

2Ch RS-232C Serial I/O Board COM-2(PC)F

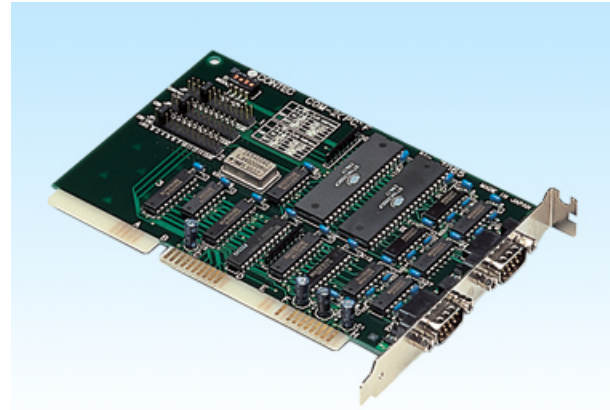
There are the compatible mode which operates as a standard serial port of a personal computer, and enhanced mode operated by the original control method of our company in COM-2(PC)F.

Compatible mode(COM1 - COM4)

Two channels of COM-2(PC)F can be used as a standard serial port of a personal computer. CN1 of COM-2(PC)F can be assigned to COM1 or COM3, and CN2 can be assigned to COM2 or COM4. In the compatible mode, one interruption level is used for every channel. Two or more interruption levels which can be used with the personal computer of use are required for a certain thing. Moreover, since I/O Address is treated as a standard serial port of a standard personal computer, it can be operated using the driver software of others which can operate the driver software (option) of our company, and a standard serial port.

Enhanced mode

At enhanced mode, two channels are controlled by one interruption level. It can operate, even when there is only one interruption level which can be used with the personal computer of use. Moreover, I/O Address uses the original address of our company. In order to operate it by the original control method of our company, it is necessary to make driver software himself, using the driver software (option) of our company. Programming of enhanced mode differs from the compatible mode.



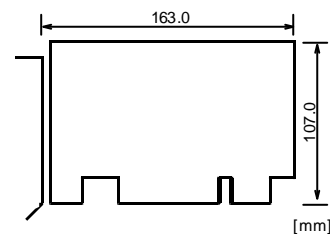
Specification

Item	Specification
Number of Channels	2
Input Type	RS-232C
External connectors	Two 9-pin D-SUB connector (Male)
Transfer Method	Asynchronous serial transfer
Baud Rate	50-115,200bps *1
Data Length	5, 6, 7, 8 bits 1, 1.5, 2 stop bits *1
Parity check	Even, Odd, Non-parity *1
Controller Chip	NS16550 or equivalent
Distance	15m Max.
Interrupt Requests	Enhanced mode : 1 level Compatible mode : 2 levels
I/O Address	8 bits x 16 ports
Power Consumption	+5VDC, 420mA Max. +12VDC, 60mA Max. -12VDC, 50mA Max.
Operating Temperature	0-50° C
Storage Temperature	-20-60° C
Relative Humidity	20-90% non-condensing
Dimensions	160.0 x 107.0 x 18.5mm (6.3inch x 4.2inch x 0.7inch)
Weight	130g

*1 : Software programmable.

For details, see "Appendix B Notes on Developing Driver Software" or refer to the data sheet of the NS16550 or the equivalent chip.

Board size



Features

- Transmission of the serial data of two channels can be performed on this one interface board.
- It has the serial I/O port of RS-232C conformity 2ch.
- Setup of a transmission rate can be set up by software out of 50-115, 200bps. Moreover, the transmission rate of channel 1 and channel 2 is independent, and can be set up.

Support Software

DDE Communication Driver Software

For Windows NT/98/95: DDE SERVER(W32)

For Windows 98(Win16)/95(Win16)/3.1:

DDE SERVER(PC)WIN

For PLC Windows 98(Win16)/95(Win16)/3.1:

DDE-PLC WIN

Driver software

For Windows 2000/NT/98/95: API-PAC(W32)

For Windows 95(Win16)/3.1: API-SIO(PC)WIN

For MS-DOS: SUPPORT-PAC(PC)103

Cable & Connector (Option)

Cable (option)

ERSS-9M/F

ERSS-9F

ERSS-25M/9F

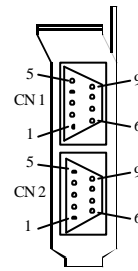
ERSC-25F/9F

Packing List

- COM-2(PC)F Board - 1
- Sample Program Diskette (3.5inch/1.44M B) - 1
- User's Guide (This Booklet) - 1

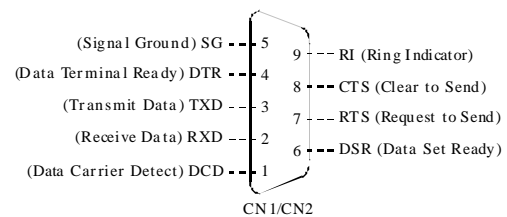
External Connection

It connects with external apparatus using the interface connector on board.



On-board Connector : DELC-J9PAF-20L9 (Male) [mfd. by JAE]

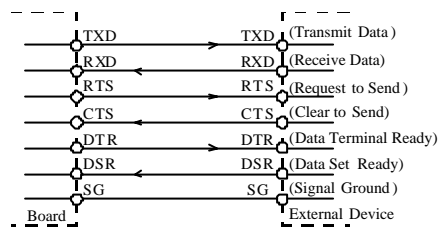
Application Connector : 17JE-13090-02 (D8C) (Female) [mfd. by DDK]



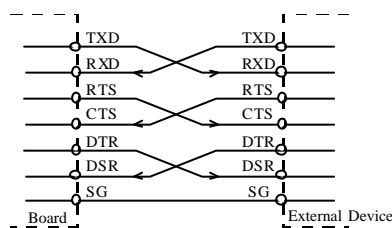
Cable type and Connection Sample

Cables which use connection of RS-232C interface with the equipment connected like a modem or a computer (personal computer) may differ. Therefore, a cable should prepare straight type or crossing (reverse) type by the classification (specification) after checking the specification of the external equipment to connect. Furthermore, when there is the necessity for signal line processing within a connector, please unite with specification and process appropriately.

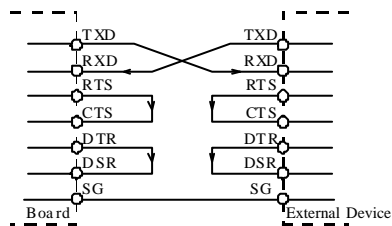
The example of connection with modem



The example of connection with a personal computer



The example of connection with apparatus



Setup of Interrupt Level

Signal from LSI (NS16550 or equivalent) on board can be chosen by JP1, JP2, and JP3, and it can be used as interruption signal.

Note!

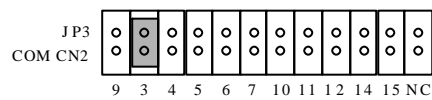
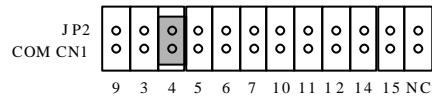
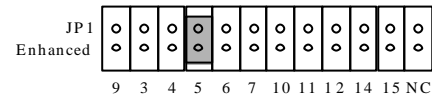
- When you use interruption, please set up not to overlap the interruption level currently used by other apparatus.

When not using interruption

Short connector is connected to NC pin of each jumper (JP1, JP2, and JP3).

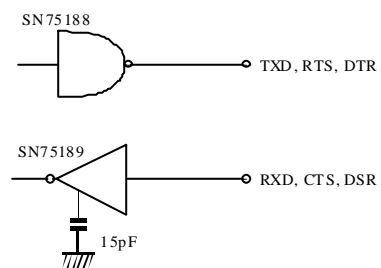
When using interruption

Interruption level is connected by the short connector attached to the jumper (JP1, JP2, and JP3). Interruption levels which can be set up are IRQ 3-7, 9-12, 14, and 15.



When IRQ5 is shared by CN1 and CN2 by a diagram when it is set as enhanced mode by setup of I/O Address of SW1, and it is set as the compatible mode, it is setup for which CN1 uses IRQ4 and CN2 uses IRQ3.

External I/O Circuit



I/O Address Setting

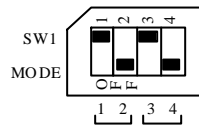
The board is an I/O device controlled by I/O instructions from the PC. I/O devices include expansion boards and devices inside the PC. The various devices are identified by their I/O addresses. I/O addresses are represented as four digit hexadecimal values (e.g. 02A0H) and act as the ID number for each I/O device.

Most expansion boards are controlled via a range of consecutive I/O addresses. The address of the first I/O address in the range is called the base I/O address.

When using Enhanced mode, either 1A0H or 2A0H is selected as the base I/O address. In Compatible mode, the fixed address for the PC system is used.

Notes!

- When using more than one expansion board, set each board so that their I/O addresses do not overlap.
- If the PC already has COM1 to COM4 ports, those ports cannot be set for the board.



	SW1		Function	I/O Address	Interrupt Vector Register Address
	Bit 1	Bit 2			
CN1	ON	ON	Enhanced	1A0-1A7	1BF
		OFF	Enhanced	2A0-2A7	2BF
	OFF	ON	COM3	3E8-3EF	---
		OFF	COM1	3F8-3FF	---

	SW1		Function	I/O Address	Interrupt Vector Register Address
	Bit 3	Bit 4			
CN2	ON	ON	Enhanced	1A8-1AF	1BF
		OFF	Enhanced	2A8-2AF	2BF
	OFF	ON	COM4	2E8-2EF	---
		OFF	COM2	2F8-2FF	---

The CN1 base I/O address set to 2A0H and the CN2 base I/O address set to 2A8H.

I/O port and register

With this board, NS16550 or equivalent of National Semiconductor Corp. is used as asynchronous communication element (ACE). For details, please refer to the data sheet of [NS]. Function of continuation 8 port of as opposed to a setting I/O Address in each channel is the same.

I/O Port Address	DLAB ^{*1}	ACE Register (NS16550)	Note ^{*2}
"Base Address" +0H	0	Receiver (Buffer register)	R
"Base Address" +0H	0	Transmitter (Holding register)	W
"Base Address" +1H	0	Interrupt Enable Register	
"Base Address" +2H	x	Interrupt ID	R
"Base Address" +2H	x	FIFO Control	W
"Base Address" +3H	x	Line Control	
"Base Address" +4H	x	Modem Control	
"Base Address" +5H	x	Line Status	
"Base Address" +6H	x	Modem Status	
"Base Address" +7H	x	Scratchpad Register	
"Base Address" +0H	1	Baud Rate Divider Register LSB	
"Base Address" +1H	1	Baud Rate Divider Register MSB	

^{*1} DLAB: Divisor Latch Access Bit in the Modem Status Register.

^{*2} R=Read only; W=Write only.

When DLAB in the best grade of line control is set as [0], as a transceiver buffer, I/O Address +1H interrupt and I/O Address +0H are used as each register of a mask. When DLAB is set as [1], it is used as a dividing register.

Setup of baudrate

The 1.8432MHz crystal oscillator is carried with this board. This is added to two ACE, respectively and is used as a clock. NSThe 16550 or equivalent contains the programmable baud rate generator, and can change a baud rate by software. ACE can dividing a clock input (1.8432MHz) freely by the ratio to 1- (216-1). Output frequency from baud rate generator is made into 16 times of the baud rate to set up.

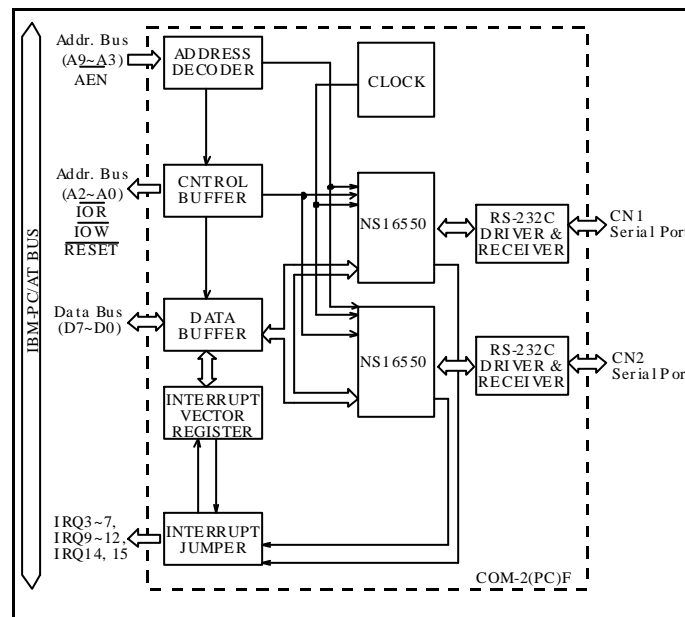
$$\text{Divisor} = \text{Clock Frequency} / (\text{Baud Rate} \times 16)$$

Two dividing 8-bit registers hold a dividing ratio in the binary form of 16-bit width. In order to ensure operation of a baud rate generator, it is necessary to set up these dividing registers at the time of initialization.

The example of a baud rate setting

Desired Baud Rate	Divisor	Percent Error
50	2304	---
75	1536	---
110	1047	0.026
134.5	857	0.058
150	768	---
300	384	---
600	192	---
1200	96	---
1800	64	---
2000	58	0.680
2400	48	---
3600	32	---
4800	24	---
7200	16	---
9600	12	---
19200	6	---
38400	3	---
57600	2	---
115200	1	---

Block Diagram



Usage Sample

The program which transmits the character of the buffer specified as an example of use of this board using optional SUPPORT-PAC(PC)103 (full duplex mode) is shown below. Description language is Microsoft C.
Transmission data = ABCDEFGHIJ

Setting conditions

- Functional setup : Enhanced mode
- I/O Address : 2A0H
- Interrupt Level : IRQ5

Connection of a cable

Please connect the connector and partner apparatus of a board by the cross cable or the straight cable according to the specification of the partner apparatus which communicates.

Flow chart

```

1. #include <stdio.h>
2. #include "h103c.h"
3.
4. void main(void)
5. {
6.     int ch, l_contl, mode, irt, port, brate;
7.     int s_delim, s_len, s_time, m_contl, p;
8.     static char *buf;
9.
10.    ch = 1;
11.    l_contl = 0x7;
12.    mode = 0;
13.    irt = 5;
14.    port = 0x2a0;
15.    brate = 12;
16.
17.    p = h103_init( ch, l_contl, mode, irt, port, brate );
18.    printf( "\n h103_init() return code = %x", p );
19.
20.    m_contl = 0x3;
21.
22.    p = h103_command( ch, m_contl );
23.    printf( "\n h103_command() return code = %x", p );
24.
25.    buf = "ABCDEFGHJIJ";
26.    s_delim = 0;
27.    s_len = 10;
28.    s_time = 0;
29.
30.    printf( "\n send data = %s", buf );
31.    p = h103_send( ch, s_delim, s_len, s_time, buf );
32.    printf( "\n h103_send() return code = %x", p );
33.
34.    p = h103_exit( ch );
35.    printf( "\n h103_exit() return code = %x", p );
36. }

```

Flow chart

