

Wallys AP DR9574: MLO Configuration Guide

1. Hardware Prerequisites & Layout

1.1. Introduction

This guide details the process for configuring a Wallys AP DR9574 router for a 3-card (2.4G/5G/6G) WiFi 7 Multi-Link Operation (MLO) setup.

1.2. Target Hardware

- **Router:** Wallys AP DR9574
- **Wi-Fi Cards:**
 - DR9274-6GK (6GHz)
 - DR9274-5GK (5GHz)
 - DR9274-2G (2.4GHz)

1.3. Board Physical Layout

Before starting, familiarize yourself with the board's layout.



- **Onboard Wi-Fi:** The board includes an onboard 2.4G Wi-Fi 7 module (which we will disable for this setup).
- **Expansion Slots:** There are four M.2 PCI-E slots. Their numbering is critical for configuration:

- PCIE-0
- PCIE-1
- PCIE-2
- PCIE-3
- **Ethernet Ports:**
 - 4x 1G RJ45
 - 2x 2.5G RJ45
 - 1x 10G RJ45
- **UART Port:** This 4-pin connector is used for console access.

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2. Connecting to the U-Bootloader

This phase establishes a direct console connection to the router's bootloader.

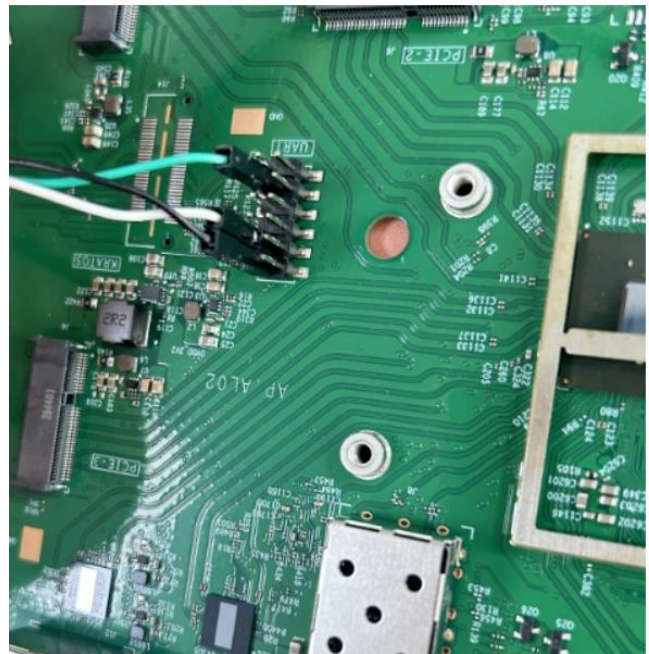
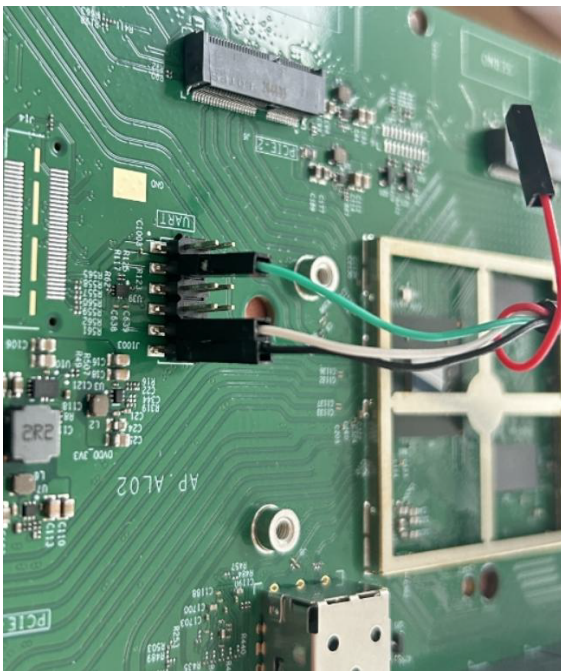
Step 2.1: Connect the UART Cable

You must use a USB-to-UART console cable. The board's UART port is self-powered (VCC is not required).

The pin sequence on the 4-pin UART connector is: GND, TX, RX, VCC.

Connect your cable as follows:

- GND (board) -> **Black cable**
- TX (board) -> **White cable** (Connect to your adapter's RX)
- RX (board) -> **Green cable** (Connect to your adapter's TX)
- VCC (board) -> **Do not connect**



Step 2.2: Connect to PC and Find COM Port

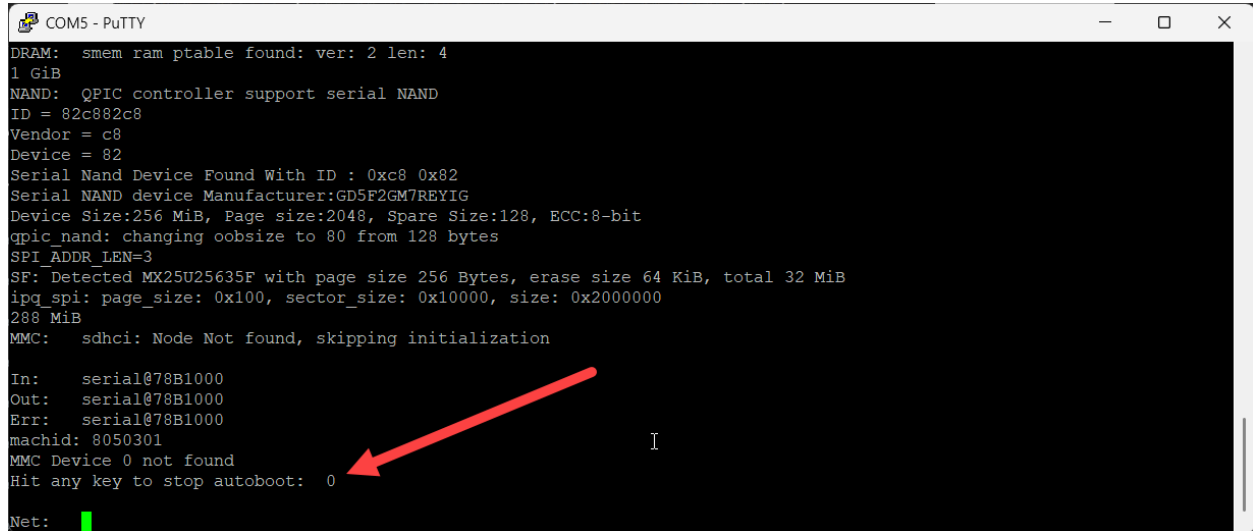
Connect the USB end of your console cable to your PC. Your computer will assign it a COM port. You can find this in your computer's **Device Manager** (e.g., Silicon Labs CP210x USB to UART Bridge (COM9)).

Step 2.3: Connect with a Terminal Client

Use a terminal client (e.g., PuTTY, Xshell) with the following settings:

- **Connection Type:** Serial
- **Port:** Your COM port (e.g., COM9)
- **Speed (Baud Rate):** 115200

Open the connection, then power on the router. You will see boot messages start to scroll. Immediately press any key to interrupt the boot process and enter the U-Bootloader prompt.



```
COM5 - PuTTY
DRAM: smem ram ptable found: ver: 2 len: 4
1 GiB
NAND: QPIC controller support serial NAND
ID = 82c882c8
Vendor = c8
Device = 82
Serial Nand Device Found With ID : 0xc8 0x82
Serial NAND device Manufacturer:GD5F2GM7REYIG
Device Size:256 MiB, Page size:2048, Spare Size:128, ECC:8-bit
qpic_nand: changing oobsize to 80 from 128 bytes
SPI_ADDR_LEN=3
SF: Detected MX25U25635F with page size 256 Bytes, erase size 64 KiB, total 32 MiB
ipq_spi: page_size: 0x100, sector_size: 0x10000, size: 0x2000000
288 MiB
MMC: sdhci: Node Not found, skipping initialization

In: serial@78B1000
Out: serial@78B1000
Err: serial@78B1000
machid: 8050301
MMC Device 0 not found
Hit any key to stop autoboot: 0
Net:
```

3. Flashing the MLO Firmware

From the U-Boot prompt, you will load the MLO firmware and configure the bootloader to recognize your specific cards.

Step 3.1: Load the Firmware Image via TFTP

1. **Network Setup:**

- Connect an Ethernet cable from your PC to one of the router's LAN ports.
- Assign your PC a static IP address (e.g., 192.168.1.77). The router's default U-Boot IP is 192.168.1.1.

2. **TFTP Server Setup:**

- Run a TFTP server (like tftpd64) on your PC.
- Place the MLO firmware (norplusnand-ipq9574-single-3cardmlo.img) in the TFTP server's root directory.

3. **Execute TFTP Commands:**

Enter the following commands at the U-Boot prompt:

```
# Set the router's IP address
```

```
setenv ipaddr 192.168.1.1
```

```
# Set the IP address of your PC (the TFTP server)
```

```
setenv serverip 192.168.1.77
```

```
# Download the firmware and flash it
```

```
tftpboot norplusnand-ipq9574-single-3cardmlo.img && imgaddr=0x50000000 && source  
$imgaddr:script
```

Wait for this process to complete.

Step 3.2: Configure U-Boot Environment Variables

Now, you must tell the bootloader which cards are in which slots. For this guide, we assume:

- PCIE-1: DR9274-5G (0x0002)
- PCIE-2: DR9274-2G (0x0001)
- PCIE-3: DR9274-6G (0x0004)

Run the following commands:

```
# Set the machine ID for this 4-slot configuration
```

```
setenv machid 8050301
```

```
# --- Card Definitions ---
```

```
# Assign 5G card firmware to PCIE-1
setenv cnss2.bdf_pci1 0x0002
# Assign 2G card firmware to PCIE-2
setenv cnss2.bdf_pci2 0x0001
# Assign 6G card firmware to PCIE-3
setenv cnss2.bdf_pci3 0x0004

# --- Boot Arguments ---
# Set the final boot arguments to enable MLO and pass the card definitions
setenv bootargs 'console=ttyMSM0,115200n8 cnss2.enable_qcn9224_support=1
cnss2.bdf_pci1=0x0002 cnss2.bdf_pci2=0x0001 cnss2.bdf_pci3=0x0004
cnss2.enable_mlo_support=1'

# Save the new environment variables to flash
Saveenv
```

```
COM5 - PuTTY
PHY ID2: 0x1c13
SPI_ADDR_LEN=3
SF: Detected MX25U25635F with page size 256 Bytes, erase size 64 KiB, total 32 MiB
device 0 offset 0x780000, size 0x80000
SF: 524288 bytes @ 0x780000 Read: OK
CRC check good on phy fw file (0xE866)
PHYFW:Loading IRAM.....done.
PHYFW:Loading DRAM.....done.
phy fw image load good CRC-16 matches (0x10D0)
PHY ID1: 0x31c3
PHY ID2: 0x1c13
EDMA ver 1 hw init
Num rings - TxDesc:1 (0-0) TxCmpl:1 (0-0)
RxDesc:1 (0-0) RxFill:1 (0-0)
ipq9574_edma_alloc_rings: successfull
ipq9574_edma_setup_ring_resources: successfull
ipq9574_edma_configure_rings: successfull
ipq9574_edma_hw_init: successfull
eth0
PCI0 is not defined in the device tree
PCI Link Intialized
PCI Link Intialized
PCI Link Intialized
IPQ9574#
```

3.3: Card Firmware Reference

The values (0001, 0002, etc.) tell the firmware which driver to load. If your slot arrangement is different, use this reference:

- 0001: DR9274-2G radio
- 0002: DR9274-5G radio
- 0004: DR9274-6G radio
- 1006: DR9274-5G6G (Dual-band) radio
- 1003: DR9274-2.4G5G (Dual-band) radio

Finally, restart the router by typing reset and pressing Enter.

4. OpenWrt Wireless Configuration

After the router reboots, log in to OpenWrt using your UART console connection or via SSH (e.g., `ssh root@192.168.1.1`).

- **User:** root
- **Password:** asdf1s234

Step 4.1: Edit the Wireless Configuration

You must manually edit the wireless config file. It is crucial to use the correct MAC address for each card.

1. Open the file in vim:
`vim /etc/config/wireless`
2. Delete the existing content and paste in the template below.
3. **Crucially:** Replace the placeholder `macaddr` for `wifi0`, `wifi1`, and `wifi2` with the actual MAC addresses of your physical cards.
4. Set your desired network name (`YourNewtorkNameHere`) and password (`yourWonderfulStronPasswordHere`).

BEWARE: Do not change the device names (`wifi0`, `wifi1`, etc.). The custom firmware relies on this naming.

```
config wifi-device 'wifi0'
    option type 'qcawifi80211'
    option channel 'auto'
    option macaddr 'c4:4b:d1:70:02:69' //The MAC of your 5G card
    option hwmode '11bea'
    option disabled '0'
    option country '840'
    option htmode 'HT160'
    option txpower '3'
    option txantenna '4chains'
    option txchainmask '15'
    option rxantenna '4chains'
    option rxchainmask '15'
```

```
config wifi-iface
    option device 'wifi0'
    option network 'lan'
    option mode 'ap'
    option mld 'mld0'
    option ssid 'YourNewtorkNameHere'
    option cactimeout '0'
```

```
option encryption 'ccmp'  
option sae '1'  
option wds '1'  
option ieee80211w '2'  
option sae_pwe '1'  
list sae_group '19'  
list sae_password 'yourWonderfulStronPasswordHere'  
option shortgi '1'
```

```
config wifi-device 'wifi1'  
option type 'qcawifi80211'  
option channel 'auto'  
option macaddr 'c4:4b:d1:70:07:19' //The MAC of your 2G card  
option hwmode '11beg'  
option disabled '0'  
option country '840'  
option htmode 'HT40'  
option txpower '3'  
option txantenna '4chains'  
option txchainmask '15'  
option rxantenna '4chains'  
option rxchainmask '15'
```

```
config wifi-iface  
option device 'wifi1'  
option network 'lan'  
option mode 'ap'  
option mld 'mld0'  
option ssid 'YourNewtorkNameHere'  
option cactimeout '0'  
option encryption 'ccmp'  
option sae '1'  
option wds '1'  
option ieee80211w '2'  
option sae_pwe '1'  
list sae_group '19'  
list sae_password 'yourWonderfulStronPasswordHere'  
option shortgi '1'
```

```
config wifi-device 'wifi2'  
option type 'qcawifi80211'  
option channel 'auto'  
option macaddr 'c4:4b:d1:70:02:C1' //The MAC of your 6G card
```

```
option hwmode '11bea'
option disabled '0'
option country '840'
option htmode 'HT320'
option txpower '3'
option txantenna '4chains'
option txchainmask '15'
option rxantenna '4chains'
option rxchainmask '15'
```

```
config wifi-iface
    option device 'wifi2'
    option network 'lan'
    option mode 'ap'
    option mld 'mld0'
    option ssid 'YourNewtorkNameHere'
    option cactimeout '0'
    option encryption 'ccmp'
    option sae '1'
    option wds '1'
    option ieee80211w '2'
    option sae_pwe '1'
    list sae_group '19'
    list sae_password 'yourWonderfulStronPasswordHere'
    option shortgi '1'
```

This is the onboard 2.4G chip, which we disable

```
config wifi-device 'wifi3'
    option type 'qca9300'
    option channel 'auto'
    option macaddr 'c4:4b:d1:60:0A:A9' //The MAC of your 2G onboard card
    option hwmode '11bea'
    option disabled '1'
```

```
config wifi-iface
    option device 'wifi3'
    option network 'lan'
    option mode 'ap'
```

This defines the virtual MLO network

```
config wifi-mld 'mld0'
    option mld_macaddr '00:21:31:43:32:98' //Virtual MLO MAC, can be left as is
    option mld_ssid 'YourNewtorkNameHere'
```

5. Verification & Final Steps

Step 5.1: Restart and Verify Wireless

1. Save the wireless file in vim (Press Esc, type :wq, press Enter).
2. Reload the Wi-Fi service to apply the new settings:
wifi reload
3. Verify that the interfaces are active:
iwconfig

You should see your new interfaces (e.g., ath0, ath1, ath2) listed with Mode:Master and your correct ESSID.

Step 5.2: Access the LuCI Web Interface

You can now access the router's web interface (LuCI) from a browser at <http://192.168.1.1>.

Note on Logins:

- **Command Line (UART/SSH):** root / asdf1234
- **LuCI Web Interface:** admin / password (or as specified in your firmware)

You should see all your Wi-Fi interfaces up and running.

Happy MLO!

