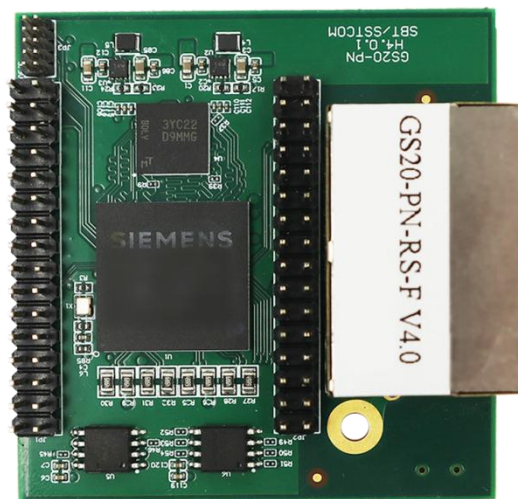


Embedded PROFINET IO RT IRT MRP Interface Module

GS20-PN-RS

User Manual

V 4.0



SST Automation

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Important Information

Warning

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1 Product Overview

1.1 Product Functions

The Embedded PROFINET IO RT MRP Interface Module GS20-PN-RS provides a PROFINET Slave (Device) communication interface for users developing products with PROFINET capabilities. It supports RT (Real-Time) and IRT (Isochronous Real-Time) communication, as well as the MRP (Media Redundancy Protocol) ring network redundancy function.

1.2 Product Features

- **Powerful Performance:** Complies with PROFINET V2.43 protocol specifications, supports RT and IRT communication, and supports MRP redundancy protocol.
- **Short Development Cycle:** Enables rapid development when used with the development board and Demo program; Demo source code and development board schematics are provided.
- **Easy Configuration:** Uses the professional configuration software SST-PNS-CFG to quickly configure PROFINET device parameters such as Vendor ID, Device ID, and Vendor Name.

1.3 Technical Specifications

- [1] Supports PROFINET IO RT V2.4 MU3 protocol, compliant with GB/T 25105-2014 "Industrial communication networks - Fieldbus specifications - Type 10: PROFINET IO specifications"
- [2] Supports RT communication; compatible with IRT networks.
- [3] The PROFINET I/O data size is freely configurable, up to a maximum of 1440 bytes Input and 1440 bytes Output.
- [4] Supports up to 32 module slots and supports direct configuration via Siemens TIA Portal. The following communication modules are supported:
 - **Input 001 byte**
 - **Input 002 bytes**
 - **Input 004 bytes**
 - **Input 008 bytes**
 - **Input 016 bytes**
 - **Input 032 bytes**
 - **Input 064 bytes**
 - **Input 128 bytes**
 - **Input 256 bytes**
 - **Input 512 bytes**
 - **Output 001 byte**

- **Output 002 bytes**
- **Output 004 bytes**
- **Output 008 bytes**
- **Output 016 bytes**
- **Output 032 bytes**
- **Output 064 bytes**
- **Output 128 bytes**
- **Output 256 bytes**
- **Output 512 bytes**
- **Input / Output 001 byte**
- **Input / Output 002 bytes**
- **Input / Output 004 bytes**
- **Input / Output 008bytes**
- **Input / Output 016 bytes**
- **Input / Output 032 bytes**
- **Input / Output 064 bytes**
- **Input / Output 128 bytes**
- **Input / Output 256 bytes**
- **Input / Output 512 bytes**

[5] Supports functionalities such as LLDP, PN_DCP, MRP, etc.

[6] Supports serial interface for communication with the host; baud rate configurable from 1200 to 460800 bps, with CRC16 checksum.

[7] The GS20-PN-RS supports UDP and TCP Server services.

[8] Requires user board power supply: 3.3VDC, 250mA. Power consumption is approximately 0.8W (A 1 W, 3.3 V DC power supply is recommended).

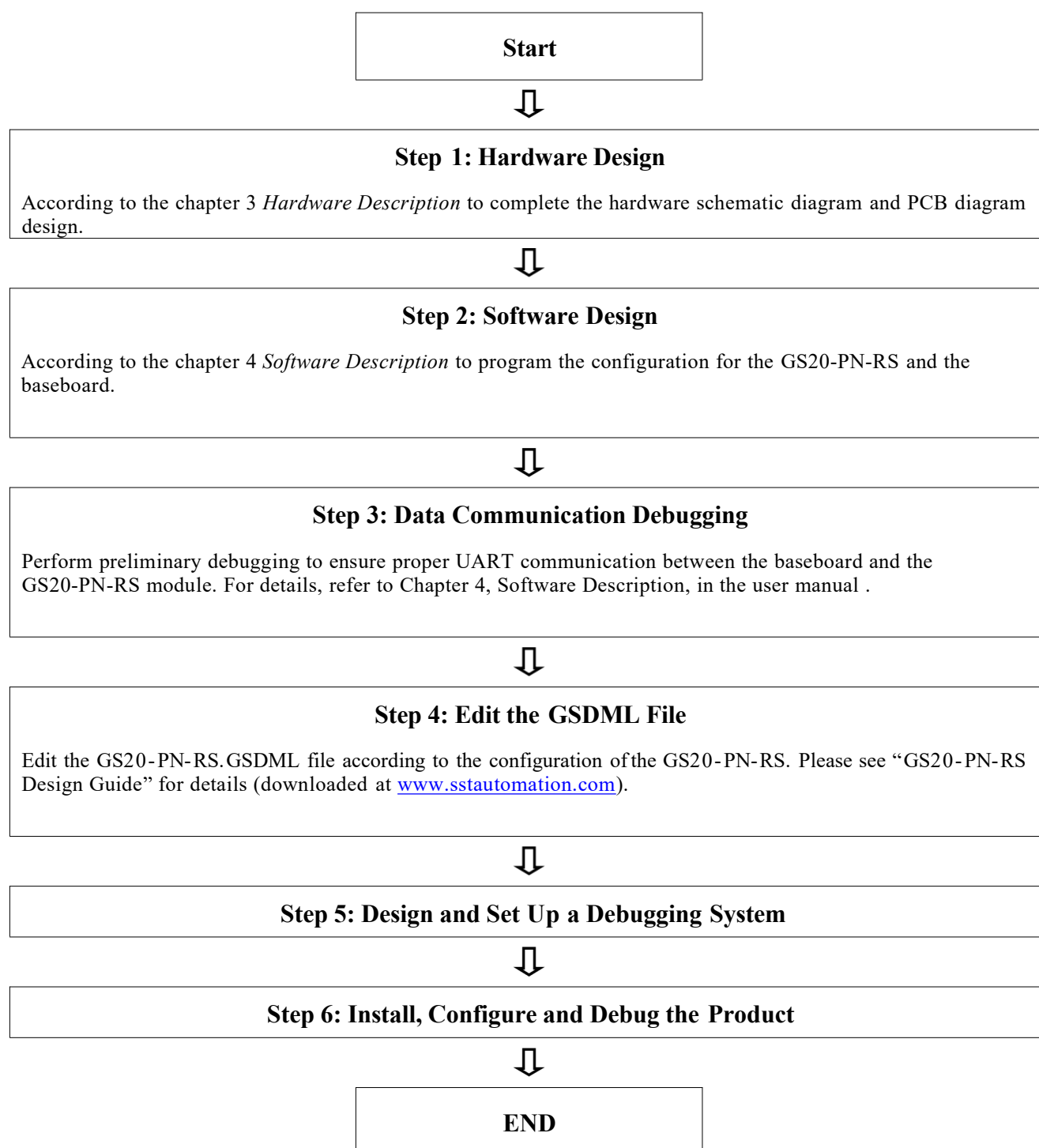
[9] Operating Temperature: -25°C ~ 60°C; Operating Relative Humidity: 5% ~ 95% (non-condensing).

[10] Dimensions: 2.14 in (W) * 0.67 in (H) * 2.24 in (D); (54.3 mm*17 mm*57 mm)

1.4 Revision History

Revision	Date	Chapter	Description
V2.1, Rev A	6/22/2015	All	First release V2.1 manual
V2.1, Rev B	10/26/2020	All	Revision
V4.0	2/10/2026	All	Revision

2 Product Development Process



3 Hardware Description

3.1 Hardware Dimensions

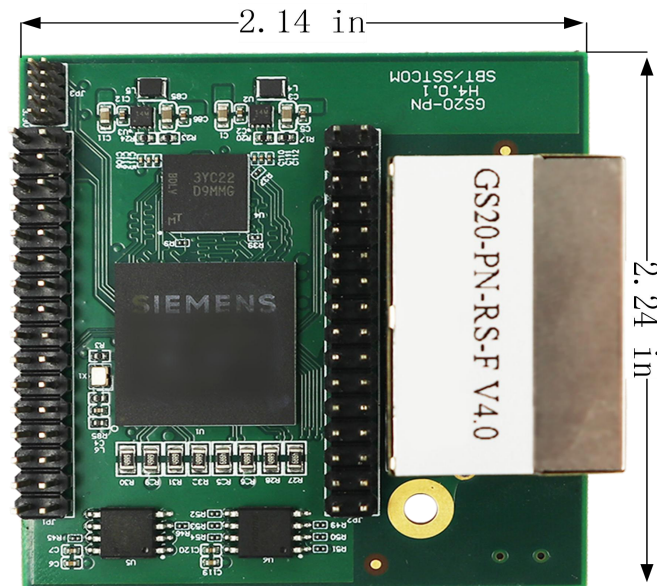


Figure 1 - GS20-PN-RS Dimensions (Plane View)

Notes: W: 2.14 in (54.3mm). D: 2.24 in (57mm)

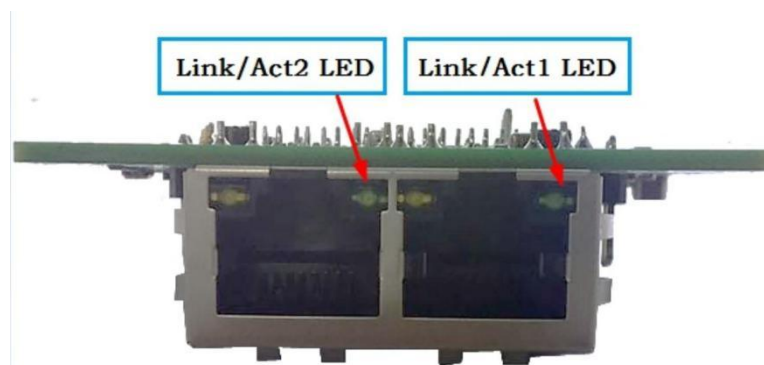


Figure 2 - Ethernet Interfaces of GS20-PN-RS

3.2 Connector Pin Definitions

The GS20-PN-RS module pin header definitions are shown in the table below. There are four rows of pins from left to right, labeled A, B, C, D. Pin numbers run from top to bottom starting from 1 (e.g., A1 is the top-left pin).

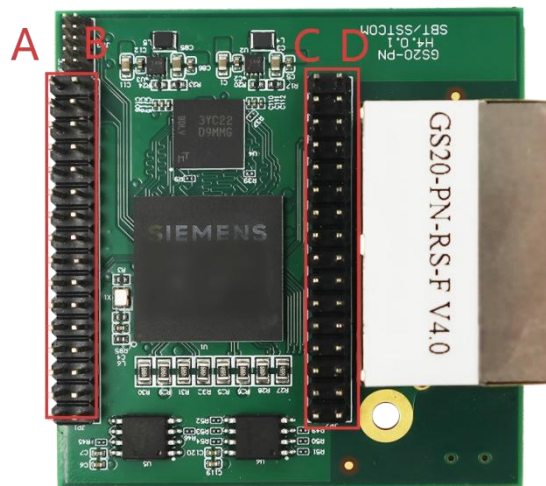


Figure 3- Connector Pin of the Network Interface Module

Table 1 - Connector Pin Definitions of X1-A

X1 Pin	Signal Name	Description	Function
A1	UIC0_1	Input	Write Data Bit 1 for Parallel Host Interface
A2	UIC0_2	Input	Write Data Bit 2 for Parallel Host Interface
A3	UIC0_3	Input	Write Data Bit 3 for Parallel Host Interface
A4	UIC0_4	Input	Write Data Bit 4 for Parallel Host Interface
A5	UIC0_5	Input	Write Data Bit 5 for Parallel Host Interface
A6	UIC0_6	Input	Write Data Bit 6 for Parallel Host Interface
A7	UIC0_15	Input	Write Data Bit 15 for Parallel Host Interface
A8	UIC0_17	Output	“INT4” connection for Parallel Host Interface
A9	INT4	Input	Interrupt 4, has 10K pull-up resistor on module; “USED” for Parallel Host Interface
A10	NC	Not connected	Do not connect
A11	NC	Not connected	Do not connect
A12	NC	Not connected	Spare pin
A13	NC	Not connected	Spare pin
A14	NC	Not connected	Spare pin
A15	NC	Not connected	Spare pin
A16	NC	Not connected	Spare pin

Table 2 - Connector Pin Definitions of X1-B

X1 Pin	Signal Name	Description	Function
B1	+3V3	Power	+3.3V Power Supply Input
B2	BOOTLOAD_EN_N	Input	Bootload Enable (active low), has 10K pull-up resistor on module
B3	UIC0_11	Input	Write Data Bit 11 for Parallel Host Interface
B4	UIC0_12	Input	Write Data Bit 12 for Parallel Host Interface
B5	UIC0_10	Input	Write Data Bit 10 for Parallel Host Interface
B6	UIC0_9	Input	Write Data Bit 9 for Parallel Host Interface
B7	UIC0_8	Input	Write Data Bit 8 for Parallel Host Interface
B8	MAN_RESET_N	Input	Manual Reset Input to FIDO's supervisor IC (active low); Not 5V Tolerant
B9	+3V3	Power	+3.3V Power Supply Input, must be connected to the same Power with X1-B1
B10	UIC0_13	Input	Write Data Bit 13 for Parallel Host Interface
B11	NC	Not connected	Do not connect
B12	NC	Not connected	Do not connect
B13	NC	Not connected	Do not connect
B14	NC	Not connected	Do not connect
B15	NC	Not connected	Do not connect
B16	RESET_OUT_N	Output	FIDO's reset output

Table 3 - Connector Pin Definitions of X1-C

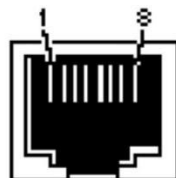
X1 Pin	Signal Name	Description	Function
C1	GND	GND	Signal Ground
C2	UIC1_17	Output	"FIFONOTEMPTY_N" for Parallel Host Interface
C3	UIC1_16	Input	TX for UART Host Interface (Connect to Host RX); Or "RD_SEL_N" for Parallel Host Interface
C4	UIC1_0	Output	RX for UART Host Interface (Connect to Host TX); Or Read Data Bit 0 for Parallel Host Interface
C5	UIC0_0	Input	Write Data Bit 0 for Parallel Host Interface
C6	UIC0_16	Input	"WR_SEL_N" for Parallel Host Interface
C7	UIC0_14	Output	Write Data Bit 14 for Parallel Host Interface
C8	UIC0_7	Output	Write Data Bit 7 for Parallel Host Interface
C9	GND	GND	Signal Ground
C10	CHASSIS GND	Chassis GND	Ethernet line-side isolated ground
C11	NC	Not connected	Do not connect
C12	NC	Not connected	Do not connect
C13	NC	Not connected	Do not connect
C14	NC	Not connected	Do not connect
C15	NC	Not connected	Do not connect
C16	NC	Not connected	Spare pin

Table 4 - Connector Pin Definitions of XI-D

X 1 Pin	Signal Name	Description	Function
D1	UIC1_1	Output	Read Data Bit 1 for Parallel Host Interface
D2	UIC1_2	Output	Read Data Bit 2 for Parallel Host Interface
D3	UIC1_3	Output	Read Data Bit 3 for Parallel Host Interface
D4	UIC1_4	Output	Read Data Bit 4 for Parallel Host Interface
D5	UIC1_5	Output	Read Data Bit 5 for Parallel Host Interface
D6	UIC1_6	Output	Read Data Bit 6 for Parallel Host Interface
D7	UIC1_7	Output	Read Data Bit 7 for Parallel Host Interface
D8	UIC1_8	Output	Read Data Bit 8 for Parallel Host Interface
D9	UIC1_9	Output	Read Data Bit 9 for Parallel Host Interface
D10	UIC1_10	Output	Read Data Bit 10 for Parallel Host Interface
D11	UIC1_11	Output	Read Data Bit 11 for Parallel Host Interface
D12	UIC1_12	Output	Read Data Bit 12 for Parallel Host Interface
D13	UIC1_13	Output	Read Data Bit 13 for Parallel Host Interface
D14	UIC1_14	Output	Read Data Bit 14 for Parallel Host Interface
D15	UIC1_15	Output	Read Data Bit 15 for Parallel Host Interface
D16	NC	Not connected	Spare pin

3.3 Ethernet Interface

Each Ethernet interface of the GS20-PN-RS is a RJ-45 connector.



RJ-45 port

Figure 4 - RJ-45 Connector

Table 5 - Pin Definitions of RJ-45 Port

Pin	Signal Description
S1	TXD+, Transceiver Data+, Output
S2	TXD-, Transceiver Data-, Output
S3	RXD+, Receive Data+, Input
S4	Bi-directional Data+
S5	Bi-directional Data-
S6	RXD-, Receive Data-, Input
S7	Bi-directional Data+
S8	Bi-directional Data-

4 Software Description

4.1 UART Connection

Data exchange between the GS20-PN-RS module and the host:

- **Connection:** CMOS TTL Level, Half-duplex Asynchronous Serial.
- **Parameters:**
 - Baud Rate: 1200-460800 bps (configurable).
 - Stop Bits: 1 bit / 2 bits (configurable).
 - Data Bits: 5, 6, 7, 8 bits (configurable).
 - Parity: Odd, Even, None (configurable).

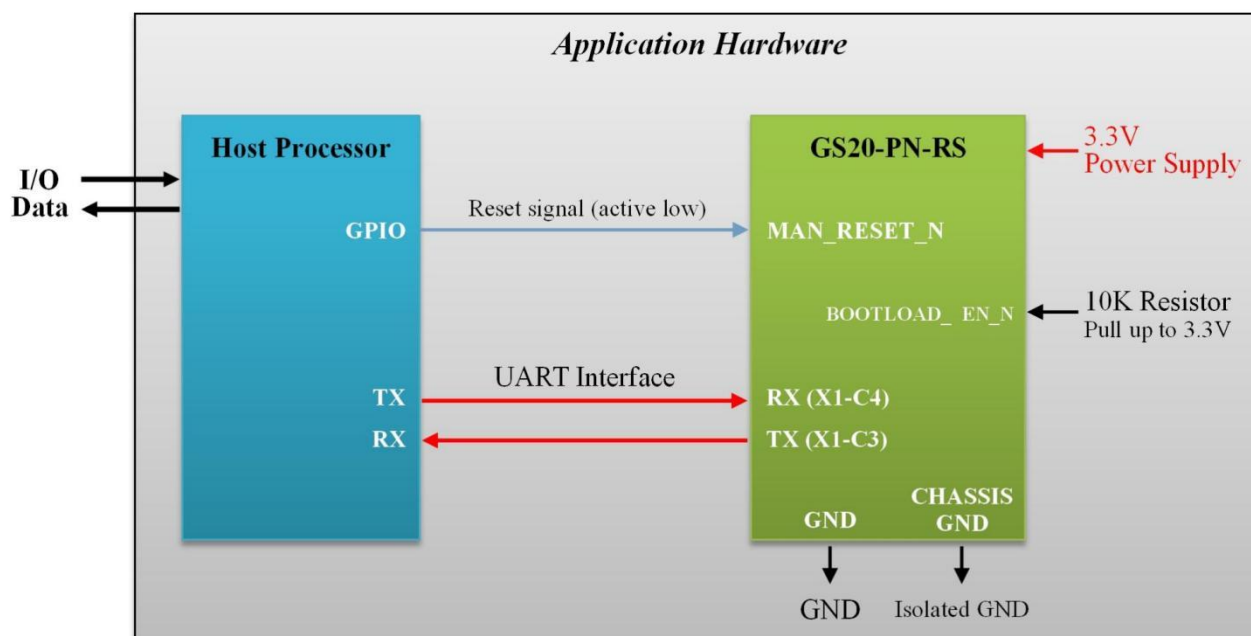


Figure 5 - UART Interface Connection

4.2 General Communication Process

The module has four operating modes: **Standby**, **Configuration**, **Suspend**, and **Run**.

Upon power-up or reset, the module is in Standby Mode, retrieving configuration info from the onboard SPI-Flash. After initialization, it enters Configuration Mode.

In Configuration Mode, the module works strictly in a command/response manner (Host sends configuration commands, Module provides status responses). Note: Compatible with the older GS20-PN-RS; the module will respond correctly to old config commands but they may not take effect; the host can skip directly to sending the Start Frame.

When the Host sends a Host Start frame, the module enters Suspend Mode to wait for a network connection. Once connected, it reports network status and enters Run Mode. Only in Run Mode will the module provide unsolicited data to the host.

In Run Mode, data sent to the host consists of four types: Network Data, Module Events, Socket Data, and Socket Events. To use network sockets, the module must be in Run Mode. Once in Run Mode, the host can open a socket. Once successfully opened, the host can send/receive socket data. The host does not need to poll the module; the module automatically sends socket data.

4.2.1 Initialization and Entering Configuration Mode

(Compatible with old GS20-PN-RS, can be skipped)

Initialization consists of a series of Host Request Status and Module Response Status exchanges.

In Configuration Mode, the host can send an **ADD Basket frame** (or an arbitrary **Add Device frame + Add Item frame**) to indicate the use of pre-loaded devices/items and define I/O data sizes. Once configured, the host sends a configuration frame regarding network info.

4.2.2 Enter Run Mode

Once configured, the Host sends a Host Start frame. The module enters Suspend Mode, waits for a network link, acquires network status, and then enters Run Mode.

4.2.3 Network Communication

In Run Mode, the Host and Module can exchange data. The Host can open network sockets to implement its own or third-party protocols over TCP/IP or UDP/IP.

To use a socket, the Host sends a Host Open Socket frame. The Module responds with a `socket_handle`. This mechanism enables the Host to maintain and reference multiple sockets with various configurations. The Host must reference this handle to send or receive data, or to close the socket. Once the Module opens a socket and provides the handle, the Host can utilize it immediately.

Socket data reception is automatic; when new data arrives, it is immediately transferred to the Host. In addition to data, the Module asynchronously sends Socket Events, providing details such as remote connection or disconnection status. Based on this event information, the Host can decide whether to keep the socket open.

4.3 Implementation of Communication

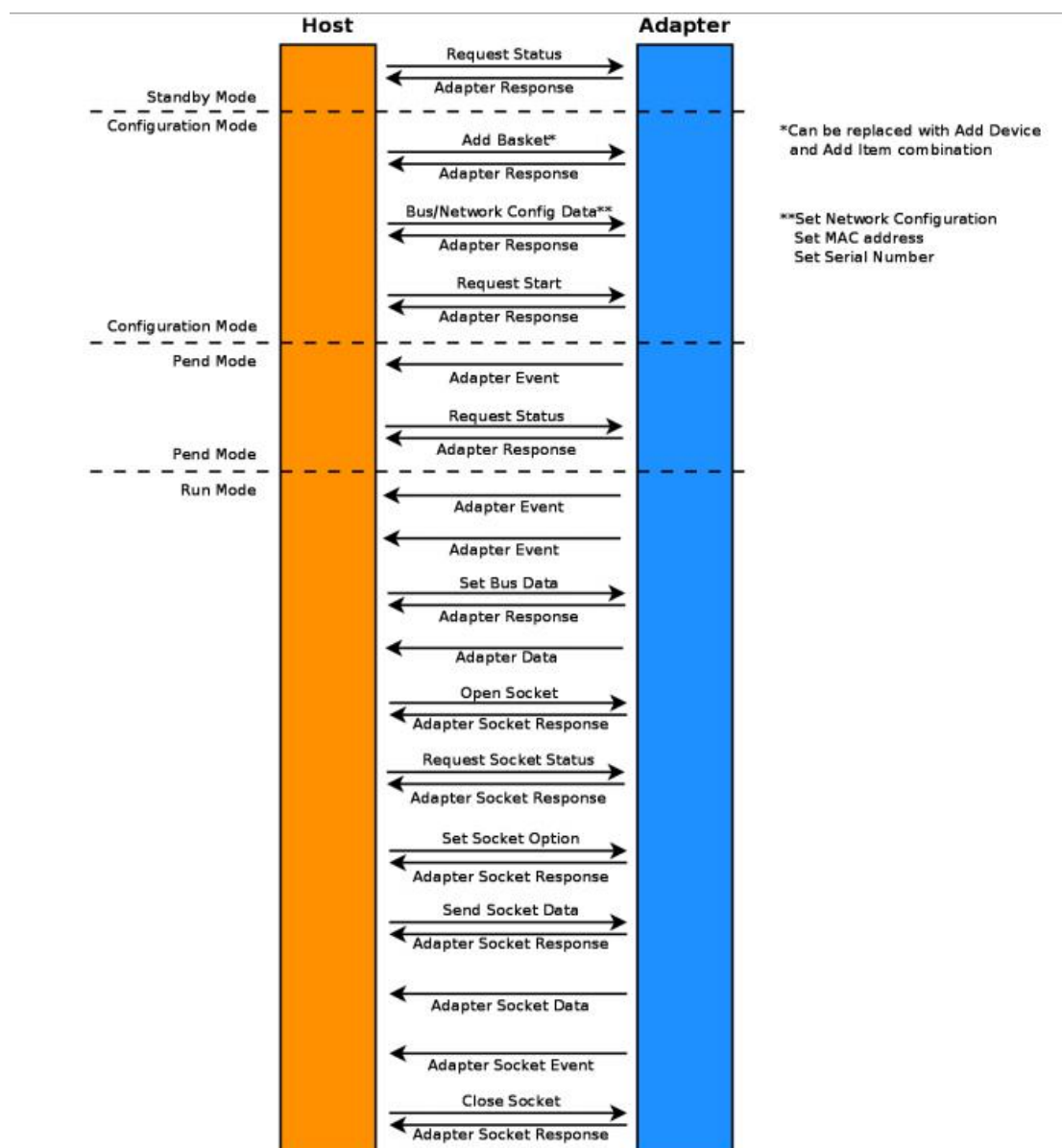


Figure 6 - Example Communication Flow

All data communication uses the same basic frame format:

$$ID\ Byte + Data\ Length + Data + 2\text{-}Byte\ CRC$$

- Byte 1: Frame ID (Indicates frame type, see below).
- Byte 2: Effective Data Length.
- Byte 3...n: Data.
- Byte n+1, n+2: Checksum (2 Bytes, Modbus/RTU CRC algorithm).

4.3.1 Host Commands

Add Basket

(This command is derived from the legacy GS20-PN-RS. It is retained for backward compatibility: it performs no action but returns a valid response, eliminating the need to update existing firmware.)

Item IDs are 4 digits.

First digit: 1=Input, 2=Output, 3=In/Out. Remaining 3 digits: Byte count.

Table 6 - I/O Byte Count Code Table

Input	Item ID	Output	Item ID	Input/Output	Item ID
1	1001	1	2001	1	3001
2	1002	2	2002	2	3002
4	1004	4	2004	4	3004
8	1008	8	2008	8	3008
16	1016	16	2016	16	3016
32	1032	32	2032	32	3032
64	1064	64	2064	64	3064
128	1128	128	2128	128	3128
256	1256	256	2256	256	3256
512	1512	512	2512	512	3512

Table 7 - Add Basket Code Table

Index	Data Type	Value	Number of Bytes
0	Frame ID	0x03	1 byte
1	Data length	6	1 byte
Frame Data			
2	Item ID	--	2 bytes
4	Location	--	4 bytes
8	CRC	--	2 bytes

Set Network Configuration

(This command is derived from the legacy GS20-PN-RS. It is retained for backward compatibility: it performs no action but returns a valid response, eliminating the need to update existing firmware.)

Table 8 - Network Configuration

Index	Data Type	Value	Number of Bytes
0	Frame ID	0x10	1 byte
1	Data length	n+21	1 byte
Frame Data			
2	Address Mode	--	1 byte (Static = 0, DHCP = 1, NVM = 2)
3	IP Address	--	4 bytes (big endian)
7	Subnet mask	--	4 bytes (big endian)
11	Gateway Address	--	4 bytes (big endian)
15	DNS 1 Address	--	4 bytes (big endian)
19	DNS 2 Address	--	4 bytes (big endian)
23	Host Name	--	N bytes (Max 63 bytes), string
n+23	CRC	--	2 bytes

Request Status

Table 9- Request Status

Index	Data Type	Value	Number of Bytes
0	Frame ID	0x20	1 byte
1	Data length	0	1 byte
Frame Data: None			
2	CRC	--	2 bytes

Request Reset

(Note: On the legacy GS20-PN-RS, the Host had to configure slots before operation. In versions where the Master Station handles slot configuration, this Host-side step is skipped, allowing a direct Run Request to enter Run Mode.)

Table 10 - Request Reset

Index	Data Type	Value	Number of Bytes
0	Frame ID	0x21	1 byte
1	Data length	0	1 byte
Frame Data: None			
2	CRC	--	2 bytes

Set Bus Data

Set Module PN Send Data (Set Bus Data): Modifies the PROFINET output register data, i.e., updates the PROFINET output data.

Table 11 - Set Bus Data

Index	Data Type	Value	Number of Bytes
0	Frame ID	0x30	1 byte
1	Data length	n	2 bytes, n = output data length (set in configuration data)
Frame Data			
3	Output Data	--	n bytes to produced on the bus
n+3	CRC	--	2 bytes

Adapter Data

After establishing a connection with the PN Master (PLC), the module transmits PN receive register data to the Host at a 250ms interval. Additionally, upon detecting any data change, the module immediately sends this command to update the data.

Table 12 - Adapter Data

Index	Data Type	Value	Number of Bytes
0	Frame ID	0x31	1 byte
1	Data length	n	2 bytes, n = input data length (set in configuration data)
Frame Data			
3	Input Data	--	n bytes to produced on the bus
n+3	CRC	--	2 bytes

Adapter Responses

The response command sent by the Module after receiving a command from the Host.

Table 13 - Adapter Responses

Index	Data Type	Value	Number of Bytes
0	Frame ID	0xF0	1 byte
1	Data length	6	1 byte
Frame Data			
2	Input Data	--	2 bytes (See Status and Mode Table)
4	Error Code	--	2 bytes (See Error Code Table)
6	Protocol Type	--	1 byte (See Protocol Type Table)
7	Interface Version Number	--	1 byte
8	CRC	--	2 bytes

State and Mode Table
Table 14 - State and Mode Table

Bit	Description	
0	0 = No errors	1 = Error occurred, check error code
1-2	00 = Standby Mode	
	01 = Configuration Mode	
	10 = Pend Mode	
	11 = Run Mode	
3	0 = Ethernet link state unknown	1 = Ethernet link state known
4	0 = No Ethernet connection	1 = Ethernet connection OK
5	0 = No IP address	1 = IP address OK
6	0 = Network error	1 = Network OK
7	0 = No connection to PLC	1 = PLC connection OK
8	0 = I/O data is big-endian	1 = I/O data is little endian
9-15	Reserved (0)	

Error Code Table
Table 15 - Error Code Table

Bit	Error	Possible Reason
0	Reserved	Reserved
1	Reserved	Reserved
2	Reserved	Reserved
3	Network configuration error	1) Invalid address mode selection 2) Invalid IP address 3) Invalid DNS1/2 address 4) Invalid gateway address 5) The length of host name is 0 byte 6) The length of host name is more than 63 bytes 7) The host name contains invalid characters
4	CRC error	Incorrect CRC
5	Frame error	1) Unrecognized frame ID 2) Frame sent in wrong mode 3) Unsupported Host Socket Command or Socket Data frame 4) Data length does not consistent with frame type 5) Frame data is too large for buffer
6	Reserved	Reserved
7	I/O data size does not match	The size of the host data does not match the size of the module I/O data

Adapter Event

Triggered when the connection status with the PN Master changes, or when the physical link status of the Ethernet interface changes, the Module spontaneously reports the event to the Host.

Table 16 - Adapter Event

Index	Data Type	Value	Number of Bytes
0	Frame ID	0xF1	1 byte
1	Data length	n+3	1 byte
Frame Data			
2	Module mode	--	1 byte (0 =Standby, 1 = Configure, 2 = Pend, 3 = Run)
3	Module event code	--	2 bytes, see Module (Adapter) Event Code Table
5	Module event information	--	n bytes, see Module (Adapter) Event Information Table
n+5	CRC	--	2 bytes

Module (Adapter) Event Code Table

Table 17 -Module (Adapter) Event Code Table

Number	Event Name	Value	Description
1	Ethernet link established	0	Cable was plugged in or link was detected
2	Ethernet disconnection	0	Ethernet cable was severed or unplugged
3	Network connection established	17	Successfully connected to network
4	PLC connection established*	0	PLC made connection to adapter
5	PLC connection broken	0	PLC stopped responding
6	PLC reset	1	PLC commanded adapter to reset
>6	Reserved		

Module (Adapter) Event Information Table

Table 18 - Module (Adapter) Event Information Table

Event Name	Size	Offset	Information
Network connection established	17	0	Addressing mode (Static = 0, DHCP=1)
		1	IP address in use (big endian)
		5	Subnet mask in use (big endian)
		9	Gateway address (big endian)
		13	DNS server address in use (big endian)
PLC reset	1	0	Reset mode (0 or 1)

Module (Adapter) Event Modes

Table 19 - Module (Adapter) Event Modes

Event Name	Mode	
	Pend	Run
Ethernet link established	Valid	Valid
Ethernet disconnection	Valid	Valid
Network connection established	Invalid	Valid

PLC connection established*	Invalid	Valid
PLC connection broken	Invalid	Valid
PLC reset	Invalid	Valid

Open Socket

Note: To enable the TCP Server to establish connections with multiple clients using the same port, simply issue the 'Open TCP Socket' command repeatedly. Currently, a combined total of up to 6 UDP Server and TCP Server services are supported.

Index	Data Type	Value	Number of Bytes
0	Frame ID	0x40	1 byte
1	Data length	8	1 byte
Frame Data			
2	Socket Direction	--	1 byte (0 = Client, 1 = Server)
3	Socket Type	--	1 byte (0 = TCP, 1 = UDP)
4	Port Number	--	2 bytes
6	IP Address	--	4 bytes (MSB is MS octet)
10	CRC	--	2 bytes

Adapter Socket Responses

Index	Data Type	Value	Number of Bytes
0	Frame ID	0xE0	1 byte
1	Data length	5	1 byte
Frame Data			
2	Socket Handle	--	1 byte
3	Socket Status	--	2 bytes (see Socket Status Table)
5	Socket Error	--	2 bytes (see Socket Error Table)
7	CRC	--	2 bytes

Socket Status Table

Bit	Status
0	Listening (UDP client/server)
1	Connecting (TCP client)
2	Accepting (TCP server)
3	Connected (TCP client/server)
4	Dead (i.e. should be closed)

Socket Error Table

Bit	Error Name	Possible Reason
0	Socket does not exist	➤ Host referenced an unopened socket
1	Failed to open socket	➤ Module (adapter) out of sockets (too many other sockets already opened) ➤ Module (adapter) doesn't support designated socket type ➤ Host specified invalid IP address ➤ Invalid Client/Server selection (was not 1 or 0) ➤ Invalid TCP/UDP selection (was not 1 or 0) ➤ Failed to bind socket
2	Invalid socket option	➤ Host specified a socket option that is not recognized
3	Invalid socket options data	➤ Host specified invalid socket option data ➤ Host specified too much or too little socket option data
4	Failed to send data	➤ Host specified too much socket data ➤ Host specified too little socket data ➤ Socket was not open
5	Close failed	➤ Host attempted to close a parent socket

Request socket status

Index	Data Type	Value	Number of Bytes
0	Frame ID	0x42	1 byte
1	Data length	1	1 byte
Frame Data			
2	Socket Handle	--	1 byte
3	CRC	--	2 bytes

Set socket option

This command is currently not supported.

Index	Data Type	Value	Number of Bytes
0	Frame ID	0x41	1 byte
1	Data length	N+2	1 byte
Frame Data			
2	Socket Handle	--	1 byte
3	Socket Option	--	2 byte (see Socket Option Table)
4	Socket Option Data	--	n bytes, dictated by socket option
n+4	CRC	--	2 bytes

Socket Option Table

Value	Socket Option	n	Action
0	Enable Broadcasts	1	Enable or disable broadcast messages
1	Reuse Address	1	Bind to a port even if it is in use
2	Type of Service	1	Set Type of Service or Traffic Class field in IP header
3	Limited Broadcast	1	Enables or disables use of the limited broadcast address. If disabled, limited broadcast address is replaced with interface broadcast address.
4	Add Multicast Membership	4	Join the specified multicast group
5	Drop Multicast Membership	4	Leave the specified multicast group
6	No TCP Delay	1	Enables or disables the Nagle algorithm (TCP sockets only)
7	Set TCP Keepalive	1	Enables and sets interval for keepalive queries (TCP server or client only)

Send socket data

Index	Data Type	Value	Number of Bytes
0	Frame ID	0x50	1 byte
1	Data length	n+1	2 bytes
Frame Data			
3	Socket Handle	--	1 byte
4	Socket Data	--	n bytes
n+4	CRC	--	2 bytes

Adapter socket Data

Receive Socket Data

Index	Data Type	Value	Number of Bytes
0	Frame ID	0x51	1 byte
1	Data length	n+1	2 bytes
Frame Data			
3	Socket Handle	--	1 byte
4	Socket Data	--	n bytes
n+4	CRC	--	2 bytes

Adapter Socket Event

Module Socket Event

Index	Data Type	Value	Number of Bytes
0	Frame head	0xE1	1 byte
1	Data length	n+4	1 byte
Frame Data			
2	Socket Handle	--	1 byte
3	Socket Status	--	2 bytes (see Socket Status Table)
5	Socket Event Code	--	1 byte (see Socket Event Code Table)
6	Socket Event Information	--	n bytes (specified by event type)
n+6	CRC	--	2 bytes

Close socket

Index	Data Type	Value	Number of Bytes
0	Frame ID	0x43	1 byte
1	Data length	1	1 byte
Frame Data			

2	Socket Handle	--	1 byte
3	CRC	--	2 bytes

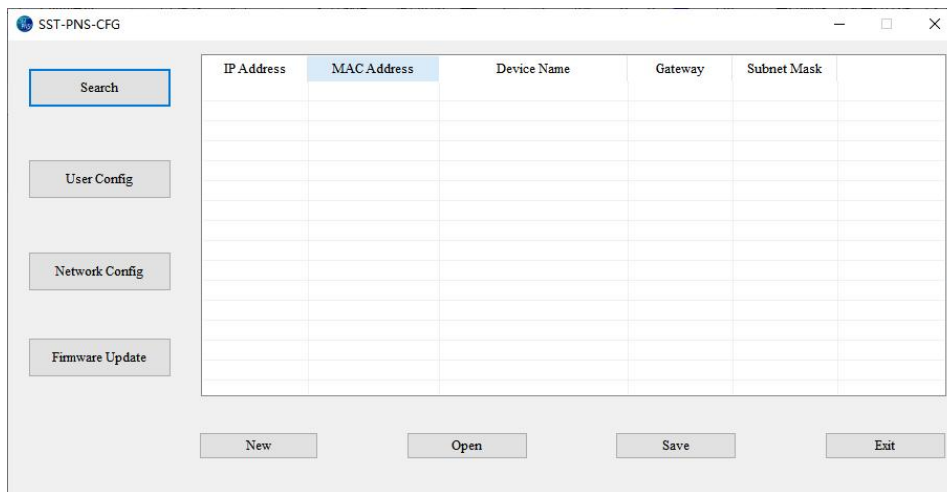
Note: The legacy GS20-PN-RS required sequential transmission of initialization frames. In the current version, slot initialization is no longer required. To maintain compatibility, the module will return a valid response to initialization frames, but the settings will not take effect. Alternatively, you can send the 'Switch to Run Mode' command directly to enter Run Mode immediately.

5 Software Configuration

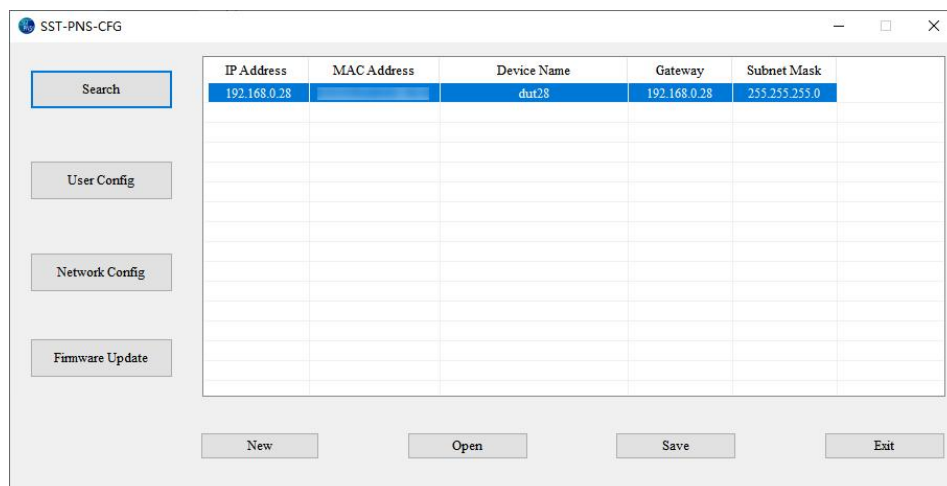
The GS20-PN-RS V4.0 supports parameter configuration using the SST-PNS-CFG software, which can be obtained from the SST Automation website. The following introduces its basic interface and functions, as well as how to use this software to configure the GS20-PN-RS.

To configure the user parameters of the GS20-PN-RS, the module's Boot pin must be pulled high to enter Bootloader mode; the module cannot be configured in normal operating mode. In operating mode, only the module's network parameters can be configured.

5.1 Main Interface



In the main interface, clicking "Search" scans for all GS20-PN-RS devices currently on the network, as shown below:



5.2 User Parameter Configuration

5.2.1 Product Information

SST-PNS-CFG

Product Information | Default Configuration | Serial Port Settings

Vendor ID: 0x0304 (0x0000-0xFFFF)

Product ID: 0x1001 (0x0000-0xFFFF)

Product Order No.: GS20-PN-RS V1 (Do not exceed 20)

Firmware Version: 4.0.0.2 (Example: 2.1.2.0)

Hardware Version: 0x0004 (0x0000-0xFFFF)

Vendor Name: SSTCOMM (Do not exceed 32)

Product Type: Gateway (Do not exceed 16)

Product Family: SSTCOMM Gateway (Do not exceed 32)

Product Name: sst-gs20 (Do not exceed 64)

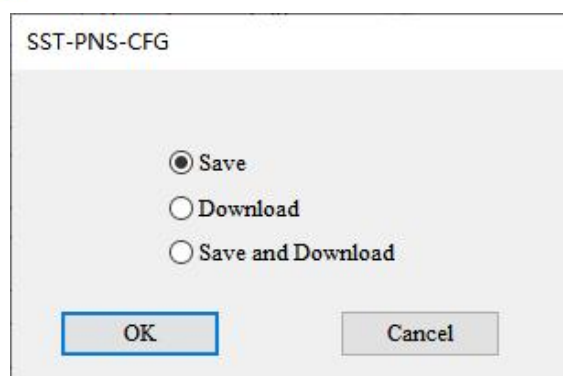
GSD File Image: [Empty] Select Image * BMP 70*40

OK Cancel Export GSD

- **Vendor ID:** The Vendor ID distributed after the Profinet certification application.
- **Product ID:** The product ID of the device under this vendor.
- **Product Order No.:** The order number of the product.
- **Firmware Version:** The firmware version number of the product.
- **Hardware Version:** The hardware version number of the product.
- **Vendor Name:** The name of the vendor (English only); this information will be displayed in LLDP.
- **Product Type:** The type of the product under the Profinet protocol; this information will be displayed in LLDP.
- **Product Family:** The product family (sub-category of the device type); this information will be displayed in LLDP.
- **Product Name:** The name of the product; this information will be displayed in LLDP.

(The above parameters are also used to generate the GSDML file; the parameters must comply with the legality of the GSDML file and Profinet protocol.)

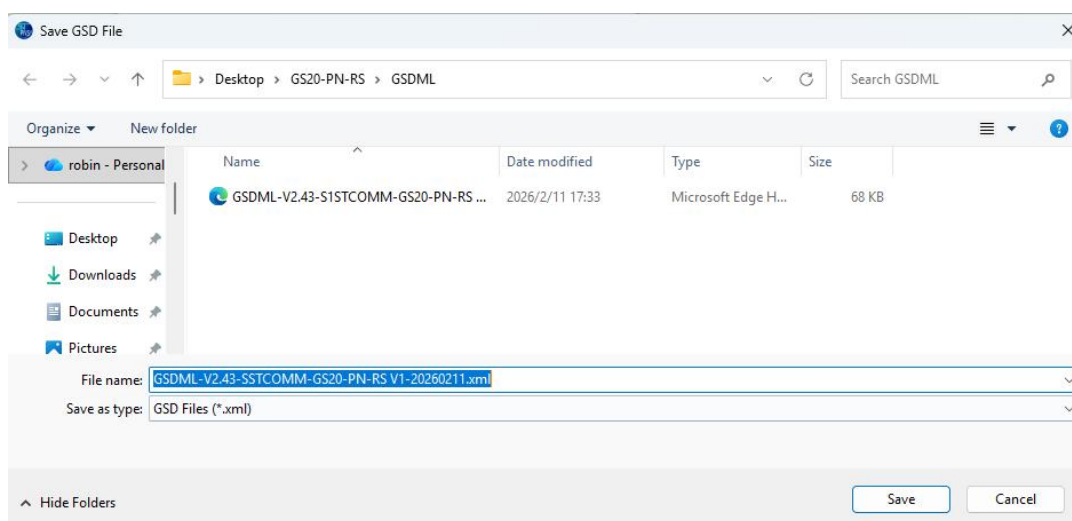
OK (Confirm): After clicking "OK", three options will pop up:



- Save: Save the current configuration file.
- Download: Download the current configuration content to the device.
- Download and Save: Download the configuration to the device and save the configuration file.
- Cancel: Cancel all changes to parameters and exit the interface.

Export GSD: Export the current configuration content to a corresponding GSDML file. The GSDML file name will be automatically generated to comply with regulations.

When exporting GSDML, you can select a product image to be displayed in the master station configuration software. It is recommended to use a 70*40 BMP format image.



5.2.2 Default Configuration

Default configuration parameters refer to the parameter values used when the PLC sends a command to restore the device to default settings.

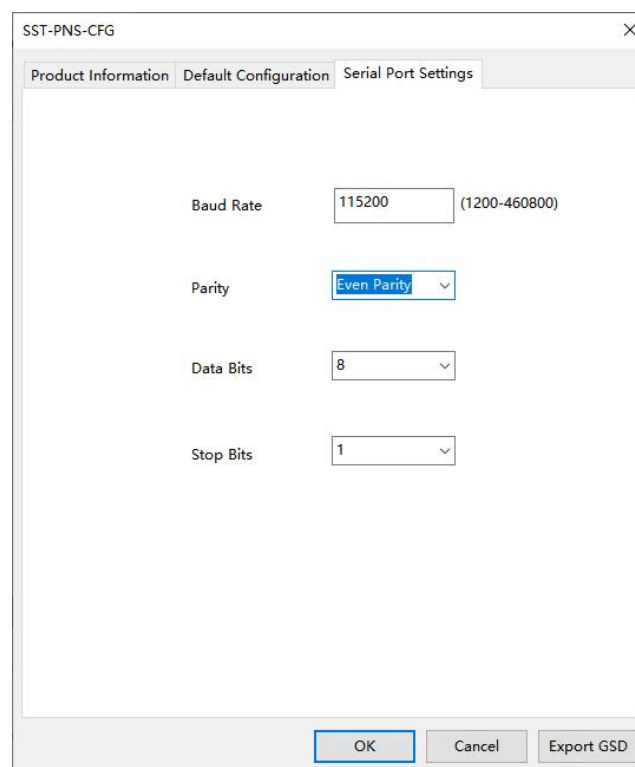
The screenshot shows the 'SST-PNS-CFG' configuration window with the 'Default Configuration' tab selected. The window contains the following fields and values:

Field	Value
Default Device	dut28
Default IP Address	192 . 168 . 0 . 28
Default Subnet Mask	255 . 255 . 255 . 0
Default Gateway Address	192 . 168 . 0 . 28

Below the fields, a note states: "Note: The default device name cannot exceed 20". At the bottom of the window are three buttons: 'OK', 'Cancel', and 'Export GSD'.

- Default Device Name: The device name after restoring default configuration.
- Default IP Address: The IP address after restoring default configuration.
- Default Subnet Mask: The subnet mask after restoring default configuration.
- Default Gateway Address: The gateway address after restoring default configuration.

5.2.3 Serial Port Settings



The screenshot shows the 'SST-PNS-CFG' dialog box with the 'Serial Port Settings' tab selected. The dialog has three tabs: 'Product Information', 'Default Configuration', and 'Serial Port Settings'. The 'Serial Port Settings' tab contains four configuration fields: 'Baud Rate' (text box with '115200' and a range '(1200-460800)'), 'Parity' (dropdown menu with 'Even Parity' selected), 'Data Bits' (dropdown menu with '8' selected), and 'Stop Bits' (dropdown menu with '1' selected). At the bottom right, there are three buttons: 'OK', 'Cancel', and 'Export GSD'.

Baud Rate: UART baud rate, range: 1200~460800.

Parity: UART parity bit; None, Odd, and Even can be set.

Data Bits: UART data bits; 5, 6, 7, 8 bits can be set.

Stop Bits: UART stop bits; 1, 2 bits can be set.

5.3 New/Open/Save

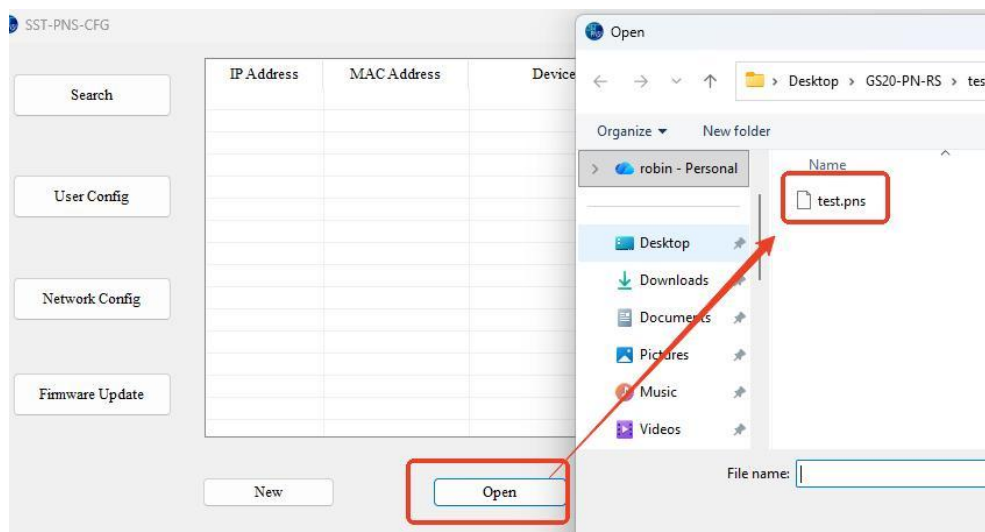
New: Create a new default "User Parameter Configuration".

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The screenshot shows the 'SST-PNS-CFG' window with the 'Default Configuration' tab selected. The window contains several input fields for product information, each with a range or constraint. The fields are: Vendor ID (0x0304, range 0x0000-0xFFFF), Product ID (0x1001, range 0x0000-0xFFFF), Product Order No. (GS20-PN-RS V1, constraint: Do not exceed 20), Firmware Version (4.0.0.2, example: 2.1.2.0), Hardware Version (0x0004, range 0x0000-0xFFFF), Vendor Name (SSTCOMM, constraint: Do not exceed 32), Product Type (Gateway, dropdown, constraint: Do not exceed 16), Product Family (SSTCOMM Gateway, constraint: Do not exceed 32), Product Name (sst-gs20, constraint: Do not exceed 64), and GSD File Image (empty, with a 'Select Image' button and constraints: * BMP, 70*40). At the bottom are 'OK', 'Cancel', and 'Export GSD' buttons.

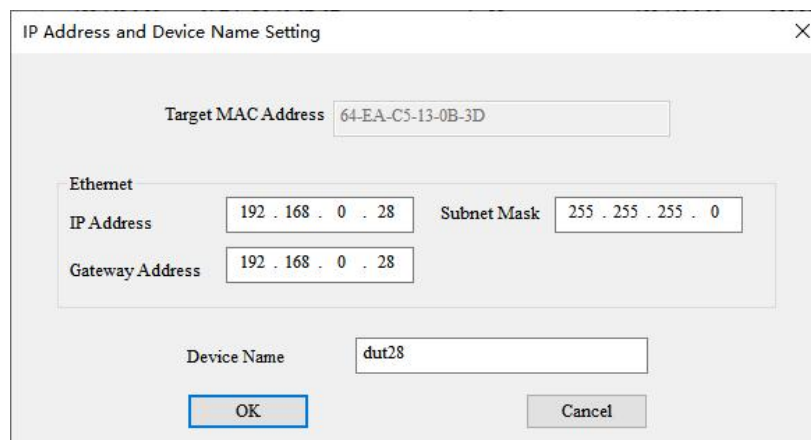
Field	Value	Constraint
Vendor ID	0x0304	(0x0000-0xFFFF)
Product ID	0x1001	(0x0000-0xFFFF)
Product Order No.	GS20-PN-RS V1	Do not exceed 20
Firmware Version	4.0.0.2	(Example: 2.1.2.0)
Hardware Version	0x0004	(0x0000-0xFFFF)
Vendor Name	SSTCOMM	Do not exceed 32
Product Type	Gateway	Do not exceed 16
Product Family	SSTCOMM Gateway	Do not exceed 32
Product Name	sst-gs20	Do not exceed 64
GSD File Image		* BMP, 70*40

Open: Open a locally saved "User Parameter Configuration".



Save: Save the currently configured "User Parameter Configuration".

5.4 Network Config



IP Address and Device Name Setting

Target MAC Address: 64-EA-C5-13-0B-3D

Ethernet

IP Address: 192 . 168 . 0 . 28 Subnet Mask: 255 . 255 . 255 . 0

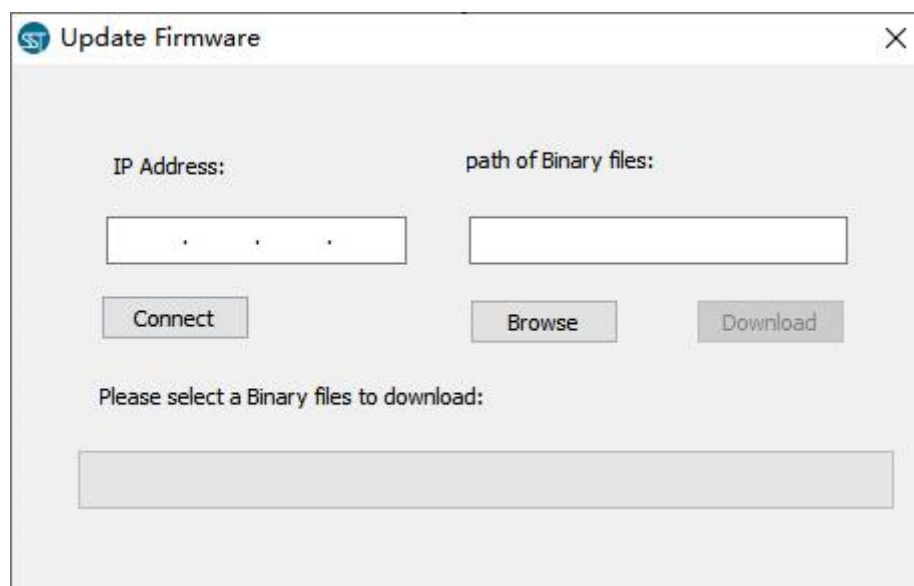
Gateway Address: 192 . 168 . 0 . 28

Device Name: dut28

OK Cancel

- Target MAC Address: The MAC address of the device; this parameter is view-only and cannot be changed.
- IP Address: The modified device IP address.
- Subnet Mask: The modified device subnet mask.
- Gateway Address: The modified device gateway address.
- Device Name: The modified device name.

5.5 Firmware Update



Update Firmware

IP Address: path of Binary files:

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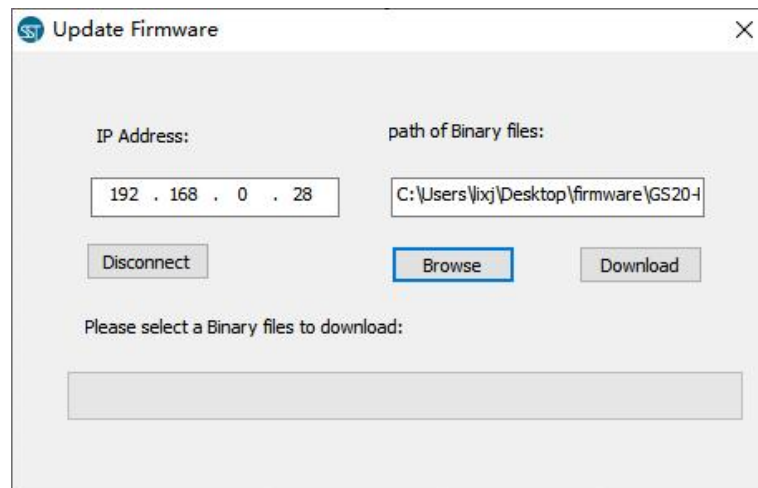
Connect Browse Download

Please select a Binary files to download:

With the module in bootloader mode:

- IP Address: The current IP address of the module, e.g., 192.168.0.28.
- Bin File Link: Open the storage path of the firmware file.

Click "Connect", then "Download Program".



Note: Do not power off during the update process. Wait until the prompt "Firmware update completed" appears.