

BASrouter **PORTABLE**



BACnet[®] Multi-Network Router

User Manual

Firmware 3.0 and Later



UM-BASRTPB3-AA7

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1 Introduction

The Portable BASrouter is a compact BACnet multi-network router which provides versatile stand-alone routing between BACnet/IP, BACnet Ethernet (ISO 8802-3), and BACnet MS/TP networks. This portable BACnet router is web page configurable and it is powered by any 5 VDC source via it's USB connection, such as the USB port of your laptop computer. It is a great commissioning and/or troubleshooting device with BACnet diagnostic capabilities. BACnet MS/TP "Status" webpage with present MS/TP device status and network statistics, in addition to a BACnet/IP "Routing" webpage with a discoverable routing table become useful when setting up or troubleshooting a BACnet network. The Portable BASrouter is equipped with one optically-isolated EIA-485 port used for BACnet MS/TP, an alternative RJ-11 MS/TP port, and one 10/100 Mbps Ethernet Auto-Negotiation and Auto-MDIX port for BACnet IP, BACnet Ethernet, and web page configuration.

The MS/TP port offers a 3-pin terminal block with a removable plug for connection to a BACnet MS/TP network. Up to 254 devices can be addressed through this port or as many as 31 full-load devices on the attached EIA-485 segment – 9600, 19200, 38400, and 76800bps MS/TP baud rates are supported.

The RJ-11 port is an alternative BACnet MS/TP connection port. Pin layout can be found on page 7.

The Ethernet port is a shielded RJ-45 connector and supports Auto-negotiation and Auto-MDIX. It will automatically match its duplex setting, data rate and signal polarity to whatever is needed by the connected equipment. When enabled from the web page, a DHCP client feature allows the BASrouter portable to automatically obtain an IP address from a DHCP server on the network. FIXED IP address is the default setting.

The USB port is used for powering the BASRTP-B. No data communication is supported through the USB port.

Reset IP switch is the user-accessible momentary switch used to reset the IP address, subnet mask and gateway address to the factory defaults. Use a paper clip to press it for a few seconds while the router is powered and then power-cycle the router to restore IP address, subnet mask, gateway address and credentials to default values of:

IP Address	192.168.92.68
Subnet Mask	255.255.255.0 (/24)
Gateway Address	192.168.92.1
Username	admin
Password	admin

Three LEDs indicate operation:

Power LED glows green when 5 VDC is provided to BASrouter.

Ethernet LED glows green for 100 Mbps link, yellow for 10 Mbps link, and the LED will flash to indicate network activity.

MS/TP LED flashes green when MS/TP traffic is received. When flashing continuously and without long interruptions, the MS/TP receive LED is a good indicator that the MS/TP network is operational.

2 Specifications

Electrical

INPUT	USB Type B
Voltage:	5 VDC
Current:	300mA
Power:	1.5 W

Environmental

Operating temperature:	0°C to 60°C
Storage temperature:	–40°C to +85°C
Relative humidity:	10–95%, non-condensing

Functional

	Ethernet	MS/TP
Signalling:	10BASE-T 100BASE-TX	EIA-485
Cable length limit:	100 m	1200 m (for AWG 18)
MS/TP Baud rate:	9600, 19200, 38400, 76800 bps	
MS/TP node limit:	254 devices total 31 full-load devices	
MS/TP LED:	flashing green = receive valid MS/TP activity	
Ethernet LED:	green = 100 Mbps yellow = 10 Mbps flashing = IP activity	

Regulatory Compliance

CE Mark; RoHS; CFR47, Part 15 Class A
UL508 and C22.2 No. 142-M1987: Industrial Control Equipment

Electromagnetic Compatibility

Each unit complies with Class A radiated and conducted emissions as defined by EN55022 and CFR 47, Part 15. This equipment is intended for use in non-residential areas.

Warning: This is a Class A product as defined in EN55022. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

Connectors

3-pin (MS/TP) Pin Assignments
(also explained on product label)

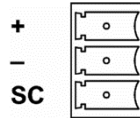


Figure 1 — 3-pin Connector

RJ-11 (MS/TP) Pin Assignments

- 2 RT -
 - 4 SC
 - 5 RT +
- (all other pins are unused)

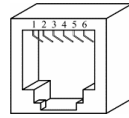


Figure 2 — RJ-11 Connector

RJ-45 (MDI Ethernet) Pin Assignments

- 1 TD + 3 RD +
 - 2 TD - 6 RD -
- (all other pins are unused)

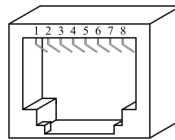


Figure 3 — RJ-45 Connector

Mechanical

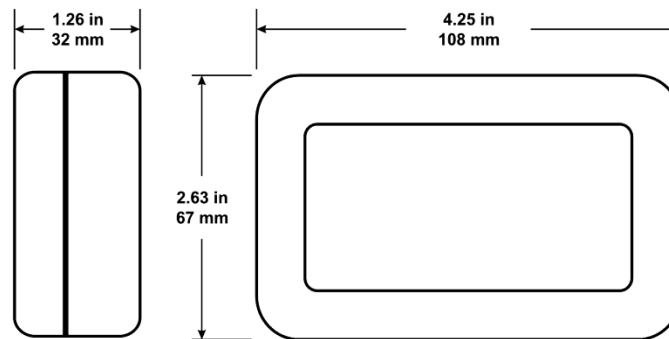


Figure 4 — Product Dimensions

3 Power

The Portable BASrouter features a 5 VDC USB power supply with a USB Type B plug (included in the original box).

It can be powered from any 5VDC source with USB interface such as a PC or laptop computer, drawing no more than 300mA of current.

4 Operation

MS/TP Port

The MS/TP port uses an isolated EIA-485 transceiver which is connected to both a removable 3-pin connector and an RJ-11 jack. Either connector can be used for the MS/TP connection. The EIA-485 transceiver's + and - lines tie to + and - pins of both connectors. The SC pin ties to the circuit ground of the EIA-485 transceiver and is isolated from both the USB and Ethernet ports.

You MUST connect the SC pin to the signal common of the MS/TP segment — or MS/TP communication will fail!

The router can support up to 254 MS/TP devices or 31 full load devices on the EIA-485 bus at data rates of 9600, 19200, 38400, or 76800 bps.

For proper 2-wire bus connections – see Figure 5

For proper 3-wire bus connections – see Figure 6

The Portable BASrouter does not provide any failsafe bias or termination. It can be connected anywhere on the MS/TP segment.

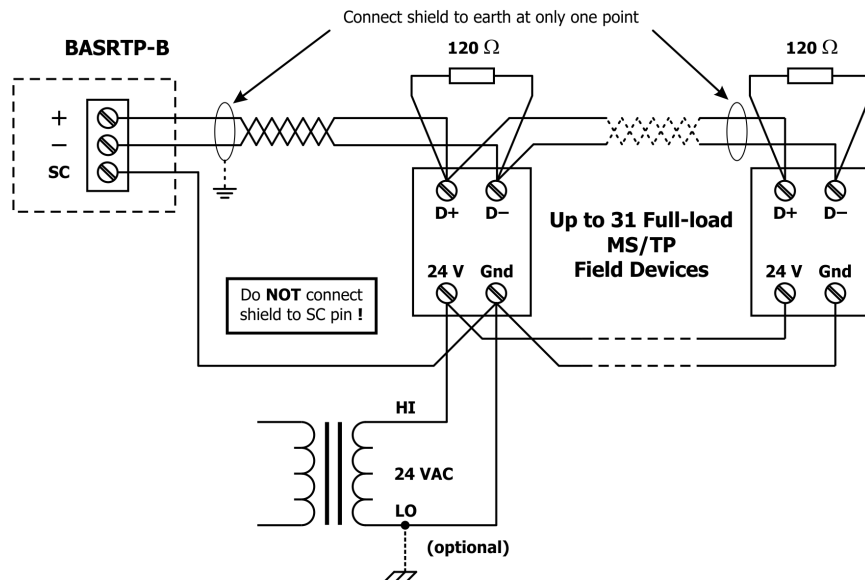


Figure 5 — 2-wire MS/TP Bus Wiring

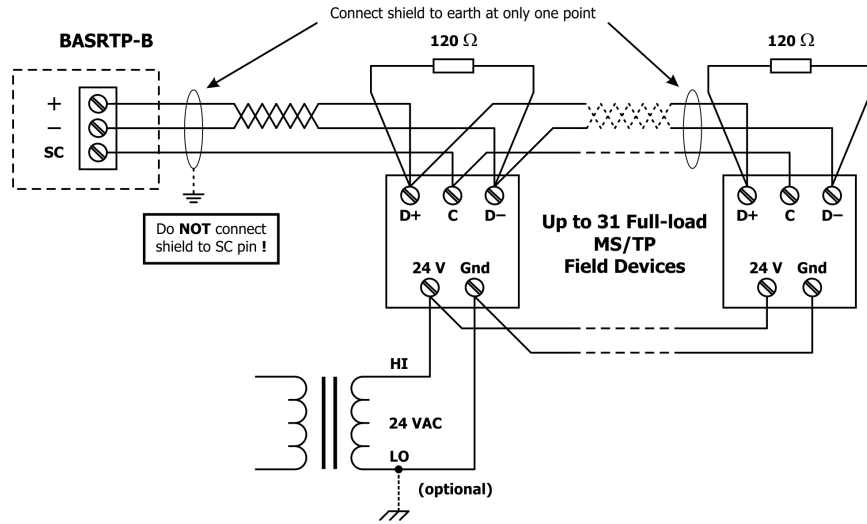


Figure 6 — 3-wire MS/TP Bus Wiring

Ethernet Port

This port is a shielded RJ-45 connector. Auto-negotiation and Auto-MDIX automatically match duplex setting, flow control, data rate and signal polarity to whatever is needed by the connected equipment. The provided CAT5 cable is the only cable needed for Ethernet connection.

Reset Switch

When pressed for a few seconds at any time while the router is powered, this switch will reset the default values of the IP address (192.168.92.68), default gateway address (192.168.92.1), netmask (24), and credentials (admin; admin).

It is accessed by a paper clip (or similar tool) through a small hole in the case — after a reboot, the default values will be applied.

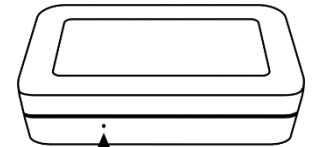


Figure 7 — Reset Switch

LEDS

- Power** glows green when 5VDC is supplied to the unit
- Ethernet** glows solid for a valid link (green for 100 Mbps or yellow for 10 Mbps) and flashes to indicate activity
- MS/TP** flashes green when receiving valid MS/TP traffic



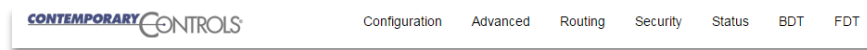
5 Webpage Configuration

The Portable BASrouter contains an interactive web server, accessible from any web browser-compatible PC on the local network with recent versions of Internet Explorer (8.0 or later), Google Chrome, Mozilla Firefox or Microsoft Edge.

It is factory-programmed with a default IP address of 192.168.92.68 and a Class C subnet mask of 255.255.255.0 (/24).

Web page navigation

The Portable BASrouter has a navigation bar at the top of the web page which can be used to navigate through all its configuration settings.



In addition, a dedicated button for each configuration item is placed on the main web page adjacent to the configuration fields:



Figure 8 shows the initial setup and accessing an MS/TP network using the BASRTP-B, a computer for configuration, and a connection to the MS/TP segment.

To configure the BASrouter, connect it to a computer with Ethernet connection and a standard web browser. For initial configuration, the PC chosen for the procedure should temporarily have its IP address modified as illustrated in **Figure 9** for Windows XP and **Figure 10** for Windows 7, 8.x, and 10.

The examples suggest an IP address of 192.168.92.**69** for the PC, but the final quad of the address could be any value from 3 to 254 — except for **68** which is used by the Portable BASrouter. After the IP address of the PC has been set to the same subnet as the BASrouter, a browser on the PC can access the BASrouter at its default IP address.

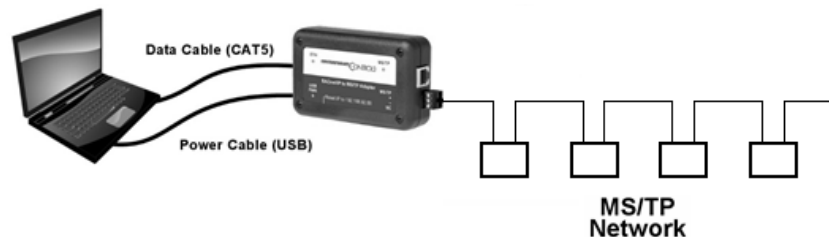


Figure 8 — Setup for Initial Configuration

1. Click **Start Menu**

2. Select **Network Places**

3. Click on **View network connections**

4. Open **Local Area Connection**

5. Choose **Properties**

6. Double-click to open **Internet Protocol (TCP/IP)** settings

7. Select **Use the following IP address** and type the IP address, subnet mask and default gateway you want to use

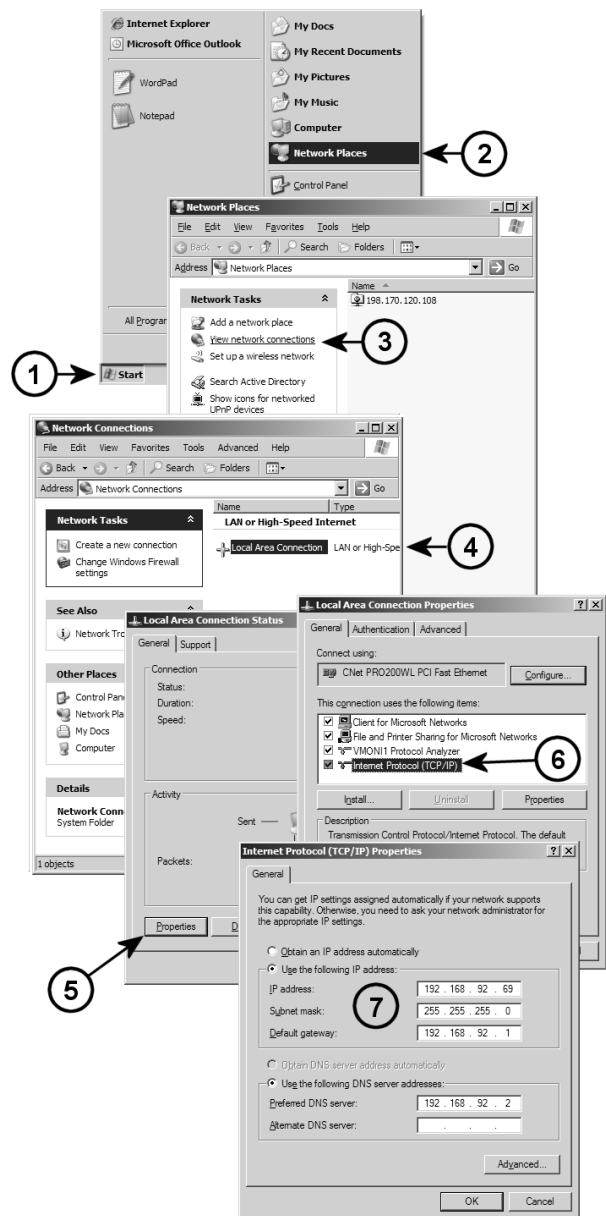


Figure 9 — Steps for Changing the IP Address of a Windows XP PC

1. Type “**network and sharing**” into the search box in the **Start Menu**

2. Select **Network and Sharing Center** (which could also be found in Control Panel)

3. Click on **Local Area Connection**

4. Click **Properties**

5. In the Local Area Connection Properties window double-click **Internet Protocol Version 4 (TCP/IPv4)**

6. Your computer was most likely set for DHCP (*Obtain an IP address automatically*) select the radio button “**Use the following IP address**” and enter in 192.168.92.69 (for example) in **IP address**. Click on **Subnet mask** and 255.255.255.0 will be entered for you automatically. For **Default gateway** enter 192.168.92.1. Click **OK** and your network adapter IP address has been set.

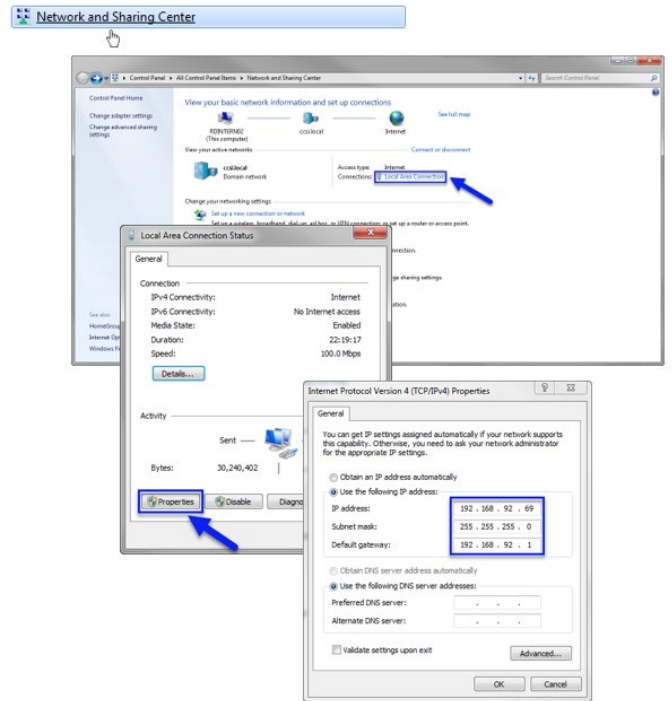


Figure 10 — Steps for Changing the IP Address of a Windows 7, 8.x, and 10 PC

After setting up your PC's network adapter to match the subnet of the BASrouter, enter the router's IP address (192.168.92.68) into your web browser's address field. You will see the BASrouter Configuration Page with the default values as shown in **Figure 11** below.

The screenshot displays the 'BASRTP-B Configuration' web page. At the top, there is a navigation menu with 'Configuration' selected, and other options: 'Advanced', 'Routing', 'Security', 'Status', 'BDT', and 'FDT'. The page title is 'BASRTP-B Configuration'. The main content area is divided into several sections, each with a corresponding button on the right side:

- Device Information (Blue background):** Device Name: BASRPP-B0151a9; Device Instance: 29268; Device Location: location. Button: 'Advanced'.
- Ethernet Network (Light Blue background):** Ethernet Network: 0. Button: 'Status'.
- BACnet/IP Settings (Orange background):** BACnet/IP UDP Port 1: BAC0; BACnet/IP Network 1: 1; IP Assigned By: FIXED (dropdown); IP Address: 192.168.92.68; IP Subnet: 24; IP Gateway: 192.168.92.1. Button: 'Routing Table'.
- MS/TP Settings (Light Green background):** MS/TP MAC: 0; MS/TP Network: 2001; Max Masters: 127; Max Info Frames: 100; MS/TP Baudrate: 38400 (dropdown); MS/TP Tolerance: Strict Lenient. Button: 'Security'.

At the bottom, there is a 'Save Changes' button and two status fields: 'MAC Address' (00-50-DB-00-E1-5E) and 'Firmware Revision' (3.0.1).

Figure 11 — Router Configuration Page with Default Values

Each parameter of the Configuration is explained in the following pages. When “Save Changes” button is clicked, the parameters are stored to non-volatile memory and the Portable BASrouter is rebooted.

Device Parameter

Device Name (Default Value = BASRTP-Bxxxxxx)

The Portable BASrouter's Device Object Name can be configured in this field. It is required to be unique throughout the BACnet network. It can be up to 20 characters and defaults to a unique name of the form BASRTP-BXXXXXX — where the Xs are replaced with the final six characters of the router's Ethernet MAC address, making it unique right out of the factory.

Device Instance (Default Value = 0)

The Portable BASrouter's device instance is a 22-bit value (0–4,194,302). Do not use 4,194,303 which is reserved by BACnet. Each BACnet device within the same BACnet internetwork must have a unique device instance. A unique instance number must be assigned to the BASRTP-B.

Device Location (Default Value = Location)

You can specify any location name of up to 20 characters.

BACnet Ethernet (0 disables BACnet Ethernet)

Ethernet Network (Default Value = 0)

Most BACnet communication that is carried by Ethernet uses the BACnet/IP protocol. However, there are still instances in which the older BACnet Ethernet protocol (ISO 8802-3) is used. The BASRTP-B allows these two protocols to communicate.

BACnet Ethernet uses Ethernet MAC addresses for station addressing — unlike BACnet/IP which addresses messages by means of Internet Protocol (IP) addresses. Each Ethernet MAC address (often called the *physical* address) is unique to the Ethernet network adapter. It is permanently embedded into the adapter during manufacturing and cannot be changed. It is composed of six two-digit *hexadecimal* numbers (00–FF).

An example of an Ethernet MAC address is:

00-08-A1-10-BD-EB

Each Ethernet network adapter has the ability to store an IP address that is *changeable*. This IP address is typically represented as four *decimal* values (each is 0–255) separated by dots. Often called the *dotted quad format*, an example is:

192.168.92.1

NOTE: Although they may share the same Ethernet physical network, BACnet Ethernet devices and BACnet/IP devices must have their own unique network number and these two networks *cannot communicate* unless their messages pass through a router. These network numbers must be in the range of 1–65534 (0 and 65535 are reserved). If the BACnet Ethernet network value is left at its default value of 0, the BACnet Ethernet function within the BASRTP-B **will be disabled**. To prevent message loops, a subnet must have only **one router enabled** for BACnet Ethernet.

BACnet/IP Parameters

BACnet/IP UDP Port (Default Value = 0xBAC0)

This 16-bit hex value (BAC0–BACF) is set to BAC0 by default. Usually, this default value should not be changed. In a typical installation, each BACnet/IP device will be assigned the same UDP port.

BACnet/IP Network (Default Value = 1)

The BACnet/IP network number is a 16-bit value (1–65534). Each network within the BACnet internetwork must have a unique number. This includes the BACnet/IP and MS/TP sides of the BASRTP-B. Do not use 0 or 65535 since these are reserved.

IP Assigned By (Default Value = FIXED)

The IP address of the Portable BASrouter is FIXED (static) by default (192.168.92.68), but it can be obtained automatically from a DHCP server on the network. To set for DHCP, choose DHCP option from drop-down menu and click “Save Changes” button.

IP Address (Default Value = 192.168.92.68)

The IP address of the router can be 0.0.0.1–255.255.255.254. A private address is usually assigned to the BASRTP-B.

IP Subnet (Default Value = 24)

This value (0–30 in the “slash” notation) is the number of *bits* with a “1” in the subnet 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 (Default Value = 192.168.92.1)

The default gateway for the IP stack is a dotted decimal number in the range of 0.0.0.0–255.255.255.254. This will be the IP address of your local IP router — if one exists.

MS/TP Parameters

MS/TP MAC (Default Value = 0)

This is the 8-bit (0–127) MAC address of the router’s MS/TP port, in decimal. Lower MAC address numbers are preferred with the default (0) recommended. It is further recommended that all other BACnet devices attached to the same MS/TP network be assigned consecutive MAC addresses beginning with 1 without allowing any gaps in addressing. This will reduce PFM messages on the network. Slave devices may have MAC addresses of 128–254, but MAC address 255 is reserved.

MS/TP Network (Default Value = 2001)

This 16-bit decimal network number (1–65534) must be unique for all BACnet networks within the BACnet internetwork. No other networks, regardless of type, can have the same network number. Do not use addresses 0 or 65535 since these addresses are reserved.

Max Masters (Default Value = 127)

Only master nodes participate in the MS/TP token-passing process. The highest master MAC address (in decimal) in the MS/TP network is 127 and you should use 127 if you are unsure of other MS/TP device addresses. Each MS/TP device has to use this same value. For a value in this field to be proper, it must equal or exceed the highest MAC address for any master on the network. Optimum performance occurs when this value:

1. **equals** the highest MAC address of any master, and
2. all masters use **sequential** MAC addresses

Since many BACnet devices do not allow this parameter to be changed, leave the BASRTP-B at the default value.

Max Info Frames (Default Value = 100)

This is the maximum number of messages that can be routed onto the MS/TP network by the router per token pass. Its range is 1–100, and typical values are 20–100. Smaller values provide less access to the MS/TP network from the BACnet/IP network because they give native MS/TP messages higher priority than those passed by the router from BACnet/IP. The default value provides good performance for a BACnet routing device.

MS/TP Baud Rate (Default Value = 9600)

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. On power up, the router checks for other masters; if it finds none, it begins token passing — at which point autobauding devices will adjust to the router's baud rate.

MS/TP Tolerance (Default Selection = Lenient)

This setting determines the degree to which interoperability with devices is successful. The Lenient option is less efficient for traffic flow but optimises interoperability. A slight improvement in performance will be realised by selecting the *Strict* setting.

Advanced

Advanced configuration web page.

The screenshot shows the 'BASRTP-B Advanced Configuration' web page. The page has a navigation menu with 'Configuration', 'Advanced', 'Routing', 'Security', 'Status', 'BDT', and 'FDT'. The main content area is titled 'BASRTP-B Advanced Configuration'. It features a blue header with the 'CONTEMPORARY CONTROLS' logo. Below the header, there are three main sections: 1. A blue box containing 'BBMD Enable' (checked), 'BBMD UDP Port' (set to 'UDP Port 1'), and 'Accept FDR' (checked). 2. Two buttons: 'Broadcast Distribution Table' and 'Foreign Device Table'. 3. An orange box containing three input fields: 'BACnet/IP UDP Port 2' (0000), 'BACnet/IP Network 2' (0), and 'Public IP Address' (0.0.0.0). At the bottom is a 'Save Changes' button.

The BACnet discovery process uses *broadcast messages*, but broadcasts are blocked by IP routers. To deal with subnets, or routed IP networks, a BACnet/IP Broadcast Management Device (BBMD) must be used.

You may deploy the BASRT-B in a situation in which BACnet communication is confined to just one IP subnet. In such a case, advanced configuration is normally not needed. But if you are dealing with more than one IP subnet, you will need the BBMD functionality offered in the advanced configuration screen.

To implement BBMD in your router, select the BBMD Enable checkbox in the upper section of the screen. Unless your router must deal with multiple IP networks, in the BBMD UDP Port drop-down menu accept the "Primary" default setting.

Warning: If you enable BBMD when it is not needed, the router will attempt to find devices that are not present and thus traffic flow will be impaired and communication will suffer.

If the Portable BASrouter is used to route between two BACnet/IP networks, the Secondary BACnet/IP UDP Port and Secondary BACnet/IP Network numbers must be entered.

When the BASrouter is used in a NAT environment and its local IP address is private (for example, 192.168.x.y) and it is communicating with BACnet devices on the other side of the NAT firewall, the Public IP Address is used in the Forwarded-NPDU IP Address field. The NAT router must be configured such that communications to the NAT router on the Secondary BACnet/IP network port are port forwarded to the BASrouter. The Public IP Address of the BASrouter should be set to the public IP address of the NAT router.

Broadcast Distribution Table (BDT) Figure 12. Enter the IP addresses of all BBMD devices to which the BAS Router will communicate. Do not include the BAS Router's own IP address. Normally, you will set the Broadcast Distribution Mask (BDM) to 255.255.255.255. If the BASrouter will communicate through an IP router which can forward broadcasts, then set the BDM to the subnet mask assigned to the destination subnet.

Foreign Device Registration (FDR) Figure 13. This screen will report all devices that have registered with the BASrouter as Foreign Devices and how long they will remain registered unless a re-registration occurs.

The screenshot shows the 'BASRTP-B Broadcast Distribution Table' configuration page. At the top, there is a navigation menu with 'Configuration', 'Advanced', 'Routing', 'Security', 'Status', 'BDT', and 'FDT'. The page title is 'BASRTP-B Broadcast Distribution Table'. Below the title, there are two sections: 'BBMD IP Address' and 'Broadcast Distribution Mask'. Each section contains five input fields. The 'Broadcast Distribution Mask' section shows a table of five rows, each with an input field containing '0.0.0.0' and another input field containing '255.255.255.255'. At the bottom of the form is a 'Save Changes' button.

Figure 12

The screenshot shows the 'BASRTP-B Foreign Device Registrations' page. At the top, there is a navigation menu with 'Configuration', 'Advanced', 'Routing', 'Security', 'Status', 'BDT', and 'FDT'. The page title is 'BASRTP-B Foreign Device Registrations'. Below the title, there is a table with the following columns: 'IP Address', 'Port', 'TTL', and 'Remaining Time'. The table is currently empty.

Figure 13

Routing

Multiple networks, possibly employing different physical layer technologies, may be interconnected by BACnet routers to form a BACnet internetwork. The Routing table web page provides a routing table which contains information about the network topology of the surrounding BACnet internetwork such as *Destination Network*, *Network Type*, *Connecting Network*, and *Network Status*. This table will be blank upon powering the Portable BASrouter. Click the “*Discover Routing Table*” button to discover other routers on the BACnet network which will send a “*Who-Is-Router-To-Network*” message and fill the table with the discovered BACnet routers.

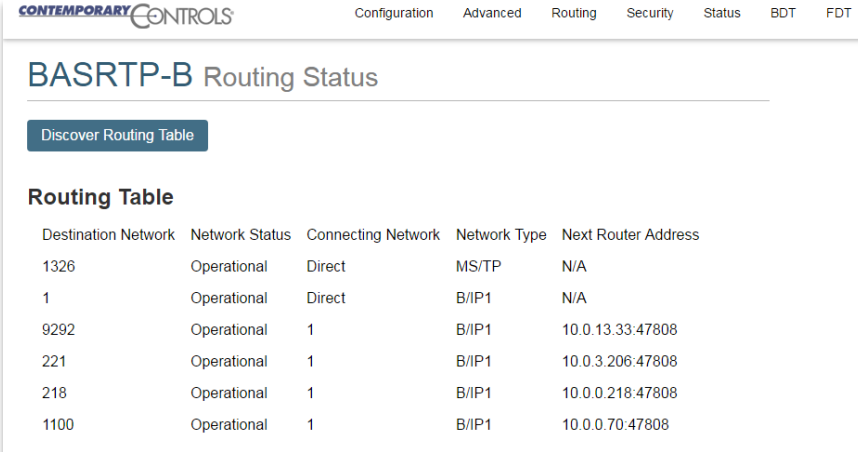
Destination Network shows the routing destination network number of routers on the BACnet internetwork.

Network Status indicates the status of the network.

Connecting Network is the network which is shared with the Portable BASrouter. If it is a BACnet/IP network on the same UDP port, or an MS/TP network on the same physical segment and MAC domain, its network number will be displayed. “*Direct*” is the Portable BASrouter’s own (directly connected) BACnet network(s).

Network Type is the type of networks seen by the Portable BASrouter. It could be a BACnet/IP on Primary or Secondary UDP ports (B/IP1 or B/IP2), BACnet MS/TP, or BACnet Ethernet network.

Next Router Address shows the discovered BACnet routers’ addresses



Destination Network	Network Status	Connecting Network	Network Type	Next Router Address
1326	Operational	Direct	MS/TP	N/A
1	Operational	Direct	B/IP1	N/A
9292	Operational	1	B/IP1	10.0.13.33:47808
221	Operational	1	B/IP1	10.0.3.206:47808
218	Operational	1	B/IP1	10.0.0.218:47808
1100	Operational	1	B/IP1	10.0.0.70:47808

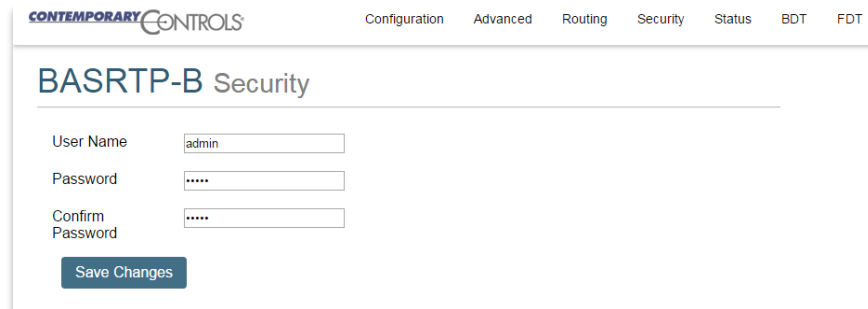
If you want to make sure the routing table is updated, simply click the “*Discover Routing Table*” button again.

Security

The “Security” screen displays the User Name (which is “admin” by default) and the Password (which is also “admin” by default).

To optimize security, it is recommended that the default values are changed to unique values only known by the network administrator or building owner. User name can be set to values between 1 and 10 characters in length. Password must be at least 5 and no more than 10 characters in length. There is no restriction on character types.

You are encouraged to change these login values to prevent unauthorized access to the BASRTP-B.



The screenshot shows the 'BASRTP-B Security' configuration page. At the top left is the 'CONTEMPORARY CONTROLS' logo. To the right is a navigation menu with links for 'Configuration', 'Advanced', 'Routing', 'Security', 'Status', 'BDT', and 'FDT'. The main heading is 'BASRTP-B Security'. Below this, there are three input fields: 'User Name' with the value 'admin', 'Password' with five dots, and 'Confirm Password' with five dots. A 'Save Changes' button is located below the input fields.

Status Screen

The *Status* screen is always operational as long as the Portable BASrouter is powered. It consists of *MSTP Device Status* table, *Network Errors* count, and *Statistics* on BACnet networks to which the Portable BASrouter is connected. The *Status* page will automatically refresh every 5 seconds with the updated status on networks and devices — so you can observe the network state changes and gain insight into the condition of the BACnet network (as seen by the Portable BASrouter). These statistics are retained over time, unless the Portable BASrouter is powered off or rebooted from the main web page using the “*Save Changes*” button, then all *Status* page parameters are reset.

The screenshot shows the 'BASRTP-B Status' page from Contemporary Controls. At the top, there are navigation tabs: Configuration, Advanced, Routing, Security, Status, BDT, and FDT. The main heading is 'BASRTP-B Status'. Below it is the 'MSTP Device Status' section, which is a grid of 128 cells (16 rows by 8 columns). The cells are numbered 0 to 127. Most cells are gray, indicating they are offline. Some cells are blue, indicating they are routers. A legend below the grid states: Green=Online, Blue=Router MAC, Gray=Offline. The 'Network Errors' section shows a count of 0. The 'Statistics' section contains several input fields for various metrics: B/IP 1 In Packets (38574), B/IP 1 Out Packets (3339), B/IP 2 In Packets (0), B/IP 2 Out Packets (0), B/Eth In Packets (0), B/Eth Out Packets (0), MSTP In Packets (2862), MSTP Out Packets (18020), TX PFM Count (366876), RX PFM Count (1), TX Token Count (922055), RX Token Count (922054), Invalid long Frames (0), Next Station (34), and SoleMaster (No). A 'Reset Statistics' button is located at the bottom of the statistics section.

The “*Reset Statistics*” button on *Status* page will reset *Network Errors* count, and *Statistics*, but retain the *MSTP Device Status* table history. To clear the *MSTP Device Status* table, along with all other *Status* page parameters, press the “*Save Changes*” button on main web page which will reboot the router. If the unit is powered off, *Status* page parameters will be reset.

MSTP Device Status is a graphical table of the BACnet MS/TP device MAC addresses on the attached EIA-485 physical segment. Devices are identified by their MAC address and coloured as:

ONLINE – Green square

OFFLINE – Gray square

ROUTER – Blue square

The *MSTP Device Status* table will be updated at the same 5-second refresh rate as the *Status* page. If changes to the network are made while the Portable BASrouter is operating on the network (such as MS/TP device MAC addressing, powering devices on/off, or rewiring the physical segment), it may take 2 or more refresh cycles, or until the bus has stabilized, to update the MS/TP device table properly. If a MAC address is altered while the Portable BASrouter is operating on the network, it will report the device's old MAC as OFFLINE and its new MAC address as ONLINE in the next refresh cycle (5 seconds). In addition, if network or physical layer changes are made while the portable BASrouter is operating on the network, the *Network Errors* count may increment slightly or dramatically (depending on the changes) due to improper communication while the bus is in an unstable condition. Once you think you have stabilized the MS/TP bus, reset all statistics and monitor the network for a period of time to ensure device online status, proper MAC addressing, and that no more network errors are being generated.

Network Errors count provides an accumulating count of BACnet MS/TP network errors such as: invalid frames, partial frames, bad CRC, wrong data length, or silence timer greater than 100ms. This count will keep incrementing if there are present MS/TP network issues until the error conditions on the MS/TP bus are resolved. If this number is high but not continuously incrementing, reset the count and observe if new errors are being generated. If no new errors are being generated over several refresh cycles, it is a good sign that the MS/TP network is in stable condition.

Network errors may have many sources. For example, devices powering up/down or having their configuration changed, bias/termination issues, cabling issues, etc. Considering this, it is best to wire up the physical layer, power on all devices and then use the "*Reset Statistics*" button to clear any errors which may have been caused by these initial conditions. After resetting the *Network Errors* count monitor it and make sure that it does not increment. If the *Network Errors* count does not increment while the Portable BASrouter is operational on the network, no new errors are detected by the Portable BASrouter.

If error count is reset with "*Reset Statistics*" button, but *Network Errors* count keeps incrementing, that is a sign that the network isn't stable and network errors are present on the MS/TP bus.

CONTEMPORARY CONTROLS Configuration Advanced Routing Security Status BDT FDT

BAS RTP-B Status

MSTP Device Status

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111
112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127

Green=Online Blue=Router MAC Gray=Offline

Network Errors: 5

Statistics

B/IP 1 In Packets	B/IP 1 Out Packets	B/IP 2 In Packets	B/IP 2 Out Packets
777324	39290	0	0
B/Eth In Packets	B/Eth Out Packets	MSTP In Packets	MSTP Out Packets
0	0	32827	371671
TX PFM Count	RX PFM Count	TX Token Count	RX Token Count
6443377	3	8779753	8779752
Invalid long Frames	Next Station	SoleMaster	
0	34	No	

Reset Statistics

Statistics reports the traffic handled by the Portable BASrouter, including the number of messages transmitted and received for each network type. Packet counts only increment for protocols which are in use by the Portable BASrouter.

“B/IP 1” is the primary BACnet/IP port traffic

“B/IP 2” is the secondary BACnet/IP port traffic

“B/Eth” is BACnet Ethernet protocol traffic

“MSTP” is BACnet MSTP protocol traffic

In addition to packet counts, the *Statistics* table displays the instantaneous state of some router MS/TP values.

“TX PFM Count” is the number of Polls For Master transmitted

“RX PFM Count” is the number of Poll For Master received.

“TX Token Count” is the number of tokens transmitted.

“RX Token Count” is the number of tokens received.

“Invalid Long Frames” is the number of frames received that have a length exceeding 1024.

“Next Station” is the MS/TP MAC address of the device to which the Portable BASrouter will pass the token next. This value may change if devices leave or enter the network — and when the router searches for devices on the network, as per the BACnet MS/TP standard.

“*Sole Master*” is a state in the MS/TP state machine when the BACnet router is continuously polling for other master devices on the segment to include in the token pass. If Sole Master is YES after multiple refresh cycles, then the router is not able to communicate with any MS/TP devices on the bus.

If there is no gap in MS/TP addresses between the BASrouter and the next logical device, for example if the BASrouter is 0 and the next logical device is 1, then the TX PFM count should not change after the network stabilizes. If the count changes then the next logical device has dropped out of the token pass. If the number is again stable, then the device has returned to the network. If the number is increasing, then the device is still off the network.

6 Warranty

Contemporary Controls (CC) warrants this product to the original purchaser for two years from the product shipping date. Product returned to CC for repair is warranted for one year from the date the repaired product is shipped back to the purchaser or for the remainder of the original warranty period, whichever is longer.

If the product fails to operate in compliance with its specification during the warranty period, CC will, at its option, repair or replace the product at no charge. The customer is, however, responsible for shipping the product; CC assumes no responsibility for the product until it is received.

CC's limited warranty covers products only as delivered and does not cover repair of products that have been damaged by abuse, accident, disaster, misuse, or incorrect installation. User modification may void the warranty if the product is damaged by the modification, in which case this warranty does not cover repair or replacement.

This warranty in no way warrants suitability of the product for any specific application. IN NO EVENT WILL CC BE LIABLE FOR ANY DAMAGES INCLUDING LOST PROFITS, LOST SAVINGS, OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PRODUCT EVEN IF CC HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, OR FOR ANY CLAIM BY ANY PARTY OTHER THAN THE PURCHASER.

THE ABOVE WARRANTY IS IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED OR STATUTORY, INCLUDING THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE OR USE, TITLE AND NONINFRINGEMENT.

Returning Products for Repair

Return the product to the location where it was purchased by following the instructions at the URL below:

www.ccontrols.com/rma.htm

7 Declaration of Conformity

Additional compliance documentation can be found on our website.

www.ccontrols.com

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