

# ALFA-Pro

Owners Manual

September 2012  
(Rev 5.0 Preliminary)



**Get a jump**



**on YOUR competition  
with ALFA Rally Computers**

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## **INTRODUCTION:**

The ALFA-Pro rally clock/odometer represents the latest technology available for rallying. The ALFA-Pro has been a proven performer for many years and will provide you with many enjoyable years of rallying. As a navigational aid, the ALFA-Pro provides you with a significant advantage over odometers and clocks from other manufacturers. As with all ALFA rally products, the ALFA-Pro is a breakthrough in price as well as performance.

Some of the special features of your ALFA-Pro include:

- OLED (Organic Light Emitting Diode) display is easily read in all lighting conditions.
- Aircraft aluminum chassis with baked enamel finish and integrated sun shade for good looks as well as long life.
- Includes Hall Effect sending unit.
- Dual odometer display (overall and incremental with quick zero).
- Odometers display to .001 miles (kilometers)
- Two sending unit inputs with separate factors
- Distance alarm counts down to an instruction.
- Time alarm counts down to a target time.
- Clock runs in seconds or hundredths (to .001 minutes or .1 seconds)
- Elapsed timer and Incremental odometer have one button reset.
- Zero-on-Hold resets incremental odometer and elapsed timer.
- Measures your car's performance: 0-30, 0-60, and Quarter mile.
- Fully customizable by the rallyist.

## **A NOTE ABOUT QUALITY:**

All ALFA rally products are hand made. 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 the final inspection before your unit was shipped to you.

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 are pleased with your new ALFA. We are always receptive to your suggestions for improvements or changes to our products. In addition, if any software upgrades or improvements become available while you own your ALFA, these will be offered to you for little or no cost (usually just shipping and handling charges).

## **TECHNICAL SPECIFICATIONS:**

This information is provided for the technically curious and otherwise insane. It is not required to either read or understand this page in order to operate you new ALFA to its best advantage.

Processor: Zilog Z80180006  
RAM memory: 8K X 8, CMOS static.  
ROM memory: 32K X 8 CMOS EPROM.  
Clock: 6,144,000 hz crystal controlled  
Display: Standard: Organic Light Emitting Diode  
Optional: High contrast Super Twisted Liquid Crystal.  
9mm Character height Custom micro controller  
surface mounted directly on the display.  
Backlight: (LCD only) White LED (light emitting diode) array.  
Life span 100,000 continuous hours.  
Software: Written entirely in Zilog assembly language.\*  
Sending Unit: Hall effect transistor with internal open collector output  
actuated by the south pole of a rare earth magnet.  
Odometer input is a standard TTL (CMOS) circuit requiring  
a 5 volt, negative going edge to trigger. The circuit is pulled  
up to +5 volts through 2,200 ohms. Input noise is filtered  
through an RC noise filter into a Schmidt trigger hysteresis.

\*Full source code and all of the tools required to assemble the ROM may be obtained for \$25,000 (no joke). Contact Small Systems Specialists for details.

## **INSTALLATION:**

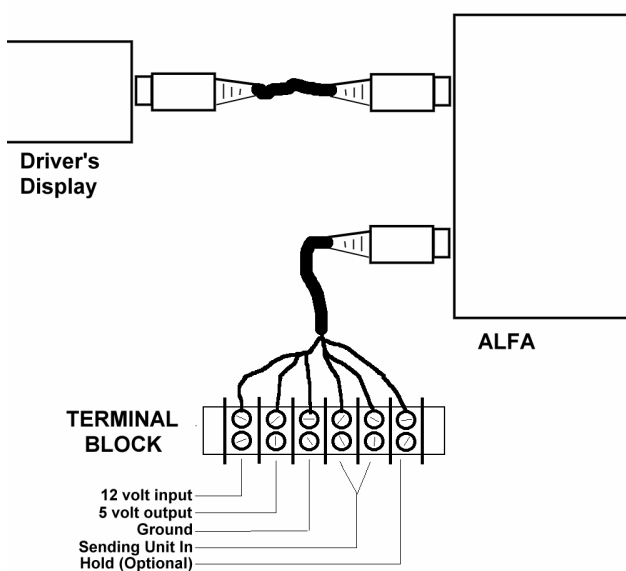
### **MOUNTING:**

The ALFA is light weight and easily mounted with either heavy duty Velcro™ (Radio Shack part# 64-2360) or it may be hard mounted using 2 10-32 screws. 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 not too long, and do not force them beyond the threaded hole. (If forced in too far, damage will result to the ALFA-Pro.)

The ALFA may be mounted on its back or bottom depending upon your car's dashboard configuration. 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.

### **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 (if equipped) without having to remove any wiring.



As shown in the illustration, there are two connectors on the left side of the ALFA-Pro. These connectors are slightly different from one another to prevent confusion. You can not plug the wrong cable into either connector. To attach a cable, line up the pins and orientation notch and gently press the connector straight into the socket. Do not force the connector into its receptacle, a gentle rocking motion will fit the ends together if the connectors fit is tight. The terminal block is usually mounted underneath your dashboard in a position convenient for wiring. You may secure the cable connectors to the ALFA using 4-40 screws.

There are 6 wires leading from the main computer to the terminal block. 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 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.

***MAKE SURE YOUR ALFA IS DISCONNECTED BEFORE PROCEEDING!***

***POWER WIRE:*** The first connection is for the power which operates your ALFA computer. 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. If you used the direct battery connection for power, it is usually best to connect the ground directly to the battery as well.

(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) will occur and may cause 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.

**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 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.

### **A LITTLE ABOUT SENDING UNITS:**

The function of a Sending Unit (also known as an Impulse Unit or Sensor) 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 units supplied with your ALFA are mounted at the wheel with magnets in the rims. Alternatively, the magnets may be attached to the back of the wheel hub, or inside a brake drum. The advantages of the Hall Effect sending unit are higher speed capability and insensitivity to vibration. These units are usually mounted on a non-driven wheel for greater accuracy.

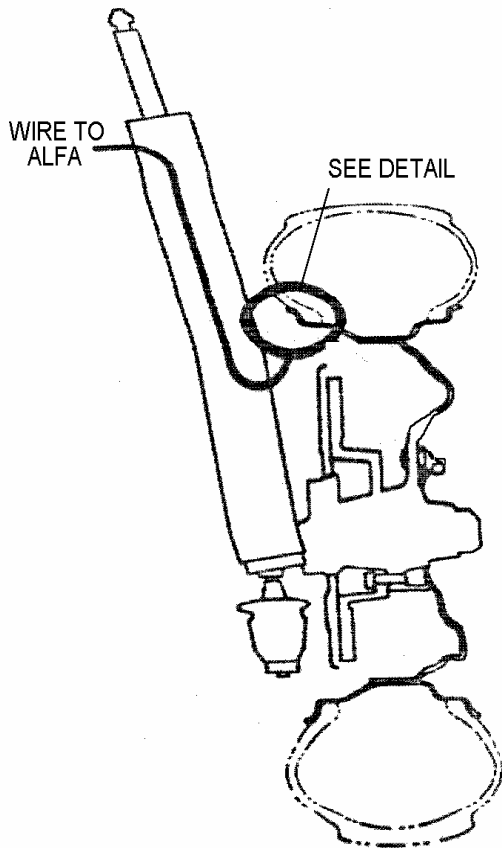
Sending units are available from some sources which attach in-line with your odometer cable. Some attach at the transmission, some behind the dashboard, and other require that you actually cut your speedometer cable and splice in the sender! The primary advantage of this type of sending unit is ease 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 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 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 non-magnetic 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:**

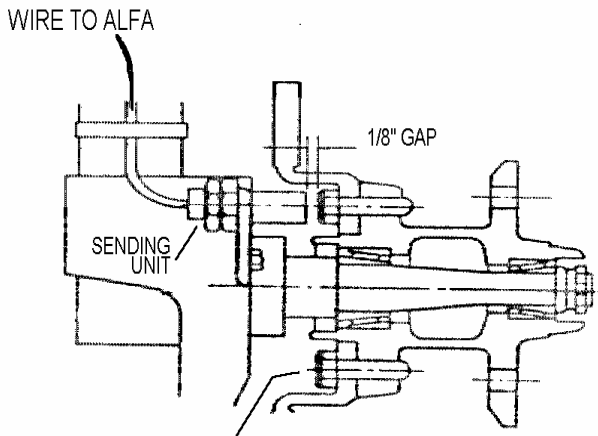


Mounting the sending unit is different for every car, and requires some imagination. If you do not feel comfortable with the mechanics involved, please refer to the above discussion on sending units and purchase one of the fine, easy to install (speedometer cable or hubcap mounted) sending units described.

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 build 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 it is shielded from rocks and other road debris. A possible alternative to wheel mounting would be mounting the





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

*HUB MOUNTING DETAIL*

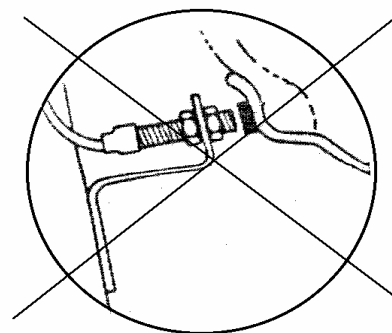
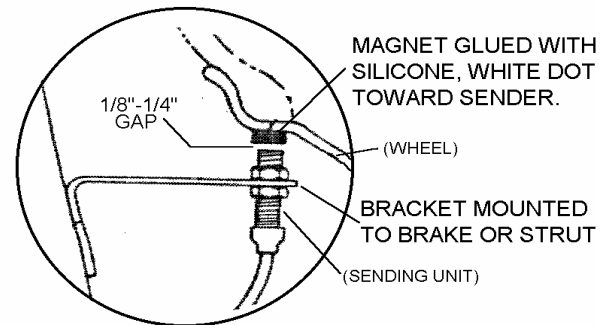
magnetic media (disks, credit cards, etc.) from a fair distance!) Use both magnets on one wheel oriented approximately opposite each other in the wheels rotation.

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.

magnets to the cars drive shaft and the sending unit to either the transmission or axle casing.

The magnets are mounted to the wheel or hub with the painted mark 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 1/4 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

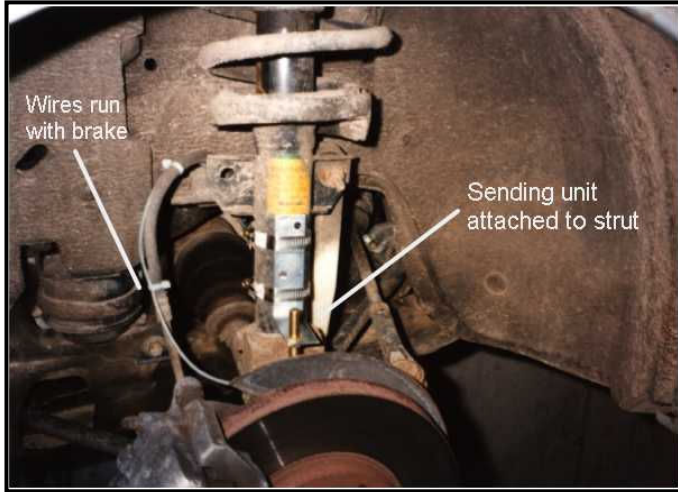
*CORRECT WHEEL MOUNTING*



***INCORRECT!***

GAP CHANGES UNDER HARD  
CORNERING AND PULSES ARE LOST

## **EXAMPLE SENDING UNIT INSTALLATIONS:**

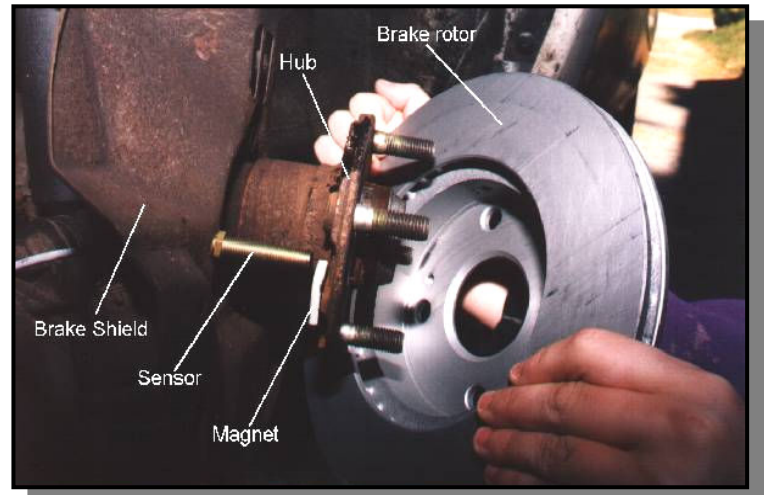


This photo shows a typical wheel installation. The magnets are glued to the inside wheel rims, and the sending unit is mounted on a bracket attached to the suspension strut.

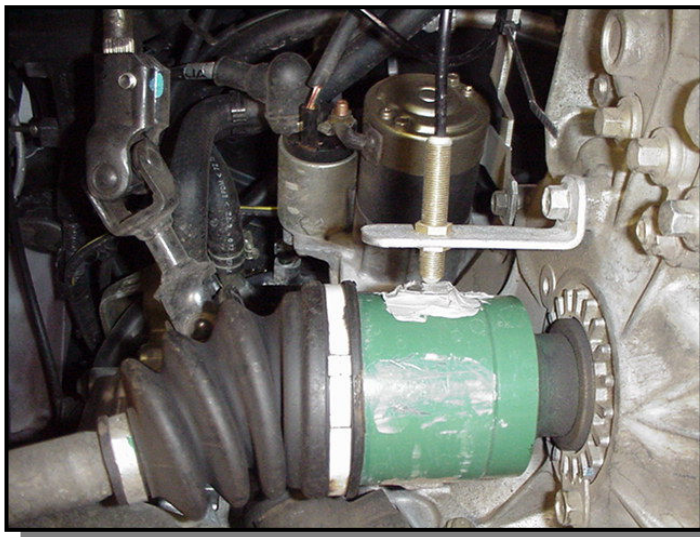
(This installation is simple to perform, but suffers from poor protection from rocks and road hazards. Also, be sure to glue magnets to your spare tires when using this type of installation.)

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.)

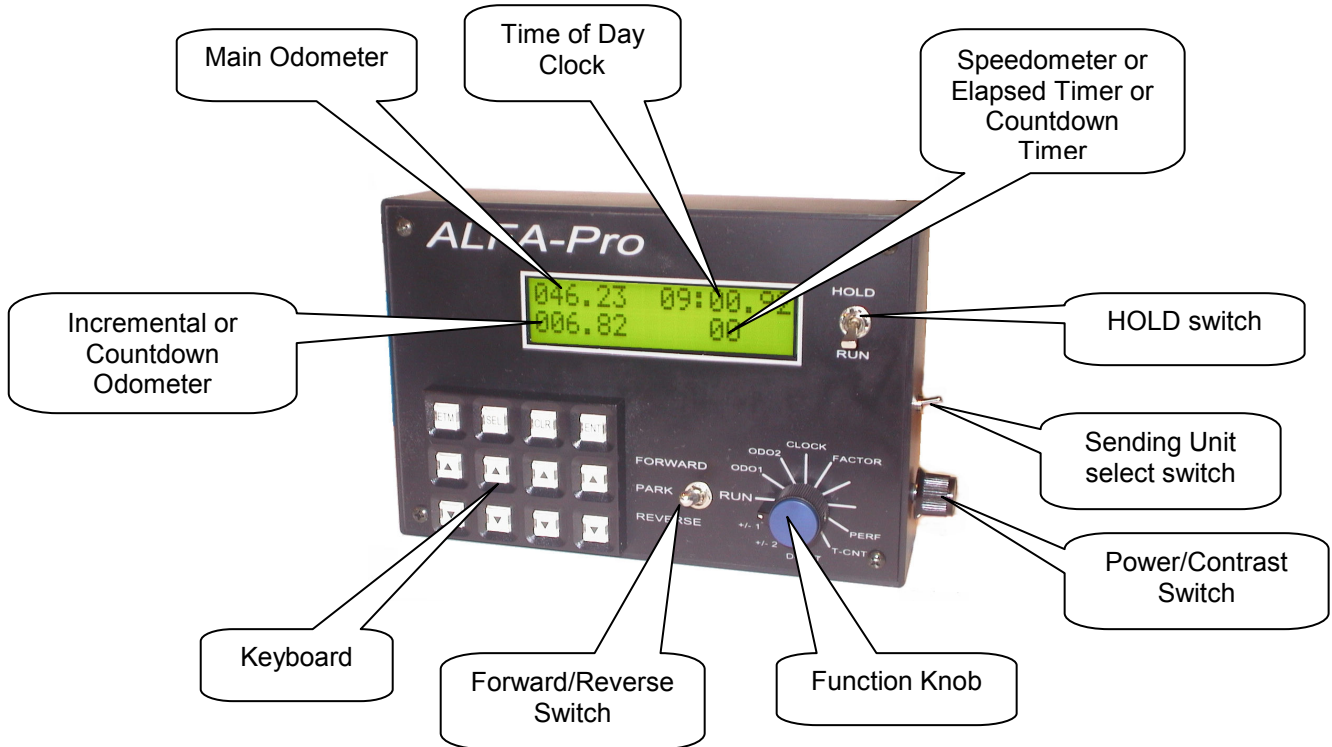


In this example the magnets are attached to the CV Joint and the sensor bolted to the transmission housing. This mounting works well on AWD vehicles in the front or back, using either the inner or outer CV Joint. It may also be possible to use the fore/aft driveshaft in the same way.



## ALFA-Pro CONTROLS:

Refer to the illustration for the position of the controls described below.



### **Function knob:**

This knob is used to tell the ALFA which type of data is being entered (odometer, clock, etc.). Note that the normal position for this switch is "RUN" which protects against accidental alteration of any function.

### **Forward/Park/Reverse switch:**

Determines which direction the odometer will run. When in PARK the odometer is disconnected and does not run. PARK does not affect any clock functions.

Some ALFA-Pro models are equipped with a locking forward/reverse switch in order to prevent accidental operation. To change the position of this type of switch, pull the handle toward you before operating it. The switch will lock again automatically when released.

### **Hold switch:**

The HOLD switch, when operated, freezes the display. The clocks and odometers continue to run unseen and will be correct upon releasing the HOLD switch to the run

position. Optionally, the hold switch may be used to freeze the display and zero the incremental odometer and elapsed timer at the same time (see customization section).

Note that the remote hold switch (optional) performs the same function as the internal hold switch. In order for the display to count normally BOTH switches must be released!

### ***Keyboard:***

The keyboard is used to enter time and distance data into the ALFA. The arrow buttons increment or decrement the corresponding digits of the number being entered.

When the function knob is in the RUN mode the ENT key toggles the thousandths digits on and off in the clock and odometer. The CLR key resets the incremental odometer and elapsed timer to zero. The ETM key alternates the elapsed timer and speedometer displays.

When not in the RUN mode, the ENT key enters the desired data. The CLR key resets the data to a known value (usually zero). The SEL key is used to select options (where available). If you have chosen to display thousandths of a mile, the ETM key will advance the .001 digit in the same manor as the arrow keys.

### **ALFA-Pro DISPLAYS:**

The display on the ALFA-Pro is generally split into 4 areas; Main Odometer, Incremental Odometer, Time of Day Clock, and Speedometer. Countdown Odometer and Elapsed Timer may be displayed in place of the Incremental Odometer and Speedometer when selected.

Whenever the function knob is moved from the RUN position, the bottom line of the display is changed to allow you to enter data. The ALFA-Pro prompts you in plain English to make data entry as simple as possible. While entering data, the top line of the display (the Main Odometer and Clock) continues to run normally.

### **POWER-ON TEST AND CUSTOMIZATION:**

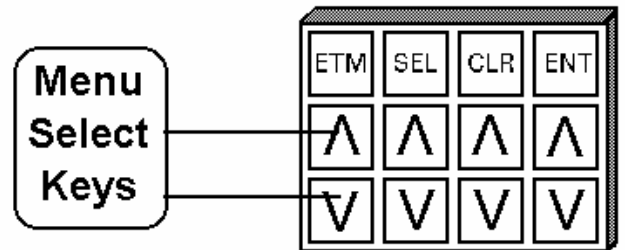
On LCD equipped models, turn on the ALFA by rotating the power/contrast knob clockwise. A "click" is heard to indicate that the switch has closed. The further clockwise the contrast knob is rotated, the darker the display will become. The setting of the contrast control will vary with the mounting position of the ALFA, the ambient lighting and the temperature. Adjust it for comfortable viewing.

On OLED equipped models, simply flip the power switch to the UP position to turn on the ALFA. No further adjustment is required.

The backlight brightness of LCD models is adjustable in your ALFA-Pro. To change the setting move the function knob fully counter-clockwise. Press the menu select keys to select Bright, Dim or Off settings. On OLED models this controls the front panel illumination rather than the display brightness.

The first time you use your ALFA, the display will show your unit's serial number and a test in progress message. The test may be terminated by pressing the ENT key, or it will terminate itself after a few seconds. If an error message is displayed (or the test doesn't terminate), make a note of it, turn the ALFA off for 10 seconds, then try again. If no message is displayed, or the ALFA fails several times in a row check your wiring carefully.

After the self test is completed you may either customize the ALFA to your liking, or use it in its default configuration. The screen will indicate options to be selected with ^ and v next to each selection. To select the desired option, press the leftmost arrow key on the keyboard which corresponds with the message.



The default condition is 12 hour clock in hundredths of a minute, zero-on-hold feature disabled, speedometer enabled, distance measured to 1/100 miles. Try the various settings to see which suits your style of rallying.

The ALFA-Pro will remember your settings the next time you use it, and will not present the customization menu. *If you wish to return your ALFA to the factory settings simply hold down the CLR key while you turn on the power.* This will completely clear its memory and present the customization menus.

## **RALLY OPERATION:**

The ALFA-Pro's function during a rally is to keep track of time and distance. the navigator (co-driver) operates the ALFA-Pro and uses the information displayed to guide the driver, himself, and the car together to an easy victory. Normally the function knob is left in the RUN position, thus locking out the keyboard from changing any of the displayed time/distance information.

At various points throughout the rally you may have to enter new distance and timing information. This is accomplished by (gently) turning the function knob to the position desired and then entering the new information via the keyboard. In addition several "quick action" functions (described later) are available which do not require moving the function knob.

## **ODOMETERS:**

There are three odometers in the ALFA-Pro, overall, incremental, and countdown. all three odometers are controlled by an odometer factor which allows your indicated mileage to be corrected to match the course mileage. The ALFA-Pro is the only odometer on the market which allows a six digit correction factor. The six digit factor is essential where high precision is required, and also allows for the use of both miles and kilometers with the same sending unit configuration. Most rallies provide a short odometer check leg prior to the competitive sections for fine tuning your odometer correction factor.

The ALFA-Pro has the ability to compute its own correction factor. To use this feature, you must set the main (overall) odometer to ZERO at the starting point of the odometer check leg. Upon reaching the end point of the leg, enter the correct mileage into the ALFA-Pro in the usual manner, **but before moving the function knob press the SEL key**. The message "Computing" will appear while the ALFA works out the correction factor. (Once computed the message will change to "Computed".) Next move the function knob to the FACTOR position - the computed factor will be displayed. To use the automatic factor, simply press ENT. (Note: It may take the ALFA some time to compute the factor - be patient!)

To manually determine your factor for a particular rally use the formula:

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

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-Pro 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-Pro. To enter the factor, move the function knob to the FACTOR position. Your former factor will be displayed. Now use the arrow keys to set the new factor by dialing each digit up or down with the corresponding arrow key. When the desired value is displayed, press ENT. The display message will acknowledge that the new factor is entered correctly.

The ALFA-Pro has two odometer inputs, and each has its own correction factor. The odometer input is controlled by the toggle switch on the right side of the ALFA-Pro. When the function knob is moved to the factor position, the display will indicate which factor is being used. You may enter data for the alternate factor without affecting the current odometer by using the SEL switch.

The *Overall Odometer* is used to determine your position along the course. It reads from 000.00 to 999.99 miles. (or 000.000 to 999.999 if thousandths are selected)

To preset the overall odometer move the function knob to the ODO1 position. Enter the mileage you wish to set the odometer to by pressing the arrow keys. When the correct odometer setting is displayed, press ENT. Once ENT is pressed, the message on the screen will change to acknowledge the change and the keyboard will be locked out from any further changes until the function knob is moved to another position (all functions work in this manner). You may set up your next hack or restart point in advance by keying in the desired mileage and not pressing ENT. The value will be preserved (even if you move the function knob) until you require it (all functions except the Distance Countdown work in this way).

The *Incremental Odometer* is set in the same way as the overall odometer except that ODO2 is selected with the function knob.

At times it is easier to simply *add or subtract* a small amount from an odometer to correct it rather than re-entering the new mileage (especially when in motion). To add or subtract from the overall odometer, use the +/-1 position, and for the incremental odometer the +/-2 function knob position. Enter the amount to correct in hundredths of a mile and press ENT. Use the SEL key to determine addition or subtraction from the odometer (the display will reflect the selected action).

To use the *distance countdown alarm*, move the function knob to the D-CNT position and enter the overall mileage to count down to. The incremental odometer display will be replaced by a count down to the selected point. The countdown display is preceded by ">" to differentiate it from the incremental odometer at a glance. When you are .2 miles



from the selected point the ALFA will begin to beep. To cancel the countdown, move the function knob to the D-CNT position and press CLR (do not press ENT).

Several different alarm sounds are available in the ALFA-Pro. To select a different tone, move the function knob fully counter-clockwise and press SEL until the beep menu appears. Use the menu select keys to choose one of the available alarms.

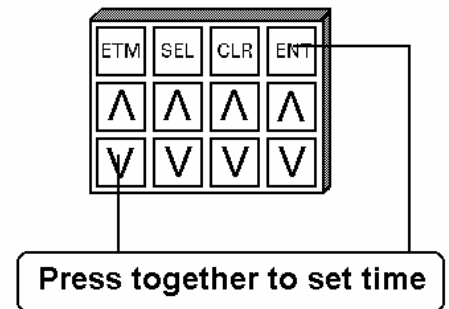
**Odometer Quick-Action:** The incremental odometer may be zeroed at any time with the function knob in the RUN position by pressing the CLR key. (The elapsed timer is also reset.)

Pressing the ENT key while the function knob is in the RUN position will display *thousandths of a mile* even if that option was not selected at power up. Press ENT again to return to the selected display mode.

### **CLOCK AND TIMERS:**

To set the time of day clock, move the function knob to the CLOCK position. As with the odometer, use the arrow keys to set the desired time onto the display.

**There is an extra safety feature when entering the time of day** - you must press the ENT and then the LEFTMOST-DOWN ARROW, rather than pressing just the ENT key. This prevents accidental resetting of the clock during a busy rally.



To use the time countdown, move the function knob to the T-CNT position and enter the target time to count down to. The time countdown will appear in the lower right of the display in place of the speedometer. The time countdown is distinguished on the display by a "+" or "-" preceding the countdown. "+" indicated that the target time has not yet been reached, and "-" that the target time has been passed. To remove the time countdown, move the function knob to the T-CNT position and press CLR (do not press ENT).

**Clock Quick-Action:** Pressing the ETM key will display the elapsed timer. This timer is displayed in the lower right corner of the display (in place of the speedometer) and is holdable like the other displays. Pressing ETM again will remove the elapsed timer display.

Pressing the CLR key when the function knob is in the RUN position will *reset the elapsed timer*. (The incremental odometer is also reset.)



Pressing the ENT key while the function knob is in the RUN position will display *thousandths of a minute* (or tenths of a second) until the ENT key is again pressed.

### **PERFORMANCE TESTING:**

Your ALFA-Pro has the ability to measure several key performance items for your car. Please note that these functions are provided for your information only and to assist you in tuning or repairing your car. These functions are not intended for use on public roads where safety or speed laws would be violated!

To measure your performance, first bring the car to a complete stop. (The speedometer should be displayed and reading zero) With the function knob in the RUN position, drive as fast as you can for ¼ of a mile. As you reach the 30mph, 60mph, and 1/4 mile points, the ALFA will record your car's performance figures. After passing the ¼ mile point, rotate the function knob to the PERF position to display the results.

Please note that if you take longer than 99 seconds to perform the test, unreliable results may be presented on the display. (and your car is extremely slow!)

### **DRIVERS DISPLAY INFORMATION:**

The optional drivers display shows overall mileage, incremental or countdown mileage, time of day, and speed. *The HOLD button has no effect on the drivers display.*

The ALFA-Pro will operate with or without the drivers display attached. You may attach or remove the driver's display while the ALFA-Pro is operating at any time. When separated from the main unit, the driver's display will continue to function as an independent clock in its internal battery. For details, see the ALFA Driver's Display owner's manual.

## **FOR LIQUID CRYSTAL DISPLAY EQUIPPED MODELS ONLY:**

Liquid crystal displays have many advantages over conventional LED or Incandescent displays. Several safeguards must be observed however to insure the proper operation and life of the display.

LCDs do not like extreme temperatures! If the display is too cold (<30 degrees F), the contrast will be reduced, and if too hot (>130 degrees F), the display may turn black. In direct sunlight on a hot day, dashboard temperatures can reach 180 to 200 degrees F! If you park your car in the sun, leave a few windows cracked open to allow the heat to escape. Another effective trick is to loosely drape a white towel over your ALFA to reflect the heat. Sunshades also help considerably in the hot weather.

If the displays turn black, don't panic! The manufacturer has assured us that they will not be damaged. Simply open the windows and drive around for a few minutes. As soon as the displays cool down, they will return to normal. It is important to note that the ALFA-Pro will continue to function correctly even if the display is unreadable and the correct time and distance will be available upon the return of the display.

The last word on temperature.... If you are comfortable, the displays will function. If the displays blackout from heat while you are driving, you probably will too!

LCD displays are made of glass! If the glass should break, do not touch the liquid which will leak out, IT IS TOXIC!!! the front panel of the ALFA is high impact Lexan and will contain the broken glass.

The contrast control may need to be readjusted from time to time as the outside lighting and temperature change. This is normal. *Use caution while adjusting the contrast in motion so that you do not accidentally turn off your ALFA.* The control is deliberately set up to use only the far half of the rotation to control the contrast to avoid this problem.

## **WARRANTY:**

Your ALFA-Pro 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-Pro, 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-Pro need to come back to the factory for service, please call 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.