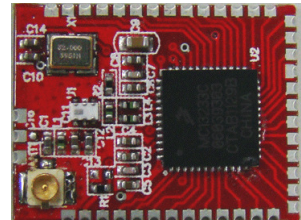


ZMD400-A01

ZigBee Compliant Platform
2.4G RF Low Power Transceiver
Module for IEEE 802.15.4 Standard

DATA SHEET
Version B



 **Quan**

Quan International Co., Ltd.,

ZMD400 Features

- Fully compliant 802.15.4 Standard and can support fully Zigbee features
 - 2.4GHz, 16 selectable channels in the 2.4 GHz ISM band
 - Programmable output power
 - Receive sensitivity of -93 dBm
 - Supports up to 250 kbps O-QPSK data and full spread-spectrum encode and decode
- Hardware acceleration for IEEE® 802.15.4 applications
 - DMA interface
 - AES-128 Security module
 - 16-Bit random number generator
 - 802.15.4 Auto-sequence support
 - 802.15.4 Receiver Frame filtering
- Multiple power saving modes provide super low power consumption benefits (less than 1 μ A in STOP3);
- 82 KB Flash and 5KB RAM for application programming and no additional MCU cost;
- Keyboard interrupt (KBI) modules
 - supporting up to a 12x12 keyboard matrix
 - support a 6x6 matrix without impacting other IO resources
 - with selectable polarity
- Up to 32 I/O pins provide flexible interfaces;
- Compact size with iPex RF connector on board (direct RF-out optional);

- “Ready to go” modules speeding up products development;

Applications

- Home Automation : Security control , HVAC/Lighting control, access control, lawn & garden irrigation, energy management, smart home network;
- Building Automation : security, HVAC, ARM, lighting control, access control;
- Industry Automation : Asset management, process control, environmental monitoring, energy management ;
- Health Care : patient monitoring, fitness monitoring .
- RF4CE consumer remote controller

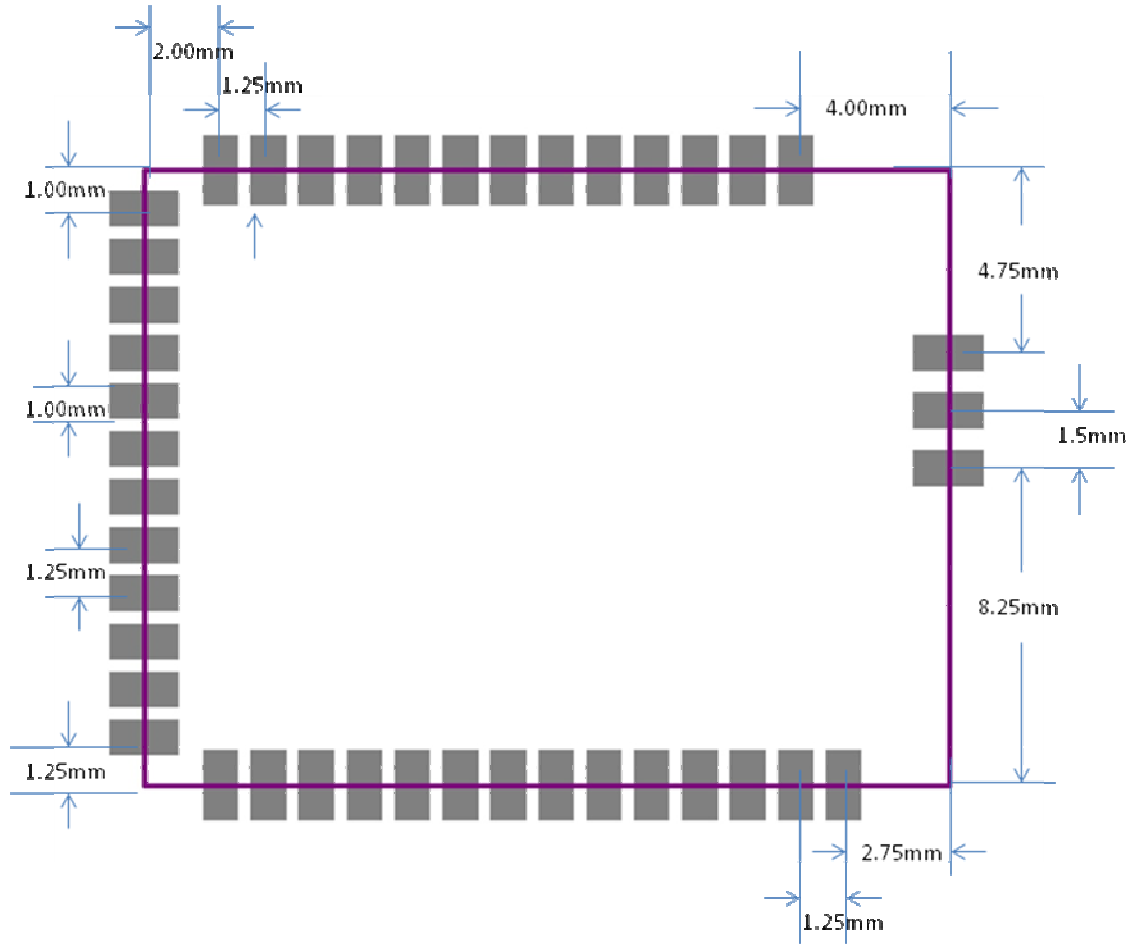
Specifications:

- 82KB flash memory with block protection and security and up to 5KB RAM , allows for application programming space and save the cost for additional MCU.;
- Input voltage: 1.8V ~ 3.6V
- RF Data rate: 250kbps
- Low power modes (Wait plus Stop2 and Stop3 modes, less than 1 μ A in STOP3)
- Fully compliant 802.15.4 Standard transceiver supports 250 kbps O-QPSK data in 5.0 MHz channels and full spread-spectrum encode and decode
- Programmable output power with 0 dBm nominal output power, programmable from -30 dBm to +2 dBm typical
- Receive sensitivity of -93 dBm (typical) at 1% PER, 20-byte packet, much better than the IEEE 802.15.4 Standard of -85 dBm

- Operates on one of 16 selectable channels in the 2.4 GHz ISM band
- On board trim capability for 32 MHz crystal reference oscillator eliminates need for external variable capacitors and allows for automated production frequency calibration
- Keyboard interrupt (KBI) modules
 - Two Keyboard control modules capable of supporting up to a 12x12 keyboard matrix
 - 12 Dedicated KBI pins support a 6x6 matrix without impacting other IO resources
 - 12 KBI interrupts with selectable polarity
- Serial communication interface (SCI)
 - Full duplex non-return to zero (NRZ)
 - Baud rates as high as 1 Mbps can be supported
 - LIN master extended break generation
 - LIN slave extended break detection
 - Wake-up on active edge
- Serial peripheral interface (SPI)
 - Full-duplex or single-wire bidirectional
 - Double-buffered transmit and receive
 - Master or Slave mode; MSB-first or LSB-first shifting
- Inter-integrated circuit (IIC) interface — Up to 100 kbps baud rate with maximum bus loading
 - Baud rates as high as 800 kbps can be programmed
 - Multi-master operation
 - Programmable slave address
 - Interrupt driven byte-by-byte data transfer;
 - Supports broadcast mode and 10-bit addressing
- Four 16-bit timer/pulse width modulators (TPM[4:1]) - each TPM module has an assigned GPIO pin and provides
 - Single channel capability
 - Input capture
 - Output compare
 - Buffered edge-aligned or center-aligned PWM10 Bit A/D converters

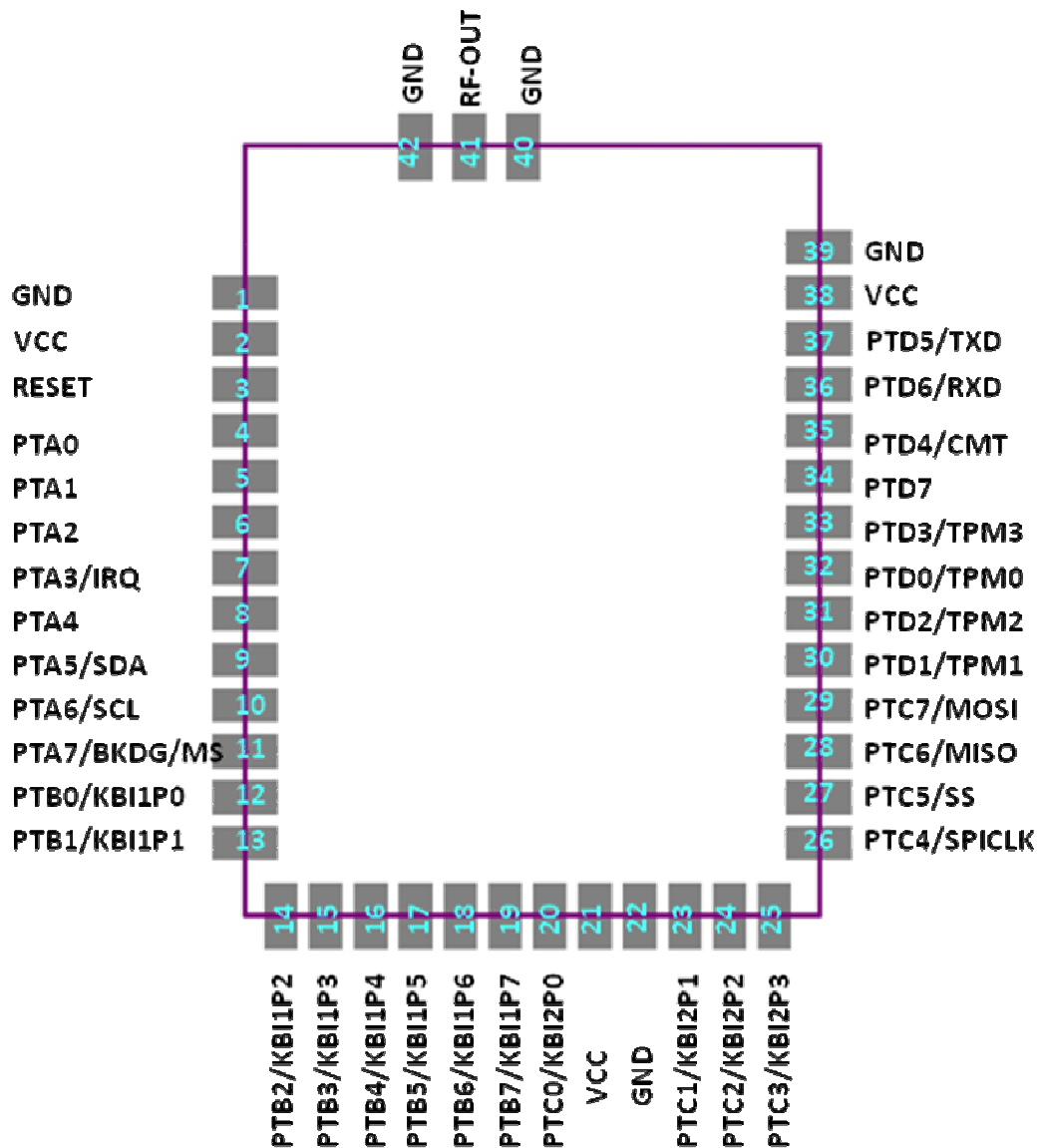
- Carrier Modulator Timer (CMT) - IR Remote carrier generator, modulator, and transmitter.
- Real-time counter (RTC)
 - 16-bit modulus counter with binary or decimal based pre-scaler;
 - External clock source for precise time base, time-of-day, calendar or task scheduling functions
 - Capable of greater than one day interrupt.
- System protection features
 - Programmable low voltage interrupt (LVI)
 - Optional watchdog timer (COP)
 - Illegal opcode detection
- Up to 32 I/O pins, include GPIOs, UART, IIC, Counters, Keyboard Interrupts, A/D converters etc., provide flexible interfaces for product development and integration.
- Minimal external components are required such as antenna, matching circuit and power, provides simple and flexible options for applications development.
- Operating Temperature: -40 to +85°C
- Additional RF switch to minimize the noise caused by internal RF switch. And this greatly enhances the communication distance.
- Power Consumption:
 - Hibernate: 8μA
 - Transmit Mode : 26.6 mA(typical)
 - Receive Mode : 34.2 mA(typical)
- Small module footprint: 16mmX21mm

Device Diagram



Dimensions : length 21 mm X width 16mm X height 2mm

Device Pinouts



Pin Definitions

	Pin Name	Description	Functionality
1	GND	System ground	
2	VCC_1	VDD supply input	Connect to system VDD supply. Pin2 and Pin21 are internally connected. Connect both or either one to VDD.
3	RESET	Device asynchronous hardware reset. Active low. Onboard Pullup.	Normally input; gets driven low for a period after a reset
4	PTA0	Port A Bit 0	

	Pin Name	Description	Functionality
5	PTA1	Port A Bit 1	For normal use, 10Kohm resistor to ground recommended
6	PTA2	Port A Bit 2 / Test Mode enable.	TM mode input. MUST BE BIASED LOW EXITING POR FOR NORMAL OPERATION
7	PTA3/IRQ	Port A Bit 3 / IRQ.	
8	PTA4	Port A Bit 4	
9	PTA5/SDA	Port A Bit 5 / IIC Bus data	Defaults to open drain for IIC
10	PTA6/SCL	Port A Bit 6 / IIC Bus clock	Defaults to open drain for IIC
11	PTA7/BKDG/MS	Port A Bit 7 / Background / Mode Select	
12	PTB0/KBI1P0	Port B Bit 0 / KBI1 Input Bit 0	Wake-up capability
13	PTB1/KBI1P1	Port B Bit 1 / KBI1 Input Bit 1	Wake-up capability
14	PTB2/KBI1P2	Port B Bit 2 / KBI1 Input Bit 2	Wake-up capability
15	PTB3/KBI1P3	Port B Bit 3 / KBI1 Input Bit 3	Wake-up capability
16	PTB4/KBI1P4	Port B Bit 4 / KBI1 Input Bit 4	Wake-up capability
17	PTB5/KBI1P5	Port B Bit 5 / KBI1 Input Bit 5	Wake-up capability
18	PTB6/KBI1P6	Port B Bit 6 / KBI1 Input Bit 6	Wake-up capability
19	PTB7/KBI1P7	Port B Bit 7 / KBI1 Input Bit 7	Wake-up capability
20	PTC0/KBI2P0	Port C Bit 0 / KBI2 Input Bit 0	Wake-up capability
21	VCC_2	VDD supply input	Connect to system VDD supply
22	GND	System ground	
23	PTC1/KBI2P1	Port C Bit 1 / KBI2 Input Bit 1	Wake-up capability
24	PTC2/KBI2P2	Port C Bit 2 / KBI2 Input Bit 2	Wake-up capability
25	PTC3/KBI2P3	Port C Bit 3 / KBI2 Input Bit 3	Wake-up capability
26	PTC4/SPICLK	Port C Bit 4 / SPI clock	
27	PTC5/SS	Port C Bit 5 / SPI slave select	
28	PTC6/MISO	Port C Bit 6 / SPI MISO	
29	PTC7/MOSI	Port C Bit 7 / SPI MOSI	
30	PTD1/TPM1	Port D Bit 1/ TPM1 signal	TPM1 timer output / gate input signal
31	PTD2/TPM2	Port D Bit 2 / TPM2 signal	TPM2 timer output / gate input signal

	Pin Name	Description	Functionality
32	PTD0/TPM0	Port D Bit 0 / TPM0 signal	TPM0 timer output / gate input Signal
33	PTD3/TPM3	Port D Bit 3/ TPM3 signal	TPM3 timer output / gate input Signal
34	PTD7	Port D Bit 7	
35	PTD4/CMT	Port D Bit 4/ CMT output	Hi drive output for IR diode
36	PTD6/RXD	Port D Bit 6 / UART RXD input	UART has no hardware flow Control
37	PTD5/TXD	Port D Bit 5 / UART TXD output	UART has no hardware flow control
38	VCC_3	VDD supply input	Connect to system VDD supply. Internally disconnected with Pin2 and Pin21.
39	GND	RF ground	Connect to analog ground for better performance
40	GND	RF ground	Connect to analog ground for better performance
41	RF	RF signal output/input	External antenna and internal iPex antenna connector available (choose either one)
42	GND	System ground	

Electrical Specifications

Item		Min	Typical	Max	Unit
Frequency		2.405		2.480	GHz
Supply voltage		1.8	2.7	3.6	V
MCU current consumption	Run mode		4.7		mA
	Wait mode		0.56		mA
	Stop2 mode		0.40		uA
	Stop3 mode		0.45		uA
RF current consumption	TX		26.6		mA
	RX		34.2		mA
TX output power		-30	0	3	dBm
TX EVM			<16	20	%
RX sensitivity(250Kbps)			-92.4		dBm
Maximum input level				10	dBm
Frequency error tolerance				200	kHz
Operation temperature		-40	25	85	°C