Model 3000 Series *Bluetooth*®
User's Manual

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Model 3000 Series

Bluetooth®

User's Manual

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Overview

Ludlum Measurements has expanded the features and options for the Model 3000 and Model 3001. These instruments may be upgraded with Bluetooth 4.0 LE® wireless technology (Bluetooth low energy, sometimes referred to as “Bluetooth Smart”) for wireless connectivity. This feature permits wireless transmission of readings from a connected instrument, allowing operators to remotely monitor the live data on the screen of their mobile device. Additionally, this combination enables discrete operation of the radiation detection instrument.

When paired with Ludlum’s Lumic Linker App, the operator can seamlessly send data to the *Rad Responder Network, which provides a central location for up-to-date information from operators in the field. Reported data includes user, radiometric survey, survey notes, and GPS location, as well as details about the instrument and the detector being used. This information can be shared with remote personnel instantly, greatly improving the speed and accuracy of acquiring and reviewing survey data.

Android and iOS applications enable Bluetooth wireless communication with the designated device. The Model 3000 Series of Ludlum’s digital survey meters, already known for their versatility and user-friendly operation, are ideal for this application.

Model 3000 Series Guide

Firmware

When the firmware version displays on the instrument screen, if Bluetooth 4.0 LE® technology is active in the firmware, it will flash the “Bq” icon on the screen. (See figure 1 following this paragraph.) This means your firmware is capable of working with Bluetooth 4.0 LE® technology.

Figure 1: Firmware version displayed during start-up sequence

Status LEDs

The Bluetooth 4.0 LE® adapter has one LED indicator. The blue LED shows the Bluetooth wireless connection status and is currently located in the bottom left section of the instrument.

- When the Bluetooth wireless technology is in use, the adaptor will flash a single blink once about every 3 seconds.
- When connected to a device, the Bluetooth adaptor will blink twice about every 2 seconds.

User's Guide

Overview

This section will describe how to use and connect to the instrument using the default settings on both the instrument and the app.

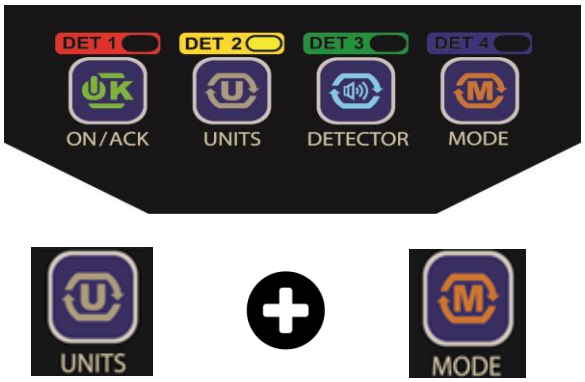


Figure 2: Instrument Buttons

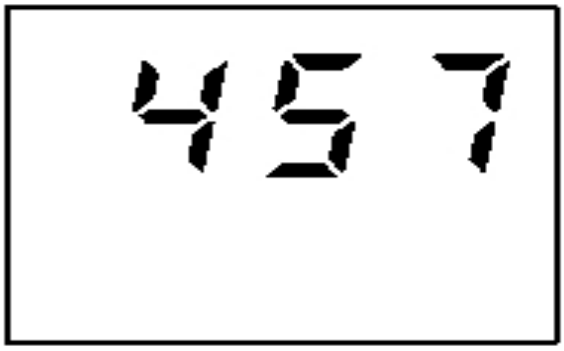


Figure 3: Instrument PIN

Connecting for the first time with Default Settings

1. **Acquiring PIN**: When settings are at default, press and hold the "UNITS" button and the "MODE" button at the same time.
   Note: Depending on the state of your Bluetooth module, it might toggle it off and then on before showing the PIN.

This will create a new three-digit PIN for your instrument. See Figure 3 to the left.

Note: Once a successful connection has been made, the PIN cannot be used again.

Note: You only have 1 minute to pair before the Bluetooth adaptor will turn itself off to save power.

All devices are required to get a PIN in order to connect. This is a feature that is necessary in order to insure that the correct instrument is connected.

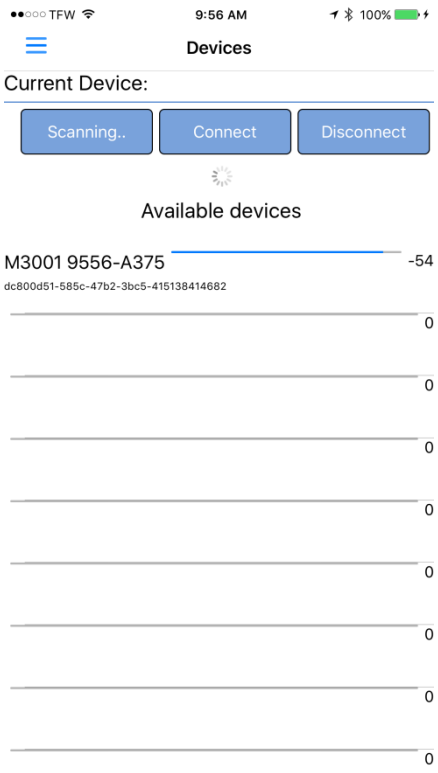


Figure 4: Lumic Linker App Devices Screen

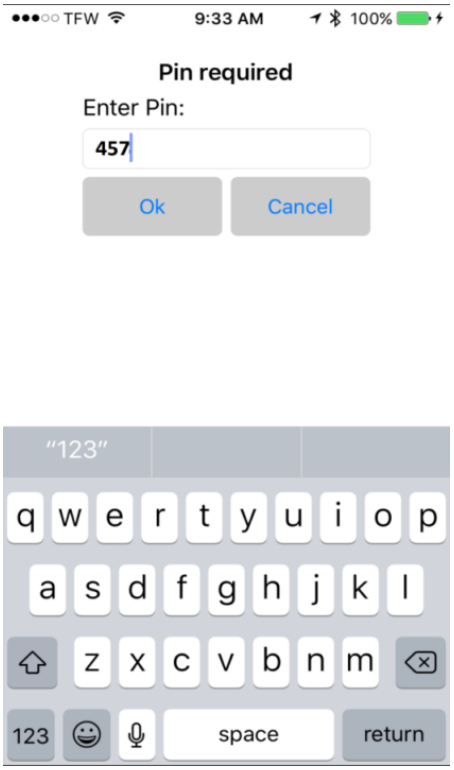


Figure 5: Lumic Linker App PIN Entry

Now head back to your phone/computer and navigate the app to the device page, which should look like Figure 4.

2. Make sure your Bluetooth feature is enabled **ON YOUR phone/computer.**

3. Select the "Scan" button and wait until the instrument you set up is listed.

Note: The last digits of the Model 3000 series Serial Number should be part of the name in the list.

4. Select the instrument that you just set the PIN for, and then select "Connect."

5. If this is your first time connecting, the phone/computer will ask for the PIN received in Step 1. Enter the PIN and select "OK", shown in Figure 5.

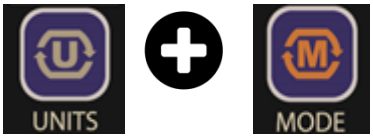
6 Wait for a pop-up message to confirm you have connected. Afterwards, data should instantly stream to the app's home screen.

Note: A green check-mark over the Devices icon on the home screen indicates you are connected to the device.

Turning Bluetooth Feature On and Off

Figure 6: Buttons

To toggle the state of your Bluetooth module from off to on and vice versa, press the Units and Mode buttons at the same time.



Instrument PIN

To keep the instrument locked with a single device, we use a three-digit PIN. This PIN is randomly generated when the Units and Mode Buttons are pressed and held at the same time.

Note: This PIN can only be used with one device and must be reset if you change devices.

Note: Changing the PIN will cause connection issues with any device currently connected.

Instrument Settings

Our instrument has several different ways of communicating besides its main USB port. All of these other communications styles or "auxiliary communications" are affected by the list of parameters below.

Note: All parameters must be enabled through Lumic Software.

Auxiliary Communications Parameters

Device Auxiliary Communication Enabled	**Dev_AuxCom_En**	Default Value: 1
Enables/disables the auxiliary communication. • 0 - Off • 1 - On **Ex: Serial port enabled/disabled, Bluetooth power on/off, kills hot key listening, etc. - on, off**		

Device Auxiliary Communication Mode	**Dev_AuxCom_Mode**	Default Value: 0 (AuxComm Wireless Secure)

Sets the mode/type of auxiliary communication
• 0 - Secure consented communication (Ludlum's only, and uses PIN)
• 1 - Secure communication (Ludlum's only, and uses PIN)
• 2 - Standard consented communication
  ○ Terminal style serial interface usable with putty/hyperterm/etc.
• 3 - Standard communication
  ○ Terminal style serial interface usable with putty/hyperterm/etc.
• 4 - 375_MODE communication (Follows the Model 375 output)		

Device Auxiliary Communication Power Mode	**Dev_AuxCom_Pwr_Mode**	Default Value: 0
Sets how the auxiliary communication powers up • 0 - Power up on start-up - default • 1 - Off until hot key pressed (Units button plus Mode button)		

Device Auxiliary Communication Power Auto Off Time	**Dev_AuxCom_Pwr_AutoOffTm**	Default Value: Default: 1 Minute
Sets the amount of time the instrument will wait to receive a connection before powering down auxiliary communication. Hot key press will re-activate it. • 0 - Disabled • 1 to 9 minutes ---- Default: 1 minute		

Device Auxiliary Communication Write Protection	**Dev_AuxCom_WritePrtct**	Default Value: 1 (On)
Sets write protection from the auxiliary communication. If this this is enabled, the auxiliary communication will be unable to modify settings on the instrument. • 0 - Off • 1 - On - Default **Note: lmi_comm is the main use for now. Port will still read input, but parameters can't be changed.**		

Device Auxiliary Communication Encryption Enabled	**Dev_AuxCom_Crypto_En**	Default Value: 1 (On)
Enables/disables encryption over the auxiliary communication. • 0 - Off • 1 - On - Default		

App Guide

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Minimum Requirements

Supported Hardware Systems:

- Apple:
  - iPhone 4s, iPhone 5, iPhone 5c, iPhone 5s, iPhone 6, iPhone 6 Plus, iPhone 7.
  - iPad 3rd Generation, iPad 4th Generation, iPad mini, iPad mini 2, iPad mini 3, iPad Air, iPad Air2.
- Android:
  - Most Android devices with **Bluetooth 4.0** technology.

Supported Operating Systems: Mobile IOS, Android

- Apple: IOS 8 and higher.
- Android: Android 3.0 (Honeycomb) and higher.

Required Software:

- Apple: App Store.
- Android: Google Play Store.

Other Requirements:

- 50 MB of free disk space.
- Must have working internet connection for download.
  - Also must be working in order to use Rad Responder features.
- Must have with **Bluetooth 4.0** capabilities.
- A Lumic Based Ludlum Instrument.

General Description

The Ludlum Lumic Linker app is a free application used to connect to Lumic based devices and receives simple readings from the instrument. The Linker also features the ability to communicate to the service known as Rad Responder and post data into its system.

Installation

Installation varies from device to device and updates for each application. Please follow normal installation procedures for downloading with the following apps.

- ITunes
- Google Play

Using the app

Pages

Figure 7: Menu Icon

There are five main pages that are brought up using the menu icon in the top left corner of the app.

- Home Page
  - This is the main screen, which receives and displays data to the user on the instrument the user has connected to. It also shows the current status of Rad Responder and the location of the device.
- Device Page
  - This page handles the connection to the instrument. It contains a few simple buttons to handle that process.
- Rad Responder Page
  - This page handles connecting to Rad Responder, as well as the current event that you post data to.
- Help Page
  - This contains a quick help menu on the app.
- Settings Page
  - This page allows the user to set app-wide settings.

Home Page

Menu Icon

In the corner is the menu icon, which is used to switch the current page.

Instrument Information

At the top of the screen is the Instrument make and serial number.

Detector Information

This frame contains the current detector information, displaying Model and Serial Number.

Device Status

This icon shows signal strength the device has to the instrument. The green check-mark signifies you are connected currently to an instrument. Tapping it will bring you to the device page.

Rad Responder Status

This icon shows the current connection status to Rad Responder, as well as if it has valid log-in credentials and permissions or not.

Location Status

This shows the current status of the location, as well as displays the accuracy of your location in meters.

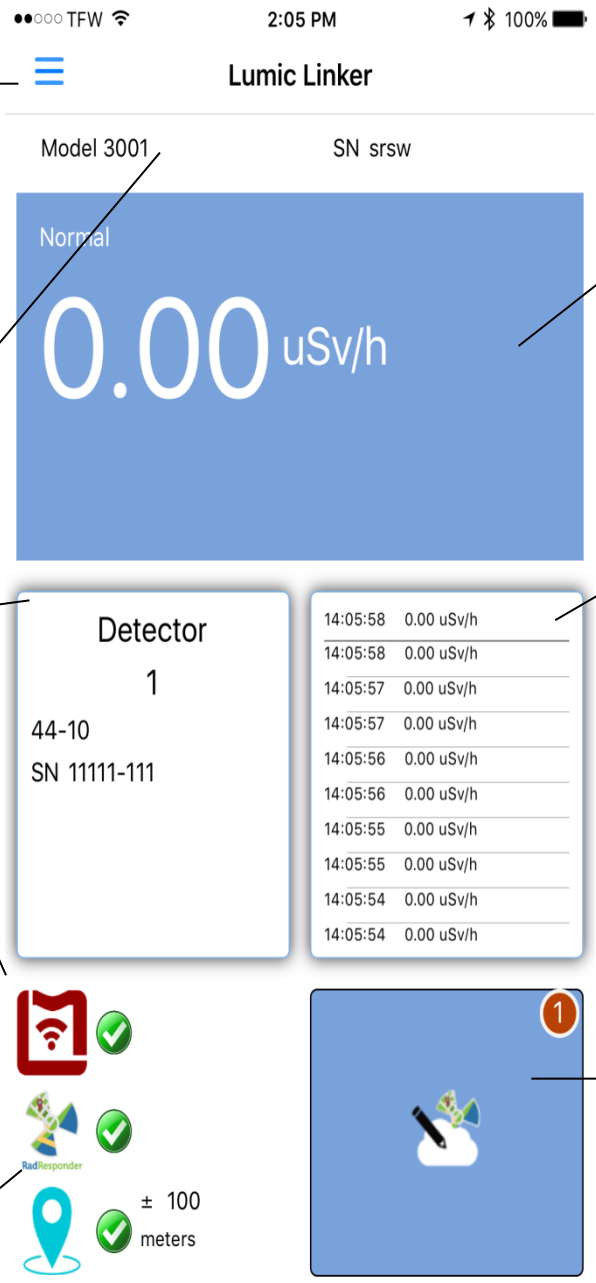

Figure 8: Lumic Linker

Display

This area displays the values on the instrument. In the top corner is the status. In the center are the main digits and the unit. Tapping this will take you to another screen similar to this one called the "Virtual Display."

History

This frame stores the last 50 readings from the Display Area.

Rad Responder Button

This button sends the current Display data to Rad Responder.

Note: If you have not logged in, this button will not appear on screen.

If internet connection was lost and a survey was attempted, the survey will be attempted again on the next chance the app gets. The number of saved surveys is indicated by the orange circle.

Device Page

Menu Icon

In the corner, the menu icon is used to switch the current page.

Scan

The scan button is used to manually search the area for **Bluetooth 4.0** devices that are broadcasting. Pressing it once will start the scan. Pressing it during a scan will cancel the current scan. The scan lasts about 10 seconds if not canceled.

The new-found devices will appear in the list below the button under “Available devices.”

Devices

The devices are listed under “Available devices.” Each device will have a name given to it by the chip, as well as a GUID underneath. The bar to the right represents the signal strength given in standard RSSI Values.

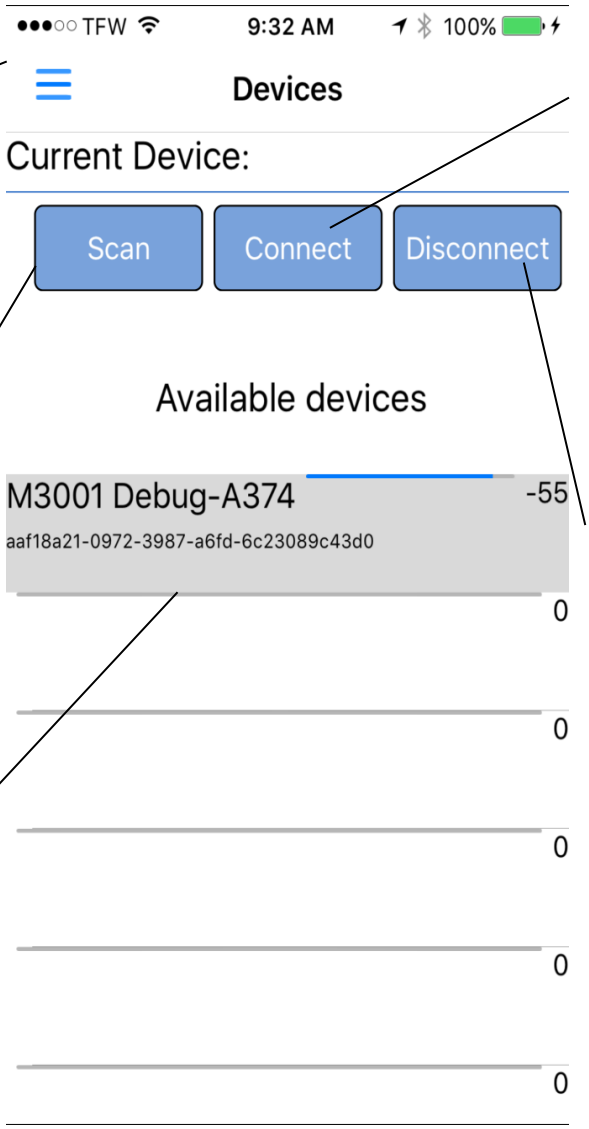

Figure 9: Current Device

Connect

Pressing the connect button will attempt to connect to the selected Available device (found by scanning). This button will be disabled for a moment as it tries to connect.

Note: More details will be under the connecting process section.

Disconnect

Pressing the Disconnect button will release the current Lumic enabled instrument from the device. All communication will stop and memory will be wiped of the last instrument connected.

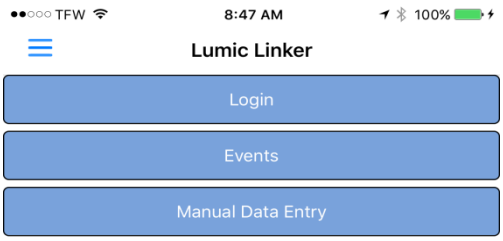

Figure 10: Rad Responder Page

Rad Responder Page

The Rad Responder page has three options:

Login

This will log you into Rad Responder and requests valid credentials and permission.

Events

This will allow you to select the current event you would like to post to. See Figure 11.

Note: An event must be selected to send survey.

Manual Data Entry

This allows a user to send a survey to Rad Responder by hand; any value and units should be allowed to be written.

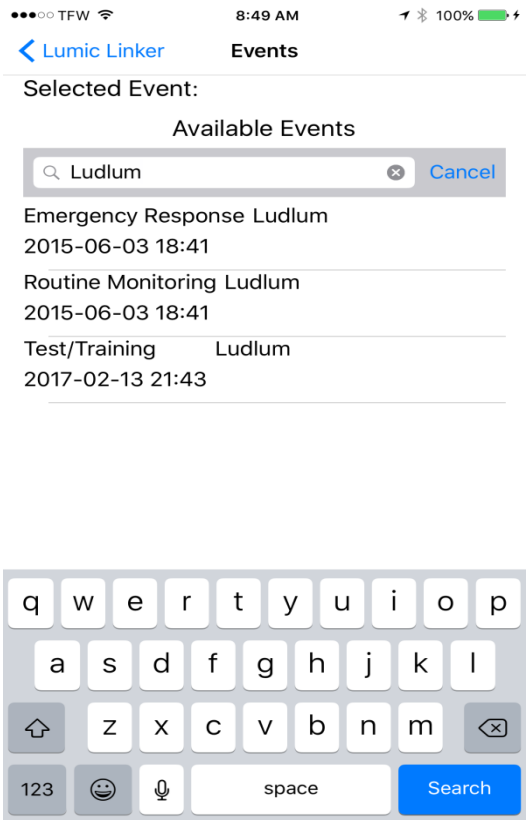

Figure 11: Events

Help Page

This page contains helpful tips and a quick guide to most options in the application.

Settings Page

This page contains three options for the user in the app:

1. Left-hand mode – switches the side the buttons are located in the home screen.
2. Target Stream Speed – attempts to set the speed the instrument outputs to the phone.
3. Use Encryption – Sets if the phone uses encryption to the device. (Disabling or enabling this option may cause connection issues.)

Quick Connect Guide to Instrument.

While each instrument might have a slight variance, the initial steps shall be the same.

1. **MAKE SURE YOUR *BLUETOOTH* FEATURE IS ENABLED ON YOUR DEVICE.**
2. **MAKE SURE YOUR *BLUETOOTH* FEATURE IS ENABLED ON YOUR INSTRUMENT.**
3. Hit the Menu button, and then press the Device button.
4. Once on the device page, scan the area for your instrument. Please press the Scan button.
5. Once the scanning is complete, (may take a few moments) if your device is found, highlight it by pressing/clicking the item on the list.
6. Press/click the Connect button.
7. The process may vary at this step. Please refer to instrument connection section.
8. If connection is a success, a dialogue message will open confirming the success.
9. Go back to the Home page and give the instrument a moment to start to stream data.

Common issues

My instrument does not show up while scanning

- **MAKE SURE YOUR *BLUETOOTH* FEATURE IS ENABLED ON YOUR DEVICE.**
- **MAKE SURE YOUR *BLUETOOTH* FEATURE IS ENABLED ON YOUR INSTRUMENT.**
- Please try scanning from less than 4 feet away from the instrument.
- Some devices may require that you disable and then re-enable your Bluetooth module.

Initial connection keeps failing after Steps 1- 6

- Check to see if the device you are connecting to is a Ludlum instrument.
- Some devices may require that you disable and then re-enable your Bluetooth module.
- If many Bluetooth devices are around, this may cause interference. Try to reduce the amount of devices in your area.
- Try connecting from less than 4 feet away from the instrument.

Rad Responder Requirements

- The user must have a valid ID and password for Rad Responder.
- The user must have a working internet connection.

Connecting

1. **MAKE SURE YOU ARE CONNCTED TO THE INTERNET ON YOUR DEVICE.**
2. Hit the Menu button, and then press the Rad Responder button.
3. Once in the Rad Responder menu, log in. Press the Login button, which will open up a web page in a few moments.
4. Using your Rad Responder information, sign in.
5. After you have successfully signed in, a message will appear asking if you want to grant Lumic Linker permission to send surveys and data on your behalf. If you agree, press the Grant button.
6. After the web pages close, the app should redirect you to the Events page. You MUST select a valid event to which to post data.
7. Go back to the Home page, check the status of Rad Responder, and see if the Send Survey button is now visible.

Common Issues

- White screen after pressing the Login button
    - This is usually caused by a flaky internet connection. Try restarting the app and logging in once again.
- Send Survey button not visible
    - Either the login failed, or you forgot to select an event. Please try selecting an event. If that doesn't help, retry logging in.