

# Mini-Z™ Z-PAN® 28-Pin Module

RD000904-0612



## Overview

The Mini-Z Z-PAN® 28-Pin Module is a stand-alone 802.15 Personal Area Network that is produced in a 28-pin Dual Inline Pin package. The Mini-Z Z-PAN® 28-Pin Module integrates Zilog's powerful ZNEO microcontroller with a Roving Networks 2402–2480MHz RN-41 Personal Area Network Module.

Designed for the hobbyist, student and engineer to quickly develop prototypes, proof of concept and demonstrations as well as provide the functionality required for hands-on learning, the Module is designed to be pin-compatible with the Parallax BS2 Series of modules as well as with Basic-Micro-Technology's Basic ATOM Pro 28-M module. This flexibility allows you to utilize different vendor's base boards that you may already have in your arsenal.

The Module ships preprogrammed with a boot loader and a control shell that can be accessed through the serial port to allow control of the Module from a terminal program and upload your code hex file through the serial port. The Module is fully compatible with the ZDSII for ZNEO tools suite. You can write your programs in C and Assembly, then compile and upload the hex file through the serial port to the Module. You can also attach the USB Smart Cable (included in the Mini-Z Z-PAN® SSR Kit) and have full control over the ZNEO chip, including interactive debugging sessions.

## Mounting the Mini-Z Z-PAN® 28-Pin Module

The Mini-Z Z-PAN® 28-Pin Module is designed to plug into a base board such as the SSR Design Board, a key component of Zilog's Mini-Z Z-PAN® SSR Kit. Pin 1 on the Module must be aligned with Pin 1 on the design board. Pin 1 on the Module is located near the chamfered corner, as indicated in Figure 1.



Figure 1. The ZNEO-Based Mini-Z Z-PAN® 28-Pin Module

► **Note:** The Mini-Z Library file associated with this reference design, [RD0006-SC01.zip](#), is available for download on [zilog.com](#). This file has been tested with version 5.0.0 of ZDSII for ZNEO-powered MCUs. Subsequent releases of ZDSII may require you to modify the code supplied with this reference design.

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## Mini-Z Z-PAN® 28-Pin Module Features

- Powerful 16-bit CISC microcontroller
- 128KB of Flash program space with 16-bit access and in-circuit programming
- 4KB internal RAM with 16 bit access
- 24-bit address space
- 24-bit stack with overflow protection
- Direct register-to-register architecture, allows each memory address to function as an accumulator. This improves execution time and decreases the required program memory
- 5.5V to 15V input with internal 5V and 3.3V regulation
- 4-channel, 10-bit ADC
- Analog Comparator
- Internal Precision Oscillator
- I<sup>2</sup>C Master/Slave Controller
- Enhanced Serial Peripheral Interface (ESPI)
- Three standard 16-bit timers with capture, compare and PWM capability
- 12-bit PWM module with three complementary pairs, or six independent PWM outputs, with deadband generation and fault trip input
- 24 interrupts with programmable priority
- Watchdog Timer with Internal RC Oscillator
- On-Chip Debugger
- Voltage Brown-Out protection (VBO)
- Power-On Reset (POR)
- Low power modes

## Networking Support

- Secure wireless authentication
  - Class 1 Radio: 330' (100m) distance
  - Frequency: 2402–2480MHz
  - FHSS/GFSK modulation: 79 channels at 1MHz intervals

- Secure communications: 128-bit encryption
- Error correction for guaranteed packet delivery
- UART local and over-the-air RF configuration
- Autodiscovery/pairing requires no software configuration (instant cable replacement)
- Autoconnect master, I/O pin (DTR) and character-based trigger modes
- Built in networking applications:
  - Embedded stack profiles included (requires no host stack): GAP, SDP, RFCOMM and L2CAP Protocols, with SPP and DUN profile support
  - Bluetooth SIG qualified; end product listing
  - Certifications: FCC, ICS, CE
- Fully qualified Bluetooth 2.1/2.0/1.2/1.1 Module
- Bluetooth v2.0+EDR support

## Module Pin Description

Table 1 describes the functions of each of the Mini-Z Z-PAN® 28-Pin Module's 28 pins.

**Table 1. Mini-Z Z-PAN® 28-Pin Module Pin-Out**

Pin	Pin Name	ZNEO Pin Name	Base Function	Alternate Function 1	Alternate Function 2
1	S <sub>OUT</sub>	PA5	MCU Transmit		
2	S <sub>IN</sub>	PA4	MCU Receive		
3	DTR	PA3	CTS/DTR		
4	V <sub>SS</sub>	GND	Ground		
5	PO	PB0	GPIO	ANA 0 (ADC)	TOIN0
6	P1	PB1	GPIO	ANA 1 (ADC)	TOIN1
7	P2	PB2	GPIO	ANA 2 (ADC)	TOIN2
8	P3	PB3	GPIO	ANA 3 (ADC)	OPOUT
9	P4	PD0	GPIO	PWMH1	
10	P5	PD1	GPIO	PWML1	
11	P6	PA7	GPIO	SDA	
12	P7	PA6	GPIO	SCL	
13	P16	PH2	GPIO	ANA10	
14	P17	PH3	GPIO	ANA11	CPINP
15	P18	PD2	GPIO	PWMH2	

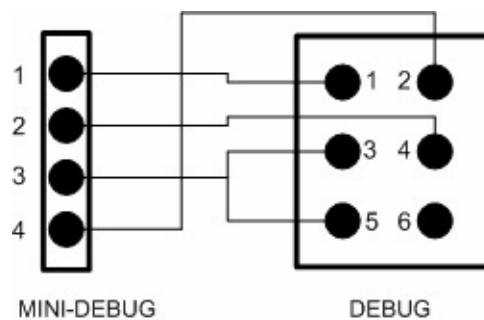
**Table 1. Mini-Z Z-PAN® 28-Pin Module Pin-Out (Continued)**

Pin	Pin Name	ZNEO Pin Name	Base Function	Alternate Function 1	Alternate Function 2
16	P19	PD7	GPIO	PWML2	
17	P8	PC0	GPIO	T1IN/#T1OUT	CINN
18	P9	PC1	GPIO	T1OUT	COMPOUT
19	P10	PC2	GPIO	SS	
20	P11	PC3	GPIO	SCK	
21	P12	PC4	GPIO	MOSI	
22	P13	PC5	GPIO	MISO	
23	P14	PC6	GPIO	T2IN/#T2OUT	PWMH0
24	P15	PC7	GPIO	T2OUT	PWML0
25	V <sub>CC</sub> I/O	—	5V in/out		
26	Reset	Reset	Reset		
27	V <sub>SS</sub>	GND	Ground		
28	V <sub>IN</sub>	—	5.5–15V in		

## Mini-Debug Connector

The Mini-Z Z-PAN® 28-Pin Module uses a miniature debug connector (included in the Mini-Z Z-PAN® SSR Kit) to connect to the smart cables and to ZDSII. Alternatively, you can build your own adapter.

The mini-debug adapter features a 4-pin single-row header; its pins are 2mm apart, center to center. To connect the mini-debug adapter, wire a male header (equivalent to Molex part number 90120-0124) to a 6-pin (2x3) male header (equivalent to Molex 90131-0763) using the connections shown in Figure 2.



**Figure 2. Mini-Debug to Debug Pin-Out**

## Electrical Characteristics

Tables 2 and 3 describe the electrical and power consumption characteristics, respectively, of the Mini-Z Z-PAN® 28-Pin Module, and reflect all available data as a result of testing prior to qualification and characterization. As such, the data presented in these tables are subject to change.

► **Note:** Stresses greater than those listed in Table 2 may cause permanent damage to the device. These ratings are stress ratings only. Operation of the device at any condition outside those indicated in the operational sections of these specifications is not implied. Exposure to absolute maximum rating conditions for extended periods affects device reliability. For improved reliability, unused inputs must be tied to one of the supply voltages ( $V_{DD}$  or  $V_{SS}$ ).

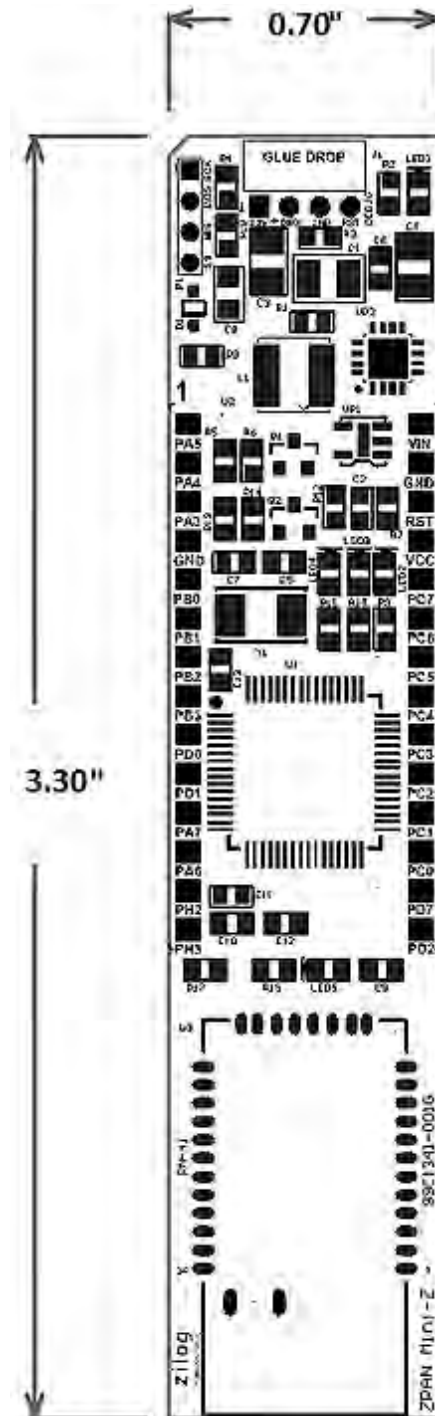
**Table 2. Mini-Z Z-PAN® 28-Pin Module Characteristics**

Parameter	Min	Max	Units	Notes
$V_{IN}$ Range	5.5	15	Volts	
Max Voltage Range for Serial Interface	–15	15	Volts	Pin 1, 2 & 3.
Max Voltage range, all other pins	–0.3	5.5	Volts	I/O pins and Reset.
$V_{CC}$ I/O Range	4.8	5.1	Volts	
Max Current for I/O pins	–25	25	Milliamps (mA)	
Max Current on input/inactive output	–5	5	Microamps ( $\mu$ A)	
Max Dissipation		540	Milliwatts (mW)	
Max Current		134	Milliamps (mA)	With respect to the ZNEO MCU, not including $V_{CC}$ I/O.
Max Current out on $V_{CC}$ I/O		100	Milliamps (mA)	
Low-level input	–0.3	1.08	Volts	
High-level input	2.5	3.6	Volts	
Low-level output	0	.6	Volts	
High-level output	2.4	3.3	Volts	
I/O leakage current	–5	5	Microamp ( $\mu$ A)	
Internal $V_{REF}$	1.9	2.1	Volts	2V, typical.
Ambient temperature	–40	105	Degrees Celsius	
Storage temperature	–65	150	Degrees Celsius	

**Table 3. Z-PAN Module Power Consumption**

State	Typical	Units
Sleep	2.5	Microamps (mA)
Connected (low power sniff)	8	Milliamps (mA)
Connected (NORMAL Mode)	30	Milliamps (mA)
Rx Supply Current	35	mA
Tx Supply Current	65	mA

Figure 3 labels each pin of the Mini-Z Z-PAN<sup>®</sup> 28-Pin Module.



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## Ordering Information

The Mini-Z Z-PAN® 28-Pin Module can be ordered from the [Zilog Store](#) using the part number listed in Table 4.

**Table 4. Mini-Z Z-PAN® 28-Pin Module Ordering Information**

Part Number	Description	Store Product ID
Z16F28ZP100MODG	Mini-Z Z-PAN 28-Pin Module	RD10008
Z16F28ZP100KITG	Mini-Z Z-PAN SSR Kit	RD10009

## Kit Contents

The Mini-Z Z-PAN® SSR Kit contains the following elements:

- Mini-Z Z-PAN® 28-Pin Module
- Mini-Z Solid State Relay Design Board
- USB Smart Cable
- Mini-Z to standard debug adapter
- USB cable (A male to Mini-B male)
- DIP Package Extractor

## Related Documentation

The documents associated with the Mini-Z Z-PAN® 28-Pin Module are listed in Table 5. Each of these documents can be obtained from the Zilog website (except where noted) by clicking the link associated with its Document Number.

**Table 5. ZAURA RF Wireless Module Documentation**

Document Number	Description
<a href="#">RD0009</a>	This Mini-Z Z-PAN 28-Pin Module Reference Design document
<a href="#">RD0006-SC01</a>	Mini-Z Library
<a href="#">QS0086</a>	Mini-Z Z-PAN 28-Pin Module Quick Start Guide
<a href="#">RM0063</a>	Mini-Z Z-PAN Shell and Flash Loader Reference Manual
<a href="#">RD0006</a>	Mini-Z ZNEO 28-Pin Module Reference Design document
<a href="#">PS0220</a>	ZNEO Z16F Series Product Specification
<a href="#">UM0188</a>	ZNEO CPU Core User Manual
<a href="#">UM0181</a>	USB Smart Cable User Manual
<a href="#">RN website</a>	Roving Networks Class 1 Bluetooth® Module Data Sheet
<a href="#">RN website</a>	Roving Networks Bluetooth® Product User Manual Version 4.77



Figure 4 shows a schematic diagram of the Mini-Z Z-PAN<sup>®</sup> 28-Pin Module.



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## Customer Support

To learn more about this product, find additional documentation, get your technical questions answered or report issues, please contact [esales@zilog.com](mailto:esales@zilog.com).



**Warning:** DO NOT USE THIS PRODUCT IN LIFE SUPPORT SYSTEMS.

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