E3 Supervisory Control Retrofitting with E2 and E2E

Overview

This technical bulletin describes E3 retrofitting of environments with existing E2 and E2E Controllers.

Preparing for Retrofit

When replacing an E2 unit with an E3, there are several major differences that must be taken into account.

1. COM 1-4 networks (the RS485 I/O networks) use the same wire and polarity for both the E2 and E2E Controllers. No rewiring of the I/O network will be necessary; just unplug the COM 1-4 connectors, and plug them into the I/O port(s) on the E3 PIB (see "**Transferring the COM 1-4 Networks**" section below).
2. E2 and E2E units support an optional Echelon card. E3 does not currently support Echelon; therefore, any Echelon-based Controllers must be replaced with BACnet or Modbus equivalent controllers that utilize BACnet or Modbus interfaces.

Note that the E3 mounting points are the same as E2E, so the fasteners can be reused for the E3 in the same mounting location.

Technical Specifications

Table 1 - E3 Specifications

|	
*Operating Temperature	-40°F to 113°F (-40°C to 45°C) *Tested to UL60730-1 standard
Operating Humidity Storage Humidity	5% - 95% RH non-condensing at 90°F 5% - 100% RH
24 VAC	24 VAC ±20%, 50/60 Hz, Class 2
Dimensions	12" L x 12.5" W x 3.75 H"
4 RS485 ports	COM 1 = RS485-COM2A and RS485-COM2B COM 2 = RS485-COM6<ISOLATED> COM 3 = <ISOLATED>RS485 COM 4 = RS485-COM4A and RS485-COM4B
2 Ethernet ports	ETH 0, ETH 1
2 USB ports	J2, J3
External Pollution Rating	All Models: Pollution Degree 3
Rated Impulse Voltage	2500/4000V
Lithium Battery Marking	**Caution:** The cell used in this device may present a fire or chemical burn hazard if mistreated. Do not disassemble, heat above 212°F (100°C), or incinerate.

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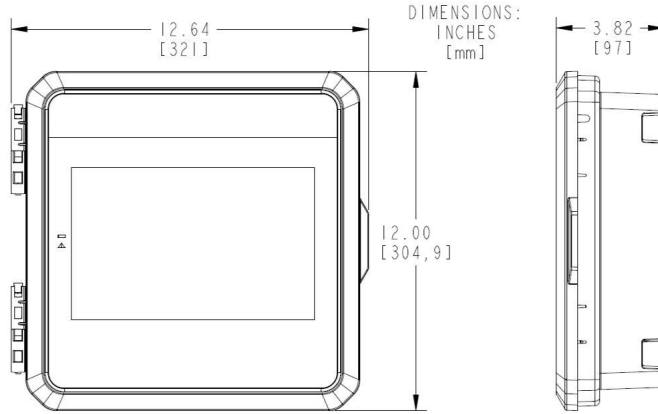
Transferring the COM 1-4 Networks

The COM 1-4 I/O networks on the E2 are where connections to all I/O devices, such as MultiFlex boards are made. The three networks are interchangeable, each one capable of connecting up to approx. **127** devices (contact Technical Services for verification of the maximum number of devices for your network).

The E3 adds an additional COM 3 port (COM 7) on the PIB. This COM port is electrically isolated. The COM 2 port (COM 6) is also electrically isolated. Please refer to the specification table for COM 1-4 RS485 equivalent numbering.

Table 2 - E3 RS845 COM Port Naming Translations for E2 Retrofit

| E3 RS485	E2 RS485
COM 1A	COM 2A
COM 1B	COM 2B
COM 2	COM 6
COM 3	Not Available
COM 4A	COM 4A
COM 4B	COM 4B

E3 Termination Jumper Settings

The network termination jumpers, directly above all COM plugs on the PIB, will need to be set to the same positions as the corresponding termination jumpers on the E2/E2E. The rules for termination on E3 I/O networks are the same as the rules for E2/E2E networks. For each COM port, set the three jumpers to the (terminated) position if the port is at the end of a network segment or the hub of a star configuration, and down **NO** (unterminated) if the port is in the middle of a segment.

On E3, there is one set of RS485 jumpers for each RS485 port. Jumpers J16-J18 are located directly above the COM2A connector port, and jumpers J20-J22 are located directly above the COM2B port. All the RS485 termination jumpers are used to terminate the devices at the beginning and end of an RS485 Network. If the E3 is at the beginning of an RS485 I/O, MODBUS, or BACnet Network, all three of these jumpers should be set to the up position. For MODBUS and BACnet, the jumpers should all be in the top-most position (**MOD**). For I/O Net, the jumpers should be in the middle position (**I/O**). For no termination, set the jumpers to the down position (**NO**).

Refer to the E3 User's Manual (P/N 026-1803) for expanded communication setup information.
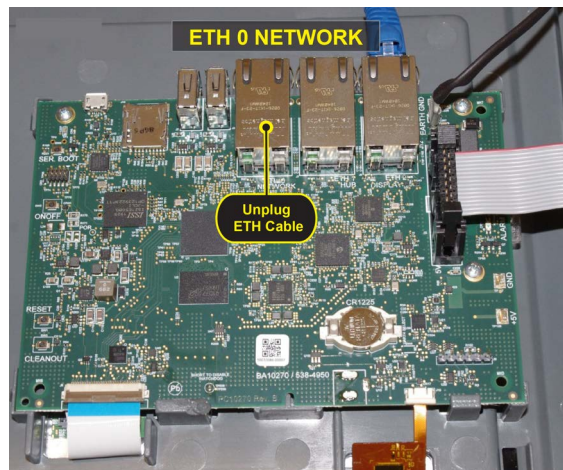
E3 Circuit Board
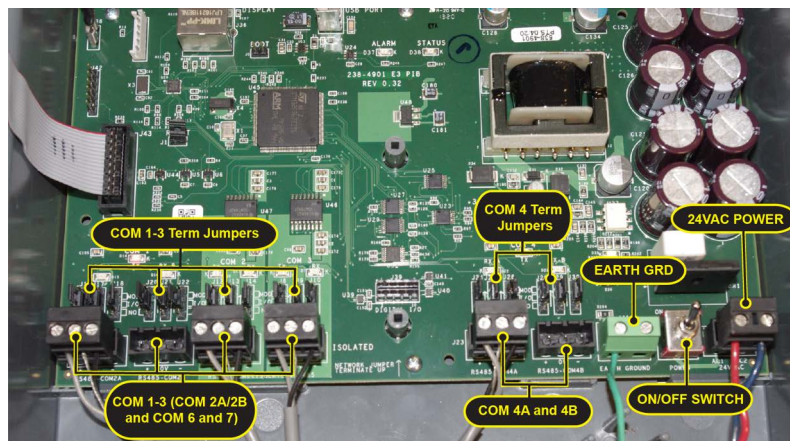
E3 PIB

Figure 2 - E3 Circuit Board and E3 PIB Retrofit Layout

STEP 1: Powering Down the E2 Controller

Power down the E2 by flipping the ON/OFF power switch to the OFF position on the E2 PIB and remove all field wiring from the E2.

1. Disconnect 24VAC power connector and remove from the box.
2. Unplug the Ethernet cable and remove from the box.
3. Unplug and remove the RS485 connections and remove wires from the box.

💡 **Labeling Wires: Pro Tip - label all wires and make note to which com ports the wires belong for quick and easy reconnections to the E3.**

4. If a Digital I/O card is present, disconnect the I/O wiring and pull the wiring out of the box. Note that the I/O card is mounted with two screws. Unscrew and remove the card.
5. Unscrew the ground terminal wire (2 screws) and remove wire from the box.

Note: Before removing the E2, ensure all wires are removed from the E2 enclosure.

STEP 2: E2 Checklist ✔

- Power switch is in the OFF position on the E2 PIB
- Disconnected the 24VAC power
- Disconnected Ethernet wires
- Disconnected RS485 comm wires
- Disconnected Digital I/O card (if present) removed and wires removed
- Disconnected and unscrewed the Ground terminal wires
- Locate the screws that attach the E2 to the wall or panel and remove the E2
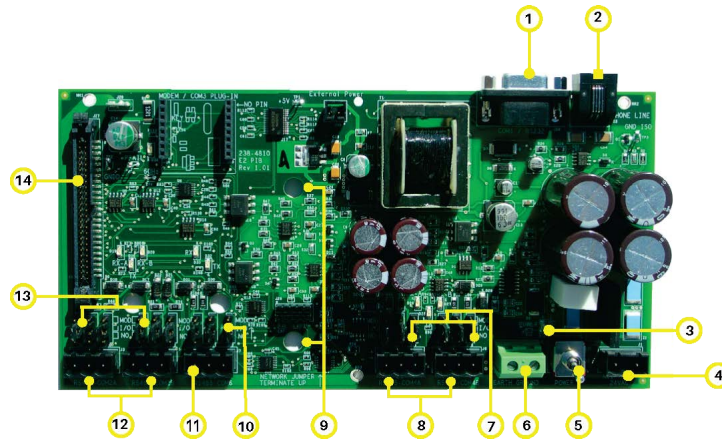

Figure 3 - E2E - PIB Board

	Legend						
1	RS232 Port	**5**	Power Switch	**9**	Plug-In Digital I/O Card	**13**	Termination Jumpers (COM2A and B) - I/O Net or Modbus
2	Phone Line Jack	**6**	Earth Ground	**10**	Termination Jumpers (COM6) - I/O Net or Modbus	**14**	Power Interface Port
3	Power ON LED	**7**	Termination Jumpers (COM4A and B) - I/O Net or Modbus	**11**	RS485 COM6 Port	**15**	Modem/COM3 Plug-In
4	Power Terminals (24VAC Class 2 Only)	**8**	RS485 COM4A and COM4B Ports	**12**	RS485 COM2A and COM2B Ports	**16**	External Power Connector (For Echelon Repeater Card)

STEP 3: Mounting the E3

Route all cables, Ethernet, RS485, ground, 24VAC, and I/O back into the box and match to the corresponding com ports.

💡 **Pro Tip - refer to the labels on the wires.**

1. Once the E2 is out of the wall or panel, mount the E3 into the same location, using the same hardware to attach to the wall or panel.
2. Attach the Ground wire to the green ground terminal and fasten by tightening down both screw terminals.
3. Reconnect the Ethernet cable to the ETH0 port on the E3 processor board.
4. Reconnect the RS485 Com Port wires.
5. If a digital I/O card is present, re install the I/O card on the E3 PIB using the same screws and plug the I/O wires into the I/O card terminal.
6. Reconnect the 24VC power plug.
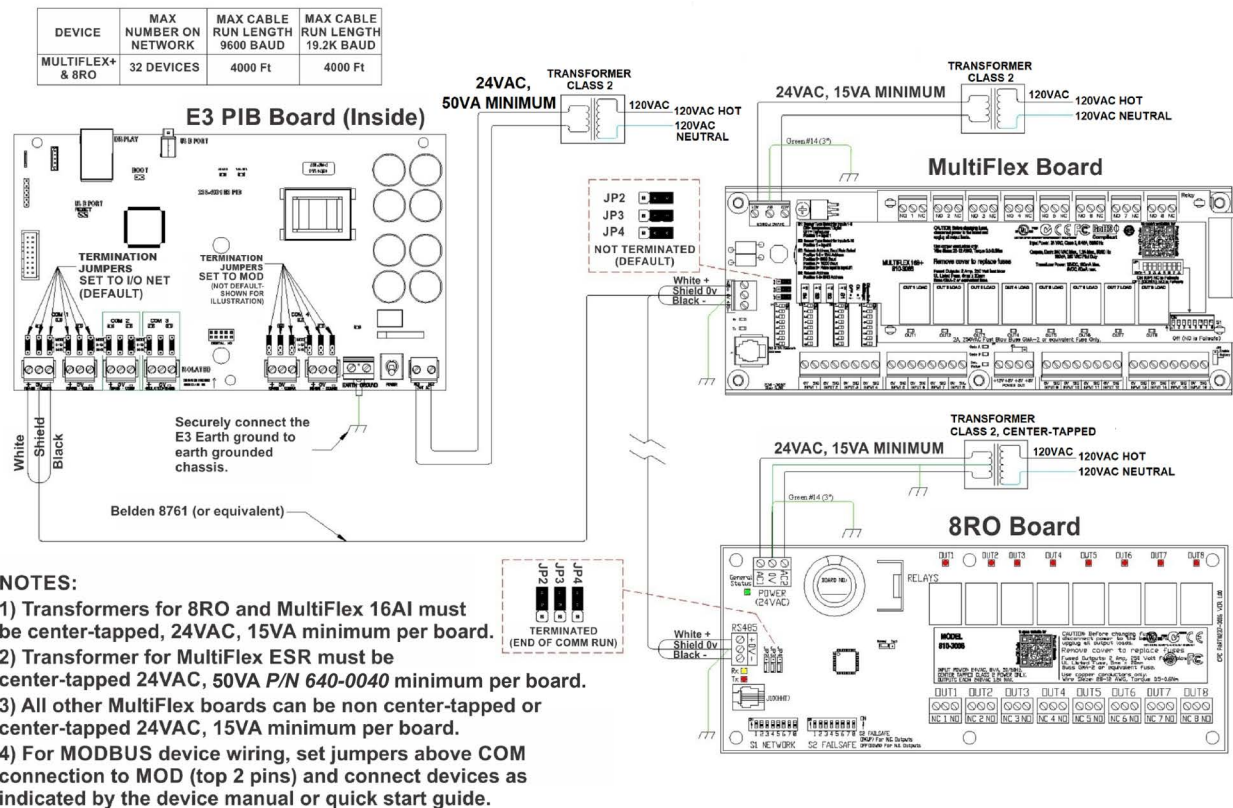7. Flip the 24VAC power switch on the E2 PIB to ON.

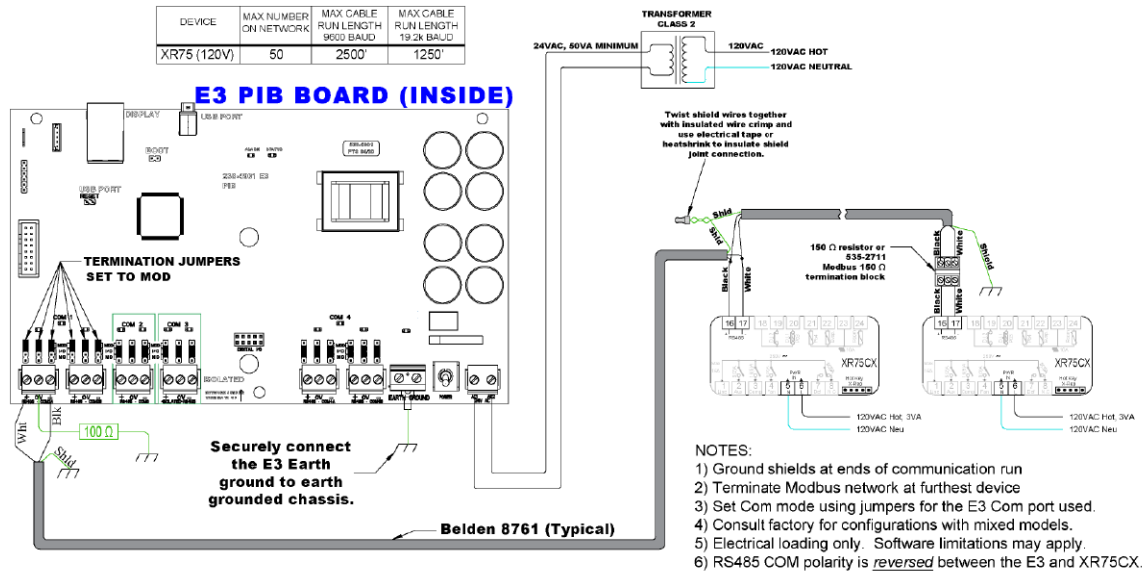*Figure 4 - E3 PIB and MultiFlex Board Wiring*

Figure 5 - E3 and XR75 Wiring

STEP 4: Setpoint Conversion Tool

For translating the E2 program, reference the E2 Setpoint Conversion Tool instruction guide:
https://www.copeland.com/documents/026-4050-e2-e3-setpoint-conversion-tool-for-retrofits-en-7062824.pdf

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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