

## TP-Link TL-WR941ND

- Unpopulated serial and USB headers

### Clones

Known clone of this device: Mercury MWR300T+.

### Hardware Highlights

Ver	CPU	RAM	Flash	Network	Wireless	USB	Serial	JTAG	Wiki	FCC
v1	Atheros AR9132 400MHz	32MB	8MB	1 WAN + 4x LAN (100 Mbit)	AR9132 [bgn 3x3:2] + AR9103 [bgn 3x3:2]	No	Yes	N/A	<a href="#">Link</a> <a href="https://wikidevi.com/wiki/TP-LINK_TL-WR941ND_v1.0">[https://wikidevi.com/wiki/TP-LINK_TL-WR941ND_v1.0]</a>	FCC ID TE7WR941NX <a href="https://fcc.io/TE7/WR941NX">[https://fcc.io/TE7/WR941NX]</a>
v2	Atheros AR9132 400MHz	32MB	4MB	1 WAN + 4x LAN (100 Mbit)	AR9132 [bgn 3x3:2] + AR9103 [bgn 3x3:2]	No	Yes	N/A	<a href="#">Link</a> <a href="https://wikidevi.com/wiki/TP-LINK_TL-WR941ND_v2.x">[https://wikidevi.com/wiki/TP-LINK_TL-WR941ND_v2.x]</a>	
v3	Atheros AR9132 400MHz	32MB	4MB	1 WAN + 4x LAN (100 Mbit)	AR9132 [bgn 3x3:2] + AR9103 [bgn 3x3:2]	No	Yes	N/A	<a href="#">Link</a> <a href="https://wikidevi.com/wiki/TP-LINK_TL-WR941ND_v3.x">[https://wikidevi.com/wiki/TP-LINK_TL-WR941ND_v3.x]</a>	
v4	Atheros AR7240 400MHz	32MB	4MB	1 WAN + 4x LAN (100 Mbit)		No	Yes	N/A		
v5.x	Atheros AR9341 535MHz	32MB	4MB	1 WAN + 4x LAN (100 Mbit)	AR9341 [bgn 2x2:2]	No	Yes	N/A	<a href="#">Link</a> <a href="https://wikidevi.com/wiki/TP-LINK_TL-WR941ND_v5.x">[https://wikidevi.com/wiki/TP-LINK_TL-WR941ND_v5.x]</a>	FCC ID TE7WR941NXV5 <a href="https://fcc.io/TE7/WR941NXV5">[https://fcc.io/TE7/WR941NXV5]</a>
v6	Atheros AR9344 560MHz	64MB	4MB	1 WAN + 4x LAN (100 Mbit)		No	Yes	N/A		

**!** The above spec for v5.x is valid only if the FCC ID of your device is TE7WR941NXV5. If the FCC ID of your device is not TE7WR941NXV5 but the hardware version is v5.x, then the above spec doesn't apply to your device and you should proceed with caution.

### Supported Versions

Ver	S/N	OpenWrt Version Supported	Model Specific Notes
v1	-	Backfire 10.03	N/A
v2	-	Backfire 10.03	Similar to v1
v3.x	-	Backfire 10.03.1	Similar to v2
v3.8	-	Attitude Adjustment 12.09	Same as v3, BUT DIFFERENT FLASH CHIP, Backfire will BRICK! See <a href="#">forum post</a> <a href="https://forum.openwrt.org/viewtopic.php?id=45922">[https://forum.openwrt.org/viewtopic.php?id=45922]</a> .
v4	-	Backfire 10.03	Similar to TL-WR741ND.
v5.0	-	Attitude Adjustment 12.09	Similar to TL-WR841ND v8, see <a href="#">forum post</a> <a href="https://forum.openwrt.org/viewtopic.php?pid=206667#p206667">[https://forum.openwrt.org/viewtopic.php?pid=206667#p206667]</a> .
v5.1	-	Attitude Adjustment 12.09	Similar to TL-WR841ND v8, see <a href="#">this forum post</a> <a href="https://forum.openwrt.org/viewtopic.php?pid=206667#p206667">[https://forum.openwrt.org/viewtopic.php?pid=206667#p206667]</a> and <a href="#">this forum post</a> <a href="https://forum.openwrt.org/viewtopic.php?pid=220561#p220561">[https://forum.openwrt.org/viewtopic.php?pid=220561#p220561]</a> .
v6	-	Barrier Breaker 14.07	Similar to TL-WDR3500.

**WARNING** (2013-08-04): ATTITUDE ADJUSTMENT 12.09 Final r36088 still works, but BARRIER BREAKER Bleeding Edge r37660 has a problem where it thinks the failsafe button is always pressed (on a v3.x) Unless if you know how to make a serial console and do TFTP, best to stay away from trunk for a while. Internet search hints [\[https://forum.openwrt.org/viewtopic.php?id=44924\]](https://forum.openwrt.org/viewtopic.php?id=44924) this may be true for more TP-Link models.

### Installation

OpenWrt firmware can be flashed via the OEM WebInterface.

- You could log in to the OEM firmware as root using 5up as password.
- You can get into U-Boot typing tpl at the 1s pause at the beginning of the boot process.

### OEM easy installation

These instructions use as example a v3 model, browse the [Barrier Breaker 14.07 repository](#) [\[https://downloads.openwrt.org/BarrierBreaker/14.07/ar71xx/generic/\]](https://downloads.openwrt.org/BarrierBreaker/14.07/ar71xx/generic/) for the binary that matches your hardware version. Pay also attention that we can find for each model version two similar files, one the *-factory* and the other one *-sysupgrade*, on this section we will use the *-factory* one.

- Download the firmware binary from [here](#) [\[https://downloads.openwrt.org/BarrierBreaker/14.07/ar71xx/generic/openwrt-ar71xx-generic-tl-wr941nd-v3-squashfs-factory.bin\]](https://downloads.openwrt.org/BarrierBreaker/14.07/ar71xx/generic/openwrt-ar71xx-generic-tl-wr941nd-v3-squashfs-factory.bin).
- Login to the default WebGUI and flash the router.
- Wait for the router to reboot, SYS LED will stop flashing and become static.
- Browse or telnet to 192.168.1.1, set a root password and enjoy.

### Upgrading OpenWrt via command line (otherwise just use Luci)

If you have already installed OpenWrt and like to reflash for e.g. upgrading to a new OpenWrt version you can upgrade using the console/terminal. It is important that you put the firmware image into the ramdisk (/tmp) before you start flashing otherwise crazy things can happen.

We will use the *-sysupgrade* firmware file, for more information about this read the *OEM Easy Installation* section. To start the upgrade process login to your router using SSH and make sure you've Internet access in order to download the new firmware file.

```
# cd /tmp
# wget https://downloads.openwrt.org/BarrierBreaker/14.07/ar71xx/generic/openwrt-ar71xx-generic-tl-wr941nd-v3-squashfs-sysupgrade.bin
# sysupgrade -v /tmp/openwrt-ar71xx-generic-tl-wr941nd-v3-squashfs-sysupgrade.bin
```

### Flashing via UBoot

**Warning!**  
 This section describes actions that might damage your device or firmware.  
 Proceed with care!

A 3.3v TTL serial connection is required ! ([Forum post](#) [\[https://forum.openwrt.org/viewtopic.php?pid=83476#p83476\]](https://forum.openwrt.org/viewtopic.php?pid=83476#p83476)) Do not try this method unless you're really sure what you're doing.

Set your serial terminal at 115200 8n1. Set your computer ip address as a static one of 192.168.1.254 netmask 255.255.255.0. Install and configure a tftp server, put the firmware on it. The Windows firewall may get in the way.

During UBOOT "1-second" message, quickly key sequence: tpl to stop UBOOT from loading the kernel and go into uboot mode proper.

```
ar7100> setenv serverip 192.168.1.254; setenv ipaddr 192.168.1.1
ar7100> tftp 0x80800000 openwrt-ar71xx-tl-wr941nd-v3-squashfs.ssysupgrade.bin
ar7100> erase.b 0xbf020000 +0x3c0000
ar7100> cp.b 0x80800000 0xbf020000 0x3c0000
ar7100> reset
```

**Note #1:** *0x3c0000* is the size of the firmware, be aware that you may have a different size thus bricking your router.

**Note #2:** *0xbf020000* is the from addr, for your device version you can get it by issuing the command: *"printenv bootcmd"*, not doing so will turn your router into a brick.

### Revert to original firmware

**Warning!**  
 This section describes actions that might damage your device or firmware.  
 Proceed with care!

You can download the original firmware from the TP-LINK support section and flash it without modification.

Only perform the dd action below if your original firmware has the word **"boot"** in it, for example, *"wr941nv4\_en\_3\_9\_17\_up\_boot(091118).bin"*. **DO NOT** dd your original firmware if it has no **"boot"** in its name, for example, *"wr941nv4\_en\_3\_11\_5\_up(100427).bin"*, because if you do, **you will brick your router** ! This was confirmed by supertom64 in wr1043nd.

Cut first 0x20200 bytes from original firmware containing **boot** in the filename:

```
dd if=orig.bin of=tplink_boot.bin skip=257 bs=512
```

Flash via uboot or mtd, you **cannot** flash via WebGUI otherwise you will turn your router into brick.

First you need to get the firmware file onto your box. If you are able to connect to your OpenWrt console and you have your network configured properly, you can use wget or scp to copy the firmware binary into the /tmp folder.

To start flashing via mtd you have to call (*wr.bin* is the file containing the firmware you previously downloaded):

```
root@OpenWrt:/tmp# mtd -r write wr.bin firmware
Unlocking firmware ...
```

```
Writing from wr.bin to firmware ...
Rebooting ...
Terminated
```

### Failsafe mode

*-generic.failsafe*

**NETWORKING IN FAILSAFE MODE IS CURRENTLY BROKEN** - See <https://dev.openwrt.org/ticket/10436> [\[https://dev.openwrt.org/ticket/10436\]](https://dev.openwrt.org/ticket/10436)

- While the SYS LED is on immediately press the QSS button.
- If done right the SYS LED will start flashing very quickly.

### Hardware

#### Info

<b>Instruction set:</b> MIPS
<b>Vendor:</b> Atheros
<b>Bootloader:</b> uboot
<b>System-On-Chip:</b> AP81
<b>CPU Speed:</b> 400 Mhz
<b>Flash-Chip:</b> S25FL032P (HW Ver 3.6)
<b>Flash size:</b> 4 MiB
<b>RAM:</b> 32 MiB
<b>Wireless:</b> Atheros AR9103 802.11n
<b>Ethernet:</b> Switch part of SoC
<b>USB:</b> No, but USB port header has been discovered on the board
<b>Serial:</b> <a href="#">Yes</a>
<b>JTAG:</b> <a href="#">N/A</a>

#### Photos

TODO.

#### Opening the case

**Note:** This will void your warranty! These instructions are not very good! (yet...)

- There are two screws underneath the rubber feet at the back (were the RJ45 jacks are) of the device. Remove those.
- Remove the front plastic piece.
- Try to open the white plastic cover at the top only a little bit.
- Unhinge the plastic cover at the front.

There is also an easy way to do it

- Remove those two screws underneath the rubber feet at the back
- Get your nails in the grooves underneath the router and lift the panel
- Use your nails and slowly go around the case to Unhinge the plastic cover at the front

*Main PCB (not V3.2)*



serial pin ver: 5.1



#### Serial

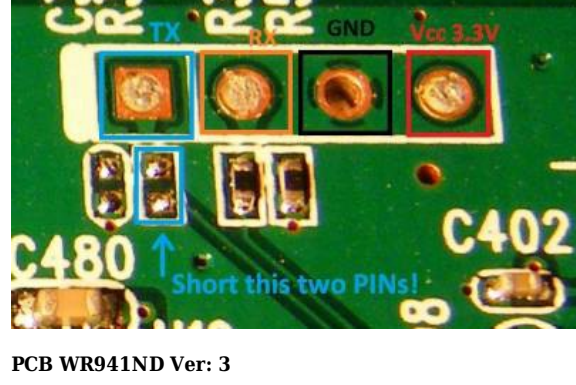
Look at the PCB picture. Serial port is located were the 4 wires are soldered to the board. The left one (green) is soldered to the pad labeled "P1".

Pinout of the port is: [TX|RX|GND|VCC(3.3)] (direction as seen in PCB picture below; Pad "P1" is TX)

Before you can use the serial port you have to bridge R356. (A smd pad right underneath the serial port pad "P1").

It is not possible to directly connect the serial port to one of your computer (voltage mismatch). You have to use a converter (i.e. a Nokia CA-42 cable, serial to USB converter or something similar. An Arduino MEGA with a simple serial bridge also works).

On the ver3 board, there is a 4.7k pull-down resistor on the RX pin. To interface with 5V devices (such as the Arduino MEGA), use a 2k2 resistor in series with the RX pin (Arduino's TX pin). Arduino's RX pin can be connected directly with the router's TX pin.



PCB WR941ND Ver: 3



## PCB WR941ND Ver: 6

Once the original firmware has booted up completely, you can press **return** to activate the Linux login prompt.

The password to get a root Shell access is **5up**:

```
TL-WR941N mips #32 Wed Oct 17 18:08:12 PDT 2012
TL-WR941N login: root
password: 5up
```

## JTAG

TODO

## Specific configuration

### VLAN Config

Setting up VLAN is a bit different from other devices:

First, you have to edit `/etc/rc.local` (sample config for VLAN 100 and 200 on trunk port lan4): # Put your custom commands here that should be executed once # the system init finished. By default this file does nothing. `vconfig add lan4 100 vconfig add lan4 200 ifconfig lan4.100 up ifconfig lan4.200 up exit 0`

Then, you have to edit `/etc/config/network` and reboot the device (that `/etc/rc.local` is executed): `config interface v1an100 option ifname "lan1 lan2 lan3 lan4.100" #[-] config interface v1an200 option ifname "lan4.200"`

### Buttons

The device has 2 buttons:

- the reset button at the back
- the "QSS" labeled button at the front

## Basic configuration

Since this part is identical for all devices, see [Basic configuration](#).

## Connect stuff to the USB port

If you have an USB port, please see [Connect stuff to the USB port](#).

## Hardware mods

### USB

WR941n Ver.5.1

