



Verasys Zone Coordinator

Installation Instructions

LC-VZC100-0, LC-VZCPNL-0

Part No. 24-10143-1280, Rev. A
Issued January 2017

Refer to the [QuickLIT website](#) for the most up-to-date version of this document.

North American Emissions Compliance

United States

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when this equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area may cause harmful interference, in which case users will be required to correct the interference at their own expense.

Canada

This Class (A) digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.
Cet appareil numérique de la Classe (A) respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Installation

Follow these guidelines when installing the Verasys™ Zone Coordinator:

- Transport the zone coordinator in the original container to minimize vibration and shock damage.
- Do not drop the zone coordinator or subject it to shock.

Parts Included

The Verasys Zone Coordinator is supplied as either a board-only model or an enclosure model.

Table 1: Model Descriptions

Product Code Number	Description
LC-VZC100-0	One Verasys Zone Coordinator board with mounting stand-offs. (Board-only model)
LC-VZCPNL-0	One Panel with Verasys Zone Coordinator and transformer pre-mounted. (Enclosure model)

Materials and Special Tools Needed

- wire strippers
- small flat-head screwdriver
- 22 AWG (0.65 mm) 3-conductor, twisted, shielded cable with a drain wire

Note: This drain wire is used only to group the shielded cable. Do not use this drain wire as a connection to the board.

- wire nuts for 22 AWG drain wire
- electrical tape

Mounting

IMPORTANT: Do not install or use this Verasys Zone Coordinator in or near environments where corrosive substances or vapors could be present. Exposure of the Verasys Zone Coordinator to corrosive environments may damage the device's internal components and will void the warranty.

IMPORTANT: Do not install the Verasys Zone Coordinator where the maximum temperature exceeds 122°F (50°C). Installing the device where maximum temperatures exceed 122°F (50°C) may cause damage to the Verasys Zone Coordinator and may void the warranty.

IMPORTANT: Electrical equipment that employs high-speed switching circuits (Variable Speed Drives [VSD], Solid State Starters [SSS], and computing equipment) generates Electromagnetic Interference (EMI) noise and Radio Frequency Interference (RFI), which can generate transient voltage between ground points in the communication wiring. The RS-485 circuitry is designed to withstand some low transient voltage, but if this difference exceeds certain limits, it can permanently damage the RS-485 circuitry.

Mounting Guidelines

Follow these guidelines when mounting the Verasys Zone Coordinator:

- Allow sufficient space for cable and wire connections.
- Mount the zone coordinator in areas free of corrosive vapors and observe the environmental limitations listed in the *Technical Specifications* section.
- Do not mount the zone coordinator where ambient temperatures may exceed 122°F (50°C).
- Do not mount the zone coordinator on surfaces prone to vibration or in areas where electromagnetic emissions can interfere with zone coordinator communication.
- Do not obstruct the zone coordinator housing ventilation holes.
- Do not mount power transformers below the zone coordinator.
- Do not mount the zone coordinator outdoors.

Mounting the Board-Only Model

Follow these additional guidelines:

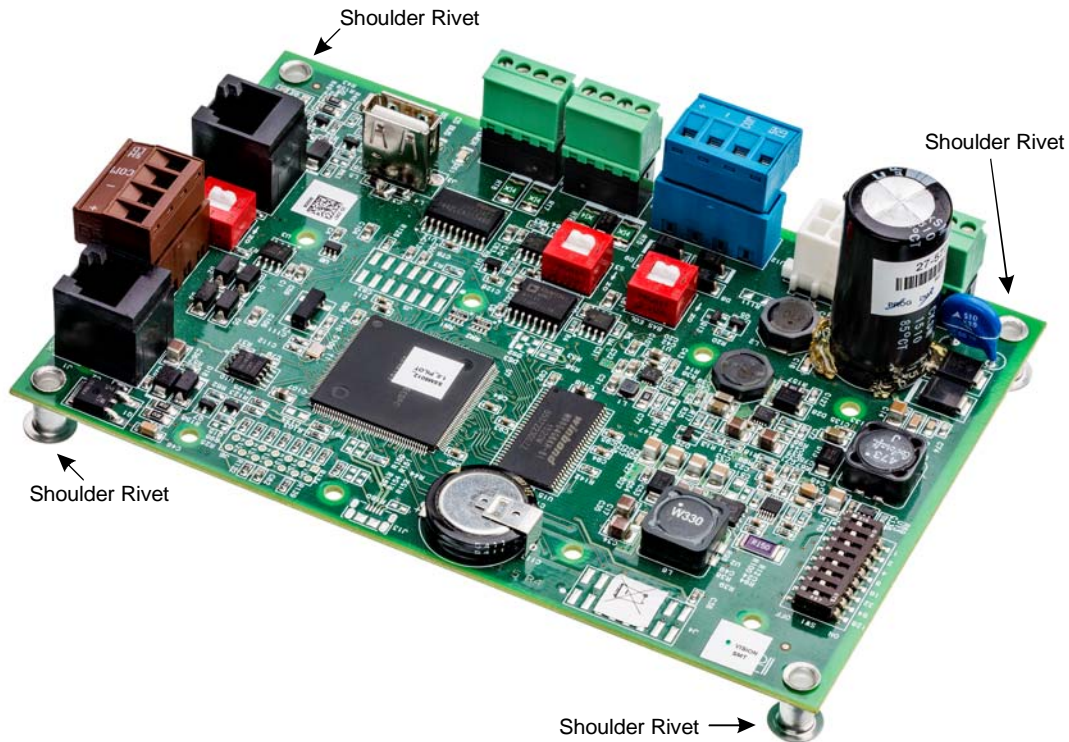
- Follow the enclosure manufacturer's instructions when mounting the enclosure.
- Do not install the zone coordinator in airtight enclosures.
- Do not install heat-generating devices in the enclosure with the zone coordinator or near the enclosure that may cause the ambient temperature to exceed 122°F (50°C).

When mounting the zone coordinator inside a panel, enclosure, or another piece of equipment:

1. Check for proper clearances for the necessary electrical and communications cable runs.
2. Ensure that power and communications wiring is in compliance with all local, national, and regional codes, and customer requirements.
3. Select a suitable location and mark the anchor points.

- Screw in the board at the locations of the shoulder rivets.

Figure 1: Shoulder Rivet Locations



- Inspect the mounted circuit board to ensure that
 - the board is mounted securely
 - the wiring connections are correct and tight (see *Wiring*)
 - the circuit board has no loose wire strands or other metal objects that could cause a short circuit
- Complete the wiring as described in the *Wiring* section.

Mounting the Enclosure Model

When mounting the enclosure model zone coordinator on a wall:

- Ensure that the mounting surface can support the zone coordinator and any user-supplied enclosure.
- Mount the zone coordinator in an upright position. Ensure that the enclosure is level.
- Mount the zone coordinator on a hard, even, vertical surface whenever possible.

If you must mount the zone coordinator on an uneven surface, be careful not to crack the zone coordinator housing when tightening the screws. Use shims or washers to mount the zone coordinator securely and evenly on the surface.

- Check for proper clearances for the necessary electrical and communications cable runs.
- Ensure that power and communications wiring is in compliance with all local, national, and regional codes, and customer requirements.
- Ensure there is no electromagnetic interference with other components in the near vicinity. Use appropriate conduit to connect the power and communications wiring.

To mount the enclosure model zone coordinator on a vertical surface:

1. Select a suitable location:
 - a. Hold the zone coordinator mounting base up to the wall.
 - b. Ensure that the enclosure is level.
 - c. Mark the location of the wall mount holes.
2. Drill pilot holes at the locations marked in accordance with the type of wall anchor used.
3. Install the enclosure on the wall:
 - a. Position the mounting base.
 - b. Insert the screws through the holes in the base.
 - c. Carefully tighten the screws.
4. Line up the side tabs on the face of the zone coordinator with the tabs on the mounting base and carefully snap the face of the zone coordinator in place.
5. Check that
 - the enclosure is securely mounted
 - the wiring connections are correct and tight
 - the circuit board has no loose wire strands or other metal objects that can cause a short circuit

Complete wiring as described in the Wiring section.

Wiring

WARNING

Risk of Electric Shock.

Disconnect or isolate all power supplies before making electrical connections. More than one disconnect or isolation may be required to completely de-energize equipment. Contact with components carrying hazardous voltage can cause electric shock and may result in severe personal injury or death.

CAUTION

Risk of Property Damage.

Do not apply power to the system before checking all wiring connections. Short circuited or improperly connected wires may result in permanent damage to the equipment.

NOTICE

Risk of Property Damage.

Do not run the AC and DC sets of wires in the same conduit. Including different sets of wires in the same conduit can create harmonics, which may damage the [fan motors] and other property.

NOTICE

Risque de dégâts matériels.

Ne pas faire courir des jeux de fils CA et CC dans une même gaine. L'installation de différents jeux de fils dans une même gaine peut générer des harmoniques susceptibles d'endommager les [moteurs de ventilateurs] et d'autres équipements.

NOTICE

Risk of Property Damage.

Do not run low-voltage cable in the same conduit or wiring troughs with high-voltage wires. Running low- and high-voltage wires in the same conduit or wiring troughs may damage the equipment or cause system malfunction.

NOTICE

Risque de dégâts matériels.

Ne pas faire courir un câble basse tension dans les mêmes gaines ou goulottes électriques que des câbles haute tension. L'installation de fils basse tension et haute tension dans les mêmes gaines ou goulottes électriques risque d'endommager l'équipement ou de provoquer des dysfonctionnements du système.

NOTICE

Risk of Property Damage.

Do not run network communication cables in the same conduit, raceway, or panel with any high-voltage (greater than 30 VAC) wiring. Isolate all network wiring and all network devices from high-voltage wiring and equipment. Failure to isolate network wiring and network devices from high-voltage wiring and equipment can result in damage to network devices or poor network performance.

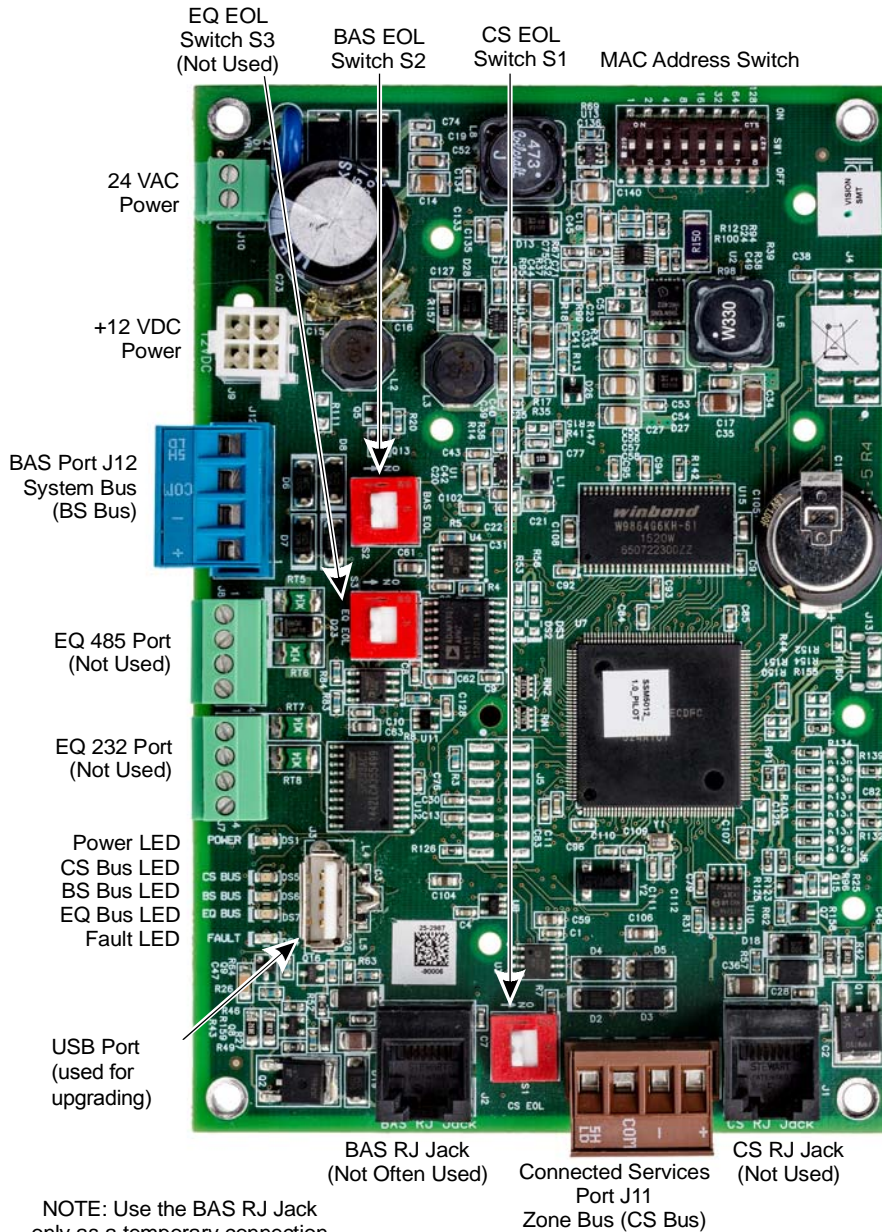
NOTICE

Risque de dégâts matériels.

Ne passez pas les câbles de communication réseau dans les mêmes gaines, chemins de câbles ou panneaux que les câbles à haute tension (supérieure à 30 Vca). Isolez tous les câbles et appareils réseau des câbles et appareils à haute tension. Un défaut d'isolement des câbles et appareils à haute tension peut provoquer des dommages aux appareils réseau et réduire les performances du réseau.

IMPORTANT: Make all wiring connections in accordance with local, national, and regional regulations.

Figure 2: Connections and Switches on the Verasys Zone Coordinator

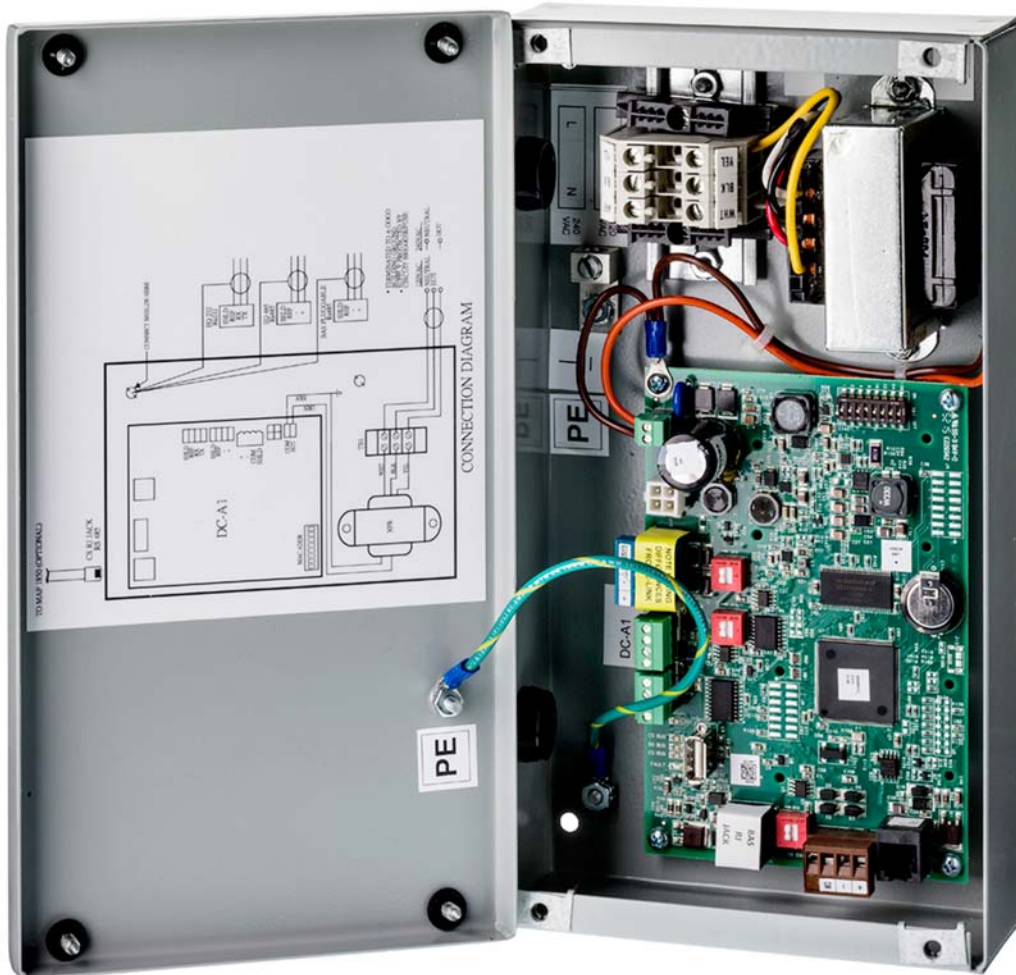


Install the wiring so it does not cause a hazard, and is protected against electrical and mechanical damage. For location of wiring connections and switches on the Verasys Zone Coordinator, see Figure 2.

Wiring Power for the Board-Only Model

- When using the board-only model zone coordinator, use a 24 VAC, Class 2 power source.
- If you install the zone coordinator circuit board in its own enclosure, ensure a transformer is included in the enclosure. Supply line voltage using an external power source. See Figure 3.
- Ensure the capacity of the power conductors supplying the equipment is rated for the additional power (VA) required by the zone coordinator.

Figure 3: Wiring Input Power for a Verasys Zone Coordinator in an Enclosure



Wiring Power for the Enclosure Model

- When using an enclosure model zone coordinator, use a 120 V or 240 V supply power.
- Protect the power source with a suitable fuse or circuit breaker.
- Ensure the power is supplied from a dedicated source and not controlled by a programmed switch.
- The wiring from the power source to the panel must always run in a suitable conduit. To obtain the best Electromagnetic Interference (EMI) and Electromagnetic Compatibility (EMC) performance, ensure that the conduit is bonded to the metal of both enclosures. Scrape the paint around the knockouts to provide a better electrical connection between the joining parts.
- Use a wire that is one size larger than required for the amperage draw (maximum 400 mA) to connect the line.
- Ensure that the zone coordinator is powered from a source with a true earth ground.

Connect a 1.29–1.02 mm (16–18 AWG) wire from a reliable ground reference to the panel's incoming power ground lug. Do not remove the existing wire that connects the ground lug to the enclosure cover.

Table 2: Wiring Line Voltage to the Enclosure Model

Application	Hot Wire	Neutral Wire	Ground Wire
120 VAC	TB-BLK	TB-WHT	Ground Lug
240 VAC	TB-YEL	TB-WHT	Ground Lug

Wiring Communications

The zone coordinator uses RS-485 electrical communication protocol for bus communication. See Figure 2 and Table 3.

Table 3: Communications Connections

Connection	Communications	Port Type
BAS Port J12	System Bus (BS Bus)	RS-485
Connected Services Port J11	Zone Bus (CS Bus)	RS-485
BAS RJ Jack ¹	Troubleshooting (temporary connection only)	RJ-12

- For further information on connecting the Verasys Zone Coordinator to the Smart Building Hub for troubleshooting, refer to *Ethernet Port* in the *Smart Building Hub Installation Instructions (Part No. 24-10737-113)* and the *Verasys System User's Guide (LIT-12012371)*.

Setup and Adjustments

End of Line (EOL) Network Termination

Terminate all End-of-Line (EOL) devices at each end of the RS-485 bus. EOL termination provides biasing of the network, and assists in returning the signal to a normal state in the event of voltage transients.

Note: Use only one set of RS-485 network wires to the terminals.

System Bus EOL

If the Verasys Zone Coordinator is an end-of-line device on the Building Automation System network, terminate the network by setting the BAS EOL switch S2 to ON.

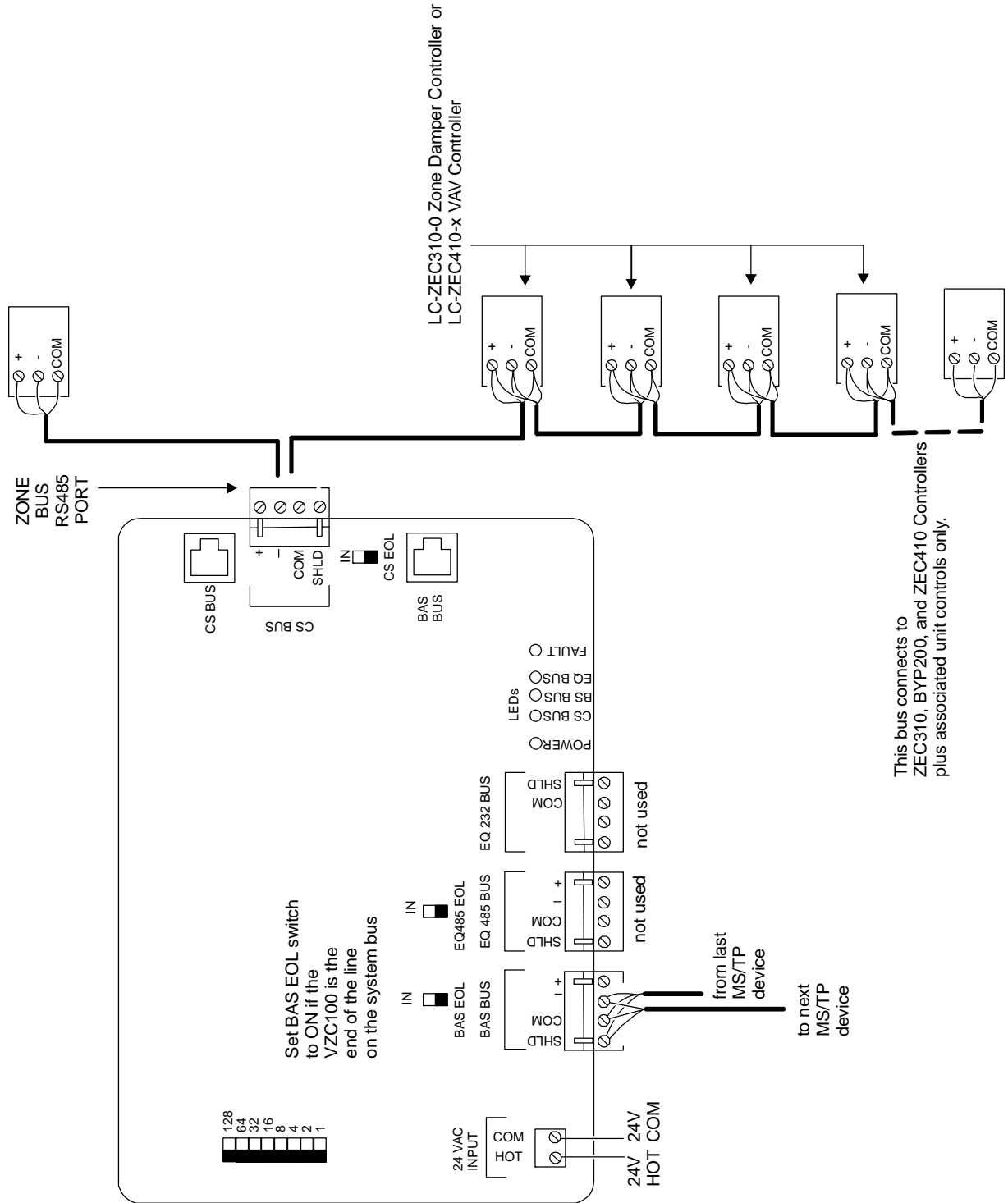
Zone Bus EOL

IMPORTANT: Ensure that the EOL switches are not set to the ON position for controllers that are not at the end of the bus.

If the Verasys Zone Coordinator happens to be an end-of-line device on the Zone Controller network, terminate the network by setting the CS EOL switch S1 to ON.

Note: Look at the number of wires coming in and out of the terminal. A single wire indicates that the device is an end-of-line device. If properly daisy-chained, you will have at most two wires coming in and out of each terminal.

Figure 4: Zone Bus EOL



Media Access Control (MAC) Address

The Verasys Zone Coordinator uses two RS-485 ports: BAS J12 and CS J11 (Figure 2). In order to communicate on the network, each bus (system or zone) needs a unique media access control (MAC) address.

The Verasys Zone Coordinator has a Zone Bus, which connects to the Connected Services Port (J11). This RS-485 port does not have a single 8-way DIP switch. This port has a fixed address of 0 and is always unique. Other devices use the range 4 to 127.

The System Bus MAC address uses a single 8-way DIP switch to set an address. Switch 8 is not used. The switches are binary weighted, allowing the setting of addresses from 4 to 127. The address selected must be unique to all devices on the system bus network.

Setting the MAC address switch is a matter of knowing what address you want and adding up the switches that are turned on. For example, address 21 is set to this. The 1, 4, and 16 switches are on ($1+4+16=21$).

The switch on the board looks like this. Switch 1 is BIT 1, Switch 2 is BIT 2, Switch 3 is BIT 4, Switch 4 is BIT 8, Switch 5 is BIT 16, Switch 6 is BIT 32, Switch 7 is BIT 64, and Switch 8 is not used. If you see the pattern, the BIT doubles for each switch.

IMPORTANT: When laying out a design for the system, it is important to identify these addresses before installation so you can make sure that the rest of the devices on the System Bus do not conflict with the address selected.

As you set the device address, the best practice is to set the highest switch value first, then the next highest switch value, and so on, until the total of the switch values equal the intended device address. For example, position switches 16, 4, and 1 to ON in order to set the device address to 21 for a device on the FC Bus.

Figure 5: Setting the Device Address and Wireless Operation Mode on the MAC Address DIP Switch Block



Troubleshooting

Multimeter Checks of the BAS Port (System Bus Port)

If the Zone Coordinator board is connected to a BAS Bus (System Bus), but the BS BUS LED is off steady, then the Zone Coordinator board is not receiving any communications occurring on the BAS bus.

Use a DC voltmeter to take these simple voltage measurements on the VCV-100 board and BAS communication bus to diagnose the problem.

1. Remove the BAS plug from the Zone Coordinator Port J12.
2. Note the position of the BAS End-Of-Line (EOL) Switch S2.
 - If the Zone Coordinator is not the EOL device, ensure that the EOL switch is set to OFF.
 - If Zone Coordinator is the EOL device, ensure that the EOL switch is set to ON.

Note: Verify that switch S2 (BAS EOL) is in the ON position during the measurement, otherwise the voltage readings will be out of the given range.

3. Measure the voltage between the + and – pins on the BAS Bus Terminal Block.
 - a. Place the positive lead of the voltmeter be on the + pin.
 - b. Place the negative lead of the voltmeter on the – pin.
 - c. Observe the voltage reading. The voltage reading can fall in the range of 0.38 to 0.47 VDC. The reading should be steady and only changing by a couple of millivolts at the most.
 - If the reading is within the range of 0.38 to 0.47 VDC, that is an indication that the BAS transceiver on the Zone Coordinator board is not damaged.
 - If the voltage reading is out of the range given by a large amount, the transceiver or its associated circuitry may be damaged.
4. If the reading in Step 3 is within the given voltage range, then return switch S2 (BAS EOL) to its proper position and connect the BAS terminal block plug back into the BAS terminal block J12 on the Zone Coordinator board.
5. Take another VDC voltage reading on the BAS plug between the + and – wire connections.

If no communications, consider the following:

- If the BAS bus is connected to a JCI BAS bus with proper EOL terminations set, then the voltage range should be steady and in the 0.38 to 0.47 VDC range if no communications are occurring on the BAS bus.
- If the voltage reading is steady but out of the 0.38 to 0.47 VDC range, then the issue could be improper EOL terminations, issues with wiring, or some other issue.
- If the BAS bus is connected to a third-party BAS, acceptable voltage readings are between 0.25 to 0.5 VDC.
- If communications are occurring on the BAS Bus, then the voltage measured should fluctuate generally in the range of (0.1 to 0.5 VDC) if the bus is properly terminated. (The voltage readings may vary somewhat out of this range depending on bus loading and the type of voltmeter used.) If the voltage readings are fluctuating in the approximate range of (1.5 to 3.5 VDC) then it is likely there is no End-of-Line (EOL) termination set on the bus and that should be corrected at the EOL device.

Note: The meter checks detailed for the BAS port can also be used for the CS port (Zone Bus).

Firmware Update

To update the firmware as new versions become available, use the following procedure.

1. Copy the firmware update file on to an empty USB 2.0 thumb drive.

Note: The file will be named similar to: 1.0.0.421.VZCUSB.pkg

2. Insert the USB thumb drive in to the USB port J3 on the Zone Coordinator. The firmware update starts automatically and the Fault LED flashes quickly during the update process.
3. When the firmware update is completed, the Zone Coordinator reboots. (All of the LEDs go dark and then light up again).
4. Once the Fault LED is off for 30 seconds, the firmware upgrade is complete and you may remove the USB thumb drive.

Using the Smart Building Hub for Troubleshooting

The Smart Building Hub (SBH) provides a wireless interface to the Zone Coordinator from a smart phone, tablet, or laptop computer. Use the SBH to troubleshoot connectivity issues.

The first screen displayed on the WiFi device through the SBH after login is the Device List screen. The example shows all of the devices connected to the SBH (Figure 6).

The Zone Coordinator shows up on the System Bus and shows the devices on the Zone Bus underneath the Zone Coordinator. This interface shows you what is connected and if it is online (if the device was online at one time).

Figure 6: Device List Screen

DEVICE LIST			
5	Generic IO	CTRL 5UI 4BI 4RO 2BO 3CO	▶
6	China Storage RTU	China Storage	▶
7	Catering Side RTU	Production Storage	▶
8	Nutrition Side RTU	Production Storage	▶
9	BMD Kitchen RTU-9	BMD Kitchen	▶
ZONE COORDINATOR			
32	ZC Device	ZC Product Test	▶
5	Office RTU	Office Area RTU	▶
6	Zone 1	Lobby	▶
7	Zone 2	Lobby	▶
8	Zone 3	Suanna's Office	▶
9	Zone 4	Paul's Office	▶
10	Zone 5	Philip's Office	▶

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 SW Version: 1.0.0.627
 OS Version: 201605161537
 ORE Up SOCKET Up

The addresses shown in the blue box indicate devices that are wired to the System Bus. The devices with addresses shown in a white box are Zone Bus devices.

If the smart building hub is not permanently mounted and connected to the system, connect the SBH to the BAS Port J12 locally or plug into the BAS RJ Jack temporarily for setup:

- If you wire the SBH to BAS Port J12, use the power supply for power to the SBH.
- If you plug into the BAS RJ port, the SBH draws power from the Zone Coordinator.

To Change the BACnet Device Instance

The Zone Coordinator has a default the Device Instance of 1. If the Verasys system is not connected to another BAS system, use the default value of 1.

If the Verasys system is connected to another vendor's BAS system, then you may need to adjust the Device Instance to another value between 2 and 4,914,302. The BAS contractor is the appropriate person to decide the new value for the Device Instance.

Figure 7: Changing the Device Instance

The screenshot displays the 'ZC DEVICE CONTROLLER' configuration page. On the left is a navigation menu with options: Coordinator Home Page, Unit, Commissioning, Controller (selected), Details, Set Schedule, Device List, Interlocks, Schedule Sync, Settings, and Robb Snawerdt. The main content area shows several configuration fields:

Field Name	Value
FIRMWARE VERSION	1.0.0 1037
RELEARN SYSTEM	False
ADDRESS	32
DEVICE OID	1
TIME	4:19 PM
DATE	Wednesday, August 17, 2016

Further Setup Using the Smart Building Hub


For further setup of the Zone Coordinator using the Smart Building Hub, please refer to the *Verasys System User's Guide, LIT-12012371*.

Repair Information

There are no user-replaceable parts in the Zone Coordinator. If the Zone Coordinator fails to operate within its specifications, replace the unit. For a replacement Zone Coordinator, contact the nearest Verasys representative.

Technical Specifications

Verasys™ Zone Coordinator

Power Requirements		Enclosure Model: 120/240 VAC Primary 50/60 Hz, 24 VAC Secondary Transformer (+10%/ -15%), 400 mA, nominal 12 VA Board-Only Model: 24 VAC (15%), Primary 50/60 Hz, 24 VAC Secondary Transformer (±15%), 400 mA, nominal 12 VA, 12 VDC (+50%/-2%)
Addressing		Addressing is selectable by the MAC Address Switch - 8 Position DIP Switch using Switches 1 through 7; Addressing Range 1 to 127
Installation Environment		Protected, Dry
Ambient Operating Conditions		-40 to 65°C (-40 to 149°F), 0 to 95% RH, Noncondensing
Ambient Storage Conditions		-40 to 85°C (-40 to 185°F), 0 to 95% RH, Noncondensing
Power		Enclosure Model: One 3-Position Terminal Block for 120/240 VAC Supply Power Board-Only Model: Removable Terminal Plug for 24 VAC Supply Power and Removable Terminal Plug for 12 VDC Supply Power
Communication Wiring Terminations		See Wiring Communications
Shipping Weight		Enclosure Model: 2 kg (4.5 lb) Board-Only Model: 227 g (8 oz)
Compliance 	United States	UL Listed 916/FCC Part 15 Conducted and Radiated
	Europe	CE Mark - Johnson Controls, Inc. declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive 2004/108/EC and Low Voltage Directive 2006/95/EC.

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local office. Johnson Controls, Inc. shall not be liable for damage resulting from misapplication or misuse of its products.

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