

GL-AR300M Series (Shadow)

Best Mini Router Ever

AR300M is the our best mini router. It is small and powerful.

It has several sub-models:

Sub-model	NOR flash	NAND flash	Antenna	5G Wi-Fi	USB power control
AR300M	16MB	128MB	Internal	No	Yes
AR300M-Ext	16MB	128MB	External	No	Yes
AR300M16	16MB	No	Internal	No	Yes
AR300M16-Ext	16MB	No	External	No	Yes
AR300M-Lite	16MB	No	Internal	No	No
AR300MD*	16MB	128MB	Internal	Yes	Yes

*AR300MD 5G Wi-Fi is suggested only to work at monitoring mode because of power consumption.

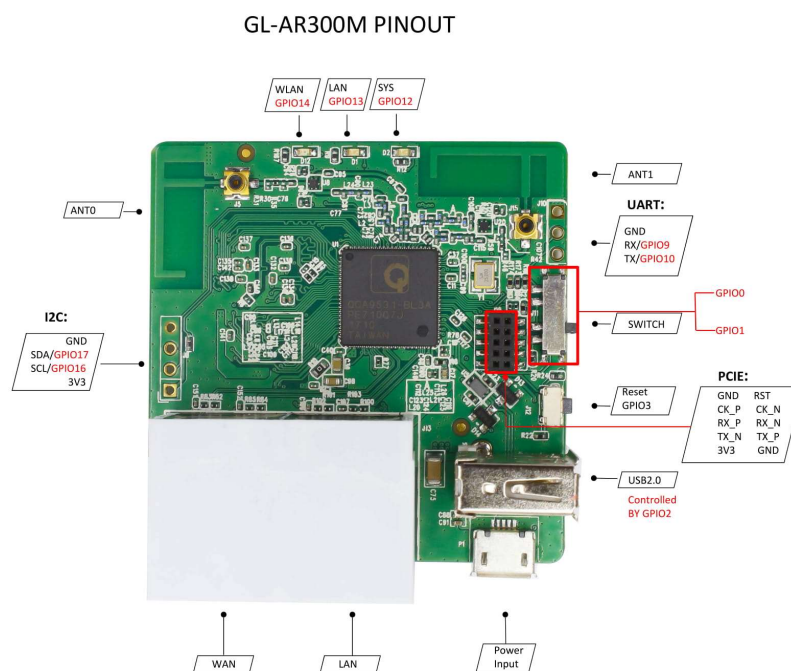
Hardware Specification

Model	GL-AR300M Series
CPU	QCA9531 650MHz

Model	GL-AR300M Series
Memory	DDRII 128MB
Storage	16MB NOR, 128 MB NAND (Optional)
Interfaces	1 WAN 1 LAN 1 USB2.0 1 Micro USB (power) 1 Reset Button PCIe UART
Frequency	2.4GHz
Transmission Rate	300Mbps
Max. Tx Power	20dBm
Protocol	IEEE 802.11b/g/n
External Drive Format Support	FAT32/NTFS/EXT4/EXT3/EXT2
Webcam Support	MJPEG, YUV (not support from firmware v2.27)
DIY Features	UART, GPIO, PCIe, 3.3V & 5V power port
External Antenna Support	Yes (optional)
PoE Module Support	No
Power Input	5V/2A
Power Consumption	<2W
Dimension, Weight	58mmX58mmX25mm, 39g

Model	GL-AR300M Series
PCIe headers	Yes

PCB Pinout



Note: I2C is not working in some early version of the router.

By using 128MB NAND flash, space is not a problem and the writing speed is improved greatly. You can compile a firmware with tons of features and writing data is almost instant.

By adding PCIe interface, a 5G 802.11 a/ac addon module can be connected and you can enjoy the Wi-Fi speed on a mini router.

Performance

By adding a fast NAND flash, you can feel how the performance is improved compared to a NOR flash router.

The performance comparison between AR300M (NAND) with AR150 is below:



It only takes 6 seconds to upload and process 250 ovpn files. When installing packages to the router, it takes no more than 20% for the time spent than using NOR flash, including the time to download resource from the Internet. So everything just happens in seconds.

Building Firmware

The router has two flash so we have two firmwares. One firmware is installed on the NOR flash and one is installed on the NAND flash. The two firmwares are independent from each other. The router will always try to boot from the NAND flash. If it fails for 3 times it will boot from the NOR flash.

By using two firmwares, businesses can have dual boot options to ensure the system can backup, upgrade and boot without problems.

Building the generic firmware for NOR flash

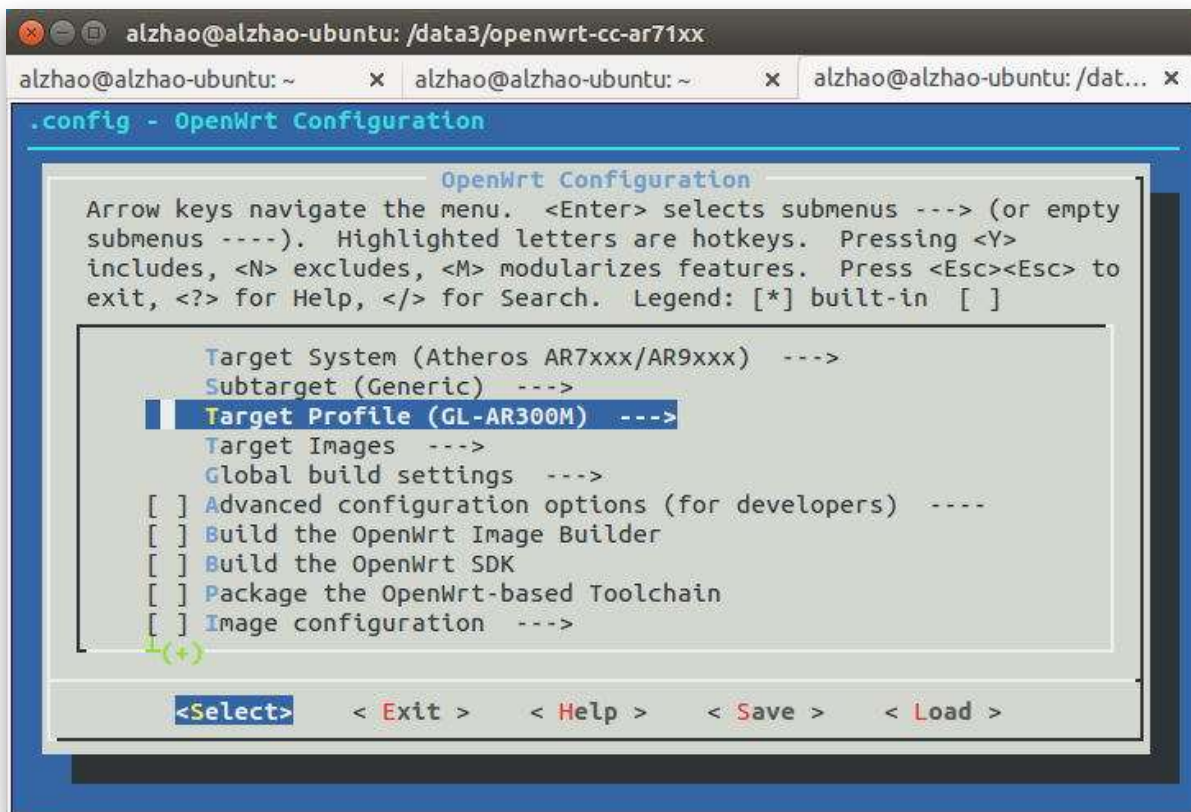
The simple instructions of building the firmware can be found here: <https://github.com/gl-inet/lede-17.01> You need to have a Linux machine. In this example we use Ubuntu.

```

$ sudo apt-get update
$ sudo apt-get install subversion build-essential git-core libncurses5-dev
zlib1g-dev gawk flex quilt libssl-dev xsltproc libxml-parser-perl mercurial bzip2
ecj cvs unzip git wget
$ git clone https://github.com/domino-team/openwrt-cc.git
$ cd openwrt-cc
$ ./scripts/feeds update -a
$ ./scripts/feeds install -a
$ make menuconfig
  ..choose your compile target and packages
$ make

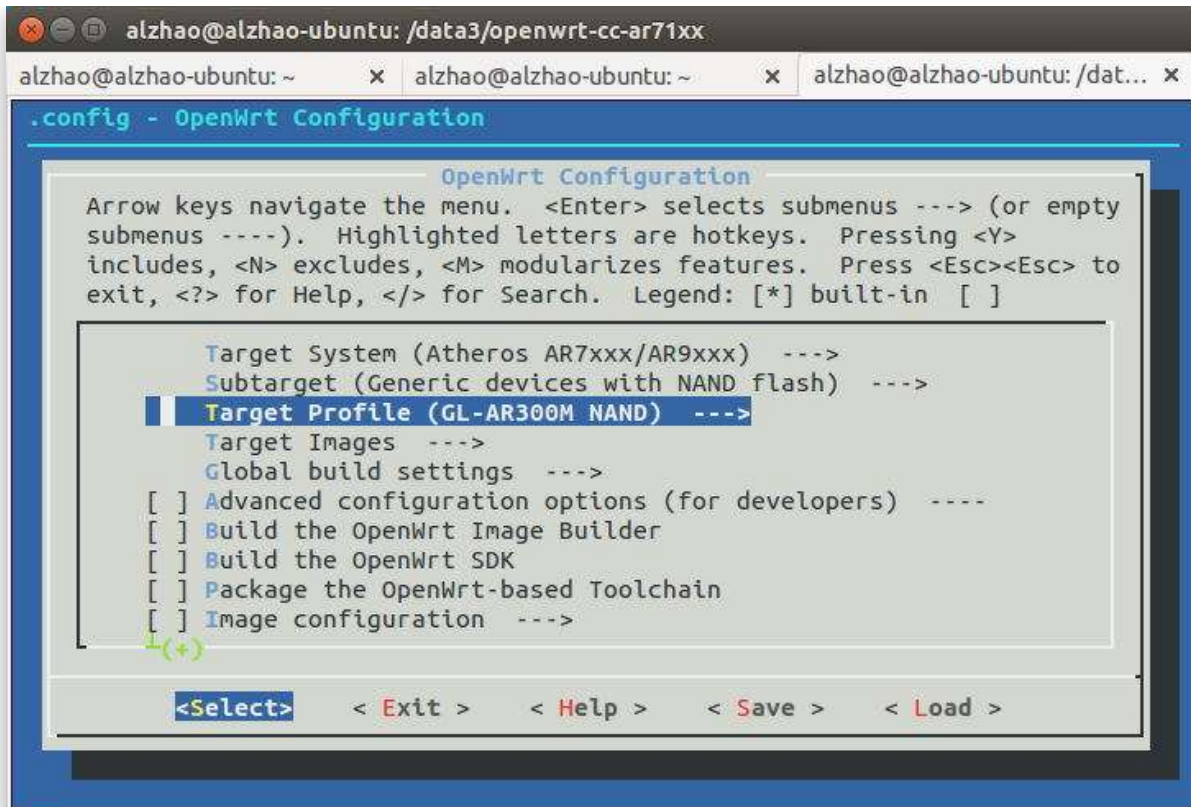
```

If you want to build the firmware for NOR flash, choose `GL-AR300M` as the target.



Build the NAND firmware for NAND flash

If you want to build the firmware for nand flash, first choose subtarget `Generic devices with NAND flash` then choose `GL-AR300M NAND` as the target.



The make process will take around 1 hour for the first time because it needs to download a lot of data from the Internet. After compiling finished, you will find the following firmware files in `bin/ar71xx/`

- **openwrt-ar71xx-generic-gl-ar300m-squashfs-sysupgrade.bin**, for NOR flash
- **openwrt-ar71xx-nand-gl-ar300m-squashfs-sysupgrade.tar**, for NAND flash firmware upgrade inside of a working Openwrt firmware
- **openwrt-ar71xx-nand-gl-ar300m-ubi.img**, for initial NAND flash firmware build, this is used when upgrading using uboot.

Note

There are two files for NAND firmware. The `xxx-ubi.img` is used for first time writing to the NAND flash. If you are using uboot to upgrade the firmware, please use this one. The `xxx-sysupgrade.tar` is used for upgrading from openwrt. So if you use our stock firmware or already using an openwrt firmware, choose this one.

Using Firmware

The firmware has exactly the same UI as our other mini routers. To determine you are using NOR flash or NAND flash, please check the available space from the [APPLICATIONS -> Plug-ins](#) page.

Control which firmware you are booting into

There are two methods to control which firmware you can boot.

Method 1: set boot count

The router will always try to boot into the NAND firmware. But if it fails for 3 times it will try to boot into the NOR firmware. If you want to boot into the NOR firmware, you can tell the router that it failed to boot for 3 times already by setting the `uboot env`. To do so, you can use the following command in a SSH terminal.

```
$ fw_printenv  
$ fw_setenv bootcount 3  
$ reboot
```

You need to do this each time if you want to boot into NOR firmware, no matter you which firmware you are using. Otherwise after the firmware boot, it will reset `bootcount` variable and next boot will always try to boot the NAND firmware.

Method 2: using the switch

This is only valid in the new uboot (from Mar 2017).

First ssh to the router and set `uboot env boot_dev`

```
$ fw_printenv  
$ fw_setenv boot_dev on  
$ reboot
```

Then when the router boot, the router will choose which firmware to boot using the hardware switch.

1. Left side (near the reset button) --> NAND flash
2. Right side --> NOR flash

To disable using the switch to choose firmware function, clear `boot_dev` variable.

```
$ fw_printenv  
$ fw_setenv boot_dev  
$ reboot
```

Debrick

If you brick your router and it cannot boot, you can try to save it using uboot.

Using uboot web UI

Follow [this guide](#) for a general instruction to get access of uboot web UI.

Here is a video guide for entering AR300M uboot failsafe.



In some early version of AR300M, the uboot boot very slowly. So be patient when you press and hold the reset button. The LEDs will start to flash around 5 seconds.

There is a bug in AR300M uboot and in some computers the connection will always reset when you upload firmware. Check [this post](#) to find the discussion. You can either try changing the MTU or just try another computer.

Note: If you have an older version of uboot, the webUI will only be able to flash NAND flash. This is fixed in newer versions.

Note: When flash NAND firmware, only use the firmware with `.img` in the name, not the one with `.rar` in the name.

The following figure is the web UI of the `new` uboot.

FIRMWARE UPDATE

You are going to update **firmware** on the device.
Please, choose file from your local hard drive and click **Update firmware** button.

The firmware version must be 3.201 or newer

No file chosen

Enable the DIP switch of the router, it allows you to select the firmware to boot from **Nor flash** or **Nand flash**.
1.Left side (near the USB) --> Nand flash 2.Right side --> Nor flash. [Reference docs >>](#)

Enable switch Disable switch

WARNINGS

- do not power off the device during update
- if everything goes well, the device will restart
- you can upload whatever you want, so be sure that you choose proper firmware image for your device
- The firmware version must be 3.201 or newer. Any older or third party firmware may brick this device!

You can find more information about this project on [GitHub](#)
uboot2.0 version:20.12.24

Using uboot console

If you want to use uboot console, you need to open the case and solder the serial connectors.

Then you need to set up a tftp server.

in uboot console, the command to flash NOR flash is `run lf` to flash NAND firmware is `run nlf`