

(ATA Security FDE/SED TCG OPAL)



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- Astra Linux Special Edition .10015-01 (1.7), .10015-10
- Astra Linux Special Edition .10015-17
- Astra Linux Special Edition .10015-37 (7.7)
- Astra Linux Special Edition .10015-03 (7.6)
- Astra Linux Special Edition .10152-02 (4.7)
- Astra Linux Special Edition .10015-01 (1.6)
- Astra Linux Special Edition .10015-16 . 1
- Astra Linux Special Edition .10015-16 . 2
- Astra Linux Special Edition .10265-01 (8.1)
- Astra Linux Common Edition 2.12



, (, ,) , (S1, S2, S3 («Suspend to RAM» (STR) BIOS, « » («Standby») , S4 («Suspend to disk» (STD)), ,

""

(" ", Full-Drive Encryption (FDE) Self-Encrypting Drive (SED),) , , , " " .

:

- AES 128 / AES 256 ;
- ;
- "" , ;



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, , . :

○ ATA Security - / , ATA.

, , ;

○ TCG OPAL -, , , , , , , "" (shadow) , . OPAL , .



ATA Security TCG OPAL . , , , , SATA () , , .



TA Security



ATA Security

hdparm, hdparm. / Astra Linux.
(. [synaptic](#))

```
sudo apt install hdparm
```

```
( /dev/sda):
```

```
sudo hdparm -I /dev/sda
```

```
:
```

```
$ sudo hdparm -I /dev/sda
```

```
/dev/sda:
```

```
ATA device, with non-removable media
```

```
Model Number: TOSHIBA HDWD110
```

```
Serial Number: X7HW1XWFS
```

```
Firmware Revision: MS20A8J0
```

```
Transport: Serial, ATA8-AST, SATA 1.0a, SATA II Extensions, SATA Rev 2.5, SATA Rev 2.6, SATA Rev 3.0;
```

```
Revision: ATA8-AST T13 Project D1697 Revision 0b
```

```
Standards:
```

```
Used: unknown (minor revision code 0x0029)
```

```
Supported: 8 7 6 5
```

```
Likely used: 8
```

```
Configuration:
```

```
Logical max current
```

```
cylinders 16383 16383
```

```
heads 16 16
```

```
sectors/track 63 63
```

```
--
```

```
CHS current addressable sectors: 16514064
```

```
LBA user addressable sectors: 268435455
```

```
LBA48 user addressable sectors: 1953525168
```

```
Logical Sector size: 512 bytes
```

```
Physical Sector size: 4096 bytes
```

```
Logical Sector-0 offset: 0 bytes
```

```
device size with M = 1024*1024: 953869 MBytes
```

```
device size with M = 1000*1000: 1000204 MBytes (1000 GB)
```

```
cache/buffer size = unknown
```

```
Form Factor: 3.5 inch
```

```
Nominal Media Rotation Rate: 7200
```

```
Capabilities:
```

```
LBA, IORDY(can be disabled)
```

```
Queue depth: 32
```

```
Standby timer values: spec'd by Standard, no device specific minimum
```

```
R/W multiple sector transfer: Max = 16 Current = 16
```

```
Advanced power management level: disabled
```

```
DMA: mdma0 mdma1 mdma2 udma0 udma1 udma2 udma3 udma4 udma5 *udma6
```

```
Cycle time: min=120ns recommended=120ns
```

```
PIO: pio0 pio1 pio2 pio3 pio4
```

```
Cycle time: no flow control=120ns IORDY flow control=120ns
```

```
Commands/features:
```

```
Enabled Supported:
```

```
* SMART feature set
```

```
Security Mode feature set
```

```
* Power Management feature set
```

```
* Write cache
```

```
* Look-ahead
```

```
* Host Protected Area feature set
```

```
* WRITE_BUFFER command
```

```
* READ_BUFFER command
```

```
* NOP cmd
```

```
* DOWNLOAD_MICROCODE
```

- Advanced Power Management feature set
- Power-Up In Standby feature set
- * SET_FEATURES required to spinup after power up
- SET_MAX security extension
- * 48-bit Address feature set
- * Device Configuration Overlay feature set
- * Mandatory FLUSH_CACHE
- * FLUSH_CACHE_EXT
- * SMART error logging
- * SMART self-test
- Media Card Pass-Through
- * General Purpose Logging feature set
- * WRITE_{DMA|MULTIPLE}_FUA_EXT
- * 64-bit World wide name
- * URG for READ_STREAM[_DMA]_EXT
- * URG for WRITE_STREAM[_DMA]_EXT
- * WRITE_UNCORRECTABLE_EXT command
- * {READ,WRITE}_DMA_EXT_GPL commands
- * Segmented DOWNLOAD_MICROCODE
- unknown 119[7]
- * Gen1 signaling speed (1.5Gb/s)
- * Gen2 signaling speed (3.0Gb/s)
- * Gen3 signaling speed (6.0Gb/s)
- * Native Command Queueing (NCQ)
- * Host-initiated interface power management
- * Phy event counters
- * NCQ priority information
- Non-Zero buffer offsets in DMA Setup FIS
- * DMA Setup Auto-Activate optimization
- Device-initiated interface power management
- In-order data delivery
- * Software settings preservation
- * SMART Command Transport (SCT) feature set
- * SCT Write Same (AC2)
- * SCT Error Recovery Control (AC3)
- * SCT Features Control (AC4)
- * SCT Data Tables (AC5)

Security:

Master password revision code = 65534
 supported
 not enabled
 not locked
 frozen
 not expired: security count
 not supported: enhanced erase
 156min for SECURITY ERASE UNIT.

Logical Unit WWN Device Identifier: 5000039fd3cc4d45

NAA : 5
 IEEE OUI : 000039
 Unique ID : fd3cc4d45

Checksum: correct

ATA Security "Security":

...

Security:

Master password revision code = 65534
 supported
 not enabled
 not locked
 frozen
 not expired: security count
 not supported: enhanced erase
 156min for SECURITY ERASE UNIT.

....

, ("Master password ... supported"), ("not enabled").
 , ("frozen"). BIOS- / , , .





⚠

- , USB, ;
- BIOS- / , ().

(- 12345678 /dev/sdb):

```
sudo hdparm --user-master u --security-set-pass 12345678 /dev/sdb
```



⚠

(sdb):

```
sudo -i
echo 1 >/sys/block/sdb/device/delete
exit
```

SATA .. .

```
sudo -i
echo "- - -" > /sys/class/scsi_host/hostX/scan
exit
```

hostX - (/sys/class/scsi_host/host3/scan), .

() (12345678):

```
sudo hdparm --user-master u --security-unlock 12345678 /dev/sdb
```



⚠

```
sudo hdparm -z /dev/sdb
```



⚠

```
sudo hdparm --user-master u --security-disable 12345678 /dev/sdb
```

, :

```
sudo hdparm -z /dev/sdb
```

TCG OPAL



, OPAL



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TCG Opal , Astra Linux.
ATA (TPM), (, libata). , libata,



"... " " . libata.allow_tpm = 1, ...".



Wki Archlinux .



, us_english. .
' ' ' ' .



(, '), ' ' .

/ ATA TPM
C <https://github.com/Drive-Trust-Alliance/sedutil/wiki/Executable-Distributions>.

ATA TPM:

1. allow_tpm = 1 /etc/default/grub:



GRUB_CMDLINE_LINUX_DEFAULT="quiet splash libata.allow_tpm=1"

2. :

```
sudo update-grub
```

3. .

: BIOS 64bit UEFI.

```
wget -O RESCUE32.img.gz https://github.com/Drive-Trust-Alliance/exec/blob/master/RESCUE32.img.gz?raw=true
```

```
wget -O RESCUE64.img.gz https://github.com/Drive-Trust-Alliance/exec/blob/master/RESCUE64.img.gz?raw=true
```



UEFI Secure Boot.

:

```
gunzip RESCUE32.img.gz
```

```
gunzip RESCUE64.img.gz
```

USB- , :



```
dd if=RESCUE32.img of=/dev/sd?
```

```
dd if=RESCUE64.img of=/dev/sd?
```

Login "root" .



```
# sedutil-cli --scan
```

:



```
#sedutil-cli --scan
Scanning for Opal compliant disks
/dev/nvme0 2 Samsung SSD 960 EVO 250GB 2B7QCXE7
/dev/sda 2 Crucial_CT250MX200SSD1 MU04
/dev/sdb 12 Samsung SSD 850 EVO 500GB EMT01B6Q
/dev/sdc 2 ST500LT025-1DH142 0001SDM7
/dev/sdd 12 Samsung SSD 850 EVO 250GB EMT01B6Q
No more disks present ending scan
```

2 , OPAL 2, .



, OPAL2, .

(PBA)

linuxpba debug.



:



```
i #linuxpba
DTA LINUX Pre Boot Authorization
Please enter pass-phrase to unlock OPAL drives: *****
Scanning....
Drive /dev/nvme0 Samsung SSD 960 EVO 250GB is OPAL NOT LOCKED
Drive /dev/sda Crucial_CT250MX200SSD1 is OPAL NOT LOCKED
Drive /dev/sdb Samsung SSD 850 EVO 500GB is OPAL NOT LOCKED
Drive /dev/sdc ST500LT025-1DH142 is OPAL NOT LOCKED
Drive /dev/sdd Samsung SSD 850 EVO 250GB is OPAL NOT LOCKED
```

```
, "is OPAL".
```

```
i OPAL. " " .
```

```
/dev/sdc /usr/sedutil/UEFI64-1.15.img.gz ( ).
/dev/sd? .
```

```
: .
```

```
#
gunzip /usr/sedutil/UEFI64-n.nn.img.gz
```

```
( debug, ):
```

```
sedutil-cli --initialsetup debug /dev/sdc
#
sedutil-cli --loadPBAimage debug /usr/sedutil/UEFI64-n.nn.img /dev/sdc
sedutil-cli --setMBREnable on debug /dev/sdc
```

```
:
```

```
sedutil-cli --enableLockingRange 0 password drive
```

PBA

```
, debug. :
```

```
i #linuxpba
DTA LINUX Pre Boot Authorization
Please enter pass-phrase to unlock OPAL drives: *****
Scanning....
Drive /dev/nvme0 Samsung SSD 960 EVO 250GB is OPAL NOT LOCKED
Drive /dev/sda Crucial_CT250MX200SSD1 is OPAL NOT LOCKED
Drive /dev/sdb Samsung SSD 850 EVO 500GB is OPAL NOT LOCKED
Drive /dev/sdc ST500LT025-1DH142 is OPAL Unlocked <----!!!
Drive /dev/sdd Samsung SSD 850 EVO 250GB is OPAL NOT LOCKED
```

```
, ( "is OPAL Unlocked").
, OPAL.
```

```
SID Admin1, .
:
```

```
sedutil-cli --setsidpassword debug yourrealpassword /dev/sdc
sedutil-cli --setadmin1pwd debug yourrealpassword /dev/sdc
```

 #sedutil-cli --setsidpassword debug yourrealpassword /dev/sdc
#sedutil-cli --setadmin1pwd debug yourrealpassword /dev/sdc
- 14:20:53.352 INFO: Admin1 password changed

```
sedutil-cli --setmbrdone on yourrealpassword /dev/sdc
```

 #sedutil-cli --setmbrdone on yourrealpassword /dev/sdc
- 14:22:21.590 INFO: MBRDone set on Your drive in now using OPAL locking.

(PBA) .

 BIOS PBE .

OPAL .

```
sedutil-cli --disableLockingRange 0 <password> <drive>
sedutil-cli --setMBREnable off <password> <drive>
```

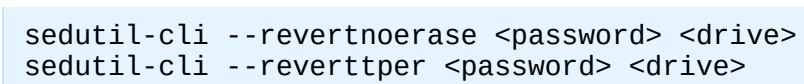
 #sedutil-cli --disablelockingrange 0 debug /dev/sdc
- 14:07:24.914 INFO: LockingRange0 disabled
#sedutil-cli --setmbrenable off debug /dev/sdc
- 14:08:21.999 INFO: MBREnable set off

```
sedutil-cli --enableLockingRange 0 <password> <drive>
sedutil-cli --setMBREnable on <password> <drive>
```

 #sedutil-cli --enablelockingrange 0 debug /dev/sdc
- 14:07:24.914 INFO: LockingRange0 enabled ReadLocking,WriteLocking
#sedutil-cli --setmbrenable on debug /dev/sdc
- 14:08:21.999 INFO: MBREnable set on

OPAL

 OPAL , .
, .



```
i #sedutil-cli --revertnoerase debug /dev/sdc
- 14:22:47.060 INFO: Revert LockingSP complete
#sedutil-cli --reverttper debug /dev/sdc
- 14:23:13.968 INFO: revertTper completed successfully
#
```

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