F&eIT Series
RS-232C 2ch Communication Module

COM-2(FIT)GY

RoHS Compliant

* Specifications, color and design of the products are subject to change without notice.

This product, which performs serial data transfers to and from an external device, can be used as an extpansion port for the F&eIT series microcontroller unit.

This product can also serve as an expansion COM port for a media converter [RP-COM(FIT)H, RP-COM(FIT)H-AF, FX-DS540-COM2].

Features

This product is equipped with two channels of RS-232C-compliant serial I/O ports.

High-speed communication is supported at up to 921,600bps (115,200bps in compatible mode).

A baud rate can be set by software.

This product has 128-byte FIFO buffers for transmit and receive.

Driver software is supplied to allow the serial ports to be used as standard Windows or Linux COM ports. *1

It corresponds to both the compatible and enhanced mode and when an enhanced mode is selected, it is possible to use it by occupying the one interrupt level per one unit.

Up to three units can be added (at the time of enhanced mode) as expansion ports for micro controller unit. *2

Up to three units can be added as expansion ports for media converters [RP-COM(FIT)H, RP-COM(FIT)H-AF, FX-DS540-COM2].

Similar to other F&eIT series products, the system, in the module itself, incorporates a 35mm DIN rail mounting mechanism as a standard item.   A connection to a controller module can be effected on a lateral, stack basis in a unique configuration, which permits a simple, smart system configuration without the need for a backplane board.

*1:   When using it as the expansion port for micro controller unit
*2:   One unit can be added at the time of compatible mode

Specification

Specifications

Item	Specification
Number of channels	2ch
Interface type	RS-232C
Transfer method	Asynchronous serial transfer
Baud rate	2 - 921,600bps *1 *2
Data length	5, 6, 7, 8 bits 1, 1.5, 2 stop bits *1
Parity check	Even, Odd, Non-parity *1
Controller chip	162850 or equivalent (The module has 128-byte receive and 128-byte transmit FIFO buffers.)
Interrupt requests	1 or 2 level use
Power consumption	5VDC±5% 100mA (Max.)
Connecting distance	15m
Dimension (mm)	25.2(W) x 64.7(D) x 94.0(H) (No protrusions)
Weight(module itself)	100g
Module connection method	Stack connection by the connector that is provided with the side of module
Module installation method	One-touch connection to 35mm DIN rails. (standard connection mechanism provided in the system)

*1   These items can be set by software.
*2   Data transmission at high speed may not be performed normally depending on the environment including the type of status of connected material of cable and environment.

⚠ CAUTION
   When connecting the module to a controller module, the internal power consumption should be taken into account. If the total current exceeds the capacity of the power supply unit, the integrity of the operation cannot be guaranteed. For further details, please see the Controller Module manual.

Installation Environment Requirements

Parameter		Requirement description
Operating temperature		0 - 50°C
Storage temperature		-10 - 60°C
Humidity		10 - 90% (No condensation)
Floating dust particles		Not to be excessive
Corrosive gases		None
Line-Noise resistance	Line-noise	AC line/2kV, Signal line/1kV (IEC1000-4-4Level 3, EN61000-4-4Level 3)
	Static electricity resistance	Contact discharge/4kV (IEC1000-4-2Level 2, EN61000-4-2Level 2)
		Atmospheric discharge/8kV (IEC1000-4-2Level 3, EN61000-4-2Level 3)
Vibration resistance	Sweep resistance	10 - 57Hz/semi-amplitude 0.15mm, 57 - 150Hz/2.0G
		80minutes each in X, Y, and Z directions (JIS C0040-compliant, IEC68-2-6-compliant)
Impact resistance		15G, half-sine shock for 11ms in X, Y, and Z directions (JIS C0041-compliant, IEC68-2-27-compliant)

Packing List

Module[COM-2(FIT)GY] …1
First step guide …1
CD-ROM [F&eIT Series Setup Disk] *1 …1

*1   The CD-ROM contains various software and User's Manual.
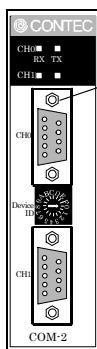
Physical Dimensions
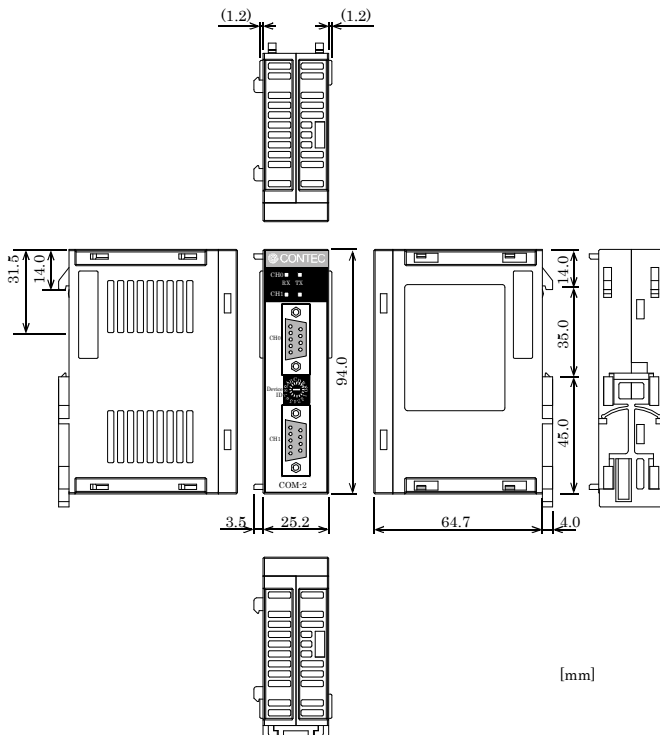
[mm]

How to Connect an Interface Connector

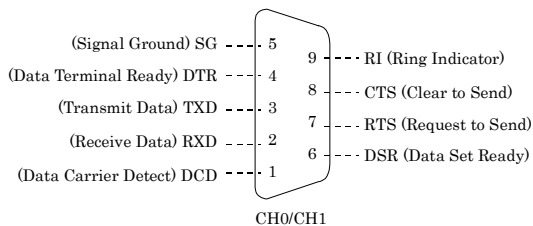The interface connector that is provided on the module can be used to connect the module to an external device.

Lock nut: UNC#4-40 (inch screw)

Connector used
- DELC-J9PAF-20L9 (Male) (mfd.by JAE) equivalent

Applicable
- 17JE-13090-02(D8C) (Female) (mfd.by DDK)
- CN5-D9F (Connector five set) (Female) (mfd.by CONTEC)

(Signal Ground) SG - - - - 5
(Data Terminal Ready) DTR - - - - 4   9 - - - - RI (Ring Indicator)
(Transmit Data) TXD - - - - 3   8 - - - - CTS (Clear to Send)
(Receive Data) RXD - - - - 2   7 - - - - RTS (Request to Send)
(Data Carrier Detect) DCD - - - - 1   6 - - - - DSR (Data Set Ready)

CH0/CH1

Setting a Device ID

Depending on the specific Device ID that is set, this product can be switched over between the compatible mode and the enhanced mode.   Table below shows the relationship between Device IDs and the modes.   For details, see the manual, Chapter 6, "Using the Module".   The factory setting is [0], in which this product can be used as a COM3/COM4 standard port.

⚠ CAUTION
This document describes the setting method for combination with a microcontroller. For combination with a media converter, read the manual for the media converter carefully before making any settings.

Setup Method
A Device ID can be set by turning the rotary switch on the device face.
To set a Device ID, turn the switch knob.

Device ID   Factory setting :
                     (Device ID = 0)

I/O Address

ID No.	CH0		CH1		
	I/O address (h)	Interrupt level	I/O address (h)	Interrupt level	Mode
0	03E8 - 03EF	IRQ5	02E8 - 02EF	IRQ7	Compatible (COM3/4)
1	03E8 - 03EF	IRQ5	02E8 - 02EF	Not used	Compatible (COM3/4)
2	03E8 - 03EF	Not used	02E8 - 02EF	IRQ7	Compatible (COM3/4)
3	03E8 - 03EF	Not used	02E8 - 02EF	Not used	Compatible (COM3/4)
4	01A0 - 01A7	IRQ5	01A8 - 01AF	IRQ5	Enhanced
5	01A0 - 01A7	IRQ7	01A8 - 01AF	IRQ7	Enhanced
6	02A0 - 02A7	IRQ5	02A8 - 02AF	IRQ5	Enhanced
7	02A0 - 02A7	IRQ7	02A8 - 02AF	IRQ7	Enhanced
8	9800 - 9807	IRQ9	9808 - 980F	IRQ9	Enhanced
9	9820 - 9827	IRQ5	9828 - 982F	IRQ7	Enhanced
A	9840 - 9847	IRQ7	9848 - 984F	IRQ9	Enhanced
B	9860 - 9867	Not used	9868 - 986F	Not used	Enhanced
C	0700 - 0707	IRQ9	0708 - 070F	IRQ9	Enhanced
D	0720 - 0727	IRQ7	0728 - 072F	IRQ7	Enhanced
E	Reserved	Reserved	Reserved	Reserved	Reserved
F	Reserved	Reserved	Reserved	Reserved	Reserved

⚠ CAUTION
When using the product in the Windows environment, select a Device ID No. other than 8, 9, A and B.

Compatible and Enhanced Modes

This product can operate in two modes: the compatible mode, in which this product, when connected to CONTEC's microcontroller unit, acts as a standard serial port; and the enhanced mode, in which this product operates under CONTEC's unique control method.   Before building a system using this product, a working understanding of the features of these modes may be in order.

* To use four or more channels of COM in the Windows environment, select the enhanced mode, and then use the COM-DRV(W32) driver.   (Ex.: Device ID-No. 04h, 07h, 0Ch)

Compatible Mode

This product can use two channels as standard serial ports. Channels CH0 of this product can be assigned to COM3, and CH1 to COM4.
In the compatible mode, this product uses one interrupt level per channel.
When adding two channels, you need to ensure that at least two interrupt levels are available.   For I/O addresses, the addresses that are assigned to the standard serial ports can be used.   Because these addresses can are treated as standard serial ports, they can be accessed by using commonly available driver software that can handle standard serial ports.

Enhanced Mode

The enhanced mode operates this product by using CONTEC's unique control method.
The enhanced mode controls two channels at one interrupt level.   Therefore, the channels can be operated even when only one interrupt level is available.   For I/O addresses, CONTEC-designated addresses must be used.
When the COM-DRV(W32) driver is used, it can be used in the same way as a standard serial port.

⚠ CAUTION
    When using it in the OS other than Windows, user needs to create the device driver for enhanced mode.

I/O Address

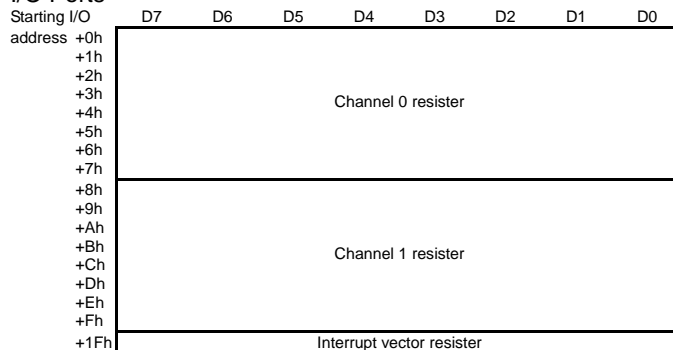| ID No.	CH0			CH1		
	Function	I/O address (h)	Interrupt level	Function	I/O address (h)	Interrupt level
0	COM3	03E8 - 03EF	IRQ5	COM4	02E8 - 02EF	IRQ7
1	COM3	03E8 - 03EF	IRQ5	COM4	02E8 - 02EF	Not used
2	COM3	03E8 - 03EF	Not used	COM4	02E8 - 02EF	IRQ7
3	COM3	03E8 - 03EF	Not used	COM4	02E8 - 02EF	Not used
4	Enhanced	01A0 - 01A7	IRQ5	Enhanced	01A8 - 01AF	IRQ5
5	Enhanced	01A0 - 01A7	IRQ7	Enhanced	01A8 - 01AF	IRQ7
6	Enhanced	02A0 - 02A7	IRQ5	Enhanced	02A8 - 02AF	IRQ5
7	Enhanced	02A0 - 02A7	IRQ7	Enhanced	02A8 - 02AF	IRQ7
8	Enhanced	9800 - 9807	IRQ9	Enhanced	9808 - 980F	IRQ9
9	Enhanced	9820 - 9827	IRQ5	Enhanced	9828 - 982F	IRQ7
A	Enhanced	9840 - 9847	IRQ7	Enhanced	9848 - 984F	IRQ9
B	Enhanced	9860 - 9867	Not used	Enhanced	9868 - 986F	Not used
C	Enhanced	0700 - 0707	IRQ9	Enhanced	0708 - 070F	IRQ9
D	Enhanced	0720 - 0727	IRQ7	Enhanced	0728 - 072F	IRQ7
E	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
F	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved

⚠ CAUTION
    Please use it excluding Device ID No. 8, 9, A, B when using in the Windows environment.

I/O Ports and Registers

The module uses the XR16C2850 (Exar Corporation) upward compatible with the 16550 UART.
For details on the internal resisters of the XR16C2850 and its control, refer to the XR16C2850 data sheet.   In enhanced mode, "starting I/O address + 1Fh" is used as an interrupt vector resister.

I/O Ports

Starting I/O address	D7	D6	D5	D4	D3	D2	D1	D0
+0h								
+1h								
+2h								
+3h								
+4h				Channel 0 resister				
+5h								
+6h								
+7h								
+8h								
+9h								
+Ah								
+Bh				Channel 1 resister				
+Ch								
+Dh								
+Eh								
+Fh								
+1Fh				Interrupt vector resister				

⚠ CAUTION
    Each port must be accessed in bytes to conform to device specifications.
    Non-byte access to any port is not allowed (such as word access or doubleword access).

Setting the Baud Rate

The output baud rate can be set by setting the appropriate value to the Baud Rate Generator resister.   The available setting range depends on which clock mode is used.

Clock 3 mode: 15 - 921,600bps

Clock 2 mode: 8 - 460,800bps

Clock 1 mode: 4 - 230,400bps

Clock 0 mode: 2 - 115,200bps

However, some baud rate values do not have a corresponding Baud Rate Generator resister setting.   If the result of substituting the baud rate into the equation below is an integer, then that baud rate can be set.   If the result contains a fractional part, the baud rate cannot be set.

Clock 3 mode

$921600 \div$ Desired baud rate $=$ Division resister setting value

Ex.) $921600 \div 9600bps = 96$ (As the result is an integer, this baud rate can be set.)

$921600 \div 128000bps = 7.2$ (As the result contains a fractional part, this baud rate cannot be set.)

Clock 2 mode

$460800 \div$ Desired baud rate $=$ Division resister setting value

Ex.) $460800 \div 9600bps = 48$ (As the result is an integer, this baud rate can be set.)

$460800 \div 128000bps = 3.6$ (As the result contains a fractional part, this baud rate cannot be set.)

Clock 1 mode

$230400 \div$ Desired baud rate $=$ Division resister setting value

Ex.) $230400 \div 9600bps = 24$ (As the result is an integer, this baud rate can be set.)

$230400 \div 128000bps = 1.8$ (As the result contains a fractional part, this baud rate cannot be set.)

Clock 0 mode

115200 ÷ Desired baud rate = Division resister setting value

Ex.) 115200 ÷ 9600bps = 12 (As the result is an integer, this baud rate can be set.)

115200 ÷ 76800bps = 1.5 (As the result contains a fractional part, this baud rate cannot be set.)

⚠ CAUTION

See the manual Chapter 5 "Interrupt Vector Resisters" for selecting the clock frequency (1.8432, 3.6864, 7.3728, or 14.7456 MHz).
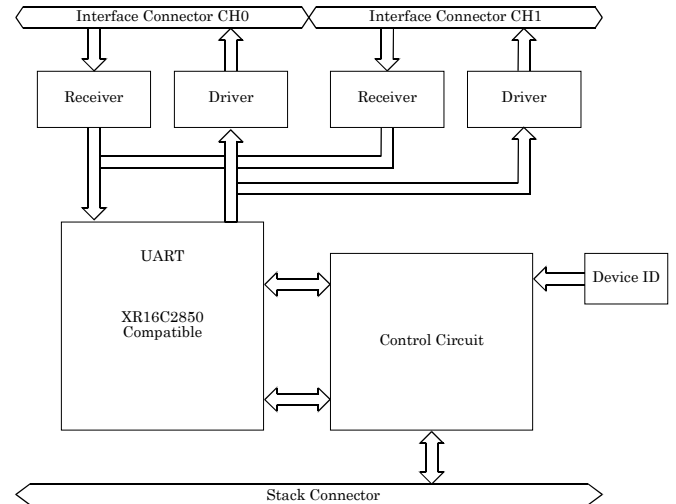For use in compatible mode, clock 0 (1.8432 MHz) is used as a fixed setting.

Refer to the following baud rate setting examples.   Baud rates other than those listed below can also be set if they produce a valid setting value in the equation described above.

Baud Rate Generator Programming Table

Output baud rate	Clock 0 mode (1.8432MHz)		Clock 1 mode (3.6864MHz)		Clock 2 mode (7.3728MHz)		Clock 3 mode (14.7456MHz)	
	Baud Rate Generator resister	Setup error (%)	Baud Rate Generator resister	Setup error (%)	Baud Rate Generator resister	Setup error (%)	Baud Rate Generator resister	Setup error (%)
2	57600	-						
4	28800	-	57600	-				
5	23040	-	46080	-				
8	14400	-	28800	-	57600	-		
15	7680	-	15360	-	30720	-	61440	-
50	2304	-	4608	-	9216	-	18432	-
75	1536	-	3072	-	6144	-	12288	-
110	1047	0.026	2094	0.026	4189	0.0022	8378	0.0022
134.5	857	0.058	1713	0.0006	3426	0.0006	6852	0.0006
150	768	-	1536	-	3072	-	6144	-
300	384	-	768	-	1536	-	3072	-
600	192	-	384	-	768	-	1536	-
1200	96	-	192	-	384	-	768	-
1800	64	-	128	-	256	-	512	-
2000	58	0.68	115	0.17	230	0.17	461	0.04
2400	48	-	96	-	192	-	384	-
3600	32	-	64	-	128	-	256	-
4800	24	-	48	-	96	-	192	-
7200	16	-	32	-	64	-	128	-
9600	12	-	24	-	48	-	96	-
14400	8	-	16	-	32	-	64	-
19200	6	-	12	-	24	-	48	-
28800	4	-	8	-	16	-	32	-
38400	3	-	6	-	12	-	24	-
57600	2	-	4	-	8	-	16	-
76800			3	-	6	-	12	-
115200	1	-	2	-	4	-	8	-
153600					3	-	6	-
230400			1	-	2	-	4	-
460800					1	-	2	-
921600							1	-

Block Diagram

Equivalence Circuit

MAX3245

TxD, RTS, DTR

RxD, CTS, DSR, DCD, RI