

F&eIT Series Isolated RS-422A/485 1ch  
Communication Module  
**COM-1PD(FIT)GY**



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

**Features**

RS-422A/485 serial communication ports

The communication lines are electrically isolated from the module.

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

A baud rate can be set by software.

The module 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

The data transfer mode (full duplex or half duplex) can be set by a switch.

The board includes a 100Ω terminating resistor required for multi-drop (party line) connections. The resistor can be inserted into the signal line by a switch.

Surge protection is provided for each RS-422A/485 signal line.

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 35-mm 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 Two units can be added at the time of compatible mode

**Packing List**

Module[COM-1PD(FIT)GY] ...1

First step guide ...1

CD-ROM [F&eIT Series Setup Disk] \*1 ...1

\* The CD-ROM contains various software and User's Manual.

This product performs serial communication with an external device in compliance with RS-422A/485, capable of serving as COM3 or COM4 of an F&eIT series microcontroller unit.

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

**Specification**

Specification

| Item                       | Specification   |
|----------------------------|---|
| Number of channels         | 1ch   |
| Interface type             | RS-422A/RS-485  |
| Isolation                  | Bus Isolation   |
| Isolation voltage          | 1000VDC   |
| Transfer method            | Asynchronous serial transfer (Full/Half duplex)   |
| Baud rate*5                | 2 - 921,600bps *1 *2*4  |
| Data length*5              | 5, 6, 7, 8 bits<br>1, 1.5, 2 stop bits *1   |
| Parity check               | Even, Odd, Non-parity *1  |
| Controller chip            | 162850 or equivalent<br>(The module has 128-byte receive and 128-byte transmit FIFO buffers.)     |
| Interrupt requests         | 1 level use   |
| Power consumption          | 5VDC 300mA (Max.)   |
| Connecting distance        | Within 1200m *3   |
| 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.<br>(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.

\*3 The table below lists an example of the relationship between baud rate and communication distance.

| Communication distance | Baud rate  |
|------------------------|------------|
| 300m                   | 115,200bps |
| 600m                   | 57,600bps  |
| 900m                   | 19,200bps  |
| 1200m                  | 9,600bps   |

Communication cable: 28AWG, double shielded cable, twisted pairs used for each +/- signal line.

\*4 For the "Driver Library API-PAC(W32)" on the supplied CD-ROM, the range is 15 - 921,600 bps.

\*5 When stacked in a media converter, the setting(s) depend on the media converter. For detailed specifications, refer to the media converter's instruction manual.

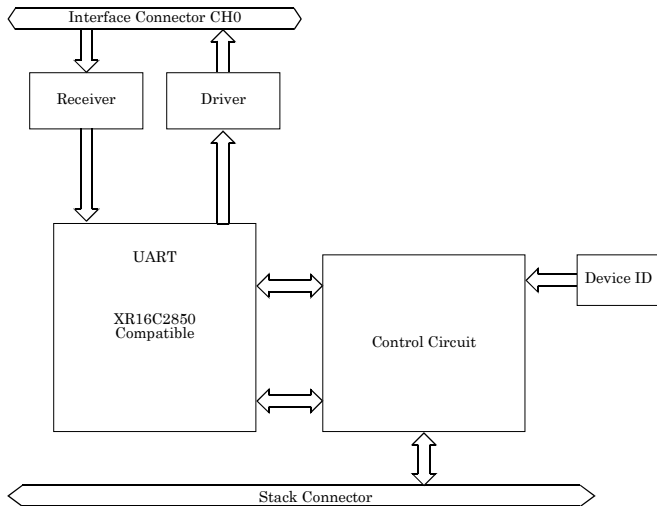
**CAUTION**

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.

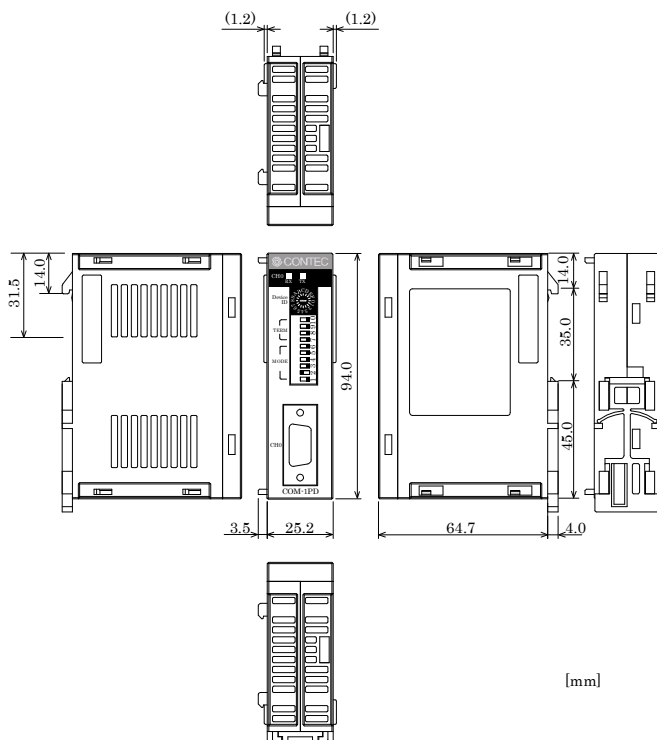
**Installation Environment Requirements**

| 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                       |

## Block Diagram



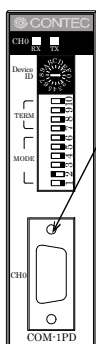
## Physical Dimensions



## Interface Connector

### How to Connect an Interface Connector

When connecting the Module to an external device, you can use the supplied connector plug



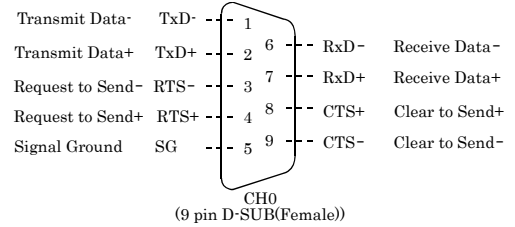
Lock nut: UNC#4-40(inch screw)

#### Connector used

- DELC-J9SAF-20L9 (Female Connector type) (mfd.by JAE) equivalent

#### Applicable

- 17JE-23090-02(D8C) (Male Connector type) (mfd.by DDK)
- CN5-D9M(Male Connector type) (mfd.by CONTEC)



### CAUTION

For TxD, RxD, and RTS, big numbered pins are + and small numbered pins are -.

For CTS, big numbered pins are - and small numbered pins are +. This is the opposite of the other signals, but is not a misprint.

The external metal frame (shell) of the connector is isolated from the unit, or not in contact with any part of the unit.

When grounding is required, for example, as data transfer remains unstable, ground the remote device to the earth.

## 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 a description of the compatible and enhanced modes, see Chapter 4, "Using the Module" in the manual.

The factory setting is [0], in which this product can be used as a COM3 standard port.

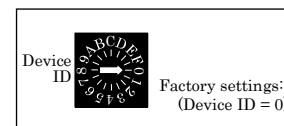
### CAUTION

The setup method in this document assumes the combination with a microcontroller. For the combination with a media converter, read the manual for the media converter carefully for setup.

### 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.



### I/O Address

| DeviceID | I/O address(h) | CH0       |                   |
|----------|----------------|-----------|-------------------|
|          |                | Interrupt | Mode              |
| 0        | 03E8 - 03EF    | IRQ5      | Compatible (COM3) |
| 1        | 03E8 - 03EF    | Not Used  | Compatible (COM3) |
| 2        | 02E8 - 02EF    | IRQ7      | Compatible (COM4) |
| 3        | 02E8 - 02EF    | Not Used  | Compatible (COM4) |
| 4        | 01A0 - 01A7    | IRQ5      | Enhanced mode     |
| 5        | 01A0 - 01A7    | IRQ7      | Enhanced mode     |
| 6        | 02A0 - 02A7    | IRQ5      | Enhanced mode     |
| 7        | 02A0 - 02A7    | IRQ7      | Enhanced mode     |
| 8        | 9800 - 9807    | IRQ9      | Enhanced mode     |
| 9        | 9820 - 9827    | IRQ5      | Enhanced mode     |
| A        | 9840 - 9847    | IRQ7      | Enhanced mode     |
| B        | 9860 - 9867    | Not Used  | Enhanced mode     |
| C        | 0700 - 0707    | IRQ9      | Enhanced mode     |
| D        | 0720 - 0727    | IRQ7      | Enhanced mode     |
| E        | Reserved       | Reserved  | Reserved          |
| F        | Reserved       | Reserved  | Reserved          |

**I/O Address (When connected to the BX-300 Series)**

| Device ID | CH0            |           |                   |
|-----------|----------------|-----------|-------------------|
|           | I/O address(h) | Interrupt | Mode              |
| 0         | 03E8 - 03EF    | IRQ5      | Compatible (COM3) |
| 1         | 03E8 - 03EF    | Not Used  | Compatible (COM3) |
| 2         | 02E8 - 02EF    | IRQ7      | Compatible (COM4) |
| 3         | 02E8 - 02EF    | Not Used  | Compatible (COM4) |
| 4         | 01C0 - 01C7    | IRQ5      | Enhanced mode     |
| 5         | 01C0 - 01C7    | IRQ7      | Enhanced mode     |
| 6         | 02C0 - 02C7    | IRQ5      | Enhanced mode     |
| 7         | 02C0 - 02C7    | IRQ7      | Enhanced mode     |
| 8         | 9800 - 9807    | IRQ10     | Enhanced mode     |
| 9         | 9820 - 9827    | IRQ5      | Enhanced mode     |
| A         | 9840 - 9847    | IRQ7      | Enhanced mode     |
| B         | 9860 - 9867    | Not Used  | Enhanced mode     |
| C         | 0700 - 0707    | IRQ10     | Enhanced mode     |
| D         | 0720 - 0727    | IRQ7      | Enhanced mode     |
| E         | Reserved       | Reserved  | Reserved          |
| F         | Reserved       | Reserved  | Reserved          |

**⚠ CAUTION**

If the model label on the main unit reads "Rev.D", Device ID No. C or D can be used for that product. Please use it excluding Device ID No. 8, 9, A, B when using in the Windows environment.

**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.

**⚠ CAUTION**

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)

The I/O address and IRQ that can be configured differs according to the connection source microcontroller. For the CPU-SBxx Series, refer to Table 1. For the BX-300 Series, refer to Table 2. When using it in the OS other than Windows, user needs to create the device driver for enhanced mode.

**Compatible Mode**

This product can use two channels as standard serial ports. This product can be assigned to COM3 or COM4.

The module uses the I/O addresses assigned for a standard serial port. As the module is handled as the standard serial port, it can run under other driver software that can operate standard serial ports.

Although OS-dependent, the I/O addresses in this product can be recognized by the system and used as standard ports. You can use these addressed by checking the system settings.

**Enhanced Mode**

The enhanced mode operates this product can by using CONTEC's unique control method.

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.

**Table 1. I/O Address**

| Device ID | CH0               |                |                 |
|-----------|-------------------|----------------|-----------------|
|           | Mode              | I/O address(h) | Interrupt Level |
| 0         | Compatible (COM3) | 03E8 - 03EF    | IRQ5            |
| 1         | Compatible (COM3) | 03E8 - 03EF    | Not Used        |
| 2         | Compatible (COM4) | 02E8 - 02EF    | IRQ7            |
| 3         | Compatible (COM4) | 02E8 - 02EF    | Not Used        |
| 4         | Enhanced mode     | 01A0 - 01A7    | IRQ5            |
| 5         | Enhanced mode     | 01A0 - 01A7    | IRQ7            |
| 6         | Enhanced mode     | 02A0 - 02A7    | IRQ5            |
| 7         | Enhanced mode     | 02A0 - 02A7    | IRQ7            |
| 8         | Enhanced mode     | 9800 - 9807    | IRQ9            |
| 9         | Enhanced mode     | 9820 - 9827    | IRQ5            |
| A         | Enhanced mode     | 9840 - 9847    | IRQ7            |
| B         | Enhanced mode     | 9860 - 9867    | Not Used        |
| C         | Enhanced mode     | 0700 - 0707    | IRQ9            |
| D         | Enhanced mode     | 0720 - 0727    | IRQ7            |
| E         | Reserved          | Reserved       | Reserved        |
| F         | Reserved          | Reserved       | Reserved        |

**Table 2. I/O Address(When connected to the BX-300 Series)**

| Device ID | CH0               |                |                 |
|-----------|-------------------|----------------|-----------------|
|           | Mode              | I/O address(h) | Interrupt Level |
| 0         | Compatible (COM3) | 03E8 - 03EF    | IRQ5            |
| 1         | Compatible (COM3) | 03E8 - 03EF    | Not Used        |
| 2         | Compatible (COM4) | 02E8 - 02EF    | IRQ7            |
| 3         | Compatible (COM4) | 02E8 - 02EF    | Not Used        |
| 4         | Enhanced mode     | 01C0 - 01C7    | IRQ5            |
| 5         | Enhanced mode     | 01C0 - 01C7    | IRQ7            |
| 6         | Enhanced mode     | 02C0 - 02C7    | IRQ5            |
| 7         | Enhanced mode     | 02C0 - 02C7    | IRQ7            |
| 8         | Enhanced mode     | 9800 - 9807    | IRQ10           |
| 9         | Enhanced mode     | 9820 - 9827    | IRQ5            |
| A         | Enhanced mode     | 9840 - 9847    | IRQ7            |
| B         | Enhanced mode     | 9860 - 9867    | Not Used        |
| C         | Enhanced mode     | 0700 - 0707    | IRQ10           |
| D         | Enhanced mode     | 0720 - 0727    | IRQ7            |
| E         | Reserved          | Reserved       | Reserved        |
| F         | Reserved          | Reserved       | Reserved        |

**⚠ CAUTION**

If the model label on the main unit reads "Rev.D", Device ID No. C or D can be used for that product.

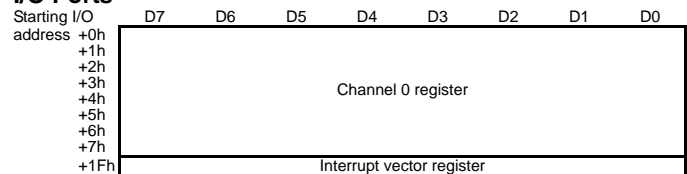
Please use it excluding Device ID No. 8, 9, A, B when using in the Windows environment.

**I/O Ports and Registers**

The module uses the XR16C2850 (Exar Corporation) upward compatible with the 16550 UART.

For details on the internal registers 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 register.

**I/O Ports**



**⚠ 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 register. 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 register 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

$921600 \div \text{Desired baud rate} = \text{Division register setting value}$

Ex.)  $921600 \div 9600\text{bps} = 96$

(As the result is an integer, this baud rate can be set.)

$921600 \div 128000\text{bps} = 7.2$

(As the result contains a fractional part, this baud rate cannot be set.)

### Clock 2 mode

$460800 \div \text{Desired baud rate} = \text{Division register setting value}$

Ex.)  $460800 \div 9600\text{bps} = 48$

(As the result is an integer, this baud rate can be set.)

$460800 \div 128000\text{bps} = 3.6$

(As the result contains a fractional part, this baud rate cannot be set.)

### Clock 1 mode

$230400 \div \text{Desired baud rate} = \text{Division register setting value}$

Ex.)  $230400 \div 9600\text{bps} = 24$

(As the result is an integer, this baud rate can be set.)

$230400 \div 128000\text{bps} = 1.8$

(As the result contains a fractional part, this baud rate cannot be set.)

### Clock 0 mode

$115200 \div \text{Desired baud rate} = \text{Division register setting value}$

Ex.)  $115200 \div 9600\text{bps} = 12$

(As the result is an integer, this baud rate can be set.)

$115200 \div 76800\text{bps} = 1.5$

(As the result contains a fractional part, this baud rate cannot be set.)

### ⚠ CAUTION

See Chapter 5 "Interrupt Vector Registers" for selecting the clock frequency (1.8432, 3.6864, 7.3728, or 14.7456 MHz) in the manual.

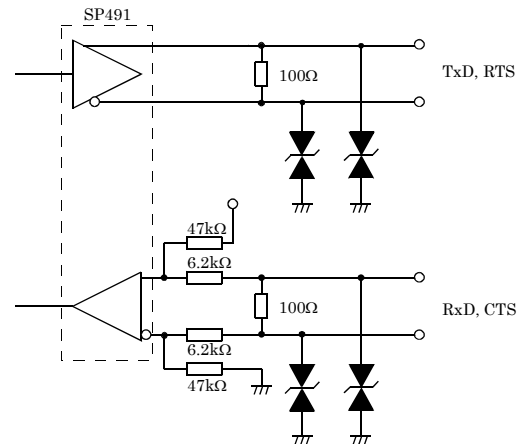
For use in compatible mode, clock 0 (1.8432 MHz) is used as a fixed setting.

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.

| 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 register | Setup error (%) | Baud Rate Generator register | Setup error (%) | Baud Rate Generator register | Setup error (%) | Baud Rate Generator register | 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                            | -               |

## Equivalence Circuit

### Circuitry Diagrams RS-422A/485 in Full Duplex



### Circuitry Diagrams RS-422A/485 in Half Duplex

