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RRL5 Remote Radio Link

User Guide

RRL 5
Remote Radio Link

April 30, 2025

Solinst®

1 Introduction

The Solinst RRL 5 Remote Radio Link offers a very simple and inexpensive method of local telemetry. The wireless system is designed to collect real-time data from field-located dataloggers and send it via radio to your Home Station computer. RRL 5 Systems are designed specifically for high quality Solinst dataloggers. Up to two Solinst dataloggers can be connected to one RRL 5 Station. The RRL 5 is excellent for small, closed-loop networks such as mine sites and landfill monitoring networks.

Systems operate on two basic schedules.

Sample Rate is the frequency the RRL Remote Stations collect real-time readings from each of the attached dataloggers. The Sample Rate can be set from 10 seconds to 99 hours.

Report Rate is the rate at which stored data is sent from a Remote Station to the Home Station. The Report Rate can be set from 1 minute to 99 hours.

Optionally, dataloggers themselves can be set up to record and store data independently of the Telemetry System. This provides a reliable back-up if circumstances require it. An internal barometer allows barometrically compensated water levels to be reported.

This manual focuses on configuration, programming, and installation of Remote RRL 5 Networks. It includes instructions for installing and using Solinst Telemetry Software to set up data collection schedules, manage data, and perform remote diagnostic checks.

Figure 1-1 RRL 5 Remote Radio Link System

RRL 5 Remote Radio Link Specifications	
Communication:	900 MHz or 2.4 GHz radio modules
Communication Distance:	900 MHz: ~ 30 km (20 miles) RF line-of-sight 2.4 GHz: ~ 600 m (1200 ft) RF line-of-sight
Antenna:	Whip, Bracket Mount, RPSMA, Omnidirectional, 12.5 cm (5") length with 2 m (6.5 ft) cable. IP67 2.4 GHz: 3 dBi, 900 MHz: 1.6 dBi
Data File Type:	.mdb (database), .xle or .csv (exported)
Sampling Interval:	10 seconds - 99 hours
Reporting Interval:	1 minute - 99 hours (the lower threshold will increase as the number of devices sharing the RF air space grows)
Schedule Programming:	Solinst Telemetry Software at Home Station
Power Supply:	6 x AA 1.5V replaceable lithium batteries
Battery Life Example:	1 year of standard usage
Memory Capacity: (Between Reports)	128 KB (13,000 LT or 10,000 LTC readings)
Operating Temperature:	-20ºC to +60ºC
Weight:	447 grams (15.8 oz)
Size:	8.79" (unit height to base of antenna jack)
Materials:	Black Delrin®, 316 stainless steel
IP Rating:	IP67
Compatible Dataloggers:	Levelogger 5 Series dataloggers, LevelVent 5, as well as previous versions of the LevelVent and Edge Series dataloggers
Connected dataloggers:	1, or 2 using a splitter
Barometric Compensation:	Internal barometer for automatic barometric compensation of water level data if a Barologger is not being used (not required for vented loggers)
Internal Barometer Range:	60 kPa – 120 kPa
Internal Barometer Accuracy:	±0.2 kPa (2 cm)

Table 1-1 RRL 5 Specifications

1.1 RRL 5 Compatibility

Each RRL 5 Station can connect up to two Solinst dataloggers. RRL 5 Systems are compatible with the Levelogger 5, Barologger 5, Levelogger 5 Junior, Levelogger 5 LTC, Rainlogger 5, and LevelVent 5, as well as Levelogger Edge Series dataloggers and previous LevelVent dataloggers using the following firmware versions (or higher):

Datalogger	Firmware Version
Levelogger 5	1.006
Barologger 5	1.006
Levelogger 5 Junior	1.006
Levelogger 5 LTC	1.006
Rainlogger 5	1.006
LevelVent 5	1.006
Levelogger Edge	3.004
Barologger Edge	3.004
Levelogger Junior Edge	3.004
LTC Levelogger Edge	1.003
Rainlogger Edge	3.001
LevelVent	1.000

Table 1-2 Compatible Datalogger Firmware Versions

It is also important to ensure you are using the most recent RRL 5 firmware version, with the most recent Solinst Telemetry Software. To check this, go to https://downloads.solinst.com

Note: To determine the current firmware version on an RRL 5 unit, connect it to the PC with a USB cable and open the RRL Remote Utility. See Section 5.

Note: To determine what software version you are using, use the Help menu in the STS/RRL Administrator.

2 RRL 5 Overview

RRL Stations work with omnidirectional antenna line-of-sight transmission, therefore, can communicate over distances up to 30 km (20 miles) with 900 MHz radios and up to 600 m (1200 ft) with 2.4 GHz radios. Optional antennas can maximize distances (user-sourced). The radio range will vary at different frequencies, as well as environments and antenna setups.

2.1 RRL 5 Stations

All RRL 5 Stations use the same hardware, and are programmed using a wizard in the Solinst Telemetry Software as a Home Station or Remote Station. As such, RRL 5 Stations are interchangeable as required.

Home Station: Each RRL 5 Network will have one Home Station. The Home Station is connected to a PC using a USB cable. The Home Station is powered though the USB connection, but it also requires the internal batteries to operate.

Figure 2-1 RRL 5 Network

Note: The RRL 5 Home Station requires an external power supply (through the USB connection to the Home Station PC), as well as the internal batteries.

Remote Station: The Remote Station will turn the radio module on and off based on the Report Rate scheduled, to send the accumulated data from the connected dataloggers to the Home Station.

RRL 5 Stations are designed to be placed in a 2" diameter well (4" with adaptor), but can also be used in other applications. Each RRL 5 comes with a 2" Well Cap Assembly and a Support Hanger Bracket (see Section 6 for installation instructions). RRL 5 Stations are constructed from Black Delrin®, and have an IP rating of 67 (dust proof and can withstand immersion up to 1 meter depth for up to 30 minutes).

Figure 2-2 RRL 5 Station

RRL 5 Stations have the option of a 900 MHz radio or 2.4 GHz radio. RRL 5 Stations come standard with six (6) 1.5V AA replaceable lithium batteries and antenna. There is input for one datalogger, with the option of using a Splitter to allow the connection of up to two dataloggers. An internal barometer allows barometrically compensated water level data to be reported. There is a USB-C connection for programming the RRL 5 with Solinst Telemetry Software, firmware update and diagnostic purposes, and for connecting a Home Station RRL 5 to the PC. It can also be used to connect an external power supply.

The USB cable, dataloggers, Direct Read Cables, and Reader Cables to be used with the System are purchased separately. Other installation housings and requirements are user-supplied.

RRL 5 Stations have a non-volatile internal memory of 128 KB (13,000 sets of LT readings or 10,000 sets of LTC readings). A Remote Station stores collected data in its memory until the Home Station has been successfully contacted. The light on the RRL Station flashes with every transmission activity.

2.1.1 Installing Batteries

RRL 5 Stations are shipped with separate batteries, which must be installed before programming. Each RRL 5 uses six (6) 1.5V AA replaceable lithium batteries.

Note: Alkaline batteries can also be used, but battery life estimates will be reduced. They may also reduce the operating temperature range.

To install the batteries:

1. Use a Phillips screwdriver to remove the three screws from the top of the RRL 5.
2. Pull the top cap off. This will take some force to get past the o-ring.

Note: If the antenna is connected, you may want to unscrew it to more easily remove the top cap.

3. Use the Phillips screwdriver to remove the two screws holding the battery compartment cover in place. Pull to remove the cover.
4. Note the positive (+) and negative (–) etchings on the RRL. Install three batteries with the positive ends up in the side with the positive (+) etching. Install the other three batteries with the negative (-) ends up.
5. Replace the battery compartment cover and secure using the two screws.
6. Replace the top cap and secure with the three screws.

Note: If you are not using your RRL 5 for more than two months, Solinst recommends removing the batteries for long term storage.

Figure 2-3 Installing RRL 5 Batteries

Note: It is recommended to replace the batteries when the Remote Station Battery indicator reaches 60% (see Section 4.1).

2.1.2 Installing the Antenna

The RRL 5 comes with a whip antenna with a 2 m (6.5 ft) cable extension. A mounting bracket is included on the antenna.

To attach the antenna, line the cable connection up with the antenna jack and screw the cable onto the connection. See section 6.1 for instructions to accommodate the antenna when using the 2" well cap.

The antenna for the RRL 5 uses a reverse polarity SMA (RP-SMA) connection (male thread and male centre), therefore, you can source other appropriate (legal) antennas or an antenna cable extension with an SMA connector, if required (as long as waterproofing is maintained).

Figure 2-4 Installing RRL 5 Antenna

2.2 Connecting Dataloggers and Splitters

Each RRL 5 has a single port to connect one datalogger. An optional splitter allows the connection of a second datalogger. To connect the Reader Cables to the RRL 5 Station, remove the black dust cap from the connection on the RRL 5 Station, line up the holes in the connectors, push the Reader Cable connector into the connection on the RRL Station and screw the Reader Cable onto the RRL connection until finger-tight.

Figure 2-5 Reader Cable

2.2.1 Connecting Leveloggers

Leveloggers are connected to the RRL 5 using a Reader Cable, which connects to a Direct Read Cable threaded onto the Levelogger.

Note: For more information on installing Leveloggers in the field, see the Levelogger User Guide.

Figure 2-6 Connecting Leveloggers

2.2.2 Connecting LevelVent Dataloggers

LevelVent 5 dataloggers are connected to the RRL 5 using a Reader Cable, which connects directly to a LevelVent Wellhead (which is connected to the LevelVent Vented Cable and Datalogger).

Note: For more information on installing LevelVent 5 dataloggers in the field, see the Vented Dataloggers User Guide.

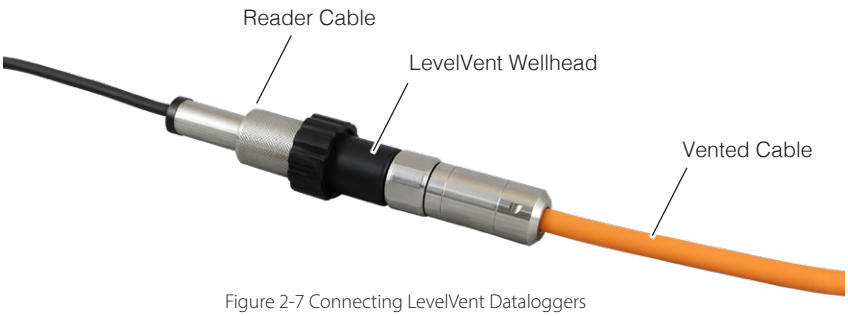


Figure 2-7 Connecting LevelVent Dataloggers

2.2.3 Splitters

A Splitter allows the connection of up to two dataloggers to each RRL 5. To connect a Splitter to the RRL 5, remove the black dust cap, line up the holes in the connectors and screw the Splitter onto the RRL 5 connection until finger-tight.

Reader Cables are connected to the Splitters in the same manner they are connected directly to the RRL 5.

Figure 2-8 Splitter (pt# 109427)

Figure 2-9 Splitter Connection

3 Solinst Telemetry Software

The Home Station computer requires the latest version of **Solinst Telemetry Software**. The **STS/RRL Administrator Software** provides an easy-to-use graphical interface to set up each RRL 5, specify communication intervals, and define sampling rates for attached dataloggers. Collected data is stored and viewed using the software; it can also be exported for use in other programs.

Note: You must have administrator privileges on your PC to install Solinst Telemetry Software.

The **STS/RRL Communication Agent** is automatically installed with the STS/RRL Administrator Software, and is used to view communication activity. It **must** remain open (can be minimized) in order to receive real-time reports at the Home Station.

Note: The STS/RRL Communication Agent should always remain open when the RRL 5 System is in operation. It may be closed, but the data can not be sent to the Home Station computer. The data will be stored in the RRL 5 Remote Station until the Agent is re-opened, and not until the next scheduled report .

The **RRL Remote Utility** is useful to install on a portable laptop, as it provides a convenient way to communicate with programmed RRL 5 Stations in your office or in the field, as well as perform remote diagnostic checks. See Section 5 for more information on the Remote Utility.

3.1 System Requirements

The minimal hardware and software requirements for software installation and operation are:

Hardware	Software
Processor: 1 GHz or faster processor or SoC	OS: Windows 10 or 11
RAM: 1 GB for 32-bit or 2 GB for 64-bit	
Hard disk space: 128 MB	
Display: 800 x 600	
Ports: USB	

3.2 Software Installation

Web Download

Download the newest version of the Solinst Telemetry Software and the RRL Remote Utility by visiting https://downloads.solinst.com/

The STS/RRL Communication Agent automatically installs with the STS/RRL Administrator.

Note: Solinst Telemetry Software is also used to program STS Telemetry Systems. See separate User Guide for more information.

Note: When installing the software, the STS Field Utility is also installed. This program is not required for setting up RRL Systems.

3.3 RRL 5 Software Communication

For initial setup and direct communication with Solinst Telemetry Software, the RRL 5 must be connected to the PC using a USB to USB-C cable (available from Solinst). During operation, the RRL Home Station will remain connected to the PC using this same connection.

To access the USB-C connection on the RRL 5:

1. Unscrew the black cap from the top of the RRL 5.
2. Plug the USB cable into the USB-C connection.
3. Connect the USB cable to the PC.
4. When done communicating with the PC Software, unplug the USB cable and replace the cap.

Note: During operation, the RRL Home Station will remain connected to the PC using this same connection.

Figure 3-1 USB Cable Connection

4 RRL 5 Network Configuration

To start the Solinst Telemetry Software, click  on your desktop.

4.1 Software Administrator Window

After the Software has been started, the Administrator window will open. From here you can create new RRL Networks, edit existing networks (remote updates), delete existing networks, set up barometric compensation (if the internal barometer is not used), and open site data.

Note: When opening the Software for the first time, you will be prompted to the Network Setup screen before the Administrator is shown.

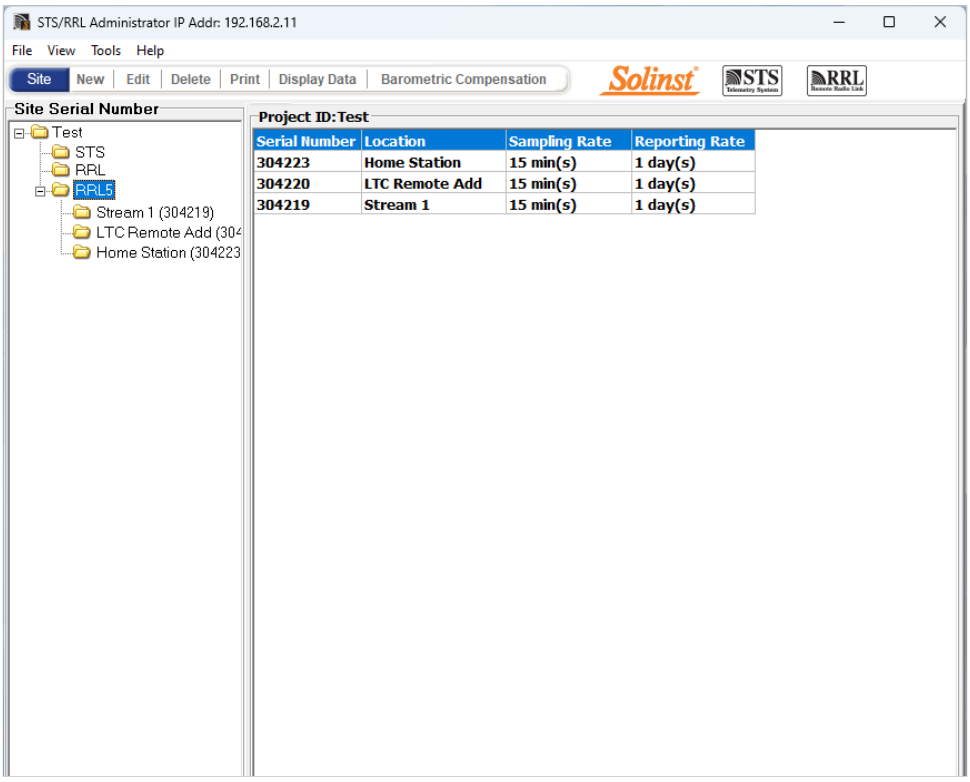


Figure 4-1 Administrator Window - Network Information

The Menu on the left of the window lists each existing RRL 5 Network by its project identification and each RRL 5 Station in the network by its location and serial number (number located on each RRL unit).

Note: STS Telemetry Sites will also be listed in the Administrator Window. See separate User Guides for more information on STS Telemetry Systems.

Selecting a network from the list will display all of the stations in the network, along with the report and sampling rates. Selecting a station from the list will display information on the Station Battery Strength, Station Signal Strength, Last Update Time and network details (including Project ID, Location, Number of Dataloggers, etc). Information for each datalogger connected to the site is displayed, including instrument type, serial number, and battery strength.

Note: Selecting "Delete" when a RRL Network is highlighted, will not allow you to delete that network, until all stations in that network are deleted first. To delete a RRL Station from the list, click to highlight the serial number, and select "Delete" from the main menu bar.

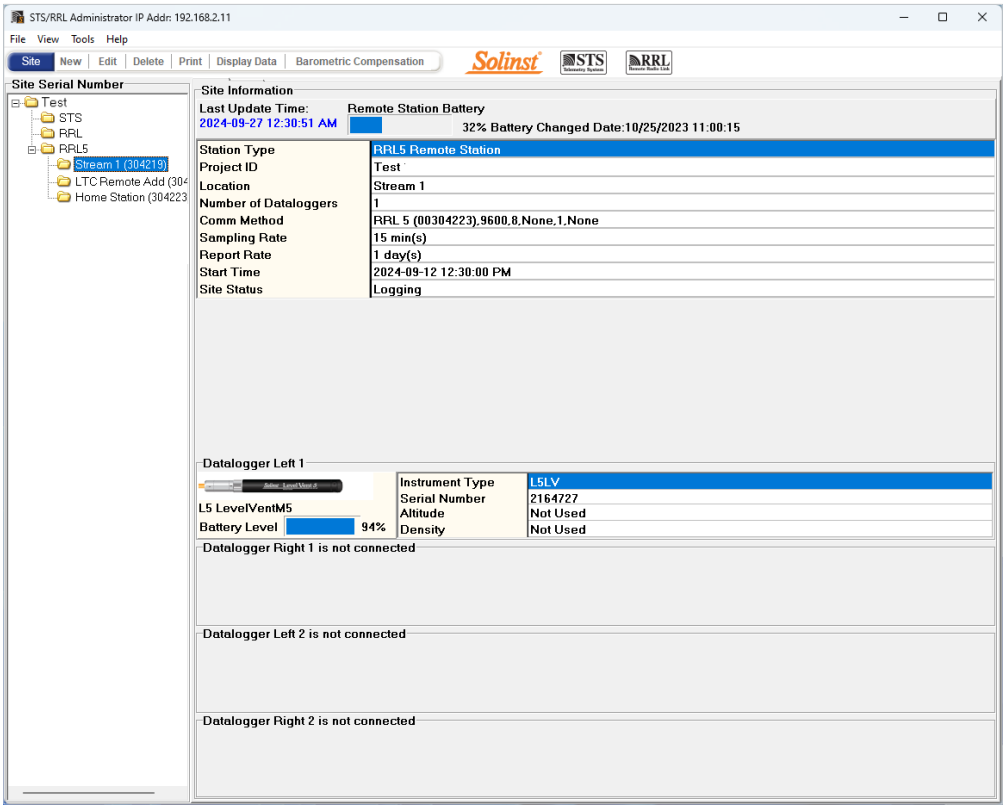


Figure 4-2 Administrator Window - Station Information

- **Last Update Time**: The last time the Home Station was contacted
- **Remote Station Battery:** Percentage of strength left in the RRL Station battery and the last date and time that the batteries were replaced.
  Note: It is recommended to replace the batteries when the Remote Station Battery indicator reaches 60%.
- **Station Type**: Identifies whether the station has been programmed as a Remote Station or Home Station.
- **Project ID**: Your own identification system that you input.
- **Location**: Specific site / location information you input.
- **Number of Dataloggers**: The number of dataloggers that are connected to the RRL Station.
- **Comm Method**: Indicates the COM Port that is being used at the Home Station computer for communication.
- **Sampling Rate**: The Sample Rate of the RRL 5 Station.
- **Report Rate:** The Report Rate of the RRL 5 Station.
- **Start Time:** The date and time that the RRL Station started collecting data.
- **Site Status**: Will show the status of the RRL Station, i.e. “Logging”, “Waiting for Update”.

4.2 Programming a RRL 5 Network (Software Wizard)

Step 1: Create New Site

Selecting "New" in the Administrator window main menu opens the Network Setup Screen. It will also open when the software is started for the first time. Choose to set up a RRL 5 Network, which will start the software wizard.

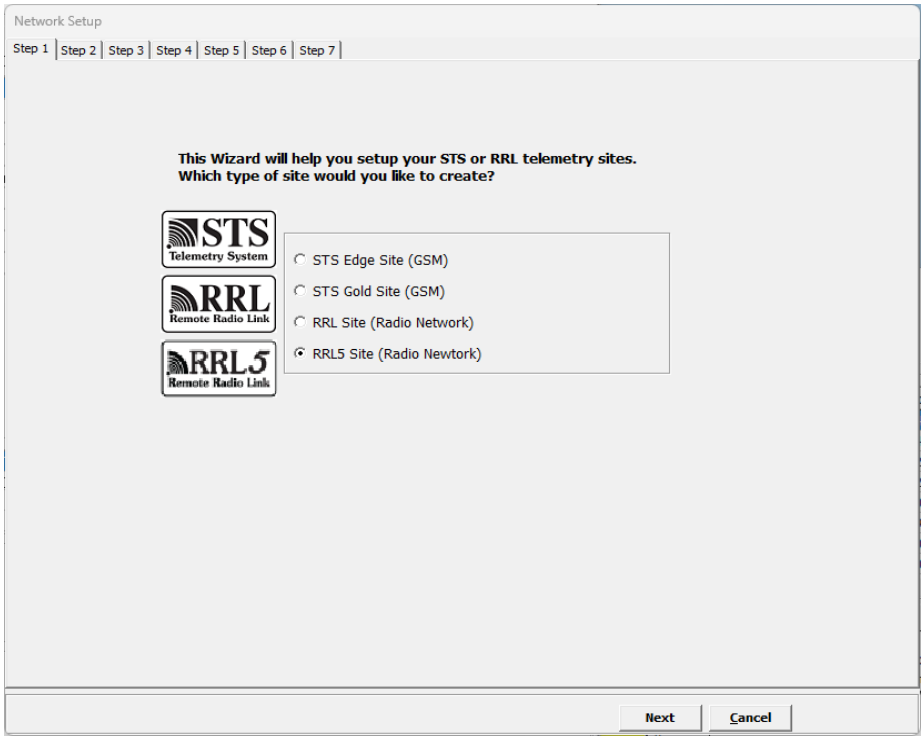


Figure 4-3 Network Setup Screen

Step 2: Network Configuration

After you select "RRL 5 Site", the RRL Network Setup screen will open. In this screen you will enter the settings for your RRL 5 Network. At this point you should connect the RRL 5 Station you are about to program to the Home Station computer (see Section 3.3). Programming the Home Station is always first.

- **Project Identification**: Input the unique name you choose to identify your project/site.
- **Network ID**: Select a number to identify the network. There may be more than one network reporting to the same Home Station computer. There can be a maximum of 5 networks reporting to the same Home Station. This is to avoid radio communication conflict between adjacent networks. Each RRL 5 Station in the same network should use the same ID number.
- **Home Station Connection**:
  When connecting your RRL 5 Home Station to a PC, identify the **Master Com Port** being used for communication between the computer and the RRL 5 Home Station. Click Refresh if you connect a new RRL 5.
- **Number of Home Stations**: This is always 1.
- **Number of Remote Stations**: Enter the number of Remote Stations in your network.

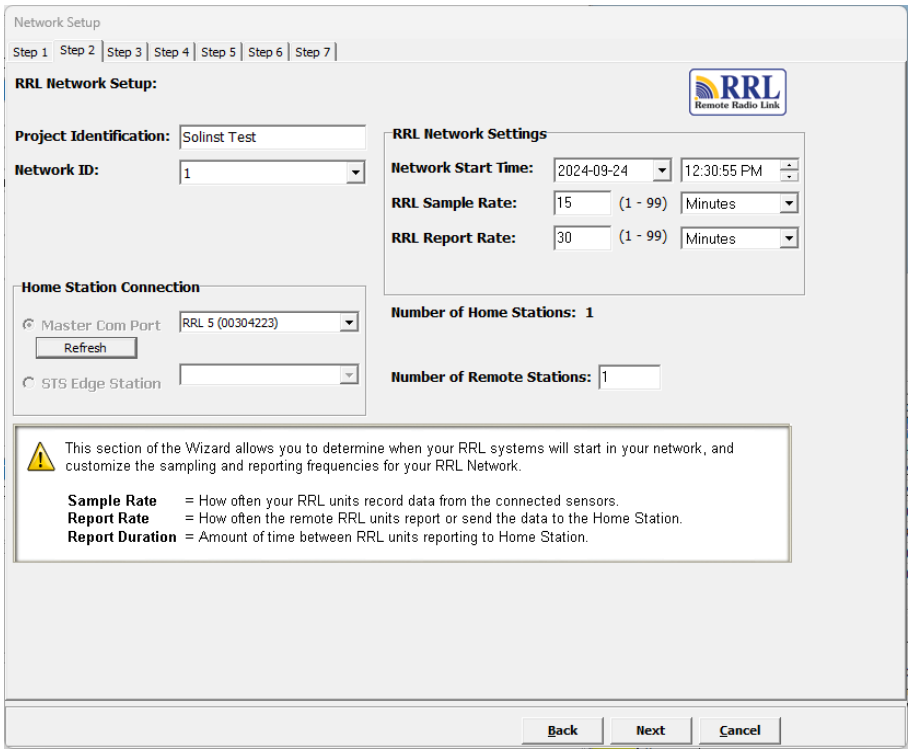


Figure 4-4 RRL Network Setup Screen

- **RRL Network Settings:**

  Network Start Time: Enter the date and time your RRL 5 Remote Stations will begin collecting data from the attached dataloggers.

  Sample Rate: Is the frequency the RRL 5 Remote Stations collect real-time readings from each of the attached dataloggers. The Sample Rate can be set from 1 second to 99 hours. You can choose to set each station with a different Sample Rate. This can be done in Step 4 when you are setting up each individual station, otherwise all stations will have the same sampling rate as set in this step.

  Report Rate is the rate at which stored data is sent from a Remote Station to the Home Station. The Report Rate can be set from 1 minute to 99 hours.

  Note: Longer Report Rate intervals will conserve battery power at Remote Stations.

Step 3: Configuration Progress

Step 3 is a transition screen. At this point you should connect the RRL 5 Station you are about to program to the Home Station computer (see Section 3.3), if not done already. Programming the Home Station is always first. This screen shows you the RRL Stations you will be configuring your RRL 5 Network.

Note: It is recommended you connect your dataloggers to each RRL 5 Station before programming.

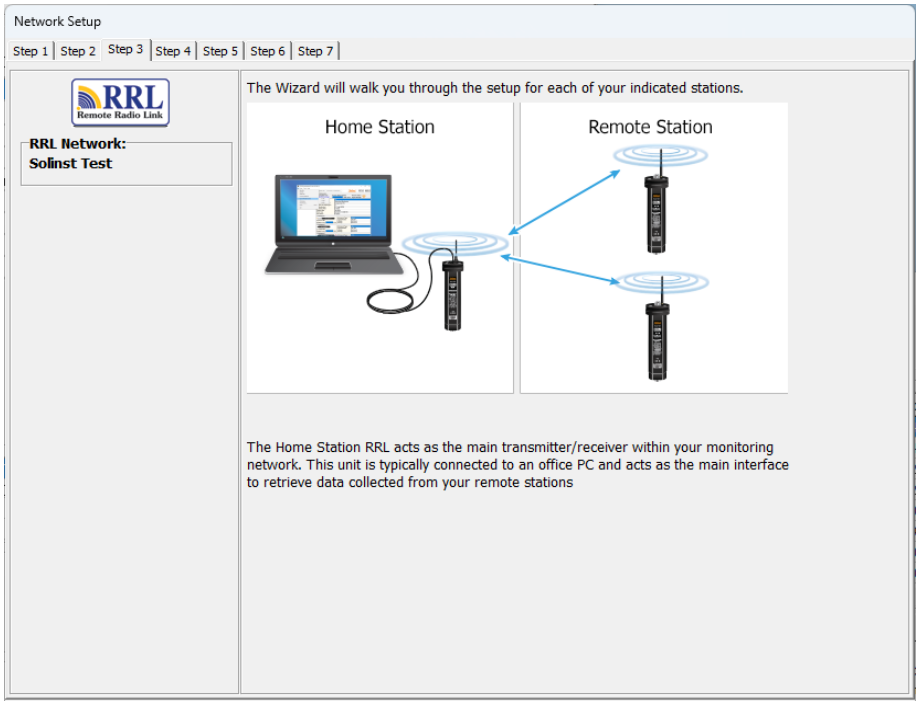


Figure 4-5 RRL Software Wizard Transition Screen

Step 4: Programming Your RRL 5 Station

In Step 4, enter the serial number of the RRL 5 Station you are programming; the Location of the Station, i.e.: "Home Station", "Well 1", "Remote Station 2"; the Com Port being used to program the RRL 5 Station (click refresh if connecting a new RRL 5); and the Sample Rate for that station (if different from the one set in Step 2).

If you are programming the Home Station, you will select whether there is a datalogger connected to the station. If there is not, you will skip to Step 6. If there is a datalogger connected, or you are programming a Remote Station, you will proceed to Step 5.

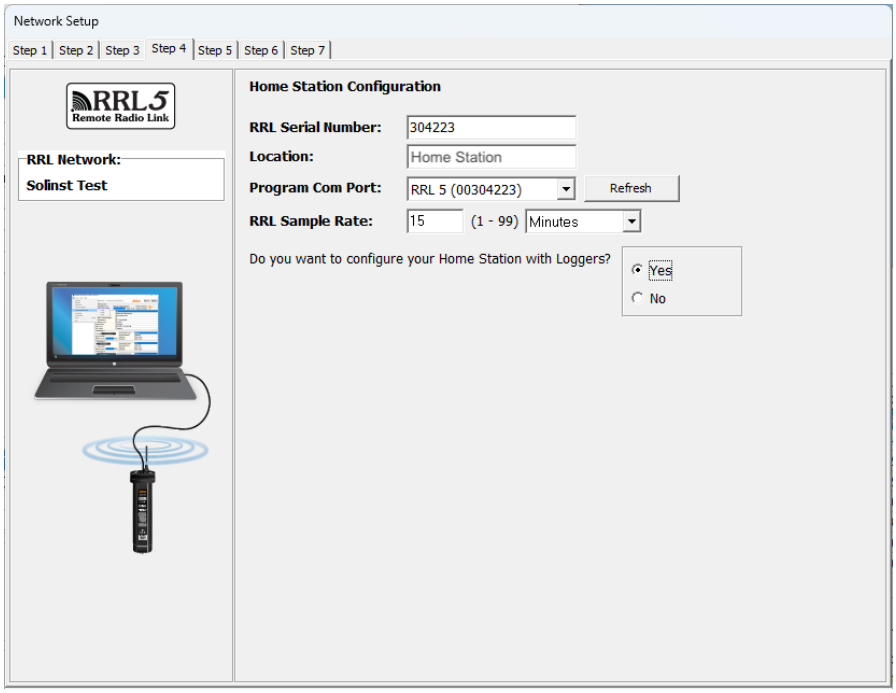


Figure 4-6 Programming a RRL Station

Step 5: Configuring Attached Dataloggers

In this step you will select the number and types of dataloggers connected to the RRL 5 Station. If using a Splitter, the number 1 or 2 will identify the dataloggers. The numbers 1 and 2 are labeled directly on the connections of each Splitter.

Barometer Setup: If you are not connecting a Barologger as the second datalogger, you can choose to Enable the internal barometer of the RRL 5. You will select the unit of measurement for the pressure readings from the drop-down menu; the options are kPa, mbar, and psi. This will allow reported water level readings to be automatically barometrically compensated.

For each connection you will select the type of datalogger attached. Select 'NONE' for connectors with no datalogger attached. After selecting the datalogger type from the drop down menu, an image of the selected datalogger will be displayed.

Note: The firmware versions shown in red for each datalogger, are the firmware versions that will work with the current Solinst Telemetry Software version.

To optionally set each datalogger to record in their internal memory, select **Edit** to begin entering data collection information.

Note: Dataloggers programmed to record and store readings in their internal, non-volatile memory, provide reliable back-up data. This will, however, cause their internal battery to be used up more quickly.

You **must** program a Rainlogger in order to enter a Rainfall Calibration Constant (the amount of rainfall per tip of the connected rain gauge), but you do not have to set it to record independently.

Select Next, without editing any datalogger settings, if you do not want to set your dataloggers to record independently.

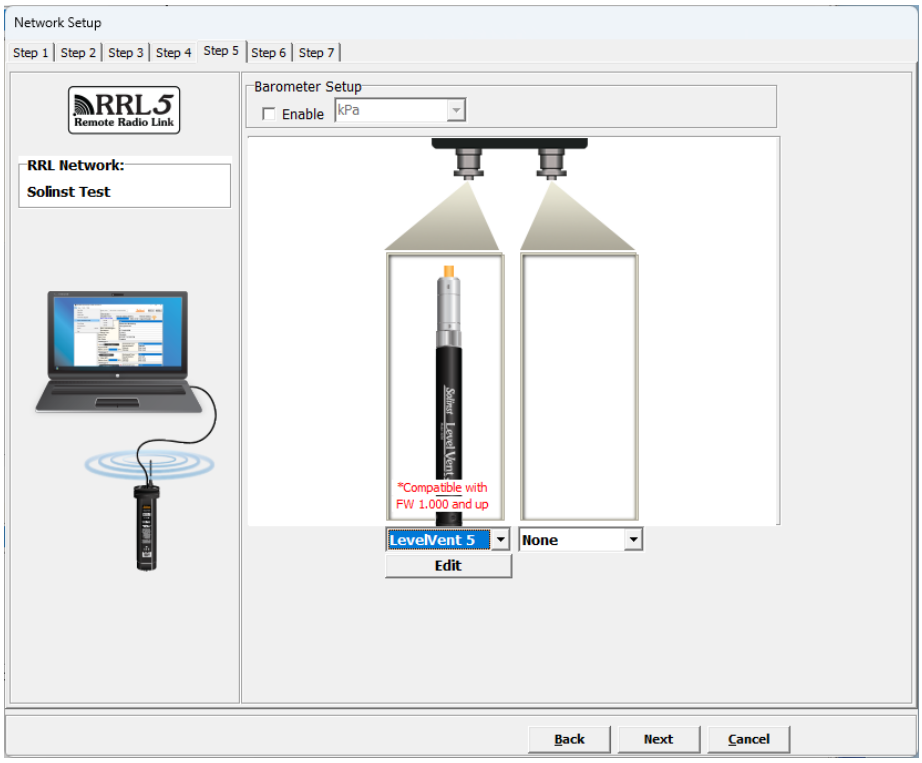


Figure 4-7 Enabling Barometer and Adding Dataloggers

4.2.1 Editing Datalogger Information

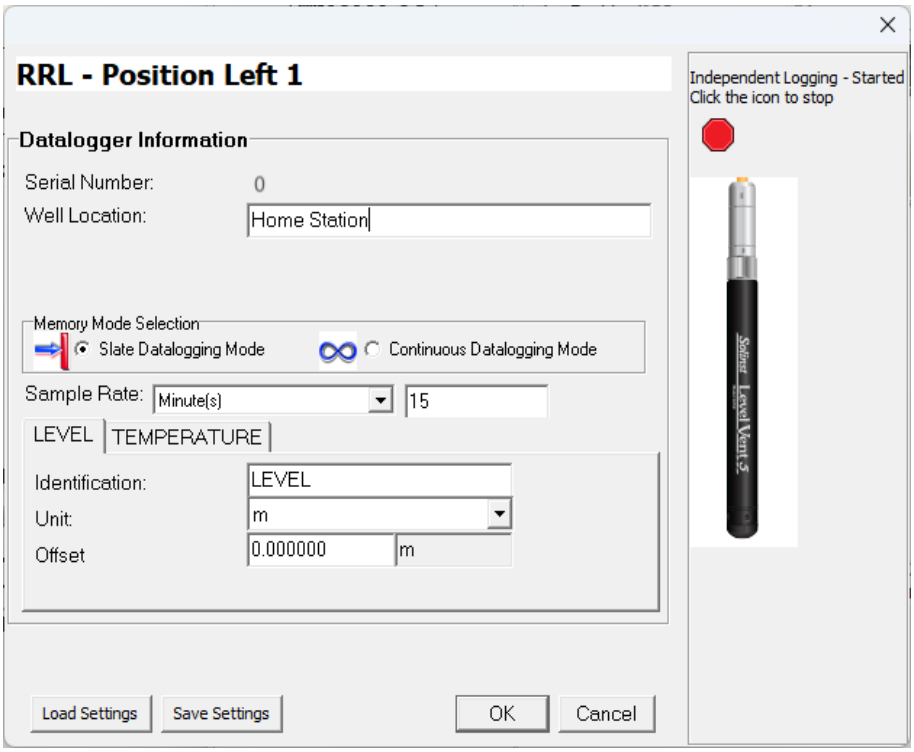


Figure 4-8 Datalogger Information Window

The Datalogger Information window includes Datalogger Serial Number, Well Location, Sample Rate, and Memory Mode Selection.

If you do not require independent logging, select and the RRL 5 Station will only collect a real-time reading from the datalogger at the scheduled Sample Rate. There is no need to enter a Sample Rate.

If you want your datalogger to record and store readings in its internal memory, independent of RRL 5 operation, fill in the Sample Rate and Memory Mode Selection fields, and select if independent logging has been stopped.

- **Serial Number:** Your datalogger Serial Number will display after the System is started.
- **Well Location**: Input specific site / location information.
- **Sample Rate**: Is linear. Linear refers to a set time interval between collection of readings. The default sample rate is set to 15 minutes.
- **Memory Mode Selection:** There is a choice of Continuous Logging (wrap around) or Slate Logging. In Continuous Logging the new log is started at the end of any previous log and continues logging, eventually recording over the first logged data. As one of the download options is to 'Append Data', Continuous Logging can be a preferred choice when logging long-term. In Slate Logging the new log is also started at the end of any previous log, but will stop recordings when the memory is full, so that the beginning of the current log will not be written over. Rainloggers record in Slate mode only.

  Note: In Slate Logging, the datalogger will stop recording readings after its memory is full. Therefore, Continuous Logging is recommended for long term monitoring applications.

Please refer to the chart below for a summary of the available sampling and memory options for each datalogger type (See the Levelogger User Guide for previous Levelogger models).

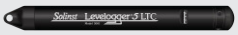
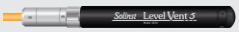
Datalogger Programming Options			
Datalogger Type	**Linear Sampling**	**Memory**	**Battery Life**
Levelogger 5/ Barologger 5 	0.125 second to 99 hours	150,000 sets of readings in Slate or Continuous Mode	10 years based on 1 reading per minute
Levelogger 5 Junior 	0.5 second to 99 hours	75,000 sets of readings in Slate or Continuous Mode	5 years based on 1 reading per minute
Levelogger 5 LTC 	2 seconds to 99 hours	100,000 sets of readings in Slate or Continuous Mode	8 years based on 1 reading every 5 minutes
Rainlogger 5 	Event Based (records tips from tipping-bucket rain gauge)	Up to 100,000 tip time logs in Slate or Continuous Mode	10 years based on 2 parameters logged every 10 minutes
LevelVent 5 	0.125 second to 99 hours	150,000 sets of readings in Slate or Continuous Mode	10 years based on 1 reading per minute

Table 4-1 Datalogger Programming Options

Note: If you are programming a number of dataloggers with the same settings, select "Save Settings" after programming the first datalogger. Select "Load Settings" when starting to set up your next datalogger to apply the saved settings.

Setting Up Datalogger Measurement Parameters

In the lower portion of the Datalogger Information screen is the window for setting channel parameters. The software will detect the available channels when the Datalogger Information settings are read.

For the Level Channel, you can set the following parameters:

- **Identification** describes the measurement parameter of the channel and has already been configured as 'LEVEL'. The Level Channel monitors water column equivalent pressure. The Identification field will be the data column heading and graph line name when viewing the data.
- **Units** refers to the channel's units of measurement. There are six units of measure available for the user to select: m (default), cm, ft, kPa, mbar, and psi. When using a Barologger, the options are kPa (default), mbar, and psi.
- **Offset** refers to an offset correction, such as the distance between the tip of the datalogger and the monitoring well cap or static water level. It is recommended that the value of 0.00 be used for offset as this keeps all subsequent readings relative to the tip of the datalogger. The offset range is -1000 to 16400 ft or -300 m to 5000 m.

The Temperature Channel includes the following parameters:

- **Identification** describes the measurement parameter of the channel and has already been configured as 'TEMPERATURE'
- **Units** refers to the channel's units of measurement. The temperature channel can be set to °C (default) or °F.

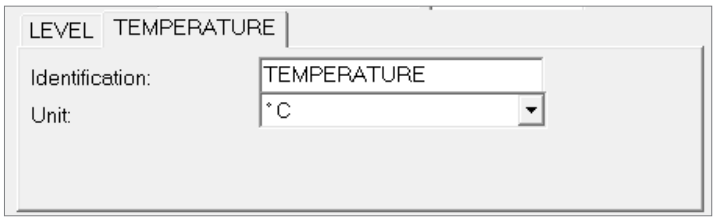


Figure 4-9 The Temperature Channel

The Conductivity Channel includes the following parameters:

- **Identification** describes the measurement parameter of the channel and has already been configured as 'Conductivity' .The Identification field will be the channel heading, data column heading and graph line name when viewing the data.
- **Unit** refers to the channel's units of measurement. There are two units of measure available for the user to select: mS/cm or µS/cm.

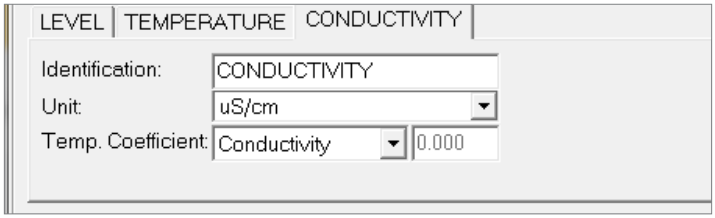


Figure 4-10 LTC Levelogger Measurement Parameters

Rainlogger Measurement Parameters:

Note: You **must** program your Rainloggers in order to enter a Rainfall Cal Constant (the amount of rainfall per tip of the rain gauge), but you do not have to set them to record independently.

There is one channel of measurement for Rainloggers. The 'RainFall' Channel records each tip time by the connected tipping-bucket and outputs the amount of rainfall per tip (input Rainfall Cal Constant). When an RRL Remote Station reports Rainlogger data to the Home Station, it will send the accumulated rainfall amount per sample period (based on RRL 5 Station Sample Rate). To determine the exact time that a tip occurred, the Rainlogger would have to be set to record in its own internal memory, which stores each tip event.

- **Identification** describes the measurement parameter of the channel and has already been configured as 'RainFall'. The channel can be re-named to suit each project. The Identification field will be the channel heading, data column heading and graph line name when viewing the data. Identification is limited to 32 characters.
- **Units** refers to the channel's unit of measurement. There are two units of measure available for the user to select: mm or in.
- **The Rainfall Cal Constant** field allows you to enter the calibration factor for the tipping-bucket you will be using. The calibration factor is the amount of rainfall depth (mm, in) per tip. The calibration factor should be indicated on a label on the tipping-bucket device or in the manufacturer's documentation. Input the calibration factor in mm or inches.

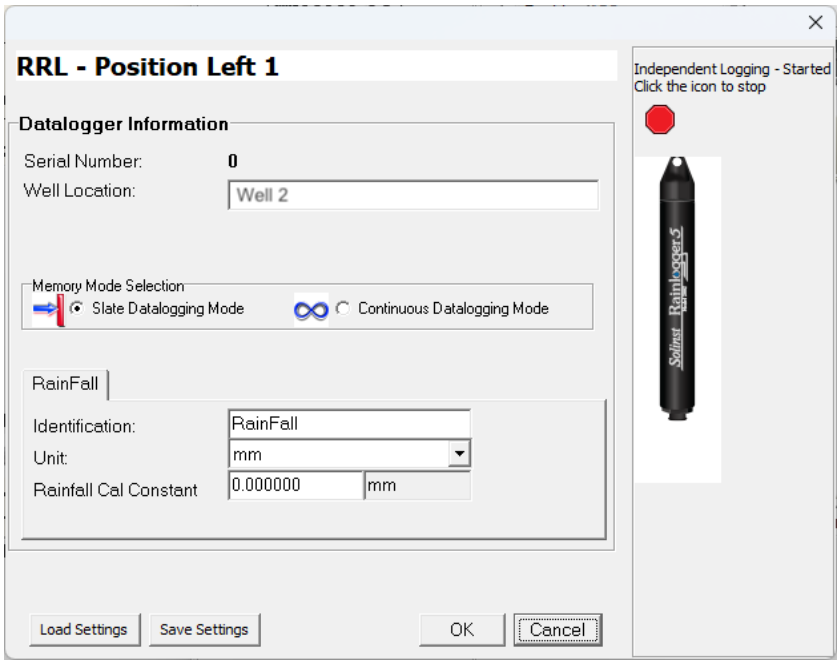


Figure 4-11 Rainlogger Measurement Parameters

Note: When an RRL 5 reports Rainlogger data to the Home Station, it will send the accumulated rainfall per sample period (based on RRL 5 Sample Rate).

After all dataloggers have been entered and programmed as desired, proceed to Step 6.

Step 6: Confirm Station Settings

In this step, select "Retrieve RRL Info". This will apply all the settings to the RRL 5 Station and retrieve information from that station to confirm it has been successfully programmed.

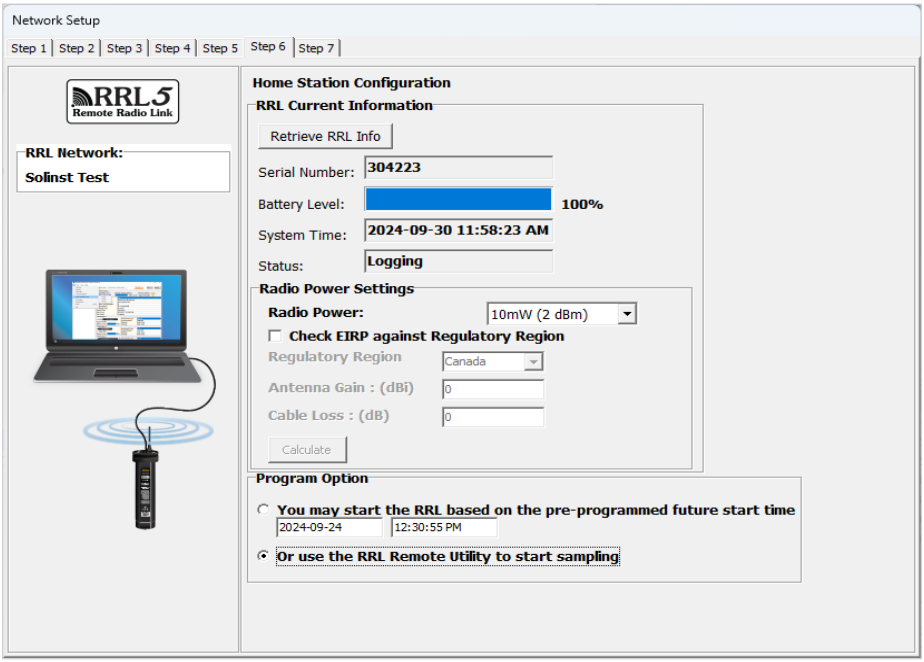


Figure 4-12 RRL Station Information

- **Serial Number**: Should match the serial number you entered in Step 2.
- **Battery Level**: The internal battery level of the RRL 5 Station
- **System Time**: The internal system time of the RRL 5 Station
- **Status:** The RRL 5 Station is "Logging" or "Future Started".
- **Radio Power Settings:** Selecting a lower power setting can reduce power consumption, however, the communication distance is directly proportional to the radio power. Choose 1 mW to maximize battery life. Choose 1W to maximize the communication distance.

  Note: If a higher Radio Power setting is selected, the battery at the RRL 5 Station will be drained more quickly.

  Note: If the highest Radio Power setting is still not adequate to communicate the distance required, you may need a more sensitive antenna.

  If you are in an area that has regulations on the maximum allowed radiated power, you can use the calculator provided to determine the **EIRP** of the RRL 5 Station and see if it meets the requirements for your selected region.

You will also select whether you wish to start this station using the Programmed Start Time entered in Step 2, or use the Remote Utility to start the station at a different time (see Section 5).

- **Sampling based on the Future Start Time:** The RRL 5 Station will start sampling based on the start time you set in Step 2.
- **Use RRL Remote Utility to Start Sampling:** The RRL 5 Station will stay in stop mode. To start sampling, you have to use the RRL Remote Utility (see Section 5).

If you are programming the Home Station or one of multiple Remote Stations, you will be prompted to the transition screen in Step 3.

You will proceed through Steps 3 to 6 until all stations have been programmed. See Figure 4-13.

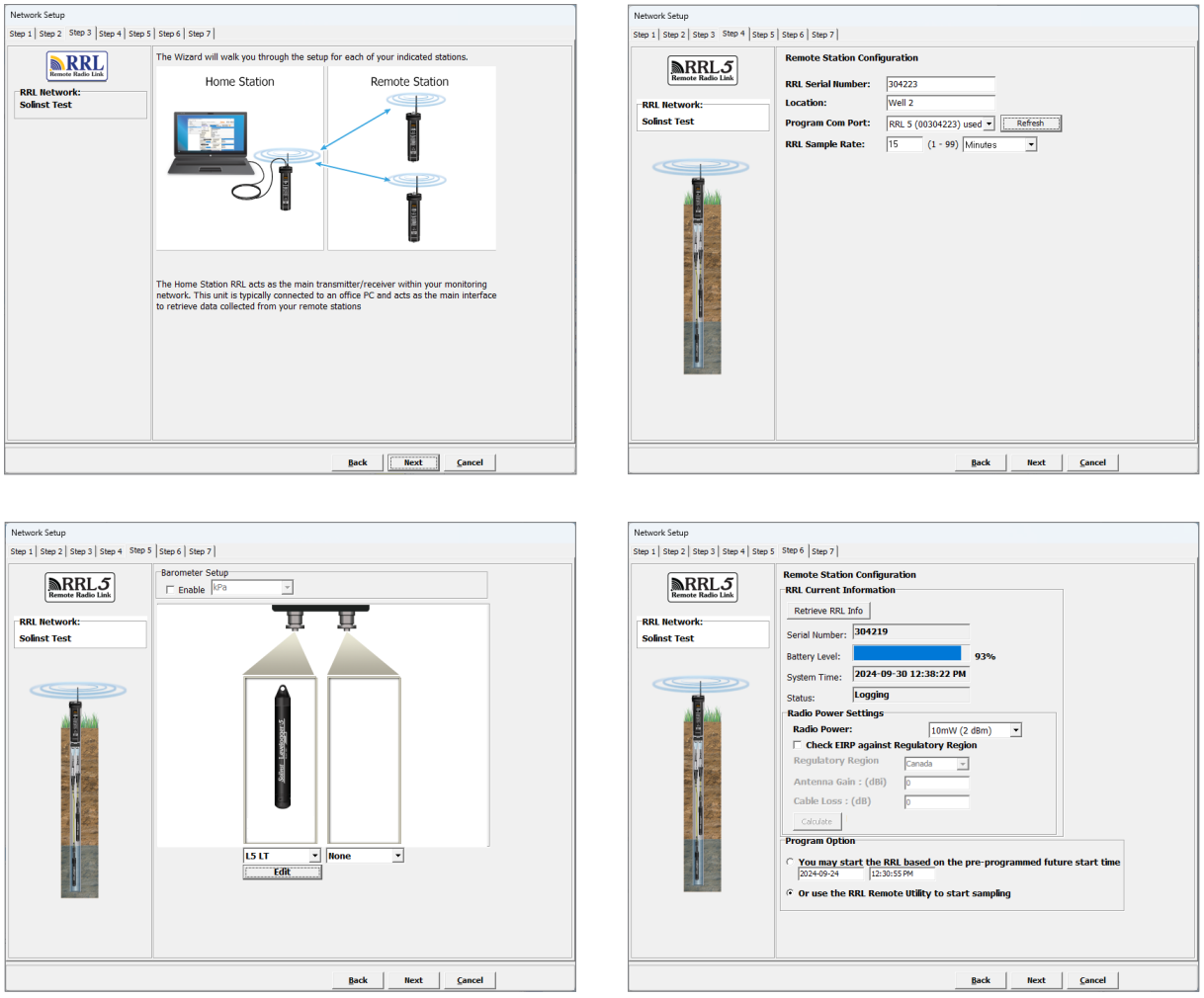


Figure 4-13 Configuring a Remote Station

Step 7: RRL Network Configuration Summary

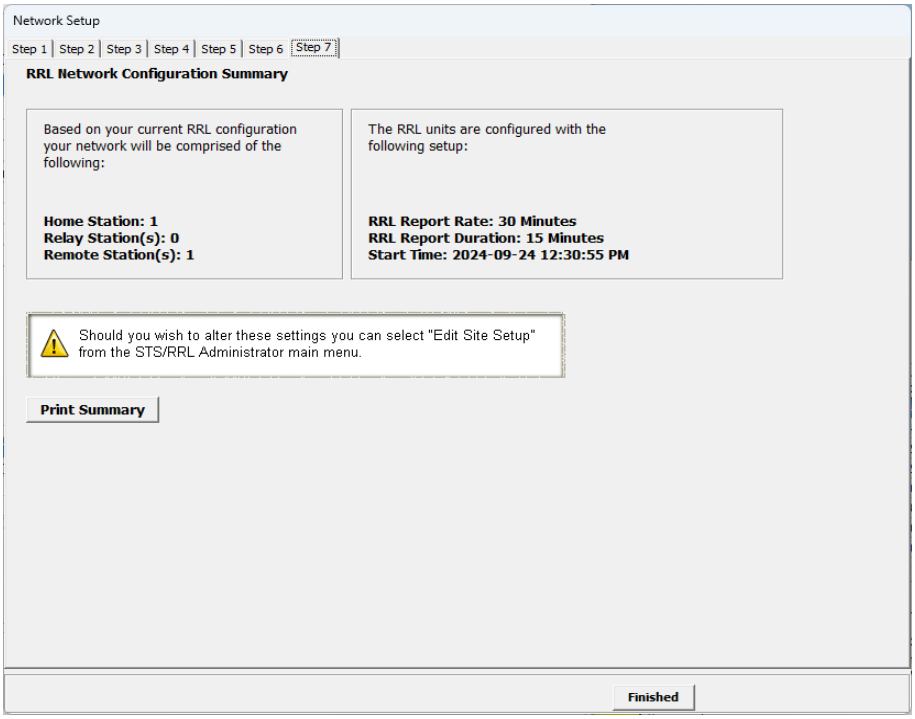


Figure 4-14 RRL Network Configuration Summary

After all settings have been programmed for each RRL 5 Station in the network, Step 7 will display a summary of all the settings. You can print a copy of this summary for your records.

Selecting 'Finished' will open the STS/RRL Administrator window and start the Communication Agent.

Note: Once all stations have been programmed, it is recommended you start each station logging as a test in the office. This can be done using the Remote Utility (see Section 5). After each station is started, and has contacted the Home Station, the serial numbers and types of dataloggers connected to the station will be shown in the Administrator Window. You can print a copy of this screen for each station as a record, and refer to it when installing your stations in the field.

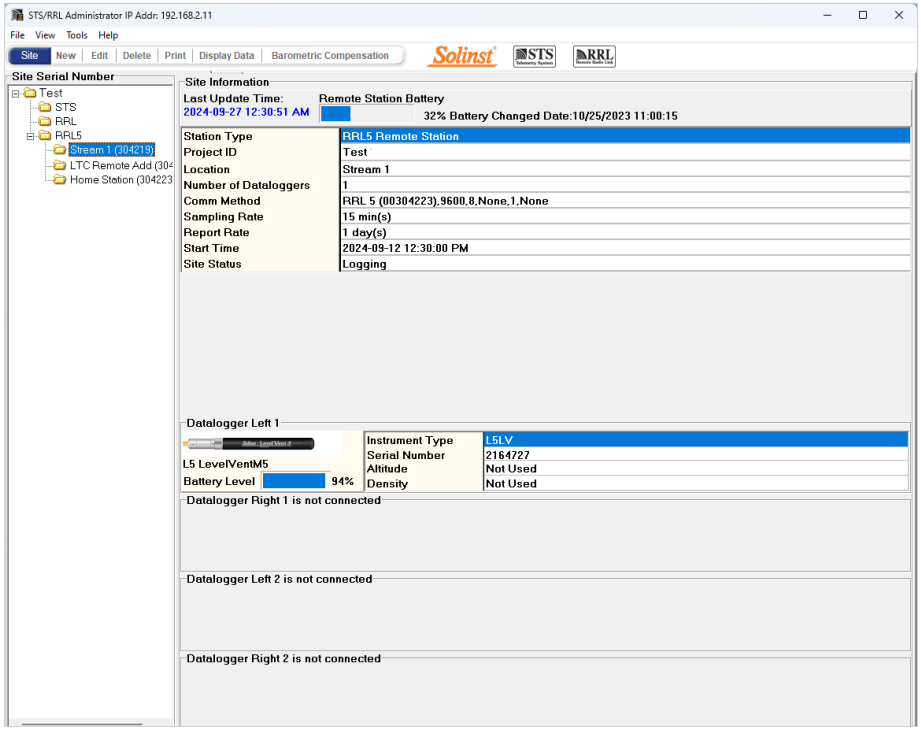


Figure 4-15 RRL Network in Administrator Window

4.2.2 Editing RRL 5 Networks

Editing the Network Setup

When you select a RRL 5 Network from the list in the STS/RRL Administrator window, choosing "Edit Site Setup" will allow you to "Edit Network Setup" or "Add new Site to Network".

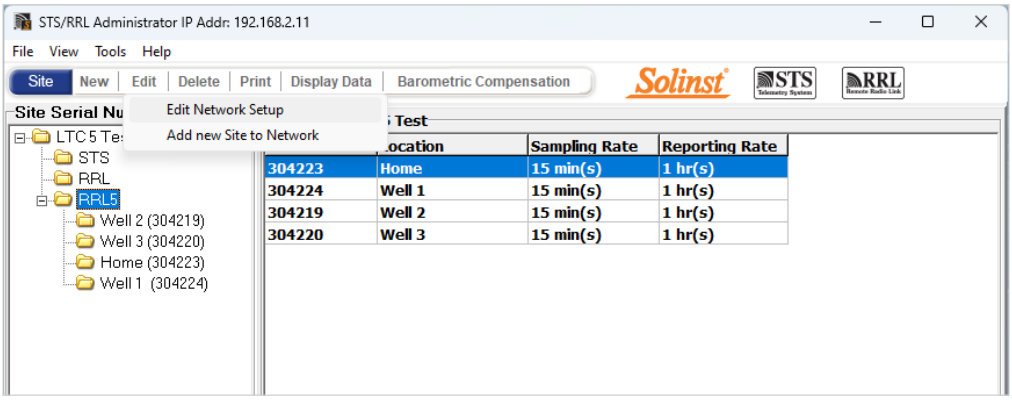


Figure 4-16 Editing a RRL 5 Network

When you select "Edit Network Setup" there are two options. You can choose to update each RRL 5 Station in the network by connecting them to the PC with a USB cable or the "Remote Schedule Update" allows you to make the changes in the software, and the new settings will be applied to each RRL 5 Station with their next scheduled report to the Home Station.

Note: Selecting "Delete" when a RRL 5 Network is highlighted, will not allow you to delete that network, until all stations in that network are deleted first. To delete a RRL 5 Station from the list, click to highlight the serial number, and select "Delete" from the main menu bar.

If you choose "Remote Schedule Update", there are two steps. Step 1 allows you to make changes to the network settings, including: Project Identification, Network ID, and Radio Power. You can also restart the network with a new Report Rate.

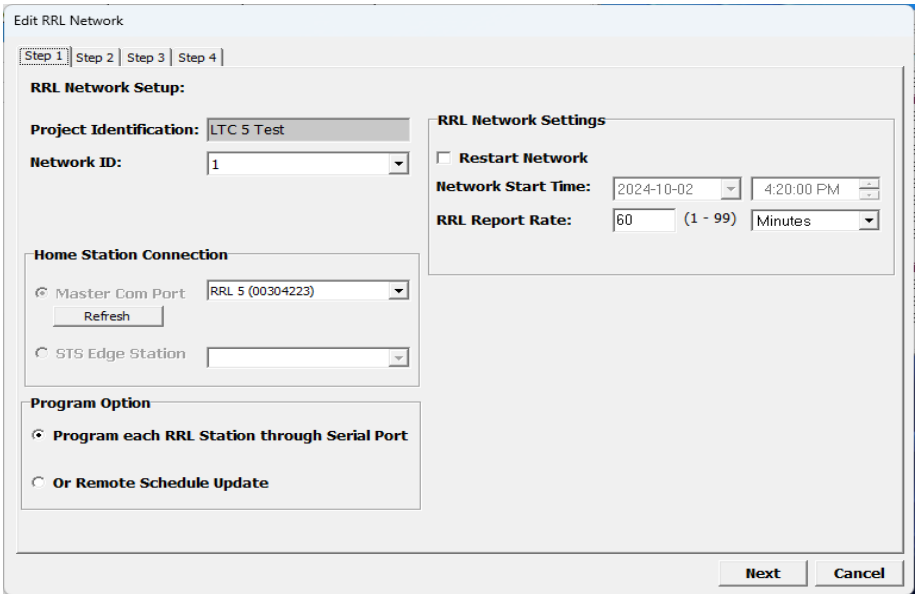


Figure 4-17 Editing a RRL 5 Network - Step 1

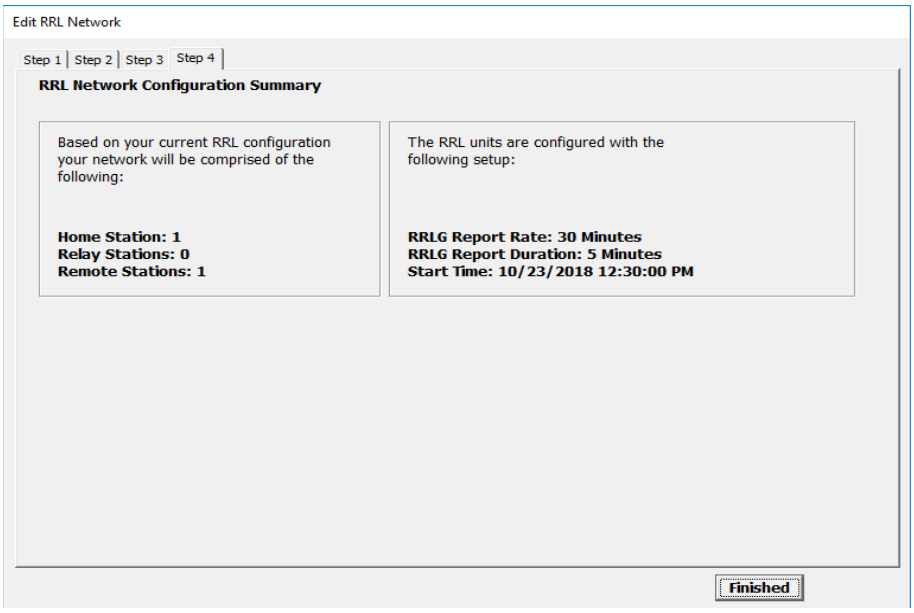


Figure 4- 18 Editing a RRL 5 Network - Step 2

Note: Figure 4-18 shows 4 steps. This is because the option to update each RRL 5 Station through the serial port was selected. Steps 2 and 3 in this case are for connecting the two Remote RRL 5 Stations in the network, to the PC and updating their settings. Step 4 provides the summary.

Step 2 will provide you with a new Network Configuration Summary that you can print for your records.

If you select to update each RRL 5 Station through the serial port, after changing the setting in Step 1, you will be prompted to connect each RRL 5 Station to the Home Station PC with a USB cable, and update them with the new network settings. The last step will provide you with a Network Configuration Summary for your records.

When you select "Add new Site to Network", you will be prompted though Steps 2 through 7 of the software wizard.

Editing RRL 5 Stations

When you select a specific RRL 5 Station from the list in the STS/RRL Administrator window, choosing "Edit Site Setup" will allow you to edit the settings for that RRL 5 Station.

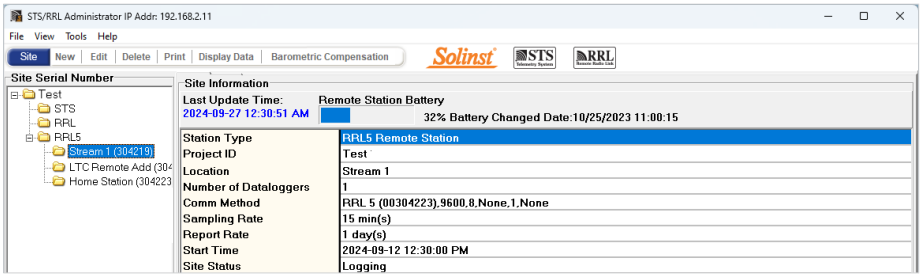


Figure 4-19 Editing a RRL 5 Station

Note: Selecting "Delete" when a RRL 5 Station is highlighted will prompt a window asking if you are sure you want to delete that station. You must delete all stations in a site before the entire network can be deleted.

There are three steps when editing a RRL 5 Station's settings. Step 1 allows you to enter a new Location, Program Com Port and Sample Rate. Step 2 allows you to add or edit the attached dataloggers and their settings, including enabling the RRL internal Barometer. Step 3 retrieves the new settings, allows you to change the Radio Power, and allows you to choose between applying the changes to the RRL 5 Station by connecting it to the PC, or the "Remote Schedule Update" allows you to make the changes in the software, and the new settings will be applied to the RRL 5 Station with its next scheduled report to the Home Station.

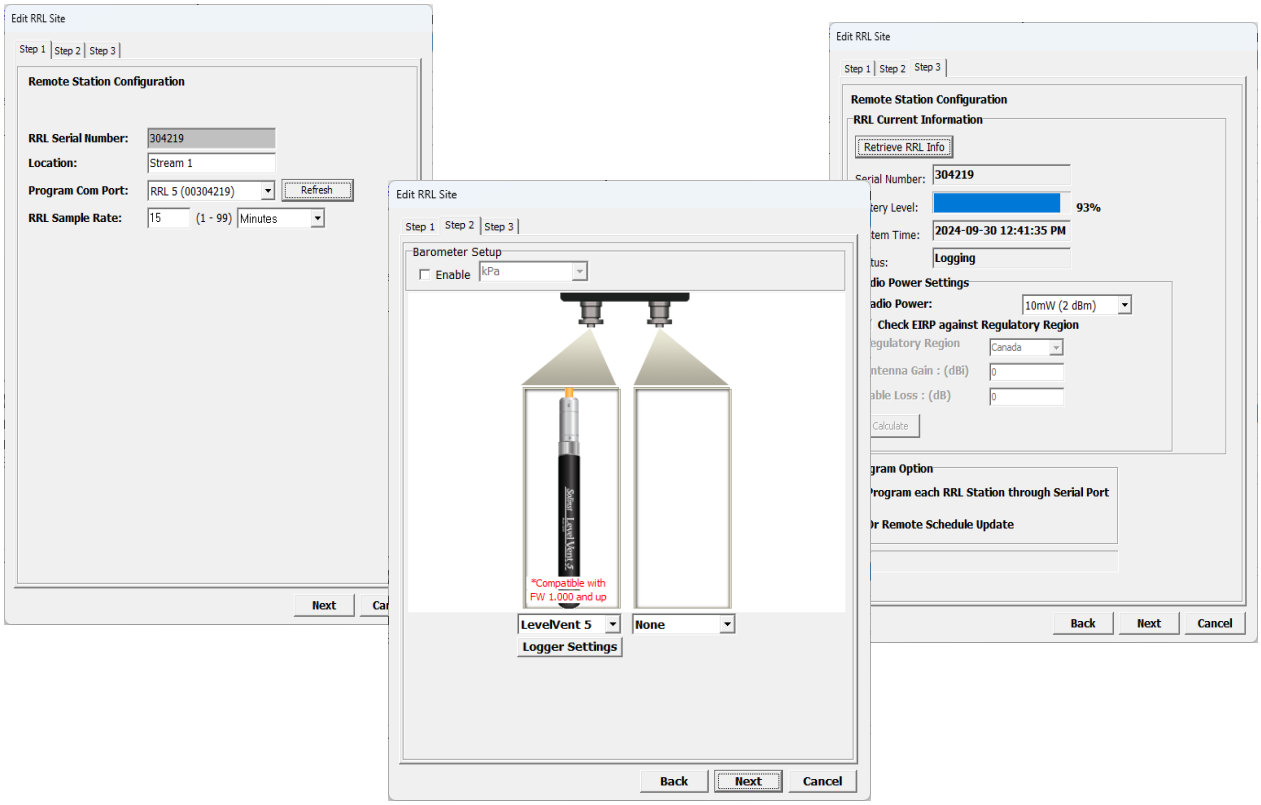


Figure 4-20 Editing a RRL Station

4.3 Barometric Compensation

Submersed Leveloggers measure total or absolute pressure (water column equivalent + barometric pressure). In order to accurately determine the true changes in water level only, Levelogger data must be barometrically compensated. Compensation simply involves subtraction of the barometric reading from the corresponding Levelogger reading. This can be done by enabling the internal RRL 5 barometer (see Section 4.2) or by using a Barologger.

Levelogger data can be barometrically compensated using data from a local Barologger (one Barologger can cover all Leveloggers within a 30 km/20 mile radius or per 300 m/1000 ft change in elevation) using the Barometric Compensation application in the STS /RRL Administrator.

The Levelogger and Barologger must have the same time stamp in order for the compensation to be successful. A Barologger 5 or Barologger Edge can be used to compensate the data from any version of Levelogger.

Note: Alternatively, RRL 5 data files can be exported using the STS/RRL Administrator as *.xle or *.lev files and opened in Levelogger Software for barometric compensation. See the Levelogger User Guide for more details.

To begin the compensation, click the **Barometric Compensation** tab on the STS/RRL Administrator window.

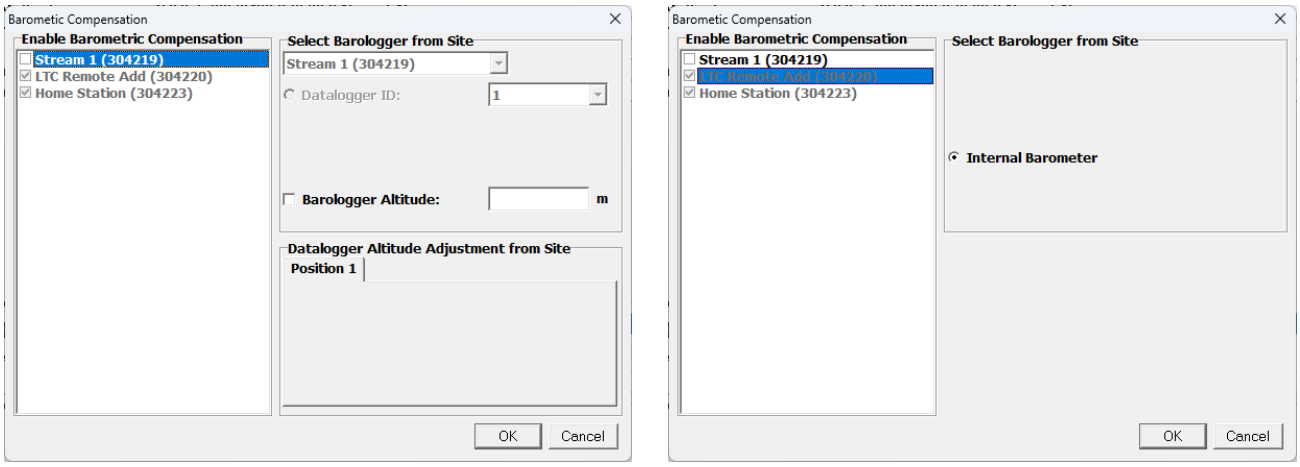


Figure 4-21 Barometric Compensation

In the Barometric Compensation Window, from the "Enable Barometric Compensation" list, check the RRL 5 Station that you wish to compensate, and RRL 5 Station (or STS Site) that will provide the Barologger for the compensation.

Note: If you select a site to Enable Barometric Compensation, but the internal barometer of the RRL Station has already been enabled, this will be indicated.

In the "Select Barologger from Site" section, select the RRL 5 Station (or STS Site) that contains the Barologger you wish to use for the compensation, and identify the Barologger by its position (Datalogger ID) on the RRL 5 Station (or STS Site).

The Levelogger and Barologger must have the same time stamp in order for the compensation to be successful.

To account for different deployment altitudes in your compensation, you can choose to enter an altitude for your Barologger and each datalogger.

Click OK to complete the barometric compensation set up.

To view compensated data, see Section 7.2.1

4.4 Communication Agent

The Communication Agent is an information window that will display all communication activity that has occurred between a RRL 5 Station and the Home Station computer. This application is used to view activity, and monitor communication for diagnostic purposes.

To open the Communication Agent, click , on your desktop.

The Communication Agent must be opened before your RRL 5 Network starts logging and must remain running while the RRL 5 System is in operation. If the Communication Agent is closed, the Remote Station will save data until the Communication Agent is reopened. The accumulated data will then be sent with the next scheduled report.

The Communication Agent will automatically open after you have finished configuring your RRL 5 Network. The Communication Agent can be left open, and minimized even after the STS/RRL Administrator Software has been closed.

In the Messages tab, the serial number of each RRL 5 Station and datalogger will be shown to indicate which communication has come from that site. Each report will be time and date stamped. Log files for each RRL 5 Station are automatically saved on your Home Station PC, and can be retrieved from the following location: <C:\Program Files\Solinst\STS_Gold\log> If a station is stopped, when started again, the data will be appended to the same log file. At any time, clicking the Save icon will save a log file of all RRL 5 Stations on your Home Station PC for record or for diagnostic purposes.

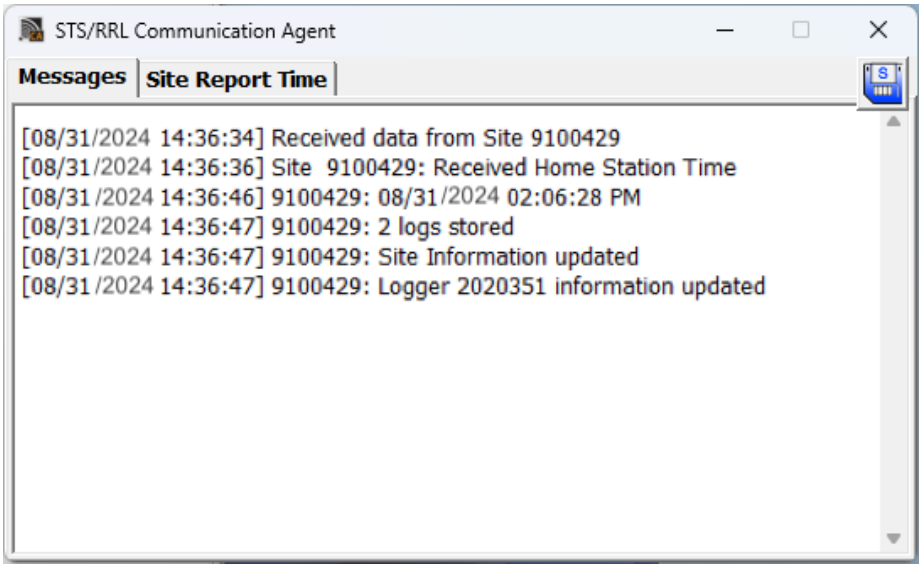


Figure 4-22 Communication Window

The Site Report Time tab lists each RRL 5 Station by serial number and shows the next time it is scheduled to report to the Home Station.

If there is a communication conflict and the Remote Station does not report when scheduled, a timeout message will be shown in the Communication Agent Messages. To stop receiving timeout messages from a station (you may be aware of what is causing the communication issue, and do not need the messages any longer), uncheck the box beside the Station.

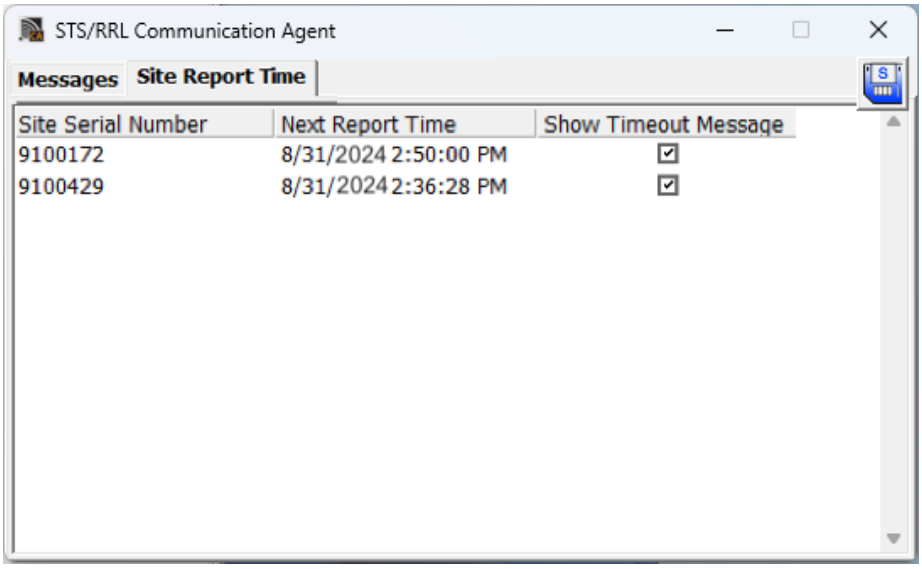


Figure 4-23 Communication Window - Site Report Time

5 RRL Remote Utility

The RRL Remote Utility provides a convenient way to communicate with programmed RRL 5 Stations in your office or in the field, as well as perform diagnostic checks.

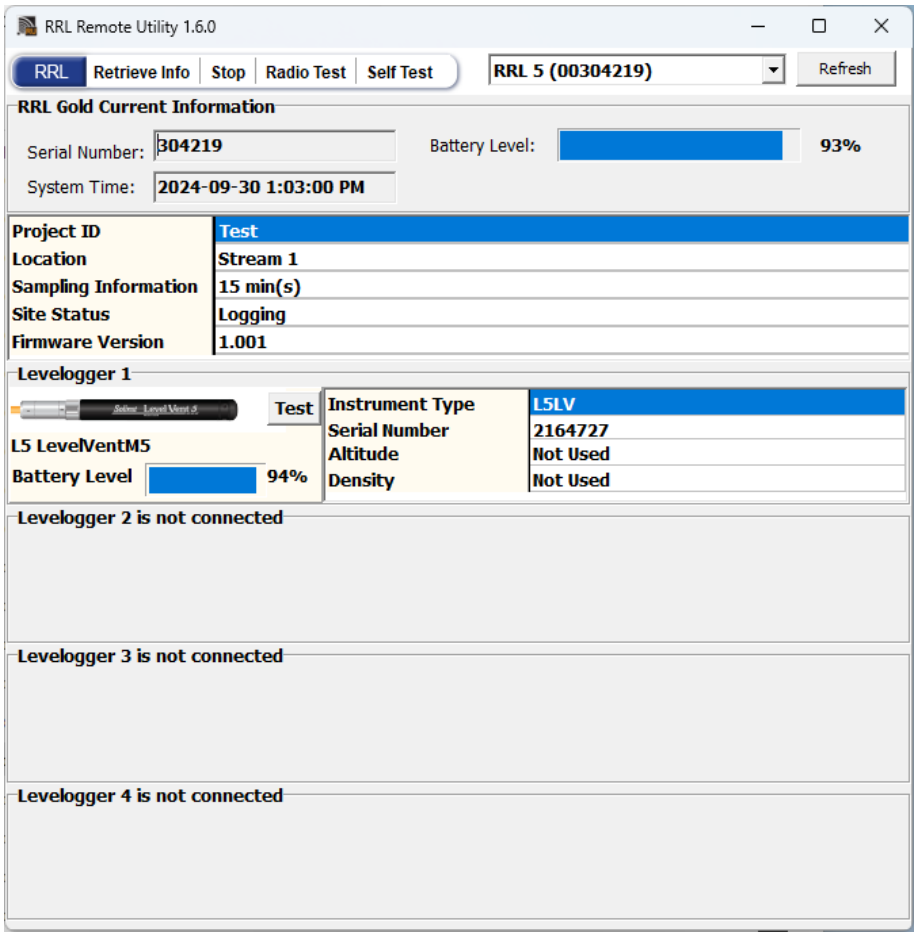


Figure 5-1 RRL Remote Utility

To open the RRL Remote Utility, click on your desktop.

The RRL Remote Utility can be used to test radio communication between a Remote Station and the Home Station, check RRL 5 Station settings and status, test communication with the attached dataloggers, and stop or start the RRL 5 Station logging (when selected in Step 2 of the software wizard).

The Remote Utility also includes a self-test function. The function performs a series of self-tests on a RRL 5 Station to check for problems with the battery, memory, etc.

To use the RRL Remote Utility, connect the RRL 5 Station to a PC with a USB cable, select the COM port to which the Station is connected and click “Retrieve Info” to display the settings from the RRL 5 Station.

The Remote Utility has the following functions:

- **Radio Communication Test:** Click "Radio Test" to initiate the test. The test will display information about the Home Station and Remote Station radio power and show that communication is successful between the Stations.

  Note: The Radio Communication Test is a convenient tool when determining the final location of you Remote Station in the field and the proper Radio Power setting for that station.

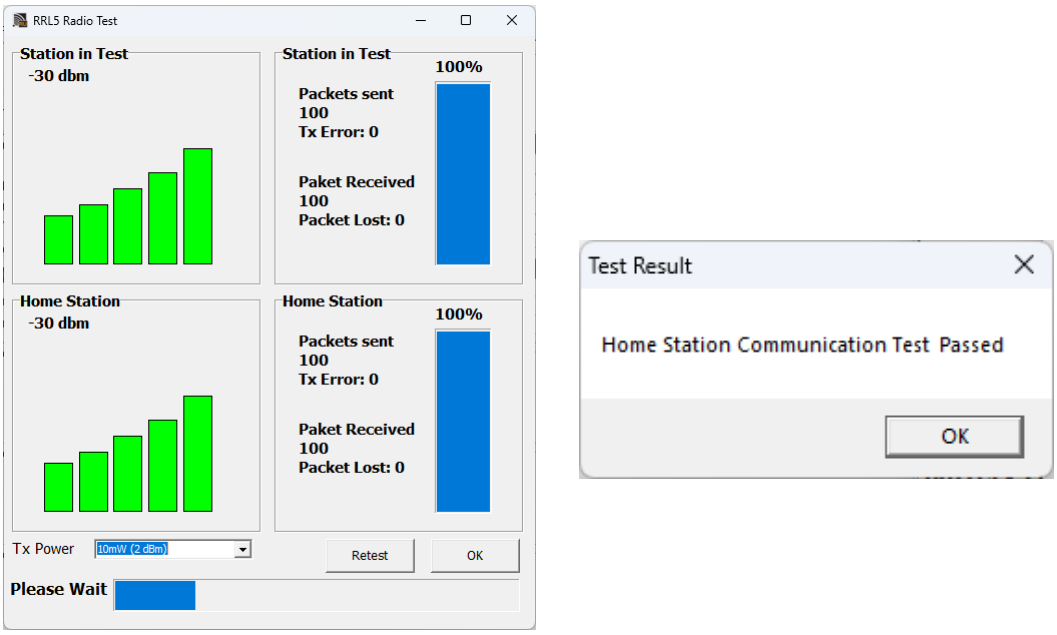


Figure 5-2 Home Station Communication Test

- **Datalogger Communication Test**: Click the Test button beside the datalogger image to initiate the test. If the communication is successful, the "Probe Communication Test Passed" message will be shown.

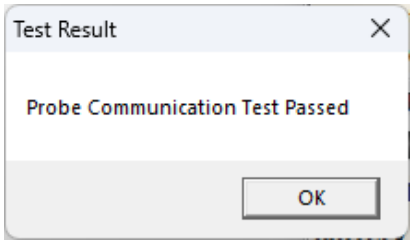


Figure 5-3 Datalogger Communication Test

- **Start Logging**: If the RRL 5 Station is in idle mode "Start" will be displayed in the Remote Utility main menu. To start logging, click "Start", and "Stop" will then be displayed to indicate that the RRL 5 Station is in logging mode.

- **Stop Logging**: If the RRL 5 Station is in logging mode "Stop" will be displayed in the Remote Utility main menu. To stop logging, click "Stop". A message "Data Logging and Reporting will be terminated. Do you want to continue?" will be shown. Click Yes to continue. "Start" will be displayed to indicate that the RRL 5 Station is in idle mode.

5.1 Self Test

The Remote Utility also includes a self-test function. The function performs a series of tests on a RRL 5 Station to check for problems with the battery, memory, etc. If any of these tests fail, then a report should be created and sent to Solinst Technical Support. To execute this function, select "Self Test".

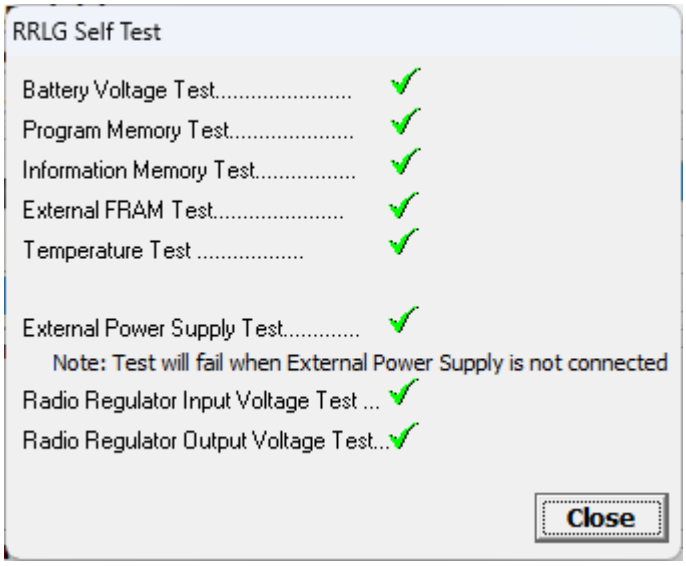


Figure 5-4 RRL Station Self Test

6 RRL 5 Installation

The RRL 5 is designed to be conveniently installed in a 2" well casing (4" with an adaptor). However, other installations are acceptable, if proper precautions are followed.

The RRL 5 has an IP rating of 67 (dust proof and can withstand immersion up to 1 meter depth for up to 30 minutes), so should not be submerged for longer periods. The operating temperature range is -20 to 60°C.

You should have already installed the batteries before configuring the RRL 5 using the PC Software, as well as the antenna (see Section 2).

Note: You may want to consider the use of an extended top cap style protective well head. This would allow full access to the RRL 5 components at the top of the monitoring well. If made of a plastic, it would eliminate signal interference that protective metal casing can cause.

6.1 Installing a RRL 5 in a Well

Each RRL 5 station comes with a 2" Well Cap Assembly and a Support Hanger Bracket.

To accommodate 4" wells, an optional adaptor is available for use with the 2" well cap base.

The Support Hanger Bracket is recommended to add extra security to the Reader Cable(s) when deployed.

Figure 6-1 RRL 5 Installation Accessories

The following is the recommended method for installing a RRL 5 in a 2" well with one Levelogger:

1) If you are connecting a RRL 5 to a Levelogger already installed in the field with a Direct Read Cable and Solinst Well Cap Assembly, you will need to remove the installation from the well. You may save the well cap base, but you do not need the insert or cap.

Note: Each RRL 5 comes with a 2" Well Cap Assembly, without the insert.

Remove Existing Levelogger Installation

Remove the Well Cap Insert from the Well Cap Base

Figure 6-2 Remove Existing Installation

Note: If you are installing a Levelogger and Barologger in the same well, you will need a splitter to connect both dataloggers to the RRL 5. See Section 2.

2) Install the well cap base on the well casing.

Figure 6-3 Install the Well Cap Base

3) Wrap the Reader Cable around the Support Hanger Bracket, similar to what is shown in the photo below, leaving about 6" of slack above the top of the bracket. Use zip ties to secure the cable to the bracket.

Note: Providing enough slack above the bracket allows you to lift the RRL 5 from the well cap base to make room for a Water Level Meter for periodic depth to water measurements, without disturbing the datalogger(s) from their downhole position.

If installing a Barologger, secure the second Reader Cable to the Support Hanger Bracket using the same method.

The length of Reader Cable wrapped around the Support Hanger Bracket will depend on your application. If you are installing a Barologger in the same well, the Reader Cable/Direct Read Cable connection will need to be staggered from the Leveloggers connection in order to fit in a 2" well casing. Staggering the connections also allows more space for a Water Level Meter for periodic manual depth to water measurements.

Note: Ensure the weight of the reader cable is not resting on a zip tie, but instead supported by one of the cutouts in the bracket.

Figure 6-4 Secure the Reader Cable to the Support Hanger Bracket

4) Connect the Levelogger to the Direct Read Cable (see Levelogger User Guide for more information, if required). Connect the Direct Read Cable to the Reader Cable. See Section 2 for more details. Slowly lower the datalogger(s) down the well.

Figure 6-5 Connect the Direct Read Cable and Levelogger

5) Lower the assembly until the Support Hanger Bracket seats on the shoulder in the well cap base.

Figure 6-6 Lower the Assembly into the Well

Note: There are three holes in the top of the Support Hanger Bracket the can be used to secure it in the well cap base with screws.

6) Connect the top end of the Reader Cable to the RRL 5 (or Splitter). See Section 2 for more details.

Figure 6-7 Connect the Reader Cable to the RRL 5

Note: Providing enough slack at the top of the well allows you to lift the RRL 5 from the well cap base, in order to make room for a Water Level Meter for periodic depth to water measurements, without disturbing the datalogger(s) from the downhole position.

7) Carefully push the excess Reader Cable(s) into the well, while lowering the RRL 5 into position. The RRL 5 has flat sides so it fits alongside the Support Hanger Bracket. The RRL 5 will seat on the shoulder in the well cap base.

Figure 6-8 Lower the RRL 5 into Position

8) Thread the end of the antenna cable through the opening in the top of the well cap. Connect the antenna to the RRL 5.
9) Insert the antenna cable through the slit in the side of the grommet, leaving a bit of slack in the antenna cable as shown in the photo.

Figure 6-9 Install the Well Cap

10) Push the grommet into the opening in the well cap to seal around the antenna cable.
11) Install the well cap onto the well cap base.

Note: See the Levelogger User Guide for more specific details on installing Leveloggers and Barologgers.

6.1.1 Levelogger Installation Examples

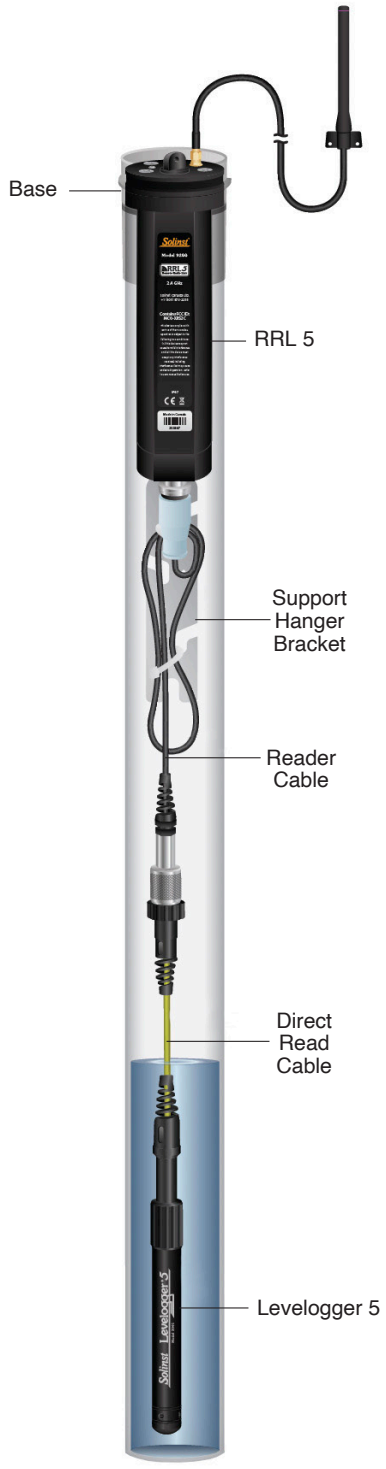


Figure 6-10 Single Levelogger 5 Installation

Note: When installing a Barologger 5 an L5 Threaded Optical Adaptor can be used in place of a Direct Read Cable, if extra cable length is not required. However, keep in mind, It is always recommended to install a Barologger in a similar thermal environment as the Levelogger, and should be suspended beyond the frost line and deep enough to avoid large temperature fluctuations.

Figure 6-11 Levelogger and Barologger Installation (Reader Cable Connections Staggered)

6.1.2 LevelVent 5 Installation

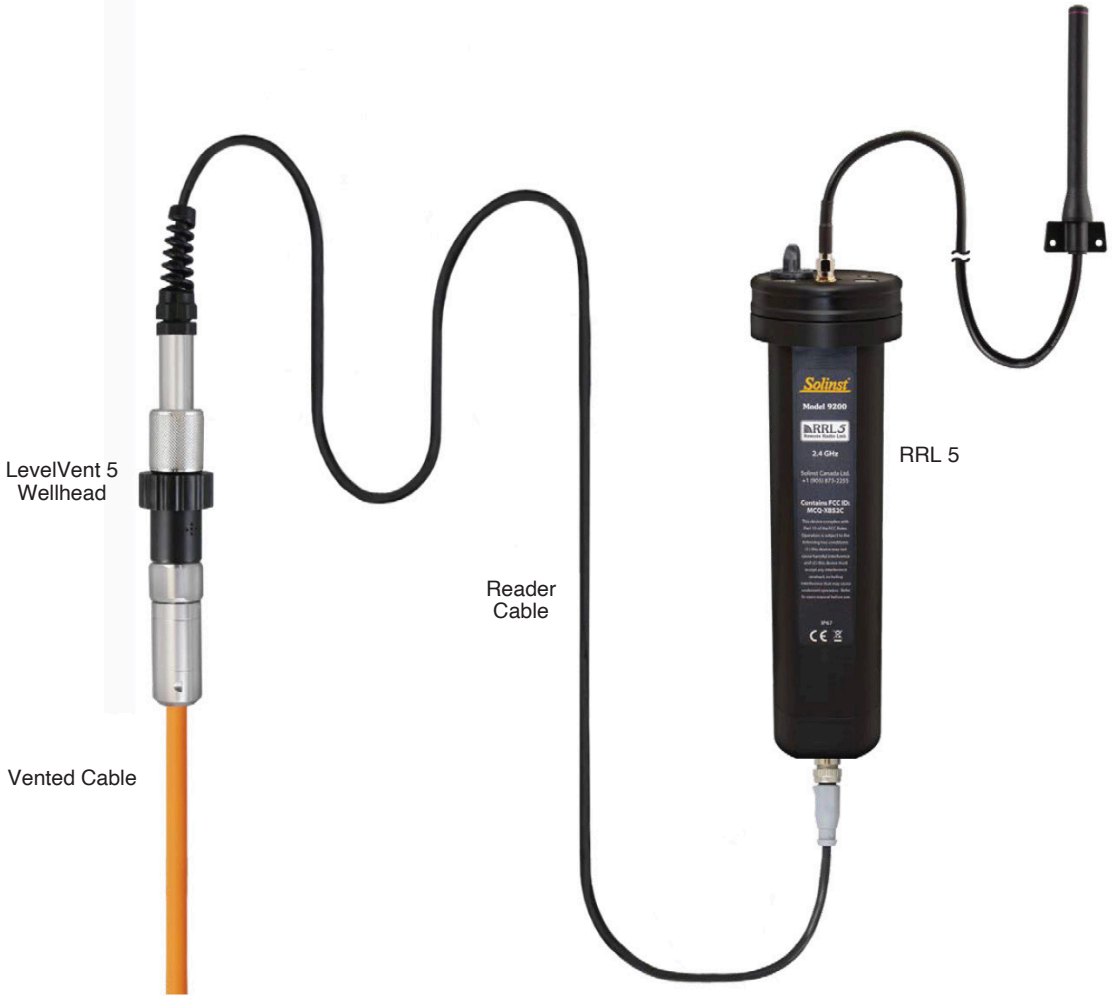


Figure 6-12 LevelVent 5 Installation

Note: See the Vented Dataloggers User Guide for more specific details on proper installation of the LevelVent 5.

6.2 Power Supply

RRL 5 Stations come standard with six (6) 1.5V AA lithium batteries. **The batteries must be installed for proper operation**, ***even at the Home Station.*** The life of the battery varies depending on the frequency of your Sample and Report Rates, as well as the Radio Power setting. The following are estimates based on the standard lithium batteries, with the Radio Power setting at 1 Watt. With the Radio Power set at 100 mW, the battery life increases by about 10% of the estimates below. RRL 5 Stations can also be powered by six (6) user-supplied 1.5V AA alkaline batteries. With alkaline batteries, the battery life will be about 40% of the estimates below.

Note: Where possible, use lower Radio Power settings and/or longer Report intervals to conserve Remote Station Battery life.

Sample Rate	Report Rate	Battery Life
Every 5 Minutes	Every Hour	3 Months
Every 15 Minutes	Every 6 Hours	1 Year
Every Hour	Every 12 Hours	1.5 Years
Every 12 Hours	Every Day	2 Years
Every 15 Minutes	Every 3 Days	2 Years
Every Hour	Every 7 Days	2.5 Years
Every 12 Hours	Every 14 Days	3 Years

Table 6-1 Battery Life Estimates (6 AA lithium batteries at 1 Watt setting)

Note: It is recommended to replace the batteries when the Remote Station Battery indicator reaches 60% in the STS/RRL Administrator. See Section 4.1.

Note: Rechargeable batteries cannot be used inside any RRL Units as the voltage would be to low.

6.3 Location and Communication Considerations

When using radio communication, you must take extra care when locating the Remote Stations. RRL 5 radios communicate with each other via line-of-sight. They must be able to "see" each other in order to have effective communication. The path between radio antennas should not be through trees or perpendicular to the sides of flat buildings.

The communication distances given for each radio module, with standard antennas, are guidelines. Each project is site specific, and will require testing and planning before installing a RRL 5 Network.

A communication range test can be performed prior to installation between the Home Station and the Remote Station using the RRL Remote Utility (see Section 5). Tests can be done using different Radio Power settings (see Section 4.1) to determine the ideal setup for your site. Always start with the lowest Radio Power setting, as this will conserve battery power. (Longer Report intervals will also conserve battery power).

Field tests will allow you to determine if you need a higher gain antenna to increase communication distances.

6.3.1 Antennas

RRL 5 Stations come standard with an omnidirectional antenna. The antenna should always be mounted on the outside of any steel/metal enclosure for maximum communication distance, as they communicate via line-of-sight transmission. 900 MHz radios can communicate over distances up to 20 miles (30 km) and 2.4 GHz radios over distances up to 600 m (2000 ft.).

A higher gain antenna may be sourced to increase communication distances. RRL 5 Stations have a Reverse Polarity SMA (RP-SMA) connector (male treads and male centre) for direct or cabled connection to any (legal) antenna or connector that maintains waterproofing.

6.4 RRL 5 Maintenance

As with any groundwater or surface water monitoring project, you should select the proper equipment and determine a maintenance schedule based on the monitoring environment specific to your application.

For the RRL 5, Leveloggers and LevelVent, this means selecting the appropriate pressure range, ensuring the monitoring temperatures are within the instruments specifications, and making sure the wetted materials are compatible with site chemistry. See the Levelogger and Vented Dataloggers User Guides for important information about maintaining your dataloggers.

Replacing the RRL 5 batteries will have to be done on a regular basis, and is based on usage. See Section 6.2 for battery life estimates. See Section 2.3 for installation instructions. Battery life percentage is sent with each RRL 5 report to allow remote battery level monitoring. **It is recommended to replace the batteries when the percentage reaches 60%.**

When not in use, the Reader Cable should be disconnected and the dust cap replaced on the RRL 5 datalogger connection. Batteries should be removed from the RRL 5 during storage.

7 Viewing Site Data

7.1 Access Database

Data received in each report from a RRL 5 Station is placed in a Microsoft® Access® database (.mdb files) on the Home Station computer. New data is appended to the existing database. The program will save data downloaded to the following default directory: <C:\Program Files\Solinst\STS_Gold\db> The location of the default directory may vary for different Windows operating systems.

Note: The *.mdb file may be located in a different directory than the default location. It is often found under your User account instead of Program Files. To easily find the location of the *.mdb file, search for "sts_gold.mdb" in the C drive.

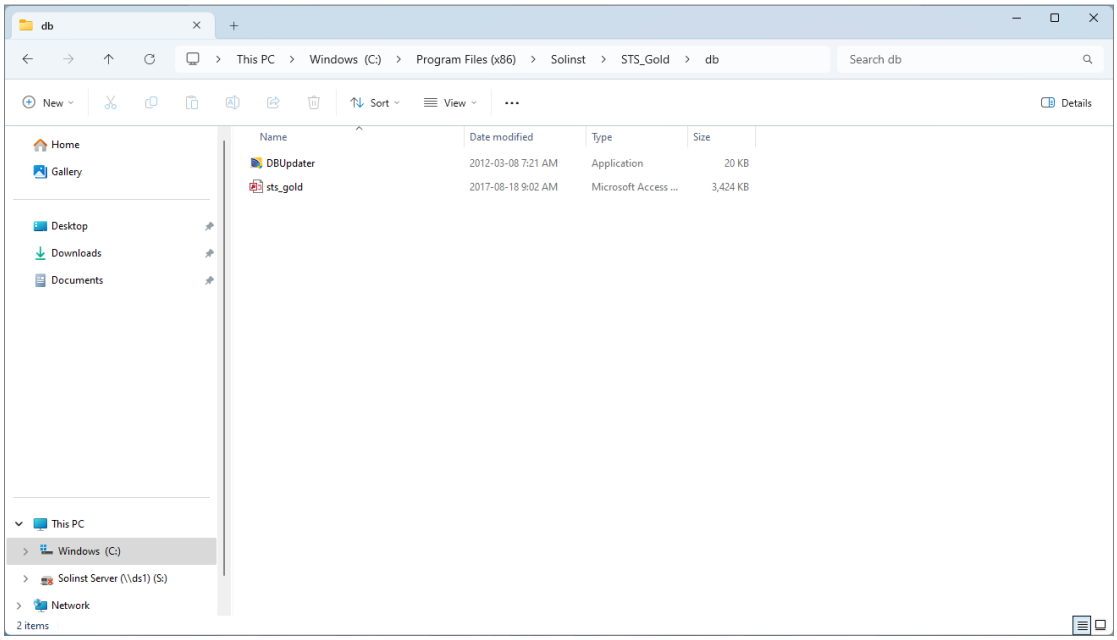


Figure 7-1 RRL Access Data

The Access database can be queried by your own macros or applications, to automatically check for updates and display the data in your own program, on a website, or in any way you choose.

7.2 View Using Solinst Telemetry Software

The Solinst Telemetry Software can be used for a quick check of the latest readings. Data can also be exported using the Software as *.xle, *.lev or *.csv files for use in other programs.

To view data from a specific site using the Solinst Telemetry Software, open the Administrator window and select a RRL 5 Network or station from the list. Click on "Display Data".

Select the RRL 5 Station from the list that opens and click OK.

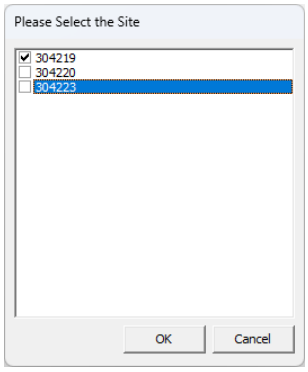


Figure 7-2 Select RRL 5 Station

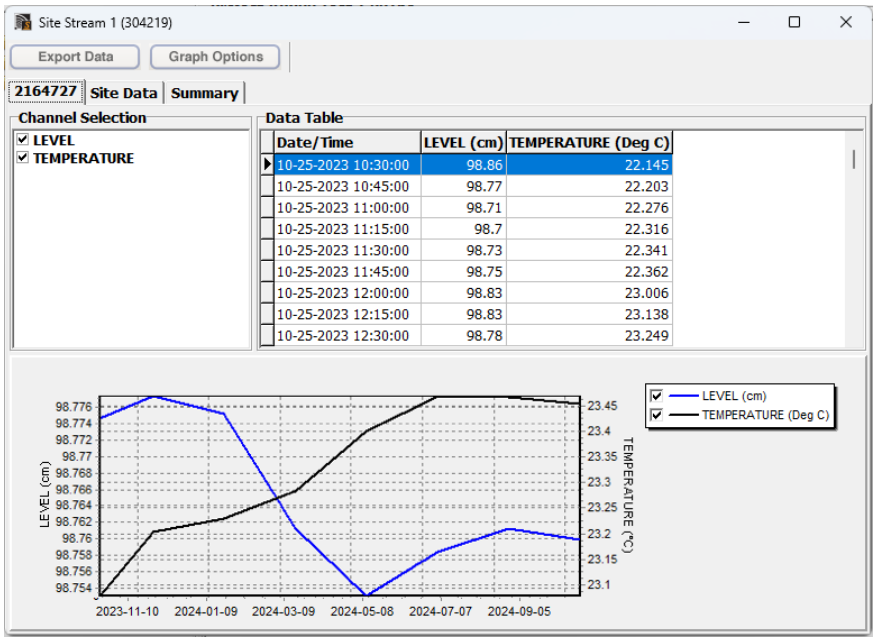


Figure 7-3 RRL 5 Station Data Window

The data will be displayed in a table at the top of the window, the bottom portion of the window will show the data graphed. Data from each datalogger is shown in a separate tab (identified by serial number), Station data, including battery voltage is also displayed in a separate tab. A summary of all data is in a separate tab.

7.2.1 View Compensated Data

If you have set up barometric compensation (see Section 4.3), check "Show Compensated Data" to view the automatically compensated data.

The compensated data will be in the units that the Levelogger was programmed to record in. E.g.: if your Barologger was set to record in psi and your Levelogger was set to record in feet, the compensated data will automatically be converted to feet.

The data will be displayed in a table at the top of the window, the bottom portion of the window will show the data graphed. Data from each Levelogger is shown in a separate tab (identified by serial number). To view raw Levelogger data (uncompensated), uncheck "Show Compensated Data".

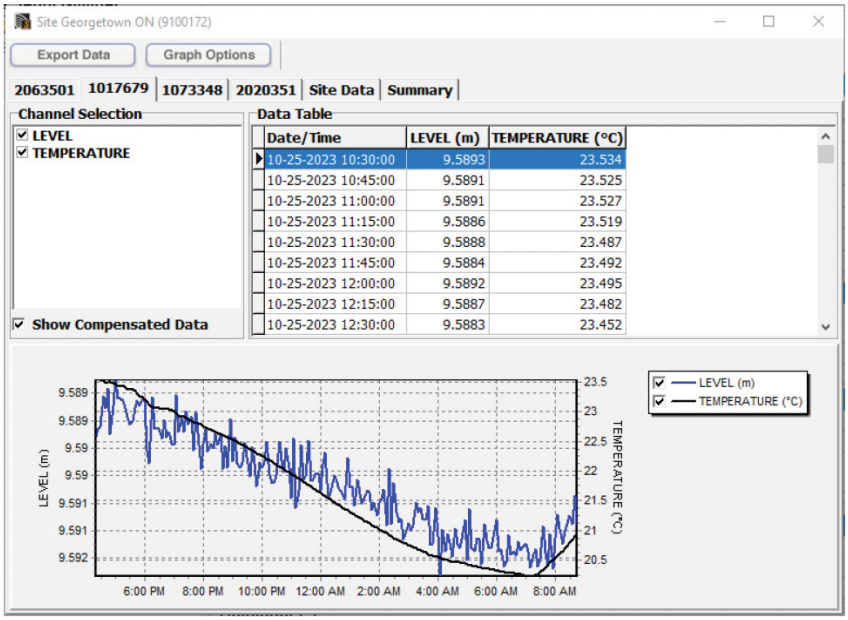


Figure 7-4 View Compensated Data

7.2.2 Graphing Options

Click the Graph Option icon to open the Graph Option Dialog. The Graph Dialog is shown in Figure 7-8.

The **Line Option** is used to adjust the style and colour of the line in the graph for each channel. The user can also select the shape of the data marker or remove the data marker.

The **Title and Axis** Option is used to enter the title of the graph and change the Y axis label or user selected scale. Check the Best Fit box to enable the software to determine the best fit scale. If the Best Fit box is not checked, the user has to enter a maximum and minimum value of the selected channel. The X axis is logging time.

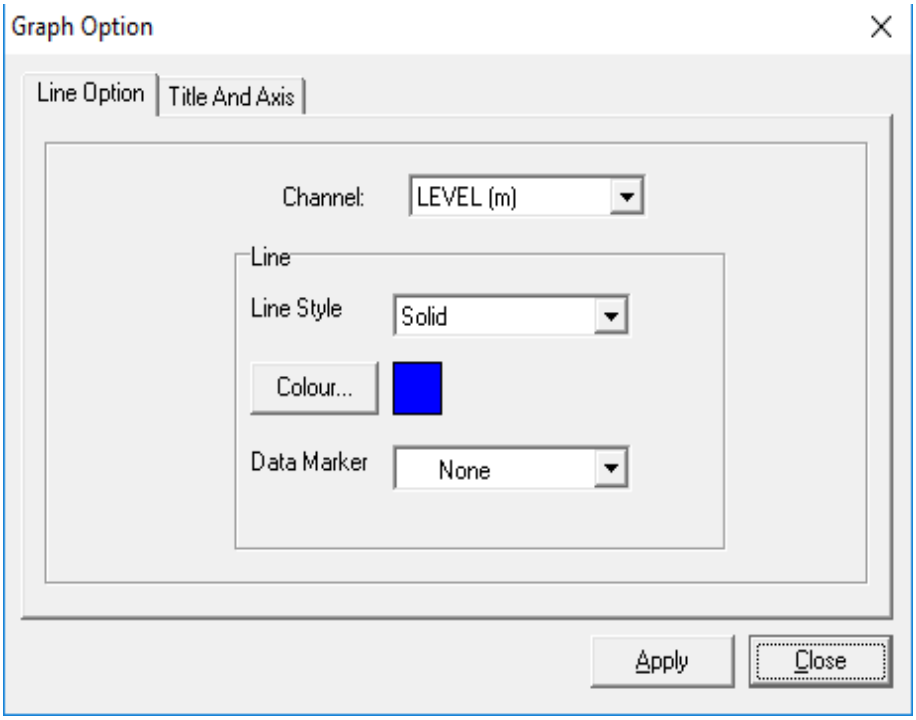


Figure 7-5 Graph Option Dialog Box

7.3 File Export

Data can be exported in *.csv (comma separated value), *.xle or *.lev (Levelogger/LevelVent) file formats by clicking Export Data while viewing the site data. The *.csv file format is supported and can be imported by most spreadsheet programs, *.xle files can be imported by Levelogger Software Version 4.0 and up, and *.lev files can be imported by any Levelogger Software Version, where data compensations can be performed.

Clicking Export Data will display a drop down menu where you can select to export as a *.csv, *.xle or *.lev file.

Note: You can not export Rainlogger Data as a .lev file.

Exporting allows you to select a specific datalogger File. Choose the desired file from the list. The file name will include the datalogger serial number, and can be saved in a folder of your choice. You can also choose to rename the files. The files can be imported by the Levelogger Software, where barometric and other compensations can be performed.

Note: For more information on data compensations using Levelogger Software, see separate User Guide.

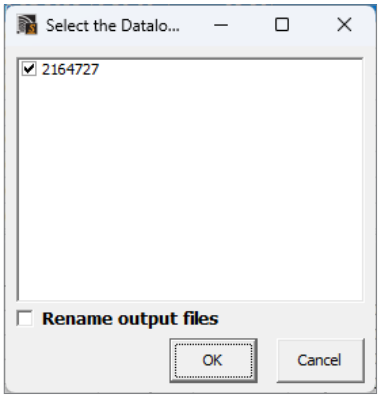


Figure 7-6 Select Datalogger

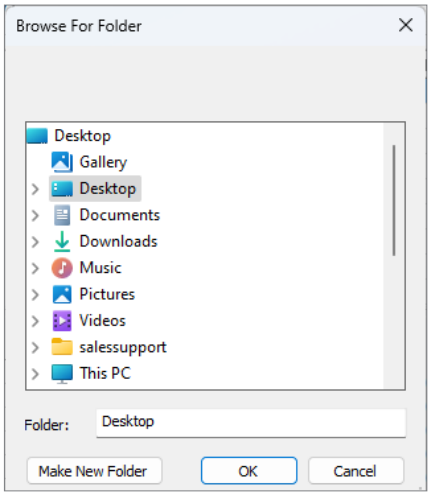


Figure 7-7 Save Data

7.3.1 Export All Data

Data from all RRL 5 Stations (and STS Sites) can be exported at one time, using the "Export all Stations Data" function in the File menu.

There is the option to save all the data in *.csv, *.xle , or *.lev files.

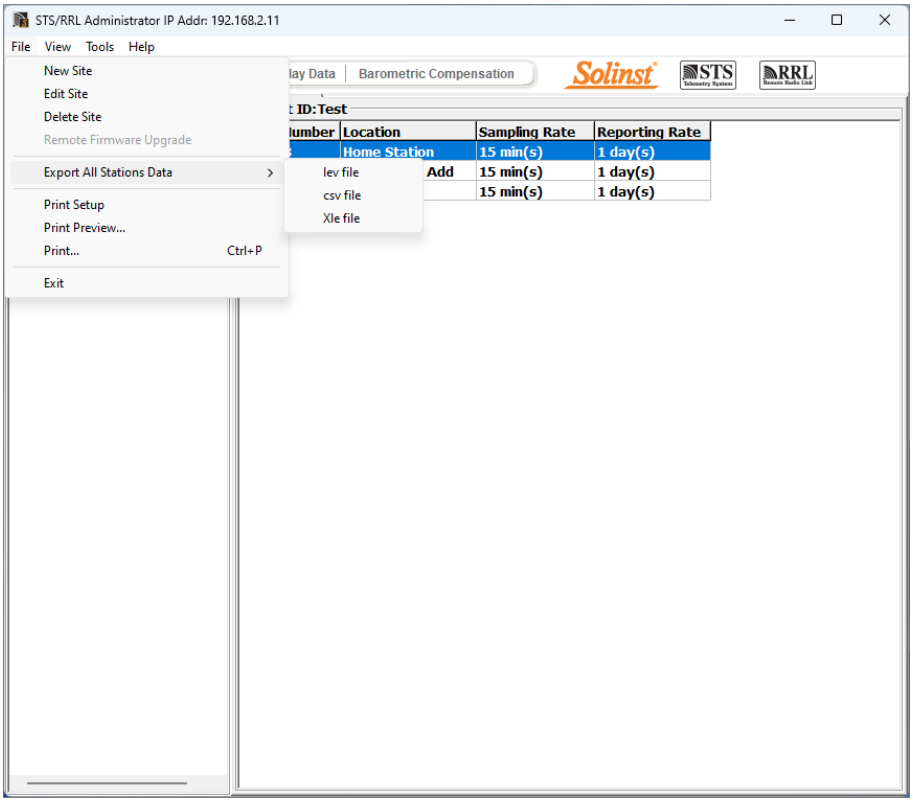


Figure 7-8 Export All Stations Data

8 Firmware Upgrade Instructions

RRL 5 Stations have been designed with firmware that is easy to update whenever useful new functions or other improvements become available, as with software releases. To determine the current firmware version on an RRL5 unit, connect it to the PC with a USB cable and open the RRL Remote Utility. Select the COM port to which the unit is connected and click "Retrieve Info" to display the settings, including firmware version, from the RRL 5 Station. Battery percentage should be above 60% before proceeding.

To update the firmware in your RRL 5 Station, go to the Solinst Website at: https://downloads.solinst.com where you can obtain a link to the RRL 5 firmware update file that is contained within a Zip Archive. Ensure you unzip the archive to access the *.ssf firmware file.

1) Use a USB to USB-C cable to connect the RRL 5 Station to the PC.
2) The Firmware Upgrade Utility can be accessed by going to the Tools menu in the STS/RRL Administrator Software.
3) Open the Firmware Upgrade Utility and make sure the Baud Rate is set to 9600.
4) Click the 'Open' button, which should open a file dialog asking for the firmware file (*.ssf) to upload. Navigate to where the firmware file was saved on your PC, then click on the file and click 'Open'.
5) Check the 'File Information' box to make sure that the opened file is the right one.
6) Click the 'Upload Firmware' button to start the firmware upload process.
7) If a communication error occurs and is indicated in the 'Datalogger Status' box either before or after the "Verifying Firmware" and "Loading Firmware to Datalogger" messages, then restart the upgrade process.
8) If, however, a communication error occurs between the "Verifying Firmware" and the "Loading Firmware to Datalogger" messages, then please contact Solinst. You will need to give the RRL Serial Number and explain the exact positioning of the error message.

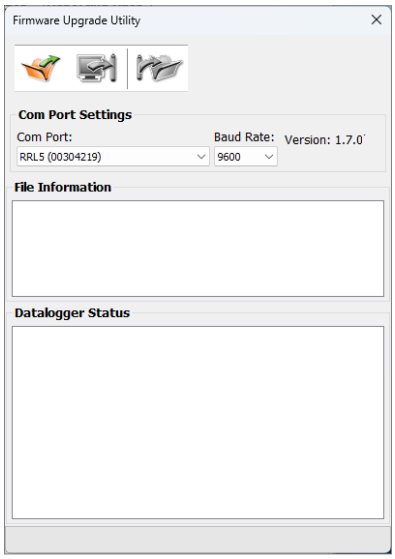


Figure 8-1 Firmware Upgrade Utility

Note: When conducting a firmware upgrade, DO NOT interrupt the process prior to completion (This may take 30 minutes). If the notice "The firmware version in the RRL is more recent, continue the firmware updated?" appears, you must select "Continue". Selecting "No" or otherwise interrupting the upgrade process will make the RRL 5 Station unable to communicate with Solinst Telemetry Software. To correct this, the firmware must be re-upgraded, and allowed to fully complete installation. Installation is not complete until a note appears at the base of the program window indicating "Firmware Upgrade Completed".

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