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A2FX User Manual

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About the A2FX

The A2FX from Blue Water Design is an enclosure that turns an A2X into a portable, field-ready transceiver.

The A2X is a two-way capable ALERT2 Intelligent Network Device (IND), also from Blue Water Design, which can act in any of the traditional ALERT2 roles: base station, repeater, or gauging site.

ALERT2 Information

ALERT2 is a low-bandwidth, high-reliability protocol designed for the transport of real-time data over radio telemetry networks.

A Description of the ALERT2 Protocol[1], a white paper summarizing the protocol, opens with the following description:

> ALERT2 is a new protocol optimized for the transport of real-time data over radio telemetry networks. It is the intended successor to the ALERT (Automated Local Evaluation in Real Time) protocol introduced in the 1970s. It offers a 7- to 10-fold increase in net data rate (or channel capacity), detects all errors introduced in transmission and corrects the great majority of them. The new protocol comprises multiple sub-protocols, with the flexibility to add new ones as needs emerge. It provides greater "data space" that expands the range of sensor identifiers and data resolution. It can be used in either ALOHA or TDMA environments, the latter providing the opportunity to eliminate data contention altogether.

The protocol specification documents are linked from Blue Water Design's support page, here.

[1] *A Description of the ALERT2 Protocol*, Don Van Wie, October, 2011, http://bluewaterdesign.us/docs/ALERT2_Description_102511.pdf

Hardware Overview

What's Included

Image: The A2FX includes an AC power supply, automobile power supply, and a magnetic mount GPS antenna -- everything necessary for self-contained ALERT2 field operation

- Pelican 1300 waterproof case, RF transparent
- A2X, IND is offered by default, RPT option available at time of order
- Ritron DTX-Ls radio
- Radio antenna
- 15VDC AC power supply
- Vehicle cigarette lighter power adapter
- Magnetic mount GPS antenna
- USB Bluetooth adapter

A2FX Main Panel

Image: The main panel of the A2FX

- Ant - Connect radio antenna here
- On/off switch
- Battery fuel gauge. LEDs will only turn on when the A2FX is powered on, even if the charger is connected.
- Volume switch, turn all the way counter-clockwise to turn speaker off
- Radio channel select switch
- Radio programming connector
- 12-17VDC charge port
- Magnetic mount section for GPS antenna

Charging

The charging circuit of the A2FX requires at least 14.2V to fully charge the batteries. Note, the voltage output of a vehicle when using the cigarette power adapter may not be enough to fully charge the A2FX's batteries. When used with less than 14.2V of external power, the A2FX will charge up to a lower capacity, and will use the external power instead of its batteries.

A2X Configuration Notes

Due to the unique features offered, some standard configuration settings will not work on the A2X with the A2FX enclosure:

- The radio is powered directly from the A2FX's batteries, and is turned on when the front panel switch of the A2FX is turned on. Thus, the included A2X does not control the radio's power, which many users will be accustomed to. Because of this, the 'Tx Always On' setting in A2Control is not functional.
- The radio's channel selection functionality is controlled solely via the channel select knob on the front panel of the A2FX. Setting the radio channel is via the A2X, either through A2Control or the API, will not work
- If it is operating in "random mode", without GPS lock, the "One Radio RX/TX" setting can be used to prevent the A2FX from transmitting while the receiver is decoding a message.
- If you wish to limit transmissions from the A2FX, status report transmission can be disabled by setting the Status Report Interval to 0.

Setup

Hardware setup

The A2FX is shipped with the A2X, Bluetooth dongle, radio and radio antenna installed and ready for use. The GPS antenna is provided separately, and must be attached to the A2X for the unit to acquire the time. The A2FX's case is RF transparent, and is intended to be used open or closed, including Bluetooth, GPS, and radio data.

Install A2Control

A2Control is Blue Water Design's GUI for configuring and interacting with the A2X. A2Control can be downloaded from our website. Try to match the version of A2Control with the version of the firmware running on your A2X.

Bluetooth Pairing

The A2FX includes a USB Bluetooth dongle to enable remote access. Please see the A2Control manual on our website for instructions on how to pair your PC to the A2FX.

Configuration

PLEASE NOTE: In its default configuration, the A2X transmits status reports every hour. Make sure the A2X is properly integrated into your ALERT2 system by assigning its address and timeslot before allowing it to transmit. Status report transmission can be disabled by setting the Status Report Interval configuration setting to 0 in the Device Configuration page of A2Control.

Common configuration tasks are covered in the A2X manual, which can be found on our website. At a minimum for a transmitting device, users will want to set an appropriate Source Address and TDMA configuration.

Common Tasks

Decode ALERT2 Messages

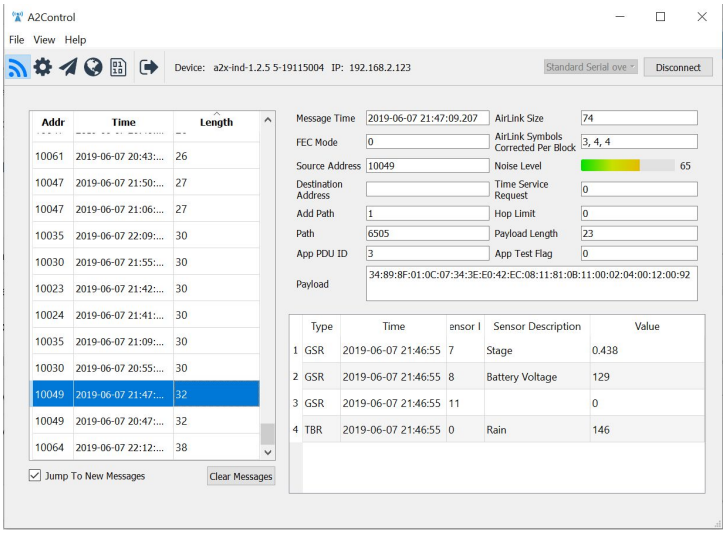

Image: The messages screen of A2Control

A2Control displays all received ALERT2 messages in the Messages window.

For more information, see the A2Control manual.

Send ALERT2 Messages

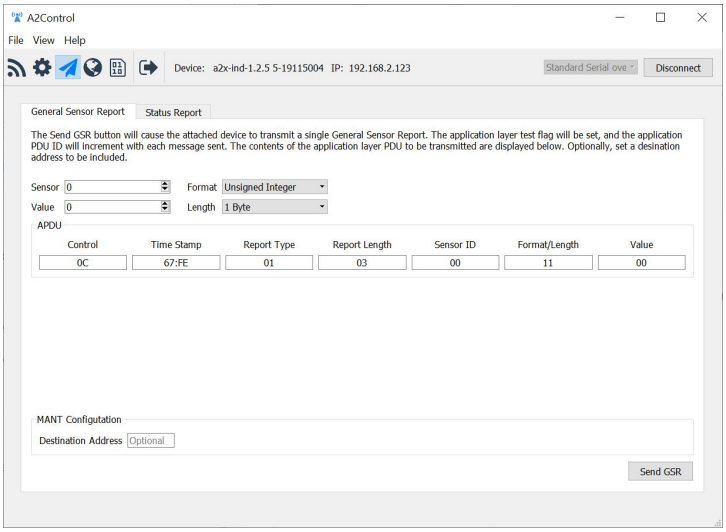

Image: The transmit screen of A2Control

A2Control can build and transmit ALERT2 messages from the transmit screen.

For more information, see the A2Control manual.

Test GPS Functionality

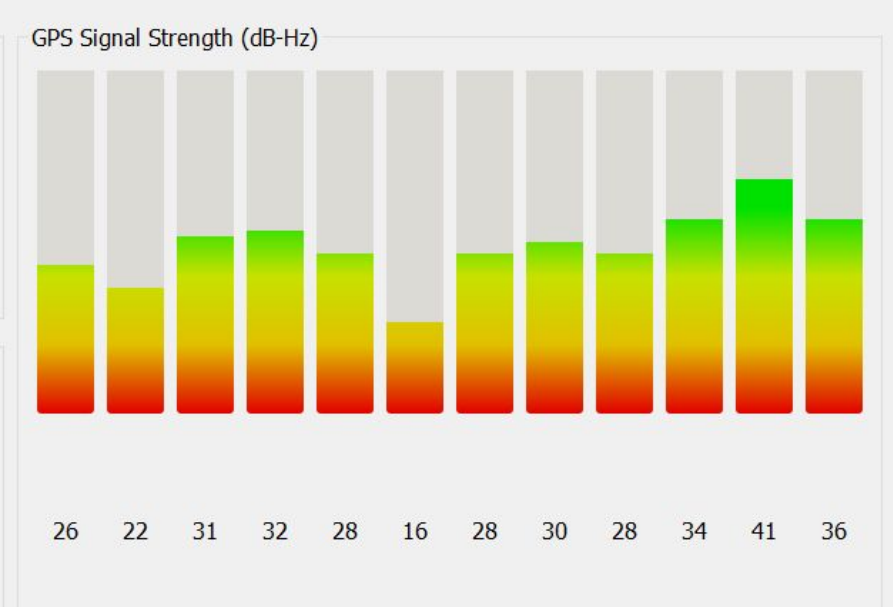

Image: The GPS screen of A2Control shows signal strength per satellite

PLEASE NOTE: *A shorted GPS antenna or cable may cause damage to the GPS module on the A2X! Please use a multimeter to check for shorts on any suspect antennae or cables BEFORE connecting to the A2X.*

The GPS screen of A2Control turns the A2FX into a valuable tool for testing GPS reception. The real-time signal strength feedback allows for instant feedback when testing various antenna and positioning options.

Site Survey

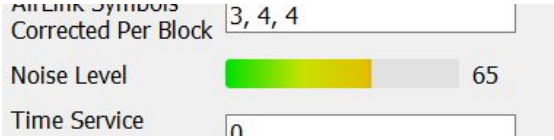

Image: The messages screen of A2Control displays the noise level of received messages

The A2FX may be used to assist in developing site surveys. The noise level indicator in A2Control provides an indication of received signal quality. By monitoring A2Control as the A2FX is physically transported, a received signal quality map may be developed to help understand which transmitting sites are able to be received at the various candidate site locations.