

# AL200X

ALERT2 Modem and Sensor Interface



## For Critical Flood Warning Applications



## Overview

The AL200X is an ALERT2 modem and sensor interface for use in critical flood warning weather systems. It meets the ALERT2 standards maintained by the National Hydrologic Warning Council (NHWC) and ALERT Users Group (AUG). ALERT2 improves the accuracy and performance of flood warning systems and software by providing faster data transfer, forward error correction, and a TDMA architecture.

With integrated sensor inputs and outputs, the AL200X enables you to create a minimal ALERT2 transmitter/station, decreasing the cost of a typical flood warning system. Internal storage provides data logging capabilities to enhance troubleshooting and maintenance activities. The switched 12 volt and control ports can be configured to provide logic for control of other devices, such as warning beacons. Combining the AL200X with a Campbell Scientific data logger provides enhanced sensor support and extended telemetry options.

## Benefits and Features

- Minimize setup time with easily configurable user software.
- Reduce system costs with integrated sensor inputs and data logging.
- Generate event- or schedule-driven reports for battery, clock, tipping bucket, voltage, current, SDI-12, and high/low state.
- Smoothly integrate into new and existing systems with screw terminals for power, radio, and sensors.
- Decrease field time with quick-access features for initiating sensor test transmissions, testing radio power, and checking antenna (VSWR) performance.
- Ensure data integrity with encrypted ALERT2 messages.
- Support 250-millisecond slots and configurable forward error correction to enable high data-rate transmissions over strong RF paths.



# I Detailed Description

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## Terminal Descriptions

- SEI: One single-ended analog input to measure 0 to 5 Vdc or 4 to 20 mA sensors
- P1: One pulse port for measuring tipping bucket rain gauges
- C1, C2, and C3: Three digital I/O control ports that can be configured for SDI-12 as separate buses, digital input, or digital output
- SW12A and SW12B: Two switched 12 Vdc power outputs that can be programmed to power sensors on and off
- G: Two grounding ports

## Operating Modes

The AL200X can be configured to operate in measurement and control mode as a stand-alone device or in Intelligent Network Device (IND) mode to connect to an external device, such as a data logger.

- The measurement and control mode activates the sensor input and output ports to operate as an ALERT2 transmitter.
- The IND mode allows connection to a data logger through the COM1 RS-232 interface for expanded sensor and telemetry device support.

Both configuration modes use the integrated radio and GPS interfaces.

## Configuration

Easily configure the AL200X with the familiar Device Configuration (DevConfig) software utility. The intuitive user interface enables you to easily set up and maintain a station, spending less time in the field. You can configure the sensor input and output in either basic or advanced mode, providing flexible control over the device. The provided data monitor helps you view the current system data and the past three measurements. The command terminal offers powerful control over the AL200X, enabling access to raw sensor traffic, data logs, and SDI-12 sensor configuration, in addition to other features.



# Specifications

■ <b>Operating Temperature</b>	<ul style="list-style-type: none"> <li>› -40° to +60°C (-40° to +140°F)</li> <li>› Non-condensing environment</li> </ul>
■ <b>Case Material</b>	<ul style="list-style-type: none"> <li>› Anodized aluminum</li> </ul>
■ <b>Analog Input</b>	<ul style="list-style-type: none"> <li>› One single-ended (SE1), selectable 0 to 5 Vdc or 4 to 20 mA</li> <li>› 16-bit ADC resolution</li> </ul>
■ <b>Pulse Counter</b>	<ul style="list-style-type: none"> <li>› One pulse or switch closure (P1) with 16-bit counter</li> <li>› 100 Hz maximum count rate, 100 kΩ pull-up to 5 Vdc</li> </ul>
■ <b>Digital I/O</b>	<ul style="list-style-type: none"> <li>› Three terminals (C1 to C3) configurable for digital input, output, or SDI-12</li> <li>› Up to three independent SDI-12 channels</li> <li>› 0 to 5 Vdc digital I/O, 200 kΩ pull-down</li> </ul>
■ <b>Switched 12 Volt</b>	<ul style="list-style-type: none"> <li>› Two terminals</li> <li>› Current limit 0.9 A @ +20°C per terminal</li> <li>› Reverse polarity protected</li> </ul>
■ <b>Communications Ports</b>	<ul style="list-style-type: none"> <li>› USB-C</li> <li>› RS-232 (Com1)</li> </ul>
■ <b>Power Requirements</b>	<ul style="list-style-type: none"> <li>› 9 to 18 Vdc input</li> <li>› Reverse polarity protected</li> </ul>
■ <b>Current Drain</b>	<ul style="list-style-type: none"> <li>› 9.5 mA (@ 12 Vdc average when idle)</li> <li>› + 19 mA additional (@ 12 Vdc GPS active with typical 20 mA GPS antenna)</li> <li>› + 7 mA additional (@ 12 Vdc during transmit)</li> </ul>
■ <b>GPS Antenna Connection</b>	<ul style="list-style-type: none"> <li>› SMA socket (female) connector</li> <li>› Active or inactive antennas supported, 25 dB max gain</li> <li>› Active antenna power 3.2 Vdc @ 50 mA (maximum)</li> </ul>
■ <b>System Timekeeping</b>	<ul style="list-style-type: none"> <li>› 60 PPB (0.06 PPM) clock drive typical (-40° to +60°C)</li> <li>› Internal UTC accuracy of 5 ms/day without continuous GPS synchronization derived from a precision TCXO tracking loop</li> </ul>

■ <b>Radio Interface</b>	<ul style="list-style-type: none"> <li>› ALERT2 communications protocol</li> <li>› Tx audio, PTT, switched power, ground</li> <li>› Tx audio level adjustable from 100 to 1,000 mVpp</li> <li>› Programmable warm-up, carrier only, Automatic Gain Control (AGC), and RF tail time intervals</li> </ul>
■ <b>Data Storage</b>	<ul style="list-style-type: none"> <li>› 128 MB on-board flash</li> </ul>
■ <b>Test Button</b>	<ul style="list-style-type: none"> <li>› Initiates a 1 kHz transmit tone or self-report transmission</li> </ul>
■ <b>Dimensions</b>	<ul style="list-style-type: none"> <li>› 15.9 x 7.7 x 2.8 cm (6.3 x 3.0 x 1.09 in.)</li> </ul>
■ <b>Weight</b>	<ul style="list-style-type: none"> <li>› 249 g (0.55 lb)</li> </ul>

## Standards

■ <b>ALERT2</b>	<ul style="list-style-type: none"> <li>› IND API specification v2.1 draft</li> <li>› AirLink v1.2 draft</li> <li>› MANT v1.2</li> <li>› Application Layer Protocol v1.3, rev. E</li> </ul>
■ <b>Compliance</b>	<ul style="list-style-type: none"> <li>› RoHS 2: EN IEC 63000:2018</li> <li>› Emissions: FCC Part 15</li> </ul>

