



# PLC/RS-485 Adapter User's Guide

PL7070-COM

**PlugLink**<sup>®</sup>  
by Asoka<sup>®</sup>

**QUICKFIND LOCATOR**

**Contact**

**Information**

**Getting Help**

**Table of Contents**

**Installation**

66-0386-01Rev.001

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Revision	Date	Description
66-0386-01Rev.001	Aug. 2013	Preliminary Release

## Changes in This Revision

- Not applicable (preliminary release)

## Contact Information

For more information about the **PLC/RS-485 Adapter** or any of Asoka's other leading-edge solutions, please contact us using any of the following methods:

- **Voice calls:** We welcome your calls Monday through Friday, from 9:00 am to 5:00 pm Pacific Time at (408) 550-8167. Voice mail is available during non-business hours.
- **Email:** If you prefer, you can send information requests to our e-mail address: [sales@asokatech.com](mailto:sales@asokatech.com).
- **Fax calls:** You can also send your requests for information to our 24-hour fax number: (408) 884-2390.
- **Web site:** Our Web site contains valuable information about our products, solutions, and services. We encourage you to visit us at <http://www.asokatech.com>.

## Getting Help

Asoka USA backs its products with unparalleled customer service and technical support for our valued customers.

### Customer Service

Customer service, the customer-satisfaction arm of Asoka USA, is available Monday through Friday, from 9:00 am to 5:00 pm Pacific Time, by calling (408) 550-8167 or emailing [custserv@asokatech.com](mailto:custserv@asokatech.com)

### Technical Support

Technical support is available Monday through Friday, from 9:00 am to 5:00 pm Pacific Time, by calling (408) 550-8173 or through email at [support@asokatech.com](mailto:support@asokatech.com).

Please provide the following information about the problem:

- Product name, model number, part number (if applicable) and serial number
- System configuration, including a description of the devices connected to your PL7070-COM
- The circumstances surrounding the error or failure
- A detailed description of the problem and what has been done to try to solve it

# Table of Contents

1

<b>Installation Setup</b> .....	<b>5</b>
Package Contents.....	5
Finding a Suitable Location .....	5
Simple Connection (Peer to Peer) .....	6
<b>Troubleshooting</b> .....	<b>7</b>
<b>Specifications</b> .....	<b>8</b>
RS-485 DB9 Male pinout assignment .....	9
<b>Components</b> .....	<b>10</b>
<b>Warranty</b> <b>14</b>	
<b>FCC Notice</b> .....	<b>16</b>

# 1

## Installation Setup

Congratulations on your purchase of the PL7070-COM PLC/RS-485 Adapter.

The PL7070-COM adapter allows you to transmit RS-485 data between two points via the existing electrical wiring by simply plugging the PL7070-COM directly into an electrical outlet. The PL7070-COM acts as a bridge for the RS-485 signal. This manual describes how to install your PL7070-COM PLC/RS-485 Adapter.

### Package Contents

- Two (2) PLC/RS-485 Adapters(PL7070-COM)
- Quick Installation Guide
- Warranty and Support Information Card




If any of the parts are incorrect, missing, or damaged, contact the retailer where you made your purchase. Keep the carton, including the original packing materials, in case you need to return the unit for repair.

### Finding a Suitable Location

Find a suitable location to install your PL7070-COM adapters. If possible, find a location that has:

- Acceptable temperature and humidity ranges (see the PL7070-COM specifications on page 9)
- Free of strong electromagnetic field generators (such as motors), vibration dust and direct exposure to sunlight.
- An electrical outlet for your PL7070-COM adapter that is within the RS-485 distance specs.

## Simple Connection (Peer to Peer)

 **NOTE:** Do not plug the PL7070-COM adapter into a power strip, UPS (Uninterruptable Power Supply) or surge protector device. This may prevent the unit from working properly or degrade the PLC (Powerline communication) network performance.

1. Connect one PL7070-COM device to your Solar Inverter with an RS-485 cable (twisted wire); then plug it into a wall outlet. For the PL7070-COM Pin Out Wiring Specifications, see page 11.
2. Connect the other PL7070-COM device to your Data logger with an RS-485 cable (twisted wire); then plug it into a wall outlet.
3. Set the Baud Rate on both adapters to the same Baud Rate (speed) as the Solar Inverter and the Data Logger. You can change the Baud Rate by pressing on the Baud Rate Key (see page 10 for the location of the Baud Rate Key button). For additional information on how to use the Baud Rate Key button, see page 13.
4. See Figure-1 below for your reference.

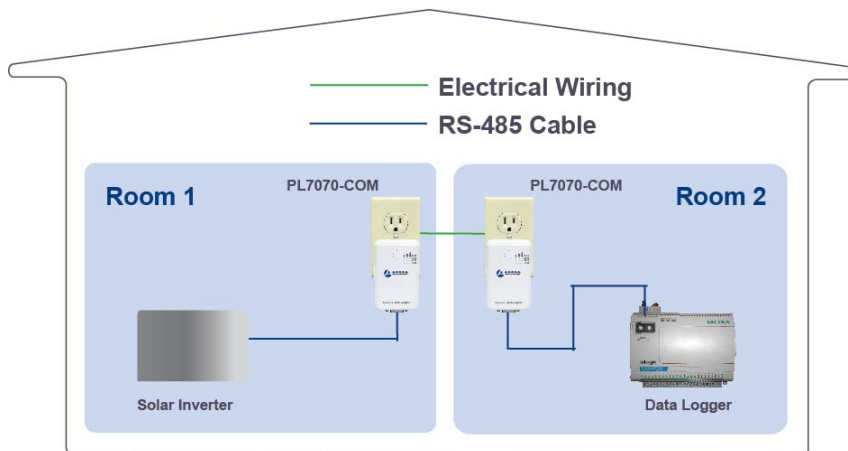


Figure-1 Solar Inverter and Data Logger connection via PL7070-COM PLC adapters.



**Congratulations!** You have completed the installation of the PL7070-COM.

# 2

## Troubleshooting

Following are solutions to a few situations you might encounter. If you do not find a solution in this chapter, contact Asoka USA Technical Support by phone at (408) 550-8173 or through email at [support@asokatech.com](mailto:support@asokatech.com).

### Symptom:

I can't connect to anything and there are no lights (LED) activity on my PL7070-COM.

### Solution:

- Unplug the device from the electrical outlet in question.
- Locate another available outlet.
- Test the outlet by plugging in an electrical device such as a lamp or radio.
- Plug the PL7070-COM into the working electrical outlet.
- Check to see if the lights (LED) work
- If the above does not work, the device might be defective.
- At this point, please contact Asoka Technical Support for instructions on returning the device for repair or replacement.

### Symptom:

The lights seem to be functioning, however, the solar inverter and data logger do not communicate (no connection).

### Solution:

- Check the Baud rate on both PL7070-COM (front Baud rate LED indicator), the Baud rate must be the same on both PL7070-COM devices. If the Baud is not the same, simply press the Baud rate button to change it to the correct speed.



## Specifications

This appendix lists the specifications for your PL7070-COM adapter.

Standards Compliance:	•HomePlug® AV • IEEE 802.3, IEEE 802.3x, IEEE 802.3u, IEEE1901
Network Interface:	RS-485
PHY-Rate:	Up to 200 Mbps
Distance:	Over 300 meters
Operating Frequency:	2 to 30 MHz
Modulation Schemes:	• Orthogonal Frequency Division Multiplexing (OFDM) • QAM 1024/256/64/16 • QPSK • BPSK
EMI and Safety:	• FCC Part 15 Class B • UL (US and Canada) • CE
Additional Protocols:	Two-wire RS-485, A bridge between RS-485 and PLC
Power Supply:	• US Version: 100-120VAC • UK/EU Version: 220-240VAC
Surge Energy Rating:	4KV
Power Rating:	• 100-240VAC , 0.1A, 50-60Hz
Security:	128-bit AES



Environmental Specifications:	<ul style="list-style-type: none"> <li>• Operating temperature: 32°F to 113°F (0°C to 45°C) for EU plug</li> <li>• Operating temperature: 32°F to 95°F (0°C to 35°C) for US plug</li> <li>• Operating humidity: 10% to 85% Non-condensing</li> <li>• Storage temperature: -4°F to 158°F (-20°C to 70°C)</li> <li>• Storage humidity: 5% to 90% Non-condensing</li> </ul>
Warranty:	lifetime

Table-A1

## RS-485 DB9 Male pinout assignment

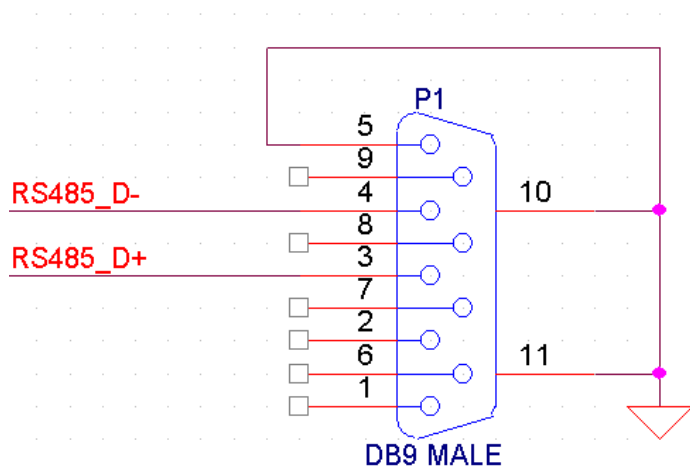


Figure-A2 RS-485 pin assignment (electrical characteristics)

- DB9\_pin3 is RS-485\_D+
- DB9\_pin4 is RS-485\_D-
- DB9\_pin5 is GND



## Components

### Front Panel

Use the status lights on the front and side panel to verify connections.



Picture-B1

The following table describes the status light functions in the front and side panel:

Status Light	State	Indication
Power	Illuminated	Device is powered on
	Off	Devices has no power
PLC Activity	Blinking Red	Low connection
	Blinking Yellow	Good connection
	Blinking Green	Excellent connection
Baud Rate	ON	RS-485 Baud Rate Indicator Ready
	Blinking Green	Data transmitting on the RS-485 connector

Table-B2

### Bottom Side

The bottom panel of the PL7070-COM contains the following component:

- One RS-485 serial DB9 Male Connector



Picture-B2

## Rear Panel

The label on the rear panel of the P L 7 0 7 0 - C O M (PLC/RS-485) Adapter contains the information listed below.

- MAC address
- Model number
- Part number
- Serial number
- PLC DAK
- PLC MAC
- Dest MAC

Note: Write this information down in your Warranty Support Information card for future reference.



Figure-B1

## Buttons

The PLC/RS-485 Adapter device has two hardware push buttons:

**SECURITY (Network ID) button** - All PLC/RS-485 Adapter devices have a default Network Encryption Key (NEK) set to "HomePlugAV" allowing them to communicate to each other. The SECURITY button allows you to set a device to a randomized Network Encryption Key (NEK) for maximum security. You can then set other devices to the same NEK by using their SECURITY button. Only units with the same NEK can communicate to each other.

### Baud Rate Key button and lights:

1. This button allows you to change the Baud Rate speed to 1200,9600 and 19200. The two PL7070-com device baud rate should be same.
2. The Baud Rate light will start to flashing if data is passing through the RS-485 Connector.
3. **Locking and Unlocking the Baud Rate:**
  - To lock a specific Baud Rate on the PL7070-COM adapter, simply press the Baud Rate Key button for about 8 seconds. The correspond led will flash if the time is reached, meaning that the baud rate is locked. To Unlock the Baud Rate, press the Baud Rate Key button again for about 8 seconds; then it will unlock, or powering OFF then ON will unlock the baud rate.

## SETTING A RANDOMIZED PLC NETWORK PASSWORD (NEK)



PLC ACT light  
Power light



Device A



Device B

1. Select a PL7070-COM Adapter (Device A) and plug into an AC outlet. The POWER light indicator should be lit solid green.
  - a. Press the SECURITY button BRIEFLY (0.5 to 2 seconds) and release. The POWER light should now be blinking green.
  - b. **IMPORTANT:** If the POWER light is not blinking green, repeat Step "a" until the power light blinks green.
  - c. This unit is now ready to create a new randomized NEK (Net Encryption Key) network. This unit will remain in this "adder" mode for about 2 minutes.
2. Select another PL7070-COM Adapter (Device B) and plug into a second outlet.
  - a. Press the SECURITY button BRIEFLY (0.5 to 2 seconds) and release. The POWER light should now be blinking green.
  - b. **IMPORTANT:** If the power light is not blinking green, repeat Step "a" until the power light is blinking green.
3. In about 15 seconds the POWER light will change from flashing green to solid green and the PLC ACT (Power line Communication Activity) light will turn solid green (flashing green when there is data traffic) indicating they are synchronized with the same NEK.
4. Congratulations, you are done!



## Warranty

Asoka warrants that (a) the hardware components of the product will be free from defects in materials and workmanship under normal use from the date of purchase when used within the limits set forth in the Specifications section of the User Guide, and (b) the software components will perform substantially in accordance with Asoka's published specifications for ninety (90) days from the date of purchase, but does not warrant that the software will be error-free or free of all defects.

Should a product fail to perform as described in the User Guide, it will be repaired or replaced with the same or functionally equivalent product by Asoka, at its discretion, free of charge provided that you: (a) return the failed product to an Asoka designated repair facility with shipping charge prepaid, and (b) provide Asoka with proof of the original date of purchase. Repaired or replacement products will be returned to you with shipping charges prepaid. Asoka warrants any replaced or repaired product or component for the life of the product.

This warranty extends only to you, the original purchaser and is not transferable to any subsequent purchasers.

This warranty does not apply if, in the judgment of Asoka, the product fails due to damage from shipment, handling, storage, accident, abuse, misapplication or misuse, or if it has been used or maintained in a manner not conforming to product manual instructions, has been modified in any way, or has had any serial number removed or defaced. Repair by anyone other than Asoka or an approved agent will void this warranty. The maximum liability of Asoka under this warranty is limited to the purchase price of the

product covered by the warranty. Prior to returning any defective product, the purchaser or the authorized merchant from whom the purchaser originally bought the product must obtain a Return Material Authorization (RMA) number from Asoka. All defective products should be returned to Asoka with shipping charges prepaid. Asoka will not accept collect shipments.

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## FCC Notice

### FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct

The interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help

This device complies with Part 15 of FCC Rules.

Operation is subject to the following two conditions:

This device may not cause harmful interference, and

This device must accept any interference received, including interference that may cause undesired operation.



## FCC RF Radiation Exposure Statement

**Note:** The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. such modifications could void the user's authority to operate this equipment.

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66-0386-01Rev.001