CAS-2700-02

Veeder Root

Modbus (RTU and TCP) / BACnet / HTML Gateway

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1. Veeder Root Gateway Description

The TLS protocol can be used to connect to suitably enabled Veeder Root Devices. This is a serial protocol using RS232. The protocol is nodeless, so only one Veeder Device can be connected to port one of the gateway.

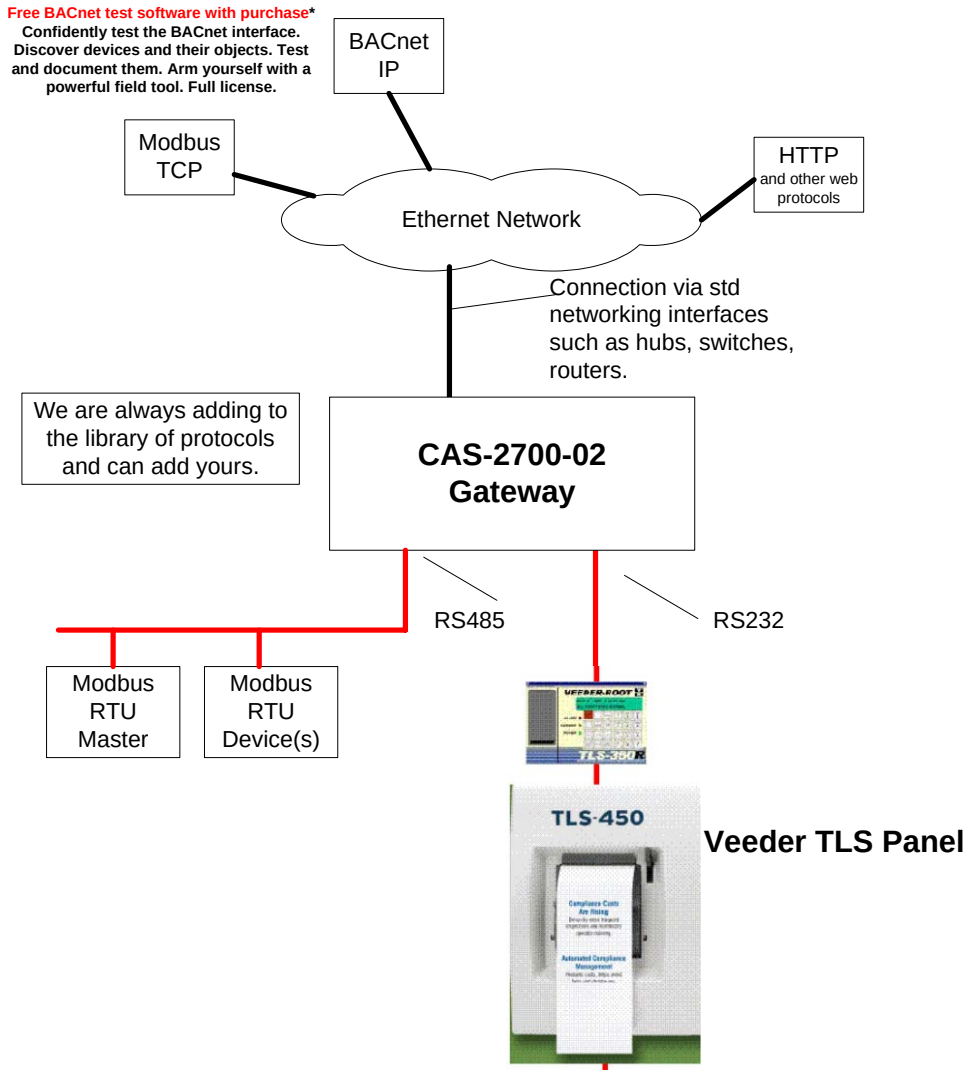
The Gateway connects to the Veeder Device, reads data and stores it internally. When a remote system requests data, this data is served in a form that is appropriate to the requesting protocol. In the event that the connection to the Veeder controller is lost, or data cannot be read, the gateway can signal this to the remote data client.

The gateway requires minimal configuration and can be considered a plug and play component of a system, in that it is ready to operate out of the box with the default configuration.

2. Connections

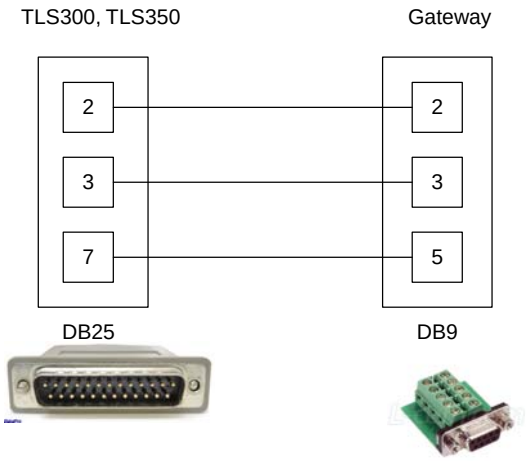
2.1. Block Diagram

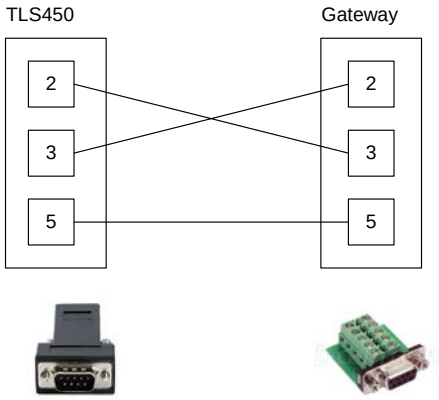
Monitor and Control Veeder TLS 300/350/450 Panels using BACnet, Modbus or Web



2.2. Wiring / Connections

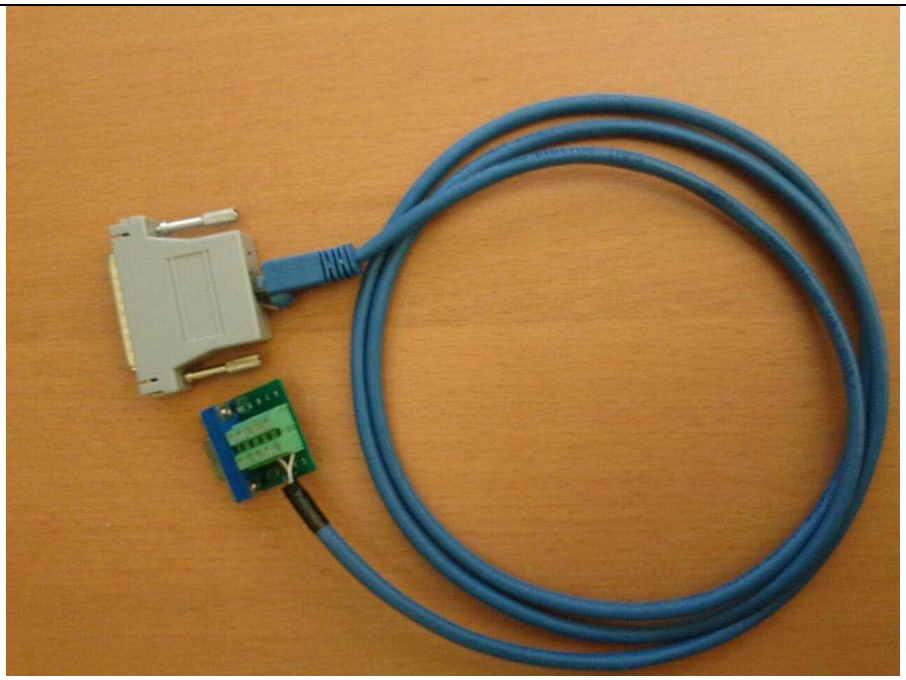
Block Diagrams of the pin-outs on the Veeder TLS Panel and the Gateway

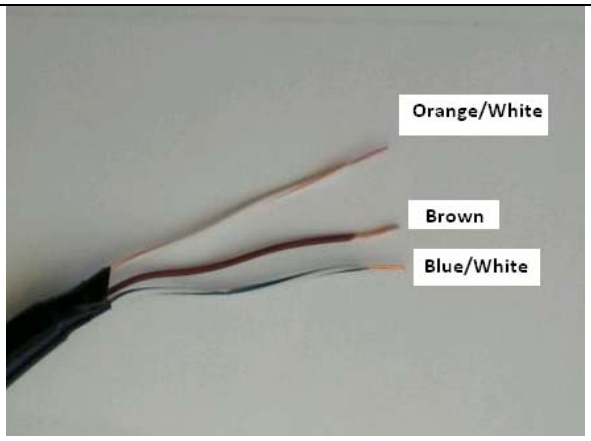


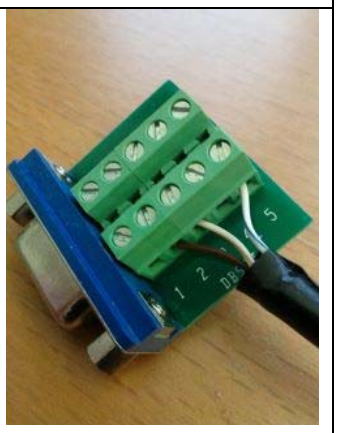


Quick Assembly Cable

This is the cable that is shipped with the gateway. You can easily assemble your own. Use the connection block diagrams or replace the Ethernet Patch cable with a longer segment.







2.2.1. Modbus RTU Connections

Port 0 – RS485 Mode Terminals

DB9 - Terminal 3	RS485 – Positive
DB9 – Terminal 2	RS485 – Negative
DB9 – Terminal 5	RS485 - Common

2.3. Limitations and Best Practices

Maximum Number of Veeder Root devices per Gateway

Only 1 Veeder Root device can be connected to a single gateway. This is a limitation of RS232 and of the TLS protocol.

RS232 Best Practices

We recommend a maximum of 30ft for the RS232 cable. A well made cable in a clean environment can easily run to 100ft and provide satisfactory performance.

3. Configuration and Settings

3.1. Veeder Root Device Connection Settings

The baud rate is a configurable setting for the Veeder Root Panel. (Note: Default is highlighted)

Baud Rate = 1200, 2400, 4800, **9600**, 19200

Also configurable are the Data Bits, Parity and Stop Bits settings. (Note: Defaults are highlighted)

Data Bits = 7, **8**

Parity = **None**, Even, Odd

Stop Bits = **1**, 2

3.2. Veeder Root Panel Setup for comms

Each model of TLS panel has different default settings. Print the Veeder 'Setup Report' to see the settings.

Make Reference to the

TLS-3XX Series Consoles System Setup Manual.pdf manual from Veeder Root

TLS-4XX Series Consoles System Setup Manual.pdf manual from Veeder Root

Abbreviated Procedure

Selecting the Communications Setup Function

To select Communications Setup, press FUNCTION until you see the message:

```
COMMUNICATIONS SETUP
PRESS <STEP> TO CONTINUE
```

Press STEP to continue.

Port Settings

In response to the COMMUNICATIONS SETUP message, press STEP until you see the message:

```
PORT SETTINGS
PRESS <ENTER>
```

This display allows you to access the communications settings–Baud Rate, Parity, Stop Bit, etc.–for any board installed in the console's Comm Bay.

The menu "PORT SETTINGS", contains parameters:

- Comm Board: 1 (RS-232)
- Baud Rate:
- Parity:
- Stop Bit:
- Data Length
- Code:

Press STEP to scroll thru the parameters

Press CHANGE to modify, ENTER and then STEP as prompted

Abandon the changes you are making by pushing MODE until the front screen showing time/date appears.

3.3. ModbusTCP Settings

To connect using ModbusTCP you need to know the IP address of the gateway and the Modbus 'Station' number (also known as 'Device Address' or 'Node ID') and the TCP Port for the connection.

The following are the configurable parameters for this connection:

- Modbus Station Number (Default value is 1)
- Modbus TCP Port (Default value is 502)

Review section *7.6 Another Method for Changing the IP* Address - DHCP to see the default IP Address settings and how to change them.

3.4. ModbusRTU Settings

To connect using ModbusRTU you need to set the connection correctly and the Modbus 'Station' number (also known as 'Device Address' or 'Node ID')

Modbus Station Number = 1 (This parameter is configurable – shared with ModusTCP).

Connection Settings : 9600 (or 19200) Baud , 8 Data Bits, 1 Stop Bit, No Parity. The Baud Rate is configurable. The device is a ModbusRTU slave.

3.5. BACnet IP Settings

BACnet supports discovery. Thus any BACnet tool will discover the gateway and report its properties. Each gateway must be allocated a unique device instance number and thus this is a configurable setting.

The configurable BACnet IP connection settings are:

- Device Instance Number (Default value is 389001)
- Port (Default value is 47808)

It is important to note that BACnet messages cannot pass from one subnet to another without a BACnet technology called BBMD installed. The easiest installation and the best way to avoid this complication is to set the gateway's IP address so that it is on the same subnet as the BACnet data client (usually the BAS / Scada system).

Review section *7.6 Another Method for Changing the IP* Address - DHCP to see the default IP Address settings and how to change them.

3.6. Other Settings

The following is a list of other configurable settings for the Gateway itself.

- Default Value:
  This is value that all data will be defaulted to on system startup and if the connection is ever lost to the device. This value also represents unavailable parameters or bad values.
- Scan Interval:
  This is the amount of time in seconds between sets of message polls sent to the device.
  Default = 10 seconds
- Timeout Time:
  This is the amount of time in seconds to wait for a valid response message from the

device.
Default = 3 seconds

- Number of Retries after a Timeout:
  This is the number of retries to attempt after a message has resulted in a timeout.
  Default = 3
- Time between Retries:
  This is the amount of time in seconds to wait between each retry.
  Default = 1 second
- Disconnect Time:
  This is the amount of time in seconds to wait after the device has been disconnected to set all data values to a bad value (the default value).
  Default = 120 seconds

3.7. Configuration Settings

Use a Browser and browse to the IP address of the Gateway. For example: http://192.168.1.113/bin/veederroot.

3.8. Change Configuration Settings

Use a Web Browser and type the following into the address bar:

http://192.168.1.113/ bin/veederroot

IP Address of your unit.

Veeder Root Configuration

BACnet Server

Port (?)	Device ID (?)
47808	389001

Modbus Slave

RTU Baud Rate (?)	Device ID (?)	TCP Port (?)
9600	1	502

Veeder Root Configuration

Baud Rate(?)	Data Bits(?)	Parity(?)	Stop Bits(?)
9600	8	None	1

VeederRoot Settings

	Default Value (?)
10	Scan Interval (in seconds) (?)
3	Timeout Time (in seconds) (?)
3	Number of Retries after a Timeout (?)
1	Time between Retries (in seconds) (?)
120	Disconnect Time (in seconds) (?)

Tank Configuration

#	Name(?)	Address(?)	Suffix(?)
1	Tank 1	01	Tank_1
2	Tank 2	02	Tank_2
3	Tank 3	03	Tank_3
4	Tank 4	04	Tank_4
5			
6			
7			
8			
9			
10			

Sensor Configuration

#	Name(?)	Address(?)	Suffix(?)	Type(?)
1				Liquid Sensor
2				Liquid Sensor
3				Liquid Sensor
4				Liquid Sensor
5				Liquid Sensor
6				Liquid Sensor
7				Liquid Sensor
8				Liquid Sensor
9				Liquid Sensor
10				Liquid Sensor

Vacuum Sensor Configuration

#	Name(?)	Address(?)	Suffix(?)
1			
2			

System Configuration

☑ System Alarms

Save Configuration

Change the Settings and click Submit to save them. To cancel changes simply close the page without submitting.

The Modbus Station ID is shared between ModbusRTU and ModbusTCP

Note on IP Addresses: Another method is provided to change the Netmask and Gateway address.

Changes do not take effect until the device restarts. Use the Reset button the web page or recycle the power.

4. Reading Data using HTML / Web Browser

Use a Web Browser to browse to this page.

http://192.168.1.113/bin/veederroot/reports

You are presen[illegible]ith a screen similar to this one.

This is the IP address of your gateway

VeederRoot mapping and current status

VeederRoot	BACnet IP	Modbus	Value
Tank_1_tank_product_code	analog_input (1)	40001	-1
Tank_1_tank_tank_status	analog_input (2)	40002	-1
Tank_1_tank_volume	analog_input (3)	40003	-1
Tank_1_tank_tc_volume	analog_input (4)	40004	-1
Tank_1_tank_ullage	analog_input (5)	40005	-1
Tank_1_tank_height	analog_input (6)	40006	-1
Tank_1_tank_water	analog_input (7)	40007	-1
Tank_1_tank_temperature	analog_input (8)	40008	-1
Tank_1_tank_water_volume	analog_input (9)	40009	-1
Tank_2_tank_product_code	analog_input (101)	40101	-1
Tank_2_tank_tank_status	analog_input (102)	40102	-1
Tank_2_tank_volume	analog_input (103)	40103	-1
Tank_2_tank_tc_volume	analog_input (104)	40104	-1
Tank_2_tank_ullage	analog_input (105)	40105	-1

5. Reading Modbus Data

Need to know more about Modbus ? Read this guide.

http://www.chipkin.com/september-2010-newsletter

5.1. Modbus Function Supported (RTU and TCP)

The Gateway supports functions 1, 2, 3, and 4. Most masters should be configured to use function 3 (Read Holding Registers). However it will respond to polls that use the other functions with offset equal to zero. You can read this data as 3xxxx, 1xxxx, 0xxxx or 4xxxx data.

5.2. Veeder Root Modbus Data Map

Typical Tank Inventory

Modbus Address	Value Stored
40001	Tank1_ Product_Code
40002	Tank1_Tank_Status
40003	Tank1_Volume
40004	Tank1_TC_Volume
40005	Tank1_Ullage
40006	Tank1_Height
40007	Tank1_Water
40008	Tank1_Temperature

40009	Tank1_Water_Volume

The 00 value can range from 00 - 09 which stands for tanks # 01 to 10

Typical Tank Alarms

Modbus Address	Value Stored
40010	Tank Common Alarm
40011	Tank Setup Data Warning
40012	Tank Leak Alarm
40013	Tank High Water Alarm
40014	Tank Overfill Alarm
40015	Tank Low Product Alarm
40016	Tank Sudden Loss Alarm
40017	Tank High Product Alarm
40018	Tank Invalid Fuel Level Alarm
40019	Tank Probe Out Alarm
40020	Tank High Water Warning
40021	Tank Delivery Needed Warning
40022	Tank Maximum Product Alarm
40023	Tank Gross Leak Test Fail Alarm
40024	Tank Periodic Leak Test Fail Alarm
40025	Tank Annual Leak Test Fail Alarm
40026	Tank Periodic Test Needed Warning

40027	Tank Annual Test Needed Warning
40028	Tank Periodic Test Needed Alarm
40029	Tank Annual Test Needed Alarm
40030	Tank Leak Test Active
40031	Tank No CSLD Idle Time Warning
40032	Tank Siphon Break Active Warning
40033	Tank CSLD Rate Increase Warning
40034	Tank AccuChart Calibration Warning
40035	Tank HRM Reconciliation Warning
40036	Tank HRM Reconciliation Alarm
40037	Tank Cold Temperature Warning
40038	Tank Missing Delivery Ticket Warning
40039	Tank/Line Gross Leak Alarm
40040	Delivery Density Warning
40041	Tank Unknown Alarm

The 00 value can range from 00 - 09 which stands for tanks # 01 to 10

Typical Vacuum Sensor

Modbus Address	Value Stored
41001	Vaccum_Serial_Number
41002	Vaccum_Evac_State

41003	Vacuum_Fluid_Status
41004	Vacuum_Ctrl_Vlv_State
41005	Vacuum_Valid_Leak_rate
41006	Vacuum_Leak_Rate
41007	Vacuum_Leak_Rate_x1000
41008	Vacuum_Valid_Time_to_noVac
41009	Vacuum_Time_to_noVac
41010	Vacuum_Valid_Evac_Ratio_Flag
41011	Vacuum_Evac_ratio
41012	Vacuum_Evac_ratio_x1000
41013	Vacuum_Evac_Ratio_Pressure
41014	Vacuum_Evac_Ratio_Pressure_x1000
41015	Vacuum_sensor_fault_bits
41016	Vacuum_Num_Values
41017	Vacuum_Compensated_pressure
41018	Vacuum_Compensated_pressure_x1000
41019	Vacuum_Uncompensated_pressure
41020	Vacuum_Uncompensated_pressure_x1000

The 0 value can range from 0 to 1 which represents the vacuum sensors (1 or 2)

System Status

Modbus Address	Value Stored

42001	System Common Alarm
42002	Printer out of Paper
42003	Printer Error
42004	EEPROM Configuration Error
42005	Battery Off
42006	Too Many Tanks
42007	System Security Warning
42008	ROM Revision Warning
42009	Remote Display Communications Error
42010	Autodial Error
42011	Software Module Warning
42012	Tank Test Shutdown Warning
42013	Protective Cover Alarm
42014	BIR Shift Close Pending
42015	BIR Daily Close Pending
42016	PC(H8) Revision Warning
42017	System Self Test Error
42018	System Clock Incorrect Warning
42019	System Device Poll Timeout
42020	Maintenance Tracker NVMem Removed
42021	Maintenance Tracker Communication Module Removed
42022	Database Error

42023	File System Error
42024	System Unknown Alarm

Typical Sensors

Note: The number of registers for each sensor will differ depending on which type of sensor is configured. The following tables display some possible register combinations for a few different sensor types. The register numbers provided are if this sensor was configured as Sensor # 1 in the configuration screen.

Vapor Sensor

Modbus Address	Value Stored
43001	Vapor Common Alarm
43002	Vapor Sensor Setup Data Warning
43003	Vapor Sensor Fuel Alarm
43004	Vapor Sensor Out Alarm
43005	Vapor Sensor Short Alarm
43006	Vapor Sensor Water Alarm
43007	Vapor Sensor Water Out Alarm
43008	Vapor Sensor High Liquid Alarm
43009	Vapor Sensor Low Liquid Alarm
43010	Vapor Sensor Liquid Warning

43011	Vapor Unknown Alarm

Type B Sensor

Modbus Address	Value Stored
43001	Type-B Common Alarm
43002	Type-B Sensor Setup Data Warning
43003	Type-B Sensor Fuel Alarm
43004	Type-B Sensor Out Alarm
43005	Type-B Sensor Short Alarm
43006	Type-B Sensor Water Alarm
43007	Type-B Sensor Water Out Alarm
43008	Type-B Sensor High Liquid Alarm
43009	Type-B Sensor Low Liquid Alarm
43010	Type-B Sensor Liquid Warning
43011	Type-B Unknown Alarm

Relay Sensor

Modbus Address	Value Stored
43001	Relay Common Alarm
43002	Relay Setup Data Warning
43003	Relay Out Alarm
43004	Relay Unknown Alarm

Volumetric Line Leak Sensor

Modbus Address	Value Stored
43001	VLLD Common Alarm
43002	VLLD Setup Data Warning
43003	VLLD Self Test Alarm
43004	VLLD Shutdown Alarm
43005	VLLD Leak Test Fail Alarm
43006	VLLD Selftest Invalid Warning
43007	VLLD Continuous Handle On Warning
43008	VLLD Gross Line Test Fail Alarm
43009	VLLD Gross Line Selftest Fail Alarm
43010	VLLD Gross Pump Test Fail Alarm
43011	VLLD Gross Pump Selftest Fail Alarm
43012	VLLD Periodic Test Needed Warning
43013	VLLD Annual Test Needed Warning
43014	VLLD Periodic Test Needed Alarm
43015	VLLD Annual Test Needed Alarm
43016	VLLD Periodic Line Test Fail Alarm
43017	VLLD Periodic Line Selftest Fail Alarm
43018	VLLD Periodic Pump Test Fail Alarm
43019	VLLD Periodic Pump Selftest Fail Alarm
43020	VLLD Annual Line Test Fail Alarm

43021	VLLD Annual Line Selftest Fail Alarm
43022	VLLD Annual Pump Test Fail Alarm
43023	VLLD Annual Pump Selftest Fail Alarm
43024	VLLD Pressure Warning
43025	VLLD Pressure Alarm
43026	VLLD Gross Test Fault Alarm
43027	VLLD Periodic Test Fault Alarm
43028	VLLD Annual Test Fault Alarm
43029	VLLD Fuel Out Alarm
43030	VLLD Unknown Alarm

Smart Sensor

Modbus Address	Value Store
43001	Smart Sensor Common Alarm
43002	Smart Sensor Setup Data Warning
43003	Smart Sensor Communication Alarm
43004	Smart Sensor Fault Alarm
43005	Smart Sensor Fuel Warning
43006	Smart Sensor Fuel Alarm
43007	Smart Sensor Water Warning
43008	Smart Sensor Water Alarm
43009	Smart Sensor High Liquid Warning

43010	Smart Sensor High Liquid Alarm
43011	Smart Sensor Low Liquid Warning
43012	Smart Sensor Low Liquid Alarm
43013	Smart Sensor Temperature Warning
43014	Smart Sensor Relay Active
43015	Smart Sensor Install Alarm
43016	Smart Sensor Sensor Fault Warning
43017	Smart Sensor Vacuum Warning
43018	Smart Sensor No Vacuum Warning
43019	Smart Sensor Unknown Alarm

For the above sensor address maps, these addresses only correspond to a sensor that is configured in the Sensor 1 spot in the Gateway configuration. The 0 value can range from 0 - 9 which stands for Sensors # 01 to 10.

5.3. Interpreting Modbus Data

Modbus does not have a mechanism for reporting the validity of data. What happens if the gateway loses its connection to the Veeder Root Device? After a timeout period has elapsed the gateway will regard the data it had read previously, as unreliable.

The remote data client will see the value 65535 (-1, configurable) in the registers that contain unreliable data. In other words, rather than serve the old (possibly obsolete) data, the gateway serves a value that clearly identifies that the data is invalid.

Some values have been encoded as IEEE754 format floating point numbers. These values use 2x 16bit registers. They are clearly identified in the Modbus Map. Since Modbus does not support floating point numbers so all other values are served as whole numbers.

5.4. Test Procedure – Use CAS Modbus Scanner

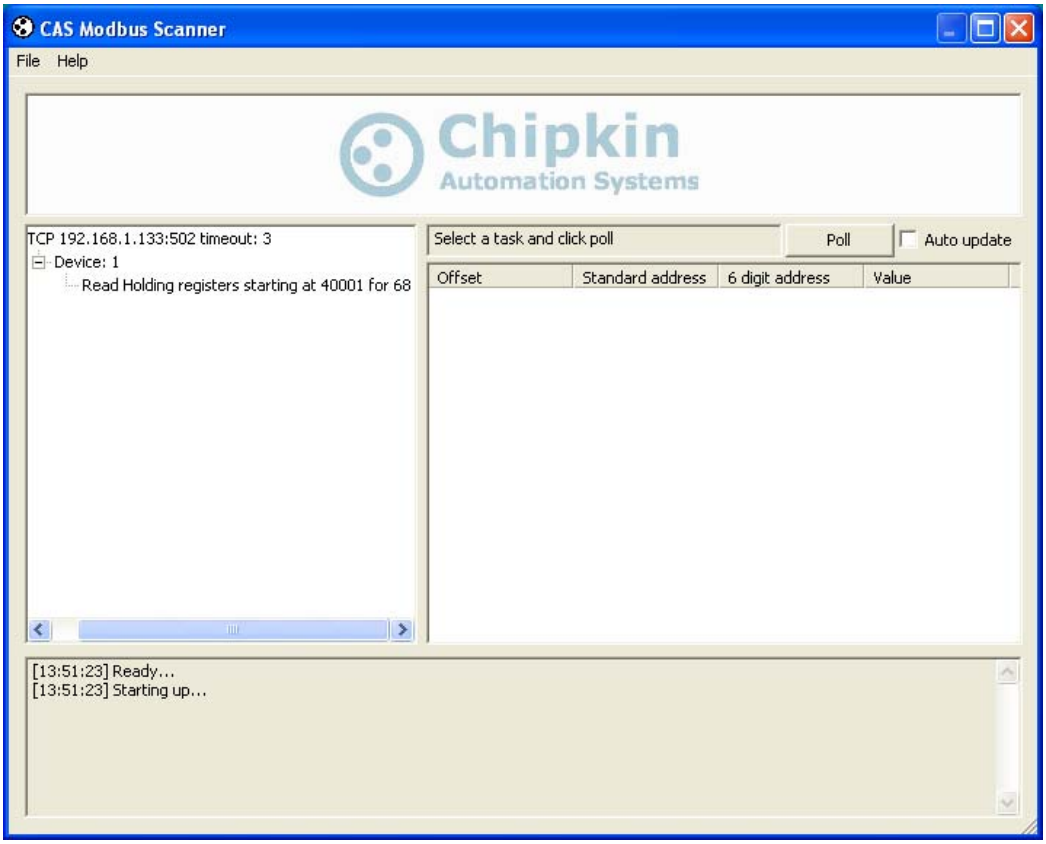
You can test the ModbusTCP data using free test software provided by Chipkin Automation Software.

This is a link to the download page. http://www.chipkin.com/cas-modbus-scanner

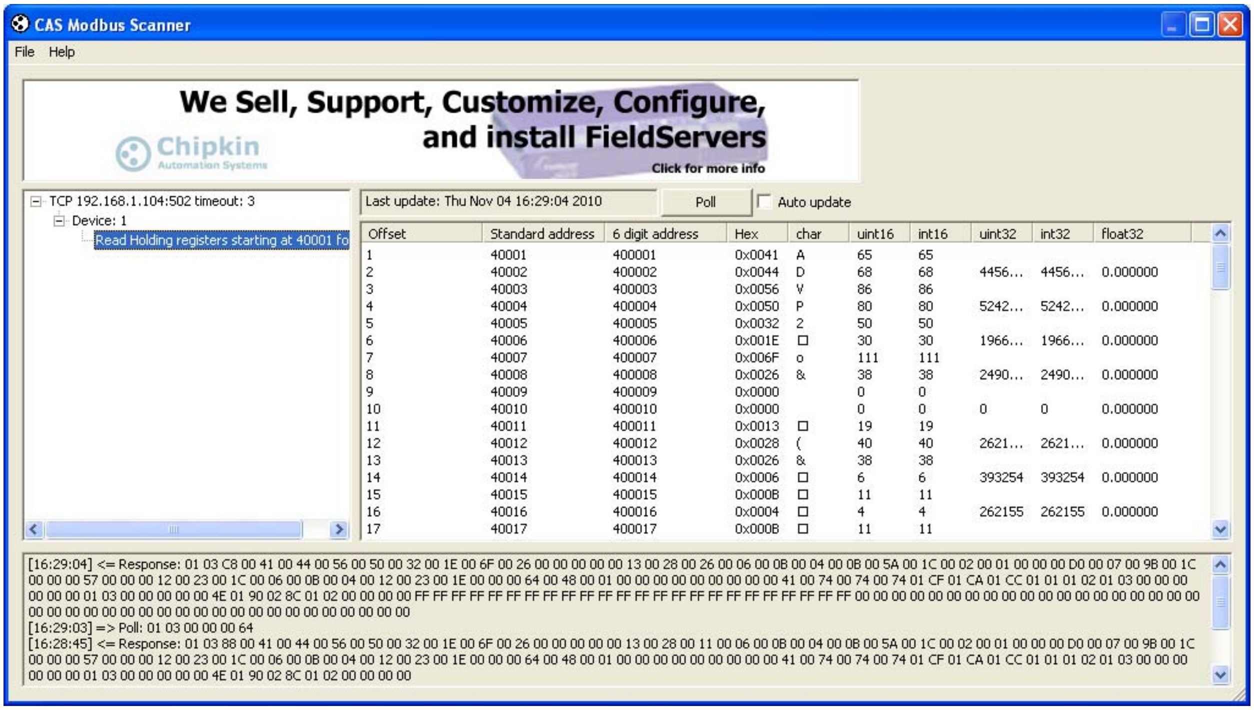
Configure the scanner as follows

1. Add a connection – specify the IP address of the gateway
2. Add a device to the connection. Set the device=1
3. Add a Request to the device: Read Holding register offset=1 Length=68

The result should be like this.



4. Click the Poll Button
5. Use the values found in the ‘int16 column and the data map table to review the data.


CAS Modbus Scanner
File Help
We Sell, Support, Customize, Configure, and install FieldServers
Chipkin Automation Systems
Click for more info
TCP 192.168.1.104:502 timeout: 3
Device: 1
Read Holding registers starting at 40001 fo
Last update: Thu Nov 04 16:29:04 2010
Poll
Auto update
Offset Standard address 6 digit address Hex char uint16 int16 uint32 int32 float32
1 40001 400001 0x0041 A 65 65
2 40002 400002 0x0044 D 68 68 4456… 4456… 0.000000
3 40003 400003 0x0056 V 86 86
4 40004 400004 0x0050 P 80 80 5242… 5242… 0.000000
5 40005 400005 0x0032 2 50 50
6 40006 400006 0x001E □ 30 30 1966… 1966… 0.000000
7 40007 400007 0x006F o 111 111
8 40008 400008 0x0026 & 38 38 2490… 2490… 0.000000
9 40009 400009 0x0000 0 0
10 40010 400010 0x0000 0 0 0 0 0.000000
11 40011 400011 0x0013 □ 19 19
12 40012 400012 0x0028 (40 40 2621… 2621… 0.000000
13 40013 400013 0x0026 & 38 38
14 40014 400014 0x0006 □ 6 6 393254 393254 0.000000
15 40015 400015 0x000B □ 11 11
16 40016 400016 0x0004 □ 4 4 262155 262155 0.000000
17 40017 400017 0x000B □ 11 11
[16:29:04] <= Response: 01 03 C8 00 41 00 44 00 56 00 50 00 32 00 1E 00 6F 00 26 00 00 00 00 00 13 00 28 00 26 00 06 00 0B 00 04 00 0B 00 5A 00 1C 00 02 00 01 00 00 00 D0 00 07 00 9B 00 1C
00 00 00 57 00 00 00 12 00 23 00 1C 00 06 00 0B 00 04 00 12 00 23 00 1E 00 00 00 64 00 48 00 01 00 00 00 00 00 00 00 00 00 41 00 74 00 74 00 74 01 CF 01 CA 01 CC 01 01 01 02 01 03 00 00 00
00 00 00 01 03 00 00 00 00 00 4E 01 90 02 8C 01 02 00 00 00 00 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
[16:29:03] => Poll: 01 03 00 00 00 64
[16:28:45] <= Response: 01 03 88 00 41 00 44 00 56 00 50 00 32 00 1E 00 6F 00 26 00 00 00 00 00 13 00 28 00 11 00 06 00 0B 00 04 00 0B 00 5A 00 1C 00 02 00 01 00 00 00 D0 00 07 00 9B 00 1C
00 00 00 57 00 00 00 12 00 23 00 1C 00 06 00 0B 00 04 00 12 00 23 00 1E 00 00 00 64 00 48 00 01 00 00 00 00 00 00 00 00 00 41 00 74 00 74 00 74 01 CF 01 CA 01 CC 01 01 01 02 01 03 00 00 00
00 00 00 01 03 00 00 00 00 00 4E 01 90 02 8C 01 02 00 00 00 00

6. Reading BACnet Data

BACnet supports discovery. When you discover the gateway, objects and properties you will find appropriately named objects that report data from the Veeder Root device. Because BACnet supports discovery, usually knowledge of the BACnet Device Instance Number does not need to be known in advance.

Each BACnet device (like the gateway) needs to have a unique instance number. Therefore it may be necessary for you to change the instance number.

Need to learn some BACnet basics? Read this guide.

http://www.chipkin.com/bacnet-solutions

6.1. Most Common BACnet Problem

If the device or application that is reading the BACnet data is on another subnet then it will not discover or be able to talk to the gateway. This can be resolved two ways. 1. Change the IP address of the gateway to be on the same subnet – a simple task. 2. Install BBMD – a non trivial task – but a task you can often pass the buck on – it is the responsibility of the company installing the BAS system to provide BBMD. You can read more about it at this link. http://www.chipkin.com/articles/bacnet-bbmd

6.2. Interpreting BACnet Data

If the gateway loses communications with the Veeder Root device or if a data point cannot be read from the controller, the 'Out of Service' property of the data object is set true once the timeout has expired. The value of the 'Present Value' property is not changed, thus the last good value will be shown.

6.3. BACnet Objects

The following is a list of possible BACnet Objects. **Note**: This list only contains what is configured with the default configuration (four tanks and system alarms).

BACnet IP Object	Description
analog_input (1)	Tank_1_tank_product_code
analog_input (2)	Tank_1_tank_tank_status
analog_input (3)	Tank_1_tank_volume
analog_input (4)	Tank_1_tank_tc_volume
analog_input (5)	Tank_1_tank_ullage
analog_input (6)	Tank_1_tank_height
analog_input (7)	Tank_1_tank_water
analog_input (8)	Tank_1_tank_temperature
analog_input (9)	Tank_1_tank_water_volume
analog_input (101)	Tank_2_tank_product_code
analog_input (102)	Tank_2_tank_tank_status
analog_input (103)	Tank_2_tank_volume
analog_input (104)	Tank_2_tank_tc_volume
analog_input (105)	Tank_2_tank_ullage
analog_input (106)	Tank_2_tank_height
analog_input (107)	Tank_2_tank_water
analog_input (108)	Tank_2_tank_temperature
analog_input (109)	Tank_2_tank_water_volume
analog_input (201)	Tank_3_tank_product_code
analog_input (202)	Tank_3_tank_tank_status

analog_input (203)	Tank_3_tank_volume
analog_input (204)	Tank_3_tank_tc_volume
analog_input (205)	Tank_3_tank_ullage
analog_input (206)	Tank_3_tank_height
analog_input (207)	Tank_3_tank_water
analog_input (208)	Tank_3_tank_temperature
analog_input (209)	Tank_3_tank_water_volume
analog_input (301)	Tank_4_tank_product_code
analog_input (302)	Tank_4_tank_tank_status
analog_input (303)	Tank_4_tank_volume
analog_input (304)	Tank_4_tank_tc_volume
analog_input (305)	Tank_4_tank_ullage
analog_input (306)	Tank_4_tank_height
analog_input (307)	Tank_4_tank_water
analog_input (308)	Tank_4_tank_temperature
analog_input (309)	Tank_4_tank_water_volume
analog_input (2001)	System_Status_system_common_alarm
analog_input (2002)	System_Status_printer_out_of_paper
analog_input (2003)	System_Status_printer_error
analog_input (2004)	System_Status_eeprom_configuration_error
analog_input (2005)	System_Status_battery_off
analog_input (2006)	System_Status_too_many_tanks

analog_input (2007)	System_Status_system_security_warning
analog_input (2008)	System_Status_rom_revision_warning
analog_input (2009)	System_Status_remote_display_communications_error
analog_input (2010)	System_Status_autodial_error
analog_input (2011)	System_Status_software_module_warning
analog_input (2012)	System_Status_tank_test_shutdown_warning
analog_input (2013)	System_Status_protective_cover_alarm
analog_input (2014)	System_Status_bir_shift_close_pending
analog_input (2015)	System_Status_bir_daily_close_pending
analog_input (2016)	System_Status_pch8_revision_warning
analog_input (2017)	System_Status_system_self_test_error
analog_input (2018)	System_Status_system_clock_incorrect_warning
analog_input (2019)	System_Status_system_device_poll_timeout
analog_input (2020)	System_Status_maintenance_tracker_nvmem_removed
analog_input (2021)	System_Status_maintenance_tracker_communication_module_removed
analog_input (2022)	System_Status_database_error
analog_input (2023)	System_Status_file_system_error
analog_input (2024)	System_Status_system_unknown_alarm
analog_input (10)	Tank_1_tank_common_alarm
analog_input (11)	Tank_1_tank_setup_data_warning
analog_input (12)	Tank_1_tank_leak_alarm
analog_input (13)	Tank_1_tank_high_water_alarm

analog_input (14)	Tank_1_tank_overfill_alarm
analog_input (15)	Tank_1_tank_low_product_alarm
analog_input (16)	Tank_1_tank_sudden_loss_alarm
analog_input (17)	Tank_1_tank_high_product_alarm
analog_input (18)	Tank_1_tank_invalid_fuel_level_alarm
analog_input (19)	Tank_1_tank_probe_out_alarm
analog_input (20)	Tank_1_tank_high_water_warning
analog_input (21)	Tank_1_tank_delivery_needed_warning
analog_input (22)	Tank_1_tank_maximum_product_alarm
analog_input (23)	Tank_1_tank_gross_leak_test_fail_alarm
analog_input (24)	Tank_1_tank_periodic_leak_test_fail_alarm
analog_input (25)	Tank_1_tank_annual_leak_test_fail_alarm
analog_input (26)	Tank_1_tank_periodic_test_needed_warning
analog_input (27)	Tank_1_tank_annual_test_needed_warning
analog_input (28)	Tank_1_tank_periodic_test_needed_alarm
analog_input (29)	Tank_1_tank_annual_test_needed_alarm
analog_input (30)	Tank_1_tank_leak_test_active
analog_input (31)	Tank_1_tank_no_csld_idle_time_warning
analog_input (32)	Tank_1_tank_siphon_break_active_warning
analog_input (33)	Tank_1_tank_csld_rate_increase_warning
analog_input (34)	Tank_1_tank_accuchart_calibration_warning
analog_input (35)	Tank_1_tank_hrm_reconciliation_warning

analog_input (36)	Tank_1_tank_hrm_reconciliation_alarm
analog_input (37)	Tank_1_tank_cold_temperature_warning
analog_input (38)	Tank_1_tank_missing_delivery_ticket_warning
analog_input (39)	Tank_1_tank/line_gross_leak_alarm
analog_input (40)	Tank_1_delivery_density_warning
analog_input (41)	Tank_1_tank_unknown_alarm
analog_input (110)	Tank_2_tank_common_alarm
analog_input (111)	Tank_2_tank_setup_data_warning
analog_input (112)	Tank_2_tank_leak_alarm
analog_input (113)	Tank_2_tank_high_water_alarm
analog_input (114)	Tank_2_tank_overfill_alarm
analog_input (115)	Tank_2_tank_low_product_alarm
analog_input (116)	Tank_2_tank_sudden_loss_alarm
analog_input (117)	Tank_2_tank_high_product_alarm
analog_input (118)	Tank_2_tank_invalid_fuel_level_alarm
analog_input (119)	Tank_2_tank_probe_out_alarm
analog_input (120)	Tank_2_tank_high_water_warning
analog_input (121)	Tank_2_tank_delivery_needed_warning
analog_input (122)	Tank_2_tank_maximum_product_alarm
analog_input (123)	Tank_2_tank_gross_leak_test_fail_alarm
analog_input (124)	Tank_2_tank_periodic_leak_test_fail_alarm
analog_input (125)	Tank_2_tank_annual_leak_test_fail_alarm

analog_input (126)	Tank_2_tank_periodic_test_needed_warning
analog_input (127)	Tank_2_tank_annual_test_needed_warning
analog_input (128)	Tank_2_tank_periodic_test_needed_alarm
analog_input (129)	Tank_2_tank_annual_test_needed_alarm
analog_input (130)	Tank_2_tank_leak_test_active
analog_input (131)	Tank_2_tank_no_csld_idle_time_warning
analog_input (132)	Tank_2_tank_siphon_break_active_warning
analog_input (133)	Tank_2_tank_csld_rate_increase_warning
analog_input (134)	Tank_2_tank_accuchart_calibration_warning
analog_input (135)	Tank_2_tank_hrm_reconciliation_warning
analog_input (136)	Tank_2_tank_hrm_reconciliation_alarm
analog_input (137)	Tank_2_tank_cold_temperature_warning
analog_input (138)	Tank_2_tank_missing_delivery_ticket_warning
analog_input (139)	Tank_2_tank/line_gross_leak_alarm
analog_input (140)	Tank_2_delivery_density_warning
analog_input (141)	Tank_2_tank_unknown_alarm
analog_input (210)	Tank_3_tank_common_alarm
analog_input (211)	Tank_3_tank_setup_data_warning
analog_input (212)	Tank_3_tank_leak_alarm
analog_input (213)	Tank_3_tank_high_water_alarm
analog_input (214)	Tank_3_tank_overfill_alarm
analog_input (215)	Tank_3_tank_low_product_alarm

analog_input (216)	Tank_3_tank_sudden_loss_alarm
analog_input (217)	Tank_3_tank_high_product_alarm
analog_input (218)	Tank_3_tank_invalid_fuel_level_alarm
analog_input (219)	Tank_3_tank_probe_out_alarm
analog_input (220)	Tank_3_tank_high_water_warning
analog_input (221)	Tank_3_tank_delivery_needed_warning
analog_input (222)	Tank_3_tank_maximum_product_alarm
analog_input (223)	Tank_3_tank_gross_leak_test_fail_alarm
analog_input (224)	Tank_3_tank_periodic_leak_test_fail_alarm
analog_input (225)	Tank_3_tank_annual_leak_test_fail_alarm
analog_input (226)	Tank_3_tank_periodic_test_needed_warning
analog_input (227)	Tank_3_tank_annual_test_needed_warning
analog_input (228)	Tank_3_tank_periodic_test_needed_alarm
analog_input (229)	Tank_3_tank_annual_test_needed_alarm
analog_input (230)	Tank_3_tank_leak_test_active
analog_input (231)	Tank_3_tank_no_csld_idle_time_warning
analog_input (232)	Tank_3_tank_siphon_break_active_warning
analog_input (233)	Tank_3_tank_csld_rate_increase_warning
analog_input (234)	Tank_3_tank_accuchart_calibration_warning
analog_input (235)	Tank_3_tank_hrm_reconciliation_warning
analog_input (236)	Tank_3_tank_hrm_reconciliation_alarm
analog_input (237)	Tank_3_tank_cold_temperature_warning

analog_input (238)	Tank_3_tank_missing_delivery_ticket_warning
analog_input (239)	Tank_3_tank/line_gross_leak_alarm
analog_input (240)	Tank_3_delivery_density_warning
analog_input (241)	Tank_3_tank_unknown_alarm
analog_input (310)	Tank_4_tank_common_alarm
analog_input (311)	Tank_4_tank_setup_data_warning
analog_input (312)	Tank_4_tank_leak_alarm
analog_input (313)	Tank_4_tank_high_water_alarm
analog_input (314)	Tank_4_tank_overfill_alarm
analog_input (315)	Tank_4_tank_low_product_alarm
analog_input (316)	Tank_4_tank_sudden_loss_alarm
analog_input (317)	Tank_4_tank_high_product_alarm
analog_input (318)	Tank_4_tank_invalid_fuel_level_alarm
analog_input (319)	Tank_4_tank_probe_out_alarm
analog_input (320)	Tank_4_tank_high_water_warning
analog_input (321)	Tank_4_tank_delivery_needed_warning
analog_input (322)	Tank_4_tank_maximum_product_alarm
analog_input (323)	Tank_4_tank_gross_leak_test_fail_alarm
analog_input (324)	Tank_4_tank_periodic_leak_test_fail_alarm
analog_input (325)	Tank_4_tank_annual_leak_test_fail_alarm
analog_input (326)	Tank_4_tank_periodic_test_needed_warning
analog_input (327)	Tank_4_tank_annual_test_needed_warning

analog_input (328)	Tank_4_tank_periodic_test_needed_alarm
analog_input (329)	Tank_4_tank_annual_test_needed_alarm
analog_input (330)	Tank_4_tank_leak_test_active
analog_input (331)	Tank_4_tank_no_csld_idle_time_warning
analog_input (332)	Tank_4_tank_siphon_break_active_warning
analog_input (333)	Tank_4_tank_csld_rate_increase_warning
analog_input (334)	Tank_4_tank_accuchart_calibration_warning
analog_input (335)	Tank_4_tank_hrm_reconciliation_warning
analog_input (336)	Tank_4_tank_hrm_reconciliation_alarm
analog_input (337)	Tank_4_tank_cold_temperature_warning
analog_input (338)	Tank_4_tank_missing_delivery_ticket_warning
analog_input (339)	Tank_4_tank/line_gross_leak_alarm
analog_input (340)	Tank_4_delivery_density_warning
analog_input (341)	Tank_4_tank_unknown_alarm

6.4. BACnet Test Procedure

You have been provided with a USB key to the CAS BACnet Explorer. This key activates the software. It cannot run without it. If you don't have your USB key, you can still activate the application – it requires an internet connection. A video provides help.

http://www.chipkin.com/articles/cas-bacnet-explorer-software-activation-video

You might also want to refer to these articles.

http://www.chipkin.com/articles/cas-bacnet-explorer-usbsoftware-activation-problems

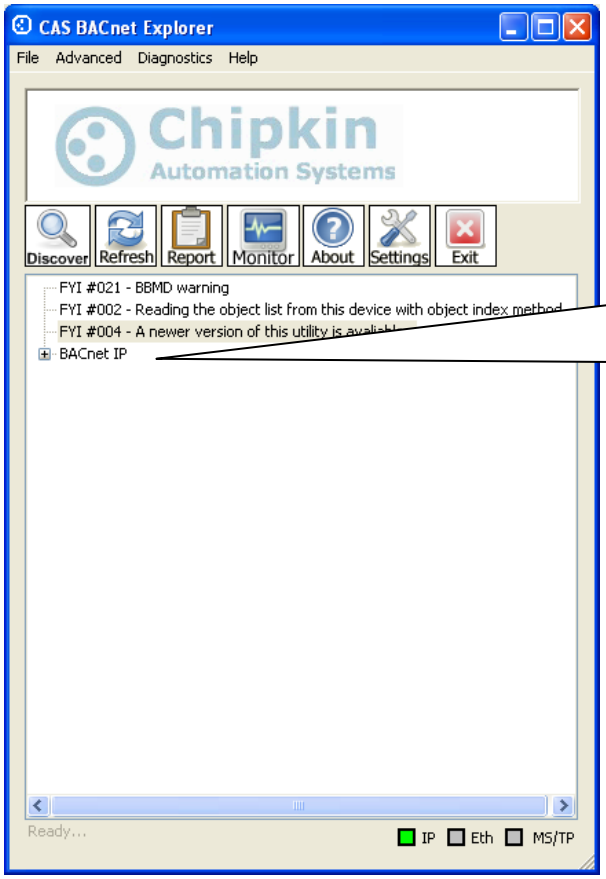
http://www.chipkin.com/cas-bacnet-explorer-licenses-faq

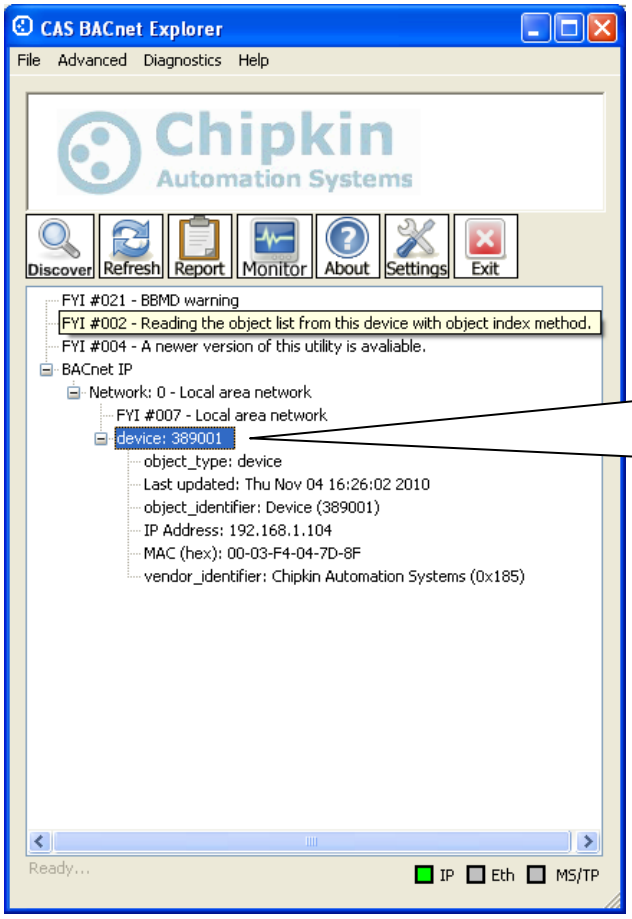
Install and activate the application. Download from here.

http://www.chipkin.com/cas-bacnet-explorer/

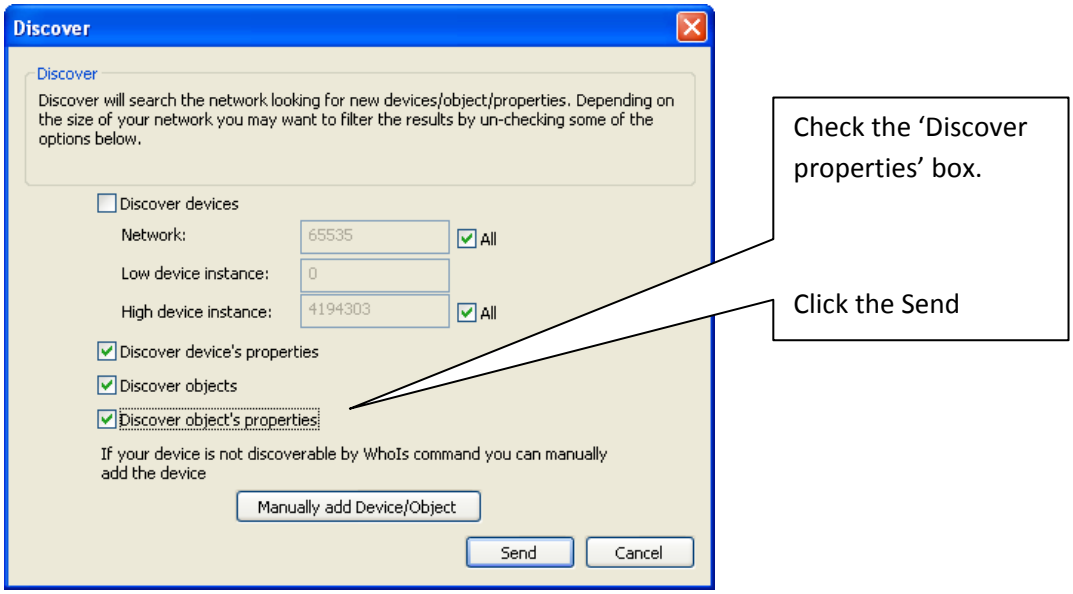
Procedure

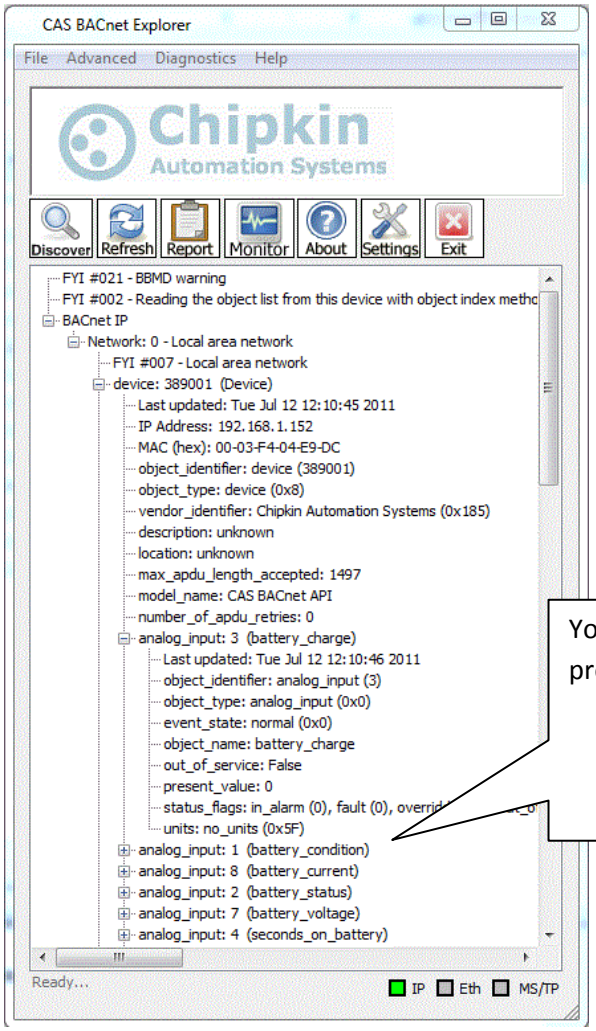
1. Start the application
2. Click Settings
3. Check IP – uncheck MSTP and Ethernet
4. Click on the network card you will use.
5. Click Ok.
6. Now click discover
7. Click Send


CAS BACnet Explorer
File Advanced Diagnostics Help
Chipkin
Automation Systems
Discover
Refresh
Report
Monitor
About
Settings
Exit
FYI #021 - BBMD warning
FYI #002 - Reading the object list from this device with object index method
FYI #004 - A newer version of this utility is avaliabl
BACnet IP
Ready...
IP
Eth
MS/TP
Device(s) were discovered.
Click the + to open



Select the device and click discover again.

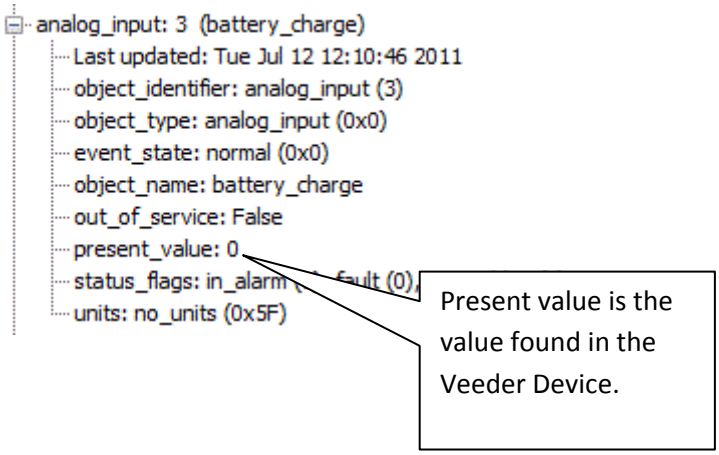

Discover
Discover
Discover will search the network looking for new devices/object/properties. Depending on the size of your network you may want to filter the results by un-checking some of the options below.
Discover devices
Network:
65535
All
Low device instance:
0
High device instance:
4194303
All
Discover device's properties
Discover objects
Discover object's properties
If your device is not discoverable by WhoIs command you can manually add the device
Manually add Device/Object
Send
Cancel
Check the 'Discover properties' box.
Click the Send



You get a list of objects with properties.

Out of Service=False means data from Veeder Device is valid.

True=Veeder device data has timed out and cannot be read.


analog_input: 3 (battery_charge)
Last updated: Tue Jul 12 12:10:46 2011
object_identifier: analog_input (3)
object_type: analog_input (0x0)
event_state: normal (0x0)
object_name: battery_charge
out_of_service: False
present_value: 0
status_flags: in_alarm
fault (0)
units: no_units (0x5F)
Present value is the value found in the Veeder Device.

7. Commissioning, Diagnostics and Trouble Shooting

7.1. What to Take to Site for Commissioning

1. The gateway and other supplied components.
2. USB->232 Converter

   Any will do. This will allow you run tests using the 232 serial connection. Connect to the device and find out which COM port is now available, use CAS Modbus Scanner to retrieve data.

3. Serial Cables

   A Null Modem cable is used to connect to the gateway diagnostic port. Take one with you. A Null Modem cable is used to connect the Veeder Root Device to the Gateway.

4. Laptop
5. Gateway IP Address Allocation Tool

   Download from
   http://www.chipkin.com/articles/cas-gateway-ip-address-tool

6. Wireshark packet sniffer software – free download

   http://www.wireshark.org/download.html

7. CAS Modbus Scanner – free download

   CAS Modbus Scanner is a utility to retrieve coils, inputs, holding registers, and input registers from a Modbus enabled device. Values retrieved from the device can be viewed in many different formats including Binary, HEX, Uint16, Int16, Uint32, Int32, and Float32.

http://www.chipkin.com/cas-modbus-scanner

8. Serial Mini Tester

9. DB9 and DB25 male and female connector make-up kits (Solder free)

   Always useful but not required if you have tested your cable prior to attending the site.

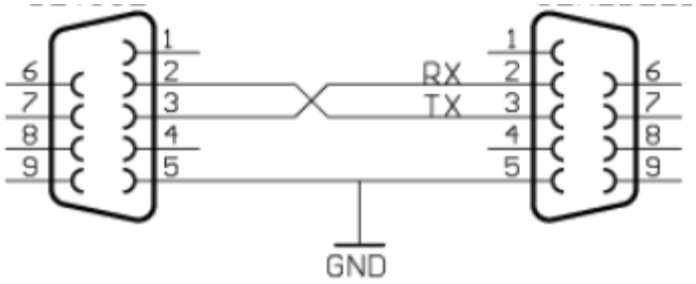
10. Rx / TX cross over.

    Always useful but not required if you have tested your cable prior to attending the site.

    It is useful to be able to swap the conductors connected to pins 2 and 3. Take a module with you. It is easier than changing the wires.

    For example, the Ziotek Null Modem Adapter DB25

    http://www.cyberguys.com/product-details/?productid=751&rtn=750&core_cross=SEARCH_DETAIL_SIMILAR#page=page-1



11. Gender Benders

    Always useful but not required if you have tested your cable prior to attending the site.

12. Ethernet Patch cables

13. Hub

    Used as a last resort if there are problems on Modbus or BACnet

    A hub is not a switch. A hub can be used for trouble-shooting whereas only a 'supervised' switch can. Most switches are not supervised.

    http://www.chipkin.com/articles/hubs-vs-switches-using-wireshark-to-sniff-network-packets

7.2. Gateway Status

Browse to http://192.168.1.113/bin/veederroot/reports and you will the present values of the data points

If all of the data values are displayed as "-1" (or whatever the configured default value is) then it could mean one of two things.

1) The Gateway has just been configured and has begun to poll for values. Wait for a little while for the first couple of scan intervals to finish, and then refresh the page. Current correct values should be displayed.

2) The Gateway is not connected to the Veeder Device. Either the Gateway was never connected, or the Gateway got disconnected from the device. After an amount of time has passed (as configured in the Disconnect Time parameter of the configuration), the Gateway will set all values to the default value.

You must manually refresh this page to get the updated values.

7.3. Gateway Diagnostics

Power Led: Green Solid = Normal Condition.

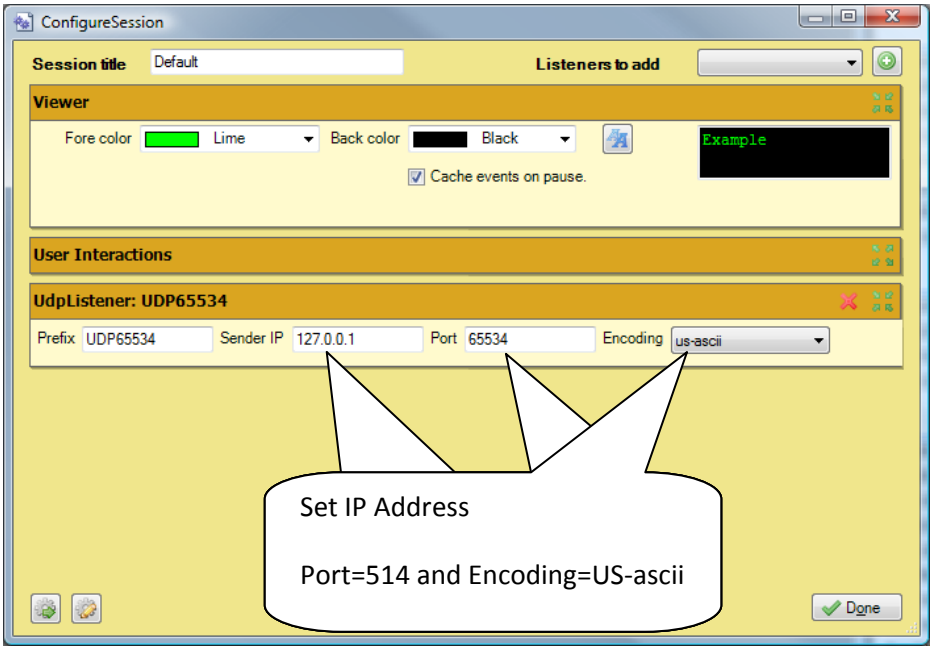
RJ45 LED: Green to show link.

7.4. Debug log.

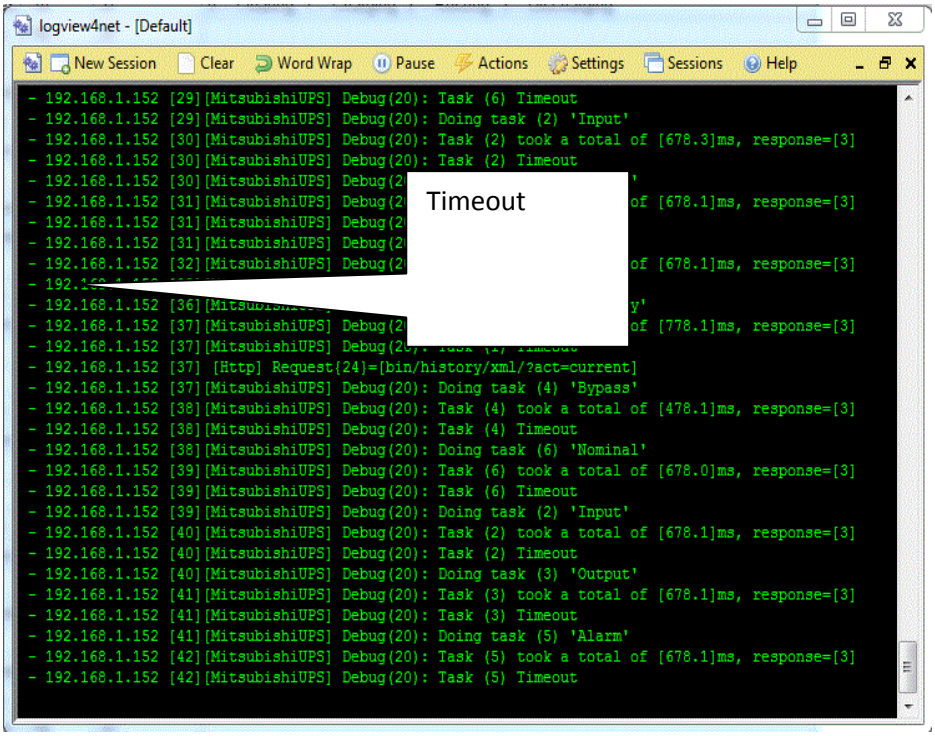
The debug messages are sent on UDP port 514 to the broadcast IP address: {255.255.255.255} as plain ASCII text. You can use "logview4net" tool to view and recorded the debug messages as they are sent from the device.

Logview4net

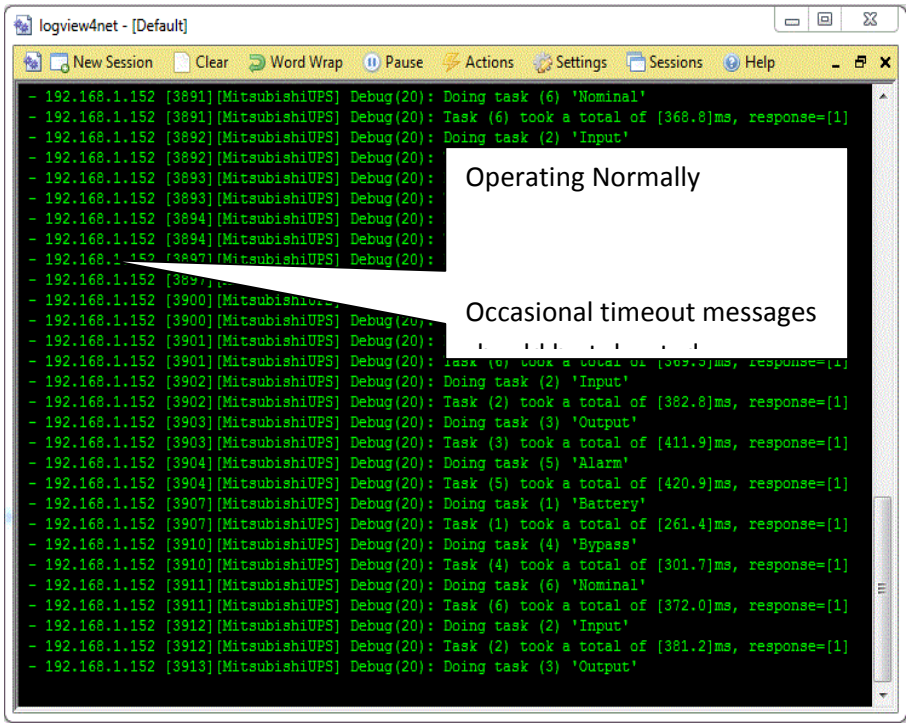
Free and open source tool built to viewing and monitoring logs. It works with many different file formats and protocols including UDP. This tool can be download for "free" from the publishers website http://logview4net.com/



Click Done



Abnormal operation. No communication with device. Perform Veeder Device Connection Diagnostics.



Normal Operation.

7.5. Veeder Device Connection

Use a mini tester to check the serial ports.

Connect the cable to the Veeder device only – RD should be green. If it isn't this means the cable to the Veeder device is wrong or the port isn't working.

Connect the cable to the gateway only – TD should be green. If it isn't this means the cable to the gateway is wrong or the port isn't working.

During normal operation RD will flicker green/red


RS232 MINI-TESTER
TD
RTS
DSR
CD
RD
CTS
DTR
BELKIN

7.6. Another Method for Changing the IP Address - DHCP

This device supports DHCP and DHCP is disabled.

When shipped the device

IP = 192.168.1.113

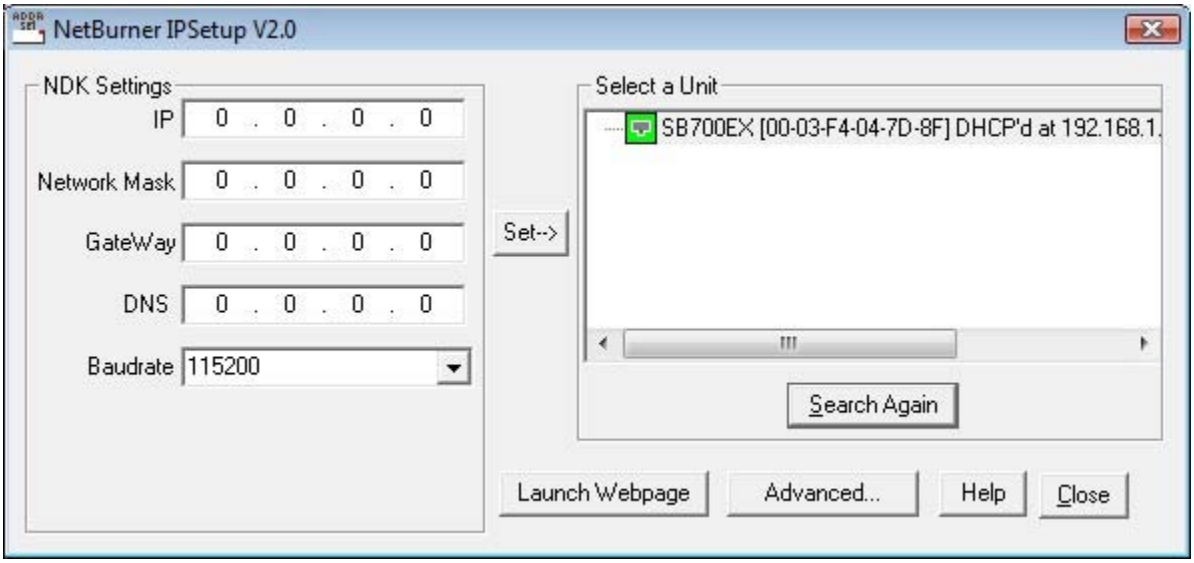
Mask = 255.255.255.0

If you simply want to change the IP address then use the simpler method provided in section 3.8 Change Configuration Settings.

A tool is provided to change the IP address of the gateway. The tool can be downloaded from:

http://www.chipkin.com/articles/cas-gateway-ip-address-tool

When you start this tool it discovers gateways and list them in the right had side 'Select a Unit' area. If the area is blank then click the 'Search Again' button. If it remains blank check that the Ethernet connection is made – is there a green link LED on the RJ45 and on the hub/switch you are connected to.



To change the IP address complete the Fields and click the 'Set' button.

To set it to DHCP, simply put all fields to 0.0.0.0 and click the 'Set' button.

7.7. Discovering the Gateway

Use the tool provided to change the IP address to discover the gateway and learn what its pre-allocated IP address is. See section 7.6 Another Method for Changing the IP Address

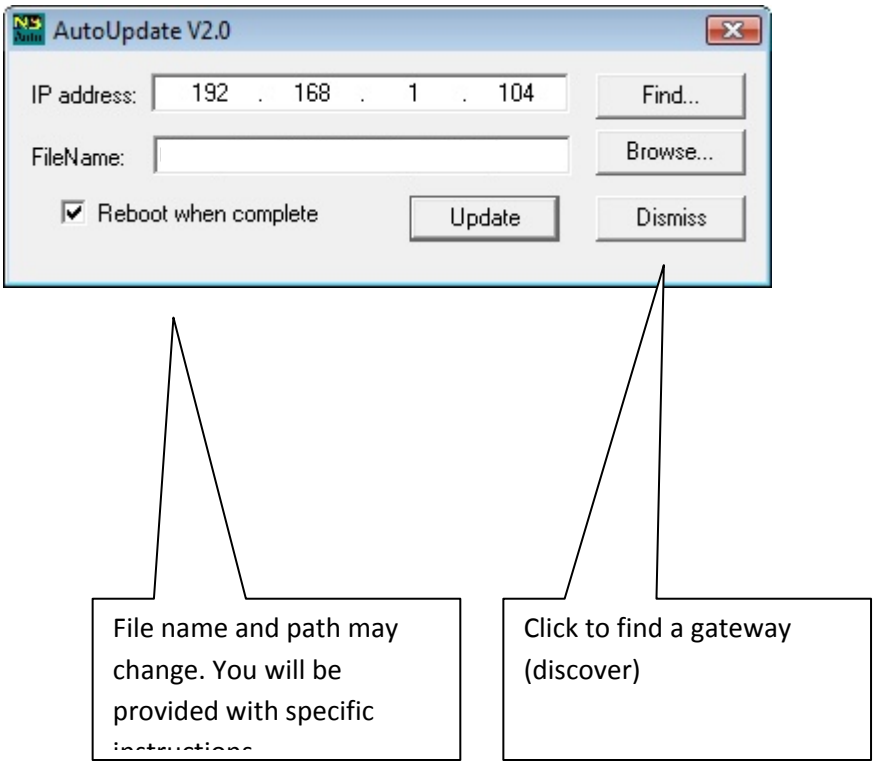
7.8. Downloading New Firmware

If you are sent new firmware you will be provided with specific instructions. These are generic – i.e. folder and file names may be different.

A tool is provided. It can be downloaded from

http://www.chipkin.com/articles/cas-gateway-firmware-download-tool

Screen Shot from the Firmware update tool.



8. Specifications

- **UL and ULc approved**
- 10/100BaseT with RJ-45 connector
- 1x RS232 Port
- 1x RS485 Port (Different Models have additional ports)
- 2MBytes flash memory, 8MBytes of SDRAM
- Power: 5-24VDC
- Operating Temperature: 0 to 70 C
- Dimensions: 4.2" x 3.25" x 1"
- LEDs: Link, Speed/Data, Power

Revision History

Date	Resp	Format	Driver Ver.	Doc. Rev.	Comment
17 Feb 2012	ACF		0.05	0	Document Created