ROTEM®

Control & Management

RLINK

Wireless Communication

User & Installation Manual

P/N: 110105

www.rotem.com

Take Control©

Warranty & Limitation of Liability

1. ROTEM warrants that the product shall be free of defects in materials or workmanship and will conform to the technical specification for a period of 1 (one) year from the date of initial installation on site (the "warranty period").

2. ROTEM warrants that during said warranty period, any item/items or part/parts of equipment found defective with respect to materials or workmanship or which do not conform to the technical specification shall be repaired or replaced (at ROTEM's sole discretion), free of charge.

3. During the warranty period, in the event of an alleged defect, authorized resellers in relevant regions should be notified as soon as possible from the date of noticing the said defect, but no longer than thirty (30) days from such a discovery. The report shall include (1) a short description of the defects noticed (2) type of card / component and its matching serial number.

4. ROTEM's sole liability under this warranty is the repair or replacement of the defective item of product.

5. Load cells are not covered by ROTEM's warranty.

Conditions and Limitations

1. ROTEM will not be responsible for any labor costs or expenses associated with replacement of defective items or other parts of the product or repair.

2. This warranty shall not cover: (i) product or part therein which has been modified (without prior written approval of ROTEM), or (ii) product or part therein which has not handled or installed by an authorized reseller of ROTEM or (iii) product or part therein which has either handled or installed not in strict accordance with ROTEM's instructions, (iv) products which were used for function other than agriculture industry.

3. This warranty will not apply in the following cases: (i) if all components of the product are not originally supplied by ROTEM (ii) the defect is the result of an act of nature, lighting strikes, electrical power surge or interruption of electricity (iii) the defect is the result of accident, misuse, abuse, alteration, neglect, improper or unauthorized maintenance or repair.

ROTEM warns and alerts all users that the Product is inherently complex and may not be completely free of errors. ROTEM's products are designed and manufactured to provide reliable operation. Strict tests and quality control procedures are applied to every product. However, the possibility that something may fail beyond our control exists. Since these products are designed to operate climate control and other systems in confined livestock environments, where failure may cause severe damage, the user should provide adequate backup and alarm systems. These are to operate critical systems even in case of a ROTEM system failure. Neglecting to provide such a backup will be regarded as the user's willingness to accept the risk of loss, injury and financial damage.

In no event will ROTEM be liable to a user or any third party for any direct, indirect, special, consequential or incidental damages, including but not limited to any damage or injury to business earnings, lost profits or goodwill, personal injury, costs of delay, any failure of delivery, costs of lost or damaged data or documentation, lost or damaged products or goods, lost sales, lost orders, lost income.

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Software Version: **1.0.1**

Document Version: **2.7**

Table of Contents

1 FRONT MATTER

This section includes information on the manual and general information.

1.1 Introduction

Rotem manuals provide easy-to-use information regarding the installation, operation, long/short term planning and parts listing (this manual may not deal with all of the above subjects). The table of contents is an outline of the relevant information in this manual. Read this manual before operating your Rotem product. Using this equipment for any other purpose or in a way not within the operating recommendations specified in this manual will void the warranty and may cause personal injury. If you have any questions or comments regarding your product please contact your local Rotem dealer.

1.2 Conventions

NOTE: Notes provide important details regarding specific procedures.

CAUTION **Cautions alert you to potential damage to the controller if the procedures are not followed carefully.**

1.3 Contact Information

Rotem Control and Management Email: support@rotem.com **URL**: www.rotem.com

1.4 Document Information

Revision Level / Date	Section	Description
1.0		Release Document
1.1 / May 2011	multiple	Added front material, sample network diagram, package details, diagrams added and exact distances erased, installation procedure corrected and wiring diagrams added, DIP switch configuration changed, ordering info added
1.2 / July 2011	2.2 / 7	Removed battery warning/ updated ordering information
1.3 /Nov 2011	2.2	Added safety zone warning
1.4/ Dec 2011	5.2	Added wiring diagrams
1.5 /April 2012	3.2/5.1	Power supply changed
1.6 / July 2012	6	Added ambient temperature
1,7 / October 2012		Corrected Figures 1, 8, 9, & 17
1.8 / March 2013	5.1	Added note about installation height
1.9 / April 2013	5.4	Changed procedure
2.0 / June 2013	5.2.3	Changed Figure 14 / added Figure 15
2.1 / August 2013	5.1.1	Added section
2.2 / October 2013		Added grounding information
2.3 / Sept 2014	5.4	Added section
2.4 / Jan 2015	5.4	Edited section
2.5 / April 2015	3.2/5.4.3/8.2	Edited multiple sections, added sections
2.6 / March 2016		Removed 100 mWatt, edited wiring diagrams
2.7 / Nov 2016	5.3.2	Edited wiring diagram

2 PRECAUTIONS

- Grounding
- RF Safety Zone

2.1 Grounding

- The COM connection for communications is not the shield wire. The COM, RX and TX wires must connect to each other at all controllers.
- To ensure product functionality, proper grounding of the RLINK and controllers is essential. **Review all instructions (mounting and wiring)** before installing the unit.

2.2 RF Safety Zone

- When operating an RLINK 1 Watt unit, keep a distance of 7 feet / 2 meters between you and the RLINK.

3 RLINK GENERAL DESCRIPTION

The RLINK Communication provides wireless communication between a user PC and the controller network. RLINK operates at frequencies and power levels which do not require a license.

Figure 1 illustrates a sample controller network utilizing the RLINK. Office units are connected to a Communicator, MUX-485, or USB RS-485 Driver. Connect the field unit to a Rotem controller.

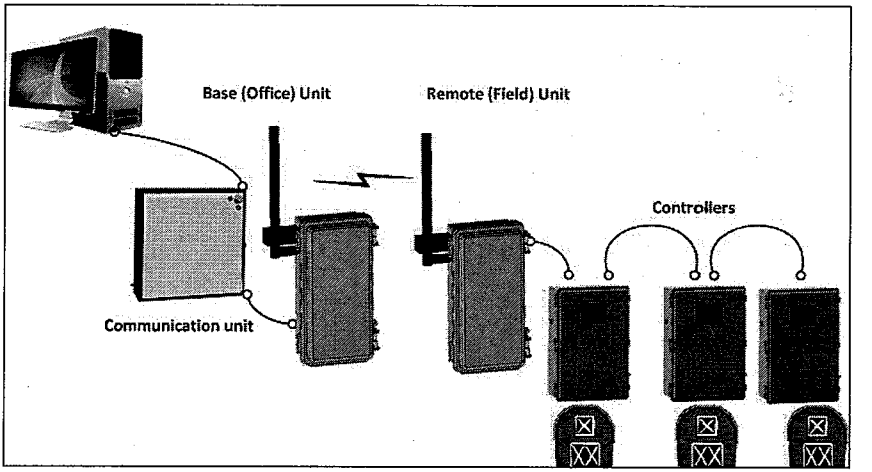


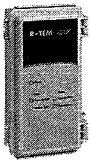
Figure 1: Sample Network

Generally, RS-485/232 communication cable connects each controller to the network. If something such as structure or a street divides one house from the next, RLINK enables wireless connections.

NOTE: The distance between the communication unit and the Base RLINK can be quite long. There is no requirement that the two pieces of equipment be located in the same structure.

3.1 What Comes in the Package

The RLINK package includes:

RLINK unit		Omni-directional 2 dBi antenna	
RG-58 cable (option)		Antenna mounting clip and screws (comes with the RG-58 cable)	
12 VDC power supply			

- For further information, refer to Ordering Information, page 25, which lists the different units and options.

3.2 System Setup

Before setting up your system check the following issues:

- **Test kit**: Rotem recommends using an RF Test Kit when setting up an RLINK system. Consult with your dealer for more information.
- **Country/State**: RLINK supports different RF power levels and frequencies (refer to RF Type, page 25). Your dealer **MUST** verify that the RLINK units' power levels and frequency meets your country's legal requirements, as set forth by the local communication ministry.
- **Software**: All RLINK units **must** have the same software version (see Figure 2).
- **Frequency and power levels**: All RLINK units must use **exactly** the same frequency and power levels (check the RF modules).
- **Controller type**: Different Rotem controllers support different RLINK types. Refer to Communication Type, page 25.
- Rotem recommends limiting each RLINK system to 20 RLINK units.
- **Communication device – RLINK compatibility**:
  - MUX-485 and USB RS-485 Driver units work with all RLINK versions.
  - Communicator: Refer to Table 1.

Table 1: Communicator-RLINK Issues

Communicator Product Software	RLINK	Note
Compatible combinations		
Any	RLINK 2.4 GHz 50 mWatt, all software versions	
3.05 and above	RLINK 900 MHz 1 Watt, Version 3.01 and above	
Incompatible combinations		
Below 3.05	RLINK 900 MHz 1 Watt, Version 3.01 and above	Upgrade Communicator Software
3.05 and above	RLINK 900 MHz 1 Watt, Version 3.00 and below	Consult with Rotem technical support

3.3 Checking the Software/Hardware Version

- Software Version
- Hardware Version

3.3.1 Software Version

- To check the **Communicator software**: On the Communicator front screen, press 

.
- To check the **RLINK software**:
  1. Open the RLINK unit.
  2. Under the communication card is a label stating the software version.

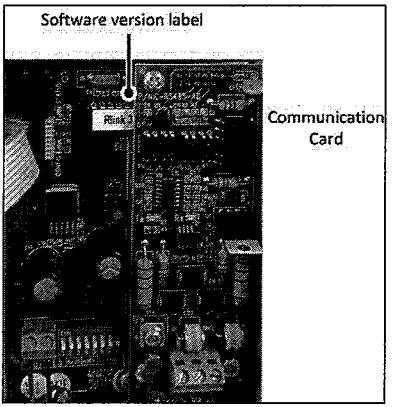


Figure 2: RLINK Software Version

3.3.2 Hardware Version

The installation procedure (Establishing a Communication Link) depends on the transmission power level. If you are unsure as to the unit's power level, refer to the silver sticker on the RLINK.

4 RF TRANSMISSION QUALITY

Various factors influence transmission distance including (but not excluded to) presence of buildings, trees, high power lines, electrical equipment, the weather and ambient RF noise. While there are factors beyond your control which affect transmission length and quality, you can improve them as follows.

- Attach the RLINK directly to the pole (Figure 3).

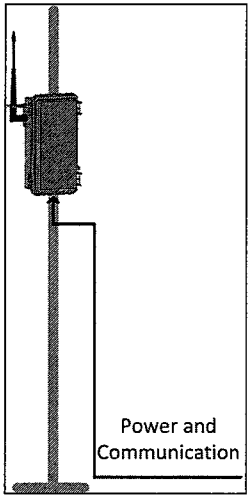


Figure 3: RLINK Installed on a Pole (Recommended)

- Mount the antenna on a pole and connect it to the RLINK using RF cable (Figure 4).

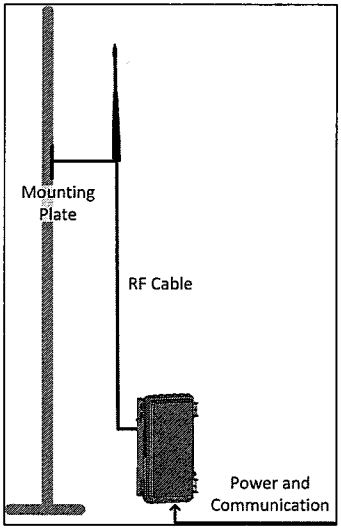


Figure 4: RLINK Antenna Installed on a Pole

CAUTION **Rotem recommends installing the RLINK as shown in Figure 3. When an RF cable separates the unit and antenna the cable attenuates the signal, resulting in a 3 dB loss (half of the signal strength).**

- In cases of poor reception, use a uni-directional antenna
- Choosing to install a uni-directional antenna entails changes in the installation. Refer to Figure 14.

NOTE: , page 11.

- Maintain a clear "line of sight":
  - The antenna must be installed at least 5 meters/16 feet above ground (refer to Figure 10).
  - Place the radio units on the sides of the barns facing the main office (refer to Figure 5).

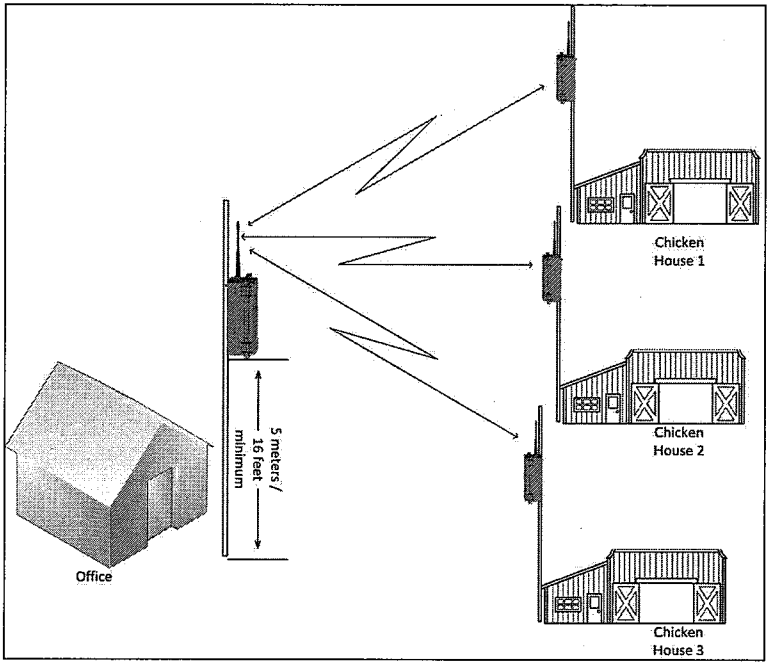


Figure 5: Placement on Adjacent Sides of Barn

- When using metal poles:
  - Ground it according to industry standards!
  - Install the RLINK only on the side of the poles **facing** the main office. Signal strength **behind** the RLINK is extremely poor (Figure 6).

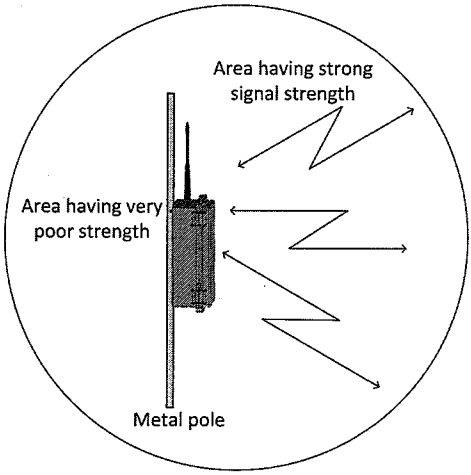


Figure 6: Transmission Area

- Ensure that there are no metal obstacles or power lines between the RLINKs (Figure 7 and Figure 8). These objects create electromagnetic interference.

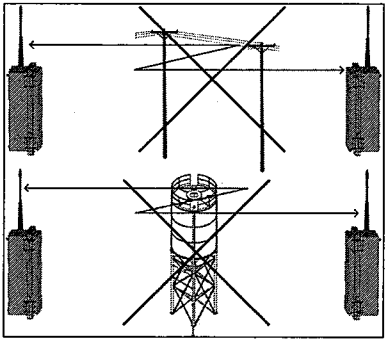


Figure 7: Obstacles in Path

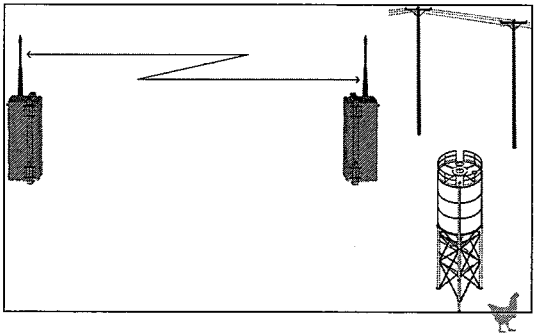


Figure 8: Clear Path

NOTE: Given the number of factors that influence transmission distance, each installation is unique. Consult with your dealer regarding which options you require and how to install them.

5 INSTALLATION

The following sections detail RLINK installation and configuration.

- Preventing Lightning Damage
- Installing the Unit
- Wiring the RLINK
- Using the DIP Switches

5.1 Preventing Lightning Damage

Lightning will attempt to find the shortest, easiest path to get to ground. When installing the unit, it is incumbent to ensure that the RLINK is not this path.

Lightning can enter the RLINK in three ways:

- Via the power supply
- Via the communication card
- Via the RF (antenna)

Therefore, Rotem recommends the following steps when installing your units.

- Install a 25 – 50 watt isolation transformer in front of the RLINK power supply.

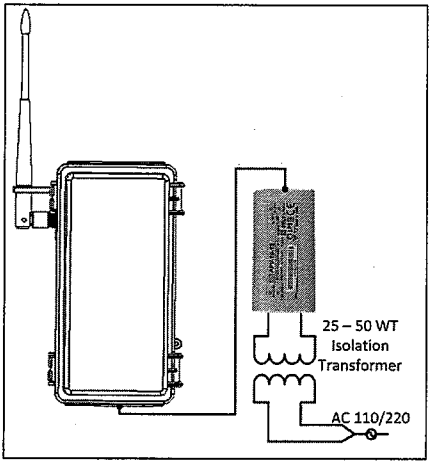


Figure 9: Isolation Transformer set up

- Make a proper safety GND connection to the C-RS485-AD card at RLINK. Refer to Figure 15 - Figure 18.
- Antenna pole (refer to Figure 10):
  - Ideally the pole should be an isolated material (for example plastic or wood).
  - Place the RLINK unit so that:
    - The antenna is at least one foot below the pole top (when using a metal pole).
    - The unit is at least three feet above the roof.

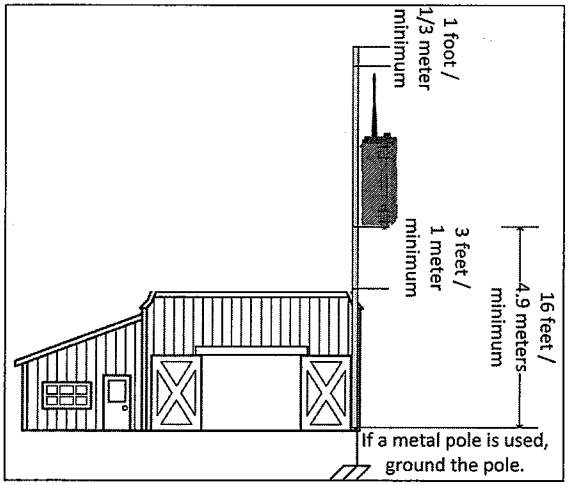


Figure 10: Lightning Rod Setup

CAUTION	**There may be other steps you can take to prevent lightning damage to your equipment such as installing lightning dissipators. Rotem recommends following industry best practices as speaking with your local extension agent.**

5.2 Installing the Unit

- Mounting the Unit
- Placing the Field Units

5.2.1 Mounting the Unit

NOTE: Before installing your units, refer to Preventing Lightning Damage, page 11, which provides important installation tips.

1. Mount the RLINK:
   a) On a wall, using the supplied screws and plates, through the mounting holes
   b) On a pole.

NOTE: Users employing a 2.4 GHz unit: Rotem recommends installing the RLink unit connected to the Communicator 3-5 meters / 10-15 feet higher than the RLink unit(s) installed in the houses.

2. Place the required cables through the cable holders at the bottom of the unit.
3. Connect the antenna to the unit.
   a) Option 1: Connect the antenna via the supplied RG-58 cable and antenna mounting clip (Figure 4).
   b) Option 2: Replace the antenna with a user-supplied uni-directional antenna (connected directly to the unit or via a cable).
   c) Option 3: Connect the antenna directly to the unit (Figure 11).
      - Slip the antenna through the antenna lock.
      - Attach the antenna to the connector.

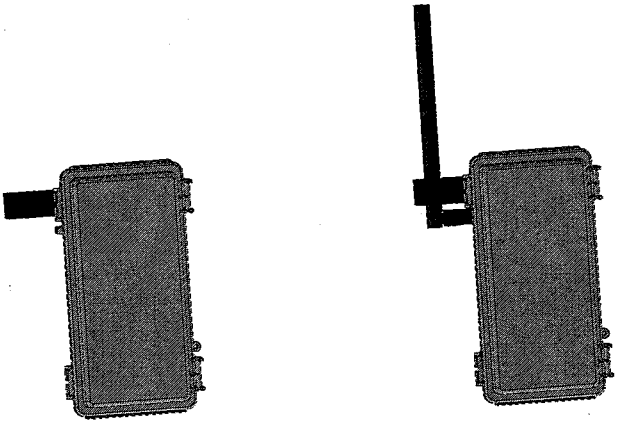


Figure 11: Antenna Placement

4. Connect the controller cable wires using one of the methods illustrated in Wiring the RLINK, page 14.

NOTE: Certain Rotem controllers support RS-485 only. Refer to Communication Type, page 25 for details.

5. Connect the RLINK to the power source and power supply as shown in Figure 12. The Power LED lights up.

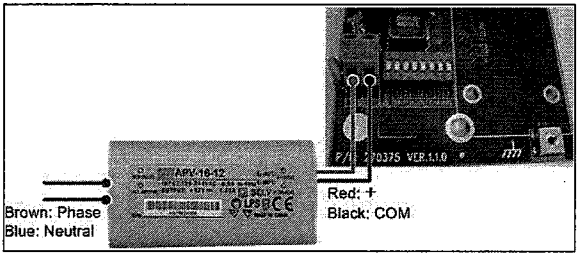


Figure 12: RLINK Power Wiring

NOTE: Other LEDs only light up when there is traffic. Refer to Appendix A: Trouble Shooting page 26.

5.2.2 Placing the Field Units

- When using an omni-direction antenna, place the RLINKs and controllers anywhere, 360 degrees around the central RLINK (Figure 13).

NOTE: If you are using a metal pole, refer to Figure 6.

- Rotem's uni-directional antenna has a 21° beam-angle. When using other uni-directional antenna, refer to the manufacturers beam width specification (Figure 14).

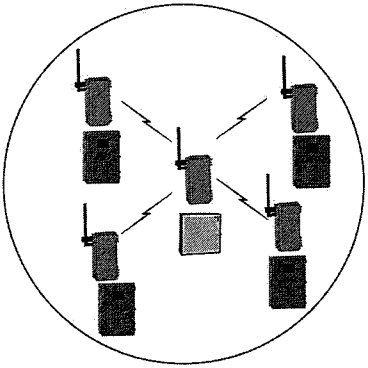


Figure 13: Placing RLINKs Using an Omni-Directional Antenna

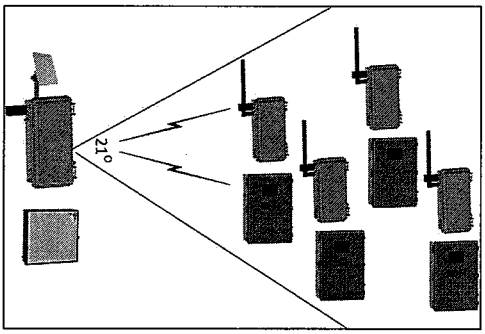


Figure 14: Placing the RLINKs Using a Uni-directional Antenna

5.3 Wiring the RLINK

The following sections describe:

5.3.1 Wiring the Office RLINK

The following section details how to wire an RLINK to a communication device (office RLINK).

- Figure 15: Wiring a Communicator External Box to an RLINK-485
- Figure 16: Wiring a USB RS-485 to an RLINK
- Figure 17: Wiring a MUX-485 to an RLINK

NOTE: When connected to an RLINK, the Communicator and MUX support RS-485 only.

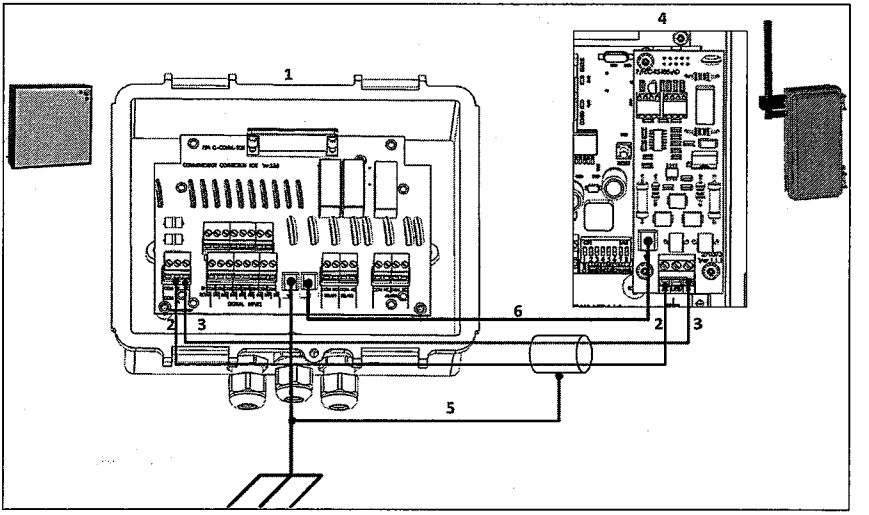


Figure 15: Wiring a Communicator External Box to an RLINK-485

Figure 15 key			
1	Communicator External Box	4	RLINK board
2	TX port	5	Shield cable
3	RX port	6	Run a grounding wire from the RLINK ground connector to the Communicator External Box ground connector.

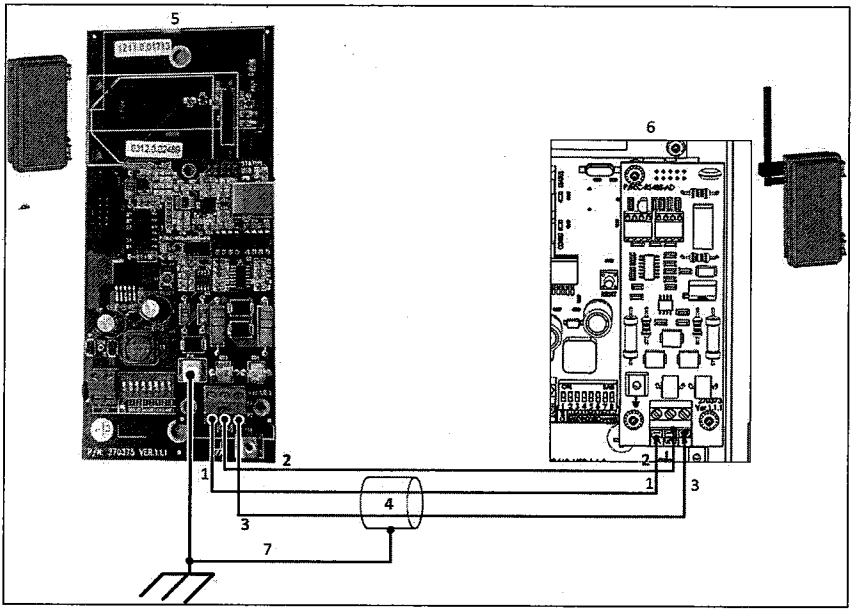


Figure 16: Wiring a USB RS-485 to an RLINK

Figure 16 key			
1	A (red wire)	5	USB Driver board
2	Ground cable	6	RLINK board
3	B (black wire)	7	Shield cable
4	Twisted pair cable		

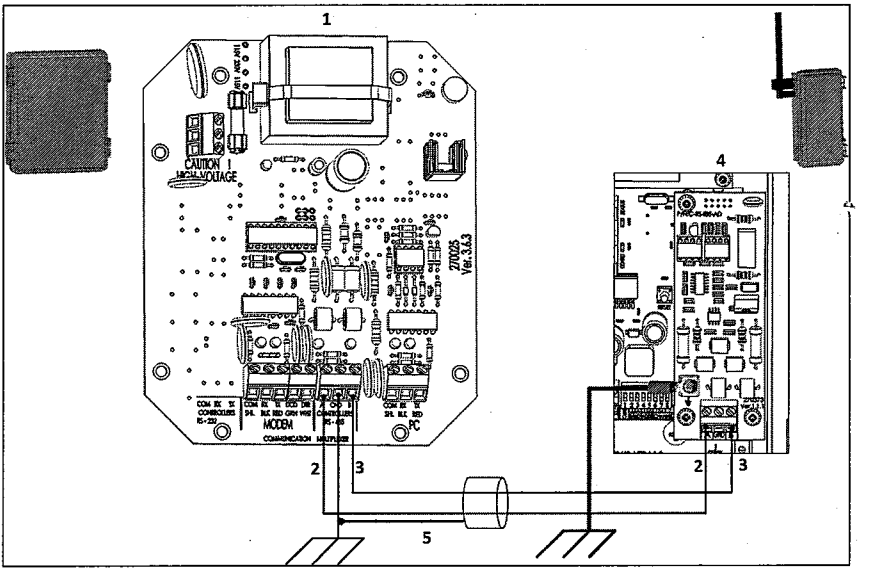


Figure 17: Wiring a MUX-485 to an RLINK

Figure 17 key			
1	MUX 485 board	4	RLINK board
2	A (red wire)	5	Shield cable
3	B (black wire)		

5.3.2 Wiring the Field RLINK

The following section details how to wire an RLINK to a controller (field RLINK).

- Figure 18: Wiring an RLINK to a RS-485 Communication Card (Isolated COM)
- Figure 19: Wiring an RLINK to an AC-2000 / RFS-6 / RSW-2 SE RCLP Card

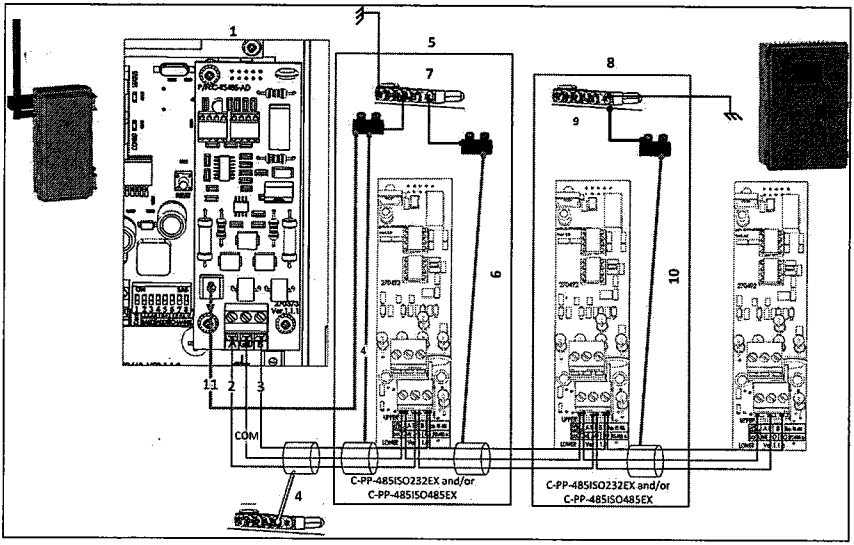


Figure 18: Wiring an RLINK to a RS-485 Communication Card (Isolated COM)

Figure 18 key			
1	RLINK board	7	Controller 1 ground strip
2	A (red wire)	8	Controller 2
3	B (black wire)	9	Controller 2 cable shield
4	Cable shield	10	Controller 2 ground strip
5	Controller 1	11	Connect the RLINK ground port to the nearest controller's ground strip.
6	Controller 1 cable shield		

CAUTION **Connect the shield cable of each controller to the ground strip on one side only (Figure 18)!**

CAUTION **The RLINK RS-485 Communication Card port labelled GND is actually an isolated common port. Do not attack a grounding wire to this port.**

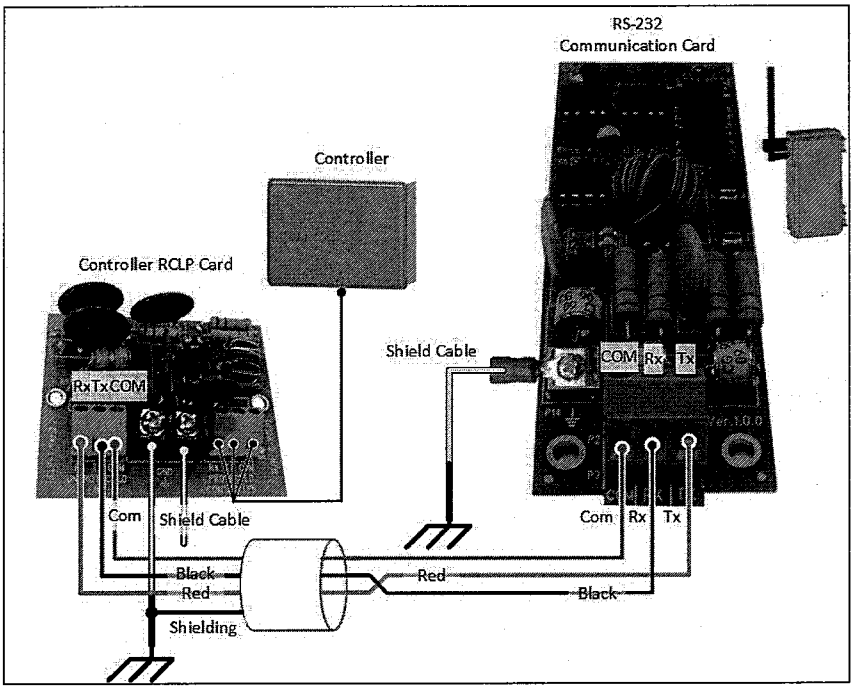


Figure 19: Wiring an RLINK to an AC-2000 / RFS-6 / RSW-2 SE RCLP Card

NOTE: Install an RCLP card when the system includes multiple controllers. If there is a single controller only, wire RLINK directly to the controller's RS-232 communication card. The actual wiring is the same.

5.4 Using the DIP Switches

The following sections how to use the RLINK DIP Switches.

- DIP Switch Principles
- Establishing a Communication Link
- Expanding the Network

5.4.1 DIP Switch Principles

Each RLINK includes a DIP Switch panel used to configure up to four different baud rates, addresses (or base/remote status), and channels (Figure 20). There are eight DIP switches. Table 2 details the switch functions.

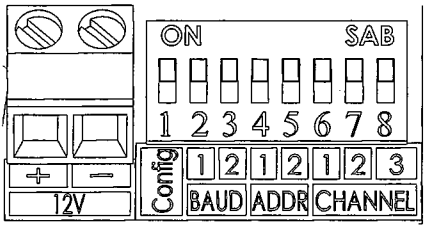


Figure 20: DIP Switch

1	2	3	4	5	6	7	8
Config	Baud Rate		Address		Channel		

Table 2: DIP Switch Functions

5.4.1.1 *Configuration and Baud Rate Switches*

- **Configuration (DIP Switch 1)**: When set to ON, this switch enables configuring the dip switches.
- **Baud rate (DIP Switches 2, 3)**: These switches set the baud rate, the communication bit rate between the communication unit, controllers, and RLINK. The default baud rate is 9600 bps. Table 3 summarizes the rate settings. Rotem recommends the following:
  - Since faster rates and longer transmission distance mean a greater chance of transmission errors, reduce the baud rate as you increase the distance.
  - If RLINK is being used and the connection is to several controllers at different distances, reduce the baud rate until you establish an error-free connection to the RLINK located at the furthest distance. Use that baud rate for all other RLINKs. In any case where there are transmission errors, reduce the baud rate.

CAUTION **RLINKs, controllers, and communication units must have the same baud rate!**

Table 3: Setting the Baud Rate

DIP 2	DIP 3	Baud rate
OFF	OFF	9600 bps
OFF	ON	2400 bps
ON	OFF	4800 bps
ON	ON	19200 bps

5.4.1.2 Network Configuration Switches

- When employing a **Communicator – RLINK** (any model) network or MUX – RLINK 2.4 GHz, RLINK supports **up to two radio pathway layers**, the address and/or channel state. DIP Switches 4/5 and 6/7/8 control these layers, respectively. Set each RLINK system to one of 32 possible radio pathways (4 address x 8 channels = 32).
- When employing **MUX - RLINK 1 Watt** network, RLINK supports **one radio pathway layer** only, the channel state. Set each RLINK system to one of 8 radio pathways (8 channels). In this setup, DIP Switches 4/5 define the RLINK's **location** (base or remote unit).

CAUTION **If a neighboring farm is using RLINK, ensure that you use a different channel/address number!**

- **Channel (DIP Switches 6/7/8)**:

Table 4 lists all possible dip switch combinations for switches 6/7/8. In each network, all units **must** have the same setting.

Table 4: Channel States

DIP 6	DIP 7	DIP 8	Channel
0	0	0	CHAN-0
1	0	0	CHAN-1
0	1	0	CHAN-2
1	1	0	CHAN-3
0	0	1	CHAN-4
1	0	1	CHAN-5
0	1	1	CHAN-6
1	1	1	CHAN-7

- **DIP Switches 4/5**:
  - Communicator – RLINK (any model): Table 5 lists all possible dip switch combination for switches 4/5 used to set the network address. In each network, all units **must** have the same setting.

Table 5: RLINK 2.4 GHz Address Configuration

	DIP 4	DIP 5
Address 0	OFF	OFF
Address 1	ON	OFF
Address 2	OFF	ON
Address 3	ON	ON

  - MUX – RLINK 1 watt systems: Table 6 list all possible dip switch combination for switches 4/5 used to define the RLINK location.

Table 6: RLINK 900 mHz 1 Watt Unit Definition

	DIP 4	DIP 5
Base unit	ON	OFF
Remote unit	OFF	OFF

5.4.2 Establishing a Communication Link

Establishing the communication link can depend on the communication unit employed, RLINK model, and position.

- Establishing a Communicator Based Network
- Establishing a MUX 900 MHz 1 Watt Based Network
- Establishing a MUX 2.4 GHz 50 mWatt Based Network

5.4.2.1 Establishing a Communicator Based Network

➲ **Install and wire the base RLINK to the Communicator External Box (refer to Figure 15). Disconnect the base RLINK's power before beginning the following procedure.**

➲ **Install the remote RLINK.**

1. In the Communicator unit, go to *System* > *Advanced Setup* > *RF/Wired Network.*
2. Configure the settings as required (refer to the Communicator manual for details).
   - o Baud rate
   - o Channel
   - o Address
3. Apply power to the base RLINK.
4. Disconnect and reapply Communicator's power.
   - o In **new installations**, perform a **Cold Start**.

NOTE: Create a memory restore point before performing a Cold Start! Refer to the Communicator Manual for details.

   - o In **existing installations**, go to *System* > *Save/Res Setting* > *Restore* and run the function.

Communicator automatically configures the base unit's settings; there is no need to configure this unit's DIP switches.

CAUTION Resetting the Communicator or disconnecting the power only is insufficient!

5. In the **remote** unit, move DIP Switch 1 to **ON**.
6. Match the remote unit's baud (DIP 2 and 3) and channel ((DIP 6, 7 and 8) settings to the Communicator's settings.
7. DIP 4 and 5:
   - o RLINK 900 MHz 1 Watt: Set both switches to **OFF**.
   - o RLINK 2.4 GHz 50 mWatt: Match the Communicator's address setting **exactly** (when configuring the address, refer to Table 5).
8. Press the RLINK's **Reset** button. The LED blinks for 4 - 12 seconds and turns off.
9. Return DIP Switch 1 to **OFF**. The LED turns on.
10. Repeat for each remote RLINK unit.

Table 7: Summary of Communicator – RLINK DIP Switch Settings

Unit	DIP 2/3	DIP 4/5	DIP 6/7/8
Communicator	As required	As required	As required
Base RLINK	Irrelevant	Irrelevant	Irrelevant
Remote RLINK (1 watt)	Match Communicator settings	OFF/OFF	Match Communicator settings

Unit	DIP 2/3	DIP 4/5	DIP 6/7/8
Remote RLINK (50 mWatt)	Match Communicator settings	Match Communicator settings	Match Communicator settings

5.4.2.2 Establishing a MUX 900 MHz 1 Watt Based Network

When employing MUX/USB RS-485 and RLINK 900 MHz 1 watt units, use DIP Switches 4 and 5 to define one RLINK unit as the base (office) unit and one unit as the remote (field) unit. Table 5 lists the required positions.

➲ **Install and wire the base RLINK to the MUX/USB RS-485 (refer to Figure 16 or Figure 17).**

➲ **Install the remote RLINK.**

1. In the **base RLINK**, move DIP Switch 1 (Config.) to **ON**.
2. Configure the baud rate and channel as required.
3. Set the DIP Switch 4 to **ON** and DIP Switch 5 to **OFF**.
4. Press the **Reset** button. The LED blinks for 4 - 12 seconds and then turns off.
5. Return DIP Switch 1 to **OFF**. The LED turns on.
6. In the **remote** RLINK, move DIP Switch 1 to **ON**.
7. Configure the baud rate and channel as required.

CAUTION **Base and remote units' baud and channel settings must be the same!**

8. Set the DIP Switch 4 and DIP Switch 5 to **OFF**.
9. Press the **Reset** button. The LED blinks for 4 - 12 seconds and turns off.
10. Return DIP Switch 1 to **OFF**. The LED turns on.

Table 8: Summary of MUX – RLINK 900 MHz 1 Watt DIP Switch Settings

Unit	DIP 2/3	DIP 4/5	DIP 6/7/8
MUX	Not applicable	Not applicable	Not applicable
Base RLINK	As required	ON/OFF	As required
Remote RLINK	Match Base RLINK settings	OFF/OFF	Match Base RLINK settings

5.4.2.3 Establishing a MUX 2.4 GHz 50 mWatt Based Network

When employing MUX/USB RS-485 and RLINK 2.4 GHz 50 mWatt units, set up the radio pathway using the channels, the address, or both. In these RLINK units, DIP Switches 4 and 5 define the system address. Table 5 lists the possible positions. Using these DIP switches to define an address enables up to 32 radio pathways (any combination of eight channels, four addresses).

➲ **Install and wire the base RLINK to the MUX/USB RS-485 (refer to Figure 16 or Figure 17).**

➲ **Install the remote RLINK.**

1. In the **base RLINK**, move DIP Switch 1 (Config.) to **ON**.
2. Configure the baud rate as required.
3. Configure the channel or address DIP switches (or both) as required.
4. Press the **Reset** button. The LED blinks for 4 - 12 seconds and then turns off.
5. Return DIP Switch 1 to **OFF**. The LED turns on.
6. In the **remote** RLINK, move DIP Switch 1 to **ON**.
7. Configure the baud rate, channel, and address as required.

CAUTION **All base and remote units' settings must be the same!**

8. Press the **Reset** button. The LED blinks for 4 - 12 seconds and turns off.
9. Return DIP Switch 1 to **OFF**. The LED turns on.

Table 9: Summary of MUX – RLINK 2.4 GHz DIP Switch Settings

Unit	DIP 2/3	DIP 4/5	DIP 6/7/8
MUX	Not applicable	Not applicable	Not applicable
Base RLINK	As required	As required	As required
Remote RLINK	Match Base RLINK settings	Match Base RLINK settings	Match Base RLINK settings

5.4.3 Expanding the Network

This section details how to add an RLINK unit to an existing network.

- **Review all issues mentioned in System Setup, page 6.**
- Place the unit as recommended in RF Transmission quality, page 8.
- Take all steps needed to prevent lightning damage (Preventing Lightning Damage, page 11).
- Physically mount and wire the unit (Installing the Unit, page 12 / Wiring the RLINK, page 14).

- To establish a communication link between the RLINKs:
  - Communicator – RLINK network: Refer to Establishing a Communicator and perform steps 6 – 10.
  - MUX – RLINK 900 MHz 1 Watt network: Refer to Establishing a MUX 900 MHz 1 Watt Based Network and perform steps 6 – 10.
  - MUX – RLINK 2.4 GHz 50 mWatt network: Refer to Establishing a MUX 2.4 GHz 50 mWatt Based Network and perform steps 6 – 9.
- Points to check:
  - Ensure that the channel/address settings are accurate!
  - Ensure that all LEDs are lit or blinking.

6 ORDERING INFORMATION

The following tables detail the RLINK units and their accessories. The specific model that you order is based on:

- Communication type
- RF type
- Antenna type

When ordering units:

- The RLINK communication type must match the controller or communication device's type.
- The RF type (**both** the power levels and frequency) of each RLINK unit must be the same.
- The frequencies of the units and the antennas must be the same.

For example:

- The RLINK connected to a Rotem Communicator must support RS-485.
- Any 900 MHz RLINK can work with any 900 MHz antenna.
- When ordering a 2.4 GHz, 50 mW RLINK, the corresponding RLINK must also be 2.4 GHz, 50 mW.

6.1 Communication Type

RLINK supports opto-isolated RS-232 and RS-485 communication. The RLINK ordered depends on the communication standard installed in the controller or communication device.

- **Communicator or MUX**: Order RLINK-485 only
- **SuperGuard**: Order RS-485 only
- **Platinum/SMART**: Order RLINK-232 or RLINK-485
- **AC-2000, RFS-6, RSW-2 SE**: Order RLINK-232 or RLINK-485

CAUTION **A Rotem RS-485 Driver is required to connect an AC-2000, RFS-6, and RSW-2 to an RLINK-485.**

6.2 RF Type

The RLINK can transmit at the following frequencies and power levels:

- 902 - 928 MHz 1 W
- 915 - 928 MHz (Australia) 1 W
- 2.4 GHz 50 mW

NOTE: The 915 MHz (Australia) unit works with any 900 MHz antenna.

6.3 Antenna Type

The RLINK supports the following antennas:

- 900 MHz 2 dBi omni-directional
- 2.4 GHz 2 dBi omni-directional
- 900 MHz 8 dBi omni-directional
- 2.4 GHz 6 dBi omni-directional
- 900 MHz uni-directional
- 2.4 GHz uni-directional
- 900 MHz 2 dBi omni-directional

7 SPECIFICATIONS

Power Requirements	12 VDC ± 10% (stabilized), 1 Amp (maximum)
Transmission Method	Spread spectrum, frequency hopping
Data Rate	User selectable, 9600 MHz default
Receiver Sensitivity	-110 dBm
Frequency	Refer to RF Type, page 25
Ambient (Operating) Temperature	0° to +50° C (32° to +122° F)
0-10 VDC Analog Input Impedance	10 KOhm

8 APPENDIX A: TROUBLE SHOOTING

- Front Panel LEDs
- Diagnosing Transmission/Reception Problems

8.1 Front Panel LEDs

The RLINK Communication's front panels LEDs (Figure 21) light up for activity notification. Use these LEDs as a diagnostic tool when performance issues arise. Table 10 details the LEDs' functions.

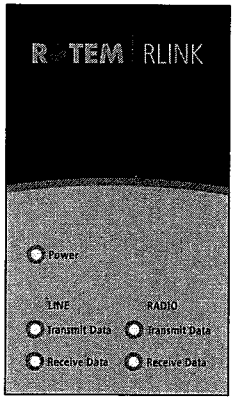


Table 10: Front Panel LED Description

LED	Description
Power	Power is on
LINE Transmit Data	RLINK is transmitting data to the communication device/controller
LINE Receive Data	RLINK is receiving data from the communication device / controller
RADIO Transmit Data	RLINK is transmitting data to an RLINK
RADIO Receive Data	RLINK is receiving data from an RLINK

Figure 21: RLINK Communication Front Panel LEDs

8.2 Diagnosing Transmission/Reception Problems

RLINK LEDs blink when the unit receives or transmits data signals. When checking for any problems, keep in mind that there is a fundamental difference between the base RLINK and each individual remote RLINK:

- One Base RLINK supports up to 20 remote units; it is constantly receiving data from the communication unit and then transmitting the data to a particular remote RLINK. Therefore, the Base RLINK's Receive Data/Radio Transmit Data LEDs are constantly blinking.
- A remote unit only transmits data as required. This means that the Receive Data/Radio Transmit Data LEDs can remain unlit for extended periods of time.

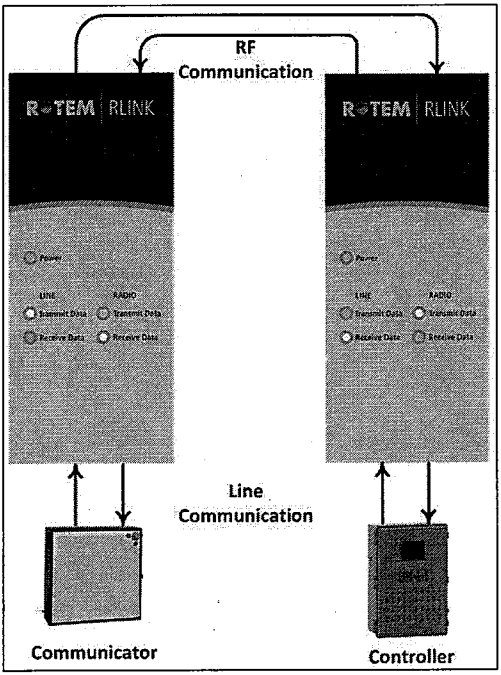


Figure 22: Example Communication Pathway

NOTE: The LEDs lit in Figure 22 are an example only. All Line and Radio LEDs should blink.

Pattern	Problem	Solution
Line Receive Data LEDs does not blink	RLINK is not receiving data from the controller/communication unit	• Verify that the controller/communication device is transmitting data • Check the wiring between the RLINK and the communication unit or controller.

Pattern	Problem	Solution
Radio Transmit Data LED does not blink	Internal modem non-functional	• Verify that the Line Receive Data LED is blinking • Replace the communication card. • If none of the above help, replace the unit.
Radio Receive Data LED does not blink	Problematic RF transmission.	• Verify that transmitting RLINK is functioning. • Check the alignment, obstruction, distance. • Replace the communication card. • If none of the above help, replace the unit.
Line Transmit Data LED does not blink	Internal modem non-functional	Replace the communication card.
Power LED is off		Check the power supply.

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