ethtool NIC settings and stats

START HERE

`ethtool <iface>`
Link, speed, duplex

`ethtool -g <iface>`
Ring buffer sizes

`ethtool -i <iface>`
Driver and firmware

`ethtool -p <iface> 10`
Blink the port LED

`ethtool -S <iface>`
NIC counters

`ethtool -m <iface>`
SFP module info

`ethtool -k <iface>`
Offload features

`sudo ethtool -s <iface> autoneg on`
Change link settings

Kernel stack TCP/IP, offloads → `rings` → **Driver** ethtool -i → `DMA` → **NIC** ethtool -S → `PHY` → **Cable / module** ethtool, -m

CONCEPTS

> Lowercase letters show settings, uppercase letters change them: -k shows offloads, -K sets them.

> Settings changed with ethtool live in the driver and are lost on reboot or driver reload; persist them via NetworkManager, udev or systemd-networkd.

> Not every driver supports every option. 'Operation not supported' means the driver, not your syntax.

LINK

`ethtool <iface>`
Show link, speed, duplex
Look at 'Link detected' first; 'Speed' and 'Duplex' show the negotiated values.

`ethtool -s <iface> speed <mbps> duplex full autoneg off`
Force speed and duplex
Both ends must match, or you get a duplex mismatch. Prefer autoneg on.

`ethtool -s <iface> autoneg on`
Enable autonegotiation

`ethtool -s <iface> advertise <hexmask>`
Limit advertised modes
Mask of modes from 'Supported link modes'; e.g. 0x008 is 100baseT/Full.

`ethtool -r <iface>`
Restart autonegotiation

`ethtool -P <iface>`
Show permanent MAC address

`ethtool -a <iface>`
Show pause (flow control)

`ethtool -A <iface> rx off tx off`
Set pause parameters

`ethtool --show-eee <iface>`
Show Energy-Efficient Ethernet

`ethtool --set-eee <iface> eee off`
Turn EEE off
A known cure for flapping links on some NICs.

`ethtool --show-fec <iface>`
Show forward error correction

DRIVER & STATS

`ethtool -i <iface>`
Driver, version, bus address
Shows firmware-version and bus-info too; handy for bug reports.

`ethtool -S <iface>`
Per-NIC statistics
Names vary by driver. Pipe through grep -E 'err|drop|miss'.

`ethtool -S <iface> --all-groups`
Standard MAC/PHY stats

`ethtool --phy-statistics <iface>`
PHY statistics

`ethtool -t <iface> online`
Run a self-test
offline is a full test and can interrupt traffic.

`ethtool -d <iface>`
Dump registers

`ethtool -e <iface>`
Dump EEPROM

`ethtool --cable-test <iface>`
Test the cable
Needs PHY and driver support; the link drops during the test.

`ethtool --json <iface>`
Machine-readable output
Works only for some options.

OFFLOADS

`ethtool -k <iface>`
Show offload features
[fixed] means the feature cannot be changed.

`ethtool -K <iface> gro off`
Toggle GRO

`ethtool -K <iface> tso off gso off`
Toggle TSO and GSO
Disable while debugging captures with oversized packets.

`ethtool -K <iface> rx on tx on`
Toggle checksum offload

`ethtool -K <iface> lro off`
Toggle LRO
Turn it off on routers and bridges; it breaks forwarding.

`ethtool -K <iface> sg off`
Toggle scatter-gather

`ethtool -K <iface> rxvlan off`
Toggle VLAN tag offload

OFFLOADS (cont.)

`ethtool -K <iface> rxhash on`
Toggle RX hashing

`ethtool --show-priv-flags <iface>`
Driver private flags

QUEUES & RINGS

`ethtool -g <iface>`
Show ring buffer sizes
Compare 'Pre-set maximums' with 'Current hardware settings'.

`ethtool -G <iface> rx 4096 tx 4096`
Set ring buffer sizes
Larger rings absorb bursts and cut drops, at the cost of latency.

`ethtool -l <iface>`
Show channel (queue) counts

`ethtool -L <iface> combined <n>`
Set channel count

`ethtool -c <iface>`
Show interrupt coalescing

`ethtool -C <iface> rx-usecs <n>`
Set interrupt coalescing

`ethtool -x <iface>`
Show RSS table and hash key

`ethtool -X <iface> equal <n>`
Spread RSS over n queues

`ethtool -n <iface>`
Show flow classification rules

IDENTIFY & WAKE

`ethtool -p <iface> <secs>`
Blink the port LED
Find the right cable in a rack; stops after the seconds given.

`ethtool <iface> | grep Wake-on`
Show Wake-on-LAN state
g = wake on magic packet, d = disabled.

`sudo ethtool -s <iface> wol g`
Enable Wake-on-LAN
Many NICs reset this on boot; re-apply from a unit or NetworkManager.

`sudo ethtool -s <iface> wol d`
Disable Wake-on-LAN

IDENTIFY & WAKE (cont.)

`ethtool -s <iface> wol pumbg`
Combine wake triggers
p PHY, u unicast, m multicast, b broadcast, g magic packet.

`ethtool -s <iface> sopass <mac>`
Set SecureOn password
Needs wol s as well.

Wake-on-LAN letters

Letter	Wakes on
`g`	magic packet
`u`	unicast
`m`	multicast
`b`	broadcast
`a`	ARP
`d`	disable all

MODULES & FLASH

`ethtool -m <iface>`
Show SFP/QSFP module info
Vendor, part number, temperature and optical power levels (DOM).

`ethtool -m <iface> hex on`
Raw module EEPROM dump

`ethtool -f <iface> <file>`
Flash a firmware image
Risky; use the vendor's documented procedure.

`ethtool -T <iface>`
Show timestamping support
Check for PTP hardware clock support.

`ethtool --version`
Print ethtool version

RECIPES

Dropped packets: look at counters and rings

```
ethtool -S <iface> | grep -Ei 'drop|miss|err'
ethtool -g <iface>
sudo ethtool -G <iface> rx 4096
```

Slow link: check what was negotiated

```
ethtool <iface> | grep -E 'Speed|Duplex|Auto|Link'
sudo ethtool -s <iface> autoneg on
ethtool -r <iface>
```

Find the port in a rack

```
ethtool -p <iface> 30
```

Keep Wake-on-LAN across reboots (NetworkManager)

```
nmcli connection modify <name> 802-3-ethernet.wake-on-lan magic
nmcli connection up <name>
```