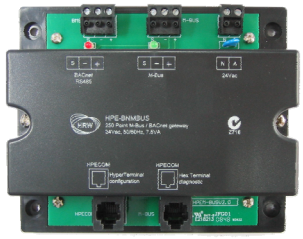

HPE-BNMOD – Modbus Integration to BACnet MS/TP

FW4

The HRW Point Expansion unit, type HPE-BNMOD, is for integration of Modbus RTU slave devices in to BACnet MS/TP networks. Multiple Modbus RTU devices of any mix may be connected to the HPE-BNMOD for read/write access of up to 250 data-points.

All points may be individually scaled and multiple points representing Modbus registers which use multiple Words may be combined so that only one Object Instance representing the scaled multiple Word register value needs to be read up by the BMS.

Application Data

Primary network protocol:	BACnet MS/TP	
Sub-network protocol:	Modbus RTU	
Administration points:	Point 1	- Diagnostic counter reset
	Point 2	- BACnet comms error count
	Point 3	- Modbus comms error count
	Point 1000	- BACnet node
	Point 1001	- BACnet baud rate
	Point 1002	- Modbus baud rate / config.
	DI	- BACnet global Device Instance
	MM	- Max Master
	SV	- System Vendor ID
Modbus RTU data points:	250 total, point 4…253	
Supported Modbus RTU functions:	01	- Read (write) Coil status
	02	- Read Discrete Input
	03	- Read (write) Holding Register
	04	- Read Input Register
Comm speed selection, BACnet MS/TP:	2400, 4800, 9600 (default), 19200, 38400, 76800	
Comm speed selection, Modbus subnet:	2400, 4800, 9600 (default), 19200	
Modbus subnet comm configuration:	7/8 data bits – Odd/Even/No parity – 1/2 stop bits (default – 8N1)	

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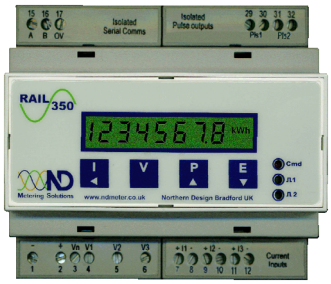
Default Settings

The HPE-BNMOD is suitable for use with a wide range of Modbus RTU devices and is programmable by the user to suit the various connected devices. As a setup example the factory defaults include a number of points already configured. These default point settings relate to the Rail 350 Modbus RTU electricity meter (KR3502).

KR3502:



- kWh, kVArh, kVAh
- kW, kVAr, kVA
- Inductive VAr, Capacitive VAr
- Neutral current
- Volts, Amps, PF, Frequency
- Peak values, MD values
- %THD per phase V & I

If using the HPE-BNMOD for integration of devices other than the MR3002 the sample points may be overwritten or deleted.

Modbus RTU Addressing Structure

For the purpose of setting up the HPE-BNMOD, the Modbus RTU point numbers are grouped in to sets of 256 points (0…255). Each set of 256 points is referred to as a **Table** (AddHi) and each point within a table is referred to as **Row** (AddLo).

Although there is some difference between individual manufacturers in the way that they refer to points within devices, the Modbus RTU addressing in the background of their devices is similar, following the Modicon Modbus RTU or J-Bus addressing structure.

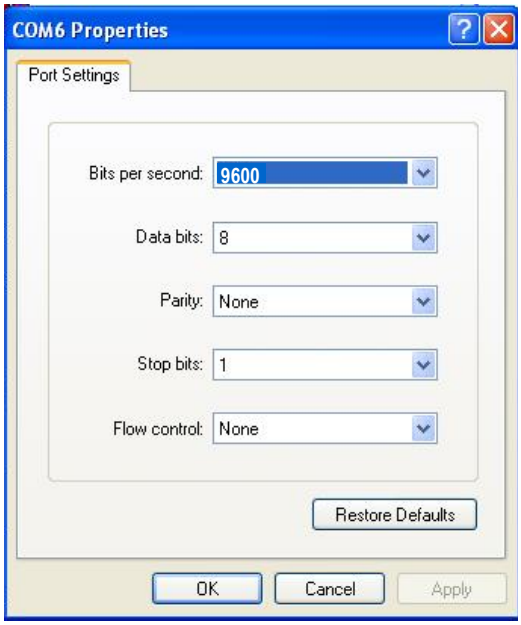
A conversion of Modbus RTU addresses to HPE-BNMOD Table & Row is as follows (based on Function 03):

MODBUS Addr Range		**HPE-P1MOD**	
		Table #	**Row #**
40001…	40256	0	0… 255
40257…	40512	1	0… 255
40513…	40768	2	0… 255
40769…	41024	3	0… 255
41025…	41280	4	0… 255
41281…	41536	5	0… 255
41537…	41792	6	0… 255
41793…	42048	7	0… 255
42049…	42304	8	0… 255
42305…	42560	9	0… 255
42561…	42816	10	0… 255
42817…	43072	11	0… 255
43073…	43328	12	0… 255
43329…	43584	13	0… 255
			and so on…

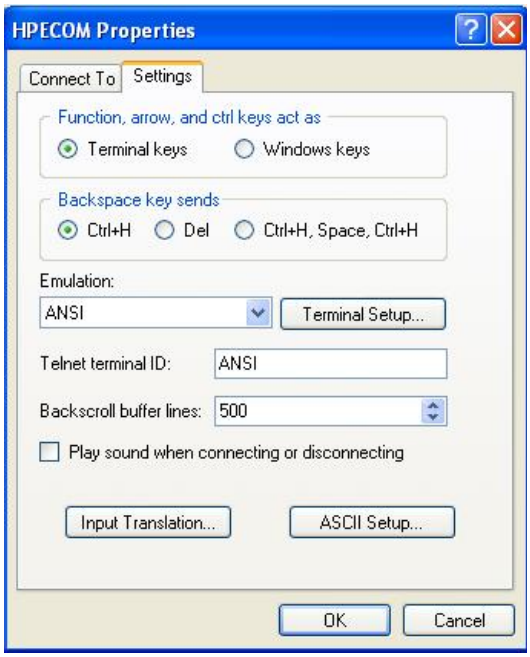
HyperTerminal configuration

For successful communication between HyperTerminal and the HPE device, initial Properties setup of HyperTerminal should be as follows:

'Connect To' Com Configuration:

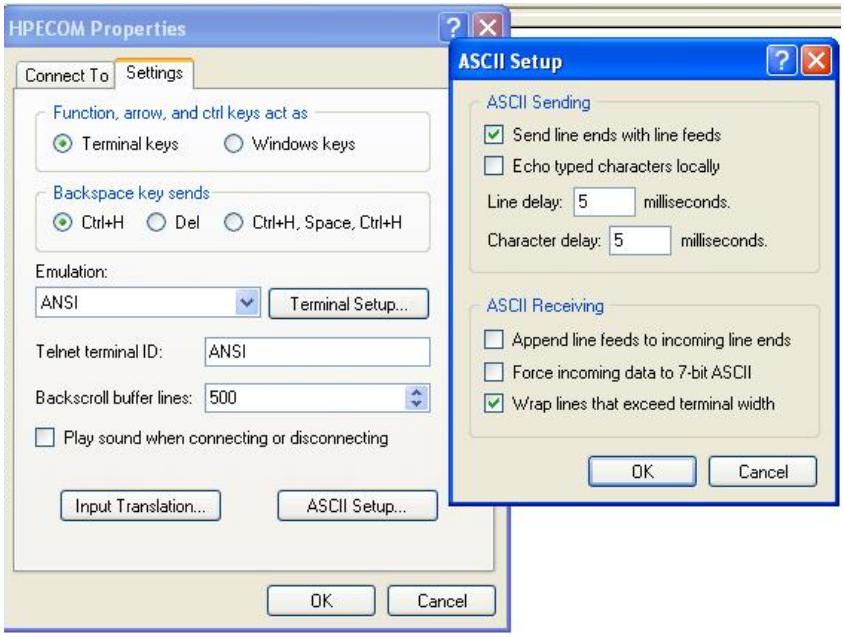


'Settings' General:



HyperTerminal configuration (cont…)

'Settings' ASCII Setup:



Note: If there are no Modbus devices connected, or they are incorrectly addressed, and the Modbus subnet comms is 'Enabled', then HyperTerminal communication response will be delayed at power-up of the HPE-BNMOD and during data refresh activity on the bus connection due to scanning and response-wait timeout for each point. This period of delay is indicated by slow flashing of the green LED at the Modbus connection. In such a case, press **TTTTT**… to break in to terminal mode and enter **E** to 'Disable' the subnet comms until the RTU devices are correctly configured.

Connecting to and communicating with the HPE-BNMOD:

- Connect HPECOM via the left-hand RJ11 socket
- With the keyboard Caps Lock on, press **TTTTTT…** until communication begins (it is not necessary to press the enter key)
- **For successful FLN network communication Write any changes (W), eXit HyperTerminal (X) and disconnect the HPECOM cable at the RJ11 connector**

We strongly recommend you to save the HyperTerminal setup for each baud rate you may wish to use with an easily recognised configuration name. For example:

- HPECOM 48 (4800)
- HPECOM 96 (9600)
- HPECOM 19.2 (19200)
- HPECOM 38.4 (38400)
- HPECOM 57.6 (57600)

Saving one or more of these HyperTerminal configurations enables trouble free communication without having to repeat the HyperTerminal set up in future.

HyperTerminal configuration (cont…)

Note for 76800 baud:

Because HyperTerminal does not support 76800 baud then connect at 9600 baud. After setting to 76800 the baud rate for HyperTerminal communication will remain at 9600 baud. **W**rite the 76800 setting; after next power-up the device will operate at 9600 baud for 5 seconds. Therefore to reconnect HyperTerminal, use HyperTerminal at 9600 baud and TTTTT… in to terminal mode within 5sec of powering up the HPE-BNMOD. If terminal mode does not become active within 5sec then the communication speed will switch to 76800 baud.

In this case, when exiting terminal mode at 9600, the device will switch back to 76800 automatically.

Administration Point Summary

Function	Enter	Result	Options / *Comments*
Start communication	TTTTT…	Display of configuration and data-point status	*With the Caps Lock on, hold the T key down until the screen updates with HPE data. It is not necessary to press the enter key to start communication.*
Download point database text file	DE	HPE-BNMOD is 'Ready' for download of text file	*Go to HyperTerminal 'Transfer' menu, select 'Send Text File' and browse to target folder and select the file. After download the data will be checked and the device will restart. If there is any discrepancy the original database will be restored*
Clear data base	DE / 10000=1	Delete existing points	*Enter DE to prepare Download ready state then enter 10000=1*
Set node address (MAC)	1000=1…255	Network node number is assigned	*Example: 1000=25*
Set system Device Instance	DI=0…4194303	Unique Device Instance is assigned	*Example: DI=401025 (building 4, network 1, node 25)*
Set BACnet network baud rate	1001=…	Primary network comms speed is set	2400, 4800, **9600**, 19200, 38400, 76800 *Example: 1001=9600* ***After changing comm. speed it will be necessary to reconnect with HyperTerminal at the new comm. speed to save (Write) the change!***
Set Modbus RTU subnet baud rate	1002=…	Subnet comms speed is set	2400, 4800, **9600**, 19200 *Example: 1002=9600*
Set Modbus RTU subnet comms configuration	1002=…	Subnet comms data configuration is set	7N1, 7N2, 8N1, 8N2 *Example: 1002=8N1* 7O1, 7O2, 8O1, 8O2 7E1, 7E2, 8E1, 8E2
Set Maximum Master address	MM=1…127	Highest Master device address on the network is registered	*Next address searching limited to MM address*
Set Sys. Vendor ID	SV=0…255	System vendor specific features may be available	*SV=0 applies generic BACnet operation. If an entered ID is not implemented then the generic operation will be applied*
Zero the Reset counters	1=0	All Reset counters are zeroed	*Factory diag. In order as displayed: Rx timeout, Tx timeout, Hardware reset*
Zero the BACnet comms error counter	2=0	BACnet comms error counter is reset	*Example: 2=0*
Zero the Modbus comms error counter	3=0	Modbus comms error counter is reset	*Example: 3=0*
Diagnostic display	D	Point by point response codes are displayed	*For data stream analysis between the HPE and the Modbus RTU devices. Also displays scaled data results within the point listings*
Find Modbus point detail	F	Point data structure is revealed from a specified starting point	*Refer to the description on page 10*
Scroll page display	P=1…10	Scroll to specific page if more data-points are present than can be displayed on one screen	*Example: P=2* *The second page of database settings are displayed*

Administration Point Summary (cont…)

Function	Enter	Result	Options / *Comments*
Enable Modbus RTU subnet communication	E	Toggles Enabled/Disabled of Modbus RTU Subnet communication	*Default Disabled to allow easy configuration when no Modbus devices are connected.* ***Always 'Enable' when Modbus devices are connected and points are configured!***
Write values as default	W	Changes written	***Always do this after making changes that you wish to be permanent including Enabling the Modbus comms!***
Exit communication	X	Communication with HyperTerminal no longer active	***Always do this when finished with configuration and disconnect the HPECOM cable!*** *HyperTerminal comms is automatically exited after a power reset.*

Point Types

Each data point must be configured to access the relevant Modbus network device and data register within the device. The Function Types associated with Modbus devices is a key part of locating the correct data location within each device. Below is a summary of the point type settings available

HPE Point Type	Programming Value	Description
N/A	0	Not Used
Read/Write Input Coil (RIC)	1	Function 01 (F01)
Read Input Discrete (RID)	2	Function 02 (F02)
Read/Write Holding Register (RHR)	3	Function 03 (F03)
Read Input Register (RIR)	4	Function 04 (F04)
RHR - IEEE 754 (RHE + RHEP)	5	F03 2 Word (IEEE floating point)
RIR - IEEE 754 (RIE + RIEP)	6	F04 2 Word (IEEE floating point)
RHR 2 Word Pair (RHR+RHRP)	7	F03 2 Word (integer)
RIR 2 Word Pair (RIR+RIRP)	8	F04 2 Word (integer)
RHR Signed Integer (RHRS)	9	F03 -32767…+32767
RIR Signed Integer (RIRS)	10	F04 -32767…+32767

Using a point type 5 or 6 will generate two data points with in the HPE device of either F03 or F04 respectively for registers using IEEE floating-point data format which are always 2 Word registers. The first point address is entered in the point configuration string and the second point is automatically generated. These two points are then always read together when the Modbus network is polled.

Using a point type 7 or 8 will generate two data points with in the HPE device of either F03 or F04 respectively for registers which are 2 Word integers (typically energy registers in electricity meters). The first point address is entered in the point configuration string and the second point is automatically generated. If a register is more than 2 Words then additional single or pair points can be added sequentially. In any case, the value result of multiple Word points may be compiled by the HPE-BNMOD using the Scaling feature as described on page 7.

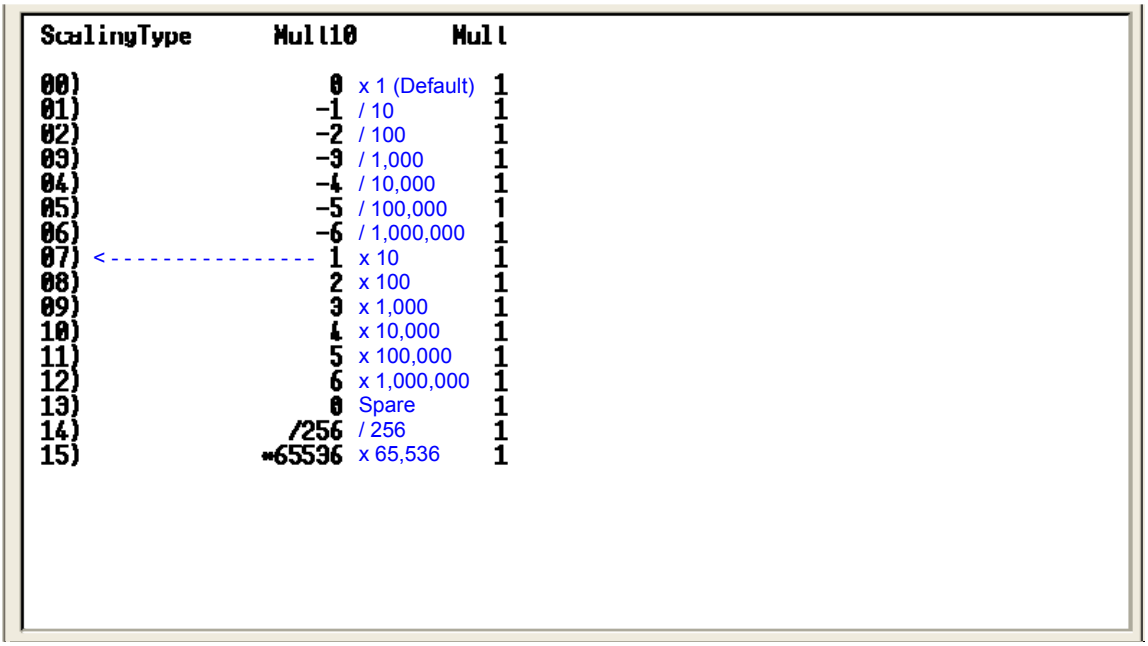
When point pairs are generated (types 5…8) the first of the pair has a normal type tag, such as RHR, whereas the second of the pair has a 'P' tag suffix, for instance RHR**P** (**P**aired with the preceding point).

Point Scaling & Combining

Each point may be individually SCaled and/or combined with sequential points where Modbus registers are comprised of more than 1 Word and therefore use more than one HPE-BNMOD point. This is helpful when, for example, the 1st Word of a register may be units and the 2nd Word may require a multiplier of 65,536 or some other scaling before combining with the 1st Word.

In any case where two or more Words are combined then only the first HPE-BNMOD point (object) of the sequence of Words needs be read up by the BMS as this first point of the sequence contains the final result of the scaling and combining.

Scaling types may be viewed in HyperTerminal by entering **S** to display the scaling table:



ScalingType	Mult10		Mult
00)	0	x 1 (Default)	1
01)	-1	/ 10	1
02)	-2	/ 100	1
03)	-3	/ 1,000	1
04)	-4	/ 10,000	1
05)	-5	/ 100,000	1
06)	-6	/ 1,000,000	1
07) <----------	1	x 10	1
08)	2	x 100	1
09)	3	x 1,000	1
10)	4	x 10,000	1
11)	5	x 100,000	1
12)	6	x 1,000,000	1
13)	0	Spare	1
14)	/256	/ 256	1
15)	*65536	x 65,536	1

Scaling types may be assigned to an HPE-BNMOD point either as a part of the Point Programming string as outlined in the following section or individually after initial point configuration. To scale an individual point as being x10 then a Scale type value of **7** must be assigned to that point, as referenced in the left-hand column of the table above. If the next sequential point is to be combined with any point then the Scale type value +100 configures the preceding point accordingly. For instance:

An eight digit Wh register with value 12,345,678 Wh comprised of 2 Words needs the 2 Word's HPE points to be combined to represent the register value of 12,345.678 kW at one only BACnet AV Object. The 1st Word is configured at HPE-BNMOD point 4 (with value 5678) and the 2nd Word is configured sequentially at point 5 (with value 1234).

SC4=103 Object AV4 = (5,678 + AV5) / 1,000 = 12,345.678 kWh
Scale type 3 for /1000. Scale type 103 for 'add next point result then /1000'

SC5=10 Object AV5 = 1,234 * 10,000 = 12,340,000 wh
Scale type 10 for x10,000 (if also required to add next sequential point before x10,000 then Scale type 110)

Point Scaling & Combining (cont…)

SCaling Type Customisation

It is possible to change the table position of the **Mult10** scaling multipliers and dividers (column 1) so as to use a particular Mult10 value applied with different **Mult** values (column 2).

Mult10 (10's Multiplier)
These values are fixed as decimal shift magnitude in the range -6…6
Some Mult10 setting values however have a fixed application:

- -7 applies /256
- 7 applies x 65536

Objects defined as Pairs are automatically assigned Type 15 as the high Word multiplier as it is assumed that 2 Word pairs will be Word 1 + (Word 2 * 65536) so Type 15 settings should not be changed.

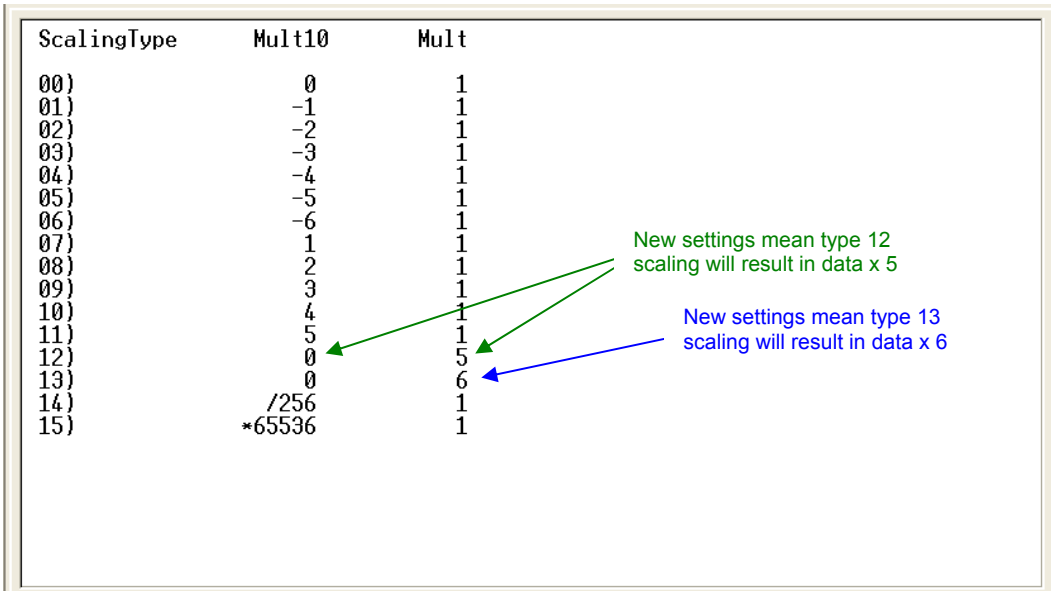
Mult (Units Multiplier)
These values may be in the range -32768…32768

Example – To change scaling type 12 so as to deliver a multiplier of 5:

Change Mult10 to 0 with Type 12 / column 1 matrix: 121=0
Change Mult to 5 with Type 12 / column 2 matrix: 122=5

Example – To change scaling type 13 so as to deliver a multiplier of 6 then:

Mult10 already 0 by default so no change required
Change Mult to 6 with Type 13 / column 2 matrix: 132=6



It follows that if type 8 Mult is changed to x7 (82=7) then the existing type 8 Mult10 (x100) when combined with the new Mult of 7 would result in object data multiplier of 700 when applied to a specific data object (data value x 100 x 7)

Point Programming

The structure for manual entry of point configuration over HyperTerminal is as follows:

<Point #>=<Modbus Device Addr>,<Table #>,<Row #>,<Scaling >,<PointType>
(Address) (AddHi) (AddLo) (SC) (e.g. 4 [RIR])

Following this structure, in reference to the KR3502 meter as an example, you will see that the frequency register, point 8, is on Modbus RTU #1 and the Hz data is found in the register located at Table 11, Row 4, scaling is /10 and the point type is 4 which is an Input Register as 1 Word:

8=1,11,4,1,4

If the scaling is not yet decided then the scaling value can be omitted or value 0, which is x1, and included later as an SC command for each point that requires scaling as illustrated in the table below for all except the Hz register.

HPE-BNMOD Point #	KR3502 Register ♣	Point #=Modbus Data
4	kWh (Hi)	4=1,2,2,,4
5	kWh (Lo)	5=1,2,3,,4
6	kW	6=1,11,0,,4
7	PF	7=1,11,3,,4
8	Hz	8=1,11,4,1,4
9	Volts L1	9=1,11,5,,4
10	Amps L1	10=1,11,6,,4
11	Volts L2	11=1,11,8,,4
12	Amps L2	12=1,11,9,,4
13	Volts L3	13=1,11,11,,4
14	Amps L3	14=1,11,12,,4
15	Vpeak L1 *	15=1,13,3,,4
16	Vpeak L2 *	16=1,13,4,,4
17	Vpeak L3 *	17=1,13,5,,4

** Vpeak points are read/write, therefore, while the point is in override (as commanded from the BMS), Vpeak registers may be reset/preset by writing the register value.*

♣ To delete any of the default example points – point 17 for instance: 17=,,,, (enter)
To delete all point data please refer the 'Download Procedure' section on page 13.

When using the KR3502 meter the data-point numeric values relating to the Device Address, Table Number and Table Row may be taken directly from the documentation supplied with the device.

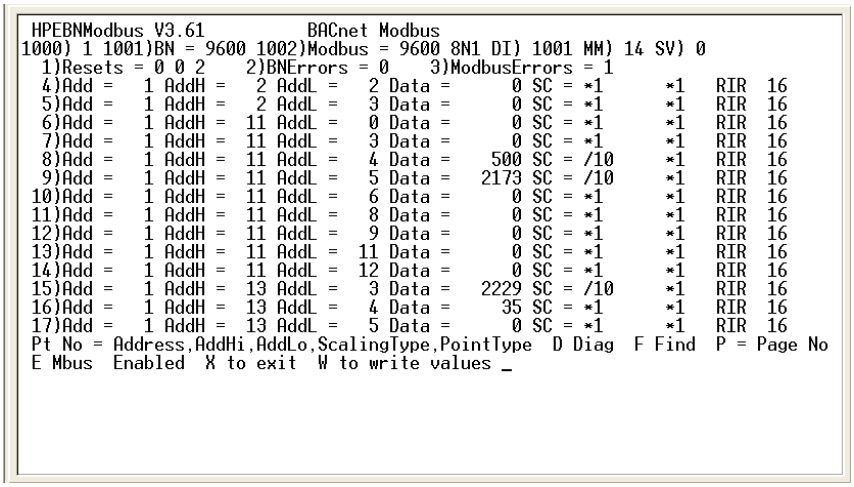
For other Modbus RTU devices the point data can be converted according the table on page 2 or by using our calculator tool which creates the point database for copying to a text file (*.txt using Notepad) and automatic download over HyperTerminal connection with the HPECOM cable.

HyperTerminal Display

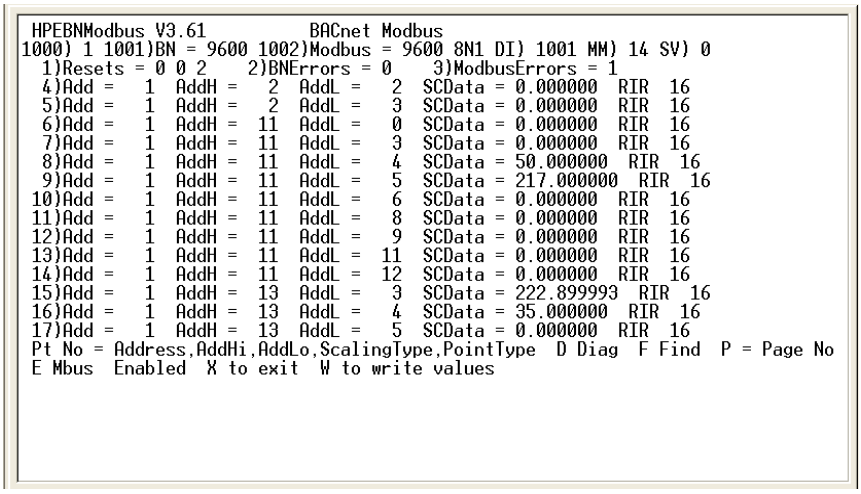
Below is the of the HPE-BNMOD as displayed in HyperTerminal after breaking in to Terminal mode by entering **TTTTTTT**….

Point 8, as an example, is configured to read an electricity meter, Modbus RTU #1, frequency register and the read data indicates raw data of 500 and a Scaling of /10, therefore the BACnet AV8 value will be 50.0 (Hz).

Point 9 is the L1 voltage (Ph-N) and the raw data indicates 2173 which represents 217.3Vac. BACnet AV9 would have a value of 2173 but by configuring point 9 with scaling type value of 1 (/10) by entering SC9=1 then the AV9 value would be presented as 217.3 (Vac):



By activating the Diag display mode, as explained on page 14, you may display the Scaled result including the combining of any subsequent points (if applicable):



- Point **1000** indicates the BACnet network node address as being 1 (factory default is 98)
- **DI** indicates factory default network Device Instance (allowable range 0…4194303)
- **MM** is the Max Master setting, in this case 14 (factory default is 127)
- The System Vendor ID (SV) is set to 0 (generic BACnet)

Address Calculator

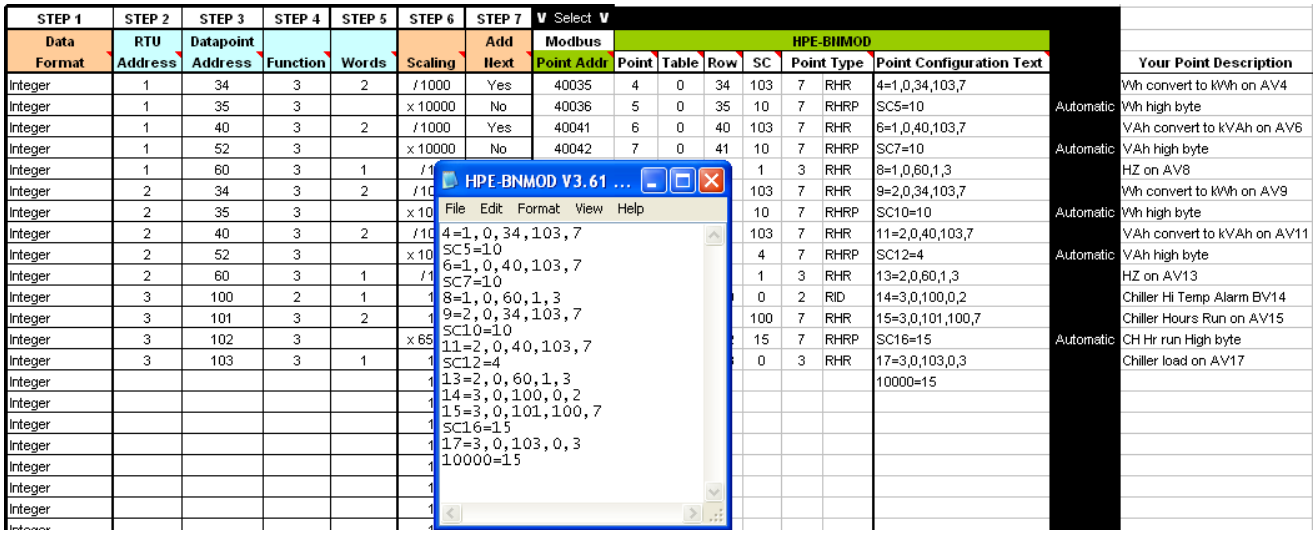
The address calculator tool is an MS Excel tool designed to assist in building the point database in conjunction with a Modbus RTU's technical manual.

Consult the Modbus RTU's manual for register address and data format information and enter the detail in the tool as instructed in the tool notes.

STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	STEP 7	V Select V								
Data Format	RTU Address	Datapoint Address	Function	Words	Scaling	Add Next	Modbus Point Addr	HPE-BNMOD Point	Table	Row	SC	Point Type	Point Configuration Text		Your Point Description
Integer	1	34	3	2	/1000	Yes	40035	4	0	34	103	7 RHR	4=1,0,34,103,7		Wh convert to kWh on AV4
Integer	1	35	3		x 10000	No	40036	5	0	35	10	7 RHRP	SC5=10	Automatic	Wh high byte
Integer	1	40	3	2	/1000	Yes	40041	6	0	40	103	7 RHR	6=1,0,40,103,7		VAh convert to kVAh on AV6
Integer	1	52	3		x 10000	No	40042	7	0	41	10	7 RHRP	SC7=10	Automatic	VAh high byte
Integer	1	60	3	1	/10	No	40061	8	0	60	1	3 RHR	8=1,0,60,1,3		HZ on AV8
Integer	2	34	3	2	/1000	Yes	40035	9	0	34	103	7 RHR	9=2,0,34,103,7		Wh convert to kWh on AV9
Integer	2	35	3		x 10000	No	40036	10	0	35	10	7 RHRP	SC10=10	Automatic	Wh high byte
Integer	2	40	3	2	/1000	Yes	40041	11	0	40	103	7 RHR	11=2,0,40,103,7		VAh convert to kVAh on AV11
Integer	2	52	3		x 10000	No	40042	12	0	41	4	7 RHRP	SC12=4	Automatic	VAh high byte
Integer	2	60	3	1	/10	No	40061	13	0	60	1	3 RHR	13=2,0,60,1,3		HZ on AV13
Integer	3	100	2	1	1	No	10101	14	0	100	0	2 RID	14=3,0,100,0,2		Chiller Hi Temp Alarm BV14
Integer	3	101	3	2	1	Yes	40102	15	0	101	100	7 RHR	15=3,0,101,100,7		Chiller Hours Run on AV15
Integer	3	102	3		x 65536	No	40103	16	0	102	15	7 RHRP	SC16=15	Automatic	CH Hr run High byte
Integer	3	103	3	1	1	No	40104	17	0	103	0	3 RHR	17=3,0,103,0,3		Chiller load on AV17
Integer					1	No		18					10000=15		
Integer					1	No		19							

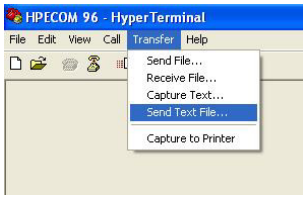
Once the information is properly entered in the tool the resultant point configuration data, in Column S, may be copied to Notepad for saving as a text file and download to the HPE-BNMOD.

Note that the second point of 2 Word pairs is generally indicated as 'Automatic' because the second point will be automatically created at time of download. The Scale factor will be included for those automatic points in the case that it differs from the Paired point default of x65536.



The last row of the download data, 10000=15, is a line count for a validity check as part of the download process. If manually entering the configuration text lines 10000=*n* should be ignored.

Download Procedure



To download a new data base text file:

- Prepare the HPE device to receive the text file by entering **DE**
- Select 'Send Text File' from the HyperTerminal Transfer menu item
- Browse to the folder containing the required database text file and select the relevant file

After the download process you will see a check of line numbers expected and line numbers actually received and the HPE device will indicate 'restarting' should the line check be correct.

After a successful download enter **E** to toggle between Disabled/Enabled Modbus communication. Once toggled to Enabled press enter again to invoke a live scan of the Modbus network. Enter **W** to Write the enabled state to ensure the comms remains enabled after a power reset.

Note that if there are a number of points wrongly configured (nonexistent devices or data points on the Modbus network) the live scan may take longer than usual to complete while invalid registers are requested from the network. In this situation you may TTTTTTT… to stop the scanning activity and **E** to toggle to Disabled for checking point setups.

To delete all existing point data without downloading a new text file enter **DE** then enter **10000=1**

Find Function

If the Modbus RTU documentation is not clear, then the **Find** function of the HPE device may be used to reveal the Modbus RTU point addresses together with detail required to enter the points in to the HPE device. The Find function is linked to point # 4 and is activated by keystroke **F** (enter). *It is recommended to set HyperTerminal to buffer the maximum 500 lines of displayed data to assist in reviewing the data received during activation of the Find function.*

Example 1: If you wish to reveal the point detail and activity of all points starting from Modbus address 30001, Read Input Register (Table 0/Row 0, F04) of a connected Modbus RTU device with address 1 then set up point 4 as follows:

4=1,0,0,0,4 (enter)

Example 2: If you wish to reveal the point detail and activity of all points starting from 42817 (Table 11/Row 0, RHR/F03) of a connected Modbus RTU device with address 25 then set up point 4 as follows:

4=25,11,0,0,3 (enter)

Once you have set up point 4 according your search criteria then enter **F** the points from the starting Table/Row will be sequentially displayed as in the example on page 14. To Exit the Find sequence enter TTTTTTTT… to revert back to the normal point listing.

Note: When you exit the Find sequence the Table/Row detail at the scanning point at which you exit will be inserted in to the point data of point 4. Please ensure the setup of point 4 is as you require it before Writing (W) the configuration.

Find Function (cont…)

```
15)Address =   1    AddHi =  13    AddLo =   3    Data =   2170    RIR
16)Address =   1    AddHi =  13    AddLo =   4    Data =      0    RIR
17)Address =   1    AddHi =  13    AddLo =   5    Data =      0    RIR
Pt No = Address,AddHi,AddLo,PointType D Diag  F Find  P = Page No
E Mbus  Enabled  X to exit  W to write values F

4)  1, 2, 2,V =  30515 D =      0 RIR
4)  1, 2, 3,V =  30516 D =      0 RIR
4)  1, 2, 4,V =  30517 D =      0 RIR
4)  1, 2, 5,V =  30518 D =     58 RIR
4)  1, 2, 6,V =  30519 D =      0 RIR
4)  1, 2, 7,V =  30520 D =     29 RIR
4)  1, 2, 8,V =  30521 D =      0 RIR
4)  1, 2, 9,V =  30522 D =     22 RIR
4)  1, 2,10,V =  30523 D =      0 RIR
4)  1, 2,11,V =  30524 D =      0 RIR
4)  1, 2,12,V =  30525 D =      0 RIR
4)  1, 2,13,V =  30526 D =    119 RIR
4)  1, 2,14,V =  30527 D =      0 RIR
4)  1, 2,15,V =  30528 D =      0 RIR
4)  1, 2,16,V =  30529 D =      0 RIR
4)  1, 2,17,V =  30530 D =      0 RIR
4)  1, 2,18,V =  30531 D =  24577 RIR
4)  1, 2,19,V =  30532 D =    381 RI
```

You will see that even without adequate Modbus RTU device documentation, in parallel with checking against the Modbus device's own displayed readings, it is possible to integrate your devices using the HPE-BNMOD's Find function to reveal the point data of a series of point addresses.

Diagnostic Function

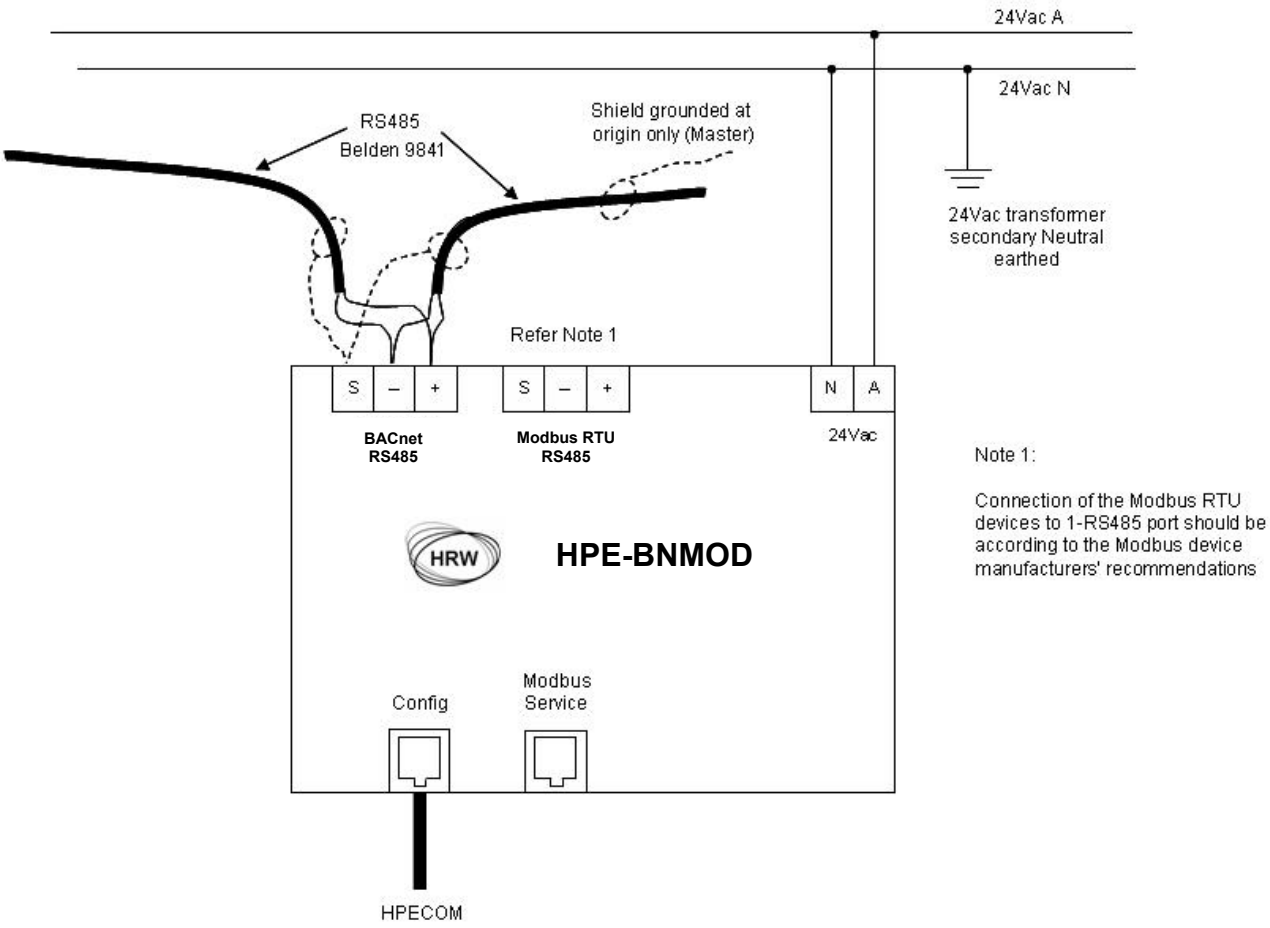
For trouble shooting the Diagnostic function allows a clear view of the Modbus network data requests and replies. Enter **D** to activate the Diag function. Now, each time you force a scan with Enter you will see the full HEX request and reply including checksum detail or error messages if applicable. When a valid device/data register is communicated with then the point data value will also be displayed.

After screen refresh when in Diag mode all Data point results will display in respect of any Scaling settings (BACnet AV value).

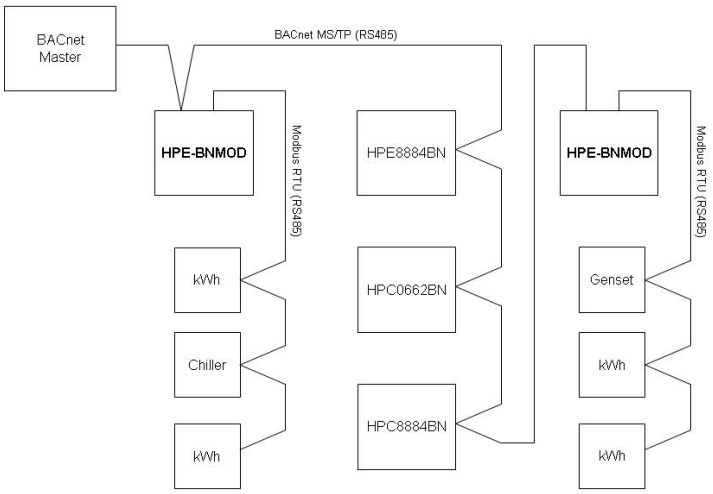
```
10)Add =   1  AddH =  11  AddL =   6  SCData = 0.000000  RIR  16
11)Add =   1  AddH =  11  AddL =   8  SCData = 0.000000  RIR  16
12)Add =   1  AddH =  11  AddL =   9  SCData = 0.000000  RIR  16
13)Add =   1  AddH =  11  AddL =  11  SCData = 0.000000  RIR  16
14)Add =   1  AddH =  11  AddL =  12  SCData = 0.000000  RIR  16
15)Add =   1  AddH =  13  AddL =   3  SCData = 2229.000000  RIR  16
16)Add =   1  AddH =  13  AddL =   4  SCData = 0.000000  RIR  16
17)Add =   1  AddH =  13  AddL =   5  SCData = 0.000000  RIR  16
Pt No = Address,AddHi,AddLo,ScalingType,PointType  D Diag  F Find  P = Page No
E Mbus  Enabled  X to exit  W to write values

  4 =010402020002D1B3 R 01 04 04 00 00 00 00 FB 84 FB84 CRC OK
  4=     0   5=     0
  6 =01040B00000133EE R 01 04 02 00 00 B9 30 B930 CRC OK
  6=     0
  7 =01040B03000403ED R 01 04 08 00 00 01 F4 08 8E 00 00 F6 42 F642 CRC OK
  7=     0   8=   500   9=  2190  10=     0
 11 =01040B080002F22D R 01 04 04 00 00 00 00 FB 84 FB84 CRC OK
 11=     0  12=     0
 13 =01040B0B0002022D R 01 04 04 00 00 00 00 FB 84 FB84 CRC OK
 13=     0  14=     0
 15 =01040D03000342A7 R 01 04 06 08 B5 00 00 00 00 EC 01 EC01 CRC OK
 15=  2229  16=     0  17=     0
  4 =010402020002D1B3
```

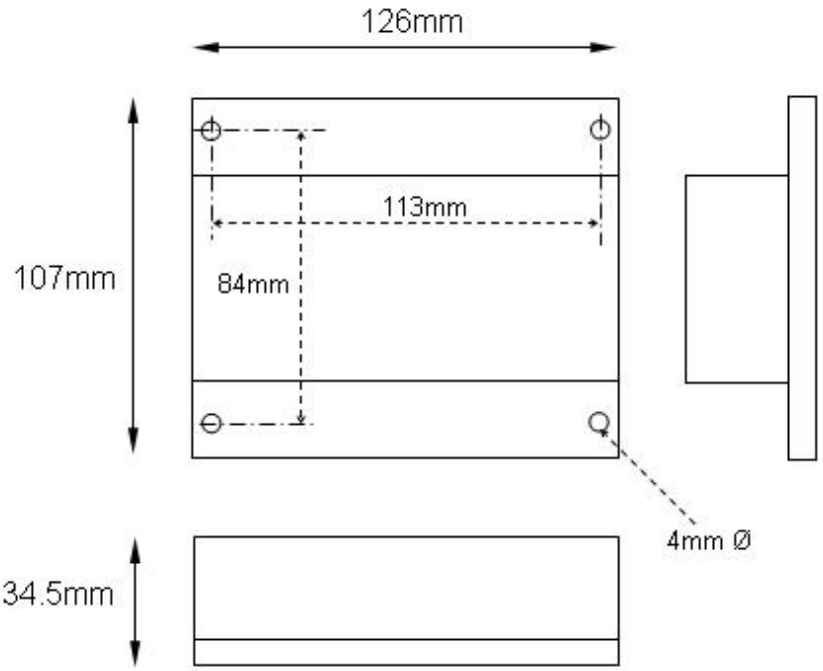
Connections



Network Configuration (example)



Dimensions



Ordering

HPE-BNMOD	250 point gateway – BACnet MS/TP integration of Modbus RTU devices - for control panel mounting
Standard Packaging	40 units per carton

Accessories

HDA0002	DIN rail adapters factory fitted to HPE-BNMOD
HPECOM	Config. data cable (DB9 <> RJ11)
U232-P9	RS232 (DB9) <> USB converter cable

Other HP-BN Series Devices

HPC0662BN	12 point universal controller
HPC8884BN	28 point universal controller
HPD0460BN/C/T/CT	10 point universal controllers & room units
HPE8884BN	28 point universal I/O expansion
HPV0662BN	13 point VAV / universal controller
HPE-BNMBUS	BACnet gateway for M-Bus devices

Technical data

Power supply:	24Vac
Power consumption:	2.5VA
BACnet network:	RS485, 255 node over 1.2km without repeater
Modbus RTU network:	RS485, 32 node over 1.2km without repeater
Conformity & Approvals:	
Dimensions:	126mm (W) x 107mm (H) x 34.5mm (D)

Notes