CL4790 Quick Start

CL4790-1000-232, CL4790-1000-485

Application Note *v1.0*

1 Introduction

The goal of this Application Note is to outline how to configure the CL4790 ConnexLink units with the most basic settings to establish a Point-to-Point (P2P) or Point-to-MultiPoint (P2MP) connection between two or more CL4790 units.

2 Requirements

- Two (or more) CL4790-1000-xxx units (for demonstration purposes we will be working with two CL4790-1000-232 variant)
- Appropriate USB-to-xxx interface adapters to enable connection to PC – not included with CL4790 units
  - CL4790-1000-232
    - RS232-to-USB (examples: FTDI Model: UC232R-10, Tripp-Lite Keyspan Model: USA-19HS)
  - CL4790-1000-485 (One of the following)
    - RS485-to-USB (example: ULinx Model 485USBTB-2W)
    - RS485-to-RS232 combined with RS232-to-USB adapter (example B&B Electronics Model: 485SD9TB)
- PC Operating Windows XP or newer
- Laird Configuration and Test Utility Software v6.07 from CL4790 Product Page
- (Optional) Female-to-Female pin jumper wire (to tie TX/RX RS232 pins for loopback test) or serial loopback plug (example: SeaLevel DB9 Female Serial Loopback Adapter)

3 DOWNLOAD & INSTALL CONFIGURATION SOFTWARE

You will need to download the Laird Configuration and Test Utility Software v6.07 from the CL4790 Product Page.

Note: Downloading the configuration utility will require the completion of a Software Request Form, which will pop up when you click on the download link. This Software Request Form is required so that we have valid contact information to use for product update notifications, such as new software releases. Once you submit this form a download link should be made available at the top of the Product Page. Additionally, you should receive a download link via email.

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To install the CU follow these steps:

1. Once the files have been downloaded, extract them (right-click on file and select "Extract All ") as shown in Figure 1.

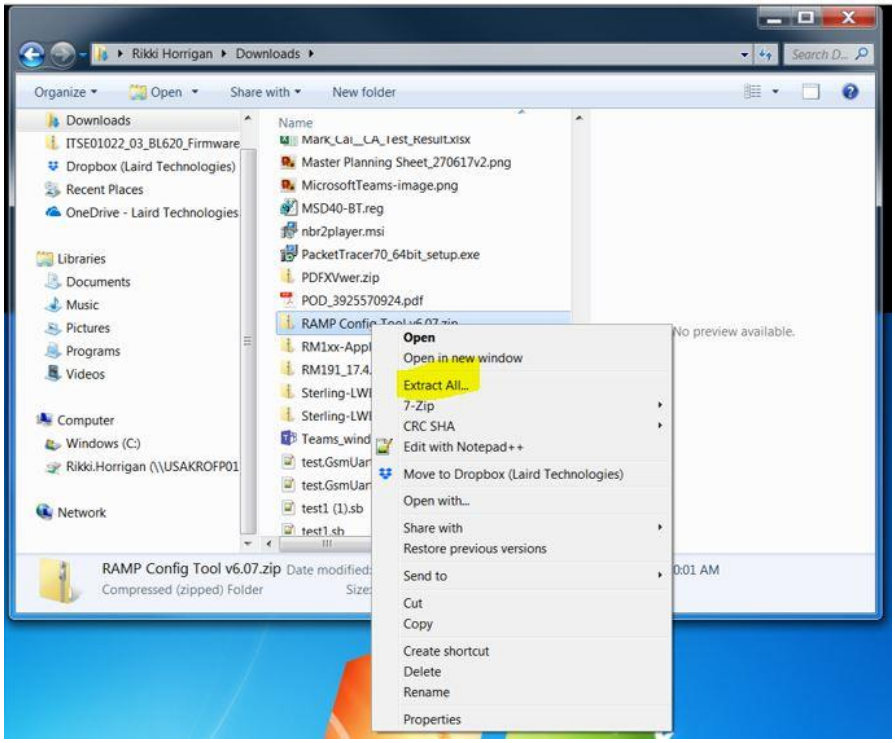

Figure 1: Extract All

2. Install the extracted files. Be sure to run the installation software as administrator (right-click on Setup.exe and select “Run as administrator”), as shown in Figure 2.

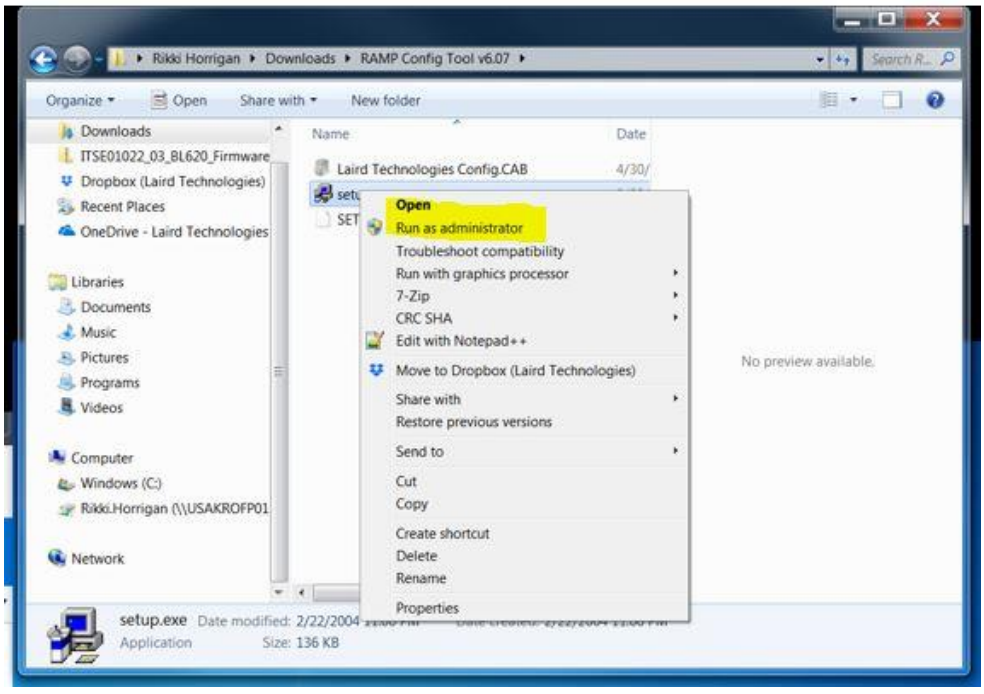

Figure 2: Run as Admin

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3. Follow the prompts of the Installation software to install the Utility. Click OK (Figure 3)

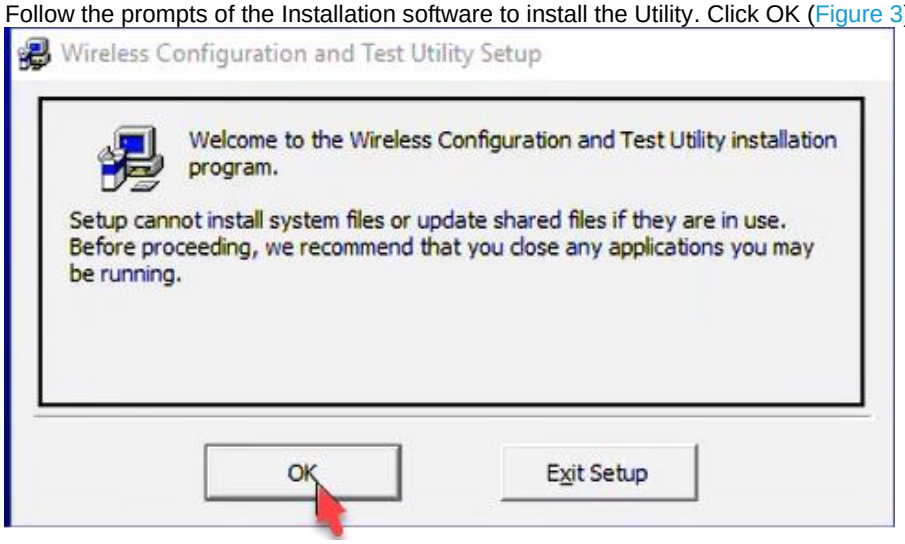

Figure 3: Follow prompts

4. Note the directory the files will be installed into and click the button to install. (Figure 4)

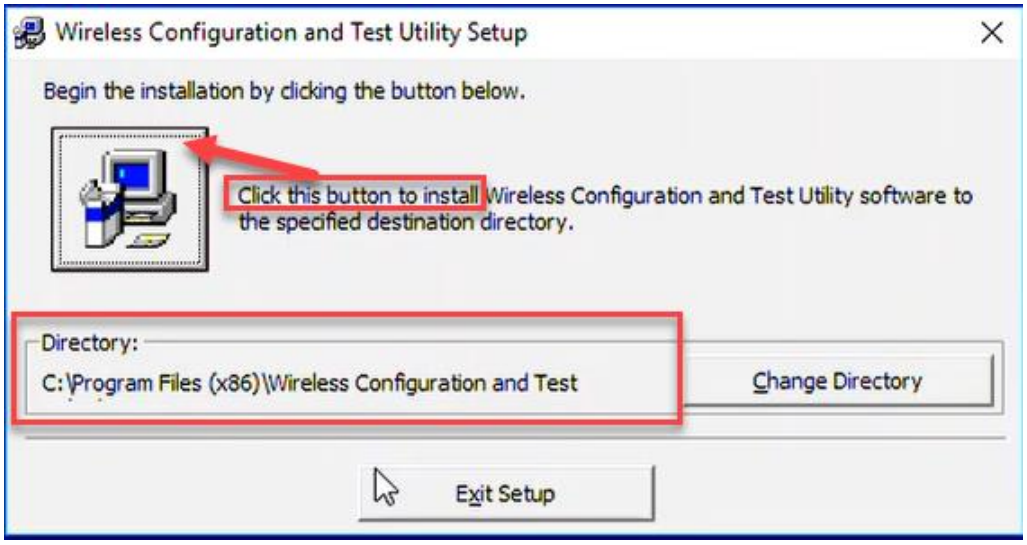

Figure 4: Begin installation

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5. Click Continue (Figure 5).

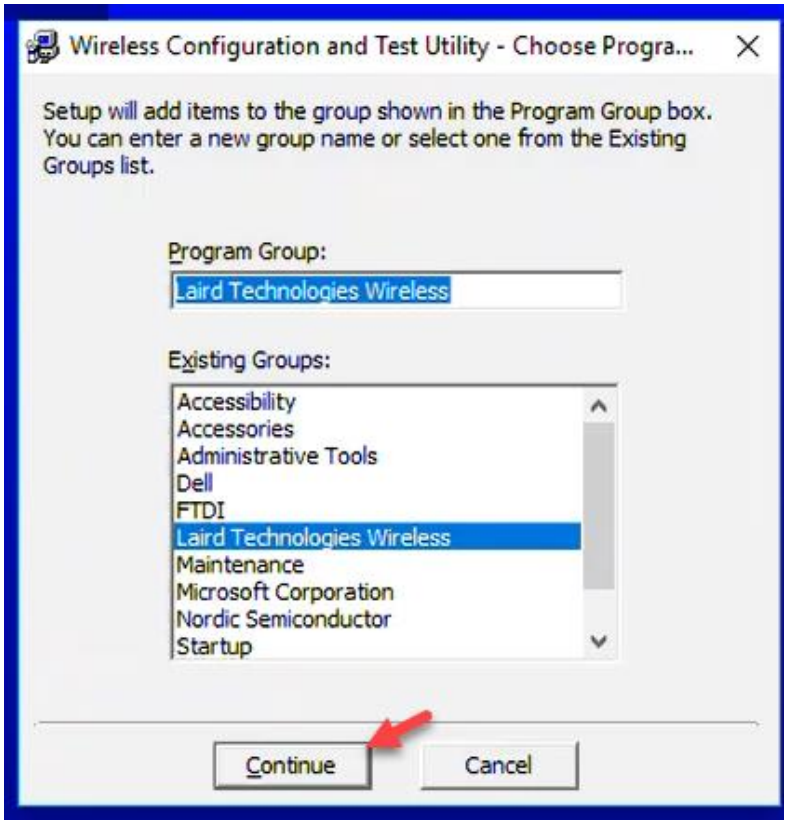

Figure 5: Continue

6. Reboot your system to complete the installation (Figure 6).

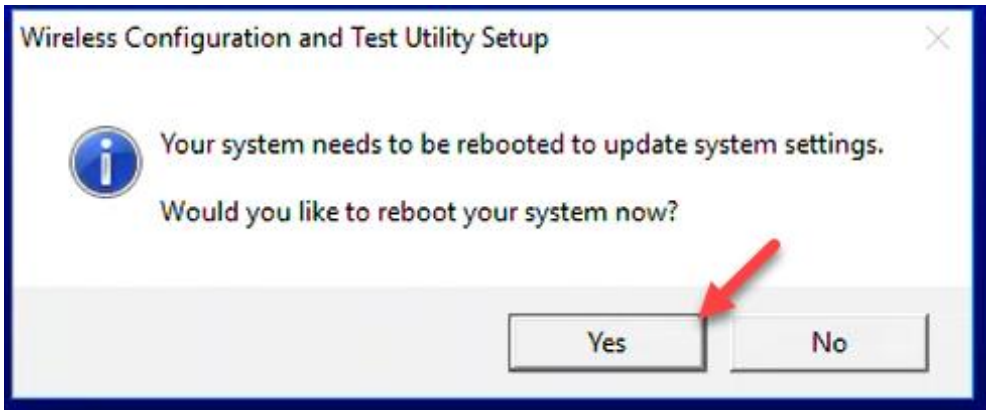

Figure 6: Reboot

Note: Be sure to install and run the CU as Administrator otherwise it does not have the required permissions to properly configure the port(s) to communicate with the ConnexLink device(s).

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4 CONNECT CL4790 TO PC

Warning: Operating the CL4790 Unit without the antenna attached can damage the radio and void the warranty!

To connect the CL4790 to your PC, follow these steps:

1. Attach the Antenna to the CL4790
2. Connect the CL4790 unit to your PC. Depending which variant of the CL4790 is being used you will need to connect to your PC using one of the following setups:
   - CL4790-1000-232 can be directly connected to a DB9 Serial port on PC using the included serial cable.
   - CL4790-1000-232 can be connected using RS232-to-USB Serial cable to PC (Figure 7).

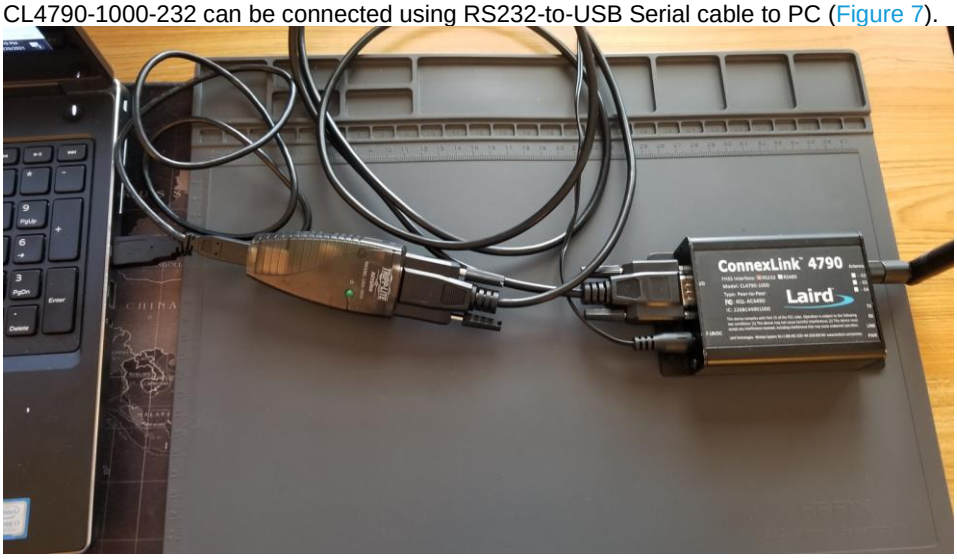

Figure 7: CL4790 connected to a PC via RS232-to-USB cable

   - CL4790-1000-485 can be connected using an RS485-to-USB adapter (Figure 8). See page 10 of CL4790 Hardware Integration Guide (Datasheet) for wiring diagram.

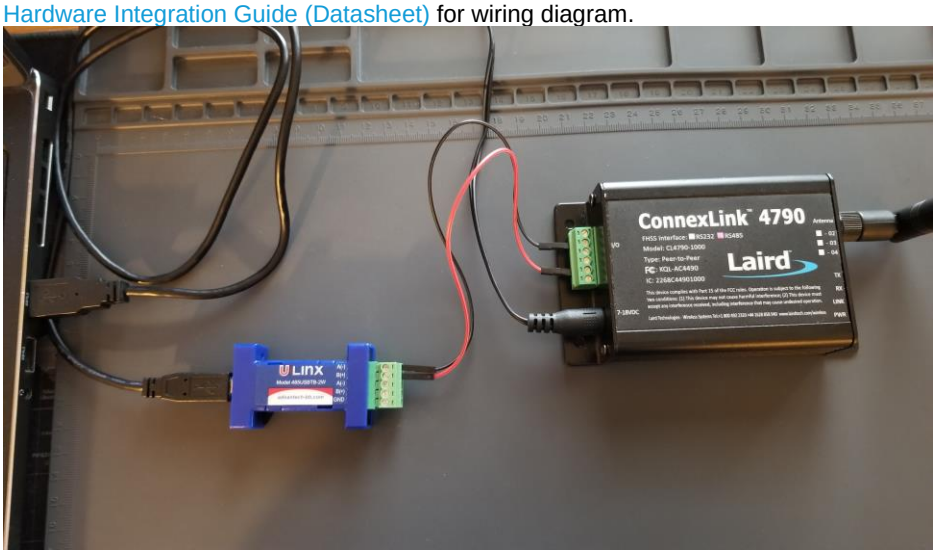

Figure 8: RS485-to-USB (ULINX 485USBTB-2W)

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- CL4790-1000-485 can be connected using combination RS485-to-RS232 & RS232-to-USB adapter (Figure 9) See page 10 of CL4790 Hardware Integration Guide (Datasheet) for wiring diagram.

Figure 9: RS485-to-RS232 + RS232-to-USB (485SD9TB + USA-19HS)

3. Connect the Power Adapter to power on the radio and verify LEDs as shown in Figure 10. Green Power LED (Red Link LED lights only when connected to a peer and passing data)

Figure 10: LEDs (Red Link LED only lights when in a connection)

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5 Verify COM Port in Device Manager

Open Device Manager on your PC and verify the COM port is properly installed and available. If any issues are indicated verify that the correct drivers are properly installed for the serial adapter used. **DO NOT configure the port settings in Device Manager**. These will be configured by the Configuration Utility. (Figure 11)

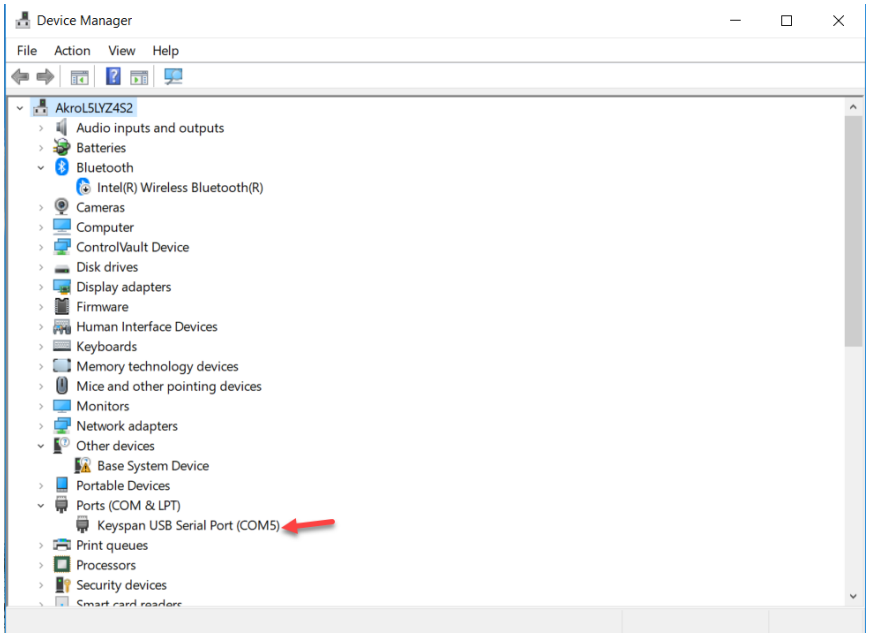

Figure 11: Verify COM Port

Note: The assigned COM port should be less than 16, otherwise it will not register in the configuration utility.

6 Configure PC Settings in Configuration & Test Utility (CU)

1. Open the CU and click on the ***PC Settings*** tab to configure the following PC settings to enable you to communicate with the ConnexLink Unit:
   a. Select the Product - Connex4790
   b. Select the COM Port verified in Device Manager from the dropdown menu, if none are listed click **Find Ports.**
   c. Default baud rate of 57600 should be selected, but if it is known that the unit has been configured to a different baud rate it should be selected here.

Note: If connecting to a previously configured radio, set baud rate to what is configured on the radio

   d. Set Parity to None (recommended)
   e. Set Handshaking to the following:
      - **RS232**: Hardware Recommended
      - **RS485**: None
   f. Set Data Bits to 8
   g. Set Stop Bits to 1
   h. Enable the Options shown
   i. Verify Port 1 Status

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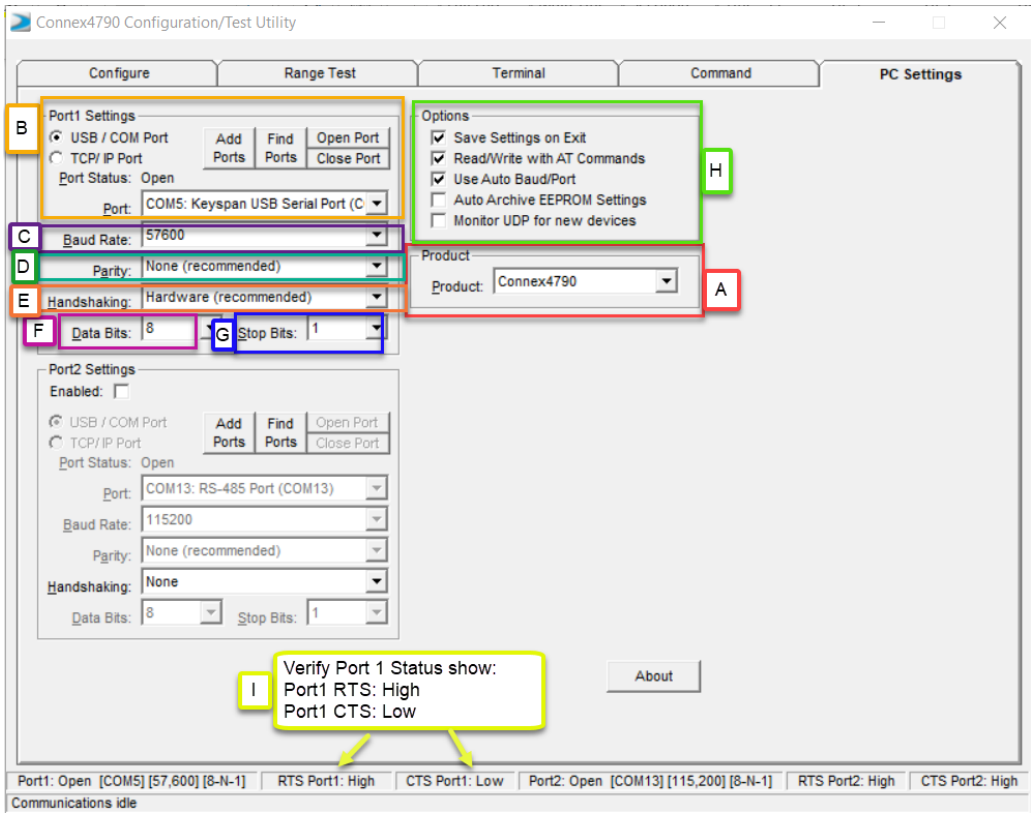

Figure 12: PC Settings tab

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2. Click on the ***Configure*** tab and select ***Read Radio*** (Figure 13) to read the current settings and confirm communication. You should see Read successful message (Figure 14) once the radio has been read.

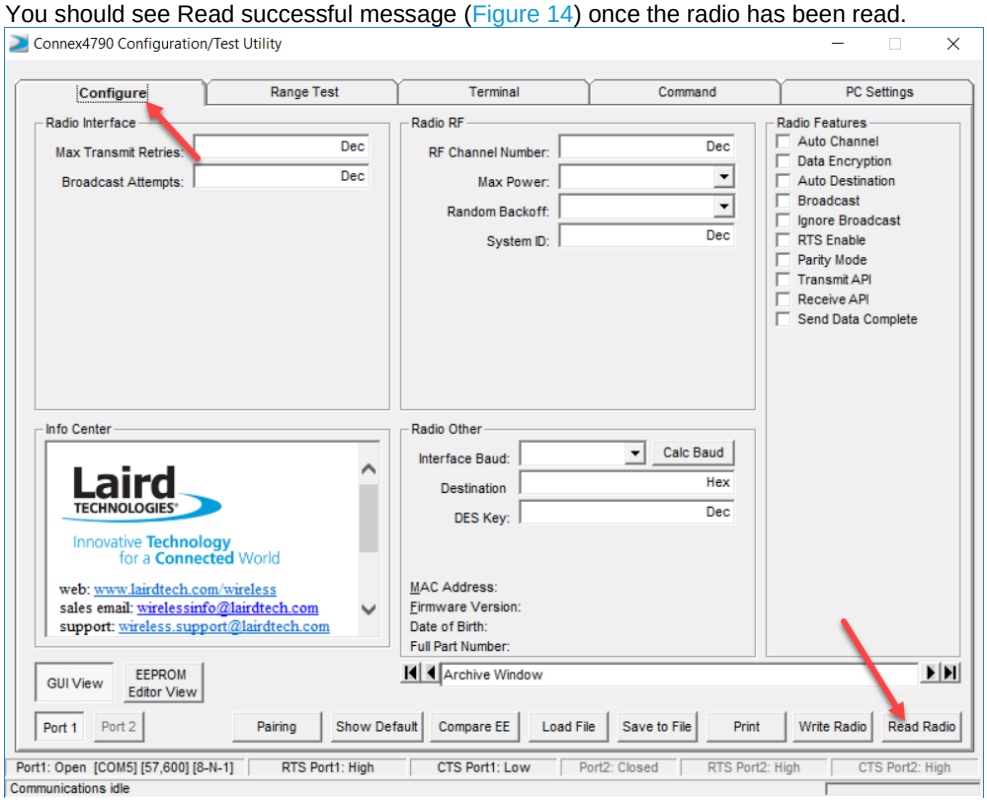

Figure 13: Read radio

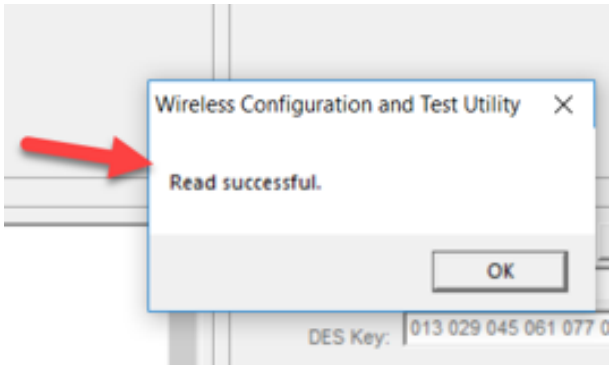

Figure 14: Read successful

Note: If you receive a message that the read was not successful or “Unable to enter command mode”, verify the Baud setting on PC settings tab. You can use AutoBaud mode when prompted to see if the utility can connect with a different Baud setting. If still having issues we recommend referencing the Troubleshooting Appendix on page 14 of the CL4790 User Guide. It may be necessary to recover communication with the radio by enabling Force 9600 as per the Application Note - Force 9600 Baud for ConnexLinks.

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7 Pairing Two Units

By default, single units are configured with default baud of 57600, RF Channel 16 and System ID of 1. Each CL4790 system requires to either be direct addressed to each other, or one unit set with Broadcast enabled and second unit with either Broadcast or Auto Destination enabled. For the purposes of this demonstration, we will configure both units with Broadcast enabled.

1. Configure First Unit: To configure using Broadcast method, the following basic changes are recommended:
   a. Set RF Channel (16 by defaut)– **2nd unit's RF Channel** will also need to be set to same RF Channel to pair
   b. Set System ID (1 by default) - **2nd unit's System ID** will also need to be set to same System ID to pair
   c. If **Auto-Destination** is enabled, disable it
   d. Enable **Broadcast Mode**
   e. Interface Baud – should be set to Host device requirements
   f. If testing in close proximity, it may be necessary to redude the Max Power setting to Low or you may see Data Timeouts or Framing errors in the Range test output
   g. All other settings should be left to the default configuration
   h. Click Write Radio to save the configuration changes to the radio. (See Figure 15)

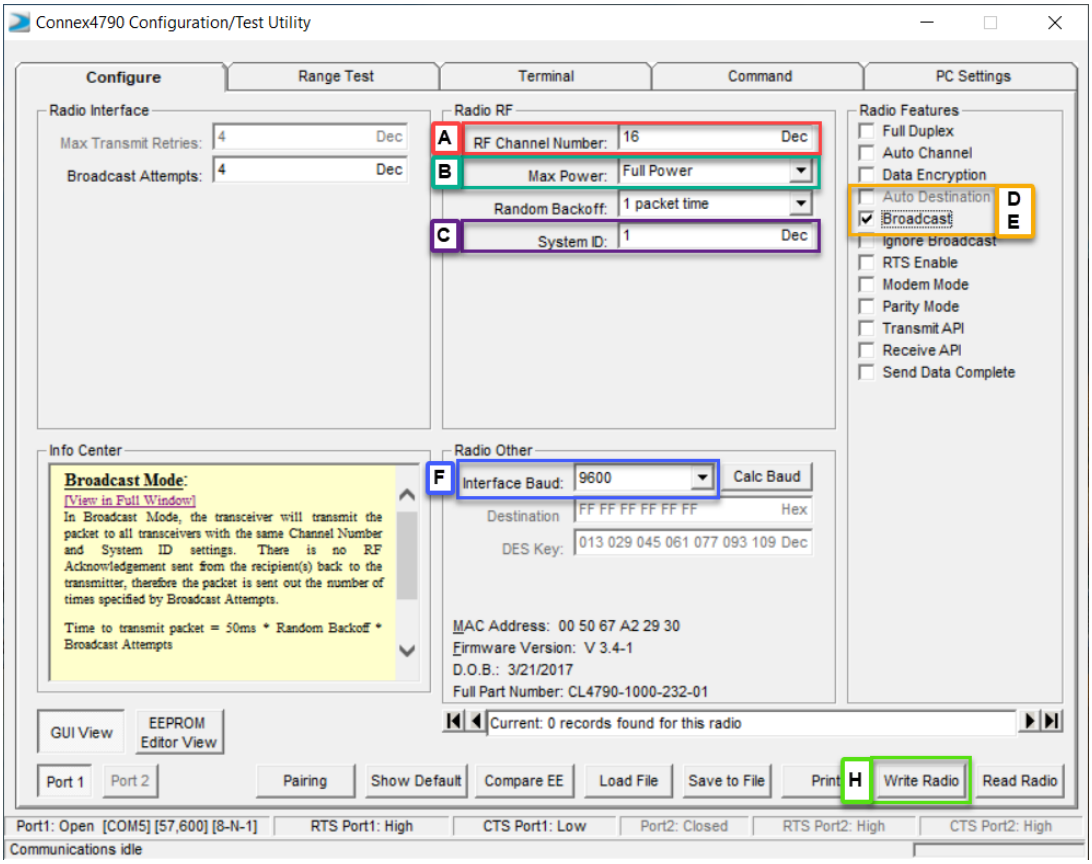

Figure 15: Configuring First Unit

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2. Click **OK** when prompted (Figure 16). The CU will return Write successful message (Figure 17) when complete. Click **OK** to close the message.

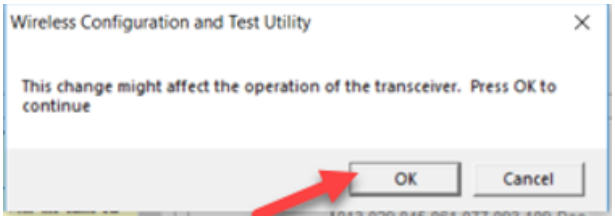

Figure 16: OK to continue

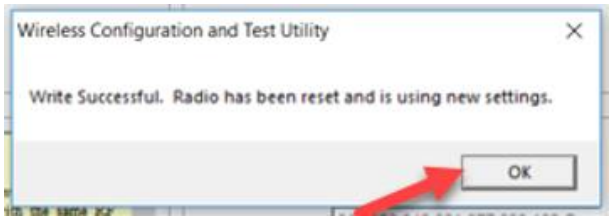

Figure 17: OK to close

3. If Interface baud was changed, return to **PC Settings** tab and change baud rate for this connection to match.

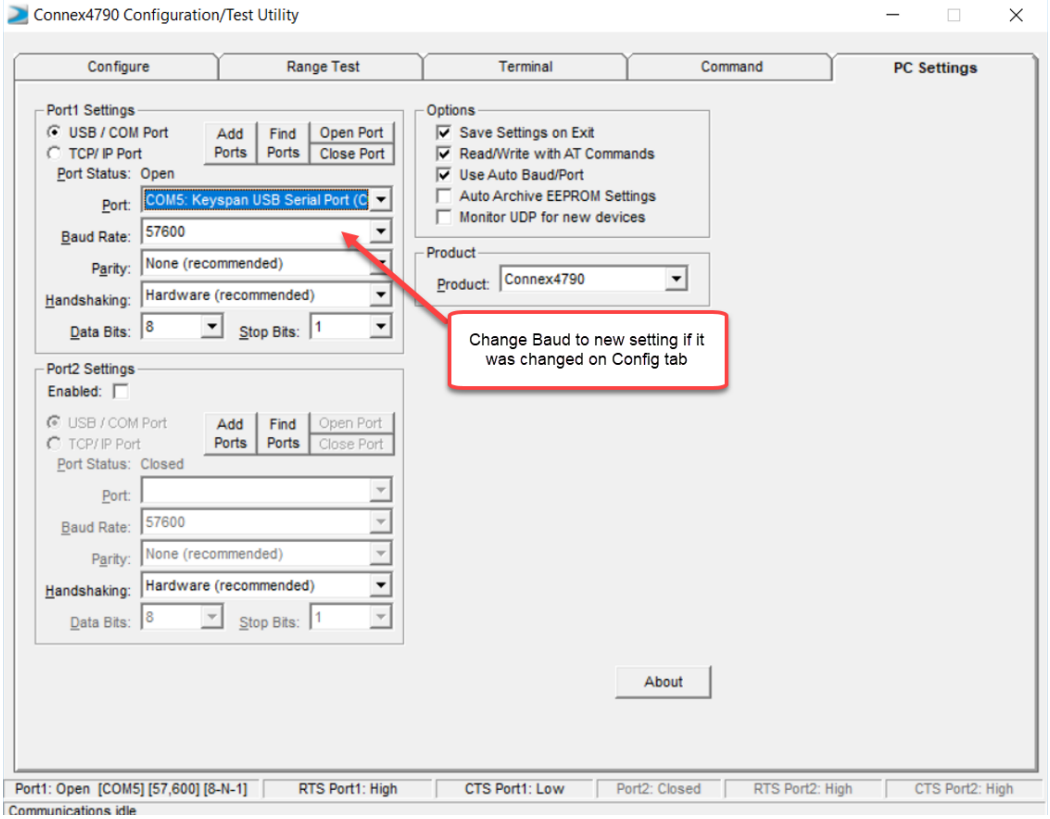

Figure 18: Interface baud setting

4. Return to **Configure** tab and read the radio again to confirm connection and that changes were written to the radio.
5. Return to PC Settings Tab and Click **Close Port** (Figure 19).

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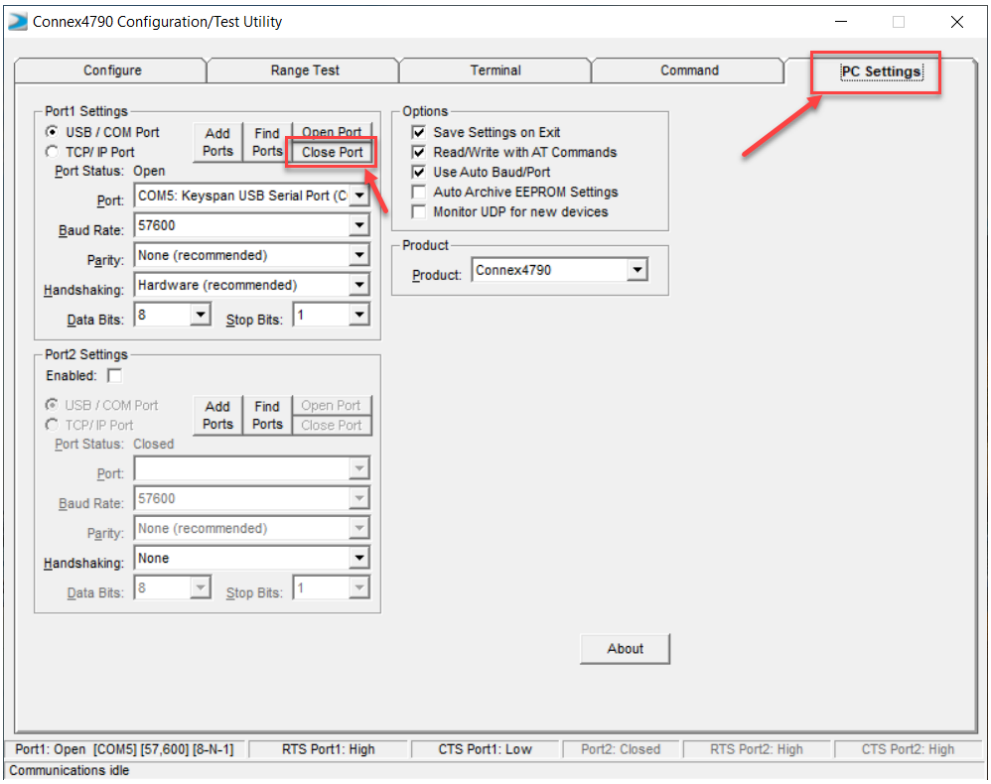

Figure 19: Close port

6. Disconnect the first radio and connect to the second radio as per Connect CL4790 to PC section.
7. **Configure the second unit exactly the same as the first one** – (see steps 1-4 of Pairing Two Units)

Note: The **RF Channel** and **System ID** must be set the same on BOTH units for them to connect and pass data.

8 Test Configurations

1. Ensure the power supply is connected to both radios.
2. Ensure the radios are at least five feet apart
3. Verify the green Pwr (Power) LED are lit on **both** units – this indicates they are linked (paired) and ready to pass data.

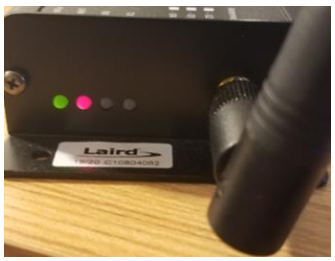

Figure 20: LEDs active

Now that the radios are paired the **Range Test** tab can be used to perform a Loopback test (**RS232 Only**) to confirm the radios are paired and transmitting data.

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1. On 1st Unit (not connected to the PC) jumper pins 2-3 together to tie RX and TX (loopback) using female to female pin jumper wire. (Figure 21)

Figure 21: Loopback Jumper

2. Connect power to the 1st radio and make sure that it is at least 10 feet away from the 2nd Unit
3. With the 2nd Unit still connected to the Configuration Utility via the PC – click on Range Test tab
4. Test Selection: Port 1 Loopback
5. Test Type: Continuous
6. Receive Packet Display: ASCII
7. Port 1: View RX Packets
8. Click on **Run** to run the test

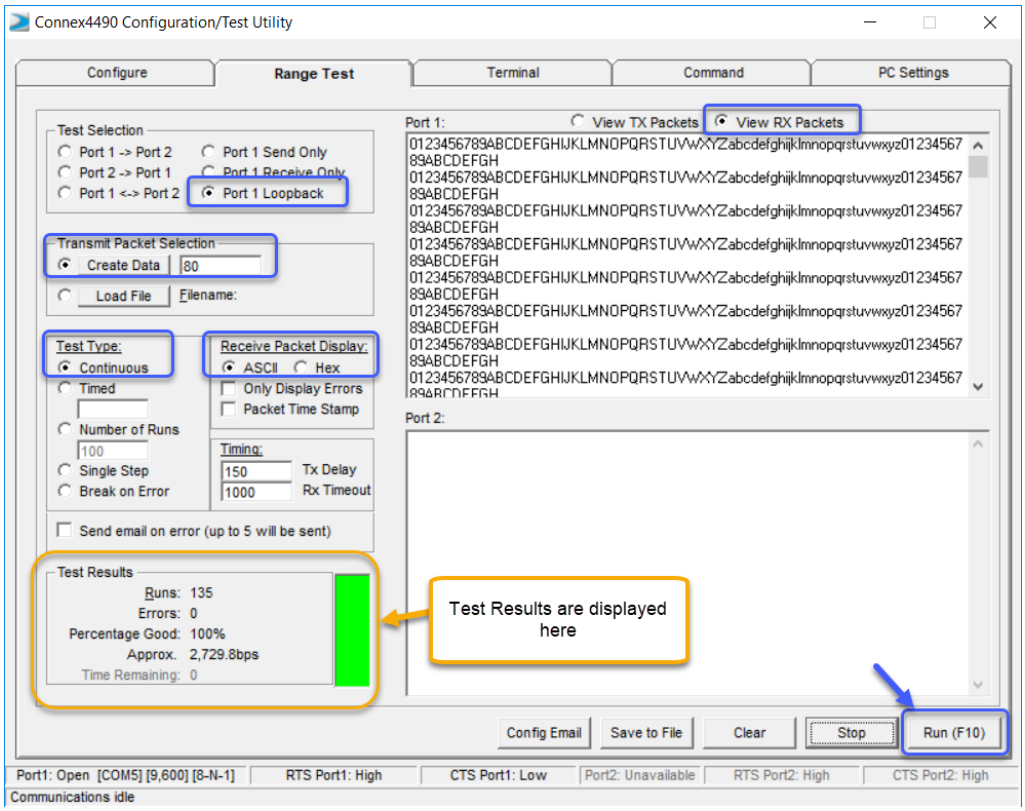

Figure 22: Range Test tab - loopback

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Note: Testing **CL4790-1000-RS485** configurations with Range Test Tab requires **two RS485-to-USB (or RS485-to-RS232) adapters**, so that both radios can be connected to the Configuration Utility, as RS485 does not support Loopback configurations. See the Laird Configuration and Test Utility Software - RAMP Modules User Guide for additional information about using the Range Test feature for alternate testing options.

9 Direct Address RADIOS (Optional)

For additional security and resistance to crosstalk the radios can be direct addressed to each other, rather than using the Broadcast and Auto-Destination features which were used in steps 8 & 9. To do this you would

1. Disable **Broadcast** on the 1st radio
2. Add the **MAC Address** of the 2nd radio to the ***Destination*** field of the 1st radio
3. Save the changes using the **Write Radio** button
4. Disable **Broadcast** mode on 2nd radio
5. Add the **MAC Address** of the 1st Radio to the **Destination** field of the 2nd radio
6. Save the changes using the **Write Radio** button.

Radios can be tested using the same process in step 8.

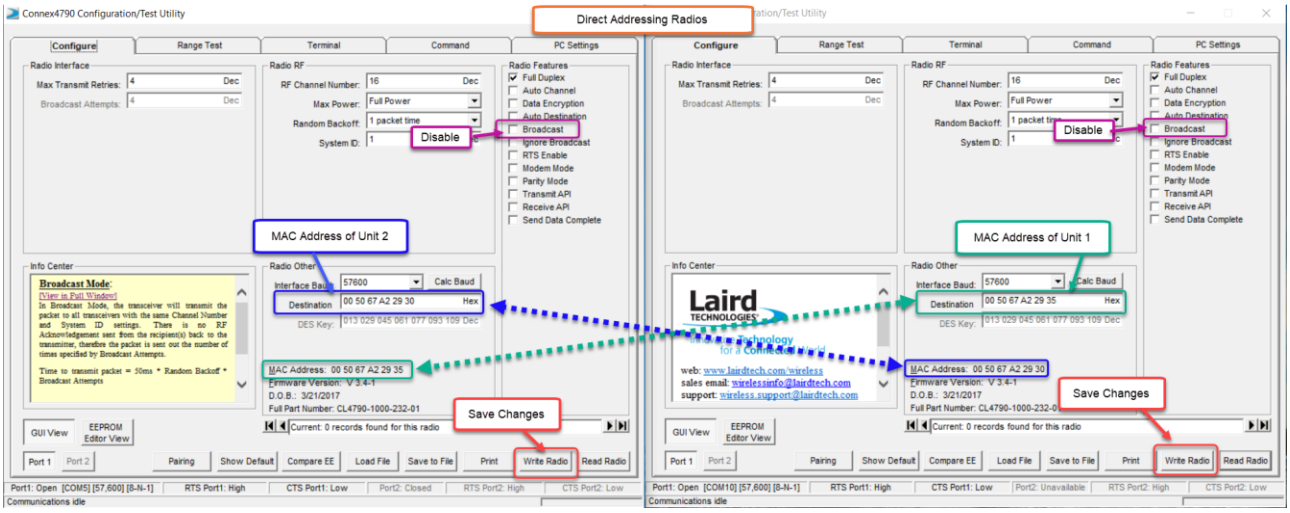

Figure 23: Direct Addressed

10 Point to Multipoint (P2MP)

To configure a P2MP system follow the same procedure in step 7 to configure each additional radio. Each radio in the system will need to be configured with the same RF Channel and System ID. If one radio will be acting as a "Server" or master and the others will only communicate with the "Server" then the one acting as the "Server" must be set to broadcast. The radios which will be acting as clients should be direct addressed to the unit acting as the server. The **Auto-destination** feature can be used to automatically address each of the remaining units to the "Server".

Version	Date	Notes	Contributor(s)	Approver
1.0	20 Dec 2021	Initial Release	Rikki Horrigan	Jonathan Kaye

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