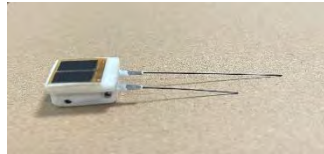
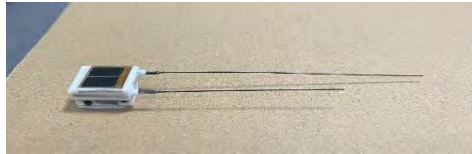


## Product Introduction

# Debut<sup>®</sup> ULTRA Series

Debut ULTRA is tiny GPS-Solar-ACC tracker that uses either INTELINK to transmit data directly to mobile phone or professional gateways developed by Druid, or use or 5G network to upload data directly to the cloud server.

## BASIC SPECIFICATIONS

MODEL	ULTRA P1	ULTRA 5G P1
Appearance		
Weight	1.8±0.1g	2.6±0.1g
Dimensions	17 mm x 12 mm x 8.5 mm	18 mm x 12 mm x 8.5 mm
Working Temperature	-10°C~60°C	
Battery	15 mAh lithium polymer rechargeable battery, with under-and-over-charging protection	
Battery Life	Over 100 GPS positions under optimal GPS satellite view at 5-minute interval	
Solar Type	GaAs solar unit (30% efficiency) with good performance under weak light	
Antenna Material	Titanium alloy with protective coating	
Attachment	Two through holes at two ends, respectively for harness, or glued-on	
GPS Module	Precision: CEP (50%) 5m Maximum update rate: 10 Hz	
Waterproof	IP 68	
Firmware Upgrade	Remotely via network, or instantly via INTELINK	
Working Schedule	Remotely via network, or instantly via INTELINK	
Global Roaming	Support	
DATA STORAGE	Logged data will be stored in memory if network is unavailable. <ul style="list-style-type: none"> <li>- Flash memory: 16 MB</li> <li>- Regular data storage: 460 days at default setting (1h GPS+1h ENV+10 min BHV)</li> <li>- BOOST data storage: 280,000 pieces</li> <li>- ACC data storage: 28,700 pieces</li> </ul>	

## DATA TYPES

- GPS: longitude, latitude, altitude, geoid height, course, GPS satellite quantity
- ENV: light intensity, temperature, inner air pressure, voltage
- BHV: ODBA (overall dynamic body acceleration)
- ACC: x/y/z acceleration data at 25 Hz (by default)

## DATA COLLECTION MODES

User can choose from the following data collection modes, and specify the related parameters to suit the condition and objective of the study.

### ■ Regular Mode

- GPS interval: 5 min ~1 day
- ENV interval: 5 min ~1 day
- ODBA interval: 10 min/30 min
- ACC interval: 25 Hz, 3 seconds in every 10 min (by default)

Above ranges can be set on webpage/App. If other settings are required, please contact us.

### ■ Sleep Mode

This mode is to save power by deactivating certain type of data collection for:

- a certain period (from minutes to months)
- a regular period each day (a maximum of 16 hours)

## INTELLIGENT FREQUENCY OPTIMIZATION (BOOST)

The BOOST function intelligently increases the frequency for data collection when certain conditions are met (good charging, fast movement, etc.).

The default setting is as below:

- Frequency Optimization: GPS at every 10 minutes
- Flight Detection: GPS at every 5 minutes

With BOOST, the device portrays detailed movement tracks and attempts more frequent data transmission without manual intervention, keeping long-term energy balance and avoiding the possibility of battery drain caused by radical settings during bad weather.

## DATA TRANSMISSION

### ■ ULTRA

- Transmission method: INTELINK based on Bluetooth 5.0
- Maximum uplink/downlink speed: 1 Mbps/1 Mbps
- Output power: 8 dBm
- Transmission distance: 80~120m with ordinary smart phone; up to 1200m with Debut series gateway products

### ■ ULTRA 5G

ULTRA 5G supports both NB-IoT and LTE-M (or called eMTC) frequency bands. We will activate selected bands for devices to be used in different regions.

Below lists all the bands that are supported.

NB-IoT bands:

Band	Duplex mode	f (MHz)	Uplink (MHz)	Downlink (MHz)	UL/DL Bandwidth (MHz)	Duplex spacing (MHz)	Channel bandwidths (kHz)
B1	HD-FDD	2100	1920-1980	2110-2170	60	190	180(/200)
B2	HD-FDD	1900	1850-1910	1930-1990	60	80	180(/200)
B3	HD-FDD	1800	1710-1785	1805-1880	75	95	180(/200)
B4	HD-FDD	1700	1710 -1755	2110 -2155	45	400	180(/200)
B5	HD-FDD	850	824-849	869-894	25	45	180(/200)
B8	HD-FDD	900	880-915	925-960	25	45	180(/200)
B11	HD-FDD	1500	1427.9-1447.9	1475.9-1495.9	20	48	180(/200)
B12	HD-FDD	700	699-716	729-746	17	30	180(/200)
B13	HD-FDD	700	777-787	746-756	10	31	180(/200)
B14	HD-FDD	700	788-798	758-768	10	30	180(/200)
B17	HD-FDD	700	704-716	734-746	12	30	180(/200)
B18	HD-FDD	800	815-830	860-875	15	45	180(/200)
B19	HD-FDD	800	830-845	875-890	15	45	180(/200)
B20	HD-FDD	800	832-862	791-821	30	41	180(/200)
B25	HD-FDD	1900	1850-1915	1930-1995	65	80	180(/200)
B26	HD-FDD	850	814-849	859-894	35	45	180(/200)

B28	HD-FDD	700	703-748	758-803	45	55	180(/200)
B31	HD-FDD	450	452.5-457.5	462.5-467.5	5	10	180(/200)
B66	HD-FDD	1700	1710-1780	2110-2200	70/90	400	180(/200)

LTE-M (eMTC) bands:

Band	Duplex mode	f(MHz)	Uplink (MHz)	Downlink (MHz)	UL/DL Bandwidth (MHz)	Duplex spacing (MHz)	Channel bandwidths (MHz)
B1	HD-FDD	2100	1920-1980	2110-2170	60	190	1.08(/1.4)
B2	HD-FDD	1900	1850-1910	1930-1990	60	80	1.08(/1.4)
B3	HD-FDD	1800	1710-1785	1805-1880	75	95	1.08(/1.4)
B4	HD-FDD	1700	1710 -1755	2110 -2155	45	400	1.08(/1.4)
B5	HD-FDD	850	824-849	869-894	25	45	1.08(/1.4)
B8	HD-FDD	900	880-915	925-960	25	45	1.08(/1.4)
B11	HD-FDD	1500	1427.9-1447.9	1475.9-1495.9	20	48	1.08(/1.4)
B12	HD-FDD	700	699-716	729-746	17	30	1.08(/1.4)
B13	HD-FDD	700	777-787	746-756	10	31	1.08(/1.4)
B14	HD-FDD	700	788-798	758-768	10	30	1.08(/1.4)
B17	HD-FDD	700	704-716	734-746	12	30	1.08(/1.4)
B18	HD-FDD	800	815-830	860-875	15	45	1.08(/1.4)
B19	HD-FDD	800	830-845	875-890	15	45	1.08(/1.4)
B20	HD-FDD	800	832-862	791-821	30	41	1.08(/1.4)
B25	HD-FDD	1900	1850-1915	1930-1995	65	80	1.08(/1.4)
B26	HD-FDD	850	814-849	859-894	35	45	1.08(/1.4)
B28	HD-FDD	700	703-748	758-803	45	55	1.08(/1.4)
B31	HD-FDD	450	452.5-457.5	462.5-467.5	5	10	1.08(/1.4)
B66	HD-FDD	1700	1710-1780	2110-2200	70/90	400	1.08(/1.4)

Maximum output power: 23 dBm

## EXTRA FUNCTIONS brought by INTELINK®

INTELINK® technology enables remote connection to your ULTRA devices to perform various operations and realize many amazing functions.

To establish such connection, you only need an ordinary smart phone or/and a Debut series gateway device.

*\*Debut gateways could be a HUB, TAG or QUEST. The connection distance is 800~1200m depending on environment. For more information about the gateways, please contact Druid or your local distributor.*

## ■ Tracker Recovery

With ECOTOPIA app, a device and a mobile phone will automatically function as a beacon system. The mobile phone will ring if the device is detected nearby. The closer they are, the louder the ringing sound will be. This provides a convenient way to find lost devices.

## ■ Firmware Upgrade & Setting Modification

The user can easily upgrade the firmware or change data collection settings for a device nearby using ECOTOPIA APP.

## ■ Raw Acceleration Data Collecting

Raw x/y/z acceleration data could be very useful for behavioral research, especially when the data can be combined with timestamps, GPS, environmental data, and the bird's activity rhythm. However, the raw data can seldom be obtained due to its large size.

With INTELINK, the user can not only download the raw data from memory, but also obtain real-time raw acceleration data by connecting a mobile phone to ULTRA.

## ■ In-situ Modeling

During the process of obtaining real-time raw data described as above, the user can also mark the data with behavior tags. ECOTOPIA App provides comprehensive tools for In-situ modeling, which includes real-time x/y/z acceleration visualization and data downloading, video shooting, and behavior tagging. All these data will be combined under the timestamps and saved for later verification and analysis.

With the help of Druid's AniAct<sup>®</sup> behavior algorithm platform, the user will be able to generate acceleration-based behavior algorithm for different species.

Furthermore, such algorithm can be loaded into the tracker and be conducted on board. Then, the tracker will be able to send back continuous computed result of behavior tags instead of discontinuous raw data. This will expand the data dimensions and bring breakthrough on bird research and ecology conservation.

Druid Technology reserves the right to interpret the technical specifications and to make changes of the same without prior notice.