

BACnet Router Start-up Guide

BAS Router (BACnet Multi-Network Router)



APPLICABILITY & EFFECTIVITY

Effective for all systems manufactured after October 2014

Kernel Version: 6.15
Document Revision: 3

TABLE OF CONTENTS

1	BACnet Router Description.....	3
2	Certification	3
2.1	Specifications.....	3
3	Installing the BACnet Router	4
3.1	RS-485 Connection R1 Port	4
3.2	RS-485 Connection R2 port	4
3.3	10/100 Ethernet Connection port.....	5
4	Operation.....	5
4.1	Power up the device.....	5
5	Connecting to the BACnet Router.....	6
5.1	Using the FieldServer Toolbox.....	6
5.2	Using a Web Browser directly	6
6	Configuring the BACnet Router	7
6.1	Button functions.....	7
6.2	Network Settings.....	7
6.3	All connections	8
6.4	BACnet IP Primary	8
6.5	BACnet IP Secondary	8
6.6	BACnet MSTP.....	8
6.7	Diagnostics	9
	Appendix A Limited 2 year Warranty	10

1 BACNET ROUTER DESCRIPTION

The BACnet Router provides stand-alone routing between BACnet networks such as BACnet/IP, BACnet Ethernet, and BACnet MS/TP — thereby allowing the system integrator to mix BACnet network technologies within a single BACnet internetwork. There are three physical communication ports on the BAS Router. One is a 10/100 Mbps Ethernet port and the other two are RS-485 MS/TP ports. Configuration is accomplished via a web page.

2 CERTIFICATION

2.1 Specifications¹



Available Ports	One 6-pin Phoenix connector, one RS-485 +/- ground port, power +/- frame ground port One 3-pin RS-485 Phoenix connector, one RS-485 +/- ground port One Ethernet-10/100 port
Power Requirements	Input Voltage: 9-30VDC or 12-24VAC Input Power Frequency 50/60 Hz. Power Rating: 2.5 Watts Current draw @ 12V, 150 mA
Approvals	TUV approved to UL 916 Standard RoHS Compliant FCC Part 15 Compliant CE Mark
Surge Suppression	
EN61000-4-2 ESD EN61000-4-3 EMC EN61000-4-4 EFT	
Physical Dimensions(excluding the external power supply)	
(WxDxH):	5.05 x 2.91 x 1.6 in. (12.82 x 7.39 x 4.06 cm) excluding mounting tabs
Weight:	0.4 lbs (0.2 Kg)
Environment:	
Operating Temperature:	-40°C to 75°C (-40°F to 167°F)
Humidity:	5 - 90% RH (non-condensing)

“This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference
- This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause

¹ Specifications subject to change without notice

harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his expense. Modifications not expressly approved by FieldServer could void the user's authority to operate the equipment under FCC rules"

3 INSTALLING THE BACNET ROUTER

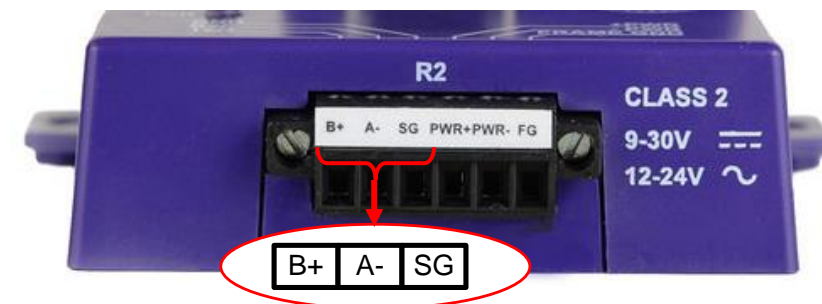
3.1 RS-485 Connection R1 Port

Connect to the 3-pin connector as shown.



The following Baud Rates are supported on the R1 Port:
4800, 9600, 19200, 38400, 57600, 76800, 115200

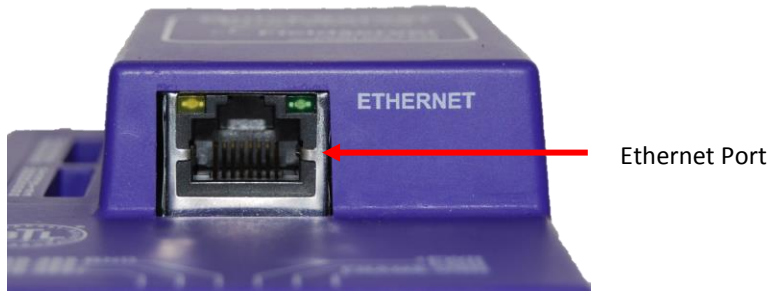
3.2 RS-485 Connection R2 port



Connect to the 3 pins on the left-hand-side of the 6 pin connector as shown.

The following Baud Rates are supported on the R2 Port:
4800, 9600, 19200, 38400, 57600, 76800, 115200

3.3 10/100 Ethernet Connection port



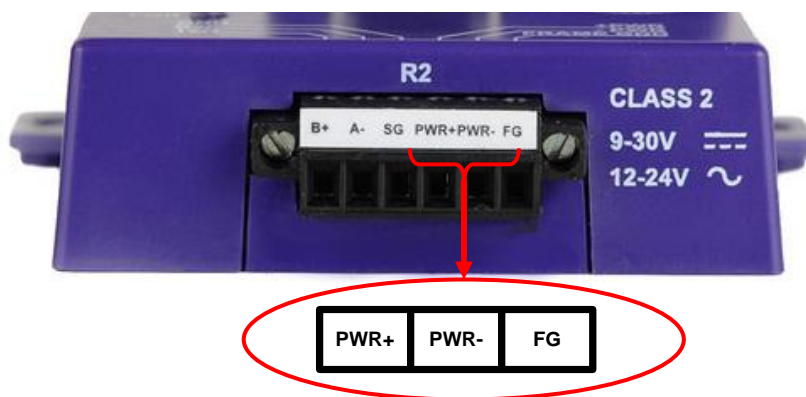
The Ethernet Port is used both for BACnet Ethernet and BACnet/IP communications. It is also used for configuring the Router from a Web page. Follow the steps below to connect the Router to a BACnet network and optionally to a PC for configuration purposes:

- Connect an Ethernet cable between the PC and the BACnet Router or connect the BACnet Router and the PC to the Hub/switch using a straight Cat 5 cable.
- Disable any wireless Ethernet adapters on the PC/Laptop.
- Disable firewall and virus protection software .

4 OPERATION

4.1 Power up the device

Apply power to the device. Ensure that the power supply used complies with the specifications provided in Section 2.1. Ensure that the cable is grounded using the "Frame GND" terminal. The BACnet Router is factory set for 9-30VDC or 12-24VAC.

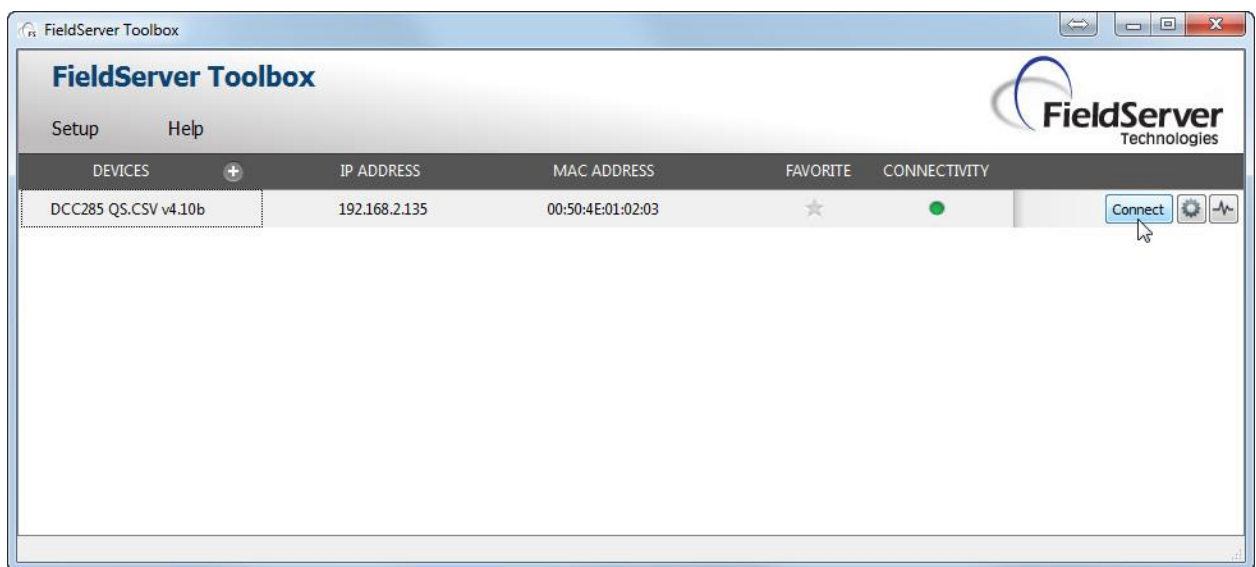


5 CONNECTING TO THE BACNET ROUTER

The FieldServer Toolbox Application can be used to discover and connect to the BACnet Router on a local area network. To connect to the BACnet Router over the Internet using Toolbox, add the Internet exposed IP address of the Router by clicking on the **+** button, or alternatively enter the Internet exposed IP address in a Web Browser directly.

5.1 Using the FieldServer Toolbox

- Install the Toolbox application from the USB drive or get it from our website <http://fieldserver.com/techsupport/utility/downloads.php>
- Use the Toolbox application to find the BACnet Router, change the IP address detail if required and launch the Web GUI.



5.2 Using a Web Browser directly

- Open a Web Browser and connect to the BACnet Router's Default IP address. The Default IP Address of the BACnet Router is **192.168.2.101**, Subnet Mask is **255.255.255.0**
- If the PC and the BACnet Router are on different IP Networks, assign a Static IP Address to the PC on the 192.168.2.X network.

6 CONFIGURING THE BACNET ROUTER

FieldServer BACnet Router **Settings** Diagnostics About

Network Settings

IP Address

Netmask

Default Gateway

DHCP Client

DHCP Server

Passwords

BACnet Ethernet

Enable

Network Number

Controls

Save **Reload**

Defaults **Restart**

BACnet IP Primary

Network Number

IP Port

Device Instance

Device Name

BACnet IP Secondary

Enable

Network Number

IP Port

Enable BBMD

Public IP Address

Public IP Port

Edit BDT

BACnet MSTP R1

Enable

Network Number

MAC Address

Max_Master

Max_Info_Frames

Baud Rate

Token Usage Timeout (ms)

BACnet MSTP R2

Enable

Network Number

MAC Address

Max_Master

Max_Info_Frames

Baud Rate

Token Usage Timeout (ms)

Status

Router is online

Log


14:43:58: Loaded BDT

14:43:56: Loaded BDT

06:54:22: Loaded BDT

06:54:18: Loaded BDT

06:54:15: Loaded BDT

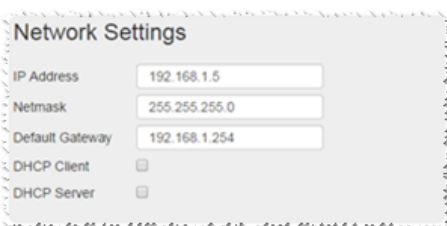


6.1 Button functions



- **Save** - write the currently displayed settings to the device. A restart will be required to apply the updated settings.
- **Reload** - discard the currently displayed settings and reload the settings stored on the device. This will undo any unsaved edits.
- **Defaults** - discard the currently displayed settings and load default settings. This must still be saved and the device must be restarted for the default settings to be applied.
- **Restart** - restarts the device.

6.2 Network Settings

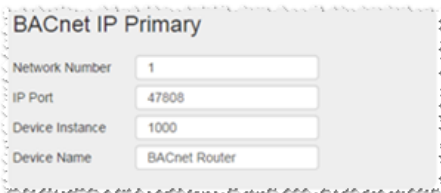


The IP settings for the Router are also used by both BACnet/IP connections. The IP settings can be changed in the Network Settings section as shown.

6.3 All connections

- Network Number - set up the BACnet network number for the connection. Legal values are 1-65534. Each network number must be unique across the entire BACnet internetwork.
- Enable - enable or disable the connection; note that BACnet/IP Primary is always enabled.

6.4 BACnet IP Primary



BACnet IP Primary

Network Number: 1

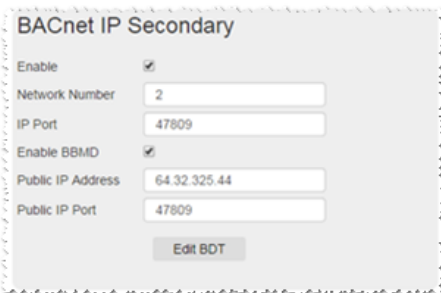
IP Port: 47808

Device Instance: 1000

Device Name: BACnet Router

- Device Instance and Device Name - A BACnet Router must provide a Device Object. Configure its name and Instance Number here. Take care to select a Device Instance Number that is unique across the entire BACnet internetwork.
- IP Port - the BACnet/IP default is 47808 (0xBAC0), but a different port number may be specified here.

6.5 BACnet IP Secondary



BACnet IP Secondary

Enable:

Network Number: 2

IP Port: 47809

Enable BBMD:

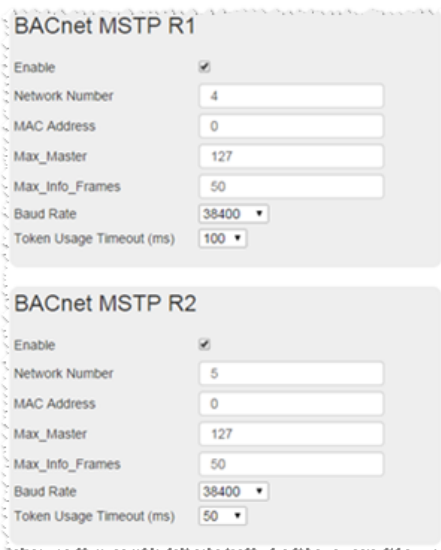
Public IP Address: 64.32.325.44

Public IP Port: 47809

Edit BDT

- Enable BBMD - select this checkbox to enable the Router to act as a BBMD.
- Public IP Address and Port - if the BBMD is being accessed across a NAT Router, then these values must be configured with the public IP address and Port by which the BBMD can be reached from across the NAT Router. The Public IP Address and Port would also be used in the BDT of remote BBMD's that need to reach this BBMD across the NAT Router. If no NAT Router is being used, these fields can be left blank.
- IP Port - this MUST be different to the IP Port used on the BACnet IP Primary connection. Default is 47809 (0xBAC1).

6.6 BACnet MSTP



BACnet MSTP R1

Enable:

Network Number: 4

MAC Address: 0

Max_Master: 127

Max_Info_Frames: 50

Baud Rate: 38400

Token Usage Timeout (ms): 100

BACnet MSTP R2

Enable:

Network Number: 5

MAC Address: 0

Max_Master: 127

Max_Info_Frames: 50

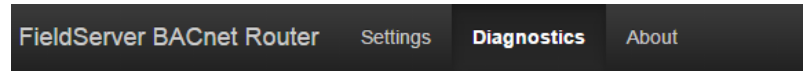
Baud Rate: 38400

Token Usage Timeout (ms): 50

- MAC Address - legal values are 0..127, must be unique on the physical network
- Max_Master - the highest MAC address to scan for other MSTP master devices. The default of 127 is guaranteed to discover all other MSTP master devices on the network.
- Max_Info_Frames - the number of transactions the Router may initiate while it has the MSTP token. Default is 50.
- Baud Rate - the serial baud rate used on the network.
- Token Usage Timeout (ms) - the number of milliseconds the router will wait before deciding that another master has dropped the MSTP token. This value must be between 20ms and 100ms. Choose a larger value to improve reliability when working with slow MSTP devices that may not be able to meet strict timing specifications.

6.7 Diagnostics

By clicking on the Diagnostics tab all the connection communication details can be viewed to ensure the BACnet Router is working correctly.



BACnet Ethernet

Network Number	103	
Info Statistics	Messages Received	13700497
	Messages Sent	14822025
Error Statistics	Total Errors	0
Routing Table		
DNET	MAC Address	Status
111	00:50:4e:10:0a:6c	Available

BACnet IP Primary

Network Number	101	
Info Statistics	Messages Received	9562610
	Messages Sent	10705619
Error Statistics	Total Errors	0
Routing Table		
Routing Table is empty		

BACnet IP Secondary

Network Number	100	
Info Statistics	Messages Received	1121889
	Messages Sent	67659
Error Statistics	BACnet NL RX Reject Msg	30
	Total Errors	30

Appendix A Limited 2 year Warranty

FieldServer Technologies warrants its products to be free from defects in workmanship or material under normal use and service for two years after date of shipment. FieldServer Technologies will repair or replace any equipment found to be defective during the warranty period. Final determination of the nature and responsibility for defective or damaged equipment will be made by FieldServer Technologies personnel.

All warranties hereunder are contingent upon proper use in the application for which the product was intended and do not cover products which have been modified or repaired without FieldServer Technologies approval or which have been subjected to accident, improper maintenance, installation or application, or on which original identification marks have been removed or altered. This Limited Warranty also will not apply to interconnecting cables or wires, consumables or to any damage resulting from battery leakage.

In all cases FieldServer Technology's responsibility and liability under this warranty shall be limited to the cost of the equipment. The purchaser must obtain shipping instructions for the prepaid return of any item under this warranty provision and compliance with such instruction shall be a condition of this warranty.

Except for the express warranty stated above, FieldServer Technologies disclaims all warranties with regard to the products sold hereunder including all implied warranties of merchantability and fitness and the express warranties stated herein are in lieu of all obligations or liabilities on the part of FieldServer Technologies for damages including, but not limited to, consequential damages arising out of/or in connection with the use or performance of the product.