When it **Absolutely Must** Connect

802.11ah Wi-Fi HaLow™ SDIO/SPI module with enhanced features for hosted embedded systems

SX-SDMAH

◗ Product Overview

SX-SDMAH is an 802.11ah Wi-Fi HaLow SDIO/SPI module enabled by Morse Micro's MM6108. It features a host SDIO or SPI interface to operate with a processor or a microcontroller. It supports up to 8MHz channel bandwidth to improve the maximum data throughput in the countries allowing 8MHz usage. Its small footprint design with the integrated antenna connector saves the PCB space and allows a more flexible embedded system design. The SX-SDMAH also features high-transmission power to gain more distance and coverage.

◗ Benefits

Data Transfer over Further Distances

The SX-SDMAH features higher transmission power than other Wi-Fi HaLow modules enabled by MM6108 IC. It ensures the best performance in its data throughput over long distances, and also provides wide coverage of Wi-Fi HaLow radio signal.

Improved Data Throughput

The SX-SDMAH supports up to 8MHz channel bandwidth to allow data transmission at up to 32.5Mbps PHY bit rate. It will improve the user experiences with Wi-Fi HaLow in regions where 8MHz channel bandwidth usage is allowed. Improved data throughput also enhances the experience with a large-scale IoT network.

SDIO Host Interface for Linux OS

The SDIO host interface has been widely used in legacy Wi-Fi systems. The SX-SDMAH offers more options for the embedded system design. It also eliminates a performance constraint with certain processors with SPI interface.

SPI Host Interface for RTOS

The SX-SDMAH supports the SPI host interface for RTOS embedded systems.

Small Footprint

The SX-SDMAH is the small footprint module integrating the antenna connector to save PCB space and simplify the PCB design.
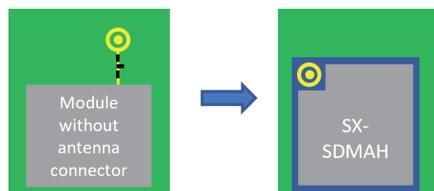
◗ Embedded System Examples

- Wi-Fi HaLow™ access point
- Gateway
- Ethernet wireless bridge
- Wi-Fi extender
- IP camera, thermography camera
- 3D scanner
- GNSS receiver
- Vehicle telemetry devices
- High-end sensors (e.g. vibration sensors)
- Access control system

◗ Key Features

- Complies with IEEE 802.11ah
- 1/2/4/8MHz channel bandwidth support
- Up to 32.5Mbps PHY bit rate
- Transmission power of +23dBm or higher (target)
- Access point and station mode
- SDIO/SPI interface
- Enhanced Open/WPA3 security
- Power-saving mode
- Modular certification for the United States and Canada (plan)
- Linux/Free RTOS driver support

Specifications

Name	SX-SDMAH-R2-US/SX-SDMAH-US
Chipset	MM6108
Host Interface	SDIO for Linux SPI for FreeRTOS
Wi-Fi Standard	802.11ah Wi-Fi HaLow
Antenna Connector	MHF1
Operating Voltage	VDD: 3.3V VDDIO: 3.3V VDDFEM: 3.3V or 5V (US)
Operating Environment	Temperature: -40 - 85°C Humidity: 15% - 95% w/o condensation
Storage Environment	Temperature: -40 - 85°C Humidity: 15% - 95% w/o condensation
Size	17mm × 18mm × 2.65mm
Weight	1.6 grams
Package Type	60-pin LGA
Modular Certification	US, Canada

Block Diagram

SX-SDMAH-R2 SYSTEM BLOCK DIAGRAM
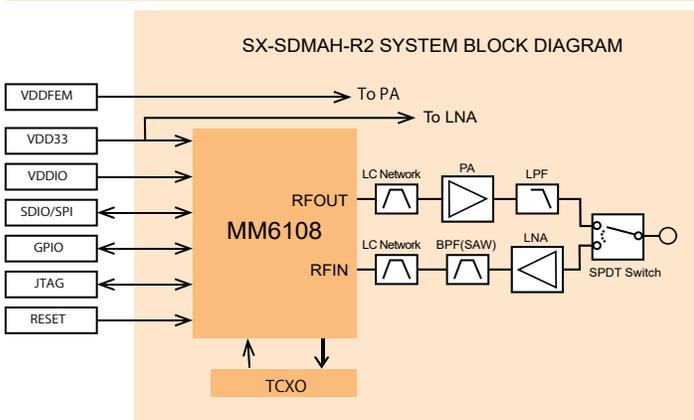
Product SKUs

Part Number	MoQ	Description
SX-SDMAH-R2-US	500	Reel
SX-SDMAH-R2-SP-US	1	Cut Reel
SX-SDMAH-R2-EVK-US	1	Evaluation kit with Raspberry Pi
SX-SDMAH-R2-EVB-US	1	Raspberry Pi HAT Board
SX-SDMAH-US	500	Reel
SX-SDMAH-SP-US	1	Cut Reel
SX-SDMAH-EVK-US	1	Evaluation kit with Raspberry Pi
SX-SDMAH-EVB-US	1	Raspberry Pi HAT Board

*1 SX-SDMAH-R2-US is recommended for new design.

Mechanical Specifications

(units: mm)
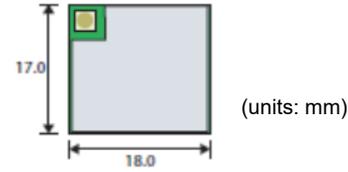
Evaluation

SX-SDMAH-EVB-US/
SX-SDMAH-R2-EVB-US

SX-SDMAH-EVK-US/SX-SDMAH-R2-EVK-US

For Linux driver evaluation:

- SX-SDMAH Linux driver evaluation image for Raspberry Pi 4 model B
- Linux kernel version 5.15 (SX-SDMAH), 6.1 (SX-SDMAH-R2)
- hostapd/wpa_supplicant version 2.10
- Configurable to an access point or a station
- SX-SDMAH command line tool
- Network test command: ping, iperf, iw, etc.

1	Prepare the required hardware • SX-SDMAH-EVK/SX-SDMAH-R2-EVK or SX-SDMAH-EVB/SX-SDMAH-R2-EVB and Raspberry Pi 4 model B
2	Prepare the evaluation OS image • Request the evaluation image from Silex's website and load into a micro SD card
3	Refer to the evaluation setup guide to start • Instructions in the user guide available on our website

For FreeRTOS IoT SDK:

- FreeRTOS for STM32U575 Nucleo Board
- Application development platform for station devices
- Necessary items:
  - SX-SDMAH-EVB-US or SX-SDMAH-R2-EVB-US
  - NUCLEO-U575ZI-Q
- Configurable to an access point or a station
- SX-SDMAH command line tool
- Network test command: ping, iperf, iw, etc.

For more information on SX-SDMAH, please visit:
www.silextechnology.com/connectivity-solutions/embedded-wireless/sx-sdmah

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