

## 1 BACnet Interface

IBC's BACnet Interface option provides BACnet Server functionality to the V10 Touch Screen Boiler Controller using a BACnet/IP interface.

To make use of the BACnet capabilities, a properly configured BACnet Operator's Workstation (B-OWS) or BACnet Web Server software package is required. The BACnet Interface has been tested using the Reliable Controls® RC-Studio Operator's Workstation V2.0, though any BACnet Operator Workstation or BACnet Web Server software package should work as well.

### 1.1 Site Requirements

It should be noted that the BACnet Interface option does not provide any BBMD, foreign device, or other BACnet routing support. The controller supports BACnet/IP only, the MSTP interface is not supported. Please contact your Network Administrator or your BACnet Systems Integrator for more information and assistance.

A properly configured BACnet Operators Workstation or BACnet Web Server software package is required to access the BACnet Interface features.

The BACnet interface is an optional feature that must be activated with a license key. Licenses for individual boilers as well as site licenses are available. Please contact your installer or IBC Technologies for additional information.

An example of the sort of customized display that can be setup for use with your B-OWS software package is shown below:

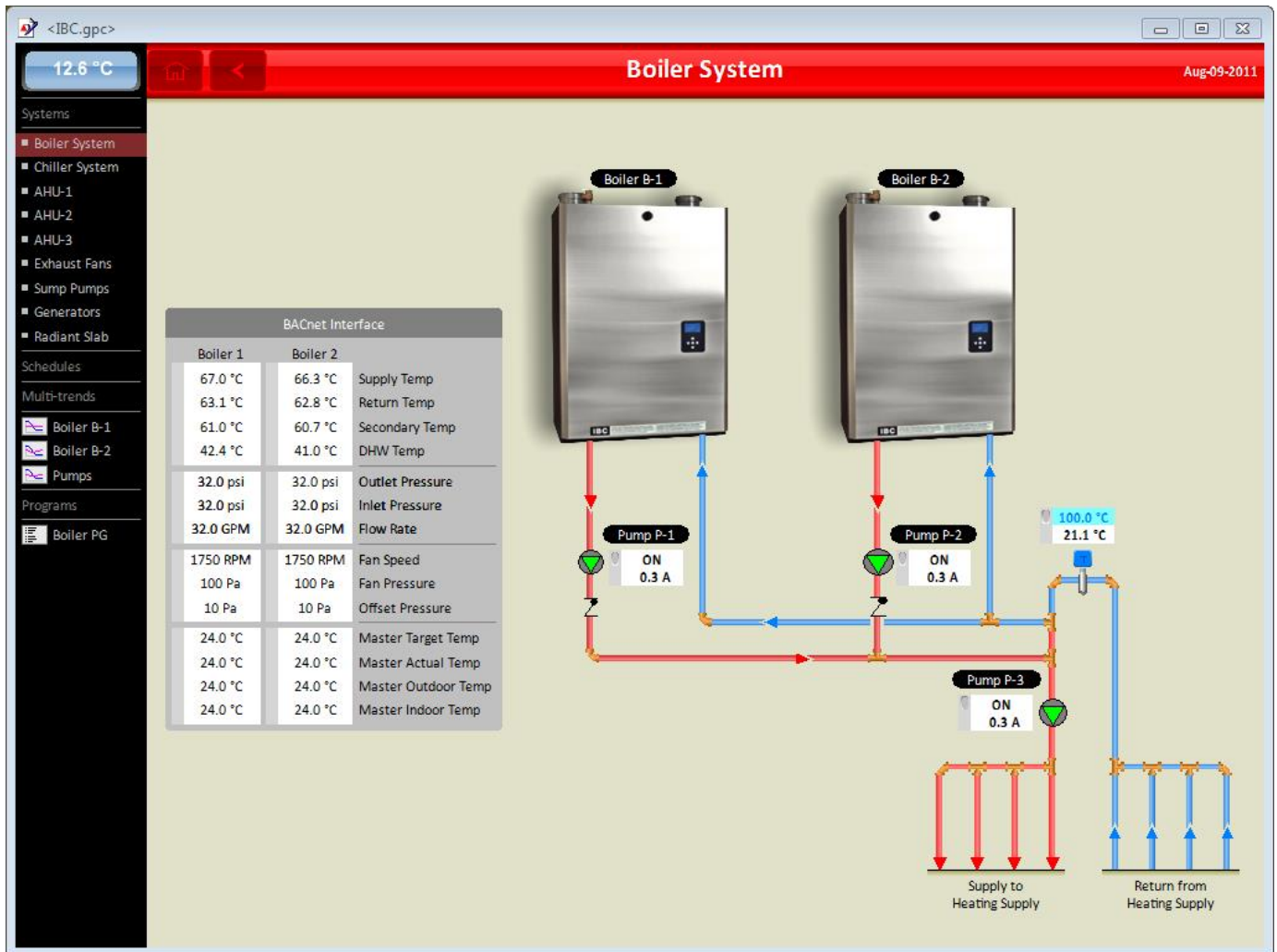


Figure 1

Of course, much more elaborate system and status displays can be developed than that shown in this example. The actual configuration and use of the BACnet Operator Workstation software will be specific to your site and your software package.

The integration of IBC boilers into a new or existing BACnet installation will be dependent on your particular site, network configuration, and the BACnet software package(s) you are using, and is therefore beyond the scope of this document. Any questions regarding the use and setup of the BACnet software package you are using, and the integration of the BACnet objects provided by the IBC BACnet Interface should be referred to the manufacturer of your BACnet workstation or server software, your Network Administrator, or your BACnet System Integration and Support organization.

## 1.2 BACnet Objects

The IBC BACnet Interface will provide a set of BACnet objects from each boiler on the network. There is also set of "Master" objects, which are associated with the boiler designated as the "Master" boiler.

An example of a BACnet object list obtained from an IBC V10 boiler controller is shown below:

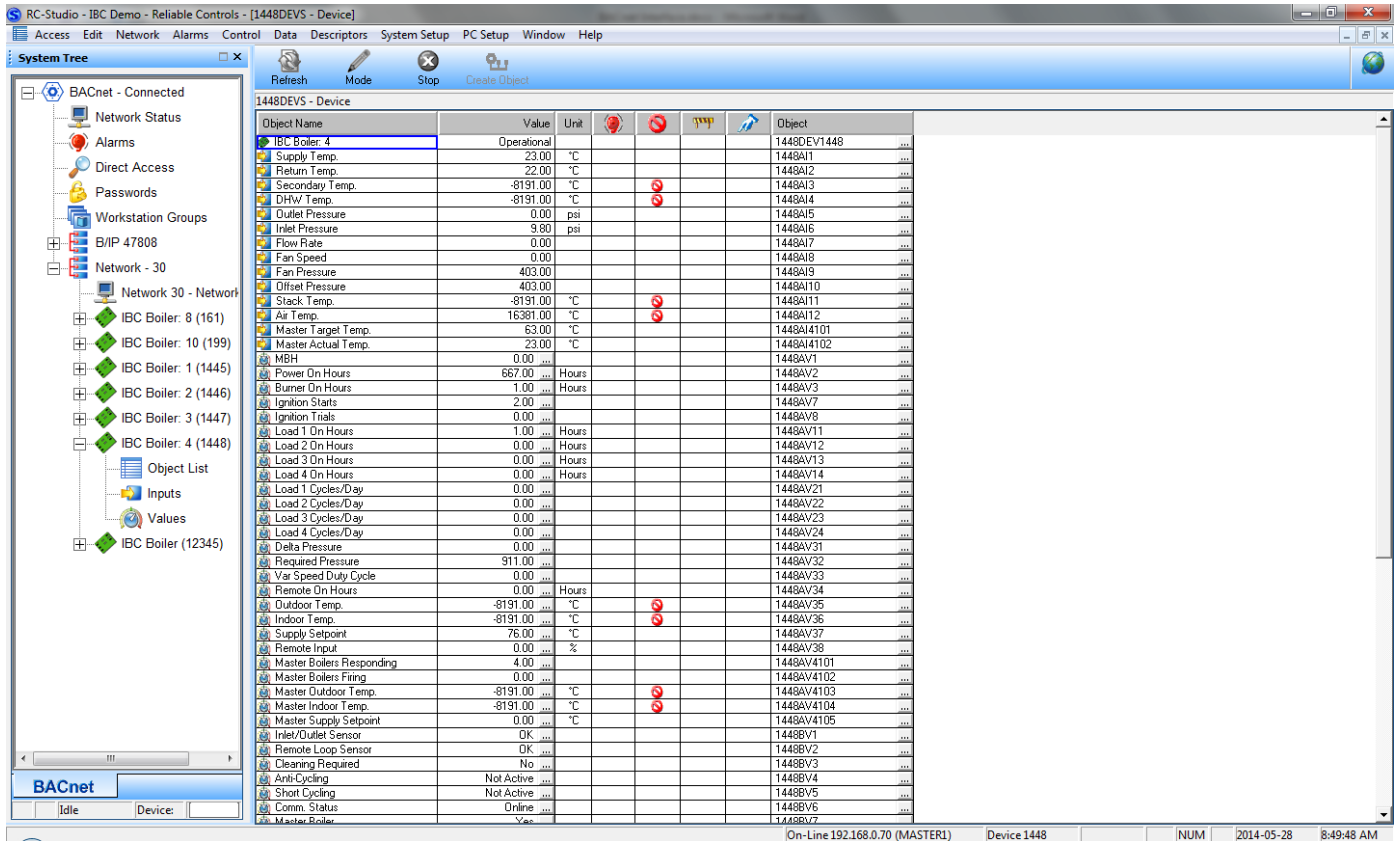


Figure 2

Any BACnet object commands that require a password (e.g. the "Reinitialize Device" command), will use the password that has been setup for the "BACnet" user id. The user name will always be "BACnet", with the default password being "IBC-admin".

The "Object Number" will generally be in the format of:

11111AA22333

11111 BACnet Address

AA Object Type

22333 Object ID

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For “Master” objects, or the controller has been designated as a “BoilerNet Master”, then the object number will be:

22	Boiler ID
333	Object ID

Please note that not all objects will be valid for all boiler models. For example, “SL” boiler models do not have an Outlet Pressure Sensor, so therefore this object will not have a usable value. If a temperature sensor is not connected (e.g. the Indoor Sensor), then that object will also not have a usable value.

**Table 1 – Boiler Objects**

Object Name	Value	Units	Object ID	Commandable	Notes
Supply Temp.	41	°C	xxxAI1		
Return Temp.	28	°C	xxxAI2		
Secondary Temp.	39	°C	xxxAI3		
DHW Temp.	60	°C	xxxAI4		
Outlet Pressure	5.6	psi	xxxAI5		"SL" models excluded
Inlet Pressure	5.7	psi	xxxAI6		
Flow Rate	0	Gal/min	xxxAI7		
Fan Speed	4500	revs/min	xxxA8		
Fan Pressure	102		xxxAI9		
Offset Pressure	102		xxxAI10		
Stack Temp.	70	°C	xxxAI11		If equipped
Air Temp.	24	°C	xxxAI12		If equipped
MBH	199	MBtu	xxxAV1		
Power On Hours	9125	hrs	xxxAV2		
Burner On Hours	2175	hrs	xxxAV3		
Ignition Starts	99		xxxAV7		
Ignition Trials	6		xxxAV8		
Load 1 On Hours	500	hrs	xxxAV11		
Load 2 On Hours	600	hrs	xxxAV12		
Load 3 On Hours	625	hrs	xxxAV13		
Load 4 On Hours	450	Hrs	xxxAV14		
Load 1 Cycles/Day	10		xxxAV21		
Load 2 Cycles/Day	5		xxxAV22		
Load 3 Cycles/Day	5		xxxAV23		
Load 4 Cycles/Day	7		xxxAV24		
Delta Pressure	0		xxxAV31		"SL" models excluded
Required Pressure	154		xxxAV32		
Var Speed Duty Cycle	0		xxxAV33		
Remote On Hours	0	hrs	xxxAV34		
Outdoor Temp.	5	°C	xxxAV35	✓	1
Indoor Temp.	21	°C	xxxAV36	✓	1
Supply Setpoint	60	°C	xxxAV37	✓	1
Remote Input	50	%	xxxAV38		
Inlet/Outlet Sensor	OK		xxxBV1		
Remote Loop Sensor	OK		xxxBV2		
Cleaning Required	No		xxxBV3		Future feature
Anti-Cycling	Not Active		xxxBV4		
Short Cycling	Not Active		xxxBV5		

Object Name	Value	Units	Object ID	Commandable	Notes
Comm. Status	Online		xxxBV6		
Master Boiler	Yes		xxxBV7		
Primary Pump	Off		xxxBV8		
Occupied	Yes		xxxBV9	✓	2
Boiler Enable	Enabled		xxxBV10	✓	2
Boiler Over Temp.	No		xxxBV11		
P/V 1	Off		xxxBV21		
P/V 2	Off		xxxBV22		
P/V 3	Off		xxxBV23		
P/V 4	Off		xxxBV24		
Setback 1	Disabled		xxxBV31	✓	2
Setback 2	Disabled		xxxBV32	✓	2
Setback 3	Disabled		xxxBV33	✓	2
Setback 4	Disabled		xxxBV34	✓	2
Thermostat 1	On		xxxBV41	✓	1
Thermostat 2	Off		xxxBV42	✓	1
Thermostat 3	Off		xxxBV43	✓	1
Thermostat 4	Off		xxxBV44	✓	1
Operating Status	Standby		xxxMV1		
Error Message	None		xxxMV2		
Service Mode	Normal		xxxMV3	✓	2
Boiler Model	45-225		xxxMV4		
Load 1 Type	Set Point		xxxMV11	✓	2
Load 2 Type	Reset		xxxMV12	✓	2
Load 3 Type	DHW		xxxMV13	✓	2
Load 4 Type	Off		xxxMV14	✓	2

**Table 2 – Master Objects**

Object Name	Value	Units	Object ID	Commandable	Notes
Master Target Temp.	22	°C	xxxAI1101		
Master Actual Temp.	22	°C	xxxAI1102		
Master Boilers Responding	4		xxxAV1101		
Master Boilers Firing	1		xxxAV1102		
Master Outdoor Temp.	10	°C	xxxAV1103	✓	1
Master Indoor Temp.	21	°C	xxxAV1104	✓	1
Master Supply Setpoint	60	°C	xxxAV1105	✓	1

A master boiler must be defined in the system for these objects to be available.

**Table 3 – Miscellaneous Objects**

Object Name	Value	Units	Object ID	Commandable	Notes
IBC 201 11			DEV		

- 1) If BACnet communications is lost for a period of 5 minutes, then these objects will revert to their non-commanded (relinquish) values.
- 2) Altering the object's value will alter the saved value in the boiler's controller; sending a relinquish command or a loss of BACnet communications will not restore the setting to its previous state.
  - Values shown are examples only.
  - Each boiler in the network will have its own list of "Boiler Objects"; Boiler #1 only is shown in the above example.
  - The "Object ID" will be dependent on the BACnet software package you are using (the examples above are generated by the Reliable Controls® Operator's Workstation).
  - The actual "Object ID" numbers will be site specific.
  - Certain objects may or may not be available depending on the boiler model and the software version installed.

### 1.3 Multi-value Objects

**Table 4 – MV1 – Operating Status**

1	Standby
2	Purging
3	Igniting
4	Heating
5	Circulating
6	Error
7	Initialize
8	Service
9	Restart
10	Unknown

**Table 5 – MV2 – Error Message**

1	None
2	Water High Limit Exceeded
3	Vent High Limit Exceeded
4	Ignition Failure
5	Aux. Interlock 1 Open
6	Aux. Interlock 2 Open
7	Low Air Flow
8	No Water Flow
9	Low Water Pressure
10	Inlet Pressure Sensor
11	Outlet Pressure Sensor
12	Ignition Module
13	AC Crossing Error
14	Max. In-Out Temp. Exceeded
15	Loop/Indoor Sensor
16	Water High/Low Cutout
17	Vessel/Vent High Limit

**Table 6 – MV3 – Service Mode**

1	Normal Operation
2	Service Standby
3	Restart



**Table 7 – MV4 – Boiler Model**

1	Unknown
2	15-150
3	45-225
4	80-399
5	20-115
6	45-250
7	30-175
8	20-115 G2
9	28-160
10	35-199

**Table 8 – MV11, MV12, MV13, MV14 – Load Type**

1	Off
2	DHW
3	Reset Heating
4	Set Point
5	External Control
6	Manual Control

**Table 9 – BIC-II – Touch Screen Controller Cross Reference**

Object Name	Value	Units	TSC Object ID	BIC-II Object ID
Supply Temp.	41	°C	xxxAlxx1	xxxAlxx1
Return Temp.	28	°C	xxxAlxx2	xxxAlxx2
Secondary Temp.	39	°C	xxxAlxx3	xxxAlxx3
DHW Temp.	60	°C	xxxAlxx4	xxxAlxx4
Outlet Pressure	5.6	psi	xxxAlxx5	xxxAlxx5
Inlet Pressure	5.7	psi	xxxAlxx6	xxxAlxx6
Flow Rate	0	Gal/min	xxxAlxx7	xxxAlxx7
Fan Speed	4500	revs/min	xxxAxx8	xxxAxx8
Fan Pressure	102		xxxAlxx9	xxxAlxx9
Offset Pressure	102		xxxAlxx10	xxxAlxx10
Stack Temp.	70	°C	xxxAlxx11	xxxAlxx11
Air Temp.	24	°C	xxxAlxx12	
MBH	199	MBtu	xxxAVxx1	xxxAVxx1
Power On Hours	9125	hrs	xxxAVxx2	xxxAVxx2
Burner On Hours	2175	hrs	xxxAVxx3	xxxAVxx3
Ignition Starts	99		xxxAVxx7	xxxAVxx7
Ignition Trials	6		xxxAVxx8	xxxAVxx8
Load 1 On Hours	500	hrs	xxxAVxx11	xxxAVxx4
Load 2 On Hours	600	hrs	xxxAVxx12	xxxAVxx5
Load 3 On Hours	625	hrs	xxxAVxx13	xxxAVxx6
Load 4 On Hours	450	Hrs	xxxAVxx14	
Load 1 Cycles/Day	10		xxxAVxx21	xxxAVxx9
Load 2 Cycles/Day	5		xxxAVxx22	xxxAVxx10
Load 3 Cycles/Day	5		xxxAVxx23	xxxAVxx11
Load 4 Cycles/Day	7		xxxAVxx24	
Delta Pressure	0		xxxAVxx31	xxxAVxx12
Required Pressure	154		xxxAVxx32	xxxAVxx13
Var Speed Duty Cycle	0		xxxAVxx33	xxxAVxx14
Remote On Hours	0	hrs	xxxAVxx34	xxxAVxx15
Outdoor Temp.	5	°C	xxxAVxx35	xxxAVxx16
Indoor Temp.	21	°C	xxxAVxx36	xxxAVxx17
Supply Setpoint	60	°C	xxxAVxx37	xxxAVxx18
Remote Input	50	%	xxxAVxx38	xxxAVxx19
Inlet/Outlet Sensor	OK		xxxBVxx1	xxxBVxx1
Remote Loop Sensor	OK		xxxBVxx2	xxxBVxx2
Cleaning Required	No		xxxBVxx3	xxxBVxx3
Anti-Cycling	Not Active		xxxBVxx4	xxxBVxx4
Short Cycling	Not Active		xxxBVxx5	xxxBVxx5

Object Name	Value	Units	TSC Object ID	BIC-II Object ID
Comm. Status	Online		xxxBVxx6	xxxBVxx6
Master Boiler	Yes		xxxBVxx7	xxxBVxx7
Primary Pump	Off		xxxBVxx8	xxxBVxx8
Occupied	Yes		xxxBVxx9	xxxBVxx12
Boiler Enable	Enabled		xxxBVxx10	xxxBVxx16
Boiler Over Temp.	No		xxxBVxx11	
P/V 1	Off		xxxBVxx21	xxxBVxx9
P/V 2	Off		xxxBVxx22	xxxBVxx10
P/V 3	Off		xxxBVxx23	xxxBVxx11
P/V 4	Off		xxxBVxx24	
Setback 1	Disabled		xxxBVxx31	xxxBVxx13
Setback 2	Disabled		xxxBVxx32	xxxBVxx14
Setback 3	Disabled		xxxBVxx33	xxxBVxx15
Setback 4	Disabled		xxxBVxx34	
Thermostat 1	On		xxxBVxx41	xxxBVxx47
Thermostat 2	Off		xxxBVxx42	xxxBVxx18
Thermostat 3	Off		xxxBVxx43	xxxBVxx19
Thermostat 4	Off		xxxBVxx44	
Operating Status	Standby		xxxMVxx1	xxxMVxx1
Error Message	None		xxxMVxx2	xxxMVxx2
Service Mode	Normal		xxxMVxx3	xxxMVxx3
Boiler Model	45-225		xxxMVxx4	xxxMVxx4
Load 1 Type	Set Point		xxxMVxx11	xxxMVxx5
Load 2 Type	Reset		xxxMVxx12	xxxMVxx6
Load 3 Type	DHW		xxxMVxx13	xxxMVxx7
Load 4 Type	Off		xxxMVxx14	