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MODEL ROB-8A

USER MANUAL

Notice

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Warranty

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If a unit is suspected of failure, contact ACCES' Customer Service department. Be prepared to give the unit model number, serial number, and a description of the failure symptom(s). We may suggest some simple tests to confirm the failure. We will assign a Return Material Authorization (RMA) number which must appear on the outer label of the return package. All units/components should be properly packed for handling and returned with freight prepaid to the ACCES designated Service Center, and will be returned to the customer's/user's site freight prepaid and invoiced.

Coverage

First Three Years: Returned unit/part will be repaired and/or replaced at ACCES option with no charge for labor or parts not excluded by warranty. Warranty commences with equipment shipment.

Following Years: Throughout your equipment's lifetime, ACCES stands ready to provide on-site or in-plant service at reasonable rates similar to those of other manufacturers in the industry.

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General

Under this Warranty, liability of ACCES is limited to replacing, repairing or issuing credit (at ACCES discretion) for any products which are proved to be defective during the warranty period. In no case is ACCES liable for consequential or special damage arriving from use or misuse of our product. The customer is responsible for all charges caused by modifications or additions to ACCES equipment not approved in writing by ACCES or, if in ACCES opinion the equipment has been subjected to abnormal use. "Abnormal use" for purposes of this warranty is defined as any use to which the equipment is exposed other than that use specified or intended as evidenced by purchase or sales representation. Other than the above, no other warranty, expressed or implied, shall apply to any and all such equipment furnished or sold by ACCES.

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Chapter 1: Introduction

ROB-8A is an eight-channel electromechanical relay output accessory card that accepts inputs from parallel digital I/O cards. As many as four ROB-8As can be connected to one 24-bit I/O port. Provide +5 VDC from an external power supply via screw terminals at TB9 or from the computer's hard disk drive power cable Molex connector.

The card can receive inputs from Port A of any 24-bit group of any ACCES digital I/O card via a CAB50F-xx ribbon cable. A read-back capability is provided for Port B of that same 24-bit group. The lower nybble Port C bits PC0 and PC1 are used for card address decoding when multiple ROB-8As are used and Port C high nybble bits are coupled to screw terminals (TB10) on the card for general purpose use.

ROB-8A contains eight Form C relays (SPDT). Dual Form C relays (DPDT) are an optional configuration. Relay connections are brought out to eight sets of labeled screw terminals. Two LEDs, one green and one red, are associated with each relay. The green LED is illuminated when the relay is de-energized and the red LED glows when the relay is energized. A Polarity Select switch on the card provides means to energize the relays from either high or low logic levels.

The relays used are UL-recognized, non-latching, polarized units designed to FCC Part 68 isolation requirements and can switch up to two amperes current into a resistive load.

Specifications

Logic Inputs (8 Lines)

- Logic High: 2.0 to 5.0 VDC
- Logic Low: -0.5 to 0.8 VDC
- Input Load (Hi): 70 microamperes
- Input Load (Lo): 600 microamperes

Logic Outputs (4 Lines)

- Logic High: 2.5 VDC min., load drive depends on signal source
- Logic Low: 0.5 VDC max., load drive depends on signal source

Relay Outputs

- Contacts: Form C, SPDT, non-latching (DPDT optional)
- Contact Material: Gold overlay silver
- Contact Rating: 28 V DC at 1 A; 120 V AC at 0.5 A
- Max. Switched Current: 2 A DC or 1.25 A AC
- Max. Carry Current: 2 A, AC or DC
- Max. Switched Voltage: 125V DC or 220 V AC
- Max. Switched Power: 30 VA DC or 60 VA AC (resistive)
- Operate Time @ nominal voltage: 8 milliseconds max. (including bounce)
- Release Time @ nominal voltage: 8 milliseconds max.
- Life Expectancy: 2 x 10⁷ operations at 18,000 ops/hr.

- Power Required: +5 VDC at 0.15A (all relays OFF) and 0.9A (all relays ON) each ROB-8A.
- Size: 4.5" x 6.125" (114 mm x 156 mm)

Environmental

- Operating Temperature Range: 0 °C. to 60 °C.
- Storage Temperature Range: -30 °C. to 105 °C.
- Humidity: 45% to 90% RH, non-condensing

Chapter 2: Installation

The software provided with this card is contained on either one CD or multiple diskettes and must be installed onto your hard disk prior to use. To do this, perform the following steps as appropriate for your software format and operating system. Substitute the appropriate drive letter for your CD-ROM or disk drive where you see d: or a: respectively in the examples below.

CD Installation

DOS/WIN3.x

1. Place the CD into your CD-ROM drive.
2. Type `D:Enter` to change the active drive to the CD-ROM drive.
3. Type `I N S T A L L Enter` to run the install program.
4. Follow the on-screen prompts to install the software for this card.

WIN95/98/NT/2000

- A. Place the CD into your CD-ROM drive.
- B. The CD should automatically run the install program after 30 seconds. If the install program does not run, click START | RUN and type d:install, click OK or press `Enter`.
- C. Follow the on-screen prompts to install the software for this card.

3.5-Inch Diskette Installation

As with any software package, you should make backup copies for everyday use and store your original master diskettes in a safe location. The easiest way to make a backup copy is to use the DOS DISKCOPY utility.

In a single-drive system, the command is:

```
D I S K C O P Y  A :  A : Enter
```

You will need to swap disks as requested by the system.

In a two-disk system, the command is:

```
D I S K C O P Y  A :  B : Enter
```

This will copy the contents of the master disk in drive A to the backup disk in drive B.

To copy the files on the master diskette to your hard disk, perform the following steps.

- a. Place the master diskette into a floppy drive.
- b. Change the active drive to the drive that has the diskette installed. For example, if the diskette is in drive A, type `A: Enter`.
- c. Type `INSTALL Enter` and follow the on-screen prompts.

Directories Created on the Hard Disk

The installation process will create several directories on your hard disk. If you accept the installation defaults, the following structure will exist.

[CARDNAME]

Root or base directory containing the SETUP.EXE setup program used to help you configure jumpers and calibrate the card.

DOS\PSAMPLES: A subdirectory of [CARDNAME] that contains Pascal samples.

DOS\CSAMPLES: A subdirectory of [CARDNAME] that contains "C" samples.

Win32\language: Subdirectories containing samples for Win95/98 and NT.

WinRISC.exe

A Windows dumb-terminal type communication program designed for RS422/485 operation. Used primarily with Remote Data Acquisition Pods and our RS422/485 serial communication product line. Can be used to say hello to an installed modem.

ACCES32

This directory contains the Windows 95/98/NT driver used to provide access to the hardware registers when writing 32-bit Windows software. Several samples are provided in a variety of languages to demonstrate how to use this driver. The DLL provides four functions (InPortB, OutPortB, InPort, and OutPort) to access the hardware.

This directory also contains the device driver for Windows NT, ACCESNT.SYS. This device driver provides register-level hardware access in Windows NT. Two methods of using the driver are available, through ACCES32.DLL (recommended) and through the DeviceIOControl handles provided by ACCESNT.SYS (slightly faster).

SAMPLES

Samples for using ACCES32.DLL are provided in this directory. Using this DLL not only makes the hardware programming easier (MUCH easier), but also one source file can be used for both Windows 95/98 and WindowsNT. One executable can run under both operating systems and still have full access to the hardware registers. The DLL is used exactly like any other DLL, so it is compatible with any language capable of using 32-bit DLLs. Consult the manuals provided with your language's compiler for information on using DLLs in your specific environment.

VBACCES

This directory contains sixteen-bit DLL drivers for use with VisualBASIC 3.0 and Windows 3.1 only. These drivers provide four functions, similar to the ACCES32.DLL. However, this DLL is only compatible with 16-bit executables. Migration from 16-bit to 32-bit is simplified because of the similarity between VBACCES and ACCES32.

PCI

This directory contains PCI-bus specific programs and information. If you are not using a PCI card, this directory will not be installed.

SOURCE

A utility program is provided with source code you can use to determine allocated resources at run-time from your own programs in DOS.

PCIFind.exe

A utility for DOS and Windows to determine what base addresses and IRQs are allocated to installed PCI cards. This program runs two versions, depending on the operating system. Windows 95/98/NT displays a GUI interface, and modifies the registry. When run from DOS or Windows3.x, a text interface is used. For information about the format of the registry key, consult the card-specific samples provided with the hardware. In Windows NT, NTioPCI.SYS runs each time the computer is booted, thereby refreshing the registry as PCI hardware is added or removed. In Windows 95/98/NT PCIFind.EXE places itself in the boot-sequence of the OS to refresh the registry on each power-up.

This program also provides some COM configuration when used with PCI COM ports. Specifically, it will configure compatible COM cards for IRQ sharing and multiple port issues.

WIN32IRQ

This directory provides a generic interface for IRQ handling in Windows 95/98/NT. Source code is provided for the driver, greatly simplifying the creation of custom drivers for specific needs. Samples are provided to demonstrate the use of the generic driver. Note that the use of IRQs in near-real-time data acquisition programs requires multi-threaded application programming techniques and must be considered an intermediate to advanced programming topic. Delphi, C++ Builder, and Visual C++ samples are provided.

Findbase.exe

DOS utility to determine an available base address for ISA bus , non-Plug-n-Play cards. Run this program once, before the hardware is installed in the computer, to determine an available address to give the card. Once the address has been determined, run the setup program provided with the hardware to see instructions on setting the address switch and various option selections.

Poly.exe

A generic utility to convert a table of data into an nth order polynomial. Useful for calculating linearization polynomial coefficients for thermocouples and other non-linear sensors.

Risc.bat

A batch file demonstrating the command line parameters of RISCTerm.exe.

RISCTerm.exe

A dumb-terminal type communication program designed for RS422/485 operation. Used primarily with Remote Data Acquisition Pods and our RS422/485 serial communication product line. Can be used to say hello to an installed modem. RISCTerm stands for Really Incredibly Simple Communications TERMINal.

Installing the ROB-8A

The ROB-8A is installed external to the host computer. The card is supplied with four 0.375" stand-offs and may be installed in either T-Box enclosures from ACCES or on user-supplied panels/chassis. To install the card without the box in your own enclosure, see Figure 2-2 for the hole spacing. ROB-8A provides two 50-pin headers for 50-conductor ribbon cable connection to the host computer and to another ROB-8A when more than one ROB-8A is in use. Screw terminals are provided for the relay outputs. The screw terminals used can accommodate wire sizes as large as #14 AWG. Silk-screen labels on the card identify the relay elements and other related functions. As you read the following descriptions, refer to the layout drawing on the next page for the locations of switches, jumpers, and terminal strips.

DIP switch S1 sets various modes of operation as follows:

Switches #1 through #4 set the card address in multiple ROB-8A applications.

Switch #5 must be set to ON for multiple card operation.

This switch is set to OFF when only one ROB-8A is to be used. (The card will respond to requests from any of the four addresses.)

Card No.	Address	S1	S2	S3	S4	S5
1	0	ON	Off	Off	Off	ON
2	1	Off	ON	Off	Off	ON
3	2	Off	Off	ON	Off	ON
4	3	Off	Off	Off	ON	ON

Switch #6 is set ON if a logic 1 is to actuate the relays and set to OFF if a logic 0 is to actuate the relays.

TB9's screw terminals (AWG 14 max size, AWG 16 minimum recommended size) or the Molex quick connect are used for external +5 VDC power input to the ROB-8A.

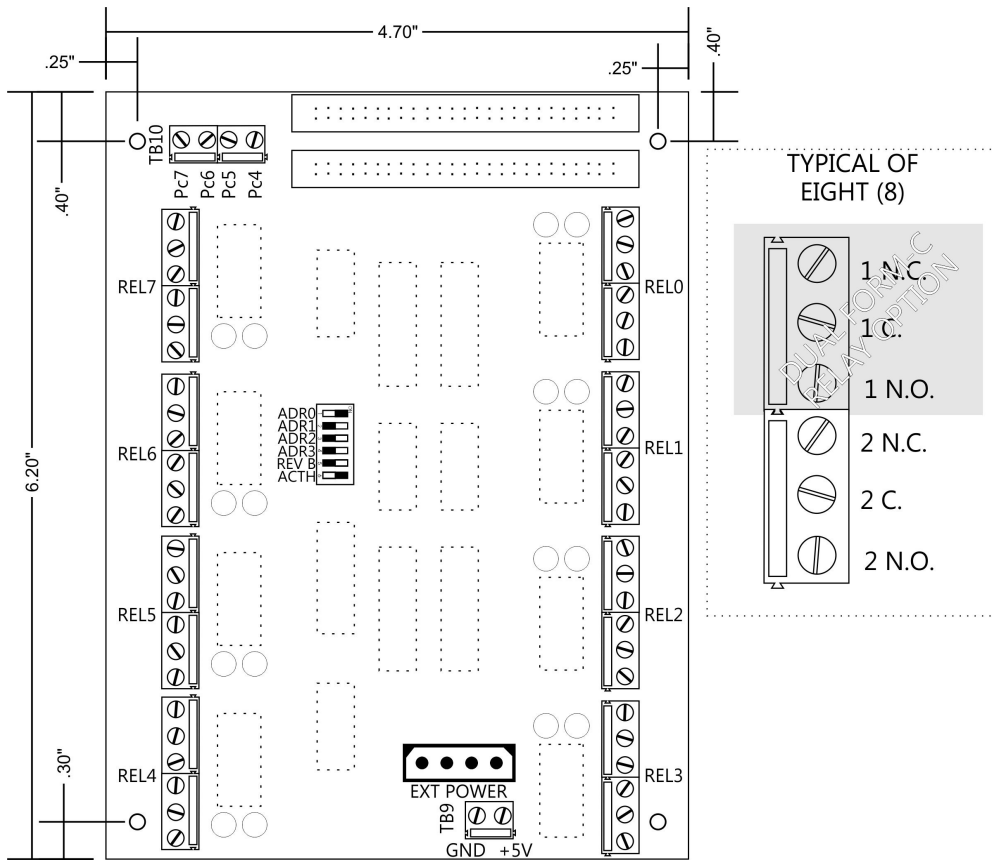


Figure 2-1: ROB-8A Layout

Chapter 3: Connector Pin Assignments

A 50-pin ribbon cable header is used to interface to the digital output card in the host computer. The mating connector is a type AMP 1-746285-0 or equivalent.

Pin	Assignment	Pin	Assignment
1	Bit PC7 to Screw Terminal	2	Ground
3	Bit PC6 " "	4	"
5	Bit PC5 " "	6	"
7	Bit PC4 " "	8	"
9	Bit PC3 Unused	10	"
11	Bit PC2 Read/Write	12	"
13	Bit PC1 Address Select	14	"
15	Bit PC0 Address Select	16	"
17	Bit PB7 Relay 7 Readback	18	"
19	Bit PB6 Relay 6 "	20	"
21	Bit PB5 Relay 5 "	22	"
23	Bit PB4 Relay 4 "	24	"
25	Bit PB3 Relay 3 "	26	"
27	Bit PB2 Relay 2 "	28	"
29	Bit PB1 Relay 1 "	30	"
31	Bit PB0 Relay 0 "	32	"
33	Bit PA7 to Relay 7	34	"
35	Bit PA6 to Relay 6	36	"
37	Bit PA5 to Relay 5	38	"
39	Bit PA4 to Relay 4	40	"
41	Bit PA3 to Relay 3	42	"
43	Bit PA2 to Relay 2	44	"
45	Bit PA1 to Relay 1	46	"
47	Bit PA0 to Relay 0	48	"
49	Not Connected	50	"

Table 3-1: Connector Pin Assignments

TB9		J3	
Pin	Assignment	Pin	Assignment
1	+5VDC	1	Open
2	Gnd	2	Gnd
		3	Gnd
		4	+5VDC

Table 3-2: External Power Connections

Appendix A: Demonstration Program

The following program, written in BASIC, illustrates how easy it is to interface the ROB-8A to digital input/output cards. This example was written for the IOD-24E or IOD-24 but, with minor variations could be used with any of the IOD-Series cards.

This program allows any relay to be turned on or off

This program expects an ACCES IOD-xx board to be connected to a ROB-8A relay board, with the base address of the IOD-xx card set to hex 300.

'Set up the variables

```
DIM RELAYS%(8) ' mask for each relay
RELSTATE% = 255 ' start all HI which is off
RELAYS%(1) = 1 ' first relay mask
FOR I = 1 TO 7 ' set up the relay masks
    RELAYS%(I + 1) = RELAYS%(I) * 2 ' shift prev one left
NEXT I
```

'Now initialize the board

```
CWORD% = &H8A ' port A and C-lo are OUT, others are IN
WSTATE% = &H4 ' Use board #1, write function
PORTA% = &H300 ' port address, also port A
PORTC% = &H302 ' port C
CADDR% = &H303 ' address for control word
```

```
OUT CADDR%, CWORD% ' program the ports
OUT PORTC%, WSTATE% ' program port C for board number and write function
OUT PORTA%, RELSTATE% ' turn off all relays
```

'Do menu selection here

```
MENU:
CLS
PRINT
PRINT
PRINT " RELAY DEMONSTRATION PROGRAM"
PRINT " COPYRIGHT ACCES"
PRINT
PRINT
PRINT " 1 Toggle any relay"
PRINT " 2 RUN a simple sequence"
PRINT " 3 Quit"
PRINT
PRINT " ROB-8A must have ADDR0 and REVB ON for sample to work."
```

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```
PRINT "      All other switches must be off. The IOD-24(E) must be at"
PRINT "      base address 300 HEX."
PRINT
SELCT:
INPUT "  Your selection"; PICK
PRINT ""
IF PICK >= 1 AND PICK <= 3 THEN GOTO CONT
PRINT "  OUT OF RANGE, TRY AGAIN."
GOTO SELCT
CONT:
ON PICK GOSUB TOGGLE, SEQUENCE, QUIT
GOTO MENU
```

‘This section will toggle a relay

```
TOGGLE:
CLS
PRINT
PRINT
```

```
RETRY:
INPUT "Enter relay number to toggle:"; REL
IF REL >= 1 AND REL <= 8 THEN GOTO DOIT
PRINT "Invalid relay number, try again."
GOTO RETRY
```

```
DOIT:
TEMP% = NOT RELSTATE%
RELSTATE% = NOT (TEMP% XOR RELAYS%(REL))
OUT PORTA%, RELSTATE%
RETURN
```

```
WALKIT:
RELSTATE% = NOT (RELAYS%(REL))
OUT PORTA%, RELSTATE%
RETURN
```

SEQUENCE:

‘Performs a simple sequence by turning all relays off, then
‘turning them on, one by one, then turning them off one by one

```
RELSTATE% = 255      ' turn off the relays
OUT PORTA%, RELSTATE%
FOR REL = 1 TO 8
    GOSUB WALKIT ' turn on the relay
    GOSUB DELAY
NEXT REL
```

```
RELSTATE% = 0
OUT PORTA%, RELSTATE%

GOSUB DELAY

FOR REL = 8 TO 1 STEP -1
    GOSUB DOIT ' turn off the relay
    GOSUB DELAY ' one second delay
NEXT REL
RETURN

DELAY:
    FOR OURDELAY = 1 TO 5000: NEXT
RETURN

QUIT:
'Program exit
END
```


Customer Comments

If you experience any problems with this manual or just want to give us some feedback, please email us at: manuals@accesio.com. Please detail any errors you find and include your mailing address so that we can send you any manual updates.



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