Driver Manual

(Supplement to the FieldServer Instruction Manual)

FS-8700-24 ControlNet

APPLICABILITY & EFFECTIVITY

Effective for all systems manufactured after May 1, 2001

Driver Version:	**1.06**
Document Revision:	**7**

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1. ControlNet Description

The ControlNet driver allows the FieldServer to transfer data to and from devices using ControlNet protocol. The SST 5136-CN-ISA Communications Adapter card is included with the FieldServer. The FieldServer can communicate using un-scheduled transfers with PCCC messages embedded in the ControlNet messages.

When the FieldServer originates PCCC messages to communicate with PLC5 controllers, it uses connected messages. This provides fast reliable communication to the other node. When another device originates PCCC messaging, the FieldServer will emulate a PLC5 controller supporting connected or unconnected messages to files N7 through to N32..

2. Driver Scope of Supply

2.1. Supplied by FieldServer Technologies for this driver

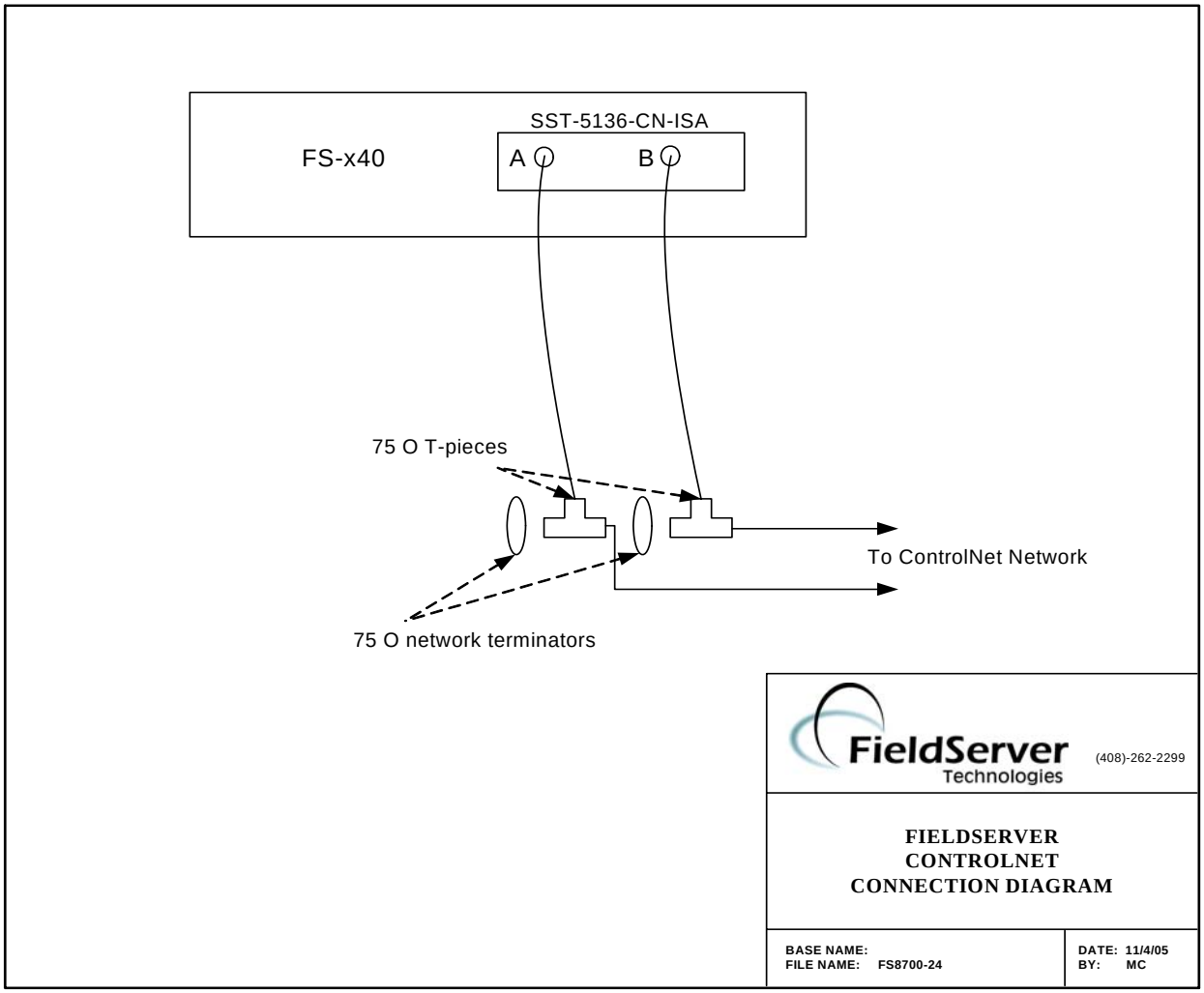
FieldServer Technologies PART #	Description
SST 5136-CN-ISA	Communication Adapter - complete with BNC Tee Connector
	ControlNet Tools CD
	ControlNet Module User's Guide (Version 1.00)
	CNF2BSS.EXE utility
FS-8700-24	Driver Manual.

2.2. Provided by the Supplier of 3rd Party Equipment

PART #	DESCRIPTION
	ControlNet Network with cables and terminators

3. Hardware Connections

The FieldServer is connected to the ControlNet Network with 75 ohm coaxial cable. If the ControlNet is not wired in redundant mode, ensure that all connectors are connected to the COM A port. A 75 ohm terminator must be placed at either end of the ControlNet Bus.



3.1. Connection Notes

Before connecting the FieldServer to the network, the FieldServer MacId should be set. The MacId is the term used for a ControlNet station address. The ControlNet MacId of the FieldServer is set to the System_Station_Address specified in the FieldServer configuration file.

Section Title		
Bridge		
Column Title	**Function**	**Legal Values**
System_Station_Address	Provide MacId for the FieldServer	1-99

Example

```
//   .Bridge Information

Bridge
System_Station_Address
5
```

4. Configuring the FieldServer for Unscheduled ControlNet Access with PCCC messaging

For a detailed discussion on FieldServer configuration, please refer to the FieldServer Configuration Manual. The information that follows describes how to expand upon the factory defaults provided in the configuration files included with the FieldServer (See ".csv" sample files provided with the FieldServer).

This section documents and describes the parameters necessary for configuring the FieldServer to communicate with ControlNet devices using PCCC messaging. This transfer mechanism would be used to communicate between the FieldServer and PLC-5 controllers.

The configuration file tells the FieldServer about its interfaces, and the routing of data required. In order to enable the FieldServer for ControlNet communications, the driver independent FieldServer buffers need to be declared in the "Data Arrays" section, the FieldServer virtual node(s) needs to be declared in the "Nodes" section, and the data to be transferred needs to be mapped in the "Unscheduled Map Descriptors" section. Details on how to do this can be found below.

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

4.1. Server Side Connection Descriptors

Section Title		
Connections		
Column Title	**Function**	**Legal Values**
Adapter	Adapter Name	ControlNet
Protocol	Specify protocol used	ControlNet

Example

```
// Connections

Connections
Adapter,                    Protocol
ControlNet,                 ControlNet
```

4.2. ControlNet Node Descriptors

This section of the configuration file defines the different MacIds of the ControlNet devices on the network. If you want to transfer the data on the local ControlNet card to the data-arrays on your FieldServer, typically used when acting as a Server, define a Node_ID with the same value as the System_Station_Address.

Section Title		
Nodes		
Column Title	**Function**	**Legal Values**
Node_Name	Provide name for node	Up to 32 alphanumeric characters
Node_ID	ControlNet MacId of the node to communicate with	1-99
Protocol	Specify protocol used	ControlNet

Example

```
//  ControlNet Nodes

Nodes
Node_Name,          Node_ID,    Protocol
PLC_1,              1,          ControlNet
Local,              5,          ControlNet
```

4.3. Unscheduled Map Descriptors using PCCC messaging

Maintained on the SST 5136-CN-ISA card are 32 integer files (N7-N39) that can be read or written to by other devices on the ControlNet network using PCCC messaging. Client style Map Descriptors are used to transfer data to or from the file buffers on the card to the Data Arrays on the FieldServer.

4.3.1. FieldServer Specific Map Descriptor Parameters

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	One of the Data Array names from “Data Array” section above
Data_Array_Offset	Starting offset in Data Array	0 to maximum specified in “Data Array” section above
Function	Function of Client Map Descriptor	RDBC, WRBC, WRBX

4.3.2. Driver Specific Map Descriptor Parameters

Column Title	Function	Legal Values
Node_Name	Name of Node to communicate with	One of the node names specified in "Node Descriptor" above
Block_Number	PLC File Number	For local node 7-39 For remote node 1-999
PCCC_Type	Type of PCCC data to be transferred over ControlNet	UINT, (SINT, INT) (REAL, FLOAT) (BOOL, BIT, FLAG) Equal types are shown in brackets.
Address	Starting address within file	0 – 999 (INT, SINT) 0 – 499 (REAL, FLOAT) 0 – 15999 (BOOL, BIT, FLAG)
Length	Length of Map Descriptor	1 – 249 (INT, SINT) 1 – 124 (REAL, FLOAT) 1 – 3984 (BOOL, BIT, FLAG)

Note the number of bytes per PCCC_Type:
SINT, INT = 2 bytes, REAL, FLOAT = 4 bytes, BOOL, BIT, FLAG = 8 bits per byte

Each PLC file is 2000 bytes long and therefore the address values will range from zero to a maximum value as indicated. The start address is specified in increments of the basic data type specified under PCCC_Type.

The message buffers in the ControlNet card are each 498 bytes long and only one message buffer can be allocated to a Map Descriptor. The Map Descriptor lengths are therefore limited to maximum values as indicated when taking the data type byte lengths into account.

4.3.3. Timing Parameters

Column Title	Function	Legal Values
Scan_Interval	Rate at which data is polled	>0.1s

4.3.4. Unscheduled Map Descriptor Example

The following Map Descriptor will read data from a PLC5.

```
//    Server Side Map Descriptors

Map Descriptors
Map_Descriptor_Name,    Data_Array_Name,    Data_Array_Offset,    Function,    Node_Name,    Block_Number,    PCCC_Type,    Address,    Length
A1,                     DA_AI3,             0,                    RDBC,        PLC5,         7,               SINT,         33,         5
```

Active Map Descriptor polls the PLC regularly (change to WRBC to write)

Remote Node name of the PLC to poll

PLC 5 file number to read (N7:33)

Offset into the file (N7:33)

The following Map Descriptor will send data to the card to allow other nodes to read the data contained in the FieldServer's Data Array.

```
//    Server Side Map Descriptors

Map Descriptors
Map_Descriptor_Name,    Data_Array_Name,    Data_Array_Offset,    Function,    Node_Name,    Block_Number,    PCCC_Type,    Address,    Length
A1,                     DA_AI3,             0,                    WRBC,        Local,        7,               SINT,         125,        5
```

Active Map Descriptor transfers the data to or from the card (change to RDBC to read data written by other nodes)

Node name whose MacId matches the System_Station_Address

PLC 5 emulated file number (7-39)

Offset into the file (N7:125)

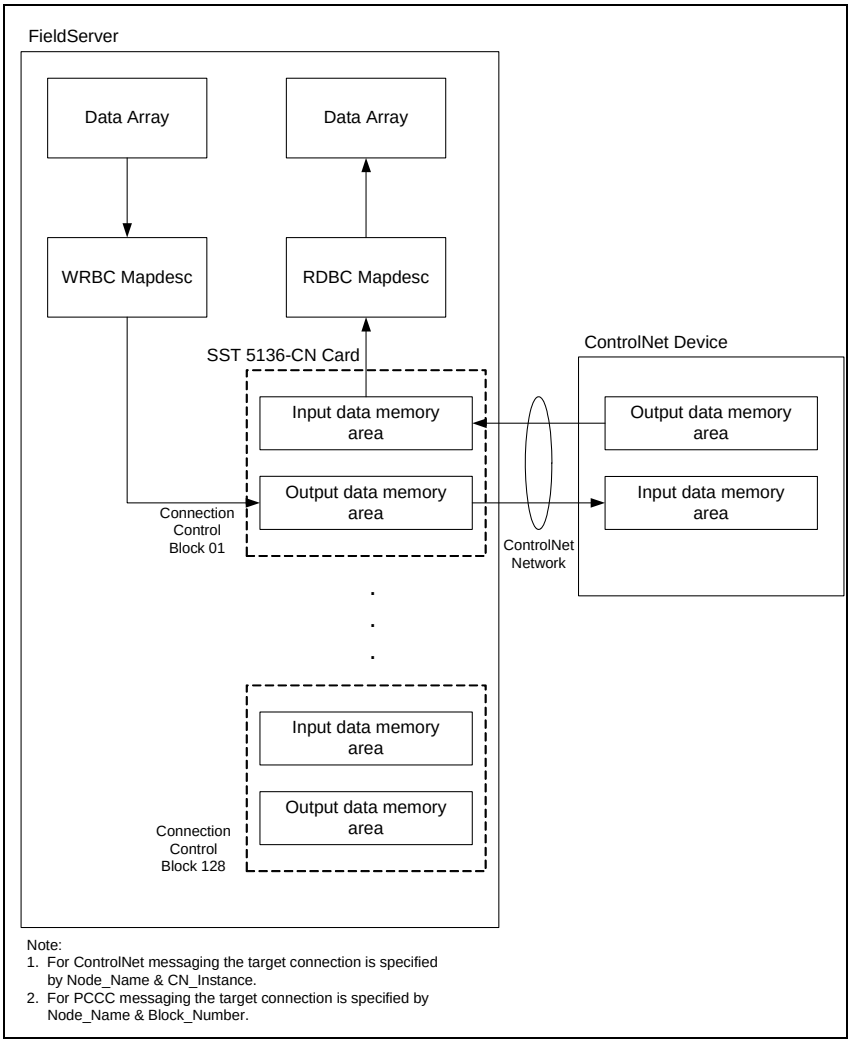
Appendix A. Advanced Topics

Appendix A.1. Write-throughs

Some FieldServer drivers support “write-throughs”. This is the ability of a Read Map Descriptor to automatically create a temporary write Map Descriptor to update the value of an external R/W (Read or Write) memory location. Since the ControlNet card contains separate Read-Only (Output) and Write-Only (Input) Buffers, write-throughs are not supported on ControlNet messaging, but are supported for PCCC messaging. This is because PCCC messages are embedded within ControlNet messages allowing for the receiving device to process the embedded write message.

Appendix A.2. Map Descriptor functions

The diagram below explains the difference between the use of WRBC (Write Block Continuous) and RDBC (Read Block Continuous) Map Descriptors. Note that WRBC Map Descriptors write data from the FieldServer’s Data Arrays into the output data memory area of the card whereas RDBC Map Descriptors place data from the card’s input data memory area into the FieldServer’s Data Arrays. The IO data memory areas are kept in RAM on the card and are defined by Connection Control Blocks on the card.



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