

Driver Manual

FS-8700-128 Safetran SCS-128

APPLICABILITY & EFFECTIVITY

Effective for all systems manufactured after June 2023.



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fieldserver

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1 Description

The Safetran-SCS-128 driver allows the transfer of data to and from devices over RS-232 SCS-128 protocol. Vital Hamon Logic Controller (VHLC) supports SCS-128 protocol. SCS-128 80938-098 Rev A04 is the basis of the Safetran-SCS-128 driver. The FieldServer can act as a Client or Server.

Max Nodes Supported

FieldServer Mode	Nodes	Comments
Client	1	Only 1 virtual client per port allowed on multidrop systems, which can poll 127 Server devices
Server	32	This is a protocol limit; maximum devices can be polled by client

2 Driver Scope of Supply

2.1 Supplied by MSA Safety

Part #	Description
	Driver Manual

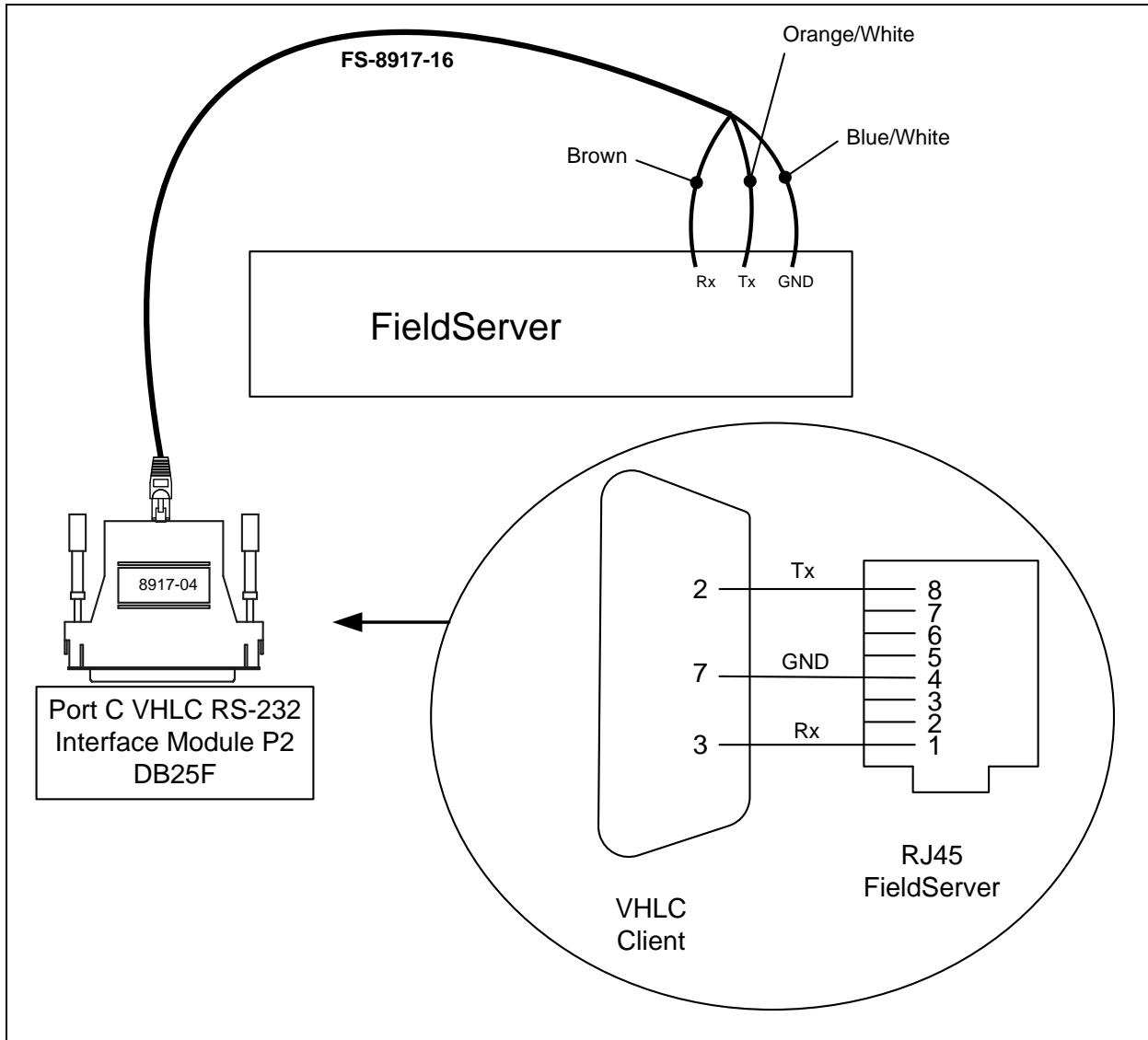
2.2 Provided by the Supplier of 3rd Party Equipment

2.2.1 Required 3rd Party Hardware

If the FieldServer is configured as a server, then the SCS-128 client must be configured to use 'recall' for indication status polling.

3 Hardware Connections

The FieldServer is connected to the VHLC as shown in connection drawing.



4 Client Side Configuration

For detailed information on FieldServer configuration, 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 a Safetran-SCS-128 Server.

4.1 Data Arrays/Descriptors

The configuration file tells the FieldServer about its interfaces, and the routing of data required. In order to enable the FieldServer for Safetran-SCS-128 communications, the driver independent FieldServer buffers need to be declared in the “Data Arrays” section, the destination device addresses need to be declared in the “Client Side Nodes” section, and the data required from the Servers needs to be mapped in the “Client Side Map Descriptors” section. Details on how to do this can be found below.

NOTE: In the tables below, * indicates an optional parameter, with the bold legal value as default.

Section Title		
Data_Arrays		
Column Title	Function	Legal Values
Data_Array_Name	Provide name for Data Array.	Up to 15 alphanumeric characters
Data_Array_Format	Provide data format. Each Data Array can only take on one format.	Float, Bit, Byte, Uint16, Uint32, Sint16, Sint32
Data_Array_Length	Number of Data Objects. Must be larger than the data storage area required by the Map Descriptors for the data being placed in this array.	1-10000

Example

```
// Data Arrays

Data_Arrays
Data_Array_Name           , Data_Array_Format           , Data_Array_Length
DA_DI_01                  , Bit                          , 256
DA_DO_01                  , Bit                          , 256
DA_8I_01                  , Byte                         , 32
DA_8O_01                  , Byte                         , 32
DA_16I_01                 , Uint16                       , 16
DA_16O_01                 , Uint16                       , 16
DA_32I_01                 , Uint32                       , 8
DA_32O_01                 , Uint32                       , 8
```

4.1 Client Side Connection Descriptions

Section Title		
Connections		
Column Title	Function	Legal Values
Port	Specify which port the device is connected to the FieldServer.	R1 & R2 ¹
Protocol	Specify protocol used.	SCS-128, SCS128, Safetran SCS-128
Baud*	Specify baud rate.	75, 150, 300 ,600, 1200, 2400, 9600 (Vendor limitation)
Parity*	Specify parity.	Even (Vendor limitation)
Data_Bits*	Specify data bits.	8 (Vendor limitation)
Stop_Bits*	Specify stop bits.	1 (Vendor limitation)
Poll_Delay*	Time between internal polls.	0-32000 seconds, 0.05 seconds

Example

```
// Client Side Connections

Connections
Port      , Protocol      , Baud      , Parity      , Poll_Delay
R1        , SCS-128      , 9600      , Even        , 0.100s
```

4.2 Client Side Node Descriptors

Section Title		
Nodes		
Column Title	Function	Legal Values
Node_Name	Provide name for Node.	Up to 32 alphanumeric characters
Node_ID	SCS-128 station address of physical Server Node.	1-127
Protocol	Specify protocol used.	SCS-128 SCS128 Safetran SCS-128
Connection	Specify which port the device is connected to the FieldServer.	R1 & R21
SCS128_Ack*	If ON, Ack will be sent to Server upon receipt of every indication response.	OFF, ON

Example

```
// Client Side Nodes

Nodes
Node_Name , Node_ID , Protocol , Connection , SCS128_Ack
NODE_A    , 1      , SCS-128 , R1         , OFF
```

¹ Not all ports shown are necessarily supported by the hardware. Consult the appropriate Instruction manual for details of the ports available on specific hardware.

4.3 Client Side Map Descriptors

4.3.1 FieldServer Related 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 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, Wrbc, Wrbx

4.3.2 Driver Related Map Descriptor Parameters

Column Title	Function	Legal Values
Node_Name	Name of Node to fetch data from.	One of the Node names specified in "Client Node Descriptor" above
SCS128_Poll_Type*	<p>Specify Poll_type:</p> <p>'Recall' or 2 always poll for current indications.</p> <p>'Poll' or 1 request for indications if changed.</p> <p>'Controls' or 3 writes controls to target device.</p> <p>'Cutoff' or 5 or 6 send 'cutoff' command to target device.</p>	<p>Read Map Descriptors:</p> <p>Recall, 2, Poll, 1</p> <p>Write Map Descriptors:</p> <p>Controls, 3</p> <p>Cutoff, 5, 6</p>
Data_Type*	<p>'Flag' - each byte of Indication statuses will be stored in 8 consecutive locations in the Data Array. On write; one Control byte will be composed from 8 consecutive locations.</p> <p>'Byte' - each byte of Indication statuses will be stored as an 8 Bit Integer at the specified location. On Write; one Control byte will be composed from a single location.</p> <p>'Register' - two bytes of Indication statuses will be stored as a 16 Bit integer at the specified location. On Write; two Control bytes will be composed from a single location.</p> <p>'32-Bit_Reg' four bytes of Indication statuses will be stored as 32 Bit integers at the specified location. On Write, four Control bytes will be composed from a single location. Refer to Section 6.</p>	Flag, Byte, Register, 32-Bit_Reg
Length*	<p>Length of Map Descriptor:</p> <p>Number of indications to store or number of controls to write as per Data_Type.</p>	<p>Flag: 8-256, 16</p> <p>Byte: 1-32, 2</p> <p>Register: 1-16, 1</p> <p>32-Bit_Reg: 1-8, 1</p>

4.3.3 Timing Parameters

Column Title	Function	Legal Values
Scan_Interval	Rate at which data is polled	≥0.001s

4.4 Map Descriptor Examples

4.4.1 Read Indications

The following Map Descriptors will read 256 indication statuses from physical Server Node_A (described in Client Side Node Descriptors section) after every 1 second. One such Map Descriptor is required for each Node.

```
// Client Side Map Descriptors
Map_Descriptors
Map_Descriptor_Name ,Data_Array_Name ,Data_Array_Offset ,Function ,Node_name ,Data_Type ,SCS128_Poll_Type ,Length ,Scan_Interval
CMD_DI1 , DA_DI , 0 , RDBC , Node_A , Flag , Recall , 256 , 1
CMD_DI2 , DA_8I_01 , 0 , RDBC , Node_A , Byte , Poll , 32 , 1
CMD_DI3 , DA_16I_01 , 0 , RDBC , Node_A , Register , 2 , 16 , 1
CMD_DI4 , DA_32I_01 , 0 , RDBC , Node_A , 32-Bit_Reg , 1 , 8 , 1
```

Example comments:

- Data_Array_Name – Name of one of the Data Arraya defined in the Data_Array section. Indication statuses will be stored in this Data Array.
- Data_Array_Offset – Starting offset in Data Array to hold 1st indication status.
- Node_Name – One of the Nodes declared in Node Section. Indications will be read from the station address belonging to this Node.
- Length – Number of consecutive locations in the Data array to be used for storing data from the Server.
- Scan_Interval – Frequency (in seconds) to read Indication Statuses.

4.4.2 Write Controls

The following Map Descriptor will write 256 controls to physical Server Node_A (described in Client Side Node Descriptors section) whenever any of the control statuses changes/updates. One such Map Descriptor is required per Node.

```
// Client Side Map Descriptors
Map_Descriptors
Map_Descriptor_Name ,Data_Array_Name ,Data_Array_Offset ,Function ,Node_name ,Data_Type ,Length ,SCS128_Poll_Type
CMD_DO1 , DA_DO_01 , 0 , Wrbx , Node_A , Flag , 256 , Controls
CMD_DO2 , DA_8O_01 , 0 , Wrbx , Node_A , Byte , 32 , Controls
CMD_DO3 , DA_16O_01 , 0 , Wrbx , Node_A , Register , 16 , Controls
CMD_DO4 , DA_32O_01 , 0 , Wrbx , Node_A , 32-Bit_Reg , 8 , Controls
```

Example comments:

- Data_Array_Name – Name of one of the Data Arrays defined in Data_Array section. This Data Array holds control statuses to be written to other devices.
 - Data_Array_Offset – Starting offset in the Data Array which holds the 1st control status.
 - Function – Wrbx: send write command to the Server when the associated Controls updates or changes. To write continuously use Wrbc as function and add a Scan_Interval parameter to configure how often to write.
 - Node_Name – One of the Nodes declared in the Node Section. Indications will read from the station address belonging to this Node.
- Length – Number of consecutive locations in the Data array to use when issuing the Write command.

5 Server Side Configuration

For detailed information on FieldServer configuration, 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 a Safetran-SCS-128 Client. When configured as a Server, the FieldServer is unable to keep synchronism with other Servers and Clients on the network if it is being polled using ‘Poll’ Function (i.e. single byte message). Therefore, the FieldServer must be polled with ‘Recall’ request for indication statuses. The FieldServer will always respond with the current statuses.

The configuration file tells the FieldServer about its interfaces, and the routing of data required. In order to enable the FieldServer for Safetran-SCS-128 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 “Server Side Nodes” section, and the data to be provided to the clients needs to be mapped in the “Server Side Map Descriptors” section. Details on how to do this can be found below.

NOTE: In the tables below, * indicates an optional parameter with the bold legal value as default.

5.1 Server Side Connection Parameters

Section Title		
Connections		
Column Title	Function	Legal Values
Port	Specify which port the device is connected to the FieldServer.	P1-P2, R1-R2 ²
Protocol	Specify protocol used.	SCS-128, SCS128, Safetran SCS-128
Baud*	Specify baud rate.	75, 150, 300 ,600, 1200, 2400, 9600 (Vendor limitation)
Parity*	Specify parity.	Even (Vendor limitation)
Data_Bits*	Specify data bits.	8 (Vendor limitation)
Stop_Bits*	Specify stop bits.	1 (Vendor limitation)
Server_Hold_Timeout	Specifies time FieldServer will reserve Server side connection while waiting for the Client side to update data in Data_Array (if necessary).	>1.0s

Example

```
// Server Side Connections
Connections
Port          , Protocol  , Baud   , Parity
R1            , SCS-128 , 9600   , None
```

² Not all ports shown are necessarily supported by the hardware. Consult the appropriate Instruction manual for details of the ports available on specific hardware.

5.2 Server Side Node Parameters

Section Title		
Nodes		
Column Title	Function	Legal Values
Node_Name	Provide name for node.	Up to 32 alphanumeric characters
Node_ID	Modbus station address of physical Server Node.	1-255
Protocol	Specify protocol used.	SCS-128, SCS128, Safetran SCS-128
Server_Hold_Timeout	Specifies time FieldServer will reserve Server side connection while waiting for the Client side to update data in Data_Array (if necessary).	>1.0s

Example

```
// Server Side Nodes
Nodes
Node_Name      , Node_ID  , Protocol
PLC 1          , 1       , SCS-128
```

5.3 Server Side Map Descriptor Parameters

5.3.1 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 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 (Data_Array_Length-1) as specified in "Data_Array" section
Function	Function of Server Map Descriptor.	Server
Server_Hold_Timeout*	Specifies time FieldServer will reserve Server side connection while waiting for the Client side to update data in Data_Array (if necessary) .	>1.0s

5.3.2 Driver Specific Map Descriptor Parameters

Column Title	Function	Legal Values
Node_Name	Name of Node to which data has to be sent.	One of the Node names specified in the Server "Node" section above
SCS128_Poll_Type	Specify type of requests to handle from client: 'Indications' Handle all read requests from client. 'Controls' Handle all write requests from client.	Indications, Controls
Data_Type	<p>'Flag' each byte of Controls will be stored in 8 consecutive locations in the Data Array. While responding Indications; status byte will be composed with data from 8 consecutive locations.</p> <p>'Byte' each byte of Controls will be stored as 8 Bit Integer at specified location. While responding Indications; status byte will be composed with data from single location.</p> <p>'Register' every two bytes of Controls will be stored as 16 Bit integer at specified location. While responding indications; two Control bytes will be composed with data from single location.</p> <p>'32-Bit_Reg' every four Control bytes will be stored as 32 Bit integer at specified location. While responding indications; four Control bytes will be composed with data from single location. Refer to Section 6.</p>	Flag, Byte, Register, 32-Bit_Reg
Length	Length of Map Descriptor: Number of indications to serve or number of controls to store as per Data_Type.	Flag: 8-256, 16 Byte: 1-32, 2 Register: 1-16, 1 32-Bit_Reg: 1-8, 1
Address	Irrelevant parameter for this driver.	

5.4 Map Descriptor Example

The following Map Descriptors will Serve 256 indication statuses emulating Server Node_A (described in Client Side Node Descriptors sections). One such Map Descriptor is required for each Node.

```
// Server Side Map Descriptors

Map_Descriptors
Map_Descriptor_Name , Data_Array_Name , Data_Array_Offset , Function , Node_Name , Data_Type , SCS128_Poll_Type , Length , Scada_Hold_Timeout
SMD_DI1 , DA_DI , 0 , Server , Node_A , Flag , Indications , 256 , 4
SMD_DI2 , DA_8I_01 , 0 , Server , Node_A , Byte , Indications , 32 , 4
SMD_DI3 , DA_16I_01 , 0 , Server , Node_A , Register , Indications , 16 , 4
SMD_DI4 , DA_32I_01 , 0 , Server , Node_A , 32-Bit_Reg , Indications , 8 , 4
SMD_DO1 , DA_DO , 0 , Server , Node_A , Flag , Controls , 256 , 4
SMD_DO2 , DA_8O_01 , 0 , Server , Node_A , Byte , Controls , 32 , 4
SMD_DO3 , DA_16O_01 , 0 , Server , Node_A , Register , Controls , 16 , 4
SMD_DO4 , DA_32O_01 , 0 , Server , Node_A , 32-Bit_Reg , Controls , 8 , 4
```

Example comments:

- Data_Array_Name – Name of one of the Data Arrays defined in the Data_Array section. Indications statuses will be served to clients from this Data Array.
- Node_Name – One of the Nodes declared in the Node Section. The Node holds the Node_Id.
- Data_Type – See Driver Specific Map Descriptor Parameters.
- SCS128_Poll_Type – Specify what type of requests from client should be processed.
- Length – Number of indication statuses Node will have. It also depends upon Data_Type. All example lengths have the same meaning.

Flag - 1 bit,

Byte - 8 bits,

Register - 16 bits,

32-Bit_Reg - 32 bits.

6 Advanced Topics

6.1 Data Format

- LSB bit in Indication/Control Byte is the 1st status/control value.
- Suppose Data_Type is 'Byte' and only the 1st and 2nd indication status values are 1 (out of 8 statuses), all others being zero, Driver will store a numeric value of 3 in Data Array.
- Suppose Data_Type is 'Register' and only the 1st and 9th indication statuses values are 1 (out of 16 statuses), all others being zero, Driver will store numeric value of 257 in the Data Array.
- Suppose Data_Type is '32-Bit_Reg' and only the 1st 9th and 17th indication statuses values are 1 (out of 32 statuses), all others being zero, Driver will store the numeric value 65793 in the Data Array.