FS-8705-33 – Hunter Industries Gateway and Hunter Industries Protocol Driver

DATASHEET – Rev 2

DESCRIPTION

The Hunter ACC protocol can be used to connect to suitably enabled Hunter Industries controllers such as the ACC99 Irrigation Controller. The Driver can read and write data, change settings and issue commands to the irrigation system. A single gateway can connect to multiple controller's using this driver.

The Gateway will be an active client in communications with the Hunter controller. This means that the gateway will issue messages to read/write data. The Hunter Controller ACC99D will be a passive server, waiting silently for messages from the gateway to which it will respond. The data read will be cached for serving via a 2nd protocol such as DNP3 to Cimplicity or Modbus / BACnet for a building management system. Any of the over 140 protocols in the gateway library may be connected to the Hunter Driver.

QS-1XX0

QS-2XX0

QS-3XX0

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TYPICAL BLOCK DIAGRAM

Free BACnet test software with purchase*
Confidently test the BACnet interface. Discover devices and their objects. Test and document them. Arm yourself with a powerful field tool. Full license.

Lonworks Network
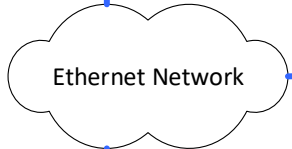
RS232 / RS485
Port count varies by model

Other bus protocols such as
- Profibus
- DeviceNet
- DH+
- Modbus+
- ControlNet
- BACnet Arcnet

Other serial protocols such as
- Bacnet MSTP
- Modbus RTU, ASCII, and other flavors
- Rockwell DF1
- GE-SNP
- JCI Metasys N2
 And more…

GATEWAY

Ethernet

Other ethernet protocols such as
- HTTP, XML, Json
- BACnet IP or Eth
- Modbus TCP
- AB-CSP
- Ethernet/IP
- SNMP, Telnet
- GE-EGD, GE-SRTP
- Omron FINS
- DNP3
  And more...

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

Ethernet Network

Bluetooth Wireless Cell
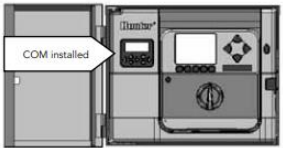
SAMPLE PROJECT BLOCK DIAGRAM

In this sample the Irrigation Sites are monitored from a central location. The Central uses DNP3 (Primary function of Central Station is Power Management). The DNP3 connection is made by means of the mobile network.
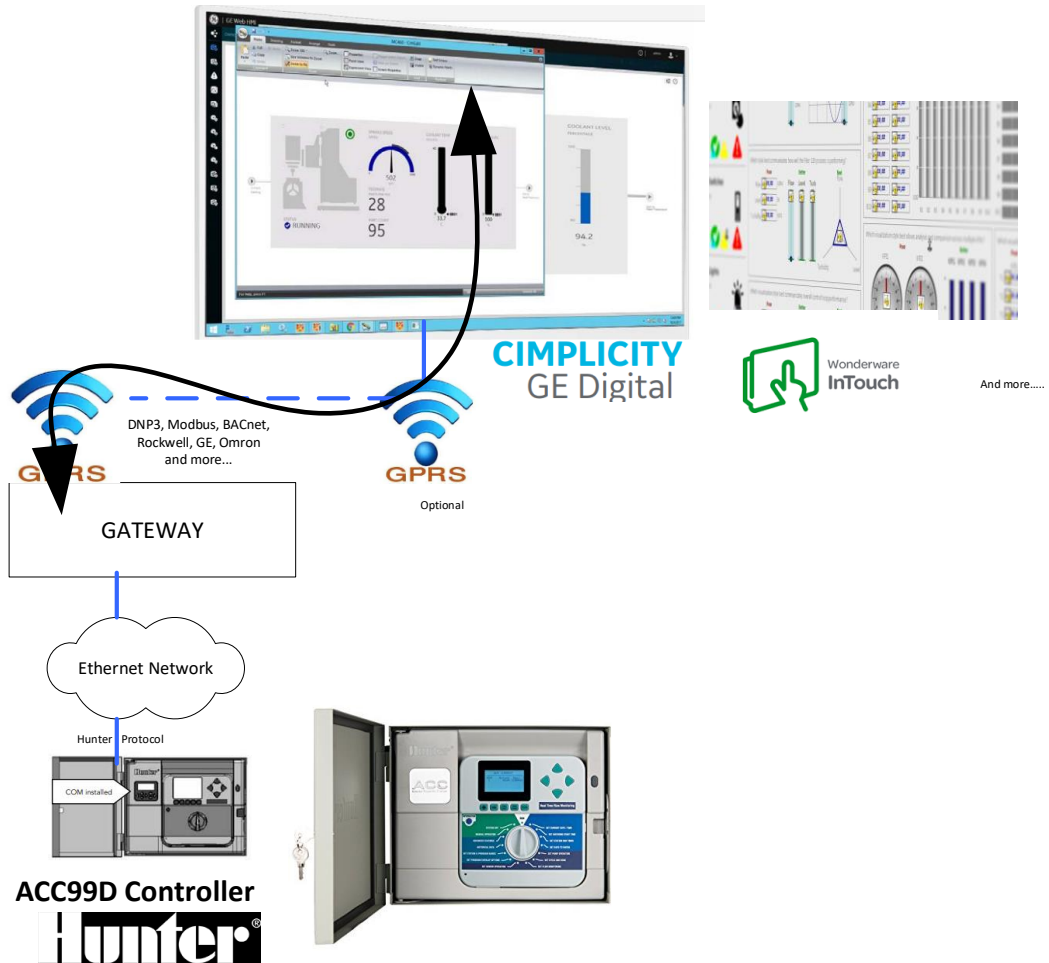
SAMPLE SCREENS SHOWING HOW DATA CAN BE USED

The following images are screenshots of a Dashboard interface to monitor and control the ACC. This is how the data might be used for SCADA or GUI purposes. These sample screens are implemented in HTML and javascript. You can use them to learn how the data is used to build your own GUI. Or you can just use these sample pages. **They are available at any time and can preinstalled on request.** While we used HTML and javascript to read the gateway data using Json, we expect that in most projects protocols like Modbus or BACnet will be used and GUI software like Cimplitiy or IFix (for example) might be used.

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Example – animate the rotary selector with the data read from the controller.

TIME : 11:09:53 PM

Refresh	Stop Irrigation	Suspend Irrigation	un Suspend	Pause	Un Pause

Mute (06H)	Reset Mute (07H)	Stop Irrigation (51H)
Suspend Irrigation (53H)	Cancel Programmable Off (54H)	Cancel Suspend (55H)
Set System Event Mode (57H)	Set FCP Mode (58H)	Clear ACC Display Msgs (59H)
Set Pause Mode (5AH)	Purge Log - Contoller Log (28H-1)	Purge Log - Station Log (28H-1)
Purge Log - Alarm Log (28H-3)		

Rotary Knob=Set Date/Time

0x01 – Set Field Controller System Globals

0x02 – Report Field Controller Global

Simple Commands

0x13 - Set Station Parameters

0x17 – Set Controller Start Time Options

0x17 – Set Controller Start Time Options - Alternate View

0x1E – Set Field Controller Program Header Data

Example – Connect buttons to data objects to provide control.

02H - Controller Global Settings

Offset	Parameter	Value
0	Firmvare Vr.	511
1	Engg. Vr.	26
2	Station Count	99
3	Hours	23
4	Minutes	11
5	Seconds	37
6	Month	10
7	Day	15
8	Year	2019
9	Sys. Event Hour	0
10	RCP hour	0
11	DST (Active/Deactive)	0
12	ETAP Schedule	1
13	ETAP schedule length	3
14	Response level	2
15	Interval (seconds)	3
16	Mode	0
17	Remains Days	0
18	Global Seasonal Adjust	0
19	Stack	1
20	Max. programs running before Smart Stack	1
21	Max. programs running before SSG / Smart Stack	0
22	Rotary Knob	2

Example – Connect to Data objects to provide real time data for operators and

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72H - Report Stations On

Offset	Parameter	Value	
69	Station1 On	1	🔴
70	Station2 On	1	🔴
71	Station3 On	0	🟢
72	Station4 On	0	🟢
73	Station5 On	0	🟢
74	Station6 On	1	🔴
75	Station7 On	1	🔴
76	Station8 On	0	🟢

7AH - Flow Totals

Rec	Today	Yesterday	Week - todate	Week - Prev	Month - todate	Month - Prev	Year - Todate	year - Prev
Ctrlr	0	0	0	0	0	0	0	0
SSG1	0	0	0	0	0	0	0	0
SSG2	0	0	0	0	0	0	0	0
Prog 0	0	0	0	0	0	0	0	0
prog 1	0	0	0	0	0	0	0	0
prog 2	0	0	0	0	0	0	0	0
Prog 3	0	0	0	0	0	0	0	0
Prog 4	0	0	0	0	0	0	0	0
Prog 5	0	0	0	0	0	0	0	0

LIST OF SUPPORTED COMMANDS AND SERVICES

A full description of each service and the data variables each service reads, writes is available in the driver manual.

Google = "FS-8705-33 Hunter Industries ACC Irrigation Controller.pdf"

	COMMAND / SERVICE
1	Set Field Controller System Globals
2	Read Global
3	Mute
4	Reset Mute
5	Report versions
6	Set Station Parameters
7	Set Controller Start Time Options
8	Set Field Controller Program header Data
9	Set Global Seasonal Adjust
10	Stop and Delete Stations
11	Stop a Program
12	Purge Log
13	Report Field Ctrlr Header
14	Stop Irrigation Command
15	Programmable Off
16	Suspend Irrigation
17	Cancel Programmable Off
18	Cancel Suspend
19	Start Manual All Station
20	Set System Event Mode
21	SetFCP Mode
22	Clear Field Controller Display
23	Set Pause Mode
24	Cancel pause Mode
25	Start Manual One Station
26	Start Custom Manual Program
27	Report Stations On
28	Report Mode/Alarms
29	Read Contoller Log
30	Read Station Log
31	Read Alarm Log
32	Report Current Flow Data
33	Report Sensor Data
34	Report Flow Totals Ctrlr

Details of the most commonly used services and data variables are provided in the sections that follow the table below.

35	Report Flow Totals Program
36	Report Flow Detail Data
37	Report Comm Module Globals
38	Report Comm Module Firm Rev

CLIENT SERVER MODEL & DATA FLOW

Data flow is Bi Directional. The central station will be able to read and write parameters and issue commands.

The Gateway will be an active client in communications with the Hunter controller. This means that the gateway will issue messages to read/write data. The Hunter Controller ACC99D will be a passive server, waiting silently for messages from the gateway to which it will respond. The data read will be cached for serving via DNP3 to Cimplicity

A number of **data manipulation tools** such as the ability to scale values, perform arithmetic, logic operations, bit extraction, bit packing, conversion to / from Real and Integer types etc.

This data is shared with another protocol. For example DNP3 for the power industry, BACnet for the building automation industry. Any of the over 140 protocols available in the FieldServer library can be linked. More than 2 protocols can be used in the same gateway. You could share the irrigation data with Modbus and BACnet if required.

The 2nd protocol can be configured to be a server or a master or even both. So you can read Flow data and write it to another device using a protocol like Modbus. Or you can read the flow data and serve the data to a remote client using the 2nd protocol

Data Objects

An Excel spreadsheet is provided with the driver that contains a listing of all the services, the data objects used to monitor and command the controller. The following images provide samples from this spreadsheet. It contains notes on how to use the service and the meaning and use of each data object.

				BACnet Bv	BACnet Bi	BACnet Av	BACnet Ai		Bacnet Object Type
				DNP3 Bv Grp10	DNP3 Bi Grp1	DNP3 Av Grp 40	DNP3 Ai Grp30	DNP3 Ai Grp20	DNP3 Object Type
		Green – Data sent to ACC		Modbus Coil	Modbus Bi	Modbus Holding	Modbus Input Reg		Modbus Data Type
		Pink – Data read from ACC		0x0000	1xxxx	4xxxx	3xxxx		
		Data from ACC – Not available with DNP3		Add 1	Add 10001	Add 40001	Add 30001		
		Daya from ACC – only for DNP3		to get 0xxxx	to get 1xxxx	to get 4xxxx	to get 3xxxx		

Only use these columns for advanced configurations.

This is
DNP3 - Group 10, Address 0
BACnet - BinaryValue(0)
Modbus - Coil 00001

Notes on how to use the service

0x01 – SET FIELD CONTROLLER SYSTEM GLOBALS

Transmits to field controller(s), system global information from a Central to all Field Controllers for system event operation. The Time-of-Day and Midnight components will be expressed in 24-hour format. The new values become effective immediately. This command would normally use the global field controller address of 1940H. Addressing a single controller would be an alternate method

The payload of data is extracted from the Data Array as show below to form the message sent to the Controller

Data Array Offset	Payload item	Variable/ Data	Data Ty	Bo	Bi	Ao	Ai	Ai	
0		Trigger Write		0					Write to this point to trigger the command or configure command to write continuously
3	1	Hours	Byte			0			Hour time of day. Range is 0 to 23
4	2	Minutes	Byte			1			Minute of the hour. Range is 0 to 59
5	3	Seconds	Byte			2			Second of the minute. Range is 0 to 59.
6	4	Month	Byte			3			Calendar month. Range is 1 to 12.
7	5	Day	Byte			4			Calendar date. Range is 1 to 31
8	6	Year	Uint16			5			Calendar year. Range is 2005 to 2099.
9	7	SysDChour	Byte			6			Value of System Event Day-Change hour. Range is 0 to 23.
10	8	FcpDChour	Byte			7			Value of FCP Day-Change hour. Range is 0 to 23.
11	9	options	Byte			8			Sets up global options for the controller. Bit values are as follows: bit 0: Set if in 24-hour mode
12	10	curEtap	Byte			9			ETAP day of schedule. Range is 1 to 3.
13	11	maxEtap	Byte			10			ETAP schedule length. Range is 1 to 3.

Object Names

These are Ao Objects. The object number is provided. To get the Modbus register simply add 4000

Notes on how to use the object

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Full list of services and objects is provided.

Green = Send to Controller
Pink = Read from Controller

SUPPORTED SERVICES AND DATA – MOST COMMONLY USED
The Driver manual contains a full list of services and data objects. The notes provided here are for illustration only.

The Central station (example Cimplicity) can execute the following services.

Service
Change the 6 programs with all the variables associated with them

1. (1..6)
2. Start/stop Programs (1..6)
3. Start/stop Stations (1..99)
4. Read the daily Flow
5. Read the Station Activity Log
6. Read the Alarm Log
7. Set the Date and Time
8.

Change 6 programs
The following program parameters may be read/ changed

Program Parameters
1. 10 start times per program
   Irrigation days (days of the week,
2. ODD\EVEN, Day interval)
3. Program Stack/overlap
4. Seasonal Adjust
5. Run times

Exposed Variables / Data Objects

Program Parameters
1 set for each program

Param	Number of items if more than 1	Analog or Binary Point	Notes
Mode:			
StartTime	x10	A	
SchedType		A	
Sched		A	Days of week etc
Sched - Program Day - Monday Enable		B	
Sched - Program Day - Tuesday Enable		B	
Sched - Program Day - Wednesday Enable		B	
Sched - Program Day - Thursday Enable		B	
Sched - Program Day - Friday Enable		B	
Sched - Program Day - Saturday Enable		B	
Sched - Program Day - Sunday Enable		B	
Sched - Program Day - Odd Day Enable		B	
Sched - Program Day - Even Day Enable		B	
Sched - Program Day - Day Interval Enable		B	
IntLength		A	
IntNextWater		A	
SeasAdj		A	
NwwStart		A	
NwwEnd		A	
StaDly		A	
isRunning		B	
Startcmd		B	
Stopcmd		B	

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Alarm Log
The alarm log record consists of 5 fields which together provide information and details about the alarm event.
There are 96 Sets of these objects

Param	Number of items if more than 1	Analog or Binary Point	Notes
Idiom	Full Table of most recent	A	Alarm Category
Field1		A	Alarm reason Sensor/Pump/Program
Field2		A	Number
Field3		A	Other
Field4		A	Other
PurgeLogcmd		B	When commanded clears log

Flow Data

Param	Number of items if more than 1	Analog or Binary Point	Notes
flowToday		A	
flowyesterday		A	
flowWTD		A	
flowMTD		A	
flowYTD		A	

Station Data

Param	Number of items if more than 1	Analog or Binary Point	Notes
StationIsRunning	1 per station	B	
StationIsOverloaded	1 per station	B	
StationInAlarm	1 per station	B	

CUSTOMER SUPPORT

Hunter Industries Gateway Driver for FieldServer was developed by Chipkin, and we are proud to provide support for our products. For technical support, sales and customer service, please call us at 1 (866) 383-1657.

Thanks for choosing Chipkin's products and integration services to meet your building and industrial automation requirements!

Chipkin™ is a building and industrial automation protocol expert. We develop, configure, install and support gateways (protocol converters), data loggers and remote monitor and controlling applications. Founded in October 2000, Chipkin provides expert solutions for converting BACnet®, Modbus®, and LonWorks®—to name just a few—and enabling interfaces for HVAC, fire, siren, intercom, lighting, transportation and fuel systems. The high-quality products we offer (including those from other vendors) interface with Simplex™, Notifier™, McQuay™, GE™ and many others—so you can rest assured that we will select the most appropriate solution for your application.

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Toll Free: +1 866 383 1657
Email: salesgroup1@chipkin.com

REVISION HISTORY

DATE	RESP.	DRIVER VERSION	DOCUMENT REVISION	COMMENTS
14 Feb 2019	PMC	0.00	0	Released
22 Oct 2019	PMC	9	1	Updated
16 Jun 2021	YC	9	2	Updated to latest template