

## SECTION 1—GENERAL

This bulletin contains important information about the POWERLINK® AS Control Module AS42C and AS42C-T. **Please retain this bulletin for future reference.**

### TECHNICAL SUPPORT

For technical assistance, please contact your local Square D distributor or field office, or:

- **Fax your request for support to (615) 287-3404**, 24 hours a day, seven days a week. Be sure to include your name and company, address, phone number, type(s) of POWERLINK product(s), and a detailed description of your problem. The support center will normally respond within two business hours. Business hours are 7:30 A.M. to 4:30 P.M., Central Time, Monday through Friday—except holidays.
- **Phone (615) 287-3400**, 7:30 A.M. to 4:30 P.M., Central Time, Monday through Friday—except holidays—for assistance from a technical support specialist. If a support specialist is not available, leave a voice mail message, or, in an urgent situation, speak to an operator who will process your request. The support center will normally respond within two business hours.

Be sure to have the product serial number ready. The serial number is located on the back of the control module.

### BEFORE BEGINNING

This bulletin assumes that:

- User understands the system configuration. (See Appendix B for system configuration worksheets.)

If you have questions concerning system installation or configuration, contact Square D.

**NOTE:** For a complete description of the POWERLINK AS system, see Appendix A.

### BULLETIN FORMAT

This bulletin is arranged in the following format:

- Section 1—General—gives important information to be read before using the control module.
- Section 2—Installation—explains how to properly install and remove the control module.
- Section 3—Programming Basics—explains the POWERLINK AS system and gives step-by-step directions for setting up control module communication parameters.
- Section 4—Troubleshooting—explains what to do for common problems with control module operation.
- Appendix A—System Components—describes the POWERLINK AS system components.
- Appendix B—Configuration Sheets—provides system configuration worksheets to use when programming the control module.
- Appendix C—Operation of Inputs in a POWERLINK AS System—provides a detailed description of input operation.
- Appendix D—Priorities—explains how the POWERLINK system avoids conflicts by assigning priorities.
- Appendix E—Sunrise/Sunset Data Tables—provides data for entering latitude information through POWERLINK software.

## SECTION 2—INSTALLATION

### INSTALLING CONTROL MODULE

1. Open panelboard cover.  
**Note:** The control module is installed with panelboard deadfront in place. Power to the panelboard does not need to be turned off to install or program the control module. **DO NOT REMOVE PANELBOARD DEADFRONT.**
2. Install control module onto power interface module (see figure 1).  
Position control module (A) with reset button (B) to the right. Align the two mounting holes on back of control module with power interface module mounting tabs (C). Push control module at points D until mounting holes snap onto power interface module mounting tabs. Do NOT apply force to display screen on module.  
**Note:** This also connects control module and power interface module connectors.
3. Set up control module's communications parameters as instructed in the user's guide.
4. Close panelboard door.

**Note:** While in *SETUP* mode, values may be changed as many times as needed; however, if no key is pressed for two and a half minutes, the module automatically exits *SETUP* mode.

### REMOVING CONTROL MODULE

Grasp control module (figure 2) by edges (A). Lift up until module comes free.

**Note:** If control module is removed, the *POWERLINK AS* circuit breakers will go to their default positions as specified by the "Default Controller Action" setting (either *ALL ON*, *ALL OFF*, *NO CHANGES*, or *RUN INPUTS*). This is set using *POWERLINK* software. Power does not need to be turned off to remove unit.

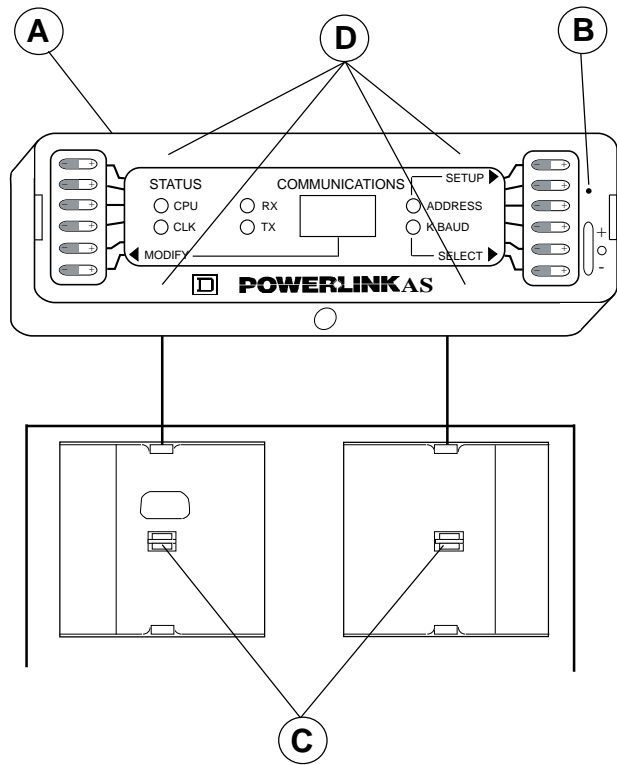


Figure 1

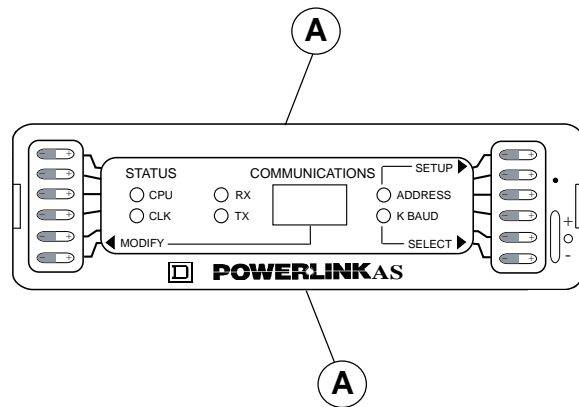


Figure 2

## SECTION 3—PROGRAMMING BASICS

## CONTROL MODULE DESCRIPTION

The POWERLINK AS Control Module (figures 3 and 4) is used to control operation of a POWERLINK AS system. It uses remotely operated circuit breakers to control up to 42 independent branch circuits. Control signals can originate externally from dry contact closures via external control devices or from commands received from the communications network, or internally from data entered into the control module.

The control module displays status and communication parameters using indicators (D, F, G) and an LED display (B). System configuration is done using selection keys (A) on both sides of the control module. In addition to the network connection, a temporary link is available using the RS-232 (serial) communications port (E). (If using the RS-232 port, serial communications cable #AS42CM-SC is required.) The control module can be reset manually by depressing the reset button (C) with a paper clip or similar tool. This will restart operation without affecting system configuration.

## PROGRAMMING

Control module programming is done locally using the RS-232 communications port or over a network via an IBM PC-compatible computer running POWERLINK software (refer to user's guides).

POWERLINK offers two software packages for programming control modules:

- (1) POWERLINK PLK101 Software (Class 3080, Type PLK101)
- (2) POWERLINK Circuit Manager Software (Class 3080, Type CMS-1000)

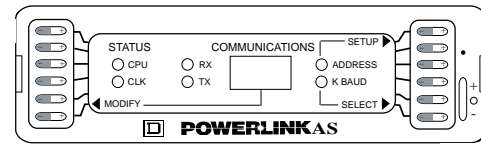
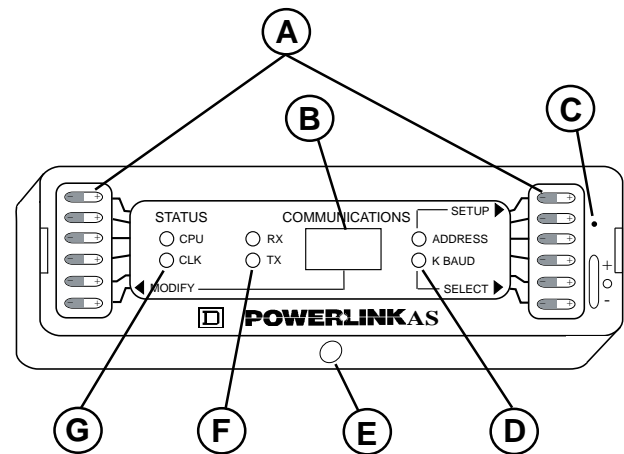


Figure 3



- A—SELECTION KEYS
- B—LED DISPLAY
- C—RESET BUTTON
- D—DISPLAY MODE INDICATORS
- E—RS-232 COMMUNICATIONS PORT
- F—COMMUNICATIONS ACTIVITY INDICATORS
- G—STATUS INDICATORS

Figure 4

### FRONT PANEL DESCRIPTION

The control module (figure 5) front panel (A) has two main headings: status and communications.

The STATUS area monitors the operating status of the module by using the following indicators:

Status Indicators (E):

CPU: Flashes slowly when the control module is in normal operation

CLK: Lights to indicate a “time of day” control module (AS42C-T)

The COMMUNICATIONS area monitors communications activity and allows you to set the module’s parameter values. Functions are as follows:

The display mode indicators (C) correspond to the “Address” and “K Baud” parameters. An indicator is lit when its parameter value is displayed.

The LED display (B) shows the current address or baud rate, as indicated by the display mode indicators.

*Note: Pressing the SELECT (lower right) key toggles the indicator light between “Address” and “K Baud,” allowing you to see the current value for each parameter in the LED display.*

Communications Activity Indicators (D):

RX: Flashes briefly anytime the control module receives communication information either over the network or using the RS-232 port.

TX: Flashes briefly any time the control module transmits communication information either over the network or using the RS-232 port.

The SETUP, SELECT, and MODIFY selection keys are used to set or change communications values. (See the “Setting Communications” section on the following page for instructions on using these keys.)

### SELECTION KEYS

The selection keys are used for viewing and setting communications parameters. Five selection keys are used in operating the control module. They are as follows:

The three communications setup keys – SETUP, SELECT, and MODIFY (marked by arrows)

The system security key (G) (top left key), described in the “System Security” section on the following page

The “version” key (F) (left side, third key down). Upon pressing this key, the LED display blinks three values: the control module version (first), the power interface module version (second), and the expander (if present) version (third).

*Note: The keys stay in a neutral position until actuated. Except when pressing the MODIFY selection key (described in the following section), you may press either the minus (-) or plus (+) side of the keys when setting communications values.*

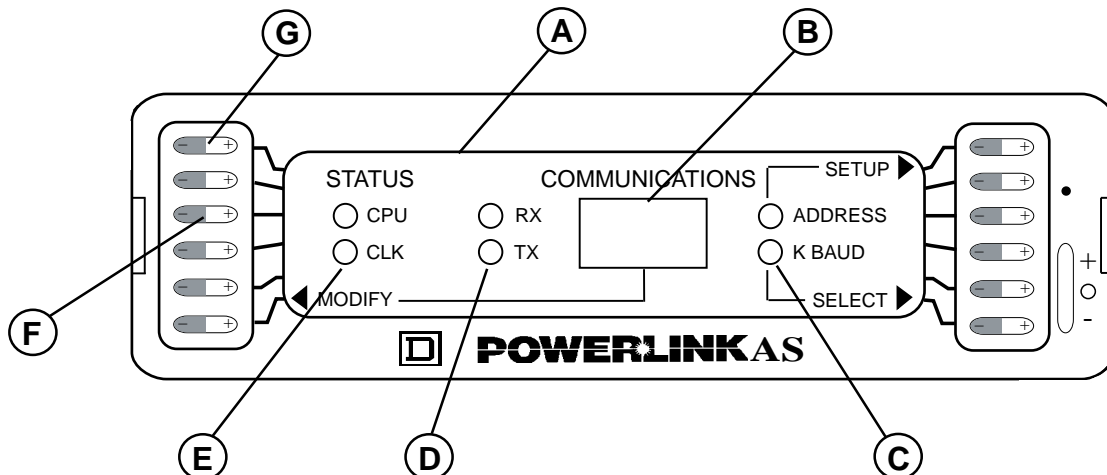


Figure 5

## POWER-UP/INITIALIZATION

Upon power-up or reset, the control module undergoes the following process:

- All LEDs turn on momentarily.
- Checksum test is performed. The LED display briefly shows “C - P” to indicate that checksum has passed.
- Initialization sequence begins. Decimal points in the LED display blink as the digits begin a countdown from 10 to 1.
- Module begins normal mode of operation, as follows:
  - Address indicator is lit.
  - LED display shows the current Address.
  - CPU indicator flashes slowly.
  - CLK indicator (if a “time of day” module) is lit.
  - Communication activity indicators may blink periodically.

## SYSTEM SECURITY

An optional security feature can be implemented in the control module, using POWERLINK software. This feature, when enabled, requires a user to press an unlabeled key before entering the SETUP mode.

### Enabling the Security Feature

To enable the security feature, refer to one of the POWERLINK Software User’s Guides: In both the PLK101 Software and Circuit Manager Software user’s guides, see “Defining Access Codes” in Chapter 5. Using the software, enter an access code (other than 0000) in the “Master” access code field; then send the information to the control module. To disable the security feature, re-enter “0000” in the “Master” access code field.

### Security Key

The security key is the top left key on the control module, as shown in the diagram on the previous page. If system security is enabled, you must press this key immediately (within 2.5 seconds) before pressing the SETUP key in the “Setting Communications” section. Otherwise, pressing the SETUP key results in a momentary display of “- - -,” indicating that access has been denied.

## SETTING COMMUNICATIONS

Set or change the control module’s network address and baud rate by following these steps:

**Note:** If the system security feature is enabled, you must press the unlabeled security key immediately before pressing the “Setup” key in step 1.

1. Press the SETUP key to enter the SETUP mode.  
The display mode indicator for the value shown in the LED display (Address or K Baud) blinks.
2. Press the SELECT key to display the value to be changed. (If the value to be changed is already displayed, go to step 3.)  
Pressing the SELECT key toggles between the current Address and K Baud values.
3. Press the MODIFY key to change the value displayed.

Pressing the plus (+) position increases the numerical value, and pressing the minus (-) position decreases the numerical value. Press the key once for a single increment; hold the key down for fast movement through the available increments.

To change the other value (Address or K Baud), press the SELECT key, and then follow instructions in the above paragraph again.

4. When you are satisfied that both communication values are correct, press the SETUP key to save the values and exit the SETUP mode.

Upon exiting the SETUP mode, the LED display momentarily shows the selected parameter values.

**Note:** While in SETUP mode, values may be changed as many times as needed; however, if no key is pressed for two and a half minutes, the module automatically exits SETUP mode.

## GETTING STARTED

When programming the control module using POWERLINK software, use the system configuration sheets from Appendix B to lay out the system and define system operation. Keep these sheets with the user’s guide so that future changes can be noted.

**SECTION 4—TROUBLESHOOTING**

If solutions below do not correct the problem, refer to **Section 1—Technical Support** for assistance.

CONDITION	POSSIBLE CAUSES	SOLUTION
<b>Control module LED and status indicators are not functional.</b>	<ol style="list-style-type: none"> <li>1. Panelboard is not energized.</li> <li>2. Control module is not receiving power from the power interface module.</li> <li>3. Power interface module is not operating.</li> </ol>	<ol style="list-style-type: none"> <li>1. Energize panelboard.</li> <li>2. Verify that control module is properly seated.</li> <li>3. Verify that power interface module is properly installed.</li> </ol>
<b>Control module displays "C-E" on power-up (checksum error).</b>	<ol style="list-style-type: none"> <li>1. Control module firmware incompatibility.</li> </ol>	<ol style="list-style-type: none"> <li>1. Upgrade required. Contact Technical Support at (615) 287-3400.</li> </ol>
<b>Circuit breaker does not respond to input.</b>	<ol style="list-style-type: none"> <li>1. Circuit breaker is tripped.</li> <li>2. Circuit breaker handle is OFF.</li> <li>3. Circuit breaker manual mode is engaged.</li> <li>4. Input not defined properly or is inhibited.</li> <li>5. Input is not programmed to operate circuit breaker.</li> <li>6. Circuit breaker is overridden.</li> </ol>	<ol style="list-style-type: none"> <li>1. Turn circuit breaker ON.</li> <li>2. Turn circuit breaker handle to ON.</li> <li>3. Disengage manual mode on circuit breaker.</li> <li>4. Define input type.</li> <li>5. Create program to operate circuit breaker from input.</li> <li>6. Release override for circuit breaker, or, if circuit breaker is part of a zone, release override for that zone.</li> </ol>
<b>Circuit breaker remotely switching ON or OFF at random.</b>	<ol style="list-style-type: none"> <li>1. Improper or multiple program commands assigned to same circuit breaker.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check input-based, time-based, and special date programs. Also check sunrise/sunset data programs.</li> </ol>
<b>Circuit breaker not responding to network command.</b>	<ol style="list-style-type: none"> <li>1. Network is not operating.</li> <li>2. Wrong address.</li> <li>3. Wrong baud rate.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check input connections and personal computer software diagnostic screens.</li> <li>2. Verify correct address is set.</li> <li>3. Verify baud rate matches network baud rate.</li> </ol>
<b>Circuit breakers do not switch at desired times.</b>	<ol style="list-style-type: none"> <li>1. Wrong day, date, or time (AS42C-T Only).</li> <li>2. Special holiday period (AS42C-T Only).</li> <li>3. Improper days of week selected(AS42C-T Only).</li> <li>4. Circuit breaker is overridden OFF by sunrise/sunset program (AS42C-T Only).</li> <li>5. Circuit breaker is tripped.</li> <li>6. Circuit breaker handle is OFF.</li> <li>7. Circuit breaker manual mode is engaged.</li> <li>8. Circuit breaker is overridden.</li> </ol>	<ol style="list-style-type: none"> <li>1. Enter correct day, date, and time.</li> <li>2. If current date is within a special date period, verify that a program is entered for that special date period.</li> <li>3. A day of the week must be selected for a time-based program.</li> <li>4. Check to see if circuit breaker is assigned to Sunrise/Sunset Circuits.</li> <li>5. Turn circuit breaker ON.</li> <li>6. Turn circuit breaker handle to ON.</li> <li>7. Disengage manual mode on circuit breaker.</li> <li>8. Release override for circuit breaker, or, if circuit breaker is part of a zone, release override for that zone.</li> </ol>

**Table 1**

## APPENDIX A—SYSTEM COMPONENTS

## POWERLINK AS SYSTEM

The POWERLINK AS system (figure 6) consists of two control buses (A), a panelboard (B), remotely operated circuit breakers (C), a power interface module (D), and a control module (E). If external control wiring is needed, a Class 2 wire barrier kit (F) is required. An alignment fixture (G) is provided with the control bus package.

The **Input Expansion Cabinet** is an optional, separate item that provides up to 48 additional inputs and 42 outputs. Refer to the POWERLINK Input Expansion Cabinet instruction bulletin. The cabinet is separately mounted within 50 feet of the panelboard.

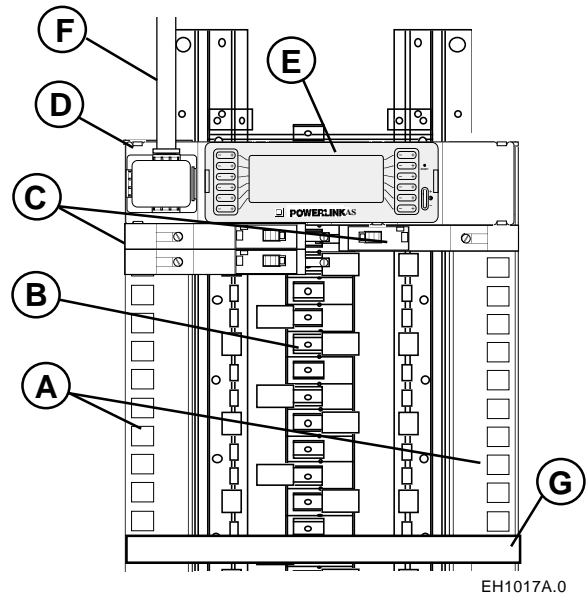


Figure 6

## CONTROL BUS

The control buses (figure 7) provide a control power data highway between POWERLINK AS remotely operated circuit breakers and the POWERLINK AS power interface module. Installed control buses will not interfere with the installation of standard circuit breakers into the panelboard.

**NOTE:** Always install identical control buses on the left and right sides of the panelboard. Control buses are shipped as matching pairs.

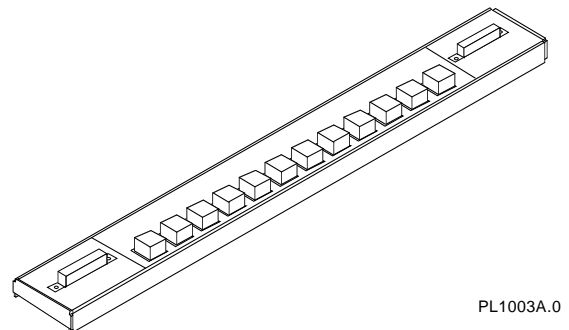


Figure 7

## REMOTELY OPERATED CIRCUIT BREAKERS

POWERLINK AS remotely operated Circuit Breakers (figure 8) provide the same overcurrent protection as standard circuit breakers, and have an integral operator which can remotely switch the circuit breaker ON and OFF. The circuit breaker works with POWERLINK AS control and power interface modules and control buses to provide a remote power switching system in a panelboard.

Each remotely operated circuit breaker has a switching mode button (H) to choose between automatic and manual modes. In automatic mode, the circuit breaker responds to signals from the power interface module. In manual mode, the circuit breaker will not respond to commands issued from the power interface module and assumes the status indicated by its handle.

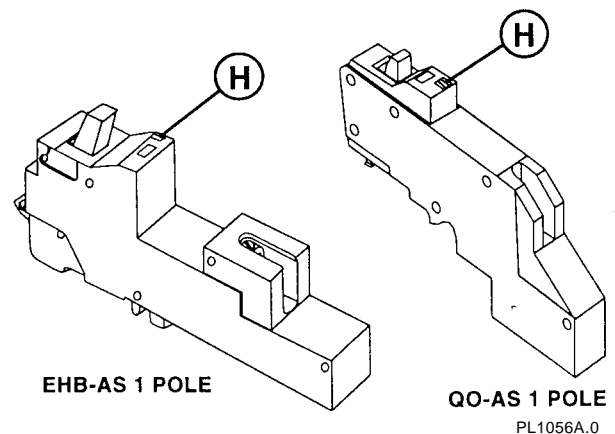


Figure 8

### POWER INTERFACE MODULE

The POWERLINK AS Power Interface Module (figure 9) provides power to the POWERLINK AS system and connections for field-installed external control devices.

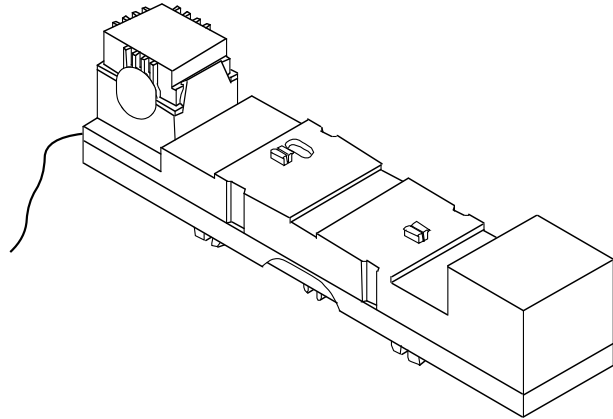


Figure 9

EH1006A.0

### CONTROL MODULE

The POWERLINK AS Control Module (figure 10) provides programmable control for POWERLINK AS remotely operated circuit breakers.

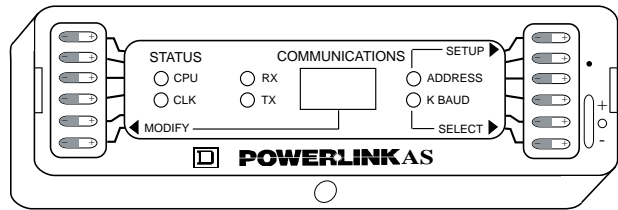


Figure 10

### BARRIER KIT

If external control wiring is used, a Class 2 barrier kit (figure 11) is required. If necessary, two barrier kits (one straight end and one angle end) may be used.

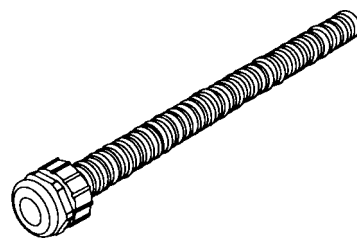


Figure 11

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## APPENDIX B—SYSTEM CONFIGURATION SHEETS

Use the system configuration sheets in this section during programming of the control module using POWERLINK software. Keep the completed configuration sheets with the software user's guide for use when making programming changes.

There is one copy of each sheet. Make copies of each sheet to use during programming. Retain the originals with this manual.

### POWERLINK® AS Panel Wiring Schedule (1-Phase)

Panelboard \_\_\_\_\_ Voltage \_\_\_\_\_ Phase 1 \_\_\_\_\_ Wire 3 \_\_\_\_\_ PNIM #, Network Address \_\_\_\_\_  
 Panel Type \_\_\_\_\_ Mains \_\_\_\_\_ Mains Rating \_\_\_\_\_ Short Circuit Current Rating \_\_\_\_\_  
 NEMA Type Enclosure \_\_\_\_\_ Mounting \_\_\_\_\_ Options \_\_\_\_\_ Interface Module Location \_\_\_\_\_  
 Software Filename \_\_\_\_\_ System File Name \_\_\_\_\_

Ckt No.	Zone	Load Description Zone Description	Bkr. Size ▲	Breaker Options	Conduit Wire	kVA	PHASE	kVA	Conduit Wire	Breaker Options	Bkr. Size ▲	Breaker Options	Load Description Zone Description	Zone	Ckt No.
<b>■ Recommended Location For Power Interface Module And Control Module</b>															
1							B								2
3							A								4
5							B								6
7							A								8
9							B								10
11							A								12
13							B								14
15							A								16
17							B								18
19							A								20
21							B								22
23							A								24
25							B								26
27							A								28
29							B								30
31							A								32
33							B								34
35							A								36
37							B								38
39							A								40
41							B								42
<b>■ Optional Location For Power Interface Module And Control Module</b>															

**Notes**

- Power interface module occupies 6 pole spaces.
  - ▲ All circuit breakers to be 20-Amp, 1-pole unless otherwise noted.
- Totals: ØA \_\_\_\_\_ kVA ØB \_\_\_\_\_ kVA Total \_\_\_\_\_ kVA

- Breaker Options  
 AS — POWERLINK AS BREAKER  
 LO — Handle lock-off device  
 ST — Shunt Trip Type  
 AUX — Auxiliary Contacts  
 PA — Handle Padlock Attachment  
 GFCI — Ground Fault Circuit Interrupter

Control Module Model \_\_\_\_\_  
 Serial Number \_\_\_\_\_  
 Date of Manufacture \_\_\_\_\_  
 Hardware Series \_\_\_\_\_  
 Firmware: U4: \_\_\_\_\_ U8: \_\_\_\_\_

Power Interface Model \_\_\_\_\_  
 Serial Number \_\_\_\_\_  
 Date of Manufacture \_\_\_\_\_  
 Hardware Series \_\_\_\_\_  
 Firmware: U7: \_\_\_\_\_

**POWERLINK<sup>®</sup> AS Panel Wiring Schedule (3-Phase)**

Panelboard \_\_\_\_\_ Voltage \_\_\_\_\_ Phase 3 Wire 4 PNIM #, Network Address \_\_\_\_\_  
 Panel Type \_\_\_\_\_ Mains \_\_\_\_\_ Mains Rating \_\_\_\_\_ Short Circuit Current Rating \_\_\_\_\_  
 NEMA Type Enclosure \_\_\_\_\_ Mounting \_\_\_\_\_ Options \_\_\_\_\_ Interface Module Location \_\_\_\_\_  
 Software Filename \_\_\_\_\_ System File Name \_\_\_\_\_

Ckt No.	Zone	Load Description Zone Description	Bkr. Size ▲	Breaker Options	Conduit Wire	kVA	PHASE	kVA	Conduit Wire	Breaker Options	Bkr. Size ▲	Load Description Zone Description	Zone	Ckt No.
<b>■ Recommended Location For Power Interface Module And Control Module</b>														
1							A							2
3							B							4
5							C							6
7							A							8
9							B							10
11							C							12
13							A							14
15							B							16
17							C							18
19							A							20
21							B							22
23							C							24
25							A							26
27							B							28
29							C							30
31							A							32
33							B							34
35							C							36
37							A							38
39							B							40
41							C							42

**■ Optional Location For Power Interface Module And Control Module**

**Notes**  
 ■ Power interface module occupies 6 pole spaces.  
 ▲ All circuit breakers to be 20-Amp, 1-pole unless otherwise noted.  
 Totals: ØA \_\_\_\_\_ kVA ØB \_\_\_\_\_ kVA ØC \_\_\_\_\_ kVA Total \_\_\_\_\_ kVA  
 Breaker Options: AS — POWERLINK AS BREAKER, LO — Handle lock-off device, ST — Shunt Trip Type, PA — Handle Padlock Attachment, AUX — Auxiliary Contacts, GFCI — Ground Fault Circuit Interrupter

Control Module Model \_\_\_\_\_ Power Interface Model \_\_\_\_\_  
 Serial Number \_\_\_\_\_ Serial Number \_\_\_\_\_  
 Date of Manufacture \_\_\_\_\_ Date of Manufacture \_\_\_\_\_  
 Hardware Series \_\_\_\_\_ Hardware Series \_\_\_\_\_  
 Firmware: U4: \_\_\_\_\_ U8: \_\_\_\_\_

<b>POWERLINK<sup>®</sup> AS Global Setup Schedule</b>																															
<p><b>System Response</b></p> <p>First Breaker Location <input style="width: 100px;" type="text"/></p> <p>Blink Notice <input style="width: 100px;" type="text"/></p> <p>Sequence Delay <input style="width: 100px;" type="text"/></p> <p>No Controller Present <input style="width: 100px;" type="text"/></p> <p>Initialization Mode <input style="width: 100px;" type="text"/></p> <p>Access Codes *                  Operator <input style="width: 100px;" type="text"/>                  Supervisor <input style="width: 100px;" type="text"/>                  Master <input style="width: 100px;" type="text"/></p>	<p style="text-align: right;">Panel Designation _____                  Software Filename _____</p> <p style="text-align: right;">PNIM, Network Address _____                  System Filename _____</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 80%;"></th> <th style="width: 20%; text-align: center;">Default</th> </tr> </thead> <tbody> <tr> <td>1 to 53 (odd numbers only)</td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="1"/></td> </tr> <tr> <td>0 - 60 minutes (0 = disabled)</td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="0"/></td> </tr> <tr> <td>0.25 to 10.00 seconds, 0.25 increments</td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="0.25"/></td> </tr> <tr> <td>Run Inputs, All On, All Off, No Change</td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="Run Inputs"/></td> </tr> <tr> <td>Send, Get</td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="Send"/></td> </tr> <tr> <td>0000-9999</td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="0000"/></td> </tr> <tr> <td>0000-9999</td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="0000"/></td> </tr> <tr> <td>0000-9999</td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="0000"/></td> </tr> <tr> <td colspan="2"> </td> </tr> <tr> <td>1200, 2400, 4800, 9600</td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="9600"/></td> </tr> <tr> <td>0 to 199 (0 = point to point)</td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="1"/></td> </tr> <tr> <td colspan="2"> </td> </tr> <tr> <td>Hours, Minutes</td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="0:00"/></td> </tr> <tr> <td>1 to 12</td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="6"/></td> </tr> </tbody> </table>		Default	1 to 53 (odd numbers only)	<input style="width: 50px;" type="text" value="1"/>	0 - 60 minutes (0 = disabled)	<input style="width: 50px;" type="text" value="0"/>	0.25 to 10.00 seconds, 0.25 increments	<input style="width: 50px;" type="text" value="0.25"/>	Run Inputs, All On, All Off, No Change	<input style="width: 50px;" type="text" value="Run Inputs"/>	Send, Get	<input style="width: 50px;" type="text" value="Send"/>	0000-9999	<input style="width: 50px;" type="text" value="0000"/>	0000-9999	<input style="width: 50px;" type="text" value="0000"/>	0000-9999	<input style="width: 50px;" type="text" value="0000"/>			1200, 2400, 4800, 9600	<input style="width: 50px;" type="text" value="9600"/>	0 to 199 (0 = point to point)	<input style="width: 50px;" type="text" value="1"/>			Hours, Minutes	<input style="width: 50px;" type="text" value="0:00"/>	1 to 12	<input style="width: 50px;" type="text" value="6"/>
	Default																														
1 to 53 (odd numbers only)	<input style="width: 50px;" type="text" value="1"/>																														
0 - 60 minutes (0 = disabled)	<input style="width: 50px;" type="text" value="0"/>																														
0.25 to 10.00 seconds, 0.25 increments	<input style="width: 50px;" type="text" value="0.25"/>																														
Run Inputs, All On, All Off, No Change	<input style="width: 50px;" type="text" value="Run Inputs"/>																														
Send, Get	<input style="width: 50px;" type="text" value="Send"/>																														
0000-9999	<input style="width: 50px;" type="text" value="0000"/>																														
0000-9999	<input style="width: 50px;" type="text" value="0000"/>																														
0000-9999	<input style="width: 50px;" type="text" value="0000"/>																														
1200, 2400, 4800, 9600	<input style="width: 50px;" type="text" value="9600"/>																														
0 to 199 (0 = point to point)	<input style="width: 50px;" type="text" value="1"/>																														
Hours, Minutes	<input style="width: 50px;" type="text" value="0:00"/>																														
1 to 12	<input style="width: 50px;" type="text" value="6"/>																														
<p><b>Communications</b></p> <p>Baud Rate <input style="width: 100px;" type="text"/></p> <p>Network Address <input style="width: 100px;" type="text"/></p>																															
<p><b>Sunrise/Sunset</b></p> <p>Today's Sunrise Time <input style="width: 100px;" type="text"/></p> <p>Latitude Band <input style="width: 100px;" type="text"/></p>																															
<p>* AS42CM and AS42CM-T only</p>																															

**POWERLINK<sup>®</sup> AS Special Date Schedule**

Panel Designation \_\_\_\_\_ Software Filename \_\_\_\_\_  
 PNIM, Network Address \_\_\_\_\_ System File Name \_\_\_\_\_

Special Date	Start Date (MM/DD)	End Date (MM/DD)	Description
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			

Special Date	Start Date (MM/DD)	End Date (MM/DD)	Description
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			

**POWERLINK® AS Input/Event Schedule**

Software File Name \_\_\_\_\_ Panel Designation \_\_\_\_\_

System File Name \_\_\_\_\_ PNIM, Network Address \_\_\_\_\_

DESCRIPTION		EVENT			OUTPUT ACTION				Blink Notice	
		Input Type	Input Timer	Time HH:MM	Day(s) SMTWTFS	Special Dates	ON Circuit(s)	Zone(s)		OFF Circuit(s)

**Notes:**  
 Refer to Special Date schedule for Special Date periods.  
 Blink Notice applies only to scheduled "OFF" events and inputs with timed "OFF".

## APPENDIX C—OPERATION OF INPUTS IN A POWERLINK AS SYSTEM

### INPUT SOURCES

A typical POWERLINK AS panel may have one or more of its 16 local inputs connected to a wall switch or other dry-contact device. However, POWERLINK AS can also accept input signals from remote sources, such as the POWERLINK AS Input Expansion Cabinet. It is important to understand the interaction of input sources when configuring a POWERLINK AS system.

Input control is handled within the power interface module. When an input changes state, all breakers programmed to respond to that input change state. The transition of the input source, not the final input state, is important to system operation. An OFF-to-ON transition is interpreted as an ON event, and an ON-to-OFF transition is interpreted as an OFF event. By triggering breaker operation via input transition, multiple sources can operate the same input, with breakers responding to the last command.

There are 64 input “channels” in each POWERLINK AS panel. Of these channels, 16 are internally connected to the eight input terminals inside the power interface module. The remaining channels are only available to remote devices.

### INPUT STATUS VIA NETWORK

Input status can be monitored via network communications (for example, using POWERLINK software). However, since more than one source may be controlling the same input, it is very important to understand what the status bits for an input represent.

Two bits of information represent each input: the “last input command state bit” and the “input command state unknown bit.” The power interface module interprets an input transition as an ON or OFF command. This command is recorded as the “last input command state.” For all input types except “priority maintained,” if panel power is interrupted, the last command state is lost and, therefore, the state is unknown when power is restored. This condition is indicated in the second of the two bits. The input command state unknown bit is available through communications, and should be used to qualify information contained in the last input command state bit. Any new transition of the input causes the system to learn a command state, and the input state is known again.

“Priority maintained” inputs control breakers with a priority level above that of other input types and time programs and below that of continuous overrides. The action of a priority maintained input is much like an override effected by turning on an input. When the input is ON (the last input command state is ON), the breakers are placed in the states indicated by the program; when the input is OFF (the last input command state is OFF), the program is ignored.

Input Operation Table

General Rules			Exceptions		
On Reset:			On Reset, if Input Type = Priority Maintained		
<u>Source</u>	<u>State</u>	<u>Unknown</u>	<u>Source</u>	<u>State</u>	<u>Unknown</u>
Local	0	1	Local	(State)	0
Expander	0	1	Expander	N/A	N/A
On Transition:			If Input Type = Inhibit		
<u>Source</u>	<u>State</u>	<u>Unknown</u>	<u>Source</u>	<u>State</u>	<u>Unknown</u>
Local	(State)	0	Local	N.C.	N.C.
Expander	(State)	0	Expander	N.C.	N.C.

Table 2

Notes:  
 Local = Physical input connection to power interface module  
 Expander = Input activity from expander  
 (State) = State of input signal either ON (1) or OFF (0)  
 N.C. = No change in bit status

The action of a priority maintained input in its OFF state is different from that of other input types. For other input types, (when an input is OFF), the breakers assume a state opposite of that indicated by the program. Also, priority maintained programs, unlike programs for other input types, take effect immediately after a program is created and the physical input is ON.

Do not confuse the input command state with the physical position of a switch. Momentary switches are closed only briefly, but the switch closures are translated into ON or OFF command states. Maintained switches stay closed when turned ON, but they only update the input command state when a transition occurs. The input command state may be turned OFF afterwards by another source. The control module, for example, commands an input programmed with an input timer OFF when the timer expires, changing the last input command state to OFF. It is possible for the input command state to be OFF, while the maintained switch connected to that input is closed.

Whenever an input type is changed to a type other than priority maintained, the input command state unknown bit is set, and the last input command state is set to OFF. For priority maintained inputs, because an internal command is generated during initialization, the input command state unknown bit is always clear. Input transitions, from any source, are ignored if the input type is set to “inhibit.”

## POWER-UP OPERATION

During power-up, the input command state unknown bits for inputs (except priority maintained inputs) are set, indicating the last input command state is not known. Priority maintained inputs (available for inputs 1–8 and 57–64 in the power interface module) are “automatically transitioned” after power interruption. This is useful in some applications. For example, if a priority maintained switch is closed at the time the panel is energized, this “automatic transition” causes breakers programmed to that input to respond as if the switch had transitioned closed. (If more than one local maintained input is assigned to control the same breaker, and the states of the inputs conflict, the lowest numbered input has priority.)

This feature is useful when it is important that the breakers synchronize themselves to the state of a switch on power-up. For example, contacts from a photosensor may transition ON at dusk, but this transition would be missed if the panel were being serviced at that time. When power is re-applied, this feature causes the lights by the photosensor to turn ON.

This feature may cause undesired operation in other applications. For example, if lights are commanded ON via a time event, but maintained wall switches are used to control the same lights, the state of the wall switch controls the lights after a power interruption. If the switch state is OFF, the lights turn off in response to the switch. For this reason, use momentary switches in applications where switches are used interactively with time schedules, or connect maintained switches through the input expansion cabinet.

## OPERATION WITH INPUT EXPANSION CABINET

Inputs connected to the input expansion cabinet are remote inputs, which only affect the input command state when the commands are received. The input expansion cabinet only sends input information on transitions.

Set the input range switch on the input expansion cabinet to the “9–56” position if any local inputs or maintained inputs are used (see figure 12). If the input range switch is in the “1–48” position, remote input 1 controls the same breakers as local input 1. Therefore, do not use local inputs if the input range switch is in the “1–48” position (see figure 13).



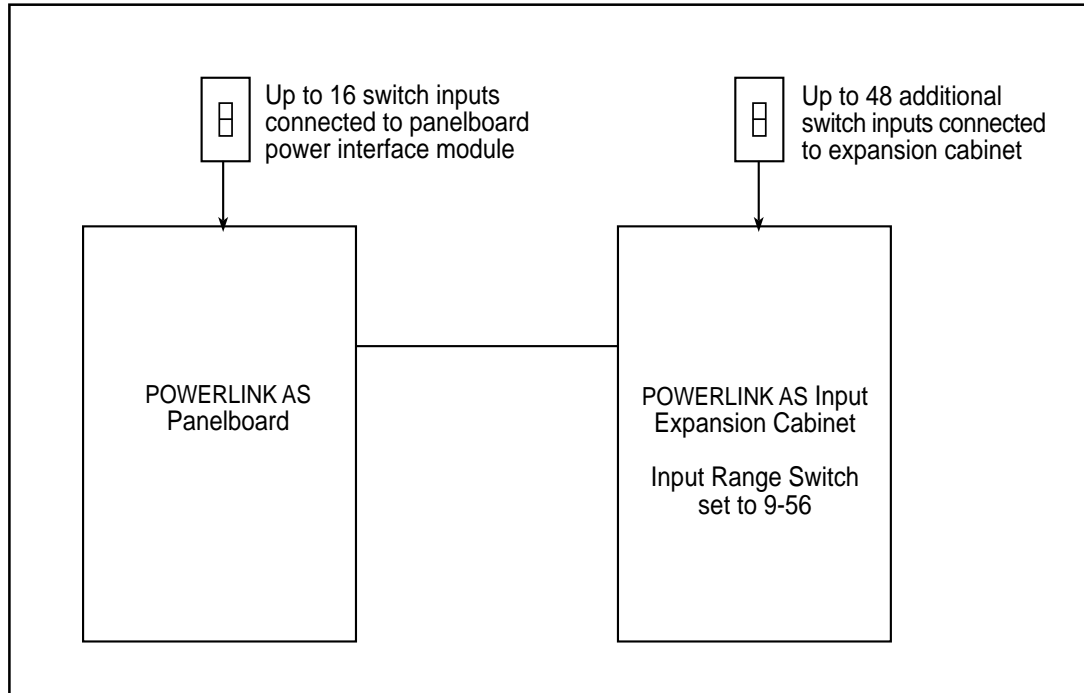


Figure 12

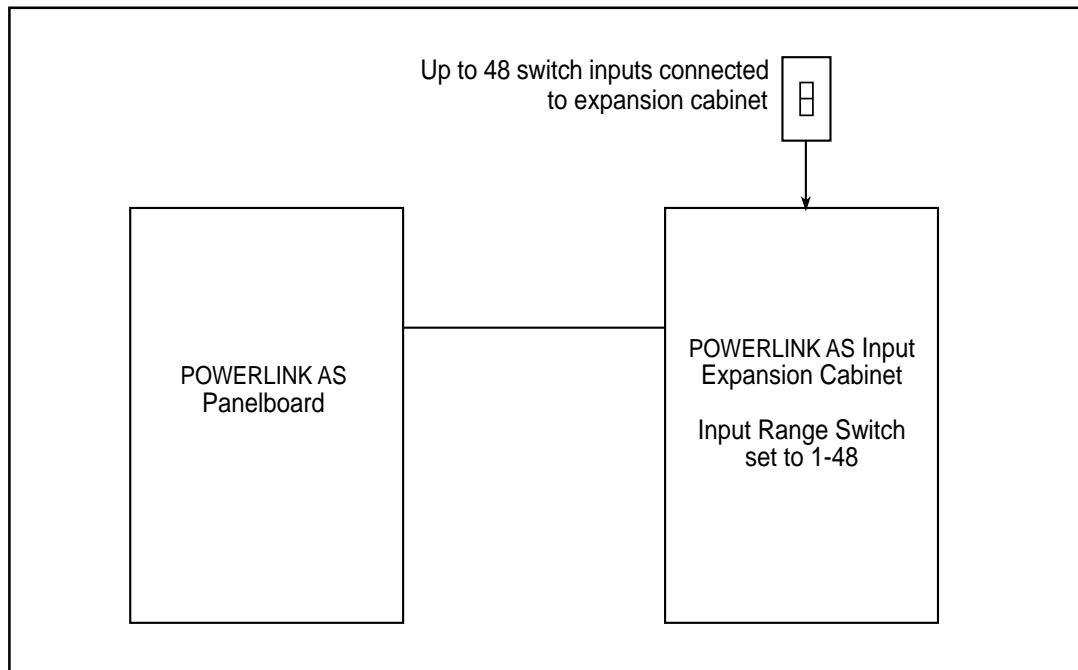


Figure 13

### APPENDIX D—PRIORITIES

There may be cases when the POWERLINK system receives conflicting commands. For example, a time-based event may tell a circuit breaker to turn ON, while at the same time an input event tells it to turn OFF. The POWERLINK system handles these conflicts by assigning priorities. Table 3 shows how the system assigns priorities.

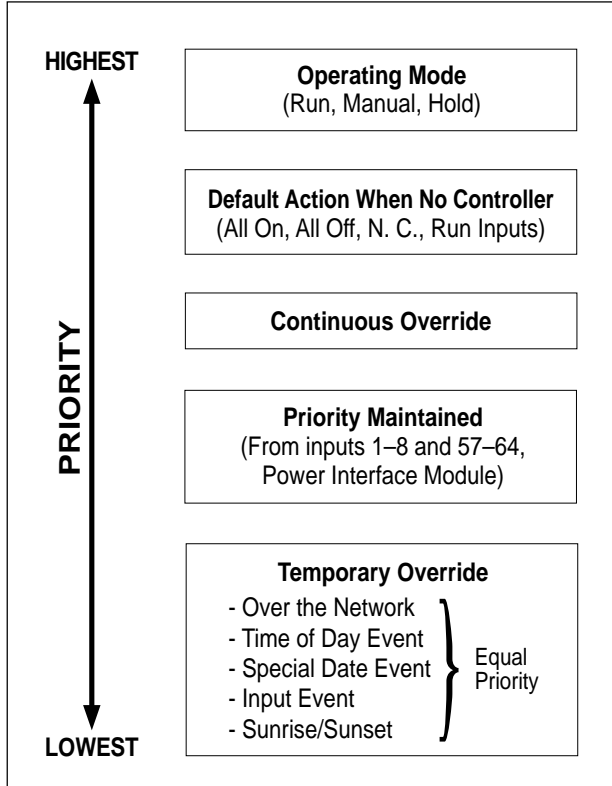
The four items in the temporary override category have equal priority. Items within a category are executed in the order in which they are received. The following example illustrates.

From a remote PC, you send a command over the network to temporarily override breaker 1, turning it OFF. A few seconds later, a time of day event occurs that is programmed to turn breaker 1 ON. Breaker 1 turns ON.

Priority maintained events take precedence over normal inputs and time programs but have a priority below that of continuous overrides. The following example illustrates:

Breakers 1–4 are controlled by two time-based events and an input event, (i.e., wall switch). The first time-based event is scheduled to turn the breakers ON at 7:00 AM weekdays, and OFF at 8:00 PM week nights. Input 1 is a 2-wire maintained contact input and is configured to be a priority maintained input type.

At 7:30 PM, breakers 1–4 are ON; it is desired to keep them on past the normal scheduled turn-off time. Input 1 can be switched ON, effectively overriding the scheduled OFF event at 8:00 PM. When input 1 is turned OFF, the breakers assume the state of the last active event (in this case, the last active event was OFF at 8:00 PM; therefore, breakers turn OFF when input 1 is turned OFF). If the input is turned OFF before 7:00 AM, the breakers turn OFF. If the input is turned OFF after 7:00 AM, the breakers remain ON.



**Table 3**

As table 3 shows, the operating mode has the highest priority, and temporary overrides have the lowest priority. The following examples illustrate.

**Example:**

(For this example, assume that you’ve set the *Default Action When No Controller* to ALL ON. ALL ON means that when the control module is removed from the panel, all circuits are turned ON.) At 7:00 p.m. a time of day event occurs that turns zone 1 OFF. At 7:05 p.m. you remove the control module from the panel. Since the *Default Action When No Controller* has higher priority than a temporary override caused by a time of day event, the breakers in zone 1 turn ON.

**APPENDIX E—SUNRISE/SUNSET DATA TABLES (AS42C-T Only)**

The following tables are used with the two POWERLINK Software User’s Guides to find the latitude bands for selected U.S. cities. (In the PLK-101 User’s Guide, see “Entering Sunrise/Sunset Data” in Chapter 4. In the CMS User’s Guide, see “Entering Sunrise/Sunset Data” in Chapter 5). Table 5 lists latitudes and latitude bands for major U.S. cities. Refer to table 4 to find the latitude band for any city not listed in table 5.

*Note: Sunrise and sunsets times are calculated based on the latitude at the center of the selected band, the current date, and the sunrise time on the day the data is entered.*

Latitude Band	Range
1	19°00' to 22°59'
2	23°00' to 26°59'
3	27°00' to 30°59'
4	31°00' to 34°59'
5	35°00' to 38°59'
6	39°00' to 42°59'
7	43°00' to 46°59'
8	47°00' to 50°59'
9	51°00' to 54°59'
10	55°00' to 58°59'
11	59°00' to 62°59'
12	63°00' to 66°59'

**Table 4**

Latitudes and Latitude Bands of U.S. Cities								
City and State	Lat.	Lat. Band.	City and State	Lat.	Lat. Band.	City and State	Lat.	Lat. Band.
Akron, OH	41° N	6	Durham, NC	36° N	5	Nashville, TN	36° N	5
Albany, NY	43° N	6	El Paso, TX	32° N	4	Newark, NJ	41° N	6
Albuquerque, MN	35° N	5	Eugene, OR	44° N	7	New Haven, CT	41° N	6
Allentown, PA	41° N	6	Fairbanks, AK	65° N	12	New Orleans, LA	30° N	3
Amarillo, TX	35° N	5	Fargo, ND	47° N	7	New York, NY	41° N	6
Anchorage, AK	61° N	11	Flagstaff, AZ	35° N	5	Niagara Falls, NY	41° N	6
Ann Arbor, MI	42° N	6	Fort Wayne, IN	41° N	6	Nome, AK	64° N	12
Asheville, NC	36° N	5	Fort Worth, TX	33° N	4	Norfolk, VA	37° N	5
Atlanta, GA	34° N	4	Gainesville, FL	30° N	3	Oakland, CA	38° N	5
Augusta, GA	33° N	4	Galveston, TX	29° N	3	Oklahoma City, OK	35° N	5
Austin, TX	30° N	3	Gary, IN	42° N	6	Omaha, NE	41° N	6
Baltimore, MD	39° N	6	Grand Rapids, MI	43° N	7	Peoria, IL	41° N	6
Bangor, ME	45° N	7	Green Bay, WI	44° N	7	Philadelphia, PA	40° N	6
Baton Rouge, LA	30° N	3	Greenville, SC	35° N	5	Phoenix, AZ	33° N	4
Biloxi, MS	30° N	3	Harrisburg, PA	40° N	6	Pittsburgh, PA	40° N	6
Birmingham, AL	34° N	4	Hartford, CT	42° N	6	Pocatello, ID	43° N	6
Bismarck, ND	47° N	7	Honolulu, HI	21° N	1	Portland, ME	44° N	7
Boise, ID	44° N	7	Houston, TX	30° N	3	Portland, OR	46° N	7
Boston, MA	42° N	6	Indianapolis, IN	40° N	6	Providence, RI	42° N	6
Brattleboro, VT	43° N	6	Iowa City, IA	42° N	6	Provo, UT	40° N	6
Bridgeport, CT	41° N	6	Jacksonville, FL	30° N	3	Reno, NV	40° N	6
Buffalo, NY	43° N	6	Joplin, MO	37° N	5	Richmond, VA	38° N	5
Butte, MT	46° N	7	Juneau, AK	58° N	10	Rochester, NY	43° N	7
Casper, WY	43° N	6	Kalamazoo, MI	42° N	6	St. Louis, MO	39° N	5
Charleston, SC	33° N	4	Kansas City, MO	39° N	6	Salt Lake City, UT	41° N	6
Charlotte, NC	35° N	5	Knoxville, TN	36° N	5	San Francisco, CA	38° N	5
Chattanooga, TN	35° N	5	Lancaster, PA	40° N	6	Santa Fe, NM	36° N	5
Cheyenne, WY	41° N	6	Las Vegas, NV	36° N	5	Savannah, GA	32° N	4
Chicago, IL	42° N	6	Lincoln, NE	41° N	6	Seattle, WA	48° N	8
Cincinnati, OH	39° N	6	Little Rock, AR	35° N	4	Shreveport, LA	32° N	4
Cleveland, OH	42° N	6	Los Angeles, CA	34° N	4	Sioux Falls, SD	44° N	7
Columbus, OH	40° N	6	Louisville, KY	38° N	5	Syracuse, NY	43° N	7
Concord, NH	43° N	7	Macon, GA	33° N	4	Tallahassee, FL	30° N	3
Dallas, TX	33° N	4	Madison, WI	43° N	7	Texarkana, TX	33° N	4
Dayton, OH	40° N	6	Memphis, TN	35° N	5	Topeka, KS	39° N	6
Daytona Beach, FL	29° N	3	Miami, FL	26° N	2	Tulsa, OK	36° N	5
Denver, CO	40° N	6	Milwaukee, WI	43° N	7	Tucson, AZ	32° N	4
Des Moines, IA	42° N	6	Minneapolis, MN	45° N	7	Utica, NY	43° N	7
Detroit, MI	42° N	6	Mobil, AL	31° N	3	Washington, DC	39° N	5
Dubuque, IA	42° N	6	Montgomery, AL	32° N	4	Wichita, KS	38° N	5
Duluth, MN	47° N	7	Montpelier, VT	44° N	7	Wilmington, DE	40° N	6

**Table 5**



## GLOSSARY

**barrier kit** = provides a physical barrier between the panel and system external control wiring.

**baud rate** = specifies how fast data is transmitted across a network port.

**circuit breaker** = a device designed to open and close a branch circuit by non-automatic means and to open the circuit automatically on an overcurrent without damage to itself when properly applied within its rating.

**continuous current rating** = the designated rms alternating current in amperes which a device or assembly will carry continuously without tripping.

**control bus** = provide connection between POWERLINK AS remotely operated circuit breakers and the POWERLINK AS power interface module.

**control module** = provides programmable control for POWERLINK AS remotely operated circuit breakers.

**event** = input change used to trigger operation of a remotely operated circuit breaker. (For maintained contacts, a close or an open. For momentary contacts, a closure.)

**input** = control signal received by POWERLINK AS system input connections.

**interface module** = see power interface module.

**internal date** = date maintained by the control module memory.

**internal time** = time maintained by the control module memory.

**interrupting rating** = highest current at rated voltage available at the incoming terminals of the circuit breaker. The circuit breaker interrupting rating must be equal to or greater than the available short-circuit current at the point where the circuit breaker is applied to the system.

**key** = see selection key

**latitude** = line running east-west used to give distance north or south from the equator measured through 90°.

**network** = an interconnected group of processing equipment, such as personal computers, which can communicate with each other.

**overcurrent** = any current in excess of the rated continuous current of equipment or the ampacity of a conductor.

**override** = program instruction which sets aside the normally programmed operation.

**password** = see access code

**power interface module** = controls POWERLINK AS remotely operated circuit breakers via POWERLINK AS control bus.

**POWERLINK AS system** = provides a remote power switching system in a panelboard for controlling lighting and other electrical loads.

**programming** = instructions entered into POWERLINK software, telling the control module how to operate the circuits under its control.

**priorities** = assigned by the POWERLINK AS system to handle conflicting commands in order of importance.

**remotely operated circuit breaker** = circuit breakers with an integral operator which can turn the circuit breaker on or off.

**RS-232 port** = input connection on the bottom of the control module for RS-232 cable.

**screen** = LED screen on the control module face used to view and set up communications in the control module.

**selection key** = switch on control module used to set up communication parameters.

**special dates** = dates which are exceptions to regular operation dates.

**sunrise/sunset circuit** = circuits which interact with time-based programs so that the circuits are on at the programmed times only if they are also between sunset and sunrise, plus or minus an offset time.

**system configuration** = how the system is set up.

**terminal block** = the connections for control wiring.

**time-based** = operation is based on time of day.

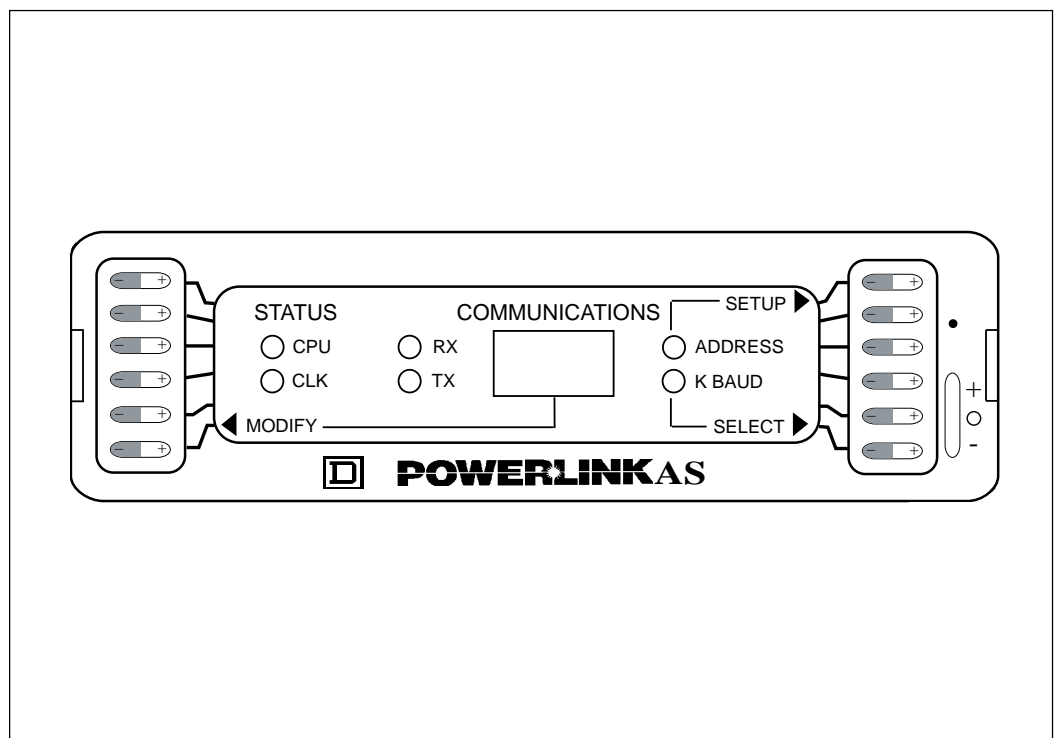
**troubleshooting** = evaluating and correcting problems in operation.

**zones** = a group of circuits which can be programmed to operate together.





# POWERLINK® AS Control Module AS42C And AS42C-T User's Guide



**Retain this bulletin for future reference.**

**Federal Communications Commission  
Radio Frequency Interference Statement**

NOTE: This equipment complies with the requirements in part 15 of FCC rules for a Class A computing device. Operation of this equipment in a residential area may cause unacceptable interference to radio and television reception, requiring the operator to take whatever steps are necessary to correct the interference.

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