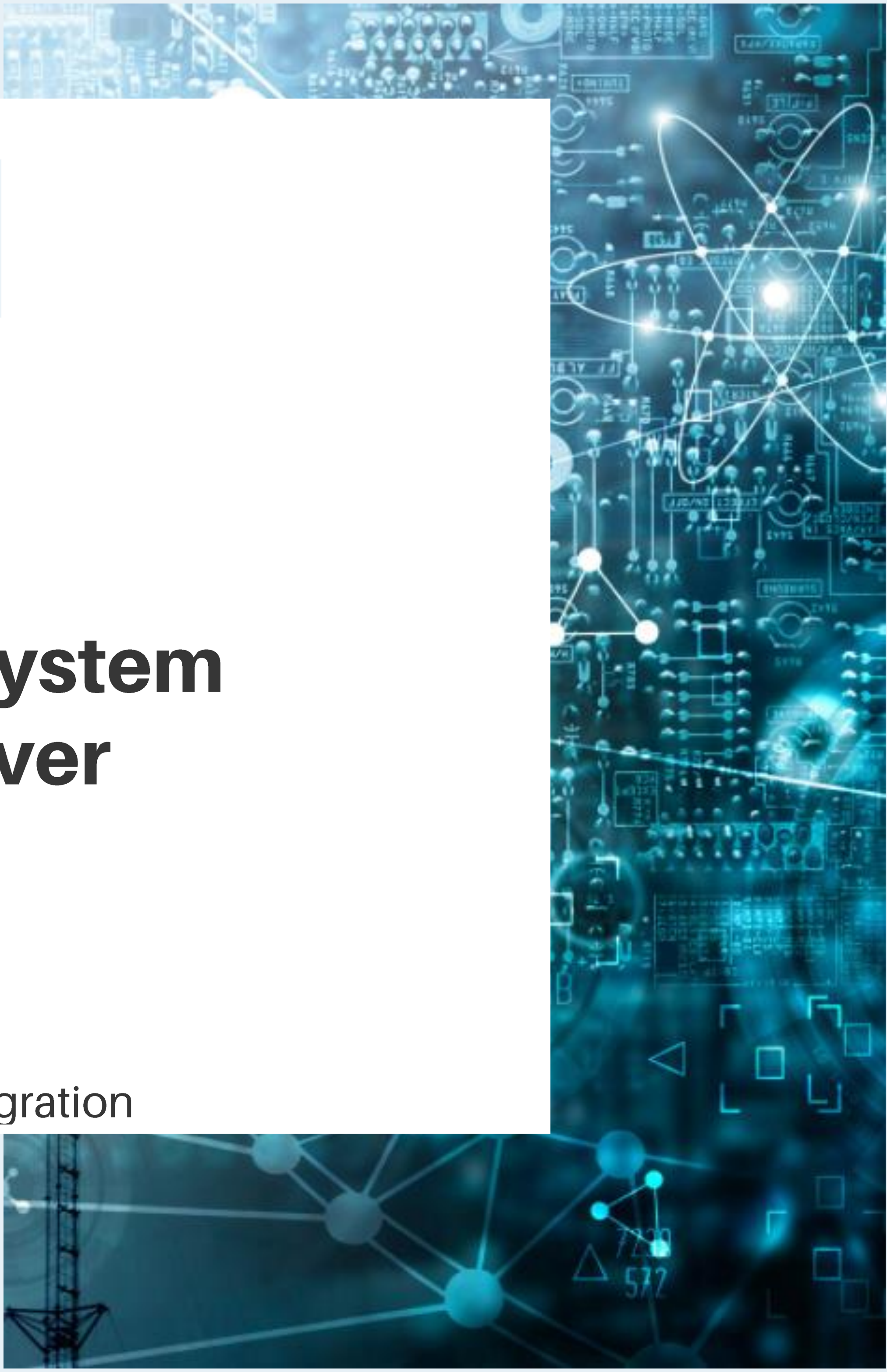
CHIPKIN

Honeywell HUS CCTV System Ethernet Driver FS-8705-37

Chipkin - Enabling Integration



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Driver Version: 8.0
Document Revision: 2

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1 Honeywell HUS Driver Description

This Ethernet driver supports an Ethernet TCP/IP connection between the HUS and the gateway. Once connected, the driver can send alarm notifications to the HUS system. Within the HUS system these alarm notifications can be processed with HUS rules to trigger actions or further notifications (e.g. triggering cameras to designated preset positions).

The driver can be linked to any of the library of over 120 protocols supported by the FieldServer products and thus the HUS system can be driven with data from Modbus, BACnet, Rockwell, Lonworks, GE PLC, Omron, JCI and many other systems.

The driver is fully compatible with other FieldServer drivers and meets FieldServer's quality assurance standards. The driver was developed by Chipkin Automation Systems, an Approved FieldServer Integrator.

This driver comes in 2 flavors. 1) Provides a simplified interface which triggers configured presets 2)provides full real time control over preset parameters – They do not need to be preconfigured in the gateway.

Max Nodes Supported

FIELDSERVER MODE	NODES	COMMENTS
Client	1	One gateway supports a connection to a single Honeywell HUS system.
Server	0	Not supported or documented.

2 Driver Scope of Supply

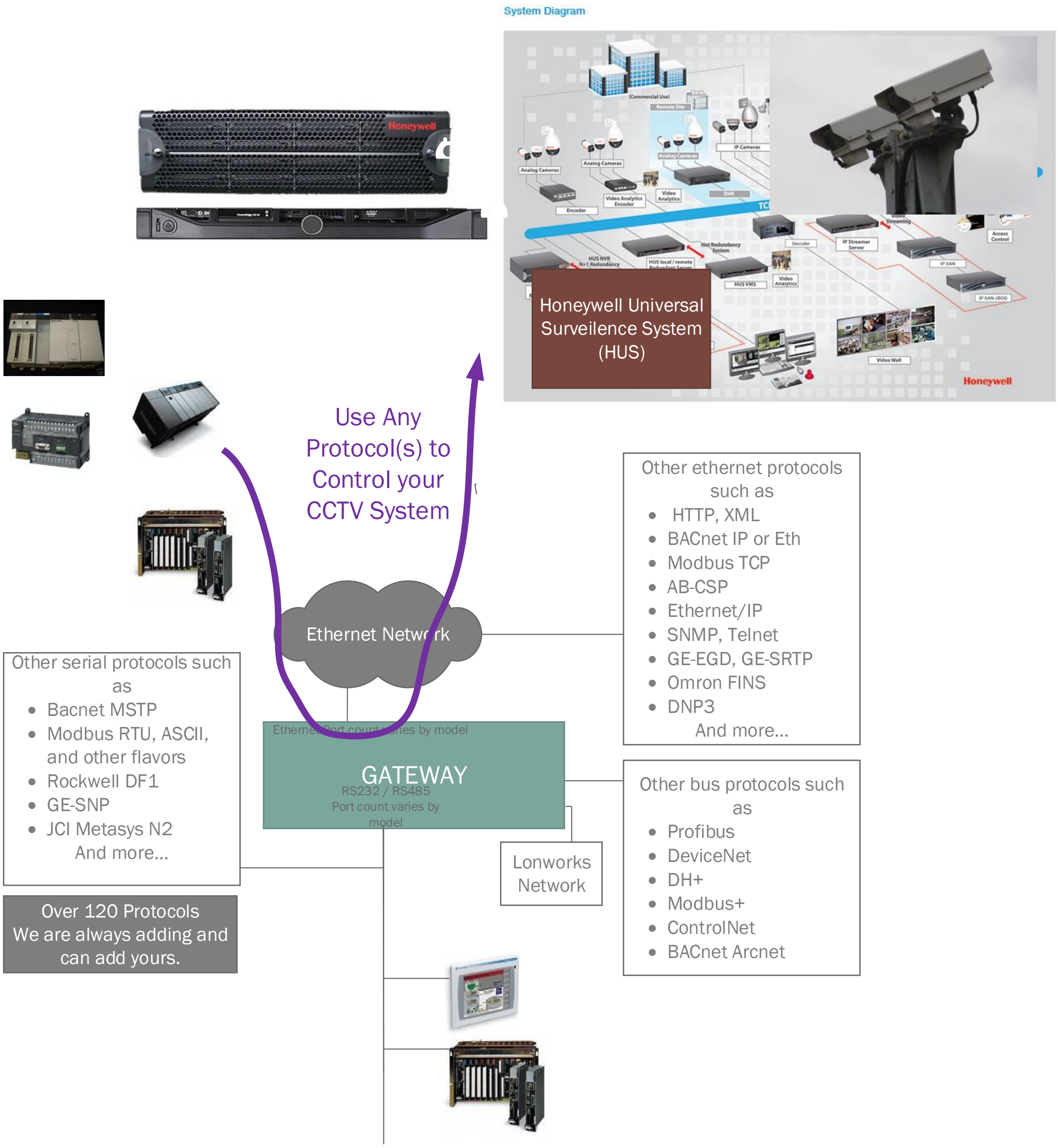
2.1 Supplied with this driver

FIELDSERVER TECHNOLOGIES PART #	DESCRIPTION
Cables	No specific cables are shipped with this driver.
FS-8705-37	Driver Manual.

3 Hardware Connections

3.1 Block Diagram

Multiple WorkStation protocols and connection supported. See list of FieldServer Drivers.



System Diagram
Honeywell Universal Surveilence System (HUS)
Use Any Protocol(s) to Control your CCTV System
Ethernet Network
Ethernet Port count varies by model
GATEWAY
RS232 / RS485
Port count varies by model
Lonworks Network

Other ethernet protocols such as

- HTTP, XML
- BACnet IP or Eth
- Modbus TCP
- AB-CSP
- Ethernet/IP
- SNMP, Telnet
- GE-EGD, GE-SRTP
- Omron FINS
- DNP3

And more...

Other serial protocols such as

- Bacnet MSTP
- Modbus RTU, ASCII, and other flavors
- Rockwell DF1
- GE-SNP
- JCI Metasys N2

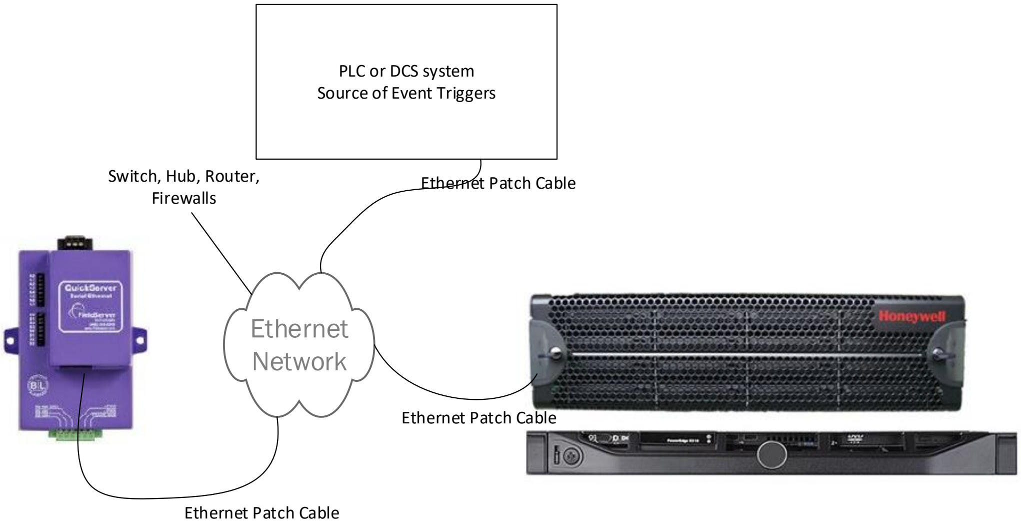
And more...

Other bus protocols such as

- Profibus
- DeviceNet
- DH+
- Modbus+
- ControlNet
- BACnet Arcnet

Over 120 Protocols
We are always adding and can add yours.

3.2 Cable Connections



4 Configuring the FieldServer as a Honeywell HUS 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 FS).

This section documents and describes the parameters necessary for configuring the FieldServer to communicate with Honeywell HUS system.

The configuration file tells the FieldServer about its interfaces, and the routing of data required. In order to enable the FieldServer for Honeywell HUS interaction, 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.

4.1 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_Array_Format	Provide data format. Each Data Array can only take on one format.	**Recommended**: Bit, UInt16, Also Supported: Float, Uint32, 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

4.1.1 Data Arrays – Example

```
Data_Arrays

Data_Array_Name ,Data_Format ,Data_Array_Length

HUS-Stats       ,UINT16      ,1000

HUS-Interface   ,UINT16      ,1000

DA_HUS_MODBUS   ,UINT16      ,3000

HUS-RESETCtrl   ,UINT16      ,100
```

4.2 Client Side Connections

Create one connection for each Honeywell HUS serial port. Each connection can only be used to connect to a single Honeywell HUS interface/port.

SECTION TITLE
Connections

COLUMN TITLE	FUNCTION	LEGAL VALUES
Adapter	Specify which network port the device is connected to the FieldServer	N1, N2
Protocol	Specify protocol used	HoneywellHus

4.2.1 Client Side Connection Descriptions – Example

(Configure your gateway as shown in this example. Do not introduce your own variation.)

```
Connections
Adapter ,protocol
N1      ,HoneywellHUS
```

4.2.2 Client Side Nodes

Create one Node per FACP in the network only.

SECTION TITLE
Nodes

COLUMN TITLE	FUNCTION	LEGAL VALUES
Node_Name	Provide name for node	Up 12 of the max of 32 alphanumeric characters possible to specify the Node name. NB ! The name must be set to the Meter's 12 character address.
Node_ID	Not used directly by the driver	0-255 Commonly omitted. If you are using Node_Status bits then allocate a Node_ID. Give each meter a unique number.
Protocol	Specify protocol used	HoneywellHus

4.2.3 Client Side Nodes – Example

(Configure your gateway as shown in this example. Do not introduce your own variation.)

```
Nodes
Node_Name  ,Node_ID ,Protocol
Gateway    ,1       ,HoneywellHUS
```

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..	Server

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
Length	Length of Map Descriptor	1

4.3.3 Actions (actions.csv)

A file called actions.csv MUST be loaded onto the gateway. (Take care not to overwrite config.csv). It defines actions associated with each trigger for each camera. A Sample is provided below. Only the 1st 5 columns are used by the driver. The remainder of the line is ignored. Commented lines are ignored as is the header line if it begins with the word 'Camera'. The keyword 'end' terminates processing of the file. The file is loaded once when the gateway starts up.

```
Camera No.,Bit No.,PointID,AlarmTypeCode,AlarmCode,Fire Detector Tag,Modbus
Register,Register Bit,PCCTV Camera & Preset,Process Unit

// Lines that begins with double slash are ignored.,,,,,,,,,

// Heading line is ignored if 1st word is Camera.,,,,,,,,,

// Only 5 columns are processed - rest are reference data.,,,,,,,,,

1,0,10001,111,11,01-AFT-00012,40001,0,01-TCAP-000001 Pos 1,Unit 1

1,1,10001,111,11,01-AFT-00013,40001,1,01-TCAP-000001 Pos 1,Unit 1

1,2,10002,111,11,01-AFT-00021,40001,2,01-TCAP-000001 Pos 2,Unit 1

1,3,10003,111,11,01-AFT-00022,40001,3,01-TCAP-000001 Pos 3,Unit 1

1,4,10003,111,11,01-AFT-00023,40001,4,01-TCAP-000001 Pos 3,Unit 1

1,5,10004,111,11,01-AFT-00046,40001,5,01-TCAP-000001 Pos 4,Unit 1

2,0,10006,111,11,01-AFT-00004,40005,0,01-TCAP-000002 Pos 2,Unit 1

2,1,10013,111,11,01-AFT-00014,40005,1,01-TCAP-000002 Pos 9,Unit 1

2,2,10014,111,11,01-AFT-00015,40005,2,01-TCAP-000002 Pos 10,Unit 1

2,3,10007,111,11,01-AFT-00016,40005,3,01-TCAP-000002 Pos 3,Unit 1

2,4,10005,111,11,01-AFT-00033,40005,4,01-TCAP-000002 Pos 1,Unit 1

end,,,,,,,,,

// End statement ends processing of file - all lines following are
ignored.,,,,,,,,,
```

Column 1 – Camera Number

Column 2 – Bit Number (0-63)

Column 3 – Preset PointID

Column 4 – Preset AlarmCode

Column 5 – Preset AlarmTypeCode

Example

```
1,1,10001,111,11,01-AFT-00013,40001,1,01-TCAP-000001 Pos 1,Unit 1
```

If Camera 1 – bit 1 is activated then send camera 1 to preset 10001 (111,11)

Notes:

1. The action will have no effect on the HUS until the triplet (PointID,AlarmCode,AlarmTypeCode) have been specified as an alarm/action in the HUS CCTV system.
2. You do not need entries in this file for bits that will not be activated. The sort order of the file is not important.

4.3.4 Priorities (priority.csv)

Its possible that multiple triggers for a single camera could be active at the same time. How does the driver handle this. Normally it does it this way – when a trigger for a camera is active, all other triggers for that camera are ignored. When the active trigger-preset is cleared then the next trigger is immediately considered. The file is loaded once on startup.

Normal Operation – A camera that does not have a priority action defined.

Eg.

Camera 1 Bit 0 is allocated to 10001,111,1

Camera 1 Bit 1 is allocated to 10002,112,2

Camera 1 Bit 2 is allocated to 10003,113,4

Eg 1:

If 40001 = 7. All three bits are activated. Driver selects lowest number bit (bit 0 in this case) and drives camera 1 to preset 10001.

Now external system sets 40001 to 6. Bits 1 and 2 are active,. Bit 0 has been cleared which allows the driver to activate another preset. In this case 10002 because it looks at the active bits starting at the lowest bit number. Bit 2 will be ignored until bit 1 has been cleared.

Eg 2:

If 40001 = 2 then bit 1 is set so camera 1 is driven to 10002.

Now 40001 = 6. Bit 1 and 2 active. A camera preset is already active so the new active bit is ignored.

Now 40001 = 0. All bit are cleared. No action taken.

Now 40001 = 4. Bit 2 is set. Camera 1 driven to preset 10003.

A file called priority.csv MUST be loaded onto the gateway. (Take care not to overwrite config.csv). It can be an empty file.

Only entries for camera's with priority actions are specified here.

It defines actions associated with each trigger for each camera. A Sample is provided below. Only the 1st 5 columns are used by the driver. The remainder of the line is ignored. Commented lines are ignored as is the header line if it begins with the word 'Camera'. The keyword 'end' terminates processing of the file.

```
Camera No.,Active Bits,PointID for Priority Position,AlarmTypeCode,AlarmCode

// Lines that begins with double slash are ignored.,,,,

// Heading line is ignored if 1st word is Camera.,,,,

// Only 5 columns are processed - rest are reference data.,,,,

// Only include cameras with priority rules.,,,,

25,21,10216,333,33

26,21,10224,333,33

27,6,10228,333,33

28,6,10232,333,33

29,6,10236,333,33

30,6,10240,333,33

end,,,,

// End statement ends processing of file - all lines following are ignored.,,,,
```

Priorities have been defined for camera 25,26,27,28,39,30. All other camera’s will operate without priority actions.

<u>This is how Priority Actions work</u>

If A camera is defined to have a priority action, then if that camera has more than one trigger bit active at a time, then that camera shall take the priority action.

Eg.

Camera 25 – Corresponds to Modbus 40097,98,99,100

Lets say Modbus 40097 has a value of 31. Ie bits 0-5 are on.

That means Camera 25 has multiple triggers active.

It is present in the priority.csv file so the driver applies the priority rule and in this example sends camera 25 to (10216,333,33)

Column1 – Camera

Column2 – Max Bits, How many of the 64 bits to evaluate as being simultaneously on.

Column 3 – Preset PointID

Column 4 – Preset AlarmCode

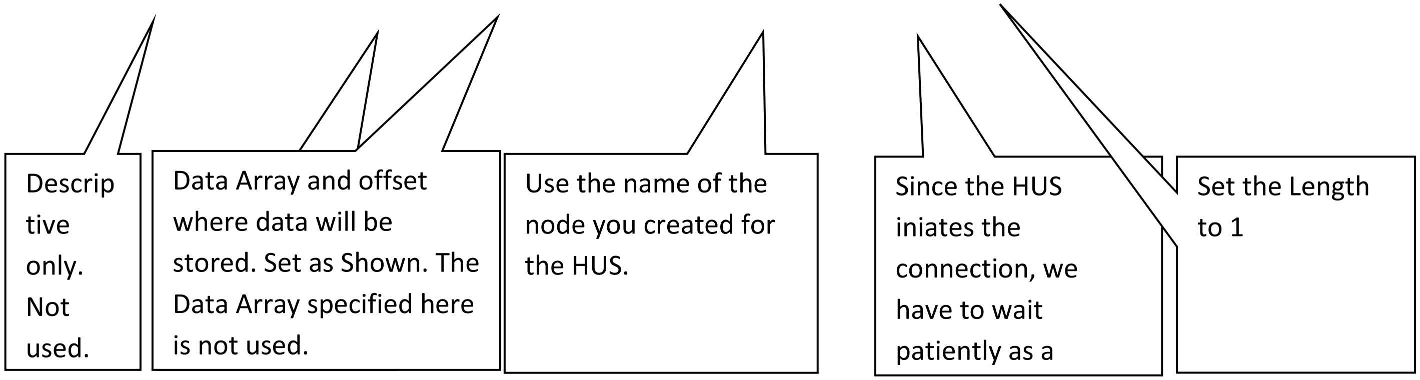
Column 5 – Preset AlarmTypeCode

4.4 Examples

4.4.1 Map Descriptor – Required

This Map Descriptor is required. Configure the gateway as shown below. Do not introduce your own variation. No other Map Descriptors connected to the HoneywellHus Node are permitted.

```
Map_Descriptors
Map_Descriptor_Name ,Data_Array_Name ,Data_Array_Offset ,Node_Name ,Function ,Length
Rqd but not used    ,DA_dummy        ,0                 ,Gateway   ,Server   ,1
```



Descriptive only. Not used.

Data Array and offset where data will be stored. Set as Shown. The Data Array specified here is not used.

Use the name of the node you created for the HUS.

Since the HUS iniates the connection, we have to wait patiently as a

Set the Length to 1

5 Configuring the FieldServer as a Honeywell HUS Server

This driver cannot be used to emulate a Honeywell HUS system. It always expects the HUS to be the HUS to establish the connection, to subscribe to points and to accept alarm notifications which drive cameras to presets.

6 Revision History

DATE	RESP	FORMAT	DRIVER VER.	DOC. REV.	COMMENT
21 Jan 2019	PMC		8.0	1	Created
30 Apr 2021	YC		8.0	2	Updated to new template

Appendix A. Advanced Topics

Appendix A.1 Sample Configuration

```
Bridge

Title

FSe7996-Phase2  Rev801



//===========================================================

//

//    Data Arrays

//


Data_Arrays

Data_Array_Name ,Data_Format ,Data_Array_Length

HUS-Stats       ,UINT16      ,1000

HUS-Interface   ,UINT16      ,1000

DA_HUS_MODBUS   ,UINT16      ,3000

HUS-RESETCtrl   ,UINT16      ,100


Preloads,

Data_Array_Name ,Preload_Data_Index ,Preload_Data_Value

// This param is read once on startup. Its the duration of the the timeout after we send an alarm message that we
wait until retry if we dont get a response.

HUS-Stats       ,09                 ,20
```

Notes on this section are provided at the end of the sample.

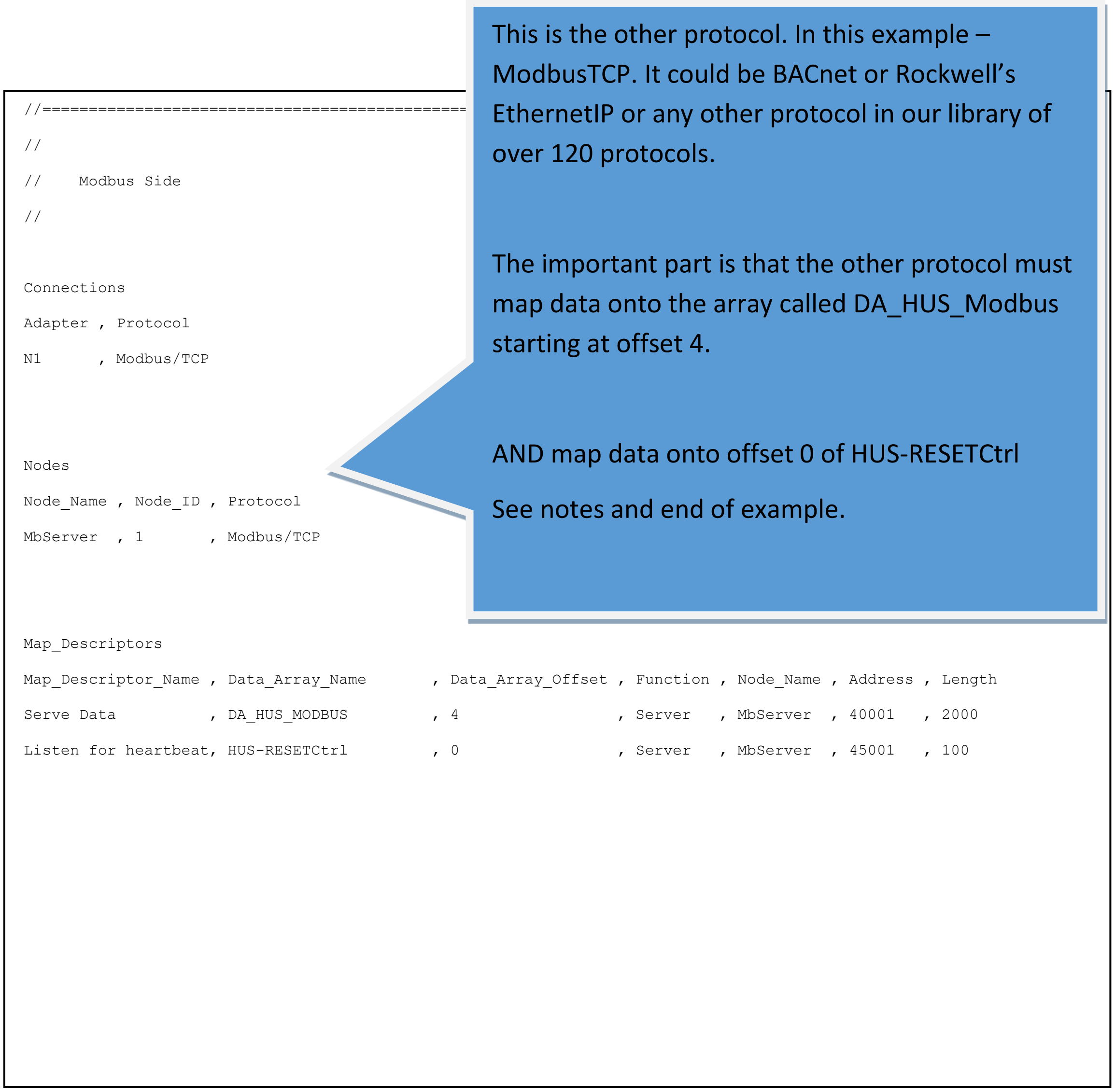
```
//================================================================================
//
//    Honeywell HUS
//

Connections
Adapter ,protocol
N1      ,HoneywellHUS

Nodes
Node_Name ,Node_ID ,Protocol
Gateway    ,1       ,HoneywellHUS

Map_Descriptors
Map_Descriptor_Name ,Data_Array_Name ,Data_Array_Offset ,Node_Name ,Function ,Length
Rqd but not used    ,DA_dummy        ,0                 ,Gateway   ,Server   ,1
```

The HUS side of the configuration should be configured exactly as shown here.



```
//============================================

//

//    Modbus Side

//


Connections

Adapter , Protocol

N1      , Modbus/TCP



Nodes

Node_Name , Node_ID , Protocol

MbServer  , 1       , Modbus/TCP



Map_Descriptors

Map_Descriptor_Name , Data_Array_Name       , Data_Array_Offset , Function , Node_Name , Address , Length

Serve Data          , DA_HUS_MODBUS         , 4                 , Server   , MbServer  , 40001   , 2000

Listen for heartbeat, HUS-RESETCtrl         , 0                 , Server   , MbServer  , 45001   , 100
```

This is the other protocol. In this example – ModbusTCP. It could be BACnet or Rockwell's EthernetIP or any other protocol in our library of over 120 protocols.

The important part is that the other protocol must map data onto the array called DA_HUS_Modbus starting at offset 4.

AND map data onto offset 0 of HUS-RESETCtrl

See notes and end of example.

Dara Array = HUS-Stats ,UINT16 ,1000

Used to control some diagnostic and debguuging functions. Do not use this array unless directed to by a support engineer.

HUS-Interface ,UINT16 ,1000

Operational status of the 1st 100 camera's is displayed here. 10 registers per camera. Displays info like the last sequence number used, the point number, the number of retires, the state of the retry time, the success code and more.

DA_HUS_MODBUS ,UINT16 ,3000

4x 16 Bit registers are allocated per camera. Offset 0,1,2,3 are for camera zero, 4,5,6,7 are for camera 1 etc. This array is mapped onto the other protocol (eg Modbus) to allow a remote system to trigger presets for each camera.

In this example configuration camera zero is not mapped onto Modbus. Modbus is mapped onto offset 4,5,6 etc. with 40001 corresponding to offset 4, 40002 to offset 5 etc. (See the Modbus side of the configuration.)

HUS-RESETCtrl ,UINT16 ,100

This special data array is also mapped onto the other protocol (eg Modbus). The driver expects that the remote system will write a heartbeat to this point. The value must change all the time. Two presets should be configured in the HUS system to report the loss of the connection from the remote system. The gateway must be configured using camera zero for these two presets. If the heartbeat stops then one preset is triggered. If the heartbeat is re-established the other preset is triggered. NOW the HUS can notify the operator using these presets.

In this example the Data Array is mapped onto Modbus 450001

Preloads

The HUS-stats array is used to control some operation and diagnostic functions. In the fragment below offset 9 has been set to a value of 20. When the config loads, the value will be loaded into the data array.

```
Preloads,

Data_Array_Name ,Preload_Data_Index ,Preload_Data_Value

// This param is read once on startup. Its the duration of the the timeout after we send an alarm message that we wait
until retry if we dont get a response.

HUS-Stats       ,09                 ,20
```

If you were using BACnet – Map up to 64 binary BO or BV objects into each of the 64 bits allocated to each camera if you want to control the presets with Binary objects.

Appendix A.2 HUS Subscriptions

When the HUS connects to the gateway it begins by subscribing to all the points that have been defined. The driver accepts these subscription requests, makes a note of them and respond with an ACK to the HUS.

The HUS does not accept alarm notifications from the Driver unless those points already exist in the HUS. In other words you cannot send a trigger for a preset that does not exist. In other words, the triplet of (PointID, AlarmCode, AlarmTypeCode) must already be defined int the HUS for this driver to activate the triplet. On connection to the driver the HUS will report all these triplets by means of sending subscription requests to the driver. (Alarm Notifications - this is how the driver tells the HUS to drive a camera to a preset)

It is normal to ignore the subscription messages during normal operation of a well configured system.

Appendix A.3 HUS Camera – PointID , AlarmCode, AlarmType Code

The 3 parameters have no specific meaning until they have been configured in the HUS. Through the HUS configuration software the triplet is mapped onto an action for a specific camera.

From the driver's point of view a camera is a virtual concept. It's a collection of presets that may be viewed from a particular physical camera.

You cannot tell from the surface what camera a triplet (PointID, AlarmCode, AlarmTypeCode) will actually activate unless you go into the HUS configuration of actions.

Appendix A.4 HUS TCP/IP

Driver uses port 6001.

Driver uses "ALLSUB" as the key identifier.

New firmware is required if this changes.

Appendix A.5 Direct control of each Camera

A version of this driver is available where the remote system can driver any camera to any preset without requiring them to be configured in csv files in advance. 10x 16bit registers are provided for control and monitoring of every camera. If you are interested in this option please request the additional manual provided.

Here they are shown as Modbus Registers but they could be mapped onto any protocol such as BACnet and Rockwells EthernetIP There are one Chunk of 10 Registers per point.

OFFSET	NAME	NOTES	READ/WRITE ON MODBUS
0	Trigger	Modbus Writes '1' to this point to trigger alarm. Retriggers ignored while timeout is running.	40001,11,21,31… Read / Write (to trigger)
1	Point Number	**Preload** with a value to define a point. Eg. Value =9 then this chunk of 10 registers is for point 9	40002,12,22,32… Read
2	AlarmTypeCode	**Preload** or write to using Modbus.	40003,13,23,33… Read
3	AlarmTypeCode	**Preload** or write to using Modbus.	40003,13,23,34… Read
4	Subscription Count	Increase each time we receive a subscription for the point	40005,15,25,35… Read
5	Not Used		40006,16,26,36… Read
6	Timer/Counter	Will wait this long for response from HUS before retrying or accepting new triggers	40007,17,27,37… Read
7	Xmite Counter	Number of times the AR message has been sent	40008,18,28,38… Read
8	Transaction Success Code	Set to 3 when message is sent. Result extracted from response if we get one and then overwrites the 3 with 0 (success),1,2	40009,19,29,39… Read
9	Sequence Number.	The number used in the Alarm Notification message to report the alarm. We track it because we might need to re-use it	40010,20,30,40… Read