



# AMW006-A1x Datasheet



AMW006-A1U 'Hopper-U'



AMW006-A1W 'Hopper-W'

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# 1 Introduction

The AMW006-A1x ‘Hopper’ module is a through-hole module adaptor that allows the AMW006 ‘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 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 AMW006 ‘Numbat’ module, see the ARG-AMW006 Datasheet and the ARG-AMW006 Reference Guide.

Table 1. AMW006-A1x Features

| Feature           | AMW006-A1x ‘Hopper’                               |
|-------------------|---|
| Product Number    | AMW006-A1x  |
| Module style      | Pluggable module adapter                          |
| Serial Interfaces | 4-wire UART<br>SPI Slave<br>I2C                   |
| Total GPIO pins   | 11  |
| Indicators        | 3 x LEDs  |
| Antennas          | 2 x wire (Hopper-W)<br>2 x u.FL socket (Hopper-U) |
| Power supply      | 3.3V  |

## 2 Feature Identification

Table 2. AMW006-A1x Expansion Header Connections

| Pin # | Type | Hopper        | AMW006  |
|-------|------|---------------|---------|
| 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                      | AMW006  |
|-------|------|-----------------------------|---------|
| 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.

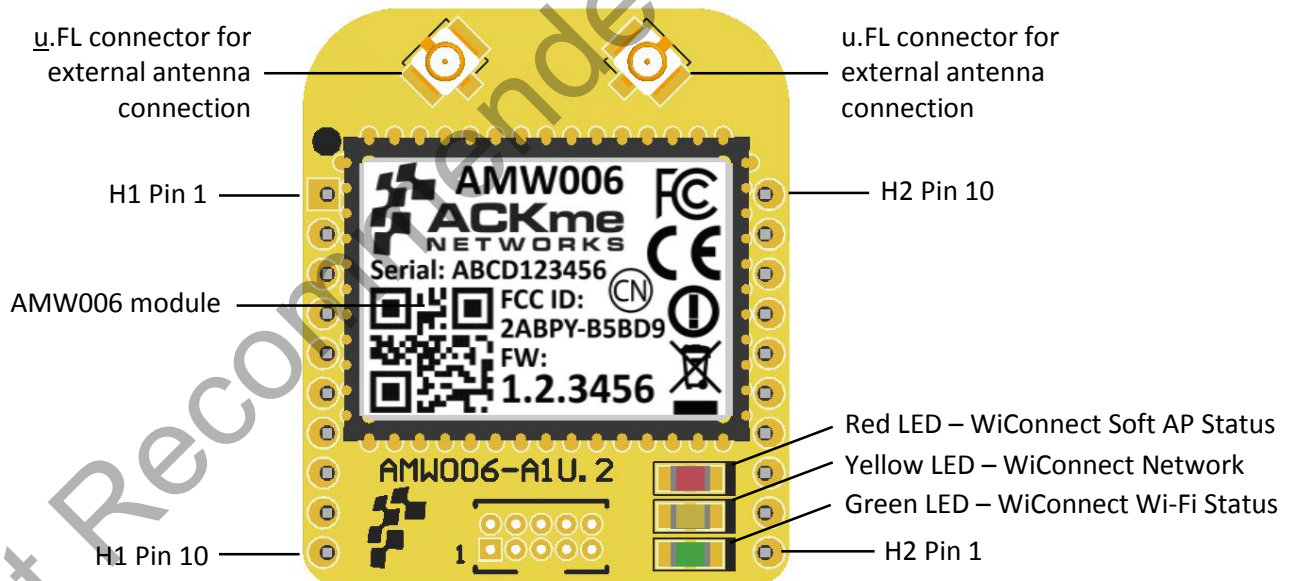


Figure 1 - AMW006-A1U Features

AMW006-A1W features are identical to AMW006-A1U features with the exception of the antenna connections.

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

The AMW006-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.

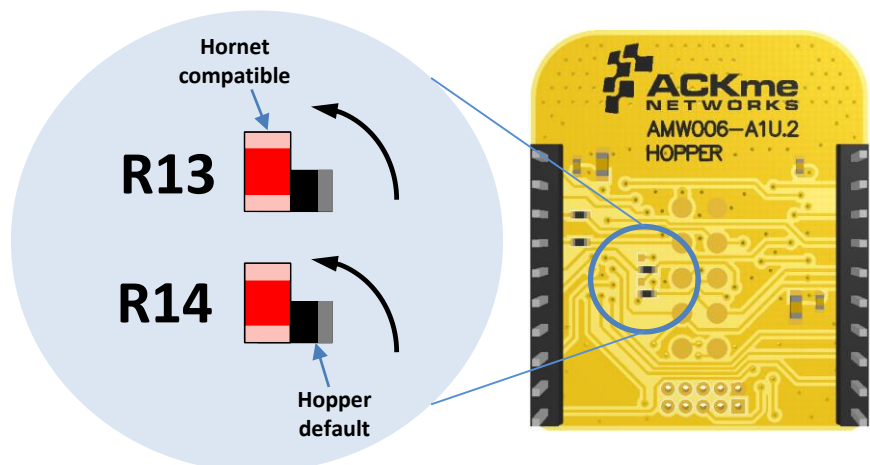
Unfortunately, designers of the de-facto standard 2mm pitch 2x10 pin sockets commonly used in wireless embedded applications swapped the definition of RTS and CTS. As a result, the Hornet module adapter does not work out-of-the-box with baseboards designed for the de-facto embedded wireless standard 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 AMW006-A1x module adapter with WiConnect, see the ARG-AMW006E 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 AMW006 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

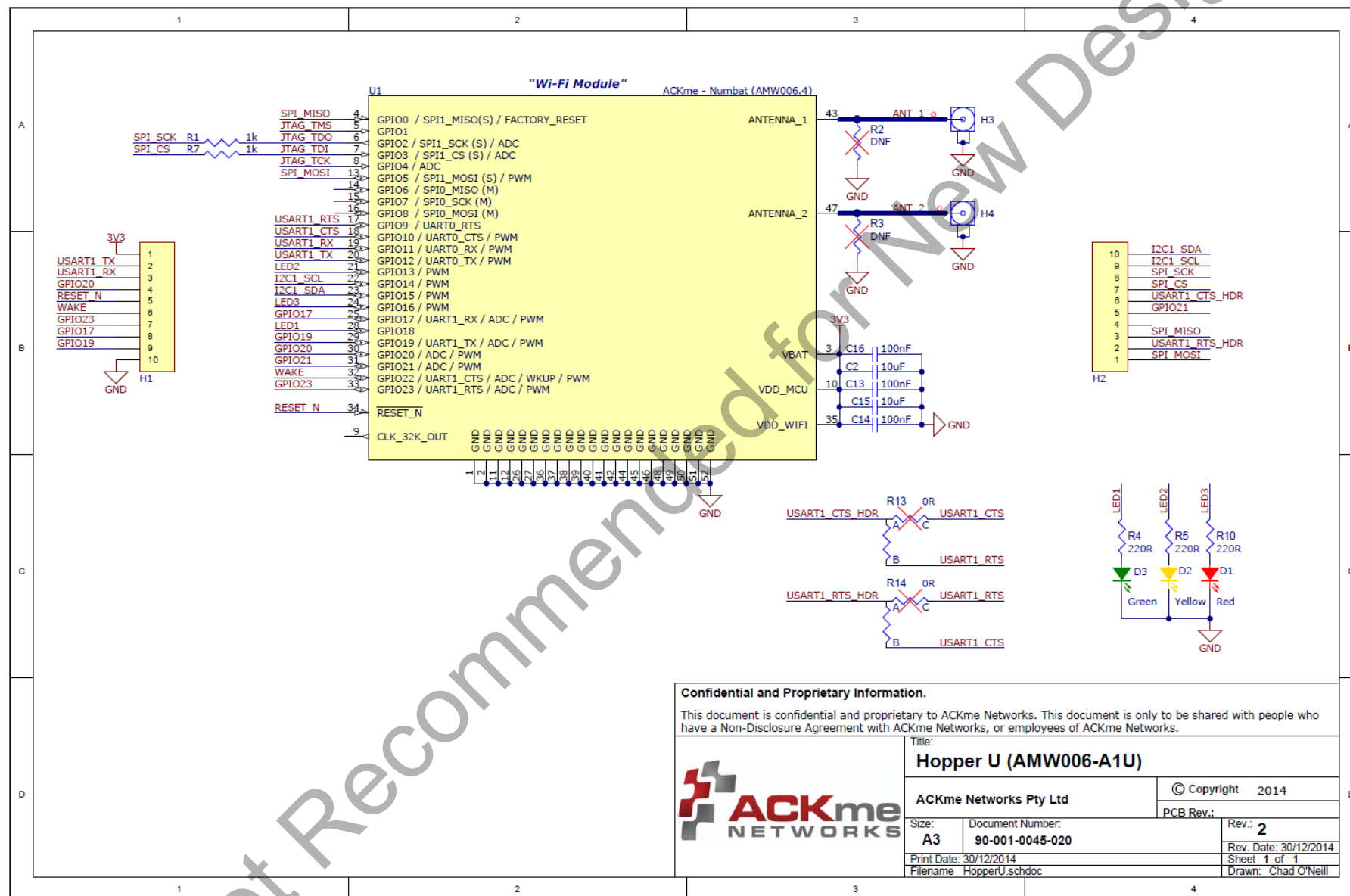
## 5 Ordering Information

Table 4 provides ordering information for AMW006-A1x and related evaluation boards.

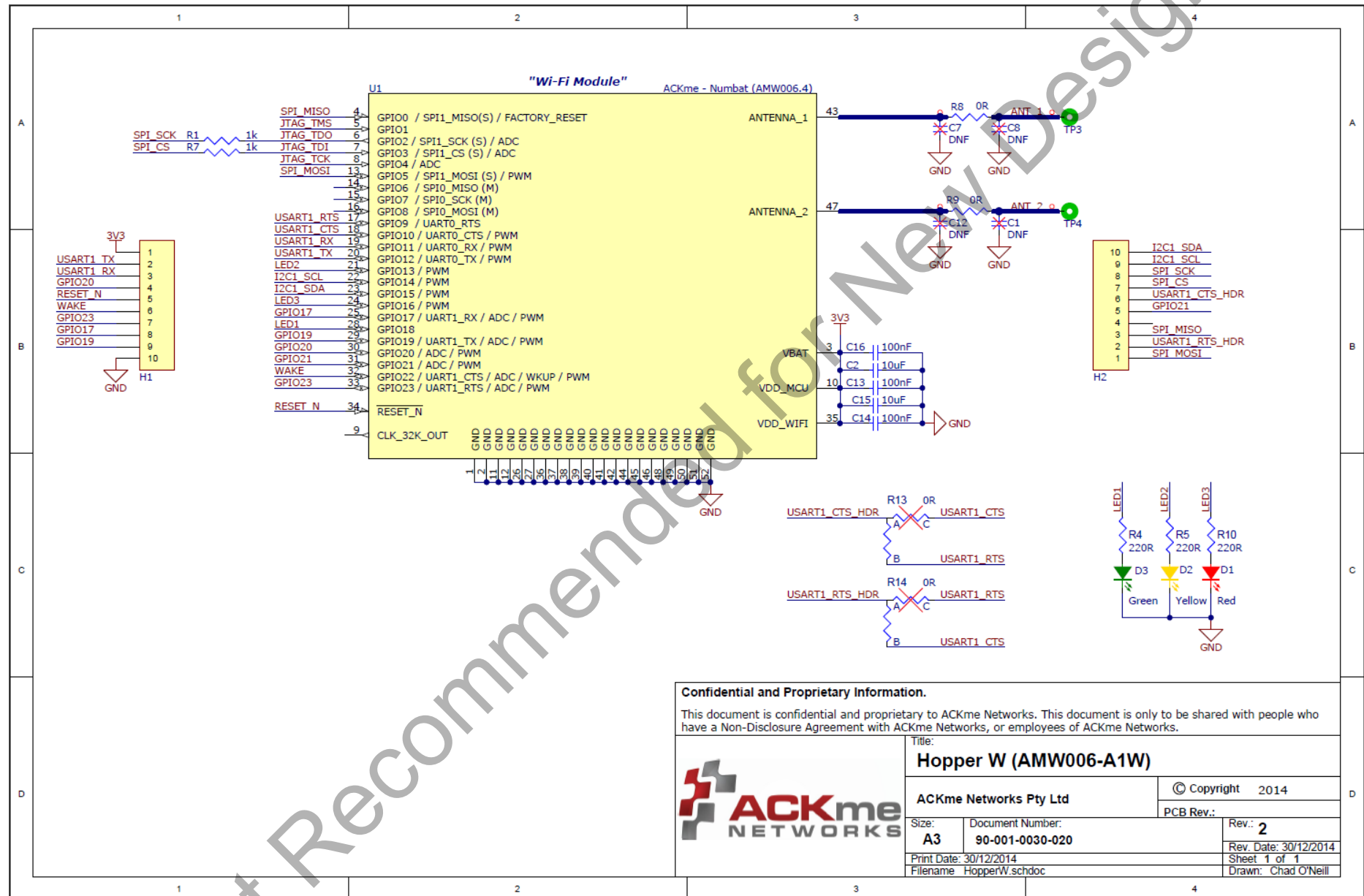
**Table 3. Ordering Information**

| Part Number              | Picture   | Description   |
|--------------------------|---|---|
| AMW006-A1U<br>'Hopper-U' |  | Hopper-U module adapter. Includes AMW006 module.  |
| AMW006-A1W<br>'Hopper-W' |  | Hopper-W module adapter. Includes AMW006 module.  |
| AAE001<br>'Marlin'       |  | Bare bones evaluation board that takes an AMW006-A1x Hopper module adapter.<br>Does <b>NOT</b> include an AMW006-A1x 'Hopper' module adapter! |

## 6 Schematics & Mechanical Dimensions

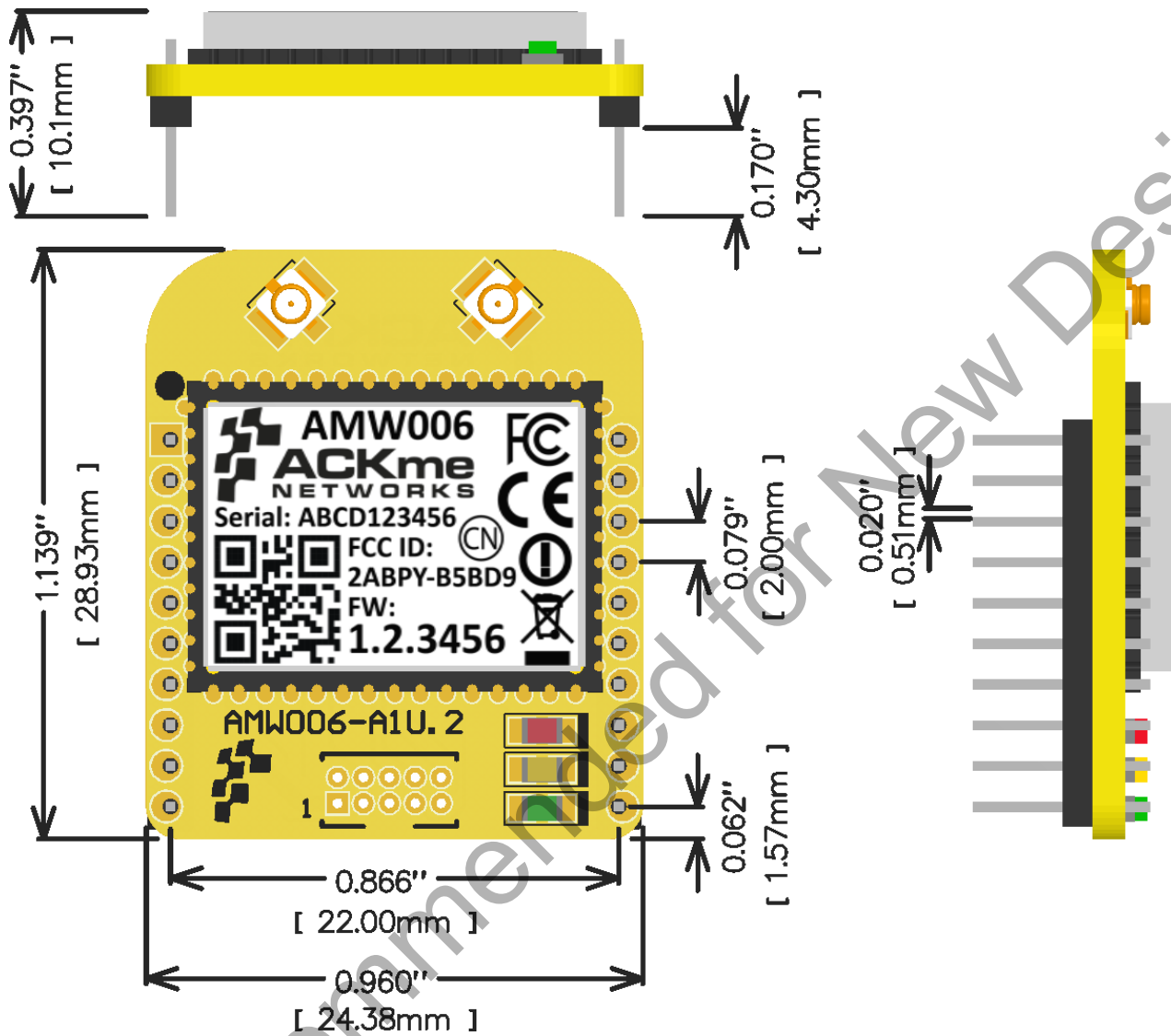




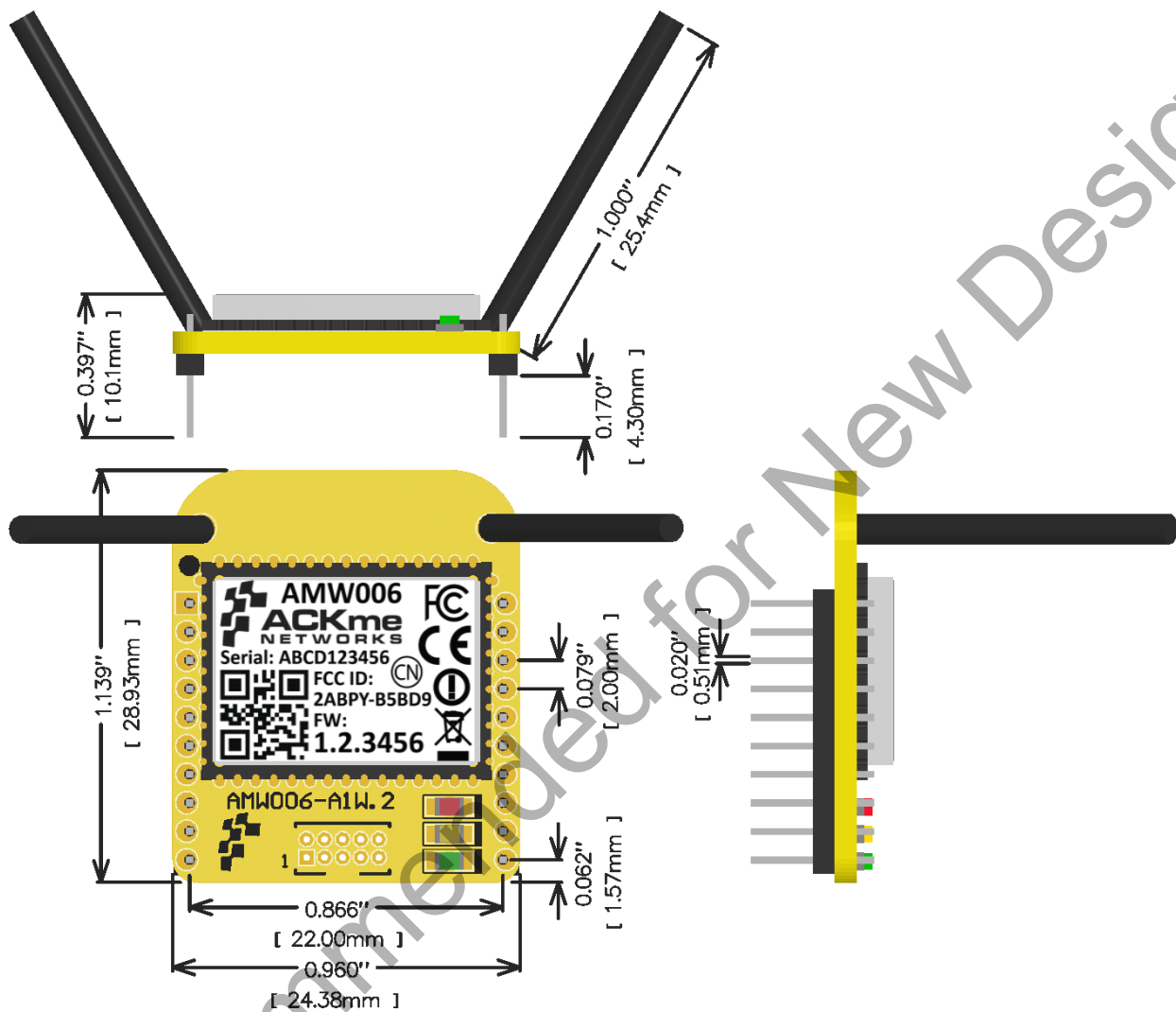




# Mechanical Dimensions for AMW006-A1x 'Hopper U'



# Mechanical Dimensions for AMW006-A1x 'Hopper W'



## 7 Revision History & Glossary

### 7.1 Revision History

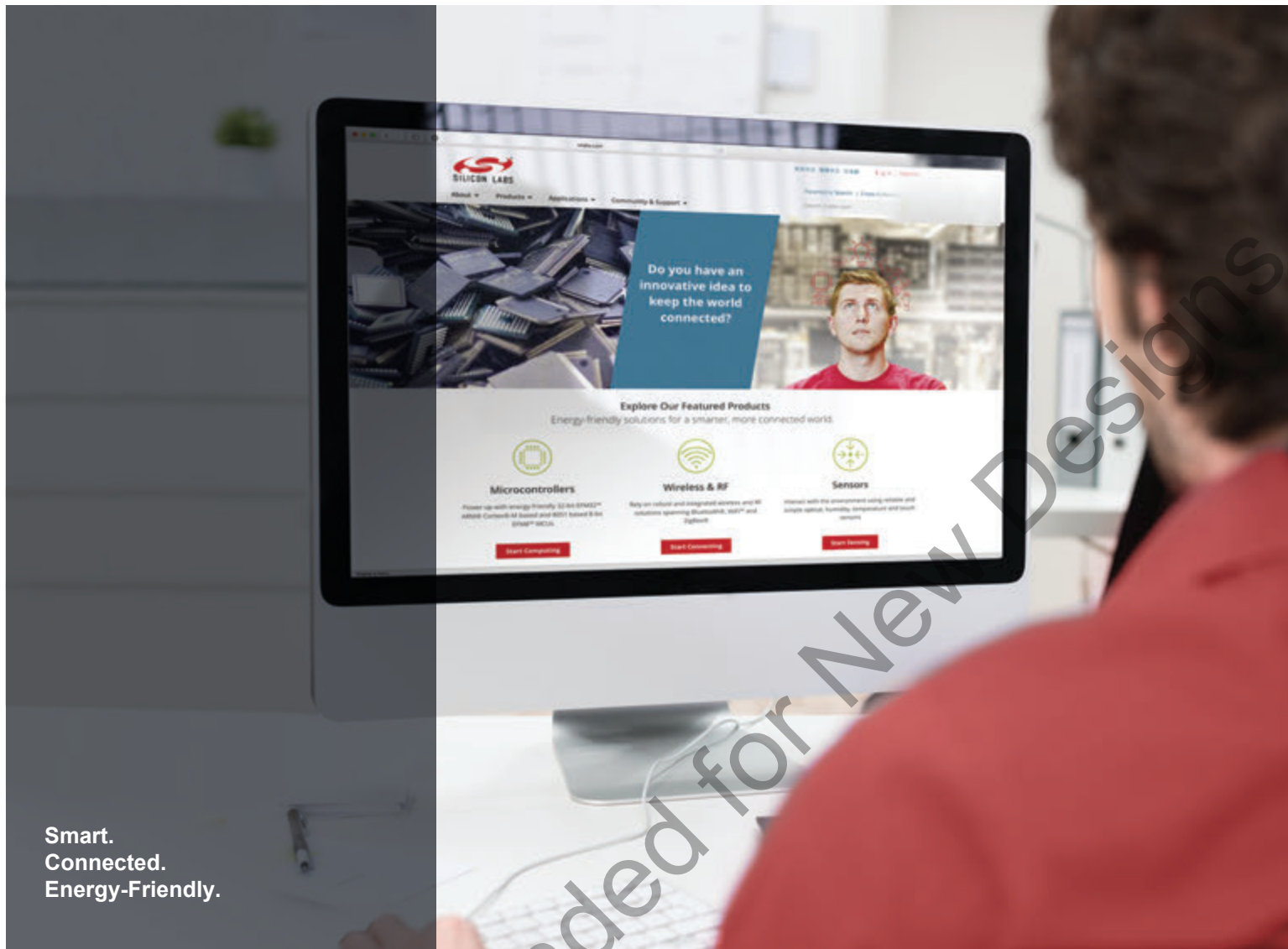
Table 4: Document Revision History

| 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 |

### 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>.

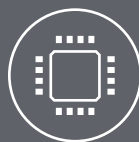


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