

data

# SHEET



## **BAS Router — BACnet® Multi-Network Router**

The BAS 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 two physical communication ports on the BAS Router. One is a 10/100 Mbps Ethernet port and the other an isolated MS/TP port. Configuration is accomplished via a web page.

### **Versatile Routing Between ...**

- BACnet/IP and BACnet MS/TP
- BACnet Ethernet and BACnet MS/TP
- BACnet/IP and BACnet Ethernet
- BACnet/IP and BACnet Ethernet and BACnet MS/TP
- Two BACnet/IP networks

### **IP Network Support**

- Web server for commissioning and troubleshooting
- Communication diagnostic web page
- BACnet/IP Broadcast Management Device (BBMD)
- Foreign Device Registration (FDR)

### **Flexible Communications**

- 10/100 Mbps Ethernet with auto-negotiation and Auto-MDIX
- Optically isolated MS/TP port
- MS/TP baud rates range from 9.6–76.8 kbps
- Jumper-selectable MS/TP bias and termination

### **Convenient Installation**

- 24 VAC/VDC ( $\pm 10\%$ ), 47–63 Hz input voltage
- Din-rail mounted



## BAS Router — BACnet® Multi-Network Router

The BAS Router is housed in a metal case that mounts on 35-mm DIN-rail and is powered from a 24 VAC/VDC ( $\pm 10\%$ ) source. There is one MS/TP port and one 10/100 Mbps Ethernet port.

The MS/TP port offers an optically-isolated transceiver. It has a removable 3-pin terminal block for the EIA-485 connection. Logically, 255 devices can be addressed. Physically, the number of devices depends upon device loading.

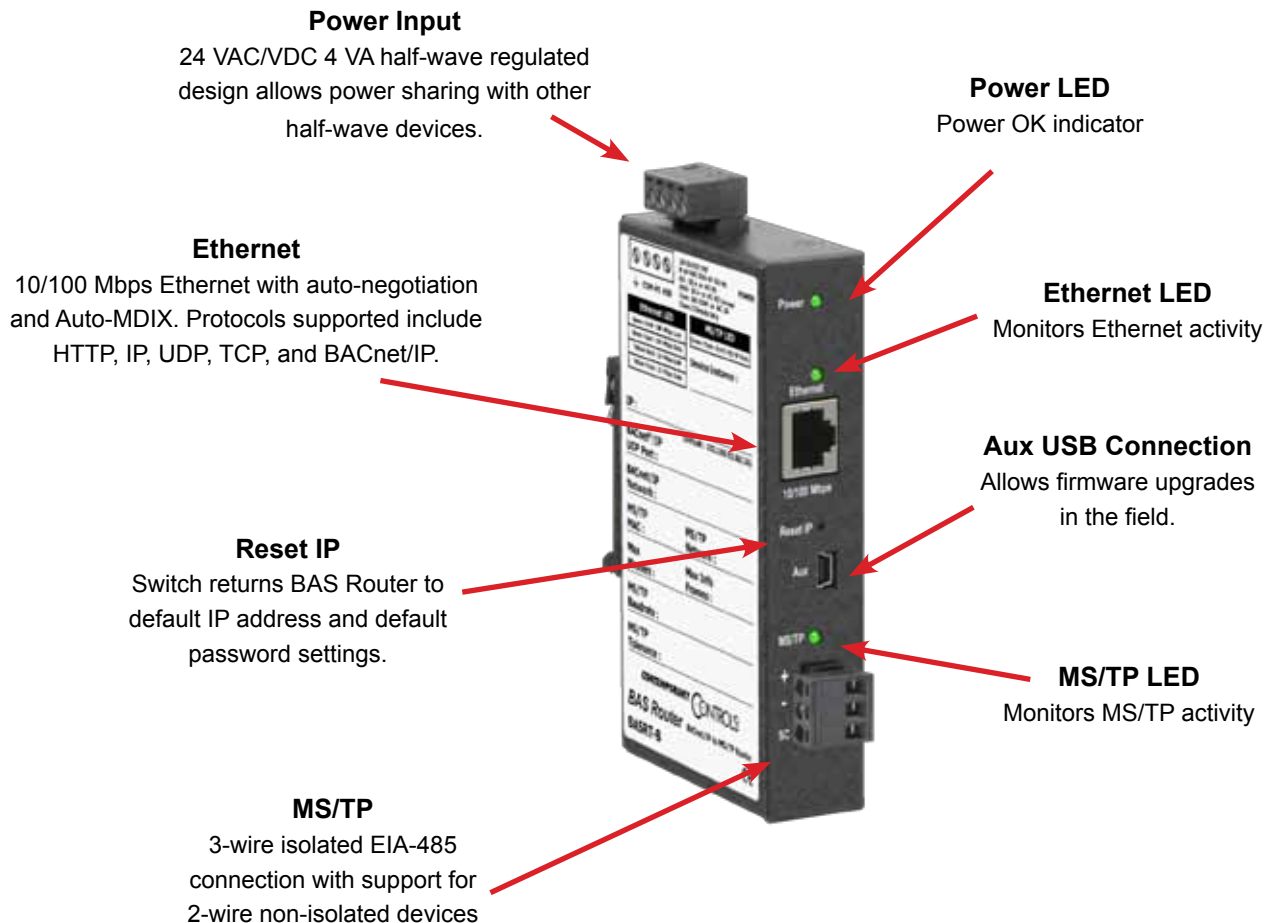
Up to 31 full-load EIA-485 devices can share the same MS/TP bus segment as the BAS Router. For half-load devices, there can be 62. All MS/TP standard baud rates are supported — from 9.6 to 76.8 kbps.

The Ethernet port offers a shielded RJ-45 connector.

Through auto-negotiation and Auto-MDIX, it automatically matches connections to the attached equipment. Therefore, either straight-through or crossover CAT5 cable can be used for hook-up.

A resident web server allows for commissioning, and troubleshooting via a standard web browser. A reset switch is provided on the router to return the unit to the factory default IP address. Three LEDs are provided: The power LED glows green when proper power is provided. A bi-colour Ethernet LED glows green for 100 Mbps operation and yellow for 10 Mbps and indicates activity by flashing. A green LED flashes with MS/TP activity.

Internal MS/TP bias and termination jumpers allow flexible bias and termination options. They can be removed for mid-span installations.



# Web Page Configuration

## BASRT-B Configuration



Device Instance	0	
Ethernet Network	0	
BACnet/IP UDP Port 1	BAC0	
BACnet/IP Network 1	1	
IP Address	192.168.92.68	Advanced
IP Subnet	24	
IP Gateway	192.168.92.1	
MS/TP MAC	0	Status
MS/TP Network	2001	
Max Masters	127	
Max Info Frames	100	
MS/TP Baudrate	38400	Security
MS/TP Tolerance	<input type="radio"/> Strict <input checked="" type="radio"/> Lenient	
<input type="button" value="Save Changes"/>		
MAC Address	00-50-DB-00-57-43	
Firmware Revision	2.0.11	

## Advanced BASRT-B Configuration



BBMD Enable	<input type="checkbox"/>
BBMD UDP Port	Primary
Accept FDR	<input type="checkbox"/>
<input type="button" value="Broadcast Distribution Table"/>	
<input type="button" value="Foreign Device Table"/>	
Secondary BACnet/IP UDP Port	0000
Secondary BACnet/IP Network	0
Public IP Address	0.0.0.0
<input type="button" value="Save Changes"/>	

## BAS Router Parameters Main Settings

<i>Device Parameter</i>	<i>Default Value</i>	<i>Description</i>
Device Instance	0	The router device instance is a 22-bit decimal value (0–4,194,303). Each BACnet device has a unique device instance.
<b><i>BACnet Ethernet Parameter</i></b>		
BACnet Ethernet Network	0	16-bit decimal value (1–65534). Each BACnet network, regardless of technology, must have a unique network number. By retaining the default value of 0, BACnet Ethernet routing is disabled.
<b><i>BACnet/IP Parameters</i></b>		
BACnet/IP UDP Port	BAC0	16-bit hex value (0–FFFF) is set to BAC0 as the default value and should be used. All BACnet/IP devices on the same BACnet network must have the same UDP port assignment. For other assignments choose ports in the range from BAC1 to BACF while verifying that these ports are available.
BACnet/IP Network	1	16-bit decimal value (1–65534). Each BACnet network, regardless of technology, must have a unique network number. It is recommended that all subnets of the same BACnet/IP network be given the same BACnet network number as well.
IP Address	192.168.92.68	IP address in dotted decimal format. Select a valid address in the range from 0.0.0.1 through 255.255.255.254.
IP Subnet	24	Decimal value (0–30) in the “slash” notation is the number of bits with a “1” in the mask. The default value of 24 corresponds to 255.255.255.0 in the dotted decimal format. All devices on the same subnet which communicate via BACnet/IP should use the same subnet mask.
IP Gateway	192.168.92.1	IP Gateway address in dotted decimal format. Select a valid address in the range from 0.0.0.1 through 255.255.255.254.
<b><i>MS/TP Parameters</i></b>		
MS/TP MAC Address	0	Decimal value (0–127) represents the MAC address of the router’s MS/TP port. Lower MAC address numbers are preferred.
MS/TP Network	2001	16-bit decimal value (1–65535). Each BACnet network, regardless of technology, must have a unique network number.
Max Masters	127	This 8-bit decimal value (1–127) represents the highest master MAC address in the MS/TP network. If the highest value MAC address is unknown or if additional devices are to be added in the future above the current highest MAC address, use the default setting of 127.
Max Info Frames	100	This is the maximum number of messages (1–100) that can be routed onto the MS/TP network by the router per token pass. Values above 20 are typical.
MS/TP Baud Rate	38400	The baud rate of the MS/TP network can be 9600, 19200, 38400 or 76800 bps. All MS/TP devices on the same MS/TP network must use the same baud rate. Auto-bauding devices will set their baud rates to that of the BAS Router.
MS/TP Tolerance	Lenient	Affects the degree to which interoperability with devices is successful. Lenient option causes less efficient traffic but optimises interoperability.

## BAS Router Parameters Advanced Settings – BBMD

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<i>BBMD Parameters</i>	<i>Default Value</i>	<i>Description</i>
BBMD Enable	Unchecked	Check to enable BACnet/IP Broadcast Management Device (BBMD).
BBMD UDP Port	Primary	Normally the primary port is selected. The secondary port is used in very special applications.
Accept FDR	Checked	Uncheck to disable foreign devices from registering with this router.
Secondary BACnet/IP UDP Port	0000	Enter secondary UDP port as a 16-bit hex value (0-FFFF) when operating with two BACnet/IP BACnet networks. In this case use BAC1 if it is available.
Secondary BACnet/IP Net	0	Assign a unique network number from all other BACnet networks.
Public IP Address	0.0.0.0	Enter the public IP address in dotted decimal format of the IP router in the system.

## BAS Router Additional Tables and Screens

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<i>Table or Screen Name</i>	<i>Description</i>
Broadcast Distribution Table (BDT)	This table must contain the entries of any other BBMDs located on the network. The IP address and subnet mask of the BBMDs must be listed.
Foreign Device Table (FDT)	This table is automatically lists all the foreign devices that have registered with this router. Information includes IP address, port number, time-to-live, and remaining time on its lease.
Status Screen	Displays a log of events in order to facilitate troubleshooting. Use this information when discussing any routing issues with Contemporary Controls' technical support.
Security Screen	Authentication menu. Allows the user to change user name and password. Depressing the Reset IP button reverts user name and password to default settings.

# BACnet Protocol Implementation Conformance (PIC) Statement

## BAS Router

BACnet Multi-network Router



### BACnet Protocol Implementation Conformance Statement (Annex A)

**Date:** 16 December 2009  
**Vendor Name:** Contemporary Controls  
**Product Name:** BAS Router  
**Product Model Number:** BASRT-B  
**Applications Software Version:**                      **Firmware Revision: 2.0**                      **BACnet Protocol Revision:**

**Product Description:** Device to route between BACnet/IP, ISO 8802-3 and MS/TP networks.

**BACnet Standardized Device Profile (Annex L):**

- BACnet Operator Workstation (B-OWS)
- BACnet Building Controller (B-BC)
- BACnet Advanced Application Controller (B-AAC)
- BACnet Application Specific Controller (B-ASC)
- BACnet Smart Sensor (B-SS)
- BACnet Smart Actuator (B-SA)

**List all BACnet Interoperability Building Block Supported (Annex K):**

NM-RC-B (Network Management-Router Configuration-B)    DM-DDB-B Device Management — Dynamic Device Binding – B  
 DS-RP-B Data Sharing — ReadProperty – B

**Segmentation Capability:**

- Able to transmit segmented messages    Window Size:
- Able to receive segmented messages    Window Size:

**Standard Object Types Supported:**

Object Type Supported	Can Be Created Dynamically	Can Be Deleted Dynamically
Device	No	No

No optional properties are supported. NOTE: The above object is directed supported on the router. The router will pass to the appropriate network all BACnet communications not directed to the router.

**Data Link Layer Options:**

- BACnet IP, (Annex J)
- BACnet IP, (Annex J), Foreign Device
- ISO 8802-3, Ethernet (Clause 7)
- ANSI/ATA 878.1, EIA-485 ARCNET (Clause 8), baud rate(s):
- MS/TP master (Clause 9), baud rate(s): 9600; 19,200; 38,400; 76,800
- MS/TP slave (Clause 9), baud rate(s):
- Point-To-Point, EIA 232 (Clause 10), baud rate(s):
- Point-To-Point, modem, (Clause 10), baud rate(s):
- LonTalk, (Clause 11, medium:
- Other:

**Device Address Binding:**

Is static device binding supported? (This is currently necessary for two-way communication with MS/TP slaves and certain other devices.)     Yes     No

**Networking Options:**

- Router, Clause 6 — routing between BACnet/IP, ISO 8802-3, and MS/TP
- Annex H, BACnet Tunnelling Router over IP
- BACnet/IP Broadcast Management Device (BBMD)  
 Does the BBMD support registrations by Foreign Devices?     Yes     No

**Character Sets Supported:**

Indicating support for multiple character sets does not imply that they can all be supported simultaneously.

- ANSI X3.4                       IBM/ MicrosoftDBCS                       ISO 8859-1
- ISO 10646 (UCS-2)                       ISO 10646 (UCS-4)                       JIS C 6226

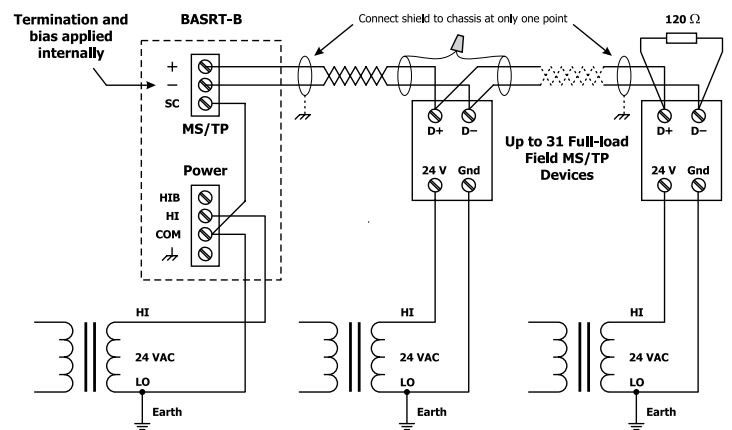
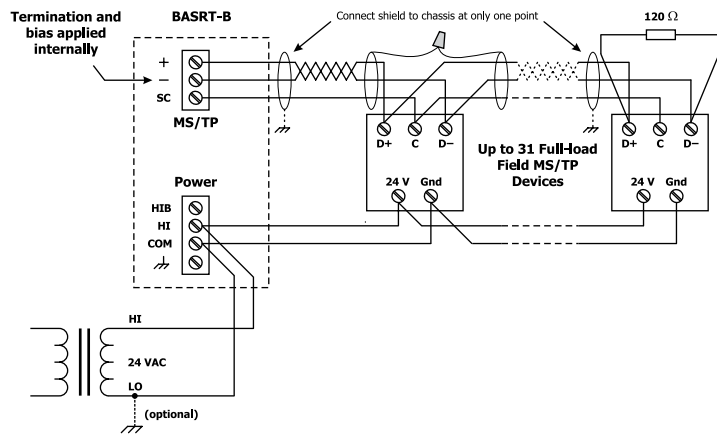
**If this product is a communication gateway, describe the types of non-BACnet equipment/network(s) that the gateway supports:**  
 No gateway support.

## Wiring Diagrams

Since the BAS Router incorporates a half-wave rectifier circuit, it can share the same 24 VAC power with other half-wave rectified devices. It can also be powered from a 24 VDC source. A redundant power connection exists for back-up power schemes.

The BAS Router incorporates a 3-wire optically-isolated EIA-485 interface for the MS/TP connection, allowing better circuit protection and noise immunity. To connect to other 3-wire devices simply make a

one-to-one connection to the other devices. But when connecting to 2-wire non-isolated devices, the signal common (SC) on the BAS Router must share the reference used by the 2-wire devices. This is accomplished by tying the SC pin to COM on the BAS Router and by grounding the low-side of each power supply on all connected devices. In this way all EIA-485 transceivers share the same earth reference. Notice that the SC pin is signal common and not a shield pin.



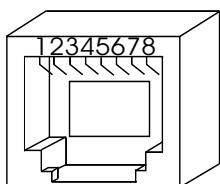
## Connector Pin Assignments

### Ethernet

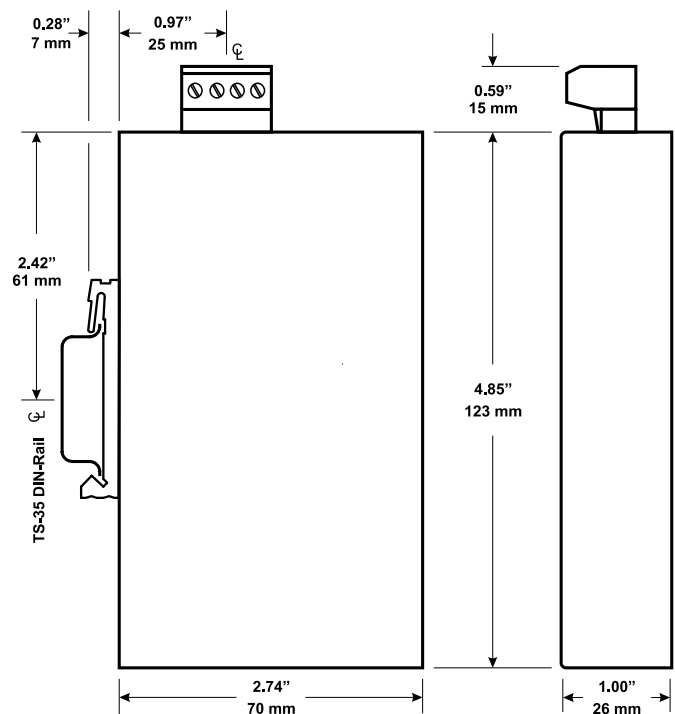
Pin	Function
1	Signal 1
2	Signal 2
3	Signal 3
4	N/C
5	N/C
6	Signal 4
7	N/C
8	N/C

### MS/TP

Pin	Function
+	Signal High
-	Signal Low
SC	Signal Common



## Mechanical Drawing



## Specifications

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**Power Requirements** 24 VDC  $\pm 10\%$  2 W or 24 VAC  $\pm 10\%$  4 VA 47–63 Hz

**Operating Temperature** 0°C to 60°C

**Storage Temperature** –40°C to 85°C

**Relative Humidity** 10–95%, non-condensing

**Protection** IP30

**Ethernet Communications** IEEE 802.3 10/100 Mbps data rate  
10BASE-T, 100BASE-TX physical layer  
100 m (max) CAT5 cable length

**MS/TP Communications** ANSI/ASHRAE 135 (ISO 16484-5)  
9600, 19200, 38400, 76800 bps data rate  
EIA-485 physical layer  
1200 m (max) cable length

**LEDs**

Power	Green = power OK
Ethernet	Green = 100 Mbps Yellow = 10 Mbps Flash = activity
MS/TP	Flashing Green = receive activity

**Regulatory Compliance** CE Mark; CFR 47, Part 15 Class A; RoHS

