



: (, /dev/sdb), (/dev/sdb1), .

(. man ddrescue):

- -r N - ;
- -i NNN - ;
- -d - ;
- -f - (, ,).
- -n - "" ;
- -A - .

:

- 1. /dev/sdh - file.tmp map.tmp:

```
sudo ddrescue /dev/sdh file.tmp map.tmp
```

GNU ddrescue 1.21

Press Ctrl-C to interrupt

ipos: 120034 MB, non-trimmed: 0 B, current rate: 24576 B

/s

opos: 120034 MB, non-scraped: 0 B, average rate: 23968 kB

/s

non-tried: 0 B, bad-sector: 0 B, error rate: 0 B

/s

rescued: 120034 MB, bad areas: 0, run time: 1h 23m

27s

pct rescued: 100.00%, read errors: 0, remaining time: n

/a

time since last successful read: n

/a

Finished

- 2. , , , , 3 , (-d):

```
sudo ddrescue -f -d -r3 /dev/sdh file.tmp map.tmp
```



:

- .
- testdisk - .
- photorec - .
- . , , - . :
 - partx kpartx (partx kpartx);
 - losetup (klibc-utils);
 - mount - , , (.).

, , .

- 3. /dev/sdb1 /dev/sdc1 (). :

```
sudo ddrescue -f /dev/sdb1 /dev/sdc1 partmap.tmp
```

```
sudo ddrescue -f -r3 /dev/sdb1 /dev/sdc1 partmap.tmp
```

- 4. -(, -,):
 - , (, ,):

```
sudo ddrescue -f -r3 -i 1234567000 /dev/sdb /dev/sdc map.tmp
```

◦ :

```
sudo ddrescue -f -r3 -R /dev/sdb /dev/sdc map.tmp
```

◦ ():

```
sudo ddrescue -f -r3 -A /dev/sdb /dev/sdc map.tmp
```

- 5. -. - (/dev/sdc), (/dev/sdd) :

```
sudo ddrescue -f -m map.tmp /dev/sdc /dev/sdd newmap.tmp
sudo ddrescue -f -n /dev/sdb /dev/sdd newmap.tmp
sudo ddrescue -f -d -r3 /dev/sdb /dev/sdd newmap.tmp
```

testdisk:



WEB- TestDisk: <http://www.cgsecurity.org>
: [TestDisk Documentation](#)

testdisk Astra Linux, , :

```
sudo apt install testdisk
```

:

- testdisk - ;
- photorec - ;

testdisk

testdisk , , (, , .). (/dev/sdb) , . :

- .
- FAT32/NTFS .
- FAT12/FAT16/FAT32/NTFS.
- FAT.
- MFT MFT.
- ext2/ext3/ext4 (fck -).
- FAT/exFAT/NTFS/ext2.
- FAT/exFAT/NTFS/ext2/ext3/ext4.

.

(, ,):

```
sudo testdisk /dev/sdb
```

testdisk - .

:

TestDisk 7.0, Data Recovery Utility, April 2015
Christophe GRENIER <grenier@cgsecurity.org>
<http://www.cgsecurity.org>

TestDisk is free software, and
comes with ABSOLUTELY NO WARRANTY.

Select a media (use Arrow keys, then press Enter):
>Disk /dev/sdb - 8589 MB / 8192 MiB - VBOX HARDDISK

>[Proceed] [Quit]

Note: Disk capacity must be correctly detected for a successful recovery.
If a disk listed above has incorrect size, check HD jumper settings, BIOS
detection, and install the latest OS patches and disk drivers.

Enter, :

TestDisk 7.0, Data Recovery Utility, April 2015
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<http://www.cgsecurity.org>

Disk /dev/sdb - 8589 MB / 8192 MiB - VBOX HARDDISK

Please select the partition table type, press Enter when done.

>[Intel] Intel/PC partition
[EFI GPT] EFI GPT partition map (Mac i386, some x86_64...)
[Humax] Humax partition table
[Mac] Apple partition map
[None] Non partitioned media
[Sun] Sun Solaris partition
[XBox] Xbox partition
[Return] Return to disk selection

Note: Do NOT select 'None' for media with only a single partition. It's very
rare for a disk to be 'Non-partitioned'.



testdisk , , . ("[None] Non partitioned media"). ("[Intel] Intel/PC partition") .

, Enter, :

TestDisk 7.0, Data Recovery Utility, April 2015
Christophe GRENIER <grenier@cgsecurity.org>
<http://www.cgsecurity.org>

Disk /dev/sdb - 8589 MB / 8192 MiB - VBOX HARDDISK
CHS 1044 255 63 - sector size=512

>[Analyse] Analyse current partition structure and search for lost partitions
[Advanced] Filesystem Utils
[Geometry] Change disk geometry
[Options] Modify options
[MBR Code] Write TestDisk MBR code to first sector
[Delete] Delete all data in the partition table
[Quit] Return to disk selection

Note: Correct disk geometry is required for a successful recovery. 'Analyse'
process may give some warnings if it thinks the logical geometry is mismatched.

"Analyze" :

, . . - "Quick Search" (" ") Enter, "" . "" ().

TestDisk 7.0, Data Recovery Utility, April 2015
Christophe GRENIER <grenier@cgsecurity.org>
<http://www.cgsecurity.org>

Disk /dev/sdb - 8589 MB / 8192 MiB - CHS 1044 255 63
Partition Start End Size in sectors
>* Linux 0 32 33 510 14 16 8192000 [first]
P Linux 510 14 17 1044 85 1 8583168 [second]

Structure: Ok. Use Up/Down Arrow keys to select partition.
Use Left/Right Arrow keys to CHANGE partition characteristics:
*=Primary bootable P=Primary L=Logical E=Extended D=Deleted
Keys A: add partition, L: load backup, T: change type, P: list files,
Enter: to continue
ext4 blockSize=4096 Large_file Sparse_SB, 4194 MB / 4000 MiB

Enter, :

TestDisk 7.0, Data Recovery Utility, April 2015
Christophe GRENIER <grenier@cgsecurity.org>
<http://www.cgsecurity.org>

Disk /dev/sdb - 8589 MB / 8192 MiB - CHS 1044 255 63

	Partition	Start	End	Size in sectors
1	* Linux	0 32 33	510 14 16	8192000 [first]
2	P Linux	510 14 17	1044 85 1	8583168 [second]

[Quit] >[Deeper Search] [Write]
Try to find more partitions

"" ("Deep Search"), ("Write").

"Advanced":

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Christophe GRENIER <grenier@cgsecurity.org>
<http://www.cgsecurity.org>

Disk /dev/sdb - 8589 MB / 8192 MiB - VBOX HARDDISK
CHS 1044 255 63 - sector size=512

[Analyse] Analyse current partition structure and search for lost partitions
>[Advanced] Filesystem Utils
[Geometry] Change disk geometry
[Options] Modify options
[MBR Code] Write TestDisk MBR code to first sector
[Delete] Delete all data in the partition table
[Quit] Return to disk selection

Note: Correct disk geometry is required for a successful recovery. 'Analyse'
process may give some warnings if it thinks the logical geometry is mismatched.

:

TestDisk 7.0, Data Recovery Utility, April 2015
Christophe GRENIER <grenier@cgsecurity.org>
<http://www.cgsecurity.org>

Disk /dev/sdb - 8589 MB / 8192 MiB - CHS 1044 255 63

	Partition	Start	End	Size in sectors
> 1 *	Linux	0 32 33	510 14 16	8192000 [first]
2 P	Linux	510 14 17	1044 85 1	8583168 [second]

[Type] >[Superblock] [List] [Image Creation] [Quit]
Locate ext2/ext3/ext4 backup superblock

:

- Type - , ;
- Superblock - fsck. (). , fsck:

TestDisk 7.0, Data Recovery Utility, April 2015
Christophe GRENIER <grenier@cgsecurity.org>
<http://www.cgsecurity.org>

Disk /dev/sdb - 8589 MB / 8192 MiB - CHS 1044 255 63

	Partition	Start	End	Size in sectors
	Linux	0 32 33	510 14 16	8192000 [first]
	superblock 0,	blocksize=4096	[first]	
	superblock 32768,	blocksize=4096	[first]	
	superblock 98304,	blocksize=4096	[first]	
	superblock 163840,	blocksize=4096	[first]	
	superblock 229376,	blocksize=4096	[first]	
	superblock 294912,	blocksize=4096	[first]	
	superblock 819200,	blocksize=4096	[first]	
	superblock 884736,	blocksize=4096	[first]	

To repair the filesystem using alternate superblock, run
fsck.ext4 -p -b superblock -B blocksize device

- List - ;
- Image Creation - ;

Ext4, Astra Linux, testparm ("q") , :

```
sudo fsck.ext4 -p -b 32768 -B 4096 /dev/sdb1
```

photorec

photorec , , .



, , .

testdisk, , :

```
sudo photorec /dev/sdb1
```

:

PhotoRec 7.0, Data Recovery Utility, April 2015
Christophe GRENIER <grenier@cgsecurity.org>
<http://www.cgsecurity.org>

PhotoRec is free software, and
comes with ABSOLUTELY NO WARRANTY.

Select a media (use Arrow keys, then press Enter):
>Disk /dev/sdb1 - 4194 MB / 4000 MiB (R0) - VBOX HARDDISK
>[Proceed] [Quit]

Note:
Disk capacity must be correctly detected for a successful recovery.
If a disk listed above has incorrect size, check HD jumper settings, BIOS
detection, and install the latest OS patches and disk drivers.

Enter.

"File Opt" - :

PhotoRec 7.0, Data Recovery Utility, April 2015
Christophe GRENIER <grenier@cgsecurity.org>
<http://www.cgsecurity.org>

Disk /dev/sdb1 - 4194 MB / 4000 MiB (R0) - VBOX HARDDISK

Partition	Start	End	Size in sectors
Unknown	0 0 1	509 236 47	8192000 [Whole disk]
> P ext4	0 0 1	509 236 47	8192000 [first]

>[Search] [Options] [File Opt] [Quit]
Start file recovery

, "".

hotoRec 7.0, Data Recovery Utility, April 2015
Christophe GRENIER <grenier@cgsecurity.org>
<http://www.cgsecurity.org>

PhotoRec will try to locate the following files

```
>[X] custom Own custom signatures
[X] 1cd Russian Finance 1C:Enterprise 8
[X] 3dm Rhino / openNURBS
[X] 7z 7zip archive file
[X] DB
[X] a Unix Archive/Debian package
[X] abr Adobe Brush
[X] acb Adobe Color Book
[X] accdb Access Data Base
[X] ace ACE archive
[X] ab MAC Address Book
[X] ado Adobe Duotone Options
[X] ahn Ahnenblatt
[X] aif Audio Interchange File Format
[X] all Cubase Song file: .all
[X] als Ableton Live Sets
[X] amd AlphaCAM (amd/amt/atd/att)
[X] amr Adaptive Multi-Rate
[X] apa APA Style Helper
[X] ape Monkey's Audio compressed format
[X] apple AppleSingle/AppleDouble
[X] ari ARRI Raw Video
[X] arj ARJ archive
[X] asf ASF, WMA, WMV: Advanced Streaming Format used for Audio/Video
[X] asl Adobe Layer Style
[X] asm Pro/ENGINEER Assembly
[X] atd Agelong Tree Database/Abs0luteDatabase
[X] au Sun/NeXT audio data
[X] axx AxCrypt
[X] bac Bacula backup
[X] db Berkeley DB (Little Endian)
[X] bim Broadcast Interface Module
[X] binvox Binvox Voxel File
[X] bkf MS Backup file
[X] blend blender
[X] bmp BMP bitmap image
[X] bz2 bzip2 compressed data
[X] cab Microsoft Cabinet archive
[X] caf Core Audio Format
[X] cam Casio QV Digital Camera Image
[X] catdrawing CATIA
[X] cdt cdl/cdt/cdd Concept Draw
[X] chm MS Windows HtmlHelp Data
[X] class Java Class
[X] comicdoc Comic Life
[X] cp_ MS compress file (SZDD)
[X] cow Qemu Image
[X] crw Canon Raw picture
Next
Press s to disable all file families, b to save the settings
>[ Quit ]
Return to main menu
```

, Enter.
, , Enter:

PhotoRec 7.0, Data Recovery Utility, April 2015
Christophe GRENIER <grenier@cgsecurity.org>
<http://www.cgsecurity.org>

P ext4 0 0 1 509 236 47 8192000 [first]

To recover lost files, PhotoRec need to know the filesystem type where the file were stored:

```
>[ ext2/ext3 ] ext2/ext3/ext4 filesystem
[ Other ] FAT/NTFS/HFS+/ReiserFS/...
```

("Free" - , "Whole" -) Enter:

PhotoRec 7.0, Data Recovery Utility, April 2015
Christophe GRENIER <grenier@cgsecurity.org>
<http://www.cgsecurity.org>

P ext4 0 0 1 509 236 47 8192000 [first]

Please choose if all space need to be analysed:

```
[ Free ] Scan for file from ext2/ext3 unallocated space only
>[ Whole ] Extract files from whole partition
```

"C", .

extundelete

extundelete Astra Linux, .

```
sudo apt install extundelete
```

```
sudo extundelete --restore-all /dev/sdh1
```

```
NOTICE: Extended attributes are not restored.
Loading filesystem metadata ... 232 groups loaded.
Loading journal descriptors ... Segmentation fault
```

ext4magic



ext4magic Astra Linux Debian: <http://ftp.de.debian.org/debian/pool/main/e/ext4magic/>.

man ext4magic, :

1. () :

```
sudo ext4magic -M /dev/___
```

2. :

```
sudo ext4magic -m /dev/___
```

RECOVERED .

R-Linux

Web- R-Tools Technology: <https://www.r-tt.com/ru/>

R-Linux — Ext2/Ext3/Ext4, Linux Unix (). - R-Tools Technology (). , . , .

R-Linux Web- :

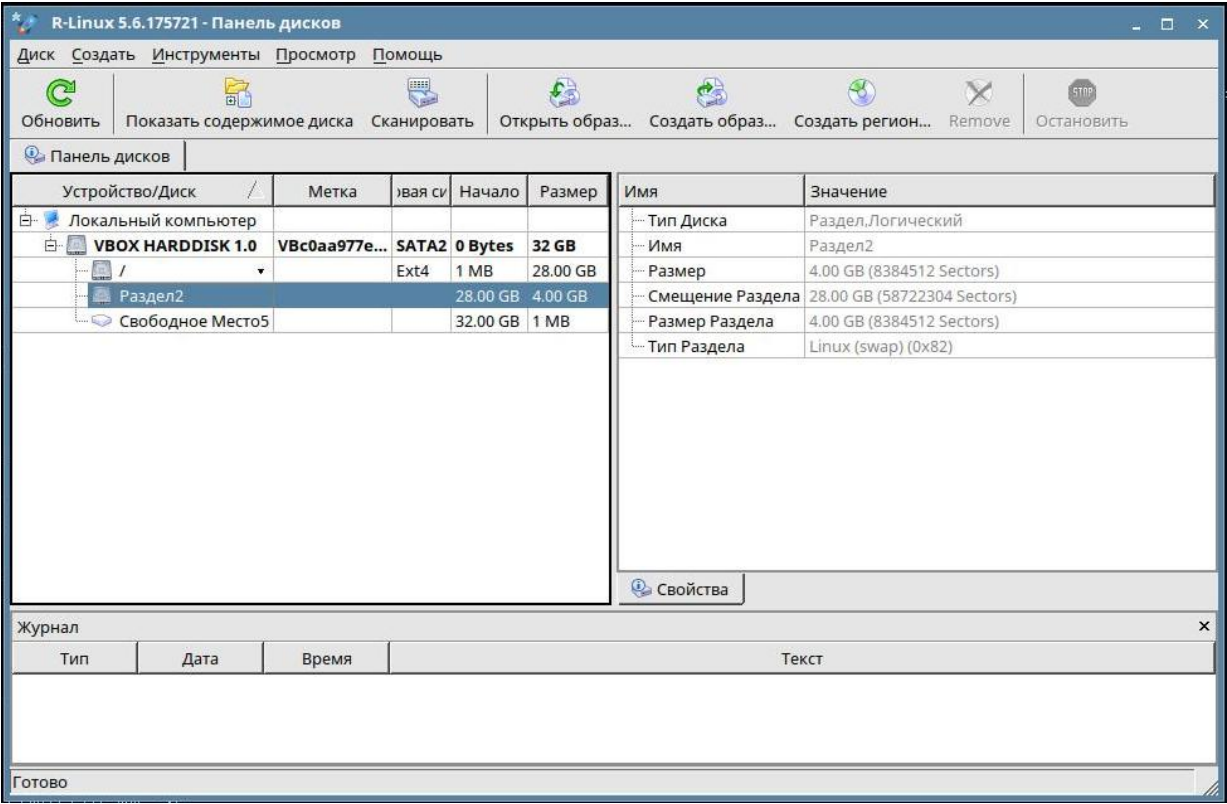
```
wget https://www.r-studio.com/downloads/RLinux5_x64.deb
sudo apt install ./RLinux5_x64.deb
```

"" , :

```
sudo rlinux
```



:



(), . / .
, , , R-Link .
R-Linux [S.M.A.R.T](#) , .