



HPE-BNPMAC

## **HPE-BNPMAC      User switchable communication module BACnet MS/TP or P1 FLN protocols For Pilot PMAC770 multi-function electricity meter**

Integration of PMAC770 metering data in to BACnet MS/TP networks or P1 FLN networks, user configurable via the meter keypad interface.

The PMAC770 modular concept means the HPE-BNPMAC module may be installed at the time of installing the meter or retrofitted to the meter at a later date.

The module is preconfigured, requiring only that the protocol type, network addressing and baud rate settings need be done. These settings are available via the display & keypad of the PMAC770 meter.

Network wiring to the module is according to the RS485 specification. The network cable type and installation practices should be meet such specification.



PMAC770

### **Feature Summary**

- Network configuration via the meter keypad / display interface
- User switchable as BACnet MS/TP or P1 FLN
  - BACnet MS/TP
    - MAC (address), baud rate, Device Instance (DI), Maximum Master (MM)
  - P1 FLN
    - Address, baud rate
    - Three (3) logical device addresses within one module (the configured address + the next two (2) addresses, allocated automatically)
- 142 registers available over the network
  - Cumulative including tariff registers
  - Instantaneous values
  - Demands c/w timestamps
  - Resetting facilities
  - Meter information





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## Configuration

After fitting the module in to a spare module slot at the rear of the meter the module is automatically recognised and the relevant setting options are made available at the meter display/keypad.

Access code for changing protected settings is 0001.

## Meter to Module Comms Set-up

The module-to-meter communications resides on 'M2 comm settings location and these settings are fixed with address 247 and baud rate 19200.

## Module Set-up

1. While meter display is showing 'Set' at button F4, press F4
2. Press F3 until BACNT METER is displayed
3. Press F1 to enter module settings
4. Press F1 to select Protocol
  - a. Press F3 to enter access code
  - b. F3 to Edit
  - c. F1 to toggle from BACnet 'BA' & P1 FLN 'P1'. After press Enter (F3) EN is displayed to indicate Enabled / DIS indicates Disabled
  - d. F4 to go back
5. Press F2 to set module network address, 1...127, excluding address 99 (F4 back)
  - a. For P1 FLN network the address range is 1...97
6. Press F3 for Baud Rate and Device Instance setting
  - a. F1 to set baud rate
  - b. F2 to set DI
    - i. High = most significant 3 digits of DI
    - ii. Low = least significant 4 digits of DI  
(DI is not applicable to P1 FLN)
7. Press F3 for Maximum Master setting
  - a. F1 for MM setting, 1...127. The MM setting should be at least as high as the highest device address present in the network  
(MM is not applicable to P1 FLN)

## Protocol Notes

### BACnet MS/TP

- Use AV # directly
  - Unit resolution is automatically applied
  - CT & PT ratios are applied subject to setting of secondary values at AV197 & AV198 respectively. Primary values are read directly from the meter

### P1 FLN

- CT & PT ratios are applied subject to setting of secondary values at Point 2-97 & Point 2-98 respectively. Primary values are read directly from the meter
- U16 = Integer
  - Apply slope according to units resolution
- U32 = Long Integer
  - Value =  $L + (H * 65,536)$
  - Apply slope according to units resolution
- S16 = Signed Integer
  - Apply intercept of -32,768
  - Apply slope according to units resolution
- S32 = Signed Long Integer
  - If  $L < 32768$  THEN  $((L + ((H-32767) * 65536)) - 32768)$  Else  $((L + ((H-32768) * 65536)) - 32768)$
  - Apply slope according to units resolution

Module address for P1 may be 1...97 but consider that 2 additional addresses are created;

- A Module with P1 FLN protocol set contains 3 logical devices, the set address + the next 2 sequentially higher addresses
- Addresses of other devices on the P1 network must use address at least 3 higher than a preceding meter module's set address

\*If module address = 1 then P1 addresses 1, 2 & 3 exist in the module

- Address 1 utilises registers 4...98 as points 4...98
- Address 2 utilises registers 101...196 as points 1...96
- Address 3 points are presently unused



## Network Data List

### Real-time Data Register List

BACnet AV	P1 Address*- Point	Description	Remark	Access	Type
4	1-4	Va (ph-N)	× 0.01, unit: V	RO	U16
5	1-5	Vb (ph-N)	× 0.01, unit: V	RO	U16
6	1-6	Vc (ph-N)	× 0.01, unit: V	RO	U16
7	1-7	Reserved		RO	
8	1-8	Average phase voltage (ph-N)	× 0.01, unit: V	RO	U16
9	1-9	Vab (ph-ph)	× 0.01, unit: V	RO	U16
10	1-10	Vbc (ph-ph)	× 0.01, unit: V	RO	U16
11	1-11	Vca (ph-ph)	× 0.01, unit: V	RO	U16
12	1-12	Reserved		RO	
13	1-13	Average line voltage (ph-ph)	× 0.01, unit: V	RO	U16
14	1-14	Positive sequence voltage	× 0.01	RO	U16
15	1-15	Negative sequence voltage	× 0.01	RO	U16
16	1-16	Neutral voltage	× 0.01, unit: V	RO	U16
17	1-17	Ia	× 0.0001, unit: A	RO	U16
18	1-18	Ib	× 0.0001, unit: A	RO	U16
19	1-19	Ic	× 0.0001, unit: A	RO	U16
20	1-20	Reserved		RO	
21	1-21	Average current	× 0.0001, unit: A	RO	U16
22	1-22	Reserved		RO	
23	1-23	Reserved		RO	
24	1-24	Reserved		RO	
25	1-25	Reserved		RO	
26	1-26	Reserved		RO	
27	1-27	Positive sequence current	× 0.0001,	RO	U16
28	1-28	Negative sequence current	× 0.0001,	RO	U16
29	1-29	Neutral current	× 0.0001, unit: A	RO	U16
30	1-30	Phase A active power	× 0.1, unit: W	RO	S16
31	1-31	Phase B active power	× 0.1, unit: W	RO	S16
32	1-32	Phase C active power	× 0.1, unit: W	RO	S16
33	1-33L	Total active power	× 0.1, unit: W	RO	S32
	1-34H				



BACnet AV	P1 Address*- Point	Description	Remark	Access	Type
35	1-35	Phase A reactive power	× 0.1, unit: var	RO	S16
36	1-36	Phase B reactive power	× 0.1, unit: var	RO	S16
37	1-37	Phase C reactive power	× 0.1, unit: var	RO	S16
38	1-38L	Total reactive power	× 0.1, unit: var	RO	S32
	1-39H				
40	1-40	Phase A apparent power	× 0.1, unit: VA	RO	U16
41	1-41	Phase B apparent power	× 0.1, unit: VA	RO	U16
42	1-42	Phase C apparent power	× 0.1, unit: VA	RO	U16
43	1-43	Total apparent power	× 0.1, unit: VA	RO	U16
44	1-44	Phase A power factor	× 0.001	RO	S16
45	1-45	Phase B power factor	× 0.001	RO	S16
46	1-46	Phase C power factor	× 0.001	RO	S16
47	1-47	Total power factor	× 0.001	RO	S16
48	1-48	Frequency	× 0.01, unit: Hz	RO	U16
49	1-49	Digital input status		RO	U16
50	1-50	Relay output status		RO	U16
51	1-51	Reserved		RO	
52	1-52	Reserved		RO	
53	1-53	Analog input 1	× 0.01	RO	U16
54	1-54	Analog input 2	× 0.01	RO	U16
55	1-55	Pulse input		RO	U16
56	1-56	Phase A voltage deviation	× 0.01, unit: %	RO	S16
57	1-57	Phase B voltage deviation	× 0.01, unit: %	RO	S16
58	1-58	Phase C voltage deviation	× 0.01, unit: %	RO	S16
59	1-59	Frequency deviation	× 0.01, unit: Hz	RO	S16
60	1-60	Vph-N unbalance rate	× 0.01, unit: %	RO	U16

## Energy Data Register List

(In 3P3W system, no each phase energy, only total energy)

BACnet AV	P1 Address*- Point	Description	Remark	Access	Type
61	1-61L	1st quadrant, total kWh	× 0.1, unit: kWh	RO	S32
	1-62H	(Invalid in 3 Phase 3 Wires)			
63	1-63L	1st quadrant, total kvarh	× 0.1, unit: kvarh	RO	S32
	1-64H	(Invalid in 3 Phase 3 Wires)			
65	1-65L	2nd quadrant, total kWh	× 0.1, unit: kWh	RO	S32
	1-66H	(Invalid in 3 Phase 3 Wires)			
67	1-67L	2nd quadrant, total kvarh	× 0.1, unit: kvarh	RO	S32
	1-68H	(Invalid in 3 Phase 3 Wires)			
69	1-69L	3rd quadrant, total kWh	× 0.1, unit: kWh	RO	S32
	1-70H	(Invalid in 3 Phase 3 Wires)			
71	1-71L	3rd quadrant, total kvarh	× 0.1, unit: kvarh	RO	S32
	1-72H	(Invalid in 3 Phase 3 Wires)			
73	1-73L	4th quadrant, total kWh	× 0.1, unit: kWh × 0.1, unit: kvarh	RO	S32
	1-74H	(Invalid in 3 Phase 3 Wires)			
75	1-75L	4th quadrant, total kvarh	× 0.1, unit: kvarh	RO	S32
	1-76H	(Invalid in 3 Phase 3 Wires)			
77	1-77L	Total kWh (of 4 quadrant)	× 0.1, unit: kWh	RO	S32
	1-78H				
79	1-79L	Total kvarh (of 4 quadrant)	× 0.1, unit: kvarh	RO	S32
	1-80H				



## Harmonic Data Register List

BACnet AV	P1 Address*- Point	Description	Remark	Access	Type
81	1-81	Phase A voltage crest factor	× 0.001	RO	U16
82	1-82	Phase B voltage crest factor	× 0.001	RO	U16
83	1-83	Phase C voltage crest factor	× 0.001	RO	U16
84	1-84	Phase A current K factor	× 0.001	RO	U16
85	1-85	Phase B current K factor	× 0.001	RO	U16
86	1-86	Phase C current K factor	× 0.001	RO	U16
87	1-87	THD for Va	× 0.001	RO	U16
88	1-88	THD for Vb	× 0.001	RO	U16
89	1-89	THD for Vc	× 0.001	RO	U16
90	1-90	THD for Ia	× 0.001	RO	U16
91	1-91	THD for Ib	× 0.001	RO	U16
92	1-92	THD for Ia	× 0.001	RO	U16
93	1-93	TEHD for Va	× 0.001	RO	U16
94	1-94	TEHD for Vb	× 0.001	RO	U16
95	1-95	TEHD for Vc	× 0.001	RO	U16
96	1-96	TEHD for Ia	× 0.001	RO	U16
97	1-97	TEHD for Ib	× 0.001	RO	U16
98	1-98	TEHD for Ic	× 0.001	RO	U16
101	2-1	TOHD for Va	× 0.001	RO	U16
102	2-2	TOHD for Vb	× 0.001	RO	U16
103	2-3	TOHD for Vc	× 0.001	RO	U16
104	2-4	TOHD for Ia	× 0.001	RO	U16
105	2-5	TOHD for Ib	× 0.001	RO	U16
106	2-6	TOHD for Ic	× 0.001	RO	U16





## Demand Data Register List

### Real-time Demand

BACnet AV	P1 Address*- Point	Description	Remark	Access	Type
107	2-7	Demand for Ia	× 0.0001, unit: A	RO	U16
108	2-8	Demand for Ib	× 0.0001, unit: A	RO	U16
109	2-9	Demand for Ic	× 0.0001, unit: A	RO	U16
110	2-10L	Demand for Ptot	× 0.1, unit: W	RO	S32
	2-11H				
112	2-12L	Demand for Qtot	× 0.1, unit: var	RO	S32
	2-13H				
114	2-14	Demand for Stot	× 0.1, unit: VA	RO	U16

### Max. Demand

BACnet AV	P1 Address*- Point	Description	Remark	Access	Type
115	2-15	Max. demand for Ia	× 0.0001, unit: A	RO	U16
116	2-16L	Time	Unix system time	RO	U32
	2-17H				
118	2-18	Max. demand for Ib	× 0.0001, unit: A	RO	U16
119	2-19L	Time	Unix system time	RO	U32
	2-20H				
121	2-21	Max. demand for Ic	× 0.0001, unit: A	RO	U16
122	2-22L	Time	Unix system time	RO	U32
	2-23H				
124	2-24L	Max. demand for Ptot	× 0.1, unit: W	RO	S32
	2-25H				
126	2-26L	Time	Unix system time	RO	U32
	2-27H				
128	2-28L	Max. demand for Qtot	× 0.1, unit: var	RO	S32
	2-29H				
130	2-30L	Time	Unix system time	RO	U32
	2-31H				
132	2-32	Max. demand for Stot	× 0.1, unit: VA	RO	U16
133	2-33L	Time	Unix system time	RO	U32
	2-34H				

## TOU (Multi-tariff) Data Register List

BACnet AV	P1 Address*- Point	Description	Remark	Access	Type
135	2-35L	Import kWh of tariff 1#	× 0.1, unit: kWh	RO	U32
	2-36H				
137	2-37L	Export kWh of tariff 1#	× 0.1, unit: kWh	RO	U32
	2-38H				
139	2-39L	Import kvarh of tariff 1#	× 0.1, unit: kvarh	RO	U32
	2-40H				
141	2-41L	Export kvarh of tariff 1#	× 0.1, unit: kvarh	RO	U32
	2-42H				
143	2-43L	Import kWh of tariff 2#	× 0.1, unit: kWh	RO	U32
	2-44H				
145	2-45L	Export kWh of tariff 2#	× 0.1, unit: kWh	RO	U32
	2-46H				
147	2-47L	Import kvarh of tariff 2#	× 0.1, unit: kvarh	RO	U32
	2-48H				
149	2-49L	Export kvarh of tariff 2#	× 0.1, unit: kvarh	RO	U32
	2-50H				
151	2-51L	Import kWh of tariff 3#	× 0.1, unit: kWh	RO	U32
	2-52H				
153	2-53L	Export kWh of tariff 3#	× 0.1, unit: kWh	RO	U32
	2-54H				
155	2-55L	Import kvarh of tariff 3#	× 0.1, unit: kvarh	RO	U32
	2-56H				
157	2-57L	Export kvarh of tariff 3#	× 0.1, unit: kvarh	RO	U32
	2-58H				
159	2-59L	Import kWh of tariff 4#	× 0.1, unit: kWh	RO	U32
	2-60H				
161	2-61L	Export kWh of tariff 4#	× 0.1, unit: kWh	RO	U32
	2-62H				
163	2-63L	Import kvarh of tariff 4#	× 0.1, unit: kvarh	RO	U32
	2-64H				
165	2-65L	Export kvarh of tariff 4#	× 0.1, unit: kvarh	RO	U32
	2-66H				

## System Parameter Register List

BACnet AV	P1 Address*- Point	Description	Remark	Access	Type
167	2-67	CT primary	1 to 9999 ( × 1A)	RW	U16
168	2-68	Connection mode	0 to 1 0--3-phase 4-wire 1--3-pase 3-wire	RW	U16
169	2-69	PT primary	1 to 650 ( × 0.1kV)	RW	U16
170	2-70	Address of RS485 COM 1	1 to 247	RW	U16
171	2-71	Baudrate of RS485 COM 1	0 to 4 0--2400 1--4800 2--9600 3--19200 4--38400	RW	U16
172	2-72	Parity check of RS485 COM 1	0 to 2 0—No parity 1—Odd 2--Even	RW	U16
173	2-73	Stop bit of RS485 COM 1	1 to 2 1—1 bit stop 2—2 bit stop	RW	U16

## Command Data Register List

BACnet AV	P1 Address*- Point	Description	Remark	Access	Type
178	2-78	Clear energy data ( kWh & kvarh)	Write 888	WO	U16
179	2-79	Clear SOE event log	Write 888	WO	U16
180	2-80	Clear Max./ Min. data	Write 888	WO	U16
181	2-81	Clear voltage unbalance event at present day	Write 888	WO	U16
182	2-82	Clear voltage unbalance event at present month	Write 888	WO	U16
183	2-83	Clear voltage unbalance event in history	Write 888	WO	U16
184	2-84	Clear voltage deviation event	Write 888	WO	U16
185	2-85	Clear frequency deviation event	Write 888	WO	U16
186	2-86	Clear Max. demand data	Write 888	WO	U16
188	2-88	Clean memory module data	Write 888	WO	U16

## Device Information Register List

BACnet AV	P1 Address*- Point	Description	Remark	Access	Type
189	2-89L	Device ID		RO	U32
	2-90H				
191	2-91L	Manufacturing No.		RO	U32
	2-92H				
193	2-93	Hardware version		RO	U16
194	2-94	Software version		RO	U16
195	2-95L	Timing, low word	The Num. of second from Jan. 1, 1970, Greenwich mean time, support radio command	RW	U32
	2-96H	Timing, high word			

## Site Specific Settings (compulsory)

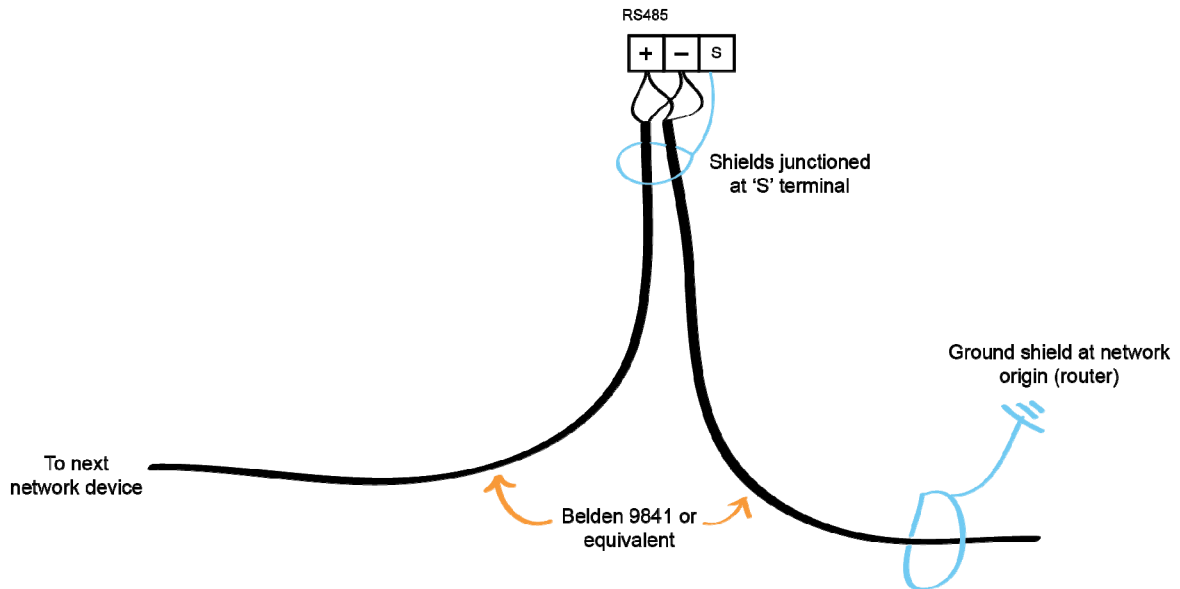
Set multipliers which will be applied to instantaneous values read over the network which would otherwise be seen as secondary values. Also time zone if UNIX based time not already allowed for in the BMS platform

BACnet AV	P1 Address*- Point	Description	Remark	Access	Type
197	2-97	CT Secondary	<p>Default 5 (5 Amp).</p> <p>User must set according to the meter's CT input (CT secondary) rating.</p> <p>Typically will be 5 but may also be 1</p>	RW	U16
198	2-98	PT Secondary	<p>Default 220 (220V).</p> <p>User must set according to the meter's nominal voltage rating if direct connected.</p> <p>If PT connected type then user must set according to the meter's PT input (PT secondary) rating which would typically be 110</p>	RW	U16
199	2-99	Time Zone	If required, GMT +/-, in Minutes	RW	S16

## Installation & Commissioning

- Power down the meter before removal or fitting of the module
- RS485 multi-drop cable should be used for the network connections, complete with end of line terminating resistors (120Ω). Belden 9841 or equivalent is recommended. The recommended cable is a low capacitance twisted pair with braid and foil screen
- The RS485 cables should be terminated directly at each device in a daisy-chain configuration, avoiding 'laterals' or 'spurs'
- The RS485 screen should be connected at the network master's ground terminal. The incoming and outgoing screen at each device should be continuously connected via the S terminal of the device (note that the device's S terminal has no electrical connection to the device, it merely acts as a junction terminal for the purpose of screen continuity)
- The RS485 cable should avoid cable routes that run with power cables. Where the RS485 cable must cross power cables then they should cross at 90° avoiding parallel runs beside power cables
- Prior to connection of the slave devices to the RS485 network check that no AC voltage is present. Double check the network for short circuits between the twisted pair cores and between the cores and the screen. Ensure continuity of the twisted pair cores and the screen
- Check the network master's +/- terminals for correct voltages to ground (approx. 2.5Vdc) and connect the RS485 network cable to the network master's RS485 port
- Where a network runs between buildings and zero earth potential difference between individual panel 24Vac power supplies cannot be guaranteed, we recommend that a repeater be used to provide isolation of the sections of the network having differing earth potential
- At each device assign an individual address and the baud rate specific to the network

## Connections



## Technical Data

<b>Network Wiring</b>	Shielded twisted pair (shield grounded at origin) Belden 9841 low capacitance twisted pair for EIA RS485 network applications (braided + foil shield, shield continuous throughout the network and grounded at network origin)
<b>BACnet MS/TP Comms</b>	EIA RS485, 1/8 <sup>th</sup> Load (256 node) 2400, 4800, 9600, 19200, 38400, 57600, 76800 baud
<b>Operating Temperature Range</b>	0...50°C (32...122°F)
<b>Storage Temperature Range</b>	-5...75°C (-40...167°F)
<b>Humidity Range</b>	10...95%rH (non-condensing)
<b>Dimensions</b>	H - 54mm, W - 30mm, D - 37mm including connection terminals (Depth should be added to PMAC770 depth for overall installed depth of the meter/module combination)



## BACnet PICS

A Protocol Implementation Conformance Statement (PICS) identifies the attributes of particular BACnet devices. This PICS applies to the HPE-BNPMAC comms module for PMAC770.

### Device Profile

B-ASC  
Maximum APDU = 206

#### 1. BACnet Conformance Class Supported

- |                                  |                                  |   |
|----------------------------------|----------------------------------|---|
| <input type="checkbox"/> Class 1 | <input type="checkbox"/> Class 2 | <input checked="" type="checkbox"/> Class 3 |
| <input type="checkbox"/> Class 4 | <input type="checkbox"/> Class 5 | <input type="checkbox"/> Class 6            |

#### 2. BACnet Functional Groups Supported

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> Clock         | <input type="checkbox"/> Files                            |
| <input type="checkbox"/> HHWS                     | <input checked="" type="checkbox"/> Reinitialise          |
| <input type="checkbox"/> PCWS                     | <input type="checkbox"/> Virtual Operator Interface       |
| <input type="checkbox"/> Event Initialisation     | <input type="checkbox"/> Virtual Terminal                 |
| <input type="checkbox"/> Event Response           | <input checked="" type="checkbox"/> Device Communications |
| <input type="checkbox"/> COV Event Initialisation | <input type="checkbox"/> Time Master                      |
| <input type="checkbox"/> COV Event Response       |   |





### 3. BACnet Standard Application Services Supported

Application Service	Initiates Request	Executes Request
Acknowledge Alarm	<input type="checkbox"/>	<input type="checkbox"/>
Confirmed COV Notification	<input type="checkbox"/>	<input type="checkbox"/>
Confirmed Event Notification	<input type="checkbox"/>	<input type="checkbox"/>
Get Alarm Summary	<input type="checkbox"/>	<input type="checkbox"/>
Get Enrollment Summary	<input type="checkbox"/>	<input type="checkbox"/>
Subscribe COV	<input type="checkbox"/>	<input type="checkbox"/>
Unconfirmed COV Notification	<input type="checkbox"/>	<input type="checkbox"/>
Unconfirmed Event Notification	<input type="checkbox"/>	<input type="checkbox"/>
Atomic Read File	<input type="checkbox"/>	<input type="checkbox"/>
Atomic Write File	<input type="checkbox"/>	<input type="checkbox"/>
Add List Element	<input type="checkbox"/>	<input type="checkbox"/>
Remove List Element	<input type="checkbox"/>	<input type="checkbox"/>
Create Object	<input type="checkbox"/>	<input type="checkbox"/>
Delete Object	<input type="checkbox"/>	<input type="checkbox"/>
Read Property	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Read Property Conditional	<input type="checkbox"/>	<input type="checkbox"/>
Read Property Multiple	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Write Property	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Read Range	<input type="checkbox"/>	<input type="checkbox"/>
Write Property Multiple	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Device Communication Control	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Confirmed Private Transfer	<input type="checkbox"/>	<input type="checkbox"/>
Unconfirmed Private Transfer	<input type="checkbox"/>	<input type="checkbox"/>
Reinitialize Device	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Confirmed Text Message	<input type="checkbox"/>	<input type="checkbox"/>
Unconfirmed Text Message	<input type="checkbox"/>	<input type="checkbox"/>
Time Synchronization	<input type="checkbox"/>	<input checked="" type="checkbox"/>



**4. BACnet Standard Application Services Supported** *(continued)*

<b>Application Service</b>	<b>Initiates Request</b>	<b>Executes Request</b>
Who-Has	<input type="checkbox"/>	<input checked="" type="checkbox"/>
I-Have	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Who-Is	<input type="checkbox"/>	<input checked="" type="checkbox"/>
I-Am	<input checked="" type="checkbox"/>	<input type="checkbox"/>
VT-Open	<input type="checkbox"/>	<input type="checkbox"/>
VT-Close	<input type="checkbox"/>	<input type="checkbox"/>
VT-Data	<input type="checkbox"/>	<input type="checkbox"/>
Authenticate	<input type="checkbox"/>	<input type="checkbox"/>
Request Key	<input type="checkbox"/>	<input type="checkbox"/>

## 5. Standard Object Types Supported

Object-Type	Supported	Dynamically Creatable	Dynamically Deletable	Optional Properties Supported	Writeable Properties
Analog Input	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Analog Output	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Analog Value	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Binary Input	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Binary Output	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Binary Value	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Calendar	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
Command	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Device	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>
Event Enrollment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
File	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Group	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Loop	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Multi-state Input	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Multi-state Output	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Notification Class	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Program	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Schedule	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**6. Data Link Layer Option**

- ISO 8802-3 10BASE5
- IS 8802-3 10BASET
- Other - BACnet/IP as defined in Annex J
- ISO 8802-3 10BASE2
- ISO 8802-3 Fibre
- ARCNET, coax star
- ARCNET, coax bus
- ARCNET, twisted pair star
- ARCNET, twisted pair bus
- ARCNET, fibre star
- MS/TP master, baud rate 9600, 38400, 76800
- MS/TP slave, baud rate 9600, 38400, 76800
- Point-to-Point, EIA 232, baud rate
- Point-to-Point, modem, baud rate
- LonTalk

**7. Character Sets Supported**

- ANSI X3.4
- JIS C 6226
- ISO 10646 (UCS2)
- IBM/Microsoft DBCS
- ISO 10646 (ICS-4)
- ISO 8859-1

**8. Special Functionality Support**

Not supported

- Segmented Requests
- Segmented Responses

Window Size:

Window Size:

**9. Router**

No routing capability

## 10. BACnet Interoperability Building Blocks (BIBBS)

The HP-BN series of devices are designed around the BACnet Application Specific Controller (B-ASC) profile. A B-ASC is a control device with a set of attributes for specific applications. The attributes of the HP-BN devices are described in the sections which follow

### i) Data Sharing

Application Service	Initiates Request	Executes Request	BIBBS
Read Property	<input type="checkbox"/>	<input checked="" type="checkbox"/>	D-RP-B
Read Property Multiple	<input type="checkbox"/>	<input checked="" type="checkbox"/>	D-RPM-B
Write Property	<input type="checkbox"/>	<input checked="" type="checkbox"/>	D-WP-B
Write Property Multiple	<input type="checkbox"/>	<input checked="" type="checkbox"/>	D-WPM-B

### ii) Alarm and Event Management

Not supported

### iii) Scheduling

Not supported

### iv) Trending

Not supported

### v) Device and Network Management

Application Service	Initiates Request	Executes Request	BIBBS
Who-Is	<input type="checkbox"/>	<input checked="" type="checkbox"/>	DM-DDB-B
I-Am	<input checked="" type="checkbox"/>	<input type="checkbox"/>	DM-DDB-B
Who-Has	<input type="checkbox"/>	<input checked="" type="checkbox"/>	DM-DOB-B
I-Have	<input checked="" type="checkbox"/>	<input type="checkbox"/>	DM-DOB-B
Reinitialize Device	<input type="checkbox"/>	<input checked="" type="checkbox"/>	DM-RD-B
Device Communication Control	<input type="checkbox"/>	<input checked="" type="checkbox"/>	DM-DCC-B