



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 ZDSII 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.

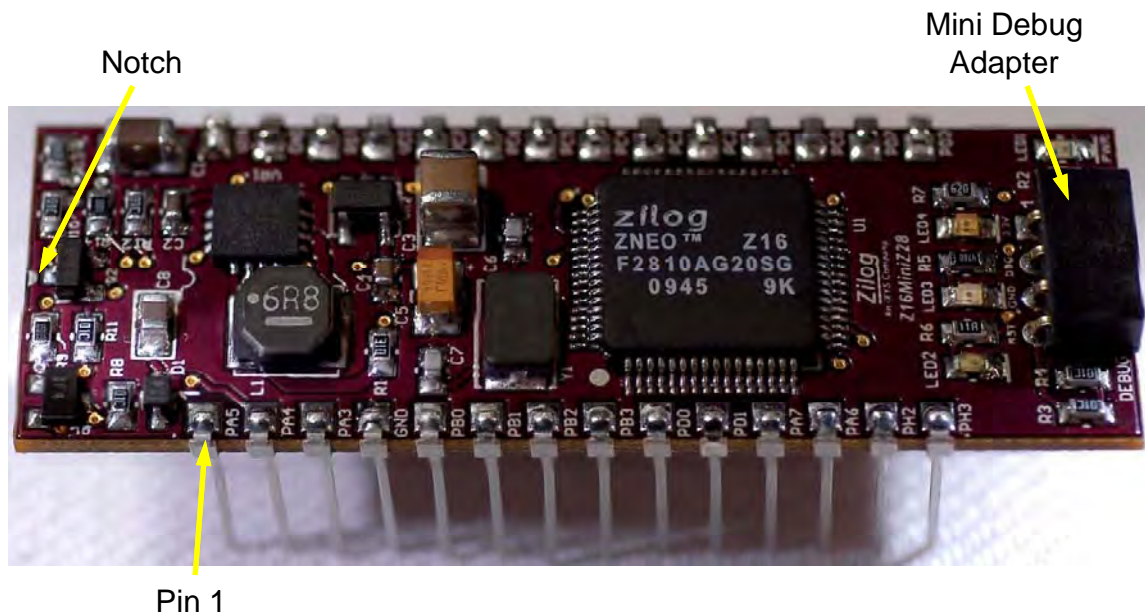


Figure 1. The ZNEO-Based Mini-Z ZNEO 28-Pin Module

- **Note:** The Mini-Z Library file associated with this reference design, [RD0006-SC01.zip](#), 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 ZNEO 28-Pin Module Features

- Powerful 16-bit CISC microcontroller
- 128KB of program space (Flash) 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, thus improving execution time and decreasing the requirement for additional program memory
- 5.5V to 15V input with internal 5V and 3.3V regulation
- 4-channel, 10-bit ADC
- Analog Comparator
- Internal Precision Oscillator
- I²C 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 ZDSII. 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 (2x3) male header (equivalent to Molex 90131-0763) using the connections shown in Figure 2.

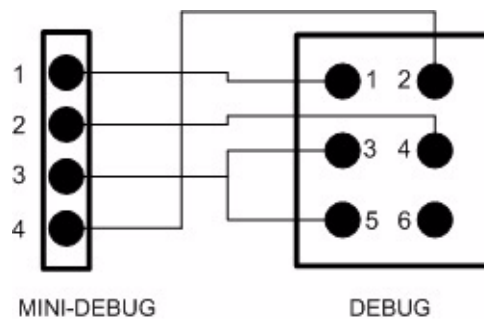


Figure 2. Mini-Debug to Debug Pin-Out

Electrical Characteristics

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 (μ 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 (μ A) | |
| 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.

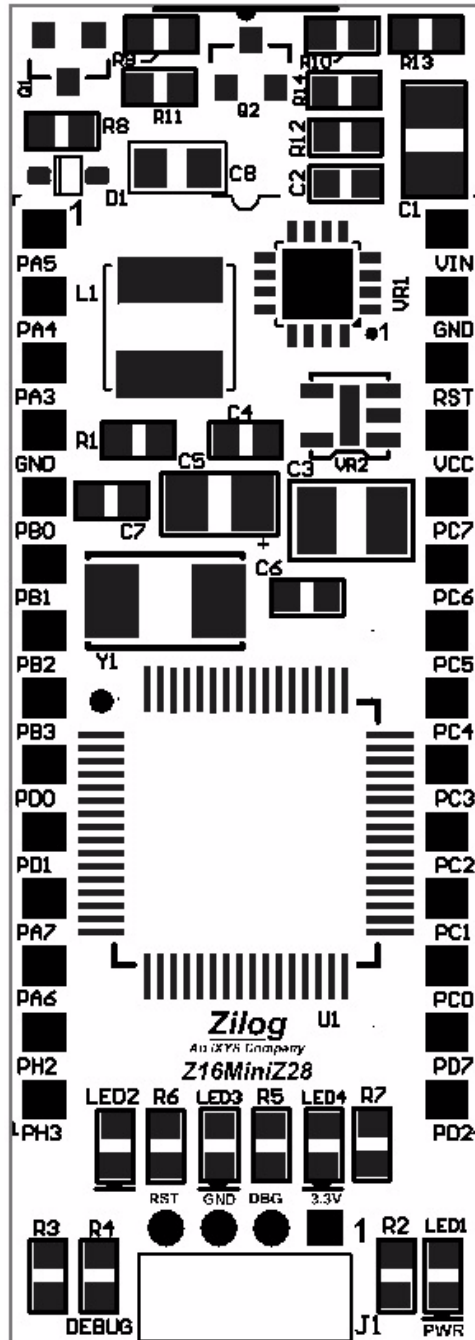


Figure 3. Mini-Z ZNEO 28-Pin Module Pin Diagram

Mechanical Profile

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

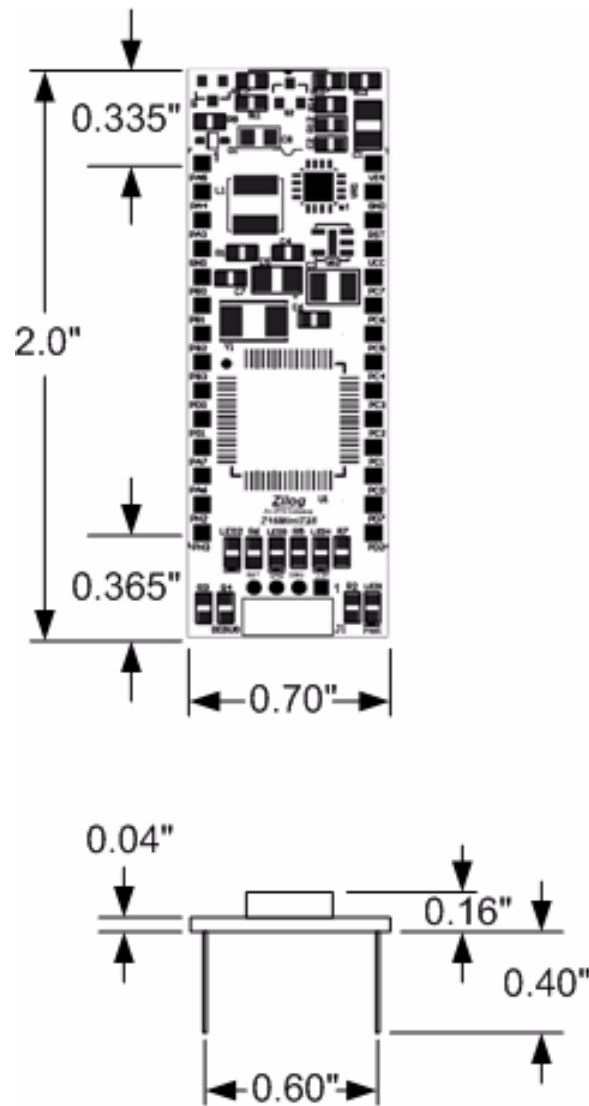


Figure 4. Mini-Z ZNEO 28-Pin Module Dimensions

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.

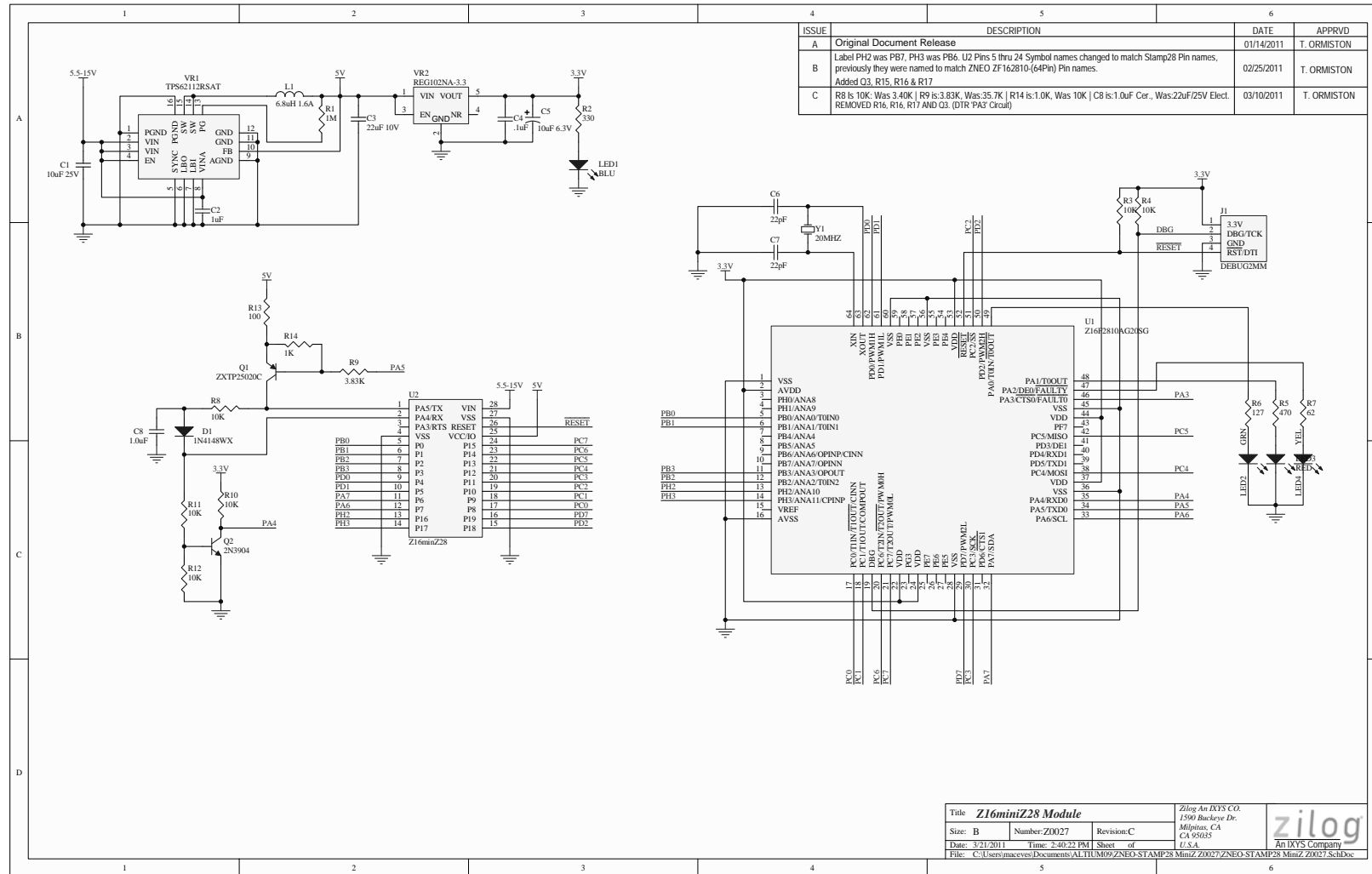


Figure 5. Mini-Z ZNEO 28-Pin Module Schematics

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.

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