# E2 and Eaton Breaker Panel

# Installation and Operations Manual







Copeland 1065 Big Shanty Road NW, Suite 100 Kennesaw, GA 30144 USA 770-425-2724 • 1-800-829-2724 www.copeland.com Email: ColdChain.TechnicalServices@copeland.com

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## 1 Introduction

E2 can communicate directly with Eaton's Breaker Control Bus (BCB) modules (Eaton Breaker Panel). Communication with the E2 will enable the user to use features such as Time Schedules, Enhanced Lighting, and Logging. In addition, the user will gain the added capabilities of dial-out on failure and off-site remote connection, specifically with UltraSite32 and Site Manager to the breaker panel.

The Eaton Breaker Panel controller is a licensed application available in the E2 300 and 400 model controllers with a maximum of 8 breaker panel rails allowed.

## 1.1 Eaton Breaker Panel

Each Eaton Breaker Panel consists of up to a total of 42 breakers that are divided into 2 rails (up to 21 breakers per rail), identified as breakers 1 through 42. In addition to being identified by number, the user will have the ability to give each breaker a unique name.



Figure 1-1 - Eaton Panel Breaker

## 1.2 Breaker Control Bus

The Breaker Control Bus (BCB) module is designed to fit in each rail of the Eaton Breaker Panel and provides the interface between the E2 and the remote controllable breakers using MODBUS. Refer to *Figure 1-2* for proper orientation of the BCB rails.



Figure 1-2 - BCB installed on an Eaton Breaker Panel

The BCB rails attach to the Eaton Breaker Panel interior without any special connectors or modifications.

Note how the rails are positioned (*Figure 1-2*) inside each panel. Observe the correct orientation of the BCBs for correct breaker numbering and control with the E2.

## 2 Wiring

## 2.1 BCB Wiring

Two four-pin combination LAN/Power Connectors are located on each BCB (*Figure 2-1*). It also has the "Breaker Terminations" for plugging into the Eaton Breaker Panel and the "LAN Address Switches" used to set the MODBUS address (1 to 8) for communication with E2. Three recessed LEDs (RUN, LAN, PWR) are located on the BCB that indicate the communication and power status of the BCB.



Figure 2-1 - BCB Connectors

#### 2.1.1 LAN/Power Connectors

A 24VAC transformer is needed to power the BCB modules (see *Table 2-1*). One 75VA transformer can power up to four panels, eight BCB modules, if they are in the same area, or one 75VA transformer can be used per panel.

#### Table 2-1 - Transformer lead Colors/Supply Voltage

Primary	Color	Secondary	Color
	Transforme	er Model: TR75V	/A005
СОМ	Black	24 VAC	Yellow
120V	White	COM	Yellow-White
208V	Red		
240V	Orange		-
480V	Grey		
	Transforme	er Model: TR75V	/A003
СОМ	Black	24VAC	Yellow
277V	Brown	COM	Yellow-White

The secondary leads of the 24 VAC transformer should have one wire connected to the 24 V terminal of the BCB modules, and the other secondary wire connected to the 24 Com terminal of the BCB modules. The side of the 24VAC secondary connected to the 24 Com terminals of the BCB should also be connected to the chassis ground/earth bus of the panel. It is recommended to use 16 AWG wire with 600 V isolation jacket for interconnecting BCB modules 24VAC power with a maximum length of 150 feet. If the BCB modules are mounted in closer proximity such that the total power length is 50 feet or less, then 18 AWG conductors may be substituted.



Figure 2-2 - BCB LAN and Power Connectors

### 2.2 Power ON Indicators

#### 2.2.1 BCB Status LEDs

Once power is applied to the Eaton Breaker Panel and each connected BCB, the "PWR" (Power) LED on each BCB should be illuminated red. If the Power LED does not illuminate, verify the power supply and the proper wiring terminations on each BCB. Confirm all four-pin connectors are properly wired.

**PWR** - The PWR LED is illuminated ON solid when the BCB is powered up (24VAC). If the PWR LED is OFF, the other LEDs will be OFF. Verify that the circuit breaker is functional and check wiring to ensure that the BCB is receiving power.

LAN - The LAN LED blinks (one-second intervals) when the E2 is communicating with the BCB and the BCB is receiving data. If the LAN LED is not blinking or is non-functional, verify the PWR LED is ON and the power wiring is correct (no crossed wires and no wiring connections that have shorted out).

**RUN** - The RUN LED blinks (one-second intervals) when the BCB is wired correctly and communicating with the E2. If the RUN LED blinks twice consecutively and turns OFF for three seconds, this indicates that the BCB is not communicating properly.

#### 2.2.2 BCB Network Termination

Use Retail Solutions standard third-party termination:

- Terminate at E2 with all three jumpers at one end of the network.
- At the other end of the network, terminate at the last BCB module with 150 ohm resistor or *P/N 537-2711* MODBUS Termination Block.
- Standard Belden #8761 RS485 I/O Net cable recommended.

## 3 Networking

### 3.1 Eaton Breaker Panel System

The relationship between the E2 and the Eaton Panel Breaker can be seen in *Figure 3-1*. The diagram shows four Eaton Breaker Panels with two BCB modules per panel with a maximum of eight BCB modules allowed per MODBUS port.

If the panel contains a single rail or only one BCB module per panel, up to eight panels can be controlled by an E2.



Figure 3-1 - E2 and Eaton Breaker Panel Layout with Example Left/ Right Rail Numbering

## 3.2 Breaker Control Bus Addressing

Assign a unique address for each BCB on the LAN address switches before the E2 can communicate reliably. In the case of a two-rail panel, each rail has a separate MODBUS physical address used for communication: the physical address of the first rail will be the device address visible to the user in Network Services. The physical address of the second rail is determined by taking the address of the first rail and adding one. Always set the *left rail as an odd number* and the *right rail as an even number* (*odd* + 1 or *left rail* + 1) in order for it to display correctly in the E2.

For example, if the physical address of panel 1 is 1, (left rail = 1, right rail = 2), you will see the address of the left rail in the Network Summary screen. In *Figure 3-1*, the odd panel numbers 1,3,5, and 7 will be visible on the **Network Summary** screen.



Figure 3-2 - BCB Address Configuration

CAUTION CAUTION CH CH

The same BCB model is used for both Left and Right rails - there are not separate BCB models for each rail. In Figure 1-2, the BCB module for the Right rail is mounted upside down from the Left rail, therefore the address switch numbering and ON/OFF positions are reversed for Left and Right rail BCB modules. Check the labeling on each BCB module for the correct address switch numbering and ON/OFF positions.

# 3.3 Network Connection to E2 using MODBUS

Connecting an Eaton Breaker Panel to an E2 unit using MODBUS requires the E2 to be version 2.82 or above. Contact Retail Solutions for upgrade information if the controller is a version prior to 2.82.



Figure 3-3 - Location of E2 COM Ports (E2 versions 3.xx and below)

Connect the MODBUS network cable to the three-terminal connector on the COM port you wish to assign as MODBUS. Wire + on E2 to LAN - on BCBs. Wire - on E2 to LAN + on BCBs.

**NOTE** Polarity on BCB MODBUS connectors is the inverse of E2.

#### 3.3.1 E2 Termination

If the E2 will be the first device in the network, set the port's termination jumpers to the TERMINATED & BIASED position (all three jumpers UP); otherwise, set all jumpers DOWN if not the first device.

## 3.4 E2 Setup of Eaton Breaker Panels

#### 3.4.1 Licensing the Eaton Breaker Panel

- 1. Press **7** (System Configuration)
- 2. Press (Remote Communications)
- 3. Press (TCP/IP Setup) to open the TCP/IP Setup screen and locate your E2's MAC address (circled in *Figure 3-4*):

99-01	-05 🔹 🞲 📖 trl-X to Se	lect fX Tabe	BX-	400 Uni	lt 1			IN	21	18:03:17
01.1	CODORAL	C2: Eng Units	69.	Modon		Ch.	TCD/TD	1 05		-nennn-
CT: 1	aeneral	CZ: Eng Units	60.	Roov N	otuuli	60.	lor/1r	0.0		ctom
		or.		neer n	e cwr R	07.	web serve	1 100	. sy	scen
		General	. set	up: GEM	IERHL	SERV				
	TCP/IP	Value								
	DHCP Enable	d : No								
	IP Address	: 10.10.64.3	9							
	Subnet Mask	: 255.255.24	8.0							
	DNS Server	1 :								
	DNS Server	2 :								
	DNS Server	3 :								
	Default Gate	eway: 10.10.64.1								
	Domain Name									
	MAC Address	:00-0A-F6-0	0-00	-AF						
Ente	r desired to	ext   Name of t	he D	omain S	erver					
F1:	PREV TAB	F2: NEXT TAB		F3: EDI	T	F4	: STATUS		F5:	CANCEL

Figure 3-4 - TCP/IP Screen - Locating the Mac Address

4. Contact Technical Support at 833-409-7505 and have your MAC Address ready in order to obtain your unique license key.

Once you have received your unique license key from Customer Service, you can now activate the Eaton Breaker Panel application from the License Report screen. The License Report screen displays that E2 controller's unit type and firmware version, the list of all licensed features on that E2, the current number and maximum number of each of those applications allowed, and which additional features, (that require a license key), have been enabled.

From the Main Menu:

- 1. Press **7** (System Configuration)
- 2. Press 9 (Licensing)
- 3. Press **F1** (Add Feature)

Enter your license key to activate the Eaton Breaker Panel:





 Reboot the controller and open the License Report screen again to see the license key appear next to the ETN Breaker Panel (*Figure 3-6*):

63 63 99 4 1 20	1 1 1	
03 63 99 4 1 20	1 1 1	
63 99 4 1 20	1	
99 4 1 20	1	
4 1 20	1	
20		
20	1	
	1	
48	1	
16	1	
63	1	
99	1	
4	1	91ED-7EFE-30BD-441B
16	1	
32	1	
8	1	
1.5		
1	1	3101-154D-6B10-AEC4
2	P	EIND 1876 DUDD-4FFE
16	6	
16	5	
31	6	
64	5	
16	6	
	16 63 99 4 16 32 8 .2 1 9 16 16 31 64 16	$\begin{array}{cccccccccccccccccccccccccccccccccccc$

Figure 3-6 - License Report Screen

The Eaton Breaker Panel application is now licensed.

#### 3.4.2 Set Up Network Ports

Before setting up an Eaton Breaker Panel, the port on the E2 that has the MODBUS cable connected must be set up as a MODBUS port.

- 1. Log in to the E2 with Level 4 access.
- 2. Press followed by 7 3 General Controller Info.
- 3. Press to open the **Serial** tab of the **General Controller Info** setup screens:

: General	C2: Ena Units	C3: Serial	C4: TCP/IP	C5: Peer Netwr
: Web Server	C7: Sustem	C8:	C9:	C0:
	Gener	al Setup: GENERAL	SERU	
Serial	Value			
COM1 Connec	ction: Serial			
COM1 Baud	: 115.2 Kb	aud		
COM2 Connec	tion: MODBUS-1			
COM2 Baud	: 9600 bau	d		
COM2 Data S	Size: 8			
COM2 Parity	; : None			
CUM2 Stop E	its: 1			
COM3 Connec	tion: Modem			
COM3 Baud	: 115.2 KD	aud		
COM2 Modem	Tupo: CPC 22 A	V Internal		
COM2 Modem	Init: ATEAUISA	-1918-182D2205\N8	% C 02.4 02.4 02.40	
COM3 Fax Ir	ATU1EASA	=1\$10=40&D2&05\N0	20 954 954 954 954 9	
COM3 DIME D	ur : 100	1010 10002003 (110	Jo ottirotti ottiro	
COM3 Pause	Dur: 2			
	54544594 ZO 341			
croll using Ne	ext/Prev keys	Connection Type	For COM2	
1: PREU TAR	F2: NEXT TAB	F3: EDIT	F4: LOOK UP	F5: CANCEL

Figure 3-7 - Serial Communications Manager Screen

- This screen will have a "Connection" field for all COM ports on the E2. Highlight the COM port connection field that will be used, and press F4 LOOK UP. From the list of network types, select MODBUS-1, MODBUS-2, or MODBUS-3.
- 5. Four fields will become visible underneath the COM port connection field, which pertain to the way the device communicates:
  - Baud Change Default setting to 9600.
  - Data Size Leave this field at the default value (8).
  - Parity Leave this field at the default value (None).
  - Stop Bits Leave this field at the default value (1).
- 6. Press to save changes and exit.

#### 3.4.3 Add and Connect Eaton Breaker Panels

To enable communications between E2 and the Eaton Breaker Panels, the devices must be added and addressed in E2.

- 1. Log in to the E2 with Level 4 access.
- 2. Press 7 7 2 Connected I/O Boards and Controllers.

07-12-10 🌒 🤭 🤅	•	- +	RX-300 Unit 3	💼 OAT:	78	8:13:00
Use Ctrl-X to s	Select CX	labs	SETUP	NAMES	JLL	*ALARM*
C1: This Unit	C2: IO	Network	C3: ECT	C4: Third	Partu	C5: Echelon
C6:	C7:		C8:	C9:		C0:
		Num Net	twork Ctrls: Net	Setup		
	Third Par	ty Boar	'd Type	Quantity	Max	
	#	EIN Coor	Breaker Panel		1	
	112	: : uper	i Echelon	z	2	
Enter 0 to 1	Enter de	esired nu	umber of these b	oards		
F1: PREV TAB	F2: NE	XT TAB	F3: EDIT	Ţ		F5: CANCEL
-			_			

Figure 3-8 - Connected I/O Screen

- 3. On the Connected I/O screen, in a box labeled Third Party Devices, enter the number of Eaton Breaker Panels in the Eaton Breaker Panel number field.
- Press to return to the Network Setup menu, then select Network Summary (*Figure 3-9*).

Locate the Eaton Breaker Panels you added to the network list (press and a to scroll through the list) and highlight with the cursor. The default name for a Eaton Breaker Panels begins with a three-letter designator of the model type (ETN for Eaton). Press
 F5 for Setup.

7-12-10 🔹 🧑 💷	-+) R) Net	K-300 Ework :	Unit 3 Summary	NAM	OAT: 78 Es Full		8:21:2 *ALARM
Name	Туре	Ne	twork Addr	ess	Rev	Status	
THIS.03.1	RX300-Refrig		Ethernet:	: 3	2.82B13	This Con	troller
LONMARK_001	LonMark Device			2	0.00		
LONMARK_002	LonMark Device			3	0.00		
16AI_001	16AI		IONet:	: 1	0.00	No Port	
8R0_001	8R0		IONet:	: 1	0.00	No Port	
8D0_001	8D0		IONet:	: 1	0.00	No Port	
4A0_001	460		IONet:	: 1	0.00	No Port	
LEAK DETECT001	IRLDS		IONet:	: 1	0.00	No Port	
CL RSC_001	CtrlLink RSC	(No	Network):		0.00	Unknown	
CL CD_001	CtrlLink CD	(No	Network):		0.00	Unknown	
CL ACC001	CtrlLink ACC		MODBUS-1:		0.00	Unknown	
ISD2 COMP_001	ISD 2.0 Comp		MODBUS-1:		0.00	Unknown	
PERF ALERT 001	Performance Alert		MODBUS-1		0 00	IInknown	-
ETN BRKRPNL001	ETN Breaker Panel		MODBUS-1:		0.00		
VY PORATE AND	VY PCLOTT AUTE		HUDBO2-1:	-	0.00	UNKNOWN	
STATUS DSP_001	Status Display		Ethernet:	1	0.00		
STATUS DSP_002	Status Display		Ethernet:	: 2	0.00		
				2 - 154			
1: DELETE RCRD	F2: STATUS		F	4: C	OMMISSION	1 F5:	SETUP
			^'			·/	

#### Figure 3-9 - Network Summary Screen

- To set the address and begin communication, press
  and select Select Address. In the list of MODBUS devices, choose the address number corresponding to the Eaton Breaker Panel's address switch (*Figure 3-2*) setting, and press to select it. For a two rail system, the user will select the left rail address and the right rail address will automatically be addressed as the left rail address + 1
- 7. Locate the Eaton Breaker Panels you set up, and look at each device's status in the Status field. You will see one of the following messages:
  - **Online** The Eaton Breaker Panel is communicating normally.
  - Offline The Eaton Breaker Panel is not communicating, has not been commissioned, is not functional, or is not powered up. Verify the Eaton Breaker Panel is powered up, wired correctly, and has the proper network address, baud rate, and parity (see Section 5, Troubleshooting).
  - **No Port** No port is set up in the E2 Serial Configuration Manager to be a MODBUS port. Follow the instructions in *Section 3.4.2*

## 4.1 Device Setup

Press 213, select ETN Breaker Panel then 5 to access the Device tab.

Rails Present must be set by the end user. Access **C6:Device** and select **Rails Present**, choose the number of rails and press ros to save.



Figure 4-1 - Device Setting for number of rails

# 4.2 Eaton Breaker Panel Application Setup in E2: Single Breaker

#### 4.2.1 Add a Lighting Schedule Application

For each group of breakers to be controlled separately, set up a Lighting Schedule application from the Add New Application screen.

Press the Main Menu, then:

- 1. 6 Add/Delete Application
- 2. Add New Application

Press **F4** - **LOOK UP** to select Lighting Schedule. Enter the number of desired applications in the "**How Many?**" field.

#### 4.2.2 Light Outputs and Proof Inputs Setup

Once the Lighting Schedule applications have been added, set up the light output and proof input for each Lighting application. (Proof input setup may be optional.) The outputs of a Lighting Schedule cell control the breakers on the Eaton Breaker Panels, and the proof inputs of the Lighting Schedule cell are the Eaton panel breaker status outputs.

#### 4.2.2.1 Light Outputs Setup - Outputs Tab

If on the E2 Home screen, press F2 or F3 to access the Lighting Schedule depending on whether a BX or CX E2 controller is being used.

- Under the Lighting Outputs tab, change the LIGHTS OUTPUT format by pressing F3 - EDIT and then 1. Alternate I/O Formats to Area Ctrl:Application:Property from the Board:Point format.
- 2. For the Area Ctrl property, use **F4 LOOK UP** to select the Eaton Breaker Panel, for the Application property select lighting panel, and for the *Input* property select the breaker input number (BREAKER\_IN\_X).

-	GUFI-A LU SE	LECT ON TAD	5 3E		FULL	F	*HLHKI9*
C1:	Setup	C2:	C3: M1	1 On/OFF   C4:		C5: St	i Events
C6:		C/: Maint l	lor  C8: In	outs C9:	Uutputs	UU: MU	(E
		Li	ghting Contr	ol: 30% LIGHT	S		
	Outputs	Area	Ctrl Appli	cation Inp	out		
	LIGHTS OUTP	UT : CX 1	:ETN BRK	RPNL001:BREAK	ER_IN_1	L	
	PROOF STATU	s :					
	ACTIVE SCHE	D:				1 L 12	
	SCHED TUCOS						
	SCHED TSCOS						
	ALG STATUS						
	IN BYPASS						



#### 4.2.2.2 Proof Inputs Setup - Setup Tab

To enable proofing, set **Enable Proofing** to **Yes** for each Lighting application under the **Setup** tab.

e Ctrl-X to S	elect CX Tabs	SETUP	FULL	*ALAR
1: Setup	C2:	C3: Min On/Off	C4:	C5: Std Event
6:	C7: Maint Ovr	C8: Inputs	C9: Outputs	C0: MORE
	Lighti	ng Control: 30%	LIGHTS	
	-	-		
Setup	Value			
Name	: 30% LIGHT	ŝ		
Use Alt Co	ntrol: No			
Enable Pro	ofing: Yes			
Use Ext Sc	hed : No			
Llev/Logic	Mode: LOGIC ONL	1		
Alt Lt/Lgc	Mode: LOGIC ONL	1		
Schedif Mo	de : SCHED ONL'	ł		
Alt Schdif	Mode: LLEV/LOGI	CONLY		
Schedule T	ype : MASTER			
Num Std Ev	ents: 1			
Num Date R	anges: Ø			
Show Sched	- : Yes			
Show LLev	: No			
Show Logic	: Yes			
Enable Dim	ming : No			
KW Load	: 6			
nter state:	Y=Yes: N=N0   Y	s to enable proc	o+ing	
F1: PREV TAB	F2: NEXT TAB	F3: EDIT	F4: STATUS	F5: CANCEL

Figure 4-3 - Enable Proofing on Setup Tab

If using a single Eaton breaker, associate the proof input (PROOF IN) with the Eaton panel (*Figure 4-4*) and status of the breaker number from the More tab in the Lighting application:

-06-09 🌒 🖗	🦻 🎟 to Select	CX Tabs	CX-	400 Unit 1 SETUP	Ú	OAT: 84	OH: 5	9 18:52: *ALAR
I: Setup	C2:		C3:	Min On/Off	64:		C5:	Std Event
5:	C7: 1	Maint Ovr	C8:	Inputs	C9:	Outputs	C0:	MORE
		Lighti	.ng Ca	ntrol: 30%	LIGHT	8		
Proof		Area Ctrl	. Ap	plication	Out	put		
Proof 1	ype :	ON Only						
PROOF 1	N :	CX 1	:ETN	BRKRPNL 001	BREAK	ER_1		
Proof D	elay :	0:00:30						
Proof L	atch :	0:00:00						
Clear F	iny Match:	No						
Pr Fail	Adv Pri:	20						
nter Prope	erty   Pro	of input	8		R		<i>t</i> ë:	
nter Prope	erty   Pro	of input	Ĩ	F9- FNIT	Î ri	- 1 00% 10	Ĩr	

Figure 4-4 - Single Breaker Proof Input Setup in E2 Lighting

- 3. Change the PROOF IN format by pressing **F3 EDIT** and then 1. Alternate I/O Formats to *Area Ctrl:Application:Property* from the *Board:Point* format.
- 4. For the Area Ctrl property, use **F4 LOOK UP** to select the Eaton Breaker Panel, for the Application property select lighting panel, and for the Output property select the breaker number (BREAKER\_X).

## 4.3 Eaton Application Setup in E2: Multiple Breaker Grouping



#### 4.3.1 Setting Light Outputs

 To group multiple breakers to a single Lighting application, press F3 - EDIT and select 2. Set Multiple Outputs.

10-0	6-69 🔶 🧑 📖		CX-40	0 Unit 1	🙆 OAT: 84 OH: 5	9 18:53:46
USE	CLFI-A LU SE	Tect to Tab	<u> </u>	ETUP	FULL	*HLHKII*
<u>C1:</u>	Setup	C2:	C3: Mi	n On/Off C4:	C5:	Std Events
C6:		C7: Maint O	vr   C8: Ir	puts 69:	Outputs CO	MORE
		Li	ghting Cont	rol: 70% LIGH	TS	
	Outputs	Area	trl Appl	ication In	put	
	LIGHTS OUTP	UT : (M)	:(M)	:(M)	L	
	PROOF STATU	IS :				
	ACTIVE SCHE	D :			L	
	SCHED TUCOS					
	SCHED TSCOS	: :				
	ALG STATUS					
	IN BYPASS					
Ent	er Board/Con	troller   L	ights outpu	t		
F1	: PREV TAB	F2: NEXT 1	AB F3	EDIT F	4: LOOK UP   F	5: CANCEL

Figure 4-5 - Set Multiple Breakers in E2 Lighting

The Multiple Output Setup screen opens (*Figure 4-6*) where you can set up the *Area Ctrl*, *Application*, and *Property* Lighting outputs.

8-86-89 🔹 🤭			CX-	400 Unit SETUP	1	DAT: 83 O Full	H: 59	18:54:58 *ALARM*
			Multipl	e Output	Setup			
	Output:	CX ·	1 :70%	LIGHTS	:LIGHTS	OUTPUT		
		Area	a Ctrl A	pplicatio	n Prop	erty		
Inputs Using	Output:	CX ·	1 ETN	BRKRPNL	01:BREAKE	R_IN_2		
		CX	1 :ETN	BRKRPNL	01:BREAKE	R_IN_6		
		CX :	1 :ETN	BRKRPNL	01:BREAKE	R_IN_10		
		CX :	1 :ETN	BRKRPNLO	01:BREAKE	R_IN_12		
		CX :	1 :ETN	BRKRPNL	01:BREAKE	R_IN_8		
Enter Board/C	ontrolle	r					_	
F1: ADD RECOR	D F2: DE	LETE	RCRD F3:	ALT FORMA	TS F4:	LOOK UP	F5:	CANCEL

Figure 4-6 - Multiple Output Setup View

For the Area Ctrl property, press F4 - LOOK UP to select the Eaton Breaker Panel, for the Application property select lighting panel, and for the Property output select the breaker input number (BREAKER\_IN\_X). Repeat for each breaker you wish to group to this Lighting application.

#### 4.3.2 Proof Inputs Setup for Multiple Breaker Grouping

Press F2 or F3 to access the Lighting Schedule from the Home screen depending on whether a BX or CX E2 controller is being used.

1. To enable proofing, set Enable Proofing to Yes for each Lighting application under the **Setup** tab.

C1: Setup	C2:	C3: Min On/Off	C4:	C5: Std Event
C6:	C7: Maint Ovr	C8: Inputs	C9: Outputs	C0: MORE
	Lighti	ng Control: 30%	LIGHTS	
Setup	Value			
Name	: 30% LIGHT	S		
Use Alt Co	ntrol: No			
Enable Pro	ofing: Yes			
Use Ext So	hed : No			
Llev/Logic	Mode: LOGIC ONL	1		
Alt Lt/Lgo	: Mode: LOGIC ONL'	1		
Schedif Mo	de : SCHED ONL'	2		
Alt Schdif	Mode: LLEV/LOGI	CONLY		
Schedule	ype : MASTER			
Num Std Ev	vents: 1			
Num Date F	langes: Ø			
Show Schee	: Yes			
Show LLev	: No			
Show Logic	: Yes			
Enable Dir	ming: No			
	- 3			

Figure 4-7 - Enable Proofing on Setup Tab

When grouping multiple breakers to a Lighting application, add a Digital Combiner application for proofing inputs. (To add an application, follow the steps for adding an application in *Section 4.2.1*) Once added, go to the Digital Combiner application:



Figure 4-8 - Digital Combiner For Input Proof Grouping

- 2. For grouping, set the combination method to AND under the Comb Method parameter in the **General Setup** and add a name that will associate the proof input group to the Lighting application.
- 3. Set the number of inputs to the number of breakers in the group.
- Under the Comb Ins tab, change the DIG INPUT1 format by pressing F3 - EDIT and then 1. Alternate I/O Formats to Controller: Application: Property from the Board: Point format.

 For the Controller property, press F4 - LOOK UP to select the Eaton Breaker Panel, for the Application property select Lighting Panel, and for the Inputs property select the breaker numbers that are included in the group.

neral	C2:	Comb	Inc								*HLHNI
			1115	C3 :	Ctrl 1	Ins	C4: 0	utput	5	C5:	
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	T1	- CX	1	- ETN	<b>DDVDD</b> K	JI 004	- DDE OVE	2 2			
G INPI	T2	CX	1	FTN	BRKRPN	1 001	BREAKE	2 6			
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G INPU	T4	: CX	i	ETN	BRKRPN	IL 001	BREAKE	10			
G INPU	T5	: CX	1	:ETN	BRKRPN	L 001	BREAKE	3 12			
	_				_						
Board/	Control	ler	Digit	al in	nputs						
RFU TA	B F2	: NEXT	TAB		E3: ED	IT	F4:	LOOK	IIP	ES:	CANCEL
	G INPU G INPU G INPU G INPU G INPU G INPU REU TA	BINPUT2 GINPUT3 GINPUT3 GINPUT3 GINPUT4 GINPUT5 Board/Control REU TAB / F2	6 INPUT3 : CX 6 INPUT3 : CX 6 INPUT3 : CX 6 INPUT5 : CX 6 INPUT5 : CX 8 INPUT5 : CX 8 INPUT5 : CX	BINPUIT : CX 1 BINPUIT3 : CX 1 BINPUIT3 : CX 1 BINPUT5 : CX 1 BINPUT5 : CX 1 BINPUT5 : CX 1 BOard/Controller   Digit REU TAB ↓ F2: NEXT TAB	6 INPUI3 : CX 1 : EIN 6 INPUI3 : CX 1 : EIN 6 INPUI3 : CX 1 : EIN 6 INPUI5 : CX 1 : EIN 6 INPUI5 : CX 1 : EIN 8 Oard/Controller   Digital fr REU TAB ↓ F2: NEXT TAB ↓	BINPUTS CX 1 EEN BAKAPY BINPUTS CX 1 EEN BAKAPY BINPUTS CX 1 EEN BAKAPY BINPUTS CX 1 EEN BAKAPY BINPUTS CX 1 EEN BAKAPY BOard/Controller   Digital inputS REU TAB ↓ F2: NEXT TAB ↓ F3: ED	BINDITE : CX 1 : ETH BERRHLOH BINDITE : CX 1 : ETH BERRHLOH BOard/Controller   Digital inputs BOard/Controller   Digital inputs BOARD/Controller   Digital inputs	BINPUTS CX 1 ETH BBKKPNLOGISBEARE BINPUTS CX 1 ETH BBKKPNLOGISBEARE BINPUTS CX 1 ETH BBKKPNLOGISBEARE BINPUTS CX 1 ETH BBKKPNLOGISBEAKE BINPUTS CX 1 ETH BBKKPNLOGISBEAKE BOard/Controller   Digital inputs BOard/Controller   Digital inputs BOArd/Controller   Digital inputs	BINFUIT : CX 1 : CTH DHRAFNCOT:BHENKER 6 BINFUIT : CX 1 : CTH DHRAFNLOOT:BHENKER 6 BINFUIT : CX 1 : CTH DHRAFNLOOT:BHENKER 10 G INFUTS : CX 1 : CTH DHRAFNLOOT:BHENKER 10 G INFUTS : CX 1 : CTH DHRAFNLOOT:BHENKER 12 BOard/Controller   Digital inputs REU TAB ↓ F2: NEXT TAB ↓ F3: EDIT ↓ F4: LOOK	BINPUTS : EX 1 :EIN BARKYNEOU:SBREMERE SINPUTS : EX 1 :EIN BARKYNEOU:BBREMER 6 SINPUTS : EX 1 :EIN BARKYNEOU:BBREMER 10 GINPUTS : CX 1 :EIN BRKRPNLOU:BBREMER 10 GINPUTS : CX 1 :EIN BRKRPNLOU:BBREMER 12 BOard/Controller   Digital inputs REU TAB ↓ F2: MEXT TAB ↓ F3: EDIT ↓ F4: LOOK UP ↓	BINPUIT : CX 1 : EIN BRARPHOUGTBREAKER_C BINPUIT : CX 1 : EIN BRARPHOUGTBREAKER_G BINPUIT : CX 1 : EIN BRARPHOUGTBREAKER_G BINPUTS : CX 1 : EIN BRARPHOUGTBREAKER_10 BINPUTS : CX 1 : EIN BRARPHOUGTBREAKER_12 BOard/Controller   Digital inputs BOard/Controller   Digital inputs BEU TAB ↓ F2: NEXT TAB ↓ F3: EDIT ↓ F4: LOOK UP ↓ F5:

Figure 4-9 - Grouping Inputs in Digital Combiner

6. Go back to the Lighting application under the **More** tab and associate the Lighting group (*Figure 4-10*) with the Digital Combiner application:

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6:		C7: Mai	int Ovr	C8:	Inputs		C9: Out	puts	C0: M	DRE
			Lightin	ng Co	ntrol:	70% L	IGHTS			
	Proof	Ĥ	rea Ctrl	Ар	plicat:	ion	Output			
	Proof Type	: 0	N Only							
	PROOF IN	: C	X 1	7 6%	LGHT PI	ROOF : 0	UTPUT			
	Proof Delay	) :	0:00:30							
	Proof Latch	1 :	0:00:00							
	Clear Any H	latch:	No							
	Pr Fail Adv	Pri:	20							
Ente	er Board/Cor	itroller	Proof	inpu	t					

Figure 4-10 - The Digital Combiner Used To Group Inputs

When using the Digital Combiner method above, the Proof Type must be set to ON Only.

- Under the More tab, change the PROOF IN format by pressing **F3** - **EDIT** and then 1. Alternate I/O Formats to Area Ctrl:Application:Property from the Board:Point format.
- 8. For the Area Ctrl property, press **F**<sup>4</sup> **LOOK UP** to select the E2 Name, for the Application property select the Digital Combiner that you created, and for the Output property select **OUTPUT**.

For more information on setting up Lighting Schedules, refer to the *Lighting Schedules* section in the E2 User Manual (*P/N 026-1610*).

# 5 Troubleshooting

## 5.1 Troubleshooting Eaton Breaker Panels and the MODBUS Network

#### Problem: Eaton Breaker Panel is Offline

- Check Wiring Verify the Eaton Breaker Panel is properly connected to the MODBUS cable. Verify the network polarity is correct (MODBUS 485+ to BCB LAN- terminal, MODBUS 485- to BCB LAN+ terminal) and there are no loose wires. If none of the Eaton Breaker Panels are online, check wiring connections on the E2. Check the cable jackets to make sure all network cable is Belden #8761 or equivalent.
- 2. Verify MODBUS Port Setup Press on the E2 front panel. Verify COM2, COM4, or COM6 is set up as a MODBUS port. If so, verify that the MODBUS cable is connected to the proper connectors. Verify the COM port fields (*Figure 3-7*) are properly set for ECT MODBUS (9600 baud, data size=8 bits, Parity=NONE, stop bits=1).
- 3. Check Eaton Breaker Panel Selector Numbering -Verify that the selector matches the "address selector" parameter under the Devices tab in E2.
- 4. Check Network Termination The two devices on either end of the MODBUS network should be terminated, with all other devices in the daisy chain unterminated. Check jumper settings for all devices on the network.
- 5. Verify BCB power connections It is important to observe proper orientation of the BCB to facilitate both physical placement and logical performance. The BCB also has three status LEDs used to indicate its activity and operation. Refer to Section 2.2.1 BCB Status LEDs.

## 5.2 Panels with UNSUPPORTED USC-1000 Controllers Installed

Connecting to panels with integrated USC-1000 controllers is not supported. If using this type of panel, *disconnecting* the USC-1000 from the BCB and connecting the BCB to the E2 controller is required.

- Disconnect and remove the MODBUS connections between the USC-1000 and the BCB modules, Lan + and Lan -
- 2. Connect the Lan + and Lan wires to the E2 RS485 MODBUS network.



Figure 5-1 - E2 and Unsupported USC-1000 Panel Layout

NOTE

Wire colors are subject to change.

Visit our website at copeland.com/en-us/products/controls-monitoring-systems for the latest technical documentation and updates. For Technical Support call 833-409-7505 or email ColdChain.TechnicalServices@Copeland.com

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