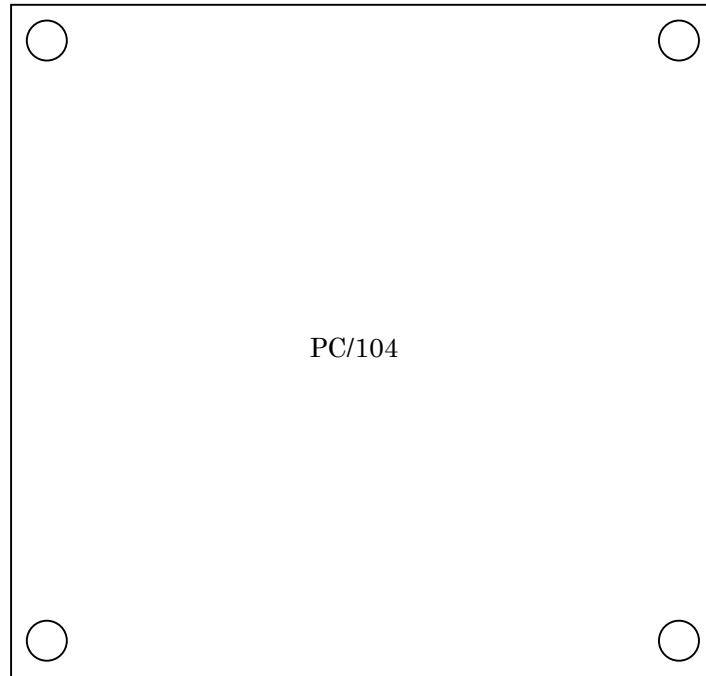


Real Solution for FA & LA



16-channel Relay Board
SWR-201PC104
User's Manual
for PC/104-BUS

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Mar 29, 2002

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Caution

Unpacking

This package contain a SWR-201PC104 board, and 4 pieces of 15mm standoff. Upon receipt the package, visually inspect the board for missing or damaged materials. This product was shipped in perfect condition as it was new. Examine the package for physical damage. In the event of damage, save all packing materials and notify your courier to validate shipping claims.

Anti-static discharge

The SWR-201PC104 contains components that are susceptible to static discharge, and should be handled with appropriate caution. The anti-static packing material protects components from being damaged by static discharge. Should the SWR-201PC104 board need to be returned for repair at a later date, it can be safely done by packing it in the original materials.

Warranty

MICRO SCIENCE warrants that this product was manufactured free of defect in materials or workmanship under normal use and service as described in this User's Manual. Obligations under this warranty are limited to replacing or repairing at MICRO SCIENCE's option. Any sale of products, at MICRO SCIENCE's factory or facility, should have to be prepaid transportation charges, and which are after examination disclosed to the satisfaction of MICRO SCIENCE to be thus defective, for a period within one year shipment. These provisions do not extend the original warranty period of any product which has either been repaired or replaced by MICRO SCIENCE. This warranty does not contain a guarantee, either expressed or implied, of merchantability or fitness for particular purpose.

This warranty shall not apply to any such products which have been repaired or altered except by MICRO SCIENCE or which have been subject to misuse, negligence, or accident.

MICRO SCIENCE assumes no liability for damages or loss consequent to use of this product. This product is not designed for a level of reliability for use in life support or critical applications. It is customer's sole responsibility to determine if this product is suitable for the application.

Disclaimer

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Applicable Laws

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This Agreement constitutes the license between MICRO SCIENCE, Co and the purchaser of MICRO SCIENCE products.

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In this Agreement, a "FILE" shall mean a contiguous collection of machine-readable symbols, bytes, characters, or codes which may be used by the CPU on the user's computer or processing equipment.

A "PROGRAM" is a file or related group of files which may be loaded and processed on the user's computer or processing equipment to perform the functions.

A "SOFTWARE" shall mean one or more FILES or PROGRAMS.

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Customer Product Support Policy

MICRO SCIENCE will answer the written questions (including FAX, or Email) in Japanese or English from the registered user about this product.
Send us the question form in this manual filled with the information.

We do not answer on phone with any language but Japanese.
Although MICRO SCIENCE may offer advice, we will not design the user's application.

Price List (on Mar, 2002)

Description	Number of contacts	Item	Unit Price \$
Dry contacted Relay Board	1	SWR-201PC104- 1N	158.00
	2	- 2N	166.00
	3	- 3N	174.00
	4	- 4N	182.00
	5	- 5N	190.00
	6	- 6N	198.00
	7	- 7N	206.00
	8	- 8N	214.00
	9	- 9N	222.00
	10	-10N	230.00
	11	-11N	238.00
	12	-12N	246.00
	13	-13N	254.00
	14	-14N	262.00
	15	-15N	270.00
	16	-16N	278.00
Wet contacted Relay Board	1	SWR-201PC104- 1A	166.00
	2	- 2A	182.00
	3	- 3A	198.00
	4	- 4A	214.00
	5	- 5A	230.00
	6	- 6A	246.00
	7	- 7A	262.00
	8	- 8A	278.00
	9	- 9A	294.00
	10	-10A	310.00
	11	-11A	326.00
	12	-12A	342.00
	13	-13A	358.00
	14	-14A	374.00
	15	-15A	390.00
	16	-16A	406.00
(Option)		User's Manual	10.00

The product consists of a SWR-201PC104 board and 4 pieces of standoff.

WEB : www.microscience.co.jp/eng/

Section 1. Introduction

1-1. Guide this Manual

This Manual contains a complete set of hardware and programming information for the SWR-201PC104 board, including configuration, installation, and I/O connection.

Section 1 contains the outline of functional descriptions and detail specifications, the installation, and setup procedure for the board.

Section 2 contains the contact ON/OFF operation.

Section 3 contains the trouble-shootings, and repair.

The last page is the request form for the Q and A.

1-2. Functional Specification

Contact Outputs.

Number of Contact	1 to 16: (8-bits x 2 ports)
Contact Element	S-105N for SWR-201PC104-xxN (Dry-type contact) S-105WG for SWR-201PC104-xxA (Hg wet-type contact) (xx is the number of contact)

Table-1-2. Specification of the contact element (made by SANYU)

	S-105N (Dry-type contact)	S-105WG (Wet-type contact)
Switching Voltage	30v (DC) or (AC/p-p)	30v (DC) or (AC/p-p)
Switching Current	0.3A (DC) or (AC/rms)	0.3A (DC) or (AC/rms)
ON/OFF time	0.35ms / 0.25ms	2.0ms / 2.0ms
Life expectancy	10,000,000 times	50,000,000 times
Contact Resistance	(Initial) 150 m-ohm	(Initial) 100 m-ohm
ON Drive Current	25 mA	75 mA

System Configuration	###: on-board switch programmable.
Bus Compatibility	PC/104 Bus All signals are driven or accepted by the C-MOS device. (74HCT type)
Board Address ###	Upper 12Bits: programmable by on-board switches. Lower 4Bits: on-board logic decoded for multiple I/O ports.

I/O Connectors

for Contact Outputs	40pin FRC type (2.54mm pitch)
---------------------	-------------------------------

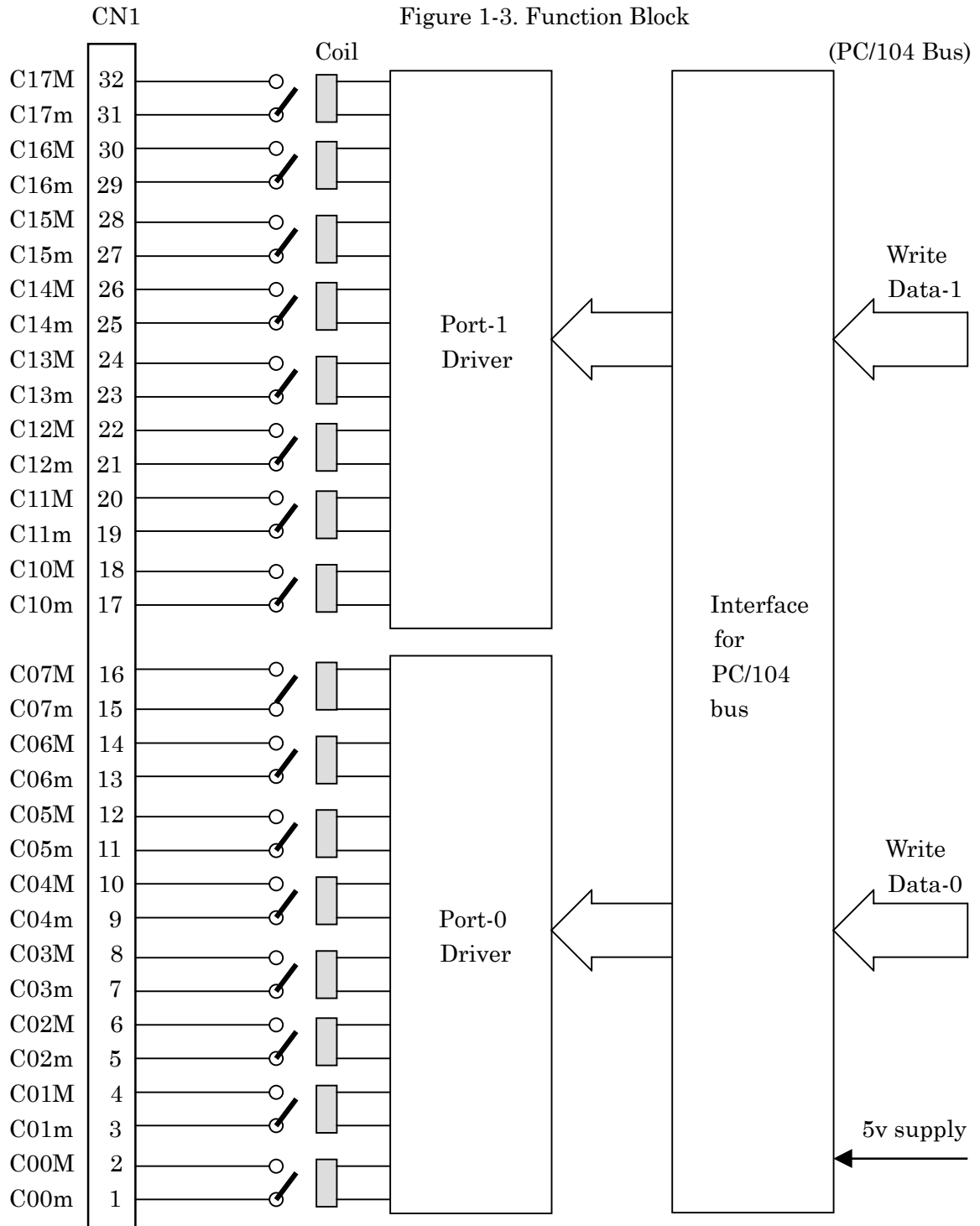
Physical, Environmental

Operating Temperature Range	0 to +55
Storage Temperature Range	-10 to +85
Relative Humidity	80% (Non-condensing)
Power Supply, Consumption	+5v 0.2 A (except for Relay drive) / See Table 1-2./

1-3. Functional Description

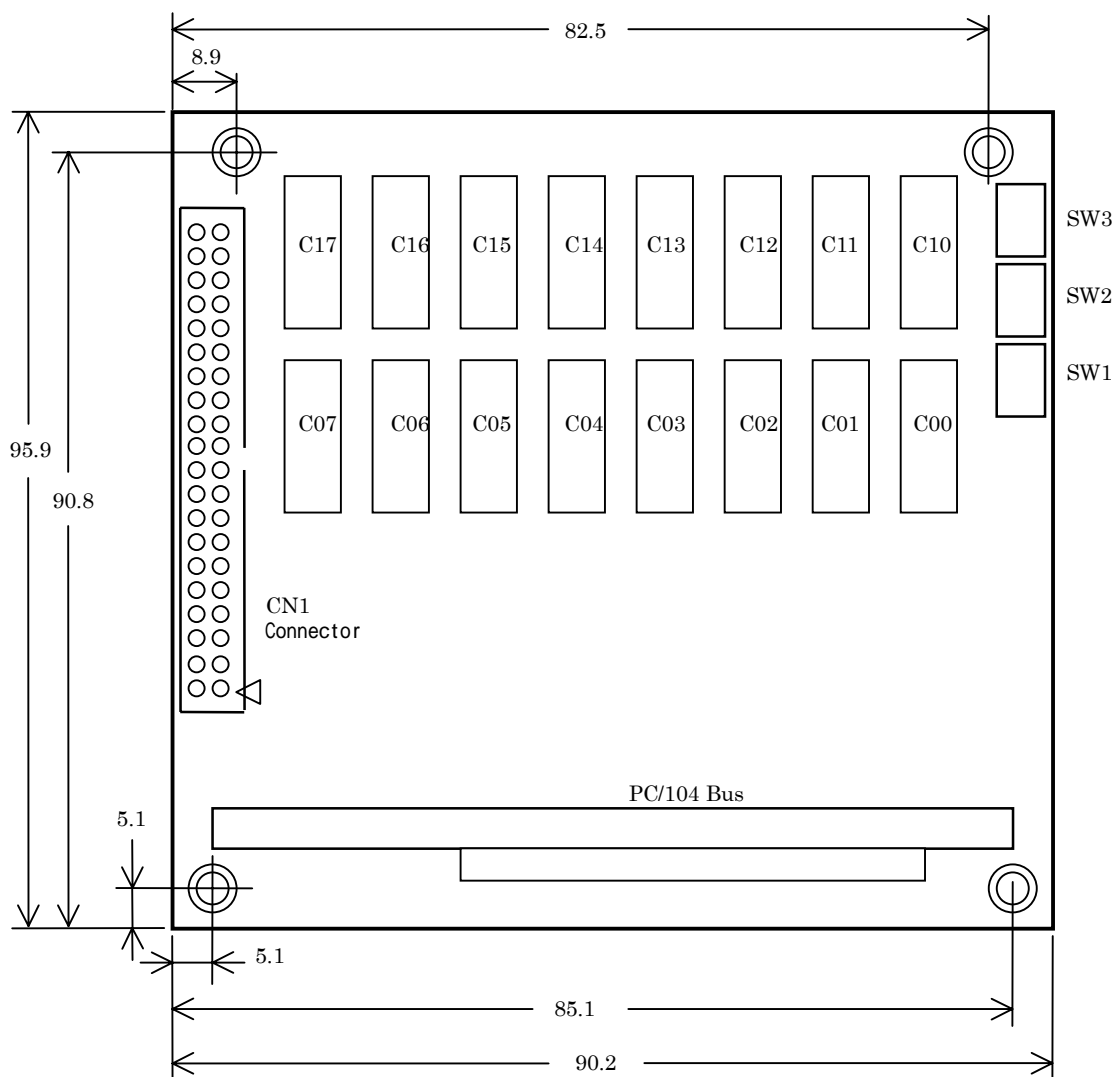
SWR-201PC104 is designed for multiple contact output with the mechanical relays. They are assembled in the socket for adjusting the requirement and/or for maintenance.

The state of all contact are “OFF” after power-on reset and power-off state. The base address of the board is programmable with the on-board switches.



1-4. Layout of the board

Figure 1-4.



Unit: mm

At shipping, on-board programmable elements are set to < > position.

SW1, SW2, SW3: Program switch for Base Address of the board. <0,1,B> / see 1-5 /

CN1: Connector. / see 1-6 /

1-5. Settings on the board

BASE ADDRESS

SWR-201PC104 appears as a 16-byte block of registers within the host CPU's I/O address space. This address block must not conflict with other system I/O devices. You can program the on-board switches SW1, SW2, and SW3 as BASE ADDRESS of the board.

These hex-a-decimal defined switches are set to SW1=0, SW2=1, SW3=B at the factory of MICRO SCIENCE, that define the BASE ADDRESS to "01B0" hex. SWR-201PC104 occupies upper 16 byte address from the BASE. See section 2-2 for more information.

Figure 1-5. Setting the BASE ADDRESS

Address Line →	AB15 to AB12	AB11 to AB08	AB07 to AB04	AB03 to AB00
On-board Hex-a-decimal Switches →	<div>SW1</div>	<div>SW2</div>	<div>SW3</div>	on-board logic decoded for multiple ports
Factory setting →	0	1	B	(F to 0)

1-6. Connector

16 contacts are available on 40-pin FRC-type male connector CN1 on the board as illustrated in Figure 1-4.

The plug is also provided for general purpose, come with the board.

Figure 1-6. Connector CN1 pin assignment

Function	Sign	Pin assign			Sign	Function
		40	O	O	39	
		38	O	O	37	
		36	O	O	35	
		34	O	O	33	
Contact-17	C-17M	32	O	O	31	C-17m
-16	C-16M	30	O	O	29	C-16m
-15	C-15M	28	O	O	27	C-15m
-14	C-14M	26	O	O	25	C-14m
-13	C-13M	24	O	O	23	C-13m
-12	C-12M	22	O	O	21	C-12m
-11	C-11M	20	O	O	19	C-11m
-10	C-10M	18	O	O	17	C-10m
Contact-07	C-07M	16	O	O	15	C-07m
-06	C-06M	14	O	O	13	C-06m
-05	C-05M	12	O	O	11	C-05m
-04	C-04M	10	O	O	9	C-04m
-03	C-03M	8	O	O	7	C-03m
-02	C-02M	6	O	O	5	C-02m
-01	C-01M	4	O	O	3	C-01m
-00	C-00M	2	O	O	1	C-00m

<Note.1> Blank signed pins are not connected any where.

<Note.2> On-board bracket : Model=HIF3FC-40PA-2.54DSA /made by HIROSE/

Section 2. General Programming

2-1. General Programming Information

Handling

SWR-201PC104 appears to the host PC/104 bus CPU as a block of contiguous 16 hardware registers mapped within the I/O address space.

These registers control the operation of SWR-201PC104 as long as they are accessed using 16bit I/O addressing with each 8bit data transfers.

These registers include recognize the board, and control ON/OFF the contacts.

Operation

Entire information for programming are specified and explained in order as follows.

(section 2-1)

General software sequences for control ON/OFF the contacts.

(section 2-2 to 2-5)

The functions of each register. These are the elements for programming.

----- Typical software sequence -----

(1)

Recognize the board.

```
ID = inp (BASE+0xF) ; /* Board ID */
```

(2)

Control ON/OFF the contacts.

```
Outp (BASE+0x0, C0) ; /* control the contacts: C00 to C07 */
Outp (BASE+0x1, C1) ; /* control the contacts: C10 to C17 */
```

(3)

Read back the state of contacts.

```
C0 = inp (BASE+0x0) ; /* state of the contacts: C00 to C07 */
C1 = inp (BASE+0x1) ; /* state of the contacts: C10 to C17 */
```

2-2. I/O Register Map

SWR-201PC104 appears as a 16-byte block of registers within the host CPU's I/O address space. This address block must not conflict with other system I/O devices. You can program the on-board switches SW1, SW2, and SW3 as BASE ADDRESS of the board.

These hex-a-decimal defined switches are set to SW1=0, SW2=1, SW3=B at the factory of MICRO SCIENCE, that specify the BASE ADDRESS to "01B0" hex.

SWR-201PC104 occupies upper 16 byte address from the BASE.
See figure 1-4 for the location of the board.

Figure 1-5. Setting the BASE ADDRESS

Address Line →	AB15 to AB12	AB11 to AB08	AB07 to AB04	AB03 to AB00
On-board Hex-a-decimal Switches →	SW1	SW2	SW3	on-board logic decoded for multiple ports
Factory setting →	0	1	B	(F to 0)

Table 2-2. SWR-201PC104 Register Assignment. (All the port consist of 8bit.)

I/O Address	Direction	Description	Refer to
BASE +FH	Read	Reset Board, and get ID.	Section 2-3
	Write		
BASE +DH to BASE +AH	Read / Write		
BASE +1H	Read	Read back the state of C10 to C17	Section 2-5
	Write	ON/OFF control the contacts: C10 to C17	Section 2-4
BASE +0H	Read	Read back the state of C00 to C07	Section 2-5
	Write	ON/OFF control the contacts: C00 to C07	Section 2-4

	Not-used
--	----------

2-3. Get ID

```
Board-ID = inp (BASE+0xF) ; /* Board-ID */
```

Read (BASE+FH) Register takes the board ID.

Table 2-3. Read (BASE+FH) Register Bit Field.

Bit	Description
B7	20H is the ID for SWR-201PC104.
B6	
B5	
B4	
B3	
B2	
B1	
B0	

2-4. Control ON/OFF the contacts.

```
outp (BASE+0x0, C0) ; /* control the contacts: C00 to C07 */
```

```
outp (BASE+0x1, C1) ; /* control the contacts: C10 to C17 */
```

Write (BASE+0H) and (BASE+1H) register specifies the state of each contact, as an update ON or OFF. They are held until next update.

The state of all contacts are “OFF” at power-OFF the board and at power-ON initialize the board.

SWR-201PC104 doesn't have any reset command.

Table 2-4A. Write (BASE+0H) Register Bit Field.

Bit	Term	“=1” specifies	“=0” specifies	on Reset
B7	Specify the contact “C07”	“ON”	“OFF”	0
B6	“C06”			0
B5	“C05”			0
B4	“C04”			0
B3	“C03”			0
B2	“C02”			0
B1	“C01”			0
B0	“C00”			0

Table 2-4B. Write (BASE+1H) Register Bit Field.

Bit	Term	“=1” specifies	“=0” specifies	on Reset
B7	Specify the contact “C17”	“ON”	“OFF”	0
B6	“C16”			0
B5	“C15”			0
B4	“C14”			0
B3	“C13”			0
B2	“C12”			0
B1	“C11”			0
B0	“C10”			0

2-5. Read back the state of contacts.

C0 = inp (BASE+0x0) ; /* Read back the state: C00 to C07 */

C1 = inp (BASE+0x1) ; /* Read back the state: C10 to C17 */

Current state of the contacts shall be read
from (BASE+0H) and (BASE+1H) Register.

Table 2-5A. Read (BASE+0H) Register Bit Field.

Bit	Term	"=1" specifies	"=0" specifies	on Reset
B7	Current state of the contact "C07"	"ON"	"OFF"	0
B6	"C06"			0
B5	"C05"			0
B4	"C04"			0
B3	"C03"			0
B2	"C02"			0
B1	"C01"			0
B0	"C00"			0

Table 2-5B. Read (BASE+1H) Register Bit Field.

Bit	Term	"=1" specifies	"=0" specifies	on Reset
B7	Current state of the contact "C17"	"ON"	"OFF"	0
B6	"C16"			0
B5	"C15"			0
B4	"C14"			0
B3	"C13"			0
B2	"C12"			0
B1	"C11"			0
B0	"C10"			0

Section 3. Maintenance and Appendix

3-1. Trouble Shootings

Reconfirm.

The SWR-201PC104 supplied by MICRO SCIENCE is fully inspected and tested. If it doesn't work on your system, reconfirm following issues.

- (1) Check the I/O BASE address specified by the on-board switch SW1, SW2, and SW3. On the IBM PC/AT compatible system, the I/O address must be mapped between "0H" to "3FFH" or the image of this range except for the occupied address by the other devices or the peripherals.
- (2) Debug your software or applications. For example, if conflict the resource with any other devices.
- (3) Be careful to use the contacts for appropriate voltage and/or current.

What's wrong?

Fill in and send (Letter, Fax, or Email) the Q&A form to MICRO SCIENCE where you didn't find anything wrong.

Although we will study about your system and answer by the letter what you should do, we don't write or debug application software.

Sorry, we won't answer with any language but Japanese on the phone. Please write us Japanese or English.

Replace the Board or Repair for free.

MICRO SCIENCE will replace or repair the Board for free which are after examination disclosed to the satisfaction of MICRO SCIENCE to be thus defective, for a period within one year of shipment. This warranty shall not apply which have been subject to misuse, negligence, or accident. See "Caution/Warranty" for details in page-3.

Repair the Board.

MICRO SCIENCE will repair, calibrate, or test the Board on request. These products should have to prepaid the transportation at MICRO SCIENCE. Be sure, give us the information with the products, maybe Q&A form is useful for the report.

Then user have to pay the proper cost in few weeks according to the bill after accept the returned products.

Q & A form (in English or Japanese)

To:
MICRO SCIENCE., Co. LTD
Customer Support Div
2-37-12, Nishiogi-kita,
Suginami-ku,
Tokyo, Japan

From:

Fax: +81-3-3301-5593
Email: gas@microscience.co.jp

Fax:
Email:

SWR-201PC104	serial # =	Purchase Date:
Preferences on- Board	SW1 =	
	SW2 =	
	SW3 =	
Other Devices In the system	Product:	
	Occupied Resources: (I/O Address =), (Interrupt =)	
System Information	CPU:	
	OS :	
Software	Language:	
	Compiler:	

(Information)

<Note> MICR SCIENCE does not answer on phone with any language but Japanese.