CAMPBELL SCIENTIFIC

QUICK DEPLOY GUIDE

Interfacing Campbell Scientific Dataloggers to the ZephIR 300

Programming and Configuration

9/2017

Info Link

1 Caution!

The Campbell Scientific Datalogger is a rugged instrument and will give years of reliable service if a few precautions are observed:

- Protect from over-voltage
- Protect from water
- Protect from ESD
- Disuse accelerates depletion of the internal battery, which backs up several functions. The internal battery will be depleted in three years or less if the datalogger is left on the shelf. When the datalogger is continuously used, the internal battery may last up to 10 years or more.
- Maintain a level of calibration appropriate to the application.

The ZephIR 300 is a Class 1 Laser Product.

Class 1 Laser Product
Laser Wavelength: 1560 to 1565 nm
Peak Power: <1 W (70 mm aperture)

CLASS 1
LASER PRODUCT

ZephIR 300 Connector Panel

CR1000 With NL115

Introduction

Campbell Scientific CR6, CR800, CR850, CR1000, CR1000X, and CR3000 dataloggers can be used to obtain data from the ZephIR 300. The dataloggers use the Modbus protocol to poll the ZephIR 300 for 10-minute averaged data.

Some of the benefits of using a Campbell Scientific datalogger with a ZephIR 300 Lidar are:

- Lidar data in standard Campbell Scientific format
- Flexible data transfer options through Campbell Scientific equipment
- Lidar data compatible with existing systems that use Campbell Scientific *LoggerNet* software
- Data configurability with programmable Campbell Scientific dataloggers
- Lidar-to-meteorological tower communications and data concentration
- Single-point data gateway for Lidar data and data from other devices
- Customizable DNP3 or Modbus maps to meet the requirements of SCADA systems

ZephIR 300 Compatibility

The datalogger must be programmed to enable communications with the ZephIR 300. This guide describes the steps for setting up a CR1000 datalogger to communicate and collect data from a ZephIR 300 Lidar.

The ZephIR 300 must be running firmware version 1.3 or later to be compatible with the Modbus protocol and to be able to send data to Campbell Scientific dataloggers. Earlier versions of ZephIR firmware may be compatible but will require different datalogger programs than the programs described in this manual.

2 Software Needed

LoggerNet
Device Configuration Utility (DevConFig)

3 Programs

Datalogger Programs

Template programs are available to facilitate datalogger programming for datalogger-to-ZephIR 300 communications.

The template programs contain code specific for ZephIR 300 communications. Code can be added to the existing template programs to measure met tower instruments, set up Modbus or DNP3 maps to make data available to SCADA systems, send emails, FTP data, etc. To obtain copies of the template programs, please contact Campbell Scientific.

Throughout the remainder of this guide, program and configuration examples will be shown for the CR1000 datalogger. Equivalent programming templates are available for the CR6, CR800, CR850, CR1000X, and CR3000 dataloggers.

There are three files that are loaded onto the datalogger to set up ZephIR 300 to datalogger communications:

- *Interface Template*
  This program is used to poll the ZephIR 300 for 10-minute averaged data. Code can be added to this template program to measure and store mast instrumentation data.

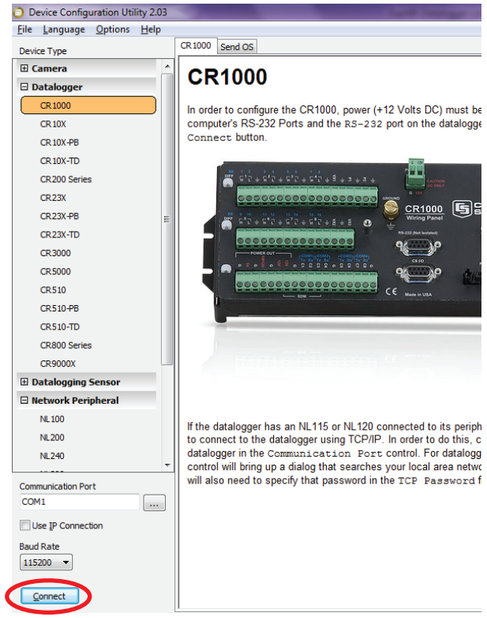
- *Flag Convert File*
  The interface template program calls on this file to run a subroutine that converts ZephIR 300 information and status flag data to readable text for storage with the 10-minute averaged data.

- *Discovery Template*
  This program is run on the datalogger to establish initial communications with the ZephIR 300 and to learn the ZephIR 300 configuration (heights being measured). This file is optional and is used to automate the process of setting up the datalogger to poll the ZephIR 300 for the heights that the ZephIR 300 is configured to measure.

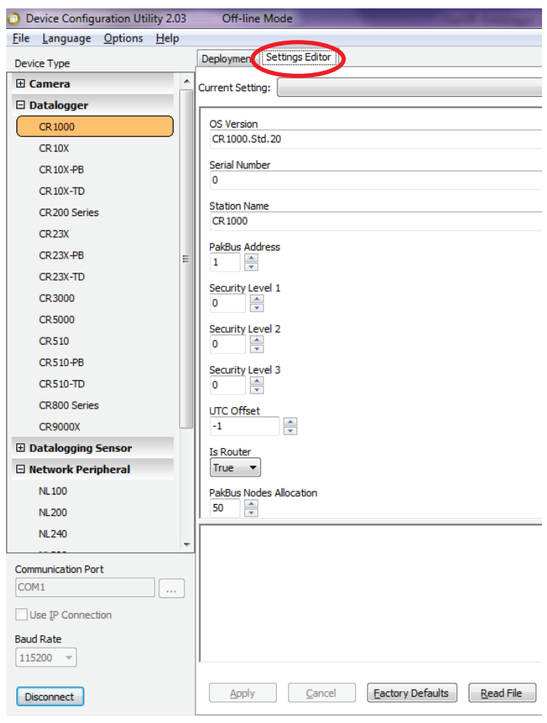
4 Software Configuration and Programming

A. Create a USR drive on the CR1000 Datalogger

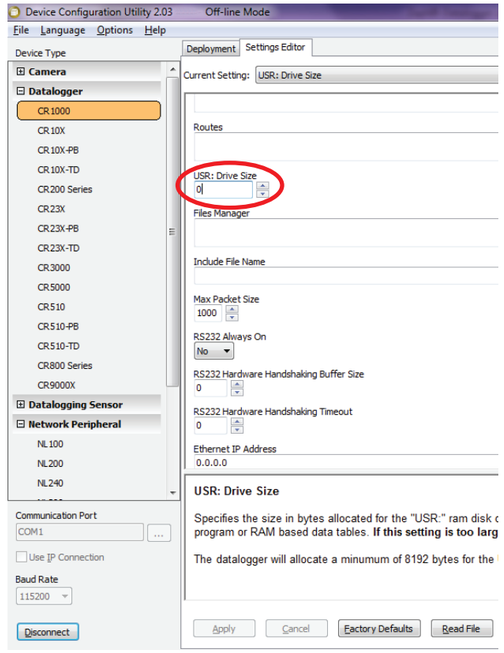
1. Connect to the CR1000 datalogger using *Device Configuration Utility*



2. Select the Settings Editor tab

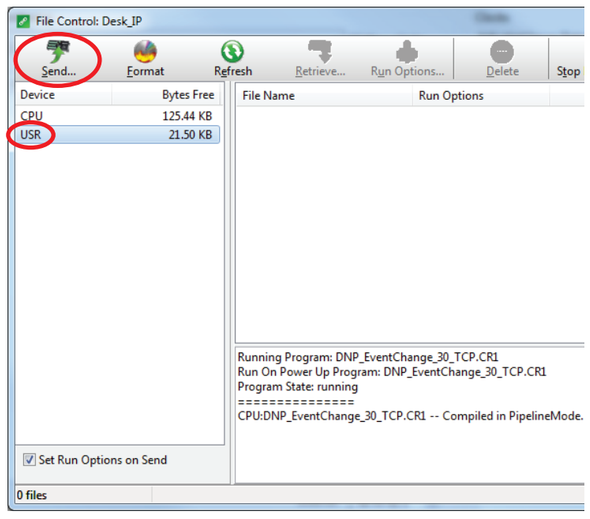


3. Scroll down until you find the USR: Drive Size setting. Enter **30000** in the data entry field and then click the **Apply** button at the bottom of the window. After the settings are applied *Device Configuration Utility* can be closed. *NOTE: A larger USR drive size may be needed for larger programs.*

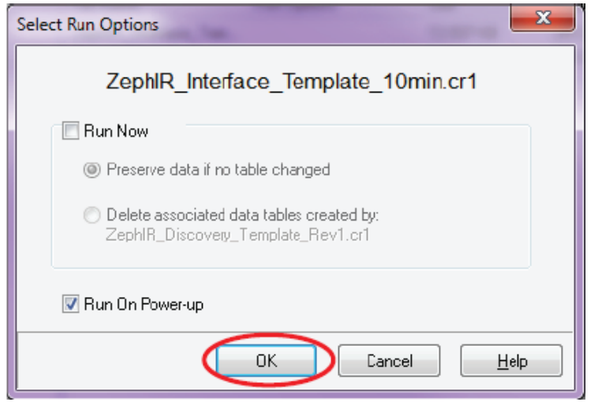


B. Establishing Communications with ZephIR_Discovery_Template.cr1

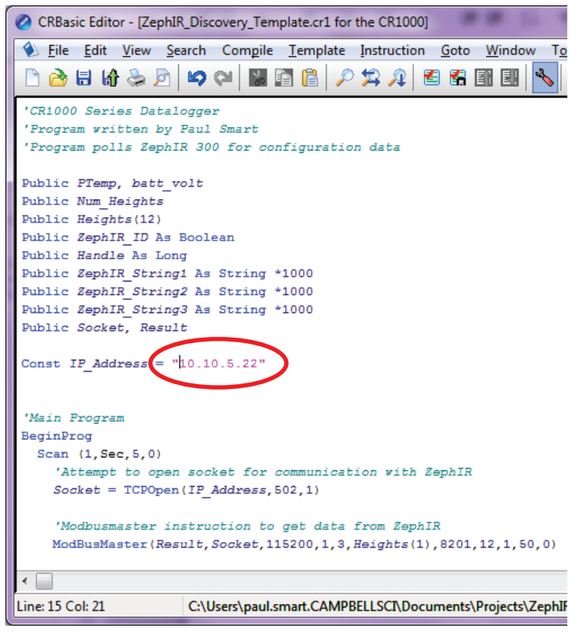
1. Connect to the CR1000 using the *Connect* screen in *LoggerNet* and click the **File Control** button at the top of the Connect screen. The *File Control* window will open as shown below. For more information on setting up a connection to the CR1000 using *LoggerNet*, see the CR1000 Manual.



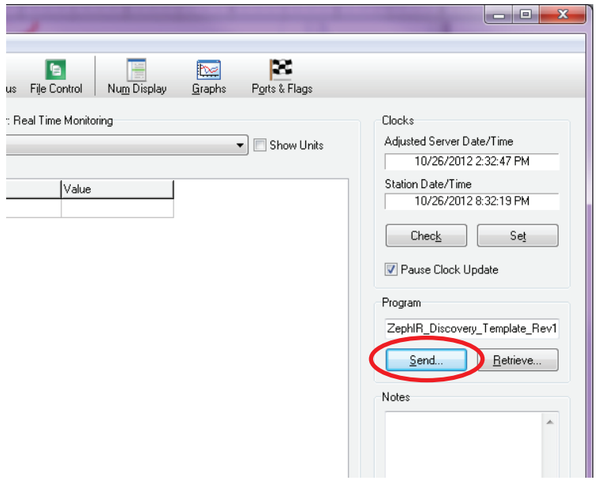
2. With the *File Control* window now open, select the USR Drive and click the **Send** button. Browse to where the **Template Program** file (See Section 3) is located, select the file, and then click the **Open** button.
3. Clear the **Run Now** box and check the **Run On Power-u**p box. Click the OK button.



4. With the *File Control* window still open, select the USR Drive and click the **Send** button. Browse to where the *Flag Convert* file is located, select the file, and then click the **Open** button.
5. Clear the **Run Now** box. Click the **OK** button.
6. After the *Interface* and *Flag Convert* files have been sent, close the *File Control window*.
7. Open the **Discovery Template** file in the *CRBasic Editor*. In the *ZephIR_Discovery_Template.cr1* file, there is an *IP_Address* constant defined near the beginning of the program. Enter the **IP address** of the ZephIR 300 between the quotation marks.



8. Save and compile the *ZephIR_Discovery_Template.cr1* file.
9. On the *Connect* screen, click the **Send** button.



10. Browse to where the *ZephIR_Discovery_Template.cr1* file is located, select the file, and then click **Open**.
11. After the CR1000 has compiled the Discovery Program, it will attempt to open a TCP socket with the ZephIR 300 and communicate with it via the Modbus over TCP protocol.

Upon successful communication with the ZephIR 300, the CR1000 will automatically create a configuration file on the USR drive called *ZephIR_Config.cr1*. This file is created based on the settings read from the ZephIR 300. The file documents the heights, aw well as the number of heights, that the ZephIR 300 is configured to measure.

Important Note: If the configuration of the ZephIR 300 is changed, the Discovery Program should be run again after all data is collected from the datalogger.

The CR1000 automatically compiles and runs the *Interface Template* file that was previously loaded on the USR drive of the CR1000 datalogger. The *Interface template* file then polls the ZephIR 300 on a regular interval to obtain the 10-minute averaged data.

Note: The ZephIR 300 can be configured to measure a maximum of 10 heights. However, a reference height of 38 m is always measured. The wind speed data at this height will be reported back to the datalogger and recorded in the final storage table.

C. Customizing the Template Files

Code can be added to the *Interface Template* program using the *CRBasic Editor*. Common functionality that is added is reading and storing data from cup anemometers, wind vanes, temperature and relative humidity probes, barometric pressure sensors, etc.

For assistance in customizing the programs running on Campbell Scientific dataloggers, please contact Campbell Scientific.