ALFA-Elite

TSD Rally Computer
Owner's Manual

(Ver 5.2)
(Revised December, 2016)

Get a jump

on YOUR competition
with ALFA Rally Computers

CONTENTS:

INTRODUCTION:

The *ALFA-Elite* rally computer represents the latest technology available for rallying. As a navigational aid, the *ALFA-Elite* should provide you with a significant advantage over your competition. As with all *ALFA* rally products, the *ALFA-Elite* is a breakthrough in price as well as performance.

Some of the special features of your *ALFA-Elite* include:

- Choice of Back lit LCD or OLED display.
- Aircraft aluminum chassis with baked enamel finish and integrated sun shade
- Front lit control panel
- Includes Hall Effect sending unit.
- User friendly (guess free) data entry system.
- Clock in 12 or 24 hour time.
- Timing in seconds or hundredths.
- Overall, incremental, and countdown odometers.
- Distance and Time measured to hundredths or thousandths of a mile or kilometer.
- Automatic odometer correction factor calculations
- Dual sending unit inputs with separate factors.
- On-the-fly timing and odometer corrections.
- Advanced error correcting and timing features.
- Driver's display with "Null" error, resetable odometer, and CAS.
- Driver's display can operate independently to act as a backup or time sync.
- User customizable
- Reliable operation backed up by a one year parts and labor warranty.

A NOTE ABOUT QUALITY:

All *ALFA* rally products are hand crafted. We like to think that this lends them a certain amount of character. What this really means is that, like snowflakes, no two *ALFAs* are exactly alike. It is possible (indeed likely) to find fingerprints, smudges, etc., that were missed during inspection or added during shipping.

Despite the above cosmetics, it is important to realize that the electronics inside your *ALFA* are built to highly exacting, state of the art, standards.   Each unit is fully tested, calibrated, and then tested again to insure reliability.

We hope that you will be pleased with your new *ALFA-Elite* computer. We are always receptive of your suggestions for improvement to our products. In addition, if any software improvements or upgrades become available while you own your *ALFA-Elite,* you will usually be offered the opportunity to upgrade for little or no cost.

INSTALLATION

MOUNTING

Car dashboard arrangements are varied, so there is no "standard" way to mount the *ALFA-Elite*. For light rallying on mostly smooth roads, the ALFA is easily mounted with heavy duty Velcro^{tm} Surelock (Radio Shack "Superlock", part# 64-2360) For more rugged events we suggest hard mounting using two 10-32 screws in the provided holes. When using Velcro, clean both the dashboard and the ALFA with alcohol or other solvent before attempting to stick on the fasteners. If the dashboard has any grease or other contaminant (especially vinyl conditioners of any type) the adhesive will not work properly. It is advisable to mount the ALFA on a flat surface to maximize the working area of the fasteners. If mounted with the screws, make sure the screws are not too long, and do not force them beyond the threaded hole. (If forced in too far you WILL damage the ALFA.)

It is important to mount the ALFA firmly to the dashboard. If the ALFA is not well attached it may become a safety hazard to the occupants of the car. Additionally, a loosely mounted ALFA tends to transmit more of the cars vibration to the electronic components and will adversely effect reliability. The drivers display is mounted similarly to the main unit.

NOTE: Be sure to mount your ALFA out of the way of airbags and other devices which may present a hazard in case of an accident.

WIRING:

Your ALFA computer must be attached to your car's electrical system. A six position terminal block is provided to make connections as easy as possible. In addition, quick disconnect connectors are employed to allow rapid removal of both the ALFA and the drivers display without having to remove any wiring.

As shown in the illustration, there are two cables used to attach the components of the *ALFA-Elite*. The power/sending unit cable plugs into the lower (5 Pin) connector, and another cable connects from the upper (8 Pin) connector to the driver's display. Do not force the connectors into its receptacles, simply insure that the keyway aligns between the plug and socket and gently push the connector all the way in. If you can not see the keyway, gently rotating the plug until it falls into place usually works.

You may route the cables wherever convenient, but should avoid sharp bends or tight spaces which crease or pinch the cable. The terminal block is usually mounted underneath your dashboard in a position convenient for wiring. The cable supplied is pre-attached to the terminal block, please refer to the illustration for the names of the connections. The screw heads of the terminal block are color coded to aid you during the wiring process.
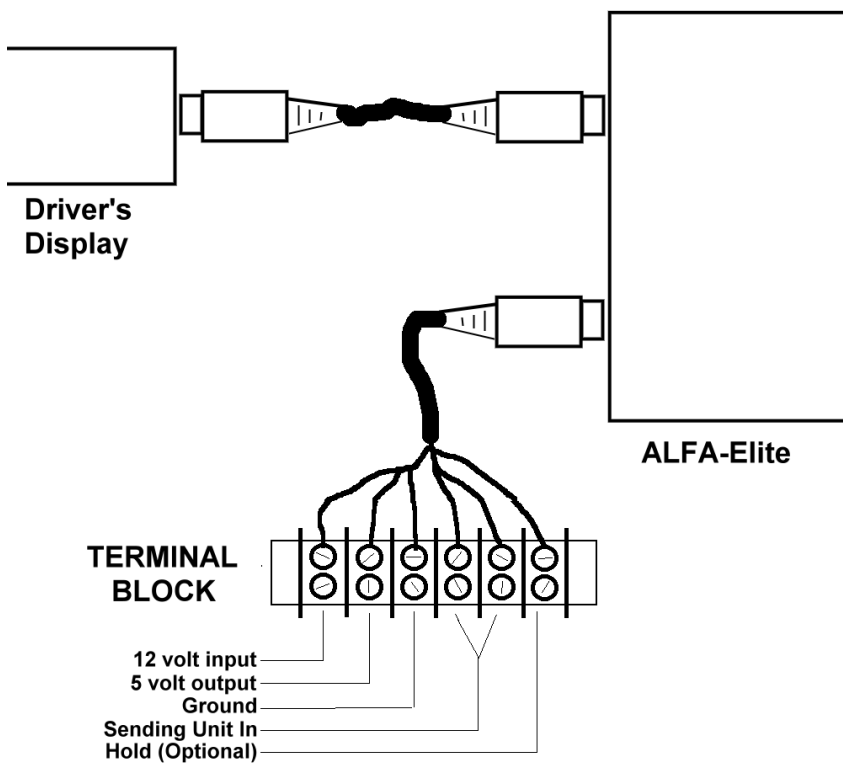
The following describes how and where to attach each connection. Use only copper stranded wire to make each connection. (Do not use solid wire, such as telephone or CAT5 cable, which will fatigue and break when flexed.) To insure a secure connection to the terminal block, strip about 1/2 inch of insulation carefully from the end of the wire, then twist all of the loose strands tightly together. If you use a knife or razor blade to strip the wire, be careful not to nick the wire when removing the insulation or a weak mechanical connection will result (and usually fail at the worst possible time!). Next, wrap the wire clockwise around the screw and screw it snugly to the block. Remove any excess wire extending beyond the screw to prevent short circuits. After all the wires have been connected, it is a good idea to put a piece of vinyl electrical tape over the entire block so that you will not accidentally short any of the screws at a later time.

Driver's Display

ALFA-Elite

TERMINAL BLOCK

12 volt input
5 volt output
Ground
Sending Unit In
Hold (Optional)

MAKE SURE YOUR ALFA IS DISCONNECTED BEFORE PROCEEDING!

POWER WIRE: This is the first (red colored) screw on the terminal block. This should be connected to a source of +12 volt (9-15 volts is OK, most cars run at 13.5 volts) power which is unaffected by your cars ignition switch (it is undesirable for power to shut off while parked or while starting your engine). The dome light fuse or horn fuse is usually a good connection point. Make sure that you attach to the fused side of the circuit so that your ALFA will be protected by the fuse. The BEST place to connect power is directly to the positive terminal of the car's battery. If you use the direct battery connection, be sure to insert a 1 amp fuse into the power wire to protect your ALFA. The ALFA has no internal fuse, it must be protected by your car's fuse box or one that you install yourself!

GROUND WIRE: The ground is the third screw in the terminal block (painted black), but should be attached at this time before connecting the sending unit(s). The ground wire may be attached to the chassis of your car, or directly to the negative terminal of your battery. Do NOT attach the ground to a screw holding interior trim or dashboard parts, this is usually not a good electrical ground.
(At this point you may attach the ALFA and turn on the power switch to test that the unit is

functioning. See the OPERATIONS section for details of this operation. Turn the ALFA back to the OFF position, and disconnect it, before continuing.)

SENDING UNIT: The BLACK lead from the sending unit is attached to the same ground screw as the ground wire from the car. Do not attach the sending unit BLACK wire to any other ground point in the car or a noise problem (known as a ground loop) may occur causing your odometer to be inaccurate.

+5 VOLT WIRE: This wire supplies a source of regulated power to the sending units. It is connected to the RED lead from the sending unit. The second terminal block screw (yellow) is the 5 volt connection. (Note: ALFA sending units may be run on 5v or 12 v power. Some alternative units have different requirements. Please check carefully when using non-ALFA brand parts.)

A and B WIRES: These wires are the sending unit pulse inputs. If you intend to use only one sending unit you may attach these two wires together to allow the ALFA's A-B sending unit switch to act as a factor switch for a single sending unit. The output lead from the sending unit is the GREEN wire, and the terminal block screws for these connections are painted green.

REMOTE HOLD: If you ordered your *ALFA-Elite* with the optional remote HOLD button, it is wired to the HOLD terminal and to the ground terminal. The hold terminal is the sixth (blue) screw on the terminal block. (Note: Any "Normally Open" switch may be used as a REMOTE HOLD for the ALFA.)

(Note: We attempt to match the color of the wire with the color of the terminal. The Yellow (5 volt) wire may be Yellow, Brown or Orange depending on the cable manufacturer. The "B" odometer input is generally White.)

A LITTLE ABOUT SENDING UNITS:

The function of a Sending Unit (also known as an Impulse Unit, Sensor or VSS) is to transmit wheel rotation to the ALFA's computer so that it can accurately measure the distance traveled. There are several types of sending units available on the market, all having different advantages and disadvantages.

The Hall Effect sending unit supplied with your ALFA is mounted at the wheel with magnets in the rims. Alternatively, the magnets may be attached to the back of the wheel hub, inside a brake drum or on a driveshaft or U-joint. The advantages of the Hall Effect sending unit are high speed capability and insensitivity to vibration. These units are usually mounted on a non-driven wheel for greater accuracy.

Sending units are available from some sources which attach in-line with your odometer cable. Some attach at the transmission, some behind the dashboard, and others require that you actually cut your speedometer cable and splice in the sender! The primary advantage of this type of sending unit is ease of installation; however this is offset by mileage inaccuracies caused by wheel spin during acceleration. Some sending units, such as the ALFA EZ-Pulse, are available which attach to your hubcap or under your wheel mounting bolts. These sending units have the advantage of being portable and quick to install, but they are vulnerable to attack from the rocks and tree limbs frequently found on rally roads. Most of these sending units are compatible with your ALFA, but some are not. Contact Small Systems Specialists before connecting any non-ALFA sending unit to your ALFA odometer.
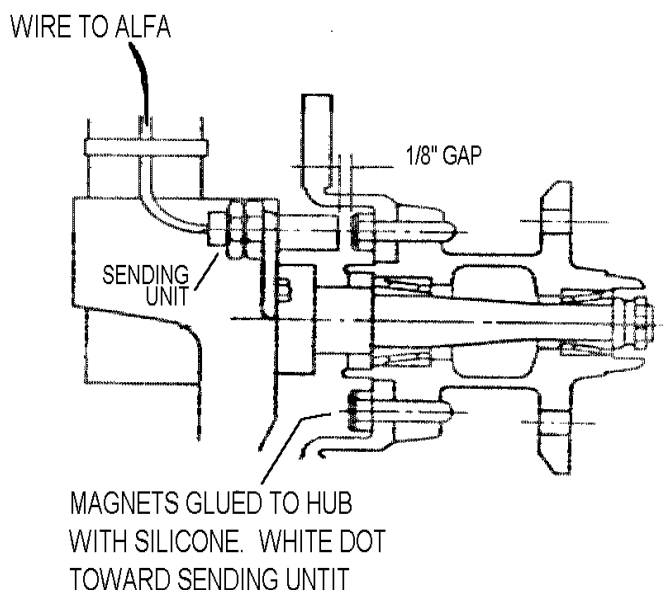
Many rallyists have had good success using the cruise control or VSS (Vehicle Speed Sensor) already installed in their cars. Please see our web site or call for up to date information about using these sensors. It is very important to fully test this type of installation for unwanted interactions between the ALFA and your car's systems. **_NEVER use your car's ABS brake sensors as inputs to your ALFA. This could compromise your safety!_**

Sending units known not to work well with the ALFA are older photoelectric sending units from Chronar or Zeron, and the 2-wire proximity probe from Terra-trip. Note that some of the photoelectric units do work well, but the power requirements for these units vary.

MOUNTING YOUR ALFA SENDING UNIT:

Mounting the sending unit is different for every car, and requires some imagination. If you do not feel comfortable with the mechanics involved, please refer to the above discussion on sending units and purchase one of the fine, easy to install (speedometer cable or hubcap mounted) sending units described.

The ALFA sending unit works best when mounted on a non-driven wheel (rear wheel for front drive cars, front wheel for rear drive cars). If your car is equipped with disk brakes, the back side of the dust shield makes an excellent mount. If your car is equipped with drum brakes, you may need to fabrica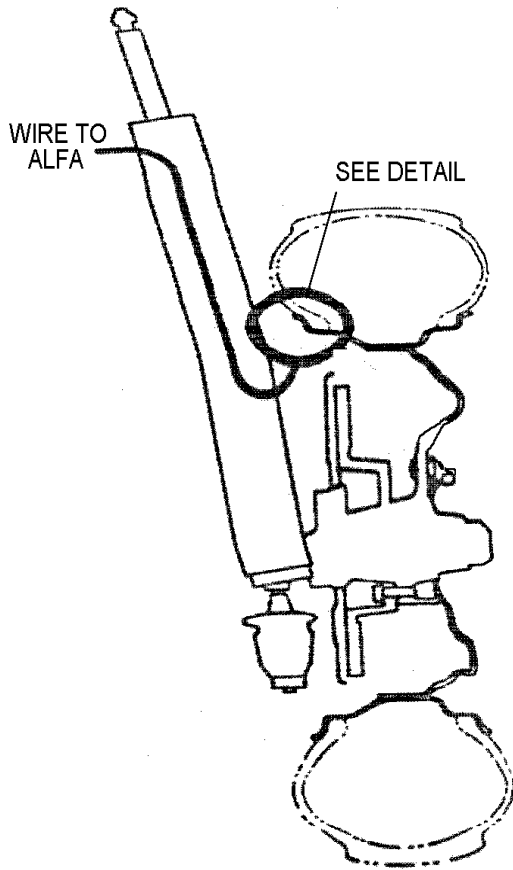te a small bracket to hold the sending unit close enough to the wheel to sense the magnets. In either case the sending unit should be mounted at the highest possible location to minimize its chances of being hit by a rock kicked up from the wheel (see illustration). The sending unit may also be attached to a strut or any other part of the car that maintains its distance from the rotating wheel. For maximum protection of the sending unit, the magnets may be mounted inside the drum, or on the back of the wheel mount studs. The sending unit would be mounted directly to the brake assembly, where is is shielded from rocks and other road debris. A possible alternative to wheel mounting would be mounting the magnets to the cars drive shaft and the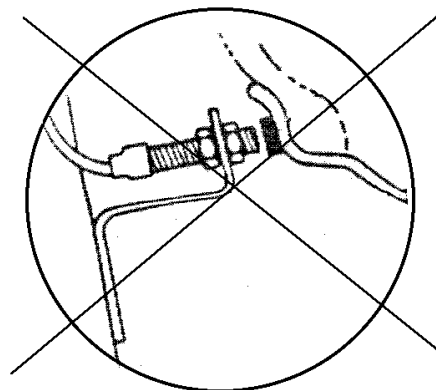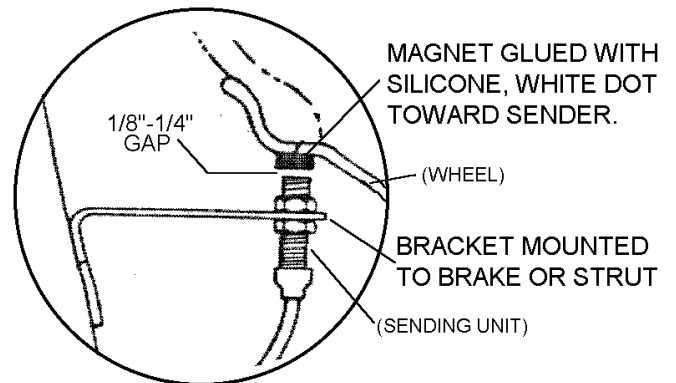 sending unit to either the transmission or axle casing. *(Note: RWD drive shafts turn 3-4 times faster than the wheel and tend to throw off the magnets by centrifugal force. You may need to restrain them with an appropriate non-magnetic strap.)*

WIRE TO ALFA

1/8" GAP

SENDING UNIT

MAGNETS GLUED TO HUB WITH SILICONE. WHITE DOT TOWARD SENDING UNTIT

HUB MOUNTING DETAIL

The magnets are mounted to the wheel or hub with the marked surface facing toward the sending unit. You may use magnets other than the ones provided with your ALFA, but they must be oriented with the south pole of the magnet facing the sending unit. ALFA sending units come equipped with 2 "Rare Earth" type magnets. These magnets allow a gap of around $\frac{1}{8}$ to ¼ inch depending upon the installation. (Be careful handling rare earth magnet, as you may easily pinch your fingers between them. Also note that they may erase magnetic media such as disks, credit cards, etc. from a fair distance!) Use **both** magnets on one wheel oriented approximately opposite each other in the wheels rotation.

The best way to route the wires from the wheel is to attach them to the brake hydraulic line with nylon cable ties. The brake line is usually routed such that it will not be stressed as the suspension does its job, and also is least prone to breakage from road hazards. The wire should enter the inside of the car at the earliest possible point, and care should be taken to be sure that it is not crimped at the point of entry. The length of all wires associated with the sending units should be kept as short as possible and should not be routed near ANY ignition components.
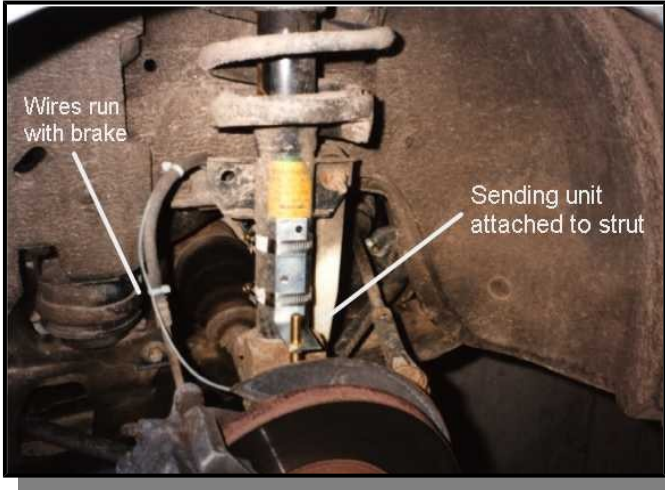
WIRE TO ALFA

SEE DETAIL

CORRECT WHEEL MOUNTING

1/8"-1/4" GAP

MAGNET GLUED WITH SILICONE, WHITE DOT TOWARD SENDER.

(WHEEL)

BRACKET MOUNTED TO BRAKE OR STRUT

(SENDING UNIT)

INCORRECT!
GAP CHANGES UNDER HARD CORNERING AND PULSES ARE LOST

EXAMPLE SENDING UNIT INSTALLATIONS:

This photo shows a typical wheel installation. The magnets are glued to the inside wheel rims, and the sending unit is mounted on a bracket attached to the suspension strut.

(This installation is simple to perform, but suffers from poor protection from rocks and road hazards. Also, be sure to glue magnets to your spare tires when using this type of installation.)

This photo shows a typical hub installation. The magnets are glued to the back of the hub, and the sending unit is mounted in a hole through the disk brake dust shield.

(This installation provides the maximum protection from rocks and other road hazards.)
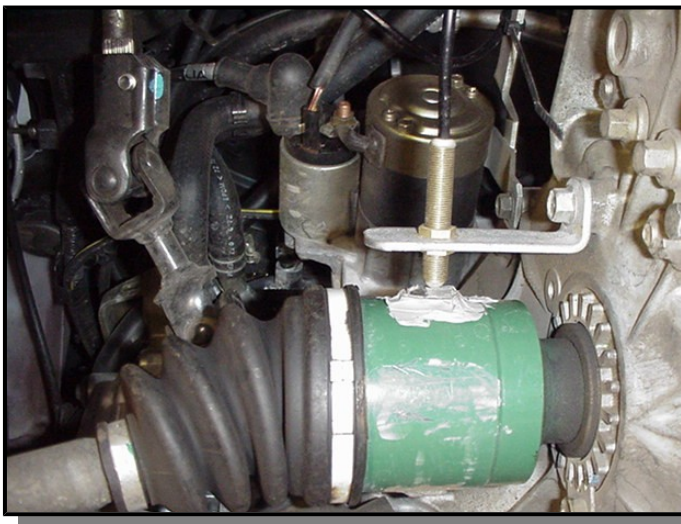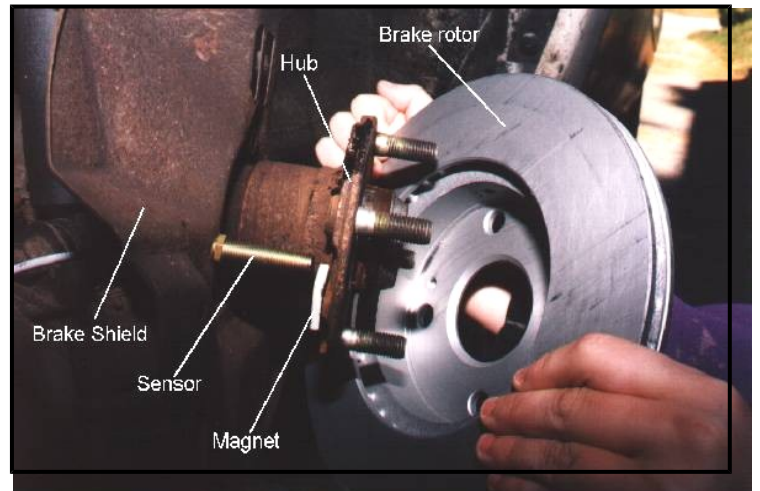
In this example the magnets are attached to the CV Joint and the sensor bolted to the transmission housing. This mounting works well on AWD vehicles in the front or back, using either the inner or outer CV Joint. It may also be possible to use the fore/aft driveshaft in the same way.

OPERATION OF YOUR ALFA-Elite:

Description of controls:

(Refer to the illustration for the location of the controls described.)

Navigator Console

Driver's Display
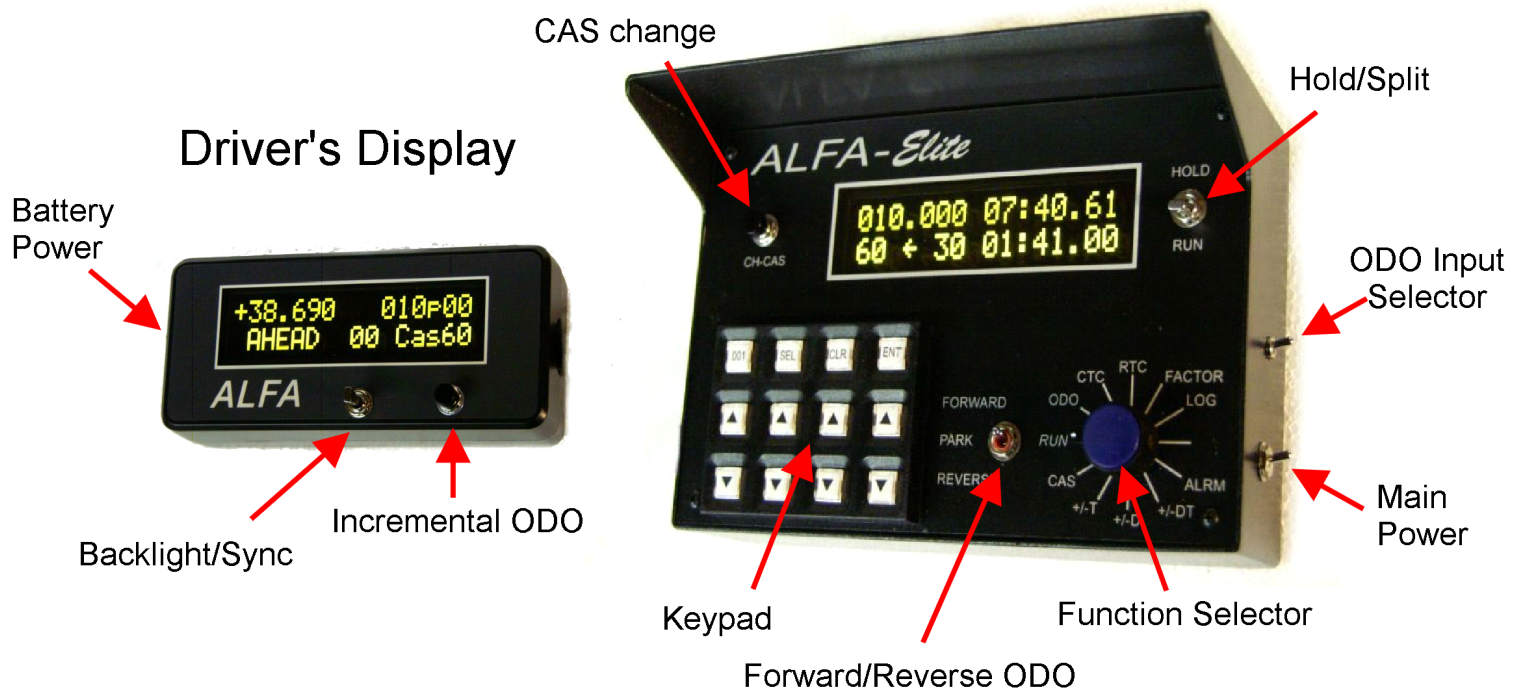
A/B ODOMETER INPUT SWITCH: If you have two sending units this switch allows you to easily select which sending unit you are using. Each sending unit has a separate odometer correction factor which is selected at the same time as the sending unit. It you have only one sending unit, and have wired both inputs together (see installation section) this switch will still select one of two preprogrammed factors. This is useful for situations where the rallymaster's correction factor seems to change between different road surfaces.

KEYPAD: The keypad is used to enter mileage and time information into the computer. The bottom two rows of keys are increment/decrement buttons used to "dial up" the required value. The ENT key is used to ENTER the value once you are sure it is correct. The CLR key clears the value to the default setting for the function selected, and the SEL key is used to select different options as described later in this manual.

CAS CHANGE SWITCH: This button is used to exchange the CURRENT CAS and the NEXT CAS. (Up to four CAS settings may be preprogrammed)

HOLD/SPLIT SWITCH: The hold switch freezes the display without disturbing the operation of the computer. This is useful for logging course information. After the HOLD button is released, the most recently held reading may be recalled by pressing the right-most up and

down arrow buttons together. Note that Recalled mileage displays thousandths of a mile even if that mode is not selected. The driver's display is not affected by the hold switch, this allows the navigator to log information while the driver maintains time and course.

FORWARD/REVERSE SWITCH: This switch causes the odometer and computed time to run either forward or backward. In the center, or PARK, position the odometer is effectively disconnected from the wheels.   Time related functions are still active even when the odometer is parked.

Note: When the *ALFA-Elite* is in either PARK or REVERSE the beeper sounds every few seconds as a reminder.

FUNCTION SELECTOR: The function selector is used to determine what type of data is being entered into the computer. The RUN position is the normal position for this switch and inhibits any data from being entered into the computer. Each function selector position is covered in detail in the rally operations section of this manual.

POWER/CONTRAST SWITCH:

> *For LCD display equipped units:* This rotating switch works like the volume control on a radio. Clockwise rotation turns the *ALFA-Elite* on and adjusts the contrast of the liquid crystal display. The knob must be rotated more than half way around before the display is visible. This is deliberate, to prevent accidentally turning the *ALFA-Elite* off while adjusting the display

> *For OLED display equipped unit:* This toggle switch turns on and off the main power.

INCREMENTAL ODO BUTTON: Pressing the button on the drivers display causes the incremental odometer to rezero and to be displayed in the distance position of the driver's display. Pressing the button again causes the distance display to return to official course mileage. *(Note: Countdown mileage has priority on this display.)*

BACKLIGHT/SYNC SWITCH: Moving this switch to the LEFT sends clock sync data from the driver's display clock to the navigator's console. For LCD equipped units, moving the switch to the RIGHT adjusts the brightness of the backlight between the off, dim and bright settings. The backlight setting has no effect on OLED equipped units.

BATTERY POWER SWITCH: In the OFF (down) position, the driver's display turns on and off together with the navigator's unit. If the driver's display is unplugged it will turn off. In the ON (up) position, the rechargeable battery in the driver's display is connected. This has two effects: It allows the battery to charge, and it permits the driver's display to operate on its own when disconnected from the main unit. This switch should be OFF when the *ALFA-Elite* is stored between rallies to preserve the battery charge.

Description of Displays:

When in the RUN mode, the navigator's display shows five items:
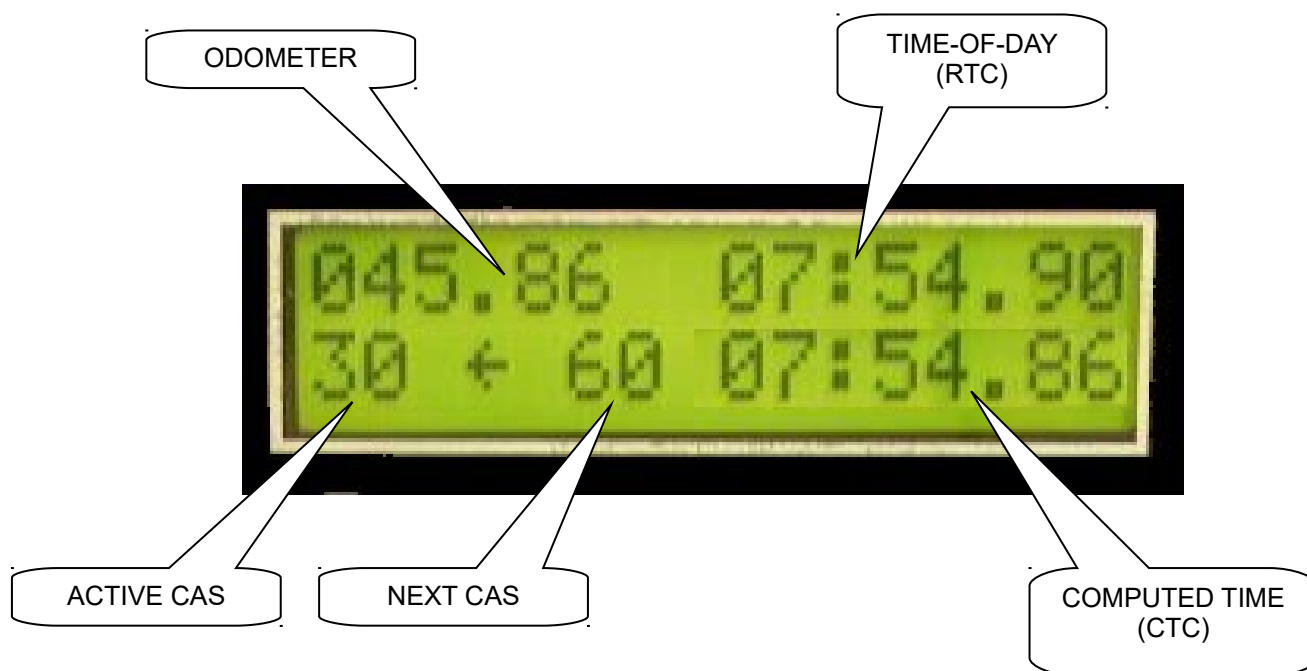
The upper left display is the odometer. Distance is measured to 1/1000 of a mile (or kilometer) and displayed to your choice of 1/100 or 1/000 miles.

The lower left is the ACTIVE CAS and the NEXT CAS.   Computed time is always calculated based upon the ACTIVE CAS. Only the whole part of the CAS is displayed for clarity, but note that CAS is entered AND COMPUTED as a decimal number.

The upper right display is the real time (time-of-day) clock. Time is displayed to your choice of seconds or 1/100 minutes, and may be displayed to 1/10 second or 1/1000 of a minute.

The lower right display is the computed time clock displayed to the same units as the real time clock. Computed time is the time it should be traveling over the course at the specified CAS. When computed time and real time agree, you are on time (zero score!).

While in the RUN mode, pressing the ENT key will switch the displays to a higher precision mode. During this mode the mileage, time, and cas will be displayed to 1/1000 (1/10 seconds) regardless of the *ALFA's* normal mode. Press ENT again to return the display to normal.

The driver's display is split into four items:

DRIVER'S ODOMETER

TIMING ERROR (NULL)

SPEED

ACTIVE CAS
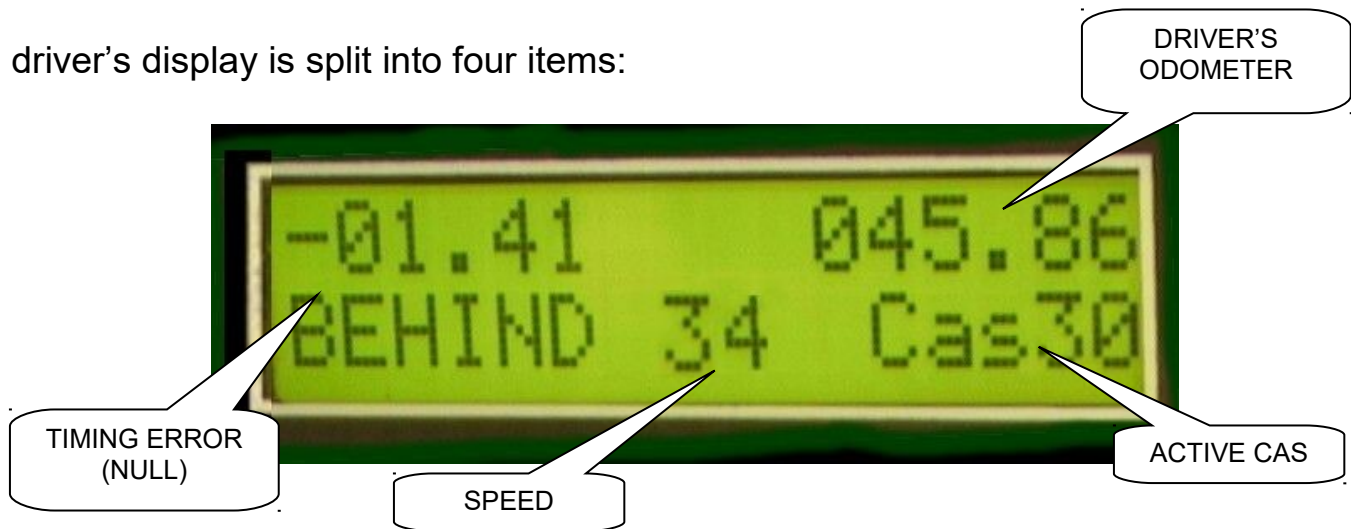
The left half of the display is the "NULL" readout. This is the difference between the real and computed time clocks, displayed in either seconds or 1/100 minutes. It is the driver's task to keep the null on 00.00. If the driver is going too fast the display will indicate a positive number and the message "AHEAD" will appear below the number. If the driver is driving too slowly, the number will be negative and the message "BEHIND" will appear.

When the car is within a few hundredths of the correct time, the ahead/behind message is replaced by an "analog zero meter", which you simply keep centered to score a zero.

The upper right display is the driver's odometer. Normally this odometer echoes the navigator's odometer, but the driver may elect to display an incremental distance by pressing the Incremental Odo button (see above). When in incremental mode, an asterisk (*) will appear preceding the odometer   If the navigator has entered a distance alarm (see rally operation section) the drivers odometer will count backwards until zero. The beeper will sound for .2 miles before the alarm mileage is reached. The navigator may eliminate the beep by either entering or clearing a new alarm setting, or by simply pressing CLR while in the run mode.   In countdown mode an angle bracket (>) will precede the odometer.

The lower right display is the ACTIVE CAS, or the speed the driver should maintain. This display saves the navigator's left ribs from the constant "what's the CAS supposed to be" nudge from the driver. If selected, the speedometer is displayed next to the CAS. Note that the speedometer is a low priority item for the *ALFA* and may appear jumpy from time to time while the computer does more important things. This does not affect odometer, Null or CTC accuracy in any way.

POWER ON TEST AND CUSTOMIZATION:

To turn on the *ALFA-Elite* rotate the power/contrast switch clockwise and adjust the knob for a comfortable viewing contrast (LCD), or move the power toggle switch upwards (OLED). The first time you use your ALFA a sign-on message, "Test in progress", should appear along with the serial number of your unit. You will then enter the customization mode. After its first use the ALFA will skip both the test message and the customization and begin operating with the same setup as its previous use. (NOTE: The time of day clock (RTC) is not maintained during power down, and therefore is reset every time power is turned on.) To force the *ALFA-Elite* to perform the power on test and reset all of the customized options back to the factory settings, hold the CLR key while turning on the power switch.

The power on test will continue for several seconds. If an error is reported, or the test does not conclude, cycle the power and try again. If the unit still reports an error, please call Small Systems Specialists for assistance.

After the test is finished, you may customize the *ALFA-Elite* as prompted on the navigators display. The leftmost UP and DOWN arrows on the keyboard select the corresponding upper and lower selections on the display.

Your choices include:
- Timing in hundredths of a minute or seconds.
- Precision displayed to 1/100 or 1/1000 miles.
- 12 or 24 hour clock format.
- Display speedometer
- Clear on enter
- Null precision
- Race or Rally mode

(Note: If you select the DEFAULT setting you will get time and distance to 1/100 and the 12 hour format clock. If you do not make a selection within 10 seconds the default will automatically be chosen.)

You may alter the customization of your *ALFA-Elite* at any time while in the RUN mode by pressing the lower left and lower right arrow keys together. Selecting the default at this time will simply return to rally mode without making any changes, otherwise you may select new options as usual.

IMPORTANT NOTE: Changing the time format may cause the clock to become inaccurate. If you change the time format (other than simply turning off or on the hours) reset the clock before continuing the rally!

Note: If the HOLD switch was on while the ALFA was powered up, the display may appear blank or incomplete. If this is the case, simply release the HOLD to start the computer working. If you have a remote hold switch attached to your computer, it may need to be released as well.

DRIVER'S DISPLAY OPERATION:

The driver's display for your *ALFA-Elite* is unique in the industry. It contains a built in rechargeable NiMH battery pack and can operate independently of the Navigator's console. The battery switch on the left side of the driver's display must be in the ON position for the internal battery to charge and for the unit to function disconnected from the navigator's console. When you are through rallying, or are placing the display in storage, please turn this switch to the OFF position to preserve the battery. It takes several hours to fully charge the battery, and separated run time will vary with charge level.

When operating independently the driver's display functions similarly to the ALFA-Checkpoint clock/odometer, and has a choice of memory clock mode or dual odometer and clock mode. Please see the separate manual included with your *ALFA-Elite* for further instructions.

RALLY OPERATION:

The ALFA-Elite's function during a rally is to measure time, speed and distance. (thus the name "tsd") The navigator enters the CAS (Current Average Speed) into the computer and the starting time of the rally or section thereof. As the car is driven the computer calculates how long it should have taken to drive to where you are. It compares this time to the actual time it took to drive the distance and displays the error (difference) on the drivers display. These calculations occur several hundred times each second, and provide continuous readout on the displays. The function knob allows the navigator to enter and correct the time and distance measurements so that the driver can always stay on time. Normally the function knob is left in the RUN position. The RUN position locks out all of the keys on the keyboard (except CAS CHANGE and ENT) so that you cannot make any accidental entries.

As you move the function knob (gently) to each position, the selected function is displayed, in English, on the bottom line of the navigators display. To enter a value you use the up/down arrow keys which correspond to each digit until the desired value is displayed. Then press the ENT key to transfer the value to the computer. *Once entered, a confirmation message is displayed, and the keyboard is locked out from further changes until the function knob is moved to a different position.* If you do not press ENT, the values are remembered individually for each function. This allows you to preset several values which must be entered at one time, and then quickly enter all of them.

For example: You have a Key Time or Restart at a stop sign, and you want to do this as quickly as possible. Prior to arrival, you can select CTC, preset it's value, then select ODO and preset it's value. Upon arrival at the stop sign, just quickly move the function knob to ODO, press ENT, move to CTC, press ENT – You're all done in 2 seconds or less.

The HOLD switch freezes the navigator's displays for hacking and/or logging purposes. Move the switch to the HOLD position to freeze the display, and to RUN to release the display. It is important to note that ALL computer operations continue internally, only the display is held. The driver's display never holds because it is important for the driver to have continuous information.   After releasing the HOLD, you may recall the information which had been displayed by pressing the rightmost two arrow buttons at the same time. The hold recall value will include the thousandths of a mile digit, even if it was not displayed at the time of the hold.

In order to properly follow the rally course, it is important to have an accurate odometer. The *ALFA-Elite's* odometer display counts from 000.000 to 999.999 and then recycles back to zero.   The 1/1000 mile position is not normally displayed unless the computer was directed to do so during customization. You may also temporarily view the 1/1000 mile (and time) by pressing the ENT button while in the RUN mode. (Press ENT again to resume normal display)

To set the odometer to a predetermined value, move the function selector to the ODO position. Note that there are up to six digits in the odometer display but only 4 up/down set positions! The 1/1000 mile position is set using the .001 key, and the 100 miles position is set by rolling the 10 miles position past its end.   This procedure is very easy to understand once you've tried it a few times. (The best way to learn to use your *ALFA-Elite* is to play with it and explore its various functions to see the effect they have on the computed values.)

Once you have dialed up the value desired, press the ENT key to transfer the value to the odometer. Once the ENT key is pressed, the keyboard is locked out to prevent accidental re-entries (this is indicated by the prompt changing to all capital letters). If you need to re-enter the value, simply move the function switch one position in either direction and then back again. This action will enable the keyboard and allow another entry.

To adjust the odometer by a small increment, rotate the function knob to the +/-D position (Add/Subtract Distance). You may then add or subtract in either .01 or .001 mile increments (determined by customization). Use the SEL key to switch between add or subtract.   During the *+/-D* operation, computed time is not effected.

You may adjust the odometer and simultaneously adjust computed time by a corresponding amount using the + /-DT mode. This works like the +/-D function, except the computed time is adjusted using the active CAS. This feature is handy to use for correcting distance error at checkpoint lines, and generally correcting the computer during course following.

If you selected the "Clear on Enter" mode of operation, the value for *+/-D, +/-DT,* and *+/-T* functions will return to zero after you enter them. Normally the value remains where ever it was last set.

The navigator may preset a mileage at which some action needs to be taken by using the ALARM function. You enter the alarm distance in the same manner as the main odometer preset.   Once entered, the *ALFA-Elte* will compute the difference between the current course mileage and the alarm setting and display the difference on the driver's odometer. This value will effectively count backwards to zero as you approach the alarm setting. A beeper will sound when you are within .2 miles of the alarm mileage. To cancel the beeper at any time, select the ALARM or RUN position on the function knob, and press CLR.

ALARM notes: You may preset up to 4 alarms using the SEL key. The sound of the alarm may be changed to suit your taste.

An odometer correction factor is available so that you can match your mileage to the rallymaster's, and thereby obtain more precise distance and time information for the rally. The factor is viewed and set by rotating the function knob to the FACT position.   The message displayed will be either FACTOR A or FACTOR B depending upon the position of the A/B switch on the side of the computer. This allows you to have either two different sending units, each with their correct factors   preprogrammed, or to have two preprogrammed factors for your single sending unit. Use the SEL button to switch between the active and inactive factor. In the FACTOR mode, the CLR button sets the factor to 5000.

The value of the factor is the fraction of a mile traveled between sending unit pulses (usually two pulses for each rotation of the wheel). The default factor is set to 5000, which corresponds to .00050000 miles (2.64 feet) between pulses. If your odometer comes up short at mileage references, you need to increase the factor. If your odometer runs long at references, decrease the factor. Most rallies provide an odometer check leg in order for you to determine the correction factor. There is an easy formula for determining your factor at the end of an odometer leg: The new factor is equal to the current factor divided by the distance recorded multiplied by the actual distance in the route instructions.

$$FACTOR = \frac{OLD\ FACTOR}{WRONG\ MILES} \times ROUTE\ MILES$$

Example: You start the odometer leg with a factor of 5000. The end of odometer leg is officially 12.56 miles, but your *ALFA-Elite* says 11.21 miles. 5000 divided by 11.21 times 12.56 is 5602.1, which is your new factor. This should be programmed into the factor for the sending unit used to run the check.

The *ALFA-Elite* can also calculate it's own correction factor using this technique: When you

begin the odometer check leg, be sure to set your odometer to 000.000 miles. At the end of the odometer check stop your car adjacent to the final reference point. (Do *not* make any odometer changes during the odometer check leg.) Move the function knob to the ODO position, dial up the correct mileage for the reference point, and press ENT. BEFORE rotating the function knob again, press the SEL button. The new factor is now being calculated. (There may be a short delay.) Once the calculation is complete a message appears, and you must move the function knob directly to the FACT position. The calculated factor will now appear in place of the factor you were using. If you wish to use the calculated factor, simply press ENT. You may discard the calculated factor and enter your own factor by simply rotating the function knob to a different position and back to FACT again.

The Forward/Reverse switch causes the odometer and computed time to run forward or backward. The Park position effectively disconnects the sending unit from the computer, freezing the odo and ctc (the real time clock is unaffected). To recover from an off course excursion, park the odometer at a known reference point (tree, sign, etc..) and turn the car around. As you pass the reference point in the reverse direction, move the switch to the Reverse position. The odometer will now count backwards as you retrace your steps. When you arrive at the point where you made your mistake, repeat the procedure except this time move the switch to the forward position to follow the correct course. Your odometer and computed time will be correct from this point on (of course you will be very late and must now either make up the time by driving above CAS or by taking a time allowance).

The *ALFA-Elite* allows you to enter your CAS changes in advance. To enter an advance CAS, move the function selector to the CAS position, and dial in the desired value (000.1 to 199.9 mph). When the desired CAS is dialed in press ENT, this value is now your NEXT CAS. Note that setting the NEXT CAS value has no effect on the ACTIVE CAS no matter how many times you set or reset the value. You may enter up to four CAS values in advance using the SEL key.

To change the CAS value being used by the *ALFA-Elite* (the active CAS), simply press the CH-CAS button. The CH-CAS button will move the NEXT CAS to the ACTIVE CAS, and immediately begin calculating with the new value. The CH-CAS button is functional regardless of the position of the function knob or the hold button so that you will not miss a CAS change because you were doing something else at the time.

It is a good idea to program the NEXT CAS into the computer as soon as you change to a new ACTIVE CAS so that you won't forget and have to do it in a panic. All of the data entry features of your new *ALFA-Elite* were designed to allow advance operation and therefore reduce navigational errors.

If you forgot to enter next CAS, or the correct CAS is not known until the reference point

occurs, the *ALFA-Elite* can accommodate you. As you pass the CAS Change reference point, press the CH-CAS button even though the next CAS is incorrect. (The *ALFA* records each CAS change, and can recalculate from the current position back to the previous CAS change)   At your convenience, rotate the function knob to the CAS position, and enter the CAS you should have switched to. After pressing ENT, press the SEL key (before moving the function knob) and the leg will be recalculated and the ACTIVE CAS will be corrected. (Note that the longer the distance since the last CAS change, the longer it will take to recalculate. There is no need to stop the car during a recalculation, although the displays will appear to freeze while it is going on.)

Entering a CAS of 00.00 mph in the *ALFA-Elite* parks the CTC while allowing the odometer to continue running. This is useful for transit zones where a time is given over a distance rather than a CAS. At the start of the transit zone set your CAS to 00.00 and enter a pause (+/- T position) for the amount of time you have to complete the transit zone. The drivers NULL display now shows the amount of time remaining to complete the transit zone. When you arrive at the end of the transit zone simply change your CAS back to the correct value and keep on driving, the NULL will be correct automatically

The Real-Time Clock normally needs to be set only once at the beginning of the rally. To set the clock, move the function knob to the RTC position and dial the time that you would like to set (usually the next whole minute). Watch the official clock and press the **ENT and LOWER LEFT ARROW key together** at exactly the time you wanted to set. The clock will now start running normally. (Note that as a safety precaution, you must press two buttons together to set the clock! We have discovered that the easiest way to do this is to press and hold the ENT key a few seconds before your hack and strike the ARROW key at the hack while still holding the ENT key, then release them both).

If the clock needs only a small nudge in one direction or the other, this is easily accomplished using the CLOCK BUMP feature. To add or subtract small increments move the function knob to the RTC position and press the ENT key. While holding the ENT, use the rightmost UP and DOWN arrow keys to adjust the time by approximately 1/1000 of a minute for each press.

Note: When setting the clocks, only the leftmost three up/down switches function for hours, minutes, and hundredths (seconds) respectively are active. The CLR key only sets the hundredths (or seconds) to zero. When the clock is started, all non-displayed digits are set to zero for maximum accuracy.

Set the Computed-Time Clock (CTC) in the same manner as the RTC except that the function knob is in the CTC position and you only need to press ENT (no safety is provided for CTC). The CTC is normally set at each key time or restart, and then is updated by the computer along with the odometer.

When setting the CTC or RTC, the SEL key will pick up the current value. This allows you to reduce the amount of button pressing required to set the clock.

During the course of a rally you sometimes need to PAUSE (Add Time) or GAIN (Subtract Time). The +/-T function accomplishes this by adding or subtracting the required number of hundredths (or seconds) to the CTC. The SEL key selects PAUSE or GAIN and the display will reflect the desired function. The CLR key sets the value to ZERO. It is important to note that when the timing is set to run in seconds the +/-T value is in seconds, not minutes and seconds! To pause one minute, you must program a pause of 60 seconds, two minutes are 120 seconds and so on. The maximum pause is 9999 seconds (about 2.77 hours!). When the timing is in hundredths, the pause value takes on the effect of minutes and hundredths due to the decimal nature of that timing system (one minute is 100 hundredths, two minutes is 200 hundredths etc. The maximum pause in hundredths is 9999, or about an hour and a half!). Note that due to the internal calculations which are performed during a pause (or gain) of more than 10 minutes, allow a few seconds for the pause to be entered before the display updates. This delay HAS NO EFFECT on either the odometer, CTC or other calculations.

If you selected the "Clear on Enter" mode of operation, the value for +/-D, +/-DT, and +/-T functions will return to zero after you enter them. Normally the value remains where ever it was last set.

Your *ALFA-Elite* keeps a log of all CAS changes, Pause/Gains, CTC sets and Holds. This allows you to review your performance or correct course or scoring errors. The last 96 operations are stored in the log, with the oldest being discarded as new operations are entered. To review the log, rotate the function knob to the LOG position. You may use the leftmost up and down arrows to view one item at a time. The logged items are numbered, with #1 being the most recent. Press CLR to reset the log.

MISC FUNCTIONS:

Rotating the function knob to the blank position opposite RUN allows several "on the run" changes to be made. Unlike the startup customizations, these may be used at any time:

To change the sound of the ALARM, use the SEL key until "Alarm Sound" is displayed. Then use the leftmost UP and DOWN arrow keys to change the sound.

To adjust the brightness of the backlight, use the SEL key until "Brightness" is displayed.

Then use the leftmost UP and DOWN arrow keys to select either Bright, Medium or Off. *Note: This applies only to the LCD display. The OLED display brightness is not adjustable.*

Your Driver's display may be used as a backup clock and to synchronize the *ALFA-Elite*'s clock to a master rally clock. First, we will assume the clock in the driver's display has been set and/or synchronized as described in the ALFA-Checkpoint owner's manual. Make sure the driver's display is attached to the navigator's console and press SEL until "Time Sync" is displayed. On the driver's display, move the toggle switch to the left and hold it until the *ALFA-Elite* synchronizes and the time is displayed.

RACE MODE:

Your ALFA-Elite is equipped with a "Race Mode" which was developed at the request of customers running Open Road Races. These races are essentially a single TSD leg run at high speed. ALFA-Elite's equipped with Race Mode will accept CAS up to 199 mph.

To enter the "Race Mode", follow the usual instructions for customizing the operation of your ALFA-Elite. The last option in the sequence is to select "Race Mode" or "Rally Mode". Once selected, the "Race Mode" changes the function of the button on the driver's display. Pressing the driver's display button will now act as a Race Start button. When pressed, the CTC, RTC and ODO are all set to zero, and the computer begins its race run at whatever CAS was preset. All other ALFA-Elite features are intact and work as described in the manual, except that the driver's display incremental odometer is not available.

To use the ALFA-Elite in a race, follow these steps:

1. Setup the ALFA as desired and select Race Mode.
2. Enter the speed you will be running as the CAS. (After entering the speed, press the CH-CAS button so that the drivers display shows the correct speed.
3. As you start the leg, press the driver's button to begin leg calculations. On a running start, press the button as you cross the start line. For a standing start, press the button as the start flag drops.
4. Drive! Keep the driver's readout on ZERO.
5. If you are running with a navigator, he can make mid coarse timing corrections to compensate for the inevitable odometer drift. By using the HOLD switch at a known waypoint, you can see if the odometer is ahead or behind. Use the +/-DT to enter the mileage correction, and the computer will automatically update the driver's error readout.

Care and Feeding of Liquid Crystal Displays:

The ALFA-Elite comes equipped with OLED (Organic Light Emitting Diode) displays which require little attention. If your ALFA has this standard display, you may safely ignore the rest of this page.

Older ALFA computers, and optionally new ones, are equipped with LCD (Liquid Crystal) displays. These displays are quite reliable, however several safeguards must be observed in order to insure the proper operation and life of the display.

LCD's do not like extreme temperature! If the display is too cold, contrast will be reduced (<30 degrees), if too hot, the display will turn black (>135 degrees). Dashboard temperatures can reach 180-200 degrees on a hot day with the car parked in the sun with the windows closed! If you leave your car parked in the sun, leave several windows open a crack. If the displays turn black, they will return to normal after several minutes of driving around when the temperature drops. The manufacturer of these displays says that they will not be permanently damaged by turning black, and our experience confirms this fact. The computer will continue to operate, even if the displays black out from heat. It is a good idea to cover your computer with a white cloth (T-shirt or diaper is perfect) when left alone in the sun, this seems to prevent all but the most extreme problems. The general rule is: If you are comfortable, the LCD is comfortable.

LCD displays are made of glass. If the glass breaks, do not touch the liquid which will leak from it. It is toxic! The front panel of your *ALFA* is made of Lexan and will protect you from any broken glass.

The contrast control may need to be readjusted from time to time as the temperature and ambient lighting conditions in your car change. This is normal. The LED Backlight may be useful during daylight operation in heavily shadowed conditions.

Small Systems Specialists recommends removing the *ALFA-Elite* from your car when it is not in use. This will prevent both theft and premature aging!

Warranty:

Your *ALFA-Elite* is warranted 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, or misuse of this product as determined by Small Systems Specialists. All shipping costs are the responsibility of the owner.

The display is warranted against electrical failure for one year, but not against breakage of the glass enclosure.

Although every effort has been made to assure reliable, accurate operation, Small Systems Specialists will not be 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 order before it is relied upon in competition.

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

If your *ALFA-Elite* needs to come back to the factory for service, please contact us first for return instructions. Service for units arriving unexpectedly may be delayed. When you do return a unit for service, please include a letter describing the difficulty and the steps taken to repair it. Also be sure to include your return shipping and payment information.