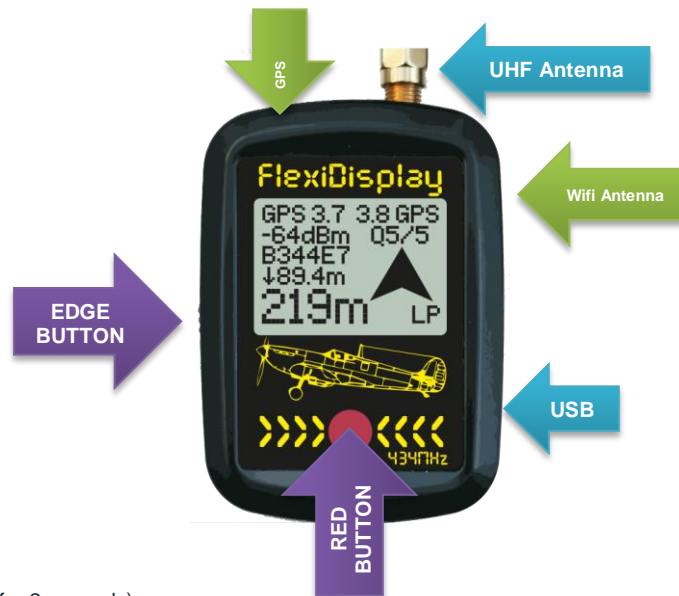


BMK FlexiDisplay

Firmware v23-07-14

GPS Model Locator User Manual



RED BUTTON

- Power ON (Pres & hold for 2 seconds)
 - Transmits DT Signal to the compatible BMK Receivers.
 - Enter / Select
 - Force Shutdown (Pres & hold for 10 seconds then release)
- *not recommended if the device is responding to the commands.**

EDGE BUTTON

- Power OFF (Pres & hold for 6 seconds)
- Next Display / Next Option
- Flight Recorder Start/Stop (Pres & hold for 1-5s)

Micro USB Socket

Charges the onboard 820mAh battery in ~4 hours.

Antenna Socket

Female SMA Antenna socket for antenna connection. You can use any compatible antenna.

Wifi Antenna

It's an onboard antenna under the enclosure.

GPS Antenna

It's an onboard antenna under the enclosure.

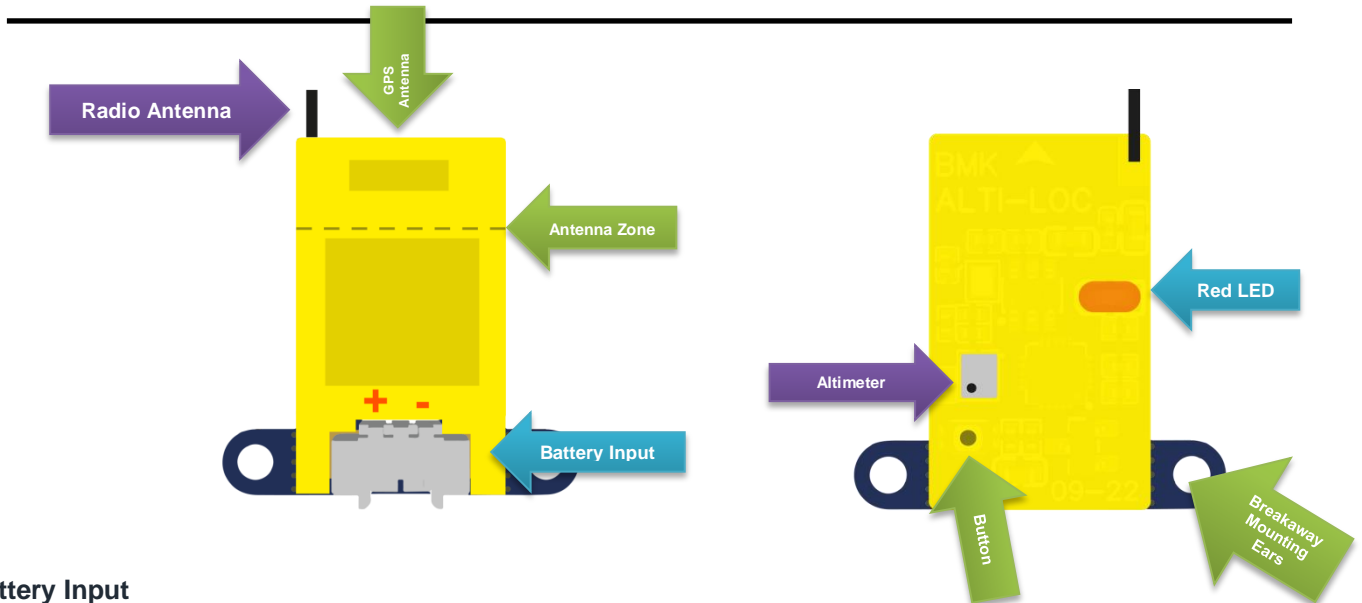
***Please do not cover this part of the device for a good GPS reception.**

Features

- FlexiDisplay Hand unit ON time: up to 16 hours @ Standard-Mode. up to 24 hours @ Low-Power-Mode.
- Flight Memory(1MB): stores 10 flight records (max.20 minutes) and summary.
- RCDT: Long Range (22dB), BMK B1 and B2 compatible.
- RSSI Indicator: useful under low accuracy or No-GPS conditions.
- Last Known Location: FD records and shows the last known location of the beacon.
- GPS LOW indicator: It appears if the GPS accuracy is low and you will know the search radius may be >10m.
- Altimeter: Altitude, Climb and Sink rates on your display.
- QR code: Just scan with your phone and google maps will show the beacon location.
- Flight Summary: Max altitude and other useful information about your last flights.
- Smart Beacon Selection: It shows all active beacons on your display. You can choose your beacons or friend's to help them. No binding is required, multiple FDs can follow the telemetry data of a beacon.
- **or Touch the FlexiDisplay antenna to Beacon antenna and wait for ~10 seconds and it will bind to the beacon automatically.**
- Firmware update over WiFi: latest firmwares here: <https://github.com/meihkarakelle/FlexiDisplay-Firmware-Releases>

BMK GPS Beacon

Features



Battery Input

- MicroJST 1.25mm socket
- Compatible with 1-3S Lithium battery (3.5-13v)
- 30mA@flight, ~7mA@stationary, 1mA@gps-off

Radio Antenna

164mm long Gauge 8 Steel Guitar Wire

GPS Antenna

Ceramic GPS Antenna.

Top 8mm of the beacon must be out of the carbon fiber fuselage. (Marked as Antenna Zone above)

Altimeter

The hole of the barometric pressure sensor must be always open to measure the air pressure. Keep away from the direct airstream or wind to measure correct altitude.

RED LED

The led shows the device status, blinks when transmitting and fast blinks when the GPS locked.

Breakaway Mounting Ears

You can break these ears by using a small plyer or wire cutter.

Beacon Features

- 20x21x6mm with ears, 13x21x6mm without ears.
- 1.5g weight.
- GPS Beacon current consumption: 30mA@flight, ~7mA@stationary, 1mA@gps-off
- Update rate: 0.5s@climbing 1s@flight 4-8s@stationary
- The range: >20km in the air(UK conditions)
- Low battery mode: The beacon disables the GPS unit for lower battery consumption and transmits the last locked GPS point if the battery is under 3.3v. You can still receive this location info and signal strength value until 1.8v.
- Altimeter: 0.1m Resolution, 5.5km max, -1km min.
- 434-435MHz , 40 channels, 25khz channel spacing.

Battery Consumption:

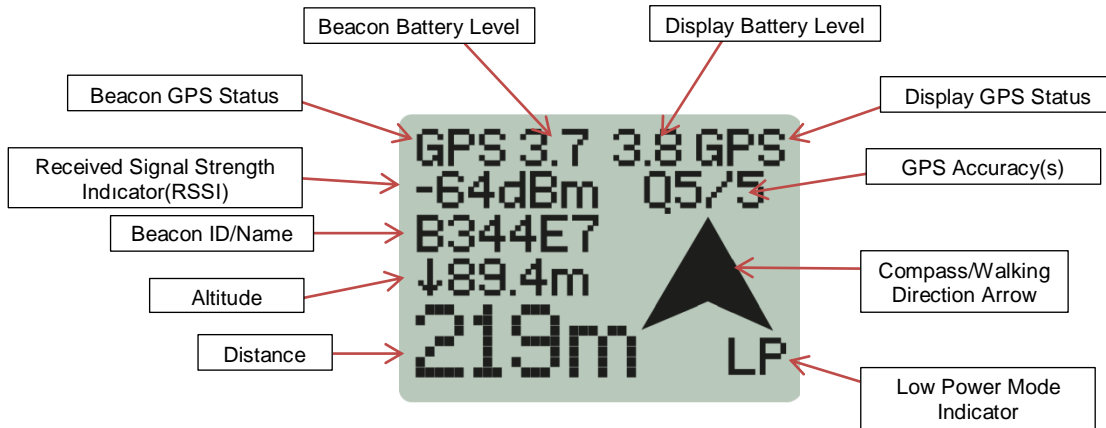
It consumes 30mA@flight, ~7mA@stationary, 1mA@gps-off.

Supplied 40mAh button batteries will be enough for 1 hours of flight or 4-5 hours of stationary use.

100mAh battery will be enough for an average flight day. (1 hours in the air + 10 hours on the ground)

1. LOCATOR DISPLAY

This is the default display to track your model.



Beacon & Display GPS Status

- GPS >> GPS fixed and working correctly.
- NO-GPS >> GPS is not fixed
- GPS-LOW >> The accuracy is low(>20m). Make sure the GPS antenna can see the horizon.
- GPS-OFF >> The battery is too low(<3.3v) to supply GPS, The beacon is transmitting the last known location.

Beacon & Display Battery Level

This feature displays the voltage level in volts. If the battery level falls below the preset values (3.6V), the text "LOW" will blink. When the battery level reaches 3.3V, the beacon will switch to Low-Power Mode and transmit the last known location, if the battery's protection circuit allows it, until it reaches 1.8V. If the battery voltage drops below 3.3V, the hand unit will automatically switch off. To continue operation, the unit can be connected to a USB power bank for recharging. In case no GPS Beacon signal is received for the duration specified in the Config.ini file (refer to section 5.1.4), which is set to 600 seconds by default, the hand unit will enter sleep mode.

Received Signal Strength Indicator(RSSI)

This feature displays the strength of the most recently received signal from the beacon. The RSSI value ranges from -110dBm (lowest) to 0dBm (highest). It is particularly useful in situations where distances are very short or GPS signals are not available.

If no beacon data is received within the last 20 seconds, the device will show the text "SIGNAL/LOST" instead of the RSSI value. This indicates that the displayed model location may not be the current location of your model. In most cases, the connection will be established once you have arrived at the last known location. Additionally, you will hear a three-tone beep when the connection is lost and re-established.

*** Please note that radio signals may reflect when the model is close to the ground, which can result in a loss of connection in the final meters of the flight.**

Q Values / GPS Accuracies

The GPS modules utilize the triangulation method to determine their location. Typically, having more satellites is better, but the positions of the satellites also play a crucial role. If the GPS module is obstructed from one direction (such as by a brick wall or buildings) and cannot see the horizon, the calculated location may shift towards the unobstructed direction. The modules generate an HDOP (Horizontal Dilution of Precision) value based on the satellite positions, but this value is too complex for practical field use. Hence, we employ a simplified 1 to 5-star rating system.

A 5-star accuracy rating represents the best accuracy. You will often encounter this rating in open, flat fields, and you can expect the model to be within a 3-meter range of the indicated location.

Conversely, a 1-star rating indicates the poorest accuracy, and the model could be located anywhere within a radius of 20-80 meters.

If the Q values are presented as something like "Q:2/3," it means that the beacon's GPS accuracy is rated at 2 stars, while the FlexiDisplay's GPS accuracy is rated at 3 stars. In such cases, it is advisable to use the Signal

Strength Indicator to locate your model once you have arrived at the designated location.

Beacon ID / Name

Each beacon is assigned a unique ID number. With your FlexiDisplay, you have the ability to track any beacon; however, you must know the channel number and ID of the specific beacon you want to recognize (see 5.1.1). If the default 6-digit hexadecimal numbers are difficult to remember, you have the option to rename the beacons. This can be done in the Config.ini File Section(see 5.1.4), allowing you to assign more recognizable names to the beacons.

Altitude Indicator

This part of the display allows you to track the live altitude of the beacon. An arrow will indicate whether the altitude is increasing or decreasing. If the altitude is rising, the arrow will point upwards, while a downward-pointing arrow will indicate a descent in altitude.

Distance Indicator

The distance indicator on the display provides the line-of-sight distance between the model and the user. It utilizes GPS location data from both the model and the user to calculate and display the distance between them.

Low Power Mode Indicator(LP)

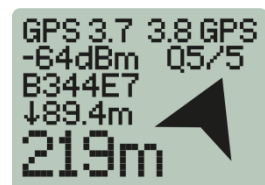
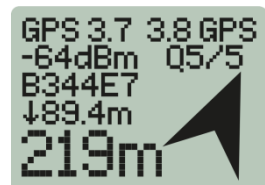
When you activate Low Power Mode, the LP logo will appear in the left-bottom corner of the display. This indicates that the Bluetooth features are turned off and the device is operating at minimum CPU power to extend the battery life. If you wish to use the BMK FINDER (Locator) app, you can switch back to Standard Mode from the Settings Menu (refer to section 5.1.3).



Compass/Walking Direction Arrows

The display features two types of arrows that share the same location:

- **Compass Arrow:** This arrow, represented by a pointed shape, indicates the model's location when you hold your FlexiDisplay level to the ground, similar to a physical compass. It's important to note that this arrow can be influenced by nearby magnetic objects such as smartwatches, cars, or underground mines, as it follows the Earth's magnetic field lines instead of true North. (see 5.1.6)
- **Walking Direction Arrow (aka. Pennington Arrow):** Introduced in July 2023, this arrow tracks your walking direction and guides you if you deviate from your intended course. The arrow will be visible when you hold the device upward, with the antenna facing up, and walk at a consistent speed and direction.

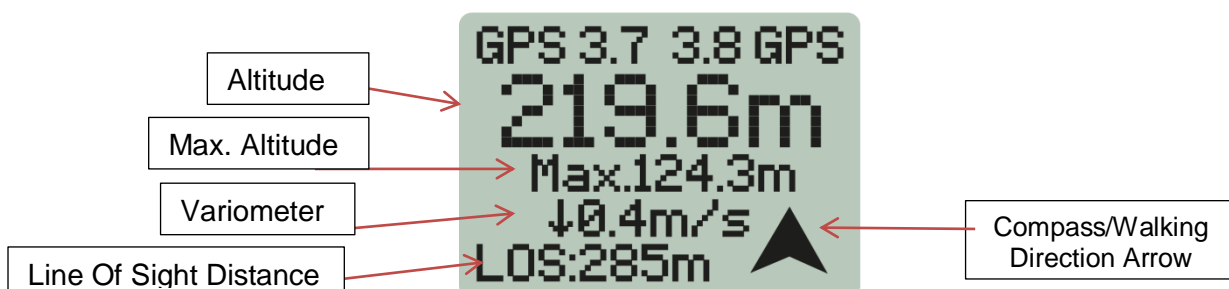


*When you're not walking, a smaller upward arrow will be displayed, indicating that the walking direction arrow is inactive.

**Please note that the displayed arrow is relative to your walking direction, not the device's position..

2. ALTIMETER DISPLAY

The Altimeter Display is the second mode available for tracking your model's performance.



In addition to the previous display mode:

Max. Altitude

The Max. Altitude display indicates the maximum altitude reached during the current or last flight of the beacon. This value represents the highest point reached in terms of altitude. It's important to note that the device automatically resets this value when it detects a new flight.(see 4. How FlexiDisplay detects a flight?)

Variometer

This displays the live climb or sink rate of the model. When the model is stationary, this value will be zero. However, if the weather is windy, there may be some minor fluctuations. An arrow is used to indicate whether the model is climbing or sinking.

Line Of Sight Distance

This represents the distance between the model and the user in a direct line of sight. It differs from the ground distance displayed in the locator display..

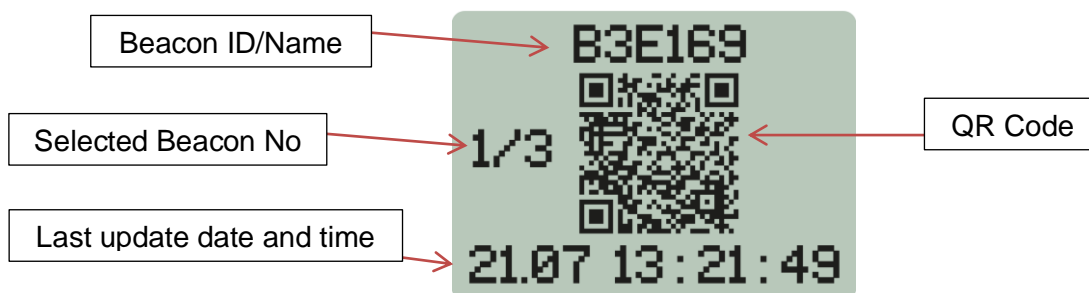
Direction Arrow (Compass and Walking)

The direction arrows mentioned previously, indicating compass direction and walking direction, are also present in this display mode but in a smaller size compared to the previous page. These arrows serve the same purpose of indicating the respective directions, but their reduced size allows for efficient use of display space.

3. QR CODE DISPLAY

The QR Code display provides a unique method for recovering your model if you prefer using your phone display or if someone else will retrieve your model from its landing position. Simply scan the QR code using your smartphone, and Google Maps will mark the location of the beacon. Additionally, you can take a photo of the display to share or track the location at a later time.

Note: If you are using an Android phone, you may need a [QR Code Scanner App](#) to scan the QR code.



Selected Beacon Number

To switch between received beacons, simply click the RED button. This action will toggle the displayed beacon information and automatically update the tracking information on both the Locator and Altimeter displays to the new beacon ID. This serves as an alternative method to select a beacon. It's important to note that in this mode, the device will not send any RCDT command via the RED button.

Last update date and time

The device displays the date and time obtained from the GPS satellites in UTC (Coordinated Universal Time). To adjust the displayed time to your local time zone, you will need to manually add or subtract the time difference accordingly.

4. FLIGHTS SUMMARY DISPLAY

The Flight Summary display provides concise summaries of the last 10 flights. You can switch between the flights by using the RED button. It's important to note that in this mode, the device will not send any RC DT command.

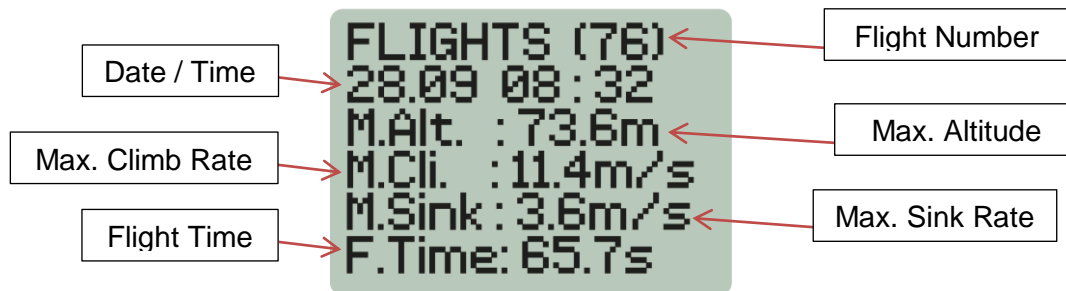
How FlexiDisplay detects a flight?:

FlexiDisplay detects a flight based on the following criteria:

New Launch/Flight: If the beacon is not stationary and climbs over 3 meters, the device recognizes it as a new launch or flight. This indicates that the model has been launched and is in motion.

Landing: Conversely, if the beacon is stationary and remains below 10 meters, the device assumes that the model has landed. This indicates the end of the flight.

These criteria help determine when to reset the max altitude value and track the flights accurately. It's important to note that the device may record "phantom" flights in certain situations, such as pressure excursions during the retrieval of your model or other external factors. These occurrences should be considered as minor anomalies in the flight tracking process.



Flight Number

The flight number displayed is an incremental number that increases with each new flight. It is important to note that this flight number is not resettable, meaning it will continue to increment with each subsequent flight, providing a unique identifier for each flight recorded by the device.

Date/Time

The date and time displayed on the device are obtained from the GPS satellites and are in UTC (Coordinated Universal Time). To adjust the displayed time to your local time zone, you will need to manually add or subtract the time difference accordingly.

Max.Climb / Sink Rates

The display shows the maximum climb and sink rates achieved during the flight. These values represent the highest rates of ascent and descent recorded by the variometer during the flight duration including any DT sink rate.

Flight Time

The displayed flight time provides an estimate of the duration of the flight. However, it is important to note that the flight time cannot be used for precise timing requirements. This is because the timing data is based solely on the altimeter, and there may be a delay in the beacon transmitting the accurate value. Therefore, the flight time should be considered as an estimation rather than an exact measurement.

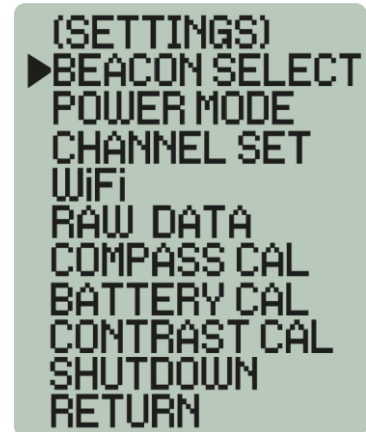
5.SETTINGS

The Settings system can be accessed by using the **[RED button]** on the device. This is the final main display mode. It's important to note that in the Settings system, the device will not send any command. The Settings menu allows you to configure various options and customize the device according to your preferences.



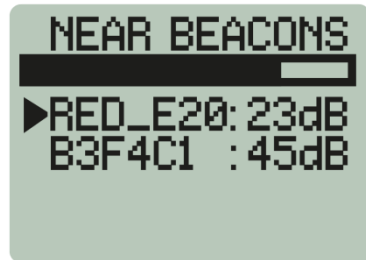
5.1.Main Settings

- Beacon Select
- Channel Set
- Power Mode
- WiFi
- Raw Data
- Compass Calibration
- Battery Calibration
- Contrast Calibration
- Shutdown
- Return



5.1.1.Beacon Select

The Beacon Select menu allows you to choose the active beacon for tracking. The list of available beacons will appear shortly after they transmit valid data. The signal strength of each beacon is displayed in negative dB, but only the positive part of the value is shown due to the limited display size. Therefore, a lower value indicates better reception.



To navigate between the beacons, you can use the **[EDGE Button]**, and to select a specific beacon, you can use the **[RED Button]**. If no button is pressed within a few seconds, the system will automatically return to the main menu.

5.1.2.Channel Set

To avoid interference and optimize live altitude tracking, the beacons can be configured to operate on 40 different channels (0-39). By default, your received beacons and hand units are preconfigured to a dedicated channel, so there is no need to change the channel number unless you are specifically searching for a friend's beacon or assisting them as a spotter.

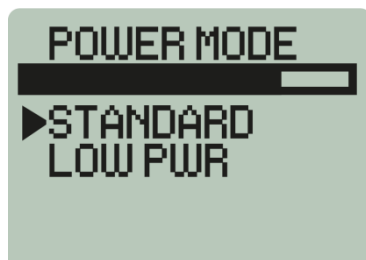


You can use the buttons to select the desired channel. If no button is pressed for 10 seconds, the system will automatically return to the main menu. This feature allows you to easily configure the channel settings for specific tracking needs or when assisting others in locating their beacons.

5.1.3.Power Mode

You can easily switch between two power modes:

Standard Mode: In this mode, the device consumes approximately 50mA of power. With a fully charged battery (850mAh), it can run for up to 16 hours. The Bluetooth features are active, and the microcontroller operates at 80MHz to meet the requirements of the BLE (Bluetooth Low Energy) protocol. The background LED remains on in the main screen.



Low-Power Mode: This mode reduces power consumption to only 30mA. With a fully charged battery, the device can run for up to 24 hours. In Low-Power Mode, the Bluetooth features are turned off, and the microcontroller operates at 20MHz, resulting in lower power consumption. The background LED is also turned off in the main screen and only blinks when a beacon signal is received.

You can switch between these power modes based on your needs, balancing battery life and functionality.

5.1.4.WiFi Mode

When the device is in WiFi Mode, it acts as a WiFi access point (AP) with a unique network ID and password. Here's how you can connect to it:



- On your phone, tablet, or computer, search for WiFi networks and look for the network ID starting with "FD-".
- Connect to the network using the provided password, which typically starts with "BMKS".
- Once connected, open a web browser and type "192.168.4.1" into the address bar. This will take you to the web-based menu.

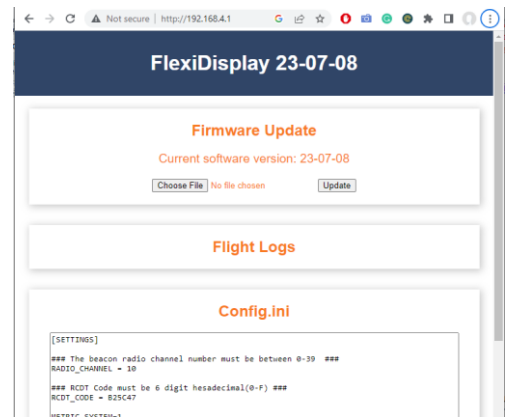
In the web-based menu, you will have several options available. You can update the firmware, adjust device settings, or download flight data in CSV and KML formats. This menu provides a convenient way to manage and interact with the device using a web browser.

Updating The Firmware:

When updating the firmware, please follow these steps:

- Check the current software version of your device. Ensure that the firmware version you download is newer than the current version installed on your device.
- To obtain the latest firmware, please download it from the following link:

https://github.com/melihkarakelle/FlexiDisplay-Firmware-Releases/raw/main/FlexiDisplay_Latest_Firmware.bin



Please note that it is crucial to use the correct firmware version for your specific device to ensure compatibility and successful firmware update.

Config.ini File System

The device utilizes a config.ini file to store user-configurable values. This file follows a standard configuration file system, where sections are denoted by "[]" and variables are used to specify values. If you want to add comments to the file, you can do so by using the "#" character at the start of the line.

The config.ini file provides a convenient and organized way to modify and customize various settings of the device according to your preferences.

```
[SETTINGS]
### The beacon radio channel number must be between 0-39 ###
RADIO_CHANNEL = 10

### RCDT Code must be 6 digit hexadecimal(0-F) ###
RCDT_CODE = B25C47

METRIC_SYSTEM=1
#METRIC_SYSTEM=0

SLEEP_AFTER_STATINARY_SECONDS=600
BEEP_AFTER_STATINARY_SECONDS=180
BEEP_EVERY_X_SECONDS=10
BLE_NAME = YOURNAME
```

[SETTINGS]:

RADIO_CHANNEL : This variable represents the transmit/receive channel (frequency) for the AltiLoc data. It is preset based on the existing user base.

Tip: If you move a significant distance to a new flying site, it is advisable to recalibrate the compass before using the GPS Locator System. This helps ensure accurate bearing information for optimal performance.

5.1.7. Battery Calibration

The battery sensor must be recalibrated if the device is showing lower voltage than 4.1volts after fully charged. The calibration process is simple: Enter this menu and it will calibrate the sensor for 4.2V. If you enter this menu accidentally when the battery level is lower, just charge the device and run the calibration again.

The battery can also be calibrated from the web-browser page – see 5.1.4.

Note that if the displayed voltage drops below 3.3v, the unit will shut down and will need to be re-charged/connected to an external power supply to enable further use.

5.1.8. Contrast Calibration

You can calibrate the display contrast from here if the display is dark or faded. Pressing the RED button will make the display darker, while pressing the EDGE button will make it lighter. Adjust the contrast to achieve the desired visibility.

Recovery Mode:

If you encounter a contrast calibration error that prevents you from reading the display, there is a recovery mode available. Follow these steps:

- 1- Press and hold the RED button for 10 seconds, then release it to force shutdown the unit.
- 2- Press and hold the EDGE and RED buttons together for 3 seconds. The device will turn on in recovery mode.
- 3- Release both buttons simultaneously.
- 4- Press the RED button 10-30 times for a darker display or press the EDGE button for a lighter display.
- 5- Wait for an automatic restart once you are satisfied with the contrast calibration.
- 6- Alternatively, the contrast can also be adjusted on the Config.ini page using the WiFi line, as described in section 5.1.4.

By following these steps, you can recover from a contrast calibration issue and recalibrate the display to ensure optimal readability.

6. Flight Recording

Recording parameters of a flight to a file is achieved by first holding the Edge Button for ~2 seconds until the appropriate message occurs and recording starts; to stop a recording similarly hold the Edge Button for ~2 seconds.



A flashing '*' appears in the middle of the top line of the Locator and Altimeter display screens when operating and will continue until the recording is stopped or when the recording memory is full after ~20 minutes. Multiple recordings are possible with each creating separate files which can be downloaded from the Config.ini file (see 5.1.3).

Two files are created for each recording period, a CSV file with 16 columns of flight data for user manipulation, and a KML file which can be used to display a pseudo-3D flight on GoogleEarth imaging.

6.1.CSV File

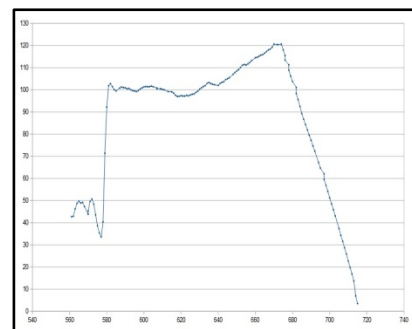
The columns in the CSV file are as follows :-

- **Beacon ID** – Hexadecimal identifier
- **Time Stamp** – GPS time in seconds. Time zero is defined as midnight, January 5th 1980. You can use a converter to translate it to the human date and time. <https://www.epochconverter.com/>
- **RSSI** – Received Signal Strength Indicator in dbm.
- **Package Count** – the received data package number. It's a rolling number between 0-255. If the numbers are not consecutive that indicates a package lost. For example if it's 89 then 92, that means you didnt received 2 packages because of interference or signal lost.
- **Battery Voltage** – Voltage of battery connected to AltiLoc
- **Temperature** – Temperature of the beacon board.
- **V-Speed and H-Speed** – Calculated vertical and horizontal speed according to the GPS position changes
- **Satellite Count** – the number of satellites that the beacon is currently connected to.
- **GPS-Fixed** – GPS 3D Position Fix(Lock) indicator. 0=Not Fixed, 1 = Fixed.
- **Low Power Mode** – If the indicator shows a value of 1, it means that the beacon is operating in low power mode. In this mode, the GPS functionality of the beacon is turned off, and it only transmits the last known location data.
- **Stationary** – AltiLoc positional mode. 1=stationary, 0 = moving
- **HDOP (Horizontal Dilution of Precision)** - A measure of the geometric quality of a GPS satellite configuration in the sky which is a factor in determining the relative accuracy of a horizontal position. The smaller the DOP number, the better the geometry.
- **Altitude** – AltiLoc altitude relative to zero height at power up.
- **Latitude and Longitude** – Position defined in decimal format.

When imported in to a spreadsheet the CSV file format becomes of this style :

Beacon ID	TimeStamp	RSSI(dbm)	Package Count	Battery(V)	Temperature(C)	V-Speed	H-Speed	Satellite Count	GPS_Fixed	Low Power Mode	Stationary	HDOP	Altitude	Latitude	Longitude
B3F916	1679140476	-81	233	3.9	22	0	0	15	1	0	1	0	-7.8	55.707325	-2.377945
B3F916	1679140477	-79	234	3.9	22	-0.1	0	15	1	0	1	0	-8	55.707325	-2.377945
B3F916	1679140478	-85	235	3.9	22	-0	-0	15	1	0	1	0	-8	55.707325	-2.377945
B3F916	1679140479	-92	236	3.8	22	0	0	15	1	0	1	0	-8	55.707325	-2.377945
B3F916	1679140480	-89	237	3.8	22	0	0	15	1	0	1	0	-7.9	55.707325	-2.377945
B3F916	1679140481	-92	238	3.8	22	-0.2	0	15	1	0	1	0	-8.2	55.707325	-2.377945
B3F916	1679140482	-94	239	3.8	22	-0.3	0	15	1	0	1	0	-8.6	55.707325	-2.377945
B3F916	1679140483	-98	240	3.9	22	-0.2	0	15	1	0	1	0	-8.8	55.707325	-2.377945
B3F916	1679140484	-97	241	3.8	22	-0	-0	15	1	0	1	0	-8.9	55.707325	-2.377945
B3F916	1679140485	-89	242	3.9	22	-0	-0	15	1	0	1	0	-8.9	55.707325	-2.377945
B3F916	1679140486	-93	243	3.8	22	0.2	0	15	1	0	1	0	-8.7	55.707325	-2.377945
B3F916	1679140487	-74	244	3.8	22	0.2	0	15	1	0	1	0	-8.4	55.707325	-2.377945
B3F916	1679140488	-74	245	3.9	22	0.1	0	15	1	0	1	0	-8.2	55.707325	-2.377945
B3F916	1679140489	-74	246	3.8	22	0	0	15	1	0	1	0	-8.2	55.707325	-2.377945
B3F916	1679140490	-74	247	3.9	22	0.2	0	15	1	0	1	0	-7.9	55.707325	-2.377945
B3F916	1679140491	-73	248	3.8	22	0	0	15	1	0	1	0	-7.8	55.707325	-2.377945
B3F916	1679140492	-75	249	3.8	22	0.2	0	15	1	0	1	0	-7.6	55.707325	-2.377945
B3F916	1679140493	-74	250	3.8	22	0.4	0	15	1	0	0	0	-7.2	55.707325	-2.377945
B3F916	1679140494	-77	251	3.8	22	0.2	0	15	1	0	1	0	-6.9	55.707325	-2.377945
B3F916	1679140495	-85	252	3.8	22	0.1	0	15	1	0	1	0	-6.8	55.707325	-2.377945
B3F916	1679140496	-83	253	3.8	22	0.2	0	15	1	0	1	0	-6.5	55.707325	-2.377945
B3F916	1679140497	-89	254	3.8	22	-0.4	0	15	1	0	0	0	-6.9	55.707325	-2.377945
B3F916	1679140499	-81	0	3.9	22	-0.4	0	15	1	0	0	0	-7.9	55.707325	-2.377945
B3F916	1679140500	-86	1	3.8	22	-0.3	0	15	1	0	1	0	-8.3	55.707325	-2.377945
B3F916	1679140501	-83	2	3.8	22	0	0	15	1	0	1	0	-8.2	55.707325	-2.377945
B3F916	1679140502	-78	3	3.8	22	0.2	0	15	1	0	1	0	-8	55.707325	-2.377945
B3F916	1679140503	-76	4	3.8	23	0.3	0	15	1	0	1	0	-7.6	55.707325	-2.377945
B3F916	1679140504	-74	5	3.8	23	0.5	0	15	1	0	0	0	-7.1	55.707325	-2.377945
B3F916	1679140505	-74	6	3.8	23	0	0.6	15	1	0	1	0	-7	55.707325	-2.377945
B3F916	1679140506	-80	7	3.8	23	3.6	0.5	15	1	0	0	0	-3.3	55.707325	-2.377948
B3F916	1679140507	-77	8	3.9	23	6.1	0	15	1	0	0	0	2.8	55.707317	-2.377995
B3F916	1679140508	-78	9	3.8	23	5.7	1.2	15	1	0	0	0	8.6	55.70731	-2.377968
B3F916	1679140509	-78	10	3.8	22	3.4	2.8	15	1	0	0	0	12.1	55.707275	-2.378003
B3F916	1679140510	-78	11	3.8	22	4.1	4	15	1	0	0	0	16.2	55.707233	-2.378002
B3F916	1679140511	-77	12	3.8	22	2.5	4.2	15	1	0	0	0	18.8	55.707195	-2.377995
B3F916	1679140512	-80	13	3.8	22	5.9	4.6	15	1	0	0	0	24.8	55.707161	-2.377988
B3F916	1679140513	-82	14	3.8	22	2.9	3.5	15	1	0	0	0	27.7	55.707119	-2.377993
B3F916	1679140514	-86	15	3.8	22	2.5	3.5	15	1	0	0	0	30.3	55.707096	-2.378008
B3F916	1679140515	-92	16	3.8	22	2	4.4	15	1	0	0	0	32.3	55.707073	-2.378004
B3F916	1679140516	-90	17	3.8	22	1.8	4.9	15	1	0	0	0	34.1	55.707024	-2.378065
B3F916	1679140517	-88	18	3.8	22	1.6	5.2	15	1	0	0	0	35.8	55.706982	-2.378087

Setting the basepoint of time to zero in the CSV file and plotting against altitude produces an altitude time history like this :



6.2.KML File

The KML file is pre-formatted to be opened directly using GoogleEarth. It is configured to display a flight path with extruded height bars to allow visualisation of a flight(s) as shown below :

The last 10 flight recording files are available via the Config.ini file to download; see 5.1.3.

Note that a change of active beacon during recording will not affect the data. The beacon ID will change in the CSV and KML files along with the information associated with it.



7.BMK Locator Application

The BMK Locator application (app) provides additional display options to the user of the GPS Locator System, using commercial mapping to display AltiLoc beacon positions and additional data in real time, and the option to indicate last positional data for beacons held in memory. The app is available in both Apple IOS and Android formats free of charge from here :-

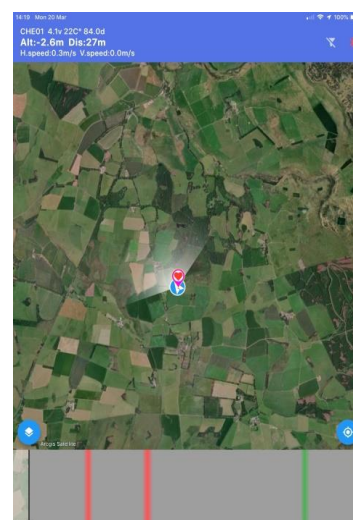
Google Store :

<https://play.google.com/store/apps/details?id=com.bmk.modellocator>

Apple Store:

<https://apps.apple.com/app/id1660730356>

FlexiDisplay transfers all received beacon data in the radio channel to the application through the Bluetooth link. All beacons within range will be tracked simultaneously and their data will be transmitted to the application for monitoring and tracking purposes.



***It's important to note that the Bluetooth functionality is only active in the Standard Power mode.**

7.1.FlexiDisplay Selection

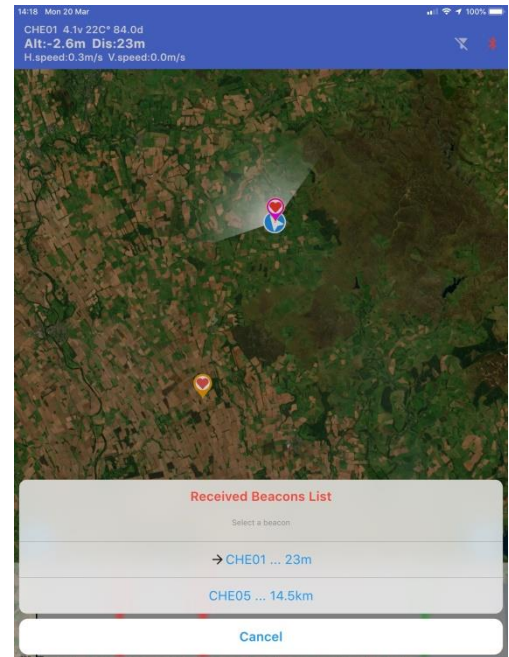
When first used, switch on the FlexiDisplay and then activate the app. The app will ask if you want to connect to the active FlexiDisplay. If you want to change the FlexiDisplay, for example to track another flier's model, then touch the BlueTooth icon and choose the new unit from the menu list.

The main display is as follows :

- Selected beacon data including altitude, distance, speeds, time since last received data etc.
- BlueTooth icon – Green = active
- My Beacon Filter icon – Green and no cross bar = active
- Position of active beacon or last position of beacon
- Position of app display and direction of display
- Map options icon
- Settings icon
- Altitude history – green = climbing, red = descending

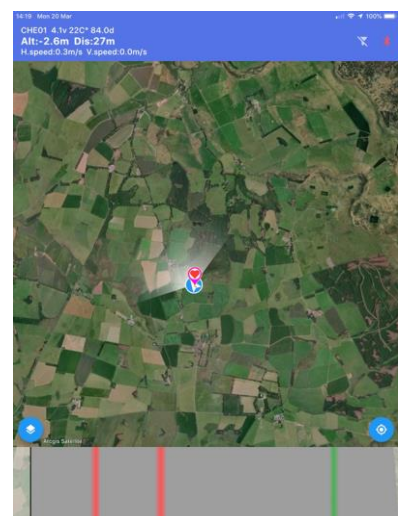
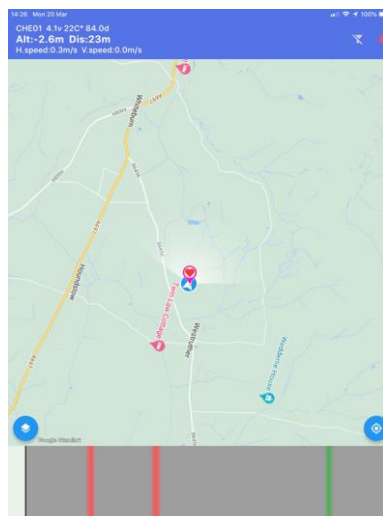
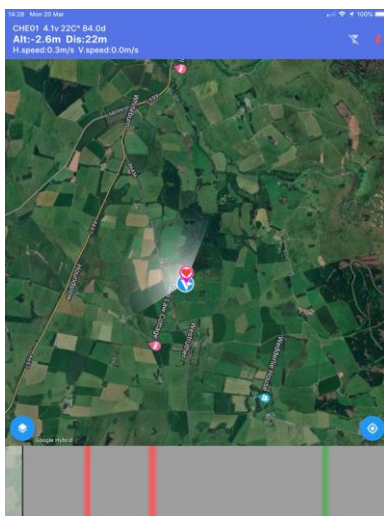
7.2.Beacon Selection

You can select a beacon ID either by touching and holding the Settings icon, or by touching and holding anywhere on the map screen, for a few seconds each. From the list, touch the beacon ID you want to track, the beacon icon will change from orange outline (untracked) to a pink outline (tracked) and the appropriate information will be displayed in the upper left-hand corner. You may need to zoom out the map to show a beacon at distance.



7.3.Map Selection

There are six different maps comprising satellite, drawn, and hybrid options available in sequence by pressing the map options icon. Here are three of the current options :-

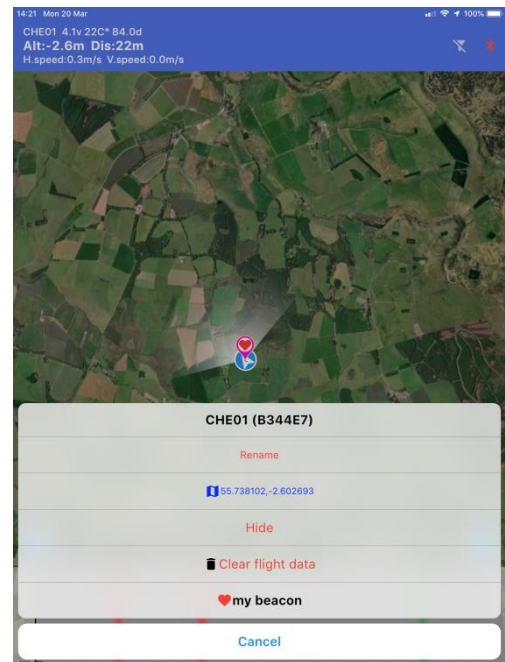


7.4. Beacon Menu Options

Touch a beacon icon for a few seconds and a menu appears.

- Beacon ID – Renamed option shown first, original name in brackets
- Rename – To allow user defined names
- Position Data – link to Google Maps
- Hide – removes beacon from current session
- Clear flight data – removes path and altitude history
- My Beacon – identify as your beacon to allow any others to be hidden by My Beacon Filter (see 7.5).

Note that currently it is not possible to export beacon names defined in the Config.ini file (see 5.1.3) thus the user will have to rename any beacons on the app separately.

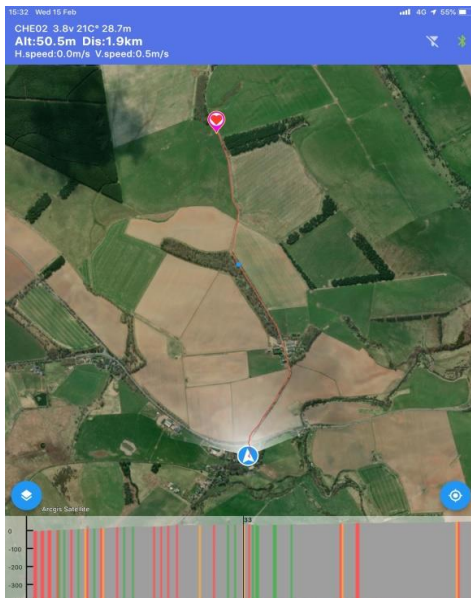


7.5. Beacon Filtering

When first displayed, a beacon will have a grey centre heart which will turn red when identified as a My Beacon. To remove from the display any beacons not identified using the My Beacon option, use the filtering icon; it will turn green when in use and the cross bar will be removed.

7.6. Altitude History

The grey bar at the bottom of the main screen is the beacon's altitude history that is populated as the beacon moves.



The image shown is a test, ie not showing a real flight, but the elements are the same. As the beacons moves away from you a red line is drawn showing its path. If the beacon is active then a small green dot appears next to the beacon icon, otherwise there is no dot. The altitude history is shown as bars, green for climbing flight, red for descending flight. Touching the altitude history brings up a blue dot on the red flight path, and if you hold and move right or left, the blue dot will move along the flight path and display the altitude value at that position. In the example above, a height of 33m is shown roughly half way along the beacon's path, identified by the blue dot.

All flight paths will be drawn consecutively unless they are removed via the Clear Flight Data option in the beacon menu.

Tip :- If the beacon appears stationary and there is no green dot then the Bluetooth link has likely failed, perhaps because the display is momentarily too far from the FlexiDisplay. Touch the Bluetooth icon and re-connect to the FlexiDisplay if appropriate.

7.6. Beacon Histories

Unless removed by the Hide option in the beacon menu, the last received position of any previously active beacons will be retained in the app's memory and can be displayed by selecting the appropriate beacon from the list. For example, in this header data the beacon ID CHE01 was last active 84 days previously.

Single Page Field Manual for FlexiDisplay

Automatic Beacon Selection (Aka: Antenna Kiss™ by Chris Edge)

If you have more than one active beacon, you can use this smart feature to switch between your beacons.

1. Make sure the beacon and the FlexiDisplay in the same channel,
2. Touch the FlexiDisplay antenna to Beacon antenna and wait for ~10 seconds.
3. The FlexiDisplay will measure the signal level and bind to the beacon automatically if it's close enough.

Calibrating the Compass

Compass calibration is recommended if you carried your FlexiDisplay unit and a strong magnet together or flying in a different field.

1. Goto SETTINGS>COMPASS CAL.>
2. Turn the device in your hand in every possible direction until hear a beep.
3. It will record the maximum magnetic field strength and return back automatically.

Channel Selection (FlexiDisplay & GPS Beacon)

Changing the radio channel is not suggested if there is no obvious reason.

FlexiDisplay

1. Goto SETTINGS>CHANNEL SET>
2. Click the RED(+) or EDGE(-) button to select, Wait a few seconds and it will return back automatically.

GPS Beacon

1. Use the tip of a ball pen to find the click point of the micro button. It's a very small black dot below the altimeter's air inlet.
2. Click and hold the button before plug the battery, then plug the battery and release the button.
3. Click the the button and count the blinks until the desired channel number then release the button.(6 blinks for CH6)
4. The LED will flash continuously, cycle the power to use.

Charging

***Do NOT store your lithium batteries at fully charged(4.2V). 3.7V will be best for a longer battery life.**

FlexiDisplay

1. Plug the Micro USB cable to the charge socket
2. The RED LED behind the display will turn on during the charging. It takes about 4 hours for a depleted battery.

GPS Beacon

1. Plug the Micro USB cable to the 25mA Charger,
2. Plug the battery and the RED LED will turn ON until fully charged then it will turn to GREEN.
3. The charge time is ~1.5 hours for a 40mAh battery and 4 hours for 100mAh.

Changing the Antenna

The stock antenna is selected for general use and small enough to fit in your pocket but sometimes you may need a better and bulky antenna if you are planing a long flight etc. Please bare in your mind:

- You can search for 433MHz, 434MHz and UHF antennas. There is no consensus on their names.
- Compare the signal strength readings to make sure your new antenna is better than stock antenna.
- The antenna connector must be SMA MALE (Not RP-SMA MALE)
- Compass calibration may required depend on the antenna material and size.

Credits:

Beta Testers and people behind the most of the features:

Chris Edge
Julian Pennington

Manual Authors:

Chris Edge
Julian Pennington
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