



CBXi System

CBXi-8R8 | CBXi-8R8-H

INTRODUCTION

The CBXi-8R8 and CBXi-8R8-H are fully programmable IP-based BTL-listed (pending) BACnet® Building Controllers (B-BC) that support simultaneous multi-protocol communications including BACnet IP, BACnet MS/TP, Modbus TCP and Modbus RTU.

Part of Cylon's CB Line of BACnet field controllers, the CBXi Series of controllers is built on an extendible platform that features 8 UniPuts™ with Relay and 8 Universal Inputs, and feature support for up to five FLX (Field Level eXpansion) Series extension modules providing a scalable solution from 16 up to 96 (pending) points of control. FLX expansion modules are available in a variety of options to allow maximum flexibility in achieving the required point configuration. The CBXi-8R8(-H) additionally provides local Hand-Off-Auto override functionality.

The fully programmable CBXi-8R8(-H) can be tailored to meet a wide variety of applications by creating and modifying strategies using Cylon's CXpro^{HD} programming interface.

APPLICATION

The CBXi-8R8(-H) is designed for a wide range of energy management applications for intelligent control of:

- HVAC equipment such as Central Plant, Boilers, Chillers, Cooling Towers, Pump Systems, Air Handling Units (Constant Volume, Variable Air Volume and Multi-zone), and Rooftop Units,
- Electrical systems such as lighting control, variable frequency drives and metering.

The CBXi-8R8(-H) can be used as an integration platform and natively supports the routing of either BACnet MS/TP to BACnet IP or Modbus RTU to Modbus TCP without the need for gateways or additional hardware.

CBXi-8R8

8 UniPuts™ + Relays
hardware connections that can be used as inputs, outputs or relays (software selectable)

8 Universal Inputs

CBXi-8R8-H

Additionally includes Hand/Off/Auto Local Override Function

Flexible onboard UniPut™ points allow expandable I/O configurations from 16 to 96⁽¹⁾ points through connected FLX modules

BACnet IP communications with dual port Ethernet switch (star or daisy chain topology) and support for both DHCP and Static IP

Multi-protocol communications support for BACnet MS/TP, Modbus TCP, Modbus RTU, HTTP, HTTPS and SSH.

Dedicated Cylon Intelligent Sensor communications

LED status on all I/O channels provides indication of fault or override status

Supports Network Time Protocol (NTP)

Compact form factor to maximize enclosure space requirement

Use of common FLX I/O expansion Modules throughout the CBX System range

Interchangeable with the CBX Series BACnet MS/TP controllers

PRODUCT SELECTION CHART

		CBXi-3R8	CBXi-3R8-H	FLX-4R4	FLX-4R4-H	FLX-3R8	FLX-3R8-H	FLX-16DI
Service		Main Controller	Main Controller	Expansion Module	Expansion Module	Expansion Module	Expansion Module	Expansion Module
I/O Point Qty	UniPuts™ with Relay ⁽¹⁾	8	8	4	4	8	8	0
	Universal Inputs	8	8	4	4	8	8	0
	Digital Inputs	0	0	0	0	0	0	16
Input Options	Voltage 0 ... 10 V @ 40 kΩ	✓	✓	✓	✓	✓	✓	
	Resistance 0 ... 450 kΩ	✓	✓	✓	✓	✓	✓	
	Temperature -40 °C ... +110 °C	✓	✓	✓	✓	✓	✓	
	Current 0 ... 20 mA @ 390 Ω	✓	✓	✓	✓	✓	✓	
	Digital Volt-Free contact	✓	✓	✓	✓	✓	✓	✓
	Digital 24 V AC detect	UniPuts™ only	UniPuts™ only	UniPuts™ only	UniPuts™ only	UniPuts™ only	UniPuts™ only	
	Pulse counting	✓	✓	✓	✓	✓	✓	✓
Output Options	Analog 0 ... 10 V	✓	✓	✓	✓	✓	✓	
	Digital 0 ... 10 V	✓	✓	✓	✓	✓	✓	
	Relay Contacts 24 V AC	✓	✓	✓	✓	✓	✓	
HOA Switch & Pot.			✓		✓		✓	
18 V Aux Power		✓	✓	✓	✓	✓	✓	✓
BACnet MS/TP-to-IP Routing		✓	✓					
Modbus TCP ⁽²⁾		✓	✓					
RS-485 Port ⁽³⁾		BACnet MS/TP or Modbus RTU	BACnet MS/TP or Modbus RTU					
CBT-STAT Bus		✓	✓					

Note (1) : UniPuts™ are software configurable for point types AI, DI, AO or DO-R.

Note (2) : CBXi supports a maximum of 120 Modbus points across a maximum of 12 devices.

Note (3) : RS-485 Port 1 supports one communication protocol at a time. When configured for BACnet MS/TP-to-IP routing, up to a maximum of 24 connected BACnet MS/TP devices are recommended. When configured for Modbus® RTU, a maximum of 120 points across a maximum of 12 devices that can be a combination of Modbus RTU or TCP may be connected.

SPECIFICATIONS

MECHANICAL

Size (excluding terminal plugs)	166 x 89.5 x 57 mm [6.5 x 3.55 x 2.25"]
Enclosure	Flame-Retardant ABS DIN 43880 type-2 compatible Enclosure IP 20
Mounting	DIN rail

CONNECTION

Note: Use Copper or Copper Clad Aluminum 70 °C conductors only.

Terminals	PCB mounted plug terminal connections
Conductor Area	Max: AWG 12 (3.31 mm ²) Min: AWG 22 (0.355 mm ²)

ENVIRONMENT

Note: This equipment is intended for field installation within an enclosure.

Ambient Temperature	-25 °C ... 50 °C (-13 °F ... 122 °F)
Ambient Humidity	0% ... 90% RH non-condensing
Storage Temperature	-30 °C ... +70 °C (-22 °F ... 158 °F)
EMC Immunity	EN 61326-1: 2013
EMC Emission	EN 61326-1: 2013 EN 61000-3-2: 2014 EN 61000-3-3: 2013
Approvals	UL Listed (CDN & US) UL916 Energy Management Equipment – File No. E176435

ELECTRICAL

Supply Requirements	24 V AC/DC ±20 % 50/60 Hz
Supply Rating	CBXi 30 VA (no FLX modules) CBXi + 1 x FLX 42 VA CBXi + 2 x FLX 54 VA CBXi + 3 x FLX 66 VA
FLX Power Connection	Proprietary FLX bus connector carries power and comms from CBXi-8R8(-H) unit. CBXi-8R8(-H) can supply power to up to 3 FLX modules.
Auxiliary Power	18 V DC / 60 mA output

PROCESSOR

Type	TI Sitara AM335X Dual-core ARM Cortex A8
Clock Speed	600 MHz
System Memory	4 GB eMMC Flash + 512 MB DDR3 DRAM
Real-Time Clock	Yes, backed for 7 days typical

COMMUNICATIONS

Ethernet ports	Dual Switched 10/100BASE-TX (RJ45) Addressing: IPv4, IPv6 or Hostname / DHCP Client or Static IP Connection Topology: Daisy-chain BACnet/IP, BTL-BBC
Local serial port	USB Micro-B socket (used as service port)
USB ports	2 x Type-A USB connectors USB 2.0 5 V dc 2.5W
RS485 Port 1	Selectable BACnet MS/TP or Modbus RTU RS485 @ 9K6,19K2, 38K4(default), 57K6, 76K8 or 115K2 Baud. Max cable length 1.2 km @ default ¼ unit load device
CBT-STAT / RS485 Port 2	CBT-STAT RS485 with a maximum cable length 500 m
FLX bus	115.2K Baud Max bus length (including extension cables): 30 m / 100 ft. using 18 AWG conductors 15 m / 50 ft. using 22 AWG conductors
FLX bus Connection	FLX bus connector carries inter-module communications and module power

INPUTS / OUTPUTS

Note: Shielded cable is recommended for all input connections.



UniPuts™ with Relay When configured as Input:

Analog Input	Range: 0 ... 10 V @ 40 kΩ Accuracy: ±0.5% full scale [50mV]
Resistance measurement	Range: 0 ... 450 kΩ Accuracy: ±0.5% of measured resistance
Temperature measurement	Range: -40 °C ... +110 °C Accuracy: 10k NTC sensors (e.g. 10k Type 2 (10K3A1) or 10k Type 3 (10K4A1): ±0.3 °C, -40 to 90 °C (-40°F to 194°F); ±0.4 °C > 90 °C (194°F)
Current input	Range: 0 ... 20 mA @ 390 Ω

Note: Current Input requires user-supplied external 390 Ω resistance.

Accuracy: depends on user supplied external resistor
Digital Volt-Free contact, 2 mA contact-wetting current
Digital 24 V AC detect
Pulse counting up to 20 Hz, 25 ms - 25 ms

When configured as Output:

Analog Output 0 ... 10 V @ 20 mA max load, 12-bit resolution
Digital Output 0 ... 10 V @ 20 mA max load
Relay Contacts with ability to switch up to 24 V AC
Maximum Load: 24 V AC, 2 (1) A resistive (inductive) for all relay contacts

Universal Inputs



Analog Input	Range: 0 ... 10 V @ 130 kΩ Accuracy: ±0.5% full scale [50mV]
Resistance measurement	Range: 0 ... 450 kΩ Accuracy: ±0.5% of measured resistance
Temperature measurement	Range: -40 °C ... +110 °C Accuracy: 10k NTC sensors (e.g. 10k Type 2 (10K3A1) or 10k Type 3 (10K4A1): ±0.3 °C, -40 to 90°C (-40°F to 194°F); ±0.4 °C > 90°C (194°F)
Current input	Range: 0 ... 20 mA @ 390 Ω Accuracy: ±0.5% full scale [100µA]
Digital Volt-Free contact	2 mA contact-wetting current Pulse counting up to 20 Hz, 25 ms – 25 ms

Digital Inputs



Digital Volt-Free contact, 2 mA contact-wetting current
Pulse counting up to 20 Hz, 25 ms – 25 ms

- Notes:**
- 1) All inputs and outputs are protected against short circuit, as well as over-voltage up to 24 V AC.
 - 2) Inputs use on-board 16-bit analog to digital convertor.
 - 3) 18 V DC supply, max 60 mA per CBXi unit, is available for powering sensors.

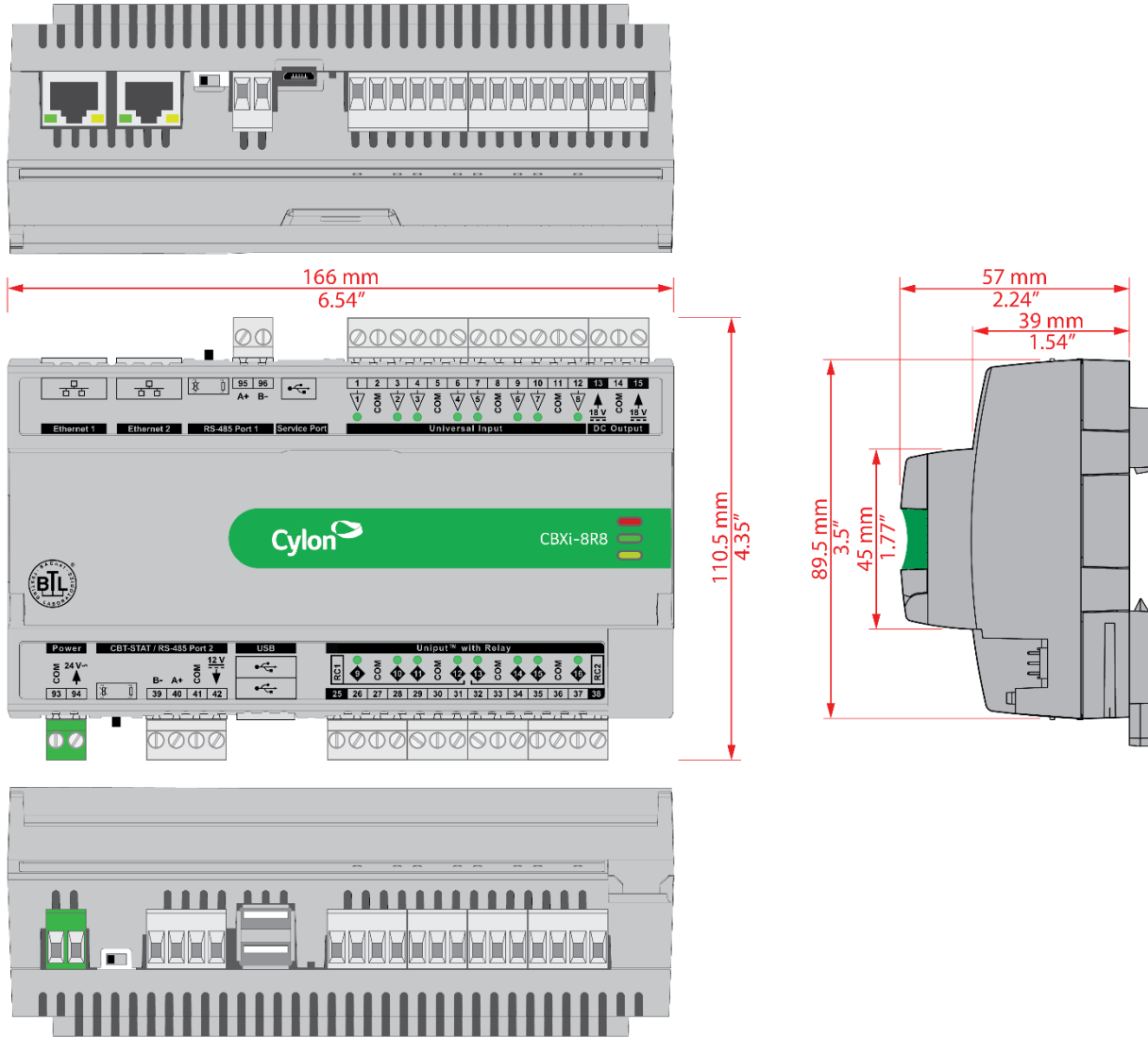
SOFTWARE FEATURES

Maximum number of Strategy Blocks	1500
Maximum number of Trendlog Modules	64
Maximum internal Trendlog capacity (standard)	1024
Maximum BACnet Schedules	10
Maximum Exception Schedules	5
Maximum number of Exposable BACnet Points	640
Data Security	Strategy and Set points backed up in Flash

INTERFACE

Engineering Software	CXpro ^{HD}	
Touchscreen	eXplore	

DIMENSIONS



WIRING

