



# AMWx06-A1x Datasheet



AMW006-A1U 'Hopper-U'



AMW006-A1W 'Hopper-W'

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## About this Document

This document provides information for the WiConnect serial Wi-Fi application and the AMWx06-A1x 'Hopper' module available from ACKme Networks.

Products covered by this guide include:

- AMWx06-A1W 'Hopper-W'
- AMWx06-A1U 'Hopper-U'

Further information about WiConnect is available in the WiConnect Reference manual online at:

<http://wiconnect.ack.me>

## Organization

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# 1 Introduction

The AMWx06-A1x ‘Hopper’ module is a through-hole module adaptor that allows the AMW006 or AMW106 ‘Numbat’ Wi-Fi module to be fitted to any board conforming to the de-facto standard 2mm pitch 2x10 pin sockets commonly used in embedded applications. The Hopper contains either an AMW006 module or a AMW106 module, collectively referred to in this document as AMWx06.

The module is a self-contained low-power Wi-Fi networking module with onboard microcontroller. Each Hopper is licensed to run ACKme WiConnect firmware. WiConnect provides a feature-rich and easy-to-use interface for host microprocessors requiring features including a HTTP webserver with REST API, secure TCP/UDP networking connections, file system, wireless software updates, and access to the goHACK.me IoT (Internet of Things) cloud. Features of the Hopper module adapter are detailed in Table 1 below.

The Hopper comes in two variations:

- the Hopper-U with u.FL antenna connectors
- the Hopper-W with wire antennas fitted



**Figure 1. AMW006-A1U ‘Hopper-U’  
Module Adapter**



**Figure 2. AMW006-A1W ‘Hopper-W’  
Module Adapter**

For details of the AMWx06 ‘Numbat’ module, see the ADS-AMWx06 Datasheet and the ARG-AMWx06 Reference Guide.

**Table 1. AMWx06-A1x Features**

Feature	AMWx06-A1x ‘Hopper’
Product Number	AMWx06-A1x
Module style	Pluggable module adapter
Serial Interfaces	4-wire UART SPI Slave I2C
Total GPIO pins	11
Indicators	3 x LEDs
Antennas	2 x wire (Hopper-W) 2 x u.FL socket (Hopper-U)
Power supply	3.3V

## 2 Feature Identification

Table 2. AMWx06-A1x Expansion Header Connections

Pin #	Type	Hopper	AMWx06
H1-1	PWR	VDD_3V3	VDD_3V3
H1-2	-	UART_TX (OUT)	GPIO_12
H1-3	-	UART_RX (IN)	GPIO_11
H1-4	GPIO	GPIO_20	GPIO_20
H1-5	-	RESET_N	RESET_N
H1-6	GPIO	WAKE	GPIO_22
H1-7	GPIO	GPIO_23	GPIO_23
H1-8	GPIO	GPIO_17	GPIO_17
H1-9	GPIO	GPIO_19	GPIO_19
H1-10	GND	GND	GND

Pin #	Type	Hopper	AMWx06
H2-10	GPIO	I2C_SDA	GPIO_15
H2-9	GPIO	I2C_SCL	GPIO_14
H2-8	-	SPI_SCK (IN)	GPIO_2
H2-7	-	SPI_CS (IN)	GPIO_3
H2-6	GPIO	UART_RTS (OUT) <sup>1</sup>	GPIO_10
H2-5	GPIO	GPIO_21	GPIO_21
H2-4	N/C	-	-
H2-3	GPIO	SPI_MISO (OUT)	GPIO_0
H2-2	GPIO	UART_CTS (IN) <sup>1</sup>	GPIO_9
H2-1	-	SPI_MOSI (IN)	GPIO_5

**NOTES**

1. The UART\_RTS and UART\_CTS signals may be swapped as described in Section 3.2. The default direction is shown in the table.

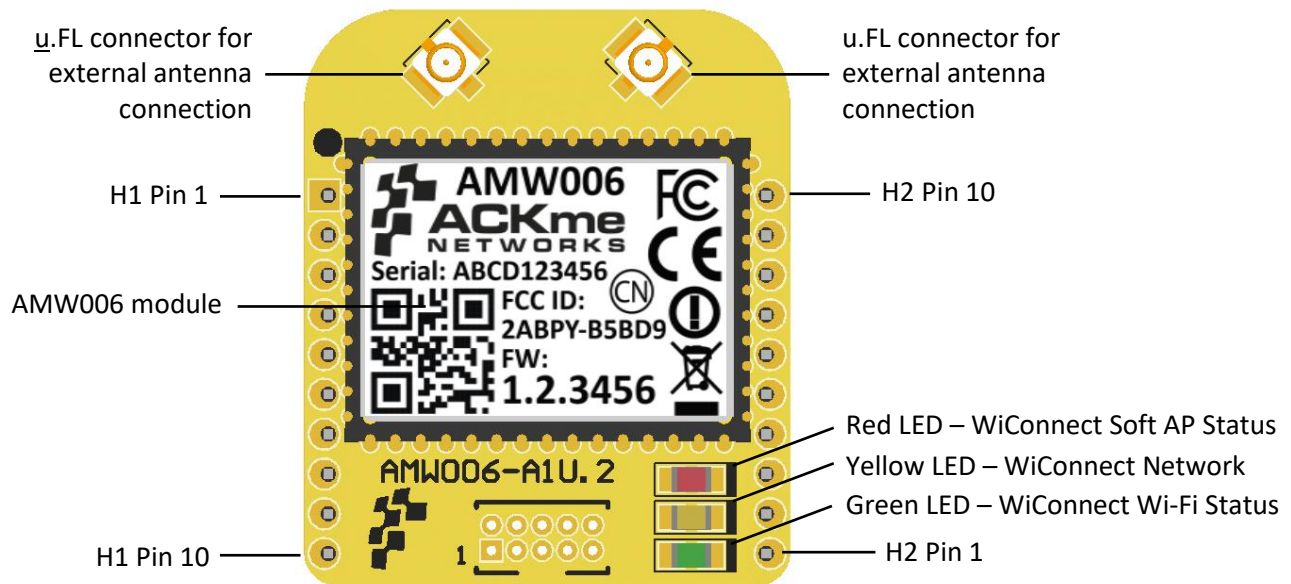


Figure 1 - AMW006-A1U Features

AMWx06-A1W features are identical to AMWx06-A1U features with the exception of the antenna connections.

### 3 Compatibility with AMW004-A01 (Hornet)

The AMWx06-A1x (Hopper) module adapter is pin-for-pin compatible with the existing ACKme AMW004-A01 (Hornet) module adapter with the exception of the UART RTS/CTS connections. A full description of RTS/CTS compatibility is described in this section.

#### 3.1 Serial Communications Primer

In traditional RS-232 serial UART communication, there are two ends of a communication link. One end is the Digital Terminating Equipment (DTE = Computer terminal) and the other end is the Digital Communications Equipment (DCE = modem).

The serial link between these two pieces of equipment can be configured to use hardware flow control signals to control data flow on the link. Hardware flow control is used by the equipment on each end of the link to signal when data is ready to be sent, and when the equipment is ready to receive more data. There are typically two hardware flow control signals known as RTS (Ready to Send) and CTS (Clear to Send).

The RTS (Ready-to-Send) signal is an output from the DCE (modem) and the CTS (Clear to Send) is an output from the DTE (computer terminal).

#### 3.2 Hopper RTS/CTS Compatibility

The UART flow control signals on the original ACKme AMW004-A01 Hornet module adapter match the traditional RTS/CTS hardware flow control implementation described in Section 3.1 above. Since a module adapter is effectively a modem, the Hornet RTS signal is an output, and the Hornet CTS signal is an input.

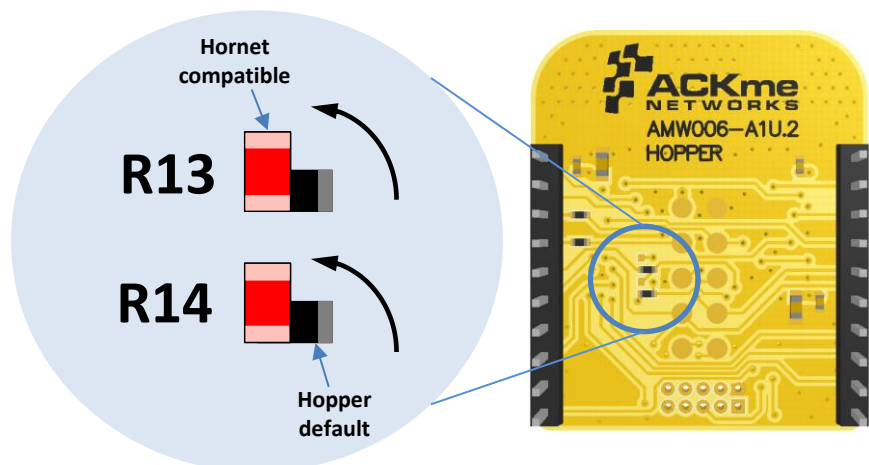
Unfortunately, designers of the de-facto standard 2mm pitch 2x10 pin sockets commonly used in wireless embedded applications swapped the definition of RTS and CTS. As a result, the Hornet module adapter does not work out-of-the-box with baseboards designed for the de-facto embedded wireless standard if UART hardware flow control is enabled.

Hopper on the other hand, is configured with RTS/CTS signals that match the de-facto standard. There are two ways to enable backwards compatibility with the AMW004-A01 Hornet:

1. Swap the RTS/CTS signals on your host microcontroller, assuming the host MCU offers this feature.
2. Two zero ohm links, R13 and R14, on the underside of the Hopper PCB can be modified. After the modification, the operation of the Hopper and Hornet UART with hardware flow control is identical. A diagram showing how to make the modification is shown below.

The Hopper default configuration is shown on the Hopper board, and as horizontal orientation, black/gray in the detail diagram.

The Hornet compatible configuration is shown as red with vertical orientation, in the detail diagram.



## 4 Using WiConnect

For a description of how to use the AMWx06-A1x module adapter with WiConnect, see the ARG-AMWx06E Reference Guide and the WiConnect Reference Guide, available online at <http://wiconnect.ack.me>.

A number of simple and more sophisticated example applications are also provided to help you get the most out of WiConnect and the AMWx06 module.

To obtain the board version, issue the WiConnect 'version' command as shown below.

```
> version
WiConnect-2.1.0.15, Built:2015-02-02 20:23:14 for AMW006.4, Board:AMW006-A1W.1
```




**Note.** Early production Hopper module adapters return a slightly different board type: Board:AMW006-A01.1

## 5 Ordering Information

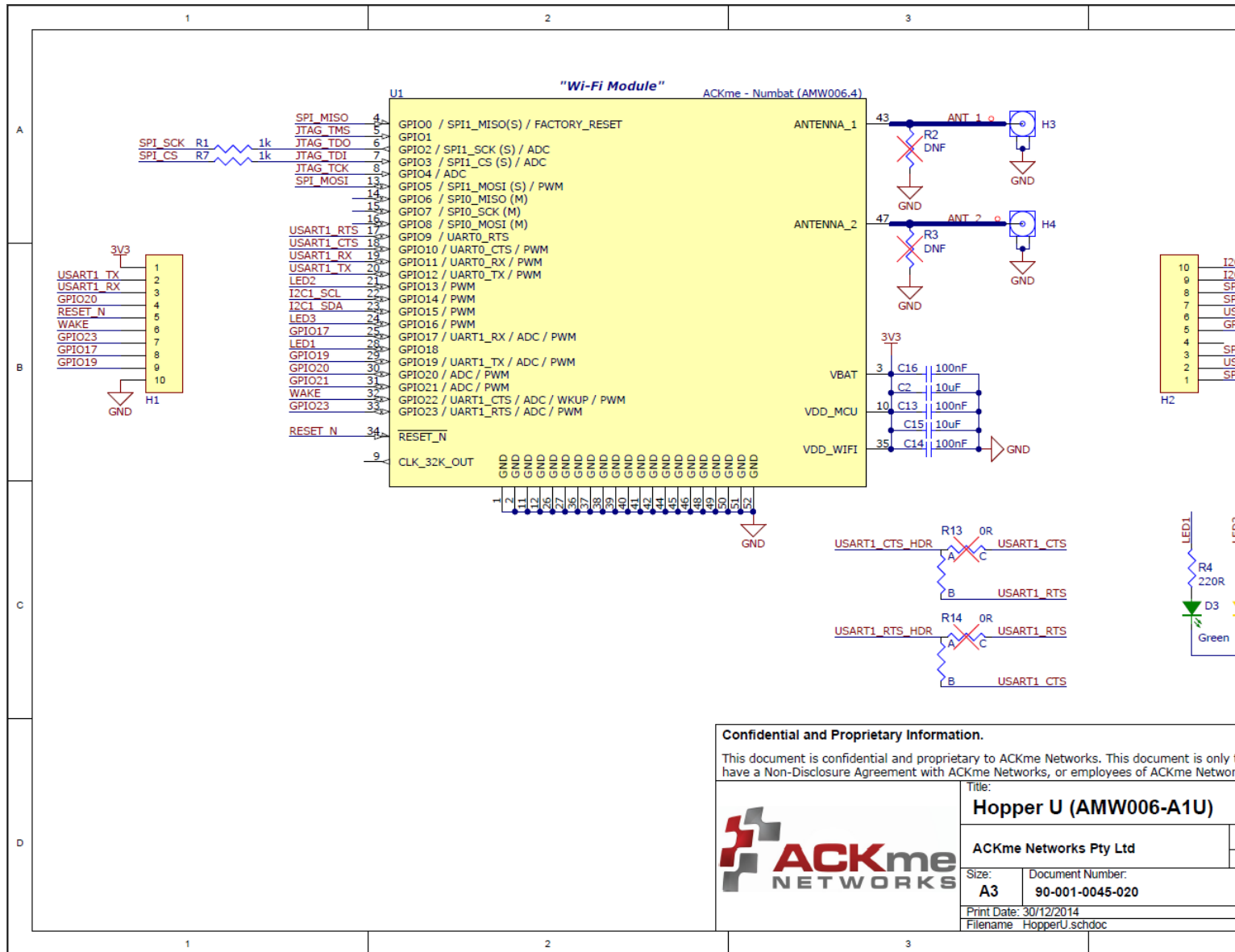
Table 4 provides ordering information for AMWx06-A1x and related evaluation boards.

**Note:** Modules ship with the latest available firmware unless otherwise stated. Customers can use the Zentri DMS (Device Management Service) to perform OTA (Over-The-Air) upgrades. If customers require volume orders of a specific firmware version (including older versions) contact Zentri for a custom part number. Minimum Order Quantities (MOQs) apply.

**Table 3. Ordering Information**

Part Number	Picture	Description
AMWx06-A1U 'Hopper-U'		Hopper-U module adapter. Includes AMWx06 module.
AMWx06-A1W 'Hopper-W'		Hopper-W module adapter. Includes AMWx06 module.
AAE001 'Marlin'		Bare bones evaluation board that takes an AMWx06-A1x Hopper module adapter. Does <b>NOT</b> include an AMWx06-A1x 'Hopper' module adapter!

## 6 Schematics & Mechanical Dimensions



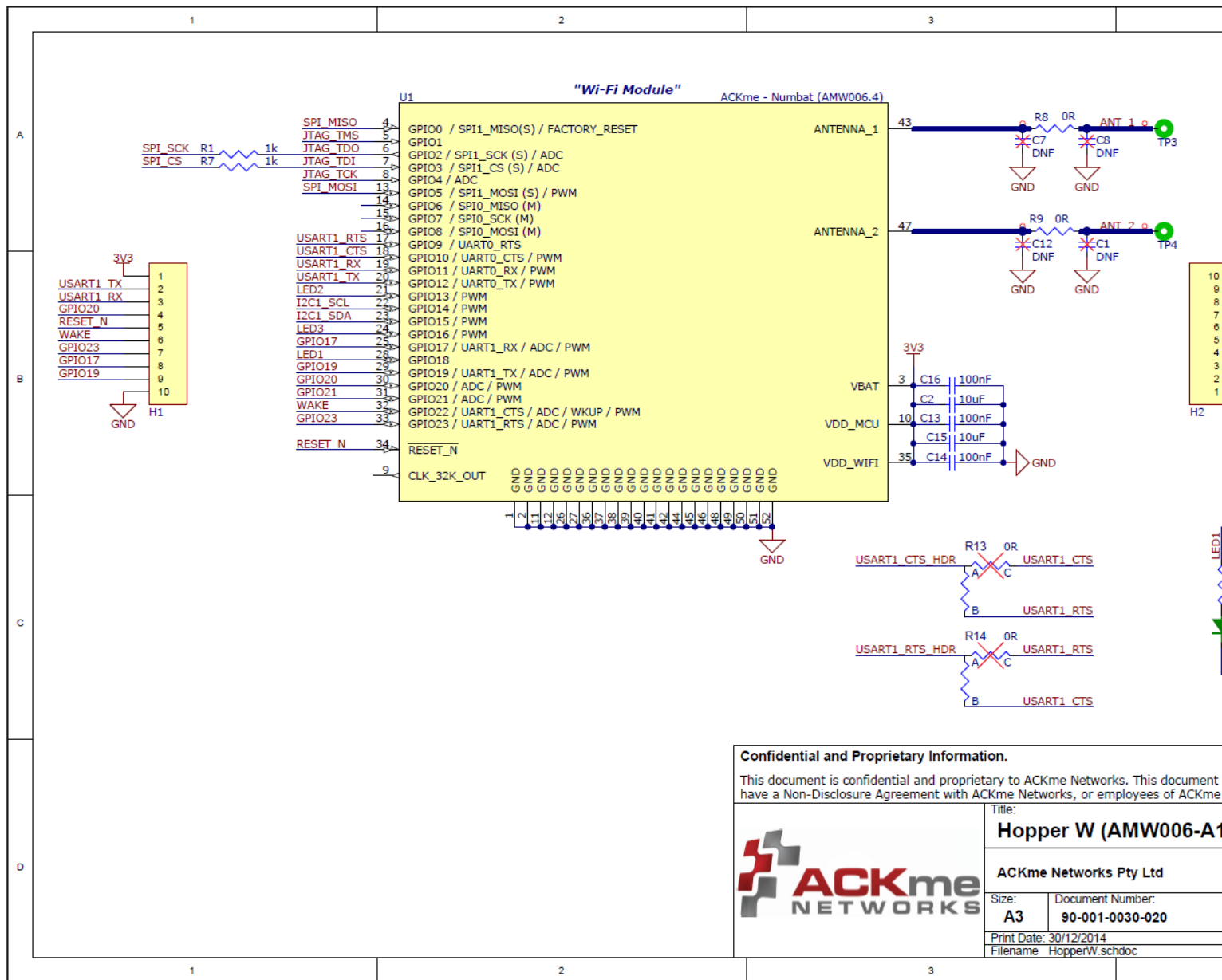
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		Print Date: 30/12/2014	
		Filename: HopperU.schdoc	



## Schematics & Mechanical Dimensions



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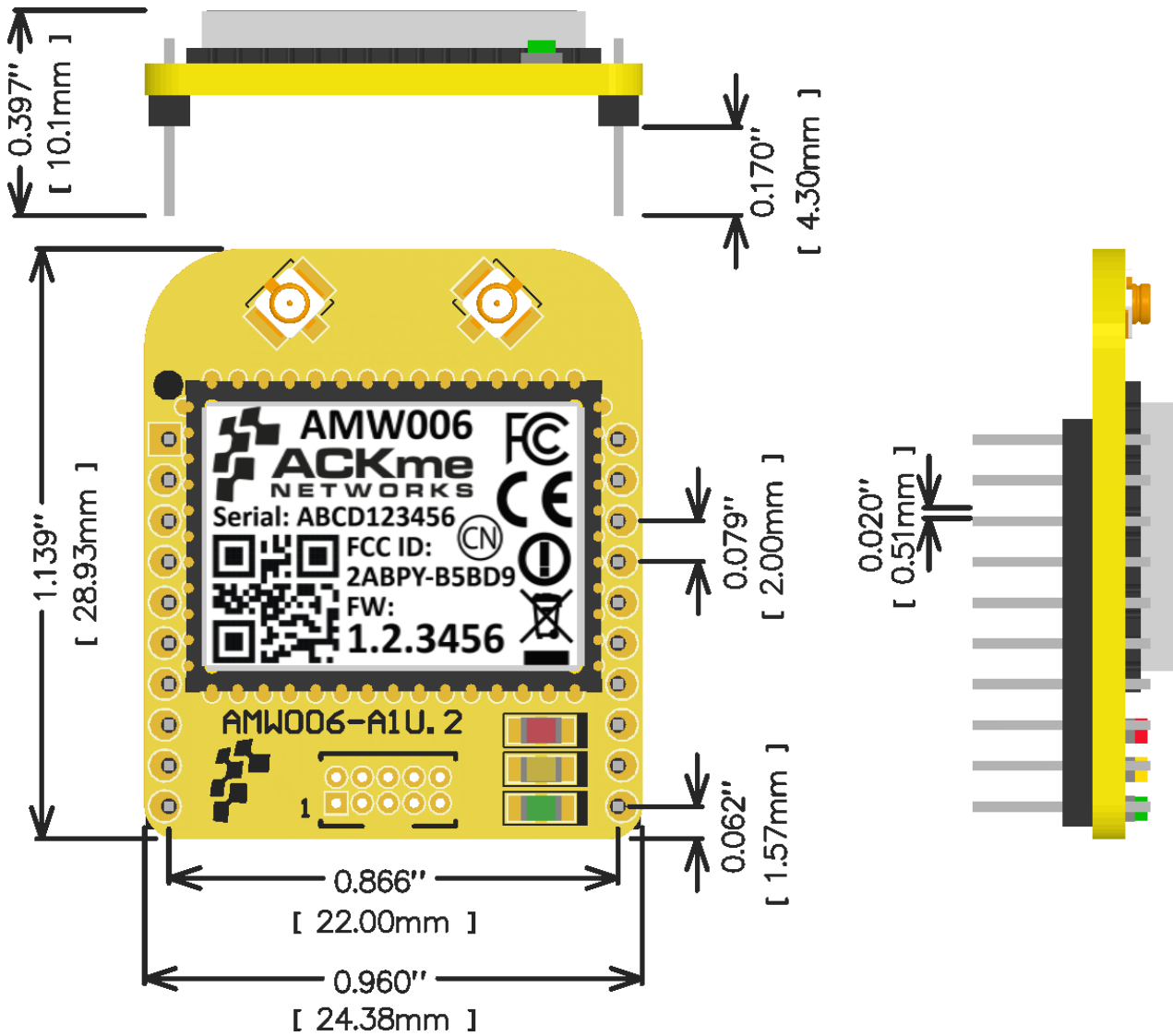
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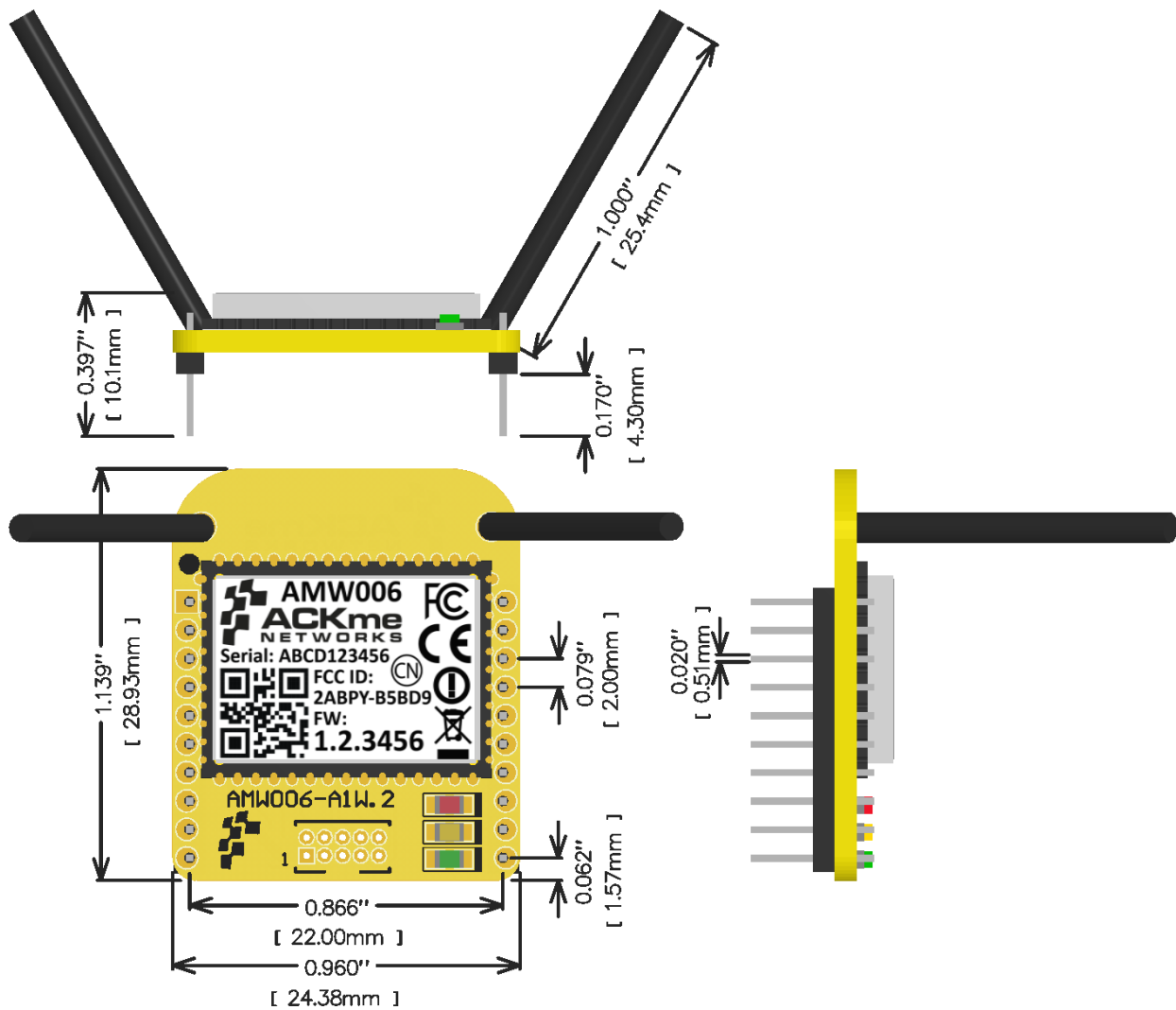
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Mechanical Dimensions for AMWx06-A1x 'Hopper U'



**Mechanical Dimensions for AMWx06-A1x 'Hopper W'**



## 7 Revision History & Glossary

### 7.1 Revision History

**Table 4: Document Revision History**

Revision	Date	Change Description
ADS-MW006-A1x-100R	February 12, 2015	First release
ADS-MW006-A1x-101R	July 8 12, 2015	Swapped RTS/CTS pins to match the default configuration at manufacturing
ADS-MW106-A1x-100R	September 15, 2015	First release of AMWx06 version of document.

### 7.2 Glossary

In most cases, acronyms and abbreviations are defined on first use. A comprehensive list of acronyms and other terms used in ACKme Networks documents are provided on the ACKme Networks website at <http://ack.me/FAQs/Glossary>.

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