

Mini-Z™ Solid State Relay Design Board

RD000703-0814



Overview

The Solid State Relay (SSR) Design Board, a complete and easy-to-use development platform for Zilog's series of Mini-Z stamp modules, is designed to provide engineers, students and enthusiasts a simple-to-use platform for developing prototypes and projects ranging from HVAC controls to animated control systems. Engineered to capitalize on the advanced functionality of Zilog's series of Mini-Z modules, the SSR Design Board exposes all of the Module's pins to add external functionality for even more creative projects.

The SSR Design Board is compatible with other vendor's modules, such as the Basic ATOM stamp and the Parallax BasicSTAMP. In essence, you can begin your project with what you already have and add a Mini-Z Module later when you are ready for its extra features. The SSR Design Board uses a USB-to-serial converter so that you no longer need to find a converter or a serial port. The SSR Design Board, shown in Figure 1, is designed to be operated by either a 9V battery or an external power supply.

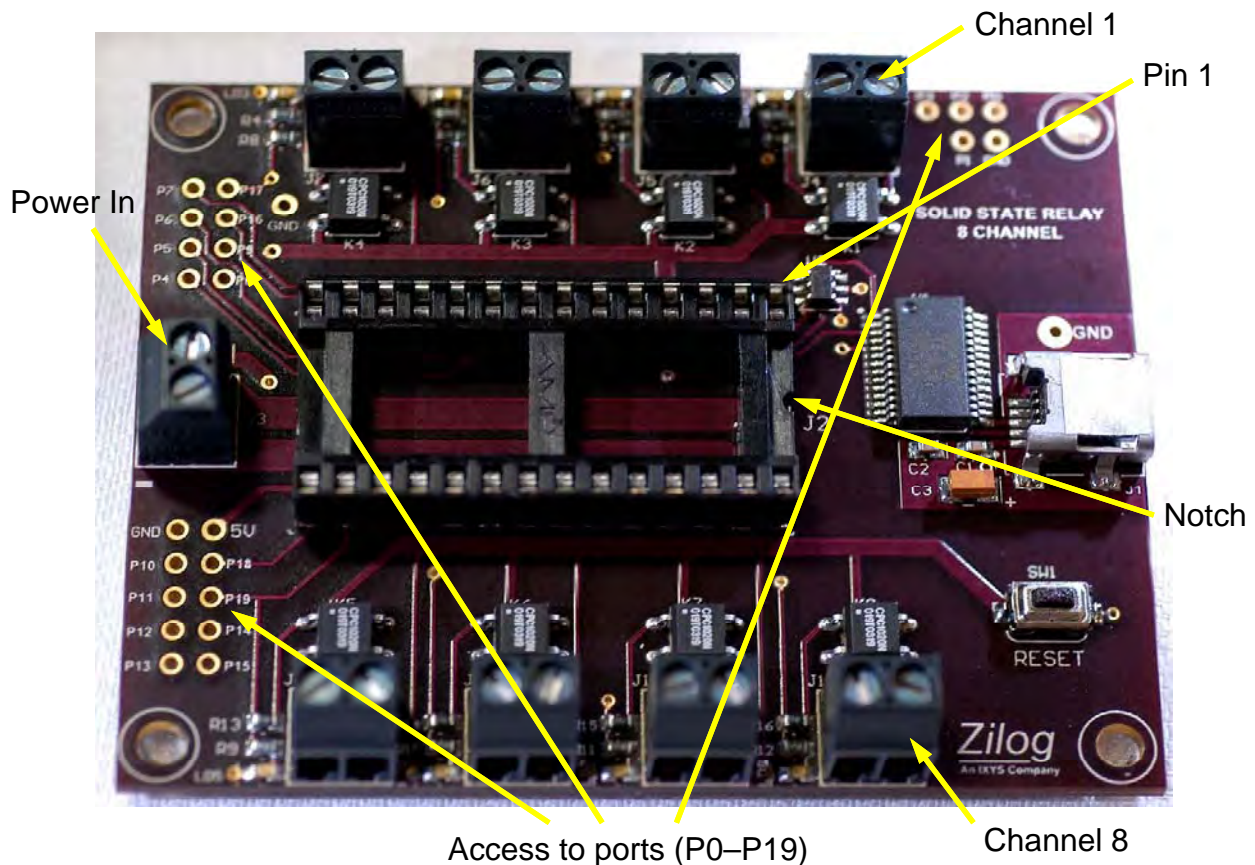


Figure 1. The Mini-Z Solid State Relay Design Board

Mini-Z Solid State Relay Design Board Features

- Controls up to 8 optically isolated solid state relays to drive your devices
- USB serial communications: no more serial cables required
- Operated by battery or external power
- Compatible with the Parallax Basic STAMP programming boards, the BasicMicro ATOM Pro and Zilog's series of Mini-Z modules
- Each pin is accessible to add functionality through breadboards and cables to additional boards

Potential Applications

The Mini-Z Solid State Relay Design Board can be used to develop a number of applications; the brief list below offers a few ideas.

- 12/24 Volt fans
- 12/24 Volt HVAC control; build your own multistage furnace thermostat
- Control 12/24 Volt architectural lighting
- Animated control system: up to 8 individual props
- Audio device control
- Pneumatic controls

Port to SSR Channel Mapping

Each channel on the Mini-Z Solid State Relay Design Board maps to a port on the Mini-Z Modules, as shown in Table 1.

Table 1. Port to SSR Channel Map

| SSR Channel | Port |
|-------------|------|
| CH1 | P9 |
| CH2 | P8 |
| CH3 | P16 |
| CH4 | P17 |
| CH5 | P19 |
| CH6 | P18 |
| CH7 | P5 |
| CH8 | P4 |

Socket Pin-Out

Socket Pin-Out to connection point mapping. See Table 2.

Table 2. Socket Pin-Out

| Socket Pin | Pin Name |
|------------|---------------------|
| 1 | S _{OUT} |
| 2 | S _{IN} |
| 3 | DTR |
| 4 | VSS |
| 5 | PO |
| 6 | P1 |
| 7 | P2 |
| 8 | P3 |
| 9 | P4 |
| 10 | P5 |
| 11 | P6 |
| 12 | P7 |
| 13 | P16 |
| 14 | P17 |
| 15 | P18 |
| 16 | P19 |
| 17 | P8 |
| 18 | P9 |
| 19 | P10 |
| 20 | P11 |
| 21 | P12 |
| 22 | P13 |
| 23 | P14 |
| 24 | P15 |
| 25 | V _{CC} I/O |
| 26 | Reset |
| 27 | V _{SS} |
| 28 | V _{IN} |

Electrical Specifications

Stresses greater than those listed in Table 3 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 3 describes the electrical characteristics of the Mini-Z Solid State Relay Design Board and reflects all available data as a result of testing prior to qualification and characterization. As such, the data presented in Table 3 is subject to change.

Table 3. Electrical Specifications for the Mini-Z Solid State Relay Design Board

| Parameter | Min | Max | Units | Notes |
|---|------|-----|-----------------|---------------------|
| V_{IN} range | | 20 | Volts | Module-dependent. |
| Max voltage range, all other pins | -0.3 | 5.5 | Volts | I/O pins and Reset. |
| Max current for I/O pin connection points | -25 | 25 | Milliamps (mA) | |
| Max V_{IN} current | | 1 | Amps | |
| Ambient temperature | -40 | 105 | Degrees Celsius | |
| Storage temperature | -65 | 150 | Degrees Celsius | |

Table 4 describes the electrical characteristics of the Mini-Z Solid State Relay Design Board under load conditions. For more information, please see the [CPC1020N Single-Pole, Normally Open 4-Lead SOP OptoMOS Relay Data Sheet \(CPC1020N\)](#), available from the clare.com website.

Table 4. Electrical Characteristics for the Mini-Z Solid State Relay Design Board

| Parameter | Condition | Symbol | Min | Typ | Max | Units |
|--------------------|-----------------------|------------|-----|-------|-----|---------|
| Max Voltage | | V_{MAX} | | | 30 | V |
| Load Current | | I_L | | | 1.2 | ADC |
| On-Resistance | $I_L = 1A$ | R_{ON} | | 0.116 | .25 | Ohms |
| Off-State Leakage | $V_L = 30V$ | I_{LEAK} | | | 1 | μA |
| Switching Speeds | | | | | | |
| Turn-On | $V_L = 10V$ | t_{ON} | | 0.48 | 3 | ms |
| Turn-Off | | t_{OFF} | | 0.65 | 3 | |
| Output Capacitance | $V_L = 30V, f = 1MHz$ | C_{OUT} | | 70 | | pF |

Table 5 describes the electrical characteristics of the Mini-Z Solid State Relay Design Board's terminal blocks.

Table 5. Terminal Block Specifications

| | |
|-----------------------------|------------|
| Rated Voltage | 150 Volt |
| Rated Current | 6 Amps |
| Wire Size | AWG 28-16 |
| Test Voltage | 2.0K volts |
| Rated Torque/Screw Size | 0.4 Nm/M2 |
| Wire: | |
| Max rated cross section: | |
| Solid Wire | 1.5mm |
| Stranded Wire | 1.5mm |
| Stranded wire with Ferrules | .75mm |
| Stripped Length | 5.5mm |

Packaging

Figure 2 displays an assembly diagram of the Mini-Z Solid State Relay Design Board.

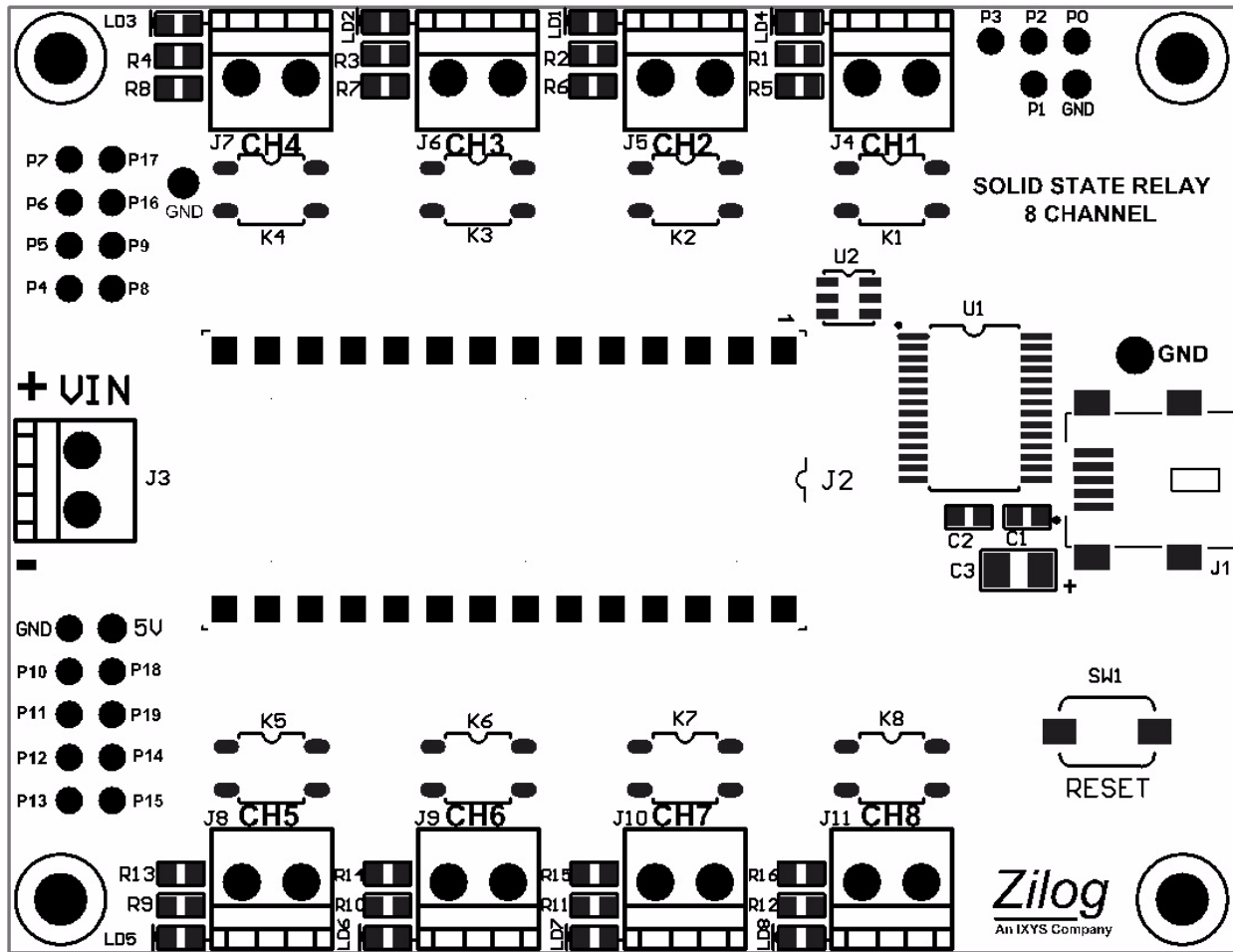


Figure 2. Mini-Z Solid State Relay Design Board Assembly Diagram

Mechanical Profile

Figure 3 displays the top- and side-view dimensions of the Mini-Z Solid State Relay Design Board.

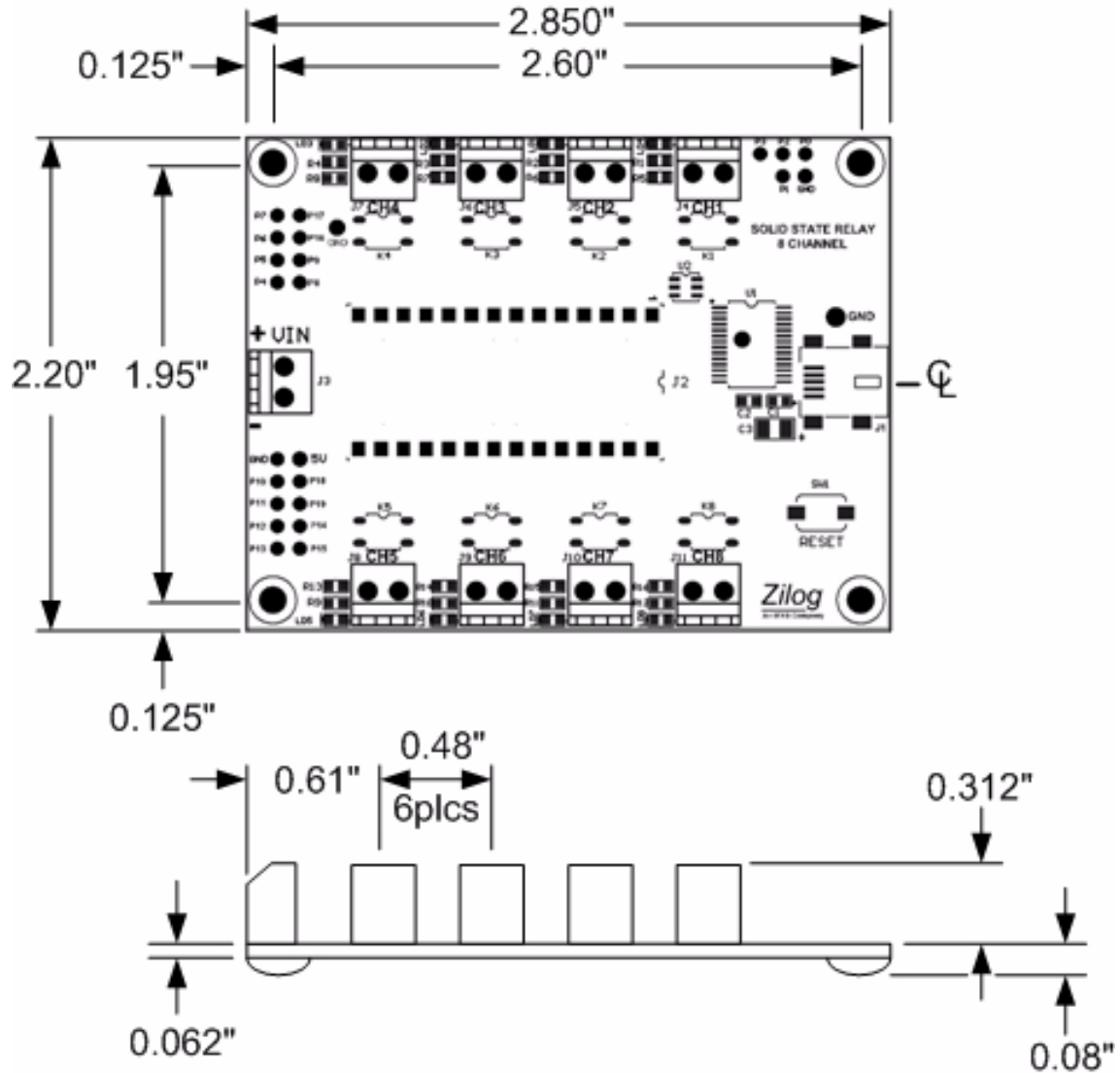


Figure 3. Mini-Z Solid State Relay Design Board Dimensions

Ordering Information

The products associated with the Mini-Z Solid State Relay Design Board are available individually or as a kit and can be purchased from the Zilog Store – simply click the Store Product IDs listed in Table 6.

Table 6. Mini-Z Solid State Relay Design Board Ordering Information

| Part Number | Description | Store Product ID |
|-----------------|---------------------------------------|-------------------------|
| Z16SSR00100DBG | Mini-Z Solid State Relay Design Board | RD10001 |
| Z16F2800100MODG | Mini-Z ZNEO 28-Pin Module | RD10002 |
| Z16F28WF100MODG | Mini-Z WLAN 28-Pin Module | RD10003 |
| Z16SSR00100KITG | Mini-Z ZNEO SSR Kit* | RD10004 |
| Z16F28WF100KITG | Mini-Z WLAN SSR Kit | RD10006 |

Note: *The Mini-Z ZNEO SSR Kit ships with a 9V battery connector.

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)
- DIP Package Extractor

The Mini-Z WLAN 28-Pin SSR Kit contains the following elements:

- Mini-Z WLAN 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 Solid State Relay Design Board are listed in Table 7. Each of these documents can be obtained from the Zilog website (except where noted) by clicking the link associated with its Document Number.

Table 7. ZAURA RF Wireless Module Documentation

| Document Number | Description |
|-------------------------------|---|
| RD0007 | This Mini-Z Solid State Relay Design Board Reference Design document |
| RD0006 | Mini-Z ZNEO 28-Pin Module Reference Design document |
| RD0006-SC01 | Mini-Z Library |
| 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 |
| Clare website | CPC1020N Single-Pole, Normally Open 4-Lead SOP OptoMOS Relay Data Sheet |

Schematic Diagram

Figure 4 shows a schematic diagram of the Mini-Z Solid State Relay Design Board.

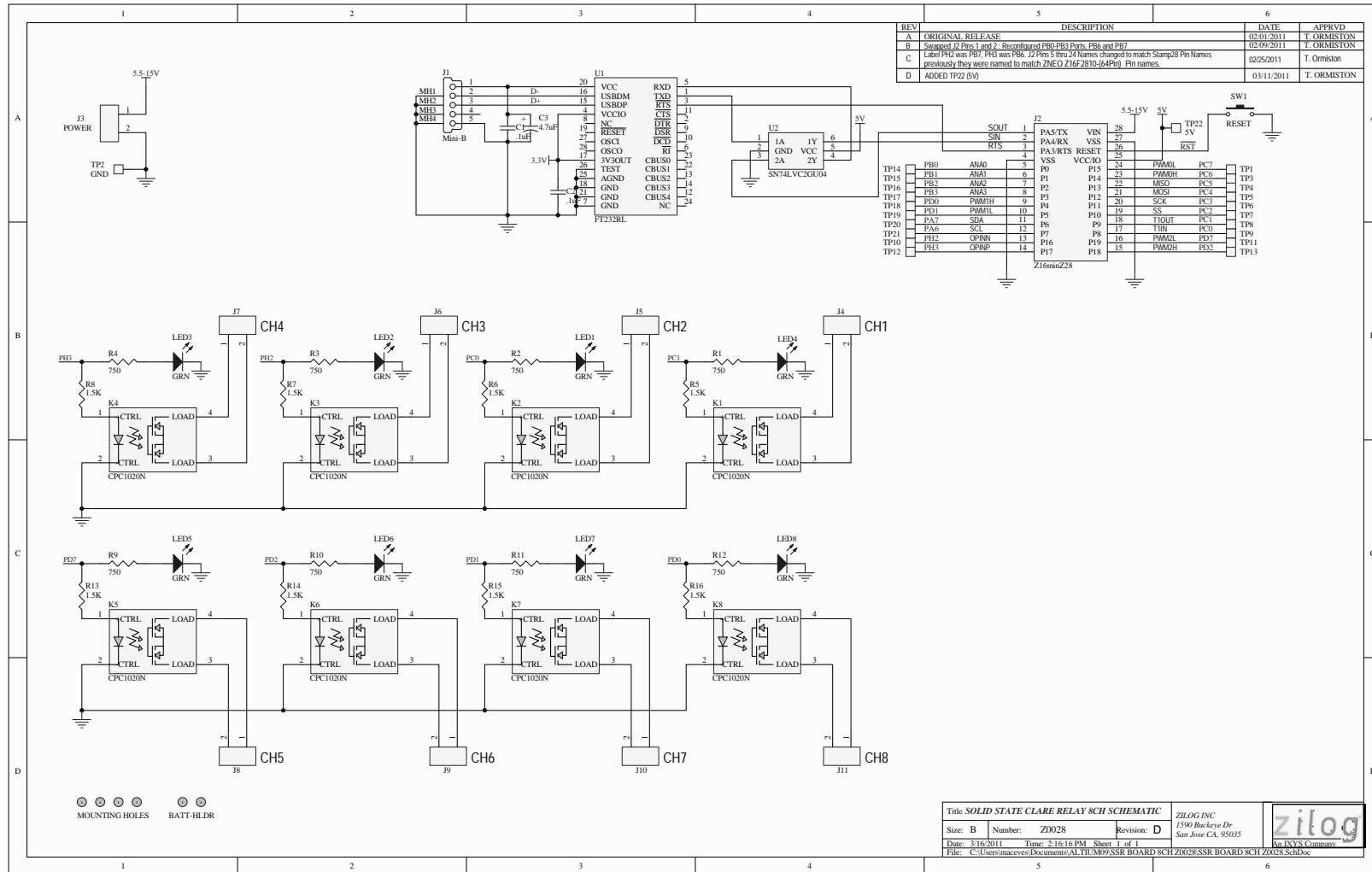


Figure 4. Mini-Z Solid State Relay Design Board Schematics

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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As used herein

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