A Sierra Monitor Company

Driver Manual
(Supplement to the FieldServer Instruction Manual)

FS-8700-102 Honeywell Zellweger IR-148 Manual

APPLICABILITY & EFFECTIVITY

Effective for all systems manufactured after May 1, 2001

Driver Version:	**1.01**
Document Revision:	**9**

TABLE OF CONTENTS

1. Honeywell Zellweger IR-148 Description

The Honeywell Infrared Gas Monitor (Model IR-148) detects solvents and gases such as HCFCs, HFCs and PFCs. IR-148 can have 1, 4 or 8 sampling points. This InfraTox driver reports gas values, alarms and troubles from IR-148 having either 1 or 8 sampling points.
The serial driver can emulate a client or a server. The FieldServer and IR-148 device are connected using a RS-485 network.

As a Client: The driver listens passively for messages from the Honeywell Zellweger IR-148 t and stores data extracted from the messages. The driver cannot poll the IR-148 device for data. The driver records some additional data age information (which is stored in the FieldServer's Data Arrays) because messages do not always contain information about all sensors and depending on the IR-148 operational mode (e.g. Locked mode.), may never contain information other than for one sensor.

As a Server: The Server side of this driver has been developed primarily to test the Client side driver as part of FieldServer's QA program. The driver sends messages reporting the state of the samples. The Server driver can also be locked to report the status/value of one particular sample channel.

It is possible to connect two Honeywell Zellweger units (IR-148) on one RS-485 network provided that one unit is configured as a single point unit (IR-148 1 point) and the other as an 8 point unit (IR-148 8 point). At this stage only one device with 8 points has been tested.

To allow for the possibility that the device is connected on a RS-485 network with other devices (such as the relay module option) messages that are not 49 bytes long and which do not begin with 0xB1 will be ignored. The Driver will, however, provide statistics for the ignored as well as the processed messages.

To see supported messages and the way the Driver stores Data, refer to Appendix A.2

Max Nodes Supported

FieldServer Mode	Nodes	Comments
Client	2	Tested only 1 node (IR-148 8 Point) per port
Server	2	Developed to test Client side of the Driver.

2. Driver Scope of Supply

2.1. Supplied by FieldServer Technologies for this driver

FieldServer Technologies PART #	Description
FS-8917-16	RJ45 to terminal connector cable.
FS-8700-102	Driver Manual.

2.2. Provided by the Supplier of 3rd Party Equipment

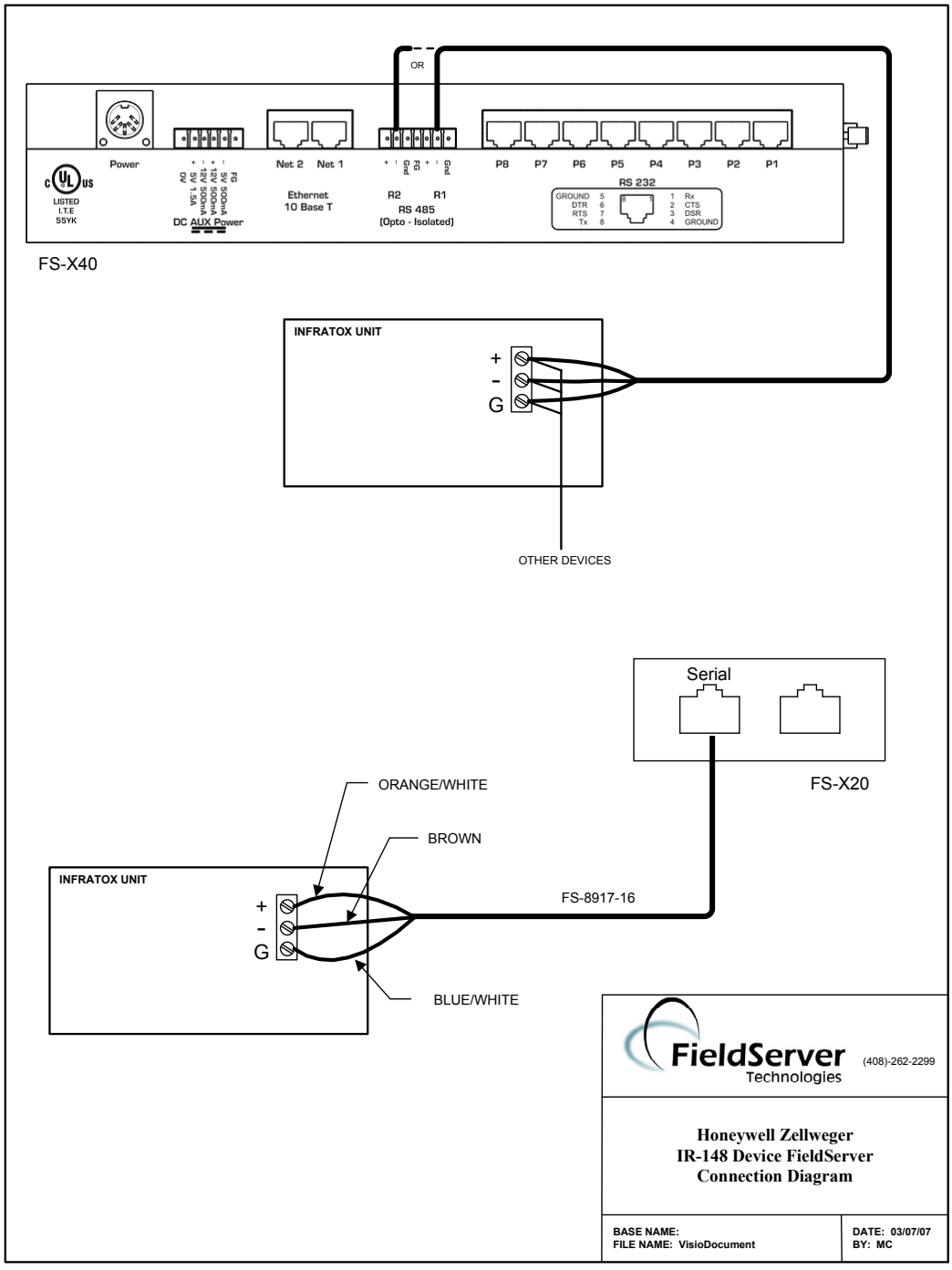
2.2.1. Required 3rd Party Hardware

Part #	Description
NONE	

3. Hardware Connections

The FieldServer is connected to the Honeywell Zellweger IR-148 Device as shown in connection drawing.

Configure the device according to manufacturer's instructions



*Other devices must not transmit Honeywell Zellweger IR-148 49 byte messages

4. Configuring the FieldServer as a Honeywell Zellweger IR-148 Client

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 a Honeywell Zellweger IR-148 Server having one or eight sensors.

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 Honeywell Zellweger IR-148 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 that in the tables, * indicates an optional parameter, with the bold legal value being the 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, UInt16, SInt16, Packed_Bit, Byte, Packed_Byte, Swapped_Byte
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.	1-10,000

Example

```
// Data Arrays
Data_Arrays
Data_Array_Name,    Data_Format,    Data_Array_Length
DA_R1,              Float,          100
DA_R2,              Float,          100
DA_CTL_R1,          Uint16,         1
DA_CTL_R2,          Uint16,         1
```

4.2. Client Side Connection Descriptors

Section Title
Connections

Column Title	Function	Legal Values
Port	Specify which port the device is connected to the FieldServer	P1-P8 (with 232/485 converter), R1-R2[1]
Protocol	Specify protocol used	InfraTox or Infra-Tox
Baud*	Specify baud rate	19200 (Vendor limitation)
Parity*	Specify parity	**None** (Vendor limitation)
Data_Bits*	Specify data bits	**8** (Vendor limitation)
Stop_Bits*	Specify stop bits	**1**
Handshaking*	Specify hardware handshaking	**None** (Vendor limitation)

Example

```
// Client Side Connections

Connections
Port,       Protocol,    Baud,    Parity,    Stop_Bits
R1,         InfraTox,    19200,   None,      1
```

4.3. 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	**Irrelevant** for this driver as long as only one Node is connected. Otherwise the Node-ID should be the number of points/sensors for which the Zellweger unit is configured. A unique Node_ID is recommended for each Zellweger Unit as it may be useful in exposing Node status information	0-255
Protocol	Specify protocol used	InfraTox, Infra-Tox.
Port	Specify at which port the device is connected to the FieldServer Ports P1-P8 can be with 232/485 converter.	P1-P8 (with 232/485 converter), R1-R2[1]

[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.

Example

```
//  Client Side Nodes

Nodes
Node_Name,          Node_ID,          Protocol,          Port
DEV1,               1,                InfraTox,          R1
```

4.4. Client Side Map Descriptors

4.4.1. 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.	Passive_Client

4.4.2. 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
Length	Length of Map Descriptor	0-Maximum of Data Array length.
Extended_Storage*	Expand Storage per point Refer to 0.	'YES' every thing else considered as 'NO'

4.4.3. Map Descriptor Example.

With the following Map Descriptor, the Driver will capture and store data for all the all (8) sensors for Node (DEV1). For detailed information about the data storage see 0. Driver will capture Gas value, Alarms, Trouble, Lock and Blank messages.

```
//  Client Side Map Descriptors

Map Descriptor
Map_Descriptor_Name,    Data_Array_Name,    Data_Array_Offset,    Function,          Node_Name    Length
CMD1,                   DA_R1,              0,                    Passive Client     DEV1,        100
```

One of the Data Arrays declared in the Data_Array section 4.1.
The Data from the Node (Dev1) will be stored in this Data Array.

The Driver stores Data from device (DEV1) with this memory location as the starting point and onward, in Data Array DA_R1.

This means that the FieldServer cannot poll the target device but monitors the device. Extracted data from incoming messages are stored in Data Array DA_R1

This is the logical name of the target device having the parameters defined in section 4.3.

Length forces driver to reserve memory space for this number of elements, starting from memory location defined as Data_Array_Offset.
Length must be long enough to store all data from Node (Dev1)

5. Configuring the FieldServer as a Honeywell Zellweger IR-148 Server

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 report sensor data to Honeywell Zellweger IR-148 Client. As a Server this driver sends Gas value, Alarm, Trouble and Lock point messages. The driver can be locked to send data for only one particular sensor.

The configuration file tells the FieldServer about its interfaces, and the routing of data required. In order to enable the FieldServer for Honeywell Zellweger IR-148 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 that in the tables, * indicates an optional parameter, with the bold legal value being the default.

5.1. Server Side Connection Descriptors

Section Title		
Connections		
Column Title	**Function**	**Legal Values**
Port	Specify which port the device is connected to the FieldServer	P1-P8 (with 232/485 converter), R1-R2[2]
Protocol	Specify protocol used	InfraTox or Infra-Tox
Baud*	Specify baud rate	110 – 115200, standard baud rates only **9600**
Parity*	Specify parity	Even, Odd, **None,** Mark, Space
Data_Bits*	Specify data bits	7, **8**
Stop_Bits*	Specify stop bits	**1**
Handshaking*	Specify hardware handshaking	RTS, RTS/CTS, **None**

Example

```
// Server Side Connections

Connections
Port,          Protocol,      Baud,      Parity,      Data_Bits
R1,            InfraTox,      19200,     None,        8
```

[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 Descriptors

Section Title
Nodes

Column Title	Function	Legal Values
Node_Name	Provide name for node	Up to 32 alphanumeric characters
Node_ID	Commonly used parameter but **irrelevant** for this driver as Protocol is node-less. A unique Node_ID is, however, recommended for each Honeywell Zellweger IR-148 Unit as it may be useful in exposing Node status information	1-255
Protocol	Specify protocol used	InfraTox, Infra-Tox.
Port	Specify at which port the device is connected to the FieldServer Ports P1-P8 can be used with 232/485 converter.	P1-P8 (with 232/485 converter), R1-R2

Example

```
// Server Side Nodes

Nodes
Node_Name,      Node_ID,    Protocol,    Port
DEVR1,          1,          InfraTox,    R1
```

5.3. Server Side Map Descriptors

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 maximum specified in “Data Array” section above
Function	Function of Server Map Descriptor	Wrbc

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 "Server Node Descriptor" - section 5.2
Length	Length of Map Descriptor	1-Maximum of Data Array length.
Da_Byte_Array_Name*	Name of Data Array used to lock the sensor. Driver will report data for the locked sensor only.	One of the Data Array names from "Data Array" section above
Data_Byte_Offset*	Specifies offset for Da_Byte_Array_Name Data array. This memory location will be checked every time if the user has locked a sensor. If this parameter is not specified, the driver will use the Data_Array_Offset value.	1-Maximum of Data Array length.
Infra_Func	For quality assurance this parameter is used to send a message to a Client from a Map_Descriptor_Name*.ini file. With the use of this function Data_Array_Offset value will be used as line number from INI to send. INFRA_SIMULATION: only numbered line will be sent to Client by the Map Descriptor. INFRA_SIMULATION_ALL: Starting at the numbered line all lines will be sent one by one to the Client until the end of the file is reached. INFRA_SIM_ALL_REPEAT: Repeatedly Starting from numbered line to end of the file all lines will be sent to Client one by one by this single Map Descriptor. Note: Ini must show all bytes as two character hex representation and first line of should be // FILE_IN_HEX_FORMAT	INFRA_SIMULATION INFRA_SIMULATION_ALL INFRA_SIM_ALL_REPEAT

5.3.3. Map Descriptor Example 1 Server using Data Array:

The following Map Descriptor enables this Driver to send data for all 8 sensors to the Node (DEV1) connected at the FieldServer. See Appendix A for the Data Array format.

The Driver can send Gas value messages, Alarm messages, Trouble messages and lock point messages. The driver can also be locked to send data for only one particular sensor. In this example, if a valid (1-8) sensor number is inserted at offset 0 in the Data Array DA_CTL_R1, the driver will only send data for that particular sensor. To disable the lock, insert an invalid (0 or >8) number.

```
//  Server Side Map Descriptors

Map Descriptors
Map_Descriptor_Name,  Data_Array_Name,  Data_Array_Offset,  Function,  Node_Name,  Length,  Da_Byte_Name,  Da_Byte_Oset
SMD1,                 DA_R1,            0,                  wrbc,      DEV1,       100,     DA_CTL_R1,     0
```

Driver will look into this data array to send Zellweger message to Zellweger 8 Channel Client.

Data Array Offset which indicates the starting memory location for the Data to send Node (DEV1).

This wrbc function makes this Server an Active Server. This Server continuously sends data for each sensor.

Server sends data to this Node connected to FieldServer.

Length should be sufficient to allow Server to store data for all sensors for a Node.

Name of Data Array used to lock sensor. Driver will report data for locked sensor only.

The memory location within Da_Byte_Name Data Array at which user can put the sensor number to be locked.

5.3.4. Map Descriptor Example 2: - Server using INI file:

This Map Descriptor will enable the Driver to send the 2nd line from the SMD1.ini to the node DEV1 irrespective of the contents. The line may contain up to 2000 characters.

```
//    Server Side Map Descriptors

Map Descriptors
Map_Descriptor_Name,    Data_Array_Name,    Data_Array_Offset,    Function,    Node_Name    Length    Infra_Func
SMD1.ini,               Dummy,              2,                    wrbc,        DEV1,        1,        INFRA_SIMULATION,
```

Data Array Offset which indicates the line number to send by this Map Descriptor to send Node (DEV1).

This wrbc function makes this Server an Active Server. This Server continuously sends data from the specified line from SMD1.ini file.

Server sends data to this Node connected to the FieldServer.

Length should be set to 1.

Specifies the use of the INI file as the Data source.

Appendix A. Advanced Topics

Appendix A.1. Supported Functions at a glance

Message Types	Notes
Gas Value Message	Message reports a gas value and units.
Trouble Message	Message reports a trouble for one sensor
Blank Message	Message used to flash Honeywell Zellweger IR-148 display
Alarm Message	Message reports an alarm (C/W/A) for one sensor
Locked Point Message	Unit is locked onto a single sample.
Other 49 byte messages beginning 0xb1	Discarded but driver report stats on these messages see 0.
Other 49 byte messages	
Other messages	

Appendix A.2. How Data is stored by the Driver.

The Driver can be configured to store data in one of two ways:
a) Default: One Set of consecutive Data Array elements is used for each Honeywell Zellweger IR-148-8.8-Channel Unit. One set per point/sensor.

Offset	Sensor	Contents	Description
0	1	Alarm or Trouble	Set non-zero if alarm or a trouble has been reported. Set to zero if neither are currently being reported.
1	1	Alarm Type	0 = None 1 = Caution 2 = Warning 3 = Alarm
2	1	Trouble	0 = None 1 = Trouble
3	1	Gas Value	Gas value multiplied by 100 is stored here. When stored, if configured, scaling will be applied.
4	1	Gas Units	1st 3 bytes of gas units are written here as ASCII characters.
5	1	Gas Units	
6	1	Gas Units	
7	1	State	0 = Enabled 1 = Disabled
8	1	Gas Value Valid	1 = Gas Value updated with most recent message. 0 = Gas Value not updated.
9	1	Gas Value Age	In seconds since last update. Initial (and max) value = 0xffff
10	1	Sensor Data Age	Time since last message containing data about this sensor. In seconds since last update. Initial (and max) value = 0xffff
11..21	2		
22..32	3		
33..43	4		
44..54	5		
55..65	6		
66..76	7		
77..87	8		

b) Extended storage : If the FieldServer is configured to use extended storage then data will be stored as below

Offset	Sensor	Contents	Description
0	1	Alarm or Trouble	Non-zero if alarm or a trouble has been reported. Zero if neither are currently being reported.
1	1	Alarm Type	0 = None, 1 = Caution, 2 = Warning, 3 = Alarm
2	1	Trouble	0=None, 1=Trouble
3	1	Gas Value	Gas value multiplied by 100 is stored here. When stored, if configured, scaling will be applied.
4	1	Gas Units	1st 3 bytes of gas units are written here as ASCII characters.
5	1	Gas Units	
6	1	Gas Units	
7	1	State	0 = Enabled, 1 = Disabled
8	1	Gas Value Valid	1 = Gas Value updated with most recent message. 0 = Gas Value not updated.
9	1	Gas Value Age	In seconds since last update. Initial (and max) value = 0xffff
10	1	Sensor Data Age	Age since last message, containing data from this sensor in seconds. Initial (and max) value = 0xffff
11	1	I/O State	255 = unknown, 0=Warm up, 1 = Ready, 2 = Trouble, 3= Cal/Setup
12	1	Alarm Latched Status	0=No, 1=Yes
13	1	Audion On Status	0=No, 1= Yes
14	1	Alarm Latching Preference	On Caution (0=No, 1= Yes)
15	1	Alarm Latching Preference	On Warning(0=No, 1= Yes)
16	1	Alarm Latching Preference	On Alarm(0=No, 1= Yes)
17	1	Audio On Preference	On Caution (0=No, 1= Yes)
18	1	Audio On Preference	On Warning(0=No, 1= Yes)
19	1	Audio On Preference	On Alarm(0=No, 1= Yes)
20	1	Audio On Preference	On Trouble(0=No, 1= Yes)
21	1	Audio On Preference	On Auxilary(0=No, 1= Yes)
22-24	1	Spare	
25..49	2		
50.-74	3		
75.- 99	4		
100-124	5		
125..149	6		
150.-174	7		
175.-199	8		

The Driver expects similar a Data array format to send data to the Client when acting as a Server.

Appendix A.3. Driver stats

In addition to the standard FieldServer operating statistics the driver can expose certain key stats in a Data Array which can then be monitored by an upstream device. Adding the following to the configuration file will activate these stats for a driver configured as a Client.

```
// Expose Driver Operating Stats.

Data_Arrays
Data_Array_Name,        Data_Format,    Data_Array_Length
Infra-stats,            UINT32,         200
```

Stat #	Stats	Description
0	INFRA_TROUBLE_MSG_RECV	Number of trouble messages received
1	INFRA_TROUBLE_WITH_ALARM_MSG_RECV	Number of Alarm as well as Trouble messages reported
2	INFRA_ALARM_MSG_RECV	Number of Alarm messages reported
3	INFRA_GAS_VALUE_MSG_RECV	Number of Gas Value messages reported
4	INFRA_GAS_VALUE_WITH_ALARM_MSG_RECV	Number of Gas value as well as Alarm messages reported.
5	INFRA_LOCK_MSG_RECV	Number of Lock messages reported
6	INFRA_BLANK_MSG_RECV	Number of Blank messages reported
10	INFRA_ST_0xB1_49_RECV_DISC	Number of discarded messages starting with 0xB1 with length 49 bytes
11	INFRA_BAD_ST_49_RECV_DISC	Number of discarded messages not starting with 0xB1 with length 49 bytes
12	INFRA_NOT_49_RECV_DISC	Number of discarded messages with length not 49 bytes.
13	INFRA_NOT_49_RECV_BYTES_DISC	Length of the latest discarded message with length not 49 bytes.
20	INFRA_BAD_CRC_MSG_DISC	Number of messages discarded because of bad checksum.

For the node connected at R1; Offset = Stat number
Example: The number of messages discarded because of bad start can be found at Offset 11 in Infra-Stats Data Array.

For the node connected at R2; Offset = 100 + Stat number
Example: The number of messages discarded because of bad start can be found at Offset 111 in Infra-Stats Data Array.

Appendix B. Driver Error Messages

Some configuration errors might produce an error every time a poll is generated. This will fill the error buffer quickly and not add any clarity. For this reason the driver suppresses subsequent similar messages. Thus it is possible for the same error produced by multiple Map Descriptors to produce only one error message. Subsequent error messages can be seen on the driver message screen.

Note : In the actual message you will see that %d has been replaced by an integer, %s by text indicating a data array name or map descriptor name and %x by two hex characters.

Error Message	Description and Action Required
INFRA: #1 Err. Da <%s> length Reqd/exist <%d/%d> Md <%s> where md offset <%d>[Ψ]	This error will be generated when the driver tries to store data for a sensor but the corresponding Data Array is not long enough. Set the Data Array length as indicated..
INFRA:#2 Err. Incoming data is being abandoned on port R-P%d [Ψ]	Honeywell Zellweger IR-148-8.8-Channel or another unit is connected at the indicated port of the FieldServer but the Configuration file does not define a Map Descriptor to capture data from this unit. Change the CSV file to define a Map Descriptor to communicate with this device if required.
INFRA:#3 ERR. Invalid Node_id %d, Valid 1-8	If there are multiple nodes then make the Node_ID the number of points (sensors) for which Zellweger units are configured.
Infra:#4 Err. Test file <%s> not found.	In Simulation mode the driver can send messages from files indicated by the Map Descriptor name. Check that the required file exists and that it is not in use by another application, or change the mode from simulation to operation by deleting the parameter “INFRA_SIMULATION” from .the CSV file.
INFRA:#11 Err. Illegal MD Function for Md <%s>[Ψ]	Set Map Descriptor’s function to Passive_Client if driver is configured as a Client or wrbc if configured as a Server.
INFRA:#12 Err. Illegal MD length <%s>[Ψ]	The Map Descriptor length parameter is either not defined or set to 0. Set the Map Descriptor length to 100.
INFRA:#13 Err. Illegal Infra_func for Md <%s>[Ψ]	This error will be generated if you are using the Infra_func parameter with an incorrect value. See section 0 for legal values.
INFRA:#21 Err. Da <%s> length Reqd/exist <%d/%d> Md <%s> where md offset <%d>[Ψ]	This error will be generated when the driver tries to send a message to the Client, but the Data Array used to compose the message is insufficiently long to hold information for all 8 sensors. Set the Data Array length as indicated.
INFRA:#22 Err. Diagnostic line <%d> ignored.[Ψ]	In Server mode the driver does not send messages from lines starting with # or //. Change the Data_Array_Offset parameter for the indicated line in the ini file.
INFRA:#41 FYI. Write-thru not Possible On MD <%s>	If an Upstream Device writes a value at a memory location under the influence of the given Map Descriptor, the Write-thru operation will be cancelled as the Driver cannot write to an UnfraTox unit..
Infra:#51 FYI. You could use an Array called <%s> to expose diagnostic info.	It is possible to define a Data Array known as “Infra-stats” (see 0) This Data Array is very useful for statistics purposes.

[Ψ] Edit CSV file, download the modified file and reset the FieldServer to have the changes take effect.

THIS PAGE INTENTIONALLY LEFT BLANK