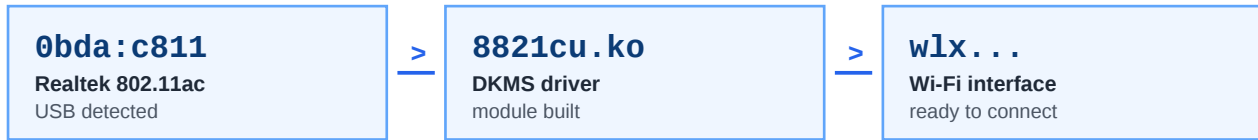


How to get the Realtek 0bda:c811 USB Wi-Fi module working under Olimage

Expected driver bring-up path



What the screenshots in this PDF mean

Dark terminal panels show commands to type and examples of output to expect. The exact bus/device numbers and Wi-Fi interface name can differ between boards.

This guide is for the Realtek-based USB Wi-Fi module that appears as '0bda:c811'.

OLIMEX A20 release images:

<https://images.olimex.com/release/a20/>

OLIMEX product page:

<https://www.olimex.com/Products/USB-Modules/WiFi/USB-WIFI6-5G/>

Driver source used:

<https://github.com/morrownr/8821cu-20210916>

OLIMAGE source:

<https://github.com/OLIMEX/olimage>

Short summary

In simple terms, the work is:

1. Write the latest OLIMAGE Bookworm base image to a microSD card.
2. Boot the A20-OLinXino-LIME2 board with serial console, Ethernet, and 5 V DC power connected.
3. Run 'apt update', then 'apt dist-upgrade', then reboot.
4. Install the matching OLIMEX kernel headers separately.
5. Install build tools, clone the Realtek '8821cu' driver, and build it with DKMS.
6. Load the driver, confirm the Wi-Fi interface appears, then connect with 'nmtui'.

The full OLIMEX kernel source workaround is no longer needed with the tested release packages.

What You Need

Hardware:

1. A20-OLinXino-LIME2 or similar OLIMAGE-supported board.
2. Realtek USB Wi-Fi adapter detected as '0bda:c811'.
3. microSD card with the OLIMAGE Bookworm base image.

4. USB serial console cable.
5. Ethernet cable for Internet access during setup.
6. Stable 5 V DC power supply.

Software/network:

1. BalenaEtcher or another image writer.
2. Root shell on the board.
3. Internet access from the board.
4. Public OLIMEX package repository enabled.

Check free disk space after boot:

TERM Terminal command

```
df -h / /usr/src /tmp
```

The driver source is small, but package upgrades and DKMS builds need working free space. A few GB free is comfortable.

Tested Setup

These instructions were tested on a clean card prepared from:

TERM Expected terminal output

```
A20-OLinuxino-bookworm-base-20260323-113959.img.7z
```

from:

TERM Expected terminal output

```
https://images.olimex.com/release/a20/
```

After public-release upgrade, the tested OLIMEX packages were:

TERM Expected terminal output

```
linux-image-5.10.180-olimex 5.10.180-20260827-071822
linux-image-olimex          5.10.180-20260827-071822
linux-headers-5.10.180-olimex 5.10.180-20260827-071822
linux-headers-olimex        5.10.180-20260827-071822
```

The running kernel was:

TERM Expected terminal output

```
5.10.180-olimex
```

The tested Realtek adapter identified as:

TERM Expected terminal output

```
Linux USB ID:      0bda:c811 Realtek Semiconductor Corp. 802.11ac NIC
Windows USB ID:    USB\VID_0BDA&PID_C811&REV_0200
Windows name:      Realtek 8811CU Wireless LAN 802.11ac USB NIC
Linux driver used: 8821cu
```

This is not the AICSem AIC8800D80 Wi-Fi 6 module. The AICSem module uses IDs such as 'a69c:5721', 'a69c:8d80', 'a69c:8d81', or Windows 'a69c:8d83', and needs a different guide.

1. Prepare and Boot the Board

Download the latest A20 OLIMAGE Bookworm base image from:

TERM Expected terminal output

```
https://images.olimex.com/release/a20/
```

Write the image to a microSD card with BalenaEtcher.

Insert the card into the A20-OLinuXino-LIME2 board.

Connect:

1. USB serial console cable.
2. Ethernet cable.
3. 5 V DC power supply.

Log in over the serial console and use a root shell.

2. Update OLIMAGE from the Public Repository

Do not add the staging repository for normal customer instructions. The fixed packages were pushed to the public release repository.

Run:

TERM Terminal command

```
apt update
apt dist-upgrade
```

If asked to continue, answer:

TERM Expected terminal output

```
Y
```

This can take a long time on A20/LIME2-class boards. The upgrade may update many Debian packages as well as the OLIMEX kernel image. Do not interrupt 'apt' or 'dpkg' unless the board is clearly no longer responding.

Reboot after the upgrade:

TERM Terminal command

```
reboot
```

After reboot, confirm the kernel and OLIMEX kernel image package:

TERM Terminal command

```
uname -r  
dpkg -l 'linux-*olimax*' | grep '^ii'
```

Expected kernel:

TERM Expected terminal output

```
5.10.180-olimax
```

3. Install the Matching Kernel Headers

Important: 'apt dist-upgrade' updates the kernel image, but the kernel headers may not be installed automatically.

Install the matching headers separately:

TERM Terminal command

```
apt install -y linux-headers-olimax linux-headers-$(uname -r)
```

Confirm the kernel image and headers are installed:

TERM Terminal command

```
uname -r && dpkg -l 'linux-*olimax*' | grep '^ii'
```

Expected package family:

TERM Expected terminal output

```
linux-headers-5.10.180-olimax  
linux-headers-olimax  
linux-image-5.10.180-olimax  
linux-image-olimax
```

The tested fixed release package version was:

TERM Expected terminal output

```
5.10.180-20260827-071822
```

4. Verify the DKMS Build Tree

Check the files that are needed by external module builds:

TERM Terminal command

```
for f in scripts/module.lds include/generated/uapi/linux/version.h scripts/mod/modpost include/generated/utsrelease.h include/generated/timeconst.h include/generated/autoconf.h include/config/kernel.release; do test -e /lib/modules/$(uname -r)/build/$f && echo "OK $f" || echo "MISSING $f"; done
```

Expected:

TERM Expected terminal output

```
OK scripts/module.lds
OK include/generated/uapi/linux/version.h
OK scripts/mod/modpost
OK include/generated/utsrelease.h
OK include/generated/timeconst.h
OK include/generated/autoconf.h
OK include/config/kernel.release
```

Note: 'include/linux/version.h' is not expected in this OLIMEX header package. The generated header used by Kbuild is:

TERM Expected terminal output

```
include/generated/uapi/linux/version.h
```

5. Identify the Realtek USB Device

Plug the Realtek adapter and check:

TERM Terminal command

```
lsusb
```

Expected:

TERM Expected terminal output

```
Bus 001 Device 002: ID 0bda:c811 Realtek Semiconductor Corp. 802.11ac NIC
```

Check whether a Wi-Fi interface already exists:

TERM Terminal command

```
ip link
```

On the tested clean OLIMAGE card, no Wi-Fi interface appeared before installing the Realtek driver.

6. Install Build Tools

Install the build dependencies:

TERM Terminal command

```
apt install -y git dkms build-essential bc bison flex libssl-dev libelf-dev iw network-manag
er
```

If 'apt' says a lock is held by unattended upgrades, wait. To check package activity:

TERM Terminal command

```
ps -ef | grep -E 'apt|dpkg|unattended|mandb' | grep -v grep
```

This helper is normal and does not mean apt is busy:

TERM Expected terminal output

```
/usr/bin/python3 /usr/share/unattended-upgrades/unattended-upgrade-shutdown --wait-for-signa
l
```

If the board lost power or hung during package installation, check package state:

TERM Terminal command

```
dpkg --audit
```

If it reports half-configured packages, repair them with:

TERM Terminal command

```
dpkg --configure -a
```

7. Download and Build the Realtek Driver

Clone the driver:

TERM Terminal command

```
cd /root
git clone https://github.com/morrownr/8821cu-20210916.git
cd /root/8821cu-20210916
```

Run the installer:

TERM Terminal command

```
bash ./install-driver.sh
```

On A20/LIME2-class boards, the DKMS compile step can take several minutes. Long rows of dots during the build are normal. Do not interrupt it unless it clearly failed or the board is no longer responding.

Successful build/install lines look like:

TERM Expected terminal output

```
The driver was built by dkms successfully.
The driver was installed by dkms successfully.
```

If it asks:

TERM Expected terminal output

```
Do you want to edit the driver options file now? (recommended) [Y/n]
```

answer:

TERM Expected terminal output

```
n
```

If it asks:

TERM Expected terminal output

```
Do you want to apply the new options by rebooting now? (recommended) [Y/n]
```

answer:

TERM Expected terminal output

n

8. Load and Verify the Driver

Load the driver:

TERM Terminal command

```
modprobe 8821cu
```

Check interfaces:

TERM Terminal command

```
ip link
```

Expected: a new Wi-Fi interface named like:

TERM Expected terminal output

```
wlxdc0d30b23820
```

The exact interface name depends on the adapter MAC address.

Check NetworkManager:

TERM Terminal command

```
nmcli device status
```

Expected: the new interface appears as Wi-Fi, usually disconnected until you select a network.

Scan for nearby Wi-Fi networks:

TERM Terminal command

```
nmcli device wifi list ifname wlxdc0d30b23820
```

Use your actual interface name from 'ip link'.

If 'nmcli' opens a pager and shows '(END)', press 'q' to return to the shell.

9. Connect with nmtui

```

TERM  Generated nmtui-style screen

+-- NetworkManager TUI -----+
| Activate a connection          |
|                                |
|   Wired                        |
|   Wi-Fi                       |
| > OlimexTenda5G                |   Signal: ****
|   OlimexAP                     |   Signal: ***
|   OlimexGuest-5GHz             |   Signal: **
|                                |
|                                |
|                                |   <Activate>   <Back>
+-----+

```

The easiest interactive method is:

```

TERM  Terminal command

nmtui

```

In the text UI:

1. Select 'Activate a connection'.
2. Select the Wi-Fi network SSID.
3. Enter the Wi-Fi password.
4. Select 'OK' or 'Activate'.
5. Exit 'nmtui'.

Verify Internet access:

```

TERM  Terminal command

ping -c 4 8.8.8.8
ping -c 4 www.google.bg

```

Successful test result:

```

TERM  Expected terminal output

packets transmitted, packets received, 0% packet loss

```

Troubleshooting

If '/lib/modules/\$(uname -r)/build' is missing or the DKMS build fails, first confirm the headers were installed:

```

TERM  Terminal command

apt install -y linux-headers-olimax linux-headers-$(uname -r)

```

Then re-run the DKMS build-tree check from step 4.

If the build fails with:

TERM Expected terminal output

```
No rule to make target 'scripts/module.lds'
```

then the installed OLIMEX header package is too old. Run 'apt update', 'apt dist-upgrade', reboot, then install the headers again.

If the build fails with:

TERM Expected terminal output

```
fatal error: linux/version.h: No such file or directory
```

check whether this generated version header exists:

TERM Terminal command

```
test -e /lib/modules/$(uname -r)/build/include/generated/uapi/linux/version.h && echo generated-version-ok || echo generated-version-missing
```

If it prints 'generated-version-missing', update the OLIMEX kernel headers.

If this is a retry after a failed Realtek install, clean the DKMS state:

TERM Terminal command

```
cd /root/8821cu-20210916
bash ./remove-driver.sh
```

If 'iw dev "\$IFACE" scan' says:

TERM Expected terminal output

```
command failed: Device or resource busy (-16)
```

NetworkManager may already be managing the interface. Use:

TERM Terminal command

```
nmcli device wifi list ifname "$IFACE"
```

or connect with:

TERM Terminal command

```
nmtui
```

If a future OLIMAGE kernel update changes 'uname -r', reboot into the new kernel, install matching headers with 'apt install -y linux-headers-olinux linux-headers-\$(uname -r)', then rebuild the DKMS driver.