



smartIAQ® GridSet™ BACnet Integration Guide

Field Commissioning using Integrated 'Bus Manager'.

smartIAQ Hub-4 Pro (BACnet) Specific Details

In order to facilitate simple commissioning, the hub is equipped with a 'Bus Manager' to set the gateway's unique BACnet identity from a local terminal. The Bus Manager is accessed by way of jumpers on the communications card in the gateway.

Accessing 'Bus Manager' Mode

First, consult the smartIAQ Hub-4 IOM for instructions on how to access the communications card on the main PCBA. (Gateway must be de-energized).

The images below show the main PCBA in the gateway and a close-up of the configuration pins on the communications card.

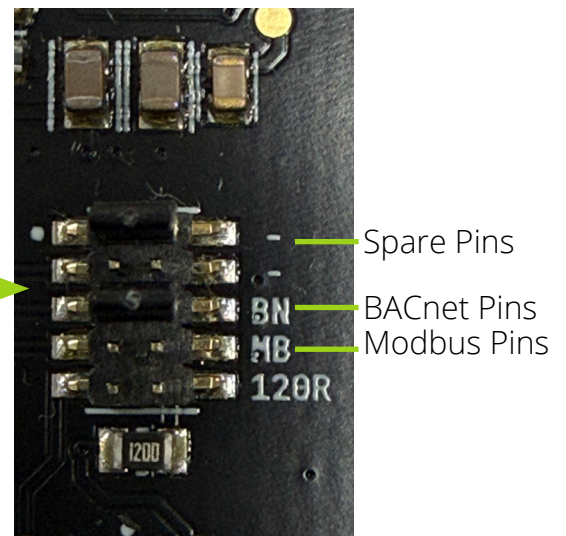
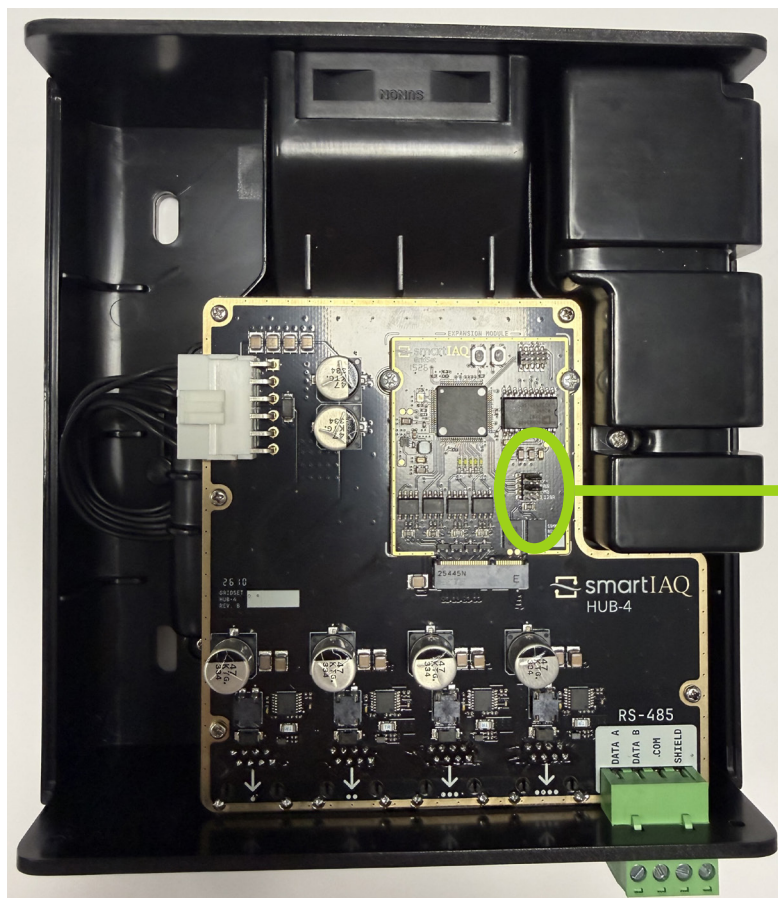


Fig. 2 - Pins

Fig. 1 - Main PCBA

By default the smartIAQ Hub-4 Pro BACnet Gateway arrives configured ready to enter BACnet service immediately

This default configuration places jumpers on the 'Spare' and 'BACnet' Pins (see figs 2 & 3a).

To access Bus Manager Mode, remove the jumper from the 'Spare' Pins and place it on the 'Modbus' pins (see fig. 3b).

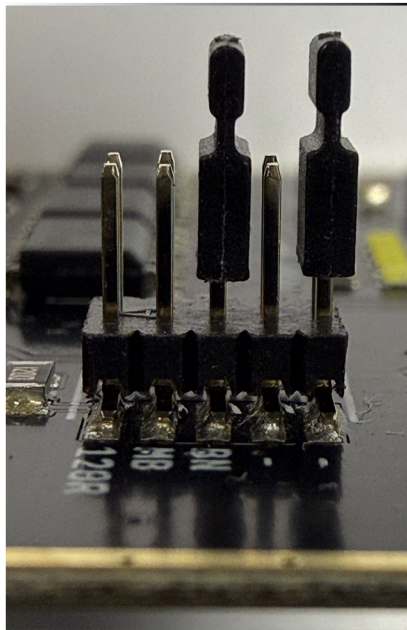


Fig. 3a - BACnet config

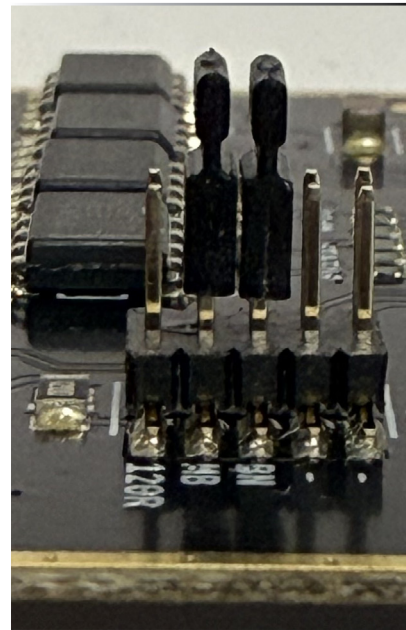


Fig. 3b - Bus Manager config

Energize the gateway and it will boot to 'Bus Manger' mode where the settings can be changed and saved.

NOTE: This is a Point-to-point only configuration. Disconnect from any live BACnet bus first.

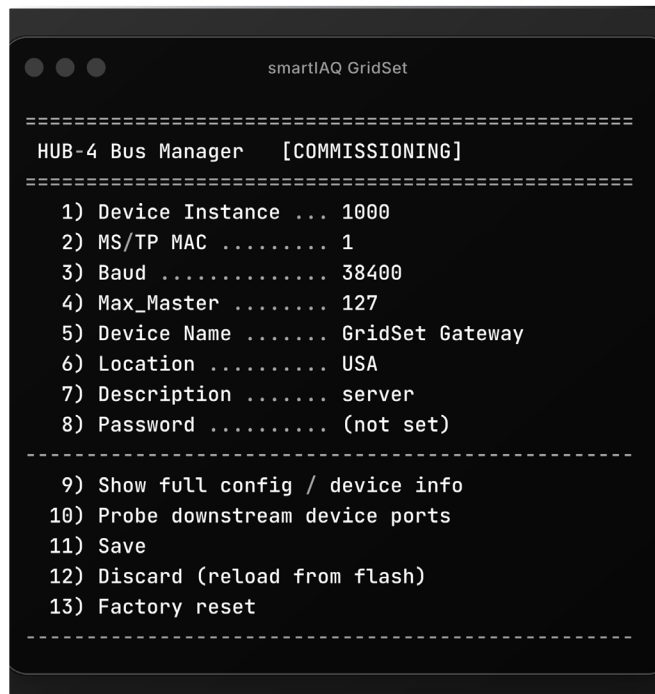
Connect to the gateway using an RS-485-to-USB serial adapter connected to the computer on which you have a terminal emulator (PuTTY / Tera Term / Etc.)

Configure the serial connection as: 115200 8N1:

- Baud Rate: 115200
- Data Bits: 8
- Parity: None
- Stop Bits: 1

Changing settings

Fig. 4 is a representation of a Bus Manager Terminal.



```
smartIAQ GridSet

=====
HUB-4 Bus Manager  [COMMISSIONING]
=====

1) Device Instance ... 1000
2) MS/TP MAC ..... 1
3) Baud ..... 38400
4) Max_Master ..... 127
5) Device Name ..... GridSet Gateway
6) Location ..... USA
7) Description ..... server
8) Password ..... (not set)

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9) Show full config / device info
10) Probe downstream device ports
11) Save
12) Discard (reload from flash)
13) Factory reset

-----
```

Fig. 4 - Bus Manager

- Pick a number from the available list (1-8).
- Enter the desired value
- Repeat for any other changes
- Select '11' to save entries.

Note: In the event of losing your password, enter Bus Manager mode , select '13', then reset (type 'RESET'). This clears the password and restores all defaults. Re-enter your settings and 'Save'.

Exiting 'Bus Manager' Mode

After saving any changes, de-energize the gateway and return the jumper configuration to match fig 3a.

The gateway will return to normal BACNet configuration when next energized.

BACnet Standard Operation

Device Specific Details

Product: GridSet Comms Gateway
Interface: BACnet MS/TP outward-facing object map
Status: Authoritative customer-facing reference for exposed BACnet points

Overview

Each connected device port exposes up to 32 BACnet objects. Objects are created dynamically when a device first reports on a port, based on the device’s capability flags. Points with no capability gate are created for every connected device. Points with a gate are only created if the device reports having that sensor or actuator.

Instance numbers follow the pattern: `<port> \\* 1000 + <offset>`. For example, Port 1 Zone Temp = AI:1001, Port 2 Zone Temp = AI:2001.

Object names follow the pattern: `Port <N> <Suffix>` (e.g., “Port 1 Zone Temp”).

Instance Ranges by Port

Port	Instance Range
1	1001 - 1061
2	2001 - 2061
3	3001 - 3061
4	4001 - 4061

Points List

	Type	Name	Units	Writable	COV Increment	Compatibility Gate	States / Text
1	AI	Zone Temp	°C	No	0.5 °C	temp_sensor	
2	AI	Humidity	%RH	No	1.0 %RH	humidity_sensor	
3	AI	CO2	ppm	No	25 ppm	co2_sensor	
4	AI	PM2.5	µg/m³	No	5.0 µg/m³	particulate_sensor	
5	AI	VOC	µg/m³	No	10.0 µg/m³	voc_sensor	
6	AI	NOx	index	No	5 pts	voc_sensor	
7	AI	HCHO (formaldehyde)	µg/m³	No	1.0 µg/m³	hcho_sensor	
8	AI	Pressure	hPa	No	1.0 hPa	pressure_sensor	
9	AI	Lux	lux	No	50 lux	light_sensor	
10	AI	PM1.0	µg/m³	No	5.0 µg/m³	particulate_sensor	
11	AI	PM4.0	µg/m³	No	5.0 µg/m³	particulate_sensor	
12	AI	PM10	µg/m³	No	5.0 µg/m³		
20	AI	Filter Life	%	No	1.0%		
21	AI	Filter Hours Left	hours	No	10 hours		
22	MSV	Filter Limiter		No	any change		1 = None, 2= time 3 = TVOC, 4=HCHO
23	MSV	Filter Confidence		No	any change		1 = Low, 2= Medium 3 = High
24	BI	Filter Warning		No	any change		Active = Warning, Inactive = Normal
25	BI	Filter Critical		No	any change		Active = Warning, Inactive = Normal
31	AI	Fan CFM	CFM	No	10 CFM		
32	MSV	Fan Mode		No	any change		1 = Auto, 2 = Manual
33	AV	Fan Duty Override	%	No	5.0%		
34	AV	Fan CFM Set point	CFM	No	5 CFM		
35	BI	Fan Inhibited		No	any change		Active = Inhibited, Inactive = Normal
36	MSV	Fan Mode Command		No	any change		1 = Auto, 2 = Manual
37	MSV	Motor Run State		No	any change	motor	1 = Auto, 2 = Manual
38	MSV	Motor Fault		No	any change	motor	
39	AI	Fan Applied Duty	%	No	5.0%		
40	BI	Zone Occupied		No	any change		
41	AV	CO2 Occ Threshold	ppm	Yes	50 ppm	co2_sensor	
50	BV	Ionizer Enable		No	any change	ionizer	Active = Enabled, Inactive = Disabled
60	BI	Device Online		No	any change		Active = Online, Inactive = Offline
61	AI	Device Uptime	seconds	No	3,600 sec		

COV (Change of Value) Behavior

All objects support COV subscription (SubscribeCOV service). COV behavior depends on object type:

- **AI/AV objects:** Notifications are sent when the present value changes by more than the COV increment listed above. This prevents notification floods from minor sensor noise.
- **BI/BV/MSV objects:** Notifications are sent on any state change (no incremental threshold)
- **All objects:** A change in 'Status_Flags' (e.g. reliability changing to 'COMMUNICATION_FAILURE') also triggers a COV notification, even if the present value hasn't changed.

Maximum concurrent COV subscriptions: **128** across all objects. Maximum unique subscriber addresses: **16**

Reliability Mapping

Condition	Reliability Value	Affected Objects
Normal operation	NO_FAULT_DETECTED	All
Port inactive/fault	COMMUNICATION_FAILURE	All Except Device Online
Sensor stale	COMMUNICATION_FAILURE	Sensor AI's (offsets 1-12)
Sensor installed but returning 'null' or omitting its value	UNRELIABLE_OTHER	Sensor AI's (offsets 1-12)
Sensor absent/capability not present	NO_SENSOR	Sensor AI's (offsets 1-12)
Motor fault	UNRELIABLE_OTHER	Fan-related objects (CFM, Mode, Mode Command, Inhibited, Duty Override, CFM Set point, Applied Duty)

'Device Online' normally reports 'NO_FAULT_DETECTED' whenever the port is reachable. A rare exception is partial BACnet object creation failure inside the gateway, where 'Device Online' remains active but its 'Reliability' becomes 'UNRELIABLE_OTHER'.

Writable Objects

Writable objects accept BACnet WriteProperty commands and propagate values to the connected device:

Object	Write Behavior
Fan Duty Override (AV : x033)	Sets fan duty cycle override (0-100%)
Fan CFM Set point (AV: x034)	Sets target airflow in CFM
Fan Mode Command (MSV: x036)	1 = Auto, 2 = Manual
CO2 Occ Threshold (AV: x041)	Sets the device's configured CO2 occupancy threshold
Ionizer Enable (BV: x050)	Active = Enable, Inactive = Disable

Writable AV objects use the pending-flag pattern: the device's reported value is not overwritten while a BMS write is pending delivery to the device. The CO2 occupancy-threshold point is populated from the device parameter store during discovery and refreshed after successful writes.