

iLevil³_{AW}

Wireless Integrated Avionics Module

AD-AHRS, GPS, ADS-B 978 / 1090 MHz Receiver, Data recorder

Instruction Manual

iLevel 3 AW



CHARGING
LED

MINI USB
PORT

ON/OFF
SWITCH

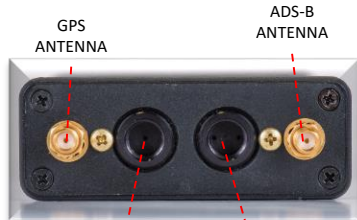
DB 15
SERIAL PORT

POWER/GPS
LED

ADS-B
LED



SD
CARD
PORT



GPS
ANTENNA

DYNAMIC
PRESSURE

ADS-B
ANTENNA

STATIC
PRESSURE

Package Contents

- Wireless iLevil3 AW
- USB to Mini USB cable
 - ADS-B Antenna
 - GPS Antenna
- DB15 male connector
 - User Manual
 - SD Card

Charge before use

When using the iLevil3 AW as a “portable” device, you must first charge the internal batteries:

- Charge the iLevil3 AW fully using the USB cable
- The LED next to USB port indicates if the device is charging.
- When the LED goes off, the battery is charged. (Takes up to 4 hrs.)
 - 100% charged battery supplies power for 5 hrs.

When connected to (12-28V) through the DB15 plug (Pin15), the batteries will be charged automatically with external power.

Alignment

- Attach the supplied ADS-B antenna and GPS antenna. See top label for reference.



- Align the airplane icon on the iLevel's top label with the roll axis of your aircraft.
- ON/OFF switch should face the back of the aircraft.
- Pressure ports and Antenna connectors should face the front.

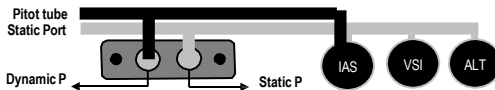
• Install iLevel on a surface that is LEVEL with the horizon DURING un-accelerated, straight and level flight. It's ok if it isn't level on the ground (i.e. in tail draggers). You may use our free AHRS App available on the AppStore to assist you with leveling the instrument.

• For optimal magnetic heading, install iLevel as far away from ferrous metals as possible. (i.e. magnetic compass, cell phones, steel airframe)

• To connect to the pitot-static system, you need two 1/8 NPT hose fittings for your specific hose size.

Connect the static line to the "static P" port and the dynamic line to the "Dynamic D" port.

Teflon is recommended when installing the fittings to prevent any leaks in the system.



- Install the end of the GPS antenna with a clear view of the sky and the ADS-B antenna with line of sight to ground towers and nearby aircrafts.

NOTE: **DO NOT** rely on the iLevel for attitude & heading if it is not aligned as specified above.

Connecting to your favorite App

The iLevil series offers the most compatibility with Apps on both iOS and Android platforms.

- Turn ON your iLevil with the ON/OFF switch. (LEDs will light up)
- Tap Settings icon on your tablet.
- Tap WiFi and connect to the iLevil3 – xxxx network, where “xxxx” is the unique serial number.
- Once your connection is established, a checkmark will appear next to the network name.
- Run your Navigation App of choice.

The AHRS Utility App is a free application available for iPad/iPhone for iLevil troubleshooting, Alignment aid, Configuration etc.

Other advanced Apps may require subscriptions and offer more features than others.

Some Apps may not support all the features of the iLevil.

You may choose to use one Nav App or a combination of Apps on multiple devices depending on your flying needs.

NOTE

- For a complete list of compatible apps go to <http://www.aviation.levil.com/compatible-apps.html>
- To download a compatible App to your iPad/iPhone search using the AppStore on your tablet
- To download a compatible for your Android tablet search using the PlayStore on your tablet

LED Indicators

Label	Status	Description
Power/GPS	Slow Blink Green: Solid Green:	Power ON / No GPS Fix Power ON / GPS fix acquired Power Off
ADS-B	Slow Blink Green: Solid Green: Off:	Traffic Received Weather and traffic received No traffic or Weather received
Charging (with 5V USB power)	Solid Green: Off (w/power): Off (no power):	Charging Battery 100% charged, not charging Not charging
Charging (with ship's power on Pin15)	No Charging Status available.	

NOTE: iLevel3 has a charging temperature protection. If the battery is above 40°C (104°F) and the iLevel3 is connected to external power, the iLevel3 will continue to operate from external power but the charging process will be disabled. The charging LED status will be set to OFF.

Magnetic Heading

There are two ways to obtain heading information from the iLevel, depending on the navigation App of choice, you may choose between the following:

- True Track: Heading information based on GPS track.
- Magnetic Heading: Heading information determined by a combination of 3-axis magnetometer and gyros that form part of the internal AHRS.

When using Magnetic Heading, it is important to know the following:

- Magnetic fields caused by other Magnetic Compass etc, may affect the AHRS heading.
- Verify your magnetic heading after following alignment and installation procedures:
(use AHRS Utility App -> options -> Heading -> Use magnetic)
- In case of magnetic deviation, the internal AHRS will slowly learn your aircraft configuration during flight to compensate.

This learning process requires the aircraft to turn both clockwise and counter clockwise for at least 40 seconds.

- After turning, or at the end of your flight, verify the magnetic heading again using the AHRS Utility App.
- If the AHRS was able to successfully compensate for errors, you may store this data inside the iLevel and it will use this new configuration on the next power cycle:
(AHRS Utility -> Device Config -> Enable Configuration -> Save Mag Data).
- If AHRS was unable to compensate for errors after turns, try using a different location.
- ERASE Magnetic data using AHRS Utility before attempting a different location or moving iLevel to a different aircraft or environment.

Specifications

AHRS

- 360 degree pitch and bank operation
 - GPS Independent attitude.
 - 300 deg/sec max turn rate
 - 4Gs max rating.
- Output: Roll, pitch, magnetic heading, slip indicator, rate of turn, G meter, Indicated Airspeed (max 200 kts), Vertical Speed (ft/min) Pressure Altitude (at 29.92 inHg)

Internal Battery

- Operating time: <= 4 hrs. typical
- Charging time: USB - approx. 5 hrs.

WIFI

- Android and iOS compatible
- Supports up to 7 devices connected simultaneously (UDP broadcast)
- Supports multiple protocols:
 - GDL90 (default)
 - ForeFlight Sim
 - NMEA

GPS

- Supports WAAS
- Cold Start < 60 sec. typ. (open sky)
 - 1 Hz output (5Hz optional)

ADS-B in (978/1090 MHz)

- Receives regional and continental NEXRAD reports broadcasted by ADS-B towers within range:
 - (Regional every 2.5 min. / Continental every 15 min.)
 - Receives "GROUND TO AIR" traffic. (re-broadcast of traffic by ADS-B towers nearby)
- Receives AIR TO AIR" traffic reports from other aircraft operating 978/1090 Mhz transmitters: (978 MHz UAT ADS-B out and Mode-ES transponders with extended squitter)

Environmental requirements

- Temperature range: -10° to 40 ° C (14 ° F to 104 ° F).
- Antenna with clear view to sky for best GPS reception.
- For best ADS-B reception, antenna with line of sight view with ADS-B ground based towers and min 2000 ft.
- Windshields with integrated heating elements will severely attenuate GPS and ADS-B signals.
- GPS fix is necessary to display traffic information received over the 1090 MHz freq.
- GPS fix is necessary for SD recording functionality.

Caution

- Ferrous materials inside aircraft affect the compass reading.
- This product contains a Lithium-Ion battery. Li-Ion batteries are volatile.
- **Never charge batteries unattended.** When charging Lithium-Ion Batteries, you should always constantly monitor the charging process to be able to respond to any problems that may occur.
- When transporting or temporarily storing in an airplane or vehicle, temperature range should be no less than 20 ° F (-12 ° C) and not more than 150 ° F (65 ° C).
- Storing Lithium-Ion batteries at temperatures higher than 170 ° F for extended periods of time (more than 2 hrs.) may cause damage to battery and possible fire.
- DO NOT disassemble, remodel, drop, or let the iLevel3 get wet!
- Not all traffic is displayed using ADS-B in. Most aircraft are not currently ADS-B Out equipped and therefore not detectable by the iLevel. Do not use the iLevel as an anti-collision system.
- AHRS/GPS data provided is not FAA certified. Do not use it as a primary instrument for IFR.

Levil Data Relay

The iLevil3 AW features three RS-232 serial ports that can be used for data transfer between tablets and other avionics in the cockpit. For more information check the iLevil Relay feature on our website www.aviation.levil.com or email: info@levil.com

DB15 pin description

PIN 1: 5V IN

PIN 2: RS-232 Data transmission (230400 bauds)

PIN 3: RS-232 Data reception (230400 bauds)

PIN 4: AUX Relay port 2 RX (receive)

PIN 5: AUX Relay port 1 TX (transmit)

PIN 6: Time Mark High*

PIN 7: Input/Output 1(for future use)

PIN 8: GROUND

PIN 9: Battery ON, connect this pin to GND using a remote switch to turn ON iLevil using internal battery, overriding the on-board power switch

PIN 10: AUX Relay port 0 RX (receive)

PIN 11: AUX Relay port 0 TX (transmit)

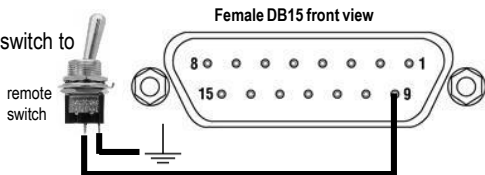
PIN 12: AUX Relay port 1 RX (receive)

PIN 13: AUX Relay port 2 TX (transmit)

PIN 14: Time Mark Low*

PIN 15: Power (8-32V), use 1 amp Fuse for protection.

*Only available with certified GPS upgrade



AHRS Utility APP



AHRS utility is a free application designed to display AHRS data graphically and numerically.

- User must be connected to the Wi-Fi network of the iLevel.
- The application will NOT display airplane attitude based on the internal gyros of your iPad/iPhone or GPS data.
- Air data is only available on the AW model. If you have an iLevel SW, Air data will be derived from the internal GPS on the iLevel.

A simple swipe to the right on the right side panel allows you to switch from gauges, diagnostics, and data recording.

AHRS Utility APP

The screenshot shows the 'Options' menu of the AHRS Utility APP. The top status bar displays 'iPad' and '11:51 AM'. The main content area is divided into several sections: 'Air Data Source' with buttons for 'Pressure', 'Both', and 'GPS'; 'Baro Adjust' with a slider and 'Feet'/'Meters' buttons; 'Speed Units' with 'KTS', 'MPH', and 'Knots' buttons; 'V Speeds' showing Vso, Vs, Vle, Vno, and Vne with corresponding KTS values and an 'update' button; 'Heading Source' with 'GPS' and 'Magnet' buttons; 'Connect using' with 'TCP' and 'UDP' buttons and a 'Disconnect' button; 'Side Display' with 'Diagnostics', 'Engine', and 'Vertical Power' buttons; 'Vertical power' with a note 'Activate if using VP-X Pro and VP-X Sport ONLY!'; and 'Artificial Alignment' with a toggle and 'Pitch Adjusted: 0.0 deg. Roll adjusted: 0.0 deg.'.

Below the main content is a 'Device Config' section with tabs for 'FPD', 'Options', 'Engine Config', and 'Device Config'. The 'Options' tab is selected, showing three gauges: Airspeed (KTS), Altitude (Feet), and Pitch (deg). The time '29.92' is displayed at the bottom.

The screenshot shows the 'Engine Config' menu of the AHRS Utility APP. The top status bar displays 'iPad' and '11:52 AM'. The main content area is a form for configuring an EIS (Engine Instrumentation System) source. It includes a dropdown for 'EIS Source' (set to 'Other'), a 'Gauge Name' field (set to 'OIL T'), and a 'Gauge Enabled' toggle (checked). There are also fields for 'Warnings Enabled', 'Units (i.e deg, Knots)', and 'Display decimal point'. Below these are 'Gauge Limits' (MIN, warning, MAX) and 'Gauge position' (A, B, C, D, E, F, G, H, I, J, K, L). A 'Refresh' button is at the bottom.

On the right side, there are two circular gauges labeled 'A B' and 'C D', and a vertical bar chart labeled 'F G H I J'. Below these are two vertical sliders for 'Pitch' and 'Roll'.

Below the main content is a 'Device Config' section with tabs for 'FPD', 'Options', 'Device Config', and 'Engine Config'. The 'Engine Config' tab is selected, showing three gauges: Airspeed (KTS), Altitude (Feet), and Pitch (deg). The time '29.92' is displayed at the bottom.

- **Options:** The options menu is the main menu that allows user to very easily adjust various settings (air data source, baro, speed unit, heading source, side display, and allows you to artificially align the iLevel)
- **Engine Config:** User must have a compatible EIS connected to the iLevel to display this information. All gauges can be set up to display desired information.

NOTE: Device Config option should only be used with the advice of Levil Aviation Tech Support. Any settings changed incorrectly in this tab can lead to iLevel malfunctioning!

Data Recording (SD CARD)

- The iLevel will automatically begin recording if the unit is powered on with an SD card already inserted.
- If the iLevel is powered on with NO SD card inserted, recording will begin by simply inserting SD card.

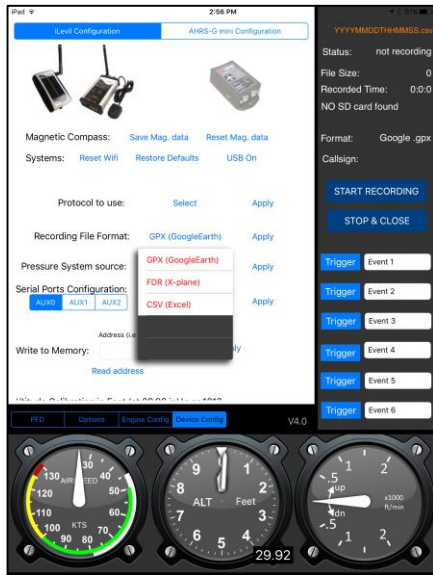
NOTE: iLevel will ONLY record once a GPS fix is obtained.
NO recording if no GPS fix.

File name will be saved as follows
iLevelxxxx-yyyymmddThhmss

- With the iLevel, you will have three file formats in which to choose from, to record in (.gpx, .csv, .fdr.)
- .gpx will be the default format from the factory and can be changed before flying, on the AHRS Utility App.

How to change format

- Open AHRS Utility
- Tap on the **Device Config** tab.
- Find **Recording File Format**.
- Tap on **Select**, and choose desired format.
- Press **Apply**
- Reset iLevel (turn OFF, wait 10 seconds, turn back ON)



Data Recording (SD CARD)

How to change Callsign:

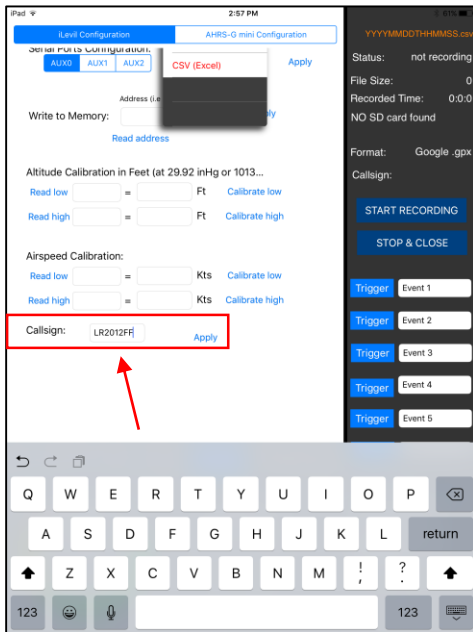
- Open AHRS Utility
- Tap on the **Device Config** tab.
- Scroll down to find **Callsign**.
- Tap and type desired Callsign
- Press **Apply**

How to use Triggers:

Triggers are for use while recording in .csv format. These can be used to mark a specific event during flight for future reference, while reviewing in spreadsheet.

NOTE:

- .gps – Google Earth, Cloud Ahoy, Ect.
- .fdr – X Plane Flight Simulator
- .csv – Microsoft Excel (ASCII file)



Helpful Tips

- If you encounter WiFi connection problems, try resetting the tablet's WiFi (disable/enable)
- If using Apple devices, you may use our free AHRS Utility App to see battery percent, GPS signal power, ADS-B diagnostics etc.
- Do Not switch the iLevel ON/OFF button swiftly when resetting power to the iLevel.
- When turning OFF the iLevel3, wait for it to complete the shut down sequence.
- Make sure the LEDs go OFF before turning iLevel ON again.
- In most locations, it is not possible to receive ADS-B information from ground towers unless you are airborne (typically above 2000 feet) with line of sight to the tower.
- The internal AHRS has a max rate of turn of 300 deg/sec.

Most likely you will exceed this limit (or "tumble" it) when playing with the iLevel in your hands.

If this is the case, and the AHRS did not recover, you may "tumble" it again, and set it on a level surface. It will recover within 4 sec.

Warranty

Levil warrants this product to the original purchaser to be free from defects in material and workmanship for a period of one year from the date of the original purchase. The following are not covered: software, damage resulting from accident, neglect, misuse, improper voltage supply or failure to follow operational guidelines supplied with this product.

Extended warranty is available for purchase on our website
Please register your product online at: www.aviation.levil.com