CB-CP100
CB-CP200
CB-ACC-IR-UNI
CB-ACC-232DTE-30
CB-ACC-232DCE-30
CB-APP-LIC
CB-PS-12V
CB-PS-24V
CB-CP-RMK

ControlBridge Processor

User Manual

Control and Manage Critical Systems using the ControlBridge Processor.

Contact Information

Order toll-free in the U.S. or for FREE technical support: Call 877-877-BBOX
(outside U.S. call 724-746-5500)
www.blackbox.com • info@blackbox.com

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You'll be live with one of our technical experts in less than 60 seconds.

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This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

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Instrucciones de Seguridad
(Normas Oficiales Mexicanas Electrical Safety Statement)

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc.
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
    - A: El cable de poder o el contacto ha sido dañado; u
    - B: Objectos han caído o líquido ha sido derramado dentro del aparato; o
    - C: El aparato ha sido expuesto a la lluvia; o
    - D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
    - E: El aparato ha sido tirado o su cubierta ha sido dañada.

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1. Specifications

Specification	CB-CP100	CB-CP200
Approvals	Power Supply: IEEE 802.3af CE, FCC, RoHS	CE, FCC, RoHS
Audio	—	Line in, LIne out
Bidirectional Serial RS-232/485	3	—
Bidirectional Serial RS-232/422/485	—	2
Enclosure	Aluminum	Aluminum
General I/O (Analog In/Digital Out)	—	4
IR Receivers	For capture: 1	For capture: 1; For wireless control panels: 1
IR/Serial Output	—	4
Low-Voltage Relay, 24 V / 0.5 A	—	2
RAM / Non-volatile flash	64 MB / 256 MB	512 MB / 4 GB minimum
Versatile I/O Ports	8	—
Wired 10/100BASE-T Ethernet	1	1
Power	24 VDC power supply, maximum 4 W, PoE, IEEE 802.3af Class 0	24 VDC power supply, maximum 4 W, PoE, IEEE 802.3af Class 0
Dimensions	1.7"H x 4.1"W x 3.6"D (4.4 x 10.5 x 9.2 cm)	1.7"H x 8.3"W x 3.6"D (4.4 x 21.0 x 9.2 cm)
Weight	0.7 lb. (0.3 kg)	1.1 lb. (0.5 kg)

2. Overview

2.1 Description

The ControlBridge units are Ethernet IP enabled controllers equipped with various types of control ports. Control ports include bi-directional serial channels RS-232/422/485, serial outputs, versatile I/O ports, infrared outputs, general I/Os, 24 volts relay outputs, DALI, KNX, DMX512, and EnOcean ports. The Ethernet port allows for bi-directional IP control of any manufacturer IP enabled products. All models are fully compatible with ControlBridge button panels.

An Internal IR sensor allows users to capture IR codes and, for some models, receive IR codes from hand-held remotes. Convenient for testing and troubleshooting, the ControlBridge Unit also has front panel indicator LEDs to indicate the status of all the control ports.

The controller keeps date and time with its on-board real time clock (RTC), allowing for a wide variety of distributed intelligence scheduling applications.

A single cable Ethernet connection provides easy network integration. The controllers are equipped with Power over Ethernet (PoE) technology, enabling an Ethernet network cable to deliver both data and power.

This controller comes complete with a web server and allows setup through a standard web browser. Unit programming is based on the Black Box standard programming tool ControlBridge Builder.

Both models include a web server and allow for setup through a standard web browser.

The aluminium enclosure can be installed on a tabletop or a 19-inch rack using the ControlBridge Control Processor 19-inch Mounting Kit (CB-CP-RMK).

2.2 Features

- Ethernet IP enabled controllers
- Modern ARM® processor platform
- On-board real time clock
- Wired 10/100BASE-T LAN
- Bi-directional control of any IP enabled products through the Ethernet port
- Various types of control ports
- Bi-directional serial RS-232/422/485
- IR /serial outputs (IR up to 1.2 MHz)
- General I/Os
- Relays NO-C-NC 24 V
- Real time clock (RTC) for scheduling application
- Web server and Admin Web for setup through a standard web browser
- Aluminium enclosure design for desktop and 19-inch kit enables rackmounting
- Various accessories available

2.3 What's Included

Your package should include the following items. If anything is missing or damaged, contact Black Box Technical Support at 877-877-BBOX (2267) or info@blackbox.com.

CB-CP100:

- (1) ControlBridge 100
- (1) 24-VDC power supply
- (1) straight-through Ethernet cable
- (2) IR adapters
- (1) connector set

CB-CP200:

- (1) ControlBridge 200
- (1) 24-VDC power supply
- (1) straight-through Ethernet cable
- (4) IR adapters
- (1) connector set

2.4 Hardware Description

2.4.1 ControlBridge Processor 100 (CB-CP100)

Figure 2-1 shows the ControlBridge Processor 100 (CB-CP100). Table 2-1 describes its components.

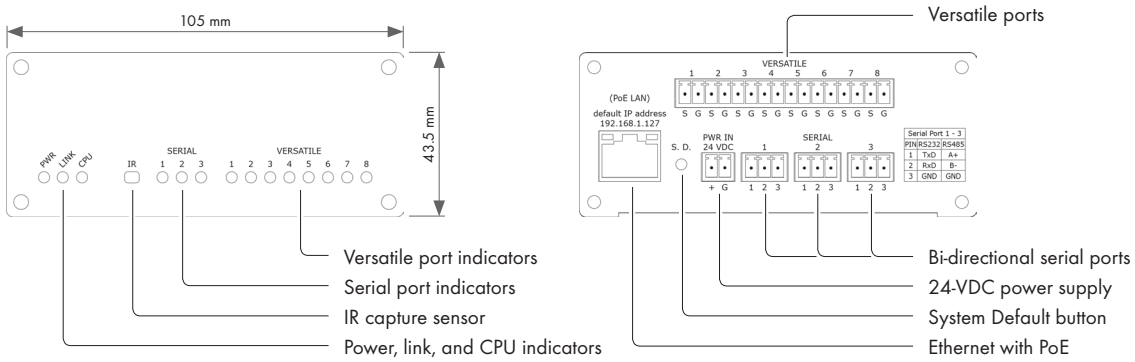


Figure 2-1. ControlBridge Processor 100.

2.4.2 ControlBridge Processor 200 (CB-CP200)

Figure 2-2 shows the ControlBridge Processor 200 (CB-CP200). Table 2-2 describes its components.

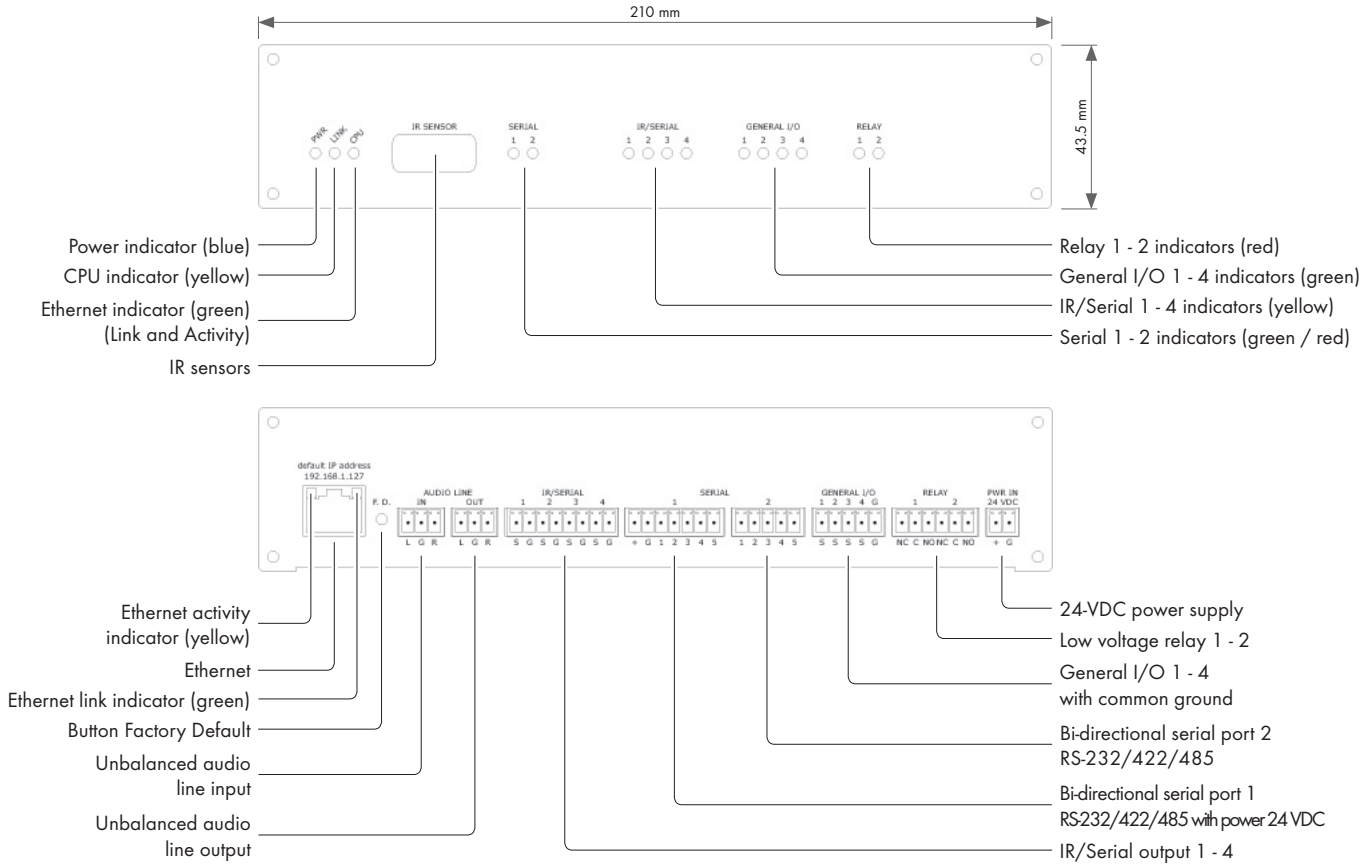


Figure 2-2. ControlBridge Processor 200.

2.4.3 Accessories

IR Adapter

The IR Adapter (CB-ACC-IR-UNI) is an infrared emitter that is compatible with IR/serial output and versatile I/O ports. The adapter mounts on the receiver window using double-sided adhesive tape.

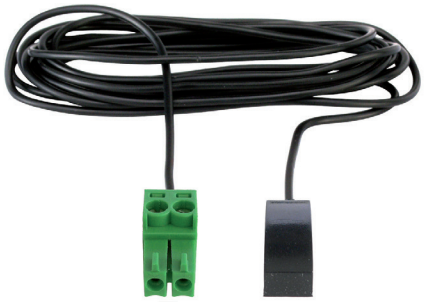


Figure 2-3. IR adapter.

Serial IO Cable DTE

The Serial IO Cable DTE (CB-ACC-232DTE-30) is 3.0-m long and supports bi-directional communication between the serial device and the ControlBridge.

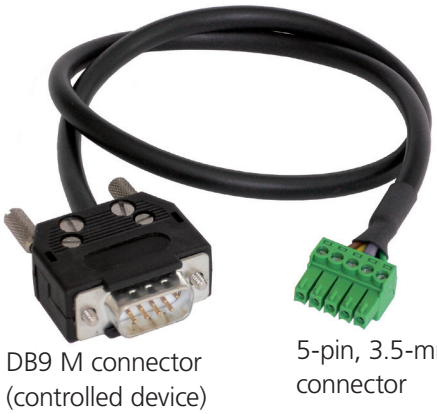


Figure 2-4. Serial IO Cable DTE (CB-ACC-232DTE-30).

Serial IO Cable DCE

The Serial IO Cable DTE (CB-ACC-232DCE-30) is 3.0-m long and supports bi-directional communication between the serial device and the ControlBridge.

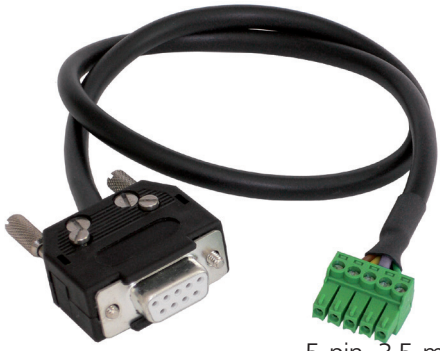


Figure 2-5. Serial IO Cable DCE (CB-ACC-232DTE-30).

ControlBridge Control Processor 19-inch Mounting Kit (CB-CP-RMK)

The ControlBridge Control Processor 19-inch Mounting Kit (CB-CP-RMK) is a shelf that supports your ControlBridge Processor 100 or 200 in a 19-inch rack. It's made of stainless steel and measures 1 U high (1.75") and 19" wide. The shelf weighs 1.3 kg and includes mounting hardware.

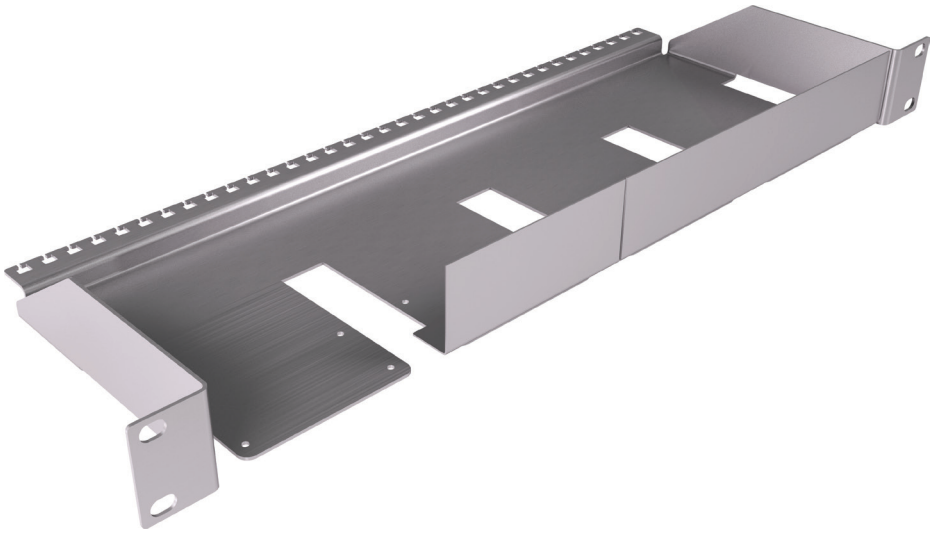


Figure 2-6. ControlBridge Processor rackmounting shelf.

3. Installation

3.1 Shelf Placement or Stacking

Four rubber feet are provided for shelf placement or stacking. Stick the rubber feet near the corner edges on the bottom side of the controllers - see picture below.

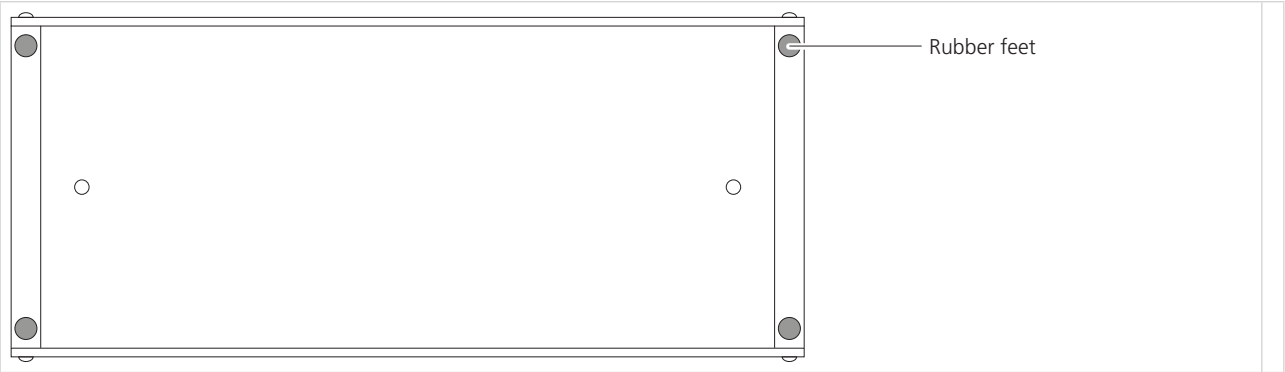
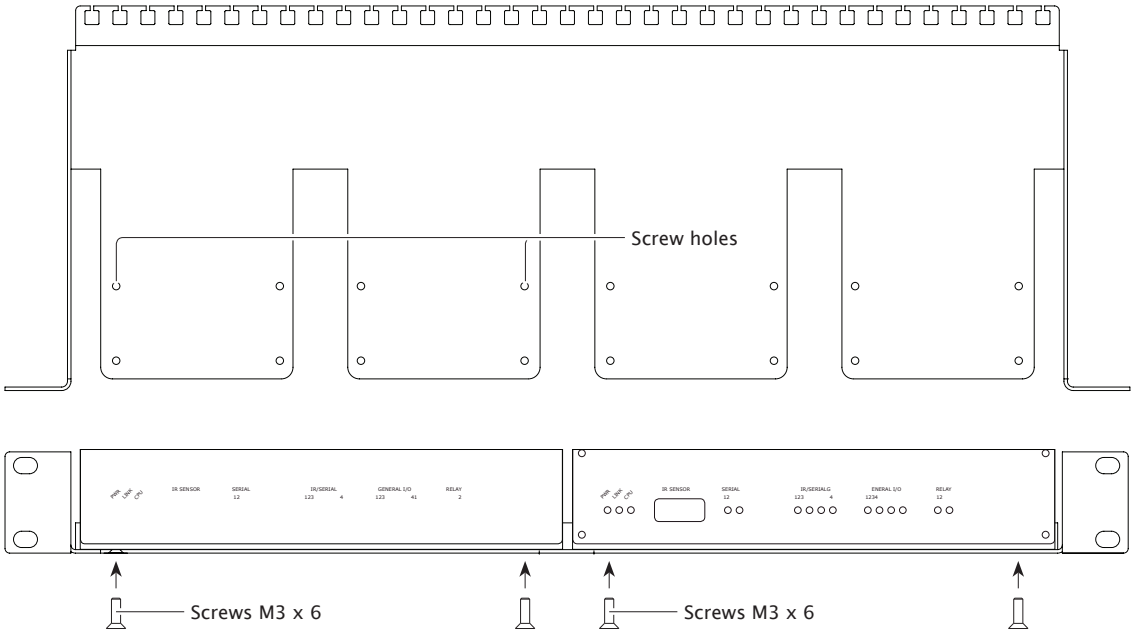


Figure 3-1. Installing rubber feet on the ControlBridge Processor.

3.2 Rackmounting

The Rackmounting Shelf (CB-CP-RMK) provides a simple solution for installing controllers in a 19-inch rack. It allows you to install up to two half-rack sized controllers in a single 19-inch unit rack space. All necessary accessories are supplied with the shelf.

Attach the controller to the Rackmounting Shelf using two M3 x 6 screws to the female threads on the bottom side of the controller - see picture below. The M3 x 6 screws are included with the Rackmounting Shelf. Don't use longer screws; this might damage PCBs inside the unit. If you install only one controller, use the cover panel delivered with the shelf.



NOTE: If you install less controllers, use the cover panels delivered with the shelf to cover empty positions.

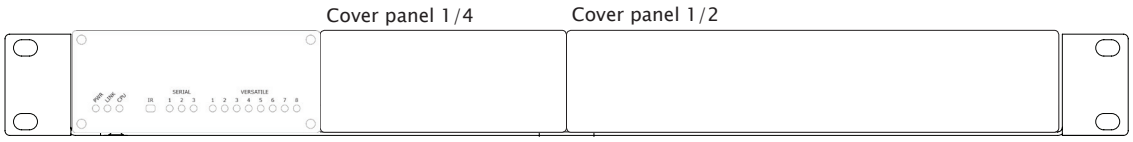


Figure 3-2. Rackmounting the ControlBridge Processor(s).

4. Operation

4.1 Factory and System Default Settings

Every device shipped from the factory is set according to table bellow, Factory Default column.

To restore the System Default settings, press the System Default (S.D.) button. This button enables you to connect if you lost the password or if you do not know the IP settings. Press the S.D. button until the CPU LED indicator flashes to confirm the system defaults settings are restored according to table below, System Default column. Use a thin screwdriver to press the S.D. button.

Table 4-1. Factory and System Default settings.

			Factory Default	System Default
Configuration	Identification	Name	Empty	Not changed
	IP settings	Host name	Empty	Not changed
		IP address	192.168.1.127	192.168.1.127
		Subnet mask	255.255.255.0	255.255.255.0
		Default gateway	192.168.1.1	192.168.1.1
	DNS	Primary DNS server	Empty	Not changed
		Secondary DNS server	Empty	Not changed

Date and time	Date and Time	Day, month, year	Real	Not changed
		Hour, minute, second	Real	Not changed
		Time zone	(UTC) Coordinated Universal Time	Not changed
	Internet clock	Use Internet clock	Not	Not changed
		Primary NTP server	Empty	Not changed
		Secondary NTP server	Empty	Not changed
Applications			Empty	Not changed
File storage			Empty	Not changed
System	Firmware		Current version	Not changed
Password			Empty	Empty

4.2 Indicators

Table 4-2. General Indicators.

Indicator	Color	Off	On / Flashing
POWER	Blue	No power presented.	Power is ON. The unit is ready.
LINK	Green	Network is not detected.	Network link / activity
CPU	Yellow	No activity.	System default indication.

Table 4-3. Control Port Indicators.

Indicator	Color	Off	On / Flashing
ANALOG	Yellow	Analog output is set to 0 V.	Analog output is set to 10 V.
DALI	Green Red	No data activity.	Data activity.
DIGITAL I/O	Green	Output is switched OFF.	Output is switched ON.
DMX512	Green Red	No data activity.	Data activity.
EnOcean	Green Red	No data activity.	Data activity.
GENERAL I/O	Green	Output is switched OFF.	Output is switched ON.
IR/SERIAL	Yellow	No data or IR code transmitted.	Data or IR code is being transmitted.
KNX	Green Red	No data activity.	Data activity.
RELAY	Red	Relay is switched OFF.	Relay is switched ON.
SERIAL	Green Red	No data transmitted or received.	Data is being transmitted. Data is being received.
VERSATILE	Green Yellow	Output is switched OFF. No data or IR code transmitted.	Output is switched ON. Data or IR code is being transmitted.

4.3 IR Sensor

The following table explains how the IR sensor works for each controller model.

Table 4-4. IR sensor functions.

Controller	IR codes capture	IR control panels receiver
ControlBridge 100	✓	Not applicable
ControlBridge 200	✓	✓

4.3.1 Capturing IR Codes

All controllers are equipped with an IR capture sensor and are able to capture IR codes. Captured IR codes can be used in both controller models.

The capture procedure consists of the following steps:

1. Connect the capture unit and the PC with ControlBridge Builder to the same Network.
2. Arrange the IR remote and the capture unit as described below.

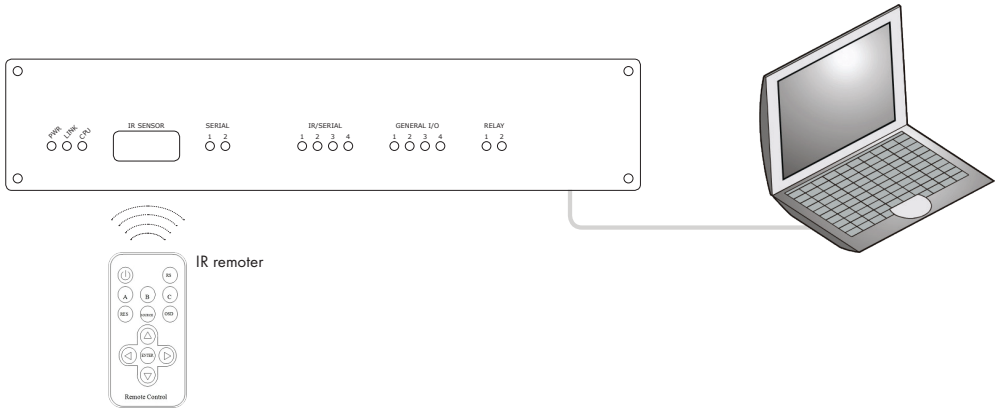


Figure 4-1. IR remote configuration.

- Be sure to set the proper distance between the capturing unit and the remote unit to accommdate the the capturing unit's requirements.
- Start ControlBridge Builder and go to the appropriate driver and command
- Set the IP address of the unit used for capture.
- Push the Start Capture button in ControlBridge Builder and then press the appropriate button on the IR remote.

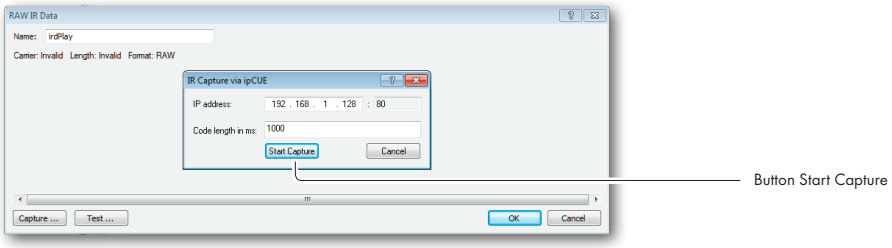
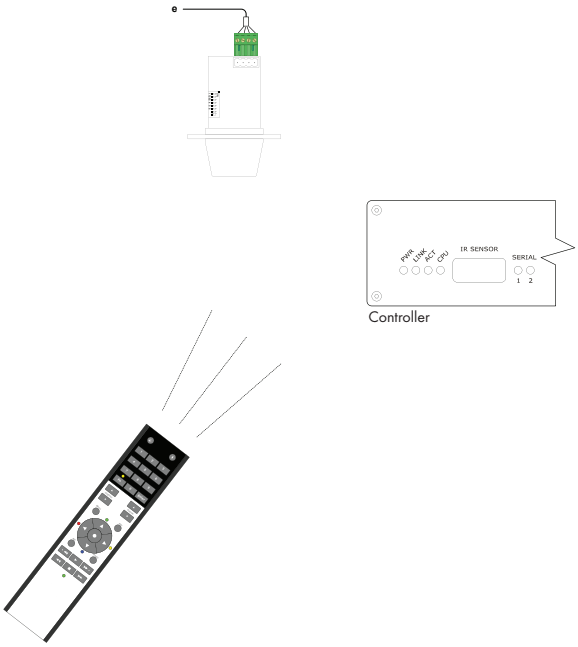


Figure 4-2. Start Capture button.

4.3.2 IR Control Panels Receiver

The built-in IR sensor functions the same as other IR receivers. This means that ControlBridge can receive an IR signal from wireless IR control panels without using an external IR receiver.



The IR Adapter connects to the rest of the control system via IR communication.

As the IR receiver you can use

The remote control unit

IR receiver built into ControlBridge controllers

IR receiver built into 8-Button Laminated Keypad and 8-Button Engraved Keypad keypads.

Figure 4-3. IR control panel receiver.

5. Connecting

The following table describes connections for both controllers.

Table 5-1. ControlBridge connections.

Unit			Connection										
	Power supply 24 VDC	Power over Ethernet	Ethernet	Serial RS-232/485	Serial RS-232/422/485	IR/Serial output	Versatile	General I/O	Low-voltage relay	DALI	KNX	DMX512	EnOcean
ControlBridge 100	1	1	1	3			8						
ControlBridge 200	1	1	1		2	4		4	2				

5.1 Power In

The unit requires power 24 VDC from an external power supply. Use any unit ONLY with the power adapter supplied in the product package. Using another power supply may damage the unit.

Power consumption

- ControlBridge 100 max. 4 W
- ControlBridge 200 max. 4 W

Table 5-2. Connector Pin Out.

PWR IN		
2-pin 3.5 mm	Pin	Description
+ G	+	Power +24 VDC
	G	Ground

Power Adapter

A standard power adapter is delivered with the ContrBridge. Attach the 2-pin connector of the power supply unit to the PWR IN connector located on the rear panel and attach the power cable to a power outlet.

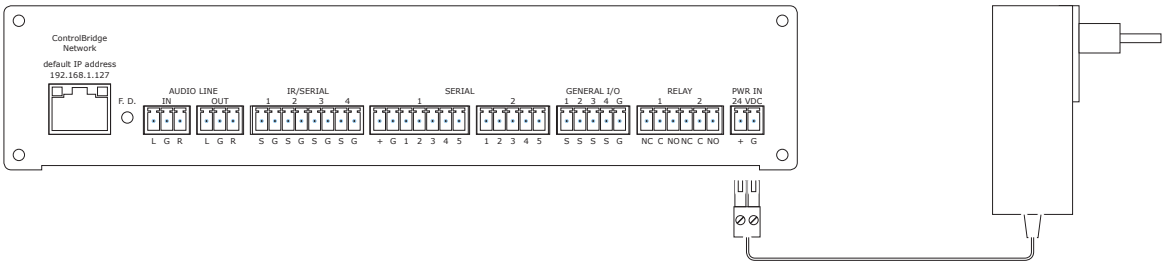


Figure 5-1. Power adapter.

5.2 Power over Ethernet (PoE)

The ControlBridge units are equipped with PoE and are compatible with standard IEEE 802.3af / Class 0 Ethernet with PoE Infrastructure.

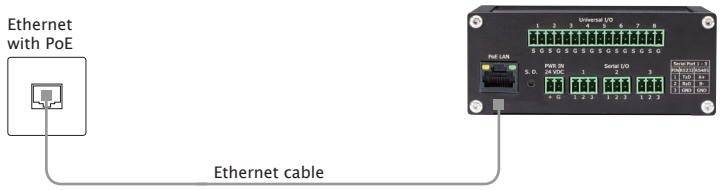


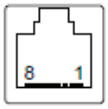
Figure 5-2. Ethernet connection with PoE infrastructure.

5.3 ControlBridge Network

The ControlBridge links to a 10/100 BASE-T LAN via its RJ-45 connector.

The length of the Ethernet cable connecting controller to the network must not exceed 100 meters.

Table 5-3. Connector pinout.

RJ-45	Pin	Signal	CAT5 Cable Color
	1	TX_D1+ and PoE	White / Orange
	2	TX_D1- and PoE	Orange
	3	RX_D2+ and PoE	White / Green
	4		Blue
	5		White / Blue
	6	RX-D2- and PoE	Green
	7		White / Brown
	8		Brown

Direct PC Connection

Attach one end of an RJ-45 Ethernet cable to the ControlBridge Network port and attach the other end of the RJ-45 Ethernet cable to your computer. Use straight-through cable if your PC supports autosensing or cross-over cable if your PC doesn't support autosensing.

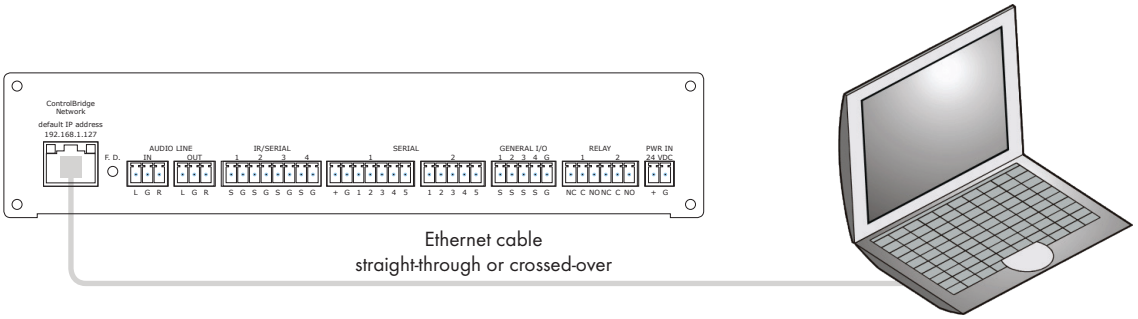


Figure 5-3. Direct PC connection.

LAN Network Connection

Attach one end of an RJ-45 Ethernet straight-through cable to the ControlBridge Network port and attach the other end of the RJ-45 Ethernet cable to your computer.

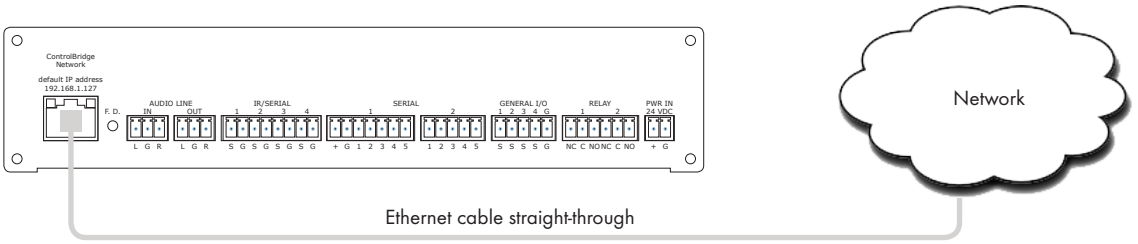


Figure 5-4. LAN network connection.

Windows Local Network Settings

Follow these steps for Windows 7:

1. Start Windows 7.
2. Click Start.
3. Enter ncpa.cpl into the Search Box and press Enter. The following window is displayed.

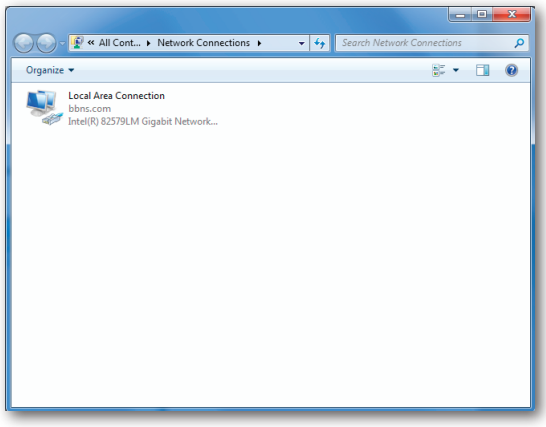


Figure 5-5. Windows 7 screen 1.

3. Right-click on network adapter used for connection with controller and then right-click and select Properties.
4. Select Internet Protocol (TCP/IP) and click Properties button.

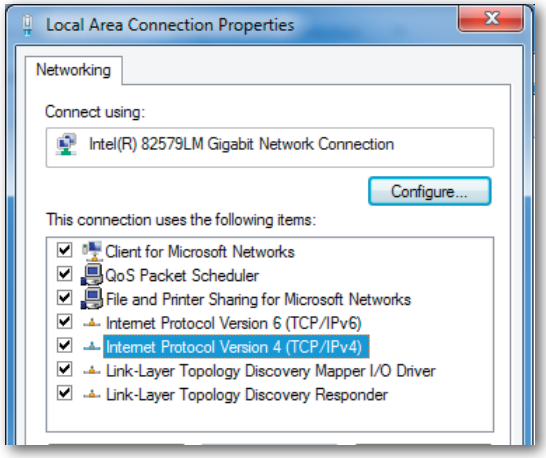


Figure 5-6. Windows 7 screen 2.

Follow these steps for Windows XP:

1. Start Windows XP.
2. Click Start, then click Control Panel and choose the option to switch to Classic View.
3. Double-click Network Connections.

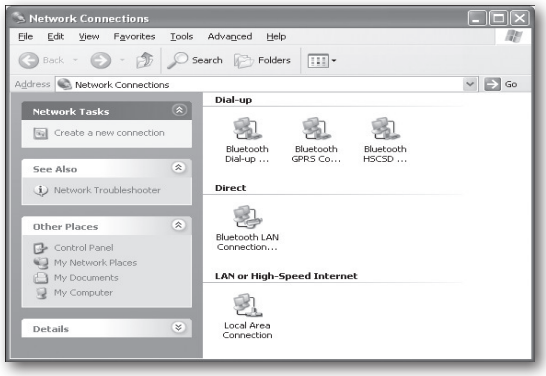


Figure 5-7. Windows XP screen 1.

1. Select Use the following IP address option. Set IP address to 192.168.1.1 (or other address different from 192.168.1.127 and from 192.168.1.128) and Subnet mask to 255.255.255.0. Leave other options unchanged and click OK.

Figure 5-8. Windows XP screen 2.

5.4 Serial

Table 5-4. Serial ports on the ControlBridge units.

Unit	Serial port		
	Serial RS-232/485	Serial RS-232/422/485	Serial RS-232/422/485 with power 24 VDC
ControlBridge 100	3		
ControlBridge 200		1	1

Bi-directional Serial RS-232/485

These bi-directional serial channels are used for RS-232 and RS-485 communication. Maximum speed is 115,200 bps. The default mode for all channels is RS-232; you must set other modes in the programming application. For more details, see your programming manuals.

RS-232 Mode

Output signal levels for RS-232 are in the -10 V to +10 V range. This is the default mode for all channels.

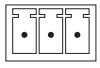
Table 5-5. RS-232 pinout.

SERIAL RS-232				
3-pin 3.5 mm	Pin	Signal	Description	Direction
1 2 3	1	TxD	RS-232 Transmitted Data	From controller
	2	RxD	RS-232 Received Data	To controller
	3	GND	Ground	—

RS-485 Mode

You must set this mode in the programming application.

Table 5-6. RS-485 pinout.

SERIAL RS-485			
3-pin 3.5 mm	Pin	Signal	Description
 1 2 3	1	A+	RS-485 Data +
	2	B-	RS-485 Data -
	3	GND	Ground

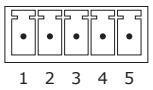
Bi-directional Serial RS-232/422/485

These bi-directional serial channels are used for RS-232, RS-422, and RS-485 communication. The maximum speed is 115,200 bps. The default mode for all channels is RS-232; you must set other modes in the programming application. For more details, see the programming manuals.

RS-232 Mode

Output signal levels for RS-232 are in the -10 V to +10 V range. This is the default mode for all channels.

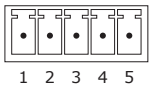
Table 5-7. RS-232 pinout.

SERIAL RS-232				
5-pin 3.5 mm	Pin	Signal	Description	Direction
	1	TxD	RS-232 Transmitted Data	From controller
	2	RTS	RS-232 Request to Send	From controller
	3	GND	Ground	—
	4	RxD	RS-232 Received Data	To controller
	5	CTS	RS-232 Clear to Send	To controller

RS-422 Mode

You must set this mode in the programming application.

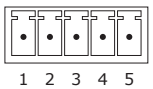
Table 5-8. RS-422 pinout.

SERIAL RS-422				
5-pin 3.5 mm	Pin	Signal	Description	Direction
	1	Tx A+	RS-422 Transmit Data (Idles High)	From controller
	2	Tx B-	RS-422 Transmit Data (Idles Low)	From controller
	3	GND	Ground	—
	4	Rx A+	RS-422 Receive Data (Idles High)	To controller
	5	Rx B-	RS-422 Receive Data (Idles Low)	To controller

RS-485 Mode

You must set this mode in the programming application.

Table 5-9. RS-485 pinout.

SERIAL RS-485			
5-pin 3.5 mm	Pin	Signal	Description
	1	A+	RS-485 Data +
	2	B-	RS-485 Data -
	3	GND	Ground
	4	N.C.	Not Connected
	5	N.C.	Not Connected

5.5 Versatile I/O Ports

Depending on the application, the versatile I/O ports can be used in multiple ways as described in the following table.

Table 5-10. Versatile port functions.

Input modes	
Digital input	Adjustable threshold • High sensitivity - binary 0 < 1.45 V, binary 1 > 2.05 V • Low sensitivity - binary 0 < 5.8 V, binary 1 > 8.2 V Input impedance >100 k Adjustable digital filter
Pulse counter	Adjustable threshold as above Input impedance as above Pulse length min. 1 ms, max. frequency 500 Hz Max. number of pulses 2 147 483 647 (Long) Adjustable digital filter
Voltage input	Range 0 to 2.5 VDC, 0 to 10 VDC, auto Input impedance >100 k-ohms Resolution 12-bit Adjustable digital filter Accuracy ±0.1 % of reading, ±0.1 % of range (0.1 to 10 V, digital filter applied)
Resistance input	Range 2 kohms, 20 kohms, 200 kohms, auto¸ Resolution 12-bit Adjustable digital filter Accuracy (digital filter applied) • 100 ohms to 800 ohms: ±3 % of reading, ±0.1 % of range • 800 ohms to 20 kohms: ±0.3 % of reading, ±0.1 % of range • 20 kohms to 200 kohms: ±1 % of reading, ±0.1 % of range
Output modes	
Digital output	Max. sink current 200 mA / max. 30 VDC Catch diodes for use with real load
Current pullup	Current-source pull-up 12 V / 10 mA
Current pulldown	Current-source pull-down -12 V / 10 mA
IR output	Maximum IR carrier frequency 500 kHz Up to 3 original IR Adapter in parallel
Serial output	RS-232 Serial data baud rate 300 bps ÷ 115,200 bps

Warnings

- ***The port is protected to 30 VDC maximum. Exceeding this voltage may damage the port.***
- ***Incorrect wiring may damage the versatile port or the connected device.***
- ***All versatile ports in the unit have common ground, which connects to the grounds of other control ports. That means versatile ports are not isolated from other control ports.***

Table 5-11. Connector pinout.

2-pin 3.5 mm	Pin	Signal	Description
S G	S	Signal	Versatile port signal (input/output)
	G	GND	Ground

Digital Input

Every versatile port can be used as a digital input for contacts, buttons, sensors, etc. For digital input usage, the output must be in an open state and current pull-up and current pull-down can be used.

Parameters of pulse counter input are as follows:

- Adjustable threshold
- High sensitivity - binary 0 < 1.45 V, binary 1 > 2.05 V
- Low sensitivity - binary 0 < 5.8 V, binary 1 > 8.2 V
- Input impedance >100 kohms
- Adjustable digital filter

The port offers adjustable threshold as described in the following picture.

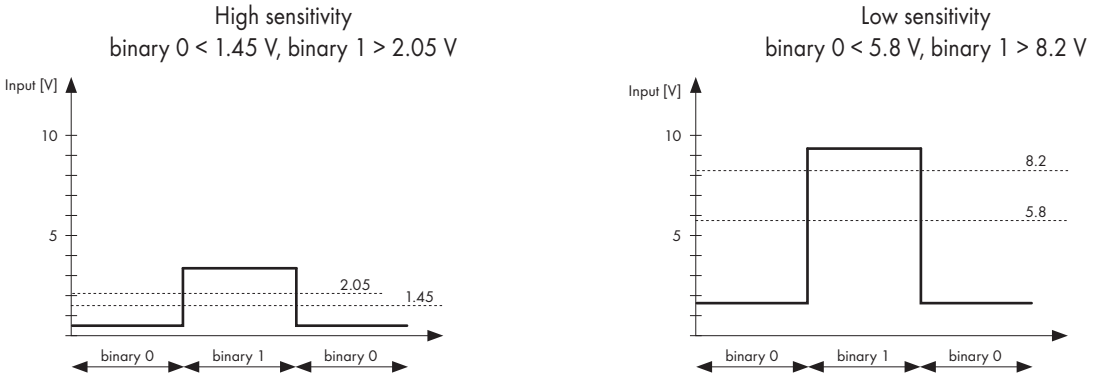
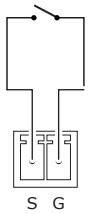


Figure 5-9. Adjustable threshold.

The following table describes how to use digital input.

Table 5-12. Digital input.

Detecting a pushbutton or contact  S G	Any button or contact closure can be connected.

Pulse Counter

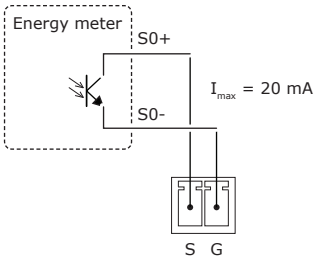
Pulse counter input parameters are as follows:

- Adjustable threshold as above
- Input impedance as above
- Pulse length min. 1 ms, max. frequency: 500 Hz
- Max. number of pulses: 2 147 483 647 (Long)
- Adjustable digital filter

The following table describes how to use pulse counter input.

Table 5-13. Pulse countter input.

Energy meters S0 interface pulse counter



Many meters have pulse outputs, including electric meters (single phase, 3-phase), gas meters, water flow meters, etc. For an electric meter, a pulse output corresponds to a certain amount of energy passing through the meter (kWhr/Whr). For single-phase domestic electric meters, each pulse usually corresponds to 1 Whr (1000 pulses per kWhr). For higher power meters (often three-phase), each pulse corresponds to a greater amount of energy eg. 2 Whr per pulse or even 10 Whr per pulse.

For pulse outputs from third-party energy meters, S0 interface defines a simple galvanically isolated open-collector output channel.

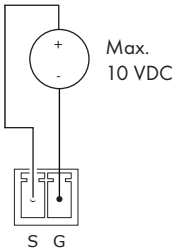
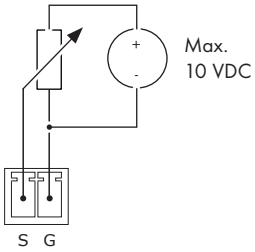
Voltage Input

Voltage input parameters are as follows:

- Range 0 to 2.5 VDC, 0 to 10 VDC, auto
- Input impedance >100 kohms
- Resolution 12-bit
- Adjustable digital filter
- Accuracy ±0.1 % of reading, ±0.1 % of range (0.1 to 10 V, digital filter applied).

The following table describes how to use voltage input.

Table 5-14. Voltage input.

Detecting a voltage	
	Sensors with voltage output 0 - 10 VDC
Reading voltage	
	Potentiometer with external power supply

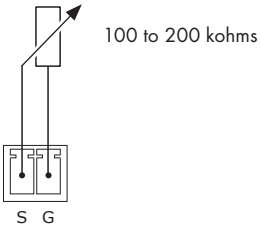
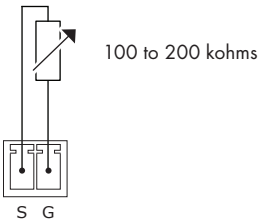
Resistance Input

Parameters of resistance input are as follows:

- Range 2 kohms, 20 kohms, 200 kohms, auto
- Resolution 12-bit
- Adjustable digital filter
- Accuracy (digital filter applied)
- 100 ohms to 800 ohms: ±3 % of reading, ±0.1 % of range
- 800 ohms to 20 kohms: ±0.3 % of reading, ±0.1 % of range
- 20 kohms to 200 kohms: ±1 % of reading, ±0.1 % of range

The following table describes how to use resistance input.

Table 5-15. Resistance input.

Reading resistance	
	Potentiometer for light, temperature and volume control.
Temperature sensors	
	Thermistors and temperature sensors can be connected.

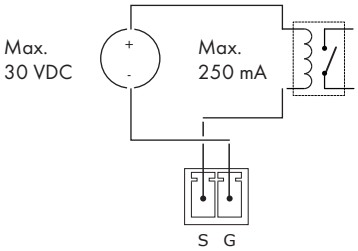
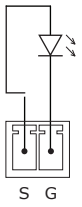
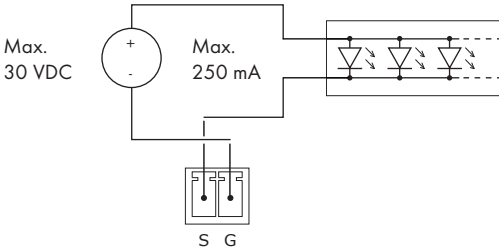
Digital Output

For digital output the open collector switch is used. Parameters of digital output are as follows:

- Max. sink current 200 mA / max. 30 VDC
- Catch diodes for use with real load

The following table describes how to use digital output.

Table 5-16. Digital output.

Driving a relay coil 	Driving relays with low-voltage coil
Driving LED indicator 	Driving LEDs for custom indicators on keyboards, control panels, etc.
Driving LED strip 	Driving LED strips with max. voltage 30 VDC and max. current 200 mA.

IR Output

This mode of versatile port provides output for infra-red emitters (IR Adapters). Parameters of IR output are as follows:

- The maximum IR carrier frequency is 500 kHz.
- Up to three original infra-red emitters (IR Adapters) can be connected to each output in parallel. All emitters send the same IR codes. This configuration can be used for different types of devices.

WARNING: We do not recommend connecting more infra-red emitters from various manufacturers in parallel because the output can be either overloaded or damaged.

Connecting

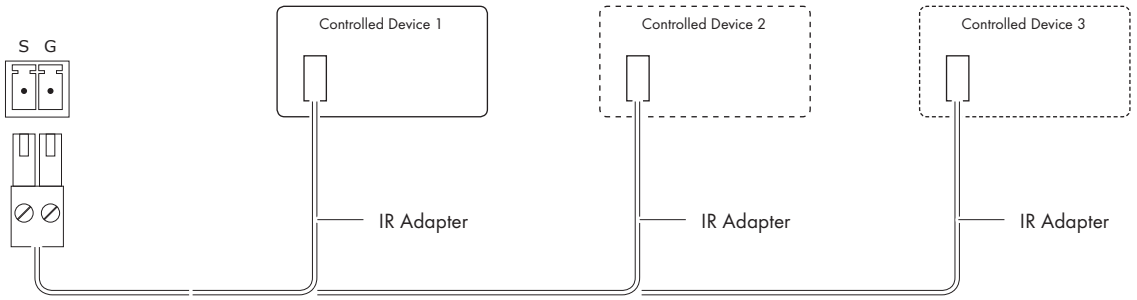


FIgure 5-10. IR output.

Serial Output

This mode provides one-way RS-232 output channel.

Serial output parameters are as follows:

- RS-232 mode only
- Serial data baud rate 300 bps to 115,200 bps

WARNING: If there are more ports in the unit, all pins labelled G are connected together.

Connecting

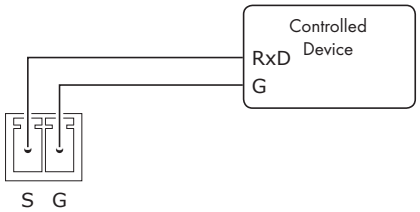


Figure 5-11. Serial output.

IR/SERIAL

This type of port provides:

- Output for infra-red emitters (IR Adapters); the maximum IR output rate is 1.2 MHz.
- For RS-232 serial output (one way), the maximum serial data rate is 115 200 Bd (bps), and output signal levels for RS-232 are in the -12 V to +12 V range.

The IR outputs and RS-232 outputs can be combined on independent outputs (for example, three outputs can be used as IR, and five outputs can be used as RS-232).

Table 5-17. IR/Serial.

IR/SERIAL			
2-pin 3.5 mm	Pin	Signal	Description
	S	Signal	IR/Serial Signal (Output)
	G	GND	Ground

NOTES:

- *All pins labelled G are connected together.*
- *Up to three original infra-red emitters (IR Adapters) can be connected to each output in parallel*
- *We do not recommend connecting more infra-red emitters from various manufacturers in parallel, because the output can be either overloaded or damaged.*

5.6 General I/O

General I/O provides analog input as well as digital output. Each General I/O port can be used either as input or as output.

A 680-ohms pull-up resistor connects to +5 VDC and can be switched on and off for each I/O independently. I/O voltage with pull-up on is approx. +4.3 VDC, because the protection diode is connected in series (0.7 V dropdown).

Analog input is rated 0 – 5 VDC. Analog to digital (A/D) converter has 10-bits precision (i.e. 1024 levels).

Digital output can switch max. 24 VDC / 80 mA. Output voltage for output switch on is approx. 0.6 V.

I/O schematic diagram

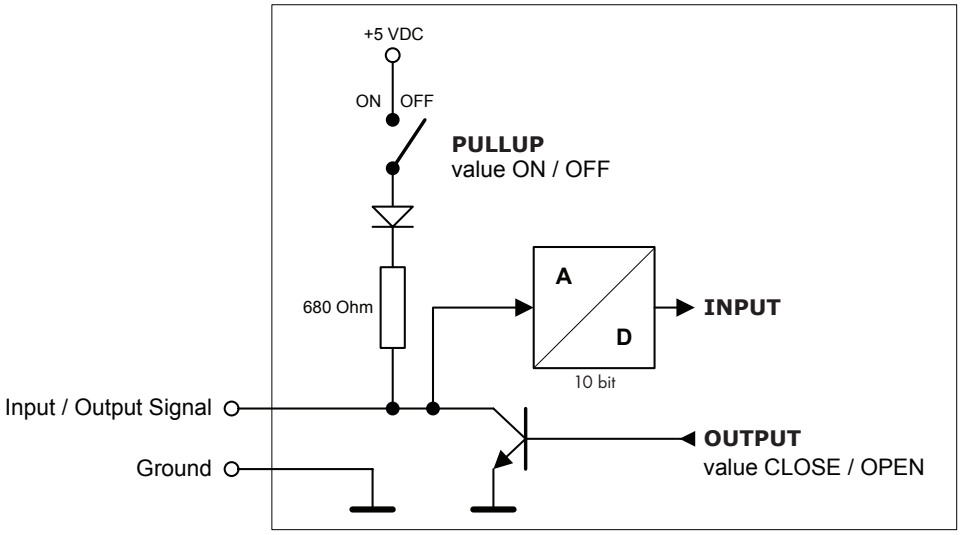
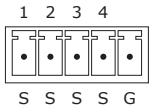


Figure 5-12. I/O schematic diagram.

Connector pinout

Table 5-18. Connector pinout.

GENERAL I/O			
5-pin 3.5 mm	Pin	Signal	Description
	S	Signal	Input / Output Signal 1 - 4
	G	GND	Common ground for all I/Os

5.7 Relay

This port provides one isolated low voltage relay. Each relay contact closure is rated 24 V / 0.5 A.

Normally Closed (NC) and Normally Open (NO) contacts as well as Common (C) contact of each relay can be used. The Normally Closed (NC) position is the state of the relay when it is not turned on (energized).

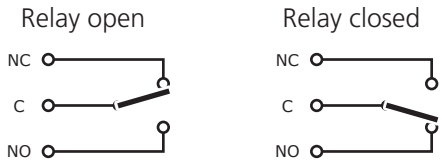


Figure 5-13. Relay.

Connector pin out

Table 5-19. Relay connnector pinout.

RELAY		
3-pin 3.5 mm	Pin	Description
NC C NO	NC	Relay Contact Normally Closed
	C	Relay Contact Common
	NO	Relay Contact Normally Open

5.8 Audio Line

IN

This connector provides unbalanced line level audio.

Connector pinout

Table 5-20. Audio line in connector pinout.

AUDIO LINE IN			
3-pin 3.5 mm	Pin	Signal	Description
L G R	L	Left	Left channel input
	G	GND	Ground
	R	Right	Right channel input

OUT

This connector provides un-amplified unbalanced line level audio. Connect audio devices, such as an audio amplifier or powered speakers to this connector.

Connector pin out

Table 5-21. Audio line out connector pinout.

AUDIO LINE OUT			
3-pin 3.5 mm	Pin	Signal	Description
	L	Left	Left channel output
	G	GND	Ground
	R	Right	Right channel output

6. Upload User Application

The user application is dedicated to control and it is programmed by ControlBridge Builder programming tools.

6.1 Using ControlBridge Builder

Follow these steps:

1. Connect the controller to your computer as described in the Connecting / ControlBridge Network chapter.
2. Run ControlBridge Builder on your PC.
3. Open a project in ControlBridge Builder. You must have the appropriate controller properly inserted and configured.
4. Use the tool bar Final button to open the Upload and Export Application dialog box.
5. Be sure your controller is checked.

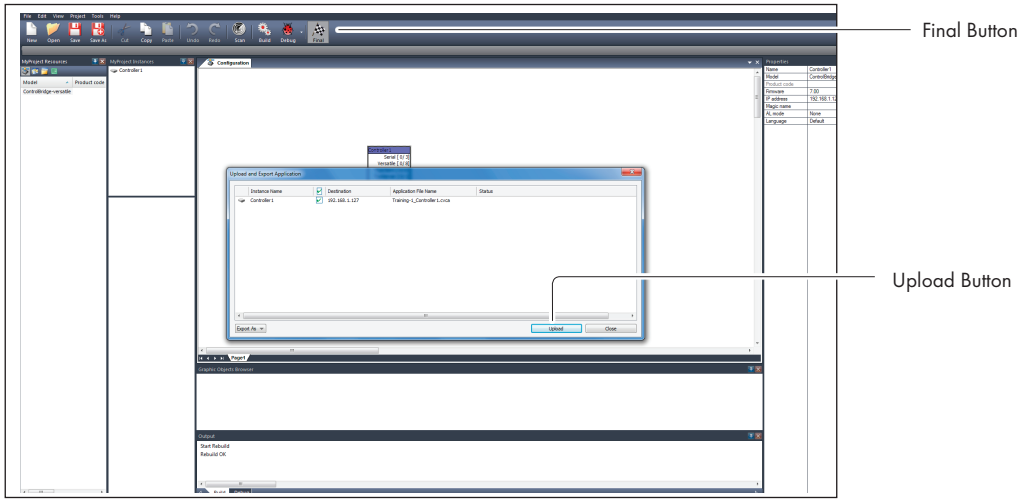


Figure 6-1. ControlBridge Builder screen.

6. Use the Upload button to start application upload.
7. If controller firmware isn't updated, it will be uploaded automatically first and then the application upload will be finished.

6.2 Using Admin Control Panel

Follow these steps:

1. Run ControlBridge Builder on your PC.
2. Open a project in ControlBridge Builder. It's necessary to have the appropriate controller properly inserted and configured.
3. Use the tool bar Final button to open the Upload and Export Application dialog box.

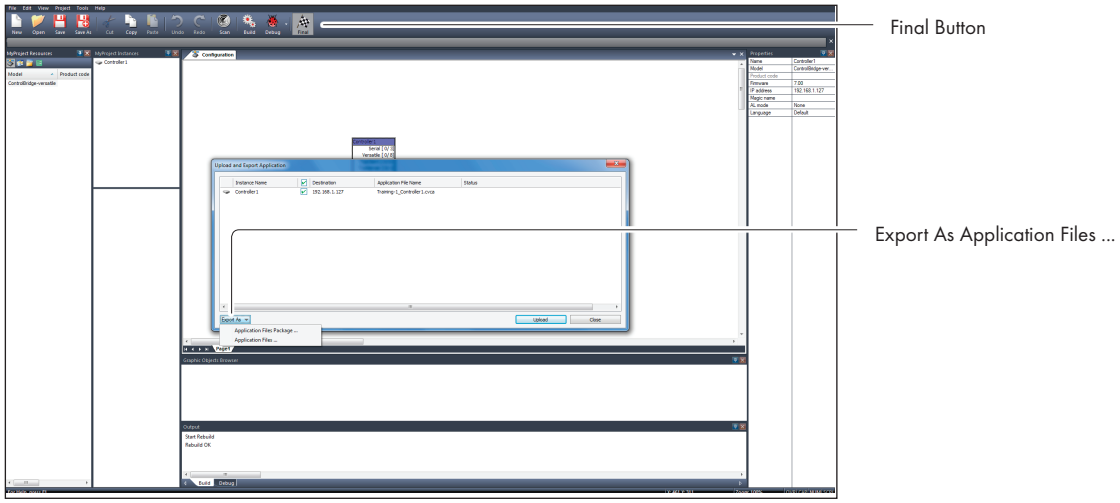


Figure 6-2. Admin Web screen.

4. Be sure your controller is checked.
5. Use the Export As... button and select Application Files ...to export an application and store it in file named *.cvca.
6. Connect the controller to your computer as described in the Connecting / ControlBridge Network chapter.
7. Run the Internet browser on your PC and type in the same controller IP address that you see in the ControlBridge Builder project, Properties / IP address window.
8. Admin Control Panel is shown.
9. Go to the System page and check the current firmware version. In case there is no actual controller firmware version, upload the firmware version that corresponds to the firmware version in the ControlBridge Builder project.
10. Go to the Applications page and upload the application file *.cvca.
11. Start the uploaded application by pressing the Start button.

7. Admin Control Panel

7.1 Access Admin Control Panel

Run the Internet browser on your PC and type in the controller IP address. The factory default IP address is 192.168.1.127.

7.2 Login

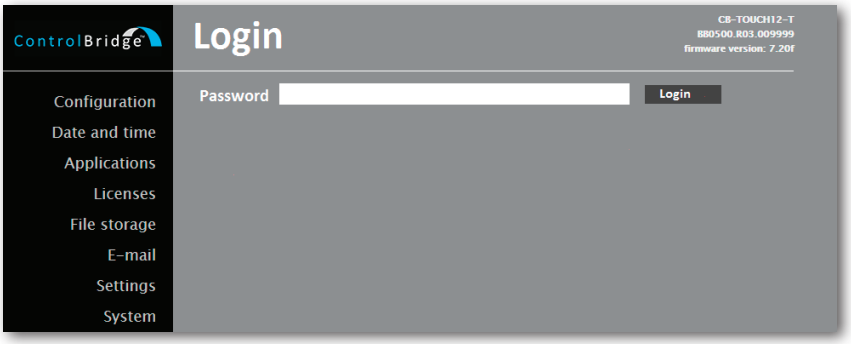


Figure 7-1. Login screen.

This screen isn't displayed if password is empty (factory default status).

If password isn't empty, you have to login first in order to access the configuration web pages.

Enter your password into the Password box and click the Login button to enter the ControlBridge Unit web pages.

Remember that the password is case sensitive. To change your password, use the Password menu after you are logged in.

7.3 Configuration

Identification

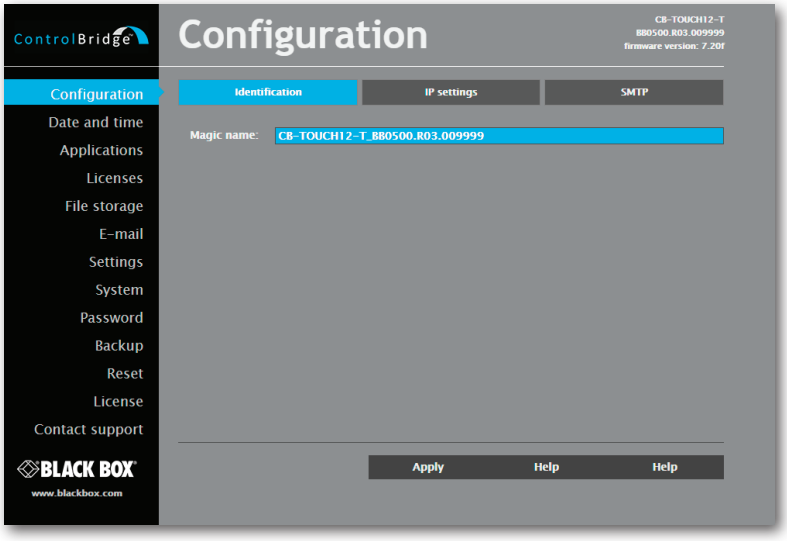


Figure 7-2. Configuration screen, Identification tab.

Each ControlBridge Unit can be identified by a unique identification name. Unique names are most useful in applications requiring more than one ControlBridge Unit. This enables programmers and installers to reference ControlBridge Units with logical, user friendly names, like "boardroom," "lobby," etc. To set the ControlBridge Unit identity, enter the unique name you wish to use in the Name box. Click the Apply button for any changes to become effective.

IP Settings

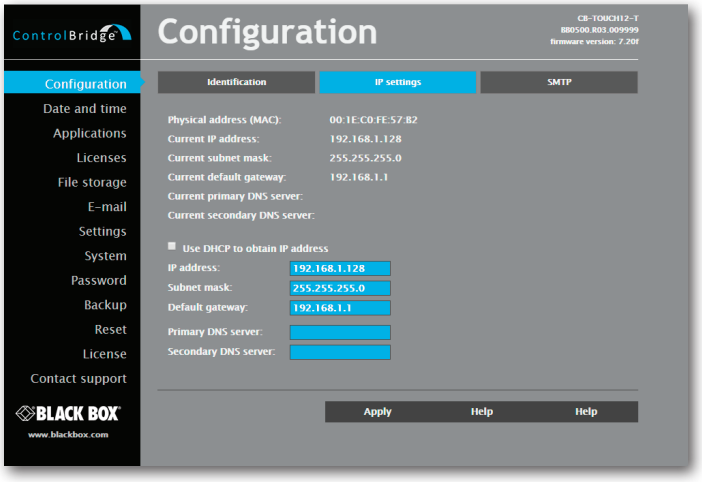


Figure 7-3. IP Settings tab.

This page is used for setting the communication parameters for your ControlBridge Unit.

The ControlBridge Unit uses standard internet protocol (IP) communication parameters. Certain parameters can be reset by the user. On start up, this page will display the ControlBridge Unit's given Physical address (MAC), and Current IP Address. Carefully note this addressing information (and any changes you elect to make to the IP address, subnet mask, or default gateway). You must enter this information into the ControlBridge Builder program written for your specific application. For control systems with more than one ControlBridge Units, you must give a unique IP address to each ControlBridge Unit.

Some control systems are "standalone" and not part of a larger network. For such "standalone" systems, the Host name is optional. However, for control systems that are connected to a larger network, obtain the Host name from the network administrator, and enter it into the corresponding box. DHCP is not supported in this release.

Be sure to click the Apply button for any changes to become effective!

SMTP

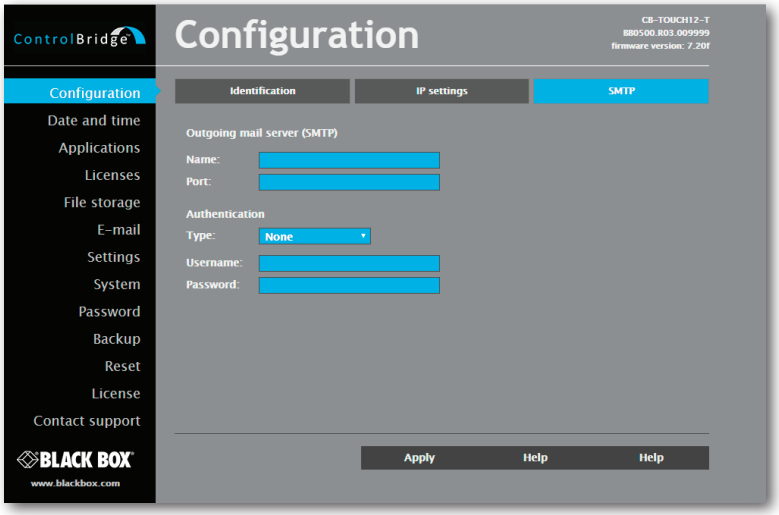


Figure 7-4. SMTP tab.

This page is used to set SMTP server parameters. Set a name or an address and the port of your SMTP server.

The SMTP server and port are used by the XPL2 commands EmailSend and PresetEmailSend.

Be sure to click the Apply button for any changes to become effective!

7.4 Date and Time

Current Date and Time

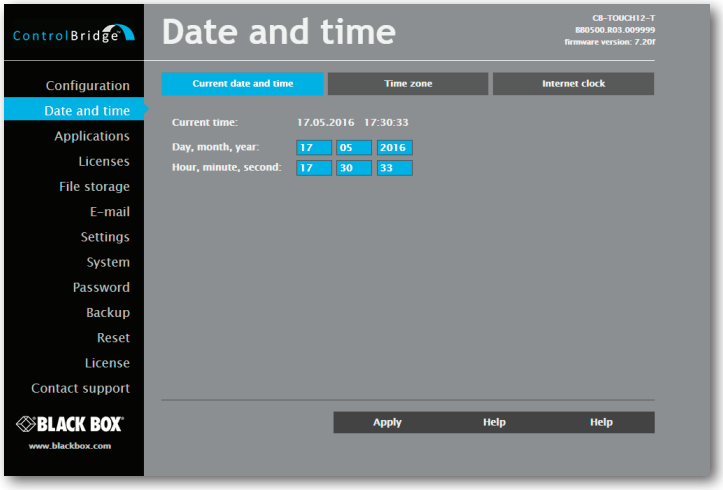


Figure 7-5. Current Date and Time screen.

Use this page to set the time clock on your ControlBridge Unit. The current date, time, and time zone are shown on the Current time line.

The applicable boxes can be selected to enter changes to the

- date: day/month/year,
- time: hour/minute/second.

Be sure to click the Apply button for any changes to become effective!

Time Zone

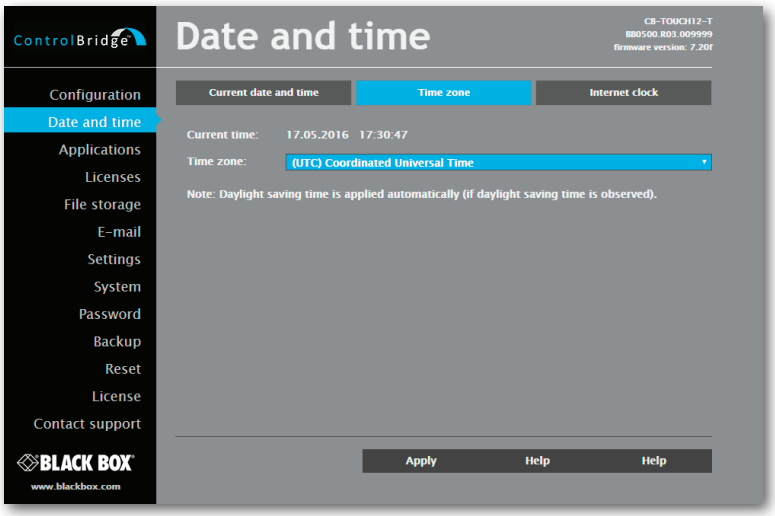


Figure 7-6. Time Zone.

Use this page to set the time zone on your ControlBridge Unit. The current date, time, and time zone are shown on the Current time line. Select the time zone box to enter changes to the Time zone.

Be sure to click the Apply button for any changes to become effective!

Internet Clock

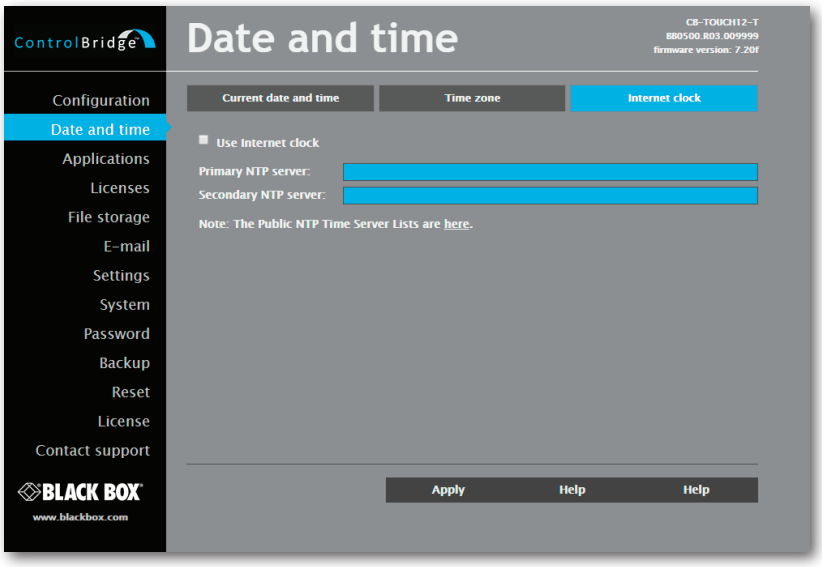


Figure 7-7. Internet Clock screen.

Use this page to synchronize the ControlBridge Unit's date and time with an internet clock. Begin by selecting the check box for Use Internet clock. Next, enter the IP addresses (or complete address name) of the primary and secondary NTP servers in the Primary NTP server and Secondary NTP server boxes.

Be sure to click the Apply button for any changes to the internet clock to become effective.

7.5 Applications

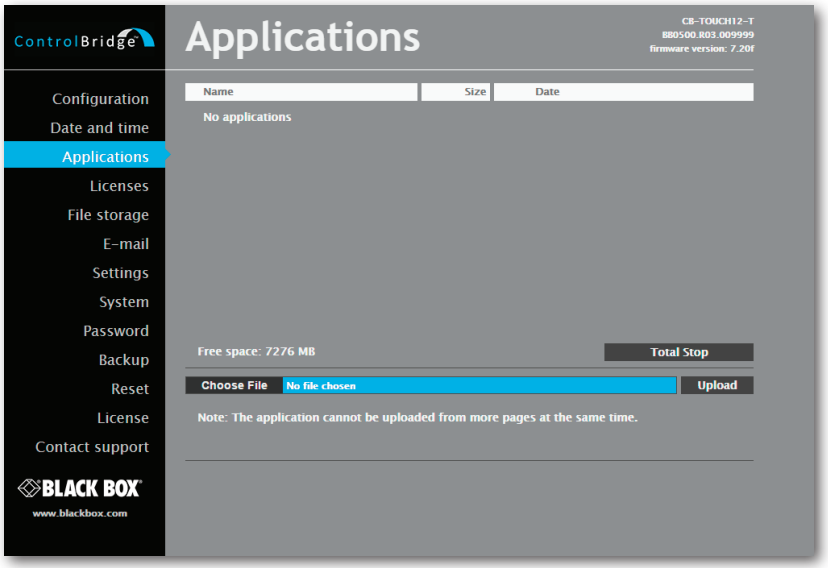


Figure 7-8. Applications.

Use this page to upload compiled ControlBridge Builder programs to your ControlBridge Unit.

All uploaded applications are listed on this page, along with their file properties: file name/file size/date. The ControlBridge Unit has a generous memory pool; unused free space is shown at the bottom of this page. The ControlBridge Unit also permits other service functions, including deleting files, downloading programs back to a personal computer, and starting/stopping specific applications.

A "running flag" denotes the active application. To stop the running application, press the Start/Stop button. To restart a stopped application, press the Start/Stop button again.

Files are uploaded from a personal computer to the ControlBridge Unit by selecting the desired application program, and clicking the Upload button. Files are downloaded from the ControlBridge Unit to a personal computer by clicking the File name. Files are easily deleted with the Delete button. The Total stop button stops a running application. This application will not automatically start after reset.

7.6 File Storage

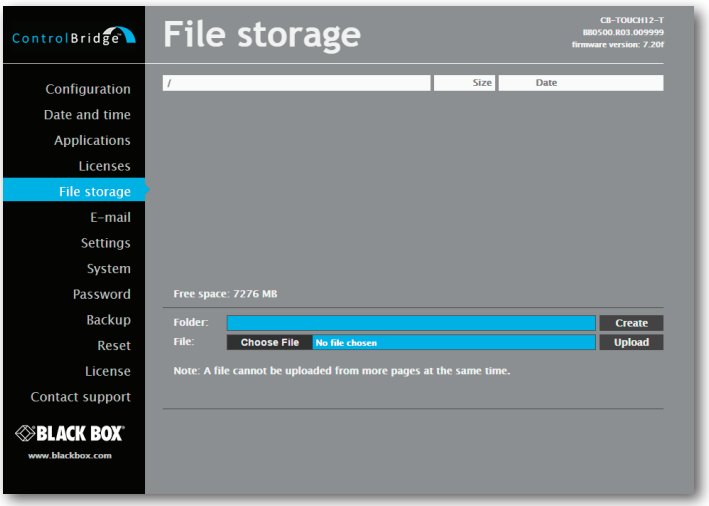


Figure 7-9. File storage screen.

You can use the ControlBridge Unit's generous memory pool for an auxiliary file storage. This is helpful for storing presets, in archiving electronic manuals, pdf files, and other support documentation. You can manage file storage via the file storage page.

A list of existing files, folders, and their properties is shown. To delete a file or a folder, click the Delete button on the corresponding line. To delete all files and folders from the current folder, click the Delete All button.

To create a new folder, enter a name for the new folder, and click the Create button. To upload a file, select the desired file, and click the Upload button.

NOTE: Files are automatically compressed for the ControlBridge Unit's internal file system. Accordingly, the size of your uncompressed file before storing may not match the decrease of free space shown on the ControlBridge Unit.

7.7 E-mail

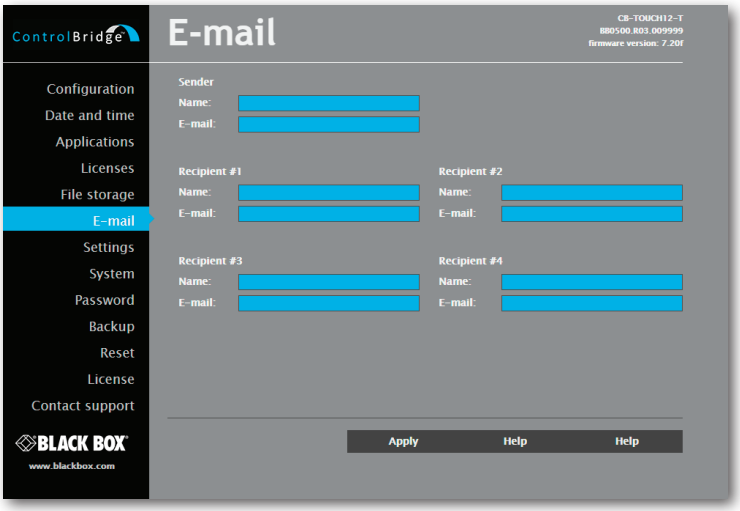


Figure 7-10. E-mail screen.

Use this page to set e-mail parameters and recipients' addresses.

You must set the SMTP server. See the Configuration/SMTP setting.

The sender Name and E-mail are the addresses of your ControlBridge Unit. The sender Name and E-mail are used by the XPL2 commands EmailSend and PresetEmailSend.

The recipient Names and E-mails are addresses of recipients where e-mails will be sent using the XPL2 command PresetEmailSend.

7.8 System

Firmware

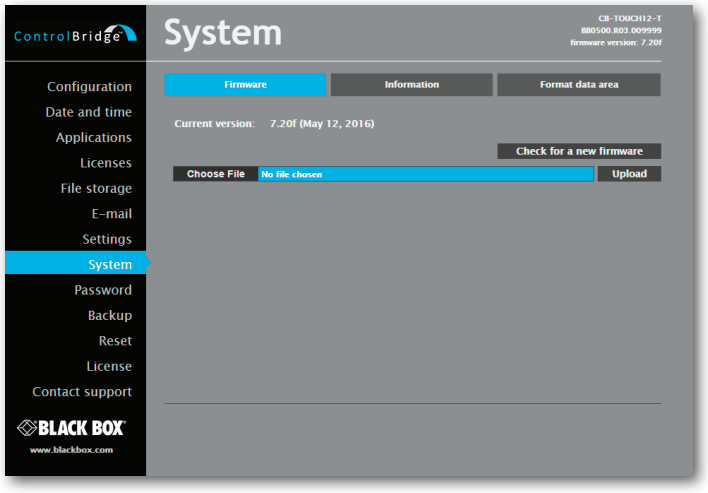


Figure 7-11. Firmware screen.

Use this page to update the ControlBridge Unit firmware. The Current version of firmware is shown. To upload new firmware, select the desired version, and click the Upload button.

Information

The Information page shows basic information about your ControlBridge Unit's firmware and version.

Format Data Area

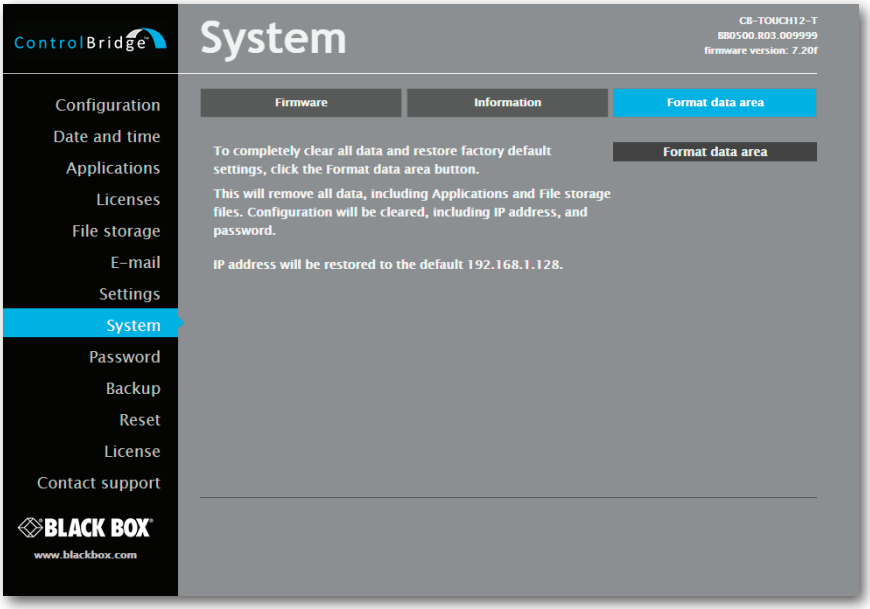


Figure 7-12. Format Data Area tab.

To completely clear all data and restore the factory default settings, click the Format data area button.

This will remove all data, including Applications and File storage files. Configuration will be cleared, including IP address and password. IP address will be restored to the default 192.168.1.127.

7.9 Password

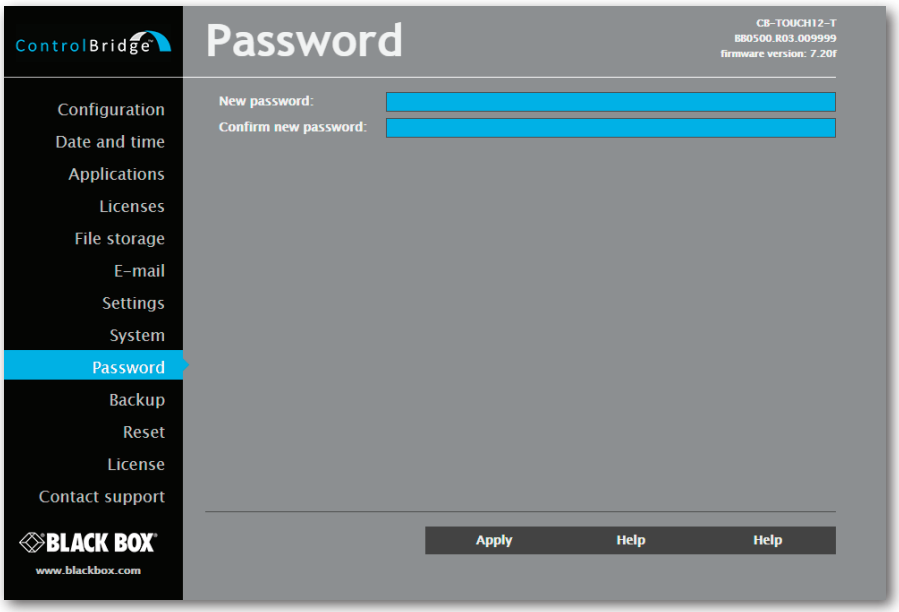


Figure 7-13. Password screen.

You need a case-sensitive password to login to the admin web pages. Set a new password via the New password box. You must reenter the password in the Confirm new password box. An error message will appear if the confirmation does not match, in which case you should reenter your password again in both boxes.

Finally, click the Apply button to implement the new password.

7.10 Backup

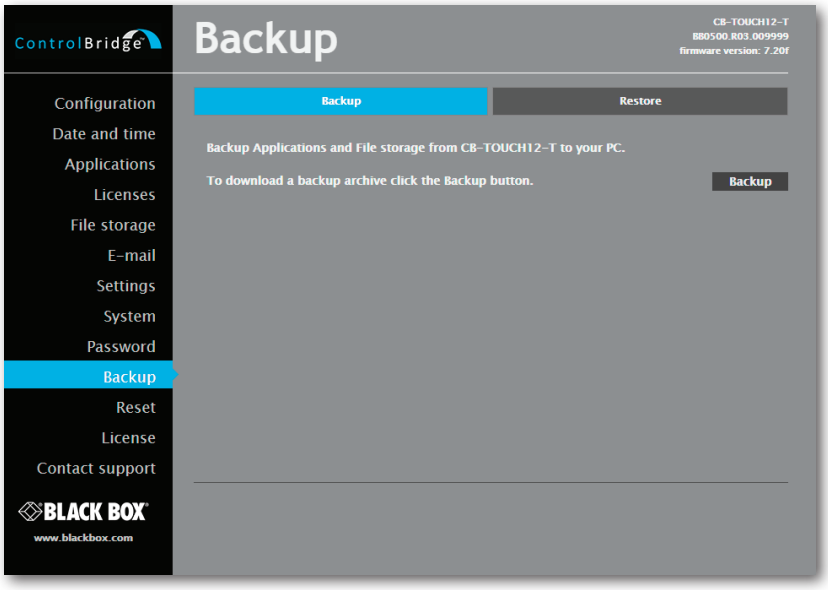


Figure 7-14. Backup screen.

Use this page for backup applications, files, folders and ControlBridge Unit's configuration. The Backup copies all Applications, Application data, File storage, and ControlBridge Unit's settings to the one archive. This archive is saved to the PC. To start the backup process, click the Backup button.

NOTE: To see the backed-up/restored applications, click the Applications menu. To see backed-up/restored files and folders, click the File Storage menu. Use this page to backup of all applications, files, and folders.

Restore

Figure 7-15. Restore screen.

READ ALL IMPORTANT NOTES THAT FOLLOW BEFORE USING THIS OPERATION!

Use this page to restore all applications, files, and folders. Restore copies of all applications, files, and folders from a backup archive on the PC to their corresponding locations on the ControlBridge Unit.

To start the restore process, select the desired backup archive, then click the Restore button. The restore process can take up to 10 minutes, depending on the size of the files being restored.

ControlBridge Unit's settings can also be restored too: check the "Restore configuration" box. The ControlBridge Unit's settings are accessible via the Configuration, Date and time, and Password menus.

Important note: Actual password and IP settings will be restored too.

Important note: When restoring files, the running application will stop and all applications, files, and folders currently stored in the ControlBridge Unit will be deleted! If you want to retain them, use the Backup command before the Restore command.

NOTE: To see the backed-up/restored applications, click the Applications menu. To see backed-up/restored files and folders, click the File Storage menu.

7.11 Reset

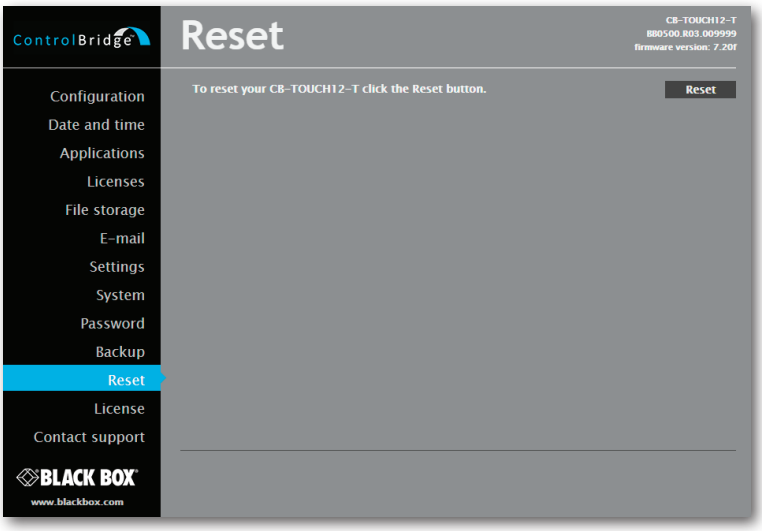


Figure 7-16. Reset screen.

To restart your ControlBridge Unit, click the Reset button.

7.12 Logout

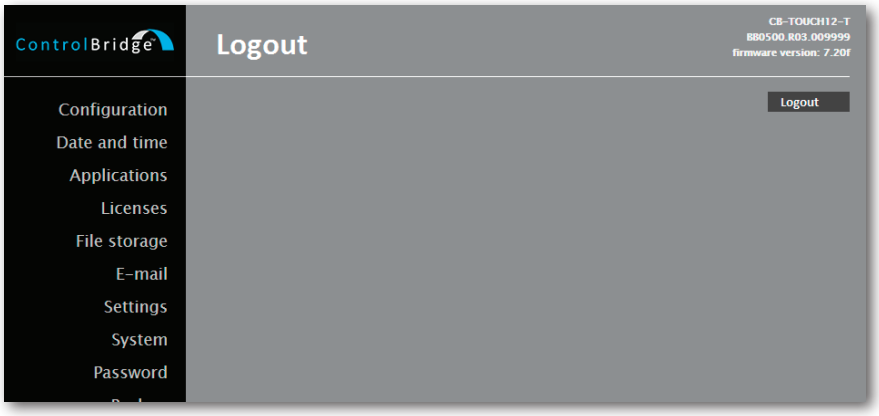


Figure 7-17. Logout screen.

This screen isn't displayed if the password is empty (factory default status).

7.13 License

This page describes the software license.

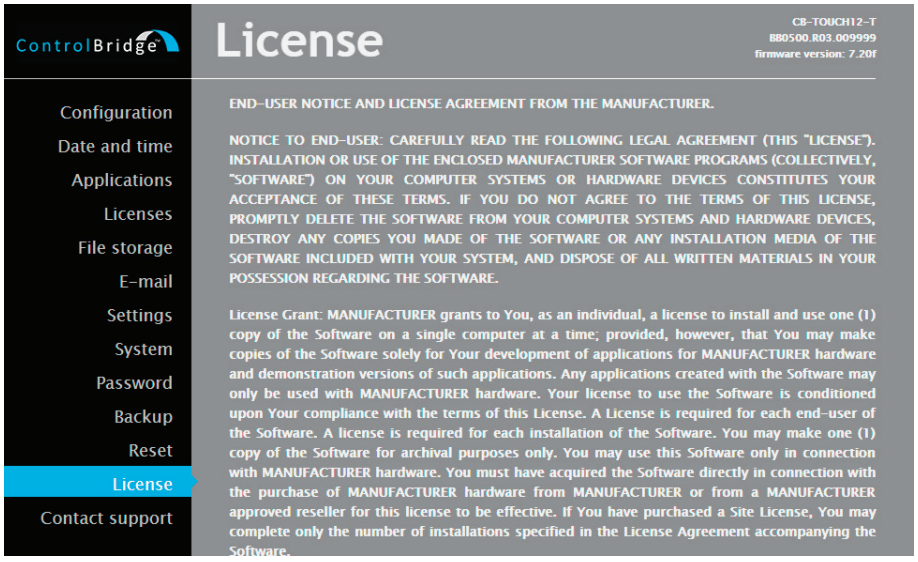


Figure 7-18. License screen.

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CB-CP100, version 1