



User's Manual

Clarity
Clarity SV



Clarity SV™

Power Button

Touch for
Data Burst

Double Click for
Wings-Level
AHRS Reset

Hold to turn off

ADS-B 978

ADS-B 1090

Lights
indicate
message
received
in last
3 seconds.

AHRS

Align arrow forward.

Steady	Normal Operation
Flashing	Warm up (15 sec.) OK to move
Flickering	Aligning. Keep still, or fly straight and level.



GPS

Green:
GPS Fix

Blue:
WAAS
Lock

Power Light

Steady	On (Battery Power)
Steady w/Flash	Low Battery
Flashing	High Temperature
Flickering	Data Burst Active (all lights flicker)
Pulsing Fast	On and Charging
Pulsing	Off and Charging
Pulsing Fast w/Flash	On, Full Charge
Pulsing w/Flash	Off, Full Charge

Clarity™

Power Button

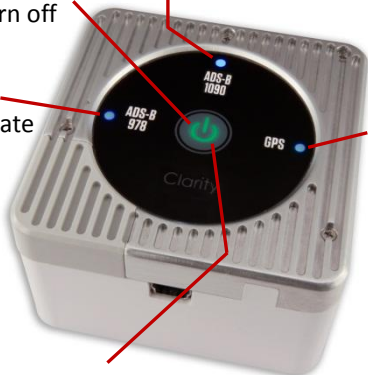
Touch for Data Burst
Hold to turn off

ADS-B 1090

Lights indicate message received in last 3 seconds.

ADS-B 978

Lights indicate message received in last 3 seconds.



GPS

Green:
GPS Fix
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Pulsing Fast	On and Charging
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Pulsing Fast w/Flash	On, Full Charge
Pulsing w/Flash	Off, Full Charge



Table of Contents

NOTICES	5
QUICK START STEPS	6
A NOTE FROM SAGETECH'S PRESIDENT	7
WHAT COMES WITH CLARITY?	8
WHAT DO I NEED TO USE CLARITY?	8
DESCRIPTION	8
OPERATIONS GUIDE	10
CHARGING	10
TURNING CLARITY ON	11
PLACEMENT IN YOUR AIRCRAFT	13
DATA BURST	14
ADS-B RECEIVERS	15
<i>978 MHz</i>	15
<i>1090 MHz</i>	16
GPS RECEIVER	17
CLARITY SV	18
<i>Wings Level AHRS Reset</i>	18
<i>Sensor Saturation AHRS Reset</i>	20
<i>Magnetic Heading</i>	20
SPECIFICATIONS	21
WARRANTY, CONTACT, NOTES	23

Notices

Your Clarity receiver is not certified. Do not use as a primary or backup flight instrument, or as a means of traffic detection, separation, or collision avoidance. Users assume all risk associated with the use of Clarity receivers.

Your Clarity receiver receives some but not all traffic information.

Do not store your Clarity receiver in your aircraft. Do not store Clarity where temperatures exceed 122° F (50° C) or are below 14° F (-10° C). Do not operate where temperatures exceed 112° F (45° C) or are below 14° F (-10° C).

Your Clarity receiver contains a lithium polymer battery. Do not disassemble the device. Do not incinerate or puncture the device or battery. Ensure that disposal is in accordance with local requirements for the recycling of electronic appliances and batteries. Check with current Federal Aviation Administration (FAA) rules before carrying Clarity inside checked luggage.



Quick Start Steps

1) Charge Clarity

For best results charge Clarity prior to use with the provided charger and cable.

2) Turn Clarity On

Clarity SV Only:

Clarity SV warms up for 15 seconds (flashing AHRS light). During the warmup period, you may reposition Clarity SV. Next, **Clarity SV** performs alignment (flickering AHRS light) for 45 seconds. **Keep Clarity SV** still or fly straight and level while the AHRS light flickers.

Clarity SV automatically corrects for minor installation tilt such as the slope of your glare shield but cannot correct for yaw error. Always position **Clarity SV** with the arrow pointing forward.

3) Connect to iPad/tablet Wi-Fi

Go to iPad > Settings > Wi-Fi

Select the Wi-Fi Network with “Clarity” in the name.

4) Start your Charting or Electronic Flight Bag (EFB) App

A note from Sagetech's President

Congratulations for choosing Safety. Clarity stands alone in offering the finest design and engineering available and contrasts sharply with products from other companies jockeying to be cheapest. At Sagetech, we know only Excellence and Elegance, and Clarity is a shining example of that culture.

During Clarity's development, we faced many challenges and often turned to our principles of Excellence and Elegance for guidance. We resisted temptations to double Clarity's size, reduce receiver robustness standards, or employ cheap design shortcuts. Our amazing engineering team stayed the course to produce one of our greatest achievements ever.

I believe Clarity squarely hits the mark with fabulous styling, incredible sophistication and capability, yet with the simplicity of a single button. I'm proud to offer you Clarity as one of our finest works of engineering and design, a high performance work of art.

Congratulations for choosing Safety.

Kelvin Scribner

President, Sagetech Corporation



What Comes with Clarity?

- **Clarity** or **Clarity SV** Receiver
- USB Cable
- Charger
- Gel Pad
- Clarity User's Manual

What do I need to use Clarity?

- Clarity Receiver
- iPad or other computer
- Electronic Flight Bag (EFB) app software.
www.sageotechcorp.com/compatibility
for compatible software.

Description

Clarity and **Clarity SV** are Automatic Dependent Surveillance-Broadcast (ADS-B) receivers. They receive Flight Information System-Broadcast (FIS-B) and Traffic Information System-Broadcast (TIS-B) messages from ground towers on 978 MHz. Traffic messages from nearby aircraft equipped with ADS-B Out equipment are received on both 978 MHz and 1090 MHz.

Clarity receivers relay these messages over Wi-Fi to your iPad or other computer. Charting or EFB software displays this information for

use in flight. Clarity does not filter or censor messages from your iPad, instead passing through all messages received, including traffic messages.

Clarity receivers include a Wide Area Augmentation System (WAAS) GPS receiver to source positional information to enable your EFB app to display your aircraft location.

Clarity receivers feature an internal Data Burst (patent pending) buffer to store incoming messages while your iPad sleeps.

The **Clarity SV** model offers an Attitude Heading Reference System (AHRS) which transmits pitch, roll, and heading information over Wi-Fi to your iPad enabling 3-D synthetic vision apps.

No external wires are necessary. Clarity receivers employ an internal multi-element antenna for excellent omnidirectional sensitivity, and a high capacity lithium polymer battery for fully portable operation.



Operations Guide

The following sections provide greater detail for maximizing the benefits of using Clarity.

Charging

Clarity charges fully in 4-8 hours. For fastest charge times:

- Turn Clarity off when charging.
- Charge in a cool location. Clarity reduces charging current to protect itself if too hot.
- Use the charger and cable that come with your unit.

Clarity is versatile and accepts a charge from high or low current sources, though charge time is longer with low current sources. Thin gauge cables and extension cables increase charge time due to added electrical resistance.

The Clarity status page on your iPad/tablet EFB App may indicate Clarity is connected to external power, but not charging. Even though the power supply isn't strong enough to power *and* charge Clarity, battery consumption is reduced and extending battery life. For better charging performance, turn Clarity off when charging battery and/or use a higher current

USB power supply (2 amps or greater) with Clarity turned off.

Turning Clarity On

Press the power button to turn Clarity on. It begins receiving messages immediately.

On power-up, position **Clarity SV** for flight during the 15 second warm up period (flashing AHRS light). **Clarity SV** automatically corrects for sloped surfaces like your glare-shield, but the arrow must point forward. After 15 seconds warm up, Clarity SV begins AHRS alignment for 45 seconds and flickers the AHRS light. While the AHRS light flickers, keep Clarity still or fly straight and level.

Clarity uses five lights to indicate status.



Table 1 Light Indications

Light	Indication	Description
Power	Steady	On (Battery Power)
	Steady w/Flash	Low Battery
	Flashing	High Temperature
	Flickering	Data Burst Active (all lights flicker)
	Pulsing Fast	On and Charging
	Pulsing Fast w/Flash	On, Full Charge
GPS	Off	No GPS Fix
	Green	2-D or 3-D Fix
	Blue	WAAS Fix
ADS-B 978	Illuminated	Message received in last 3 seconds
ADS-B 1090	Illuminated	Message received in last 3 seconds
AHRS (Clarity SV)	Steady	Normal Operation
	Flashing	Pre-alignment. Clarity may be moved
	Flicker	Aligning. Keep still or fly straight and level

Light	Indication	Description
All Lights	All lights illuminate when button is pressed	
	Flickering	Data Burst in progress
	Flash then Flicker	Powering on/off

Placement in your Aircraft

For best results, the GPS antenna should have a clear view of the sky. Place Clarity on the glare shield for aircraft without windshield heat, or use the suction cup mount accessory (option available from SagetechCorp.com) to mount Clarity to a side window.

Reception from ADS-B ground towers are line of sight and placing Clarity at the crown of your glare shield offers Clarity an excellent “view” of the earth and towers, except in aircraft with windshield heat.



Data Burst

Data Burst is a patent pending feature standard on all Clarity models that stores incoming ADS-B messages. This is useful because when your iPad/tablet sleeps to conserve battery power, such as during the en route phase of flight, it misses incoming ADS-B messages.

When your iPad/tablet wakes, activate Data Burst to bring your iPad/tablet fully up to date as if it were never asleep.

To activate Data Burst, touch the power button once or activate it from your iPad/tablet. The current ADS-B data set will be transmitted to your iPad/tablet.

While Data Burst is in progress, all lights flicker.

ADS-B Receivers

978 MHz

A 978 MHz data radio receives Flight Information System-Broadcast (FIS-B) messages transmitted from ADS-B ground stations. These messages are relayed to your iPad/tablet via Wi-Fi connection.

The ADS-B 978 light illuminates for 3 seconds each time a message is received by Clarity's 978 MHz receiver. A steady light indicates a steady stream of messages.

Reception range depends on Clarity installation and the broadcast power level of the ADS-B ground stations (there are several types of varying broadcast power). Typical maximum reception range is 100 nautical miles.

Traffic messages are received on 978 MHz, but unless your aircraft is equipped to transmit certified ADS-B Out signals, ground stations will not broadcast targets near your aircraft. Nearby aircraft, however, equipped with ADS-B Out at 978 MHz may be seen using Clarity.



Table 2 FIS-B Data Product Transmission Intervals

FIS-B (Flight Information System Broadcast) Product	Transmission Intervals
AIRMET, SIGMET, Convective SIGMET, METAR	5 min.
CONUS NEXRAD Wx Radar	15 min.
Regional NEXRAD Wx Radar	2.5 min.
NOTAM, PIREP, SUA, TAF, Wind & Temperature Aloft	10 min.
TIS-B Service Status	10 sec.

1090 MHz

A 1090 MHz data radio receives traffic messages transmitted from other aircraft or from ADS-B ground stations. These messages are relayed to your iPad/tablet via Wi-Fi connection.

The ADS-B 1090 light illuminates for 3 seconds each time a message is received by Clarity's 1090 MHz receiver. A steady light indicates a steady stream of messages.

Reception range depends on Clarity installation and the transmit power level of the broadcasting aircraft or ADS-B ground stations (there are several types of varying broadcast power). Typical maximum reception range is 125 nautical miles.

GPS Receiver

The GPS receiver is a 66 Channel Wide Area Augmentation System (WAAS) differential GPS receiver.

- A green GPS light indicates the GPS receiver has a position fix (2D or 3D) and is delivering coordinates.
- A blue GPS light indicates a WAAS (Wide Area Augmentation System) lock.

Whereas GPS satellites continually pass overhead, WAAS satellites are in a high geostationary orbit in the southern sky when in North America. For best WAAS reception, ensure Clarity has a view of the southern sky.



Clarity SV

Orient **Clarity SV** with the arrow pointed in the direction of flight. Clarity automatically detects and corrects for installation pitch and roll tilt angles at startup, and when the Wings Level command is issued. Small tilt angles (like the angle of your glare shield) are acceptable as long as the arrow is pointed in the direction of flight.

Pitch angle is assumed to be zero at startup, and for power-button initiated Wings Level AHRS Reset.

Present pitch may be entered into your app for soft-key initiated Wings Level AHRS Reset to account for inflight pitch, or tail dragger fuselage pitch angle during preflight.

Wings Level AHRS Reset

If your synthetic vision display or iPad attitude indicator develops errors, issue a Wings Level AHRS Reset. It takes several minutes for sensors to thermally stabilize. For best results, issue a Wings Level Reset 5-10 minutes after startup.

The Wings Level Reset takes about 20 seconds to complete, during which the AHRS light flickers. Keep Clarity still or fly straight and level while the AHRS light flickers.

Power Button Wings Level Reset

Double-click the power button to perform a Wings Level Reset. Wings Level Pitch is always assumed to be zero-degrees when using the power button to perform a Wings Level AHRS Reset.

App Soft-key Wings Level Reset

Your iPad app may support the Wings Level AHRS Reset, allowing you to specify present pitch. Angles between ± 90 degrees are valid. This is useful inflight, where your actual pitch is a few degrees or with tail-draggers during preflight.

- 1) Enter your present pitch angle into the Wings Level Pitch window on your app, usually on the status page.
- 2) Issue the Wings Level AHRS Reset command from your app (*rather than by double clicking the power button*).
- 3) Keep **Clarity SV** still or fly straight and level while the AHRS light flickers.
- 4) Your Synthetic Vision/Attitude Indicator display will now show the pitch you entered into your app.



Sensor Saturation AHRS Reset

During extreme turbulence, the sensors used in Clarity SV's AHRS may exceed limits, triggering Sensor Saturation AHRS Reset for about 20 seconds, during which the AHRS light flickers. While the AHRS light flickers, keep **Clarity SV** still or fly straight and level.

The Pitch setting used during Sensor Saturation AHRS Reset is zero degrees. If the automatic Sensor Saturation AHRS Reset does not give satisfactory results, perform a Wings Level AHRS Reset using the Power Button or from your app.

Magnetic Heading

Magnetic heading displayed by **Clarity SV** is significantly affected by your environment. The earth's magnetic field is skewed by magnets, electrical current and ferrous materials. Your aircraft compass has been carefully installed and compensated for these effects. Because **Clarity SV** is a portable device, some errors are to be expected. You can minimize these errors by keeping **Clarity SV** away from nearby magnets, electronic equipment, and ferrous materials. Note that the iPad has strong magnets embedded along its edge to attach screen covers.

Specifications

Table 3 Specifications

	Clarity	Clarity SV
978 MHz UAT Receiver Design		RTCA DO-282B -97dBm, -91dBm at Antenna
1090 MHz ADS-B Receiver Design		RTCA DO-260B AO/-72 dBm
Traffic Target Tracking		100 Tracks
Data Burst Buffer		Approx. 5,000 Messages
GPS Receiver		5 Hz, 66 Channels, WAAS
Tablet Communications		802.11 b/g/n Wi-Fi
Rate Gyros	N/A	3 axis, ± 495 deg/sec
Accelerometers	N/A	3 axis, $\pm 5g$
Magnetometers	N/A	3 axis, ± 1.5 Gauss



	Clarity	Clarity SV
Battery	4400 mA-hr Lithium Polymer	
Battery Life	6-8 hours depends on message throughput rates	
Recharge Time	4-8 hours charges faster at cooler temperatures	
Dimensions	2.5 x 2.5 x 1.5 inches	
Weight	5.5 oz (156 g)	
Operating Temperature	-10 to +45°C (14 to 113°F)	
Charging Temperature	0 to +35°C (32 to 95°F)	
Storage Temperature	-10 to +50°C (14 to 122°F)	
Humidity	95%, non-condensing	

Specifications are subject to change at any time.



Warranty, Contact, Notes

This Sagetech product is warranted to be free from defects in materials or workmanship for one year from the date of purchase. Within this period, Sagetech will at its discretion repair or replace any components that fail in normal use. Such repairs or replacement will be made at no charge to the customer for parts and labor the customer is responsible for shipping. This warranty does not cover failures due to abuse, misuse, accident, or unauthorized alterations or repairs.

Registering your new Sagetech product is quick and easy. Just follow the onscreen instructions at SagetechCorp.com/registration

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Sagetech is certified to design and manufacture composite and electro-mechanical assemblies for aerospace and military applications to the requirements of AS9100C by TUV USA.

This system incorporates elements of the UBR Technology developed by The Corporation on behalf of the U.S. Government.

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