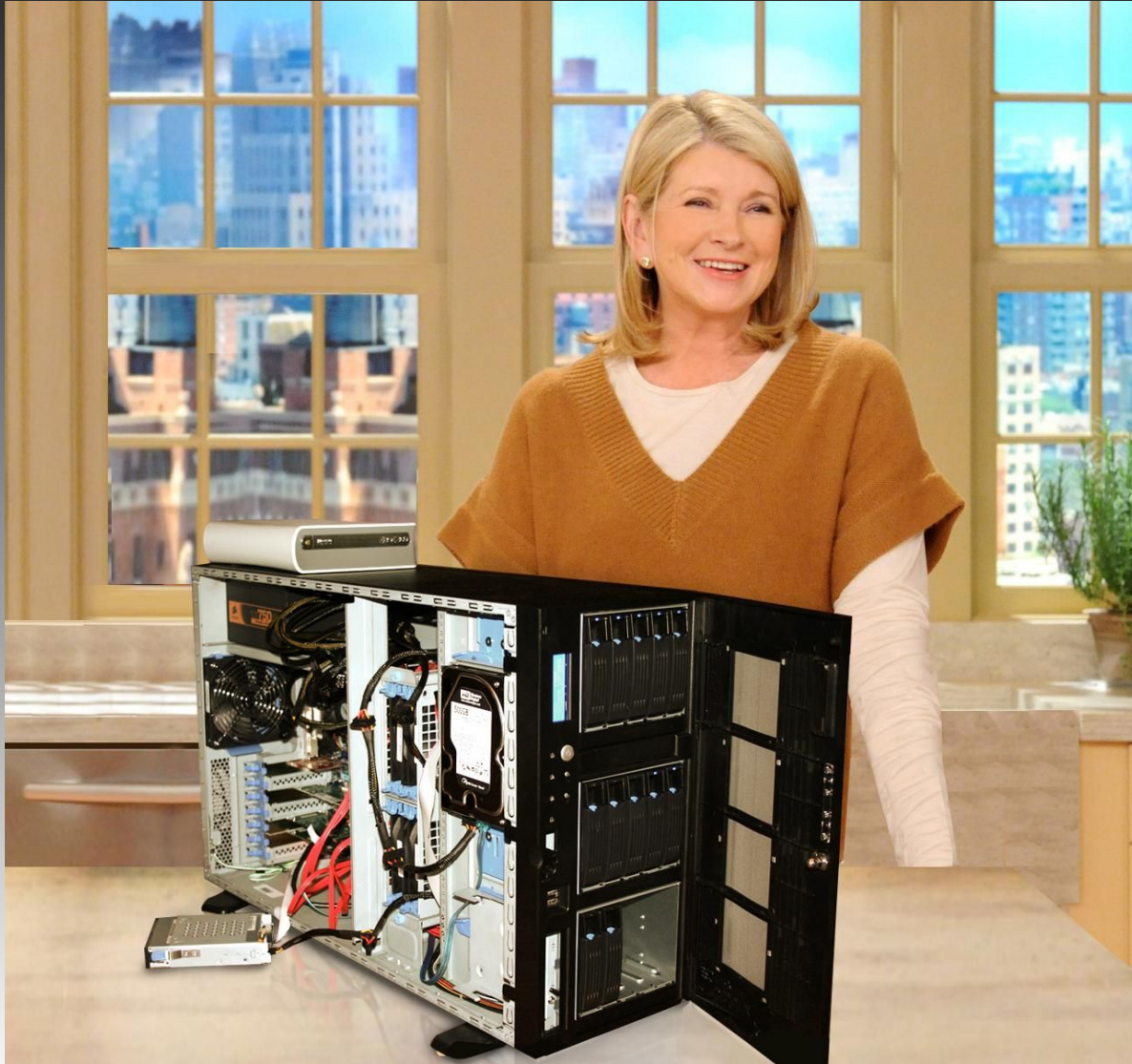


NAS: From Scratch



What will be covered:

- Purchasing tips
- Physical construction
- Common pitfalls
- Hard Drive Setup
- Service configurations

Know your requirements

- Budget
- Performance vs Storage space
- How redundant?

Requirements for this project

- 4TB of space
- Redundant
- Frequent writes

Part list:

- 4x WD 2TB SATA 6.0 Gb/s (Storage)
- 1x WD 1TB SATA 6.0 Gb/s (OS)
- Intel Pentium G620 2.6Ghz
- 2x 4GB DDR3 SDRAM
- GIGABYTE GA-Z68XP
- Corsair 750W PS
- EVGA GeForce GT 430
- Intel RAID Controller (RT3WB080)
- LIAN LI ATX Mid Tower

EVGA GT 430

Lancool

GIGABYTE

SSD
HDD

SMART Response

UNMATCHED PERFORMANCE

60% Performance Improvement

FIRST KNIGHT SERIES

BATTLE IS WHAT I DO

intel

RAID CONTROLLER

ENHANCED DATA PROTECTION, INCREASED SERVER PERFORMANCE, AND OUTSTANDING AVAILABILITY

intel Pentium

INTEL PENTIUM PROCESSOR

GE20 5411SS

CORSAIR

HYDRAUS

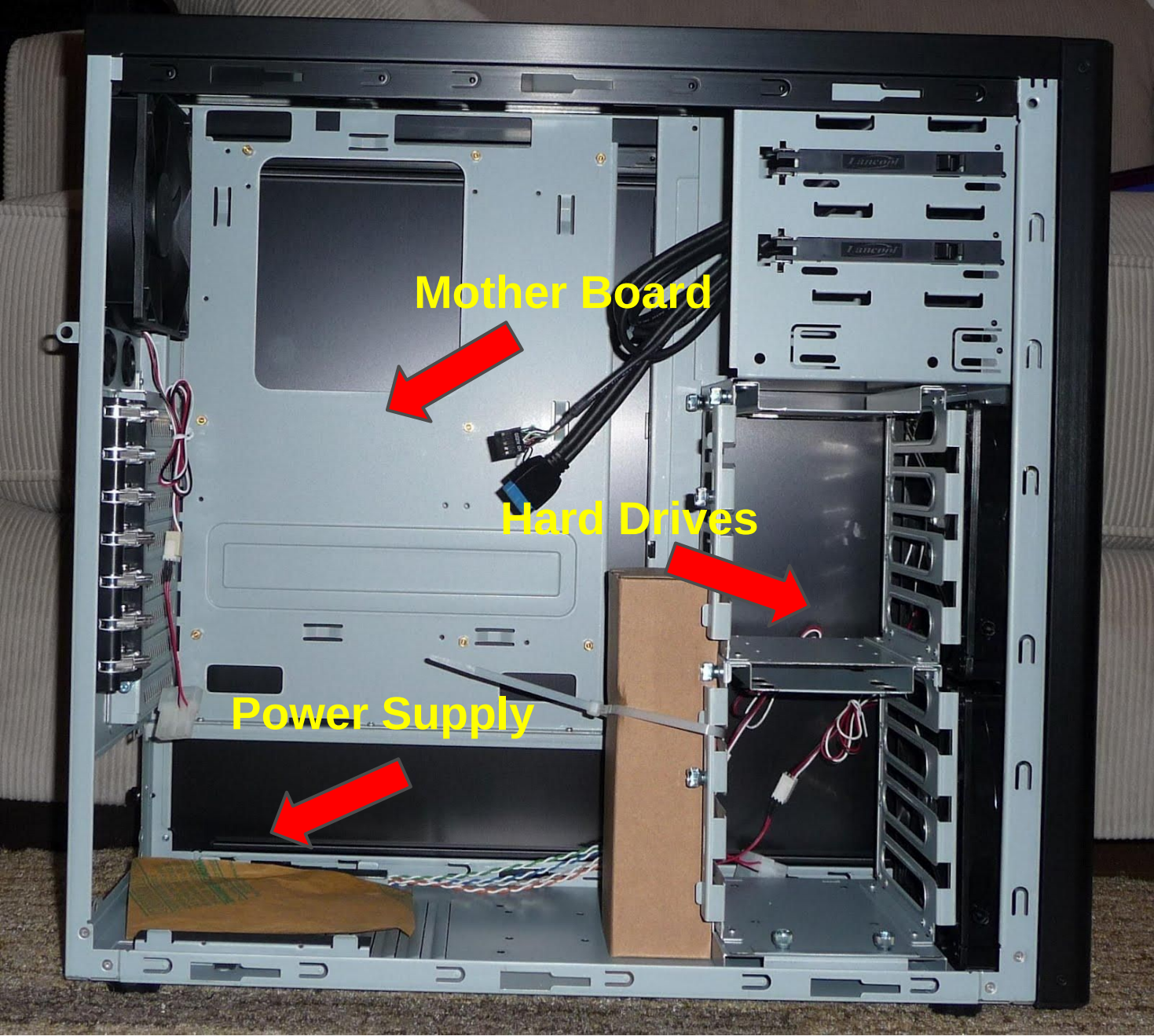
PROFESSIONAL SERIES

HYDRAUS

HYDRAUS







Mother Board

Hard Drives

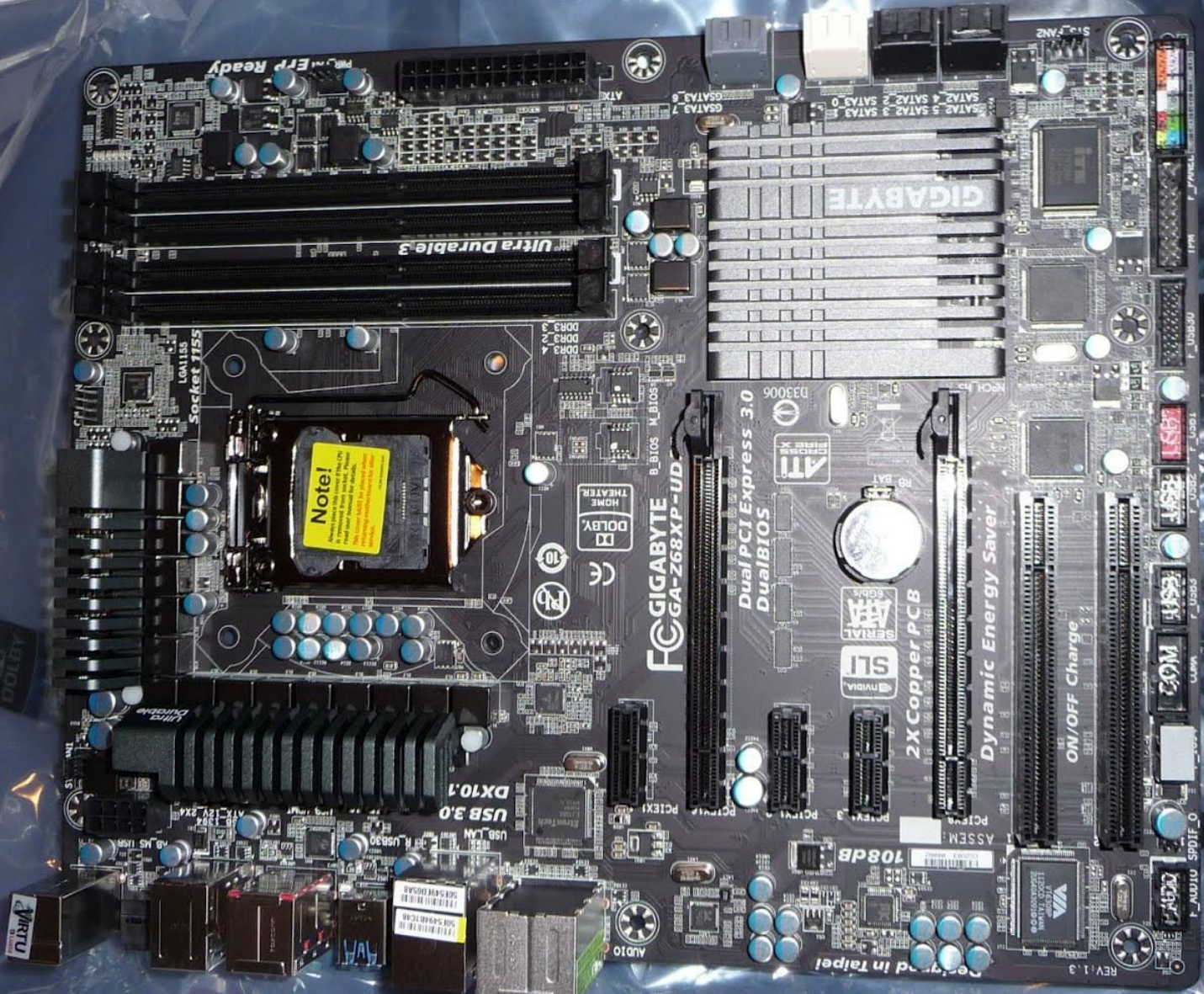
Power Supply











Note!

GIGABYTE
GA-Z68XP-UD

Dual PCI Express 3.0
Dual BIOS

2X Copper PCB
Dynamic Energy Saver

ON/OFF Charge

User's Manual

WIRU

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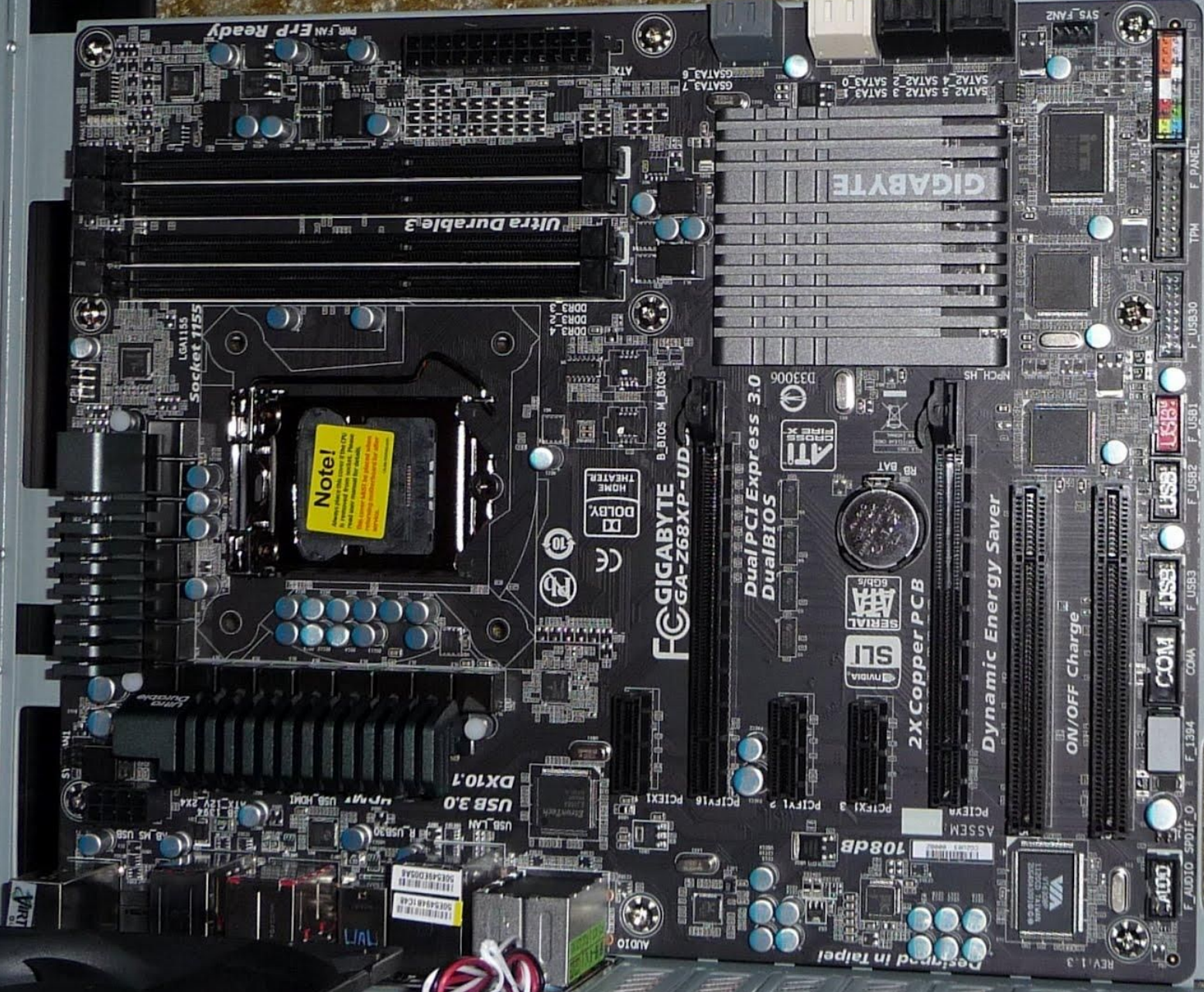
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PMR_FAN ERP Ready

Ultra Durable 3

Socket 1155

Notel

GIGABYTE GA-Z68XP-UD7

Dual PCI Express 3.0 DualBIOS

ATI

Serial ATA 6Gbps

2X Copper PCB

Dynamic Energy Saver

ON/OFF Charge

COM

USB

USB30

F_PANEL

SYS_FAN2

USB 3.0

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USB LNM

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USB LNM

USB LNM

USB LNM

USB LNM

USB LNM

DOLBY HOME THEATER

CE

PB

10

ASSEMBLY

108dB

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PCIEv1 2

PCIEv1 1

PCIEv1 0

PCIEv1 0

PCIEv1 0

PCIEv1 0

PCIEv1 0

PCIEv1 0

PCIEv1 0

PCIEv1 0

PCIEv1 0

Designed in Taipei

REV 1.3

F_1394

F_USB3

F_USB2

F_USB1

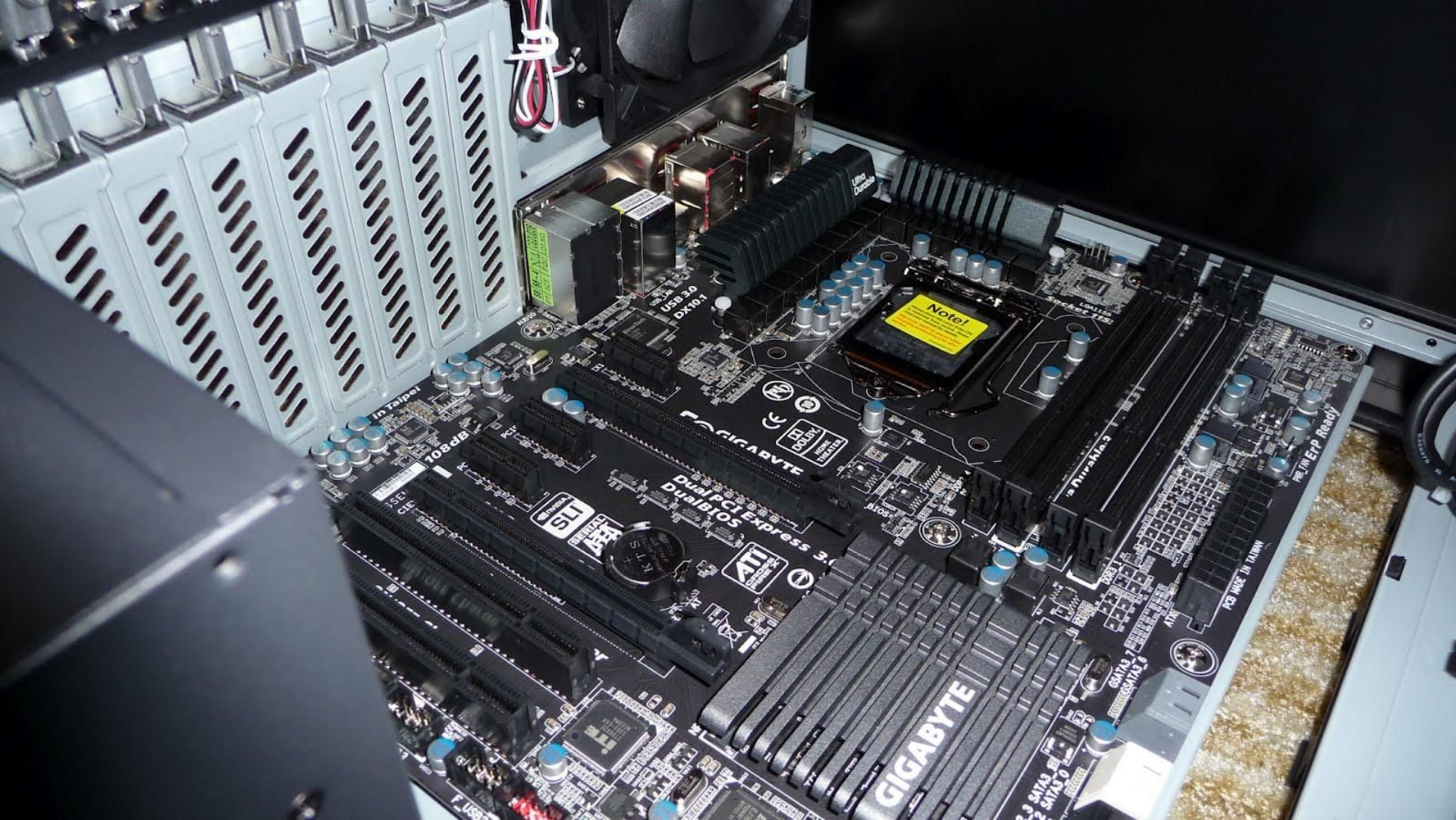
F_USB30

F_PANEL

SYS_FAN2

SYS_FAN1

SYS_FAN0



WD Western Digital
www.westerndigital.com

2.0TB

SATA / 64MB Cache
WD2002FAEX

S/N : WMA Y03445087

Jumpered pins 3-4 enables PUIS.
pins 5-6 limits PHY to 3Gbps

FACTORY JUMPER SETTINGS
7 5 3 1
8 6 4 2

MDL : WD2002FAEX-007BA0

Product warranty will be void if seal, label or cover is removed or damaged.

Do not cover any drive holes.

WWN: 50014EE002EA2BEB

DATE: 21 SEP 2011

DCM: HBRCHV2AB

DCX: 400873FB5

U.S. Patents: 6178056, 5956196, 6289484, 6263459

Product of Malaysia

Canada ICES-003 Class B / NMB-003 Classe B

5VDC : 0.60A

12VDC : 0.45A

R/N : 771624

Icons: D33, 3565, 20, KCC-REM, WDT-1624, CE, FRAGILE

Caviar Black™

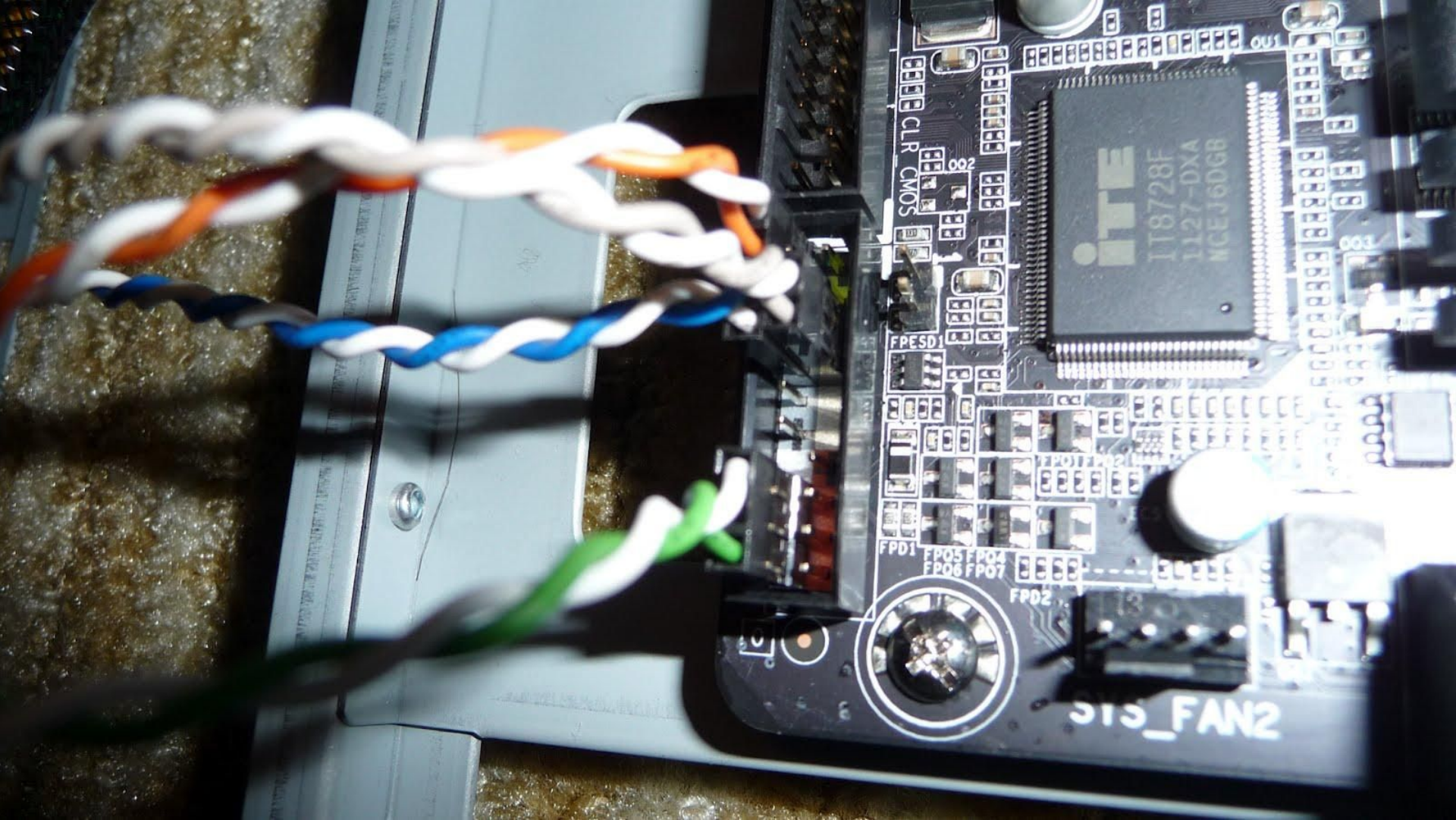


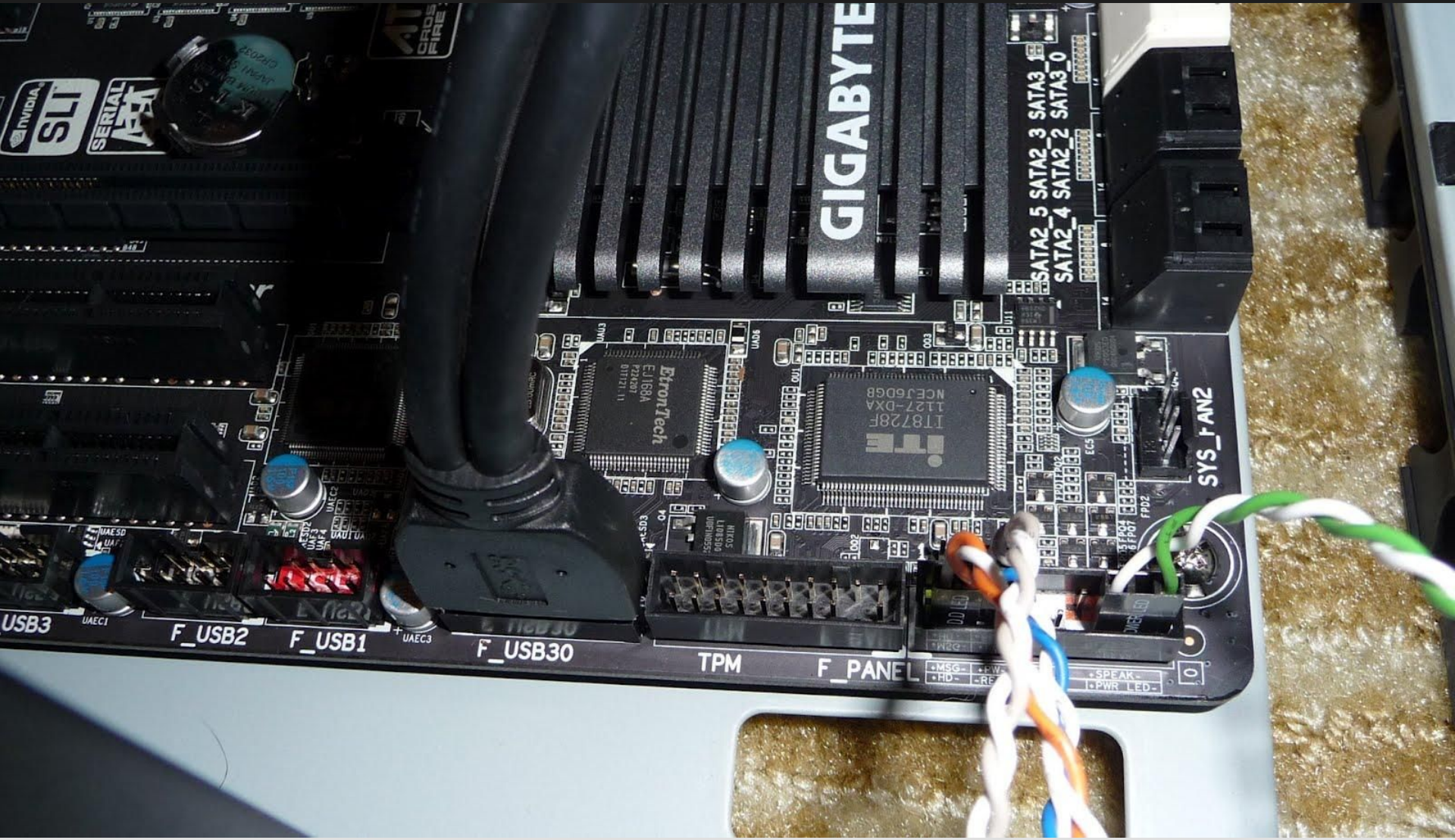












GIGABYTE

SATA2_5 SATA2_3 SATA3_1
SATA2_4 SATA2_2 SATA3_0

SYS_FAN2

EtronTech
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P2420T
D1121.11

IT8728F
1127-DXA
MCF360GB

NVIDIA SLI
SERIAL ATA

F_USB2

F_USB1

F_USB30

TPM

F_PANEL

+MSG -
+HD -

+SPEAK
+PWR LED-

USB3

UAEC1

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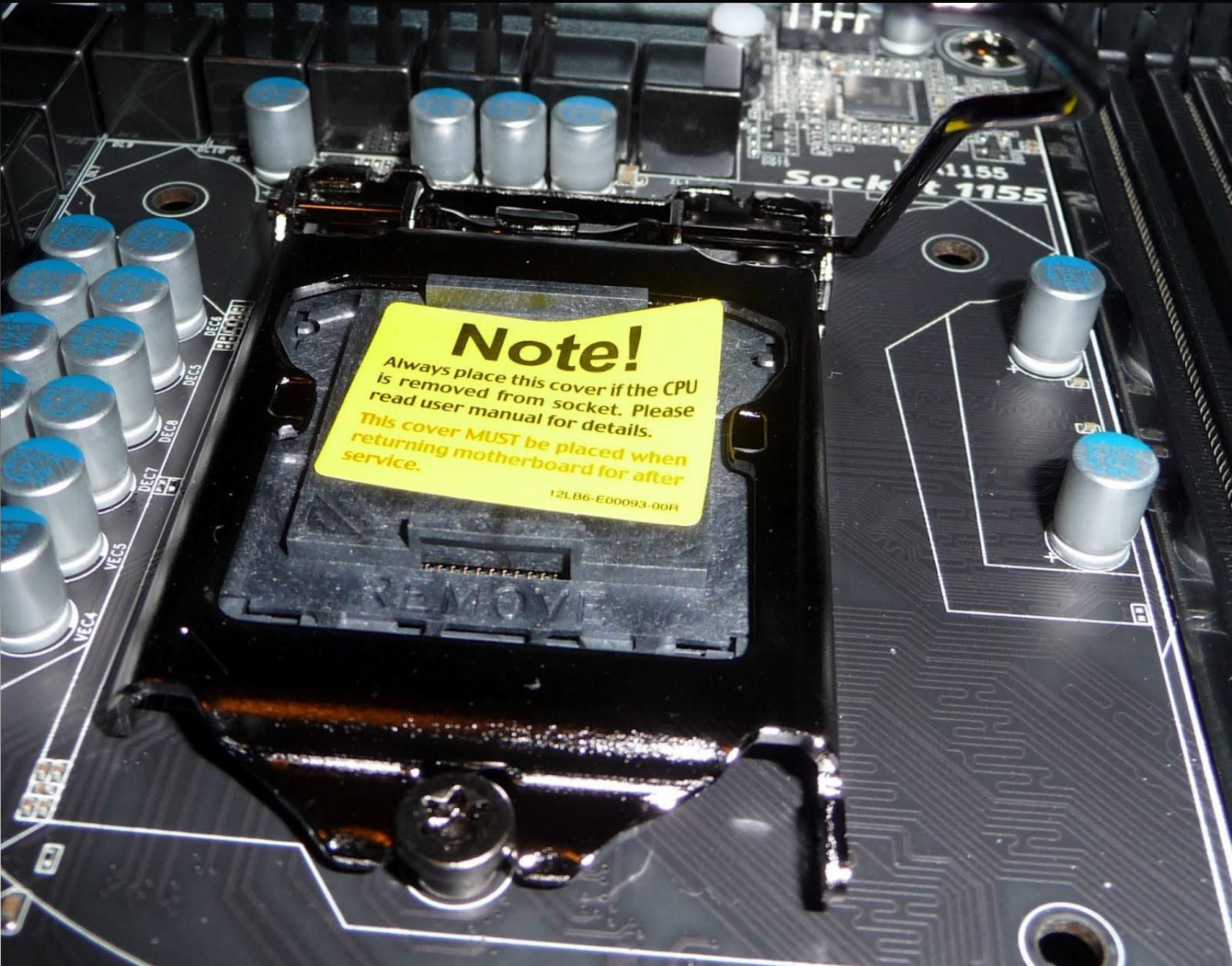
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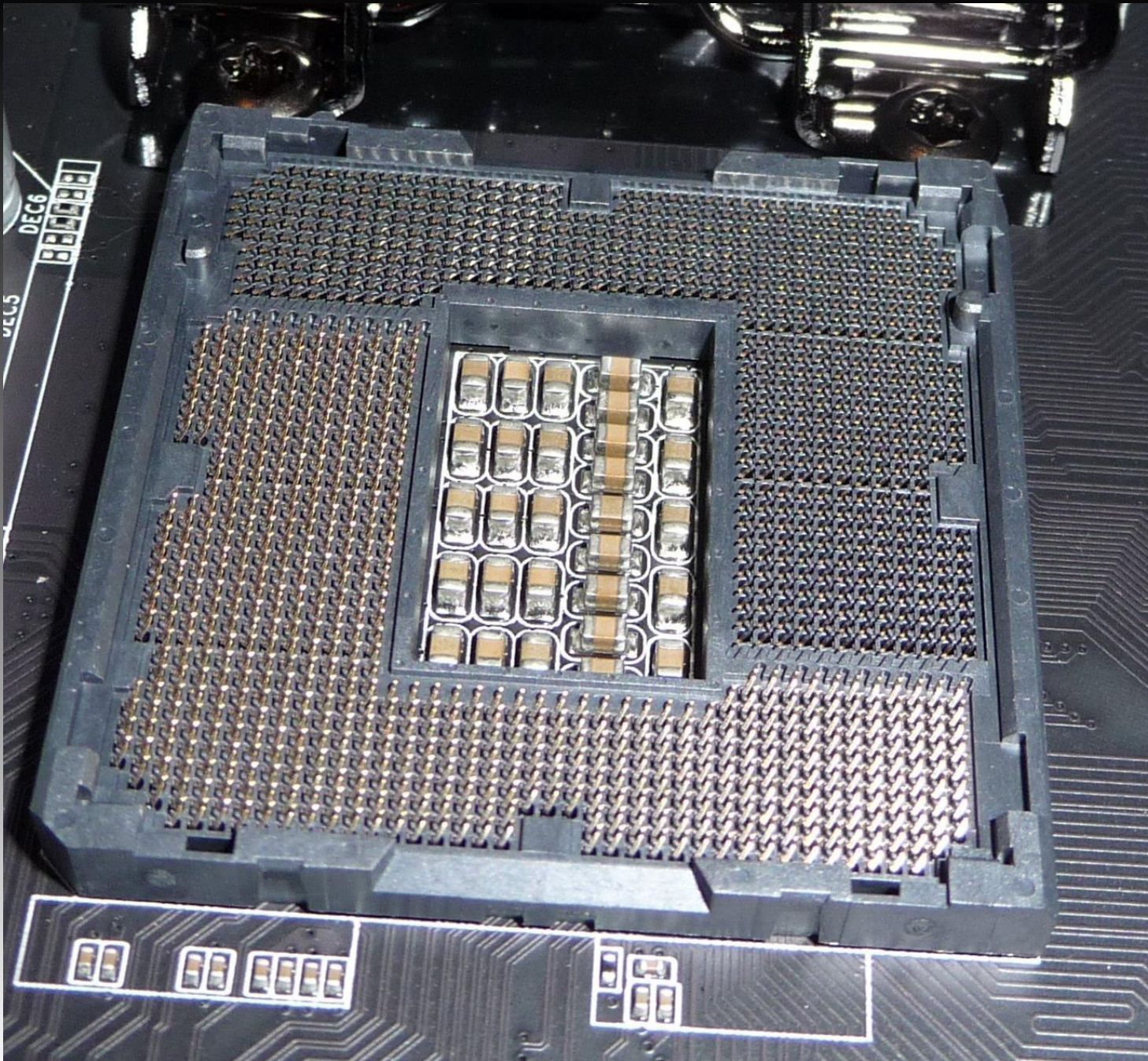
Note!

Always place this cover if the CPU is removed from socket. Please read user manual for details.

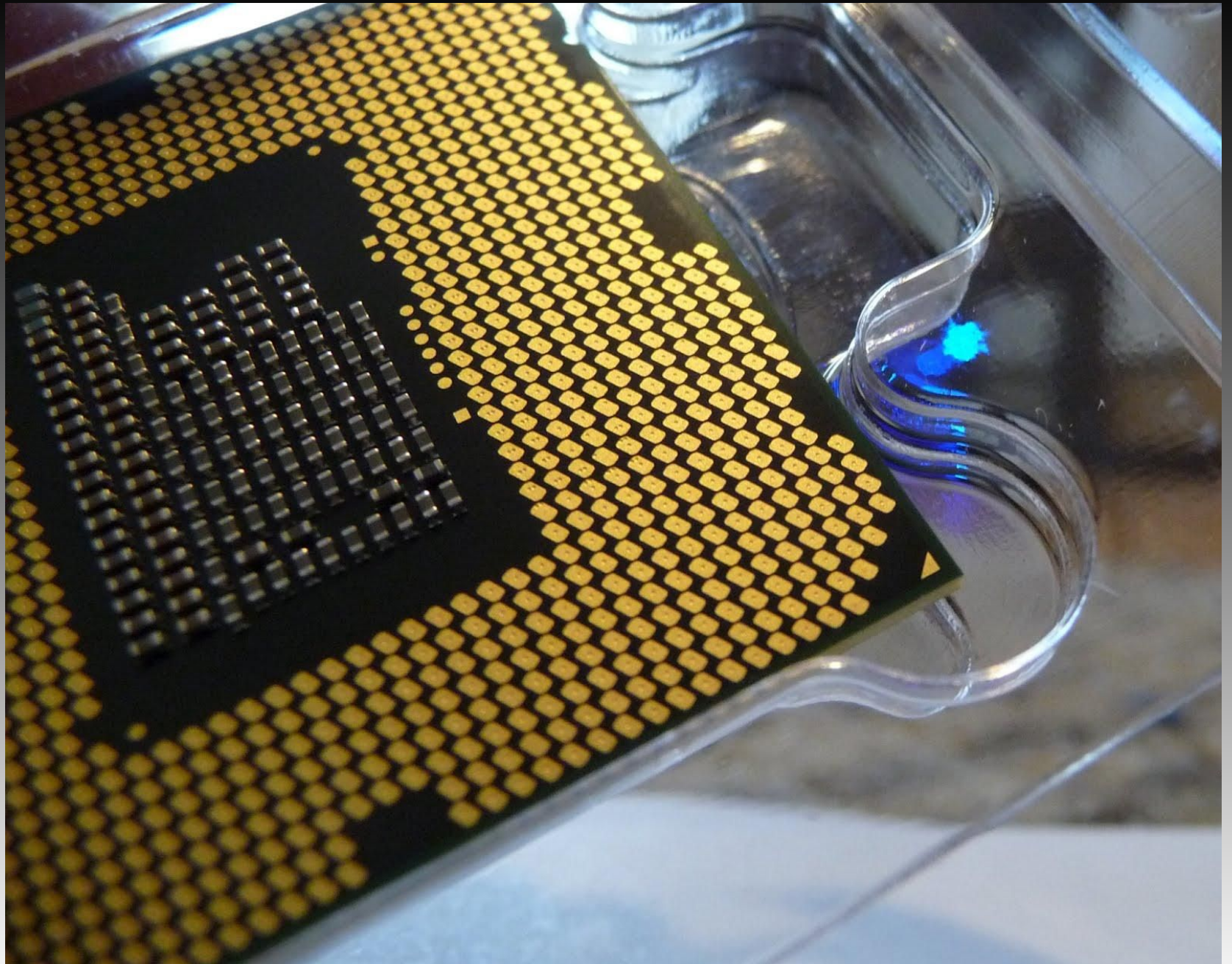
This cover **MUST** be placed when returning motherboard for after service.

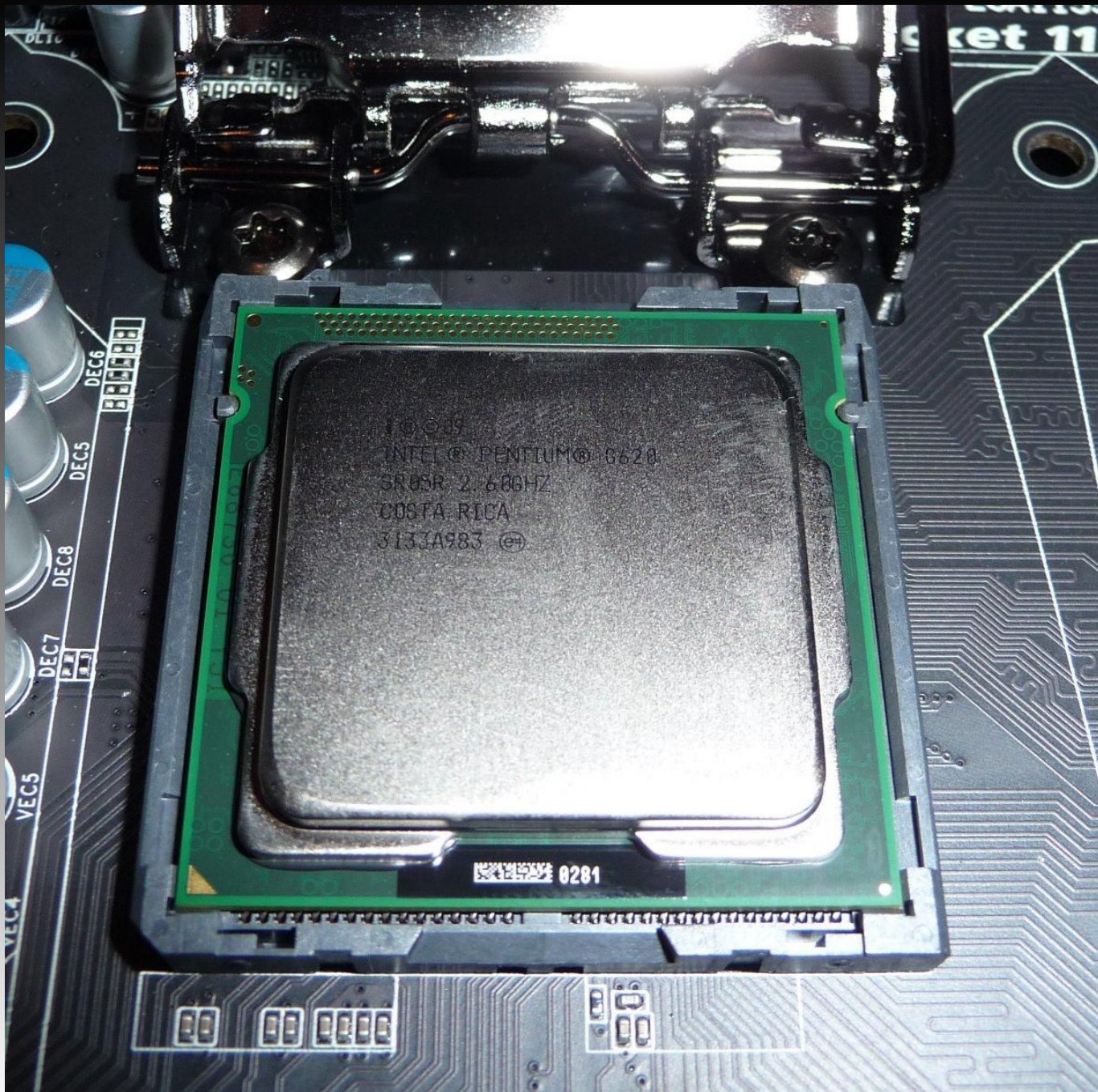
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REMOVE

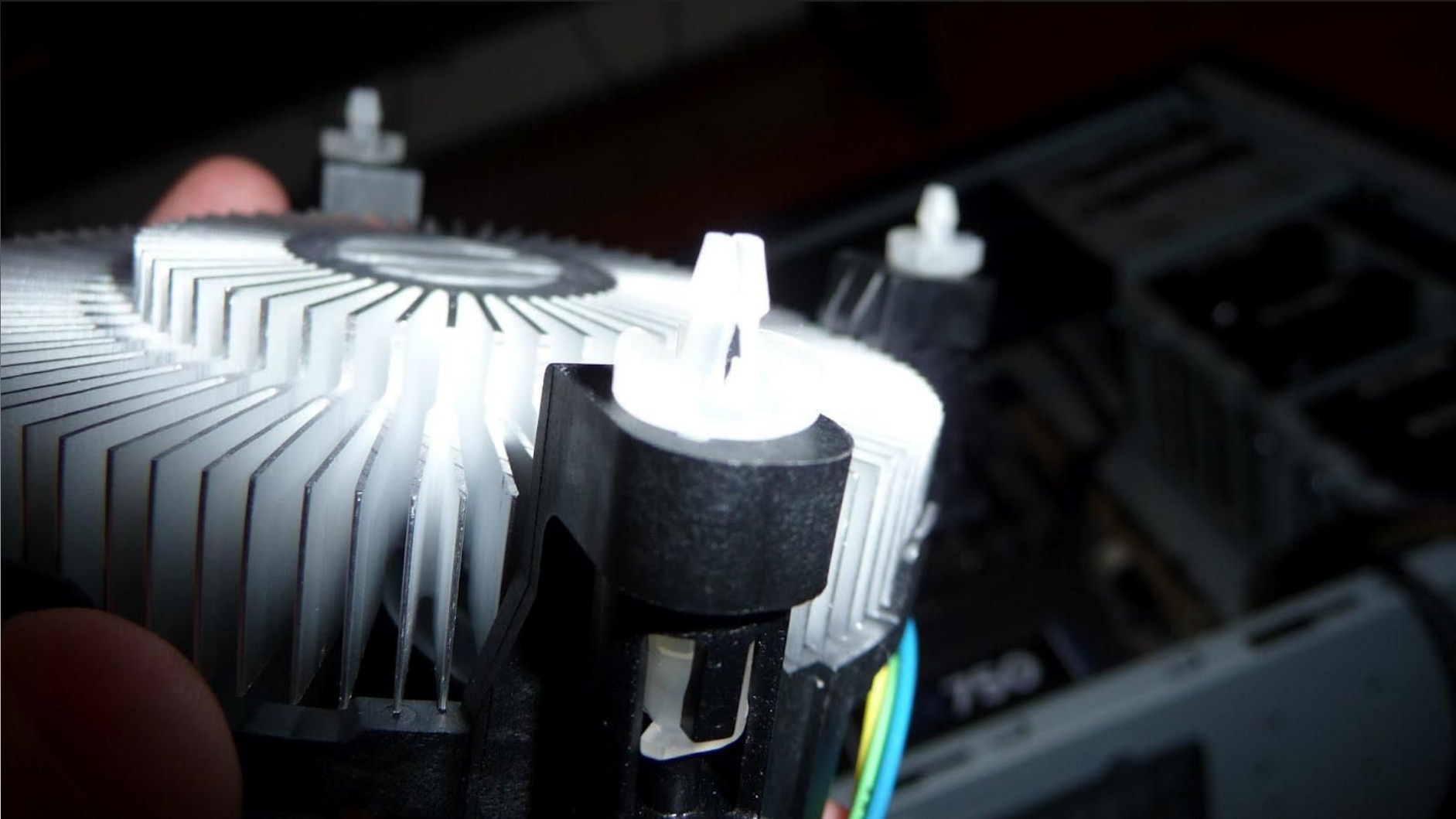


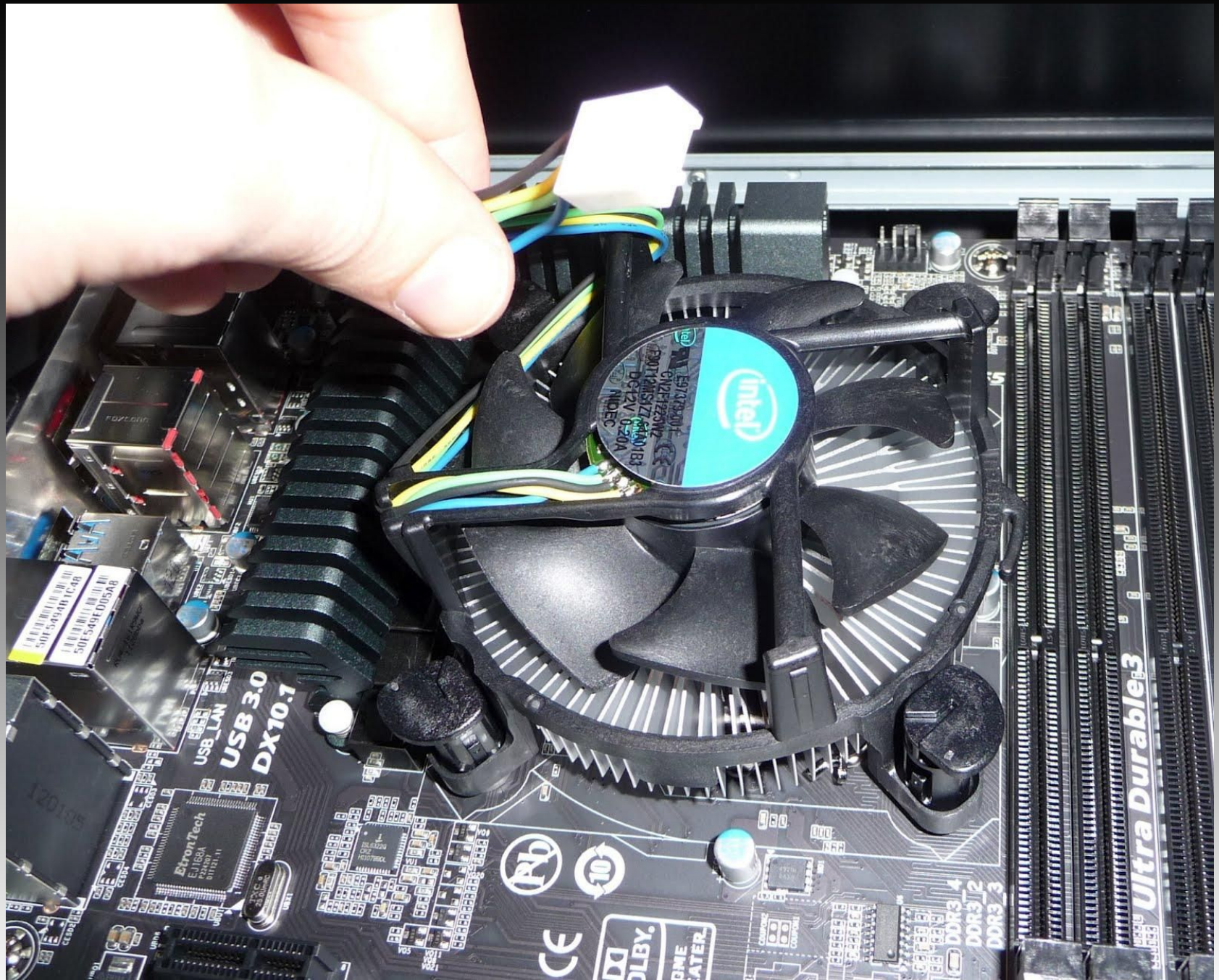












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D019 D021

D025
D024

D073
D027 D070
D016 D029

CPU FAN

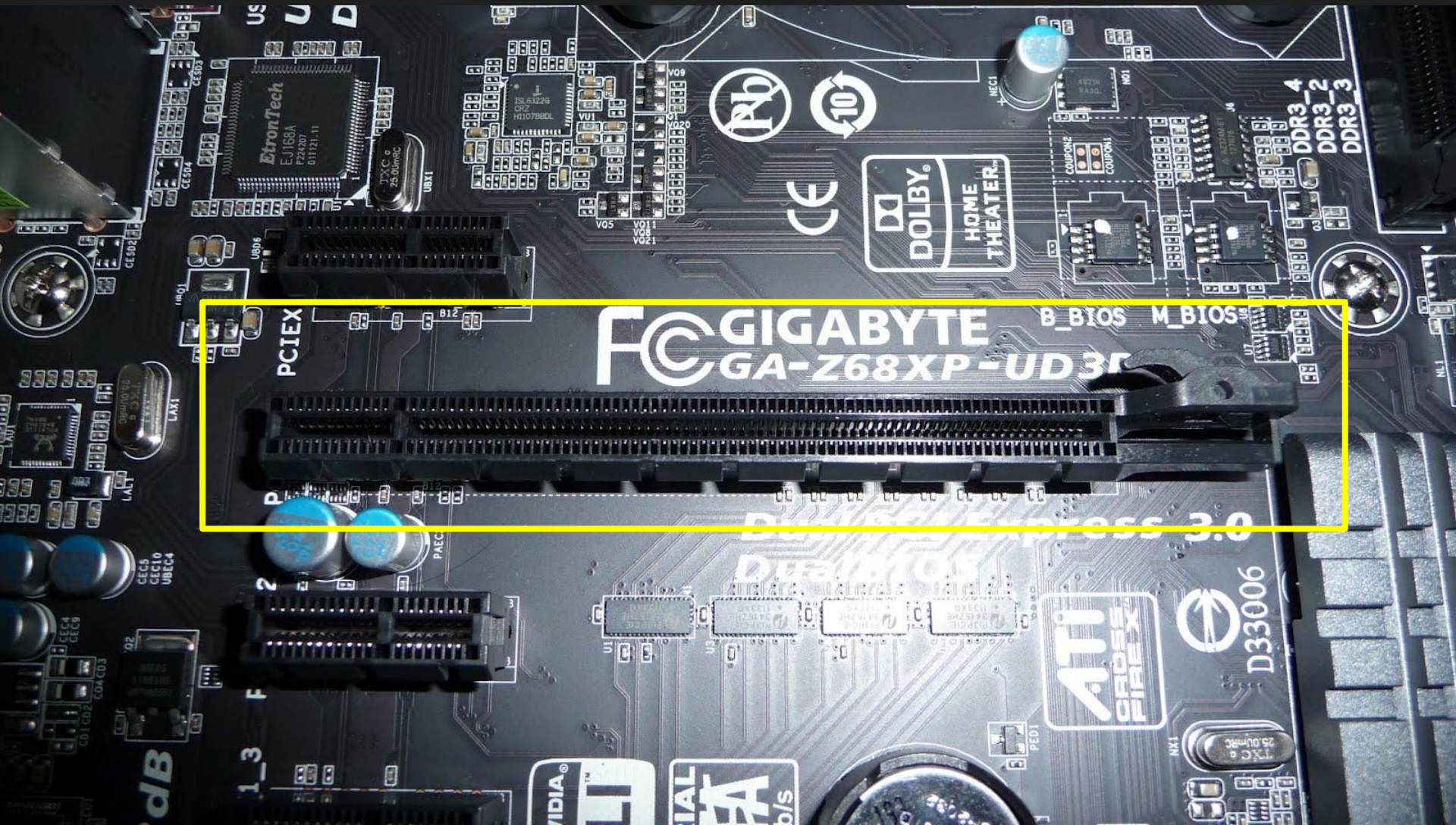
D079 D032
D080 Q01 D028
D083 D081 D039 D034 D037
D033

DU13
ISL6366
CRZ
M11103BBQ









PCIEX

GIGABYTE
GA-Z68XP-UD3

B_BIOS M_BIOS

ATI
CROSS
FIRE

D33006

EtronTech
EJ168A
P22400
011121.11

ISL63228
CRZ
H11078ECL

DOLBY
HOME
THEATER

DDR3_4
DDR3_2
DDR3_3

ATI
CROSS
FIRE

D33006

EtronTech
EJ168A
P22400
011121.11

ISL63228
CRZ
H11078ECL

DOLBY
HOME
THEATER

DDR3_4
DDR3_2
DDR3_3



EVGA

GEFORCE GT 430

Dual PCI Express 3.0
Dual BIOS

ATI
Radeon HD 4300

D33006

SLI

SERIAL
ATA
RAID



108dB

DIGI BYTE

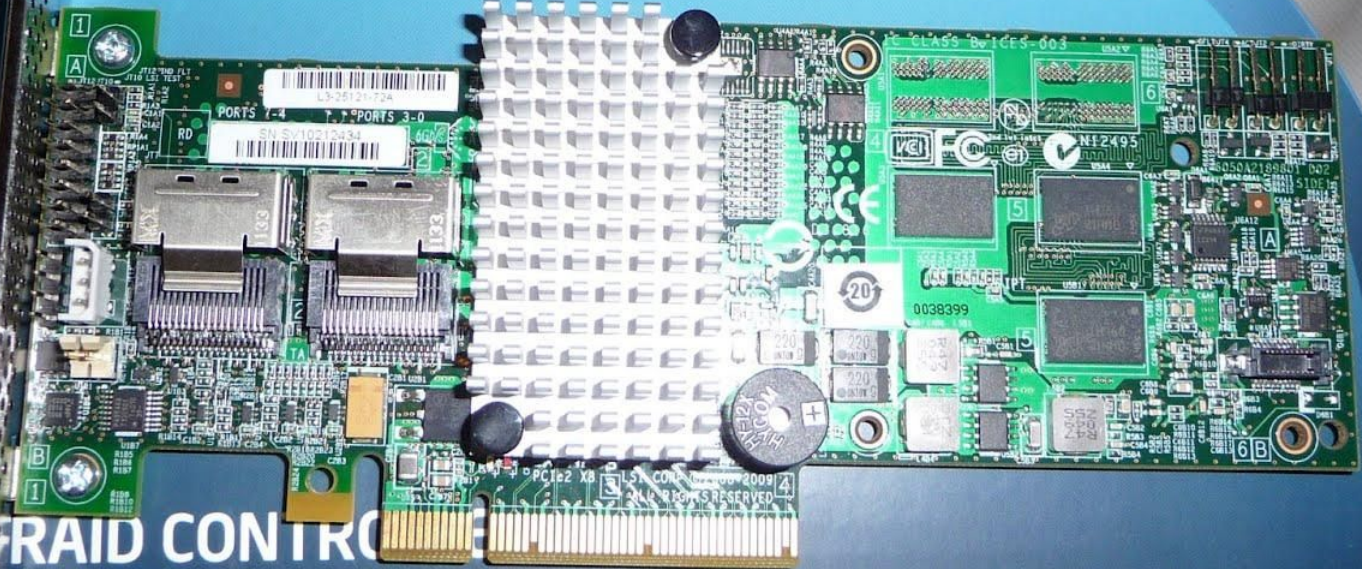


RAID CONTROLLER

- Powered by LSI MegaRAID® Technology
- Intel® RAID Software
- Three Year Limited Warranty

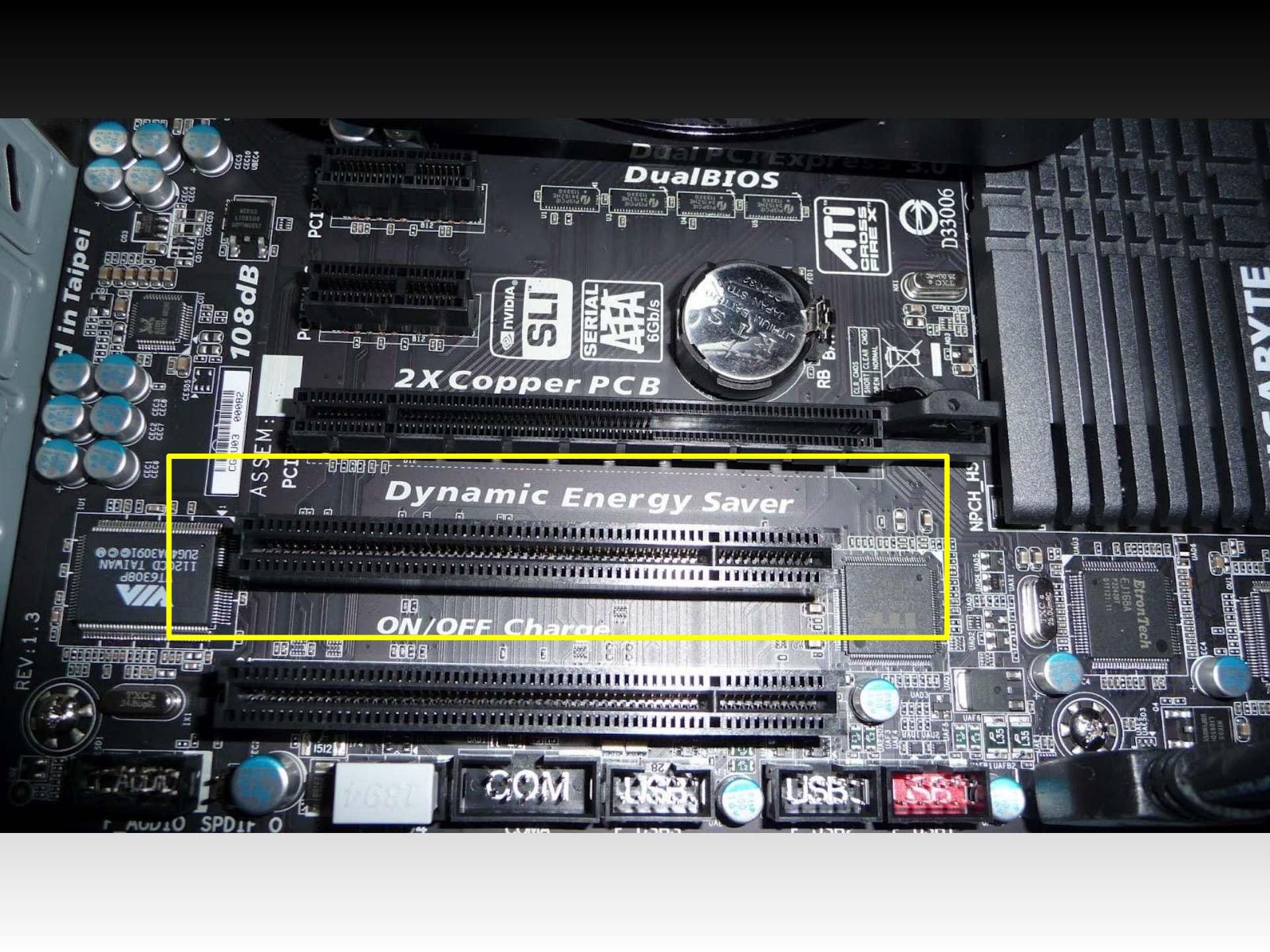
3YR LIMITED WARRANTY
SEE WWW.INTEL.COM FOR ENCLOSED ESD MANUAL

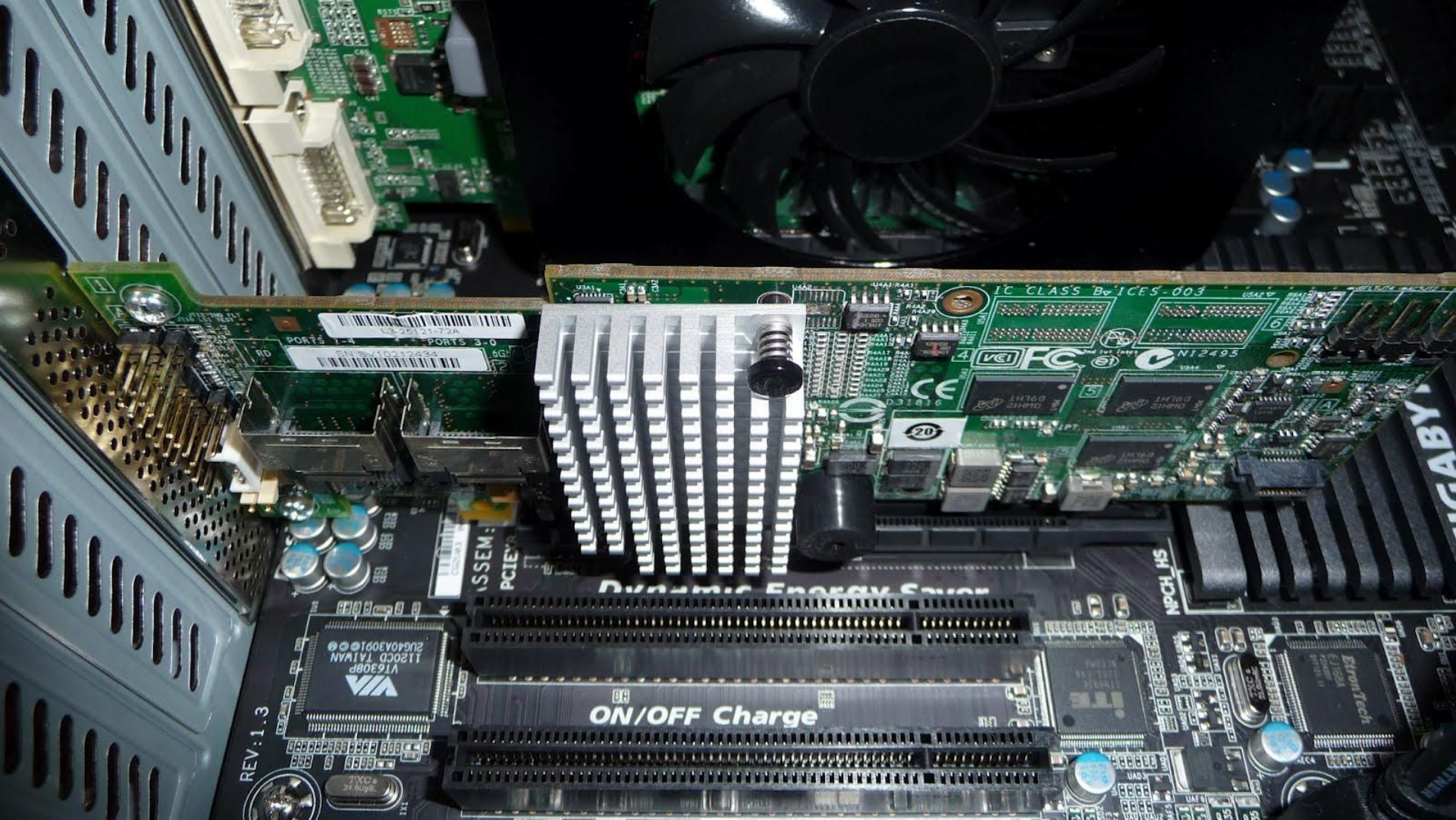
GREAT PERFORMING STARTS WITH
INTEL IN



RAID CONTROLLER

ENHANCED DATA PROTECTION, INCREASED SERVER PERFORMANCE,
AND OUTSTANDING AVAILABILITY





PORTS 1-4 PORTS 3-0
L3-Z51-21-72A
2115V10212434
6Gb/s

IC CLASS B ICES-003
VCCI FC
N12495
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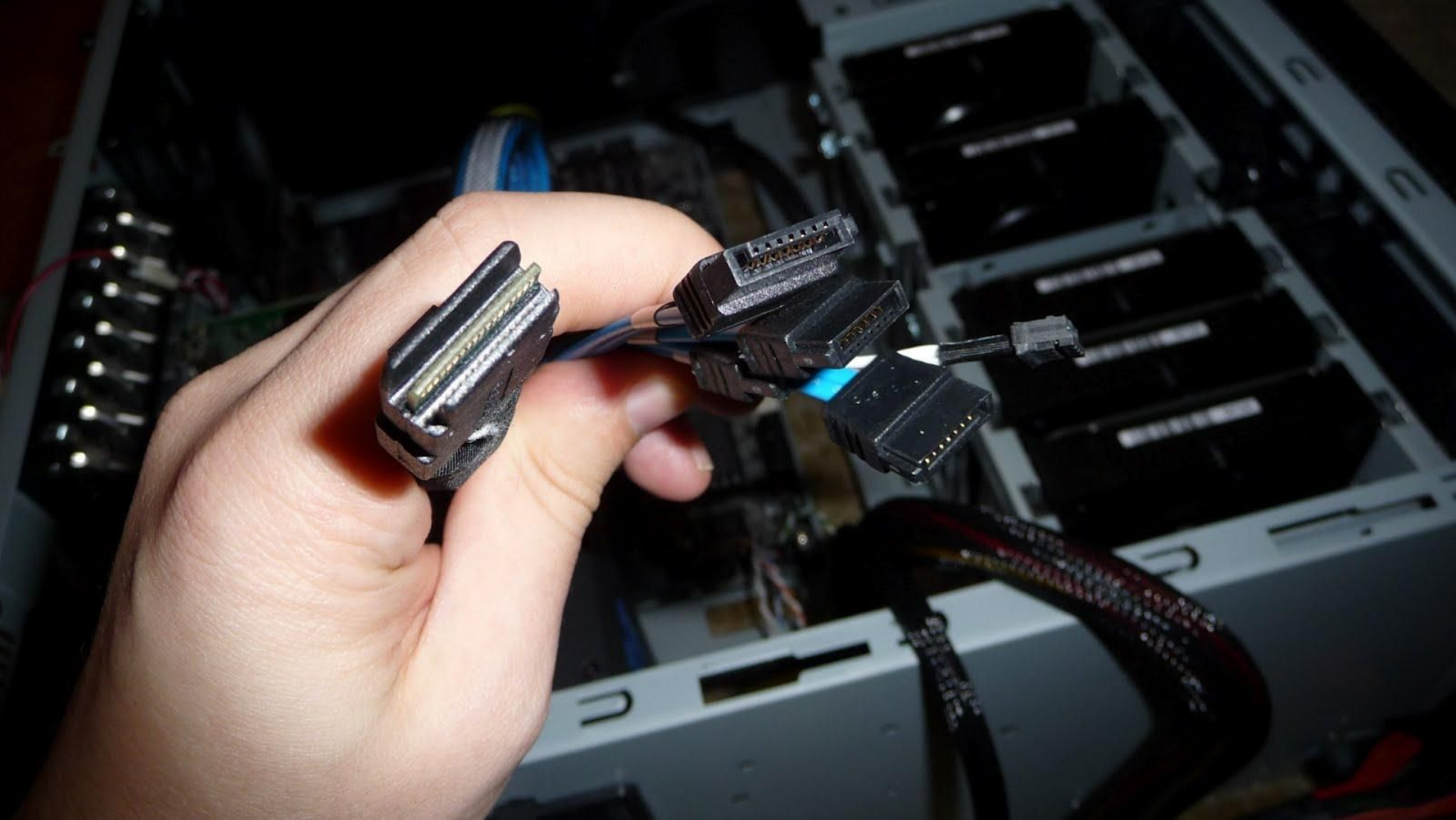
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2UG40A3091

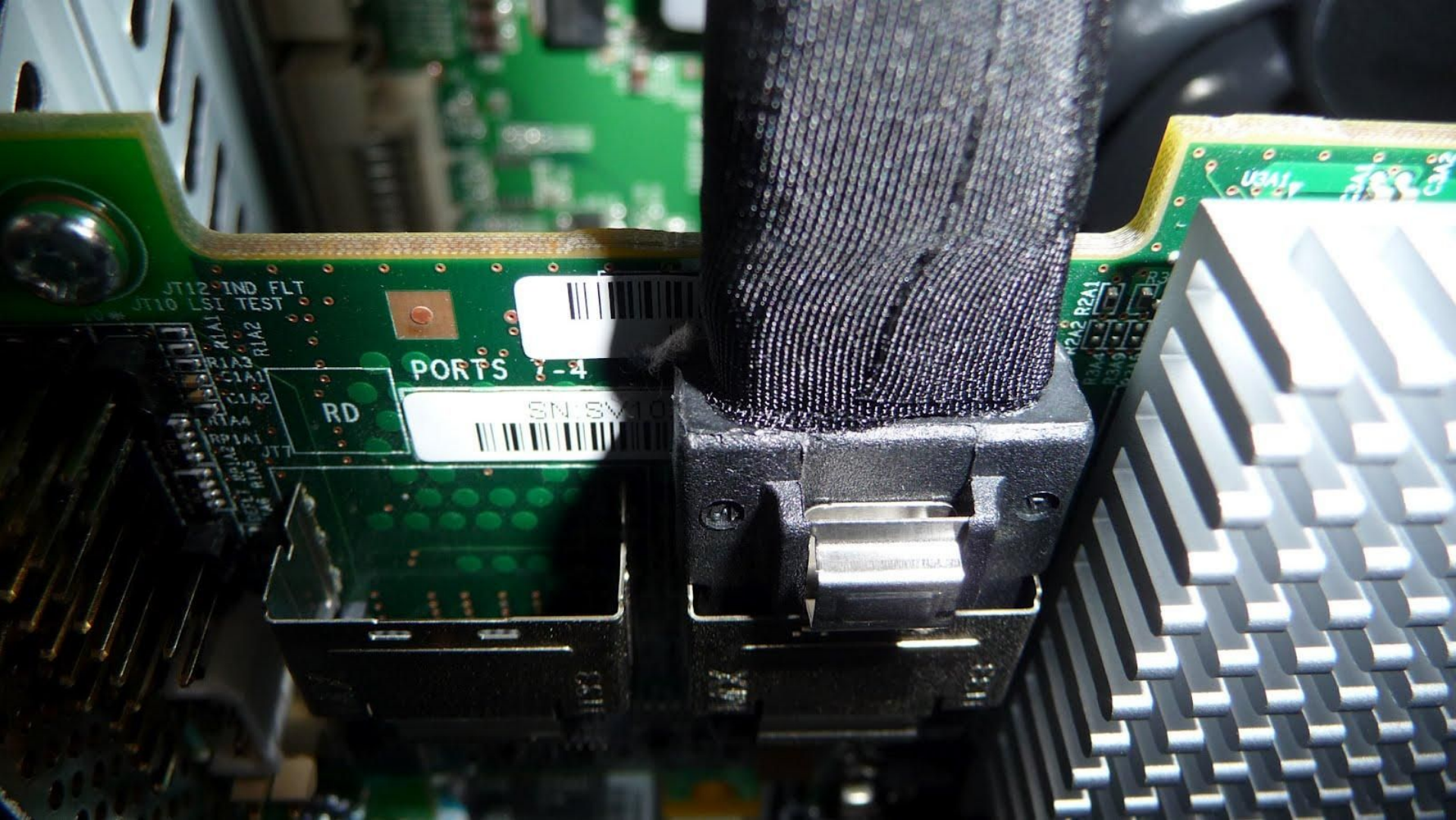
PCIE

ON/OFF Charge

NOCH_HS

EatonTech
Eaton
Eaton





JT12 IND FLT
JT10 LSI TEST

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PORTS 7-4

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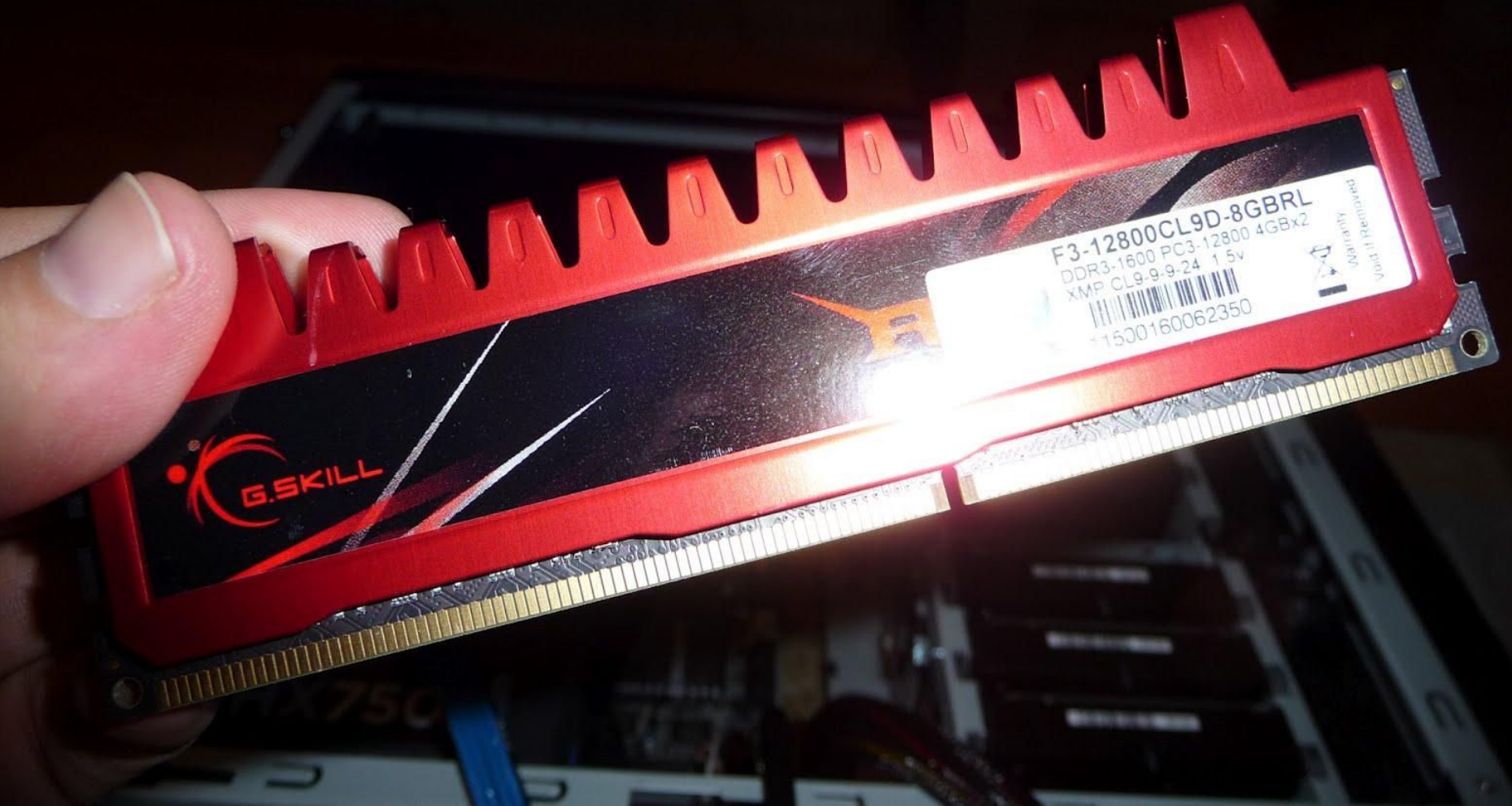
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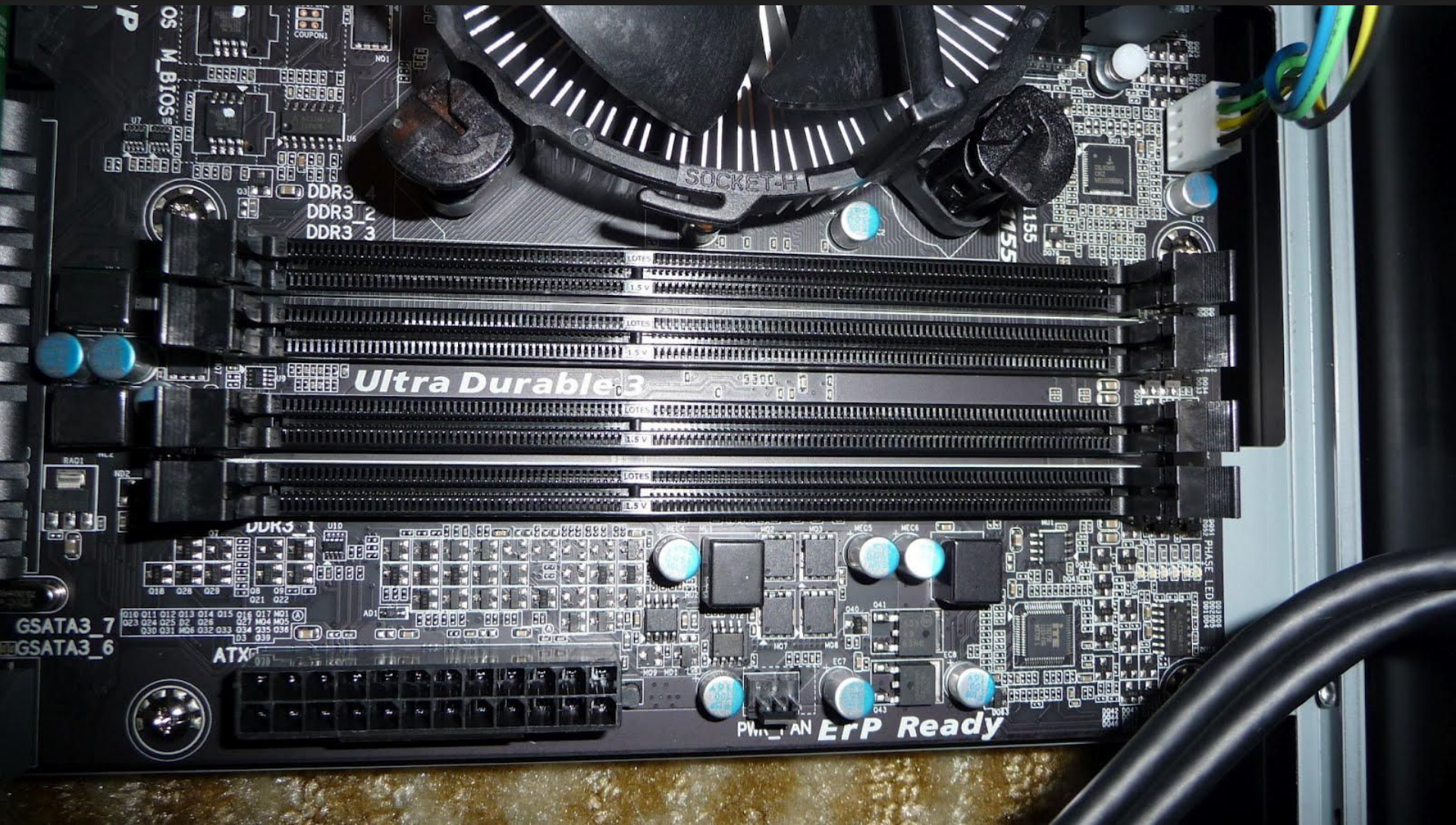
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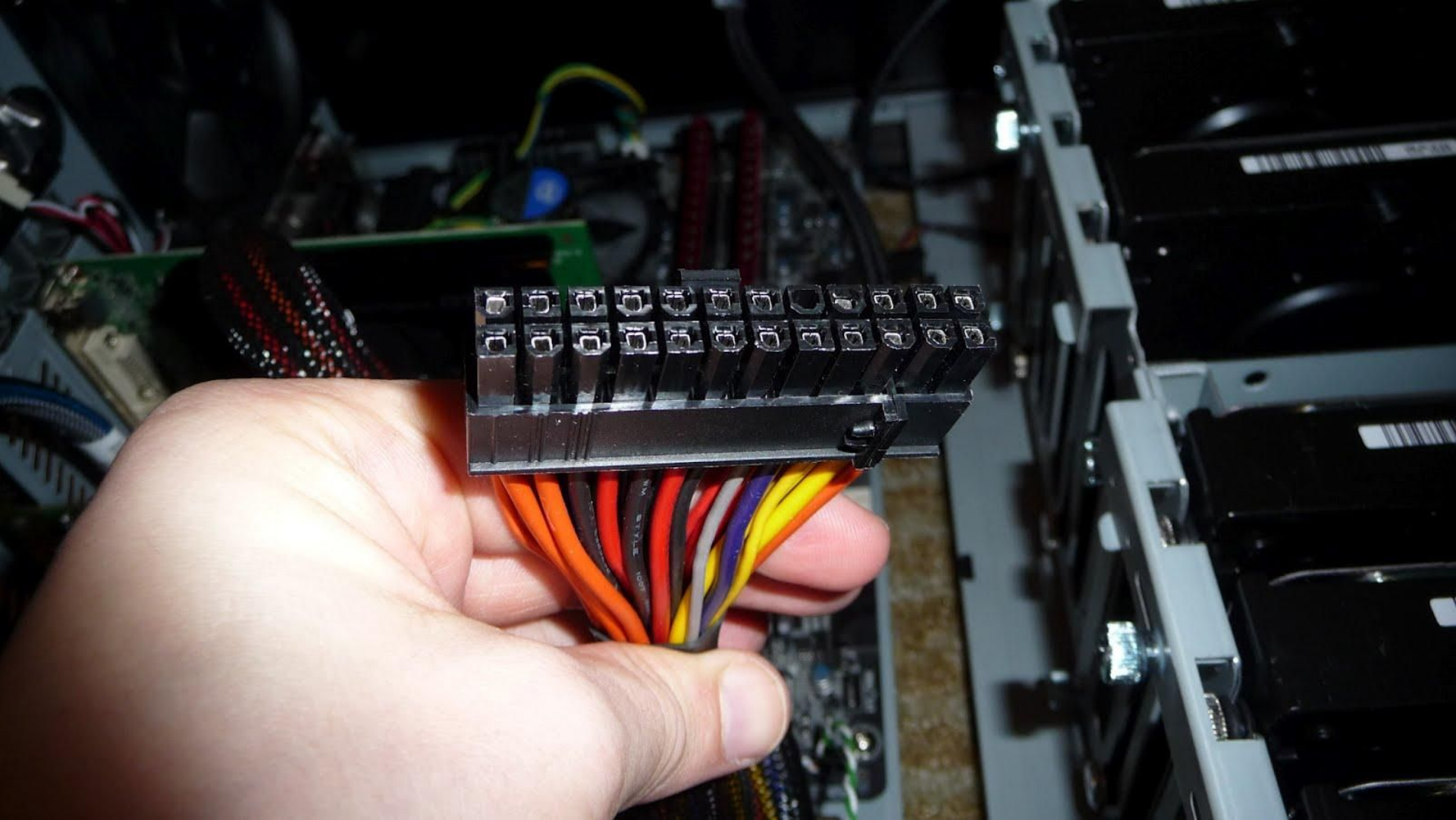
Ultra Durable 3

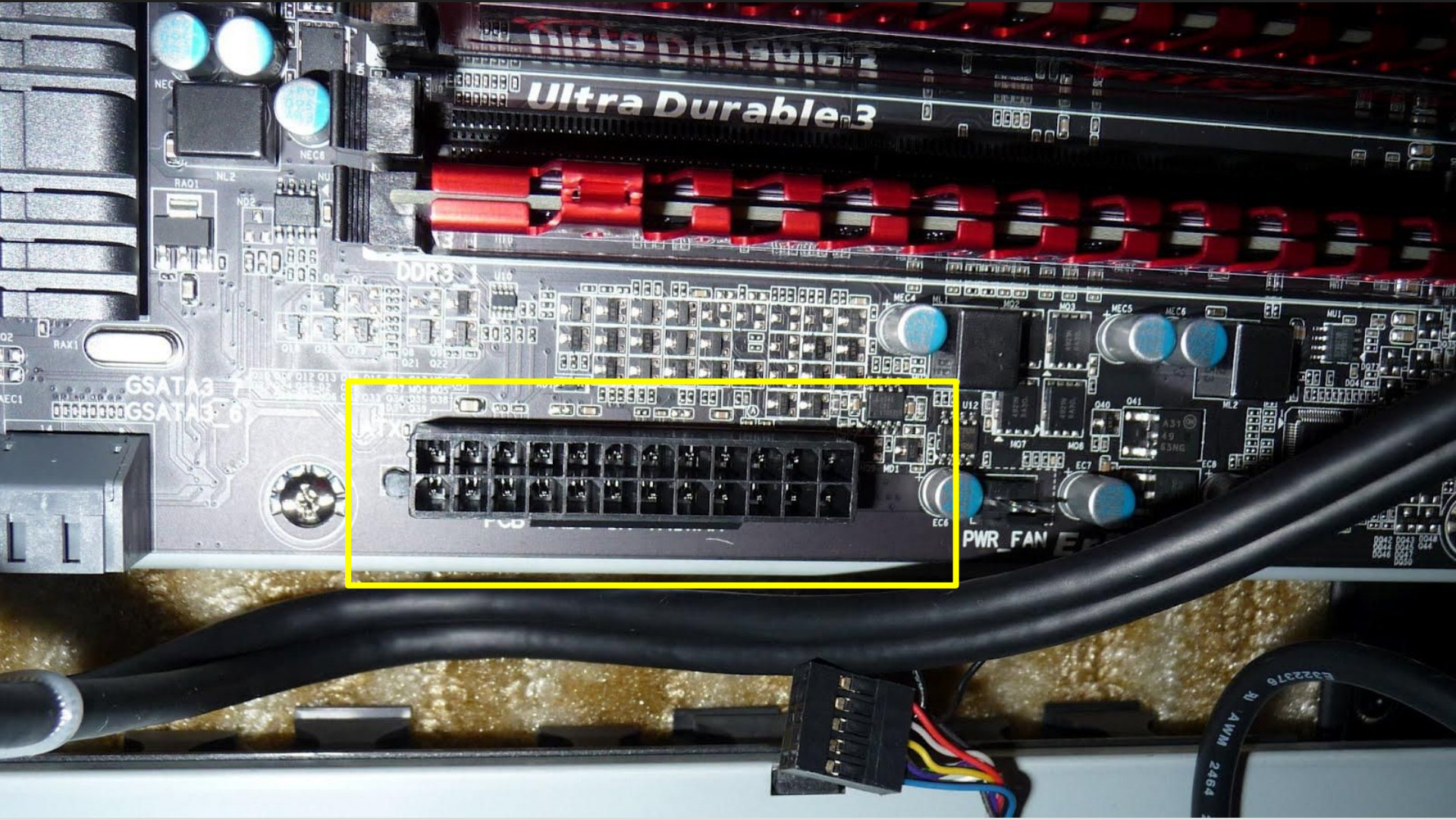
DDR3_1

GSATA3_7
GSATA3_6

ATX

PW_ON AN ERP Ready





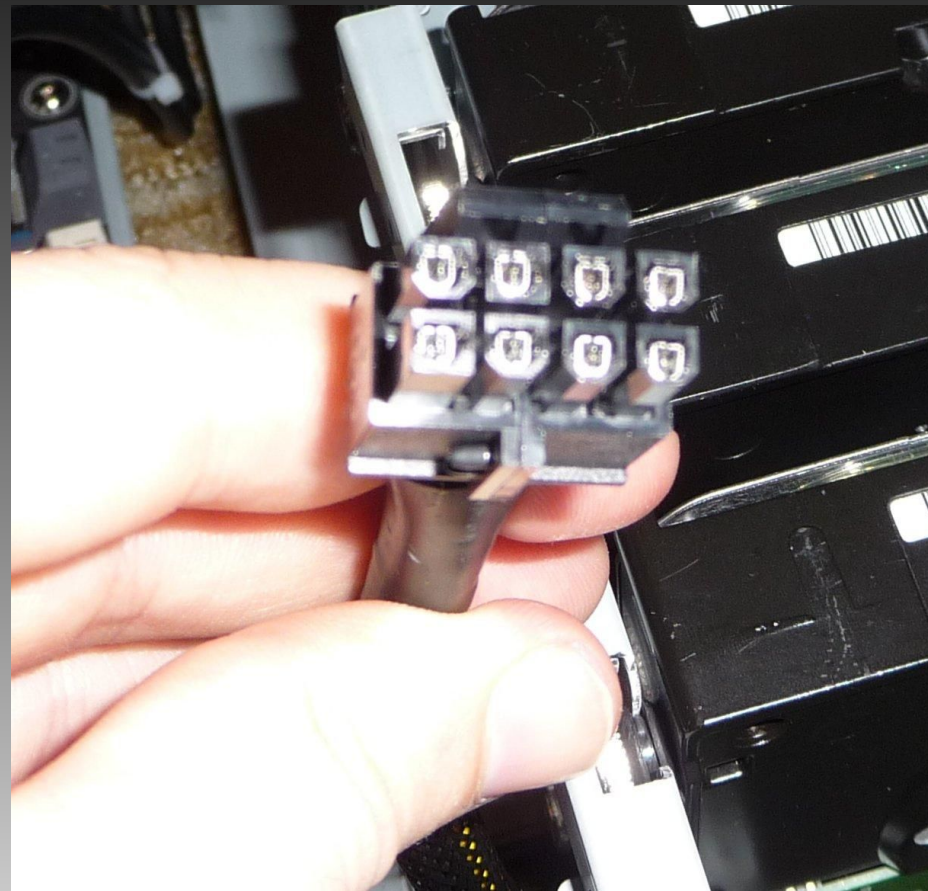
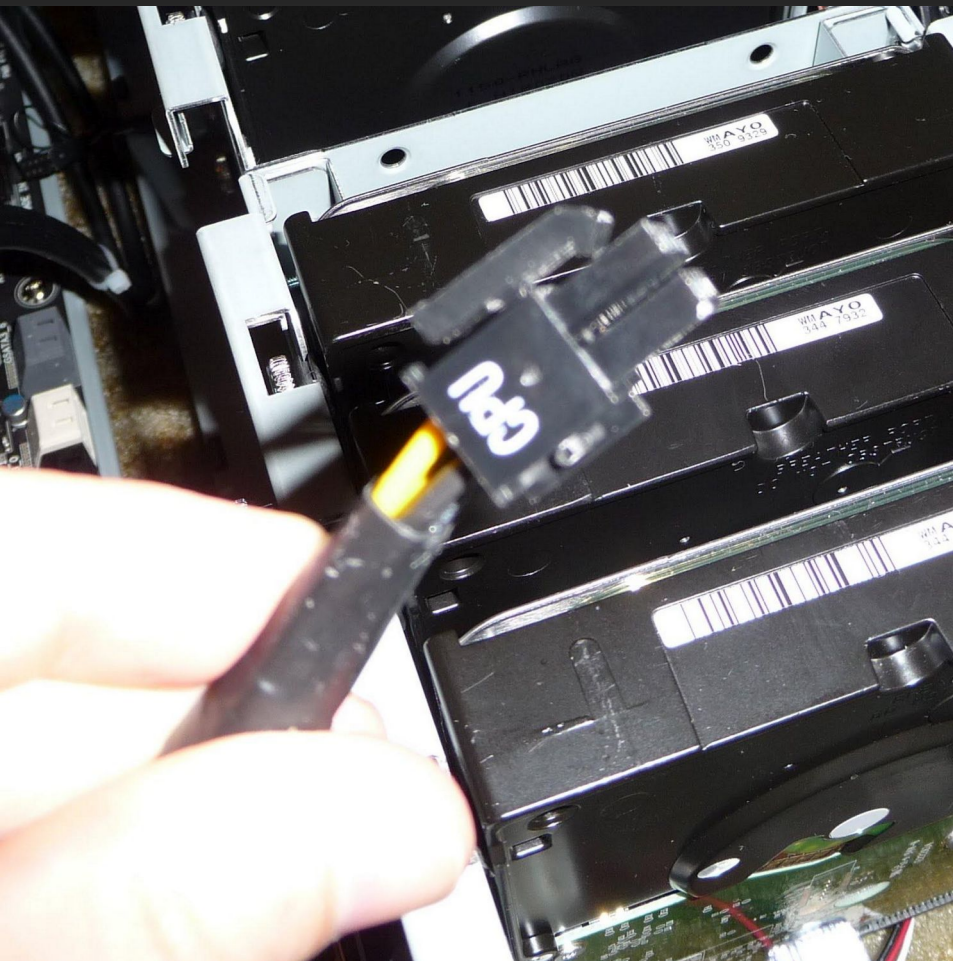
Ultra Durable 3

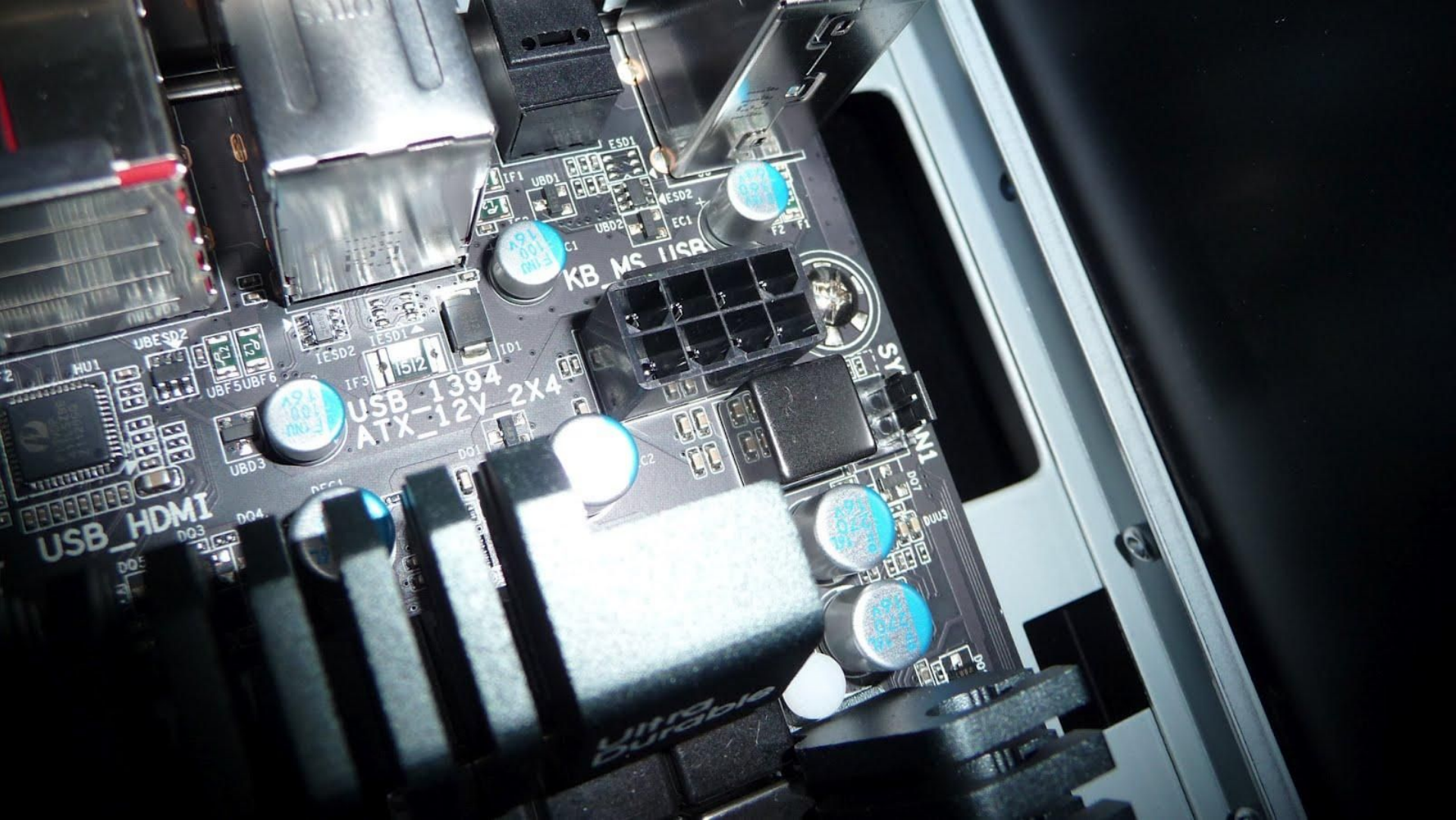
GSATA3
GSATA3-6

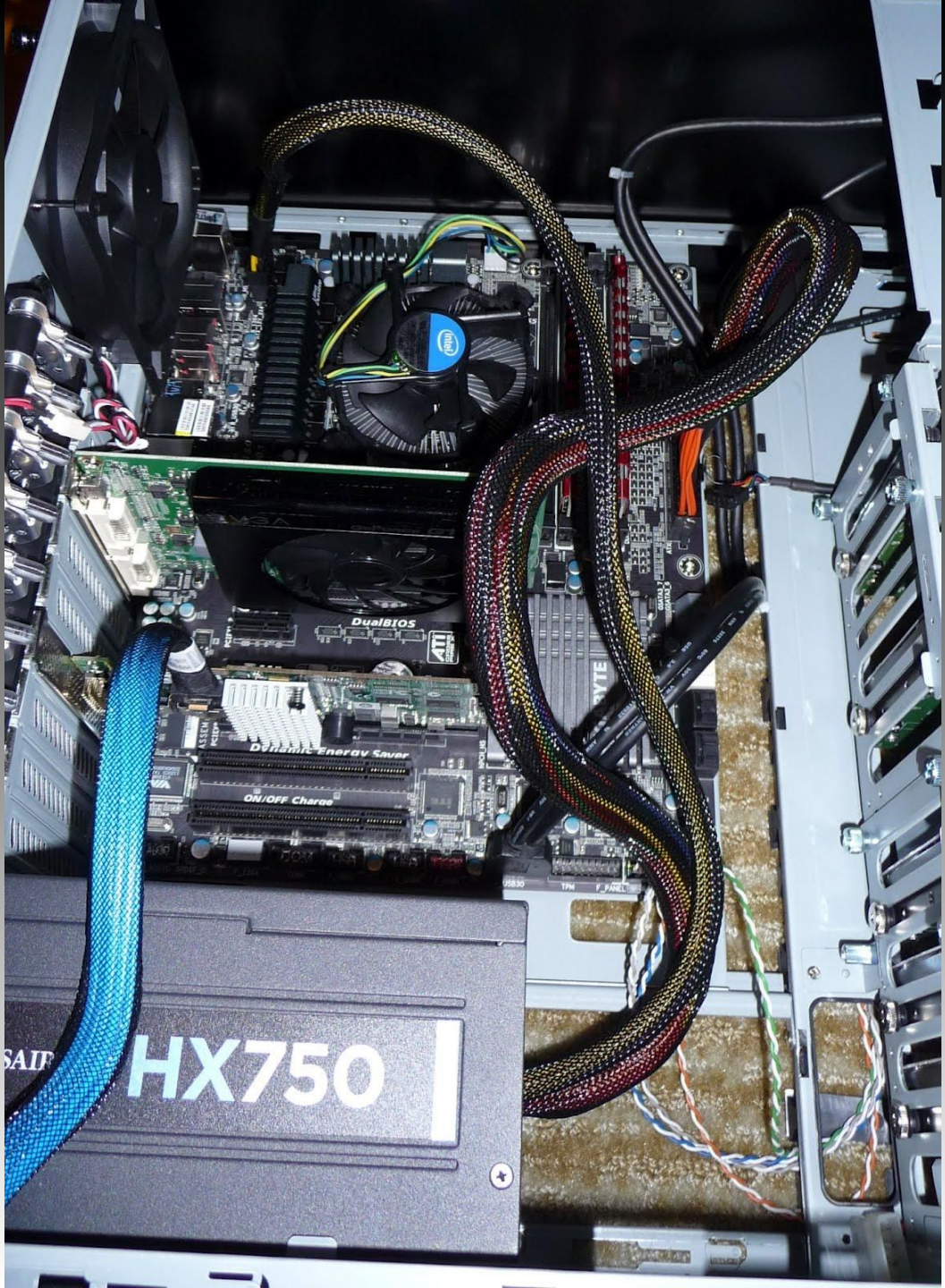
DDR3

PWR_FAN

6922376
BU AWM 2464





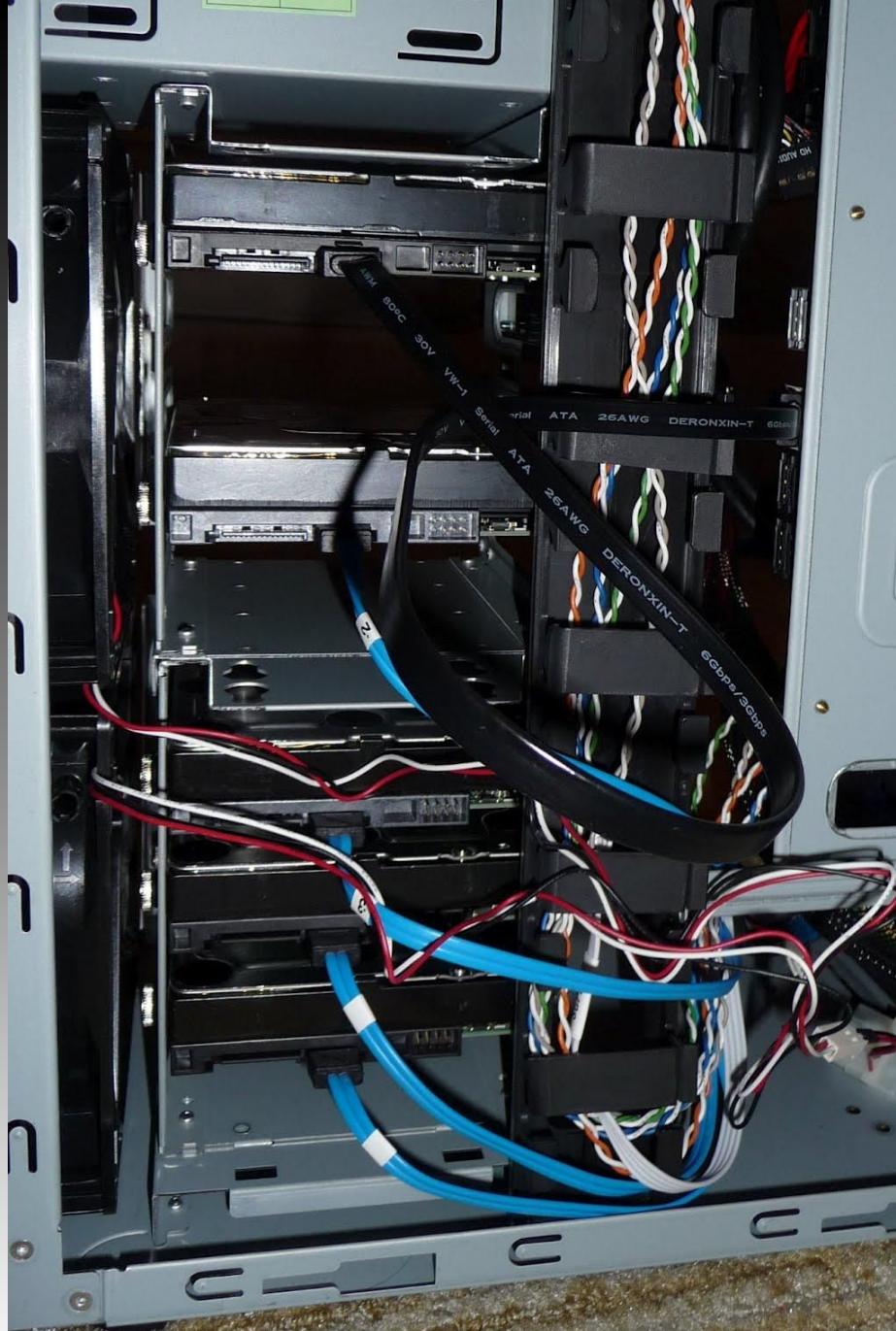






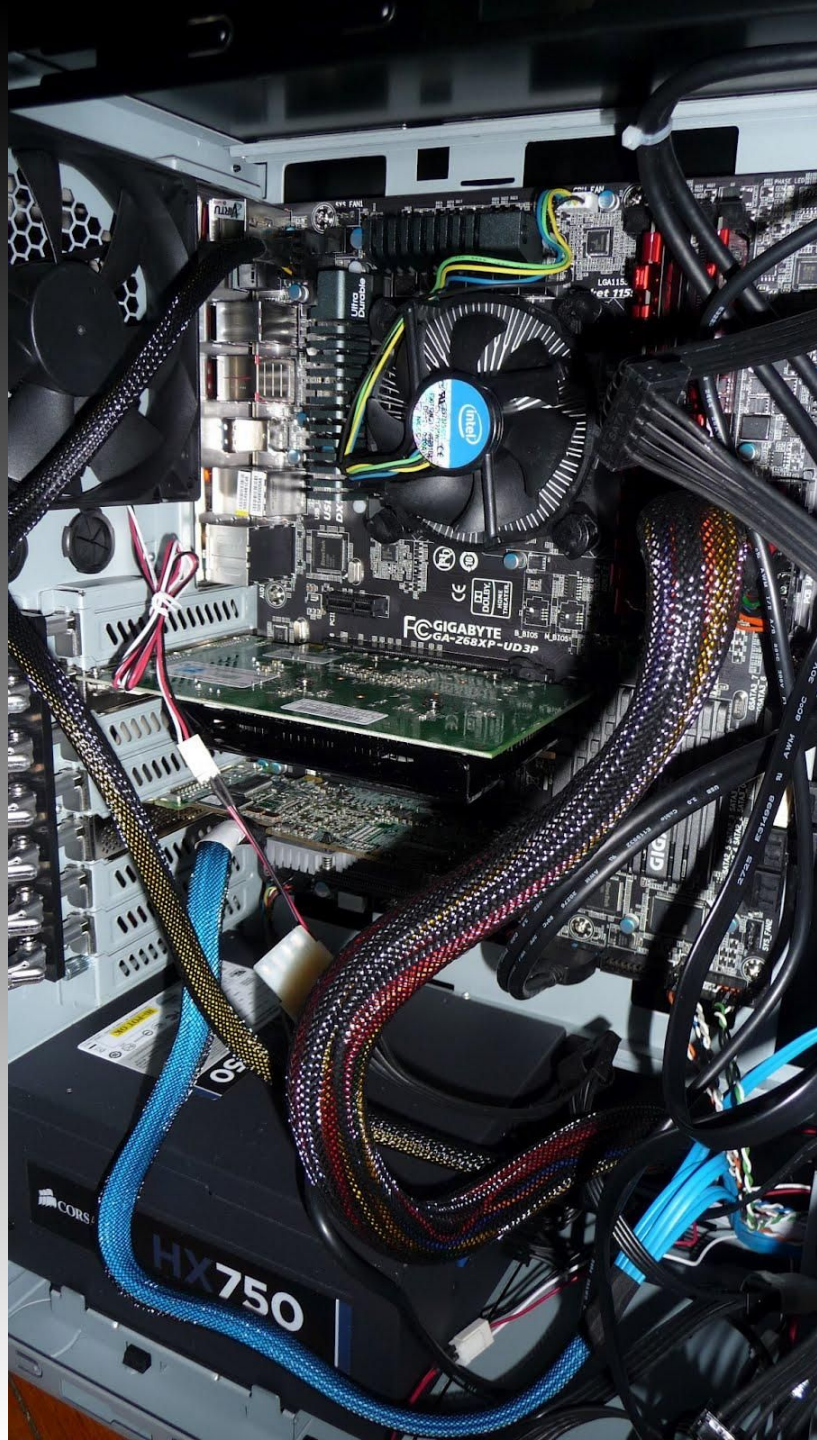








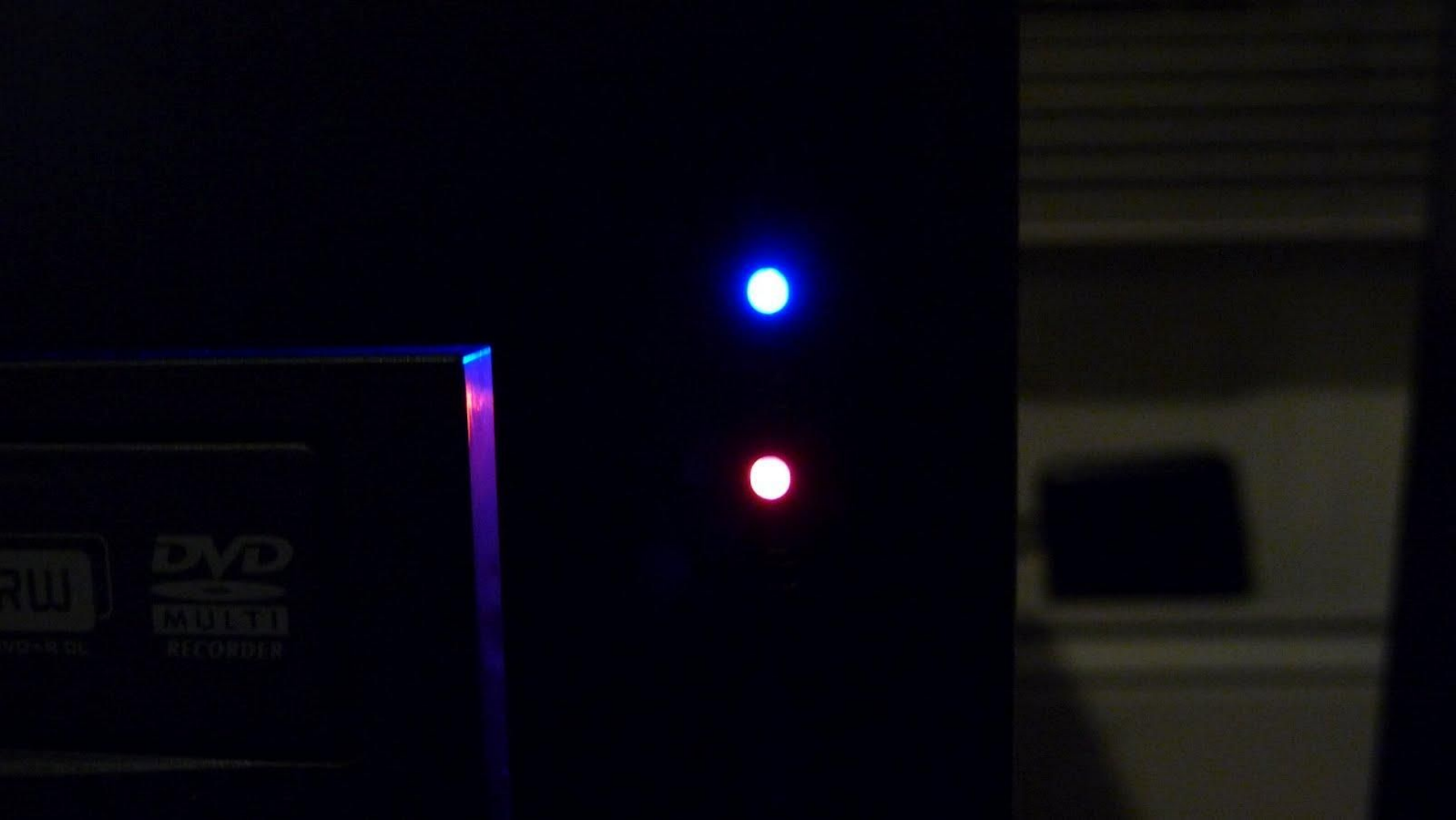








Lights = Success!



Success = Beer!



Common Problems:

- Doesn't turn on
- No video
- Various tones from the Mother Board
- Reboot loop

Common Problems:

- Doesn't turn on

Double check jumpers, make sure motherboard has power.

- No video

Check CPU supplement power, RAM.

- Various beep tones from the Mother Board

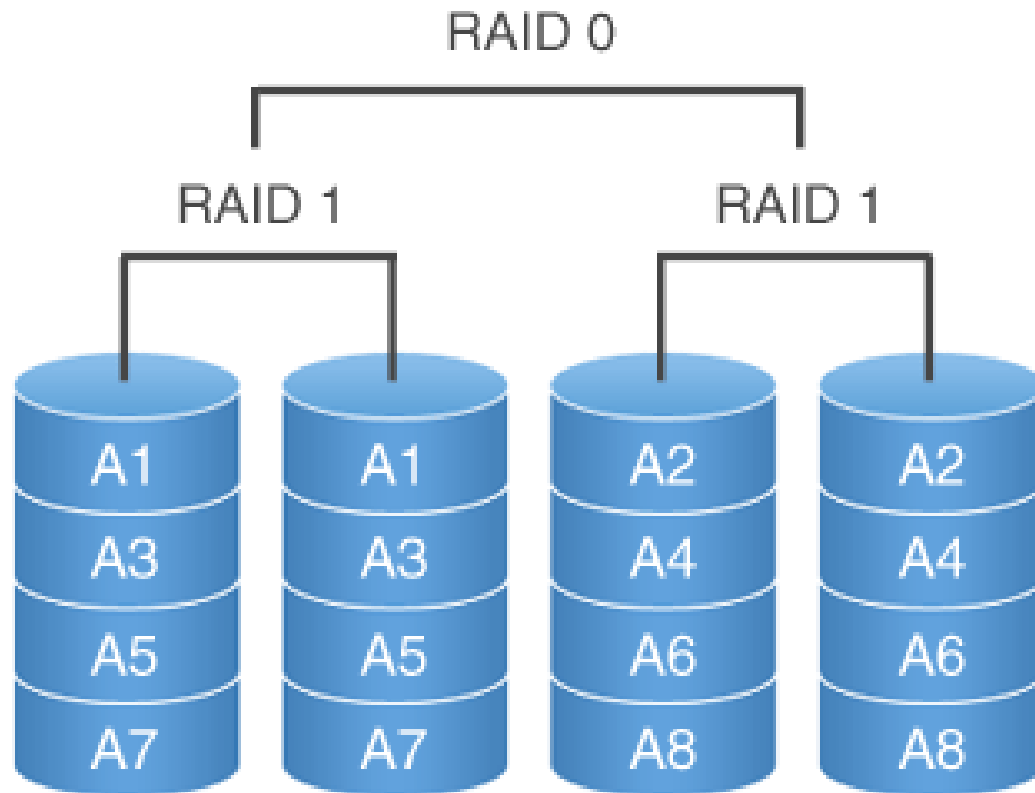
Potentially bad CPU/RAM

- Reboot loop

Not enough power, faulty CPU, overheating.

Disk setup

RAID 10



What we will need to configure

ZFS - Storage pools,
snapshots

NFS - Performance, supported
across OS's



First up, ZFS

Create a zpool

```
# zpool create pool1 da1
```

Turn off compression

```
# zfs set compression=off pool1
```

Turn off atime

```
# zfs set atime=off pool1
```

Edit /etc/rc.conf

```
zfs_enable="YES"
```

NFS pt. 1

Edit /etc/rc.conf

```
nfs_server_enable="YES"  
rpcbind_enable="YES"  
mountd_enable="YES"  
mountd_flags="-r"
```

Set permissions on your shared directory

```
# chmod 775 /pool1  
# chown root:staff /pool1
```


NFS pt. 2

Edit /etc/exports

```
/pool1 -alldirs -network 192.168.1.0 -mask 255.255.255.0
```

Start rpcbind

```
# /etc/rc.d/rpcbind start
```

Start nfsd

```
# /etc/rc.d/nfsd start
```

Start mountd

```
# /etc/rc.d/mountd start
```

Troubleshooting NFS

On a client host:

```
$ showmount -e 192.168.1.102
```

```
Export list for 192.168.1.102:
```

```
/pool1 192.168.1.0
```

Any change to `/etc/exports` must be reloaded

```
# /etc/rc.d/mountd reload
```




That's all Folks!