CHECK-IN Procedure for Altimeters @ NARAM 57

Predicted Altitude , E Eggloft Altitude, and B Altitude

1. Contestant will present their altimeter to the check-in official for visual inspection. The check-in official will verify altimeter make and model against the list of NAR approved altimeters (all are shown in this document). The check-in official will verify approved power source. Check-in official will record altimeter make and model this on the contestant’s flight card.  Check-in official will look for any obvious signs of tampering.  Check-in official will ask the contestant whether the altimeter will be used to fire deployment charges, or for altitude measurement only. The answer to this question will determine the next step.
2. FOR ALTIMETERS THAT DO NOT FIRE DEPLOYMENT CHARGES:  The contestant will power up the altimeter and allow the check-in official to verify “zero” (ready for flight mode) using this manual for assistance.  The altimeter is now to be placed in the model and secured in the presence of the safety check official. The contestant may move on to Pad Assignment.
3. FOR ALTIMETERS THAT DO FIRE DEPLOYMENT CHARGES:  These altimeters are beepers (not flashers) and are intended to be powered up using an external switch once the rocket is assembled.  Assembling or disassembling a rocket containing a powered altimeter and live deployment charge(s) can result in pressure changes that can cause accidental arming of the altimeter and firing of the charge(s), and should not be allowed.  After completing Step 1 above, the contestant will assemble the rocket for flight.  Then, the contestant will power the altimeter and the check-in official with verify “zero” (ready for flight mode) by listening, using this document as a reference. The contestant may then proceed directly to pad assignment.

\*4.2 Reloadable Motors

Only reload kits that are presented in factory, new, unopened packages may be used. As part of the check-in procedure, the contestant must present the reloadable motor and reload kit for inspection to determine proper type and tampering. The type of reload kit, the motor case designation, and the letters "RMS" must be recorded on the flight card. The reload kit and motor case will then be returned to the contestant for normal prepping and check-in. In the case of multiple reloads in a single kit, the contestant will remove the required components from the kit for prepping and the remaining items in the kit will be impounded at check-in for further use and returned at the end of the competition.

RETURN Procedure for Altimeters @ NARAM 57

**Predicted Altitude and B Altitude**

**Only the portion of the model containing or attached to the altimeter** must be returned, as recovered and unopened, for a flight to be qualified unless the RSO has requested the model in its entirety be returned for impound for reasons of Safety.

So the **Return Process** is:

1. Check the flight card to be sure that the RSO did not request the entry for impound regarding a possible safety rule violation at launch.
2. The contestant will present the Returns official with the UNOPENED portion of their Altitude model containing the altimeter (UNLESS the altimeter in use is allowed by the manufacturer to be attached to the shock cord or nose cone.) The altimeter MUST still be on (powered).  If the altimeter is off (unpowered), or is indicating “zero” (ready for flight mode), and the flight is otherwise qualified, the flight is considered “track lost” according to 14.9\*\*. (If the Returns official suspects any portion of the contestant’s model containing the altimeter and/or egg has been opened prior to return, he/she should ask for the Competition CD and he will make a ruling.)

**Look up the contestant’s altimeter in the Approved Altimeter Manual for the next steps.**

1. If the altimeter is one that beeps out its result, the portion of the contestant’s model containing the altimeter need not be opened. The returns official and contestant both may listen to and concur on the reported altitude. (Any other specific event rules may also apply.)
2. If the altimeter is one that displays its result via a flashing LED or LCD readout out then the portion of the contestant’s model containing the altimeter shall be opened by the contestant. The returns official and contestant both will observe the display or count the number of flashes and concur on the reported altitude. (Any other specific event rules may also apply.)
3. The altimeter’s result is to be written in the ‘**Altimeter Data**’ location on the contestant’s flight card. If the altimeter’s result is given in **meters**, the result is to be written in the ‘**Altitude/Meters**’ location on the contestant’s flight card.
4. If the altimeter’s result is provided in feet, it is to be converted to meters and that result is to be written in the ‘**Altitude/Meters**’ location on the contestant’s flight card.

**NOTE:** Feet to meters conversion is: Feet **/** 3.28 or Feet **x** 0.3048.

\*\*14.9 Untracked Flights

Track Lost or Track Not Closed, if it is not disqualified for any other reason, is considered an unofficial flight. In this case the contestant is entitled to an additional flight, to be made during the period allocated for tracked flights. At the option of the contestant, Track Lost or Track Not Closed may be considered an official flight if it is not disqualified for any other reason. In this case the flight cannot place but shall receive flight points; except in an event where the score is the sum of several factors, in which case the flight shall be scored as having an altitude of zero.

**E Eggloft Altitude- Altimeter**

Altitude- Altimeter models **need not be returned in their entirety** for a flight to be qualified.

**Only the portion(s) of the model containing the egg and the altimeter (or attached to the altimeter)** must be returned as recovered and **unopened**, for a flight to be qualified unless the RSO has requested the model in its entirety be returned for impound for reasons of Safety.

The **Return Process** is:

1. Check the flight card to be sure that the RSO did not request the entry for impound regarding a possible safety rule violation at launch.
2. The contestant will present the Returns official with the UNOPENED portion(s) of their Eggloft- Altitude model containing the egg and the altimeter (UNLESS the altimeter in use is allowed by the manufacturer to be attached to the shock cord or nose cone). Be sure the altimeter is still be **ON** (powered) then proceed to Step Three (3).

**NOTE:** If the altimeter is off (unpowered), or is indicating “zero” (ready for flight mode), and the flight is otherwise qualified, the flight is considered “track lost” according to 14.9\*\*.

**NOTE:** (If the Returns official suspects any portion of the contestant’s model containing the altimeter and/or egg has been opened prior to return, he/she should ask for the Competition CD and he will make a ruling.)

1. The contestant will remove the egg from the model and it’s padding/wrapping.

**If the egg is broken or cracked-**

* + On the flight card under Return: Good Egg? check the “**NO**” box.
  + The Returns official is to then strikethrough the “Qualified” mark on the contestant’s flight card (if so marked) and re-mark the card as “DQ- broken egg”.

**If the egg in unbroken and uncracked-**

* + Under Return: Good Egg? Check the “**YES**” box and move on to Step Four (4).

**Look up the contestant’s altimeter in the Approved Altimeter Check-In and Return Guide for possible help with the next steps.**

1. If the altimeter is a model that beeps out its result, the portion of the contestant’s model containing the altimeter **need not be opened**. The returns official and contestant both may listen to and concur on the reported altitude. (Any other specific event rules may also apply.)
2. If the altimeter is one that displays its result via a flashing LED or a LCD readout out, the portion of the contestant’s model containing the altimeter shall be opened and the altimeter removed by the contestant. The returns official and contestant both will observe the display or count the number of flashes and concur on the reported altitude. (Any other specific event rules may also apply.)
3. The altimeter’s result is to be written in the ‘**Altimeter Data**’ location on the contestant’s flight card. If the altimeter’s result is given in **meters**, the result is to be written in the ‘**Altitude/Meters**’ location on the contestant’s flight card.
4. If the altimeter’s result is provided in **feet**, it MUST be converted to meters and that result is to be written in the ‘**Altitude/Meters**’ location on the contestant’s flight card.

**NOTE:** Feet to meters conversion is: Feet **/** 3.28 or Feet **x** 0.3048.

**“Jay’s List” of Unit-Specific Characteristics of NAR Contest Approved Altimeters (Updated as of June 1, 2015):**

**A Guide to assist Check-ins and Returns at Sanctioned Meets**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Make and Model** | **Photo** | **Power** | **Verify Zero at Check In** | **Verify Altitude at Return** | **Comments** | |
| **Adept**  A1 (includes A1, A1-M, A1-E, A1-ME) |  | GP-23A 12V Alkaline Lighter Battery | **BEEPS.**  Battery is installed/ long beep indicates power on/ reports previous flight's altitude twice/ 10 second pause/ beeps every 1.6 seconds to indicate that it is ready. | After flight, the **A1 or A1E** will beep altitude in **feet**: Example 1,230 ft: Beep/ Beep-Beep/ Beep-Beep-Beep/ Beeeeeep. There is a pause before it repeats.  The **A1M and A1ME** will beep altitude in **meters to the nearest 1/10 meter**. Example 123.0 meters: Beep/ Beep-Beep/ Beep-Beep-Beep/ Beeeeeep. The first digits are meters. The final digit is to the nearest 1/10 meter. There is a pause before it repeats. | **A1** - measures to 3,000 **feet**  **A1E** - measures to 15,000 **feet**  **A1M** - measures to 1,000 **meters**  **A1ME** - measures to 5,000 **meters**  **Does not fire deployment charges** | |
| **Adept**  ALTS1, ALTS1-50K | http://www.adeptrocketry.com/ALTS1-50K.jpg | GP-23A 12V Alkaline Lighter Battery | **BEEPS.**  Long beep indicates power on/ 10 second pause/ beeps every 1.6 seconds to indicate it is working. Single beep indicates no deployment charge, double beep indicates deployment charge. | After flight, the unit will beep altitude in **feet**: Example 1,230 ft: Beep/ Beep-Beep/ Beep-Beep-Beep/ Beeeeeep. There is a pause before it repeats. | **ALTS1** Max Altitude 15,000 **Feet**  **ALTS1-50K** Max Altitude 50,000 **Feet**  **Fires deployment charges** | |
| **Adept**  ALT05, ALT05-50K | http://www.adeptrocketry.com/A105Qnew.jpg | GP-23A 12V Alkaline Lighter Battery | **BEEPS.**  Battery is installed/ long pulsating beep indicates power on/ 10 second pause/ beeps every 2 seconds to indicate that it is ready | After flight, the unit will beep altitude in **feet**: Example 1,230 ft: Beep/ Beep-Beep/ Beep-Beep-Beep/ Beeeeeep. There is a pause before it repeats. | **ALT05** Max Altitude 15,000 **Feet**  **ALT05-50K** Max Altitude 50,000 **Feet**  **Does not fire deployment charges** | |
| **Adept**  ALTR1 | http://www.adeptrocketry.com/alt1r.jpg | GP-23A 12V Alkaline Lighter Battery | **BEEPS.**  Battery is installed/ long beep indicates power on/ 10 second pause/ beeps every 1.6 seconds to indicate that it is ready | After flight, the unit will beep altitude in **feet**: Example 1,230 ft: Beep/ Beep-Beep/ Beep-Beep-Beep/ Beeeeeep. There is a long pause before it repeats. | Max Altitude 15,000 **Feet**  **Does not fire deployment charges** | |
| **Adept**  A1-TA | http://www.adeptrocketry.com/A1-TA.gif | GP-23A 12V Alkaline Lighter Battery | **BEEPS.**  Battery is installed/ long beep indicates power on/ reports previous flight's altitude twice/ 10 second pause/ beeps every 1.6 seconds to indicate that it is ready | After flight, the unit will beep altitude in **feet**: Example 1,230 ft: Beep/ Beep-Beep/ Beep-Beep-Beep/ Beeeeeep. There is a pause before it repeats. | Max Altitude 15,000 **Feet**  **Does not fire deployment charges** | |
| **Adept**  ALTS2, ALTS2-50K | http://www.adeptrocketry.com/ALTS2.gif | GP-23A 12V Alkaline Lighter Battery | **BEEPS.**  Long beep on power up/ reports previous flight's altitude twice/ 10 second pause/ Single beep every 1.6 seconds indicates no deployment charges. Double beep indicates continuity of only apogee charge. Triple beep indicates continuity of only main charge. Four beeps indicate both outputs have continuity. | After flight, the unit will beep altitude in **feet**: Example 1,230 ft: Beep/ Beep-Beep/ Beep-Beep-Beep/ Beeeeeep. There is a pause before it repeats. | **ALTS2** Max Altitude 15,000 **Feet**  **ALTS2-50K** Max Altitude 50,000 **Feet**  **Fires deployment charges** | |
| **Make and Model** | **Photo** | **Power** | **Verify Zero at Check In** | **Verify Altitude at Return** | **Comments** | |
| **Adept**  ALTIM1 | http://www.adeptrocketry.com/ALTIM1.gif | GP-23A 12V Alkaline Lighter Battery | **BEEPS.**  Battery is installed/ long beep indicates power on/ reports previous flight's altitude twice/ 10 second pause/ beeps every 1.6 seconds to indicate that it is ready | After flight, the unit will beep altitude in **feet**: Example 1,230 ft: Beep/ Beep-Beep/ Beep-Beep-Beep/ Beeeeeep. There is a pause before it repeats. | Max Altitude 3000 **Feet**  **Does not fire deployment charges** | |
| **Adrel**  ALT-LED | http://www.adrel.com.pl/grafika/Alt_led.gif | LiPo 50mAh,  or  LiPo 20mAh (3.6V to 6V) | **Flashes.**  Must be reset before flight to clear the previous measurement. Short the two free contacts in the connector. LED will blink with single flashes. Altimeter is ready for measurement. | After flight, unit will flash altitude in **meters**.  Result is always 4 digits. '0 'is indicated by two short blinks of 0.3 seconds flashes at an interval of 0.3 sec. Digits 1 to 9 are flashes of 0.7 sec separated by 0.5 sec. After each digit there is 2 seconds break. When you see 4 digits of altitude, the LED illuminates a steady for 2 seconds, then displays the serial number of the altimeter.  Example 0123 meters: blink-blink/ bliiiink/ bliiiink-bliiiink/ bliiiink-bliiiink-bliiiink. | Max Altitude 5500 **Meters**  **Does not fire deployment charges** | |
| **Make and Model** | **Photo** | **Power** | **Verify Zero at Check In** | **Verify Altitude at Return** | **Comments** | |
| **Altus Metrum**  Micro Peak | :Altimeter Images:Micro Peak-320x308.jpg | One, 3v CR1025 Lithium button cell | **LED**   * Turn MicroPeak on. Slide the switch so that the actuator covers the '1' printed on the board. * MicroPeak will report the maximum height of the last flight in decimeters using a sequence of flashes on the LED. * A sequence of short flashes indicates one digit. A single long flash indicates zero. * **The height is reported in decimeters, so the last digit will be tenths of a meter.** * For example, if MicroPeak reports 5 4 4 3, then the maximum height of the last flight was 544.3m, or 1786 feet. * Finish preparing the rocket for flight. After the previous flight data have been reported, MicroPeak waits for one minute before starting to check for launch. This gives you time to finish assembling the rocket. As those activities might cause pressure changes inside the airframe, MicroPeak might accidentally detect boost. * **If you need to do anything to the airframe after the one minute window passes, make sure to be careful not to disturb the altimeter.** * The LED will remain dark during the one minute delay, but after that, it will start blinking once **every 3 seconds**. | * **Fly the rocket.** Once the rocket passes about 30m in height (100 feet), the micro-controller will record the ground pressure and track the pressure seen during the flight. In this mode, the LED flickers rapidly. When the rocket lands, and the pressure stabilizes, the micro-controller will record the minimum pressure experienced during the flight, compute the height represented by the difference in air pressure and blink that value out on the LED. After that, MicroPeak powers down to conserve battery power. * **To recover the data**. Turn MicroPeak off and then back on. MicroPeak will blink out the maximum height for the last flight. Turn MicroPeak back off to conserve battery power. | Wherever the Micro Peak is mounted, make sure to protect the barometric sensor from corrosive ejection gasses as those will damage the sensor, **and shield it from light** as that can cause incorrect sensor readings. | |
| **Make and Model** | **Photo** | **Power** | **Verify Zero at Check In** | **Verify Altitude at Return** | **Comments** | |
| **Featherweight Altimeters LLC**  Raven 2 | http://www.featherweightaltimeters.com/images/front__light_small.jpg | 9V battery recommended. LiPo batteries have also been used. Can be powered by any battery between 3.8 and 16 V. | **BEEPS.**  Power-up/ battery voltage rounded down to nearest volt/ beeps once for each of 4 channels (high beep for channels with continuity, low beep for channels without a charge). This repeated pattern is the “ready” indicator. | To hear peak altitude tilt rocket. It will beep out a 5 decimal altitude, in feet. A short, low beep indicates a 0. For example, 1230 feet is represented as: low beep/ beep/ beep-beep/ beep-beep-beep/ low beep. The button can be used to repeat the last apogee altitude. | Max Altitude 99,999 Feet  **Fires deployment charges** | |
| **G-Wiz** | http://www.gwiz-partners.com/assets/images/LCX-Production-Top-min03.png | One 9 VDC transistor battery. Optional second 9V-15V battery for pyro charges. | **BEEPS.**  Powered on/ one or two low pitch beeps (one for Cluster, 2 for Stage)/ half second pause/ single or double high pitch beeps for each of 3 Pyro ports (one for good continuity, two for an open circuit)/ 1 second pause/ repeat. | After landing numbers are beeped with very brief pauses between numbers. ZERO is represented as along Beeeeeep, 1 is a quick chirp, 2 is 2 chirps, and so on. Repeats after pause for ONE FULL SECOND. For example, 1230 feet would be represented by: chirp/ chirp-chirp/ chirp-chirp-chirp/ Beeeeeep/ 1 sec pause/ repeat. | Max Altitude 70,000 Feet  Reads out in **feet or meters**  **ASK CONTESTANT IF THE ALTIMETER IS STILL IN THE DEFAULT “FEET” MODE.** (changing to “meters” can only be done using separate software and computer)  **Fires deployment charges** | |
| **G-Wiz**  MC2 (using audible barometric readout) |  | One 9VDC transistor battery. Optional second 9V-15V battery for pyro charges. | **BEEPS.**  Powered on/ one or two beeps (one for Cluster, 2 for Stage)/ half second pause/ single or double beep (one if recording will start at beginning of memory, 2 if not)/ half second pause/ single or double chirp for each of 4 Pyro ports (one for good continuity, two for an open circuit)/ 1 second pause/ repeat. | After landing numbers are beeped with very brief pauses between numbers. ZERO is represented as along Beeeeeep, 1 is a quick chirp, 2 is 2 chirps, and so on. Repeats after pause for ONE FULL SECOND. For example, 1230 feet would be represented by: chirp/ chirp-chirp/ chirp-chirp-chirp/ Beeeeeep/ 1 sec pause/ repeat.  (option speed readout may alternate with altitude readout). | Max Altitude 75,000 Feet  Reads out in **feet or meters**  **ASK CONTESTANT IF THE ALTIMETER IS STILL IN THE DEFAULT “FEET” MODE.** (changing to “meters” can only be done using separate software and computer)  **Fires deployment charges** | |
| **G-Wiz**  HCX (using audible barometric readout) | http://www.gwiz-partners.com/assets/images/HCX-Top-View.jpg | One 9V or 7.5V transistor battery. Optional second 7.5V-15V battery for pyro charges. | **BEEPS.**  Powered on/ one or two low pitch beeps (one for Cluster, 2 for Stage)/ half second pause/ single or double quick beeps for each of 4 Pyro ports (one for good continuity, two for an open circuit)/ 1 second pause/ repeat. | After landing numbers are beeped with very brief pauses between numbers. ZERO is represented as along Beeeeeep, 1 is a quick chirp, 2 is 2 chirps, and so on. Repeats after pause for ONE FULL SECOND. For example, 1230 feet would be represented by: chirp/ chirp-chirp/ chirp-chirp-chirp/ Beeeeeep/ 1 sec pause/ repeat. | Max Altitude 70,000 Feet  Reads out in **feet or meters**  **ASK CONTESTANT IF THE ALTIMETER IS STILL IN THE DEFAULT “FEET” MODE.** (changing to “meters” can only be done using separate software and computer)  **Fires deployment charges** | |
| **Make and Model** | **Photo** | **Power** | **Verify Zero at Check In** | **Verify Altitude at Return** | **Comments** | |
| **Jolly Logic**  Altimeter One | http://www.jollylogic.com/wp-content/uploads/2011/04/AltimeterOne.png | Integrated, USB- rechargeable Lithium Polymer battery | **LED display.**  Display should read 0000 FT or 0000 M. Record whether the unit is set to record feet or meters. | Peak altitude should be displayed on the LED. Is the unit is “asleep”, press the button briefly to wake it up. Record whether the display says FT (feet) or M (meters). | Max Altitude 29,500 **Feet** or 9000 **meters**  **Does not fire deployment charges** | |
| **Jolly Logic**  Altimeter Two | http://www.jollylogic.com/wp-content/uploads/2011/04/AltimeterTwo3001.png | Integrated, USB- rechargeable Lithium Polymer battery | **LED display.**  Display should read 0000 FT or 0000 M. Record whether the unit is set to record feet or meters. | Peak altitude should be displayed on the LED. Is the unit is “asleep”, press the button briefly to wake it up. Record whether the display says FT (feet) or M (meters). | Max Altitude 29,500 **Feet** or 9000 **meters**  **Does not fire deployment charges** | |
| **Make and Model** | **Photo** | **Power** | **Verify Zero at Check In** | **Verify Altitude at Return** | **Comments** |
| **Missile Works**  RRC2 rev D | RRC2 Classic MCU | One 9 VDC transistor battery. | **BEEPS (and flashes).**  Power up/ beeps the positions of 5 switches with a series of long and short beeps/ 15 second pause/ beeps continuity of ejection charges as follows:  Long Beep No continuity on either channel  1 Short Beep Continuity on channel 1  2 Short Beeps Continuity on channel 2  3 Short Beeps Continuity on channel 1 & 2  This is the “ready” mode. | Depending on the peak altitude, the unit will annunciate 3, 4, or 5 digits. For example, let’s say the rocket flew to a peak altitude of 1230 feet. The unit would beep as follows: Beep/ Beep-Beep/ Beep-Beep-Beep/ Beeeeeep/ long pause/ repeat | Max Altitude 25,000 Feet  **Fires deployment charges** | |
| **Missile Works**  RRC2 mini | RRC2-mini Altimeter | One 9V alkaline battery. 9-volt NiCad, NiMH, LiPo, or other battery types may also be used. | **BEEPS (and flashes).**  Power up/ 3 second chirps/ 15 second pause/ beeps continuity of ejection charges as follows:  Long Beep No continuity on either channel  1 Short Beep Continuity on channel 1  2 Short Beeps Continuity on channel 2  3 Short Beeps Continuity on channel 1 & 2  This is the “ready” mode. | Depending on the peak altitude, the unit will annunciate 3, 4, or 5 digits. For example, let’s say the rocket flew to a peak altitude of 1230 feet. The unit would beep as follows: Beep/ Beep-Beep/ Beep-Beep-Beep/ Beeeeeep/ short buzz/ repeat | Max Altitude 40,000 Feet  **Fires deployment charges** | |
| **Make and Model** | **Photo** | **Power** | **Verify Zero at Check In** | **Verify Altitude at Return** | **Comments** | |
| **PerfectFlite**  ALT15K/WD | http://www.perfectflite.com/wpimages/wp3698c065.png | The altimeter is powered by a standard 12 volt remote battery. Part numbers are Duracell MN21/23, GP A23, Energizer A23, and Radio Shack 23-144. | **BEEPS:**  Ten beeps are used to indicate the number zero.  Power on/beeps a 3-5 digit number representing the altitude of the last flight/ 15 second pause/ a short “beep” repeated every 1.5 seconds indicates “ready”. | When recovered, the altimeter will be beeping a 3-5 digit number to report the peak altitude in feet. For example, a peak altitude of 1230 feet would beep as follows: Beep/ Beep-Beep/ Beep-Beep-Beep/ Beep-Beep-Beep-Beep-Beep-Beep-Beep-Beep-Beep-Beep. | Max Altitude 15,000 **Feet**  **Does not fire deployment charges** | |
| **PerfectFlite**  ALT15K/WD rev 2  (Note: The Alt15K/WD Rev2 version uses a different PCB and circuitry than the previous version.) | http://www.perfectflite.com/wpimages/wp3698c065.png | The altimeter is powered by a standard 12 volt remote battery. Part numbers are Duracell MN21/23, GP A23, Energizer A23, and Radio Shack 23-144. | **BEEPS:**  Ten beeps are used to indicate the number zero.  Power on/beeps a 3-5 digit number representing the altitude of the last flight/ 15 second pause/ a short “beep” repeated every 1.5 seconds indicates “ready”. | When recovered, the altimeter will be beeping a 3-5 digit number to report the peak altitude in feet. For example, a peak altitude of 1230 feet would beep as follows: Beep/ Beep-Beep/ Beep-Beep-Beep/ Beep-Beep-Beep-Beep-Beep-Beep-Beep-Beep-Beep-Beep. | Max Altitude 15,000 **Feet**  **Does not fire deployment charges** | |
| **PerfectFlite**  MAWD/minialt WD | http://www.perfectflite.com/MAWDTop.png | 6V-16V, nominal 9V battery. For limited-space applications we recommend 5 or 6 type SR-44/357 Silver Oxide cells in series. | **BEEPS:**  Ten beeps are used to indicate the number zero.  Power on/ a 1-2 digit number, representing the Mach Delay/ 2 second pause/ a 3-4 digit number representing the main chute deployment altitude/ 2 second pause/ a 3-5 digit number  representing the altitude of the last  flight/ 2 second pause/ continuity beeps repeated every 0.8 seconds: single beep means drogue continuity, two beeps means main continuity, three beeps means both drogue & main have continuity. Silence means there is no continuity on either. | Beeps a 3-5 digit number representing the peak altitude (in feet). Ten beeps are used to indicate the number zero. For example, a peak altitude of 1230 feet would beep as follows: Beep/ Beep-Beep/ Beep-Beep-Beep/ Beep-Beep-Beep-Beep-Beep-Beep-Beep-Beep-Beep-Beep. | Max Altitude 25,000 **Feet**  **Fires deployment charges** | |
| **Make and Model** | **Photo** | **Power** | **Verify Zero at Check In** | **Verify Altitude at Return** | **Comments** |
| **PerfectFlite**  ARPA | http://www.perfectflite.com/APRATop.png  http://www.perfectflite.com/APRABott.png | 4V – 16V, nominal 12V A23 battery.  The altimeter is powered by a standard 12 volt “A23” size remote battery. Appropriate part numbers are Duracell MN21/23, GP A23, Energizer A23, and Radio Shack 23-144. | **BEEPS:**  Ten beeps are used to indicate the number zero.  Power on/ a three to six digit number representing the altitude of the last flight/ a two second pause/ a 2-3 digit number representing the battery voltage in tenths of a volt/ A thirty second pause/ a periodic “chirp” once per second when the altimeter is ready to launch. | Ten beeps are used to indicate the number zero.  After flight, An extra-long tone indicates the start of the reporting sequence/ a 3-6 digit number representing the altitude in feet/ a long separator tone/ a 2-5 digit number representing the maximum velocity in mph/ a pause of 5 seconds/ a 10 second warbling siren tone/ a 10 second period of silence/ sequence repeats until power is disconnected. For example, a peak altitude of 1230 feet would beep as follows: Beep/ Beep-Beep/ Beep-Beep-Beep/ Beep-Beep-Beep-Beep-Beep-Beep-Beep-Beep-Beep-Beep. | Max Altitude 100,000 **Feet**  **Does not fire deployment charges** | |
| **PerfectFlite**  pNut | http://www.perfectflite.com/PNutTop.png  http://www.perfectflite.com/PNutBot.png | Built-in rechargeable Lithium Polymer battery. | **BEEPS:**  Ten beeps are used to indicate the number zero.  Power on/ a three to six digit number representing the altitude of the last flight/ a two second pause/ a 3 digit number representing the battery voltage in hundredths of a volt/ A thirty second pause/ a periodic “chirp” once per second when the altimeter is ready to launch. | Ten beeps are used to indicate the number zero.  After flight, An extra-long tone indicates the start of the reporting sequence/ a 3-6 digit number representing the altitude in feet/ a long separator tone/ a 2-5 digit number representing the maximum velocity in mph/ a pause of 5 seconds/ a 10 second warbling siren tone/ a 10 second period of silence/ sequence repeats until power is removed. For example, a peak altitude of 1230 feet would beep as follows: Beep/ Beep-Beep/ Beep-Beep-Beep/ Beep-Beep-Beep-Beep-Beep-Beep-Beep-Beep-Beep-Beep. | Max Altitude 100,000 **Feet**  **Does not fire deployment charges** | |
| **Make and Model** | **Photo** | **Power** | **Verify Zero at Check In** | **Verify Altitude at Return** | **Comments** | |
| **PerfectFlite**  Stratologger | http://www.perfectflite.com/sl100top_ppage.png  http://www.perfectflite.com/SL100_bott_ppage.png | 4V – 16V, nominal 9V battery. For limited-space applications  we recommend 5 or 6 type SR-44/357  Silver Oxide cells in series. | **BEEPS:**  Ten beeps are used to indicate the number zero.  Power on/ a 1 digit number corresponding to the selected program/ 2 second pause/ a 3-4 digit number corresponding to the main deploy altitude in feet/ 2 second pause/ a 3-6 digit number representing the altitude of the last flight in feet/ 2 second pause/ a 2-3 digit number representing the battery voltage in tenths of a volt/ 2 second pause / continuity beeps repeated every 0.8 seconds: single beep means drogue continuity, two beeps means main continuity, three beeps means both drogue & main have continuity. Silence means there is no continuity on either. | Beeps altitude (in feet) and speed (in mph). Ten beeps are used to indicate the number zero.  An extra-long tone indicates the start of the reporting sequence/ a 3-6 digit number representing the peak altitude in feet/ a long separator tone followed by a 2-5 digit number representing the maximum velocity in mph. For example, a peak altitude of 1230 feet would beep as follows: Beep/ Beep-Beep/ Beep-Beep-Beep/ Beep-Beep-Beep-Beep-Beep-Beep-Beep-Beep-Beep-Beep. | Max Altitude 100,000 **Feet**  **Fires deployment charges** | |
| **Make and Model** | **Photo** | **Power** | **Verify Zero at Check In** | **Verify Altitude at Return** | **Comments** | |
| **PerfectFlite**  FireFly | **FireFly Bottom View 320x160.pngFireFly Top View 320x160.pngFireFly Top View 320x160.png** | One, 3v CR1025 lithium button cell. Rayovac and Energizer brands are recommended.  CR927 lithium cells are an option. | **LED:**  When the altimeter is turned on, it will report the peak altitude from the last flight before readying itself for flight. This is what you will see:  • The LED will light for one second to confirm power-on.  • A three to six digit number (range of 100 feet to 103,500 feet) will be reported representing the altitude of the last flight.  ***Note****: If power was lost during the last flight, the LED will flash slowly four times instead of reporting the apogee altitude. This error indicator will clear after the next good flight.*  • There will then be a thirty second pause, giving you time to insert the altimeter in your rocket and close up the rocket.  • After the thirty seconds have elapsed, the LED will blink approximately once per second while awaiting launch. If the periodic blinking begins before you have had a chance to insert the altimeter and close your rocket, turn the altimeter OFF, then turn it back ON and repeat the process. If you close up your rocket while the altimeter is blinking once per second (awaiting launch), then the air pressure created when the rocket parts are pressed together could trigger the altimeter prematurely, resulting in erroneous data.  ***Make sure you wait at least 60 seconds after turning the altimeter ON before launching your rocket.*** *This will ensure that the altimeter is ready and has had time to accurately obtain the ambient pressure at ground level.* | After flight the altimeter will report in this sequence:   * A long blink to indicate the start of the reporting sequence. * A three to six digit number representing the peak altitude in feet. * A three second pause. * A long blink followed by a two to five digit number representing the maximum speed during the flight in miles per hour. * An eight second pause, and then the sequence repeats until the altimeter is turned OFF. * ***The flight’s peak altitude is preserved when power is turned off, and will be reported every time power is turned on until a new flight is made.*** | Launch detect @ 100’ AGL  Max’ Altitude- 100,000’ MSL  Does not fire deployment charges. | |
| **Make and Model** | **Photo** | **Power** | **Verify Zero at Check In** | **Verify Altitude at Return** | **Comments** | |
| **Quest Aerospace**  How High | Click to enlarge | Uses two CR2016  lithium coin cell (non-rechargeable)  batteries. | **Flashes:**  Power on/ LED will light up for 3 seconds indicating the **feet/meters** setting. (Flickering LED indicates ‘meters’; steady LED indicates ‘feet’)/ flashes peak altitude of last flight. (For example, 1230 feet reports: flash/ flash-flash/flash-flash-flash/ quick double flash)/ LED will remain off for 4 to 6 seconds/ LED will flash every 2 seconds. This “heartbeat” lets you know the unit is on and ready. | Cycle power or “Finger Wave”/ LED will come on for 4 seconds/ Reports peak altitude by flashing the LED just like at power up. (For example, 1230 feet reports: flash/ flash-flash/flash-flash-flash/ quick double flash). | Max Altitude 7000 **Feet**  (2150 **meters**)  **Does not fire deployment charges** | |
| **Winged Shadow Systems**  How High SP  (self powered) |  | Uses two CR2016  lithium coin cell (non-rechargeable)  batteries. | **Flashes:**  Power on/ LED will light up for 3 seconds indicating the **feet/meters** setting. (Flickering LED indicates ‘meters’; steady LED indicates ‘feet’)/ flashes peak altitude of last flight. (For example, 1230 feet reports: flash/ flash-flash/flash-flash-flash/ quick double flash)/ LED will remain off for 4 to 6 seconds/ LED will flash every 2 seconds. This “heartbeat” lets you know the unit is on and ready. | Cycle power or “Finger Wave”/ LED will come on for 4 seconds/ Reports peak altitude by flashing the LED just like at power up. (For example, 1230 feet reports: flash/ flash-flash/flash-flash-flash/ quick double flash). | Max Altitude 7000 **Feet**  (2150 **meters**)  **Does not fire deployment charges** | |
| **Winged Shadow Systems**  How High (with “battery board”) |  | Uses two CR2016  lithium coin cell (non-rechargeable)  batteries on the clip-on [Smart Bat](http://www.wingedshadow.com/batbd.html) battery board | **Flashes:**  Power on/ LED will light up for 3 seconds indicating the **feet/meters** setting. (Flickering LED indicates ‘meters’; steady LED indicates ‘feet’)/ flashes peak altitude of last flight. (For example, 1230 feet reports: flash/ flash-flash/flash-flash-flash/ quick double flash)/ LED will remain off for 4 to 6 seconds/ LED will flash every 2 seconds. This “heartbeat” lets you know the unit is on and ready. | Cycle power / LED will light up for 3 seconds indicating the **feet/meters** setting. (Flickering LED indicates ‘meters’; steady LED indicates ‘feet’)/ Reports peak altitude by flashing the LED just like at power up. (For example, 1230 feet reports: flash/ flash-flash/flash-flash-flash/ quick double flash). | Max Altitude 9,999 ft  (3050 m)  **Does not fire deployment charges** | |
| **Winged Shadow Systems**  How High RT | http://www.wingedshadow.com/files/RTLongShort180.jpg | 3 to 12 volt battery, or the clip-on [Smart Bat](http://www.wingedshadow.com/batbd.html) battery board | **Flashes:**  Power on/ LED will light up for 3 seconds indicating the **feet/meters** setting. (Flickering LED indicates ‘meters’; steady LED indicates ‘feet’)/ flashes peak altitude of last flight. (For example, 1230 feet reports: flash/ flash-flash/flash-flash-flash/ quick double flash)/ LED will remain off for 4 to 6 seconds/ LED will flash every 2 seconds. This “heartbeat” lets you know the unit is on and ready. | Cycle power / LED will light up for 3 seconds indicating the **feet/meters** setting. (Flickering LED indicates ‘meters’; steady LED indicates ‘feet’)/ Reports peak altitude by flashing the LED just like at power up. (For example, 1230 feet reports: flash/ flash-flash/flash-flash-flash/ quick double flash). | Max Altitude 9,999 ft  (3050 m)  **Does not fire deployment charges** | |