

Wake on LAN (WoL)

The  [Wake-on-LAN \(WoL\)](#) feature was implemented in Batocera **v33** where it is enabled on any WoL capable system by default (if you want to disable WoL for your system for whatever reason, then just disable WoL in your system's BIOS). With WoL it is possible to turn on/off your Batocera machine by sending a “magic packet” (or something else, more info later) from a remote WoL client via a network cable. This could be used for [automation purposes](#), for example to turn on your Batocera system at a specific time at night to backup all your userdata and games to a NAS and then shutdown again. And many other things!

Requirements

On the Batocera machine, the functionality of WoL is dependent on two components supporting it:

- **BIOS:** The system's BIOS must support WoL (you may have to enable WoL within your system's [BIOS settings](#)).
- **NIC:** The system's network adapter must support WoL to stay “awake” while the system is powered off.

WoL is designed for use with wired Ethernet connections, but there are wireless NICs which may support Wake-on-Wireless (WoW). This article assumes you are using a standard wired connection.

If you are dual-booting with Windows on the same machine, you may need to also [tell Windows to not disable the WoL shutdown procedure in its drivers](#).

Setting up the BIOS

This section can not be specific to your motherboard's BIOS configuration, so the instructions can only remain broad. With that said, here are the options you must generally set:

- **Wake-on LAN:** Any setting that's related to this should be **enabled**/activated/unblocked.
- **Wake-on PCI:** The same as above (**enabled**), if this option is separated out from the previous one then it usually refers to the powered state of the NIC when the rest of the machine is shut down.
- **Network stack:** Set to **disabled**. Usually, this setting is in relation to whether or not the BIOS itself gains control of the network connection; if it does then WoL cannot function.
- **IP configuration:** When done in the context of the BIOS, this means the Network Stack is enabled. If there's no explicit option to turn off the network stack, leaving all the IP-related fields empty should disable it.
- **Power savings profile:** When mentioned in relation to the shutting down of devices when the machine is in S3/4, **disable** this. It may cause the NIC to shutdown after a period of inactivity.

When done, save and reboot to apply.

Setting up the NIC

Just boot up your regular Linux distro and adjust the settings from your drivers. Just kidding, manufacturers never release their tools in usable states for Linux, you'll need Windows.

Boot up Windows, then go to **Network and Sharing Center** → **Change adapter settings** → right-click on the adapter and go to **Properties** → **Change** → **Advanced** tab at the top.

Now scroll through the drop-down list and set the following:

- **Shutdown Wake Up** to **Enabled**
- **Wake on Pattern Match** to **Enabled**
- **Wake on Magic Packet** to **Enabled**

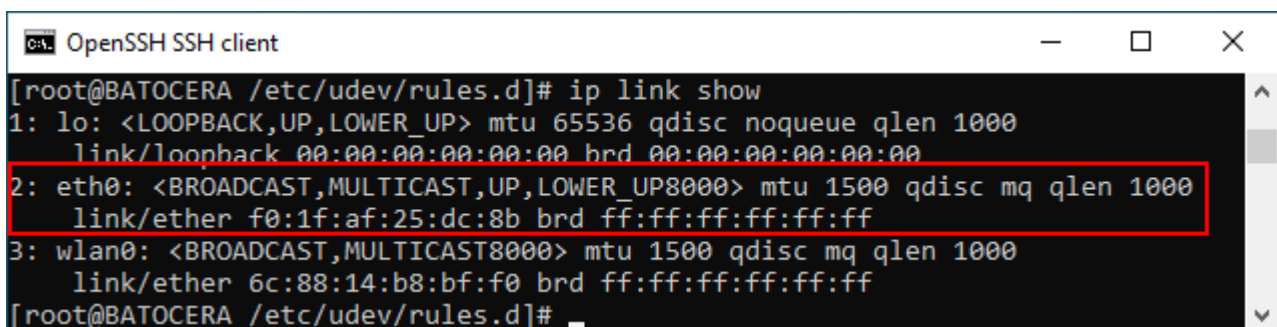
Next, click on the **Power Management** tab and check **Allow the computer to turn off this device to save power** and **Allow this device to wake the computer**. Leave **Only allow a magic packet to wake the computer** however you want, but if having issues with the system automatically waking up too often then check it too.

Wake up your Batocera device remotely

Note: It is important to have your WoL client and your Batocera system within the same [Layer 2](#) subnet of your network, otherwise WoL will not work by default.

It is possible to set up a dynamic DNS and port forwardings on your router to send WoL from other subnets but that is outside of the scope of this article.

To find out the unique MAC address of your Batocera system's NIC, run `ip link show`.



```
CaL OpenSSH SSH client
[root@BATOCERA /etc/udev/rules.d]# ip link show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue qlen 1000
   link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP8000> mtu 1500 qdisc mq qlen 1000
   link/ether f0:1f:af:25:dc:8b brd ff:ff:ff:ff:ff:ff
3: wlan0: <BROADCAST,MULTICAST8000> mtu 1500 qdisc mq qlen 1000
   link/ether 6c:88:14:b8:bf:f0 brd ff:ff:ff:ff:ff:ff
[root@BATOCERA /etc/udev/rules.d]#
```

The MAC address for this NIC (eth0) is `f0:1f:af:25:dc:8b`.

You can now use the given MAC address to wake the Batocera machine up remotely from another device (e.g. PC, Smartphone, ...) which is **within the same Layer 2 subnet** and has a WoL client ([GUI based](#) or [command line based](#) WoL client) installed.

Example of a WoL client for Windows ([Depicus Wake on Lan for Windows GUI](#)):

Most utilities require the following information (or similar enough to it):

- **Mac Address** ⇒ MAC address of your NIC on the Batocera machine.
- **Internet Address** ⇒ The IP of the NIC on the Batocera machine (if only one NIC is present on the WoL client, you can leave this empty).
- **Subnet Mask** ⇒ [Netmask](#) of the network's subnet.
- **Send options** ⇒ Choose Local Subnet.
- **Remote Port Number** ⇒ The port to send the traffic on. Acceptable values are generally 9 (default) or 7.

Click on **Wake Up** to wake the Batocera machine up.

Troubleshooting

Machine will not wake up

- Try changing the port number from 9 to 7. If the machine uses an esoteric port this will usually be noted in its documentation.
- Try sending the packet via **Internet** instead of **Local Subnet** if you are using the GUI based WoL client mentioned above.
- Check if your system does even support WoL by [running](#) `ifconfig` which helps you to identify the network interface name of your according connection (e.g. `eth0`), and then run the appropriate `ethtool eth0` command. It should give you an output similar to this:

Settings for `eth0`:

Supported ports: [TP]

Supported link modes: 10baseT/Half 10baseT/Full
100baseT/Half 100baseT/Full
1000baseT/Full

Supported pause frame use: No

Supports auto-negotiation: Yes

Advertised link modes: 10baseT/Half 10baseT/Full
100baseT/Half 100baseT/Full

1000baseT/Full

```

Advertised pause frame use: No
Advertised auto-negotiation: Yes
Speed: 1000Mb/s
Duplex: Full
Port: Twisted Pair
PHYAD: 1
Transceiver: internal
Auto-negotiation: on
MDI-X: on (auto)
Supports Wake-on: pumbg
Wake-on: g
Current message level: 0x00000007 (7)
                        drv probe link
Link detected: yes

```

The important two parts for getting information about your NIC's WoL capability are:

Property	Notes
Supports Wake-on:	Shows which hardware WoL capabilities the NIC supports (these values cannot be changed by the user)
Wake-on:	Shows which software WoL capabilities are currently enabled (these can be turned on/off by the user)

The value g means that your NIC supports receiving magic packets and therefore *is* WoL capable. Note that your NIC could also support multiple WoL functions and therefore you would get multiple output values as shown above, e.g. Supports Wake-on: pumbg.

Here is a full list of output possibilities (more info at <https://linux.die.net/man/8/ethtool> or the man ethtool command):

- p ⇒ Wake on PHY activity
- u ⇒ Wake on unicast messages
- m ⇒ Wake on multicast messages
- b ⇒ Wake on broadcast messages
- a ⇒ Wake on ARP
- g ⇒ Wake on MagicPacket™
- s ⇒ Enable SecureOn™ password for MagicPacket™
- d ⇒ Disable (wake on nothing). This option clears all previous options.

The most important value is g. Without it being shown, the NIC does not support WoL at all.

In order to turn on WoL, run the following:

```
ethtool -s eth0 wol g
```

where eth0 is the name of your network interface.

It works great the first time! But not any time after...

If dual booting, the cause is most likely the second operating system turning WoL back off. On Windows, [turn off the shutdown WoL feature](#).

Machine will not wake up anymore

If you were successfully using WoL but suddenly it does not work anymore, a power outage of your Batocera system could be the issue. Since WoL functionality relies on a “sleeping” NIC state issued when shutting down the system, the NIC will not be in “sleeping” state anymore after power outage. Therefore you can only make WoL work again by manually booting and then shutdown the system once.

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Last update: **2022/09/28 06:59**

