RELAY-4
4 RELAY PERIPHERAL BOARD
Technical Manual

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BiPOM Electronics, Inc.

Overview

RELAY-4 is an Input/Output Expander board with 4 high current relays for the MINI-MAX series of micro-controller boards.

RELAY-4 board has 4 relays with 10 Ampere contact rating. Both Normally Open (NO) and Normally Closed (NC) relay contacts are brought to screw terminals. Relays are controlled by a Philips PCA9554N I/O Expander. Any command to activate or deactivate a relay is sent through the 2-wire (I2C) bus. A jumper block configures unique 3-bit board address. Thiss allows up to 8 RELAY-4 boards to be used at the same time. Hence, it is possible to prepare a controller system with 32 high current relays.

RELAY-4 board is powered from external 5 Volts DC on the 20-pin I/O connector. This is normally provided by the MINI-MAX microcontroller board when RELAY-4 is plugged to the microcontroller board.

Specifications

RELAY-4 board has the following configuration:

- Philips I/O expander PCA9554N

- 4-channel Darlington drivers (ULN2803) to drive the relay coils

- 4 high current relays with Normally Open and Normally Closed contacts

- 4 extra digital I/O

- Address selector jumpers

- 4 relay contact screw terminal blocks

- 20-pin connector for interfacing to a variety of micro-controller boards

- Single operating voltage 5VDC

- Dimensions are 2.35 X 2.40 inches (5.97 X 6.10 centimeters)

- Mounting holes of 0.138 inches (3.5 millimeters) are on four corners

- -20° to +85° C operating, -40° to +85° C storage temperature range

WARRANTY:

BiPOM Electronics warrants RELAY-4 for a period of 1 year. If the board becomes defective during this period, BiPOM Electronics will at its option, replace or repair the board. This warranty is voided if the product is subjected to physical abuse or operated outside stated electrical limits. BiPOM Electronics will not be responsible for damage to any external devices connected to RELAY-4. BiPOM Electronics disclaims all warranties express or implied warranties of merchantability and fitness for a particular purpose. In no event shall BiPOM Electronics be liable for any indirect, special, incidental or consequential damages in connection with or arising from the use of this product. BiPOM's liability is limited to the purchase price of this product.

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Expansion bus

The 16 control pins and 5 Volt power supply pins are available on the 20-pin connector (J1) for interfacing to existing micro-controller boards. RELAY-4 board can be connected to a host board either as a piggyback daughter-board using standoffs or can be placed away from the host board using a 20-wire ribbon cable (Part #: EXPCABLE-6). Table 1 shows the pin assignments for the connector.

Input Connector (J1)

Signal	Pin	Pin	Signal
P3.0	20	19	P3.1
P3.2	18	17	P3.3
P3.4	16	15	P3.5
P3.6	14	13	P3.7
P1.0	12	11	P1.1
P1.2	10	9	P1.3
P1.4	8	7	P1.5
P1.6 (I^2C Data)	6	5	P1.7 (I^2C CLK)
VCC (+5V)	4	3	GND
VCC (+5V)	2	1	GND

Table 1

Software

RELAY-4 board uses an I2C (2-wire) I/O expander chip: PCA9554N. This chip converts I2C commands form the host microcontroller to 8 digital I/O points. 4 of these digital I/O points drive the relays and the other 4 are available on a 4-pin header for use as generic digital I/O.

The unique address of PCA9554N on the I2C bus is 40 (hex). Address jumpers JP1,JP2 and JP3 allow configuring the board for one of 8 devices starting with address 40. This way, up to 8 RELAY-4 boards can be connected to the same I2C bus.

BiPOM provides RELAY-4 driver library and software examples for various microcontrollers and software packages:

For ARM Microcontrollers, ARM Development System has an example and library functions for RELAY-4:

http://www.bipom.com/products/us/319589.html

For 8051 Microcontrollers, Micro C has an example and library functions for RELAY-4:

http://www.bipom.com/products/us/202.html

Board Layout

Figure 1 shows positions of major components, connectors and terminals on the RELAY-4 board.
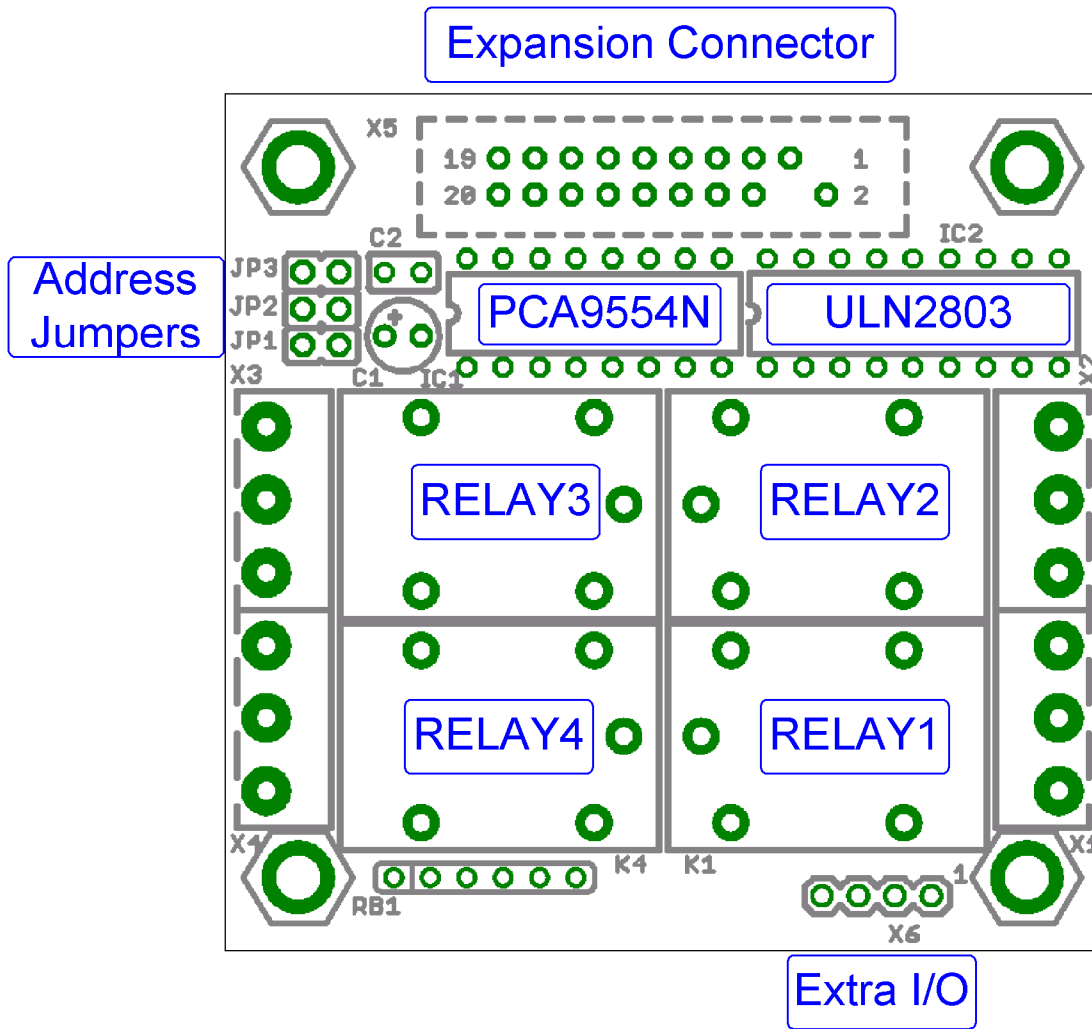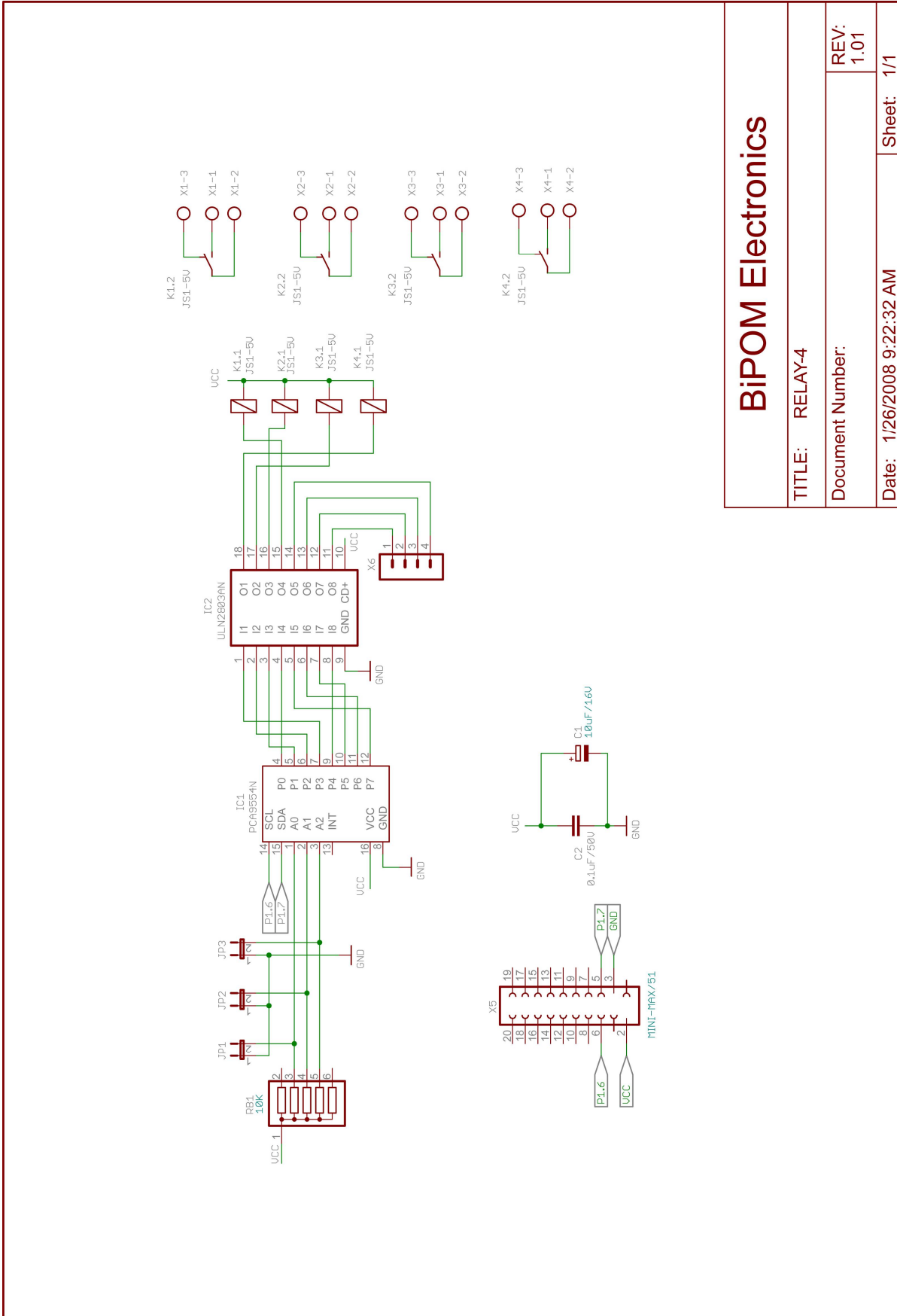

Figure 1

Schematics

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