

**Owner's Manual and
Programming Guide**

PACEMAKER
P3 PLUS
ENDURO COMPUTER



Pacemaker P3 Plus Enduro Computer

2002 User Instruction Manual

Version 02.418

Dear Racer,

Thanks for purchasing the world's most advanced off-road racing instrument. We're proud of the new features and design of the Pacemaker 3, which is now much more than just an Enduro computer. Drawing from years of experience in manufacturing the Pacemaker 3, we at FHR have included in this new computer a vast number of both software and hardware improvements. Many, if not all, of these improvements have resulted from suggestions made by our current users and sponsored riders all around North America. If you have had previous experience with an earlier version of a Pacemaker, I am certain you will appreciate the greatly increased memory, exciting new menus, and improved reliability and functions. If this is your first off-road computer, get ready for an adventure. The new Pacemaker 3 Plus is so good, you may feel a little guilty when you start taking those trophies!

Contents at a Glance

New Features of the Pacemaker P3 Plus.....5

Section 1: Installing Your Pacemaker P3 Plus Computer.....6

Mounting . . . 6

Sensor Installation . . . 6

Turning the Pacemaker On . . . 7

Turning the Pacemaker Off . . . 8

Main Menu Modes of the Pacemaker P3 Plus . . . 8

Section 2: Select Mode = SETUP.....8

Unit of Measure . . . 8

Tire Size . . . 8

Race Rules . . . 9

Speed Changes . . . 11

Waits . . . 12

Jumps and Resets . . . 13

Locations . . . 16

Alarms . . . 17

Permitted Functions in RACE! Mode . . . 19

Section 3: Select Mode = RACE!.....19

Pre-race Countdown . . . 19

Primary Race Display . . . 20

Section 5: Select Mode = ALTERNATE.....24

Maximum Speed . . . 24

Total Distance . . . 24

Stopwatch . . . 24

Alarm Test . . . 24

Pickup Test . . . 24

Clear Datalog . . . 24

Datalog Options . . . 25

Section 6: Select Mode = DOWNLOAD.....25

Send Program / Receive Program . . . 25

Send Datalog . . . 26

Test Send / Test Receive . . . 26

Batteries . . . 26

Trouble Shooting.....27

Download Connection . . . 27

Unexpected Shutdown . . . 27

Serial Number Display . . . 27

Dif Time . . . 27

New Features of the Pacemaker P3 Plus

- Expanded memory, room for over 100 speed changes and 100 resets.
- Infrared Communications Port: Download race data from one P3 to another. Communicate between your P3 and your laptop or desktop PC.
- New Race rules for FIM. World Enduros, ISDE Qualifiers, and Dual Sport events. Calibrates in Miles or Kilometers.
- Datalog Feature captures your Enduro performance data for review after the race.
- Remote thumb switch is standard equipment, for easier operation under race conditions. The remote up/down switch housing allows the rider to adjust his mileage or operate the computer without removing his hand from the left grip.
- Optional Audible Alarm alerts you before possible checkpoints.
- New Blue LCD for optimum viewing, at any angle, and easy reading in various light conditions.

Other improvements over the Pacemaker 2:

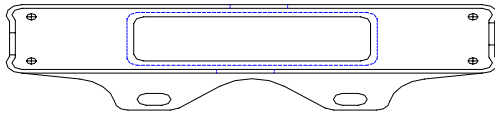
Opto-Isolators. Tiny chips with facing rows of light-emitting diodes send and receive electrical signals over an insulating gap. These Opto-isolators create a static- and EMI-proof bridge that insulates the P3's electronics from any outside interference. There are five Opto-isolators on the P3's printed circuit board.

9-volt battery operation. The P3 Plus is powered by two 9-volt transistor batteries for longer battery life and improved battery connection. Only one battery is required to operate the P3 Plus, but the user can install two cells for longer battery life. The 9 volt battery's snap top connector cannot vibrate loose

SECTION 1.... Installing your Pacemaker 3 Plus Computer

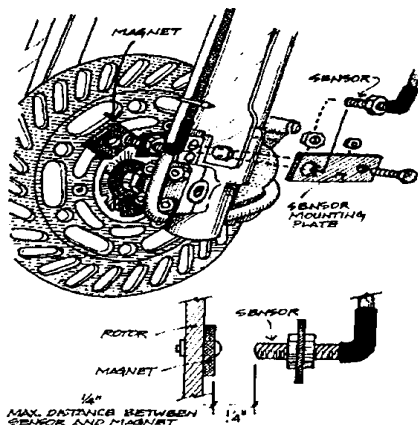
On most bikes, the installation of the Pacemaker computer can be performed by attaching the mounting brackets around the crossbar of the handlebar. The design of the Pacemaker mount allows it to be positioned either behind or in front of the crossbar. Placing the Pacemaker in front of the crossbar may require it to be removed for infrared communications, because the crossbar will partially obscure the IRD lens.

If your bike is equipped with ProTaper handlebars that have no crossbar, it is necessary to use an aluminum computer mount. These can be purchased from FHR (973-691-4431). A simple mount can probably be fabricated as well.



Use Caution when Mounting

It is very important to ensure that the Pacemaker will not interfere with your bike's control cables when the bars are turned to full right or left position. This could interfere with the operation of the controls. Also, make sure that the front brake line is not allowed to hook over the computer or headlight when the front forks are compressed. This could damage the cable or the computer.



The Sensor, also called a pickup, senses the magnetic current from a high-strength magnet placed on the front wheel. The sensor can detect this current from as far as one inch away, but for reliable operation at high wheel speeds, the sensor should be within 1/4" from the face of the magnet. The magnet should be mounted on the hub of the front wheel in a location that facilitates sensor mounting. On most machines, that means either on or adjacent to the disk rotor mounting bosses.

Make certain that the installed magnet does not interfere with the rotation of the wheel or the operation of the front brake. You may need to use one of the aluminum mounting plates to move the magnet to a location where it will not interfere with the wheel's rotation. Another good method is to use 2-part epoxy to glue the magnet in place near the spokes at the center of the hub. This epoxy method works well on bikes with very little space for a magnet.

Mount the sensor using the small aluminum plates. Most machines have small 6mm axle pinch bolts or disc protector mounting bolts that provide good points to attach a sensor. Adjust the sensor using the plastic nuts to achieve the 1/4" air gap between the sensor and the magnet.

Important: Do not over-tighten the sensor nuts. The sensor is a hollow plastic bolt and these nuts must only be tightened finger tight to avoid

Turning the Pacemaker Off

To turn the Pacemaker off, press and hold the “Down” and “0” buttons until the shutdown countdown reaches zero, and the display simply reads “Off”. Release the buttons and the display will blank.

Main Menu Modes of the Pacemaker P3 Plus

There are five main menu branches, or modes, in the P3’s menu structure. They are organized to collect functions in the logical order that they will usually be accessed. The menu modes are SETUP, RACE!, ALTERNATE, DOWNLOAD, and CLEAR MEMORY. The following sections will review all the features of each menu mode.

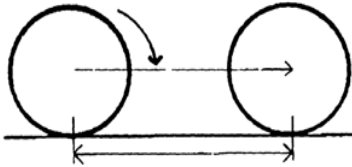
SECTION 2...Select Mode = SETUP

This is perhaps the most powerful and important part of the Pacemaker software. All of the user customization and race data entry fields are contained in the Setup section. Press the “0” button from the Select Mode Setup display to enter the Setup menu.

Unit of Measure

Use this screen to select between Miles or Kilometers as the unit of measure for operation. Tire Size will also be reflected in inches or centimeters according to the Miles/Kilometer selection.

To determine your wheel size, locate a flat surface on which you can rotate the tire at least one revolution.



Mark the ground and your tire, then rotate your tire one full revolution until the tire is in the same position. Mark the ground again, and measure the distance between the marks. **Enter this Tire Size into your computer**

Some riders desiring greater accuracy or faster speedo response time prefer to mount two or more magnets on the front wheel. To accommodate any number of magnets, divide the Tire Size by the number of magnets. Since the Tire Size really represents the distance traveled between sensor/magnet pulses, this method ensures accurate readings regardless of the actual Tire Size or number of magnets.

Race Rules

The Pacemaker is capable of operating under four distinct sets of Race Rules, or operating scenarios. Choosing one of these Race Rules enables different menu options in the remainder of the Setup Mode. The chart below shows which menu choices are linked to each set of race rules.

Menu Flowchart for Race Rules

AMA Rules		speed changes	resets	locations	alarms	customize display
Dual Sport Rules	set rider minute	speed changes	resets	locations	alarms	customize display
FIM Rules				locations	alarms	customize displays

AMA Rules

If AMA rules are selected, the user then progresses to enter Speed Changes, Resets, Locations, Alarms, and then set the Display options. Locations under AMA rules represent Known Controls.

Brand-X Rules

Many eastern Enduros are run under what is called Brand-X rules. They are similar to AMA rules, except that if a rider is late or early at a given checkpoint, the time he arrives there becomes his new keytime, and is his new target minute for the subsequent checks. If Brand-X Rules are selected, the Setup Menu proceeds the same as under AMA rules, except that first the rider is prompted to enter his starting row number. The display will prompt [Your Minute =XX]. Adjust to show your correct starting row number using the “Up” and “Down” keys, then press “0”. The user then enters Speed Changes, Resets, Locations, Alarms, and then Display options.

FIM Rules

The F.I.M. or Federation Internationale Motorcycliste, is the governing body of ISDE and world Enduros. Their rules for competition are the same as used in American ISDE Qualifiers, where the location and keytime of all checkpoints are known to the riders before the race begins. Timekeeping as we think of it in AMA Enduros is not a factor, since the rider can arrive at a checkpoint at any time without penalty, but he cannot pass through the check until his keytime. When FIM rules are selected, the rider sets his row or keytime as described above, then progresses directly to the data entry point for Locations, where actual checkpoint times and locations are recorded. The rider may then set alarms if desired, followed by review of the Display Options.

Dual Sport

to alert you at a particular time, or perhaps a distance such as the estimated number of miles you could travel prior to running your fuel tank onto reserve.

Speed Changes

Thirty years ago all AMA Enduros ran at a constant 24 miles per hour for the entire event. This facilitated the pocketwatch timepieces that most riders used to keep track of their pace. Over time, as bikes improved and organizers became more sophisticated, (or should we say diabolical), Enduros came to be formulated with many differing speed averages. Sometimes as many as forty or more average speed sections are now employed in a single event! While Enduro organizers have attempted to negate the benefits of having an Enduro computer by making events very complicated to program, Pacemaker represents the ultimate weapon for the competitive racer. Pacemaker's memory holds 100 individual Speed Changes, and can accommodate speed averages as high as 256 MPH, and races as long as 999 miles.

Entering Speed Changes

Press "0" to proceed to the Speed Change entry menu. Pacemaker will display [Clr Speed Chgs Y/N]. If you press "Up" for yes, Pacemaker will clear and erase any previously entered Speed Changes. If you want to keep or review any Speed Changes that have already been programmed, press "Down". To bypass this section of the menu, press "0" and you will proceed directly to the next menu section.

If you press "Up" to clear Speed Changes, Pacemaker will display [01 = XX MPH to: XX.XX OK] . Press the "Up" or "Down" arrow key to change the operator from OKay to EDit. Then press X. Pacemaker will display [01 = XX MPH to: XX.XX ~4]. As you are entering speeds and mileages, the active field

Entering the last speed average in the race

When you enter the final speed average, at the point where Pacemaker displays [XX = XXMPH to XX.XX OK], when the whole miles of the “to” mileage are underlined (active field), press the “Down” arrow once. The “to” mileage will change to read [FINISH]. This tells Pacemaker to continue calculations at this average until you manually shutdown the computer. Press “X” to set this final change and return the operator to [OK]. Then press “0” to exit and proceed to the next menu section.

To edit, insert or delete a Speed Change

If you wish to change one of the values displayed, scroll through the speed changes that you have entered until you find the one that you wish to change. Make the operator [OK] the active field, then use the arrow keys to select [ED] and press “X”. Proceed with the changes, and then press “X” at OK to go to the next speed change. If you are reviewing a list of Speed Changes and wish to insert a new speed change immediately after the speed change shown, select IN and press “X”. You can enter the reset to be inserted. If you wish to delete the reset shown without affecting any of the other resets in memory, select DL and Press “X”.

Races with no Speed Changes

Sometimes an event will use only one speed average (usually 24 MPH) for the entire event. If this is the case, Enter the average in the first Speed Change field -- e.g. 0 1=24MPH to XX.XX ED] -- then make the mileage field the active field and use the “Down” arrow to select [Finish], which is just below 000.00 miles. Press “X” and the operator will display “OK”. Then press “0” to exit the speed change routine. The race is now set to one average speed.

The two essential parts of a Wait

The correct procedure for entering a Wait consists of two parts; (1) entering the wait and the duration of the wait, and (2) entering the speed average at which the computer will resume, after the wait period has elapsed. One way to picture this is to imagine an Enduro that is run at 24 MPH average all day, but has five or six Waits. You must tell the Pacemaker to resume at 24 MPH after each Wait, even though this speed did not change. Pacemaker must know what speed to use for the next section.

Entering Waits

When entering Speed Changes you can enter a Wait in the following manner: When the speed average field is active (underlined) at the display [XX = XX MPH], go to select a zero MPH average using the “Down” arrow key. Instead of displaying [00 MPH], Pacemaker will display [XX=Wait]. Next the Pacemaker will ask for the duration of the Wait. Press “X” and the display will read [XX=Wait for XXX min ED]. Enter the duration of the Wait using the “Up” and “Down” arrow keys, then press “X”. The OK will appear underlined, indicating it is the active field. As you did when entering Speed Changes and Resets, choose OK if you have entered the Wait correctly, ED if you wish to edit the Wait, IN if you are reviewing the entries and need to insert another speed change immediately after the Wait, or DL if you wish to delete the Wait.

Remember: The entry immediately following a Wait must be the speed average at which the race resumes. Even if the speed is the same before and after a Wait, you must tell the Pacemaker what speed to use in resuming the race calculation.

Jumps and Resets

Important note!! For every jump-to-zero, you must also enter a corresponding reset-to-zero under the Clear Resets section of the Setup menu, or else the Dif Time display will not calculate correctly. It is **required** that every Jump be entered in both the Speed Change menu as a Jump, and a matching entry under the Reset menu.

Entering Jumps

When the course requires a reset of the computed distance, at the Speed Change display [XX =XX MPH to XXX.XX OK] set the speed to wait, then press “Down” once more. The Pacemaker will display [Change XX = JUMP]. Press “X”, and Pacemaker will display [XX=Jump to X~.XX OK], with the mileage field underlined (active). Enter the Jump “to” miles (usually 00), tenths and hundredths and then press “X” at OK to accept the Jump and proceed to the next Speed Change. As with Waits, you must enter the speed at which the race resumes immediately after entering a Jump.

Available Memory for Speed Changes

Pacemaker’s memory can contain up to 100 individual Speed Changes, Waits or Jumps.

Clear / Set Resets

Once you have entered the Speed Changes, press “0” to proceed to [Clr Resets? Y/N]. If you press “Up” for yes, Pacemaker will clear and erase any previously entered Resets. If you want to keep or review any Resets that have been programmed, press “Down”. To bypass this section of the menu, press “0” and you will proceed directly to the next menu section.

If there are Resets in the race you wish to program, you can enter them into the

computed or should-be distance to remain in agreement with the route sheet. So, as a rule of thumb, forward resets are always optional, while *backwards resets-to-zero are always required to be entered, and they are entered under Speed Changes as well as Resets.*

Hint: Many times there are several operations called for by the route sheet that occur at the same point in mileage. To ensure that the reset-to-zero is correctly recognized by the computer, it is a good idea to offset the Reset entry that accompanies a Jump. Simply add 1/100th of a mile to both the beginning and ending entry so that the computer will be sure to recognize the Reset as a distinct command. E.G.: Jump is from 40.00 to 00.00, so you should make the offsetting reset entry at 40.01 to 00.01.

Entering Resets

If you elect to enter Resets, Pacemaker will prompt you with [at XX.XX to XX.XX OK]. As you are entering Resets, the active field will be underlined. First select [ED] as the operator, as you did under Speed Changes. The mileage “at” will be active (underlined). Increment the whole mile of the first Reset using the “Up” and “Down” arrow keys. Then press the “X” key. The tenths field will be underlined, indicating that it is the active field. Enter the tenths of a mile to the first Reset, then press “X”, and finish by entering the hundredths of a mile. Press “X” once more, and enter the Reset TO mileage. Enter the end mileage that the first Reset is “to” by using the “Up” /Down“, and “X” keys as in the first part of the Reset. When you are finished, press “X” and the [OK] field is then underlined, indicating that it is now the active field. If you press “Up” or “Down”, you will scroll between OKay, EDit, INsert, or DeLete. If the

Entering the final Reset of the race

The Pacemaker's memory is able to contain 100 individual Resets. When you have entered the final Reset, press “0” to continue to the next menu section. There is no need to enter a bogus reset as in previous versions of the Pacemaker.

Locations

Pacemaker has the ability to track your progress towards certain locations that are programmed into memory. Under the FIM rules as used in an AMA qualifier or a World Enduro, you would enter the keytime and mileage of each check on the course, and in operation the Pacemaker's display screens would show the number of the next check location, the time remaining before your scheduled arrival, and the distance to the next programmed check. Under AMA Enduro rules, the user can program Known Controls as locations, and this will cause the black Free Zone indicator bars to appear on the screen 2 miles before and 3 miles after the known control location. Under Dual Sport rules, the rider could enter the location of any major turn, gas, or lunch, and receive information about the distance to this location.

Entering Locations

At the screen [Clear Locations Y/N). press “Up” to clear the locations from memory and then begin data entry. The screen will display [LOI 00:00 AT 0.00 ok]. As you have done with other data entry fields, change the operator to ED by using the “Up” key, and then the whole minutes of the time display becomes active. Enter the time to the first check, and then proceed to enter the mileage by pressing “X”. After you have entered the first location information, press “X” at the OK, and enter all subsequent locations.

If you are programming a World Enduro or Qualifier, be aware that the start is

with a friend, or for some other reason. This is commonly called “Bumping Minutes”. To change your rider minute permanently, press “X” and the screen will display [Your Minute = XXX ok]. Change the minute with the “UP” and “Down” arrows, and the Pacemaker will recalculate all of your arrival times.

Location Times in AMA Enduros

Since the only function of the Locations menu under AMA Enduro rules is to alert the rider to the Known Controls, it is not necessary to enter a time for each location. Simply leave the time entry blank, and proceed to enter the location mileages.

Alarms

Pacemaker has an Audible Alarm feature that can be used to alert the rider to the location of secret checkpoints, Resets, or Speed Changes. It can also be set to sound at a certain distance or time.

After you have completed the [Clr Speed Changes] portion of the menu, press “0” to proceed. Pacemaker will display [Clr Alarms Y/N]. If you press “Up” for yes, Pacemaker will clear and erase any previously entered Alarms. If you want to keep or review any Alarms that have already been programmed, press “Down”. To bypass this section of the menu, press “0” and you will proceed directly to the next menu section.

Entering Alarms

Press “X” at the display [Clr alarms Y/N] to continue with Alarm setup. The first screen that Pacemaker displays will say [alarm off]. Press “Up” or “Down” to view your other alarm menu choices. If you press “0” at the display [alarm off] Pacemaker will exit the alarm routine and you will proceed to the next

Pacemaker will allow you to select one of three optional alarm patterns for detecting possible checks. When the display says [Poss check in 1/10], the Pacemaker's audible alarm will sound when you reach a point 1/10th of a mile prior to a possible check location. The Pacemaker will automatically calculate the location of the Possible check, and the alarm will sound as the rider approaches that point. Press the "Up" or "Down" key to view the other two alarm patterns: [Poss check in 2/10], which gives the rider 2/10 of a mile warning prior to a possible check, or [Poss check in 2/10 1/10] which sounds the audible alarm at both 2/10th and 1/10th of a mile prior to a possible check location. Choose one of these three alarm modes by pressing the "X" key, and proceed to the next menu.

Important: The possible alarms are based on the odometer value, and not on any computed or should-be location. This means that the possible check feature, like the Dif Time display, is only as accurate as the odometer at that point in the race. This points out the importance of "Up" dating the odometer mileage at every posted turn, check or reset.

Alarm Settings

If your Dif Time is greater than -2:00-, which means that you are more than 2 minutes late, the alarm will be silenced. If you have marked a checkpoint (by pressing the "X" key for two seconds at the checkpoint), black bars will appear between the first, second and third display segments, and the alarm will be silenced. If you have entered the known controls under the LOCATIONS menu, the black free-zone bars will appear on the display, and the alarm will not sound when you are two miles away from the known control, until you reach the control.

Permitted Functions in Race Mode

Adjust Odometer	Press “Up” or “Down” buttons to adjust odometer mileage
Adjust Clock	Press “0” and “X” together, then “Up” or “Down” to adjust minutes, “X” to fast forward seconds, “0” to exit when done
Adjust Wheel Size	Press “Up” and “0” together, set new distance to autocalibrate Wheel size if desired, then “X” to see Wheel size, “Up” or “Down” to adjust if desired, then “0” when done
Exit to Setup	Press “0” and “X” together, “0” to skip clock adjust, then “Up” for yes, exit to setup.
Adjust riding minute (Brand “X” and FIM rules only)	Press “X” to see riding minute, “Up” or “Down” to adjust, “0” when done
Mark Check (AMA rules only)	Press “X” for 2 seconds to mark check, free zone bars will appear on display for 2.9 miles

SECTION 3 *Select Mode = RACE!*

When you have entered all of your race or setup information into the Pacemaker and you are ready to go riding, select the Race Mode. This is where all of the actual calculations take place, and where the race displays can be viewed. In the Race Mode, the user is locked out of all non-essential setup operations so that you can’t accidentally change any parameters. (Although there is an “emergency

Primary Race Display

Once the race has begun, Pacemaker's internal chronometer starts a race clock. The display switches to the race display, which you've selected or customized under the Setup Mode. The Pacemaker will run in the Race Mode until you shut it down (press "Down" and "0" for four seconds) or until the batteries run dead. They have a life of about 24 hours.

Changing to Secondary Race Display

Pacemaker can display up to six separate display segments, three at a time in two banks. To switch to the second bank of displays, press the "0" button. The secondary display is denoted by a dark box between the display segments. Use the secondary display bank at any time while you are in the race mode.

Racing an AMA Enduro

If you have selected the default displays, you'll see this clock in the right-hand display position. The left-hand display is your Odometer, which counts the distance you've traveled in either Miles or Kilometers. The center display is the Dif Time, or plus/minus display, which shows the difference between your actual location as determined by the odometer, and your computed or should-be location as calculated by the Pacemaker. This display shows how many minutes and seconds, either plus (early) or minus (late), you are ahead or behind your ideal pace or location as determined by the Pacemaker.

Adjusting the Odometer

When you are in the Race mode, the "Up" and "Down" buttons are always active for incrementing or decrementing the odometer reading. If you want to add mileage to the odo display, press the "Up" button. If you need to subtract mileage, or reset the odometer to zero, press the "Down" button. Adjusting the odometer does not change the Tire Size or calibration of the odometer. That

= XXX]. Change the distance displayed to match the actual mileage at that point using the “Up” and “Down” keys. This will cause the P3 Plus to recalculate the Tire Size setting for greater accuracy. After you have set to the new mileage, press “X” to compute the new Tire Size. The P3 Plus will display the new Tire Size [Tire Size = XX.XX]. If you wish to change the Tire Size, you may do so. Press “0” to resume the Race display.

Hint: For greatest accuracy, use the [New Distance = XX.XX] function only between 3 and 20 miles from the start of the ride or race. Don’t use the [New Distance = XX.XX] function after adjusting the odometer manually, such as at a reset. Instead, go past the [New Distance = XX.XX] screen to the [Tire Size = XX.XX] display, and add or subtract a few tenths of an inch of Tire Size as necessary.

Remember this formula: If you need to decrease mileage at every marker, then you need to decrease the Tire Size; if you need to add mileage at every marker, then you need to add to the Tire Size. After a couple of fine tunings using this method, you can usually achieve perfect accuracy.

Adjusting the Clock

You can adjust or reset the Pacemaker’s race clock at any time in Race Mode by using the Clock Adjust feature. From the Race display, press “0” and “X” simultaneously. The display will show [clock adj = XXX.XX]. Use the “Up” and “Down” buttons to set the clock minutes to the desired time. Use the “X” button to fast forward the clock seconds. Use this to synchronize the clock exactly to the time desired. After you have set the clock to the new value, press “0”. Pacemaker will recalculate the computed distance, and automatically adjust your Dif Time display in accordance with the speeds and resets you have

clock adjust forward to a point just prior to the end of the race, and check the Pacemaker's "computed" display against the club's route sheet for the ride. Once the Pacemaker has finished calculating the computed mileage, check the roll chart against the Pacemaker's clock and computed display to see if they agree with the roll chart. If they do, then you have programmed the race correctly. If they do not agree with the roll chart, go back and check the seed change entries and try again. *This feature does not check the accuracy of programmed resets.*

Exiting the RACE! Mode to SETUP Mode

Although the user is normally prohibited from accessing most of the setup and auxiliary features of the Pacemaker while the computer is running in the Race Mode, we have left an **emergency exit**, or back door. This feature allows the user to temporarily exit a running race, change any of the user-entered information in the Setup Mode, download or transmit program information, and then return to the race in progress. This emergency exit was included to allow advanced users the opportunity to change a display screen or correct a Speed Change or Reset that was entered incorrectly -- without having to shutdown and restart the computer.

To access this feature, go into "Clock Adjust" by pressing the "0" and "X" buttons simultaneously. Then, without adjusting the clock value, press "0". Pacemaker will display [Go to setup Y/N]. Press "Up" to go to the Setup Mode. You will progress through the Setup menus until you come to [Select Mode Race]. At this point, you can return to the race in progress by pressing "0", or enter the Download mode, or even return to Setup.

CPR

One of the best features of the Pacemaker is its ability to clock adjust forward

recognize that a race is in progress, and it will automatically transmit the race clock and current odometer value as well as all the other programming information. After the data has been transmitted and successfully received, select the Race Mode on both units. The displays will prompt you [Resume race Y/N]. Press “Up” to resume the race in progress. The Pacemakers will then both be synchronized to the original’s race clock and odo. If the second unit belongs to a rider on a different row, he will need to clock adjust forward or back the appropriate number of minutes.

Marking a Check Location

Under AMA Enduro rules, there is a free zone where no secret checks can occur. This zone extends for three miles after every checkpoint or known control. Most riders choose to go as fast as possible during these three-mile free zones in order to get a few minutes ahead of schedule without the danger of hitting a check early. The Pacemaker makes it easy to keep track of these free zones by a feature known as Check Marking. When you arrive at a check or known control, mark the check in Pacemaker’s memory by pressing the “X” key for 1-1/2 seconds. The Race display will then show the solid bars between the display segments for the next three miles as recorded on the odometer. If you reach a reset during this three-mile period, Pacemaker will count it as ground mileage. Once three odometer miles have elapsed, the Race display will return to normal.

Adjusting your Minute (Brand X and FIM Rules Only)

If you are operating under Brand X rules, press the “X” button at any time and the display will change to [Keytime = 00.00] . This is the current minute that you are riding on. When this display is active, you can use the “Up” and “Down” keys to change your row or minute number. After arriving late or early at a checkpoint, adjust to your new minute using the “Up” /down keys, then

SECTION 5...Select Mode = ALTERNATE

Many miscellaneous functions are cataloged under the Alternate Mode. Press “0” at [Select Mode = Alternate] and you can access these items in sequence.

Maximum Speed

The Maximum Speed counter registers the highest speed sensed by the Pacemaker since the last time this field or the entire memory was cleared. To clear this field, press “X”. Press “0” to proceed to the next menu item.

Total Distance

The total distance screen reads [TOT DIST = XXX.XX Miles]. This records the total miles or kilometers traveled since the last time that this field or the entire memory was cleared. To clear this field, press “X”. Then press “0” to proceed to the next menu.

Stopwatch

The stopwatch is useful for timing yourself or another rider around a certain track or special test. At the Stopwatch screen, press “X” to start the stopwatch display. Pressing “X” again will reset the display to “0:00:00.00”. Pressing the “Up” arrow will start the display, the “Down” arrow will freeze the display and not stop the stopwatch (lap timer mode), and “X” again will stop and reset the display. Press “0” to quit the stopwatch and proceed to the next menu item.

Alarm Test

Use this function to test the Audible Alarm. The screen will display “Alarm On [X] Off []”. Pressing the “X” key will toggle the X-mark between the On and

session, press the “Up” arrow at the screen [Clear Datalog Y/N]. Pressing “Down” will allow you to scroll through any items of data currently in the log.

Data items are best viewed by downloading the contents of the log to a PC or laptop computer, using the Pacemaker Interface software. This allows you to save each specific log as a unique file, and to graph and view the information. Press “0” to select a Datalog option, quit the Datalog and proceed to the next menu item.

Datalog Options

The Datalog takes an electronic snapshot of one of two variables once per minute of operation. The Datalog can be set to record Dif Time, Speedometer reading, or can be turned off. The snapshot of each variable is marked according to the time, and is saved away in the Datalog. After the race, you can download the Datalog into your PC using FHR Racemaker interface software, and print out a graph that shows your Dif Time or speedo values for every minute of time that the Datalog was collecting data. There are over 1,000 Datalog memory locations. After that limit has been reached, new data is written over the oldest data in memory.

SECTION 6...Select Mode = DOWNLOAD

Each Pacemaker 3 Plus is equipped with an infrared dataport. The Pacemaker 3 Plus uses an IRDA-compatible infrared full duplex communication format. Range of the infrared transfer is approximately 6 feet indoors, 3-6 feet outdoors in indirect sunlight. Error checking is automatic. To ensure adequate connection, hold two P3s so that the IRD lenses are facing each other, and

seconds or more to transmit. After the program has been transmitted and error checked, the screen will display [Send 100% complete!] If this message does not appear, then the error checking has failed and the data must be resent. The receiving unit will display [Listening....] followed by [Receiving data]. After the transmission the screen will say [Saving Program], then [Receive 100% complete]. Press “0” to quit the data transmission session.

Send Datalog

To transmit a Data log to the Racemaker PC interface program, select [Send Data log Press X]. Use this mode to transmit Datalog information to an IRD-equipped laptop or desktop computer. It is not possible to send Datalog memory to another Pacemaker 3, only to a PC using the Racemaker software. Press “0” to terminate the send session.

Test Send / Test Receive

To test the infrared transmission capabilities of your Pacemaker 3 Plus or the connection between units, use the [Test send] and [Test receive] screens. Press “X” on both the sending and receiving units, and a string or repeating numerical characters will be sent. This mode is useful to test the conditions prior to an outdoor download connection, or if you suspect that one of the two units may be malfunctioning. Press “0” to terminate the test.

Batteries

The Pacemaker 3 operates on 9-volt dc power, provided by one or two 9-volt transistor batteries. Battery life with one 9-volt cell is approximately 18 hours. Sensor inputs and audio outputs both consume battery power, so if you are traveling at a high speed (many sensor inputs) or if you are using the Audio Alarm at a high rate, you may want to use two 9-volt batteries. The batteries are wired in parallel, so you can employ either battery alone or both in combination.

established under these conditions, shade the sending and receiving units with a cover of some kind.

Note: even after you provide the units with a sun shade, it may take the electronic gain control up to 20 seconds to change the sensitivity enough for the download to proceed, so you need to give the system time to adapt to the conditions.

Unexpected Shutdown

There is no low battery warning on the Pacemaker 3, so be sure that you have new batteries prior to each race. When the battery voltage drops below 6v, the P3's display will shut off. No memory will be lost, but the unit will shut down. Install new batteries to restore normal operation. If the unit shuts down immediately after initiating a download, it is because a low battery cannot sustain the additional voltage drop caused by the IRD operation.

Serial Number Display won't clear

If you have shutdown the P3 by removing the battery during operation, you may receive the serial number prompt the next time that the unit is turned on. If the screen displays [Serial t~ 000000], enter any number greater than 0 using the up arrow key, and then press "0" and "X" together. The screen proceed to [Select mode = Race] and the P3 will resume normal operation.

Dif Time hangs at [-99:00] after a reset to zero

If there are three or more program instructions that occur at the exact same mileage point during a race, it is possible that the P3 will overlook one of the instructions and display erroneous data. If the Dif Time display hangs at [-99:00], it is usually because the reset entry that accompanies a jump to zero was not accepted by the computer. The easy remedy is to offset the reset entry by .01 miles, (1/100th of a mile). E.G.: the course features a 20-minute Wait at 40.00 miles, a Speed Change to 18 MPH at 40.00 miles, and a Reset (Jump) from 40.00 to 00.00. Enter all of this information as it is listed on the route sheet, but