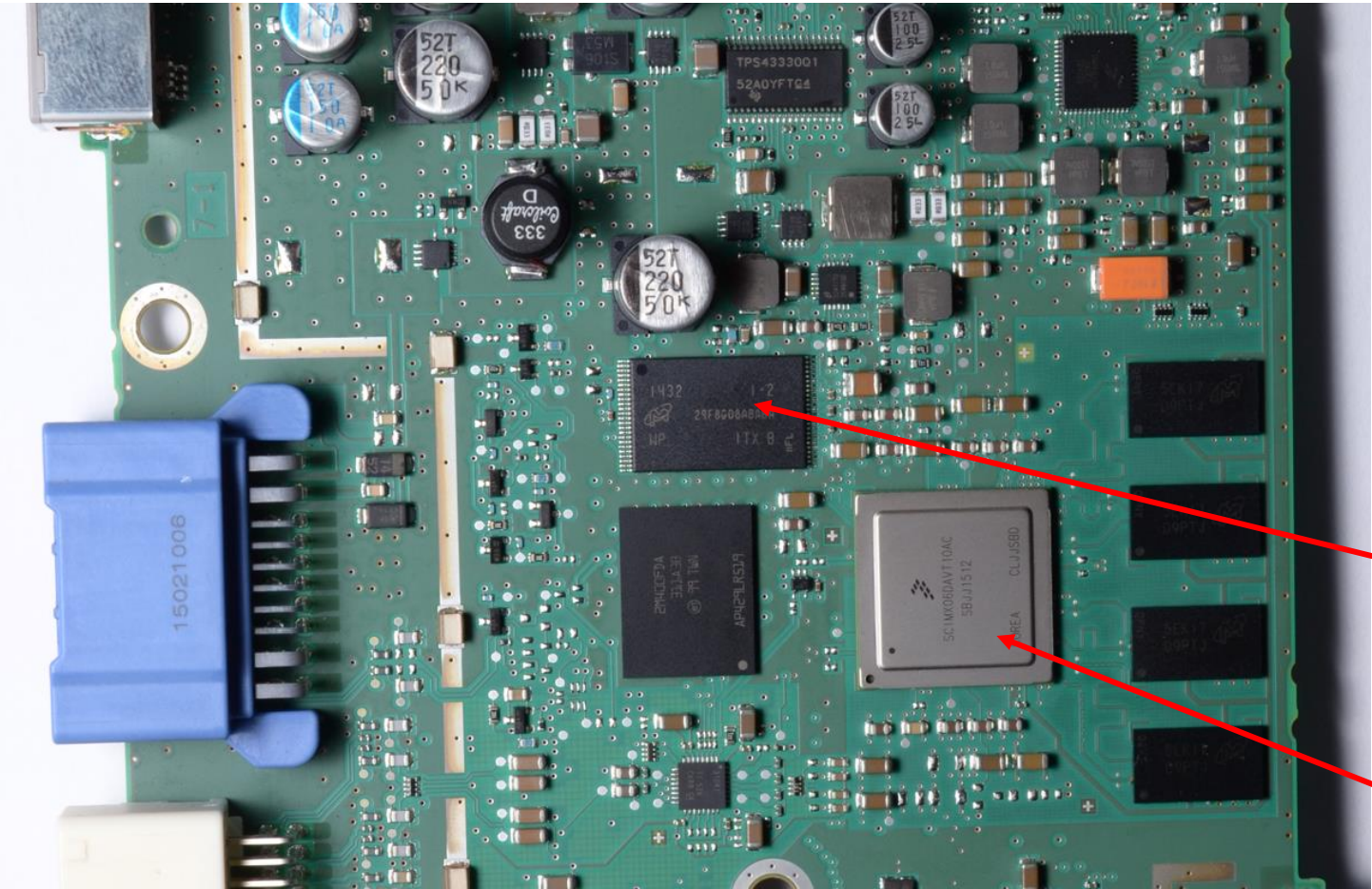
NAND FLASH TECHNOLOGY USED IN CAR SYSTEMS

eMMC



NAND FLASH TECHNOLOGY USED IN CAR SYSTEMS

RAW NAND



NAND MEMORY

CONTROLLER

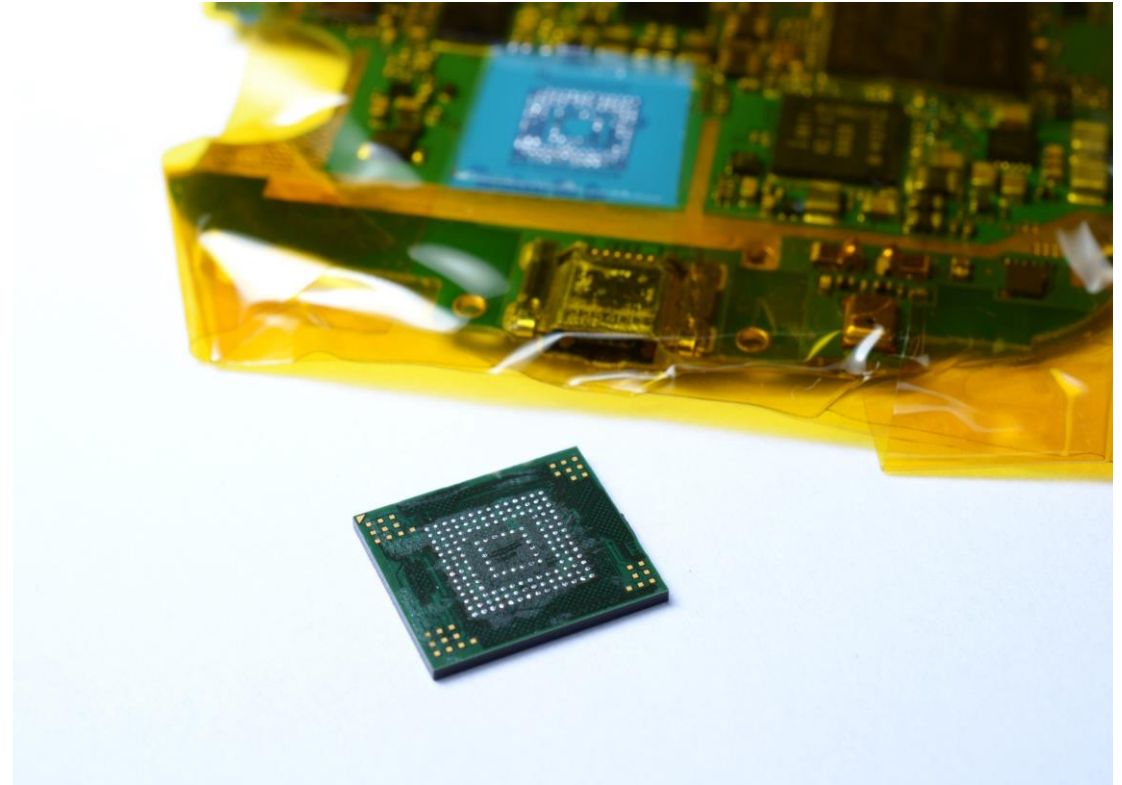
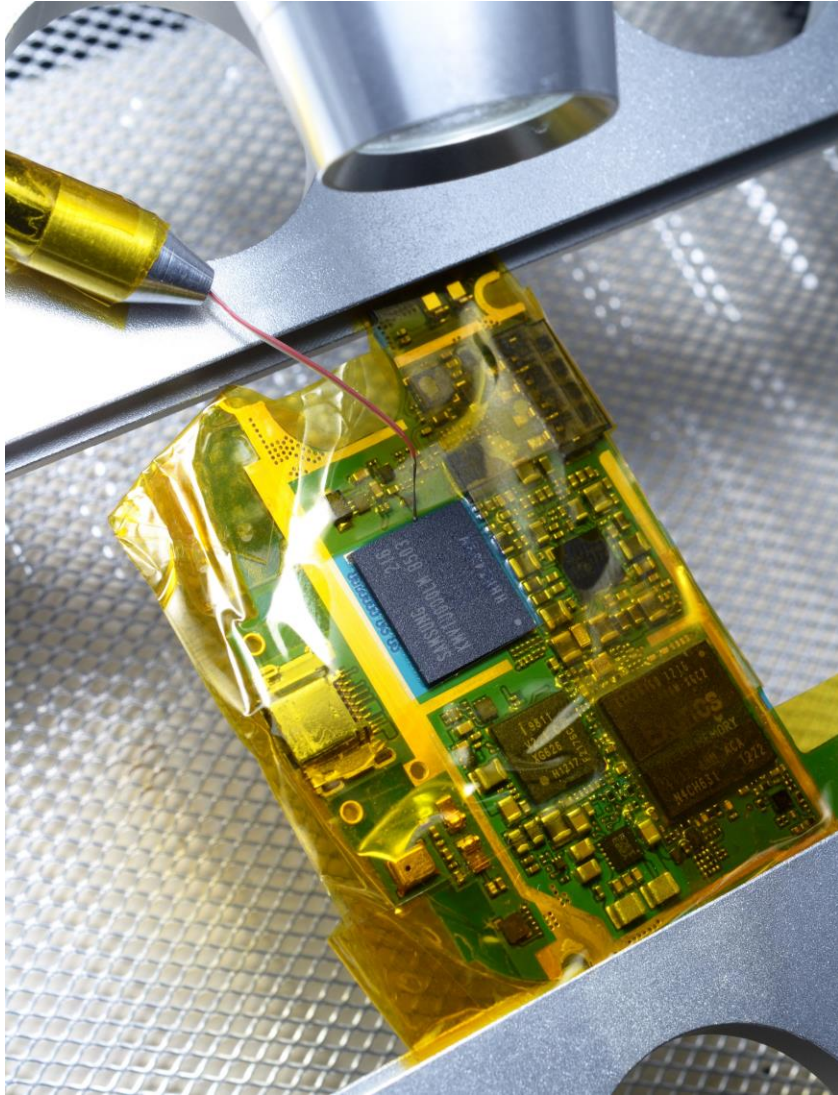
NAND CHIP UNSOLDERING



CERAMIC INFRARED
HEATER

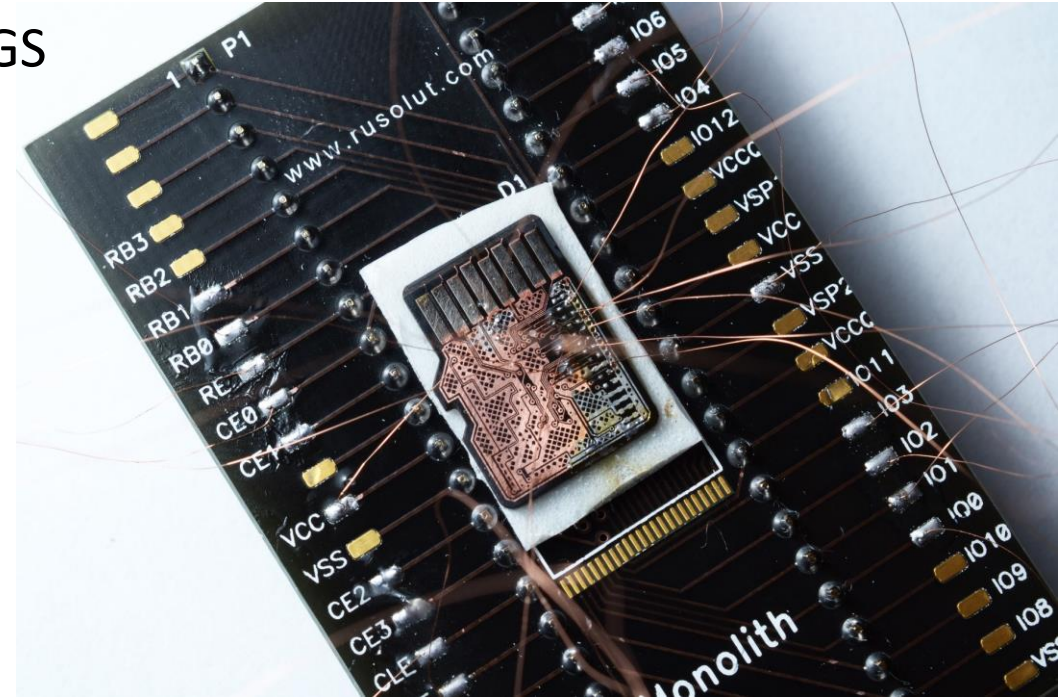


CHIP-OFF APPROACH



CHIP-OFF DATA RECOVERY METHOD ADVANTAGES

- NO RISK OF OVERWRITING DATA AND LOSING DEVICE LOGS
- ACCESS TO DATA ENSURED BY PASSWORD
- ACCESS TO ALL DATA STORED ON THE DEVICE
- ABILITY TO RECOVER DATA FROM DAMAGED DEVICES
- ACCESS TO DELETED VIA STANDARD INTERFACE DATA

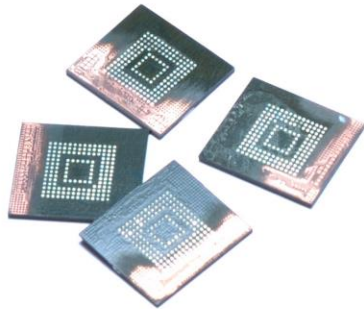
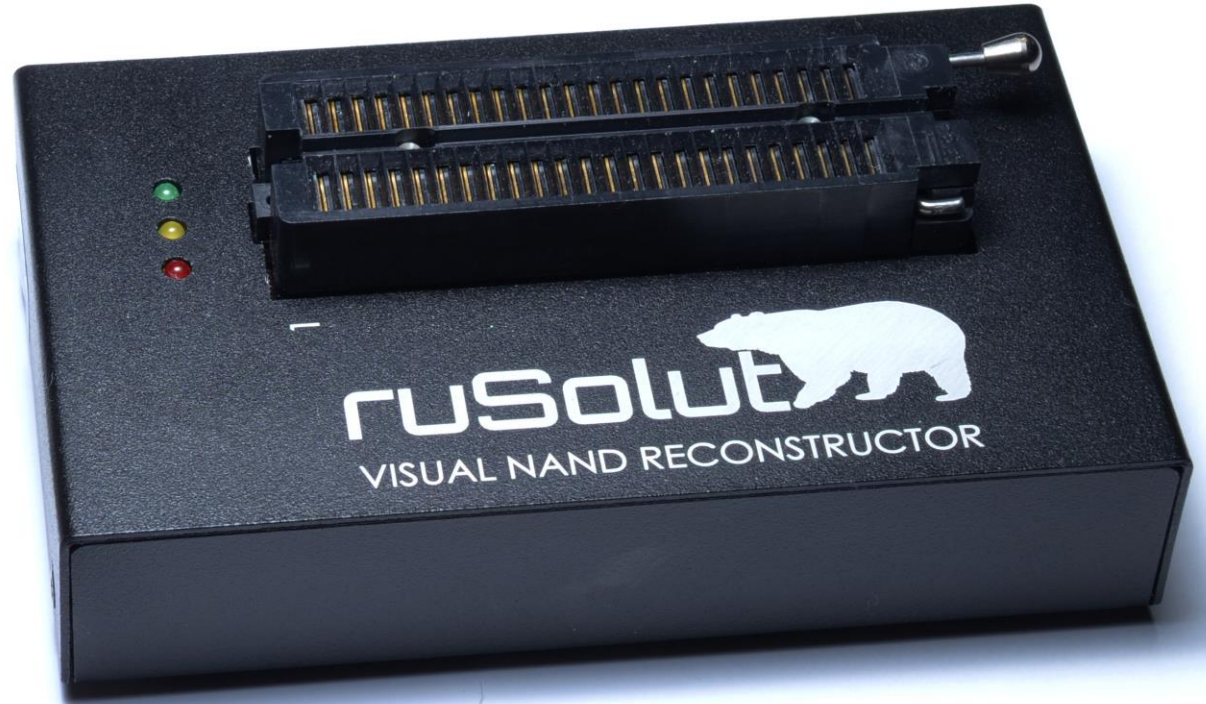
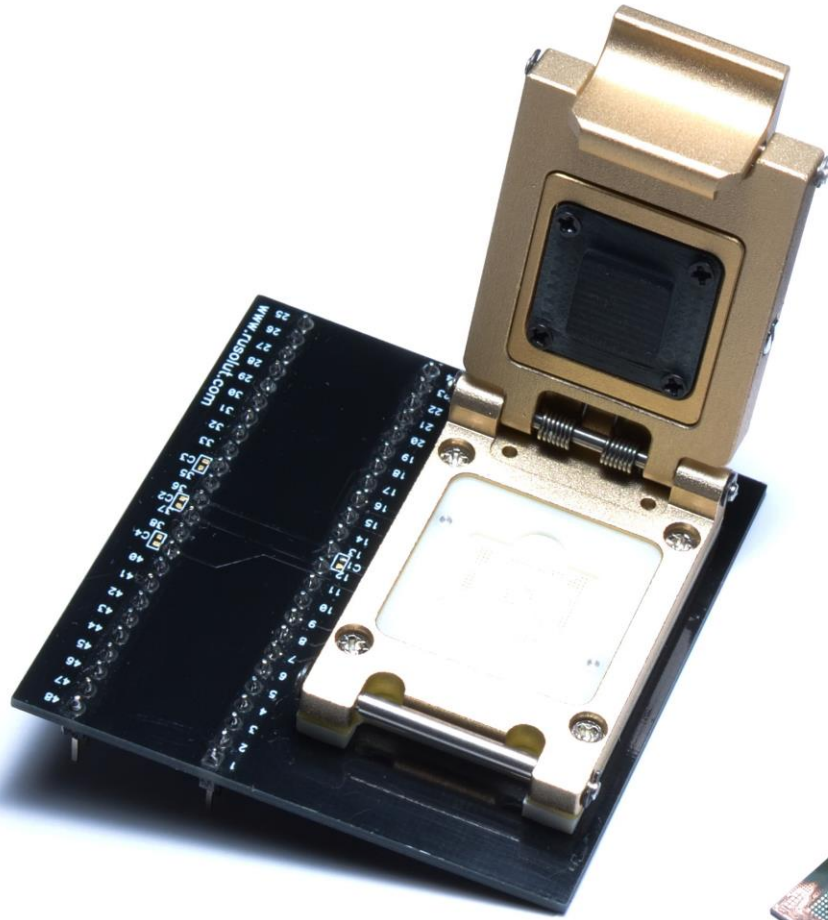


VISUAL NAND RECONSTRUCTOR

HARDWARE



CHIP-OFF



VISUAL NAND RECONSTRUCTOR SOFTWARE

The screenshot displays the Visual NAND Reconstructor software interface, which is used for reconstructing NAND flash data. The interface is divided into several main sections:

- Top Bar:** Contains menu options (Case, Workspace, Plugins, Databases) and a toolbar with icons for Delete, Copy, Paste, Open images, and Send solution to Db. It also displays device information: Device type, Device name, Pinout, Controller, Memory chip ID, Number of memory chips (1), and Number of crystals (1). A Premium Support notice is active until 07 Mar 2024.
- Workspace:** The central area shows a workflow diagram. It starts with a 'Reader' (0) connected to four 'Phy image' blocks (Chip0_0_0, Chip0_1_0, Chip0_2_1, Chip0_3_1). Each 'Phy image' block is followed by 'ECC', 'Inversion', and 'Pair' operations. These are then combined in an 'Unite' block, which leads to a 'Markers table' and finally a 'Log image' block.
- Parameters:** A section on the right with a filter string input field.
- File Dump:** A panel on the far right showing a file tree for 'Volume0 (Microsoft FAT32) NIKON D90 15.02 GB'. The tree structure is: Volume0 (Microsoft FAT32) NIKON D90 15.02 GB > Root > DCIM > 100NCD90. Below the tree is a table of files:

Name	Ext	Size	Last modified
..			
DSC_3154	JPG	5.84 MB	07/25/2016 14:46:36
DSC_3155	JPG	5.56 MB	07/25/2016 14:46:42
DSC_3156	JPG	5.51 MB	07/25/2016 14:46:44
DSC_3157	JPG	6.20 MB	07/25/2016 14:48:24
DSC_3158	JPG	5.78 MB	07/25/2016 14:49:32
DSC_3159	JPG	6.56 MB	07/25/2016 14:53:40
DSC_3160	JPG	6.38 MB	07/25/2016 14:53:52
DSC_3161	JPG	6.60 MB	07/25/2016 14:54:12
DSC_3162	JPG	6.34 MB	07/25/2016 14:54:18
DSC_3163	JPG	5.98 MB	07/25/2016 14:54:18
DSC_3164	JPG	6.15 MB	07/25/2016 14:55:10
DSC_3165	JPG	6.14 MB	07/25/2016 14:55:44
DSC_3166	JPG	6.11 MB	07/25/2016 14:56:50
DSC_3167	JPG	6.15 MB	07/25/2016 14:57:20
DSC_3168	JPG	5.29 MB	07/25/2016 14:58:10
DSC_3169	JPG	5.39 MB	07/25/2016 14:58:26
DSC_3170	JPG	4.99 MB	07/25/2016 14:59:08
DSC_3171	JPG	5.54 MB	07/25/2016 15:11:40
DSC_3172	JPG	5.77 MB	07/25/2016 15:11:46
DSC_3173	JPG	5.70 MB	07/25/2016 15:11:50
DSC_3174	JPG	5.41 MB	07/25/2016 15:12:00
DSC_3175	JPG	5.60 MB	07/25/2016 15:12:08
DSC_3176	JPG	5.61 MB	07/25/2016 15:12:10
DSC_3177	JPG	5.43 MB	07/25/2016 15:12:16
DSC_3178	JPG	5.93 MB	07/25/2016 15:12:16
DSC_3179	JPG	5.67 MB	07/25/2016 15:12:18
DSC_3180	JPG	5.82 MB	07/25/2016 15:12:18
DSC_3181	JPG	5.12 MB	07/25/2016 15:13:08
DSC_3182	JPG	5.38 MB	07/25/2016 15:13:14
DSC_3183	JPG	5.35 MB	07/25/2016 15:13:30
DSC_3184	JPG	4.90 MB	07/25/2016 15:15:14

NISSAN JUKE(ONLINE SHOP)




CAR MULTIMEDIA SYSTEM



Diagram of a car multimedia system unit with the following controls:

- Left side: RADIO, CD, AUX, playback controls (rewind, play/pause, fast forward), power button, VOL knob.
- Center: Touchscreen display.
- Right side: MAP, NAV, INFO, SETUP, return button, knob.

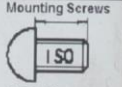
CAR MULTIMEDIA UNIT

Manufactured by: **BOSCH**  **V1**
1099635 259153VV1A E D302 006 034 43F

PART NO. 7 513 750 206 Production Date: 10.2015

LASER CLASS 1

NISSAN PART NO. 259153VV1A
Model name: LCN2K58A00
DNN: Z26556
MH: 006 HW: 034
SW: D302 Index: E

Mounting Screws  M5x8 max.

TRA REGISTERED No: ER0116339/13
DEALER No: DA0088390/12

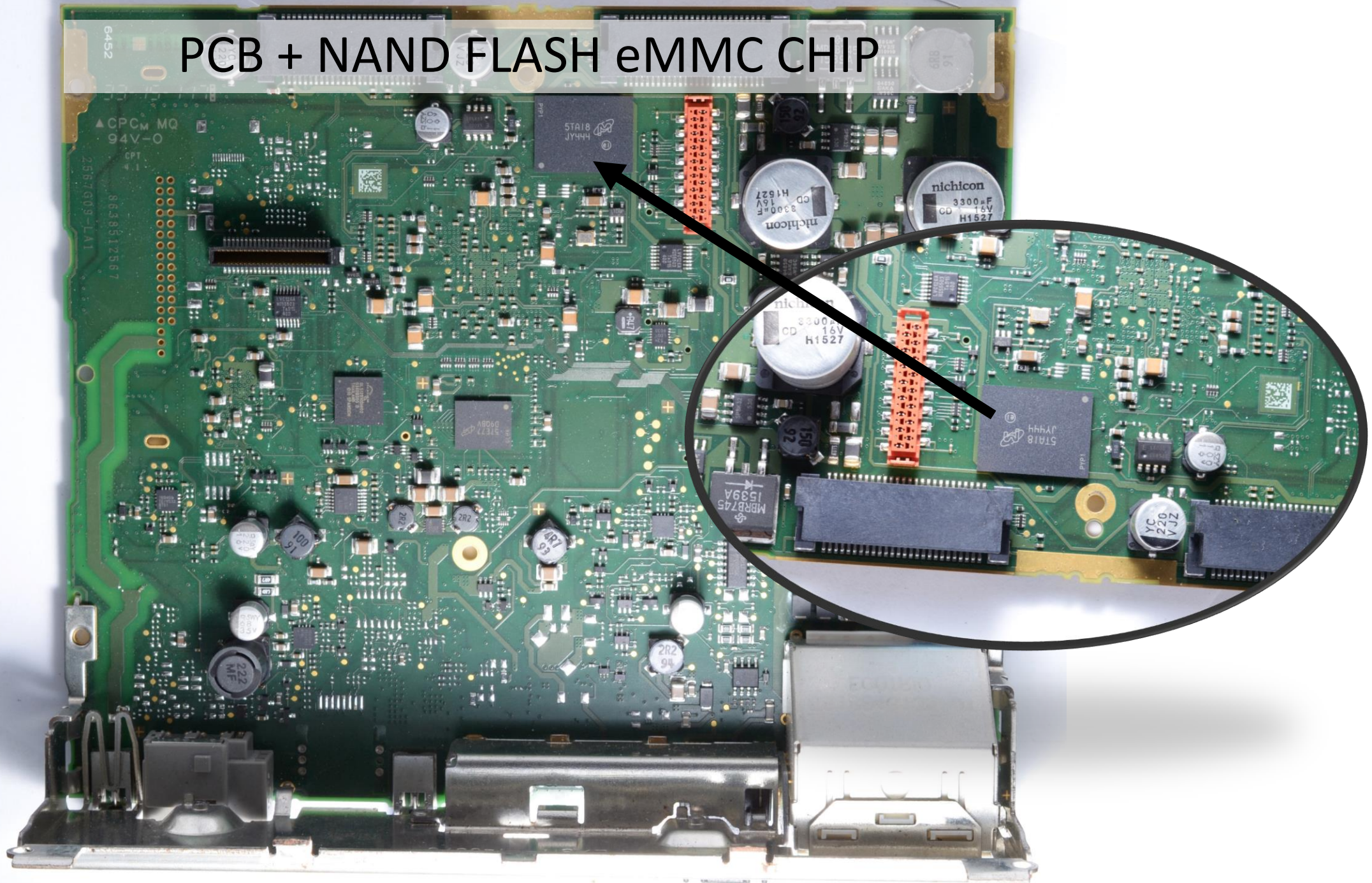
E1 10 R-04 7071 **CE 0682**

BTA REGISTERED No: BOCRA/TA/2013/444

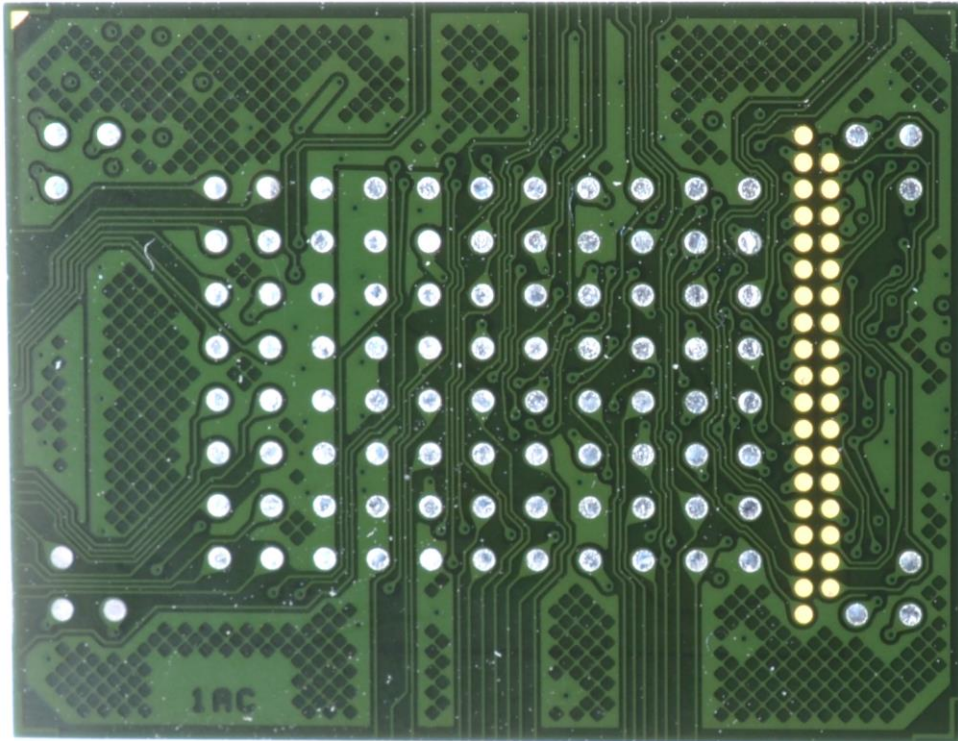
1024 ICA-SA TA-2013/892



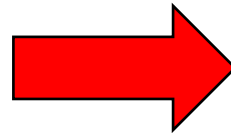
PCB + NAND FLASH eMMC CHIP



BGA 100 eMMC



CHIP READING BY THE
CONTROLLER INTERFACE



FILE SYSTEM

The screenshot displays a software interface for file system analysis. At the top, there is a menu bar with 'Case', 'Workspace', 'Plugins', and 'Databases'. Below this is a toolbar with various icons for operations like 'Delete', 'Copy', 'Paste', 'Open images', 'Send solution to Db', 'Dump viewer', 'File carver', 'File assembler', 'Mount dump', 'Unmount dump', 'Unmount R: drive', 'Find ECC', and 'XOR analyzer'. A status bar on the right indicates 'Selected: eMMC 0' and 'Premium Support is active till 07 Mar 2024'.

The main workspace is divided into three panels:

- Elements:** A sidebar containing various tool categories such as 'Dump operations', 'Block list operations', and 'Other'. Tools include Reader, Physical image, Bad byte col. remover, Bad bit col. remover, ECC, Inversion, XOR, Pair, Unite, Offsets, Logical image, AU XOR, CBM XOR, FC XOR, IS XOR, ITE XOR, SM XOR, Separate, Rotate, Block arranger, Data area, Edit, Phison dynamic XOR, Bit verification, eMMC, Shadow copy, and Concatenate.
- Parameters:** A central panel for configuring operations. It includes an 'Element' section with 'Name' set to '0' and a 'Dump' section with 'Length (bytes)' set to '0' and 'Inherit structure' checked. The 'eMMC' section shows 'Device' set to 'Generic-SD/MMC'. A warning icon is present above this panel.
- Phy image 0 X:** A file tree view showing the structure of a physical image. The tree is rooted at 'Root' and contains several sub-directories and files, including 'bin', 'boot', 'dev', 'etc', 'home', 'include', 'lib', 'lost+found', 'media', 'mnt', 'opt', 'proc', 'sbin', 'share', 'shared', 'sys', 'usr', 'var', 'cc_label', 'lcn2kai_version', 'rfs_version', and 'tmp'. The tree also shows 'Volume0 (EXT-family) /tmp/mount 900.02 MB', 'Volume1 (EXT-family) /tmp/mount/var/opt/bosch/region_static', and 'Volume2 (EXT-family) /var/opt/bosch/dynamic 699.93 MB'.

Name	Ext	Size	Last modified
bin			02/25/2015 11:47:00
boot			08/05/2014 16:21:49
dev			08/05/2014 15:29:31
etc			02/25/2015 11:56:44
home			04/03/2013 11:07:34
include			08/05/2014 16:21:26
lib			02/25/2015 11:56:43
lost+found			02/25/2015 12:04:27
media			08/05/2014 15:29:31
mnt			08/06/2014 03:32:31
opt			02/25/2015 09:42:09
proc			08/05/2014 15:29:31
sbin			02/25/2015 11:47:00
share			08/05/2014 16:21:26
shared			02/25/2015 11:56:43
sys			08/05/2014 15:29:31
usr			02/25/2015 09:42:09
var			02/25/2015 09:42:09
cc_label	txt	167 bytes	09/30/2014 10:43:02
lcn2kai_version	txt	31 bytes	02/25/2015 11:44:36
rfs_version	txt	41 bytes	08/06/2014 03:33:38
tmp		8 bytes	02/25/2015 12:05:01

SQLite Carver – DATABASE TEMPLATE

The screenshot displays the SQLite Carver software interface. The top toolbar contains various tools, with the 'SQLite carver' icon highlighted by a red box and a red arrow pointing to it. Below the toolbar, the file system view shows a directory structure under 'ffs'. A dialog box is open, prompting the user to select a carving mode. The dialog box has three radio button options: 'Get carving templates for all tables' (selected), 'Get carving templates for selected table' (with an input field for the table name), and 'Empty carving template'. A 'Next' button is located at the bottom right of the dialog box.

Case File system viewer

Check headers Save image Save selected Check file system Create unallocated data dump Correct allocated Correct unallocated Correct selected files data Android data extractor SQLite carver Refresh

Phy image shadowCopy_0 X Workspace

MBR Volume2 (EXT-family) /var/opt/bosch/dynamic 699.93 MB Root ffs

Name	Ext	Size	Last modified
..			
3D			01/01/1970 00:00:03
ccademo			01/01/1970 00:00:08
CFG			02/25/2015 09:42:09
cfg			02/25/2015 09:42:09
cpra			01/01/1970 00:00:13
datapool			07/08/2016 11:47:27
myPOIs			05/28/2013 12:20:13
sdshmi			01/01/1970 00:00:04
siriusxm			02/25/2015 09:42:23
PDATA_MNGR_LM	DAT	119.70 KB	12/19/2017 10:46:16
phone_config	dat	8.08 KB	01/05/2017 12:29:40
phone_db	db	41.00 KB	01/05/2017 12:29:41
SQLite carver			00:00:42
Select mode:			07 08:31:23
Get carving templates for all tables			7 10:46:16
Get carving templates for selected table	Enter table name		
Empty carving template			
Next			

SQLite Carver - LIST OF TABLES

Case Master table records

Export Create carving template

EXPORT TEMPLATE BASED ON THE SELECTED TABLE

Master Table X Phy image shadowCopy_0 Workspace

Source
phone_db.db

	TABLE NAME	SQL
1	fli_phonebook_01	CREATE TABLE fli_phonebook_01 ('fli_id' INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL UNIQUE, 'fli_first_name' VARCHAR(5), 'fli_last_name' VARCHAR(5), 'entry_id' INTEGER NOT NULL)
2	fli_phonebook_02	CREATE TABLE fli_phonebook_02 ('fli_id' INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL UNIQUE, 'fli_first_name' VARCHAR(5), 'fli_last_name' VARCHAR(5), 'entry_id' INTEGER NOT NULL)
3	num_phonebook_01	CREATE TABLE num_phonebook_01 ('num_id' INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL UNIQUE, 'number' VARCHAR(25), 'num_search_int' INTEGER, 'num_type' INTEGER, 'entry_id' INTEGER NOT NULL)
4	num_phonebook_02	CREATE TABLE num_phonebook_02 ('num_id' INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL UNIQUE, 'number' VARCHAR(25), 'num_search_int' INTEGER, 'num_type' INTEGER, 'entry_id' INTEGER NOT NULL)
5	phonebook_01	CREATE TABLE phonebook_01 ('entry_id' INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL UNIQUE, 'first_name' VARCHAR(161) COLLATE phoneColl, 'last_name' VARCHAR(161) COLLATE phoneColl, 'source' INTEGER, 'numbers' INTEGER)
6	phonebook_02	CREATE TABLE phonebook_02 ('entry_id' INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL UNIQUE, 'first_name' VARCHAR(161) COLLATE phoneColl, 'last_name' VARCHAR(161) COLLATE phoneColl, 'source' INTEGER, 'numbers' INTEGER)
7	SdsChecksum_01	CREATE TABLE SdsChecksum_01 (ChecksumId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL UNIQUE, DeviceID INTEGER, Source INTEGER, Sorting INTEGER, CheckSum INTEGER)
8	SdsChecksum_02	CREATE TABLE SdsChecksum_02 (ChecksumId INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL UNIQUE, DeviceID INTEGER, Source INTEGER, Sorting INTEGER, CheckSum INTEGER)
9	SdsContact_01	CREATE TABLE SdsContact_01 (ContactID INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL UNIQUE, Firstname TEXT, Lastname TEXT, PbSource INTEGER)
10	SdsContact_02	CREATE TABLE SdsContact_02 (ContactID INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL UNIQUE, Firstname TEXT, Lastname TEXT, PbSource INTEGER)
11	sqlite_sequence	CREATE TABLE sqlite_sequence(name,seq)

SQLite CARVER – NUM_PHONEBOOK_01 TABLE

SQLite carver X Phy image 0 SQLite carver Phy image shadowCopy_0 Workspace

Source
Dump

Template

Check header length From query

INTEGER

Show in table

num_id

Serial types:

Type 0 (NULL)

Type 1 (1 byte)

Type 2 (2 bytes)

Type 3 (3 bytes)

Type 4 (4 bytes)

Type 5 (6 bytes)

Type 6 (8 bytes)

Float (8 bytes)

Type 8 (0)

Type 9 (1)

BLOB

String

Set range

Min

Max

TEXT

Show in table

number

Serial types:

Type 0 (NULL)

Type 1 (1 byte)

Type 2 (2 bytes)

Type 3 (3 bytes)

Type 4 (4 bytes)

Type 5 (6 bytes)

Type 6 (8 bytes)

Float (8 bytes)

Type 8 (0)

Type 9 (1)

BLOB

String

UTF-8

Set size

Min

Max

Use regex

INTEGER

Show in table

num_search_int

Serial types:

Type 0 (NULL)

Type 1 (1 byte)

Type 2 (2 bytes)

Type 3 (3 bytes)

Type 4 (4 bytes)

Type 5 (6 bytes)

Type 6 (8 bytes)

Float (8 bytes)

Type 8 (0)

Type 9 (1)

BLOB

String

Set range

Min

Max

INTEGER

Show in table

num_type

Serial types:

Type 0 (NULL)

Type 1 (1 byte)

Type 2 (2 bytes)

Type 3 (3 bytes)

Type 4 (4 bytes)

Type 5 (6 bytes)

Type 6 (8 bytes)

Float (8 bytes)

Type 8 (0)

Type 9 (1)

BLOB

String

Set range

Min 1

Max 8

INTEGER

Show in table

entry_id

Serial types:

Type 0 (NULL)

Type 1 (1 byte)

Type 2 (2 bytes)

Type 3 (3 bytes)

Type 4 (4 bytes)

Type 5 (6 bytes)

Type 6 (8 bytes)

Float (8 bytes)

Type 8 (0)

Type 9 (1)

BLOB

String

Set range

Min

Max

Search

Start address 0

Carved data

Group by: None

<input type="checkbox"/>	rowid	number	num_search_int	num_type	entry_id	Position	Algorithm	Encoding
<input checked="" type="checkbox"/>	12	28 07778	2005107079	2	27	4450	N1 S2 N3 N4 N5	
<input checked="" type="checkbox"/>	13	27 06203	540311894	2	26	4474	N1 S2 N3 N4 N5	
<input checked="" type="checkbox"/>	14	26 04904	-1874235048	2	25	4498	N1 S2 N3 N4 N5	
<input checked="" type="checkbox"/>	15	25 02318	830494727	2	24	4522	N1 S2 N3 N4 N5	
<input checked="" type="checkbox"/>	16	24 04904	-1874373516	2	23	4546	N1 S2 N3 N4 N5	

SQLite carver X Phy image 0 SQLite carver Phy image shadowCopy_0 Workspace

Source
Dump

Template

Search

Start address 0

Carved data

Group by: None

<input type="checkbox"/>	rowid	number	num_search_int	num_type	entry_id	Position	Algorithm	Encoding
<input checked="" type="checkbox"/>	78	44 078335	-2093649147	2	43	20362	N1 S2 N3 N4 N5	
<input checked="" type="checkbox"/>	79	43 068327	-2094565991	2	42	20386	N1 S2 N3 N4 N5	
<input checked="" type="checkbox"/>	80	42 066248	1648891442	2	41	20410	N1 S2 N3 N4 N5	
<input checked="" type="checkbox"/>	81	41 067513	1964210007	2	40	20434	N1 S2 N3 N4 N5	
<input checked="" type="checkbox"/>	82	40 049093	-1869385694	2	39	20458	N1 S2 N3 N4 N5	
<input checked="" type="checkbox"/>	83	38 061934	422851881	2	36	23662	N1 S2 N3 N4 N5	
<input checked="" type="checkbox"/>	84	37 066415	1679128626	2	35	23686	N1 S2 N3 N4 N5	
<input checked="" type="checkbox"/>	85	36 067708	1997046807	2	34	23710	N1 S2 N3 N4 N5	
<input checked="" type="checkbox"/>	86	35 +33675	1967194946	2	33	23734	N1 S2 N3 N4 N5	
<input checked="" type="checkbox"/>	87	34 060945	155527523	2	33	23760	N1 S2 N3 N4 N5	
<input checked="" type="checkbox"/>	88	33 067644	1984188785	2	32	23784	N1 S2 N3 N4 N5	
<input checked="" type="checkbox"/>	89	32 066248	1648891442	2	31	23808	N1 S2 N3 N4 N5	
<input checked="" type="checkbox"/>	90	31 061445	340084100	2	30	23832	N1 S2 N3 N4 N5	
<input checked="" type="checkbox"/>	91	30 066603	1711485525	2	29	23856	N1 S2 N3 N4 N5	
<input checked="" type="checkbox"/>	92	29 096153	1632847190	2	28	23880	N1 S2 N3 N4 N5	
<input checked="" type="checkbox"/>	93	28 095494	1418985880	2	27	23904	N1 S2 N3 N4 N5	
<input checked="" type="checkbox"/>	94	27 067272	1920094499	2	26	23928	N1 S2 N3 N4 N5	
<input checked="" type="checkbox"/>	95	26 066097	1620545905	2	25	23952	N1 S2 N3 N4 N5	
<input checked="" type="checkbox"/>	96	25 066398	1670939236	2	24	23976	N1 S2 N3 N4 N5	
<input checked="" type="checkbox"/>	97	24 062052	542278756	2	23	24000	N1 S2 N3 N4 N5	
<input checked="" type="checkbox"/>	98	23 068576	-2055846887	2	23	24024	N1 S2 N3 N4 N5	
<input checked="" type="checkbox"/>	99	22 +33651	1368885143	2	22	24048	N1 S2 N3 N4 N5	
<input checked="" type="checkbox"/>	100	21 066277	1651975512	2	21	24074	N1 S2 N3 N4 N5	
<input checked="" type="checkbox"/>	101	20 060909	151593344	2	20	24098	N1 S2 N3 N4 N5	

SQLite CARVER – PHONEBOOK_01 TABLE

SQLite carver x Phy image 0 SQLite carver Phy image shadowCopy_0 Workspace

Source
Dump

Template

Check header length From query

INTEGER

Show in table

entry_id

Serial types:

Type 0 (NULL)

Type 1 (1 byte)

Type 2 (2 bytes)

Type 3 (3 bytes)

Type 4 (4 bytes)

Type 5 (6 bytes)

Type 6 (8 bytes)

Float (8 bytes)

Type 8 (0)

Type 9 (1)

BLOB

String

Set range

Min

Max

TEXT

Show in table

first_name

Serial types:

Type 0 (NULL)

Type 1 (1 byte)

Type 2 (2 bytes)

Type 3 (3 bytes)

Type 4 (4 bytes)

Type 5 (6 bytes)

Type 6 (8 bytes)

Float (8 bytes)

Type 8 (0)

Type 9 (1)

BLOB

String

UTF-8

Set size

Min

Max

Use regex

TEXT

Show in table

last_name

Serial types:

Type 0 (NULL)

Type 1 (1 byte)

Type 2 (2 bytes)

Type 3 (3 bytes)

Type 4 (4 bytes)

Type 5 (6 bytes)

Type 6 (8 bytes)

Float (8 bytes)

Type 8 (0)

Type 9 (1)

BLOB

String

UTF-8

Set size

Min

Max

Use regex

INTEGER

Show in table

source

Serial types:

Type 0 (NULL)

Type 1 (1 byte)

Type 2 (2 bytes)

Type 3 (3 bytes)

Type 4 (4 bytes)

Type 5 (6 bytes)

Type 6 (8 bytes)

Float (8 bytes)

Type 8 (0)

Type 9 (1)

BLOB

String

Set range

Min

Max

INTEGER

Show in table

numbers

Serial types:

Type 0 (NULL)

Type 1 (1 byte)

Type 2 (2 bytes)

Type 3 (3 bytes)

Type 4 (4 bytes)

Type 5 (6 bytes)

Type 6 (8 bytes)

Float (8 bytes)

Type 8 (0)

Type 9 (1)

BLOB

String

Set range

Min

Max

Search

Start address

Carved data

Group by: None

<input type="checkbox"/>	rowid	entry_id	first_name	last_name	source	numbers	Position	Algorithm	Encoding
<input checked="" type="checkbox"/>	4	36	Kert		2	1	1184	N1 S2 S3 N4 N5	
<input checked="" type="checkbox"/>	5	34	Pierot		2	1	1242	N1 S2 S3 N4 N5	
<input checked="" type="checkbox"/>	6	33	Apsara		2	1	1264	N1 S2 S3 N4 N5	
<input checked="" type="checkbox"/>	7	32	Lion		2	1	1286	N1 S2 S3 N4 N5	
<input checked="" type="checkbox"/>	8	31	George		2	1	1304	N1 S2 S3 N4 N5	

SQLite carver x Phy image 0 SQLite carver Phy image shadowCopy_0 Workspace

Source
Dump

Template

Search

Start address

Carved data

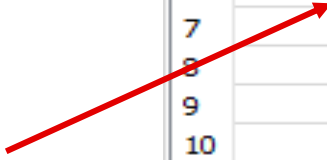
Group by: None

<input type="checkbox"/>	rowid	entry_id	first_name	last_name	source	numbers	Position	Algorithm	Encoding
<input checked="" type="checkbox"/>	58	16	Cliniques		1	1	11854	N1 S2 S3 N4 N5	
<input checked="" type="checkbox"/>	59	15	Christine		1	1	11884	N1 S2 S3 N4 N5	
<input checked="" type="checkbox"/>	60	14	Chinois		1	1	11914	N1 S2 S3 N4 N5	
<input checked="" type="checkbox"/>	61	13	Canin		1	1	11940	N1 S2 S3 N4 N5	
<input checked="" type="checkbox"/>	62	12			1	1	11960	N1 S2 S3 N4 N5	
<input checked="" type="checkbox"/>	63	11	Boules		1	1	11994	N1 S2 S3 N4 N5	
<input checked="" type="checkbox"/>	64	10	Botero		1	1	12016	N1 S2 S3 N4 N5	
<input checked="" type="checkbox"/>	65	9			1	1	12038	N1 S2 S3 N4 N5	
<input checked="" type="checkbox"/>	66	8	Blandin		1	1	12072	N1 S2 S3 N4 N5	
<input checked="" type="checkbox"/>	67	6	Bernard		1	1	12134	N1 S2 S3 N4 N5	
<input checked="" type="checkbox"/>	68	5	auphan		1	1	12158	N1 S2 S3 N4 N5	
<input checked="" type="checkbox"/>	69	4	Apsara		1	1	12180	N1 S2 S3 N4 N5	
<input checked="" type="checkbox"/>	70	3	Annie		1	1	12202	N1 S2 S3 N4 N5	
<input checked="" type="checkbox"/>	71	39	Sag		2	1	16482	N1 S2 S3 N4 N5	
<input checked="" type="checkbox"/>	72	38	Johana		2	1	16498	N1 S2 S3 N4 N5	
<input checked="" type="checkbox"/>	73	37	Quentin		2	1	16520	N1 S2 S3 N4 N5	
<input checked="" type="checkbox"/>	74	36	Kert		2	1	16544	N1 S2 S3 N4 N5	
<input checked="" type="checkbox"/>	75	34	Pierot		2	1	16602	N1 S2 S3 N4 N5	
<input checked="" type="checkbox"/>	76	33	Apsara		2	1	16624	N1 S2 S3 N4 N5	
<input checked="" type="checkbox"/>	77	32	Lion		2	1	16646	N1 S2 S3 N4 N5	
<input checked="" type="checkbox"/>	78	31	George		2	1	16664	N1 S2 S3 N4 N5	
<input checked="" type="checkbox"/>	79	30	Chinois		2	1	16686	N1 S2 S3 N4 N5	
<input checked="" type="checkbox"/>	80	29	Isabel		2	1	16710	N1 S2 S3 N4 N5	
<input checked="" type="checkbox"/>	81	28	Fabrice		2	1	16732	N1 S2 S3 N4 N5	

Position 1 from 159

BOTH TABLES COMBINED TOGETHER

FULL
PHONEBOOK
AROUND 50
RECORDS
HAVE BEEN
FOUND



	num_id	number	first_name	last_name
1	1	0677	Lola	Lola
2	2	0686	Auphan	Auphan
3	3	0466	Auphan	Auphan
4	4	0490	Auphan	Auphan
5	5	0615	Annie	Annie
6	6	0676	Les Biens	Les Biens
7	7	0625	Boules	Boules
8	8	0490	Botero	Botero
9	9	0673	Canin	Canin
10	10	0685	Françoise	Françoise
11	11	0466	Quentin	Quentin
12	12	0660	Gilbert	Gilbert
13	13	0687	Michele	Michele
14	14	0664	Milon	Milon
15	15	0609	Edmond	Edmond
16	16	0677	Mitjans	Mitjans
17	17	0490	Auphan	Auphan
18	18	0610	Bernard	Bernard
19	19	0619	Marine	Marine
20	20	0490	Weck	Weck
21	21	0490	Cliniques	Cliniques
22	22	0490	Pompier	Pompier
23	23	0627	Pascal	Pascal
24	24	0490	Peres	Peres
25	25	0231	Coudere	Coudere
26	26	0490	Blandin	Blandin
27	27	0620	Christine	Christine
28	28	0777	Alexandre	Alexandre
29	29	0662	Fabrice	Fabrice
30	30	0954	Isabel	Isabel
31	31	0662	Chinois	Chinois
32	32	0663	George	George

MERCEDES AMG C43 (REAL CASE)



MULTIMEDIA INTERFACE CONTROL UNIT



Mercedes-Benz

A 222 900 48 19 /001

Hardware for Enhanced Remote-, Mobility- & Emergency Services

Model: HERMES 1.5

Version: LTE NAFTA

Type No: M197

WLAN - MAC: 2CDCADF

NAD SW: 11.787.01.00.1419

IMEI: 354189082

ICCID: 8901170427250

12V === 0.5A

ID: 0700 A 222 901 82 06 ZGS(HW): 001 17/37

EC: 100 A 222 902 72 18 ZGS(SW): 001 18/03

Serial No.: J263

Date of Manufacture: 2018/10/10

Q01

IC: 6434A - HERMES2

contains IC: 6369A - ME919BS567A

THE PRODUCT COMPLIES WITH DHHS RULES 21 CFR

SUBCHAPTER J APPLICABLE TO THE DATE OF MANUFACTURE.

FCC ID: T8GHERMES2

contains FCC ID: QISME919BS - 567A

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES AND INDUSTRY

CANADA LICENCE - EXEMPT RSS STANDARD(S). OPERATION IS SUBJECT

TO THE FOLLOWING TWO CONDITIONS:

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND

(2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED,

INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRE OPERATION.

Harman Becker Automotive Systems GmbH

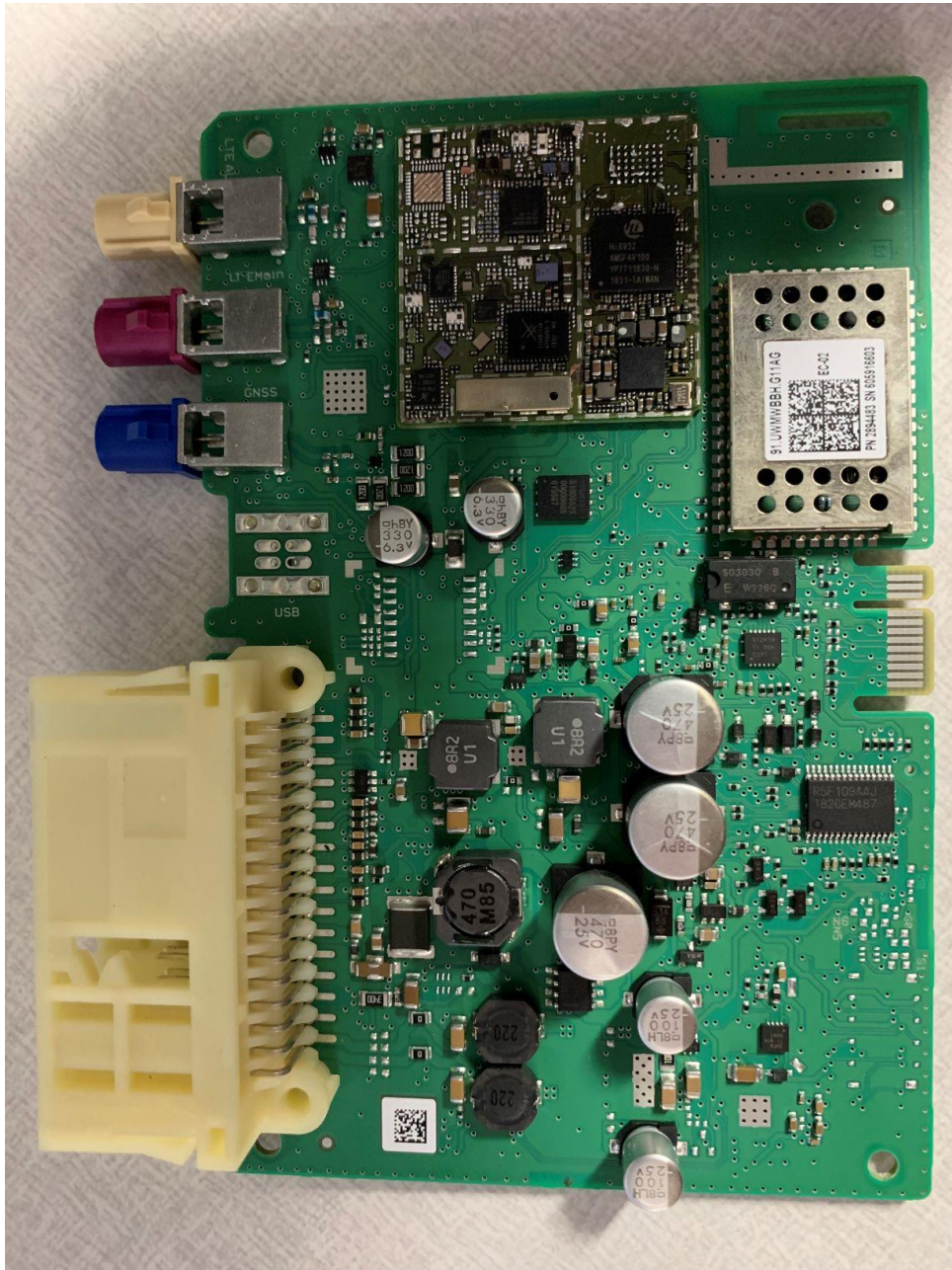
Becker - Göring - Straße 16

76307 Karlsbad, Germany

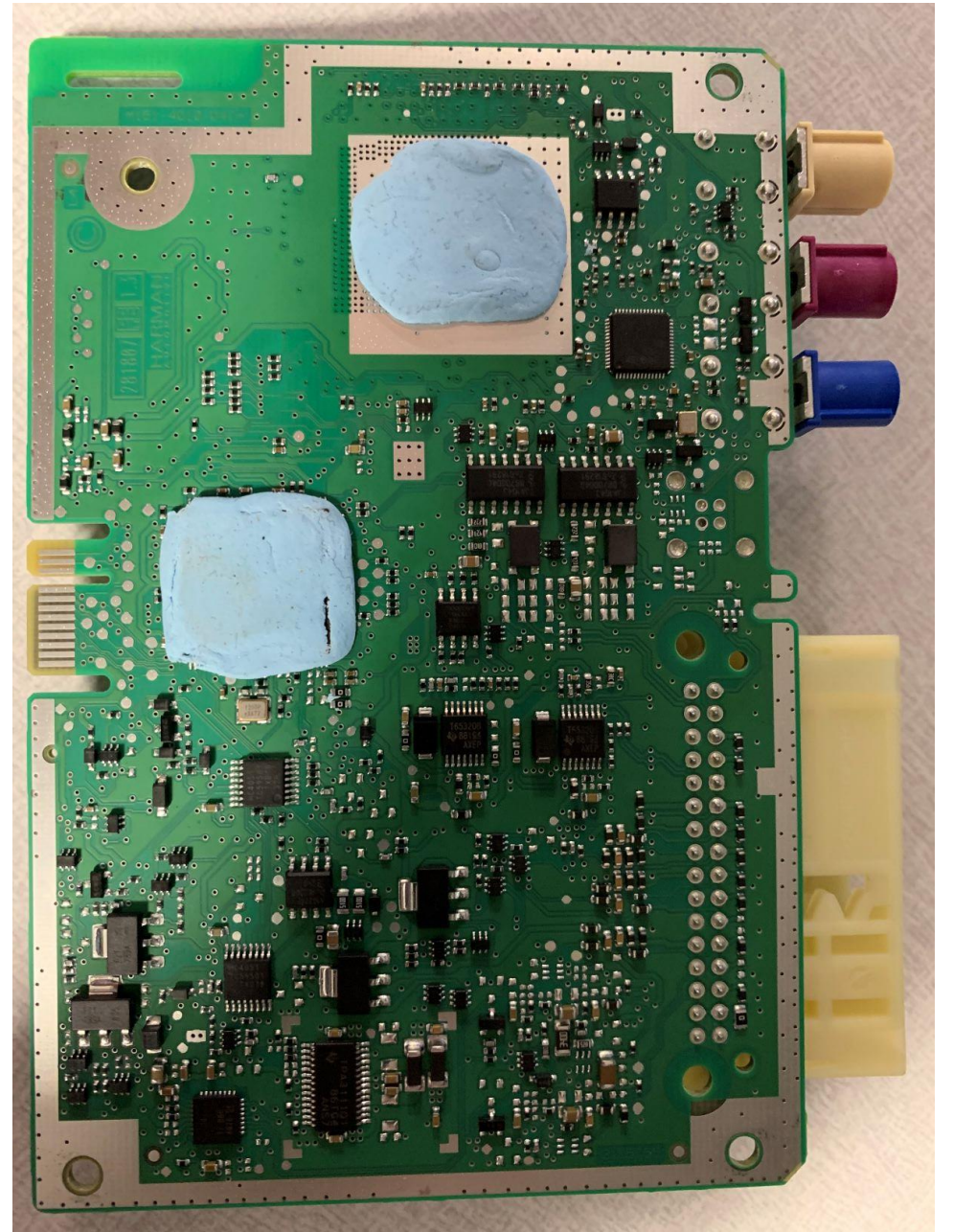
Manufactured in Hungary



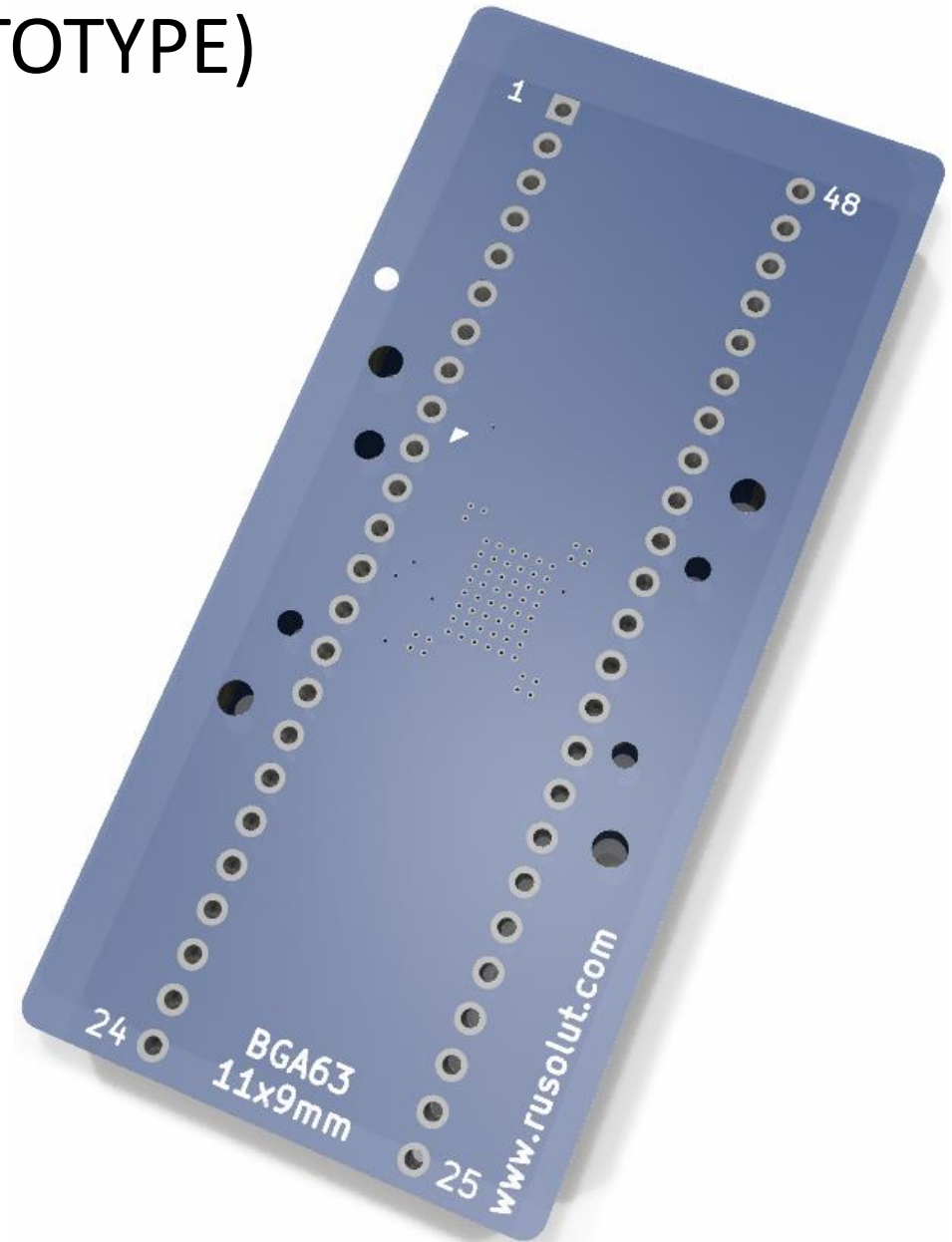
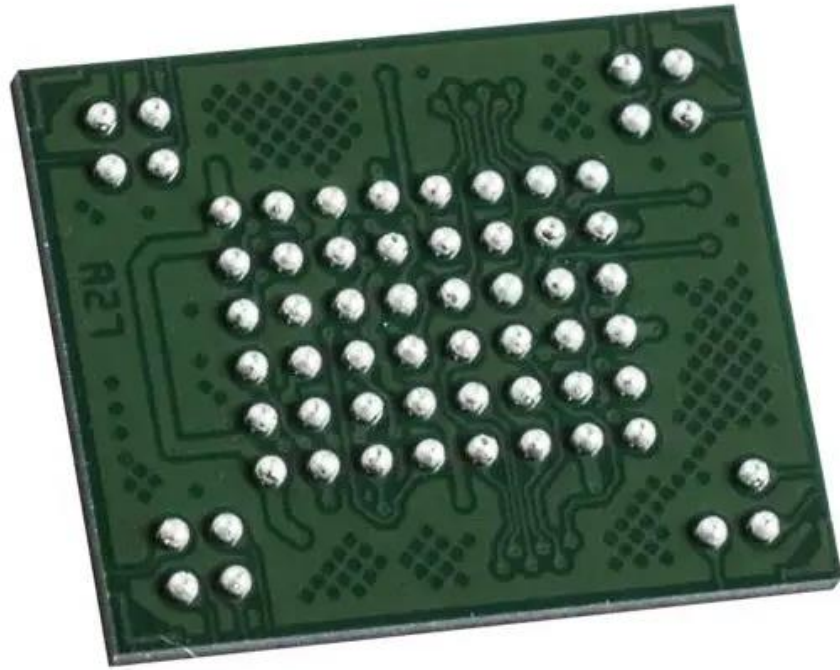
M197J80J263



BOARD



BGA63 (PROTOTYPE)



DUMP PROCESSING

Workspace X

Elements

Dump operations

Block list operations

Other

R Reader	PI Physical image
BCR Bad byte col. remover	bBCR Bad bit col. remover
BCH ECC	I Inversion
X XOR	P Pair
U Unite	O Offsets
LI Logical image	

Hide AI-powered

X AU XOR	X CBM XOR
X FC XOR	X IS XOR
X ITE XOR	X SM XOR

```
graph LR; Reader[Reader 0] --> PhyImage[Phy image Chip0_0_0]; PhyImage --> ECC[ECC 0]; ECC --> BCR[BCR 0];
```

ObjID:
305 - Last valid time
408 - GPS fixes
402 - WiFi usage time

FILES EXTRACTED FROM YAFFS2

- LocationPersist.cfg.xml
- timeinfo.cgf1.xml
- timeinfo.cgf2.xml
- timeinfo.cgf3.xml
- wifi_statistic1.xml
- wifi_statistic2.xml
- wifi_statistic3.xml
- wifi_statistic4.xml

```
LocationPersist.cfg.xml x
LocationDataSaved
{
  Latitude 1682663912
  Longitude 784841424
  Velocity 1
  Heading 274
  LocAttributes 274.39999
  EllipsoidHeigh 0
  Altitude 1216
  VisibleSatellites 12
  TrackingSatellites 0
  Fix 1
  GPSVdop 0
  GPSHdop 0
  GPSPdop 0
  Timestamp 0
  ValidationFlag true
  Year 2019
  Month 9
  Day 12
  Hour 0
  Minutes 24
  Seconds 2
  history_size 9
  Latitude_0 1682671199
  Longitude_0 784843863
  Velocity_0 0
  Heading_0 324
  LocAttributes_0 324.70001
  EllipsoidHeigh_0 0
  Altitude_0 1217
  VisibleSatellites_0 12
  TrackingSatellites_0 12
  Fix_0 4
  GPSVdop_0 0
  GPSHdop_0 0
  GPSPdop_0 0
  Year_0 2019
  Month_0 9
  Day_0 12
  Hour_0 0
  Minutes_0 23
  Seconds_0 34
}
```

```
wifi_statistic1.xml x
<?xml version="1.0" encoding="UTF-8"?>
<config>
  <total_connected_time>904902</total_connected_time>
  <total_rx>191936195</total_rx>
  <total_tx>124303838</total_tx>
  <total_flow>316240033</total_flow>
  <curr_connected_time>3006</curr_connected_time>
  <curr_rx>738407</curr_rx>
  <curr_tx>437491</curr_tx>
  <curr_flow>1175898</curr_flow>
</config>
```

```
timeinfo.cgf1.xml x
TimeInfo
{
  version 1
  deltaValue 4294945688
  lastValidTime 1567867559
}
```

BMW 3 F30 (ONLINE SCRAP YARD)



MULTIMEDIA UNIT

Garantie Magneti Marelli

SNR: 0002557
Type: NAV ECE 01DF 14
CE XXXX

Manufactured in Slovakia by: Model No. 14AV	S-ID: 0002557
SW ID: F028-17-03-582	MAC-adr: 001110-031-c
Accession No: CO-410-031-c	Version: ECE Date 18.05.17

191184 10
81AVV
6512

CRIN: MMA-01DF-H-2557470
MM pn: 5035516Q2114
HW: 004.003.003

CI 8 792 157 01

MAGNETI MARELLI CE 0560 E24
Magneti Marelli S.p.A.
Product: EN2 10R-05 164B
12V 15A
Aprobado CNC: C-14777
CMIIT TD: 2015DJ3829
Includes transmitter
FCC ID: RX2EN2
IC 4983A-EN2
TRC/LPD/2015/160
140664/SDPP1/20151
14333

OMAN-TRA TRA/TA-R/2644/15 DOB0134	ETA:NR-ETA/2144
TRA REGISTERED No: ER40BB1/15 DEALER No: DA0110016/13 MAGNETI MARELLI S.P.A.	Complies with IDA standards DA101586
201-150248	CCAN15LP0310T9

IFT: RCPBEN15-1000
NOM
NOM-121-SCT1-2009
TA No: DRQ-D-MAJU-02-2011 111083-LPD-30344

SIRIUS SATELLITE RADIO
HD Radio
NTC
ERIC
ZICTA

CLASS 1 LASER PRODUCT

2719-15-0386

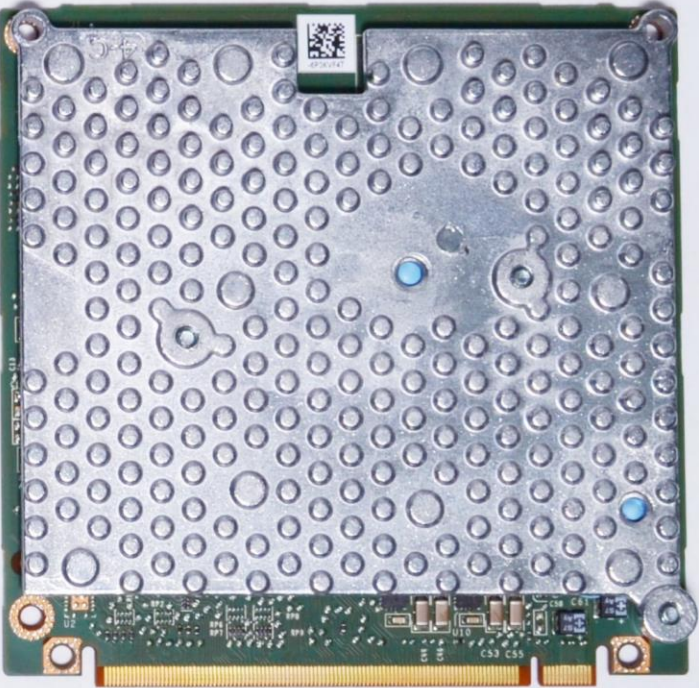
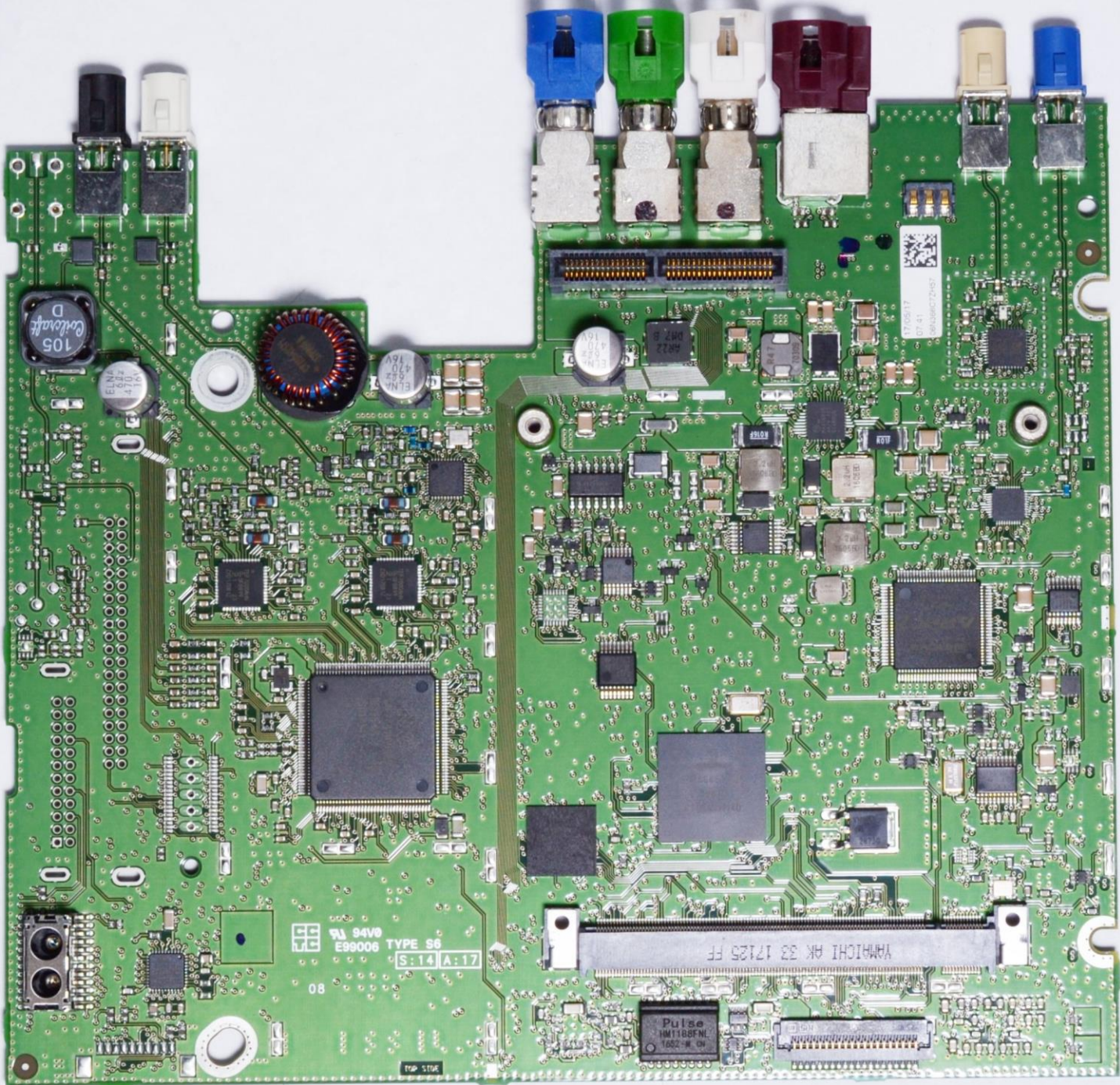
Este equipamento opera em caráter secundário, isto é, não tem direito a proteção contra interferência prejudicial, mesmo de estações do mesmo tipo, e não pode causar interferência a sistemas operando em caráter primário.

AGRE: FAPL ANRT MNRDC
Remido unapremlatIR 10SKA ANRT 2015
Date d'agrément: 27.03/2015

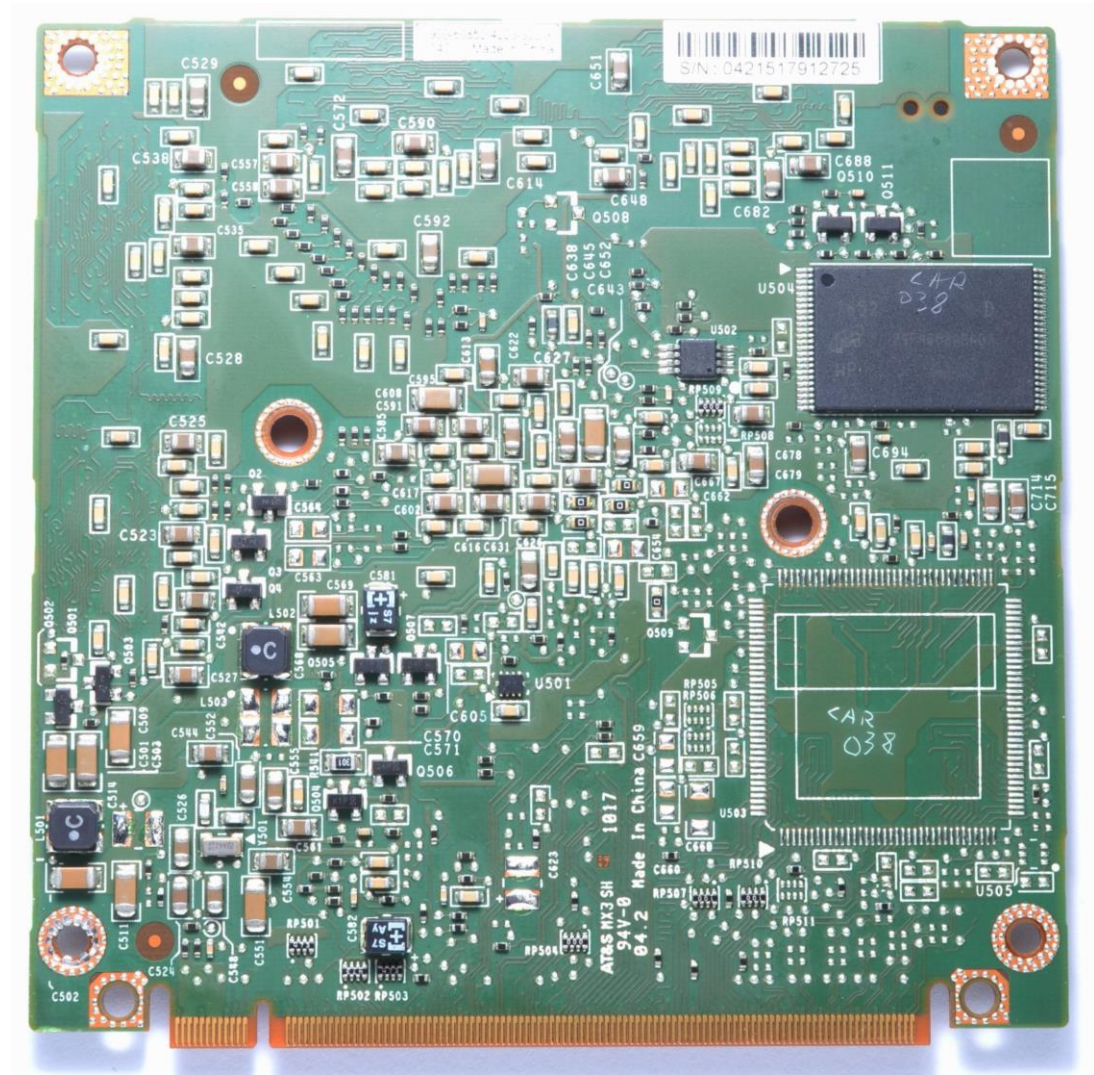
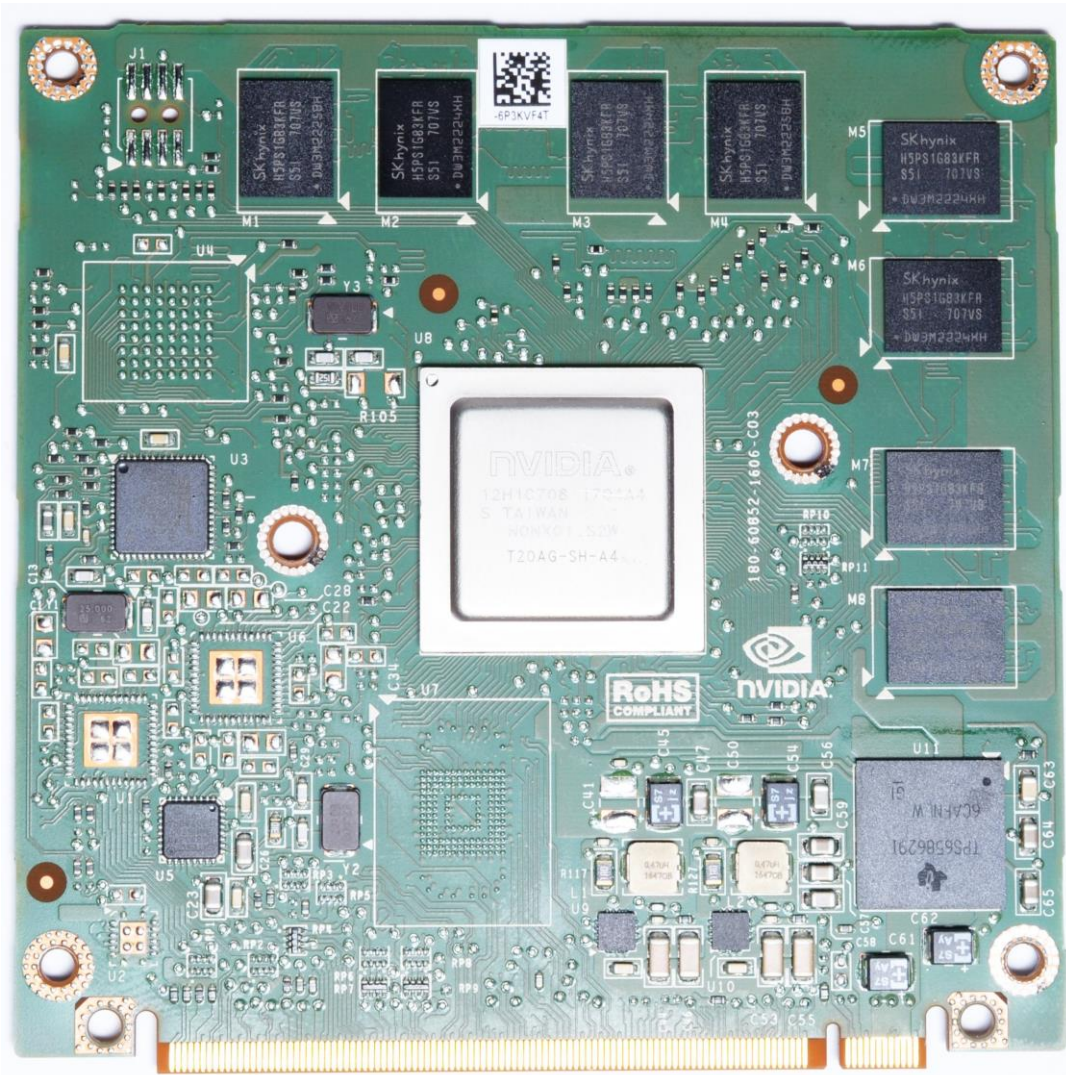
CAR 038

555551173003

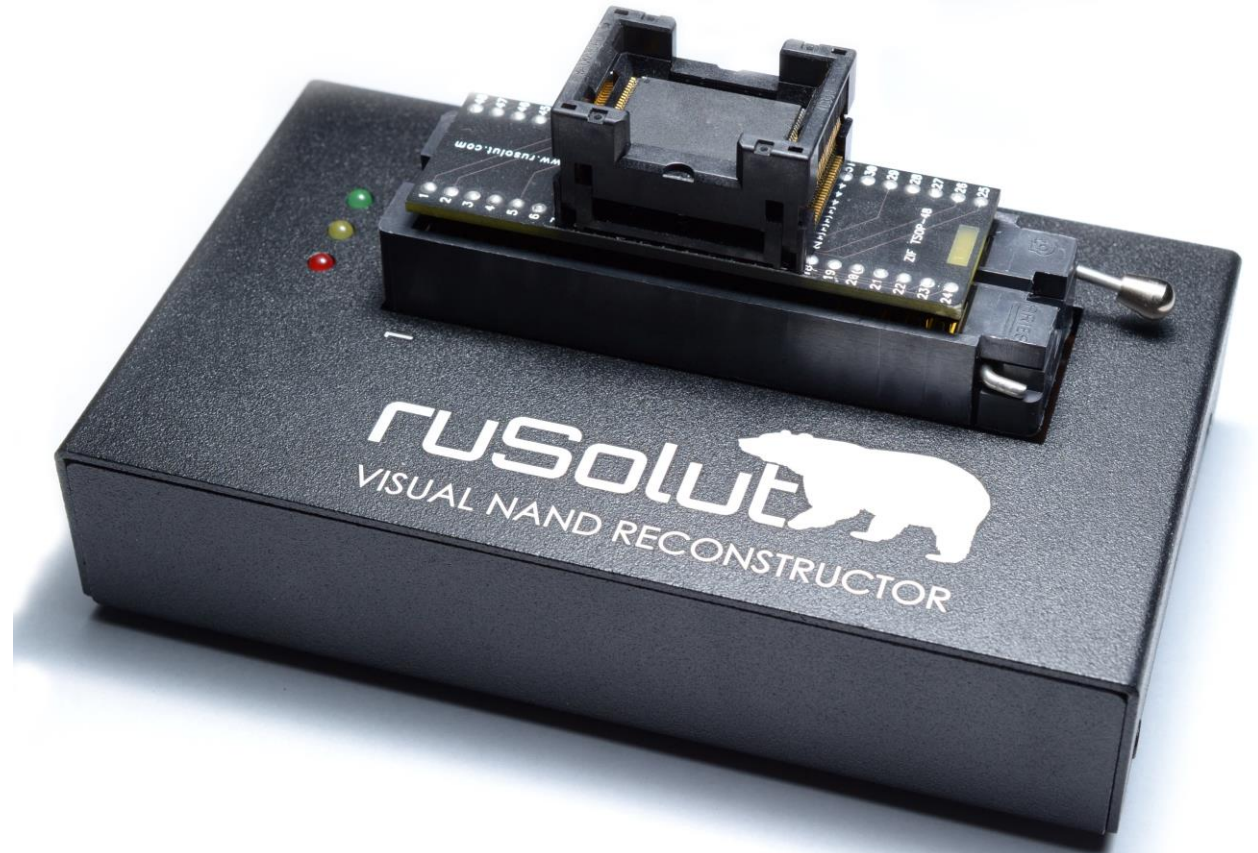
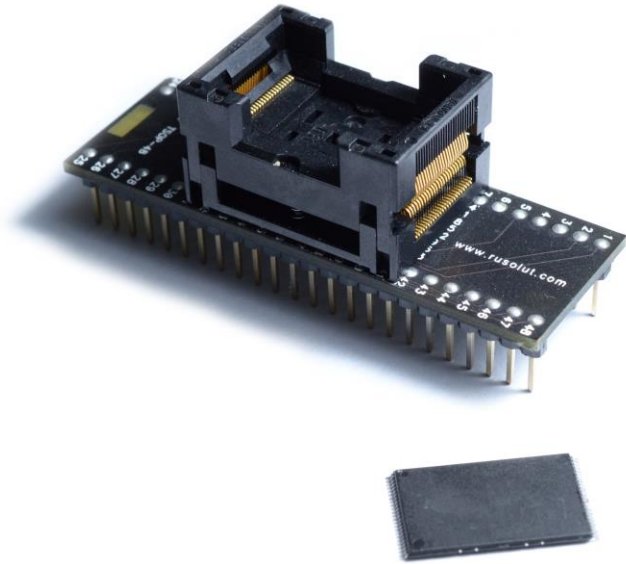
INTERNAL BOARDS



INTERNAL BOARDS



READING TSOP48...



Case Workspace Plugins Databases

Delete Copy Paste Open images Send solution to Db Insert area Skip area Extract area
 Dump viewer File system viewer Yaffs parser Blocks map File carver File assembler Compute MD5/SHA1 Mount dump Unmount dump Unmount R: drive Find ECC XOR analyzer Codeword analyzer

Element functions Dump functions Dump analysis functio...

Workspace X

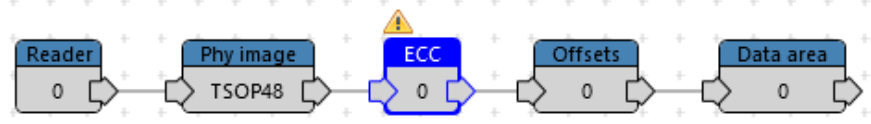
Elements

Dump operations

Block list operations

Other

- R Reader
- PI Physical image
- BCR Bad byte col. remover
- bBCR Bad bit col. remover
- BCH ECC
- I Inversion
- X XOR
- P Pair
- U Unite
- O Offsets
- LI Logical image
- Hide AI-powered
- AU XOR
- CBM XOR
- FC XOR
- IS XOR
- ITE XOR
- SM XOR
- Hide additional
- SEP Separate
- ROT Rotate



DUMP ADJUSTMENT FOR FURTHER PARSING

Parameters

Enter filter string

Element

Name 0

Dump

Length (bytes) 553648128

Automatic structure

ECC corrector

Power Off

ECC codewords 0 - 511/2052 - 2060/73; 5

Page size 2112

Use buffer

Bytes rotate

ECC map 0

- no errors
- correctable errors
- not correctable errors
- empty

UBI+UBIFS - VERY POPULAR FS IN VEHICLES AND OTHER DEVICES (SMARTHUBS, ROUTERS, ETC)

ECC 0 X Workspace

The image displays a hex dump of data from a UBI (Universal Flash Interface) partition. The left side shows a noisy, blue-tinted hex dump, while the right side shows a large, yellow-tinted area filled with 0xFF bytes, indicating a corrupted or uninitialized region. The hex dump is organized into rows, with the first column showing memory addresses from 000FD4D000 to 000FD4350. The second column shows the corresponding hexadecimal values, and the third column shows the ASCII representation of these values. The ASCII column contains various characters, including 'UBI#', 'eA@', and many 'Y' characters.

Address	Hex	ASCII
000FD4D000	55 42 49 23 01 00 00 00 00 00 00 00 00 00 00 00	UBI#.....
000FD4D010	00 00 08 00 00 00 10 00 00 00 00 00 00 00 00 00	.....eA@.
000FD4D020	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00;.+
000FD4D030	00 00 00 00 00 00 00 00 00 00 00 00 3B 0C A2 F7	.....
000FD4D040	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D050	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D060	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D070	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D080	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D090	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D0A0	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D0B0	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D0C0	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D0D0	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D0E0	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D0F0	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D100	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D110	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D120	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D130	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D140	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D150	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D160	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D170	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D180	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D190	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D1A0	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D1B0	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D1C0	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D1D0	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D1E0	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D1F0	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D200	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D210	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D220	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D230	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D240	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D250	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D260	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D270	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D280	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D290	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D2A0	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D2B0	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D2C0	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D2D0	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D2E0	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D2F0	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D300	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D310	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D320	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D330	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D340	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY
000FD4D350	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	YYYYYYYYYYYY

Byte position: 2070; Row: 125476; Address: 265007382; Value: |

Address: 265605129 Selected: |

NO USER'S DATA WAS FOUND HERE. ONLY SYSTEM DATA ON TSOP48

Car Forensics Project - UBI/UBIFS Parser

Open file \\SERVER\fileserver\CONFERENCES\2023_Summit\Conference\Sasha\Car_038\Case\UBI.img

Save selected

ruSolut

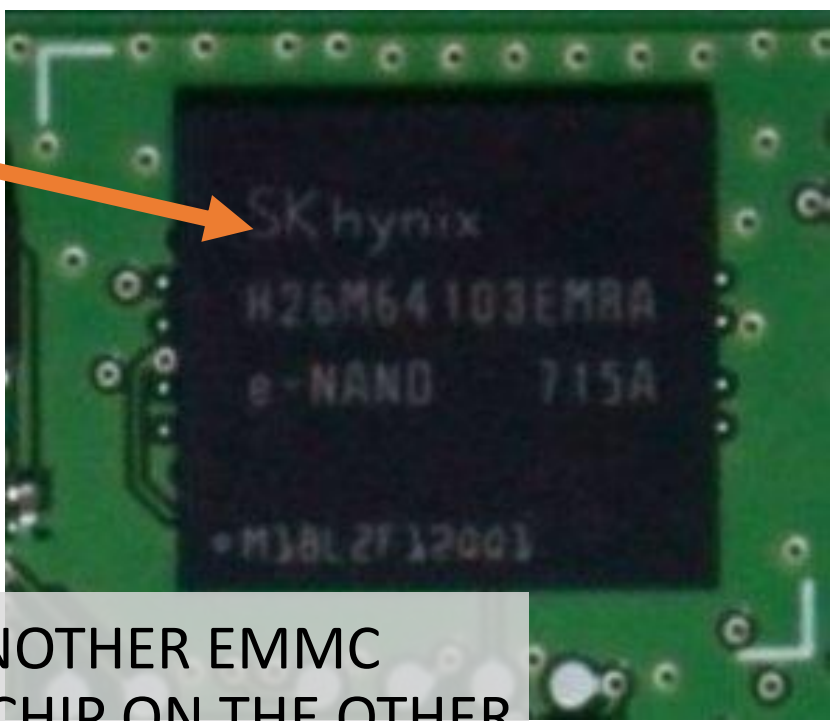
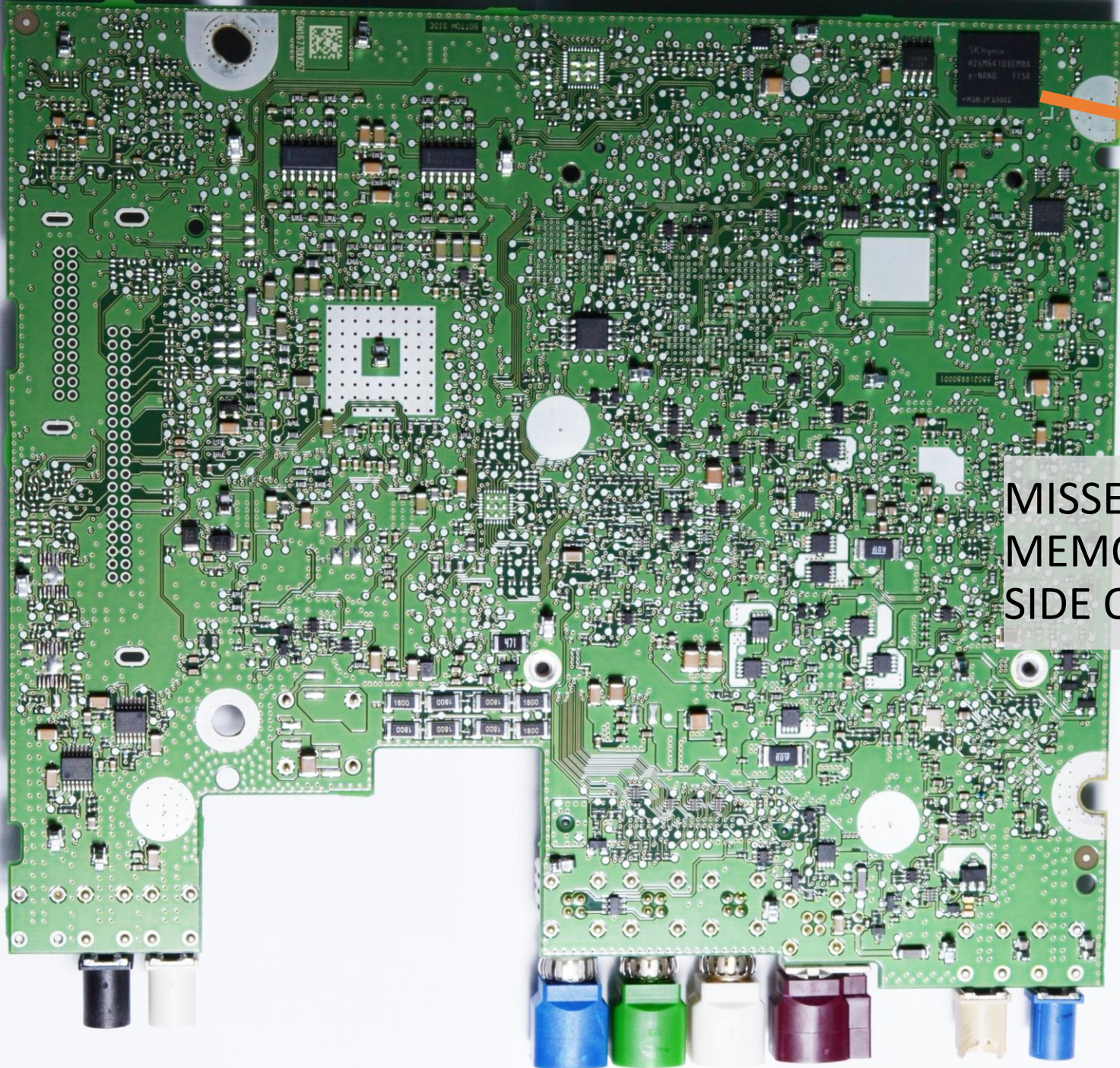
UBI Image Sequence 2135728949

- UBIFS Volume ev_fs
 - Root
 - bin
 - dev
 - etc
 - X11
 - dlt
 - fis
 - lvm
 - msr
 - opt
 - pki
 - ppp
 - rpc
 - ssh
 - xdg
 - nsswitch.conf
 - mounts.xml
 - dlt-system.conf
 - bootwart.conf
 - mtab
 - udev
 - systemd
 - asound.conf.old
 - ld.so.cache
 - lparameters.par
 - iproute2
 - dhclient-udev-script.sh
 - modules-load.d
 - modprobe.d
 - ConsoleKit
 - dhclient.conf
 - default
 - security
 - polkit-1
 - dnsmasq.conf
 - terminfo
 - quotatab

```
Parent inode 65
-> 332 drwxr-xr-x 3 0 0 0 07.02.2019 09:36 X11
-> 304 drwxrwxr-x 2 2009 2009 0 07.02.2019 09:15 dlt
-> 129 drwx----- 4 0 0 0 07.02.2019 09:36 fis
-> 298 drwxr-xr-x 5 0 0 0 07.02.2019 09:36 lvm
-> 80 drwxr-xr-x 2 0 0 0 07.02.2019 09:36 msr
-> 78 drwxr-xr-x 2 0 0 0 07.02.2019 09:05 opt
-> 285 drwxr-xr-x 3 0 0 0 07.02.2019 09:34 pki
-> 83 drwxr-xr-x 2 0 0 0 07.02.2019 09:35 ppp
-> 282 -rwxr-xr-x 1 0 0 1615 17.08.2006 01:18 rpc
-> 103 drwxr-xr-x 2 0 0 0 07.02.2019 09:36 ssh
-> 276 drwxr-xr-x 3 0 0 0 07.02.2019 09:34 xdg
-> 318 -rw-r--r-- 1 0 0 265 07.02.2019 08:47 nsswitch.conf
-> 128 -rw-r--r-- 1 0 0 1818 07.02.2019 09:19 mounts.xml
-> 262 -rw-r--r-- 1 0 0 9702 16.06.2017 14:32 dlt-system.conf
-> 125 -rw-r--r-- 1 0 0 36420 12.09.2017 08:18 bootwart.conf
-> 260 -rwxrwxrwx 1 0 0 0 07.02.2019 09:42 mtab -> /proc/self/
mounts
-> 113 drwxr-xr-x 3 0 0 0 07.02.2019 09:31 udev
-> 338 drwxr-xr-x 2 0 0 0 07.02.2019 09:36 systemd
-> 194 -rw-r--r-- 1 0 0 16944 16.06.2017 14:33 asound.conf.old
-> 100 -rw-r--r-- 1 1000 1000 74532 07.02.2019 09:36 ld.so.cache
```

File iNum	Access	Number of links	UID	GID	Size	Date	Name
332	drwxr-xr-x	3	0	0	0	07.02.2019 09:36	X11
304	drwxrwxr-x	2	2009	2009	0	07.02.2019 09:15	dlt
129	drwx-----	4	0	0	0	07.02.2019 09:36	fis
298	drwxr-xr-x	5	0	0	0	07.02.2019 09:36	lvm
80	drwxr-xr-x	2	0	0	0	07.02.2019 09:36	msr
78	drwxr-xr-x	2	0	0	0	07.02.2019 09:05	opt
285	drwxr-xr-x	3	0	0	0	07.02.2019 09:34	pki
83	drwxr-xr-x	2	0	0	0	07.02.2019 09:35	ppp
282	-rwxr-xr-x	1	0	0	1615	17.08.2006 01:18	rpc
103	drwxr-xr-x	2	0	0	0	07.02.2019 09:36	ssh
276	drwxr-xr-x	3	0	0	0	07.02.2019 09:34	xdg
318	-rw-r--r--	1	0	0	265	07.02.2019 08:47	nsswitch.conf
128	-rw-r--r--	1	0	0	1818	07.02.2019 09:19	mounts.xml
262	-rw-r--r--	1	0	0	9702	16.06.2017 14:32	dlt-system.conf
125	-rw-r--r--	1	0	0	36420	12.09.2017 08:18	bootwart.conf
260	-rwxrwxrwx	1	0	0	0	07.02.2019 09:42	mtab

```
= Address = | ===== HEX file output (up to 1024 bytes) ===== | ===== ASCII =====
-----|-----|-----
0x00000000 | 23 20 64 68 63 70 64 2E 63 6F 6E 66 0A 23 0A 23 | # dhcpd.conf.##
0x00000001 | 20 53 61 6D 70 6C 65 20 63 6F 6E 66 69 67 75 72 | Sample configur
0x00000002 | 61 74 69 6F 6E 20 66 69 6C 65 20 66 6F 72 20 49 | ation file for I
0x00000003 | 53 43 20 64 68 63 70 64 0A 23 0A 0A 23 20 6F 70 | SC dhcpd.## op
0x00000004 | 74 69 6F 6E 20 64 65 66 69 6E 69 74 69 6F 6E 73 | tion definitions
0x00000005 | 20 63 6F 6D 6D 6F 6E 20 74 6F 20 61 6C 6C 20 73 | common to all s
0x00000006 | 75 70 70 6F 72 74 65 64 20 6E 65 74 77 6F 72 6B | upported network
0x00000007 | 73 2E 2E 2E 0A 6F 70 74 69 6F 6E 20 64 6F 6D 61 | s...option doma
0x00000008 | 69 6E 2D 6E 61 6D 65 20 22 65 78 61 6D 70 6C 65 | in-name "example
0x00000009 | 2E 6F 72 67 22 3B 0A 6F 70 74 69 6F 6E 20 64 6F | .org";.option do
0x0000000A | 6D 61 69 6E 2D 6E 61 6D 65 2D 73 65 72 76 65 72 | main-name-server
0x0000000B | 73 20 6E 73 31 2E 65 78 61 6D 70 6C 65 2E 6F 72 | s ns1.example.or
0x0000000C | 67 2C 20 6E 73 32 2E 65 78 61 6D 70 6C 65 2E 6F | g, ns2.example.o
0x0000000D | 72 67 3B 0A 0A 64 65 66 61 75 6C 74 2D 6C 65 61 | rg;..default-lea
0x0000000E | 73 65 2D 74 69 6D 65 20 36 30 30 3B 0A 6D 61 78 | se-time 600;max
0x0000000F | 2D 6C 65 61 73 65 2D 74 69 6D 65 20 37 32 30 30 | -lease-time 7200
0x00000010 | 3B 0A 0A 23 20 55 73 65 20 74 68 69 73 20 74 6F | ;..# Use this to
0x00000011 | 20 65 6E 62 6C 65 20 2F 20 64 69 73 61 62 6C 65 | enable / disable
0x00000012 | 20 64 79 6E 61 6D 69 63 20 64 6E 73 20 75 70 64 | dynamic dns upd
0x00000013 | 61 74 65 73 20 67 6C 6F 62 61 6C 6C 79 2E 0A 23 | ates globally..#
0x00000014 | 64 64 6E 73 2D 75 70 64 61 74 65 2D 73 74 79 6C | ddns-update-styl
0x00000015 | 65 20 6E 6F 6E 65 3B 0A 0A 23 20 49 66 20 74 68 | e none;..# If th
0x00000016 | 69 73 20 44 48 43 50 20 73 65 72 76 65 72 20 69 | is DHCP server i
0x00000017 | 73 20 74 68 65 20 6F 66 66 69 63 69 61 6C 20 44 | s the official D
0x00000018 | 48 43 50 20 73 65 72 76 65 72 20 66 6F 72 20 74 | HCP server for t
0x00000019 | 68 65 20 6C 6F 63 61 6C 0A 23 20 6E 65 74 77 6F | he local.# netwo
0x0000001A | 72 6B 2C 20 74 68 65 20 61 75 74 68 6F 72 69 74 | rk, the authorit
0x0000001B | 61 74 69 76 65 20 64 69 72 65 63 74 69 76 65 20 | ative directive
0x0000001C | 73 68 6F 75 6C 64 20 62 65 20 75 6E 63 6F 6D 6D | should be uncomm
0x0000001D | 65 6E 74 65 64 2E 0A 23 61 75 74 68 6F 72 69 74 | ented..#authorit
0x0000001E | 61 74 69 76 65 3B 0A 0A 23 20 55 73 65 20 74 68 | ative;..# Use th
0x0000001F | 69 73 20 74 6F 20 73 65 6E 64 20 64 68 63 70 20 | is to send dhcp
0x00000020 | 6C 6F 67 20 6D 65 73 73 61 67 65 73 20 74 6F 20 | log messages to
0x00000021 | 61 20 64 69 66 66 65 72 65 6E 74 20 6C 6F 67 20 | a different log
0x00000022 | 66 69 6C 65 20 28 79 6F 75 20 61 6C 73 6F 0A 23 | file (you also.#
0x00000023 | 20 68 61 76 65 20 74 6F 20 68 61 63 68 20 73 79 | have to hack sy
0x00000024 | 73 6C 6F 67 2E 63 6F 6E 66 20 74 6F 20 63 6F 6D | slog.conf to com
0x00000025 | 70 6C 65 74 65 20 74 68 65 2D 72 65 64 69 72 65 | plete the redire
0x00000026 | 63 74 69 6F 6E 29 2E 0A 6C 6F 67 2D 66 61 63 69 | ction)..log-faci
0x00000027 | 6C 69 74 79 20 6C 6F 63 61 6C 37 3B 0A 0A 23 20 | lity local7;..#
0x00000028 | 4E 6F 20 73 65 72 76 69 63 65 20 77 69 6C 6C 20 | No service will
0x00000029 | 62 65 20 67 69 76 65 6E 20 6F 6E 20 74 68 69 73 | be given on this
```



MISSED ANOTHER EMMC
MEMORY CHIP ON THE OTHER
SIDE OF BOARD!



IT WAS RECOGNIZED IN EMMC ADAPTER, SO EASY JOB TO READ IT

The screenshot displays the Visual Nand Reconstructor software interface. The title bar reads "Visual Nand Reconstructor - Case". The interface is divided into several sections:

- Case:** A tab at the top left.
- File system viewer:** A toolbar with icons for "Check headers", "Save image", "Save selected", "Check file system", "Create unallocated data dump", "Copy allocated", "Copy unallocated", "Copy selected files data", "Correct allocated", "Correct unallocated", "Correct selected files data", "Android data extractor", "SQLite carver", and "Refresh". Below the toolbar, "Shadow copy functions" and "ECC" are labeled.
- Copy 0 X:** A tab for the current case.
- Dump:** A tree view showing the file system structure:
 - Dump
 - MBR
 - Volume0 (EXT-family) /var 849.02 MB
 - Volume1 (EXT-family) /home 36.03 MB
 - Volume2 (EXT-family) /mnt/ibad 2.76 GB
 - Volume3 (EXT-family) 398.02 MB
 - Volume4 (EXT-family) /mnt/AppData 413.02 MB
 - Root
 - 00_integrity
 - dtuner
 - fis
 - hbshare
 - HifiTuner
 - HifiTuner_evo
 - hmi
 - lib
 - lost+found
 - nav
 - saf36xxfwloader
 - setup
 - Volume5 (EXT-family) /mnt/data/nav 24.50 GB
 - Root
- Workspace:** A diagram showing the data flow process:
 - Reader (0) → Phy image (TSOP48) → ECC (0) → Offsets (0) → Data area (0)
 - eMMC (0) → Copy (0)

At the bottom, there is an "Event log explorer" and a status bar showing "Last active selection: address" and "selected".

FILES EXTRACTED FROM FILE SYSTEM ON EMMC

- %gconf.xml
- 00011A.xml
- A22E75D0D42E059F.bin
- bdaddr.txt
- bmwprovsignedBackUp.xml
- BrowserUrls.db
- bss.bak
- bttempvsdelta.txt
- contactbook
- device_history.list
- develist.dat
- HmiMain3D
- kdz_device_ids.txt
- libnav_ndslib.so
- nav_db.ini
- navpers_NavigationPositioning_Pos_Loc...
- pdl.dat
- pdm_nbt.xml
- pers_NaviControllerLastDestinationsList
- pim01.db
- POIs
- ProvOTABackUpNBT.xml
- service_history.bin
- settings.dat
- sia_device_ids.txt
- statistics_1.dat
- statistics_2.dat
- temp_diag_prov.xml
- timemanager.dat

develist.dat

```
Offset (d) 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15
00000000 01 00 00 00 44 65 76 69 63 65 6C 69 73 74 20 76 ....Devicelist v
00000016 31 2E 30 00 FF FF FF FF FF FF FF FF FF FF FF FF 1.0.YYYYYYYYYYYY
00000032 FF FF FF FF 02 00 00 00 5F 05 63 EB 43 43 3A 32 YYY.Y..._cCC:2
00000048 31 3A 31 39 3A 34 34 3A 36 46 3A 37 45 00 30 30 1:19:44:6F:7E:00
00000064 3A 30 30 3A 30 30 3A 30 30 3A 30 30 3A 30 30 00 :00:00:00:00:00.
00000080 43 43 3A 32 31 3A 31 39 3A 34 34 3A 36 46 3A 37 CC:21:19:44:6F:7
00000096 45 00 30 30 3A 30 30 3A 30 30 3A 30 30 3A 30 30 E.00:00:00:00:00
00000112 3A 30 30 00 43 43 3A 32 31 3A 31 39 3A 34 34 3A :00.CC:21:19:44:
00000128 36 46 3A 37 45 00 47 61 6C 61 78 79 20 41 37 20 6F:7E.Galaxy A7
00000144 28 32 30 31 38 29 00 FF FF FF FF FF FF 47 61 6C 61 (2018).YYYYYGala
00000160 78 79 20 41 37 20 28 32 30 31 38 29 00 FF FF FF xy A7 (2018).YY
00000176 FF FF FF FF 0C 02 5A 00 07 00 00 00 1D 00 00 00 YYY.Y.Z.....
00000192 05 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00000208 00 00 00 00 00 00 00 00 00 00 00 00 00 30 30 3A 30 .....00:0
00000224 30 3A 30 30 3A 30 30 3A 30 30 3A 30 30 00 00 FF 0:00:00:00:00..Y
00000240 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF YYYYYYYYYYYYYYYY
00000256 FF FF FF FF 00 FF FF FF FF FF FF FF FF FF FF FF YYY.YYYYYYYYYYYY
00000272 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF 00 00 00 00 00 00 YYYYYYYYYYYY....
00000288 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00000304 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00000320 00 00 00 00 30 30 3A 30 30 3A 30 30 3A 30 30 3A ....00:00:00:00:
00000336 30 30 3A 30 30 00 00 FF FF FF FF FF FF FF FF FF 00:00..YYYYYYYYYYY
00000352 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF YYYYYYYYYYYYYYYY.YYY
00000368 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF YYYYYYYYYYYYYYYYYYYY
00000384 FF FF FF FF 00 00 00 00 00 00 00 00 00 00 00 00 00 00 YYY.....
00000400 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00000416 00 00 00 00 00 00 00 00 00 00 00 00 00 30 30 3A 30 .....00:0
00000432 30 3A 30 30 3A 30 30 3A 30 30 3A 30 30 00 00 FF 0:00:00:00:00..Y
00000448 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF YYYYYYYYYYYYYYYYYYYY
00000464 FF FF FF FF 00 FF FF FF FF FF FF FF FF FF FF FF YYY.YYYYYYYYYYYY
00000480 FF FF FF FF FF FF FF FF FF FF FF FF FF FF 00 00 00 00 YYYYYYYYYYYYYYYY....
00000496 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00000512 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00000528 00 00 00 00 .....

```

```
device_history.list
1
0
0
@END USB_STACK_INFO
##END DEVICE
##START DEVICE 1452:4776 7ac47522bbba266576326633ebf7455deaafa0ad
@START DEVICE_INFO
1
1
0
/dev/hidraw0 /dev/snd/pcmC3D0c
1
512
0
0
0
1452
4776
1794
Apple Inc.
iPhone
7ac47522bbba266576326633ebf7455deaafa0ad
@END DEVICE_INFO
@START USB_STACK_INFO
1452
4776
0
0
4105
4105
4118
4118
1
0
0
@END USB_STACK_INFO
##END DEVICE
##START DEVICE 1452:4776 242fe63b231e4a917ea5c6906e60813dd357d41d
@START DEVICE_INFO
1
1
0
.
```

bdaddr.txt
B82410181612

PHONEBOOK

Visual Nand Reconstructor - Case



Case SQLite carver

Export Remove duplicates Remove unselected

SQLite carver contact_card X Master Table Phy image contactbook_20120928 Workspace

Source
Dump
Template
Search
Start address 0

Carved data
Group by: None Find repeat: CrossSum Simple view

<input type="checkbox"/>	rowid	CrossSum	CrossSumAll	memusage	vcardmemusage	AdditionalName	BMWInfo	GivenName	FamilyName	HowToReadFirstName	HowToReadLastName	Orga
<input checked="" type="checkbox"/>	85	4110468270	1804793804	0	243		0	Ic				
<input checked="" type="checkbox"/>	86	3824486461	331867985	0	264		0	Paulina				
<input checked="" type="checkbox"/>	87	163188078	4086230251	0	256		0	Praca Mama				
<input checked="" type="checkbox"/>	88	4057281176	3031521657	0	264		0	Weglarz				
<input checked="" type="checkbox"/>	89	3537869662	2769572603	0	260		0	Trener Weiss				
<input checked="" type="checkbox"/>	90	3019259467	1741848506	0	248		0	Babcia				
<input checked="" type="checkbox"/>	91	2889359923	1812653437	0	253		0	Konstanty				
<input checked="" type="checkbox"/>	92	3184332993	3616961350	0	249		0	Szmuc				
<input checked="" type="checkbox"/>	93	4213922752	3195527236	0	246		0	Hugo				
<input checked="" type="checkbox"/>	94	2285617048	2006296946	0	245		0	Ola				
<input checked="" type="checkbox"/>	95	836665506	436116718	0	313		0	Fabian Służbowy				
<input checked="" type="checkbox"/>	96	1050274559	1574013353	0	246		0	Lucas				
<input checked="" type="checkbox"/>	97	3006237490	3187954933	0	253		0	Samsung				
<input checked="" type="checkbox"/>	98	1053319548	1543015028	0	263		0	Famat				
<input checked="" type="checkbox"/>	99	1948025434	3252539309	0	251		0	Kurier				
<input checked="" type="checkbox"/>	100	1706579541	1732902687	0	263		0	Bozena				

PHONEBOOK

Source
 Dump
 Template
 Search
 Start address

Carved data

Group by: None

<input type="checkbox"/>	rowid	Contact_ID	PhoneIndex	CrossSum	PhoneType	PhoneNumber	NormalizedNumber	Position	Algorithm	Encoding
<input checked="" type="checkbox"/>	1	0	0	0	3341		0	24552	N1 N2 N3 N4 N5 S6 N7	
<input checked="" type="checkbox"/>	2	2	0	0	3 575241		75241	5 237545	N1 N2 N3 N4 N5 S6 N7	
<input checked="" type="checkbox"/>	3	3	0	0	3 +48501569	7	1569	7 237518	N1 N2 N3 N4 N5 S6 N7	
<input checked="" type="checkbox"/>	4	4	0	0	3 +48501968	4	1968	4 237491	N1 N2 N3 N4 N5 S6 N7	
<input checked="" type="checkbox"/>	5	5	0	0	3 +48602713	9	2713	9 237464	N1 N2 N3 N4 N5 S6 N7	
<input checked="" type="checkbox"/>	6	6	0	0	3 +48601586	8	1586	8 237437	N1 N2 N3 N4 N5 S6 N7	
<input checked="" type="checkbox"/>	7	7	0	0	3 1111		11	237419	N1 N2 N3 N4 N5 S6 N7	
<input checked="" type="checkbox"/>	8	8	0	0	3 +487988	83	988729	237391	N1 N2 N3 N4 N5 S6 N7	
<input checked="" type="checkbox"/>	9	9	0	0	3 692051	9	92051	9 237366	N1 N2 N3 N4 N5 S6 N7	
<input checked="" type="checkbox"/>	10	10	0	0	3 +485311	09	31168	9 237338	N1 N2 N3 N4 N5 S6 N7	
<input checked="" type="checkbox"/>	11	11	0	0	3 +48517918	9	17918	9 237310	N1 N2 N3 N4 N5 S6 N7	
<input checked="" type="checkbox"/>	12	12	0	0	3 +4850675	40	6754	0 237283	N1 N2 N3 N4 N5 S6 N7	
<input checked="" type="checkbox"/>	13	13	0	0	3 509089		9089	7 237258	N1 N2 N3 N4 N5 S6 N7	
<input checked="" type="checkbox"/>	14	14	0	0	3 601777	9	1777	9 237234	N1 N2 N3 N4 N5 S6 N7	
<input checked="" type="checkbox"/>	15	15	0	0	3 +4879404	32	94041	2 237206	N1 N2 N3 N4 N5 S6 N7	
<input checked="" type="checkbox"/>	16	16	0	0	3 +4888555	07	85552	7 237178	N1 N2 N3 N4 N5 S6 N7	
<input checked="" type="checkbox"/>	17	17	0	0	3 +4850290	84	2906	4 237151	N1 N2 N3 N4 N5 S6 N7	
<input checked="" type="checkbox"/>	18	18	0	0	3 +4884627	00	4627	30 237123	N1 N2 N3 N4 N5 S6 N7	
<input checked="" type="checkbox"/>	19	19	0	0	3 5035211		3521	44 237099	N1 N2 N3 N4 N5 S6 N7	
<input checked="" type="checkbox"/>	20	20	0	0	3 660047	1	6004	51 237074	N1 N2 N3 N4 N5 S6 N7	
<input checked="" type="checkbox"/>	21	21	0	0	3 +48515	669	1530	69 237046	N1 N2 N3 N4 N5 S6 N7	
<input checked="" type="checkbox"/>	22	22	0	0	3 +486964	345	9645	45 237018	N1 N2 N3 N4 N5 S6 N7	
<input checked="" type="checkbox"/>	23	23	0	0	3 783959		8395	08 236993	N1 N2 N3 N4 N5 S6 N7	

CITROEN C3 AIRCROSS (REAL CASE)

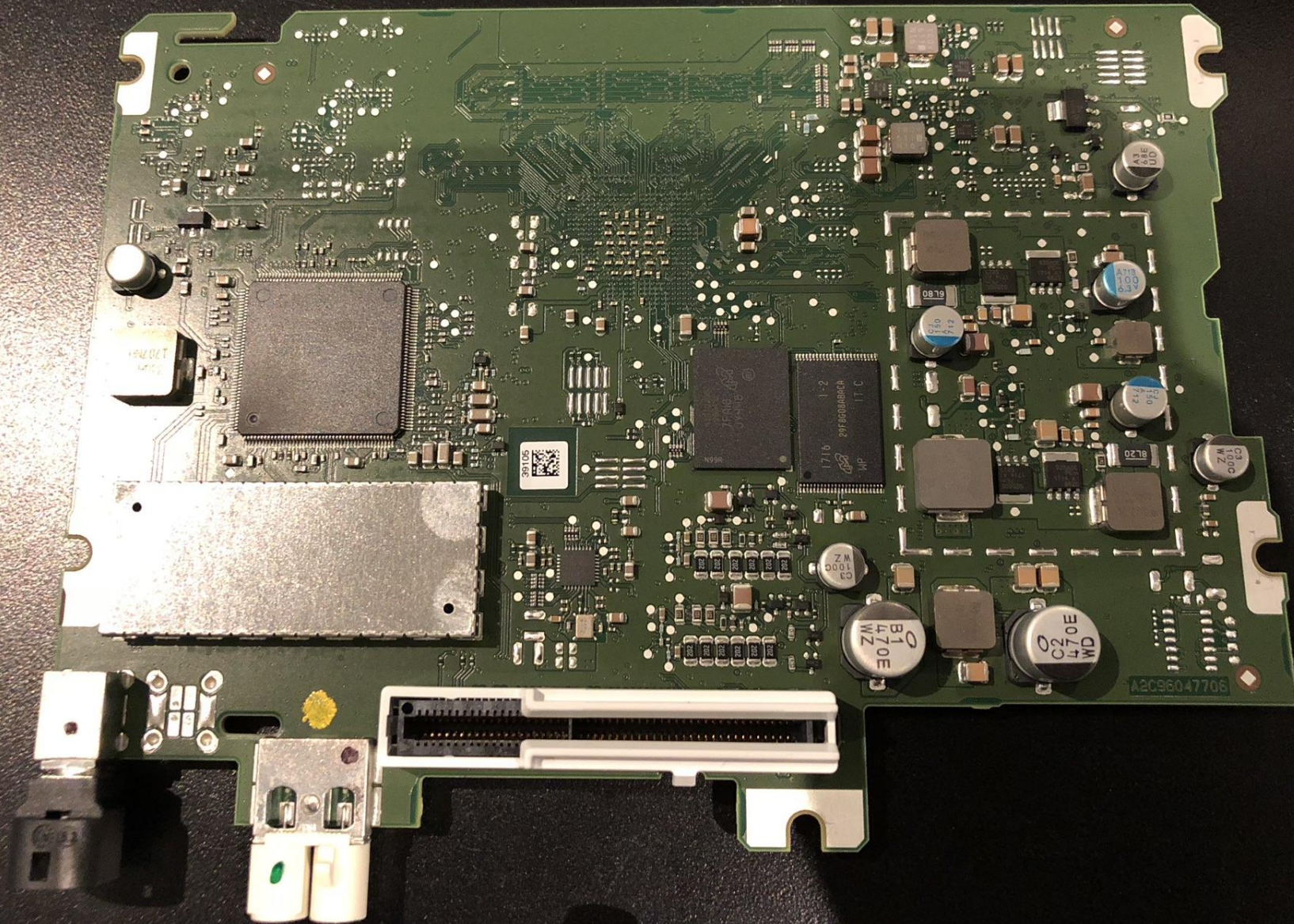




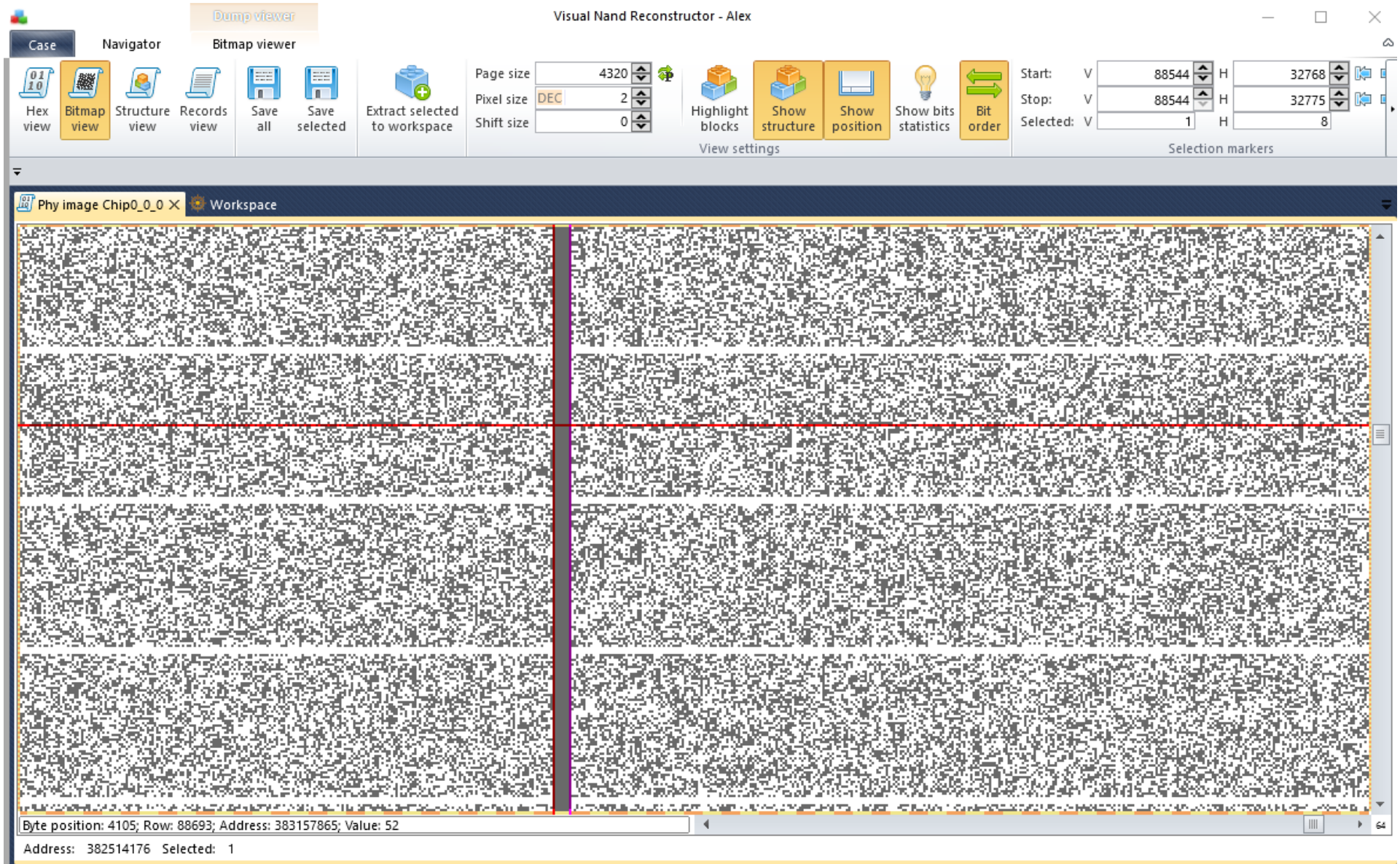
Great view!



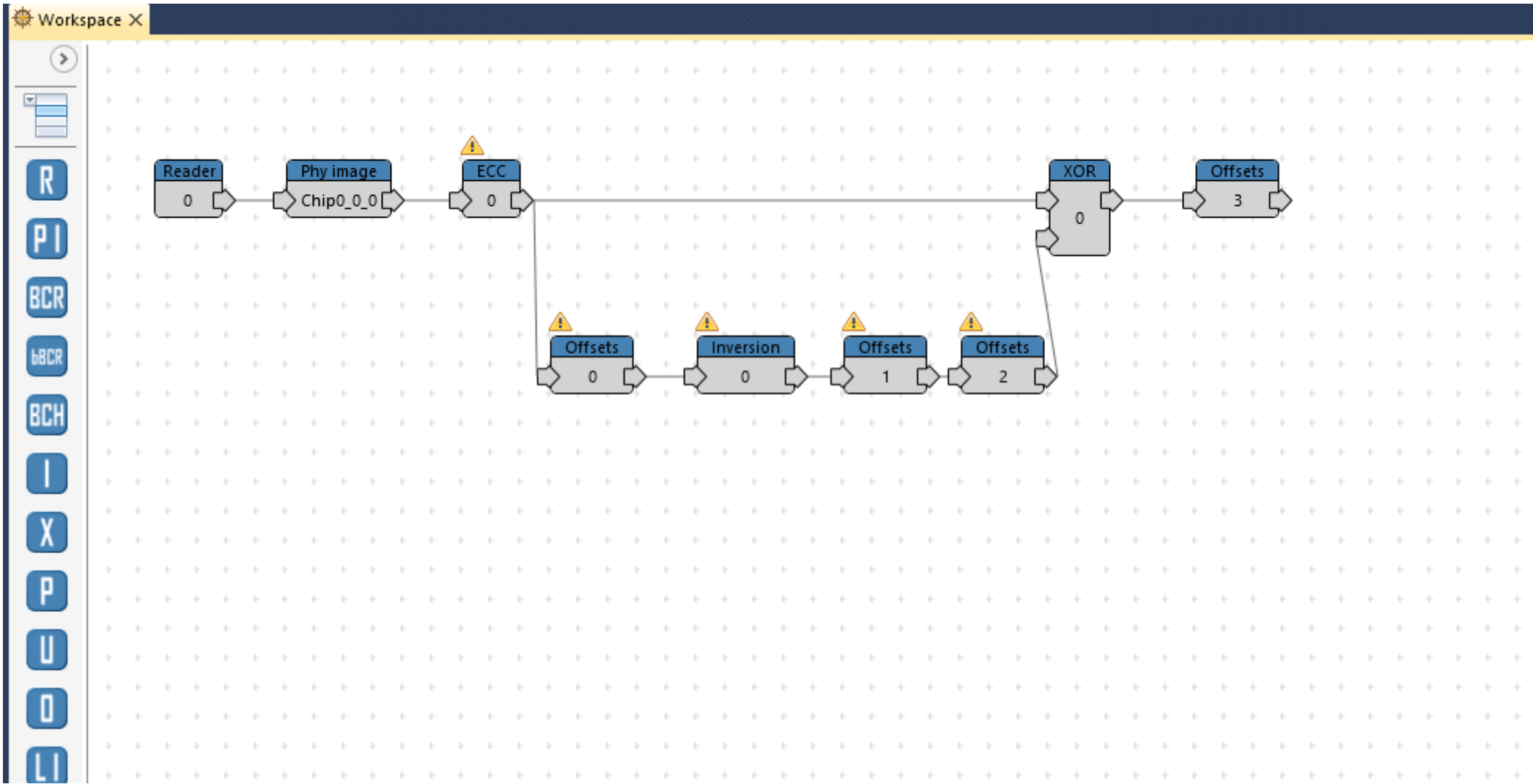
WE ONLY GOT A DUMPS FROM THE CASE.
IT WAS CONTINENTAL NAC_EUR_WAVE2 COMPUTER.
SINGLE 1GB MICRON 29F8G08ABACA TSOP48 CHIP.



THE PAGE LAYOUT WAS UNUSUAL WITH SOME DATA BYTES SHIFTED AND DUMMY BYTES INSERTED



PAGE STRUCTURE HAD TO BE ADJUSTED RIGHT AFTER ECC CORRECTION



UBIFS AGAIN!

Visual Nand Reconstructor - Alex

Dump viewer

Case Navigator Hex viewer Bitmap viewer

Hex view Bitmap view Structure view Records view Save all Save selected Extract selected to workspace Frame view Show structure

Frame size: 4320
Current frame: 59648 / 262143

View settings

Offsets 3 X Workspace

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	
000F5BE000	55	42	49	23	01	00	00	00	00	00	00	00	00	00	00	02	UBI#.....
000F5BE010	00	00	10	00	00	00	20	00	EC	ED	F6	62	00	00	00	00	.....iiöb....
000F5BE020	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....;ÿ*+
000F5BE030	00	00	00	00	00	00	00	00	00	00	00	00	BF	DD	D7	F7	.....
000F5BE040	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE050	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE060	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE070	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE080	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE090	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE0A0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE0B0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE0C0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE0D0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE0E0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE0F0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE100	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE110	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE120	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE130	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE140	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE150	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE160	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE170	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE180	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE190	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE1A0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE1B0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE1C0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE1D0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE1E0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE1F0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE200	BD	9A	90	5C	01	ED	3D	EF	A4	7E	66	13	D7	9A	BA	DD	¼§□\,i=i~f.*š°ý
000F5BE210	F2	54	A8	A8	A8	6F	0B	92	24	1F	00	00	00	00	00	00	òT""o.'\$.....
000F5BE220	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000F5BE230	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....

Byte position: 28; Row: 59559; Address: 2572

Address: 257679364 Selected:

THIS TIME WE GOT AN INTERESTING SET OF DATA OUT OF UBIFS

ApplicationTimeStamp.dat	19/12/2018 3:07 pm
Home.dat	21/03/2018 5:54 pm
LastDestination.db	19/12/2018 3:07 pm
LastRoute.dat	10/10/2018 2:55 am
POICategoryFilterMapView.dat	19/12/2018 3:04 pm
POICategoryFilterSearch.dat	18/05/2015 5:25 pm
PreferredAddress.db	18/05/2015 5:25 pm
Work.dat	15/09/2018 4:50 pm

Table: NavigableLocation New Record Delete Record

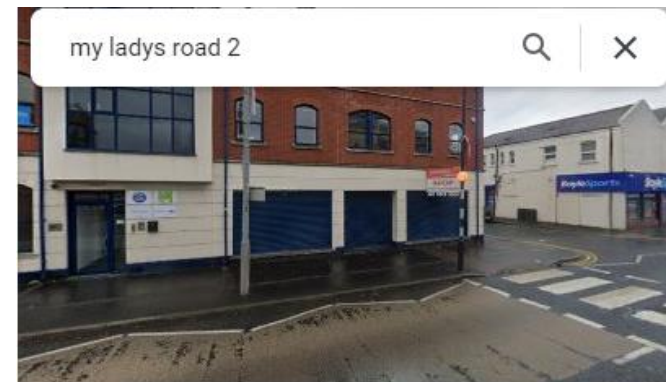
	id	address
	Filter	Filter
1	1	BLOB
2	2	BLOB
3	3	BLOB
4	4	BLOB
5	5	BLOB
6	6	BLOB
7	7	BLOB
8	8	BLOB
9	9	BLOB
10	10	BLOB
11	11	BLOB
12	12	BLOB
13	13	BLOB

Mode: Binary Import Export Set as NULL

```

0000 00 00 00 10 00 43 00 41 00 64 00 64 00 72 00 65  . . . . C . a . d . d . r . e
0010 00 73 00 73 00 00 00 1c 00 55 00 6e 00 69 00 74  . s . s . . . . U . n . i . t
0020 00 65 00 64 00 20 00 4b 00 69 00 6e 00 67 00 64  . e . d . . K . i . n . g . d
0030 00 6f 00 6d 00 00 00 06 00 47 00 42 00 52 00 00  . o . n . . . . G . B . R . .
0040 00 0e 00 42 00 65 00 6c 00 66 00 61 00 73 00 74  . . . B . e . l . f . a . s . t
0050 00 00 00 1a 00 4d 00 79 00 20 00 4c 00 61 00 64  . . . . . M . y . . L . a . d
0060 00 79 00 73 00 20 00 52 00 6f 00 61 00 64 ff ff  . y . s . . R . o . a . d . .
0070 ff ff 00 00 00 02 00 32 ff ff ff ff ff ff ff ff  . . . . . 2 . . . . .
0080 00 00 00 06 00 42 00 54 00 36 00 00 00 0e 00 42  . . . . . B . T . 6 . . . . . B
0090 00 65 00 6c 00 66 00 61 00 73 00 74 00 00 00 00  . e . l . f . a . s . t . . . .
00a0 00 00 00 00 40 4b 4b c1 69 c2 3b 79 c0 17 a4 28  . . . . @ K K . i . ; y . . . (
00b0 4d fc e3 15 01 ff ff ff ff ff ff ff ff 01      M . . . . .
    
```

Type of data currently in cell: Binary
190 byte(s) Apply



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