MSI-P455

PC/104 8-Channel SPDT Relay Output Card

PC/104 Embedded
Industrial Analog I/O Series

Microcomputer Systems, Inc.
1814 Ryder Drive □ Baton Rouge, LA 70808
Ph (225)769-2154 □ Fax (225) 769-2155
http://www.microcomputersystems.com
Email: staff@microcomputersystems.com

CONTENTS

I. DESCRIPTION

The MSI-P455 relay output card, shown in Figure 1, is designed for industrial control applications. It contains 8 SPDT relays which can be set or reset directly by I/O write instructions. The power-on rest condition for all relays is normally open.

Each relay is rated at 1.5A @ 125 VAC. The normally open (NO), normally closed (NC) and common (COM) contacts of each relay are available through a 50-pin connector. A LED which is adjacent to each relay lights when the relay is energized. The relay is activated when a logic high is written to the 16-Bit I/O port address assigned by onboard address jumpers. Requires +5V at 300 mA maximum.

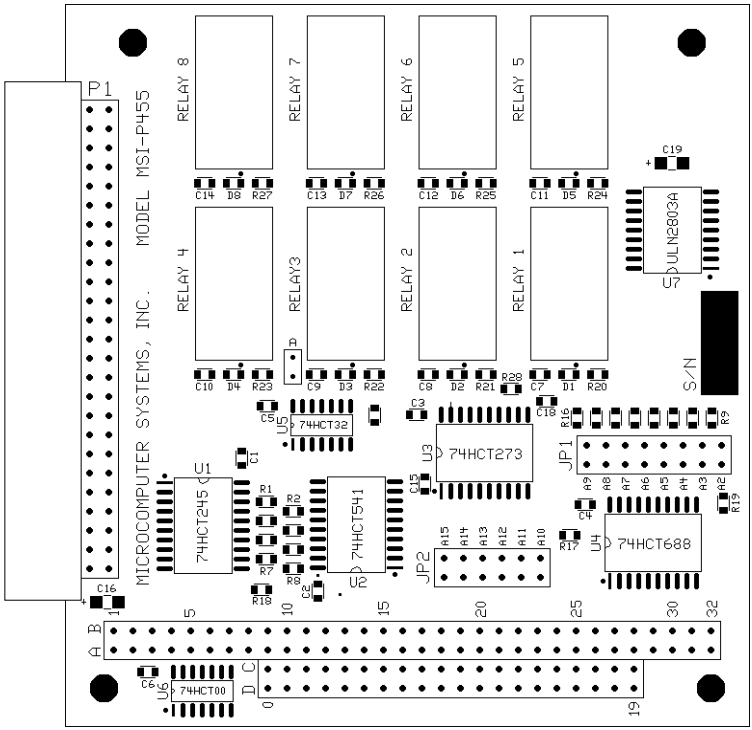

Figure 1. Outline of MSI-P455 Relay Card.

II. CARD CONFIGURATIONS

A. Card Address Selection

The I/O-mapped card address is set by installing appropriate jumpers on JP1, pins A2 thru A9, and JP2, pins A10 thru A15. An uninstalled jumper for a given address bit sets the bit address to 0 (false) and an installed jumper sets the bit to 1 (true). The address jumpers of JP1 and JP2 set the card address as described below.

1. Address Jumpers of JP1

The card address bits A2 thru A9 are set by JP1. We will refer to these as the ***base address***. These are the only address bits (including A0 and A1) that were used by original I/O cards which conformed to the IBM PC ISA Bus addressing. These correspond to the hexadecimal addresses 0 thru 0x3FF. The MSI-P544 does not decode A0 and A1. Therefore, the card occupies 4 contiguous addresses starting at the card address.

When replacing cards using only this address range (A2 thru A9), simply ignore jumpers of JP2 (install no jumpers on JP2), and the addressing is the same as that of your existing card. Examples are as follow.

a. Base address of 0x300

Install jumpers JP1-A9 and JP1-A8.

b. Base address of 0x208

Install jumpers JP1-A8 and JP1-A3.

2. Address Jumper of JP2

Addresses A10 thru A15 are jumper selectable for defining the ***offset address*** of the card which extends the address range of the card and removes the address limitations of the original ISA addressing. The card address is

Card address = base address + offset address

where the offset addresses are selectable from 0x00 to 0x8000,

as shown in Table 1. Only a single jumper can be installed on JP2.

Examples for card addressing are as follow.

a. Card address of 0x4304

In this case,

Base Address = 0x304, install JP1 jumpers A9, A8, A2

Offset Address = 0x4000, install JP2 jumper A14

b. Card address of 0x1000

In this case,

Base Address = 0x00, install no JP1 jumpers

Offset Address = 0x1000, install JP2 jumper A12

Table 1. Offset Address Selection of JP2.

Offset Address	JP2 Installed Jumper *
0x0000	NONE
0x0400	JP2-A10
0x0800	JP2-A11
0X1000	JP2-A12
0x2000	JP2-A13
0x4000	JP2-A14
0x8000	JP2-A15

* ONLY A SINGLE JUMPER IS ALLOWED ON JP2.

B. Setting the Relay Outputs

The relay outputs are set by performing an I/O write to the card address of the card selected by JP1 and JP2. The bits 0 thru 7 of the output byte sets the state of the output of relays R1 thru R8, as shown in Table 2.

0 STATE - A '0' written to the bit de-activates the relay to 'OPEN' or 'RESET' condition. In this state, the NO contact is open and NC contact is closed.

1 STATE - A '1' written to the bit activates the relay to 'CLOSED' or 'SET' condition. In this state, the NO contact is closed and NC contact is open.

At power-on, all relays are set to the 0 STATE.

Table 2. Bit Assignments for Relays R1 thru R7.

RELAY NO.	OUTPUT BIT *
R1	0
R2	1
R3	2
R4	3
R5	4
R6	5
R7	6
R8	7

* 0 is the LSB and 7 is the MSB.

A red LED adjacent to each relay indicates a 1 STATE condition.

C. Reading the Relay Output Status

The relay output status or conditions are examined by performing an I/O read (input) from the card address of the card selected by JP1 and JP2. The bits 0 thru 7 of the input byte denotes the state of the output of relays R1 thru R8 using the same bit assignments for the input byte as those of the output byte shown in Table 2.

0 STATE - A '0' denotes an 'OPEN' or 'RESET' condition. In this state, the NO contact is open and NC contact is closed.

1 STATE - A '1' denotes a 'CLOSED' or 'SET' condition. In this state, the NO contact is closed and NC contact is open.

D. Output Connector P1 Pin Assignments

The output pin assignments of connector P1 are shown in Figure 2 on page 6. In this figure, NO denotes the normally open contact, NC denotes the normally closed contact, and COM is the common terminal.

R1COM	1 2	R1COM
R1NC	3 4	R1NC
R1NO	5 6	R1NO
R2COM	7 8	R2COM
R2NC	9 10	R2NC
R2NO	11 12	R2NO
R3COM	13 14	R3COM
R3NC	15 16	R3NC
R3NO	17 18	R3NO
R4COM	19 20	R4COM
R4NC	21 22	R4NC
R4NO	23 24	R4NO
R5COM	25 26	R5COM
R5NC	27 28	R5NC
R5NO	29 30	R5NO
R6COM	31 32	R6COM
R6NC	33 34	R6NC
R6NO	35 36	R6NO
R7COM	37 38	R7COM
R7NC	39 40	R7NC
R7NO	41 42	R7NO
R8COM	43 44	R8COM
R8NC	45 46	R8NC
R8NO	47 48	R8NO
N/C	49 50	N/C

Figure 2. Pin Assignments for P1.

III. SPECIFICATIONS

Output Channels	8 SPDT relays 8 LED indicators
Output Type	NO, NC & Common
Maximum Contact Ratings	
Power	30W/60VA
Voltage	125 VAC
Current	1.5 A AC/DC
Contact Resistance	100 mOhms maximum
Life Expectancy	10 X 106 operations
Operate/Release Time	8/8 ms
Breakdown Voltage	
Coil-to-Contact	1500 Vrms
Across Contact	1000 Vrms
I/O Addressing	16-Bit, jumper selectable
Power Requirements	+5VDC @ 200 mA
Size	90 mm x 96 mm 3.550" x 3.775"
Weight	230 g 8.1 oz.
Output Connector	50-Pin , Type 3M 30350-5002

APPENDIX A

MSI-P455 Circuit Diagram

Schematic Diagrams of the MSI-P455

P455.pdf - Schematic sheet 1 of 1.