



INDUSTRIAL COMPUTER SOURCE[®]

Model RB-24 Product Manual

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INDUSTRIAL COMPUTER SOURCE[®]

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FOREWARD

This product manual provides information to install, operate and or program the referenced product(s) manufactured or distributed by Industrial Computer Source. The following pages contain information regarding the warranty and repair policies.

Technical assistance is available at: **1-800-480-0044**.

Manual Errors, Omissions and Bugs: A "Bug Sheet" is included as the last page of this manual. Please use the "Bug Sheet" if you experience any problems with the manual that requires correction.

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Guarantee

A thirty day money-back guarantee is provided on all **standard** products sold. **Special order products** are covered by our Limited Warranty, *however they may not be returned for refund or credit. EPROMs, RAM, Flash EPROMs or other forms of solid electronic media are not returnable for credit - but for replacement only. Extended Warranty available. Consult factory.*

Refunds

In order to receive refund on a product purchase price, the product must not have been damaged by the customer or by the common carrier chosen by the customer to return the goods, and the product must be returned complete (meaning all manuals, software, cables, etc.) within 30 days of receipt and in as-new and resalable condition. The **Return Procedure** must be followed to assure prompt refund.

Restocking Charges

Product returned *after 30 days, and before 90 days*, of the purchase will be subject to a **minimum 20%** restocking charge and any charges for damaged or missing parts.

Products not returned within 90 days of purchase, or products which are not in as-new and resalable condition, are not eligible for credit return and will be returned to the customer.

Limited Warranty

One year limited warranty on all products sold with the exception of the "Performance Series" I/O products, which are warranted to the original purchaser, for as long as they own the product, subject to all other conditions below, including those regarding neglect, misuse and acts of God. Within one year of purchase, Industrial Computer Source will repair or replace, at our option, any defective product. At any time after one year, we will repair or replace, at our option, any defective "Performance Series" I/O product sold. This does not include products damaged in shipment, or damaged through customer neglect or misuse. Industrial Computer Source will service the warranty for all standard catalog products for the first year from the date of shipment. After the first year, for products not manufactured by Industrial Computer Source, the remainder of the manufacturer's warranty, if any, will be serviced by the manufacturer directly.

The **Return Procedure** must be followed to assure repair or replacement. Industrial Computer Source will normally return your replacement or repaired item via UPS Blue. *Overnight delivery or delivery via other carriers is available at additional charge.*

The limited warranty is void if the product has been subjected to alteration, neglect, misuse, or abuse; if any repairs have been attempted by anyone other than Industrial Computer Source or its authorized agent; or if the failure is caused by accident, acts of God, or other causes beyond the control of Industrial Computer Source or the manufacturer. Neglect, misuse, and abuse shall include any installation, operation, or maintenance of the product other than in accordance with the owners' manual.

No agent, dealer, distributor, service company, or other party is authorized to change, modify, or extend the terms of this Limited Warranty in any manner whatsoever. Industrial Computer Source reserves the right to make changes or improvements in any product without incurring any obligation to similarly alter products previously purchased.



Shipments not in compliance with this Guarantee and Limited Warranty Return Policy will not be accepted by Industrial Computer Source.

Return Procedure

For any Limited Warranty or Guarantee return, please contact Industrial Computer Source's Customer Service at **1-800-480-0044** and obtain a Return Material Authorization (RMA) Number. All product(s) returned to Industrial Computer Source for service or credit **must** be accompanied by a Return Material Authorization (RMA) Number. Freight on all returned items **must** be prepaid by the customer who is responsible for any loss or damage caused by common carrier in transit. Returns for Warranty **must** include a Failure Report for each unit, by serial number(s), as well as a copy of the original invoice showing date of purchase.

To reduce risk of damage, returns of product must be in an Industrial Computer Source shipping container. If the original container has been lost or damaged, new shipping containers may be obtained from Industrial Computer Source Customer Service at a nominal cost.

Limitation of Liability

In no event shall Industrial Computer Source be liable for any defect in hardware or software or loss or inadequacy of data of any kind, or for any direct, indirect, incidental, or consequential damages in connection with or arising out of the performance or use of any product furnished hereunder. Industrial Computer Source liability shall in no event exceed the purchase price of the product purchased hereunder. The foregoing limitation of liability shall be equally applicable to any service provided by Industrial Computer Source or its authorized agent.

Some *Sales Items* and *Customized Systems* are **not** subject to the guarantee and limited warranty. However in these instances, any deviations will be disclosed prior to sales and noted in the original invoice. ***Industrial Computer Source reserves the right to refuse returns or credits on software or special order items.***

Advisories

Three types of advisories are used throughout the manual to stress important points or warn of potential hazards to the user or the system. They are the Note, the Caution, and the Warning. Following is an example of each type of advisory:

Note: The note is used to present information which may provide special instruction or extra information which may help to simplify the use of the product.



CAUTION!



A Caution is used to alert you of a situation which if ignored may cause injury or damage equipment.



WARNING!



A Warning is used to alert you of a situation which if ignored will cause serious injury.

Cautions and Warnings are accented with triangular symbols. The exclamation symbol is used in all cautions and warnings to help alert you to the important instructions. The lightning flash symbol is used on the left hand side of a caution or a warning if the advisory relates to the presence of voltage which may be of sufficient magnitude to cause electrical shock.

Use caution when servicing any electrical component. We have tried to identify the areas which may pose a Caution or Warning condition in this manual; however, Industrial Computer Source does not claim to have covered all situations which might require the use of a Caution or Warning.

You must refer to the documentation for any component you install into a computer system to insure proper precautions and procedures are followed.

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Chapter 1: Installation

The RB-24 Series cards installed external to the host computer. The card is supplied with four 0.375" stand-offs and may be installed on user-supplied panels/chassis. The card provides headers for both 37- and 50-conductor ribbon cable connection to the host computer and screw terminal terminations for the relay outputs. Silk-screen labels on the board identify the relay elements to which they connect. The screw terminals used can accommodate wire sizes as large as #14 AWG.

To ensure that there is minimum susceptibility to EMI and minimum radiation, it is important that EMI cabling and break-out techniques be used. (cable connected to ground at the aperture of the digital I/O card that will provide signals, twisted pair wiring, etc.)

Power Connections

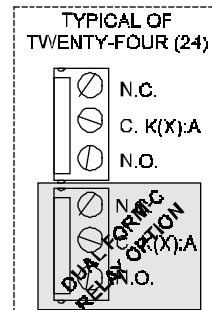
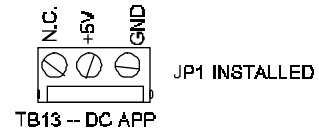
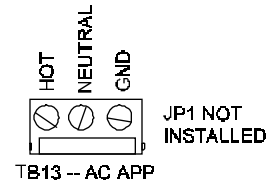
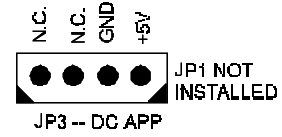
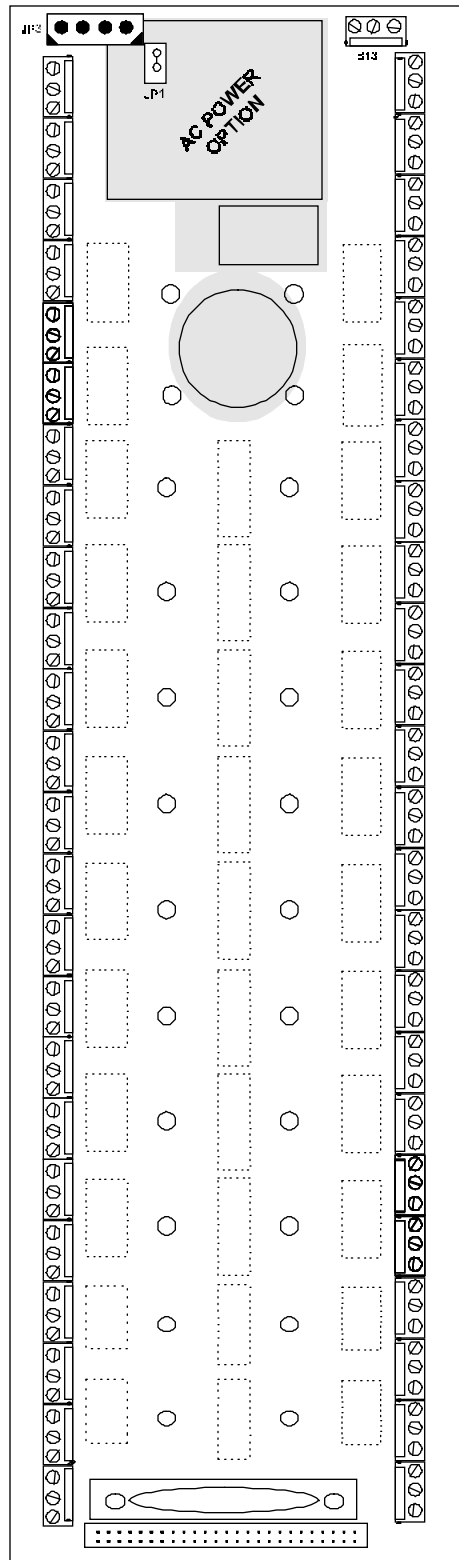
Connector J3 is provided for easy application of +5 VDC computer power via a quick disconnect cable from the computer power bus. Screw terminals are also provided for 5-volt external power to the card at TB13. (Note: Jumper JP1 *must* be installed if you intend to apply power through the screw terminals.) Alternatively, when the AC Power option is installed, JP1 should *not* be installed and the AC power is applied at TB13.

The following page illustrates the layout of the RB-24.

Configurations

- | | |
|----------|---|
| RBAC-24: | Signifies that the card is configured for 115 VAC power input. When this option is installed, AC power must be applied at TB13 as described above. Also, IC drivers U1, U3, U4, U6, U7, and U9 are omitted. |
| /DP: | The "/DP" option provides DPDT relay outputs. |

RB-24 Layout



Chapter 2: Functional Description

The Model RB-24 is a twenty-four channel electromechanical relay output accessory card. On-board amplifiers allow the relays to be driven by any 24-bit group of any of our PCDIO Series digital I/O card or from other manufacturer's LSTTL or NMOS/CMOS-compatible digital output cards that use 37 or 50-pin connections compatible with the pin connections listed later in this manual. When an input bit is high, the associated relay is energized and a red LED associated with each relay glows when that relay is actuated.

SPDT Form C relays are standard but DPDT Form C relays are an available option. The relays used are UL-recognized, non-latching, polarized units designed to FCC Part 68 isolation requirements and can switch up to three amperes current into a resistive load at voltages up to 120 VAC (rms).

The card is normally powered by +5 VDC external power but an option is available for 115 VAC, 60 Hz external power. In both cases, screw terminals are provided for termination of input power connections.

As mentioned earlier, either card may be interfaced to any 24-bit port of PCDIO Series card. Relay numbers and corresponding port-bit assignments are as follows:

Relay	Port Bit	Relay	Port Bit
1	PA0	13	PC4
2	PA1	14	PC5
3	PA2	15	PC6
4	PA3	16	PC7
5	PA4	17	PB0
6	PA5	18	PB1
7	PA6	19	PB2
8	PA7	20	PB3
9	PC0	21	PB4
10	PC1	22	PB5
11	PC2	23	PB6
12	PC3	24	PB7

Controlling RB-24

Programming RB-24 is done by simple OUT statements. For example, if the card is to be controlled by an Model PCUDIO24-P located at base address hex 310, BASIC statements would be as follows:

```
10 OUT &H313,&H80      'Sets the ports to use as outputs
20 OUT &H310,1         'Activates Port A, bit 0 (Relay 0)
30 OUT &H311,16        'Activates Port B, bit 4 (Relay 21)
```

Alternatively, any parallel, TTL-compatible, source can be used to drive the relays and would be programmed according to instructions provided by the manufacturer. Please assure that the pin-out and cable configuration is compatible with the RB-24 pin assignments listed on the following pages.

Chapter 3: Connector Pin Assignments

Either the 50-pin ribbon cable header (J2) or the 37-pin cable header (J1) is used to interface to the digital output board in the host computer. The mating connectors are a type AMP 1-746285-0 or equivalent (50 pins) or type AMP 745242-1 (37 pins) for insulation displacement flat cables or Cannon DC37-S (37 pins) for soldered connections.

Pin connections for the 50-pin connector are as follows:

PIN	ASSIGNMENT
1	Relay K16
3	Relay K15
5	Relay K14
7	Relay K13
9	Relay K12
11	Relay K11
13	Relay K10
15	Relay K9
17	Relay K24
19	Relay K23
21	Relay K22
23	Relay K21
25	Relay K20
27	Relay K19
29	Relay K18
31	Relay K17
33	Relay K8
35	Relay K7
37	Relay K6
39	Relay K5
41	Relay K4
43	Relay K3
45	Relay K2
47	Relay K1
49	Not Used

PIN	ASSIGNMENT
2	Ground
4	“
6	“
8	“
10	“
12	“
14	“
16	“
18	“
20	“
22	“
24	“
26	“
28	“
30	“
32	“
34	“
36	“
38	“
40	“
42	“
44	“
46	“
48	“
50	“

(Continued on next page)

Pin connections for the 37-pin connector are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	Not Used	19	Not Used
2	Not Used	20	Not Used
3	Relay K24	21	Digital Common
4	Relay K23	22	Relay K16
5	Relay K22	23	Relay K15
6	Relay K21	24	Relay K14
7	Relay K20	25	Relay K13
8	Relay K19	26	Relay K12
9	Relay K18	27	Relay K11
10	Relay K17	28	Relay K10
11	Digital Common	29	Relay K9
12	Not Used	30	Relay K8
13	“ “	31	Relay K7
14	“ “	32	Relay K6
15	“ “	33	Relay K5
16	“ “	34	Relay K4
17	“ “	35	Relay K3
18	“ “	36	Relay K2
		37	Relay K1

Chapter 4: Specifications

Logic Inputs (24 lines)

Logic High:	2.0 to 5.0 VDC
Logic Low:	0.0 to 0.8 VDC
Input Load (Hi):	70 microamperes
Input Load (Lo):	600 microamperes

Relay Outputs (RB-24)

Contacts:	Form C, SPDT, non-latching (DPDT is an option)		
Contact Material:	Gold overlay silver		
Contact Rating:	Max. Switching Current:	1.5A AC	
	Max. Carry Current:	2A AC or DC	
	Max. Switching Power:	30 VA	
	Max. Switching Voltage:	125 VDC or AC	

Note: Good safety practice should be followed if AC voltages are to be switched by the relays

Actuate Time @ nominal voltage:	6 milliseconds max. including bounce
Release Time @ nominal voltage:	8 milliseconds max. including bounce
Vibration:	10 to 55 Hz, 10 g
Shock: No Contact Opening:	10 g (11 mSec sine half wave)
Life Expectancy: Mechanical:	20 x 10 ⁶ operations minimum.

Power Required: DC Power:

RB-24: +5 VDC ($\pm 5\%$) at 2 amperes maximum (all relays ON)

AC Power Option:

RB-24:	115 VAC, 60 Hz at 260 mA max. (all relays ON)
RB-24H:	115 VAC, 60 Hz at 390 mA max. (all relays ON)

Physical:

Dimensions:	16" long x 4.75" wide x 1" high.
Weight:	1 lb, 8 oz (0.7 Kg)
Screw Terminal Wire Spacing:	0.197" (5 mm)
Screw Terminal Wire Sizes:	14-22 AWG

Environmental

Operating Temperature Range:	0° to 60° C
Storage Temperature Range:	-50° to 120° C
Humidity:	45 to 85% RH, non-condensing

BUG REPORT

While we have tried to assure this manual is error free, it is a fact of life that works of man have errors. We request you to detail any errors you find on this BUG REPORT and return it to us. We will correct the errors/problems and send you a new manual as soon as available. Please return to:



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Product: **RB-24**

Manual Revision: **00650-130-2A**

Please list the page numbers and errors found. Thank you!

