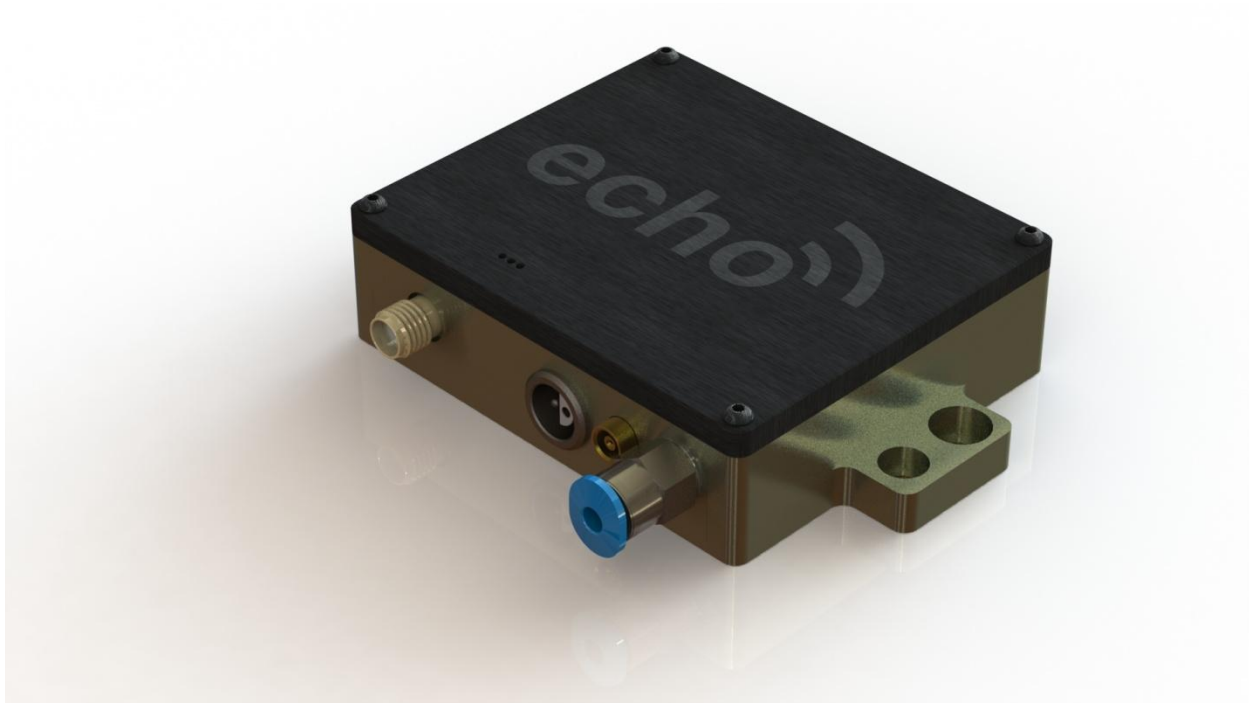




SkyEcho ATT-20B

Installation and Pilot's Guide



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1 Revision History

Revision	Date	Comments
A	7/20/2016	Initial release
B	1/19/2016	Changes to include barometer

2 Warnings / Disclaimers

All device operational procedures must be learned on the ground.

Received weather and traffic information is to be used as an aid to situational awareness and is merely supplemental and advisory in nature.

uAvionix is not liable for damages arising from the use or misuse of this product.

3 Limited Warranty

uAvionix products are warranted to be free from defects in material and workmanship for one year from purchase. For the duration of the warranty period, uAvionix, at its sole option, will repair or replace any product which fails in normal use. Such repairs or replacement will be made at no charge to the customer for parts or labor, provided that the customer shall be responsible for any transportation cost.

This warranty does not apply to cosmetic damage, consumable parts, damage caused by accident, abuse, misuse, water, fire or flood, damage caused by unauthorized servicing, or product that has been modified or altered.

IN NO EVENT SHALL UAVIONIX BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, WHETHER RESULTING FROM THE USE, MISUSE OR INABILITY TO USE THE PRODUCT OR FROM DEFECTS IN THE PRODUCT. SOME STATES DO NOT ALLOW THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU.

Warranty Service

Warranty repair service shall be provided directly by uAvionix.

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5 Introduction

The SkyEcho ATT-20B is a portable ADS-B transceiver. It incorporates a 1090 MHz receiver and 1090 MHz Class A0 transmitter limited to 20W. The ATT-20B includes a precision WAAS GPS, barometer, and Wi-Fi support for interface to EFB applications.

It is designed to meet the performance requirements of United Kingdom (UK) Civil Aviation Authority (CAA) Electronic Conspicuity (EC) CAP 1931.



EC devices are intended for voluntary carriage on registered and non-registered UK Annex II aircraft, non-complex EASA aircraft of <5700kg MTOM and for gliders and balloons (including those covered under ELA 1 and ELA 2) within uncontrolled UK airspace.



An EC device cannot be used at the same time as a transponder and it doesn't replace the need for a transponder when required by airspace/flight rules. If your aircraft is fitted with a working transponder, you must switch off the transmitter function of your EC device.

5.1 Features

The ATT-20B performs the following functions:

- 1090ES reception (1090 MHz)
 - Receives ADS-B In data from aircraft equipped with 1090 MHz Extended Squitter transmitters.
- 1090ES transmission (1090 MHz)
 - Transmits ADS-B Out data on the 1090 MHz frequency.
- WAAS GPS reception
 - High precision SBAS (WAAS) and RAIM enabled GPS provides position data for ADS-B Out transmissions.
- Barometric Altimeter for pressure altitude
- Traffic correlation
 - Traffic information from 1090ES is correlated to provide a coherent view of nearby aircraft.
- GDL 90 output

- Traffic and ownship data are translated to standard GDL 90 format.
- Wi-Fi EFB connection
The GDL 90 data is transmitted over the built-in Wi-Fi interface for reception by standards compliant with Electronic Flight Bag (EFB) applications.

5.2 Regulatory Compliance

The ATT-20B meets the Minimum Operational Performance Standards of DO-260B Class A0 with the output power limited to 20W and meets the performance requirements of TSO-C166b

5.2.1 CAA CAP 1391 Declaration

An EC device that operates using ADS-B at 1090MHz must have a Declaration of Capability and Conformance from the manufacturer before you can legally use it on board an aircraft. The pilot in command of the aircraft is responsible for ensuring that the EC device has a valid declaration.

Please refer to the CAA EC Web page for more information:

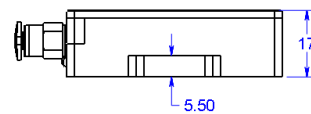
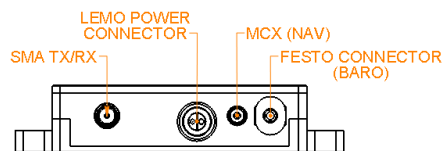
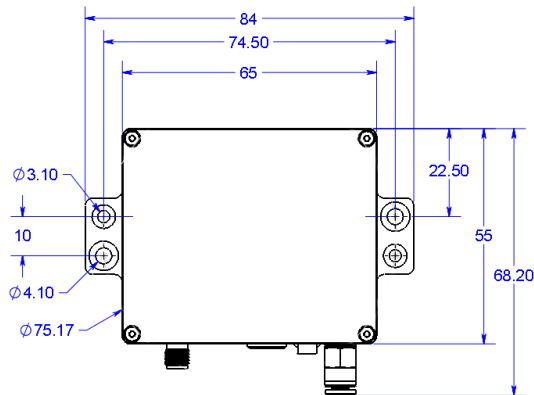
<https://www.caa.co.uk/General-aviation/Aircraft-ownership-and-maintenance/Electronic-Conspicuity-devices/>

Reference number	Issue number	Manufacturer	Type number	Category
UK.CAA.DoCC.000002	Issue 0	uAvionix Inc	Echo ATT-20B	Basic/transmit only

6 Specifications

Physical

Height	17 mm
Width	84 mm
Depth	68.2 mm
Weight	75 g



Environmental

Low temperature ground survival	-55°C
Low temperature short-time operating	-40°C
Low temperature operating	-20°C
High temperature operating	+70°C
High temperature short-time operating	+70°C
High temperature ground survival	+85°C
Loss of Cooling	Cooling air not required
Altitude	35,000 feet
Decompression	8,000 to 35,000ft in 15 secs

Overpressure	-15,000 feet
Electrical	
Input Voltage	6 to 29V
Input Power, Average	1 W
Input Power, Peak	30 W (400 μ s)
1090 ADS-B Receiver	
MSR99	-88 dBm
Dynamic Range (MSR90)	-79 to 0 dBm
1090 ADS-B Transmitter	
Frequency	1090 MHz
Transmit Power	20 W nominal (+43 dBm)
Equipment Class	CAP1391 - Basic
GPS Receiver	
Frequency (GPS/SBAS L1C/A)	1575.42 MHz
Constellation	GPS / WAAS
Sensitivity (Tracking)	-166 dBm
Sensitivity (Reacquisition)	-160 dBm
Sensitivity (Cold Start)	-148 dBm
Sensitivity (Hot Start)	-156 dBm
Barometric Altimeter	
Range	-1,000 to 50,000'
Wi-Fi Interface	
Frequency	2.412 to 2.462 MHz
Data Interface	GDL 90
Transport	UDP port 4000

Concurrent Client Connections	4
Connectors	
1090 MHz Antenna	SMA
GPS Antenna	MCX
Wi-Fi	Internal
Static Pressure / Altitude	Festo

7 Limitations

7.1 Installation

Any antenna certified to TSO-C66, TSO-C74, TSO-C112 with a peak gain of 4 dBi or less, an omnidirectional radiation pattern, and a VSWR of 1.8 or less at 1090MHz is approved for use with this device and will ensure conformance to all applicable standards for RF emissions. Ensure that the polarization of the antenna is as near vertical as possible.

Modifications and use outside of intended scope

This device has been designed and tested to conform to all applicable standards in the original form and when configured with the components shipped with the device. It is not permissible to modify the device, use the device for any use outside of the intended scope, or use the device with any antenna other than the one shipped with the device.

Important Pilot Advisory Note Regarding Safety of Radio Frequency Energy

Safe use of this device requires care as to the placement of the antenna. Place the antenna at least 4cm away from any part of your body or that of other cabin occupants. To stop all RF emissions, remove power from the equipment. Only handle the antenna when power is disconnected. Advise your passenger(s) to avoid contact with the antenna while power is applied to the equipment. Retain these instructions with your maintenance logs/files and for future reference.

FCC RF Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits (Table 1 of 47Pt1 (i) 1.1310) set forth for a Public/Uncontrolled environment.

Mode-S or ATCRBS

If the aircraft has an operating Mode-S transponder or ATCRBS beacon, the Transceiver must be deactivated. Deactivation of the device is accomplished by removing device power or disabling the transmit capability via the control setting in the uAvionix Echo mobile application.

Proximity to other equipment

Mount the ATT-20B so that it does not compromise the operation of any other proximate communication or navigation antenna or system.

Altimeter Cross Check

The reported altitude must be cross-checked against the aircraft's altimeter during pre-flight.

Harmful Interference

It is the responsibility of the pilot to ensure that the Transceiver causes no harmful interference to other onboard equipment and systems.

Configurable Options

Accessing or altering configurable options not intended to be operated may cause pilot distraction.

See and Avoid

The ATT-20B is intended to be an aid to 'see and avoid'. Maneuvers to regain adequate separation should not be based on alerts issued by this device alone.

Approvals

Approvals do not cover adaptations to the aircraft necessary to accommodate ancillary equipment such as power provisions, mounting devices or external antennas, such items must still be approved under existing minor modification/change processes applicable to the aircraft.

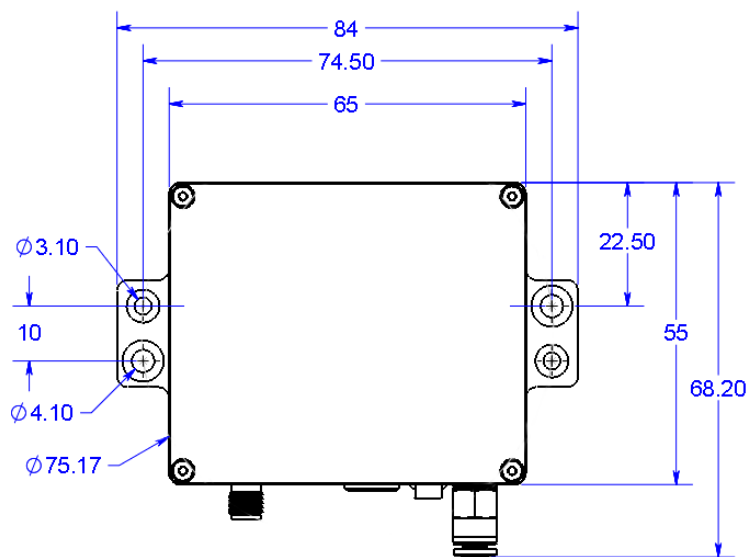
Warning: This transceiver is to be used to improve pilot situational awareness only and as a navigational aid. It is not intended for use in IFR flight conditions. uAvionix is not responsible for the transceiver's end use and will not be held liable for any events occurring from its use.

8 Equipment Installation

This section describes the installation of the ATT-20B and related accessories in the aircraft, including mounting, wiring, and connections.

8.1 Mounting

ATT-20B is approved as a portable ECD. Mounting tabs have been integrated into the design for optional panel mounting. Panel mounting does not change the device type, approval or operating restrictions under CAP-1391.



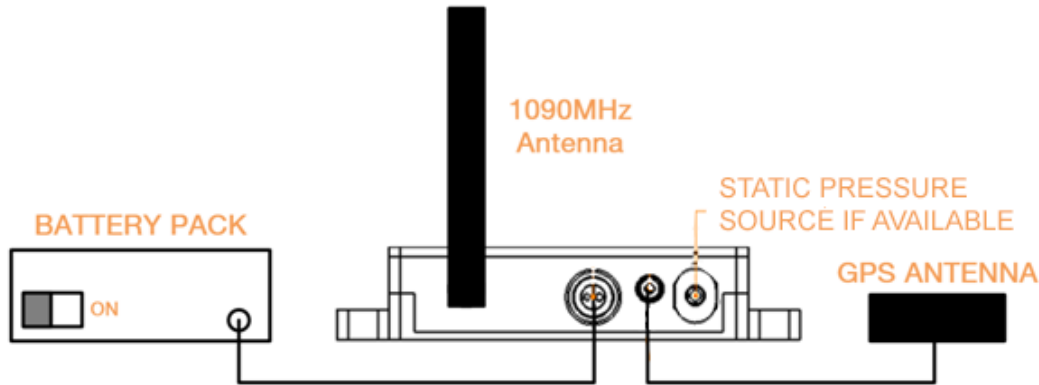
Dimensions in mm

Connections

1. Connect the supplied 1090MHz antenna to the SMA port.
2. Mount the GPS antenna with a clear view of the sky and connect to the MCX port.
3. Connection of the barometer to the aircraft static system is optional. Static and cabin pressures can vary significantly from one another

and connection to the static system is recommended when possible. The provided connector accepts 5mm tubing.

4. Connect the power lead to a battery pack and to the Lemo power port.
5. Care should be taken to make sure all devices are secure and will not interfere with pilot visibility or aircraft operation.



8.3 Installation Setup

Download the “uAvionix Echo Installer” app from the IOS App store or Google Play.

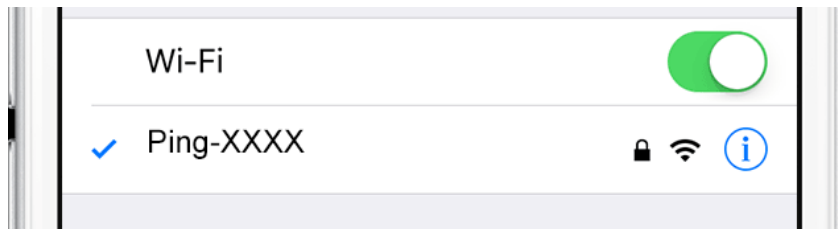


8.3.1 Connecting to the ATT-20B via WiFi

To connect to the ATT-20B join a device to the wireless network named Ping-XXXX using the procedure for your device. iOS is shown below:

1. Go to **Settings > Wi-Fi**, and make sure that Wi-Fi is turned on.

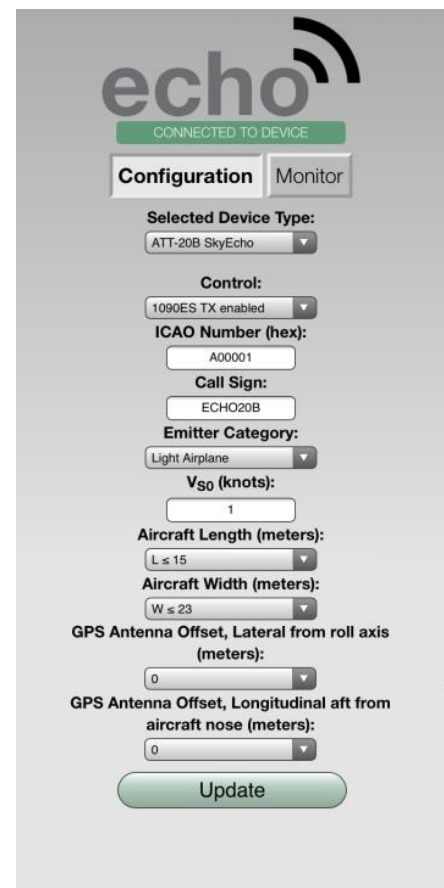
2. Tap the SSID **Ping-XXXX** where XXXX is a random string. i.e. Ping-6A8E
3. Enter **uavionix** as the WPA password for the secure Wi-Fi network, then tap join. Note: *The No Internet Connection* message is normal when iOS is connected to ATT-20B.



4. Launch the Echo App.

The application will set the following parameters:

- Device Type
- Control
- ICAO (Aircraft Registration)
- Emitter Category
- Call Sign
- Aircraft Length
- Aircraft Width
- GPS Antenna Offset from Roll Axis
- GPS Antenna Offset from Nose
- Air/Ground Threshold Speed



8.3.2 Device Type

Choose ATT-20B SkyEcho

8.3.3 Control

Select a control type. This setting configures SkyEcho for transmit, receive or standby.

- 1090TX Enable: enables transmit and receive functions.
- Receive Only: disables transmissions but continues to provide received ADS-B data to a GDL90 compatible application.
- Standby: Disables the transmit and receive functions. GDL90 position data is still available from the device.

8.3.4 Aircraft Address Programming

The ICAO address is a 24-bit number issued to the aircraft by the registration authority of the aircraft. These addresses are usually written as a 6-digit hexadecimal number, although you may also encounter one written as an 8-digit octal number. The ATT-20B understands the hexadecimal format, so you must first convert an octal number to hexadecimal before entering.

8.3.5 Emitter Category

To assist ATC tracking of aircraft, an aircraft category can be transmitted. Select the aircraft category that most closely matches the aircraft.

Emitter Category can be set as follows:

Light Airplane	Rotorcraft
Small Airplane	Glider / Sailplane
Large Airplane	Lighter Than Air
Large Airplane with High Vortex	Parachute
Heavy Airplane	Ultralight
Highly Maneuverable Airplane	UAV
	Space Craft

8.3.6 Call Sign

CALL SIGN is an 8 digit code that corresponds to the tail number of the aircraft. (0-9, A-F).

8.3.7 Aircraft Length and Width in Meters

On the ground, ADS-B transmits encoded aircraft size information which is used by ATC to identify taxiing routes and potential conflicts. Enter the length and width (wingspan) fields and the appropriate size codes will be calculated for transmission.

Enter the Aircraft Length in Meters

$L \leq 15$	$55 < L \leq 65$
$15 < L \leq 25$	$65 < L \leq 75$
$25 < L \leq 35$	$75 < L \leq 85$
$35 < L \leq 45$	$L > 85$
$45 < L \leq 55$	

Enter the Aircraft Width (wing span) in Meters

$W \leq 72.5$
$72.5 < W \leq 80$

8.3.8 GPS Antenna Offset

The GPS antenna offset is used in conjunction with the length and width to manage taxiway conflicts. A typical GPS does not report the geographic position of the center of the aircraft, or even the tip of the nose of the aircraft; instead, it usually reports the location of the actual GPS antenna (not the GPS receiver). In normal flight operation this distinction is of no importance at all, but if ADS-B is used to manage taxiway conflicts, a significant offset in antenna position could mean that the aircraft footprint is not in the same place as the ADS-B reported position. Although the GPS Antenna Offset is primarily intended for position correction on large transport aircraft, General Aviation aircraft can also have a significant offset. For example, if the aircraft has a long tail boom and the GPS antenna is on top of the tail, the GPS position could be 4 meters or more from the nose of the aircraft.

Enter the GPS Antenna Offset Lateral from Roll axis (Meters)

0	Right 2
Left 2	Right 4
Left 4	Right 6
Left 6	

Enter the GPS Antenna Offset Longitudinal from Aircraft nose (Meters)

0 to 60 Meters in 2 Meter increments

8.3.9 VSO (knots)

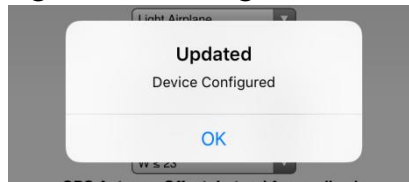
This parameter allows the ATT-20B to automatically switch between airborne and ground modes.

Enter the airspeed (in kts) that the aircraft typically flies after take-off.

0-999 knots

8.4 Commit and Confirm Configuration

1. After entering the correct information for all fields press Update. You should receive a message confirming the configuration. Tap OK.



2. Tap Monitor just below the Echo logo. Confirm the ICAO, Callsign and Emitter shown are correct values for your aircraft.
3. Programming of the SkyEcho ATT-20B is complete.

9 Normal Operation

9.1 Battery Pack (optional)

The battery pack needs to be fully charged before use.

9.2 Indicators

There are 3 LEDs visible through the top cover of SkyEcho.

LED	Flashing	On
BLUE	GPS locked	
RED	ADS-B TX	FAULT
GREEN	ADS-B RX	

9.3 Electronic Flightbag Application

Launch your GDL 90 compatible Electronic Flight Bag (EFB) application.

Configure your EFB as necessary to access the device. In most applications, it will be automatically detected.

ADS-B traffic and flight information should begin streaming to the application when in range.

SkyDemon displaying ADS-B traffic from SkyEcho ATT-20B is shown below.



Altitude must be pre-flight cross-checked by comparing the aircraft's altimeter with the GPS altitude displayed on the EFB application.

9.4 Transmit Control

Transmit must be deactivated when used on an aircraft with an air traffic control radar beacon system (ATCRBS) or Mode-S transponder. Transmit can be disabled using the Echo application and selecting Receive Only or Standby. The device can also be disabled by removing the power source.

For additional questions or support please visit

<http://uavionix.com/support>