



A Sierra Monitor Company

Driver Manual
(Supplement to the FieldServer Instruction Manual)

FS-8700-02 Modbus Plus

APPLICABILITY & EFFECTIVITY

Effective for all systems manufactured after May 1, 2001

<p>Instruction Manual Part Number FS-8700-02 Version 1.00 Revision 1a 5/24/2002</p>

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1. Modbus Plus Description

The Modbus Plus driver allows the FieldServer to transfer data to and from devices using Modbus Plus protocol. The FieldServer can emulate either a Server or Client.

The information that follows describes how to expand upon the factory defaults provided in the configuration files included with the FieldServer.

The FieldServer is shipped with the switches set of a default address of 11.

Set the Modbus Plus address switches 1--6 to the address in your application. Switches 7 and 8 are not used.

Switch 1 is the least significant bit of the address. Switch 6 is the most significant bit. The address will be one higher than the binary value you set into the switches.

1.1 Hardware/Software

Supplied by FieldServer

FieldServer Technologies PART #	DESCRIPTION
FS-8915-01	Adapter Card, Modbus Plus, Single Port. User must supply Modbus Plus cables and connectors, including termination connectors as documented by Group Schneider/Modicon

Provided by user

PART #	DESCRIPTION
	Refer to the Drawings in section 3 ¹
	Modbus Plus Client, e.g. Wonderware, Intellution FIX, GE Cimplicity, etc. ²

¹ If FieldServer used as Modbus Plus Client.

² If FieldServer used as Modbus Plus Server.

Table 1: Modbus Plus Addresses and Switch Settings

Address	Switches 6--1	Address	Switches 6--1	Address	Switches 6--1
1	0 0 0 0 0	23	0 1 0 1 1 0	45	1 0 1 1 0 0
2	0 0 0 0 0 1	24	0 1 0 1 1 1	46	1 0 1 1 0 1
3	0 0 0 0 1 0	25	0 1 1 0 0 0	47	1 0 1 1 1 0
4	0 0 0 0 1 1	26	0 1 1 0 0 1	48	1 0 1 1 1 1
5	0 0 0 1 0 0	27	0 1 1 0 1 0	49	1 1 0 0 0 0
6	0 0 0 1 0 1	28	0 1 1 0 1 1	50	1 1 0 0 0 1
7	0 0 0 1 1 0	29	0 1 1 1 0 0	51	1 1 0 0 1 0
8	0 0 0 1 1 1	30	0 1 1 1 0 1	52	1 1 0 0 1 1
9	0 0 1 0 0 0	31	0 1 1 1 1 0	53	1 1 0 1 0 0
10	0 0 1 0 0 1	32	0 1 1 1 1 1	54	1 1 0 1 0 1
11*	0 0 1 0 1 0	33	1 0 0 0 0 0	55	1 1 0 1 1 0
12	0 0 1 0 1 1	34	1 0 0 0 0 1	56	1 1 0 1 1 1
13	0 0 1 1 0 0	35	1 0 0 0 1 0	57	1 1 1 0 0 0

Address	Switches 6--1	Address	Switches 6--1	Address	Switches 6--1
14	0 0 1 1 0 1	36	1 0 0 0 1 1	58	1 1 1 0 0 1
15	0 0 1 1 1 0	37	1 0 0 1 0 0	59	1 1 1 0 1 0
16	0 0 1 1 1 1	38	1 0 0 1 0 1	60	1 1 1 0 1 1
17	0 1 0 0 0 0	39	1 0 0 1 1 0	61	1 1 1 1 0 0
18	0 1 0 0 0 1	40	1 0 0 1 1 1	62	1 1 1 1 0 1
19	0 1 0 0 1 0	41	1 0 1 0 0 0	63	1 1 1 1 1 0
20	0 1 0 0 1 1	42	1 0 1 0 0 1	64	1 1 1 1 1 1
21	0 1 0 1 0 0	43	1 0 1 0 1 0		
22	0 1 0 1 0 1	44	1 0 1 0 1 1		* = default

Table 2: Summary of Modbus Data Access Commands

Function Code (Decimal)	Command Name
1	Read Discrete Output Status (0xxxx)
2	Read Discrete Input Status (1xxxx)
3	Read Output Register (4xxxx)
4	Read Input Register (3xxxx)
5	Force Single Coil (0xxxx)
6	Preset Single Register (4xxxx)
15	Force Multiple Coils (0xxxx)
16	Preset Multiple Registers (4xxxx)

Modbus Plus Card Indicators

The Modbus Plus card has an indicator that flashes a repetitive pattern to show its network communication status, plus two indicators which identify communication errors on the two Modbus Plus cable paths. Note that one error indicator will be lit normally in single-cable installations, showing that a second cable does not exist.

Table 3: Modbus Plus Active Indicator Patterns

Indicator Pattern (Green)	Status
Six flashes/second	Normal operating state. All nodes on a healthy network flash this pattern
One flash/second	The node is off-line. After being in this state for 5 seconds, the node attempts to go to its normal operating state.
Two flashes, then OFF for 2 seconds	The node detects the network token being passed among other nodes, but it never receives the token.
Three flashes, then OFF for 1.7 seconds	The node does not detect any token passing on the network.
Four flashes, then OFF for 1.4 seconds	The node has detected another node using the same address.

2. FieldServer as a Modbus Plus Client

2.1 Hardware Connections

It is possible to connect a Modbus RTU device to any of the eight RS232 ports or two RS485 ports. These ports just need to be configured for Modbus RTU in the configuration file.

Configure the PLC according to manufacturer's instructions.

2.2 Configuration File Structure

Refer to section 4.1 of the Instruction Manual for a description of the operation principle of the FieldServer. The following tables describe parameters that need to be filled out in the configuration file. For convenience, a few example parameters already exist in the supplied PRIMSERV.CSV and SECDSERV.CSV files.

Note that * indicates an optional parameter, with the bold legal value being the default.

2.2.1 Data Arrays

Section Title		
Data_Arrays		
Column Title	Function	Legal Values
Data_Array_Name	Provide name for Data Array	Up to 15 alphanumeric characters
Data_Format	Provides data format	INT16, INT32, BIT, FLOAT
Data_Array_Length	Number of Data Objects	1-10,000

2.2.2 Client Side Connections

Section Title		
Connections		
Column Title	Function	Legal Values
Adapter	Adapter name	MBP

2.2.3 Client Side Nodes

Section Title		
Nodes		
Column Title	Function	Legal Values
Node_Name	Provide name for node	Up to 32 alphanumeric characters
Route	Modbus Plus Path	Note 1*
Protocol	Specify protocol used	Modbus Plus

Note 1: Refer to the Modicon user guide 890 USE 102 00 for details on path establishment. In general, the first number is the Destination BM85 MAC address, the second number represents the internal path, and the third number is the destination node. This varies if the BM85 is not connected to the FieldServer.

2.2.4 Client Side Map Descriptors

Section Title		
Map_Descriptors		
Column Title	Function	Legal Values
Map_Descriptor_Name	Name of this Map Descriptor	Up to 32 alphanumeric characters
Data_Array_Name	Name of Data Array where data is to be stored in the FieldServer	One of the Data Array names from "Data Array" section above
Data_Array_Offset	Starting location in Data Array	0 to maximum specified in "Data Array" section above
Function	Function of Client Map Descriptor	RDBC
Node_Name	Name of Node to fetch data from	One of the node names specified in "Client Node Descriptor" above
Address	Starting address of read block	40001, 30001, etc
Length	Number of items to read	1 - 125
Data_Array_Low_Scale*	Scaling zero in Data Array	-32767 to 32767, default 0
Data_Array_High_Scale*	Scaling max in Data Array	-32767 to 32767, default 100
Node_Low_Scale*	Scaling zero in Connected Node	-32767 to 32767, default 0
Node_High_Scale*	Scaling max in Connected Node	-32767 to 32767, default 100

3. FieldServer as a Modbus Plus Server

3.1 Hardware Connections

Refer to the Drawings in section 4

Configure the Modbus Plus client according to manufacturer's instructions (refer to section below on examples of FieldServer setup for typical clients)

3.2 Configuration File Structure

Refer to section 4.1 of the Instruction Manual for a description of the operation principle of the FieldServer. The following tables describe parameters that need to be filled out in the configuration file. For convenience, a few example parameters already exist in the supplied PRIMSERV.CSV and SECDSERV.CSV files.

Note that * indicates an optional parameter, with the bold legal value being the default.

3.2.1 Data Arrays

Section Title		
Data_Arrays		
Column Title	Function	Legal Values
Data_Array_Name	Provide name for Data Array	Up to 15 alphanumeric characters
Data_Format	Provides data format	INT16, INT32, BIT, FLOAT
Data_Array_Length	Number of Data Objects	1-10,000

3.2.2 Server Side Connections

Section Title		
Connections		
Column Title	Function	Legal Values
Adapter	Adapter name	MBP
Internal Path	Modbus Plus data path	1 - 8

3.2.3 Server Side Nodes

Section Title		
Nodes		
Column Title	Function	Legal Values
Node_Name	Provide name for node	Up to 32 alphanumeric characters
Node_ID	Node ID of virtual server node	1 – 255
Protocol	Specify protocol used	Modbus Plus

3.2.4 Server Side Map Descriptors

Section Title		
Map_Descriptors		
Column Title	Function	Legal Values
Map_Descriptor_Name	Name of this Map Descriptor	Up to 32 alphanumeric characters
Data_Array_Name	Name of Data Array where data is to be stored in the FieldServer	One of the Data Array names from "Data Array" section above
Data_Array_Offset	Starting location in Data Array	0 to maximum specified in "Data Array" section above
Function	Function of Client Map Descriptor	Server
Node_Name	Name of Node to fetch data from	One of the node names specified in "Client Node Descriptor" above
Address	Starting address of read block	40001, 30001, etc
Length	Number of items to read	1 - 125
Data_Array_Low_Scale*	Scaling zero in Data Array	-32767 to 32767, default 0
Data_Array_High_Scale*	Scaling max in Data Array	-32767 to 32767, default 100
Node_Low_Scale*	Scaling zero in Connected Node	-32767 to 32767, default 0
Node_High_Scale*	Scaling max in Connected Node	-32767 to 32767, default 100

3.3 Examples of FieldServer setup for typical clients

MSTR Example: Modbus Plus Node

This example shows a Modicon Modsoft screen for an MSTR function in a Modbus Plus node. It writes one register of data to a virtual node in the FieldServer.

- H** The MSTR Function Code specifies a Write operation
- H** One register of data is to be transferred
- H** The destination register is 40000 (addressed as register 1).
- H** The FieldServer's node address is 1. Note that the decimal value 1025 equals 0401 hexadecimal, addressing a Modbus Plus Network Option Module (NOM) in backplane slot 04 and a node at address 01.
- H** The destination index is 28. The FieldServer will forward the message to the TCP node whose IP address is in this location in the FieldServer's TCP Mapping table.

MSTR in Modbus Plus Node

