



ADL150(B) ADL190 ADL200

User and Installation Manual

Version 4.10

31.05.2024

1 Version History

Version 0.90 published 14.08.2018
Version 1.00 published 14.11.2018
Version 2.00 published 25.10.2019
Version 3.00 published 27.03.2020
Version 4.00 published 06.03.2023
Version 4.10 published 31.05.2024

2 Page Index

This manual contains numbered pages 1 to 38.

3 Emergency procedures

If you suspect any malfunction of the ADL150(B)/190/200 or interference with other aircraft systems, deactivate the device by pulling / deactivating the aircraft circuit breaker for the device or pulling the cigarette lighter plug, whichever is applicable. Do not reactivate the device until the problem has been investigated and resolved on the ground.

In case of a generator failure or similar situation requiring electric load shedding, deactivate the ADL190/200 by pulling / deactivating the aircraft circuit breaker for the device or pulling the cigarette lighter plug, whichever is applicable.

4 AHRS Warning

The ADL190/200 comes with a non certified experimental AHRS. THIS AHRS IS NOT DESIGNED OR SUITABLE TO CONDUCT ANY IFR/IMC FLIGHT. IT IS DESIGNED FOR ENTERTAINMENT PURPOSES ONLY, DRIVING SYNTHETIC VISION FEATURES IN SUITABLE iPad APPS AND SIMILAR.

DO NEVER FLY THE AIRCRAFT BASED ON THE ADL190/200 AHRS! USE ONLY CERTIFIED INSTRUMENTS FOR THIS TASK.

5 ADS-B Traffic Warning

The ADL190/200 comes with a non certified 1090 MHz ADS-B receiver. Not all aircraft are broadcasting 1090 MHz ABS-B and the non certified nature of the ADL190/200 means that due to antenna installation etc. it could even miss signals from aircraft broadcasting ADS-B. **NEVER RELY ON THE ADL190/200 FOR COLLISION AVOIDANCE!**

6 Weather Warning

While we do everything we can to ensure quality, the ADL150(B)/190/200 devices might not work at any time. In addition the system may display false information. **NEVER PENETRATE WEATHER BASED ON THE INFORMATION PROVIDED BY THE ADL150(B)/190/200** This information is for situational awareness only. The device

features a GPS moving map system. This system is designed to display the aircraft position in relation to the weather data. **THE ADL150B(B)/190/200 IS NOT SUITABLE AS A MEANS OF PRIMARY NAVIGATION.** Especially the build in database is not updated in a regular aviation cycle. It is also not maintained to the standards of certified aviation databases

7 General Description ADL150(B) / ADL190 / ADL200

The ADL200 is a satellite weather receiver with additional 4G/LTE, ADS-B 1090 MHz traffic and AHRS. The 4G/LTE link is used in order to reduce satellite transmission costs when flying slow and low enough to get a connection

The ADL190 is a medium cost version of the ADL200 without the 4G/LTE module. Other features are identical to the ADL200. The ADL190 serial #1400 and up running firmware 9.20 or later has been enabled to output wireless FIS-B signal directly while all other devices have to be combined with an ADLS1G extension box for this purpose.

The ADL150(B) is a lower cost version of the ADL200 without the 4G/LTE, without AHRS and without ADS-B. All other features are identical. The ADL150 is the classic device and the ADL150B is a device produced later on with nearly identical characteristics. The ADL150B serial #1800 and up running firmware 9.52 or later have been enabled to output wireless FIS-B signal directly while all other devices have to be combined with an ADLS1G extension box for this purpose.

8 Certification ADL150(B)/190/200

The installation into many general aviation aircraft has been approved by the EASA under Minor Change number 10072228. For details:
https://golze.tech/minor_change.jsp

9 Disclaimer

The ADL150(B)/190/200 is provided as a non certified component. It is the sole responsibility of the user and installer to install and use it in a legal way. The device may stop working at any time. Do not undertake flights you would not undertake without the ADL150(B)/190/200.

10 The Iridium satellite service

Before you can use the ADL150(B)/190/200 you have to subscribe to one of our Iridium satellite service plans. Please login to the ADL customer portal to order the different service plans:

<https://golze.tech/login.jsp>

If you have no login yet, please contact us by email at mail@ing-golze.de.

PLEASE NOTE: The ADL150(B)/190/200 will show satellite signal even without an active satellite service plan and will even be able to transmit data. But this data will not be processed and the device will receive no answer.

11 Dimensions and Direct Mounting

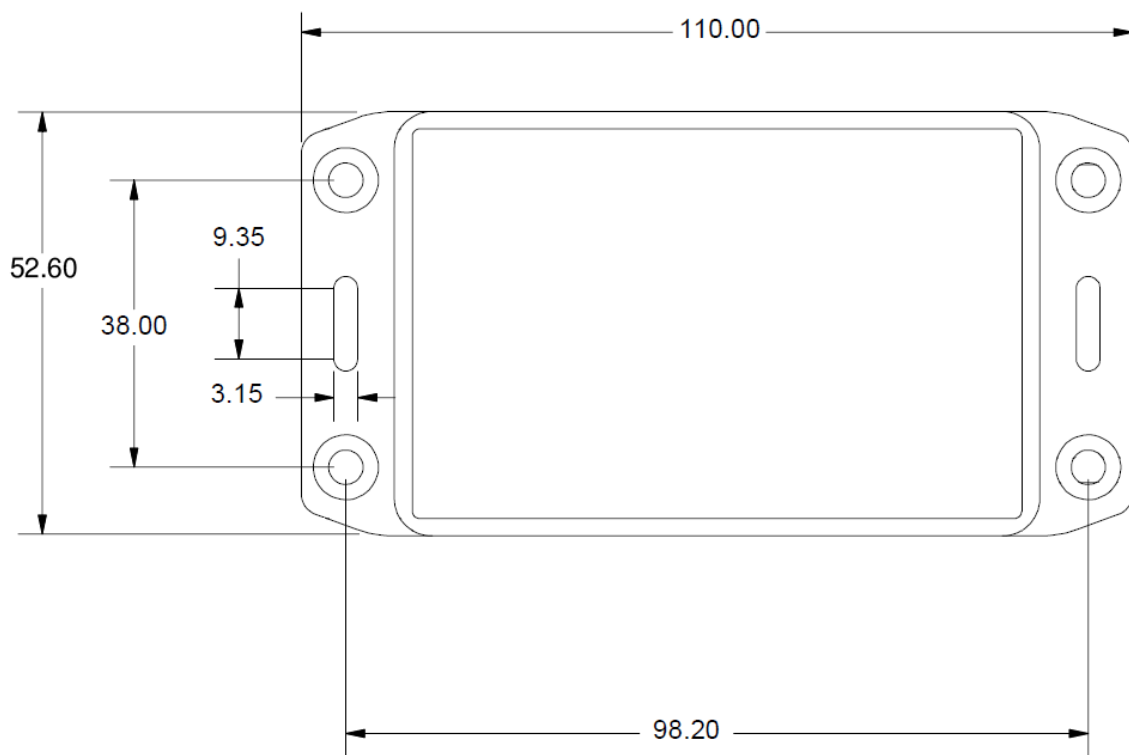


Figure 1 ADL150(B), ADL190 and ADL200 footprint (all measurements in millimeters)

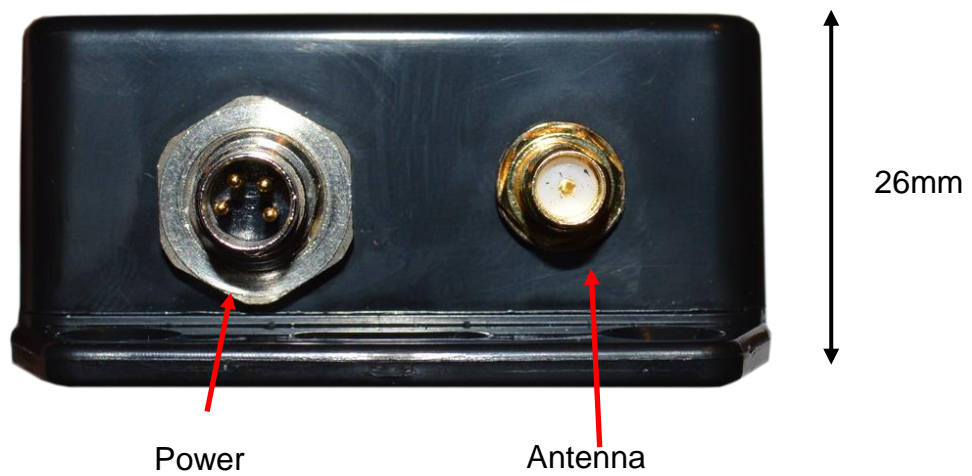


Figure 2 ADL150 side view

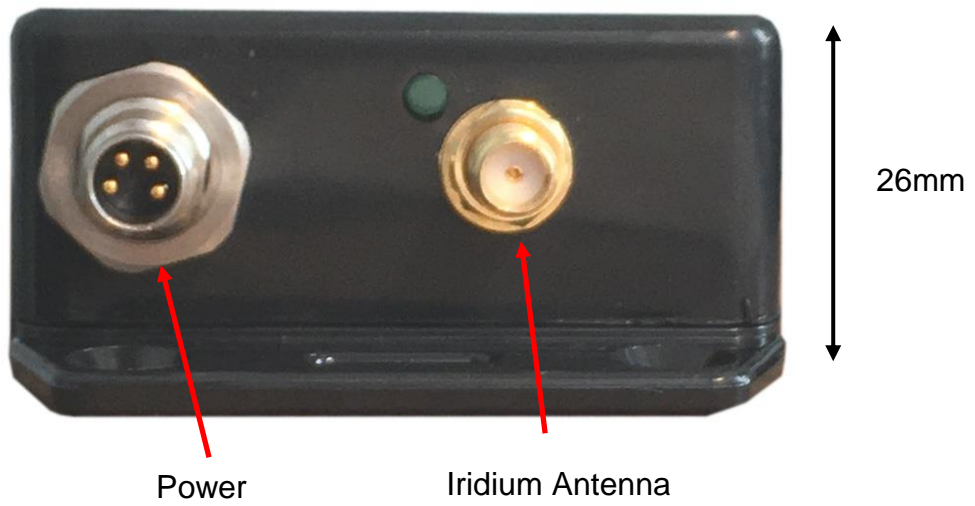


Figure 3 ADL150B pre serial #1800 side view

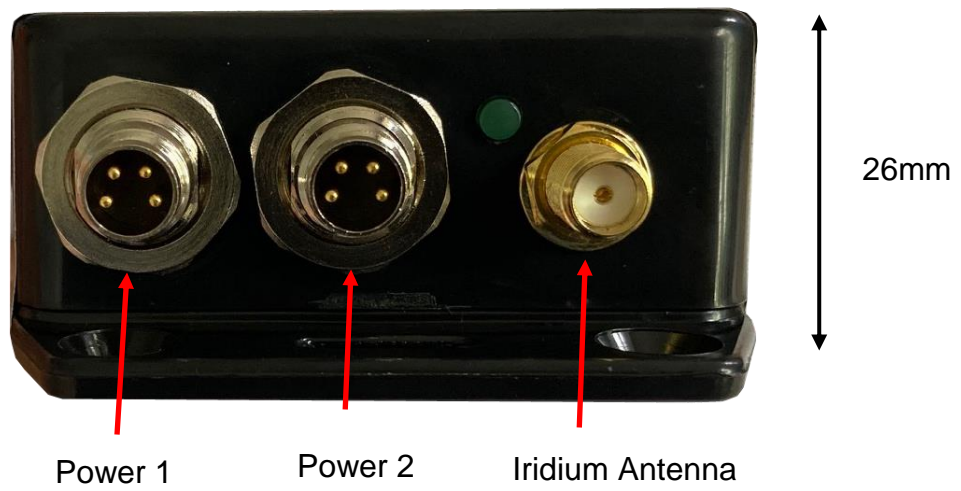


Figure 4 ADL150B serial #1800 and up side view

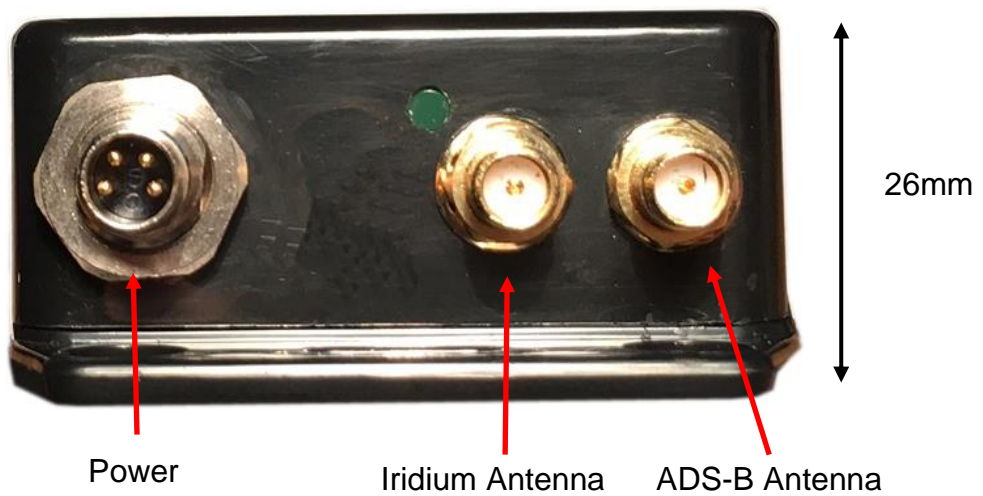


Figure 5 ADL190 side view

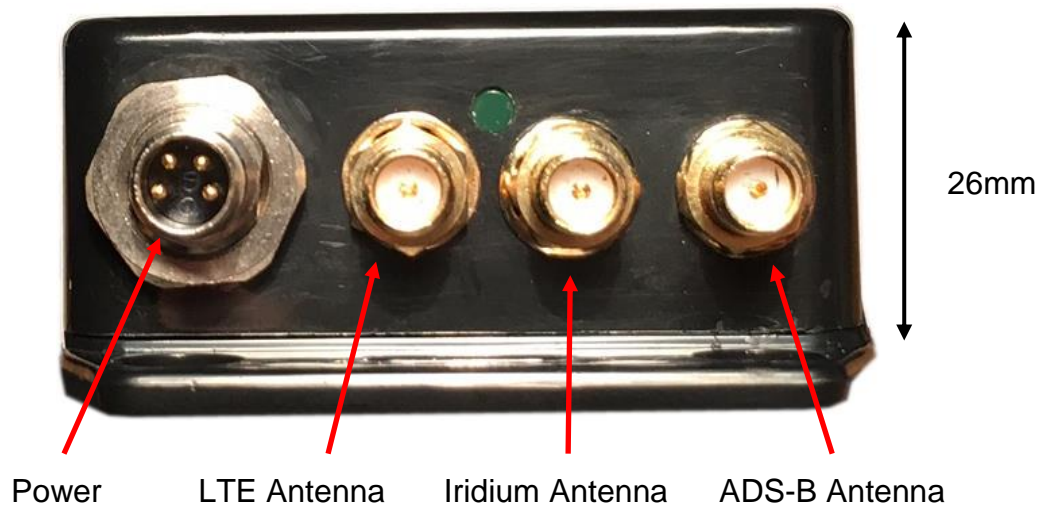


Figure 6 ADL200 side view

Attach the ADL150(B)/190/200 with four M4 screws or similar imperial mounting hardware. A big patch of high quality Velcro or two side adhesive tape on the bottom side of the enclosure usually also provides a solid fit. Pay attention not to interfere with any other aircraft systems like steering, wiring etc. Make sure the device is sufficiently attached so it can not become detached in flight.

12 Mounting Tray



Figure 7 ADL150(B)/190/200 mounting tray

A spring loaded mounting tray is available for the ADL150(B)/190/200. Whenever possible try to use it as it makes installation much easier. Please use M4 countersunk screws or equivalent imperial hardware. An overall of four screws is sufficient but the tray provides more positions to accommodate different installation situations.

13 AHRS Mounting Considerations

The ADL190/200 contains an AHRS which can sense the attitude of the aircraft. Therefore a firm connection between the ADL190/200 and the airframe is required. Attaching it to any moving parts like seatbacks and similar will interfere with the AHRS. The ADL190/200 AHRS can later be calibrated, thus it can be installed in any possible orientation as long as it does not move in relation to the airframe.

14 Power Connector

The ADL200 requires four connections, the power supply and three antennas. The ADL190 requires three connections the power supply and two antennas. The ADL150(B) requires only two connection, the power supply and the Iridium antenna. The device has to be connected to a continuous power source. It will accept 7-36 Volt and consumes about 5 Watt. The ADL150(B)/190/200 should be protected externally, typically by a 1 Amp circuit breaker. This circuit breaker should also be accessible in flight, so the crew can deactivate the ADL150(B)/190/200 if any malfunction is suspected.

As an alternative a portable cigarette lighter power cable is available. Those power cables are identical to ADL140 power cables. The picture below shows such a cable. The normal length is 2m and there is a side socket for iPad charging and other parallel applications. On demand we can also manufacture longer cables and other special solutions for 110V supplies etc.



Figure 8 Cigarette lighter cable for ADL140/150(B)/190/200

The green LED on the ADL150(B)/190/200 enclosure will illuminate if power is supplied.

Pin 1: VCC 7V – 36V DC

Pin 2: RS232 IN

Pin 3: GND

Pin 4: RS232 OUT



Looking at ADL200

Figure 9 ADL150(B)/190/200 power connector pins

The connector on the ADL150(B)/190/200 is called "RSMHL 4" and a matching connector for installation purposes would be "RKMCK 4" from Belden or an equivalent from another manufacturer.



Figure 10 RKMCK 4 connector

15 Wired RS232 Interconnect - Hardware

The ADL150(B)/190/200 features a bidirectional RS232 port. When running firmware 8.40 or later the baud rate can be configured using the ADLConnect app on the Config page.

The ADL150(B)/190/200 by itself can only run one baud rate at a time on its RS232 input and output. So if either two inputs are required simultaneously or input and output should run at different baud rates an extension box is required. In that case there are two options: ADLRS232 or ADLS1G.

ADL150B serial #1800 and up feature a second RS232 port. Port 1 has just like any other of the ADL150(B)/190/200 devices. The second RS232 port has got an input which is fixed to 9600 baud. This is usually used for Aviation data NMEA flight plan input. The output of this second RS232 is physically hard wired to the output of the first RS232 port and thus follow its configuration.

15.1 ADLRS232 - Optional RS232 Combiner

An optional RS232 combiner type ADLRS232 is available. It looks like shown below. The purpose of this device is first to allow RS232 input at 9600 baud 8N1 while outputting RS232 at 115200 baud 8N1. This feature will often be required because the Aviation Data output of third party devices (the typical Avidyne IFD440/540 interconnect) is fixed at 9600 baud while their RS232 Capstone/GDL90 input is fixed at 115200.

ADL150B serial #1800 and up are already equipped with a second RS232 port so this combiner will usually not be required.

In addition the RS232 combiner allows combining two RS232 inputs. Early versions have fixed inputs baud rates at 9600 and 115200 baud. Later versions have auto detection 9600 to 115200 baud on both input ports. Please look at the label on the ADLRS232 you are using to determine which version you have.

Remember the RS232 output at both ports will be 115200 baud and the connection to the ADL150(B)/190/200 will also run at 115200 baud.

The classic application is to connect an aviation data / NMEA flight plan source (9600 baud) in parallel to a FLARM device like the AT-1 (typically 115200 baud).



Figure 11 ADLRS232

15.2 ADLS1G – Optional Multi Purpose Extension Box

The ADLS1G box provides the exact same functions as the ADLRS232 and behaves in the same way as the later ADLRS232 with automatic input baud rate detection but adds a wireless FIS-B link on top. This wireless link can be used to communicate with many panel mounted avionics to display a weather layer (details see below). The ADL190 serial #1400 and up and the ADL150B serial #1800 and up have got this FIS-B link already installed but all other devices can be retrofitted with this feature by adding the ADLS1G.

16 Wired Interconnect – Input Protocols

The ADL150(B)/190/200 can read the following data protocols on its serial port, either directly or through the ADLRS232 or ADLS1G:

- Aviation Flight Plan Input
- NMEA Flight Plan Input
- FLARM Traffic Input
- GDL90 Traffic Input

17 Aviation Flight Plan Input

The ADL150(B)/190/200 will read current flight plan information from panel mount GPS devices in “Aviation” format. Some sources will offer two versions of the Aviation format. For example when using the GNS430 the “Aviation” format has to be select and not the “Aviation no alt” format. All sources we have seen so far will deliver this data at 9600 baud. So when connecting the RS232 input directly to the ADL device select 9600 baud on the Config page of the ADLConnect app. When running the signal through the ADLRS232 or ADLS1G select 115200 baud on the Config page. Make sure to connect the 9600 enabled port on early ADLRS232. Later ones will auto detect the

baud rate. For ADL150B serial #1800 and up connecting the second RS232 input is recommended as this is fixed to 9600 baud anyway. Experience has shown that most sources can only output 30 waypoints even though the GPS itself and the ADL device can handle longer flight plans.

18 NMEA Flight Plan Input

Traditionally certified GPS devices tend to output flight plan information in “Aviation” format while devices from the non certified market (Garmin GPS695 and many more) tend to output the flight plan in NMEA format. This usually happens at the same 9600 baud as the Aviation format described above. The ADL device will detect the format supplied automatically.

When running firmware up to version 9.50 on the ADL device it will be able to read NMEA formatted coordinates with 4 decimals only. Starting from firmware 9.52 the ADL device firmware can read NMEA coordinates with all numbers of decimals.

19 FLARM Traffic Input

The ADL devices can read FLARM formatted traffic data (which is a special flavour of the NMEA protocol). Not all FLARM devices are compatible, the NEMA stream has to contain the \$PFLAA data sentence. Most modern FLARM receivers will support this while some older ones do not.

The following models have been tested successfully:

- Air Avionics AT-1
- LX Power Mouse
- LX PowerFLARM Eagle

19.1 Air Avionics AT-1

On the AT-1 please configure the RS232 output connected to the ADL (beware there are 3 so make sure you configure the right one) as follows using the WiFi browser interface (<http://192.168.1.1>) in advanced mode:

```
RS-232 data port x Flarm Traffic: ON
RS-232 data port x ADS-B Traffic: ON
RS-232 data port x Range [m]: 999000
RS-232 data port x Vertical Range [m]: 99000
RS-232 data port x Non-Bearing Range [m]: 999000
RS-232 data port x Non-Bearing Vertical Range [m]: 99000
RS-232 data port x Output: AIR TAFFIC PROTOCOL
RS-232 data port x RS-232 Data Rate: 115200
```

19.2 LX Power Mouse

The Power Mouse has been tested successfully as well. This device will run at a baud rate of 57600 baud maximum. It is compatible with all ADLRS232 supporting automatic baud rate detection and ADLS1G and can be connected directly to the ADL device if it is configured to 115200 baud.

20 GDL90 Traffic Input

The ADL devices can also read traffic information in GDL90 format supplied on the RS232 port. The baud rate will depend on the sending device. The ADL device will again detect the data format automatically. But usually using the NMEA / FLARM protocol will work better if available. We have seen cases where an Lynx GT-9000 was used as a traffic source and this device only supports the GDL90 format. The ADL device will only read traffic information from a GDL90 source, not weather and other data that might be contained in the incoming GDL90 data stream (but it can output such a stream with weather embedded, see below).

21 Wired Interconnect – GDL90 Output

The only wired RS232 output format supported by the ADL devices is the GDL90 format. This signal will contain basic GDL90 status message like the heartbeat and GPS information. Further traffic and weather data is sent. GDL90 is also called “Cabstone” by some vendors.

21.1 Avidyne IFD440/540, EX5000

The typical application is to feed this GDL90 RS232 data stream either directly into a compatible panel mount device which will then read the data as if it came from an ADS-B in source and display the data. Displays capable of this type of installation are primarily the Avidyne IFD440/540 and Avidyne EX5000. Please note on the EX5000 software 8.2.2 or later will have to be installed for this feature to work. Configure the ADL device RS232 port to 115200 baud using the Config page of the ADLConnect app. The input protocol to be configured on the Avidyne side is “Cabstone HS”. Those settings are the same no matter if the connection is done directly to the ADL device or through the ADLRS232 or ADLS1G.

We suggest setting the ADL RS232 GDL90 output to “Avidyne” as this will slightly adapt the data stream for a more user friendly data display on those devices.

Please note if you operate multiple IFD440/540 and EX5000 you can hard wire the output to the inputs on all of those devices at the same time to display the weather data on all of them simultaneously. Last that we checked the Avidyne devices did not share weather data among them, so all devices had to be connected individually.

21.2 ADL190 or ADLS1G Sending Wireless Data to GTN650/750, G500/G600/G1000, G3X etc.

The second possible receiver for the GDL90 formatted data on the RS232 output of the ADL device is the ADLS1G extension box. Set the RS232 baud rate to 115200 baud and enable the RS232 GDL90 output.

The ADLS1G will then receive the weather and traffic data and forward it in a wireless manner to the compatible displays as so called “FIS-B” data. It is important to make sure the receiving installation is able to receive FIS-B ADS-B in.

ADL190 devices with serial number #1400 and up have this feature already integrated. ADL150B devices with serial number #1800 and up have this feature integrated as well.

This is a list of the typical compatible receivers:

- Garmin GTX345 (and all its versions like GTX345R, GTX45)
- Garmin GNX375

- Garmin GDL39 (and all its versions like GDL39R)
- Garmin GDL50 (and all its versions like GDL50R)
- Garmin GDL52 (and all its versions like GDL52R)
- Garmin GDL88
- Lynx NGT-9000

The display devices able to display the data are (among others):

- Garmin GTN650/750 (and all its versions)
- Garmin G500/G600/G1000/G3000
- Garmin G3X (and its versions)
- Garmin GPS695 and many more Garmin portables
- Avidyne IFD440/540, EX5000 but please note those can usually be connected in an easier way with a direct RS232 link (see above)

According to the device type and capabilities set the ADL RS232 GDL90 to “Avidyne” “Garmin Basic”, “Garmin Full”. The difference between Garmin Basic and Garmin Full is that Basic only contains METAR/TAF and radar while full adds satellite and lightning data. Not all displays can process those, so choosing basic can speed up processing for displays not capable of showing more data anyway.

Regarding traffic the default configuration is to forward over this link only FALRM traffic known to the ADL device. The idea is that the ADS-B receiver will usually receive its own traffic data directly from other aircraft. So supplying this same data to it again on a second path might lead to “shadow targets”. If you need to change this configuration in special circumstances please contact us.

21.3 Customizing the GDL90 Data Stream

Usually you simply activate the data stream on the Config page of the ADLConnect app. But for some special circumstances you can customize the data stream. Then you can enable and disable certain data blocks separately. The meanings of those are:

GPS: Sends the basic GDL90 heartbeat and GPS data. Omitting this data will not do any harm when operating the ADLS1G but in a direct RS232 connection to an Avidyne IFD440/540/EX5000 etc. disabling this data will produce error messages.

AI: Attitude indicator information. On the RS232 we currently do not know about any displays processing this data but for compatibility with the WiFi GDL90 interface and future applications it is contained anyway.

TF: Traffic. Disabling this data block will block any GDL90 transmission of ADS-B or FLARM traffic data known to the ADL device.

360: No bearing traffic. Disabling this feature will make the ADL device stop sending data about pure transponder targets with unknown exact position. If enabled this data will generate a ring of 6 artificial targets around the current position to enable display on all devices.

WX: Weather. This switches on and off the transmission of all weather data known to the ADL device.

22 Wireless Interconnect – FIS-B

As detailed above in the chapter “ADL190 or ADLS1G Sending Wireless Data to GTN650/750, G500/G600/G1000, G3X etc” the ADL system can communicate wireless with a compatible receiver and transmit traffic and weather data.

23 Wireless Interconnect – WiFi to ADLConnect app

The central tool to monitor and control the ADL devices is the ADLConnect iOS or Android app. Please download this app from the Apple app or Google Play Store.

Then make sure you connect the mobile device to the WiFi network called “ADL Connect”. We recommend you terminate any other apps not used in flight running in the background. Also setting a manual IP address in the range of 192.168.1.20 to 192.168.1.254 (set a different one on each device), subnet mask 255.255.255.0 and router/gateway empty can improve WiFi performance.

Start the ADLConnect app and make sure communication to the ADL device is established and maintained.

Please look at our separate documentation and tutorial videos regarding the detailed operation of the ADLConnect app.

24 Wireless Interconnect – WiFi GDL90

Besides the communication to the ADLConnect app WiFi is used to distribute a GDL90 formatted data stream to compatible apps. The most popular ones being ForeFlight, SkyDemon and Garmin Pilot. Make sure you have the WiFi GDL90 enabled on the Config page of the ADLConnect app. Please also select there the app you are actually using as this slightly adapts the data stream to the app you are using for an even better user experience.

Regarding the details on how to display the weather data in those popular app please look at our separate documentation available for each app interconnect.

Lately Avidyne has upgraded their IFD440/540 devices so they can also receive GDL90 formatted data via WiFi besides the option to deliver this data using the RS232 wired interface. Please look at the Avidyne documentation for details.

25 Wireless Interconnect – WiFi Client Mode

In some configuration you want to combine your ADL device with another WiFi enables traffic device like a Sentry, Stratux, SkyEcho2 or similar. The procedure is to switch the ADL WiFi mode to “Client” and then configure the details of the WiFi to join. The ADL device will then boot up for 90 seconds in its normal WiFi mode (to give you a chance to make changes if needed) and then try to join the foreign WiFi as a client.

You then also connect your iPad (or iPhone, Android phone etc.) to this WiFi. The ADLConnect app should find the ADL device and communicate with it normally. Apps like ForeFlight, SkyDemon and Garmin Pilot will then receive the combined data stream from both GDL90 devices and display it. To avoid data mix up it is usually best to

disable at least the “GPS” part of the GDL90 data stream by selecting the “Custom” option for the WiFi GDL90 in the ADLConnect app. In most cases enabling just the WX (Weather) data block works best.

26 Interconnect Drawing without ADLRS232 or ADLS1G

The following drawing shows an interconnect situation without using the optional ADLRS232 or ADLS1G boxes. The antennas of the ADL device are not shown. For ADL150B #1800 and up using the port 2 also please refer to the separate drawing further below.

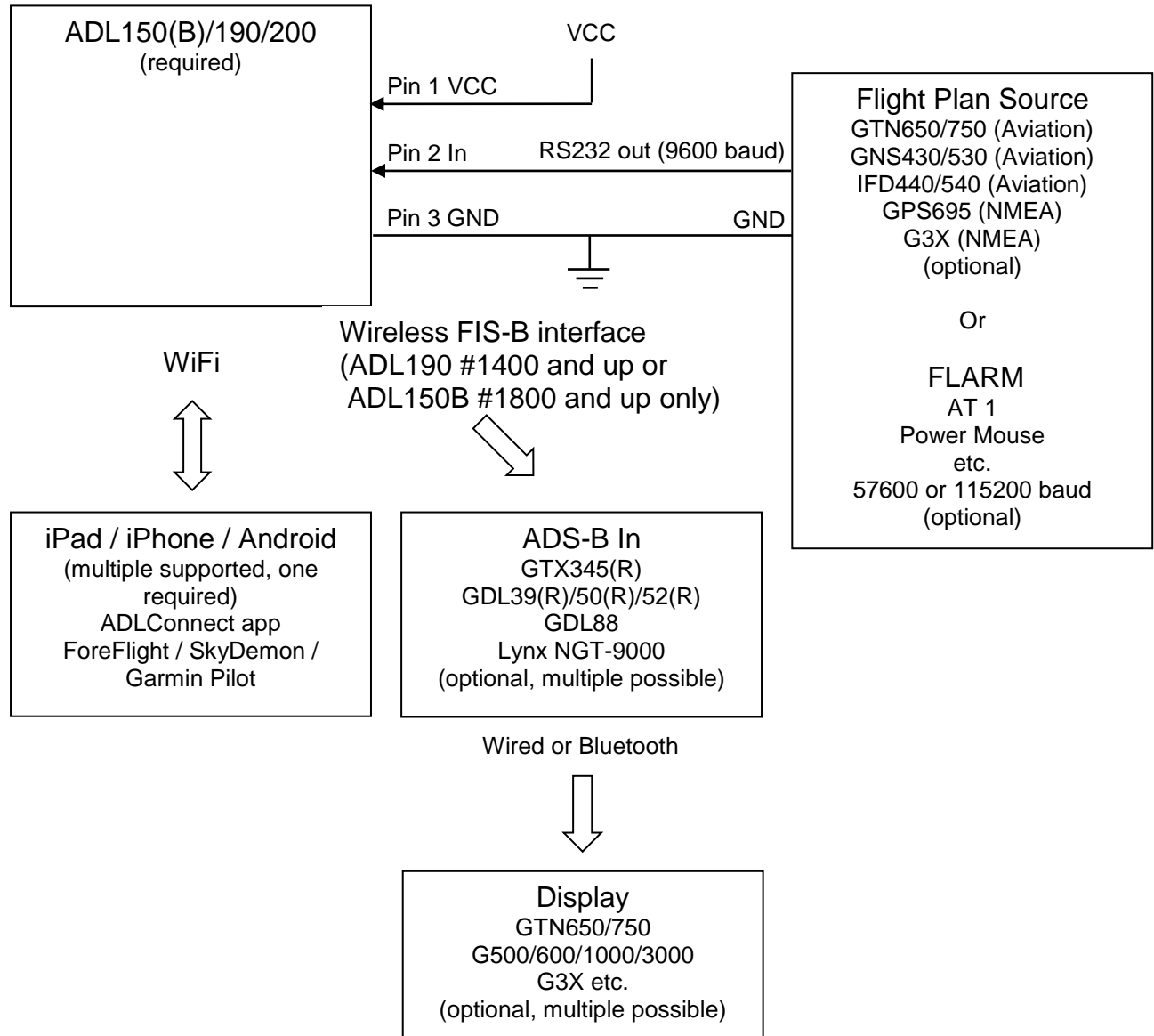


Figure 12 Interconnect Drawing without ADLRS232 or ADLS1G

27 Interconnect Drawing with ADLRS232 or ADLS1G

The drawing shows an interconnect situation with the optional ADLRS232 or ADLS1G (only one of those can be used at the same time). The antennas of the ADL device are not shown. For ADL150B #1800 and up please use the separate drawing further below.

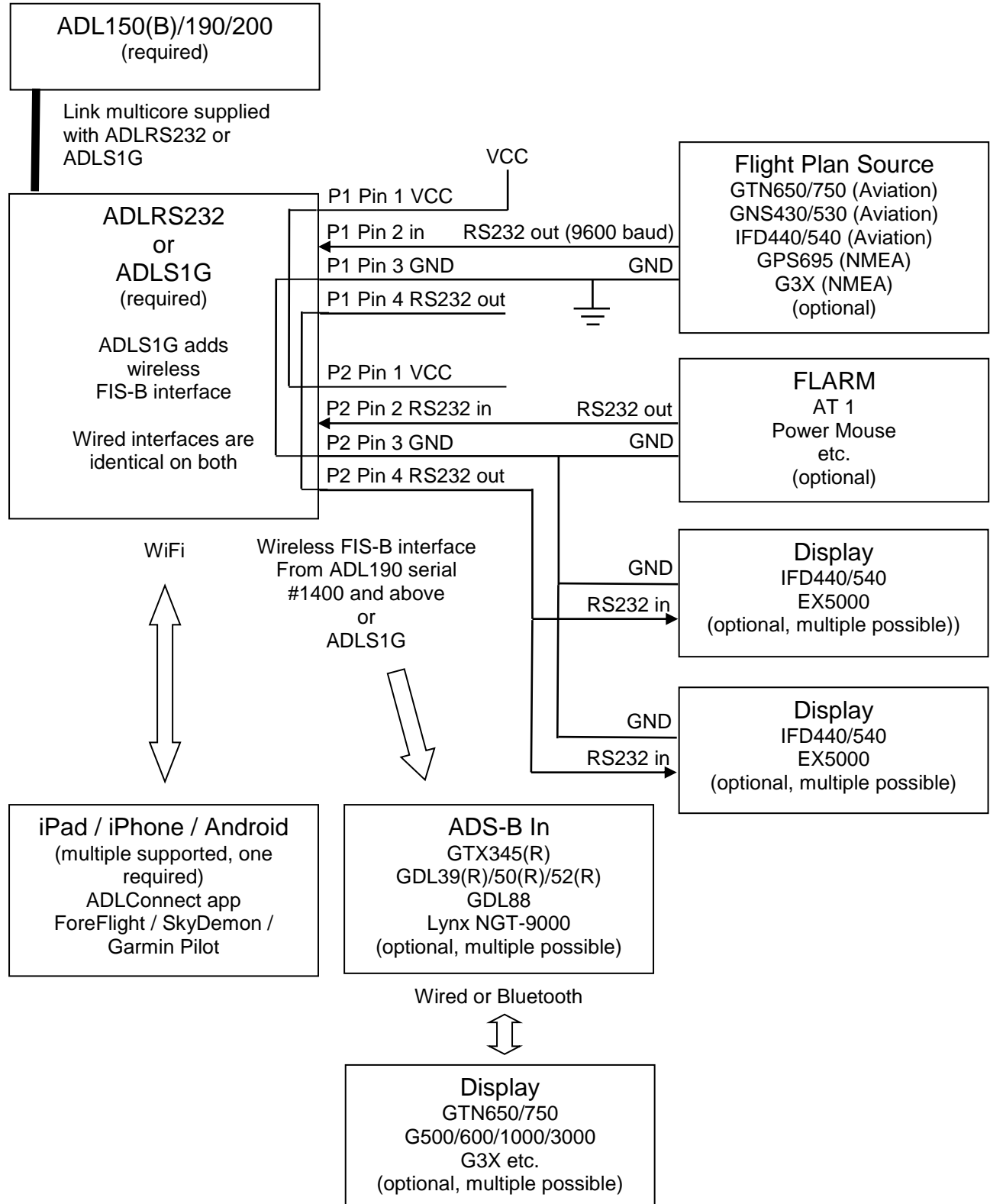


Figure 13 Interconnect Drawing with ADLRS232 or ADLS1G

28 Interconnect Drawing ADL150B serial #1800 and up

The drawing below shows an interconnect situation for the ADL150B using both ports. The Iridium antenna of the ADL150B device is not shown.

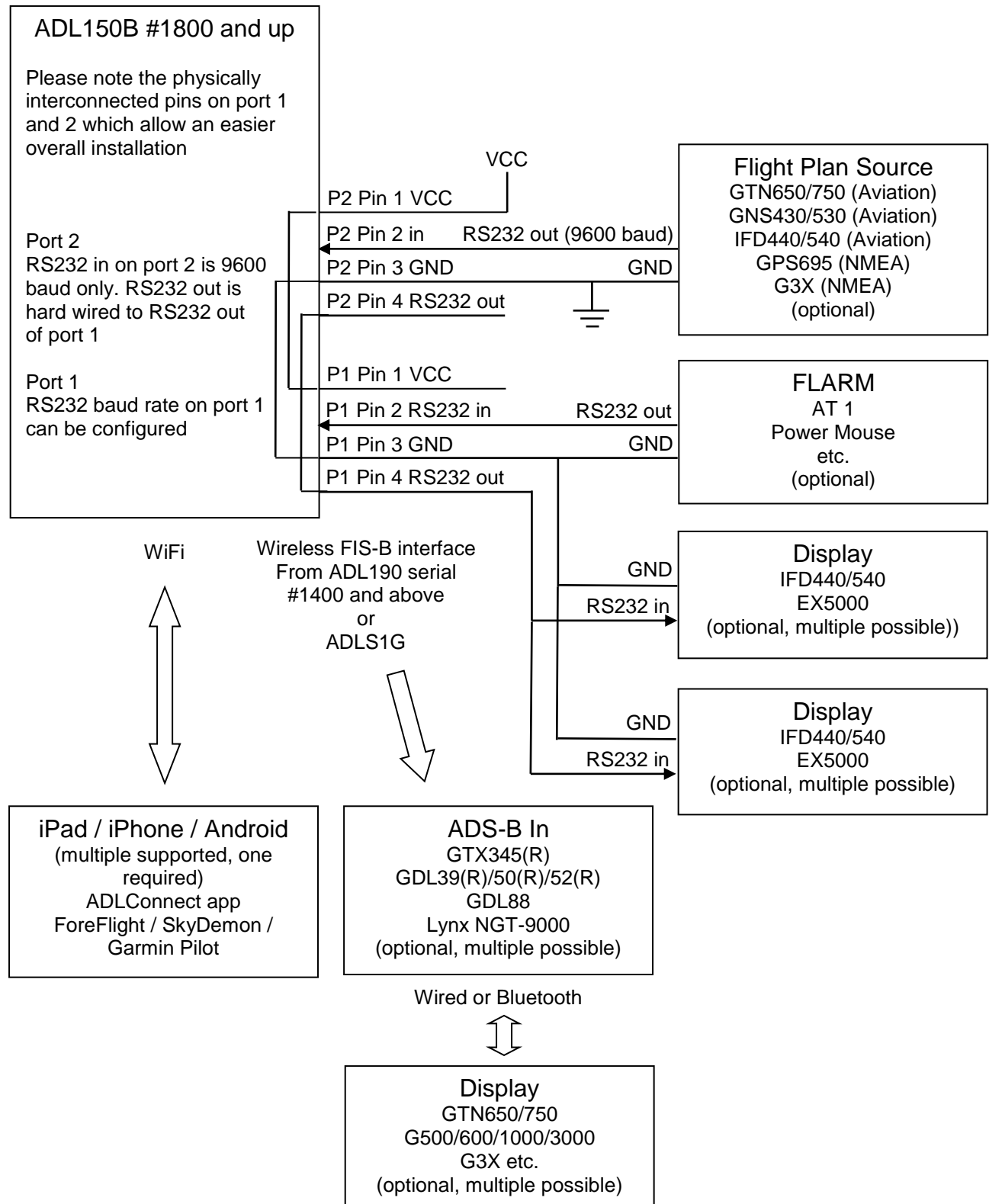


Figure 14 Interconnect Drawing with ADLRS232 or ADLS1G

29 Antennas - Do not confuse antenna types!

The ADL200 uses three antennas. One antenna for ADS-B, Iridium and LTE each. The ADS-B and LTE antennas are usually the same type but the Iridium antenna (middle connector) is different. **DO NOT CONNECT THE LTE/ADS-B ANTENNA TO THE IRIDIUM SOCKET. AS A CONSEQUENCE OF THE WRONG CONNECTION IN SOME RARE CASES WE HAVE SEEN DAMAGE TO THE DEVICE.**

The ADL190 uses two antennas only. One antenna for ADS-B and another one for Iridium. **ALSO FOR THE ADL190: DO NOT SWITCH THE ANTENNAS.**

The ADL150(B) uses only one Iridium antenna

30 LTE Antenna Considerations (ADL200 only)

The antenna supplied with the ADL200 looks similar to the one shown below:



Figure 15 LTE Antenna

As an alternative any other LTE wide band antenna can be used. The antenna must be designed for approximately 800MHz to 2GHz. The connector on the ADL200 is an SMA connector.

We suggest gluing this antenna vertically to the border of any cabin window. We have seen good results on side and front windows. Remember LTE is a means of satellite cost saving. Therefore a basic antenna installation is sufficient. Any advanced external LTE antennas could provide an advantage but would probably never pay off financially by saving enough satellite downloads.

31 Iridium Antenna

The antenna supplied with the ADL150(B)/190/200 looks similar to the one shown below:



Figure 16 Iridium Antenna

This is an Iridium patch antenna. Please note that it will radiate only upwards. Therefore the antenna should be placed with the flat side down as horizontally as possible. In most aircraft a location below the front window on the glare shield, all the way to the front, works well. The picture below shows the antenna in an aircraft in flight on the glare shield.



Figure 17 Iridium Antenna in Flight

If the aircraft is equipped with an external Iridium antenna that antenna can also be used for the ADL150(B)/190/200 Iridium link. It will probably provide a signal which is a bit better than the antenna on the glare shield. But usually the small advantage in signal quality will not justify the expensive installation of such an antenna if it is not already installed.

Avoid putting the antenna up side down. The rounded corners of the antenna must face upwards. Else the signal reception will be very poor.

Heated windshields will usually block the satellite signal even when the heating is turned off. In a similar way any conductive material like metal or carbon fiber placed over the antenna will block the signal.

32 ADS-B Antenna

The antenna supplied with the ADL190/200 looks similar to the one shown below:

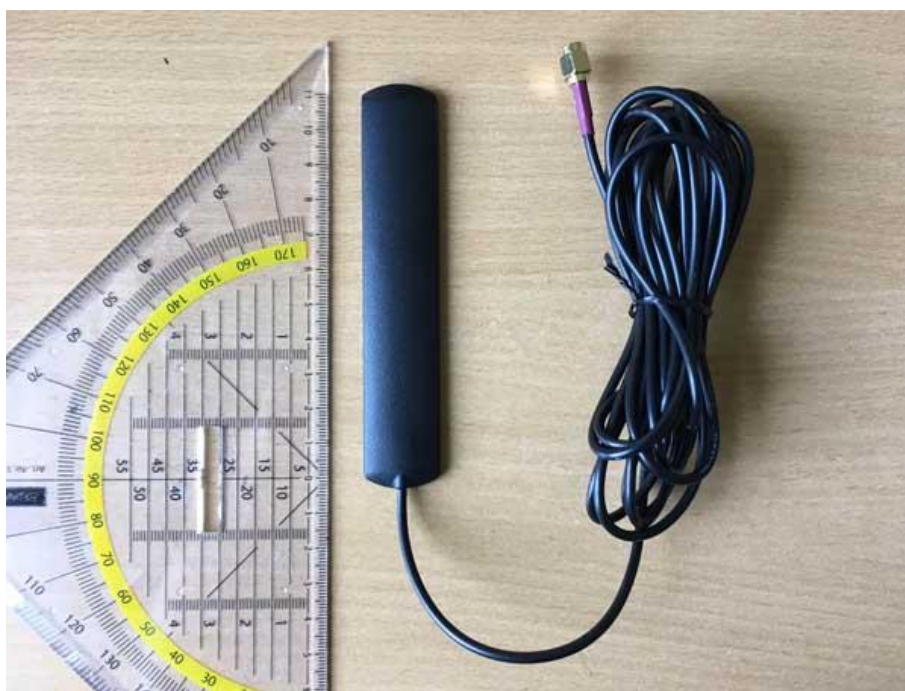


Figure 18 ADS-B Antenna

This is the same antennas used for 4G/LTE on the ADL200 but with a shorter cable. ADS-B signal reception is very sensitive to antenna and cable performance. If you have an antenna on the outside of the hull available, we recommend you use it. The supplied antenna usually works best when installed vertically in the cockpit area. The picture below shows the antenna attached to the corner of the front screen.



Figure 19 ADS-B Antenna Example

Please note that besides the antenna itself the quality and length of the cable plays a big role in ADS-B performance. Thus, shortening the ADS-B antenna cable as much as possible makes a significant difference. We can also assist you with shorter cables etc. if required. As a guideline the relatively thin RG174 cable on the supplied antenna works best if shorter than 1m. For more than 2m we recommend using much thicker cable like RG400 which has shown to work well over 6m and more.

33 Optional ADS-B Amplifier

If more ADS-B reception range is desired an ADS-B amplifier can be installed. Currently it is supplied with all ADL190/200 delivered. When using very early ADL190/200 you must check it is prepared to supply the required 3.3V to 5V to the amplifier. Devices with serial numbers above #0800 do all supply the voltage. For devices below this serial number you can check the voltage as shown in the following figure. If the device does not supply the 3.3V to 5V please send it to us and we will upgrade the device free of charge for you. To measure the amplifier supply power up the ADL190/200 device with the ADS-B antenna connector disconnected. Then measure the voltage between the inner pin and the outer ground. This should be close to 3.3V or 5V if the device is prepared to run the optional amplifier.

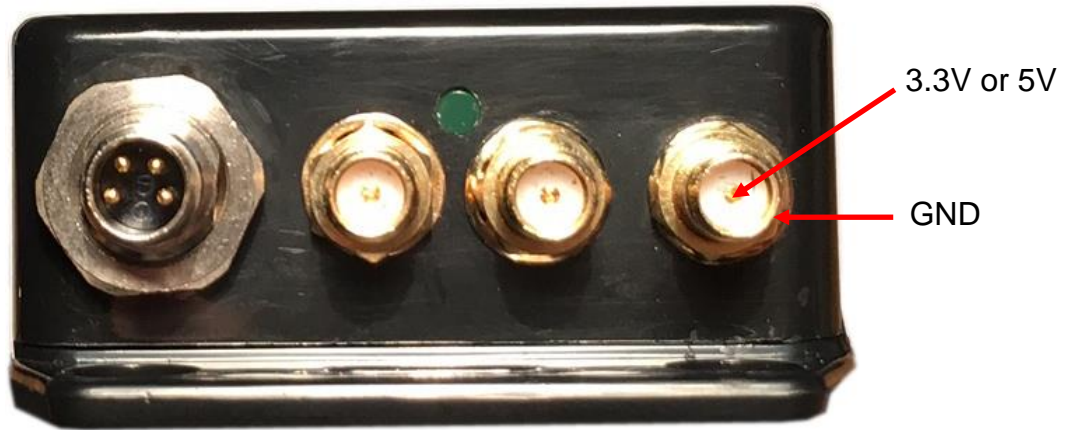


Figure 20 Measuring the 5V supply for the ADS-B amplifier on the ADL190/200 device ADS-B port

The amplifier looks as shown in the following figure. Do not confuse the two sides. They both have a SMA connectors but the amplifier only works when connected as shown in the figure. The connection marked "OUT +5V" has to be connected to the ADS-B input of the ADL190/200 device. The "IN" connector is connected to the ADS-B antenna. Besides the amplifier a cable regular SMA to regular SMA connector will be required. For short cable runs RG174 cable is acceptable. For longer cable runs lower loss cable like RG400 will be required. Place the amplifier as close as practicable to the antenna.



Figure 21 Amplifier Type "ADS-B 1090 MHz LNA"

34 ADL150(B) Antenna Drawing

The drawing shows the ADL150(B) with its antenna connected. All connectors are SMA and all connecting cables are coaxial cables.

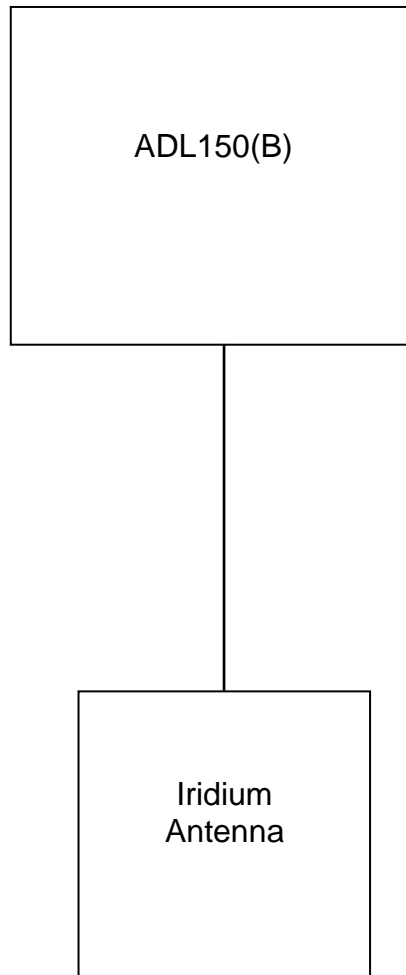


Figure 22 ADL200 with antennas

35 ADL190 Antenna Drawing

The drawing shows the ADL190 with its antennas connected. All connectors are SMA and all connecting cables are coaxial cables.

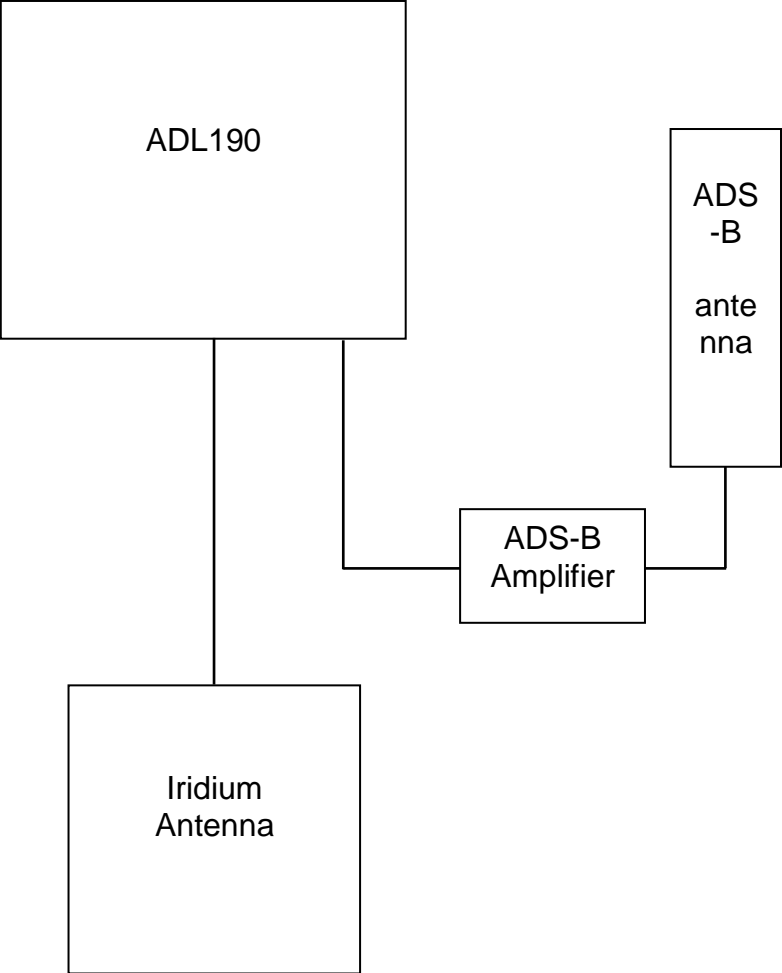


Figure 23 ADL200 with antennas

36 ADL200 Antenna Drawing

The drawing shows the ADL200 with its antennas connected. All connectors are SMA and all connecting cables are coaxial cables.

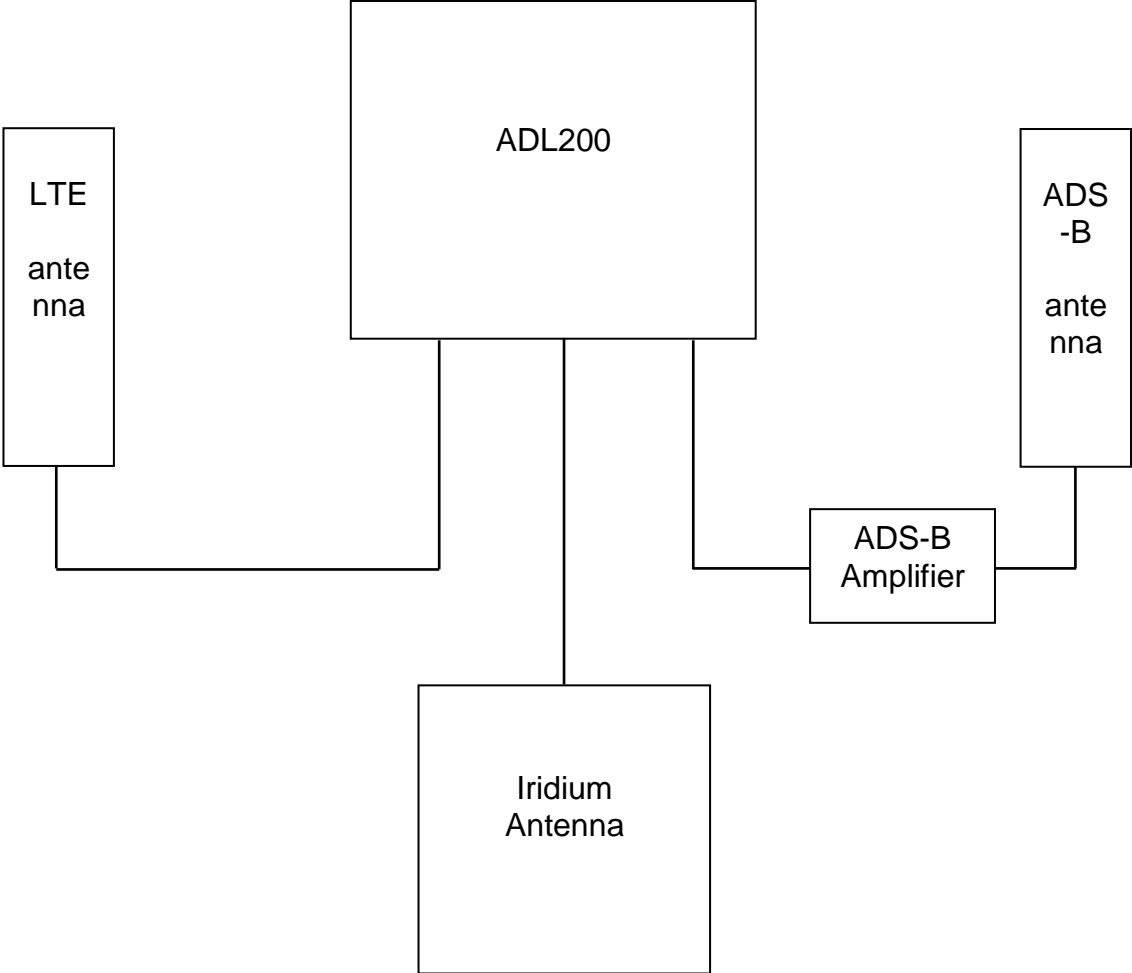


Figure 24 ADL200 with antennas

37 Connecting your iPad/iPhone/Android device to the ADL150(B)/190/200

After powering up the ADL device you have to connect your portable device to the WI-FI access point provided by the ADL device. Go to the settings screen of your device. We show this step for the Apple iPad but other devices will work in a similar way. Choose “Wi-Fi” on the left side. Then on the right side you will see the network “ADL Connect”. Choose this network and make sure the iPad really connects to the ADL Connect wireless network.



Figure 25 iPad Wi-Fi Settings

Please ignore any warnings about this network been not connected to the Internet or its security. This is a means of local communication between your table/phone and the ADL device only without a network type link to the Internet or similar.

We suggest you disable any WiFi privacy options. This assigns a random MAC address to your device which we have seen to cause issues.

38 Installing the ADLConnect App

Before you can start to use the ADL with your mobile device, you have to install the ADLConnect iPad app. On Apple devices open the app store and search for “ADLConnect” and install the free app. On Android devices please open the Google play store and also search for “ADLConnect”.

39 Starting the ADLConnect app

Start the ADLConnect app. The top status bar will indicate if the app is connected to your ADL device. When connected the Iridium, GPS and LTE signal quality will be displayed in the top left corner.

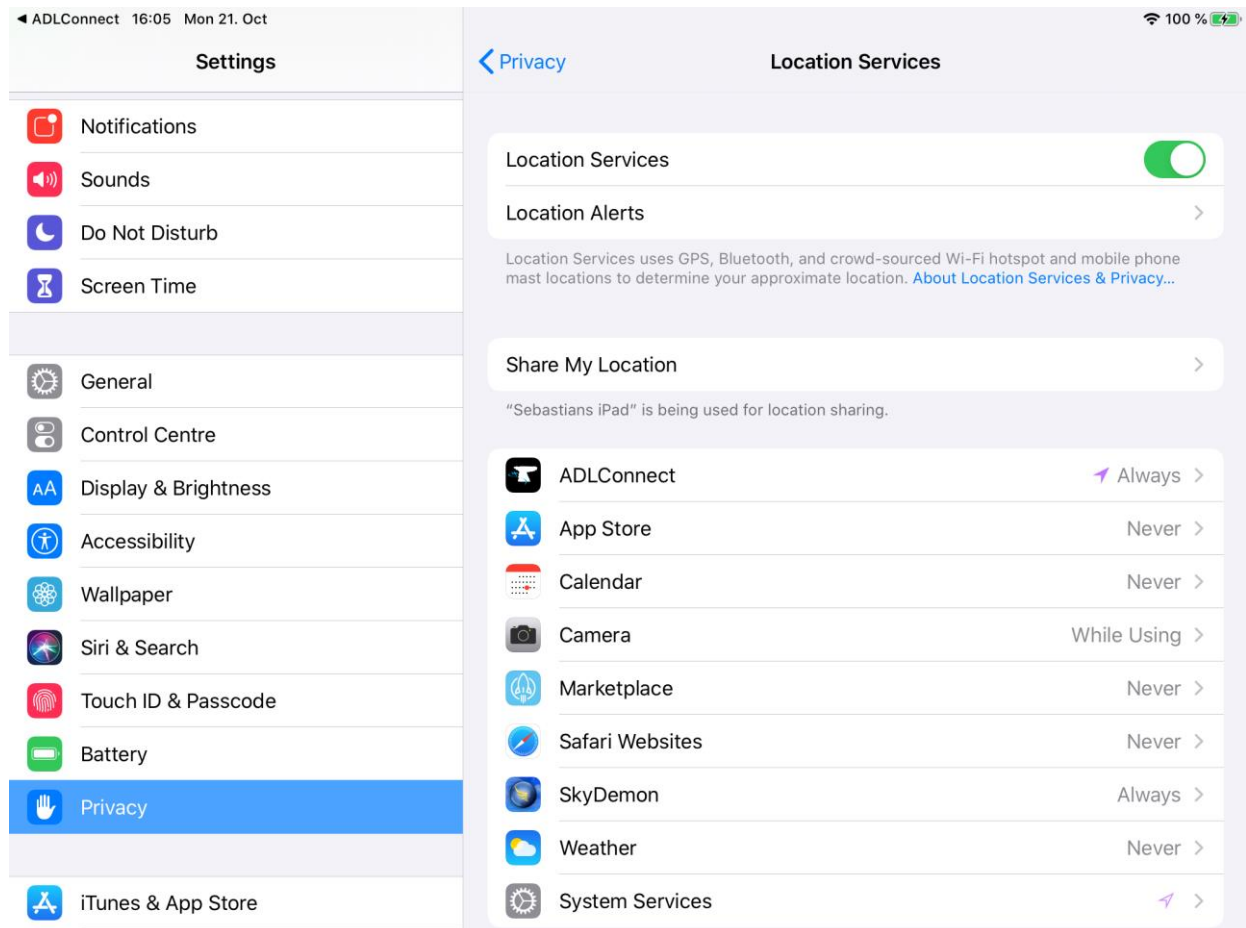
If the app displays “Internet mode”, "WWW" or "Offline" in the top status bar, it is not properly connected to the ADL200. In this case please check your WiFi settings.



Figure 26 iPad ADLConnect user interface

40 Important ADLConnect Privacy Setting

When running iOS 13 or later it is essential to configure the location privacy setting properly. The setting should be as shown in the following screenshot. Enable the location services and authorize ADLConnect to use this information "Always". ADLConnect will only use this privilege when connected to an ADL device, else it will not use your location. But disabling the location can cause severe issues regarding the WiFi communication between the ADLConnect app and the ADL device.



41 Entering Your Login Details

When starting for the first time the ADLConnect app will ask you for your email and password. This data is provided by us once we register your device to you and email to you in an automatic welcome email.

Please note: In the distant past a "Deutsche Wetterdienst login" was required. This is no longer the case.

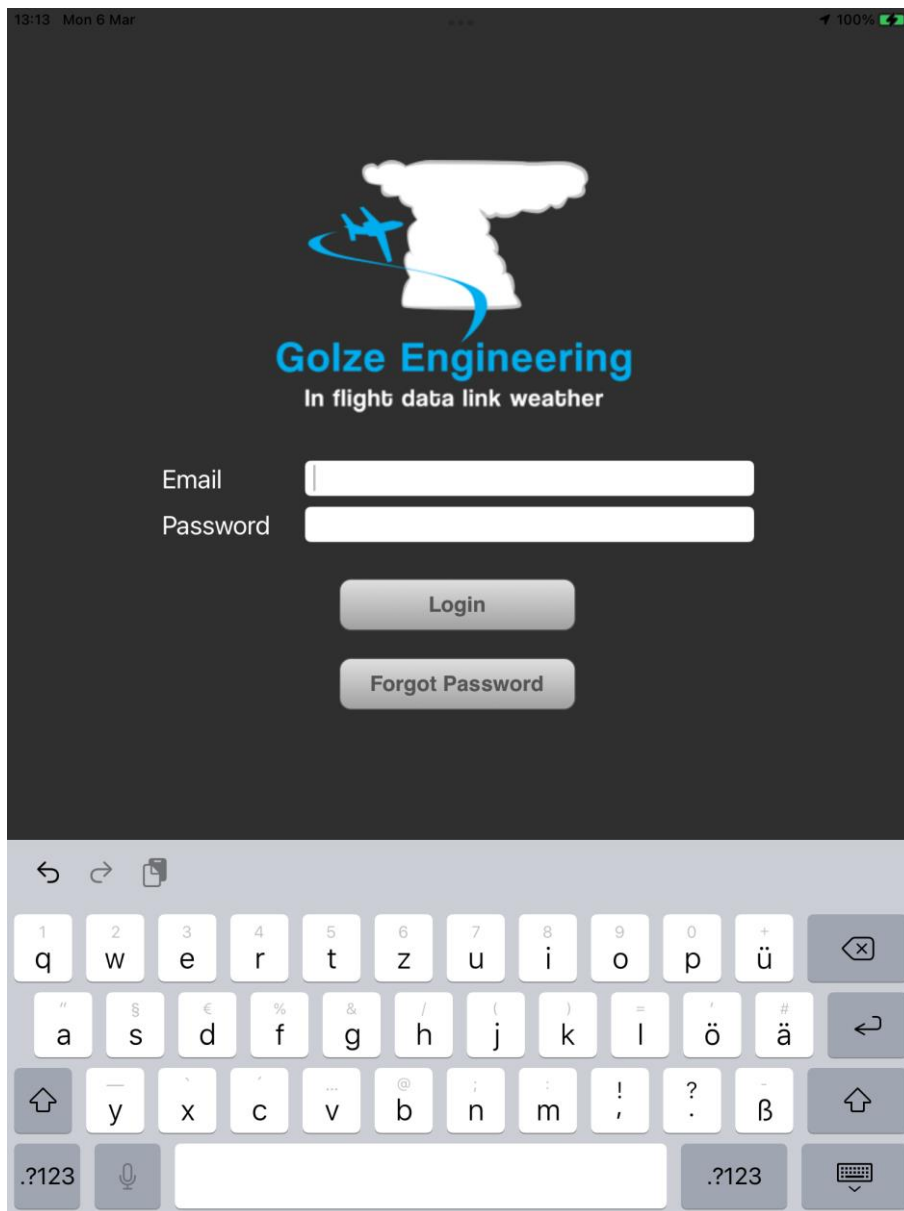


Figure 27 Entering the login details on the Config page of the iPad app

42 Configuration Options

In addition to the login details the config page allows you to make several configuration changes:

First you can select between European, Brazilian and other regions depending on which part of the world you fly in.

Then for the ADL200 only you can select between Hybrid, Cellular Only and Iridium Only mode. This allows you to control which means of communication the ADL200 is using for weather downloads. Under normal conditions we recommend to leave this setting on Hybrid.

The callsign field allows you to enter the callsign of your own aircraft. If the aircraft is transmitting 1090 MHz ADS-B out this signal will then be removed from the traffic reports in order to avoid false alerts and the transmitted baro altitude will be used instead of GPS altitude.

The tracking slider allows activating and deactivating the 10 minute tracking feature. There are no costs involved for you as the end user so we recommend leaving the tracking on at all times. It improves the general satellite reception because the device communicates with the satellite more often.

The firmware control allows updating the ADL150(B)/190/200 firmware. The ADL150B/190/200 does not have any external USB port. Firmware updates are loaded only by WiFi. The legacy ADL150 does have an external USB port which was used in the past for USB firmware updates. If the firmware 7.10 or later is installed all future firmware updates are then loaded also from the ADLConnect app and the USB port is no longer required.

Finally the AHRS buttons allow calibrating the AHRS. Please refer to the AHRS section for more details.

43 Your first weather download

Go to the Download page. Select Radar / Infrared / Strikes / Minima: Download and Wind / Temps: Download. Select an appropriate flight level range for the wind data. Finally select one or more ICAO codes for which you would like to download the METAR and or TAF. Then press "Single ADL Download" and the download will start. A satellite download will take an average of 2 minutes but this can vary a lot depending antenna and satellite position etc.

Please note that Iridium satellites move very fast over the sky. Thus, the reception will vary all the time and a bad or good connection at a single moment does not say much about the general quality of the reception.

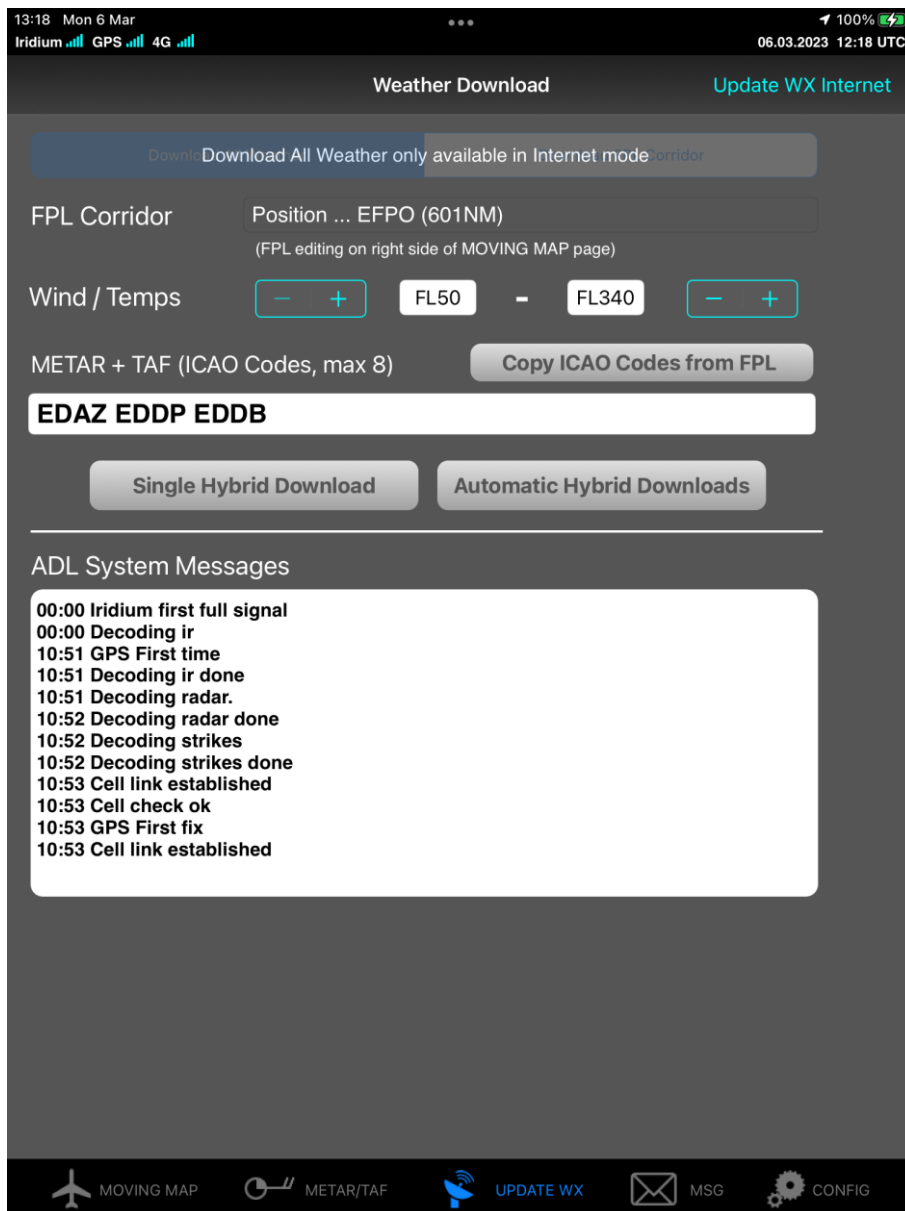


Figure 28 Download Page

Finally you can see the weather information on the moving map page. Please note that the weather information is downloaded as a corridor along the flight plan you did enter. Therefore enter at least the destination of your flight in the flight plan table right to the moving map to get the weather for your whole flight path.

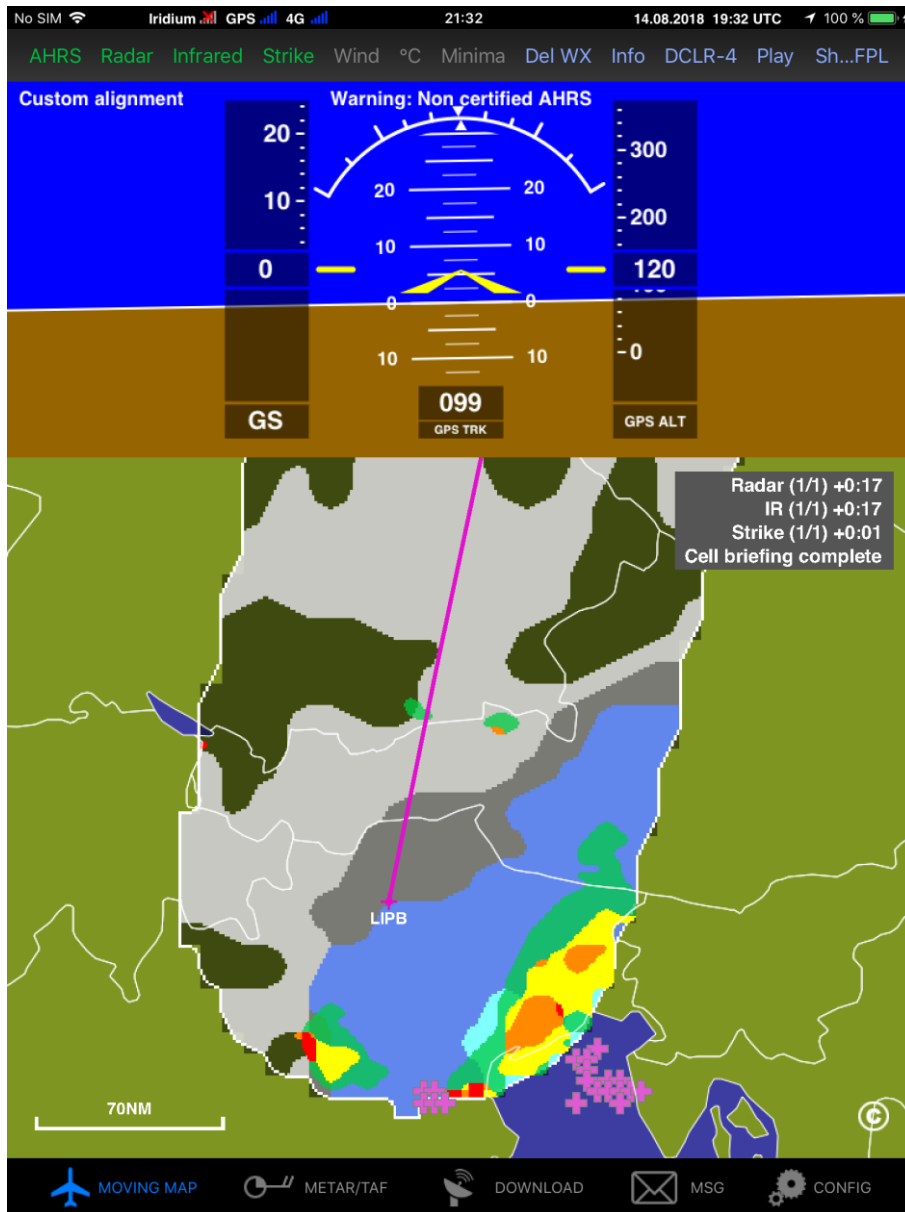


Figure 29 Latest weather information shown on the moving map page

For a more detailed description please consult our tutorial video showing how to use the ADLConnect which is available from the website <http://www.ing-golze.de>

44 ADS-B

Any ADS-B target detected will show up on the ADLConnect moving map. Below is a sample. If you zoom out some of the details will be hidden.



Please note if the own aircraft is broadcasting ADS-B and the proper callsign for the own ship has been set on the config page, the relative altitude will be calculated based on the reported baro altitude. If this data is not available GPS altitude will be used which can be several hundred feet off depending on atmospheric conditions.

45 AHRS Setup

Please remember to never use the ADL190/200 AHRS for any IFR/IMC flying! The ADL190/200 AHRS will have to be calibrated after it has been installed or if its location in the aircraft changed. This is a two step processes. This calibration is done in flight as the aircraft attitude on the ground will be different than in flight depending on strut inflation etc. **WATCH OUT FOR OTHER TRAFFIC AND KEEP THE AIRCRAFT UNDER CONTROL AT ALL TIMES WHILE DOING THE CALIBRATION. IF POSSIBLE TAKE ALONG A CO PILOT!**

When connected to the ADL190/200 in the ADLConnect app show the attitude indicator why pressing the AI button at the top left corner of the screen. Then at the left bottom of the attitude indicator press the button "Setup". Now you display changes and you see a the button required for the calibration of the AHRS.



Figure 31 AHRS Setup

Step 1: First fly straight and level. For good results the air has to be smooth. If the flight is too bumpy calibration results will be poor. If available use the autopilot to keep the aircraft straight. Try to use a normal power setting which results in a typical pitch attitude. Then press the "1: Set Level" button. Now the attitude indicator should show no pitch and no roll. If it does not, try this calibration step again.

Step 2: You have to teach the ADL190/200 in which direction it was installed. If the connectors face exactly backwards this step might not be required as this is the default orientation. In all other cases you have to pitch the aircraft precisely with zero bank and then press one of the two buttons appropriate to your situation. This will teach the AD190/L200 its orientation. You can repeat this step without repeating step 1. But if you go back to step 1 all data for the orientation is lost and you will have to repeat also step 2. The more pitch up or down you have the better the ADL190/200 can sense its orientation. **REMEMBER ALWAYS TO KEEP THE AIRCRAFT UNDER CONTROL WHILE DOING THIS CALIBRATION AND TO WATCH OUT FOR OTHER TRAFFIC!** If available again try to use the autopilot and command a level climb or decent to get a pitch angle with no bank angle.

Finally if both steps are done correctly the AHRS should show the correct pitch and bank. In some rare cases after extreme temperature changes or if the device has been inactive for years etc. the AHRS performance can be improved by letting it sit powered up on the ground with the engine shut down. In this very stable situation the device will recalibrate its internal sensors automatically.

46 ADL150(B) Technical data

- WiFi Interface for iPad/iPhone interconnect
- External Iridium antenna required
- No battery, external power supply (7-36V, 5W) required

- Dimensions: 110 x 53 x 26mm
- Mass: 140g (ADL150) / 120g (ADL150B)

47 ADL190 Technical Data

- WiFi Interface for iPad/iPhone interconnect
- External Iridium antenna required
- No battery, external power supply (7-36V, 5W) required
- Dimensions: 110 x 53 x 26mm (with latches)
- Dimensions: 84 x 55 x 26mm (without latches)
- Mass: 120g

48 ADL200 Technical Data


- WiFi Interface for iPad/iPhone interconnect
- External Iridium antenna required
- No battery, external power supply (7-36V, 5W) required
- Dimensions: 110 x 53 x 26mm (with latches)
- Dimensions: 84 x 55 x 26mm (without latches)
- Mass: 135g

49 ADL150 Label


ADL150 - Satellite weather receiver

1 Pin assignment

- Pin 1: VCC 7V – 36V DC
- Pin 2: RS232 IN
- Pin 3: GND
- Pin 4: RS232 OUT



Looking at ADL150



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In flight data link weather


2 Usage

- Install the ADLConnet iPad/iPhone app
- Connect the power supply and verify green LED is on
- Make sure Iridium antenna is connected and facing the sky
- Connect your iPad/iPhone with the WiFi "ADL Connect"
- Open the ADLConnect app to control the ADL150
- Satellite subscription required for weather downloads

3 Limitations

- Never use as a primary means of navigation or weather avoidance!
- Use USB Micro connector for firmware updates only
- Operating temperature range -20°C - 70°C

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Figure 32 ADL150 Label


50 ADL150B Label

ADL150B - Satellite weather receiver


Power

1 Pin assignment

- Pin 1: VCC 7V – 36V DC
- Pin 2: RS232 IN
- Pin 3: GND
- Pin 4: RS232 OUT



Looking at ADL150B



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Iridium


2 Usage

- Never place the ADL150B in direct sunlight!
- Install the ADLConnet iPad/iPhone app
- Connect the power supply and verify green LED is on
- Make sure the Iridium antenna is connected
- Connect your iPad/iPhone to the WiFi "ADL Connect"
- Open the ADLConnect app to control the ADL150B
- Satellite subscription required for weather downloads

3 Limitations

- Never use as a primary means of navigation or weather avoidance!
- Operating temperature range -20°C to 60°C

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Figure 33 ADL150B Label


51 ADL190 Label

Power


ADL190 - Traffic and data link receiver

1 Pin assignment

- Pin 1: VCC 7V – 36V DC
- Pin 2: RS232 IN
- Pin 3: GND
- Pin 4: RS232 OUT



Looking at ADL190



Golze Engineering
In flight data link weather

Iridium


2 Usage

- Install the ADLConnet iPad/iPhone app
- Connect the power supply and verify green LED is on
- Make sure antennas are connected. Remember the square antenna is the Iridium antenna
- Connect your iPad/iPhone with the WiFi "ADL Connect"
- Open the ADLConnect app to control the ADL190
- Satellite subscription required for weather downloads

ADS-B

3 Limitations

- Never use as a primary means of navigation, attitude information, traffic or weather avoidance!
- Operating temperature range -20°C to 60°C



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Figure 34 ADL190 Label


52 ADL200 Label

Power


ADL200 - Traffic and data link receiver

1 Pin assignment

- Pin 1: VCC 7V – 36V DC
- Pin 2: RS232 IN
- Pin 3: GND
- Pin 4: RS232 OUT



Looking at ADL200



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In flight data link weather

4G

2 Usage

- Install the ADLConnet iPad/iPhone app
- Connect the power supply and verify green LED is on
- Make sure antennas are connected. Remember the square antenna is the Iridium antenna
- Connect your iPad/iPhone with the WiFi "ADL Connect"
- Open the ADLConnect app to control the ADL200
- Satellite subscription required for weather downloads


Iridium

3 Limitations

- Never use as a primary means of navigation, attitude information, traffic or weather avoidance!
- Operating temperature range -20°C to 60°C

ADS-B

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Figure 35 ADL200 Label

53 Contact

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