



WiFi Halow Dongle Datasheet V1.0

WFDG8108

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History

Date	Version	Description	Draft	Approval
2026-09-22	V1.0	Release	Izw	Weili Wang

Overview

The WFDG8108 is a Wi-Fi HaLow USB dongle built on the Morse Micro MM8108 SoC and a USB interface. This design is capable of upgrading existing Wi-Fi 4/5/6/6E/7 network infrastructure to support Wi-Fi HaLow connectivity. Provided to customers as a fully Wi-Fi HaLow-compliant reference design, it facilitates the development of commercial USB gateways and simplifies the integration of the MM8108 chip into end products.

The WFDG8108 can be paired with a Raspberry Pi CM4/CM5, power supply, and antennas to serve as a complete Wi-Fi HaLow design solution for customers looking to evaluate and integrate the MM8108 into their own platforms. This powerful combination makes the MM8108 the core of a plug-and-play, compact solution, enabling seamless and efficient integration of Wi-Fi HaLow connectivity into existing devices.

Features

- USB gateway incorporating the latest-generation Morse Micro MM8108 chipset
- SMA antenna selected for optimal performance
- Robust design that can be seamlessly integrated into customer product designs
- Full compliance with IEEE 802.11ah specifications
- Ready for Wi-Fi Alliance Wi-Fi HaLow certification

Applications

- Upgrade Wi-Fi network infrastructure to Wi-Fi HaLow
- Internet connectivity for industrial, agricultural, residential, and urban environments
- Long-range, low-power IoT application development

Specification

- Single-stream maximum PHY rate of 43.3 Mbps at 8 MHz bandwidth
- Radio supporting worldwide Sub-1 GHz frequency bands
 - Frequency range: 850-950 MHz
 - Channel bandwidth options of 1/2/4/8 MHz
 - High power and extremely high efficiency integrated PA with maximum 26 dBm (400 mW) output power at 45% PA efficiency and 37% SoC efficiency
 - Novel PA architecture maintains efficiency at power backoff
 - Low-power receiver with integrated LNA, NF < 4 dB
- 802.11ah OFDM PHY with Wi-Fi Alliance Wi-Fi HaLow certification
 - BPSK & QPSK, 16-QAM, 64-QAM and 256-QAM Modulation
 - Automatic frequency and gain control
 - Packet detection and channel equalization
 - Forward Error Correction (FEC) coding and decoding
 - Modulation and Coding Scheme (MCS) levels 0-10
 - 1 MHz duplicate mode
 - Optional traveling pilots
- 802.11ah MAC with Wi-Fi Alliance Wi-Fi HaLow certification
 - Support for Station (STA) and Access Point (AP) roles

Listen-Before-Talk (LBT) access with energy detection

802.11 power save

802.11 fragmentation and defragmentation

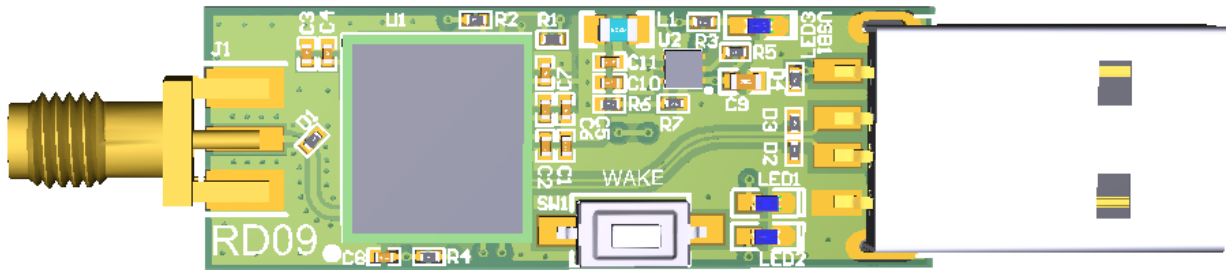
Power-Saving Target Wake Time (TWT) support for extended battery life

Automatic and manual MCS rate selection

- On-chip software stack assisting with host offload of Wi-Fi connection management
- USB 2.0 High-Speed compliant device interface
 - Integrated USB 2.0 PHY and device interface supporting High-Speed mode at 480 Mbps
- SDIO 2.0 compliant device interface
 - SDIO 2.0 High-Speed at 50 MHz max for 200 Mbps
 - Support for 1-bit and 4-bit data mode
 - Support for SPI mode operation at up to 80 MHz for 80 Mbps
- Power Management Unit (PMU) supporting various modes of operation
 - Single supply 3.0-3.6 V for integrated DC-DCs and LDOs
 - Multiple low-power modes (hibernate, deep sleep, snooze) support extreme power environments
- Broad spectrum of security features
 - Wi-Fi layer security, including Wi-Fi Protected Access version 3 (WPA3), Protected Management Frames (PMF), and Opportunistic Wireless Encryption (OWE)
 - Hardware support for Advanced Encryption Standard (AES) and Secure Hash Algorithm version 2 (SHA-2) functions (SHA-256, SHA-384, SHA-512)

Hardware System

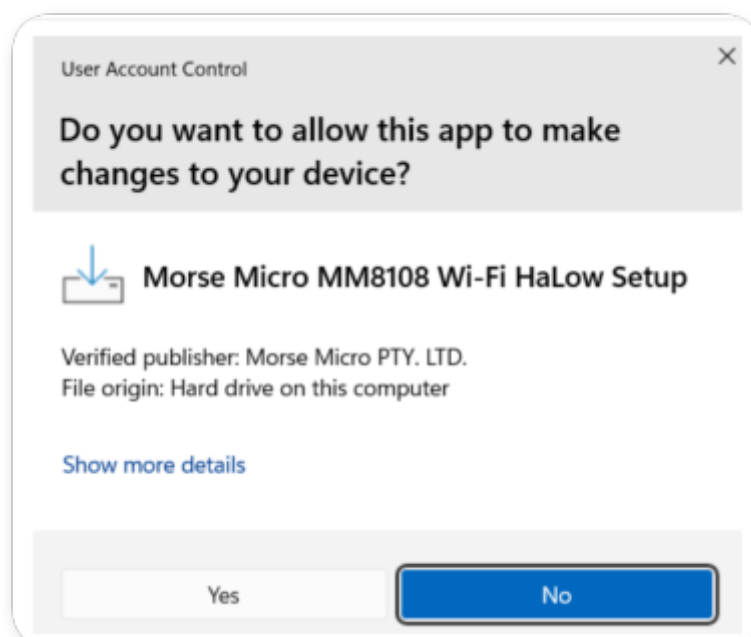
The image below shows WFDG8108 TopView.



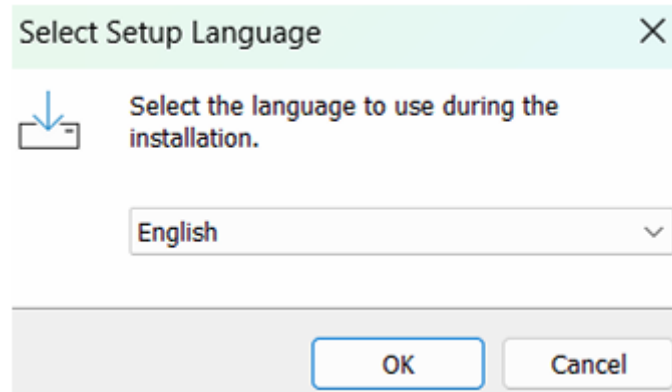
- A. **SMA Antenna Interface:** Supports SMA antennas directly or via an SMA extension cable.
- B. **MM8108 Module:** Features the Morse Micro MM8108 SoC.
- C. **DC 3.3V Power Supply:** Powered by a DC 3.3V switching power supply circuit.
- D. **USB Interface:** Provides USB 2.0 data connectivity and powers the WFDG8108 simultaneously.
- E. **WAKE Button:** Can be used to wake up the WFDG8108.
- F. **Dimensions:** L*W*H=64.3*14*7mm.

Installation

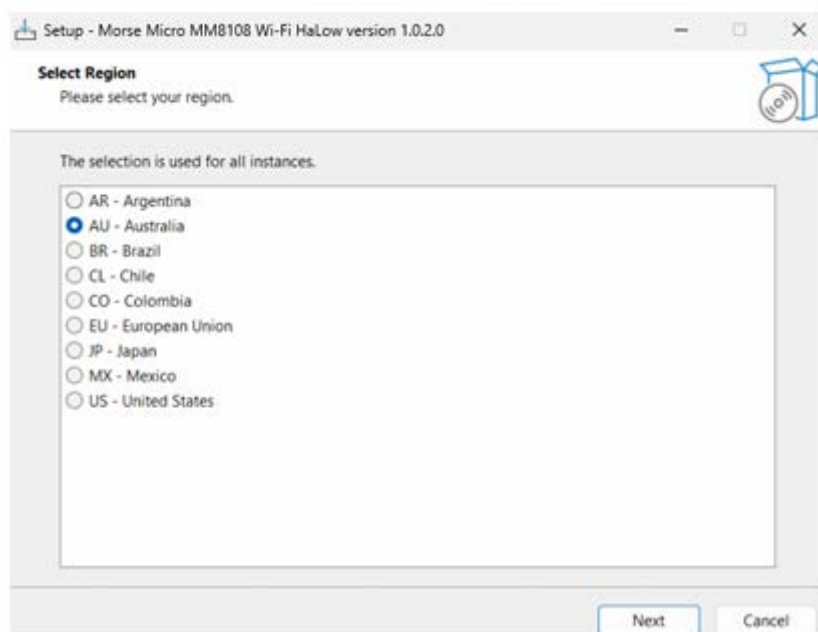
1. Download the installer from www.morsemicro.com/mm-u0. You do not need to plug in the network adapter to install the driver.
2. Double-click on the .exe installer file and click “Yes”:



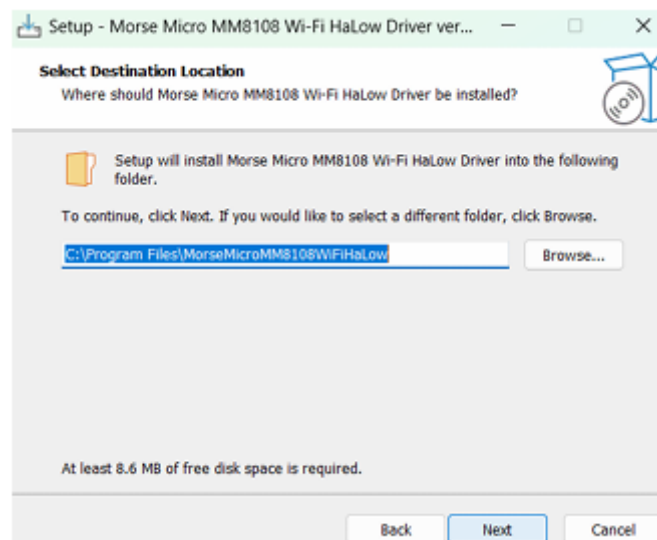
3. Select the language you will be using the product in, then click Next:



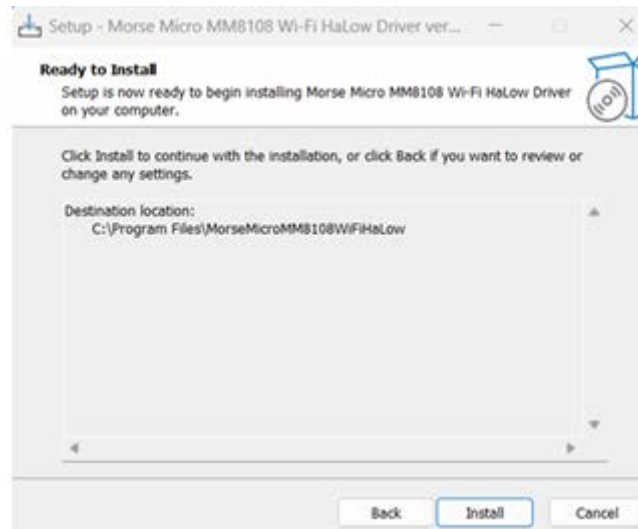
4. Select the region you will be using the product in, then click Next:



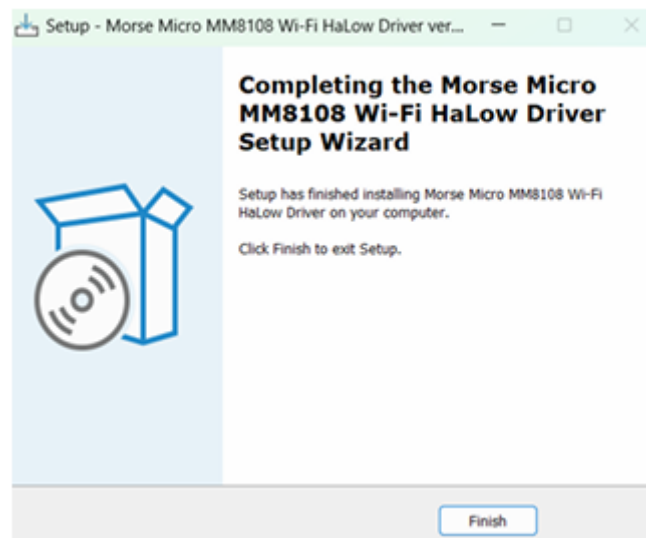
5. Confirm the installation directory. In most cases, you can leave this as the default. Click Next:



6. Click Install:



7. Click Finish to finalize the driver installation.



8. The driver is now ready to use. If the network adapter is not already plugged in, please plug it in now, ensuring that the SMA antenna is attached properly and pointing straight up for best performance.

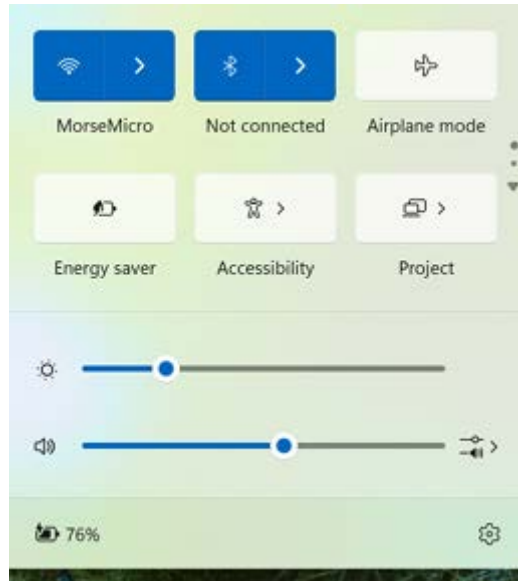
Setup

This section outlines how to set up a Wi-Fi HaLow connection after installing the driver.

1. Click on the Wi-Fi icon in the system tray:



2. In the menu that appears, click on the right arrow beside the Wi-Fi icon:



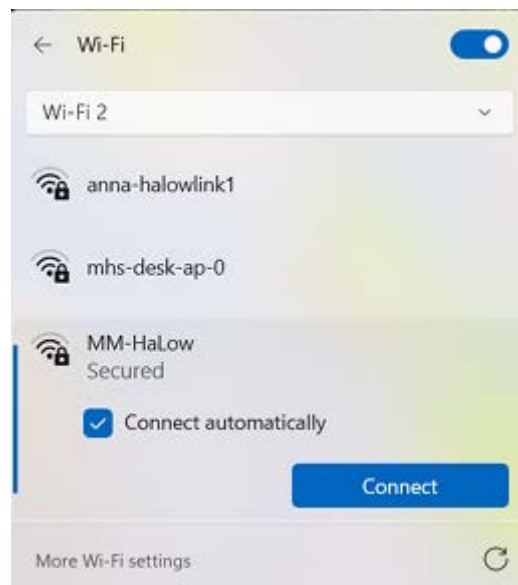
3. In the drop-down menu at the top of the scanned network list, the default option will usually be the regular Wi-Fi connection. Newly added adaptors, such as the Wi-Fi HaLow one, will be named numerically with the next available digit (e.g., Wi-Fi 2, Wi-Fi 3, Wi-Fi 4, etc.). See the troubleshooting section for how to identify the right connection. For now, we assume it is the second connection, “Wi-Fi 2”. The scan list should already be populated, but if not, or to refresh it, click the Refresh icon in the bottom right of the window.



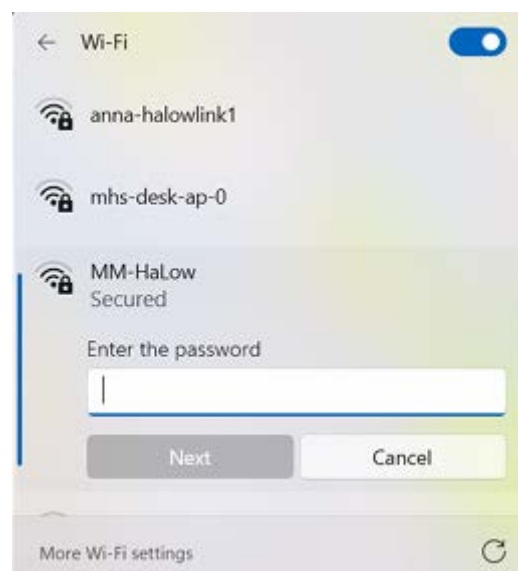
4. Select the network to connect to from the list:



5. Check “Connect Automatically” and then click Connect:



6. Enter the password for the network and click Next:



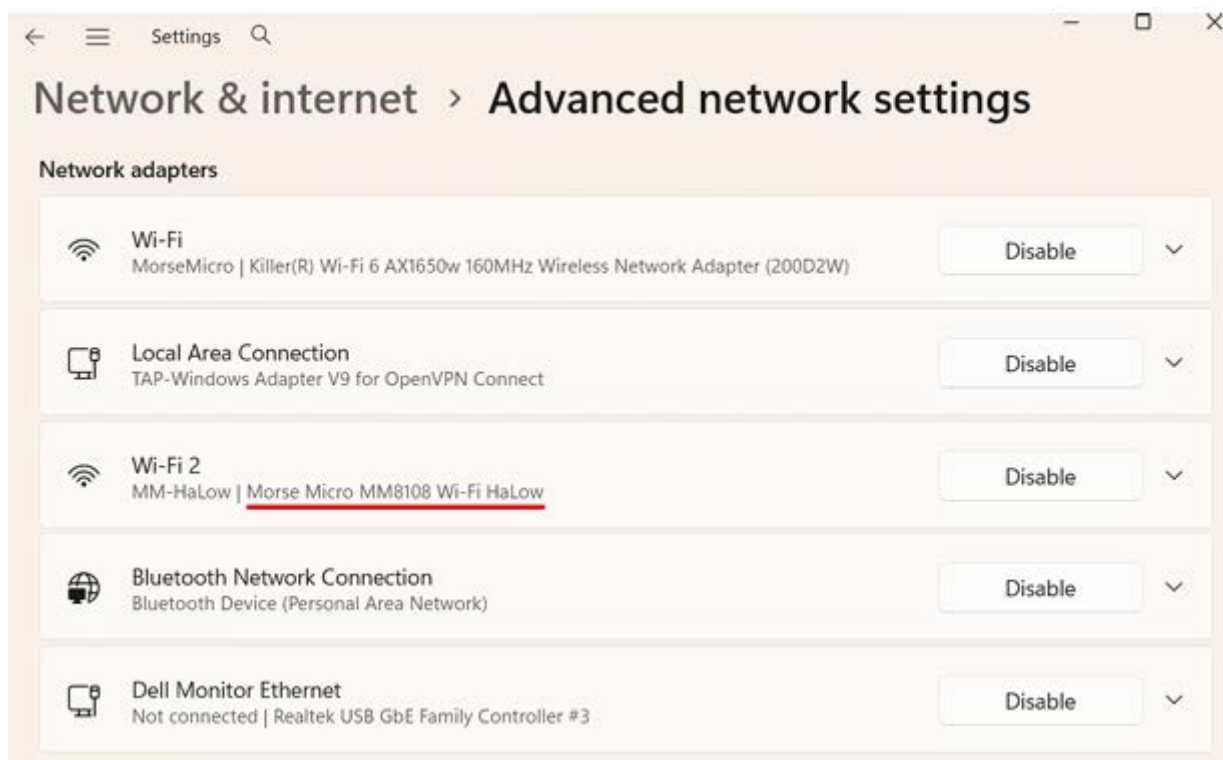
Your connection should be ready and will show the Wi-Fi icon in the system tray.



Troubleshooting

How to identify the Wi-Fi HaLow interface

Open Settings -> Network & internet -> Advanced Network settings. Look for the adapter with “Wi-Fi HaLow” mentioned:



HaLow Wi-Fi not visible in system tray

Note that there is no separate Wi-Fi icon for HaLow. Click on the normal Wi-Fi icon like the one circled in red below:



You see a drop-down menu to select between different Wi-Fi interfaces. Usually, Wi-Fi HaLow is the second (or last) interface in the list.

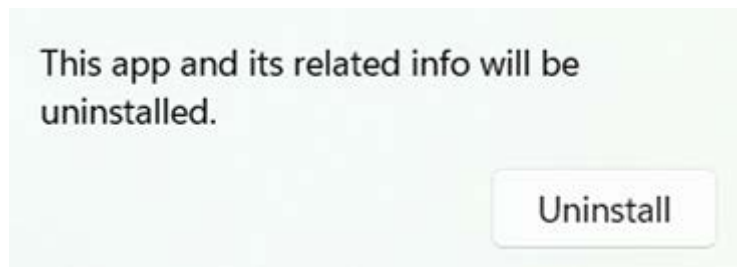
Uninstall the driver

The standard application uninstall process can be used for the driver:

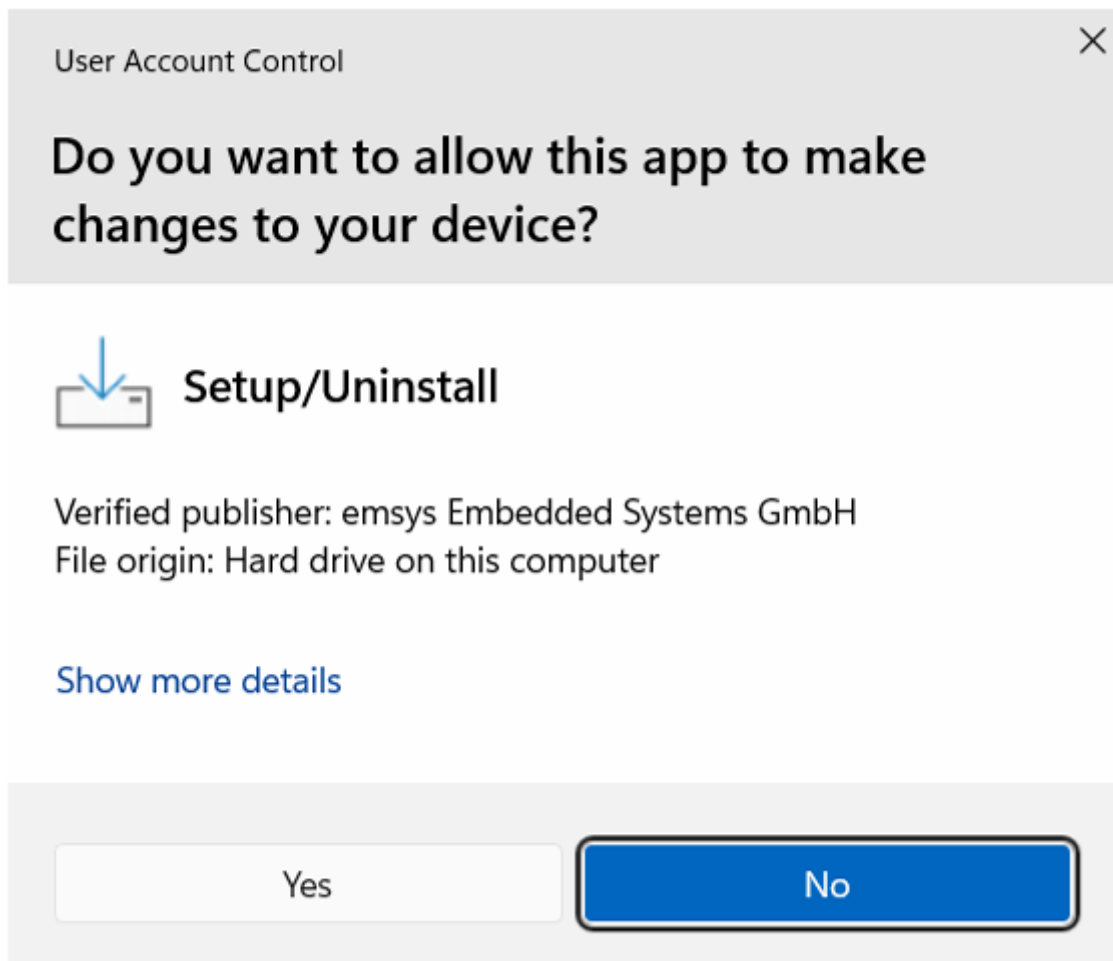
1. Right-click on the Start button, select Installed Apps
2. Find the entry for the HaLow driver and click on the 3 dots to the right, then select Uninstall:

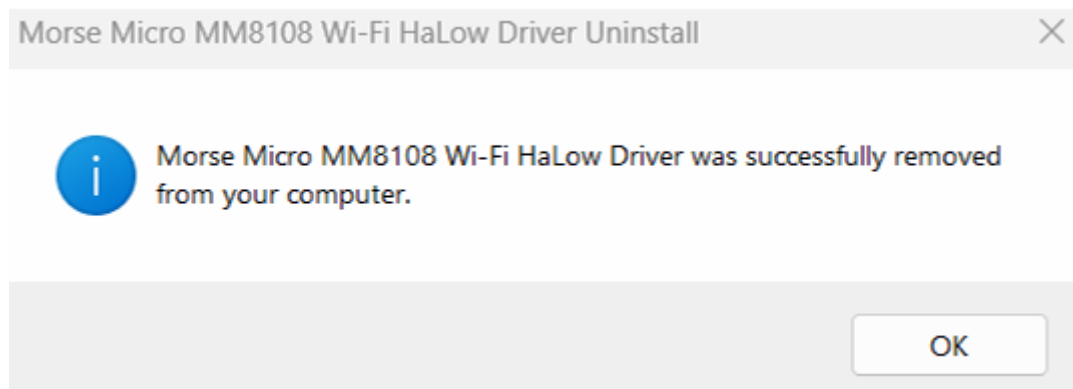
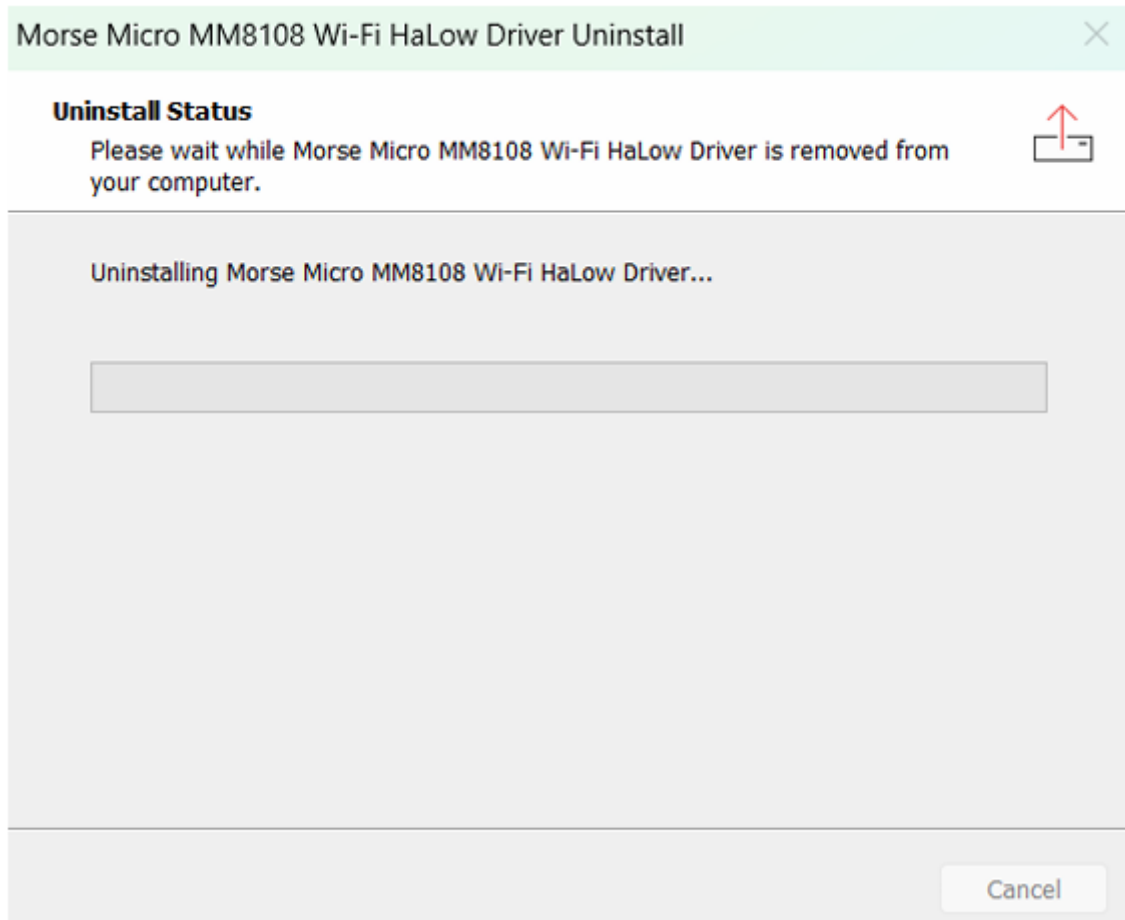
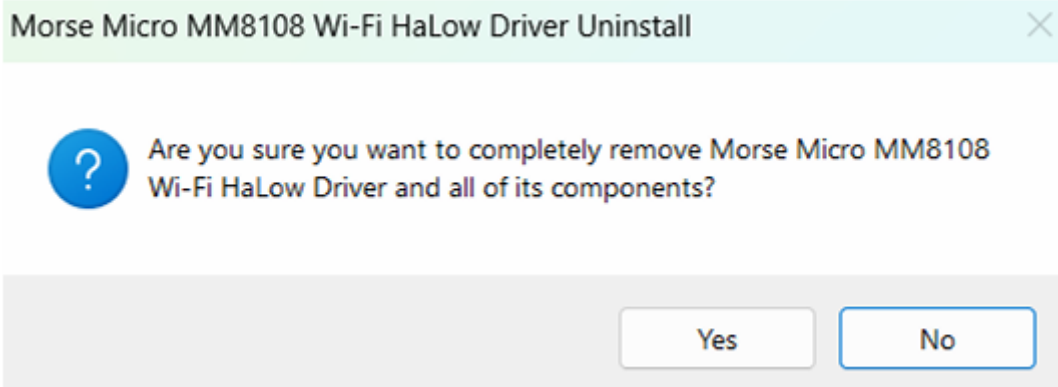


3. A prompt will appear. Click Uninstall:



4. Follow the prompts to complete the uninstallation:





HaLow shows up as a Wi-Fi 6 interface

Because of how Microsoft enumerates interfaces in Windows, the Wi-Fi HaLow interface appears as the 6th interface added to the system. It overlaps with the marketing name “Wi-Fi 6” but does not indicate that the Wi-Fi HaLow driver is operating in any mode other than Wi-Fi HaLow.

Revision History

Version Number	Release Date	Release Notes
1	15 Sep 2026	Initial Release

Reference

1. Our USB dongle is primarily designed with reference to the MM8108-EKH19 Evaluation Kit.
https://www.morsemicro.com/resources/product_brief/MM8108-EKH19-Product-Brief.pdf
2. Mm8108 usb dongle Linux driver
<https://github.com/MorseMicro>

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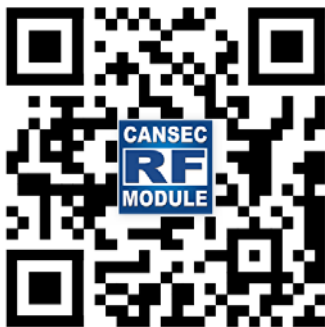
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