ALFA-Club

Memory
Checkpoint Clock

Dual
Odometer/Clock

Owners Manual
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No Information is Presented on This Page

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Introduction:

Congratulations! You have just purchased the latest in rally clock technology. The *ALFA-Checkpoint* has been the leading rally clock on the market since 1983, and its newest incarnation is the best yet. In addition to its function as a multi-split clock with memories, the *ALFA-Club* incorporates a Dual Correctable Odometer as well! Both the odometer and the clock may be driven by the optional built-in GPS receiver.

The *ALFA-Club* is a more advanced version of the original *ALFA-Checkpoint*. It provides a 3 times larger display area, a more efficient user interface, plus all of the advanced features of the *ALFA-Checkpoint*. The *ALFA-Club* is perfect for laying out rallies as well working controls and competing.

Power On :

The *ALFA-Club* does not have a power on/off switch! As soon as you insert the battery, or plug in the 12-volt power cord, the unit begins working. (Without a power switch, it becomes impossible to accidentally shut off the clock in the middle of a rally.) To insert the 9-volt battery, slide the battery cover off of the bottom of the *ALFA* to expose the battery compartment. The battery attaches to the snaps found inside the compartment. To make sure the battery snaps fit snugly (with a "click") you may have to occasionally give the snaps a gentle squeeze.

It is important to use *only 9-volt __Alkaline__* batteries in your *ALFA* clock. (Energizer and Duracell are examples of appropriate batteries.) In normal operation, the battery will last for more than 24 hours of continuous operation. This life will vary depending upon the display lighting, GPS, and other selected options. We suggest a fresh battery for each full day of operation for best results. Note: The GPS option cuts the battery life approximately in half. We recommend using 12v car power with GPS.

(When operating from an external 12-volt power source, the internal battery is used as a backup.)

When the *ALFA* first turns on, it will briefly display its serial number, and then will begin normal operation in Clock Mode.

Basic Operation:

Your new *ALFA* clock has two modes of operation, "Clock Mode" and "Odometer Mode". Within each mode there are various options which you may turn on and off. You may switch between these two basic modes whenever you like without effecting either the clock or the odometer.

See the "Menu Options" section of this manual for instructions on changing modes, setting the clock, and selecting various options.   Refer to the illustration for the location of all controls, connections and displays:
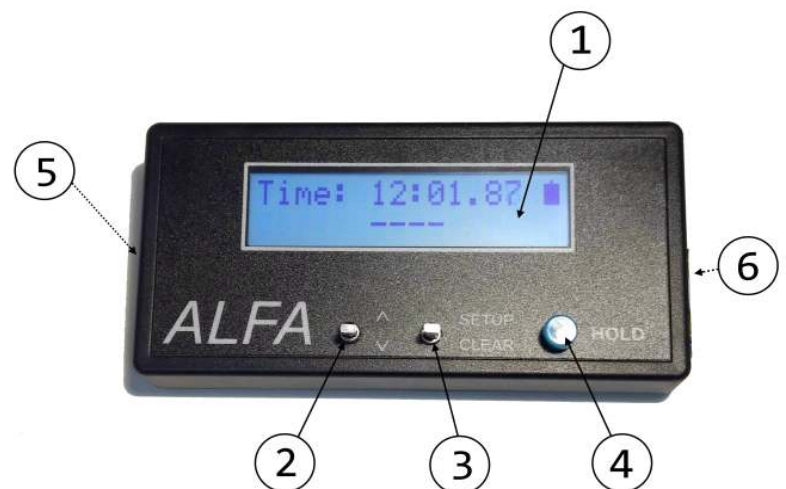
1. The **LCD** display shows the user all time, distance and memory information. It is also used to create interactive menus to configure the clock for use. The display lights up for use at night.
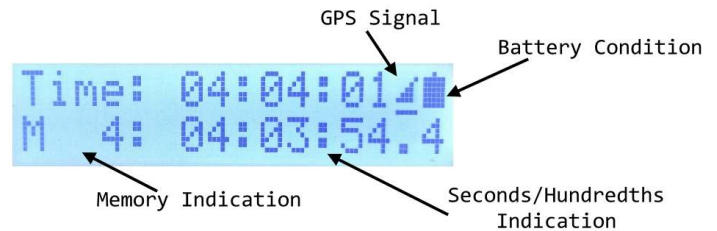2. The ∧∨ **SWITCH** is used to display memories and to set values. This is a spring loaded switch which may be moved upward (increment or next) or downward (decrement or prior).
3. The **SETUP/CLEAR** switch provides a shortcut for clearing memories, zeroing the odometer, and switching between modes.
4. The **HOLD BUTTON** is used to split (freeze) the clock and odometer display. It also is used as an ENTER button while setting the clock or odometer, etc.
5. The **BATTERY COVER** is located on the back side of the *ALFA*.
6. The **DB9 CONNECTOR** provides a single-point plug in for power, remote hold, time sync and *Rally-Link* ™ communications.

The three modes, Clock, Odometer and Setup, are accessed by moving the SETUP/CLEAR switch upward to the SETUP position.

Clock Mode:

"Clock Mode" is generally used for timing checkpoints. In this mode, the display is divided into two areas – the Time of Day and the Memory.

GPS Signal

Battery Condition

Time: 04:04:01∎

M 4: 04:03:54.4

Memory Indication

Seconds/Hundredths Indication

The time and memory are displayed as either Seconds or Hundredths of a minute, with precision to either 1/10 of a second, or 1/1000 of a minute. (You can tell which time mode is being displayed by looking for either a colon (seconds) or a decimal point (hundredths) between the minutes and seconds/hundredths display.

The Time of Day runs continuously on the top line of the display, regardless of user input to split the clock or scan the memories. The HOLD button, when pressed, transfers the present Time of Day into the next available Memory, and displays this on the bottom line of the display. (The remote HOLD input may be triggered by an automatic timing line with the same effect.) Up to 500 "splits" may be stored in the *ALFA*'s memory. Note that once the HOLD has been triggered, there is about a ¼ second delay before it may be triggered again. This prevents the front and rear wheels of a car passing over an automatic timing line from generating two splits.

Splits are stored in chronological order, and may be reviewed by using the ∧∨ switch. This switch is spring loaded, so you simply move it up or down with your finger, and then let it return automatically to its center position. (Do not force the switch beyond its "click" position.) Moving the ∧∨ switch UP will display the next memory position (later time) and pressing the ∧∨ switch DOWN displays the previous (earlier) memory. Note that when the HOLD is pressed, the most recent memory is automatically displayed regardless of user scanning. Also, if the memory size is exceeded (500 splits), the split is saved in the highest numbered memory, replacing whatever was previously stored.

The upper right corner of the screen contains a battery voltage indicator. If the indicator is solid, the ALFA-Club is running on 12 volt external power. A new 9 volt alkaline battery will always read one bar low. This is intentional so if a lighter cord accidentally becomes unplugged, it is obvious by looking at the display. A short time before the battery is completely dead, the indicator will change to a flashing "X". When this happens, please change the battery immediately! To retain the time during a battery change, be sure to first plug the unit into a 12 volt power source.

Odometer Mode:

Your *ALFA-Club* contains dual odometers. In the Odometer Mode, your display shows these two odometers on the left side of the display, and displays the Time of Day in the upper right corner. The odometer is fully factor correctable (6 digit factor) like all other *ALFA* odometer products, and may be setup to display miles or kilometers.
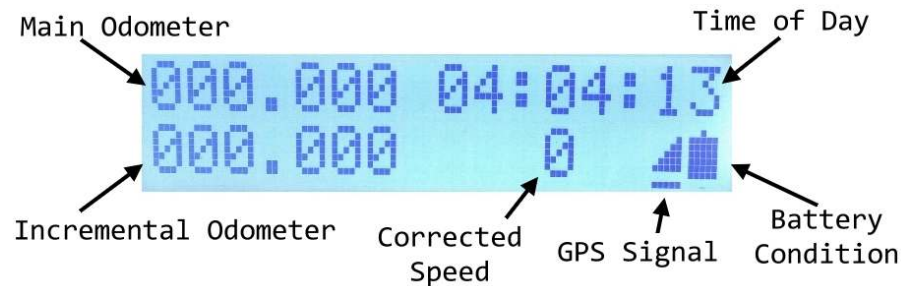
In Odometer Mode, pressing the HOLD button will alternately freeze and release the time and distance on the display. These continue to progress unseen, and the up to date values are displayed as soon as the Hold is released. (The Speed readout continues to update even during HOLD.) The word "HOLD" appears in the lower right corner to remind you that the display is frozen.

The ∧∨ switch controls the direction of the odometer. Pressing the ∧∨ switch upward causes the odometer to run forward, pressing it downward once parks the odometer (odometer off) and downward again runs the odometer in reverse. Note that the shape of the decimal point in the odometer display indicates the direction of the odometer.

The lower right corner of the display contains the battery condition and GPS signal when in Odometer Mode. The indications are the same as in the Clock Mode.

Clearing:

Moving the center switch downward activates the Clear function. In Clock Mode, the Clear function will erase all of the memorized splits. In Odometer Mode, the Clear function resets the second odometer (incremental distance) to zero. Hold the CLEAR switch for 5 seconds to clear both odometers together.

Setup Options:

Activate the Setup mode by holding the SETUP switch for 5 seconds. This mode is how you set the clock, odometer factor, and other operating features of the device. At any time during the setting of values or options, you may move the switch to the SETUP position to abort and access the standard Clock or Odometer modes. The CLEAR switch goes back to the first Setup menu option.

Whenever a menu appears, you will be asked to make a selection using the ∧∨ switch. To select the option on the top line of the display, press the ∧∨ switch upward, and to select the option on the lower line of the display press the ∧∨ switch downward. For menus requiring that you enter a value, the HOLD button will serve to enter the value.

The following menu options are available in Version 4.20 (March, 2020) of the *ALFA-Club*. Additional options will be added from time to time, and software upgrades will be offered to all *ALFA* owners as they become available.

```
┌──────────────────┐     ┌──────────────────┐     ┌──────────────────┐
│ ^ Set Clock      │ →   │ ^ Set clock      │ →   │ ^ Adjust   03:14 │
│ v More Options   │     │ v Bump clock     │     │ v Select       ^ │
└──────────────────┘     └──────────────────┘     └──────────────────┘
         │                                         ┌──────────────────┐
         │                                         │ ^ Up    10:18:44 │
         ▼                                         │ v Down  10:18.74 │
┌──────────────────┐     ┌──────────────────┐     ┌──────────────────┐     ┌──────────────────┐
│ ^ Sync Options   │ →   │ ^ GPS Sync Once  │ →   │ ^ TW Sync Once   │ →   │ ^ ALFA Master    │
│ v More Options   │     │ v More Options   │     │ v More Options   │     │ v TW Master      │
└──────────────────┘     └──────────────────┘     └──────────────────┘     └──────────────────┘
         │                                         ┌──────────────────┐
         ▼                                         │ ^ Whole Secs     │
┌──────────────────┐     ┌──────────────────┐     │ v 1/10 secs      │     ┌──────────────────┐
│ ^ Format Clock   │ →   │ ^ Seconds        │ →   ├──────────────────┤ →   │ ^ 12 Hour Clock  │
│ v More Options   │     │ v Hundredths     │     │ ^ Hundredths     │     │ v 24 Hour Clock  │
└──────────────────┘     └──────────────────┘     │ v Thousandths    │     └──────────────────┘
         │                                         └──────────────────┘
         ▼                                         ┌──────────────────┐     ┌┈┈┈┈┈┈┈┈┈┈┈┈┈┈┈┈┈┈┐
┌──────────────────┐     ┌──────────────────┐     │ ^ Adjust 031.016 │┈┈┈→ ┊ ^ New    5514.1 ┊
│ ^ Set Odometer   │ →   │ ^ Preset Odo     │ →   │ v Select       ^ │     ┊ v Old    5000.0  ┊
│ v More Options   │     │ v Set Factor     │     └──────────────────┘     └┈┈┈┈┈┈┈┈┈┈┈┈┈┈┈┈┈┈┘
└──────────────────┘     └──────────────────┘     ┌──────────────────┐
         │                                         │ ^ Adjust 05142.3 │
         ▼                                         │ v Select       ^ │
┌──────────────────┐     ┌──────────────────┐     └──────────────────┘
│ ^ Format Odo     │ →   │ ^ Zero on Hold   │
│ v More Options   │     │ v Normal Hold    │
└──────────────────┘     └──────────────────┘
         │
         ▼
┌──────────────────┐     ┌──────────────────┐     ┌──────────────────┐     ┌──────────────────┐
│ ^ Backlight      │ →   │ ^ Brighter  3    │ →   │ ^ Constant       │ →   │ ^ Longer  5 Secs │
│ v More Options   │     │ v Dimmer         │     │ v Automatic      │     │ v Shorter        │
└──────────────────┘     └──────────────────┘     └──────────────────┘     └──────────────────┘
         │
         ▼
┌──────────────────┐     ┌──────────────────┐     ┌──────────────────┐
│ ^ Sender Setup   │ →   │ Magnet Engaged   │ →   │ Magnet Separated │
│ v More Options   │     │ (HOLD to exit)   │     │ (HOLD to exit)   │
└──────────────────┘     └──────────────────┘     └──────────────────┘
         │
         ▼                                                                 ┌──────────────────┐
┌──────────────────┐     ┌──────────────────┐                             │ ^ UTC Offset     │
│ ^ GPS Setup      │ →   │ ^ GPS on         │                          →  │ v Hours:    -4   │
│ v More Options   │     │ v GPS off        │                             └──────────────────┘
└──────────────────┘     └──────────────────┘
         │               ┌──────────────────┐     ┌──────────────────┐
         │               │ ^ GPS Odometer   │ →   │ ^ GPS time sync  │
         │               │ v Impulse Sender │     │ v Normal sync    │
         │               └──────────────────┘     └──────────────────┘
         ▼
┌──────────────────┐     ┌──────────────────┐     ┌──────────────────┐     ┌──────────────────┐
│ ^ GPS Status     │ →   │ 40.869553    865 │ →   │ Sat= 9 ◢ 3D WAAS │ →   │ WAAS 63.535280%  │
│ v More Options   │     │ 75.257515      0 │     │ P1.9 H1.1 V1.5   │     │ 2D   0.000000%   │
└──────────────────┘     └──────────────────┘     └──────────────────┘     └──────────────────┘
         │
         ▼
┌──────────────────┐     ┌──────────────────┐     ┌──────────────────┐
│ ^ Clock Tune     │ →   │ ^ Faster 71hz    │ →   │ ^ Confirm change │
│ v More Options   │     │ v Slower         │     │ v Abort change   │
└──────────────────┘     └──────────────────┘     └──────────────────┘
         │
         ▼
┌──────────────────┐     ┌──────────────────┐     ┌──────────────────┐
│ ^ Factory Reset  │ →   │ ^ Factory Reset  │ →   │ ^ Yes, I'm sure.  │
│ v More Options   │     │ v Abort          │     │ v Don't do it!   │
└──────────────────┘     └──────────────────┘     └──────────────────┘
```

Clock Setting:

"Set Clock" allows you to set the time of day for the internal clock. Timing modes may be changed without affecting the time of day, so it is possible to switch between seconds and hundredths of a minute, or change the precision "on the fly". (Note: If you intend to switch between 12 and 24 hour time, please set the clock initially to 24 hour time.)

The clock is always set at the top of a whole minute. Use ∧ ∨ switch to set the hours and minutes to the next whole minute. As your official time source (official clock or WWV receiver, for example) reaches that time, press HOLD to set the clock.

```
^  Adjust    03:14
v  Select         ^
```
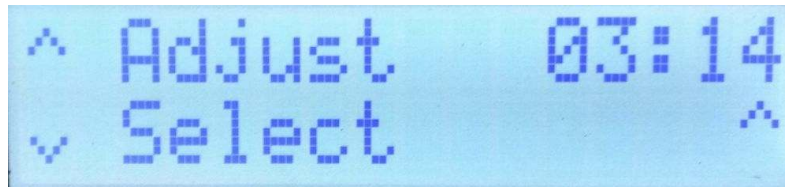
For GPS equipped clocks, you have the choice of continuous GPS sync and one-time sync. After a one-time sync, the clock runs on the internal crystal and does not require GPS reception. In continuous mode, the clock will continue to run without reception, but will not be corrected by the satellites.

Note: If GPS equipped, the clock will automatically reset after a power failure or battery replacement. Standard crystal controlled clocks will reset to midnight after a power failure. If you need to replace the battery and maintain the clock, please use a 12v power cord to keep it running. After the fresh battery is installed, the power cord may be removed.

Bump Clock:

If the time is off by a fraction of a second after setting, you may use the "Bump Clock" feature to synchronize it. When selected, this mode displays the clock, and the ∧ ∨ switch advances or retards the clock a fraction for each operation. When the clock is synchronized with the official source, use the HOLD button return to normal operation.

```
^  Up      10:18:44
v  Down     10:18.74
```

Note that the Bump display shows time in both seconds and hundredths. This is convenient for synchronization to either a WWV clock tic, or by watching another rally clock. The CLEAR switch removes any correction made to the clock.

When synchronizing to GPS, the time may not match the rally-master's time which was set by other means. The Bump feature allows you to compensate for this difference.

Do not confuse the Bump feature with the Clock Tune feature, which is used to make the non-GPS clock run faster of slower to compensate for crystal errors. The Bump is a constant time offset and does not affect the speed at which the clock runs.

Format Clock:

The displayed format of the clock may be switched between its various settings without affecting the time of day setting. The clock will record all splits at maximum resolution, 1/10th of a second or 1/1000th of a minute, regardless of the display setting. Available time formats are:

```
HOURS:MINUTES:SECONDS.TENTHS                    09:43:14.4
HOURS:MINUTES:SECONDS                           09:43:14
HOURS:MINUTES.HUNDREDTHS.THOUSANDTHS            09:43.24.0
HOURS:MINUTES.HUNDREDTHS                        09:43:24
```

Note that there is no AM/PM setting for the clock. If you intend to switch between 12 and 24 hour time, please make the initial time set in 24 hour mode. After that, switching between 12 and 24 hour display mode will produce the correct results.

Preset Odometer:

This selection allows you to preset the first odometer to any value. Once selected, the display shows the present odometer value, and two switch options. Moving the ∧ ∨ switch downward selects which digit will be altered, and pressing the ∧ ∨ switch upward increments the digit. By manipulating the scan switch, all 6 digits of the odometer may be changed, one at a time.

```
^ Adjust 031.016
v Select      ^
```

While entering the odometer value, the CLEAR switch immediately changes the value to zero. When the desired value is entered, press the HOLD or SETUP switch to resume normal operation.

Odometer Factor:

There are two ways to set the odometer correction factor, manually and automatically.

To manually set the odometer correction factor, enter it in the same manner described for presetting the odometer. The correction factor is used to calibrate your *ALFA* odometer so that it measures the same distance as the rally-master for easier course following. The correction factor works exactly the same way regardless of using GPS or Wheel mounted sensors.

```
^ Adjust 05142.3
v Select        ^
```

To determine your odometer correction factor use this formula:

$$\text{New Factor} = \frac{\text{Current Factor}}{\text{Measured Miles}} \times \text{Course Miles}$$

For example: Start the odometer leg with the factor set to 5000. The end of the odometer check leg is officially at 12.56 miles, but your *ALFA* measured only 11.21 miles. 5000 divided by 11.21, multiplied by 12.56 equals 5602. 5602 is your new factor and should be entered into your *ALFA*.

To automatically set the odometer correction factor, you need to run a known section of the course starting the odometer at zero. Generally, this is the odometer check leg of the rally. At the end of the leg, enter the correct odometer reading as described in the Preset Odometer section. Instead of exiting the Preset Odometer in the normal way, press and hold the HOLD switch for 5 seconds. You will be presented with both the newly calculated factor, and the original factor, and may choose between them with the ∧ ∨ switch.

Format Odometer:

At present the only option here is the Zero-On-Hold feature. When selected, it causes the second odometer (incremental distance) to be automatically zeroed whenever the HOLD button is pressed. The previous distance is displayed while the new distance is accumulated in the background. When the HOLD is released, the new distance is immediately displayed.

Backlight On/Off:

Your *ALFA* has an adjustable backlight. It may be turned on or off, has 5 brightness settings, and an automatic setting which preserves battery life. *The best battery life is obtained when the backlight is completely OFF.* The LCD display used in the *ALFA* is a type which has extremely good viewing characteristics with no backlighting while in normally lit situations. The backlight is only necessary in darkness.

The best compromise is to use the AUTOMATIC backlight setting when you are running the *ALFA* on battery power. This setting turns on the backlight for about 5 seconds whenever any switch is activated. The default setting for the *ALFA* is Brightness 3 and AUTOMATIC.

Note that you should only use the CONSTANT setting (either bright or dim) when running with the 12-volt adapter! Battery life will be extremely limited if the backlight is on constantly.

Sending Unit Test:

Installing a wheel mounted sending unit on your rally car has always been a challenge. Selecting the Sending Unit Test mode provides visual and audio feedback of when the sensor engages and releases each magnet. This makes alignment of the magnets easy, and insures that you're getting all of your pulses all of the time. (Shameless Plug: For an easy to setup and use wheel mounted sending unit, try our EZ-Pulse. It takes just minutes to mount on any car, including rentals.)
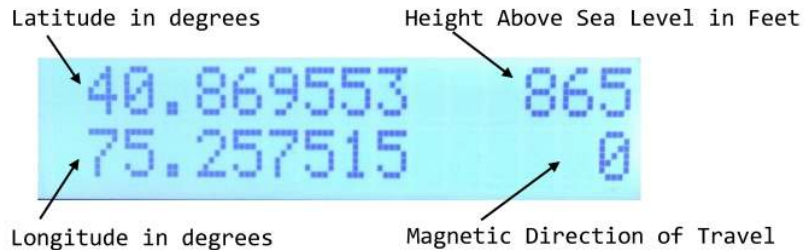
Magnet Engaged
(HOLD to exit)

Magnet Separated
(HOLD to exit)

GPS Setup:

These settings are only for ALFA-Clubs equipped with a built-in GPS receiver. The GPS may be configured to synchronize the clock and/or provide distance information to the odometer. Please see the GPS Limitations section before using these functions.

The GPS receiver, if installed, is enabled by default. You may use the GPS Off selection to disable the GPS, which sets the clock to its internal crystal and the odometer to an external sending unit. If enabled, you may use the subsequent menus to individually enable the clock and odometer GPS inputs. When the GPS clock is enabled, you must also enter your time zone difference from UTC time. (UTC is also known as GMT or Zulu time) This setting will vary depending upon your location and whether Daylight Savings Time is active. For example, New York during Standard Time would be -5 hours, and during Daylight Savings Time it's -4 hours.
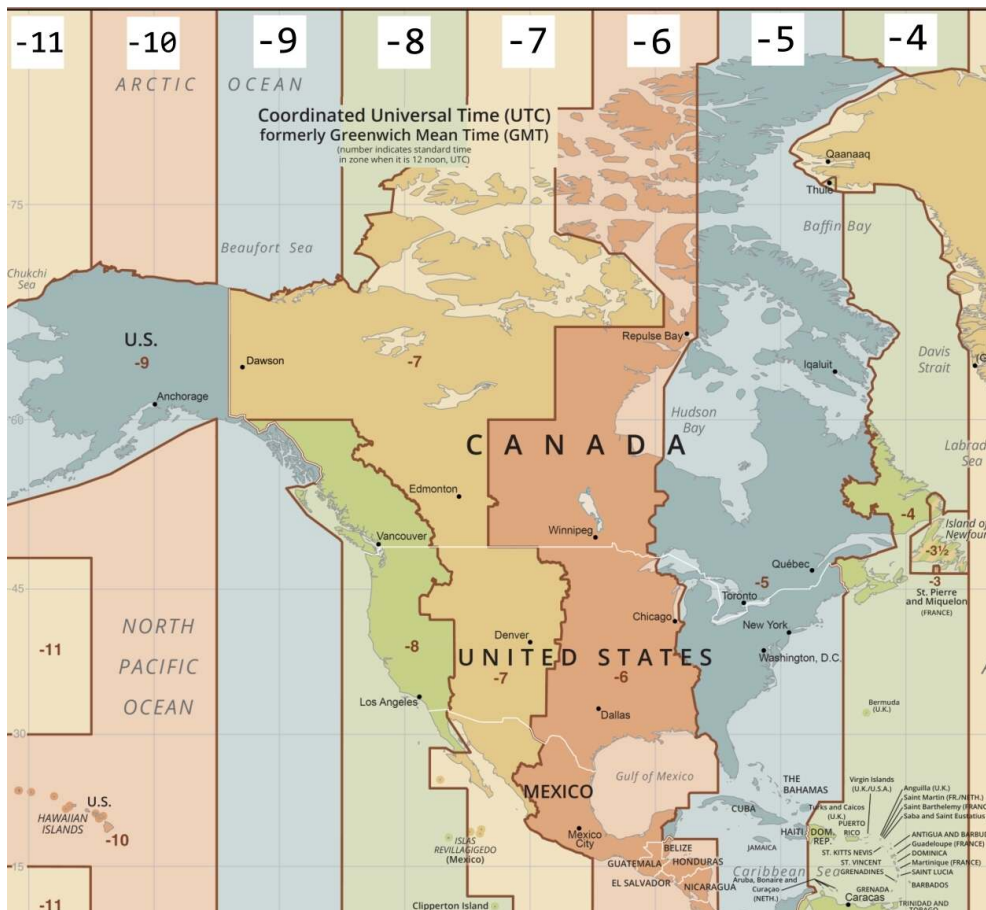
GPS Status:

When mounting the ALFA-Club equipped with a GPS, it is important for it to have a clear view of the sky with the antenna facing upwards. The antenna is located at the top edge of the unit, and faces upwards when the LCD display is facing towards the operator. Good reception is essential to accurate measurements, and so the GPS Status screens are available to you to help optimize your installation. There are three GPS Status screens. Use the ∧ ∨ switch to view them:
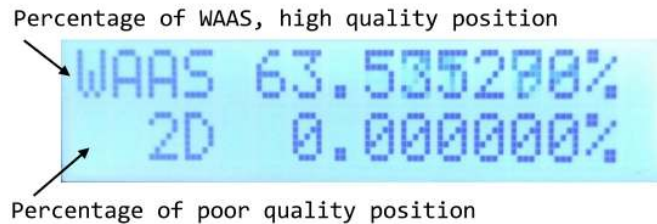

Latitude in degrees   Height Above Sea Level in Feet

40.869553   865
75.257515   0

Longitude in degrees   Magnetic Direction of Travel

Screen 1 is simply a direct readout of the current position information being provided by the GPS receiver. The Latitude and Longitude are provided in decimal degrees, and not the more common degrees, minutes and seconds. The height is given in feet above mean sea level.

Number of   Solution Quality   Best Precision
satellites

Sat= 9 ◢ 3D WAAS
P1.9 H1.1 V1.5

Overall (PDOP) Horizontal (HDOP) Vertical (VDOP)
(Dilution of Presision)
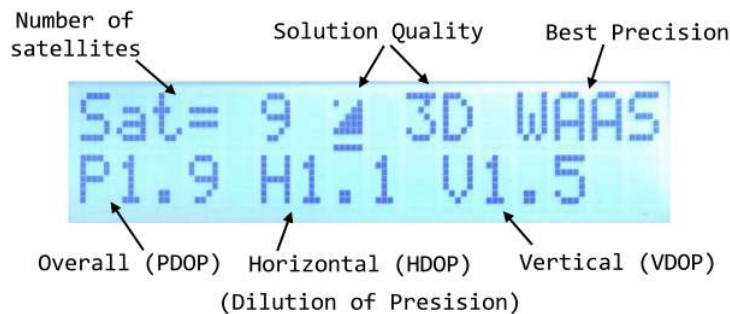
Screen 2 is crucial for setting up your devices position for good reception. Ideally, you should maximize the number of satellites being received, and the WAAS indicator should be on. (See "GPS Operations" for the meaning of the signal quality symbol.)

For the GPS to provide and service at all, at least 3 satellites need to be received, which will only provide a two dimensional location with very low precision. With 4 or more satellites the receiver can generate a three dimensional position with much higher accuracy. The more satellites, the more consistant the position will be. The best precision is obtained with the WAAS indicator on. (vs STD) (WAAS is a GPS correction system. See GPS Limitations below.) Driving through hilly or urban areas makes it even harder to receive satellites, and so optimizing these readings is critical.

The bottom line of the display shows the "Dilution of Precision" of the received GPS signals. How precisely a GPS receiver can fix a position depends upon the geometry of the orbits of the available satellites, how many are blocked by local geography, and other environmental considerations. The lower these number are, the better the position and the more consistent your odometer will be. PDOP is the overall quality of the position, taking all factors into account. HDOP and VDOP are the horizontal and vertical precision. A DOP of 1.0 is nominal, giving around 8 feet accuracy 95% of the time *under ideal conditions*. The DOP is a factor which essentially multiplies this error.

Percentage of WAAS, high quality position

WAAS 63.535270%
2D   0.000000%

Percentage of poor quality position

Screen 3 gives an idea of GPS quality over time. After a rally, or a test run, this screen shows the percentage of time that WAAS signals were received, showing a high quality signal over time. It also shows the number two dimensional, low quality, signals received over time. Ideally, the WAAS line should be close to 100% and the 2D line should be near zero.

Clock Tune:

The clock tune feature allows you to compensate for changes in the crystal frequency over time. Crystals drift with age, temperature and other factors. In the past, if a clock got out of calibration, you had to send it back to the factory to be "re-trimmed". With our new technology, we no longer trim the crystal frequency, but rather correct the timing in software. The Clock Tune is set at the factory, and adjusting it is considered an expert feature. NOTE: This feature only affects the crystal controlled clock, and not GPS time keeping.

^ Faster 71hz
∨ Slower
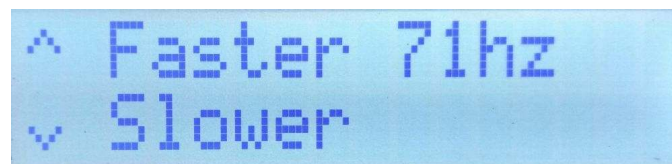
Technical discussion: The crystal frequency used to control the internal clock is ideally 8,000,000hz. The number entered into the clock tune is the number of hz error in the crystal. So, if the crystal measures 8,000,071 we enter 71hz and the software takes care of the rest. If the crystal is running lower than the normal frequency, the number would be negative. You can set this up using a frequency counter, if you want to, or you can estimate the number and see how it works over a 24 hour period. We generally expect the clock to be within .01 minutes per day.

The original value for your device, set at the factory, is permanently stored in the unit. If you mess up the setting, use the CLEAR switch to restore the original.

CHANGING THIS SETTING WILL AFFECT THE ACCURACY OF YOUR CLOCK. DON'T ADJUST IT IF YOU DON'T KNOW WHAT YOU'RE DOING!

Factory Reset:

This feature is exactly what it says. If you select this, all of your customized settings will be reset back to the original "out of the box" settings. The ALFA will ask twice if you really want to do this before actually resetting.

GPS Odometer Limitations:

The Global Positioning System, or GPS for short, is all the rage these days. Most people think of it as magically precise, and for many purposes it is just that. However, as rallyists, we have great expectations for precise mileage measurements and there are technical issues with GPS which conspire to make it less precise than a traditional wheel-mounted sending unit. Using the ALFA-Club with its built-in GPS odometer will provide a huge level of convenience and generally accurate and correctable mileages, however you should be aware of the system's inherent limitations.

"GPS" is a term which can apply to several different systems, with different capabilities. The United States, Russia, China, Japan, India and the European Union currently each have their own "GPS" system in orbit. The USA system is the oldest and most well known, but the Russian system works well too, and the other systems are under construction but will shortly give the USA system a run for its money. The USA system requires 24 satellites to be fully operational, and presently has 33 in orbit. These satellites are in constant motion, and each rises and sets roughly every 12 hours.

The ALFA-Club uses a receiver which operates on both the USA and Russian systems. In addition, it uses a supplemental system called WAAS, or Wide Area Augmentation System. WAAS monitors the system using ground stations and relays correction data via geo-synchronous satellite. While WAAS, and systems like it, make the position data more accurate, the 22,000 mile stationary orbit makes receiving the signal a bit more difficult. You will see that the WAAS indicator takes a while to "lock on", and can be lost from time to time while driving around. The WAAS service is designed to operate within the USA, but is interoperable with other services, including those operated by Japan (MSAS), Europe (EGNOS), and India (GAGAN).

GPS accuracy is a much debated subject, and the answer is not simple or a single number. The Air Force, which operates GPS in the USA, says a typical cell phone GPS under ideal conditions is good to about 16 feet. The GPS receiver in the ALFA-Club is considerably better, with accuracy possible to less than 6 feet with WAAS and about 8 feet without it – *under ideal conditions.* However, this accuracy is assumed to be during 95% of the time, while during the other 5% of the time it could be considerably worse even under good conditions. In rally terms, think about a checkpoint being misplaced by 8-16 feet, this might not bother some, but experienced Equipped class rallyists would not be happy. This is under IDEAL conditions, which rarely exist on a rally route in motion.

So, what sorts of things affect GPS accuracy:

- Satellite signal blockage due to buildings, bridges, trees, etc.
- Signals reflected off buildings or terrain ("multipath")
- Location of the GPS antenna, its view of the sky, and metallic window tinting.
- Radio interference
- Indoor or underground use (Not usually a rally problem!)
- Major solar storms
- Satellite maintenance/maneuvers creating temporary gaps in coverage

These type of inaccuracies may happen individually or in groups, and can cause small, but rally significant, jumps in position. The government web sites which track GPS problems, gps.com and uscg.gov, are loaded with reports of GPS suddenly jumping ½ mile or more and just as suddenly returning, with matching data on multiple receivers. Scheduled outages and testing make GPS all but unusable from time to time in specific areas, and these are scheduled on the web site. For example, there are 12 scheduled outages for March 2020 in areas all around the USA, some scheduled to last

more than a week. One is a 33 mile area of Upstate New York known to host some of the best rallying in the area. The trick is, be aware before you go rally and know what to expect.

The designers of ALFA brand rally odometers have been working with GPS, for both land and air based applications, for nearly as long as the system has existed. Over the years we have designed algorithms to provide the best simulation of a linear odometer possible. Our position data updates 10 times per second to insure a lag-free experience familiar to any rallyist who has used a conventional wheel driven odometer. However, we have to acknowledge that a GPS odometer will never be as accurate as a wheel driven odometer for rally purposes, given the present affordable technology.

GPS Time Limitations:

The GPS system works by measuring the amount of time a radio signal takes to travel from space to the receiver. For this to happen it requires an extremely precise clock to synchronize all of the satellites. This gives us an excellent source for our time of day clock in the ALFA-Club. However, there's always a catch, and the catch is that GPS time is not exactly the same as our clock time. During the startup of the GPS receiver, the time of day may be off by as much as a few seconds until the receiver is fully synchronized. Unfortunately, there is no status signal for us to monitor to know when the clock is fully sync'd. If the GPS has been running within the past few hours, the time is correct almost immediately. But, during a "cold start" where the GPS has been turned off for days or has been moved a significant distance from its last use, it could take several minutes for the clock to be on-time. Our testing has shown a maximum of 5 minutes is required for the clock to become accurate, even if the odometer has begun functioning much sooner. Please allow for this and power up the ALFA some time before its needed to assure accuracy.

GPS Operational Information:

- Chipset: UBX-M8030-KT
- 56 Channels
- Cold Start time < 1 minute
- 10 position reports per second
- 115,200 bps data transfer speed

Those are the official numbers. In practice, please allow a few minutes for the GPS to acquire its signal and begin tracking. You will see the signal quality indicator gain bars over the first few minutes as the receiver syncs up. It is best to start the receiver 15-30 minutes ahead of its anticipated use to assure both time and distance are up to spec.

The signal quality indicator show a combination of accuracy and number of satellites being used for tracking. The overall signal is shown as "bars" similarly to cell phone or WiFi signal indicators. An additional dot appears above the bars when the WAAS signal is received. If the signal is tracking, but at a very low, two dimensional, precision the underline will appear broken.
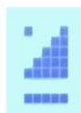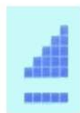
```
WAAS 3D      Standard 3D  Limited 3D   2D Only
(Best)       (Good)       (Fair)       (Poor)
```

Time Synchronization:

The *ALFA* is equipped with *Rally Link* ™ which allows one clock to read the time settings from another clock through an optional Sync Cable. **No user input is required to sync two clocks**, simply plug the marked end of the sync cable into the Master Clock, and the other end of the sync cable into the clock which needs to be set. Within a few seconds, the two clocks will be in perfect sync – *that's all that's required!* Once the clocks are in sync, simply unplug the cable.

Your ALFA-Club will sync to older ALFA-Club and ALFA-Checkpoint clocks, as well as the newest version of the ALFA-Elite rally computer and ALFA-Pro advanced "B Unit".

Beginning with Version 4.2 (March 2020), the ALFA-Club can sync with Timewise™ brand clocks. The ALFA-Club may act as either the Master Clock, or the Slave Clock. To use the ALFA-Club as a Master, go to the "Sync Options" setup menu and select either "ALFA Master" or "TW Master". The master clock sends continuous synchronization information in the selected format. To receive sync as a Slave Clock to a Timewise™ master, select "TW Sync Once" from the setup menu.

Notes:
- The ALFA-Club must be in Clock Mode to sync.
- It can take up to 12 seconds for sync to finish with either ALFA or Timewise format.
- If your ALFA is GPS equipped, you can set the ALFA to auto-sync to GPS, and act as a Timewise™ Master, therefore syncing the Timewise™ clock directly to GPS.
- *The ALFA Rally Link ™ synchronization format includes error checking features that Timewise™ does not. We highly recommend that you use the ALFA format synchronization whenever possible for the highest possible accuracy.*

Flash Memory:

The ALFA-Club uses a Flash (non-volatile) memory to store certain settings and the checkpoint memories. It stores:

- Up to 500 recorded time splits
- Unit serial number
- Crystal/Clock calibration information
- Time format
- Odometer format
- Backlight configuration
- GPS configuration information

The ALFA-Club does NOT store the time or odometer when the power is removed. If you have the GPS option, the time will be immediately restored when the GPS starts up. The GPS has its own battery which keeps time during power down for several hours.

New or Improved in version 4.2:

- Memory increased from 100 to 500 splits
- Two-Way Synchronization with Timewise^{tm} clocks and computers
- In Clock Mode, quickly access the first and last memory by holding the ∧ ∨ switch for 5 seconds
- Setup mode is now accessed by holding the SETUP switch for 5 seconds
- In Odometer Mode, clear both odometers together by holding the CLEAR for 5 seconds
- GPS features for both Clock and Odometer
- In Odometer Mode, pressing HOLD adds time splits to the memory as in Clock Mode
- Automatic odometer factor calculation
- User access to crystal frequency tuning
- Flash memory saves setup and checkpoint time splits

Options:

- 12 volt power cable and sending unit adapter
- Sync cable
- DIN adapter to use newer and older ALFA clocks to synchronize
- Built in GPS receiver (Syncs time and provides alternate odometer input)
- Timewise synchronization adapter
- Basic Sending Unit (wheel mounted magnetic sensor with rare-earth magnets)
- EZ-Pulse hub mounted (removable) sending unit

12 Volt Power Cord:

The optional 12 Volt power adapter for the *ALFA-Club* allows you to power your clock from any 7-16 volt power source. It also provides the attachment point for a sending unit and for a remote hold switch.

There are 2 connection points on the cable:

1: The DB9 connector which attaches to the ALFA.

2: The Terminal Block which provides screw terminals for easy attachment of the sending unit and hold switch.

The terminals are as follows:

RED: +12 volt power input. **Also the power connection for a sending unit**.
BLACK: Ground. This is the common point for power, sender and hold inputs.
**GREEN**:   Sending unit pulse input.
BLUE: Hold switch input.

Notes:

1: You should keep a battery in your ALFA clock as a power backup in case the 12 volt cord falls out of the lighter plug.

2: It is best to wire the ALFA directly to the battery or fuse box, and not use a lighter cord. Use a lighter cord only for temporary installations.

3: **The ALFA sending unit will operate from 5-16 volts DC**. If you use another brand sending unit, make sure it will withstand the 12 volt power source.

4: You can connect the pulse input directly to the pulse output of most car's Vehicle Speed Sensors (VSS). In this case, DO NOT connect the 12 volt power to the VSS – it gets its power from the car's system independently. See WWW.RALLY.CC for connection details. *NEVER US THE ABS BRAKE SENSOR AS AN ODOMETER INPUT!*

5: When using the ALFA-Club or Checkpoint with a sending unit, the clock should be powered from the car's 12 volt system. Battery life is limited when running in odometer mode.

Connector Information:

This information is provided for the technically curious and otherwise insane user. There is no need for most users to read or understand this section. The manufacturer of this *ALFA* Clock/Odometer takes no responsibility for damage caused to or by, this or any other equipment, when created or wired by the user.

The 9 Pin DB9 male connector on the right side of the ALFA is its outlet to the rest of the world. The pins are defined as follows:
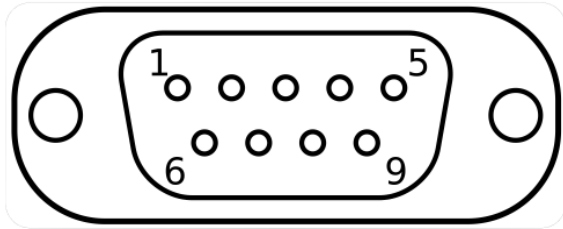
Female DB9 connector as viewed from the solder side

1. 12-volt DC power Input. The *ALFA* requires a minimum of 6-volts DC to operate. Power consumption is approximately 15ma without the backlight, 50ma with the backlight full bright. Add 20ma additional for GPS equipped units.
2. Serial communications Output. (0-5v signal, idle high)
3. Serial communications Input. (Accepts either 0-5v signal or RS-232)
4. Remote Hold Input. (Ground to trip input)
5. Ground.
6. 5-volt, ½ amp output. (May be used to power external sending unit or other devices)
7. GPS Serial Input. (115,200bps, 10hz update, NMEA-183 data stream, 3.3v max)
8. Odometer Input. (Negative edge triggered)
9. Mode Switch Input. (For use with certain ALFA-Elite and ALFA-Pro products only)

WARRANTY:

Your *ALFA* is warrantied against defects in material and workmanship for a period of one year from the original date of purchase. This warranty does not cover any parts broken due to abuse, neglect, normal wear or misuse of this product as determined by Small Systems Specialists.

The Liquid Crystal Display is warrantied against electrical failure for one year, but not against breakage of the glass enclosure.

Although every effort has been made to assure reliable and accurate operation, Small Systems Specialists is not responsible for any loss of money, property, time, or trophies due to the malfunction of this product. Good operating practice dictates that the user verify the product is in good working, and the operator has been trained in its use, order before it is relied upon in competition.

The ALFA, like many electronic clocks, may require periodic calibration. This function will be performed for the cost of shipping and handling only at any time during the life of the product.