Description and Application

The BACnet Building Controller (B-BC) is a high-performance, native BACnet direct digital controller. As part of a complete interoperable building automation system, this 16 x 16 B-BC provides precise monitoring and control of connected points. Integrated into this native BACnet device is BACnet router, web server, and expandable I/O capability.

Router Functions

- Routes traffic between two MS/TP ports, one BACnet PTP (point-to-point) port, four (logical) BACnet IP ports, and one (logical) BACnet Ethernet port (BACnet IP and BACnet Ethernet are logical ports on the Ethernet physical port)
- Supports BACnet IP foreign device registration and Broadcast Management Device (BBMD), supports PTP modem communications, and performs IP packet assembling/disassembling (PAD) routing for up to four BACnet IP PAD networks
- Each of the four (logical) BACnet IP ports can be configured for BACnet IP, BBMD, foreign device registration, or PAD

Web Functions

- Built-in web configuration pages allow web browser to configure I/Os and objects, monitor values and alarms (configuration/monitoring also available through TotalControl), and set-up users and passwords.
- Custom graphic interface (created/published in TotalControl, ver. 1.7 or higher) for remote web browser
- Firmware easily upgradable (without requiring physical access) through the Internet or local Ethernet connection

Web Functions

- Email notifications of alarms and events, using external or (with license) internal SMTP “server”
- Up to 32 Control Basic custom program sequences for optimal control of a central plant, air handlers, and other connected equipment
- High-performance 32-bit processor
- Use of programmable nonvolatile memory allows safe data and program back-up and controller shut-down during power failure (in conjunction with a UPS—future upgrade)
- Dynamic allocation of memory resources provides flexible use of scheduling, trending, and exception reporting in small- to medium-sized buildings without requiring a personal computer
- Meets or exceeds the specifications in ANSI/ASHRAE BACnet Standard 135-2004 for BACnet Building Controllers
- BTL-certified as a B-BC controller type

Specifications and design subject to change without notice.
Communication Ports

- One 10/100BaseT Ethernet connector for BACnet IP and Ethernet 802.3 (ISO 8802-3); segmentation supported
- Two EIA-485 ports (terminal blocks) for BACnet MS/TP, operating up to 76.8 kilobaud (9.6, 19.2, 38.4, 57.6, or 76.8 kilobaud)
- Two EIA-232 connectors (one DB-9 connector and one terminal block) for BACnet point-to-point connections
- One serial bus connection (terminal block) for daisy-chaining I/O expansion modules
- One USB 2.0 port with Type A connector (future firmware upgrade)
- One UPS signal interface (future upgrade)

Inputs/Outputs

- Onboard 16 universal inputs and 16 universal outputs (expandable with up to seven I/O expansion modules for a total of 128 inputs and 72 outputs), software selectable as analog, binary, or accumulator objects
- Standard and custom units of measure
- Removable screw terminal blocks, wire size 14–22 AWG

Inputs

- Inputs can be configured via a jumper for 1K or 10K ohm pull-up resistors (for unpowered contacts or devices), 0–12 VDC, or 4–20 mA
- Analog inputs accept industry-standard 1K ohm platinum and 10K ohm thermistor sensors, 0–12 VDC devices, or 4–20 mA devices
- Binary inputs accept 0 or 12 VDC (on/off)
- Pulse (passive or active up to 12 VDC) counting to 16 Hz
- Input overvoltage protection (24 volts AC, continuous)
- 16-bit analog-to-digital conversion on inputs

Outputs

- Each short-circuit protected output capable of driving up to 100 mA (at 0–12 VDC) or 600 mA total for all outputs
- 16 slots for output override cards (e.g., triac, relay, 4-20 mA) for large relays or devices that cannot be powered from a standard universal output
- 12-bit digital-to-analog conversion on outputs

Configurability

General

- See PIC statement for all supported BACnet objects
- One device object
- 16 customizable conversion tables for inputs and 8 tables for Control Basic

I/O

- 16 default (onboard) and up to 128 analog, binary, or accumulator input objects (with expansion I/O modules)
- 16 default and up to 72 analog or binary output objects (with expansion I/O modules)

Value

- 100 default and up to 1,000 analog value objects
- 100 default and up to 1,000 binary value objects
- 10 default and up to 256 multi-state value objects (with up to 16 states each)

Program and control

- 16 default and up to 128 PID loop objects
- 32 program objects (Control Basic programming initially requires TotalControl compiler)

Schedules and trends

- 10 default and up to 100 schedule objects
- 10 default and up to 32 calendar objects
- 64 default and up to 256 trend objects, each of which holds 256 samples

Alarms and events

- 10 default and up to 128 notification (alarm/event) objects
- 10 default and up to 512 event enrollment objects

Power Loss

- Power-fail auto-shutdown with auto-restart capabilities (in conjunction with an Uninterruptible Power Supply—future upgrade)
- Real time clock with (onboard battery) power backup for 72 hours

Memory

- 64 MB nonvolatile flash memory and 256 MB SDRAM
- Programs and configuration parameters are stored in nonvolatile memory
### Installation

**Dimensions**
- 8.4 x 11.2 x 1.1 (w/o HPO output card covers or 1.9 w/ covers) inches (283 x 214 x 27/48 mm)
- Weight: 2.3 lb. (1.0 kg)
- Supply Voltage: 24 VAC (−15%/+20%), Class 2 only, 35 VA @ 28.8 VAC
- Case material: Black powder-coated steel
- Warranty: 5 years (from mfg. date code)

**Environmental Limits**
- Operating Temp.: 32 to 140°F (0 to 60°C)
- Shipping Temp.: −40 to 160°F (−40 to 71°C)
- Humidity: 0 to 95% rel. humidity, non-condensing

### Options and Accessories

**NOTE:** For more information about these accessories, see the BAC-A1616BC Applications Guide.

- CAN-A168EIO: I/O Expansion Module (see the next page)
- HCO-1035: Steel control panel enclosure, 20 W x 24 H x 6” D
- HCO-1036: Steel control panel enclosure, 24 W x 36 H x 6” D
- HPO-0054: Replacement fuse bulb
- HPO-0063: Replacement two-pin jumper
- HPO-0070: Twelve-output transient suppressor board
- HPO-0071: Eight-input transient suppressor board
- HPO-6701: Output override card, triac
- HPO-6702: Output override card, 0–10 VDC analog, adjustable override pot.
- HPO-6703: Output override card, NO relay
- HPO-6704: Output override card, 4–20 mA
- HPO-6705: NC relay output override board
- HPO-6706: Output override card, NC relay
- HPO-6802: Raised cover, with labels, for output override board
- KMD-5567: Network surge suppressor
- KMD-5569: Modem (for dial-up point-to-point)
- KMD-5575: Network repeater/isolator
- KMD-5672: EIA-232 to female DB-9 PC connector cable (for Serial 2 port)
- XEE-6000 Series: Transformers

### Regulatory
- CE compliant
- Complies with Canadian ICES-003
- BACnet Testing Laboratory (BTL) listed
- UL 916 Energy Management Equipment
- FCC Class A, Part 15, Subpart B and complies with Canadian ICES-003 Class A**

**This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.**

### Models
- BAC-A1616BC-000: BACnet Building Controller
- BAC-A1616BC-001: B-BC w/ web graphics pages
**CAN-A168EIO Expansion Module**

**Features**
- Can be installed up to 200 feet away from the BAC-A1616BC using standard shielded twisted-pair wiring on a serial bus connection.
- One serial bus connection (terminal block) for daisy-chaining up to 7 expansion I/O modules.
- Expansion I/O modules addressed with DIP switches.
- Removable screw terminal blocks, wire size 14–22 AWG.
- Environmental limits information the same as the BAC-A1616BC.

**Inputs/Outputs**
Inputs and outputs have the same specifications as the BAC-A1616BC with the following exceptions (in bold):
- Onboard 16 universal inputs and 8 universal outputs, software selectable as analog or binary objects.
- Each short-circuit protected output capable of driving up to 100 mA (at 0–12 VDC) or 450 mA total for all outputs.
- 8 slots for output override cards (e.g., triac, relays, 4–20 mA) for large relays or devices that cannot be powered from a standard universal output (see HPO-6700 series under Options and Accessories on the previous page).

**Indicators, Fuses, and Jumpers**
- **LED Indicators**: Ready/Status, Expansion I/O Communication.
- **Network Bulbs**: Two per communication port for reversed polarity and overload protection/indication.
- **Fuse**: 1.6 A, fast-acting, 5 x 20 mm.
- **Jumpers**: (1) Power, (16) Input Selectors.

**Installation**
- **Dimensions**: 8.4 x 8.2 x 1.1 (without HPO output card covers or 1.9 with covers) inches (214 x 207 x 27/48 mm).
- **Weight**: 1.6 lb. (0.7 kg).
- **Supply Voltage**: 24 VAC (–15%/+20%), Class 2 only, 19 VA @ 28.8 VAC.
- **Case Material**: Black powder-coated steel.

**Regulatory**
- CE Compliant.
- UL 916 Energy Management Equipment.
- FCC Class A, Part 15, Subpart B and complies with Canadian ICES-003 Class A**

**Dimensions**

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