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A TECHNICAL SUPPLEMENT TO CONTROL NETWORK
ESSENTIALS

BAS Router Upgraded to a BACnet Multi-Network Router

The BAS Router has been a popular addition to our BAS product line due to its low cost, compact design, and its simple webpage configuration. There are only two ports on the BAS Router – a BACnet/IP Ethernet port and an optically-isolated EIA-485 BACnet MS/TP port. With this device, BACnet messages can be routed between a MS/TP bus segment to a BACnet/IP 10/100 Mbps Ethernet network. Several of these devices can be distributed throughout a building — making it convenient to attach islands of MS/TP segments to the main BACnet/IP network.

Due to comments we received from customers, we have added features that allow the BAS Router to become a multi-network router. The additional features found in version 2.0 are as follows:

- Support for BACnet Ethernet
- BACnet/IP Broadcast Management Device (BBMD)
- Foreign Device Registration (FDR)
- Support for multiple BACnet/IP networks

Information on these features can be found in the BAS Router data sheet and the new BAS Router Application Guide. Two applications that demonstrate the benefits of version 2.0 have been extracted from the application guide.

Application #5: One-armed router

Not only do the BAS Router and BAS Portable Router support BACnet/IP to BACnet MS/TP routing, BACnet Ethernet can be added to the mix in support of three-way routing. BACnet Ethernet and BACnet/IP should not be confused. BACnet Ethernet uses Ethernet as its data link technology and its MAC address for station addressing. BACnet/IP does not need to use Ethernet at all. However, if Ethernet is being used with a BACnet/IP device, the device must be accessed by its IP address and not just its MAC address. BACnet/IP to BACnet Ethernet routing is possible with either of the BAS Router products. In this case, there would be no connection to the MS/TP port on the BAS Router. There would only be one connection to the Ethernet port on the BAS Router. This is called “one-arm routing” since there is only one connection. If routing to MS/TP is still desired, a connection could be made accordingly to effect three-way routing. The BAS Router can simultaneously route between MS/TP, BACnet Ethernet and BACnet/IP.

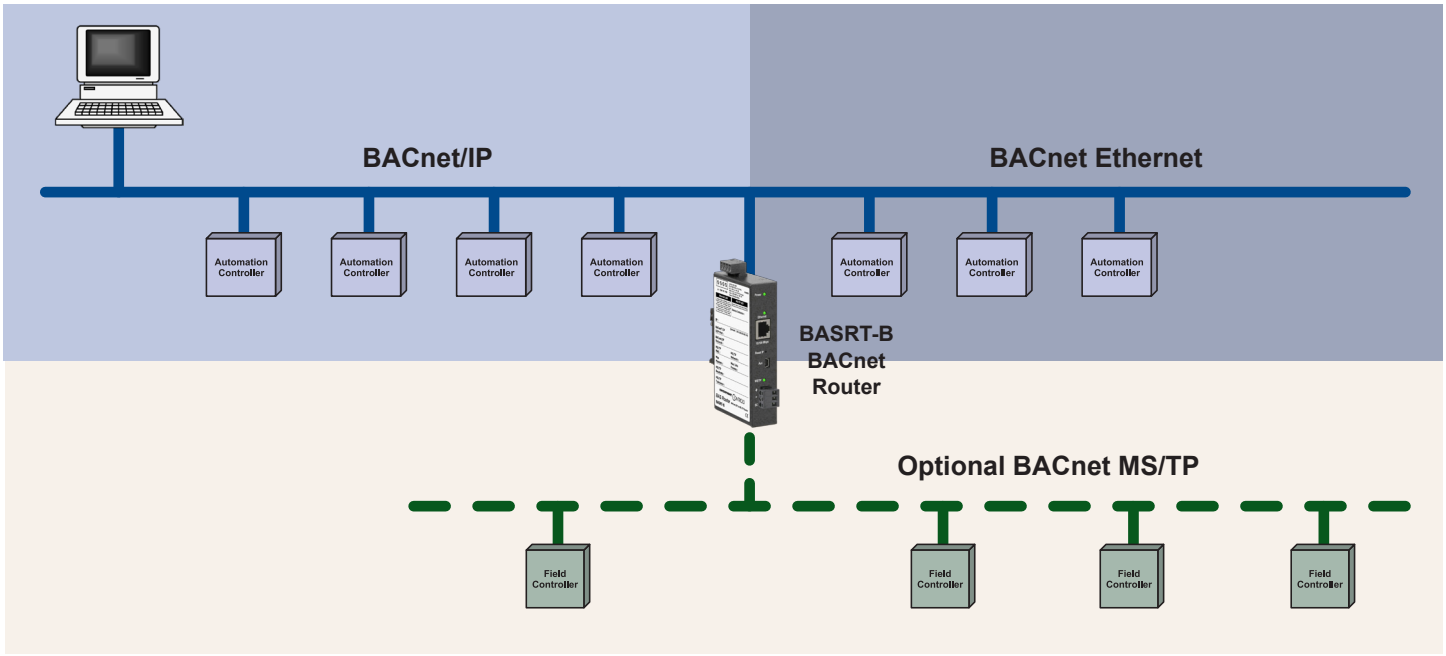
Application #6: BBMD server

When attaching BACnet devices to IP networks it is possible that the IP network has been sub-netted through the use of IP routers. Most IP routers will not pass broadcast messages which are crucial to BACnet’s operation. The solution is to incorporate BACnet/IP Broadcast Management Device (BBMD) functionality within the BACnet internetwork.

The BBMD concept requires that a broadcast message originating on one subnet be encapsulated into a directed message and sent to all remote subnets since these directed messages will pass

through IP routers. Once the encapsulated messages are received on the remote subnets, a BBMD device will decode the message and resend it on its local subnet as a broadcast message. Therefore it would appear that a BBMD device must be present on each subnet in order to provide this encoding and decoding function. However, this is not the case if all the BACnet/IP devices support Foreign Device Registration (FDR). At a minimum, one BBMD device is required to be located on one of the subnets with FDR devices registering to this one BBMD. This is what is shown in the example with a BAS Router providing BBMD functionality while allowing for foreign devices registration. Notice that connecting to a BACnet MS/TP network is an option. Two BBMD devices on the same subnet are not allowed.

Application #5 Diagram



Application #6 Diagram