Wireless Radio Modem User's Manual

Warranty

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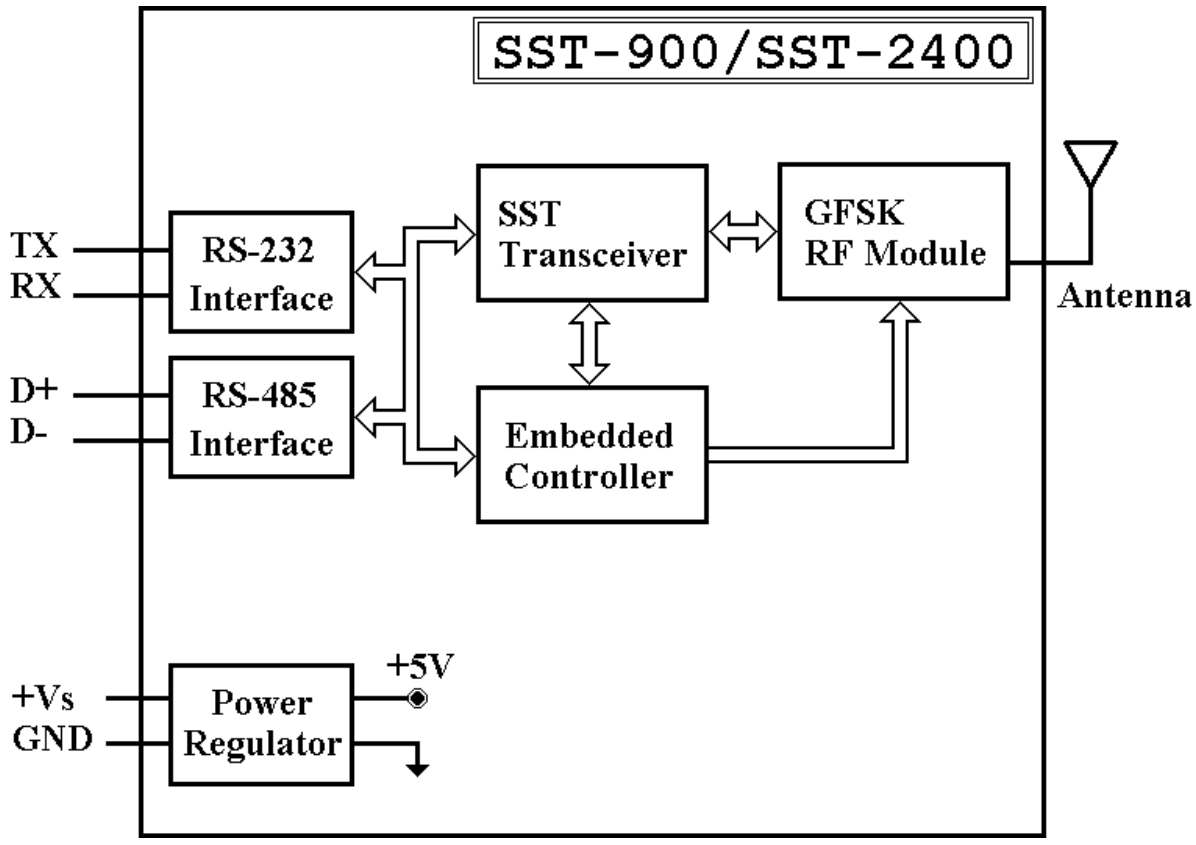
Date:2001-11

Table of Contents

1. Introduction

The SST-900 and SST-2400 are radio modems that can be used in multiple access networking. The transmission method includes peer-to-peer, multi-point structure for wireless data communication. Based on direct sequence spread spectrum and RF technology operating in ISM bands, 902-928Mhz for SST-900 and 2426-2458MHz for SST-2400.

1.1 Block Diagram



1.2 Specifications

1.2.1 SST-900EXT Wireless Radio Modem

RF Communication Transceiver

Frequency Band : 909 to 924 MHz for SST-900

Channel Spacing : 2.048 MHz (8 channels jumper select)

Output Power : 20±2 dBm

Modulation : GMSK

Time Division Duplexing

Transimition Range : Max 300M

SST Transceiver

Direct Sequency Spread Spectrum

Non-Overlapping Channels : 8 channels, jumper select (only for full-duplex operation)

Full-duplex or Half-duplex, jumper select

Synchronization or Asynchronization, jumper select

Serial Communication Interface

RS-232(TxD, RxD, GND) and RS-485(D+, D-), jumper select

Baudrate : 600bps to 57600bps, jumper select

Environment

Operating Temperature : 0°C to 50°C

Storage Temperature : -30°C to 70°C

Power Supply

Input : +10 to +30VDC, unregulated

Consumption : 1.5W

1.2.2 SST-2400EXT Wireless Radio Modem

RF Communication Transceiver

Frequency Band : 2426 to 2458 MHz

Channel Spacing : 2.048 MHz (8 channels jumper select)

Output Power : 20±2 dBm

Modulation : GMSK

Time Division Duplexing

Transimition Range : Max 300M with bundled antenna

Max 1000M with SST-2400A-3 antenna

Max 5000M with SST-2400A-12 antenna

Max 5000M with SST-2400A-13 antenna

SST Transceiver

Direct Sequency Spread Spectrum

Non-Overlapping Channels : 8 channels, jumper select (only for full-duplex operation)

Full-duplex or Half-duplex, jumper select

Synchronization or Asynchronization, jumper select

Serial Communication Interface

RS-232(TxD, RxD, GND) and RS-485(D+, D-), jumper select

Baudrate : 600bps to 57600bps, jumper select

Environment

Operating Temperature : 0°C to 50°C

Storage Temperature : -30°C to 70°C

Power Supply

Input : +10 to +30VDC, unregulated

Consumption : 1.5W

1.2.3 SST-900A External 900MHz Antenna

External antenna for SST-900EXT

Maximum Distance : 1000M

Weight : 1000g

Antenna Gain : 5dB

Cable : RG58C/U, 4M

1.2.4 SST-2400A-3 External 2.4GHz Antenna

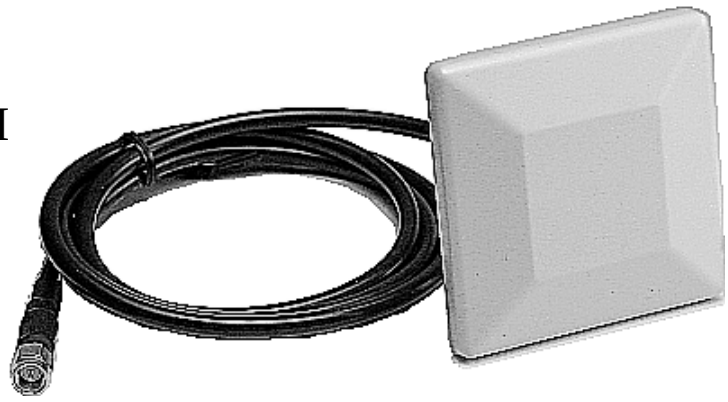
External antenna for SST-2400

Maximum Distance : 1000M

Weight : 150g

Antenna Gain : 3dB

Cable : RG58A/U, 1M



1.2.5 SST-2400A-12 External 2.4GHz Antenna

External antenna for SST-2400

Maximum Distance : 5000M

Weight : 850g

Antenna Gain : 12dB

Cable : RG58A/U, 1M

1.2.6 SST-2400A-13 External 2.4GHz Antenna

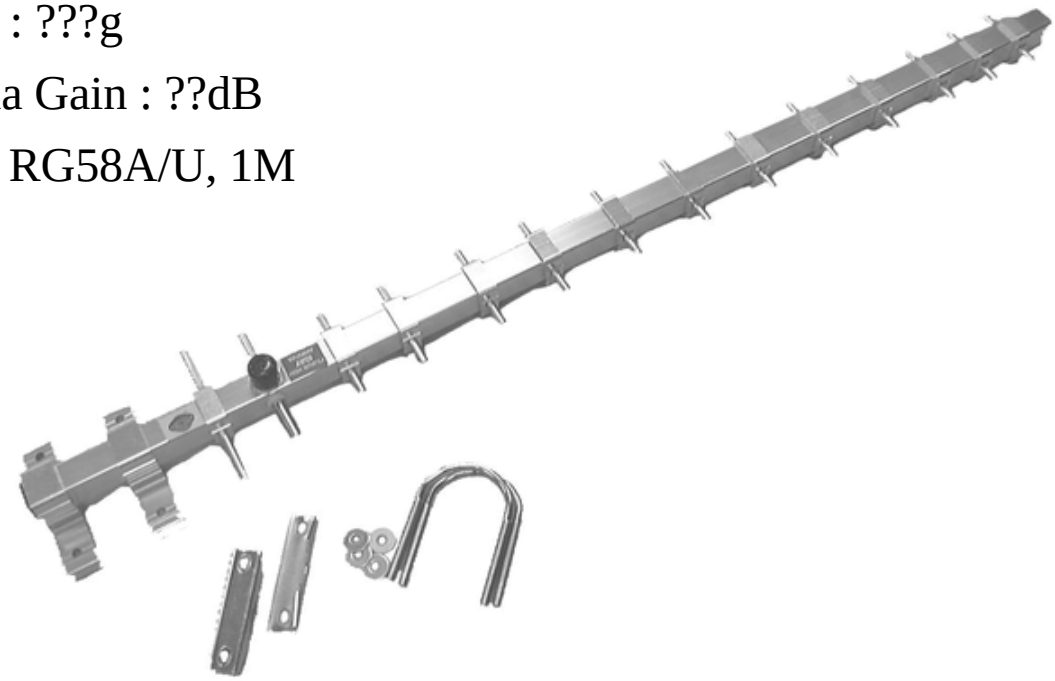
External antenna for SST-2400

Maximum Distance : 5000M

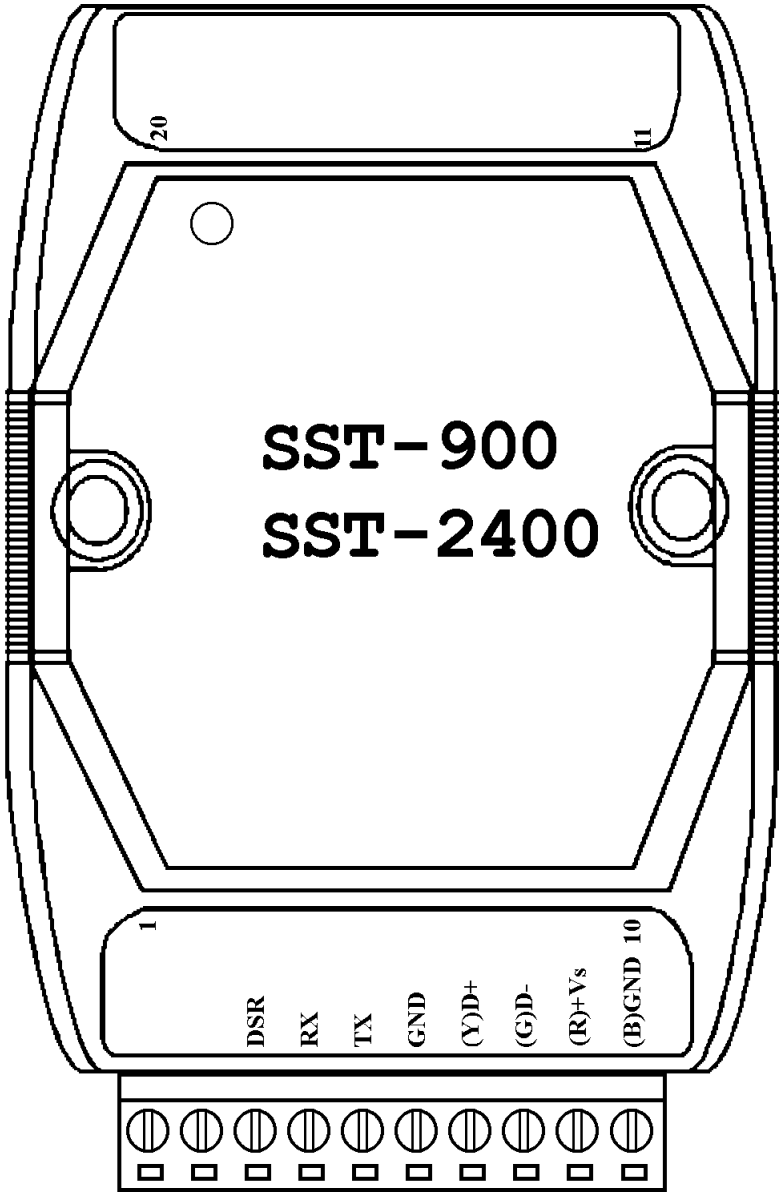
Weight : ???g

Antenna Gain : ??dB

Cable : RG58A/U, 1M



1.3 Pin Assignment



DSR	Reserved signal of diagnostic
RX	Receive of RS-232
TX	Transimit of RS-232
GND	Ground of RS-232
(Y)D+	Data+ of RS-485
(G)D-	Data- of RS-485
(R)+Vs	+10 to +30V DC power supply input
(B)GND	Ground of power supply input

1.4 Jumper Setting

Factory default jumper setting :

(1) Channel 3 (2) Frequency 915.968/2439.936MHz

(3) Baudrate 9600bps (4) Full-duplex

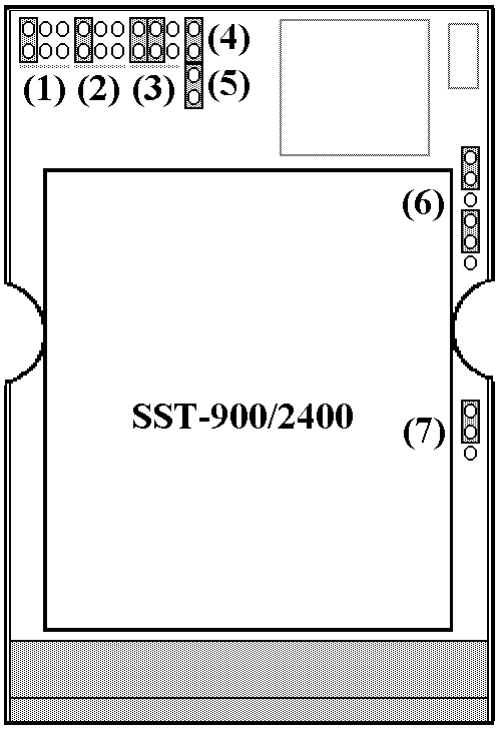
(5) Slave (6) Synchronous

(7) Interface RS-232

(1) Channel Select
Channel0
Channel1
Channel2
Channel3
Channel4
Channel5
Channel6
Channel7

(2) Frequency Select
909.824/2426.112MHz
911.872/2430.720MHz
913.920/2435.328MHz
915.968/2439.936MHz
918.016/2444.544MHz
920.064/2449.152MHz
922.112/2453.760MHz
924.160/2458.368MHz

(3) Baudrate Select
600bps
1200bps
2400bps
4800bps
9600bps
19200bps
38400bps
57600bps



(4)	Full-duplex
	Half-duplex

(5)	Slave
	Master

(6)	Synchronous
	Asynchronous

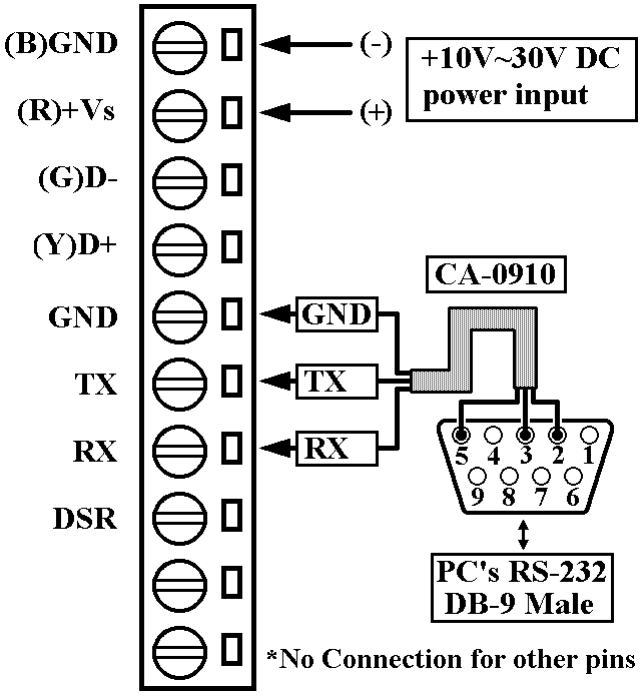
(7)	RS-232
	RS-485

1.5 Wire Connection

Wire Connection for PC's RS-232 and SST-900/2400 :

1. The jumper(7) position in RS-232 side

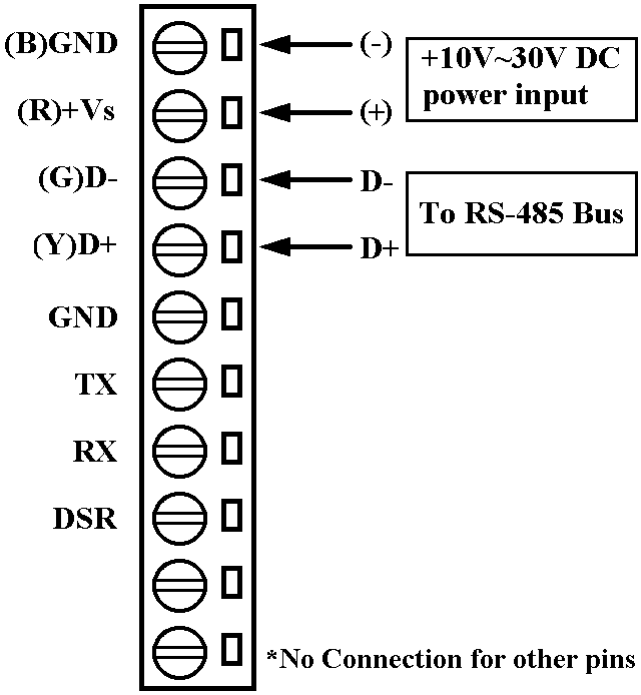
2. Connect SST-900/2400's GND to CA-0910's GND, TX to TX and RX to RX.
3. Connect CA-0910's DB-9 female connector to PC's RS-232 DB-9 male connector.



Wire Connection for I-7000 and SST-900/2400 via RS-485

1. The jumper(7) position in RS-485 side.

2. D+ of SST-900/2400 to D+ of RS-485 bus.
3. D- of SST-900/2400 to D- of RS-485 bus.

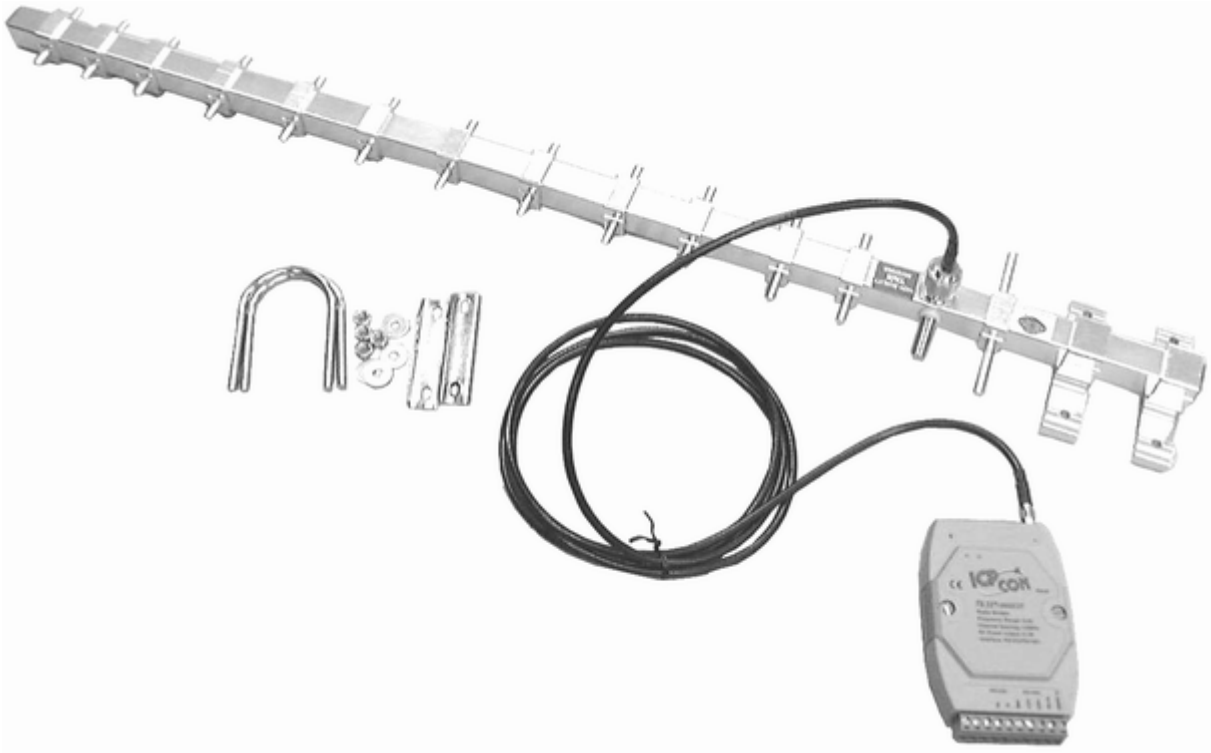


Connect SST-900EXT with SST-900A

Connect SST-2400EXT with SST-2400A-3

Connect SST-2400EXT with SST-2400A-12

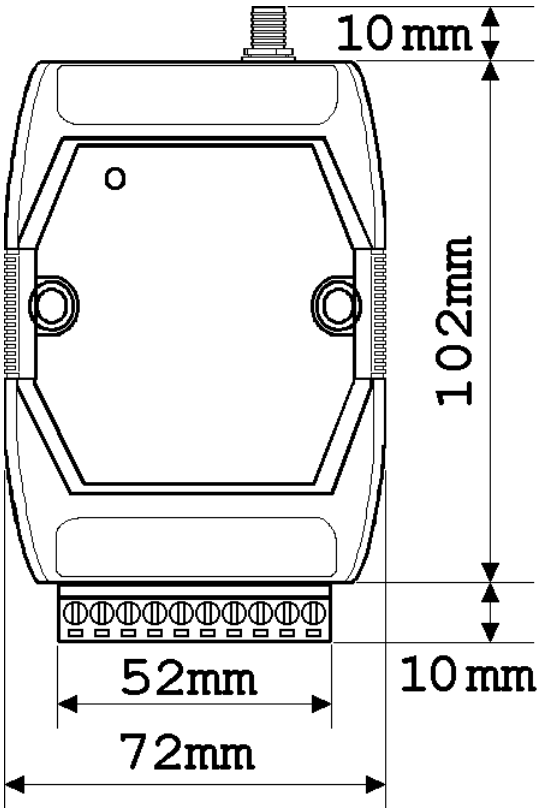
Connect SST-2400EXT with SST-2400A-13



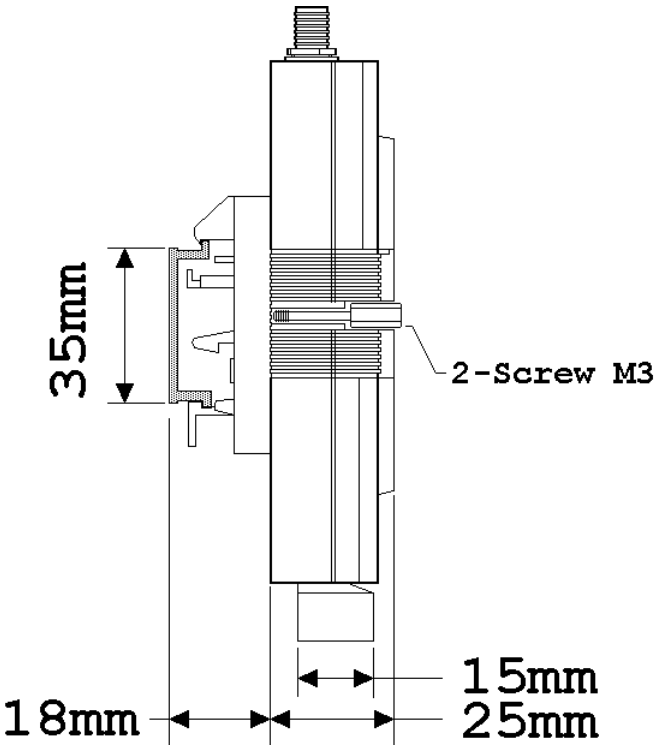
1.6 Dimension

1.6.1 SST-900EXT and SST-2400EXT

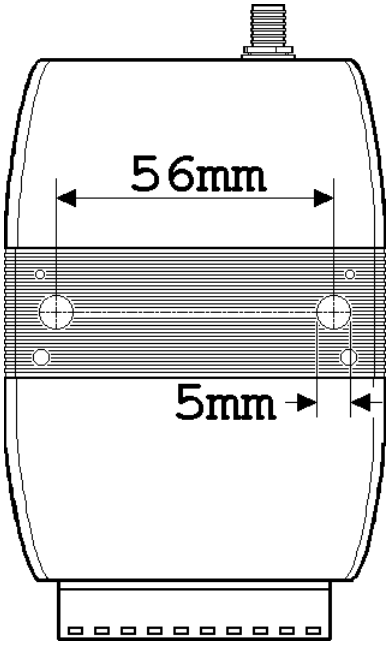
Front View



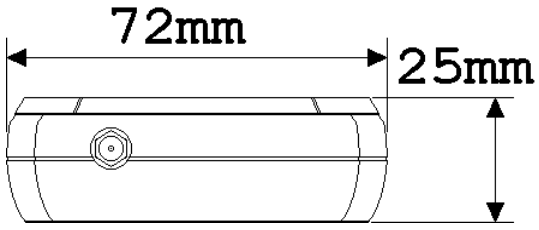
Side View



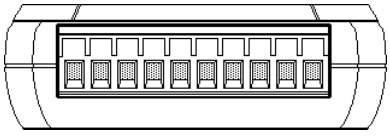
Rear View



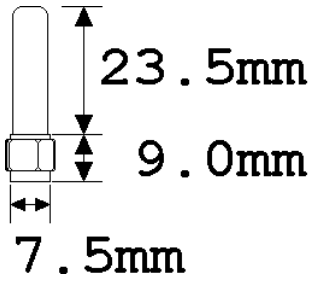
Top View



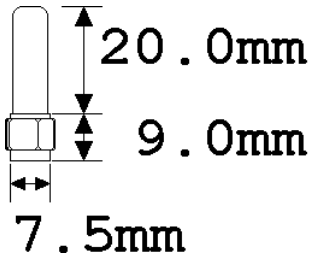
Bottom View



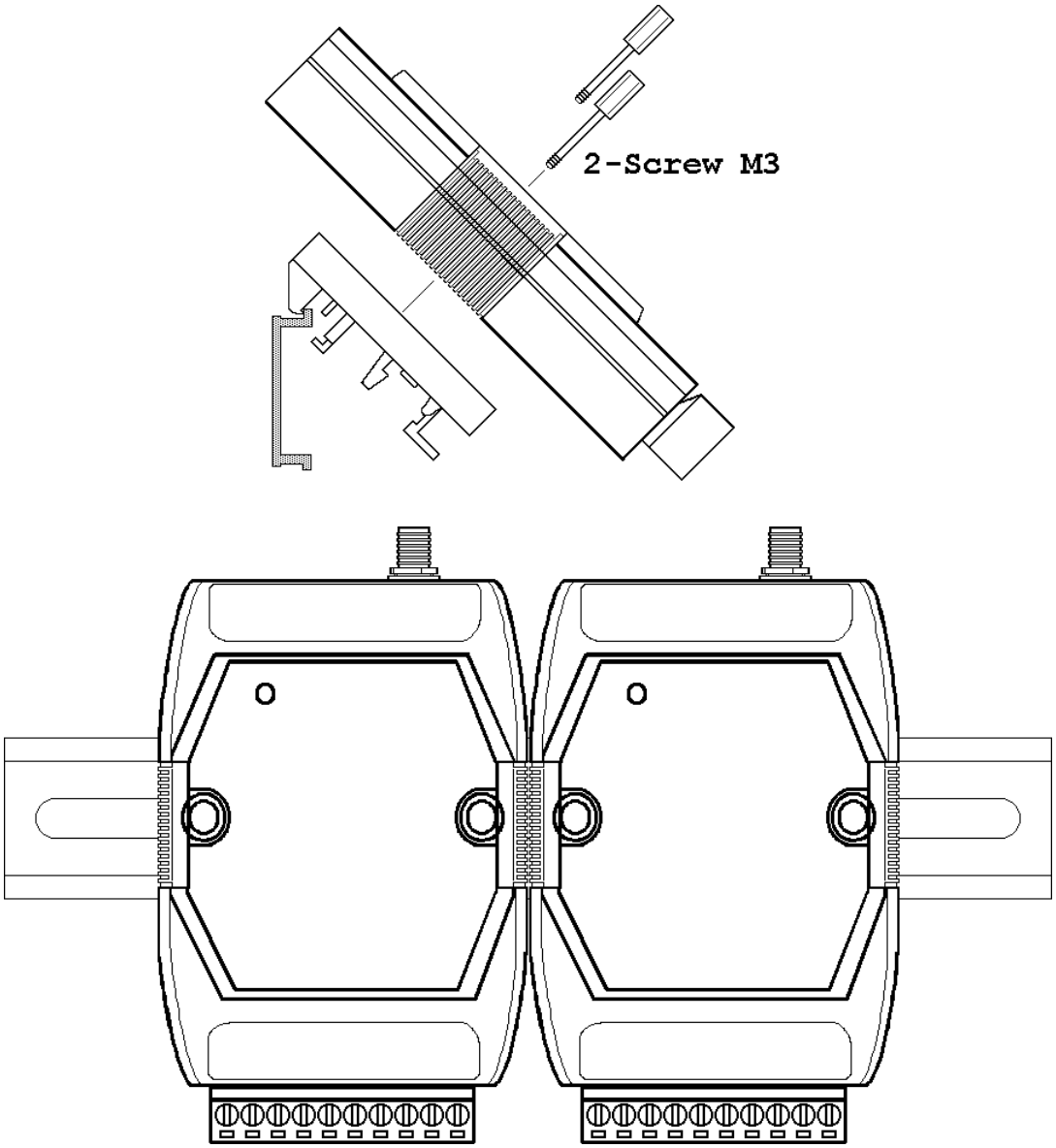
Antenna of SST-2400EXT



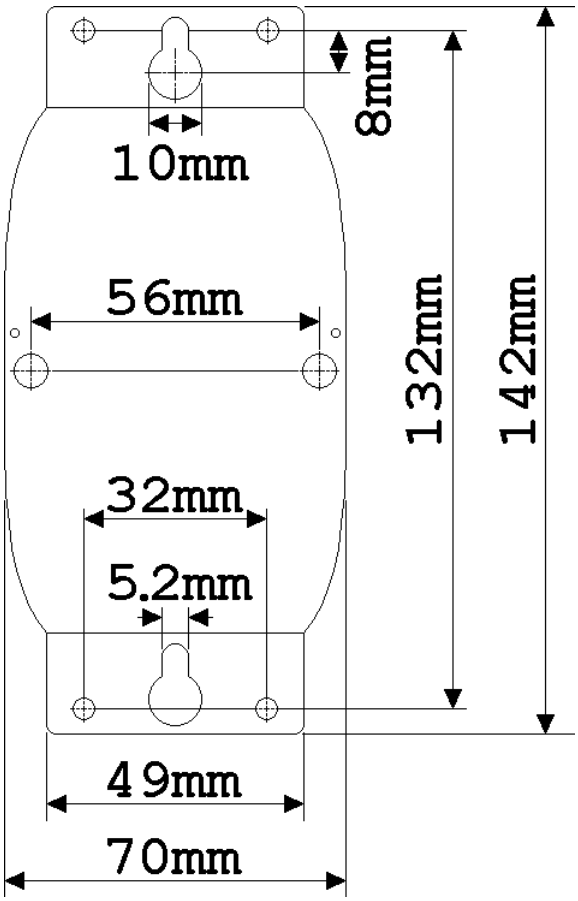
Antenna of SST-900EXT

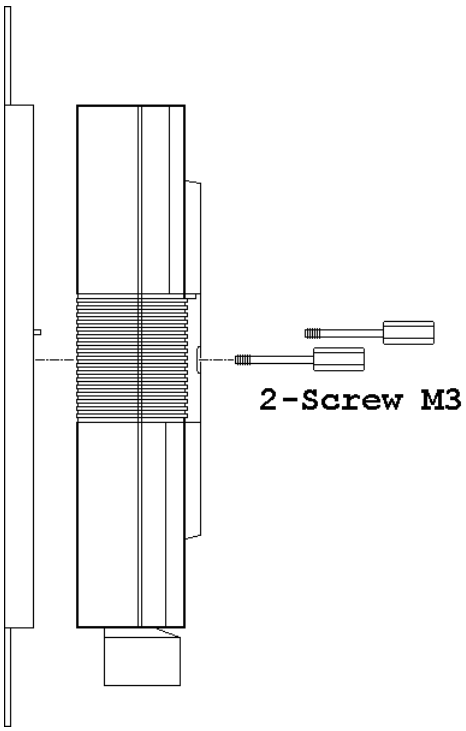


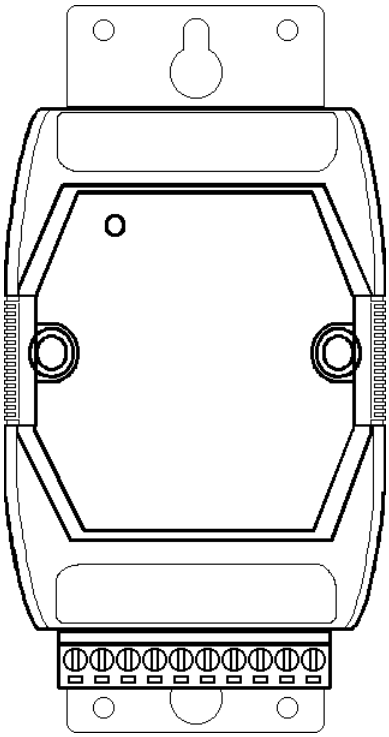
1.6.2 DIN-RAIL Mounting



1.6.4 Pannel Mounting







2 Configuration

2.1 Full-duplex and Half-duplex

Full-duplex is to transimit and receive data at the same time, and half-duplex is to transimit and receive data at seperate time. While using full-duplex mode, only peer-to-peer operation is available. For work in multi-point operation, half-duplex is the only choice.

While working in full-duplex mode, one of the two communication modules is set as master and the other is set as slave. And both modules have same baudrate, frequency and channel select.

While working in half-duplex mode, the all modules have the same configuration. The baudrate and frequency select need all the same, and all modules select slave mode. The channel select is invalid for half-duplex mode. In half-duplex mode, only one module may transimit at the same time. If more than one module transimit data at the same time, the received data is not correct.

2.2 Synchronous and Asynchronous

In synchronous mode is that the serial data need to specificed format, 1 start bit, 8 data bits, no parity bit and 1 stop bit.The data is readed in fixed data format and transimt. The receiver receive the data and output the data in fixed data format.

In asynchronous mode, the data is sampled and then transimit. And the receiver received data and regenerate the data by the sampled data. For the limitation of sampling rate of 32KHz, the data rate is limited to 14.4Kbps in order to prevent the distortion of the output data. While using asynchronous mode, only RS-232 interface may work.

2.3 Configuration Select

There are 3 different configuration of SST-900 and SST-2400 modules.

Operation Mode 1 : Full-duplex, Synchronous

Peer-to-peer communication

One master configuration and one slave configuration

Max baudrate : 19200bps

Fixed data format : 1-bit start, 8-bit data, no parity, 1-bit stop

Operation Mode 2 : Half-duplex, Synchronous

Multiple nodescommunication

All slave configuration

Max baudrate : 57600bps

Fixed data format : 1-bit start, 8-bit data, no parity, 1-bit stop

Delay between transimit and receive

Channel select is disabled

Operation Mode 3 : Full-duplex, Asynchronous

Peer-to-peer

One master configuration and one slave configuration

Max baudrate : 14400bps

Variable data format

RS-232 interface only

2.4 Operation Mode 1

Operation mode 1 is full-duplex, synchronous, fixed data format communication configuration. The mode is the most common mode for peer-to-peer communication. This mode may encode the input data streams and transimit to the other SST modules. And the other modules may decode the data streams and put into serial communication line. This may decrease the communication error rate and increase the communication stability.

Jumper Seeting : Refer *Sec.1.4* for detail

(1) : Select one channel

(2) : Select one frequency

(3) : Select one baudrate, max 19200 bps

(4) : Full-duplex

(5) : Select master or slave

(6) : Synchronous

(7) : RS-232 or RS-485

Benefits :

1. Most stable communication
2. Full-duplex communication

Limitation :

1. Fixed data format
2. Peer-to-peer only
3. Baudrates up to 19200 bps

2.5 Operation Mode 2

Operation mode 2 is half-duplex, synchronous, fixed data format communication configuration. This mode may operate for communication with two or more SST modules. While operation in this mode, all SST modules are virtually connect together with an invisible line. All communication data broadcast to every SST module. The mode is suitable to build a wireless communication network with max baudrate 57600bps. For the fewer error correction mechanism, the mode may have more communication error than operation mode 1.

Jumper Seeting : Refer *Sec.1.4* for detail

(1) : Channel select is useless

(2) : Select one frequency

(3) : Select one baudrate

(4) : Half-duplex

(5) : Slave

(6) : Synchronous

(7) : RS-232 or RS-485

Benefits :

1. Multiple nodes communication
2. Baudrates up to 57600 bps

Limitation :

1. Fixed data format
2. Half-duplex only

2.6 Operation Mode 3

Operation mode 3 is full-duplex, asynchronous communication configuration. This mode is work by the way of sample and rebuild. The SST module samples the serial input (RX of RS-232) and transimit to the other SST module, and receive from RF to rebuild the serial output (TX of RS-232). For the limitation of sampling rate, the data waveform may be distorition for higher data rate.

Jumper Seeting : Refer *Sec.1.4* for detail

(1) : Channel select is useless

(2) : Select one frequency

(3) : Baudrate select is useless

(4) : Full-duplex

(5) : Select master or slave

(6) : Asynchronous

(7) : RS-232

Benefits :

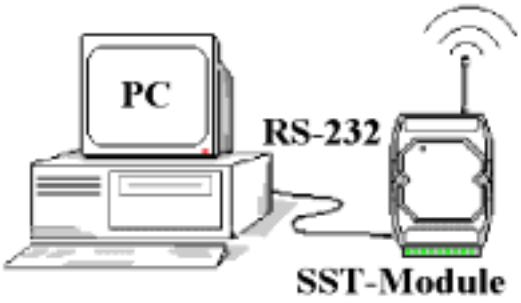
1. Full-duplex communication
2. Variable data formats

Limitation :

1. Peer-to-peer only
2. Baudrates up to 14400 bps
3. RS-232 interface only

3 Application

3.1 Peer-to-Peer Communication



SST-900/2400 Configuration :

Interface : RS-232

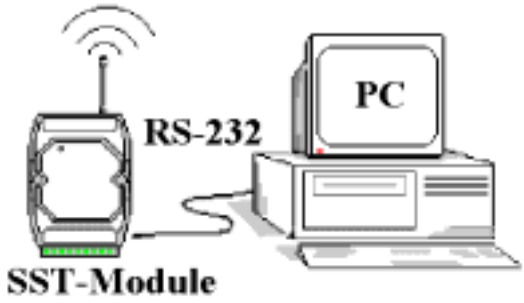
Operation Mode 1 :

Full-duplex

Synchronous

Master

Baudrate : 19200bps max



SST-900/2400 Configuration :

Interface : RS-232

Operation Mode 1 :

Full-duplex

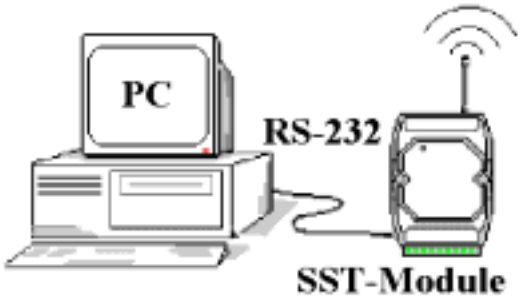
Synchronous

Slave

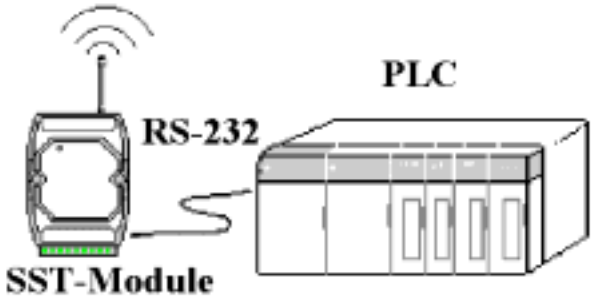
Baudrate : 19200bps max

Note : Basic full-duplex communication application for data format is 1-8-1 mode. Both SST-900/2400 modules need have same baudrate configuration, channel configuration and frequency configuration.

3.2 Asynchronous Connection



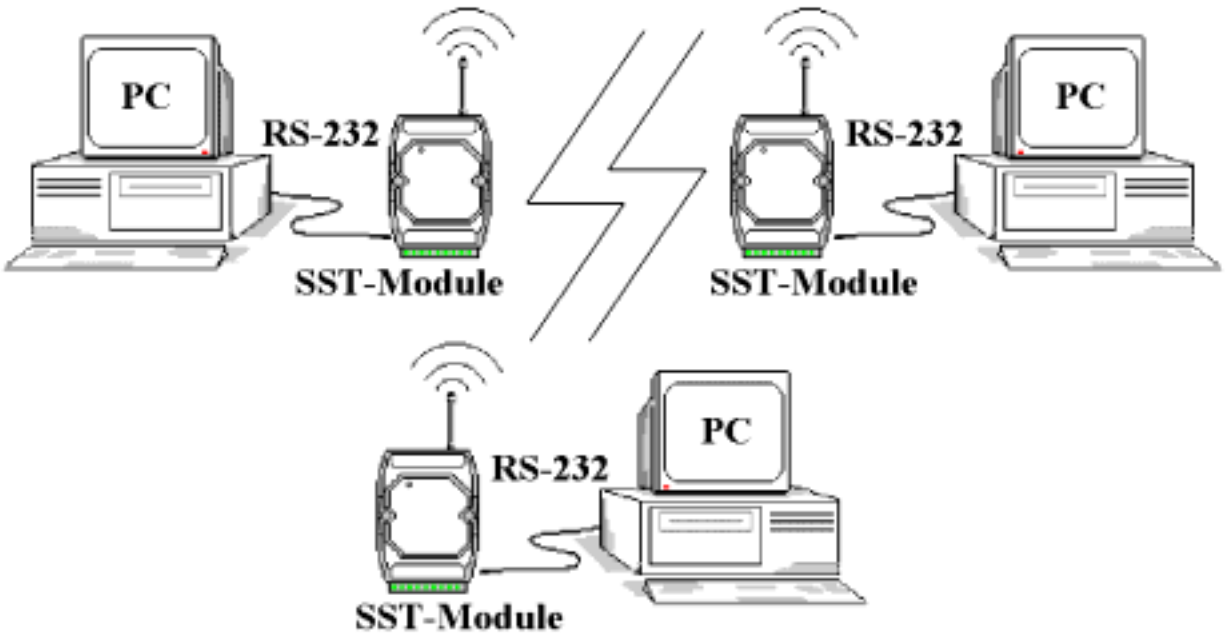
SST-900/2400 Configuration :
Interface : RS-232
Operation Mode 3 :
Full-duplex
Asynchronous
Master
Baudrate : 9600bps max



SST-900/2400 Configuration :
Interface : RS-232
Operation Mode 3 :
Full-duplex
Asynchronous
Slave
Baudrate : 9600bps max

Note : Asynchronous communication application for data format is not 1-8-1 mode. Both SST-900/2400 modules need have same baudrate configuration, channel configuration and frequency configuration.

3.3 Multiple PCs Communication



SST-900/2400 Configuration :

Interface : RS-232

Operation Mode 2 :

Half-duplex

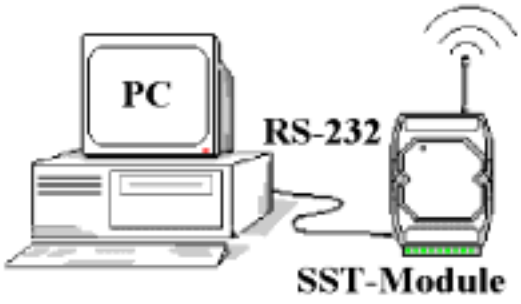
Synchronous

Slave

Baudrate : 57600bps max

Note : Multiple PCs communication application. All SST-900/2400 modules need have same baudrate configuration and frequency configuration.

3.4 Connect I-7000 Modules



SST-900/2400 Configuration :

Interface : RS-232

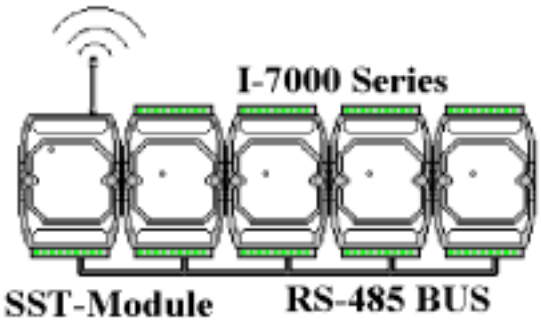
Operation Mode 1 :

Full-duplex

Synchronous

Master

Baudrate : 19200bps max



SST-900/2400 Configuration :

Interface : RS-485

Operation Mode 1 :

Full-duplex

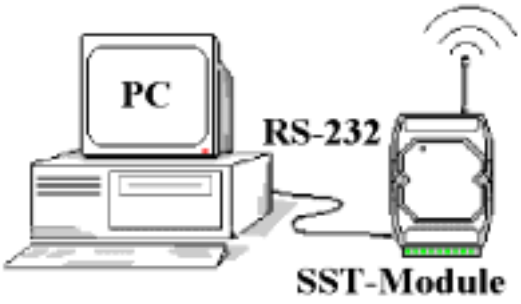
Synchronous

Slave

Baudrate : 19200bps max

Note : Connect I-7000 modules with SST-900/2400 modules. Both SST-900/2400 modules need have same baudrate configuration, channel configuration and frequency configuration.

3.5 Communication Bridge



SST-900/2400 Configuration :

Interface : RS-232

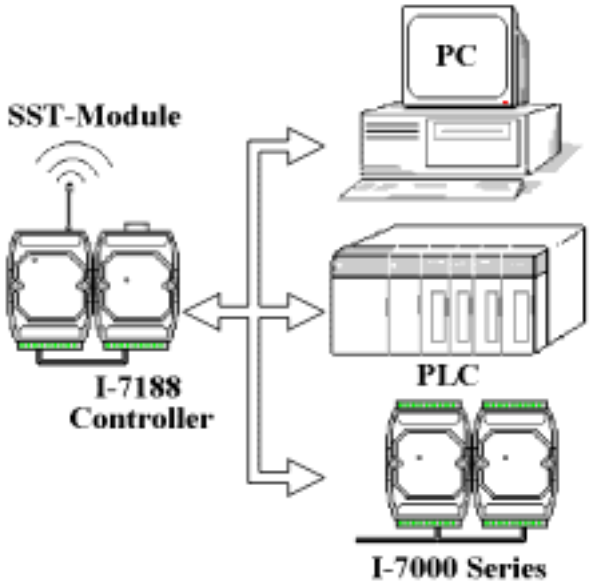
Operation Mode 1 :

Full-duplex

Synchronous

Master

Baudrate : 19200bps max



SST-900/2400 Configuration :

Interface : RS-232

Operation Mode 1 :

Full-duplex

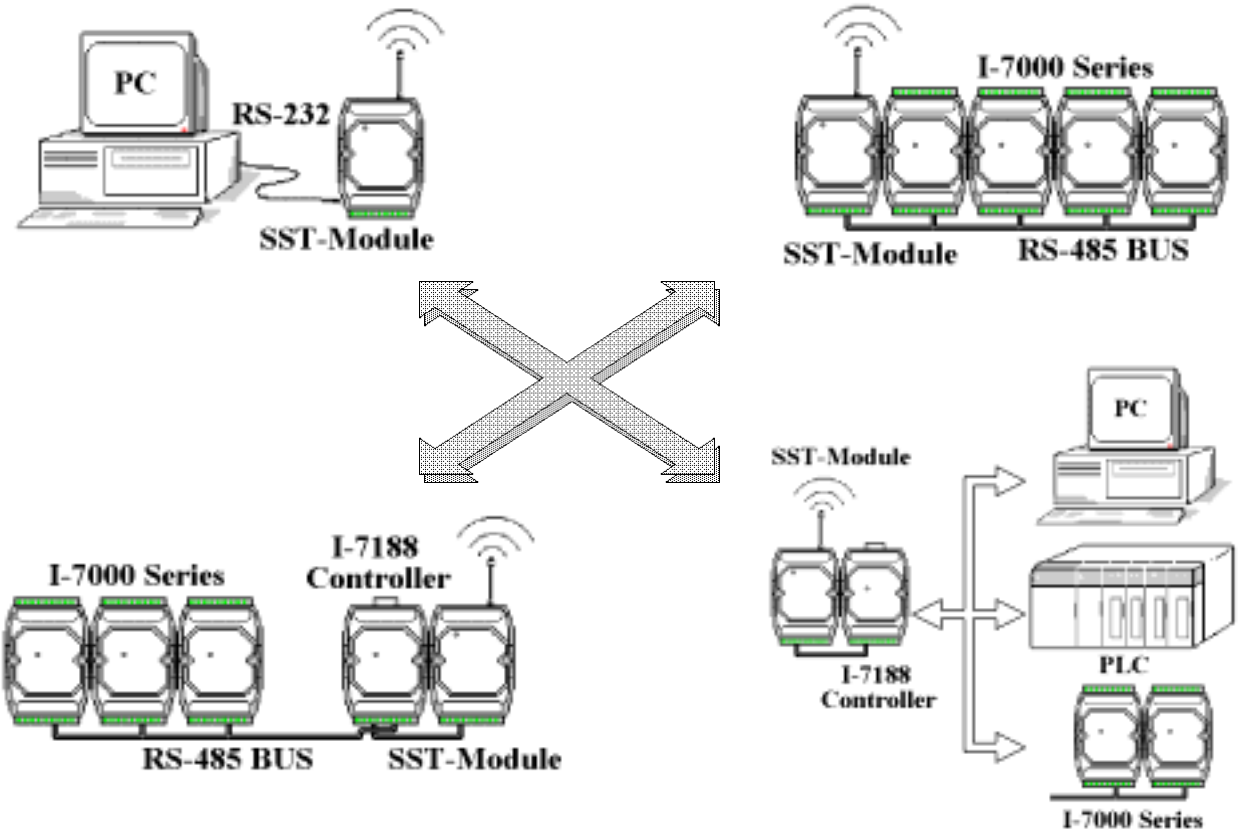
Synchronous

Slave

Baudrate : 19200bps max

Note : The I-7188 is an embedded controller with 4 serial communication ports. For different communication protocols between host PC and device, the I-1788 may work as a communication bridge or protocol converter.

3.6 Network Communication



SST-900/2400 Configuration :

Interface : RS-232 or RS-485

Operation Mode 2 :

Half-duplex

Synchronous

Slave

Baudrate : 57600bps max

Note : Builde wireless network via SST-900/2400 and I-7188. The network is master-slave structure, and only one master may exist at the smae time.