

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. The BAS Router has two physical communication ports. One is a 10/100 Mbps Ethernet port and the other is an optically isolated MS/TP port. Router 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



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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, but physically, the number of devices depends upon device loading.

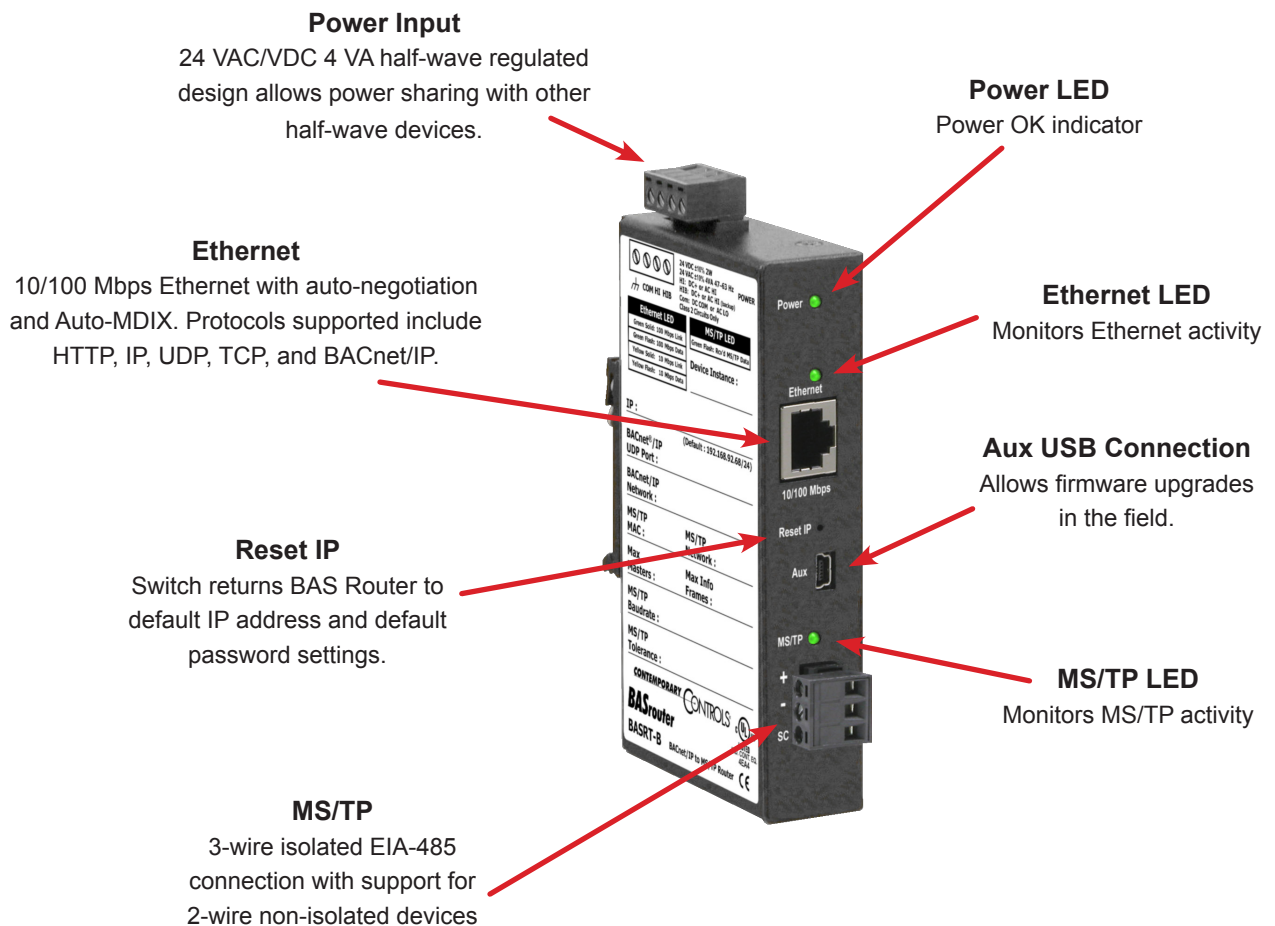
Up to 31 full-load EIA-485 devices can share the same MS/TP bus segment as the BAS Router. For half-load devices, there can be 62. All MS/TP standard baud rates are supported — from 9.6 to 76.8 kbps.

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 bicolour 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 Name	BASRT-B0050b6
Device Instance	0
Ethernet Network	0
BACnet/IP UDP Port 1	BAC0
BACnet/IP Network 1	1
IP Address	192.168.92.68
IP Subnet	24
IP Gateway	192.168.92.1
MS/TP MAC	0
MS/TP Network	2001
Max Masters	127
Max Info Frames	100
MS/TP Baudrate	38400
MS/TP Tolerance	<input checked="" type="radio"/> Strict <input type="radio"/> Lenient

Advanced

Status

Security

Save Changes

MAC Address 00-50-DB-00-50-B6

Firmware Revision 2.7.11



Advanced BASRT-B Configuration



BBMD Enable	<input type="checkbox"/>
BBMD UDP Port	Primary
Accept FDR	<input type="checkbox"/>

Broadcast Distribution Table

Foreign Device Table

Secondary BACnet/IP UDP Port	0000
Secondary BACnet/IP Network	0
Public IP Address	0.0.0.0

Save Changes

BAS Router Parameters Main Settings

<i>Device Parameters</i>	<i>Default Value</i>	<i>Description</i>
Device Name	BASRT-Bxxxxxx	The unique default value ends with the last 6 characters of the unit's Ethernet MAC address. You can edit it to be up to 20 characters.
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.
<i>BACnet Ethernet Parameter</i>	<i>Default Value</i>	<i>Description</i>
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.
<i>BACnet/IP Parameters</i>	<i>Default Value</i>	<i>Description</i>
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.
<i>MS/TP Parameters</i>	<i>Default Value</i>	<i>Description</i>
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

<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 Secondary BACnet/IP UDP Port	Checked 0000	Uncheck to disable foreign devices from registering with this router. 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 Public IP Address	0 0.0.0.0	Assign a unique network number from all other BACnet networks. Enter the public IP address in dotted decimal format of the IP router in the system.

BAS Router Additional Tables and Screens

<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 (automatically refreshed each second) 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 restores 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: 6 March 2018

Vendor Name: Contemporary

Product Name: Controls BAS Router

Product Model Number: BASRT-B

Applications Software Version: Firmware Revision: 2.7.11 BACnet Protocol Revision: 2

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

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

DS-RP-B Data Sharing — ReadProperty — B DM-DDB-B Device Management — Dynamic Device Binding — B
 NM-RC-B Network Management — Router Configuration — 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™/Microsoft™ DBCS ☐ 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.

6 March 2018

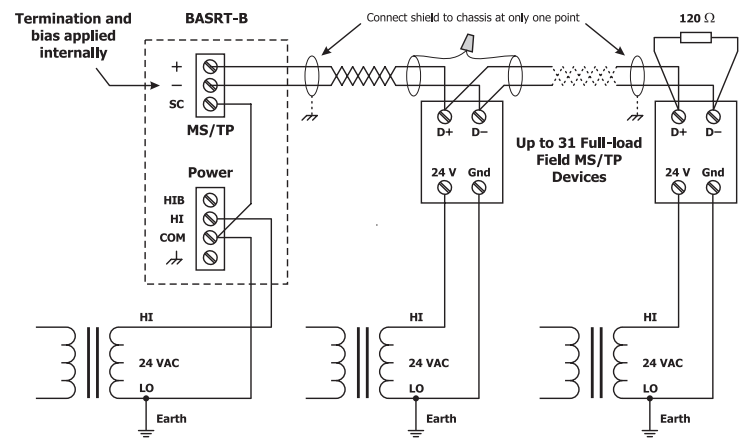
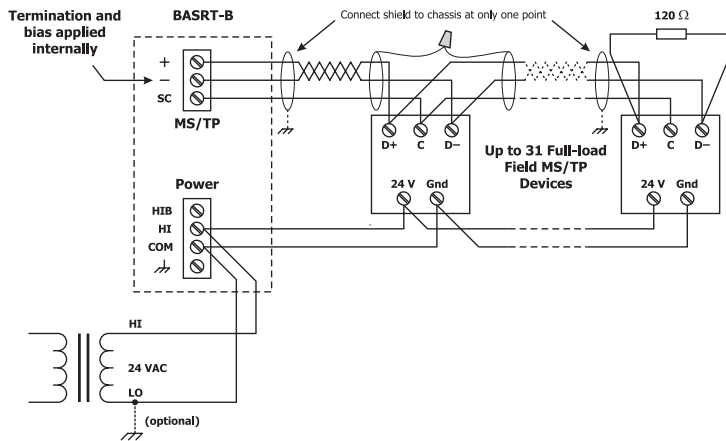
TD071200-0XD

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.



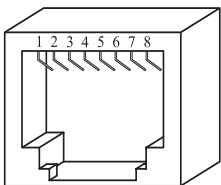
Connector Pin Assignments

Ethernet

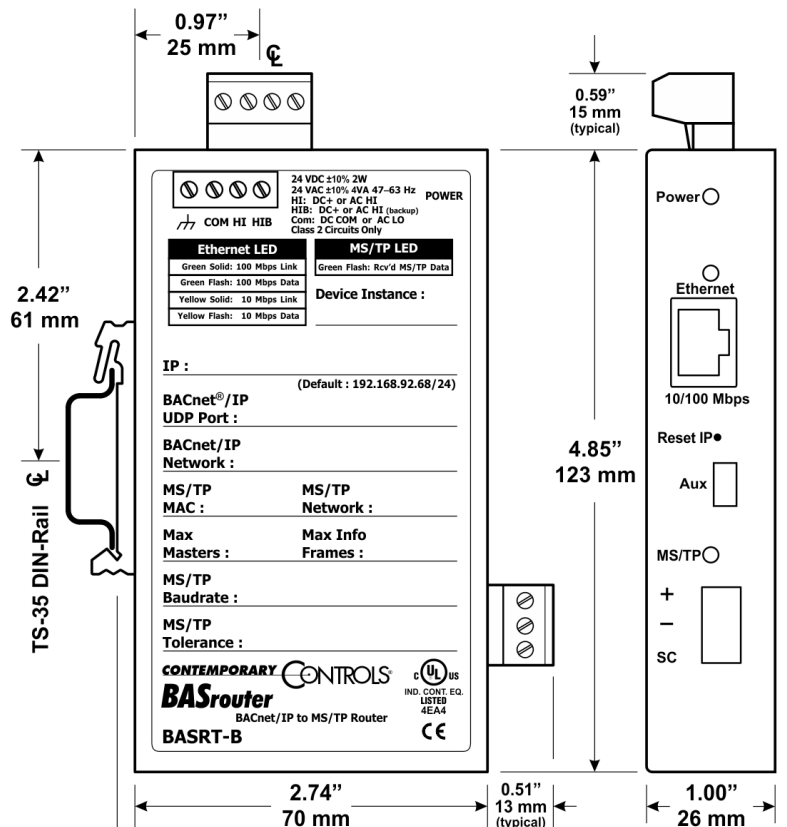
Pin	Function
1	Signal 1
2	Signal 2
3	Signal 3
4	N/C
5	N/C
6	Signal 4
7	N/C
8	N/C

MS/TP

Pin	Function
+	Signal High
-	Signal Low
SC	Signal Common



Mechanical Drawing



Specifications

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
UL 508, C22.2 No. 142-M1987



Ordering Information

Model	RoHS	Description
BASRT-B		BASrouter BACnet/IP to MS/TP to Ethernet DIN-Rail Mount

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