Getting Started Guide

AL200

Encoder Configured for ALERT2 with Sensor Input Enabled

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1. AL200 summary

The AL200 can transmit data using either the ALERT2 or legacy-ALERT protocol. Each protocol requires a specific operating system (OS) version, which is available for download from the Campbell Scientific website. The OS can be uploaded to the AL200 in less than five minutes. This document discusses configuring for the ALERT2 protocol. More information is provided in the product manual (https://s.campbellsci.com/documents/us/manuals/al200.pdf).

The AL200 includes an analog input (0 to 5 volts or 4 to 20 milliamps), a pulse counter, and a digital input (SDI-12 or switch closure) terminal for measuring a tipping bucket rain gage and digital or analog water level sensors. Combining the AL200 with a Campbell Scientific data logger provides increased measurement capabilities, user-defined logic and control, data logging, redundant communications, or other advanced functionality.

2. Device Configuration Utility

1. Download and install the latest version of Device Configuration Utility from: www.campbellsci.com/downloads/device-configuration-utility

2. Connect the AL200 to the computer using a micro USB cable.

3. Connect a 12 VDC battery to the **12V** and **G** terminals on the AL200.

4. Launch Device Configuration Utility.

5. In the **Device Type** box, type AL200 or find the AL200 under **Device Type** > **Radio**.

6. Select the appropriate **Communication Port** from the drop-down list. If you are unsure which port to select, unplug the AL200 and see which option disappears.
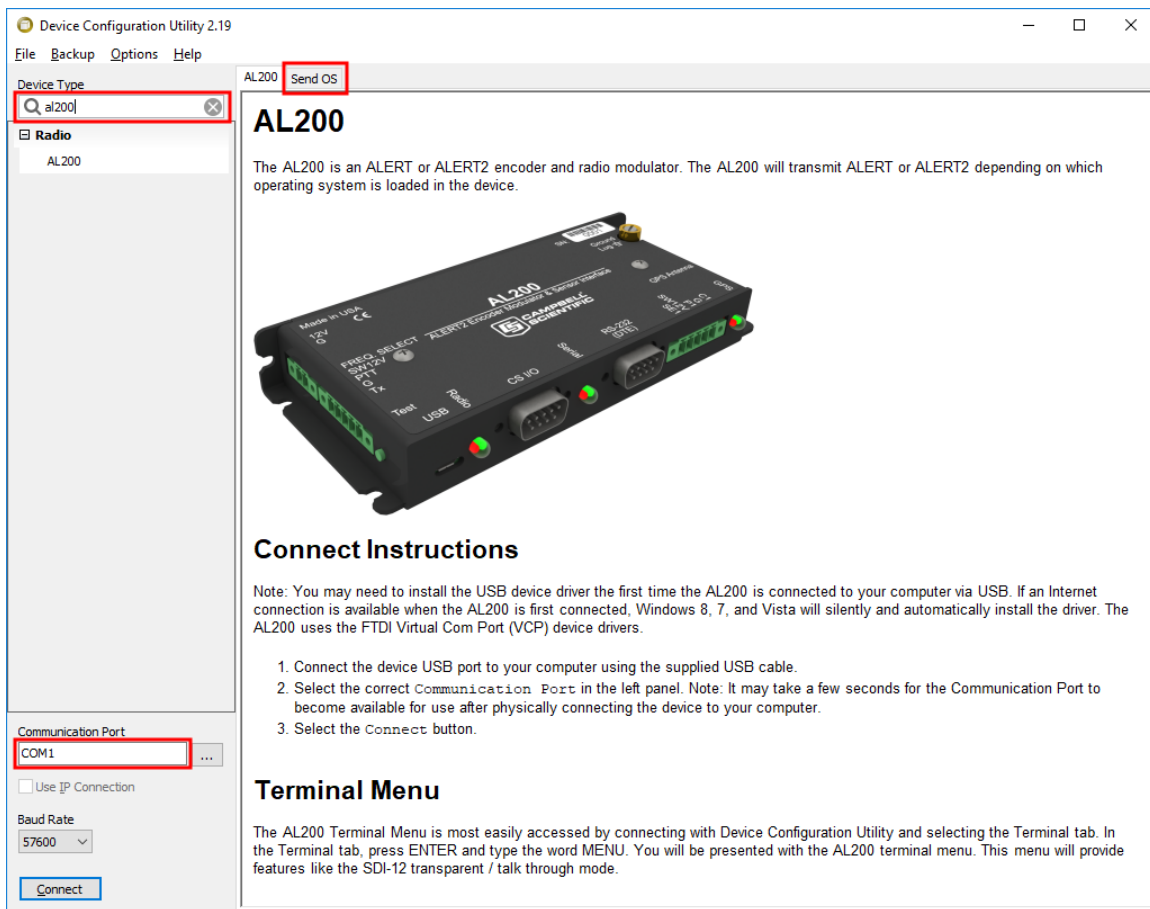

2.1 Send OS tab

The AL200 OS needs to be uploaded when a new OS is available or when changing the AL200 from ALERT to the ALERT2 protocol. Procedure for uploading a new OS is as follows:

1. Download the OS from www.campbellsci.com/downloads/al200-alert2-os.

2. Run the .exe file.

3. In the Device Configuration utility, click the **Send OS** tab and follow the instructions for load the new OS file into the AL200.

2.2 Main tab

Follow these steps to have the AL200 act as a stand-alone device with its sensor inputs enabled:

1. Click **Connect**.

2. Click the **Main** tab.

3. Ensure that the **Operation Mode** setting is **Sensor Input Enabled (CS I/O Disabled, ALERT Concentration on RS-232)**.
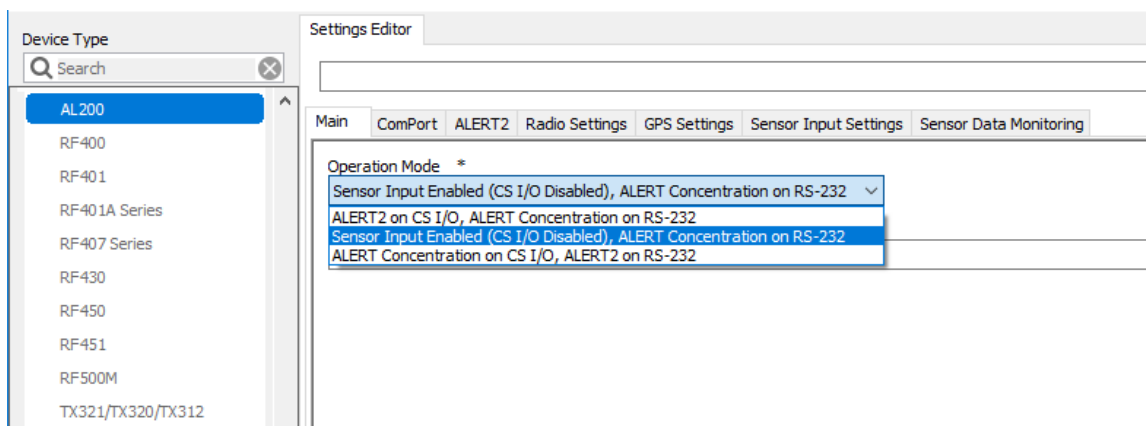
4. If the **Operation Mode** setting was originally set to something else, click **Apply** and reconnect to the AL200.

> **NOTE:**
> The settings in the **ComPort** tab are not applicable for this operation mode.

2.3 ALERT2 tab

1. Choose a **Station Source Address** (integer from 1 to 65534). A unique address is required for each station in your ALERT2 network.

2. Type the **Destination Address** for the device that will receive packets from this station. This setting is disabled if the **Add Destination Address** setting is **No**.

3. For the **Add Destination Address** setting, choose **Yes** if you want only a specific device to receive packets from this station. The address will also be added to the packet header.

4. For the **Frame Length**, type the TDMA frame in which this station will report. The value is expressed in milliseconds with a resolution of 500 ms, and must be evenly divisible into 12 hours. Typical values are 60,000 or 120,000 ms (one or two minutes).

5. Type the **Slot Length**, which is the maximum amount of time (entered in milliseconds) that the station will be allowed to transmit data within a single frame. The value can not be greater than the frame length.

6. Type the **Slot Offset** for the transmission slot. The value is expressed in milliseconds with a resolution of 500 ms and can not exceed the frame length minus 500 ms.

7. Select the **Hop Limit**, which is the number of times that a message from this station will be repeated before being discarded. Select **None (7)** to disable the **Hop Limit**.

8. For the **Path Service Enabled** setting, choose **Yes** if you want to add to the packet header the source address of each device that forwards data originating from this station. Enabling this option allows a receiver to know the path that the packet took through the network.

2.4 Radio Settings tab

The default radio settings work with the Maxon SD125EL V2 radio commonly used in ALERT2 applications. If using a different radio, refer to the radio manual or contact Campbell Scientific for the correct settings.

> **NOTE:**
> The defaults in the **GPS Settings** tab work for all applications and should not be changed.

2.5 Sensor Input Settings tab

1. Click the **Sensor Input Settings** tab.

2. For the **Multi-Sensor Report**, if you want to transmit the measurements in the multi-sensor report format, select **Type 3 - English** or **Type 4 - Metric**. Select **Disabled** if you do not want to report measurements in the multi-sensor format. Refer to the *ALERT Application Layer Specification* available at www.hydrologicwarning.org/content.aspx?page_id=86&club_id=617218&item_id=11986 for more details.

3. Type the **Self Report Interval**, which determines how often the sensor data is reported. Value is expressed in seconds.Typical settings are 7,200 or 21,6000 s (two or six hours).

4. Select the **Clock Status In Self-Report**. Choose **Enabled** to include the GPS sync status in self-report messages. Choose **Disabled** to only transmit the **Clock Status** when the GPS sync is lost or obtained.

5. For the **Clock Status Sensor ID**, choose a sensor ID (0 to 255) that will be used for the GPS sync status. Typical ID is 9.

6. Typically type -1 for the **SW12 Warm Up Time**, which leaves the SW12V continuously on.

> **NOTE:**
> Battery voltage is reported as sensor ID 8

7. To enable tipping bucket measurements, select **Enabled** for the **P1 Enabled**.

> **NOTE:**
> Tipping bucket measurements are reported as sensor ID 0.

8. To enable analog measurements, do the following:

   a. For the **SE1 Mode**, select either **Millivolt** or **Milliamp**, depending on the output of the sensor.

   b. Choose the **SE1 Sensor ID**. Table 2-1 (p. 5) shows the recommended sensor IDs:

Table 2-1: Recommended analog sensor IDs	
ID	**Measurement**
0	Precipitation
1	Air Temperature
2	Relative Humidity
3	Barometric Pressure
4	Wind Speed
5	Wind Direction
6	Peak Wind Speed
7	Stage
8	Battery Voltage
9	GPS

   c. Type the **SE1 Multiplier** and **SE1 Offset** settings, which convert the analog output of the sensor into engineering units.

   Example: Stage (ft) = SE1 Multiplier • Sensor Reading + SE1 Offset

   d. Type the **SE1 Tx Change**. If the difference between the last transmitted value and the current measurement exceeds the **SE1 Tx Change** value, an event driven transmission occurs.

9. To enabled digital measurements, do the following:

    a. For the **C1 Mode**, select either **Status** if using a float switch or **SDI-12** if using an SDI-12 sensor.

    b. If using a float switch (**C1 Mode** set to **Status**), choose a **C1 Sensor ID**.

> **NOTE:**
> An event driven transmission occurs whenever the float-switch state changes.

    c. If using an SDI-12 sensor, do the following:

        i. Type the full **SDI-12 Command** (SDI-12 address and measurement command) in the **SDI-12 Command** field.

        ii. Click the **Edit** button located to the right of the **SDI-12 Tx Config** field.

        iii. For each value returned by the SDI-12 sensor (up to 9), type the **Sensor ID**, **Multiplier**, **Offset**, and **Tx Change**.

10. Click **Apply**.

11. Click **Yes**.

12. In the summary window, click **Save**. The summary is useful for troubleshooting.

3. Sensor Data Monitoring tab

This tab displays raw and scaled values for each of the configured measurements and displays the last three transmitted values. Before leaving the site, go to this tab and check the values to ensure that the system is working properly. While connected to the AL200 with Device Configuration Utility, the AL200 makes measurements more frequently than its normal, frame-based interval to aid with calibration and maintenance. This interval can be changed by adjusting the **Configuration Sensor Scan Interval**. Make sure the **Configuration Sensor Scan Interval** is longer than the response time of any attached SDI-12 sensors.

4. Radio connections

The AL200 has five screw terminals for connecting an analog radio. Table 4-1 (p. 7) provides wiring for connecting a Maxon SD-125EL V2 radio to the AL200 by using the radio data cable available from Campbell Scientific. The cable has a DB9 female connector that attaches to the radio.

Table 4-1: AL200 to Maxon SD-125EL V2 radio connections

Wire color	AL200 terminal
Green	Tx
Black	G
White	PTT
Red	SW12V

The default radio settings of the AL200 work with the Maxon SD125EL V2 radios. Contact the radio manufacturer if using another radio.

5. Test transmissions

Use the AL200 **Test** button to trigger test transmissions and generate test tones. Press and hold the **Test** button for the duration indicated in Table 5-1 (p. 7).

Table 5-1: Function and Test button press duration

Function	Press duration
Test transmission	3 seconds
1 KHz test tone (10 seconds duration)	6 seconds

Normally, the AL200 suppresses transmissions when a user is connected with Device Configuration Utility. However, while connected, the **Test** button can be used to generate test transmissions. If a watt meter is available, the 1 KHz test tone can be used to check the output power of the radio and reflected power from the antenna system.

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