Mini-Z™ ZNEO 28-Pin Module

RD000603-0814

Overview

Zilog's Mini-Z ZNEO 28-Pin Module is a 28-pin Dual Inline Pin module designed for the engineer, student and enthusiast to quickly develop prototypes, proofs of concept and demonstrations as well as to provide the functionality required for hands-on learning. The Mini-Z ZNEO 28-Pin Module is a single-board computer that is easy to use, and it boasts a wide support base of free application resources. The Module, which features the 16-bit ZNEO CPU-based Z16F2810 MCU, is designed to be pin-compatible with the Parallax BS2 Series of stamp modules and with Basic Micro's Basic ATOM Pro 28-M module. This compatibility in the Module's design allows you to utilize differing vendors' base boards which you may already possess in your development arsenal.

The Mini-Z ZNEO 28-Pin Module ships preprogrammed with a boot loader and a control shell that can be accessed via the serial port. This serial port access allows developers to control the Module from a terminal emulation program (such as HyperTerminal) and to upload user application code as a hex file.

The Module is fully compatible with Zilog's ZDS II IDE version 4.12.0 for ZNEO-based MCUs. You can write your programs in C and Assembly, then compile and upload your hex file via the serial port to the Module. You can also attach a USB Smart Cable (not included) and have full control over the ZNEO CPU, including interactive debugging sessions.
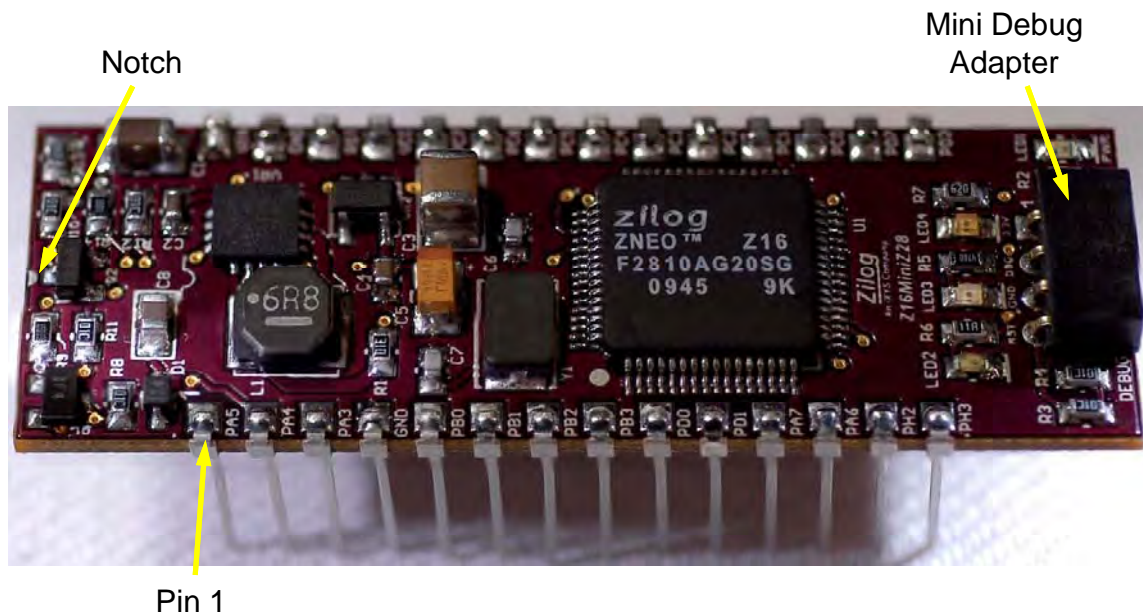

Figure 1. The ZNEO-Based Mini-Z ZNEO 28-Pin Module

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

Mini-Z ZNEO 28-Pin Module Features

- Powerful 16-bit CISC microcontroller

- 128 KB of program space (Flash) with 16-bit access and in-circuit programming

- 4 KB 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, thus improving execution time and decreasing the requirement for additional program memory

- 5.5 V to 15 V input with internal 5 V and 3.3 V regulation

- 4-channel, 10-bit ADC

- Analog Comparator

- Internal Precision Oscillator

- I^2C 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

Module Pin Description

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

Table 1. Mini-Z ZNEO 28-Pin Module Pin-Out

Pin	Pin Name	ZNEO Pin Name	Base Function	Alt Function 1	Alt Function 2
1	S_{OUT}	PA5	MCU Transmit		
2	S_{IN}	PA4	MCU Receive		
3	DTR	PA3	CTS/DTR		
4	V_{SS}	GND	Ground		
5	PO	PB0	GPIO	ANA 0 (ADC)	T0IN0
6	P1	PB1	GPIO	ANA 1 (ADC)	T0IN1
7	P2	PB2	GPIO	ANA 2 (ADC)	T0IN2
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	
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_{CC} I/O	—	5V in/out		
26	Reset	Reset	Reset		
27	V_{SS}	GND	Ground		
28	V_{IN}	—	5.5–15V in		

Mini-Debug Connector

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

The mini-debug adapter features a 4-pin single-row header; its pins are 0.1" 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 (2 x 3) male header (equivalent to Molex 90131-0763) using the connections shown in Figure 2.
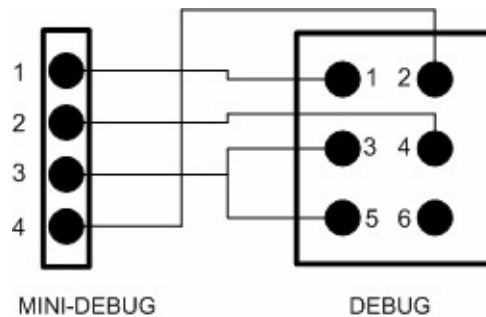

Figure 2. Mini-Debug to Debug Pin-Out

Electrical Characteristics

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 describes the electrical characteristics of the Mini-Z ZNEO 28-Pin Module and reflects all available data as a result of testing prior to qualification and characterization. As such, the data presented in Table 2 is subject to change.

Table 2. Mini-Z ZNEO 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)	

Table 2. Mini-Z ZNEO 28-Pin Module Characteristics (Continued)

Parameter	Min	Max	Units	Notes
Max Current on input/inactive output	−5	5	Microamps (µA)	
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/0		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 (µA)	
Internal V_{REF}	1.9	2.1	Volts	2V, typical.
Ambient temperature	−40	105	Degrees Celsius	
Storage temperature	−65	150	Degrees Celsius	

Packaging

Figure 3 labels each pin of the Mini-Z ZNEO 28-Pin Module.
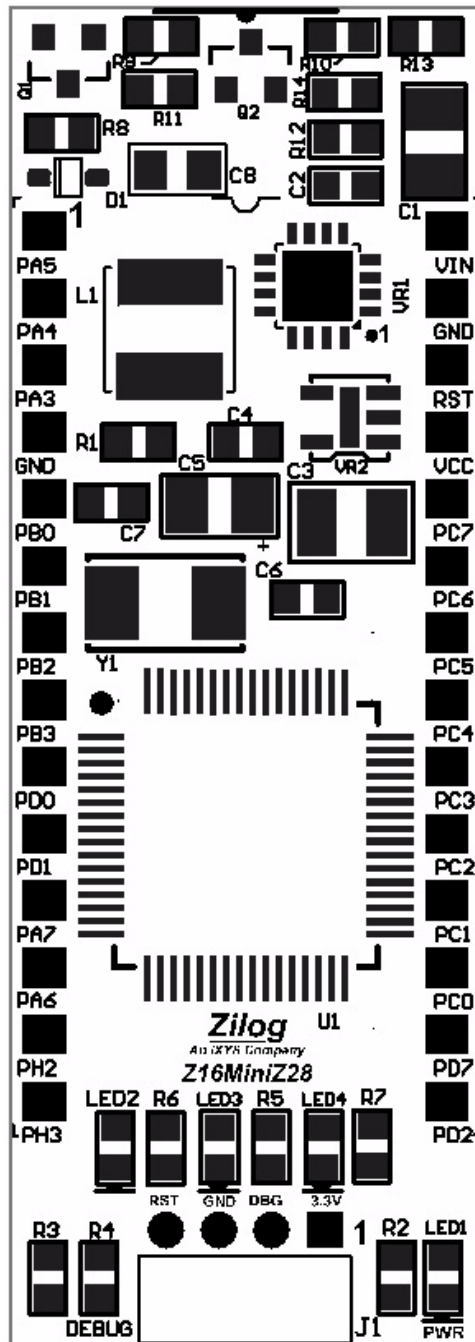
Figure 3. Mini-Z ZNEO 28-Pin Module Pin Diagram

Mechanical Profile

Figure 4 displays the top- and side-view dimensions of the Mini-Z ZNEO 28-Pin Module.
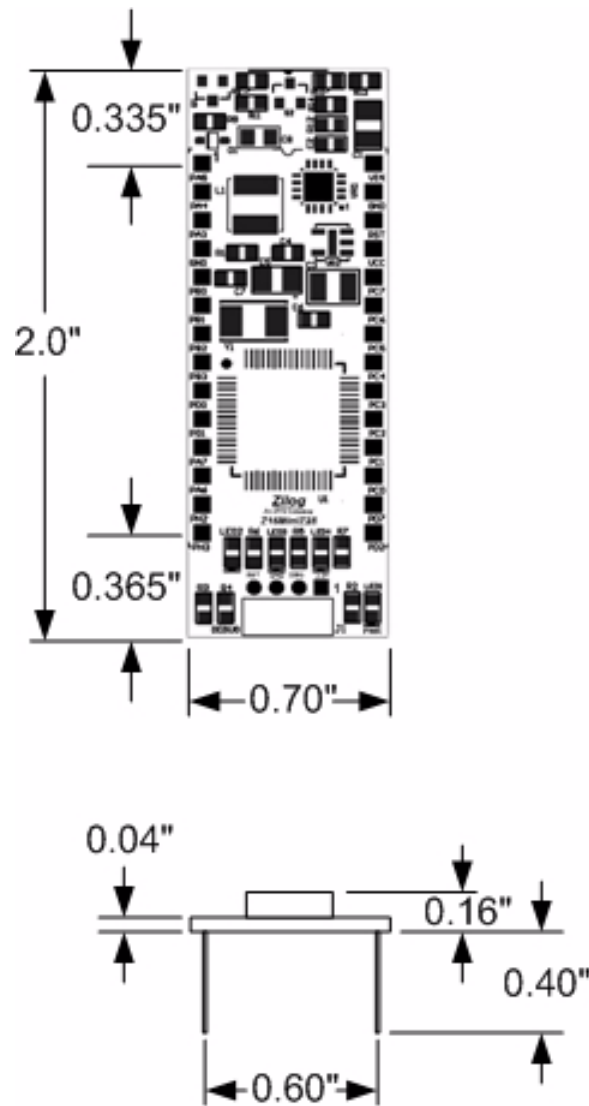
Figure 4. Mini-Z ZNEO 28-Pin Module Dimensions

Ordering Information

The Mini-Z ZNEO 28-Pin Module and Kit can each be purchased from the Zilog Store – simply click the Store Product IDs listed in Table 3.

Table 3. Mini-Z ZNEO 28-Pin Module Ordering Information

Part Number	Description	Store Product ID
Z16F2800100MODG	Mini-Z ZNEO 28-Pin Module	RD10002
Z16SSR00100KITG	Mini-Z ZNEO SSR Kit	RD10004

Kit Contents

The Mini-Z ZNEO SSR Kit contains the following elements:

- Mini-Z ZNEO 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)

Related Documentation

The documents listed in Table 4 are associated with the Mini-Z ZNEO 28-Pin Module and/or its base Z16F2810AG20SG MCU. Each of these documents can be obtained from the Zilog website by clicking the link associated with its Document Number.

Table 4. ZAURA RF Wireless Module Documentation

Document Number	Description
RD0006	This Mini-Z ZNEO 28-Pin Module Reference Design document
RD0006-SC01	Mini-Z Library
RD0007	Mini-Z Solid State Relay Design Board Reference Design document
RM0061	Mini-Z Shell and Flash Loader Reference Manual
PS0220	ZNEO Z16F Series Product Specification
UM0188	ZNEO CPU Core User Manual
UM0181	USB Smart Cable User Manual

Appendix A. Schematic Diagram

Figure 5 shows a schematic diagram of the Mini-Z ZNEO 28-Pin Module.
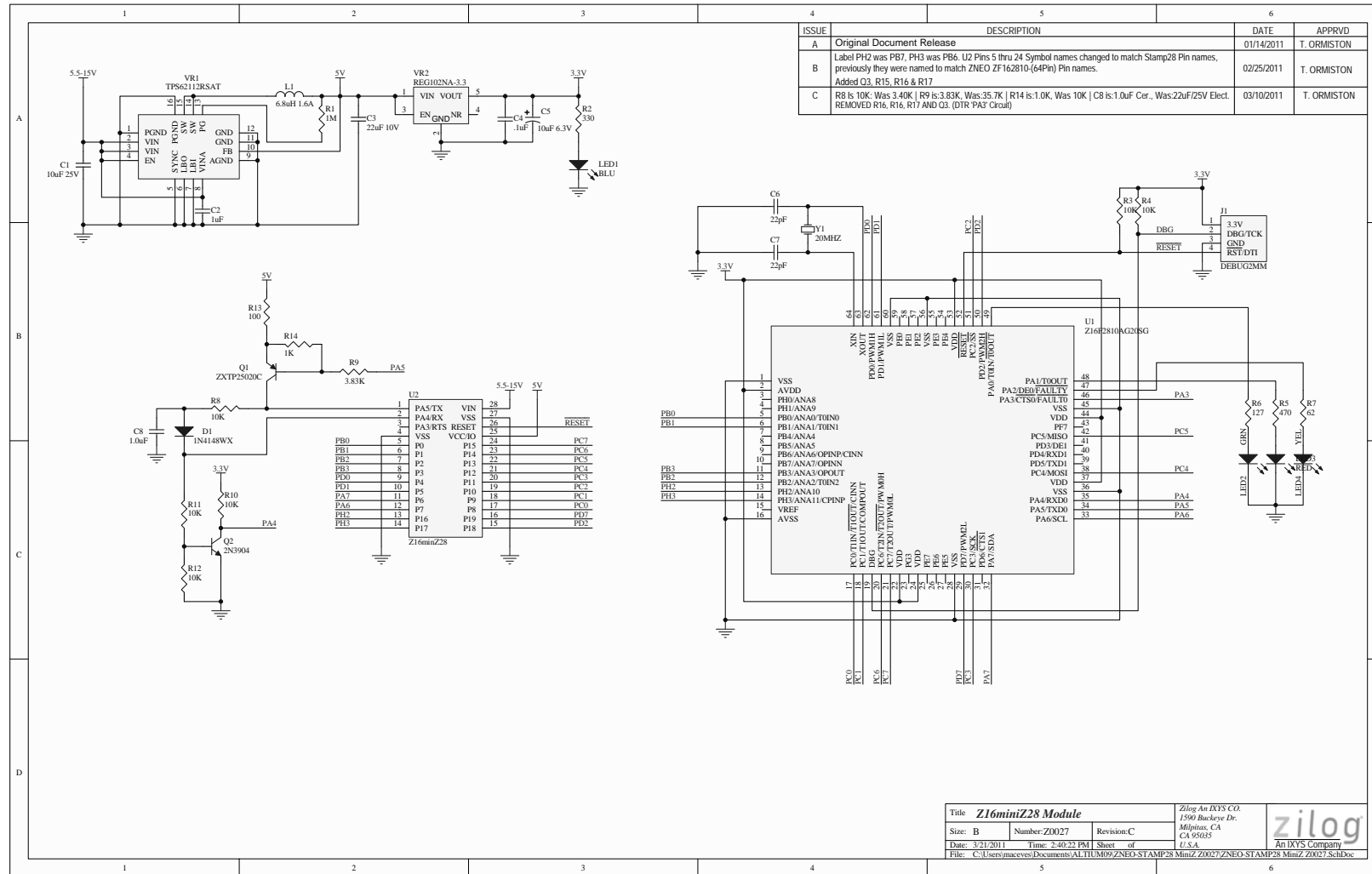
Figure 5. Mini-Z ZNEO 28-Pin Module Schematics

Customer Support

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

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