

# RZN-AEM05

## User Guide

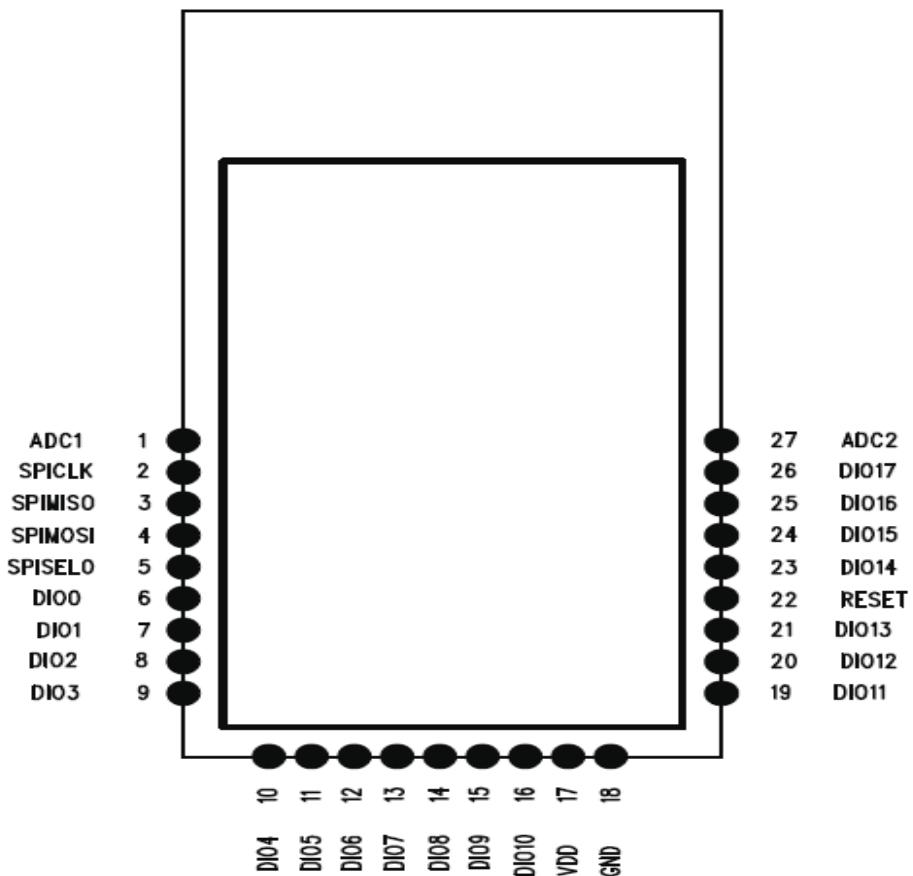


FCC ID : 2AHD  
BRZN-AEM05

## 1. Introduction

The RZN-AEN05 module provides designers with a ready-made component that provides a fully integrated solution for applications, using the IEEE802.15.4 standard in the 2.4-2.5GHz ISM frequency band [1], including JenNet-IP and ZigBee Smart Energy, and can be quickly and easily included in product designs. The modules integrate all of the RF components required, removing the need to perform expensive RF design and test. Products can be designed by simply connecting sensors and switches to the module IO pins. The modules use NXP's single chip IEEE802.15.4 Wireless Microcontroller, allowing designers to make use of the extensive chip development support material. Hence, this range of modules allows designers to bring wireless applications to market in the minimum time with significantly reduced development effort and cost.

## 2. Pin Configurations



Pin No	Pin Functions					Signal Type	Description
	Primary	Alternate Functions					
1	ADC1					3.3V	Analogue to Digital Input
2	SPICLK				PWM2	CMOS	SPI Master Clock Output or PWM2 Output

3	SPIMISO					CMOS	SPI Master In Slave Out Input
4	SPIMOSI				PWM3	CMOS	SPI Master In Slave Out Input or PWM3 Output
5	SPISEL0					CMSO	SPI Select From Module – SS0 Output
6	DIO0	SPISEL1	ADC3			CMOS	DIO0, SPI Master Select Output 1 or ADC input 3
7	DIO1	SPISEL2	ADC4	PC0		CMOS	DIO1, SPI Master Select Output 2, ADC input 4 or Pulse Counter 0 Input
8	DIO2*		RFRX	TIM0CK_GT		CMOS	DIO2, Radio Receive Control Output or Timer0 Clock/Gate Input
9	DIO3*		RFTX	TIM0CAP		CMOS	DIO3, Radio Transmit Control Output or Timer0 Capture Input
10	DIO4	CTS0	JTAG_TCK	TIM0OUT	PC0	CMOS	DIO4, UART 0 Clear To Send Input, JTAG CLK Input, Timer0 PWM Output, or Pulse Counter 0 input
11	DIO5	RTS0	JTAG_TMS	PWM1	PC1	CMOS	DIO5, UART 0 Request To Send Output, JTAG Mode Select Input, PWM1 Output or Pulse Counter 1 Input
12	DIO6	TXD0	JTAG_TDO	PWM2		CMOS	DIO6, UART 0 Transmit Data Output, JTAG Data Output or PWM2 Output
13	DIO7	RXD0	JTAG_TDI	PWM3		CMOS	DIO7, UART 0 Receive Data Input, JTAG Data Input or PWM 3 Output
14	DIO8	TIM0CK_GT	PC1	PWM4		CMOS	DIO8, Timer0 Clock/Gate Input, Pulse Counter1 Input or PWM 4 Output
15	DIO9	TIM0CAP	32KXTALIN	RXD1	32KIN	CMOS	DIO9, Timer0 Capture Input, 32K External Crystal Input, UART 1 Receive Data Input or 32K external clock Input
16	DIO10	TIM0OUT	32KXTALOUT			CMOS	DIO10, Timer0 PWM Output or 32K External Crystal Output
17	VDD				3.3V		Supply Voltage
18	GND				0V		Digital Ground
19	DIO11	PWM1		TXD1		CMOS	DIO11, PWM1 Output or UART 1 Transmit Data Output
20	DIO12	PWM2	CTS0	JTAG_TCK	ADO or SPISMOSI	CMOS	DIO12, PWM2 Output, UART 0 Clear To Send Input, JTAG CLK Input, Antenna Diversity Odd Output or SPI Slave Master Out Slave In Input
21	DIO13	PWM3	RTS0	JTAG_TMS	ADE or SPISMISO	CMOS	DIO13, PWM3 Output, UART 0 Request To Send Output, JTAG Mode Select Input, Antenna Diversity Even output or SPI Slave Master In Slave Out Output
22	RESETN					CMOS	Reset input
23	DIO14	SIF_CLK	TXD0 TXD1	JTAG_TDO	SPISEL1 or	CMOS	DIO14, Serial Interface Clock,
					SPISEL		UART 0 Transmit Data Output, UART 1 Transmit Data Output, JTAG Data Output, SPI Master Select Output 1 or SPI Slave Select Input
24	DIO15	SIF_D	RXD0 RXD1	JTAG_TDI	SPISEL2	CMOS	DIO15, Serial Interface Data or Intelligent Peripheral Data Out
25	DIO16	COMP1P	SIF_CLK	SPISMOSI		CMOS	DIO16, Comparator Positive Input, Serial Interface clock or SPI Slave Master Out Slave In Input
26	DIO17	COMP1M	PWM4	I2C DATA	SPISIMO	CMOS	DIO17, Comparator Negative Input, Serial Interface Data or SPI Slave Master In Slave Out Output
27	ADC2					3.3V	Analogue to Digital Input

### 3. Specifications

#### 3.1 Mechanical Information

- 1) Size : 16 x 30 x 1 (mm)
- 2) Antenna : uFl connector Type External Antenna (Max gain : 2 dBi)

#### 3.2 Electrical Characteristics

In most cases, the Electrical Characteristics are the same for both module and chip. They are described in detail in the chip datasheet. Where there are differences, they are detailed below.

##### 3.2.1 Maximum Ratings

Exceeding these conditions will result in damage to the device.

Parameter	Min	Max
Device supply voltage VDD	-0.3V	3.6V
All Pins	-0.3V	VDD + 0.3V
Storage temperature	-40°C	150°C

##### 3.2.2 Operating Conditions

Supply	Min	Max
VDD	2.0V	3.6V
Ambient temperature range	-40°C	85°C

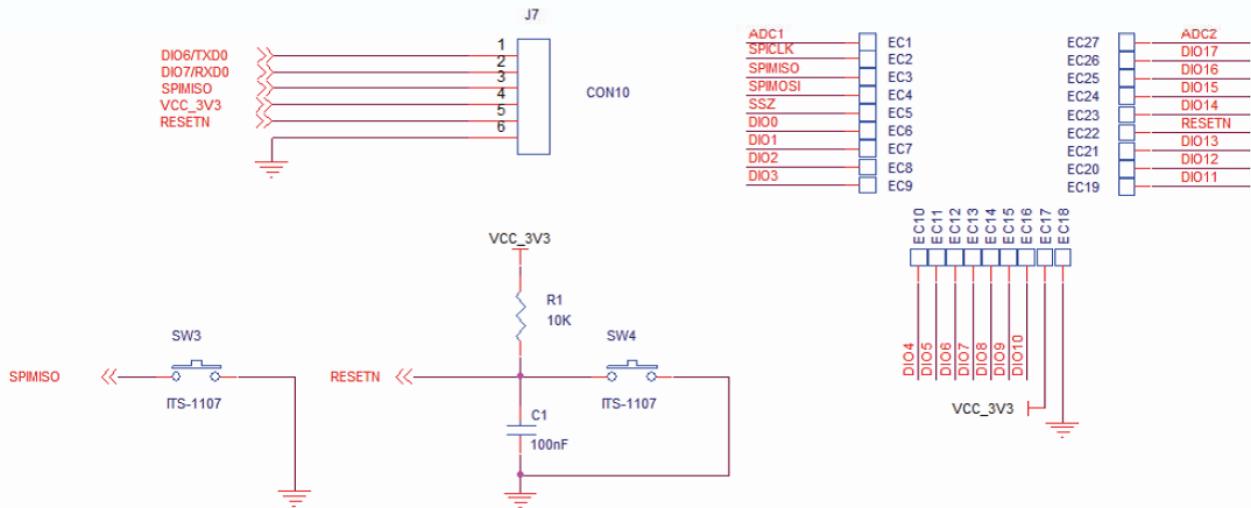
#### 3.3 Radio Transceiver

Typical RF Characteristics		Notes
Receive sensitivity	-95dBm	Nominal for 1% PER, as per 802.15.4
Maximum Transmit power	+9.5 dBm	Nominal
RSSI range	-95 to -10 dBm	
RF Port impedance	50 ohm	2.4 – 2.5GHz
VSWR(max)	2:1	2.4 – 2.5GHz

# 4. Programming

## 4.1 circuit for programming

### 4.1.1 External circuit for Programming



### 4.1.2 Entering Programming Mode

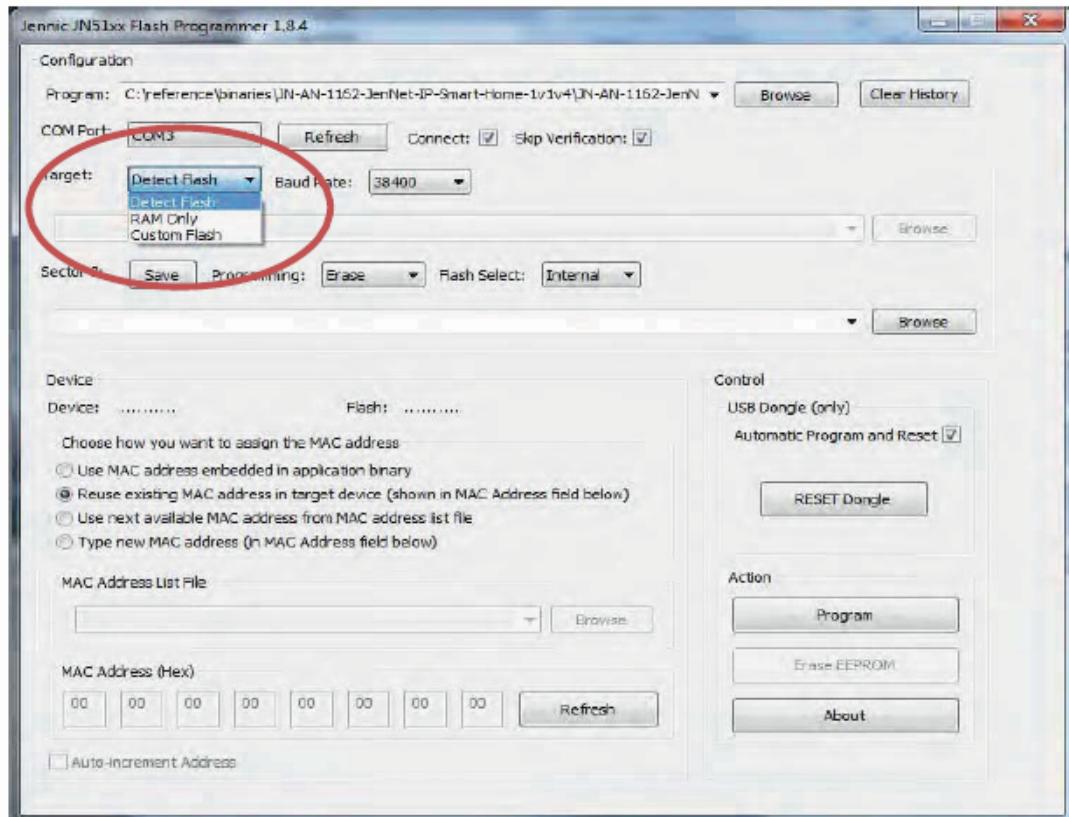
To put the module into programming mode, tie MISO to 0V while releasing RESET. This causes the device to read zeros back from the Flash memory during initialisation and, as a result, to enter programming mode. If you are using the module in conjunction with a serial dongle then the signal PGM is available to put the device into programming mode. To allow this signal to operate correctly from the Flash programming software, the signal should be connected to the module

## 4.2 Flash programming

**Step 1** In the **Program File** field of the JN51xx Flash Programmer interface, browse for the application (.bin) file to be downloaded to Flash memory.

Alternatively, the application remembers previously downloaded files and these can be selected from the drop-down list.

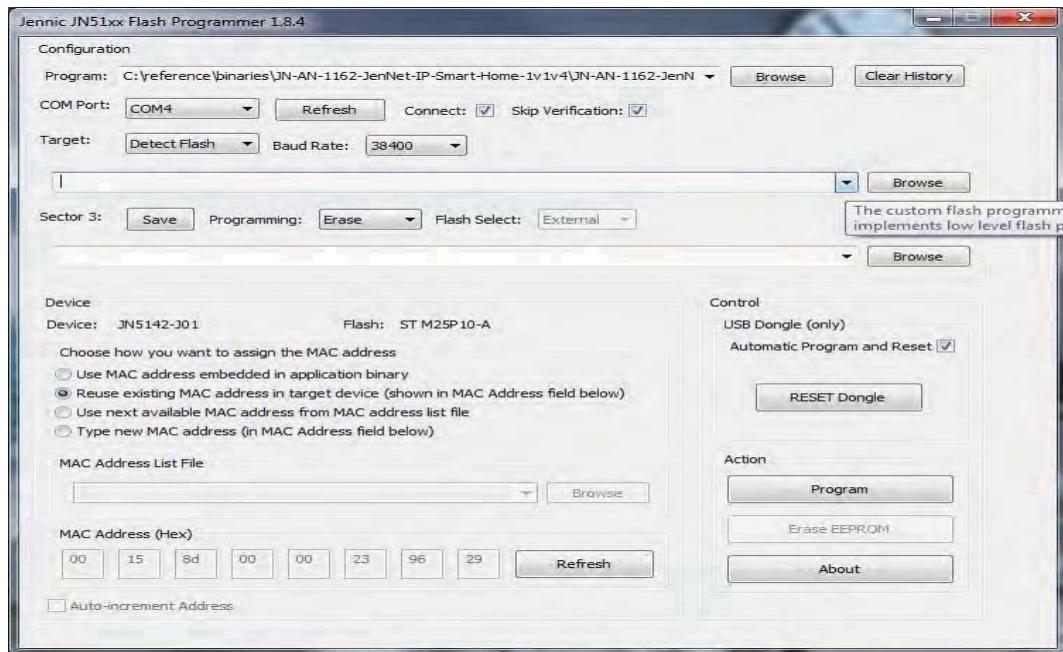
**Step 2** In the **Target** drop-down list, select the **Custom Flash** option, as illustrated below.



### Target Options

The „hidden“ field under the **Target** list now becomes visible and accessible

**Step 3** In this new field, browse to find and select your custom Flash programmer firmware image (see below).



## Custom Programming File Browser



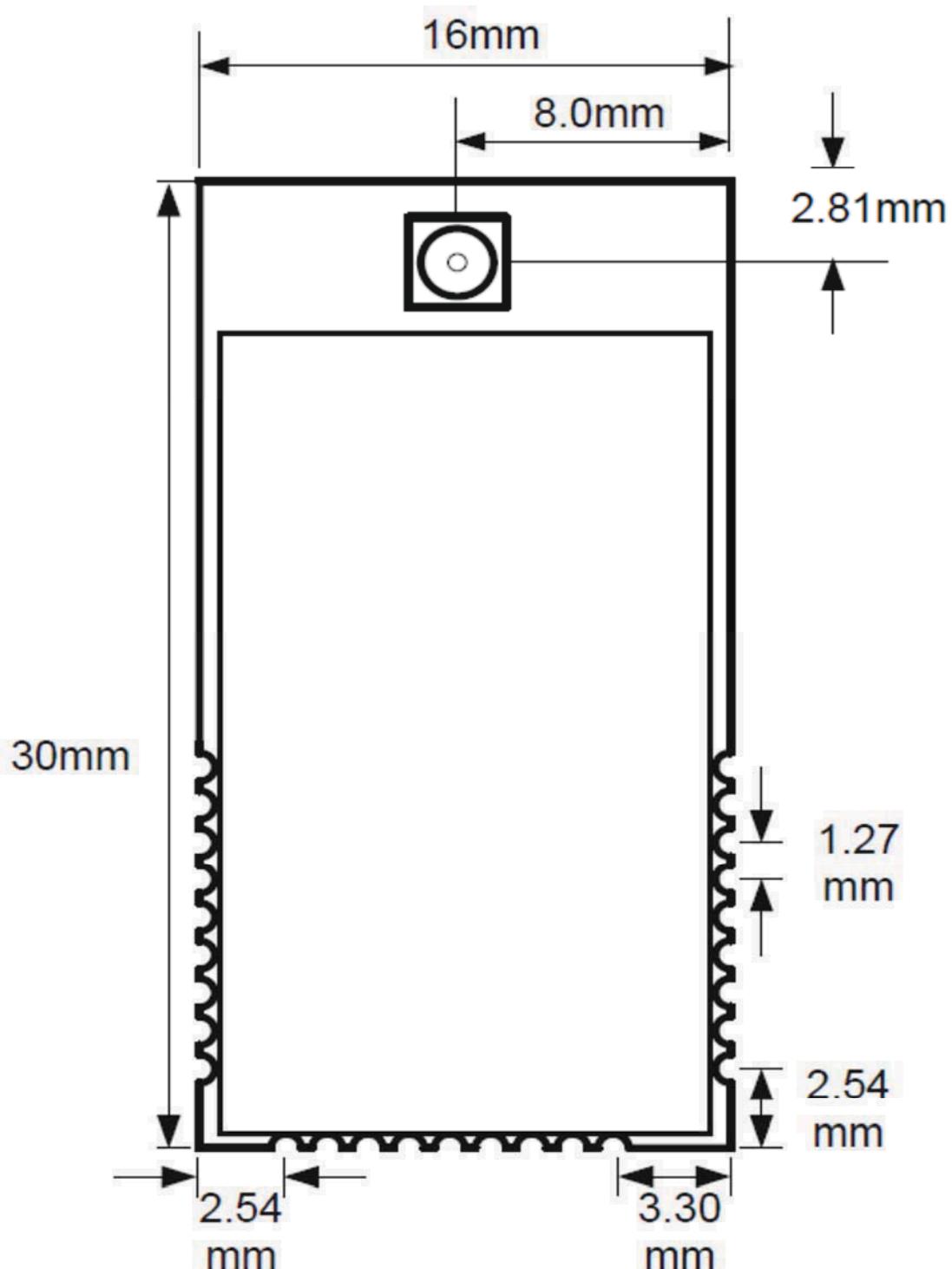
**Note 1:** The following message appears when the mouse hovers over the new **Browse** field: *The custom flash programmer firmware that implements low level flash programming commands.*

**Note 2:** Even when using this procedure just to upload a custom Flash programmer to RAM, an application binary file must be specified in the **Program File** field.

**Step 4** Click on the **Program** button.

The JN51xx Flash Programmer now uploads the custom Flash programmer to RAM. Once the upload has finished, the custom Flash programmer automatically programs your application into the Flash chip.

#### 4.3 Module Layout



## **FCC Statement:**

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### **FCC Radiation Exposure Statement**

This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

If the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains Transmitter Module FCC ID: 2AHDBRZN-AEM05 Or Contains FCC ID: 2AHDBRZN-AEM05

When the module is installed inside another device, the user manual of the host must contain below warning statements;

1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
  - (1) This device may not cause harmful interference.
  - (2) This device must accept any interference received, including interference that may cause undesired operation.

2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product

Any company of the host device which install this modular with limit modular approval should perform the test of radiated emission and spurious emission according to FCC part 15C : 15.247 and 15.209 requirement, Only if the test result comply with FCC part 15C : 15.247 and 15.209 requirement then the host can be sold legally.

**RF Exposure**

"This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter."