CompuTrainer Pro
NES Version

Computerized Training System
Model 8001



Operating Manual
1997

Congratulations!

You are the owner of the ***RacerMate CompuTrainer Professional Model 8001.*** CompuTrainer is a high performance indoor trainer which with proper use and care will give you many years of pleasure. With its programmable, interactive software, the CompuTrainer Pro gives you almost unlimited capability to fashion your workouts according to your individual needs. Furthermore, the performance and motivational qualities of your new CompuTrainer will move you to a level of fitness that can only be obtained in the controlled conditions available indoors.

Please read through this operation manual thoroughly in order to take full advantage of all the sophisticated capabilities your CompuTrainer provides.

Thank you for purchasing the CompuTrainer and please keep this manual in a safe place for quick reference!

Contents

Precautions
- **Read Me First** 2

The CompuTrainer System
- **What it is and What it does** 3
- **Parts List** 4
- **Connections**
  - Basic Pro CompuTrainer System 5-8
  - Challenge II Interactive Video Software 8

The Stand Alone Operation
- **Rolling Resistance Calibration Program** 9-10
- **Ergometer Program** 10
- **General Exercise Program** 11-12
  - Program Selection 11
  - Display Options 11
  - Heart Rate Monitor 12
  - Alarm Functions 12

The Challenge II Software Operation
- **Connection Tips** 13
- **Turning ON the System - What is displayed** 13
- **Error Signals** 13
- **Selections Screens** 14
- **Main Screen** 15
- **General Description - How it Works** 16
- **Program Descriptions** 17
  - Fixed Resistance Levels 17
  - Distance Controlled Programs 17
  - Road Races/Courses 17
  - Custom Courses 17

Procedures
- Program Selection 18
- Selecting "Race Against" 18
- Entering Your Weight 19
- Setting Heart Rate Limits 19
- Select Drafting Option 19
- Saving Your Last Race 20
- Custom Course Creation 21
  - Course Creation Limitations 21

SpinScan Pedal Stroke Analyzer
- SpinScan Display Screen 22
- Description 23
- Analyzing Results 24
- Saving Procedure 24
- Comparing Screens 24

Appendix
- Handlebar Keypad Quick Reference Guide 27
- Specifications 28

Precautions - Read Me First

1. ***Avoid Sweat and Damp Conditions***
   Keep the CompuTrainer out of damp locations to protect it from water damage Protect the *Handlebar Controller* from sweat with clear plastic wrap or a plastic bag.

2. ***Shock Hazard!! DO NOT open the case of any component or attempt a repair or modification yourself***
   This unit contains no user serviceable parts. Refer all maintenance to qualified service personnel. Opening the cases and/or tampering with internal circuitry will void the warranty.

3. ***Make sure all power is OFF before connecting or disconnecting cables***
   Always unplug the unit when installing or removing Power Supply Cable or DIN Cable to avoid short circuit caused system failure.

4. ***Handling Cables and Routing Cords***
   Always plug and unplug cables by gripping the connector and NOT the cord. Route cords in such a way as to protect them from crank arm and derailleurs.

5. ***Align Cable End Notches Visually***
   The alignment notches must be aligned before inserting cables. Visually locate the notch and align it to the indent on the cable or the jack. Failure to do so will result in a short circuit causing the fuse in the Power Supply to blow.

6. ***Electrical Interference***
   Some wireless heart rate monitors may be susceptible to interference from video displays. The CompuTrainer heart rate monitor should be used when accuracy is in doubt.

7. ***Memory Backup***
   The Challenge II software contains a special long-life battery that will retain the contents of the RAM memory even when the power is turned off or the cartridge is removed from the machine. This battery should last approximately 10 years. When the voltage drops too low to retain memory contents, have it replaced by a qualified RacerMate Service Technician. **DO NOT attempt to replace this battery yourself !!**

8. ***Static Electricity***
   Some bicycle tires and clothing made from synthetic fibers can produce static electricity in amounts sufficient to affect the operation of either the Handlebar Controller and/or the Challenge II Software cartridge.
   Static buildup on the bike is worst in cold, dry weather. If you suspect a static problem, call RacerMate for technical assistance.

9. ***Use Correct Power Supply***
   Always use the power supply which comes with the CompuTrainer.
   If the original power supply is lost or broken, a replacement, Part # R601-001-00 (120V) or Part # R601-005-00 (240V) should be purchased from RacerMate

The Road or Indoors ?

The CompuTrainer Pro is a high performance, microprocessor controlled, indoor trainer designed for use with your bike and a Nintendo Entertainment System. It employs state-of-the-art technology in its design to provide a workout that rivals an outdoor ride. Though not intended as a total replacement for training outdoors, it has the motivational qualities necessary to propel you to your desired goals in a shorter amount of time, without the distractions associated with riding on the road.

The Stand Alone Operation
(The Basic CompuTrainer Pro System without software interface.)

The CompuTrainer Pro consists of:

1) a stable, rear-axle mount **Trainer Stand** that supports the bike,
2) a proprietary **Pro Model Load Generator** driven by the rear tire,
3) a microprocessor based **Pro Handlebar Controller** which controls the **Load Generator**.
4) a **Cadence Sensor** to operate Cadence (RPM), SpinScan, and
5) an **Earclip Heart Rate Sensor.**

By measuring your speed together with the load factors encountered on the various programs, the **Load Generator** will create the appropriate resistance. In the stand-alone mode all changes to the load generator are controlled from the **Handlebar Controller.**

The Challenge II Interactive Video Software Operation
(The CompuTrainer Pro interfaced with Challenge II Interactive Software and Nintendo)

The Challenge II Software consists of:

1) a **Cartridge** which is compatible with an 8 Bit Nintendo Entertainment System (NES Deck) which has been modified by RacerMate (the newer 8 Bit NES Deck does not require modification),
2) an **Interface Module** which plugs into the NES Deck's two joystick ports,
3) a **Stereo Cable** which connects the CompuTrainer to the modified NES Deck

While using the Challenge II Software, the **Pro Handlebar Controller** will only display the word ***Pro*** along with Heartrate or RPM.

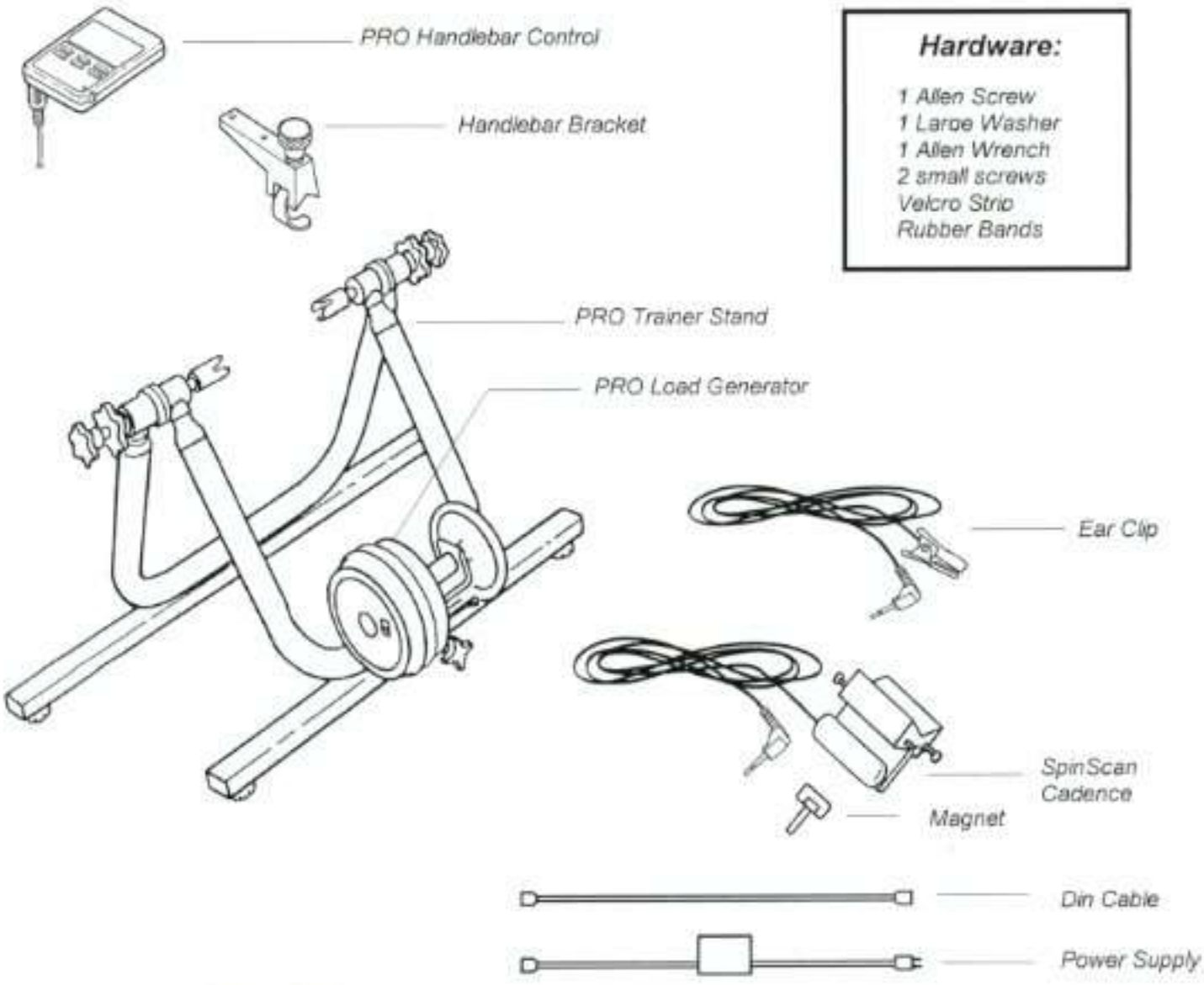
RacerMate develops the Challenge II Software package to suit the demands of CompuTrainer users; therefore, your comments or suggestions will always be welcomed.

Parts List

Before you begin please check the contents of this package and match it to the parts list for the model you purchased.

Parts List

COMPUTRAINER PRO BASIC SYSTEM



Hardware:

1 Allen Screw
1 Large Washer
1 Allen Wrench
2 small screws
Velcro Strip
Rubber Bands

CHALLENGE II SOFTWARE



Challenge II Software Cartridge



Interface Module



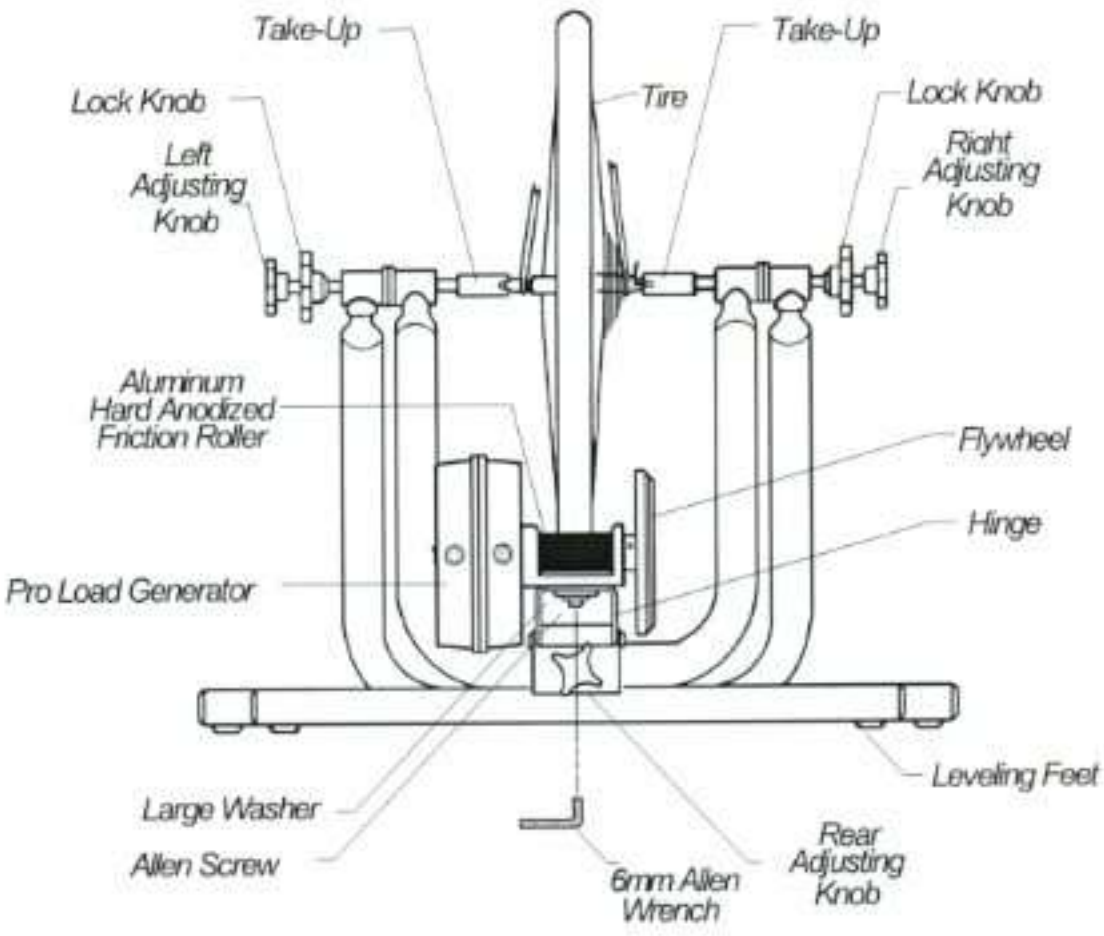
Right Angle Stereo Cable

Step 1.....ASSEMBLE PRO TRAINER STAND

Tools Required:
6mm Allen Wrench (supplied)
Phillips Screwdriver

Attach the **Pro Load Generator** to the **Hinge** on **Pro Trainer Stand** with **Allen Screw,** and **Large Washer** (use **Allen Wrench** provided).

Be sure the jacks into which the cables plug face the rear of the stand (hinge side).



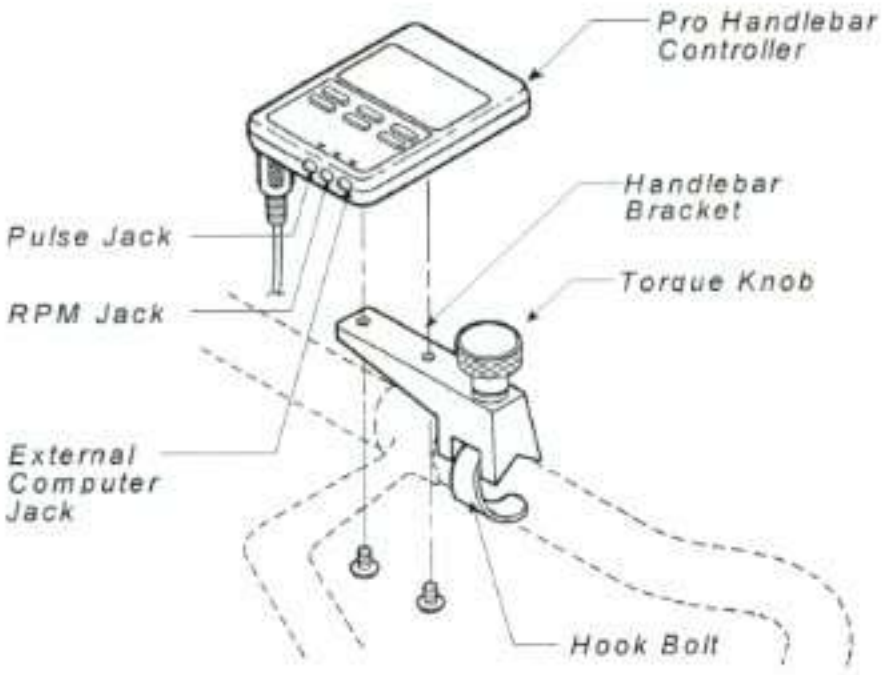
Trainer Stand
(Rear View)

The **Pro Trainer Stand** comes with all **Leveling Feet** installed. If the **Pro Trainer Stand** is to be screwed permanently to a platform (see plans in this booklet), remove the Leveling Feet and cosmetic stickers (located on the holes in the upper side of the cross members). Use countersunk screws to fasten Trainer Stand to the platform (not provided).

Step 2.....MOUNT BIKE TO PRO TRAINER STAND

Loosen left and right **Adjusting Knobs** wide enough to position rear quick release of bicycle between **Take-Ups**. Retighten the **Adjusting Knobs** to position the rear tire in the center of the aluminum friction roller. Tighten the **Adjusting Knobs** until the bike is firmly held and lock the threaded rod into place with the **Lock Knobs.**

Step 3.....Attach PRO HANDLEBAR CONTROLLER



Using a Phillips screwdriver, fasten the **Pro Handlebar Controller** to the **Handlebar Bracket** with the 2 screws provided.

Attach the **Handlebar Bracket** to your handlebar by unscrewing the **Torque Knob** a few turns until the **Hook Bolt** pivots to allow the bracket to slip over the handlebar. Position the **Controller** for the best visibility and tighten the **Torque Knob**.

Important Notice: The Pro Handlebar Controller has 4 jacks on the back side of the unit and access to all 4 must be maintained. The DIN Cable must have straight access into jack. Also, The Pro Handlebar Controller is sweat resistant, not sweat proof. To protect the unit from sweat, it is advisable to cover the Handlebar Controller with clear plastic wrap.

Step 4.....Set PRESS ON FORCE

Press-On Force is the amount of contact the tire makes with the aluminum friction roller of the **Pro Load Generator**. Lack of adequate Press-On Force will cause the tire to slip and too much will add unnecessary friction making load levels seem difficult and unrealistic.

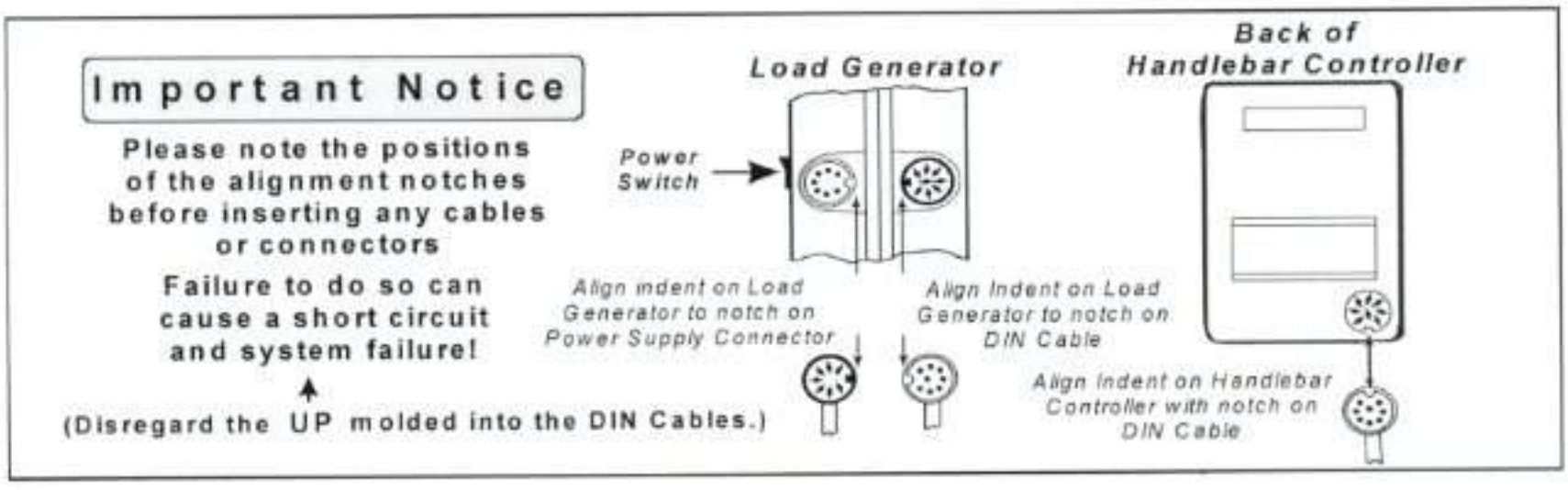
To properly adjust Press-On Force the following items should be adhered to:

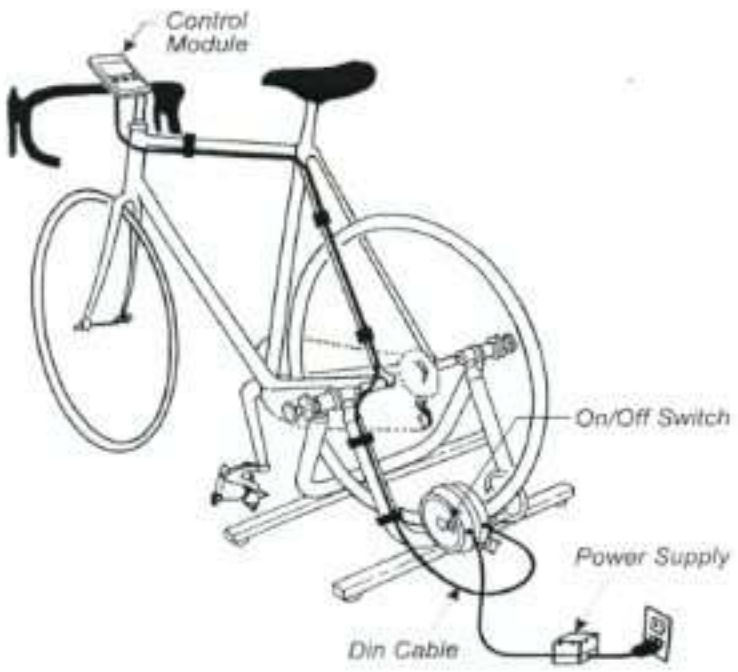
1) You should clean the tire with an evaporating cleaner such as Isopropyl Alcohol. This will remove any mold release (a compound used to allow easy removal of tire from its mold during its manufacturing process), or road oils. *We advise cleaning the tire before every training session and especially after riding outdoors.*
2) Inflate your tire to its maximum rated tire pressure.
3) Use a tire with the least amount of visible tread for the most tire to friction roller contact. Smooth tires are preferable.

Turn the **Rear Adjusting Knob** located on the **Hinge** and adjust the Press-On Force until, while holding the **Flywheel** stationary with one hand and using the other hand to pull the tire across the friction roller, the tire no longer slips when reasonably strong force is applied.

Check to insure the tire is running perpendicular to the friction roller. The easiest method is to rotate the tire forwards and then backwards a foot or so. The footprint of the tire should stay in the same spot on the friction roller in both directions. If the tire moves left and right across the roller when it is rotated back and forth, the **Load Generator Assembly** is slightly crooked in the **Hinge**. Slightly loosen the **Allen Screw** and straighten the **Load Generator** assembly so the tire tracks perfectly.

Step 5.....CONNECT DIN CABLE & POWER SUPPLY





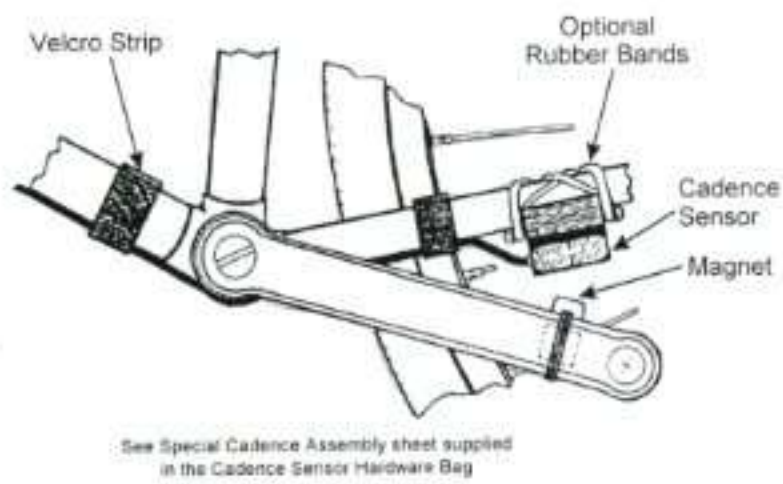
Connect one end of the **DIN cable** to the jack on the **Load Generator** nearest the tire. Connect the other end to the **Handlebar Controller** (cable ends are identical) routing the cable over **Training Stand** and bicycle as shown. Secure the DIN Cable with Velcro strips as you go, cutting off enough Velcro from the roll as needed to wrap the tube and wire.
Caution: Avoid moving parts of bicycle.

Connect **Output Cord** of **Power Supply** into the jack on **Load Generator** nearest the ON/OFF switch. Plug the power cord into *standard household power outlet.*

Step 6.....CADENCE SENSOR

Mount the **Cadence Sensor** to the left side chain stay bar nearest the position where the end of the crank arm will pass. The rubber pad must be located on top of the chain stay and the Velcro strap pulled underneath the sensor and trimmed to length.

Mount the **Magnet** to the crank arm directly opposite the **Cadence Sensor**. Clearance between Magnet and Cadence Sensor should be 1/8" - 3/16". Check clearance and make sure Magnet does not interfere with any part of the bicycle.



Please Note: It may be necessary to move **Cadence Sensor** fore or aft until an RPM signal is received on the handlebar **Control Module**. (If the Magnet passes the exact center of the Cadence Sensor, it may not produce a signal.

Route cable along frame of bike so that it reaches the **Handlebar Controllers' RPM Jack** and secure with cut Velcro strips.

Setup the Challenge II Software

Please Note: When using your Pro CompuTrainer in "**Stand-Alone Operation**", please refer to pages 9-12 or the **Handlebar Keypad Quick Reference Guide** in the appendix for details on this mode of operation.



Step 1.....SETUP NINTENDO MACHINE

Using the Owners manual which came with your Nintendo Entertainment System (NES), set up the NES Deck for your particular television set-up.

You will not be using the joy-sticks of the NES; therefore **do not** plug them in.

Step 2.....INSERT CARTRIDGE INTO DECK

Firmly insert Challenge II Software Cartridge into the NES Deck.

Step 3.....INSERT INTERFACE MODULE

Plug **Interface Module** into joy-stick ports of the NES Control Deck .

Step 4.....PLUG IN STEREO CABLE

Plug one end of the ***Stereo Cable*** into the *top* jack of the ***Interface Module*** for the main CompuTrainer. If a "Second CompuTrainer" is used, it will plug into the *lower* jack of the ***Interface Module***.

Important Note: Before connecting the **Stereo Cable** into **"Ext PC" Jack** of the **Handlebar Controller**, first calibrate the CompuTrainer for **Rolling Resistance.** (See next page). AFTER calibration, to use the CompuTrainer with the Challenge II software, plug the **Stereo Cable** into the **"Ext. PC" Jack.**

Step 5.....READY TO USE

At this time you can turn on both the NES deck and your CompuTrainer. The first screen of the Challenge II Software is the Copyright screen and contains the version number of that particular cartridge. It may be necessary to refer to that screen if service is required.

Immediately following the Copyright screen is the Race screen. All of the information on this screen is changed using the various menu screens in the software.

Ready to Ride?

Your system is now ready to function in either *Stand-Alone Operation* or with the *Challenge II Interactive Video Software & NES* package. The following pages describe the functions for both.

During "Stand-Alone" operation the CompuTrainer is **NOT** connected to the Nintendo. It functions as a self-contained unit using the software programs displayed on the LCD display in the Handlebar Controller. The software consists of a Calibration Program plus two separate Operating programs:

- **Rolling Resistance Calibration Program**
  To insure that your CompuTrainer generates the most accurate, repeatable loads, you must calibrate for rolling resistance before every training session. (In an uncalibrated state, the CompuTrainer software assumes a rolling resistance value of 2.00 lbs.)
- **Ergometer Program**
- **General Exercise Program**

> **Please Note:** Stand-Alone operation will **NOT** take place when the **Stereo Cable** is plugged into the **Ext. PC** jack. Unplug the Stereo Cable from the "Ext. PC" Jack.

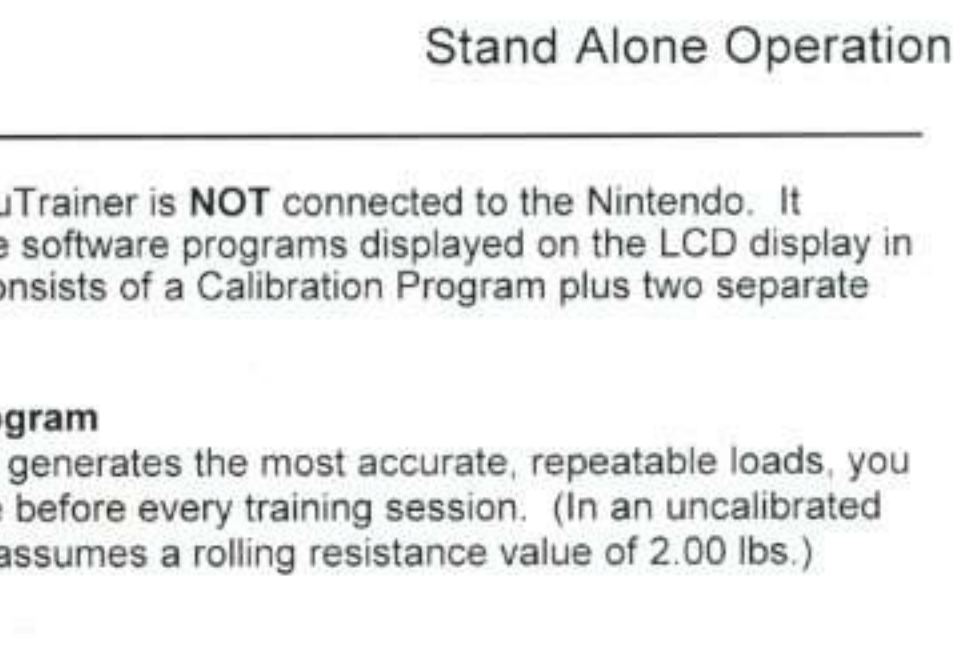
Rolling Resistance Calibration Program

> Before measuring Rolling Resistance, be sure your tire is clean and fully inflated. (See page 6 ...***Set Press-On Force***.)

Rolling Resistance varies due to such factors as the press-on force of the tire against the Load Generator friction roller, bearing friction, and tire pressure. The ***Calibration Program*** measures the Rolling Resistance and then, if saved, enters the measured value into the mathematical formulas the software uses to determine the workloads created by the Load Generator in both Stand-Alone Operation and Challenge II Software Operation. Using this ***Calibration Program*** before every training session will insure that the workloads are accurate and highly repeatable from one training session to the next. The calibration procedure involves pedaling up to 25mph (40km/hr) and then coasting to a stop. During the coast down, the Rolling Resistance is measured electronically.

Step 1

Ride CompuTrainer for 5 or 10 minutes to warm up the tire and **Load Generator** to equilibrium operating temperature. Rolling resistance decreases as system temperature increases. To increase resistance for warm ups, press the **F2** (Ergometer Mode) and press the **[+]** key to reach a load (in watts) you want. After the warm up, press the **[+]** and **[–]** keys simultaneously to return to the Calibration Program.



When first powered up, the LCD display will show the letter "**U**" (standing for 'uncalibrated') at the lower left corner and the number **200** to the right (**200** stands for 2.00 lbs and is the default value when the CompuTrainer is uncalibrated). The number **0.00** mph appears at the top of the screen.

(continued)

Step 2

Begin pedaling. The word "**UP**" will appear at about 12mph on the right side of the screen. Pedal faster, when the speed reaches 25 mph the word "**UP**" disappears. Stop ***all*** pedaling and let the wheel coast to a stop. The rolling resistance measured during the coast down will appear at the top of the screen. *Save this number by pressing* **F3**. The number will automatically replace the default value of 200 at the bottom of the screen provided it is below 500 (5.00lbs). A value above 500 is considered excessive by the software and will not be saved. Check for low tire pressure, high press-on force, etc. Make adjustments to reduce the rolling resistance to below 5.00 lbs. Calibration is now complete.

Important Note:

A difference in reading of 1 count (.01 lb.) equates to a change in load of 1/2 watt at a speed of 25 mph. You may wish to repeat Step 2 more than once to confirm your rolling resistance value repeats to within 5/10 counts. If the value continues to drop for two consecutive measurements, this indicates that the tire and Load Generator have not yet reached equilibrium operating temperature. Ride several more minutes, repeat Step 2. Also, it is **not** necessary that the numbers read the same on a daily basis. As long as the software can measure the Rolling Resistance and use it in load calculations, what you experience will be correct. Of course, daily values on the extreme end of the spectrum i.e., 1.00lb compared with 4.00lbs, should be avoided.

Step 3

Exit the calibration Program by pressing either **F2** to enter the Ergometer Program; or **RESET** to enter the General Exercise Program; or insert the Stereo Cable into the Ext. PC Jack and use the Challenge II software. When you are using either of the two Stand-Alone programs and you want to use the other, you must first return to the Calibration Program by pressing simultaneously the **[+]** and **[–]** to exit the current program.

The measured rolling resistance will remain in the Handlebar Controller memory until the power is turned off. When the power is turned off and then on again, the measured rolling resistance value will be replaced by the default rolling resistance value of 2.00 lbs.

Ergometer Program

The CompuTrainer Ergometer maintains a constant load which can be set for values from 50 to 750 watts which appear in the upper right corner of the display. You can change these values in 10 watt increments by pressing the **[+]** or **[–]** key. (A flashing load number indicates the Rolling Resistance is uncalibrated.) The torque varies automatically when the speed changes to maintain the wattage load constant (torque x speed = load).
As you slow down you will notice that the torque increases to maintain the load constant.

The CompuTrainer Ergometer Program functions as a precision ergometer. It is calibrated to operate most accurately between 14 and 18 MPH. Using this program, you accurately monitor your fitness level by comparing your heart rate to the workload over time. Conconi Tests of Aneorobic Threshold can easily be run using the Ergometer Program as explained in the CompuTrainer Workout Manual.

General Exercise Program

Program Selection

In this program there are 59 preset and random course selections. The selection number appears in the upper right hand corner of the LCD display just above the word PRGM. These selections are:

#0-10	10 fixed load levels from 0 (no load) to 10 (high load) *
#20-29.....	1 mile course / 10 difficulty levels
#30-39.....	3 mile course / 10 difficulty levels
#40-49.....	10 mile course / 10 difficulty levels
#50-59.....	Endless course made from random selections of the 10 mile course. 10 levels of difficulty

* With Programs #0-10, the **[+] / [–]** keys will manually change the load at any time.

To select a course, press the **[+] / [–]** key until the program number is displayed in the upper right corner of the display. Once selected you may start the program at any time using the **[F1] Start** key.

Please Note: Before pressing **F1 [Start]** you should bring the bicycle up to speed. It will be more difficult to do so once a load is present.

After pressing **[F1] START**, a timer at the bottom left will begin and load changes will indicate in place of the program number. To warn of an impending load change, the new load value will appear and flash a few seconds before it changes. You may want to anticipate a gear change at that time.

To change the program difficulty level once you've pressed **[F1] START**, (i.e. from level 29 to level 25), you may do so using the **[+] / [–]** keys. You will be unable to change the length of the course during the race (i.e. from level 29 to level 39).



Display Options

Manual Control

Pressing the **[F2] DISPLAY** key will change the display of SPEED, DISTANCE, WATTS and CALORIES once for each key press.

Pressing the **[F3] SET** key will change the display of LO heart rate limits, HI heart rate limits, HEART RATE, and RPM once with each key press.

Automatic Scan

For automatic scanning of either of the two display functions, press and hold either **[F3] SET** or the **[F2] DISPLAY** key until the LCD Display fades off and then on. These two **Scan** functions will change their respective display every few seconds. To reinitiate manual control of either, press and hold the **[F3] SET** or the **[F2] DISPLAY** key until the LCD Display fades off and then on, which stops **Scan** functions.

Please Note: Scan functions using [F3] SET are overridden if heart rate limits are reached

Heart Rate Monitor

Target Heart Rate Zone

To begin, make sure the **Earclip Sensor** is plugged into the **Pro Handlebar Controller.** A heart (♥) must appear in the right hand corner of the display in order to change heart rate limits.

To enter your **Target Heart Rate**, press the **SET** key until **"LO"** appears. Pressing the **[+] / [–]** keys will set the low alarm. The lowest number that can be set is 40 beats per minute. Press **SET** again and **"HI"** will appear. Pressing the **[+] / [–]** keys will set the high alarm. The highest number that can be set is 199 beats per minute. Press **SET** again to exit alarm setup function.

Please note: you will not be able to set the high alarm lower than the low alarm.

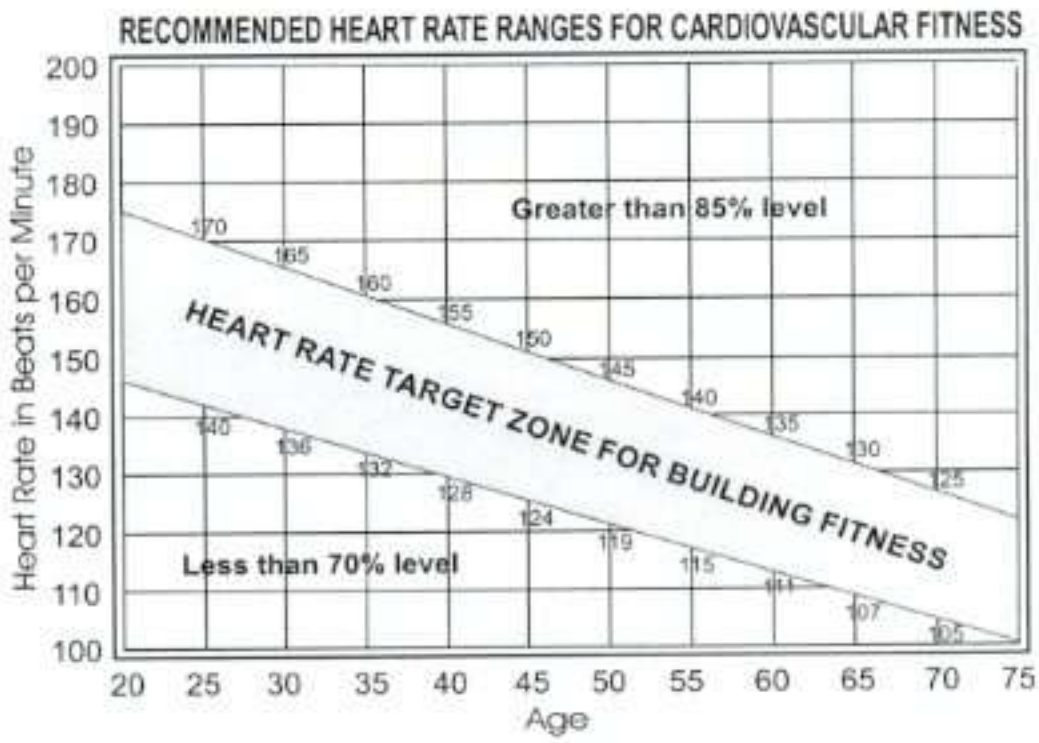
If an **"E"** appears on the display, re-adjust the Earclip Sensor in order to produce a stronger signal. To increase signal strength it may also be necessary to rub the earlobe between your fore finger and thumb to increase blood circulation.

Optimum Target Heart Rate

Medical fitness research studies show that in order to increase fitness, you need to perform exercise that elevates your heart rate to at least 60% of maximum. Most fitness authorities agree that the most desirable heart rate is between 70% and 85% of maximum.

Maximum heart rates decrease with age as shown in the chart.

CAUTION:
An individuals maximum heart rate may sometimes vary from the theoretical prediction and exercising at an elevated heart rate may be dangerous for some people. Please consult your doctor for help in determining your proper heart rate limits.



Alarm Functions

While you are exercising, and as long as you have the **Earclip Sensor** attached to your ear and it is plugged into the **Pro Handlebar Controller**, your heart rate will be displayed on the LCD Display. If your heart rate rises above your pre-set high, a fast high pitched alarm will sound; if you are below your pre-set low a slow low pitched alarm will sound. You should change speed or gears to maintain your heart rate within pre-set limits.

This concludes the section on "Stand Alone Operation". The following pages refer to the Challenge II Interactive Video Software Operation.

Connection Tips

If needed, please refer to the Connections portion (Page 8) of this Operation Manual along with the user's guide to your Nintendo Entertainment System (NES).



1) When inserting the game cartridge, assure it is firmly seated into NES deck.
2) The cursor referred to in this text looks like this: ⇒
3) When first turning on the NES deck, press the **RESET** button on the NES deck.
4) Make sure the **Stereo Cable** is inserted into the top jack of the **Interface Module** when using the software with only one CompuTrainer.
   (The bottom jack is <u>only</u> for a second CompuTrainer or optional PC compatible software.)

Turn ON the CompuTrainer and the NES Deck

You will see the **"Challenge II"** logo / **Copyright** screen and then the **"MAIN"** race screen.

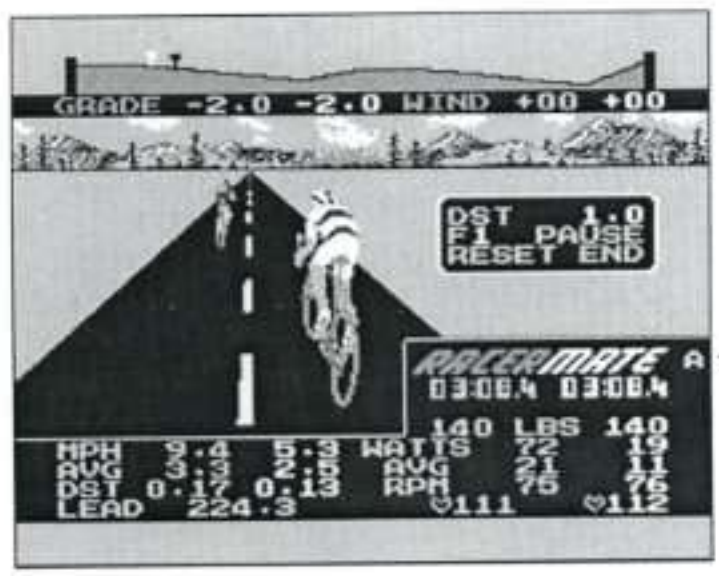
The **Handlebar Controller** LCD display will show only **Pro** along with Heart Rate or RPM (If both sensors are plugged in, only Heart Rate is displayed) when CompuTrainer is interfaced with the Challenge II software.

Error Signals

Error signals will appear just to the right of the *RACERMATE* logo on the Main Race screen, if a cable is not inserted into the proper jack.

1) An **"A"** indicates: No communication between the **Handlebar Controller** and the **Interface Module**.
   Check: The **Stereo Cable** is plugged into the top jack of the **Interface Module** and the Ext.PC connection on the **Handlebar Controller** or, you have selected Race Against: "Second CompuTrainer" and have no cable in top jack, but have one plugged into the bottom jack.

2) A **"B"** indicates: You have selected to race against a "Second CompuTrainer" and have not plugged a **Stereo Cable** into the lower jack on the **Interface Module**.



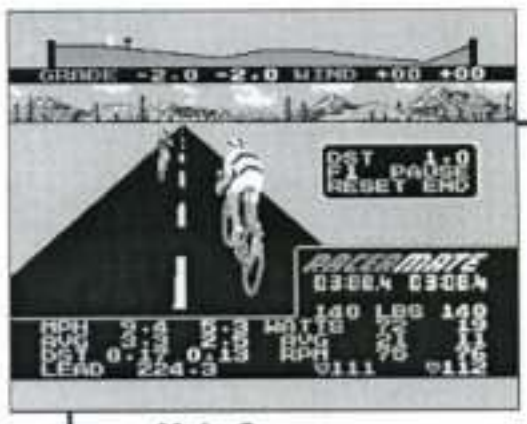
Error Signal

3) A **"C"** indicates: No **Stereo Cables** are inserted into the **Interface Module** on any "Race Against" selection.

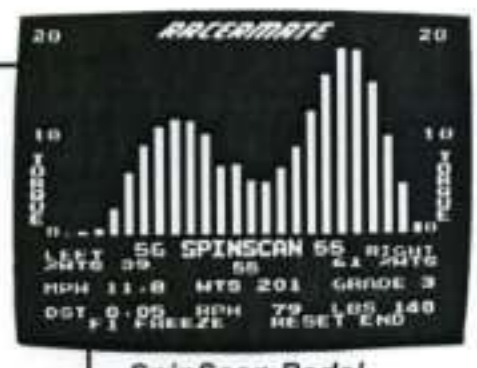
Selection Screens

This software is **"menu-driven".** The various menu screens and relationship are shown below.

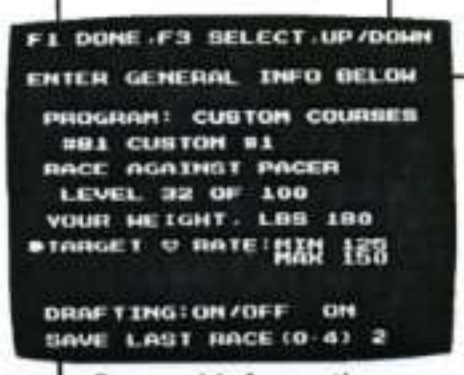
Please note: Each screen will have directions at the top of the screen in order to assist you in menu selection activities.)



Main Screen



SpinScan Pedal Stroke Analyzer



General Information
Screen 10



Race Against Selection
Screen 90



Program Selection
Screen 20



Custom Course Selection
Screen 80



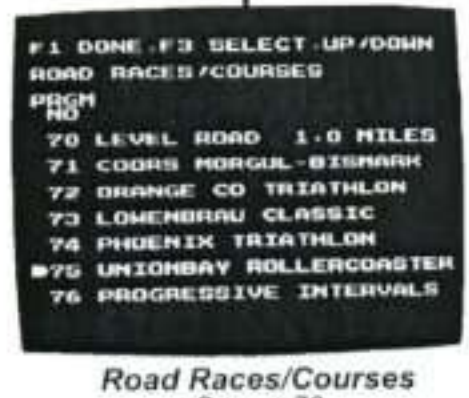
Custom Course Edit



Fixed Resistance Levels
Screen 00



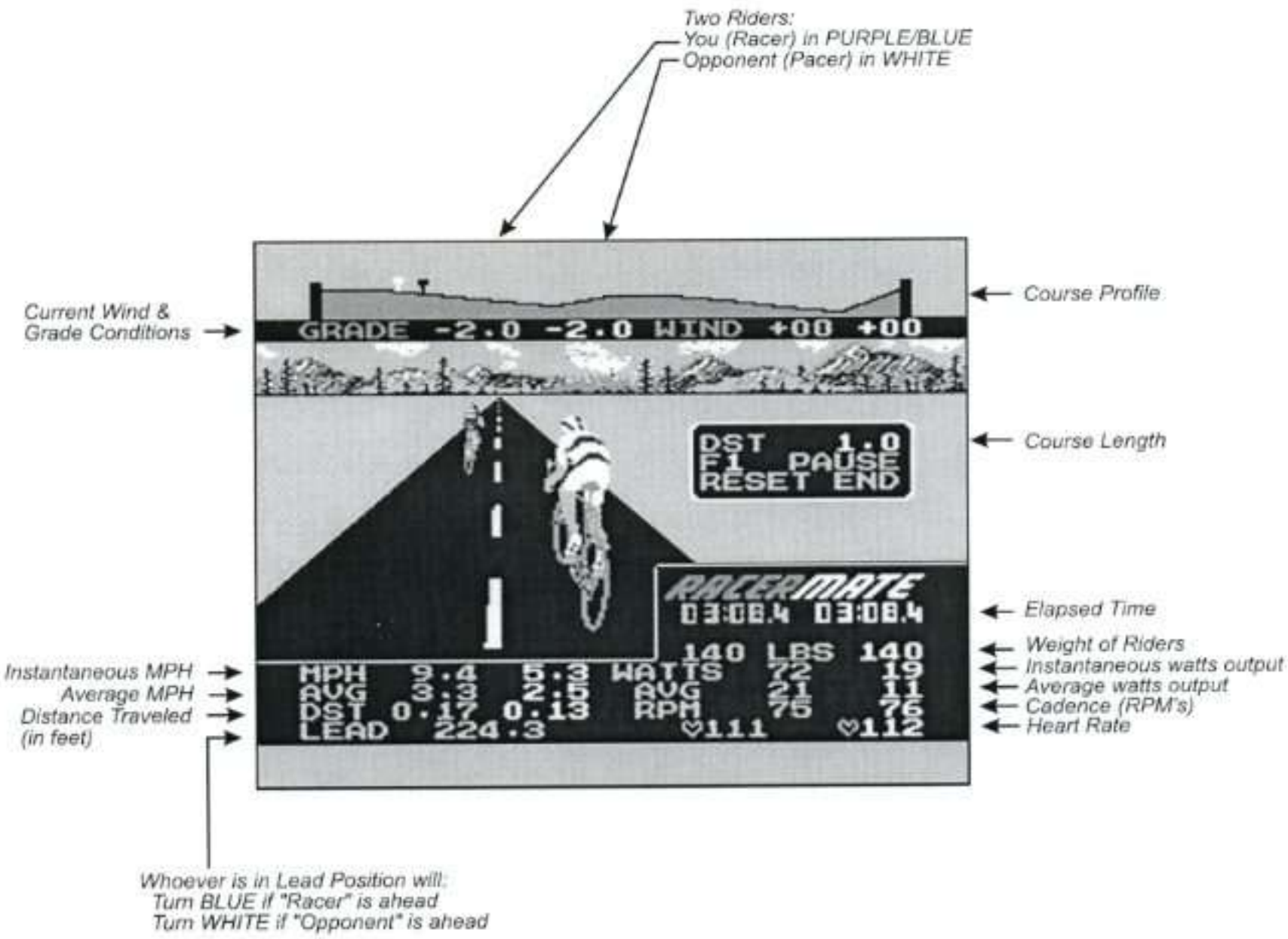
Distance Controlled Programs
Screen 30



Road Races/Courses
Screen 70

The Main Screen...In More Detail

The **Main Screen** is the Race Screen. All the information on this screen is collected from the various menu screens and should be correctly entered **before** starting a race to assure accurate calculation and display of weight, watts, opponent reaction.



Please Note: Information on the screen is in both Blue and White. Information in Blue is for the Left Rider (You) and Information in White is for Right Rider (Opponent).

General Description...How It Works

Course selections are made using the keypad on the **Handlebar Controller.** Most keys have more than one function depending on the screen you have selected.

> **Please Note:** Refer to the Handlebar Keypad Quick Reference Guide in the appendix for a view of the keypad functions.

The Selection Screens

Carefully studying page 14 you will see how various screens directly relate to each other by following the lines between the screen shots.

The **"MAIN"** screen is what you see while the program is running and a race is underway. All the information on this screen is taken from the **GENERAL INFO screen (10).**

If you wish to change a program while on the **"MAIN"** screen, use the **F3** key to enter the **"GENERAL INFO" screen (10).**

The **"GENERAL INFO" screen (10)** allows you to:

- Change a Program (Course)
- Change whom you will race against
- Enter Rider Weight
- Change Heartrate limits
- Turn Drafting On/Off
- Save your Last Race

Once in the **GENERAL INFO screen (10)**, parameters may be changed by moving the cursor alongside the information you want to change and pressing **F3**. All parameter changes can be made on this screen except the "Program" line and the "Race Against" line. Pressing the **F3** key while on these two lines will take you to screens **(20)** or **(90)**.

SCREENS (20) and (90)

Screen **(20)** will take you further into program selection. This is achieved in the same manner as previously described, positioning the cursor and pressing **F3.**

Screen **(90)** changes whom you will race against. (Please note: Do not select **"Second CompuTrainer"** unless there is one plugged into the interface module. An error signal will result and your pacer will not move.)

The **SpinScan Pedal Stroke Analyzer** can only be entered while in either the **MAIN** screen or the **GENERAL INFO** screen by pressing **F2**.

As was stated previously, a reminder of your keypad functions appear at the top of every menu selection screen.

Program Descriptions

	PROGRAM #
Fixed Resistance Levels	
Ten levels corresponding to varying grade conditions from 0% to 9%	***00 - 09***
Distance Controlled Programs	
Includes option for either 1, 3, 5, or 10 mile workout at either a beginner, intermediate, or advanced level of difficulty.	***30 - 41***

Road Races / Courses	***Length (miles)***	
Level road, variable	1 to 25.5	***70***
Coors Morgul Bismarck	13.0	***71***
Orange County Triathlon	23.9	***72***
Lowenbrau Classic	8.8	***73***
Columbia, MD Triathlon ('94 Nationals)	26.0	***74***
Union Bay RollerCoaster	1.0	***75***
Progressive Intervals	6.8	***76***

Custom Courses	***81-86***
Allows the user to create custom courses to their own specifications within the following parameters:	
Grade	-4.9 to +15.0%
Wind	+/- 99 mph
Miles	0.1 to 99.9
Course Legs	20

Procedures

Program Selection

From the **Main** screen press the **F3** key to enter **General Info screen (10)**. Using the **[+] / [–]** keys, position cursor on the line which says **PROGRAM.** Press **F3** and you will be taken to screen **20.** Use the **[+] / [–]** keys to position cursor on the line which corresponds to the program category you wish to enter. Pressing **F3** again at this point will take you to screens **30** through **80** (depending on your selection) for detailed selection of the programs in that category. Use the **[+] / [–]** keys to position the cursor on the line of the program you wish to select and press **F3** to make that selection. The program you have selected will be highlighted in white. Then press **F1** to get back to the **General Info screen (10)** where the program you selected will be displayed on the line for **PROGRAM.**

Please Note: When you select Program **70 (**Level Road), you must then use **[+] / [–]** keys to set the distance in miles. After you have set the miles, press **F3** again.

When back in the **General Info** screen, you may make further changes as described below on the **General Info** screen, or press **F1** and go to the **Main** screen.

Selecting "Race Against"

To change **"Race Against"**, from the **General Info screen (10**), use the **[+] / [–]** keys to position cursor on the line which says **Race Against**. Press **F3** and you will be taken to screen **90.** Use the **[+] / [–]** keys to position cursor on the line of your desired opponent or saved race. Press **F3**. Refer to notes below for each selected opponent. Pressing the **F1** key will bring you back to the **General Info screen (10).** When back to the **General Info** screen, you may make further changes and selections or press **F1** and go to **Main** screen.

NOTES:

1) When you select **"Pacer"**, use the **[+] or [–]** key to set the pacers' ability from 10 to 750. Press **F3** again. You can also change Pacer power while the race is running with the **[+] / [–]** keys to modify Pacer speed.

2) When you select **"Second CompuTrainer"**, use the **[+] / [–]** keys to set that rider's weight plus the bicycle's weight. Press **F3** again.

3) When you select **"Last Race"**, you must select the same course that race was saved on in order to get the correct results from the pacer.

4) As with "Last Race" when selecting a **"Saved Race"**, you must also select the same course it was saved on.

Please Note: The CompuTrainer always stores in memory the speed and finish time of your last race, exactly as you performed (or the winner's last race if you were competing against a second CompuTrainer). The pacer will use this data when you select **"Last Race"** (or **"Saved Race"** if permanently stored into memory). **The watts values displayed are recalculated and therefore not exactly the same as you performed.**

Entering Your Weight

To enter **Your Weight**, go to **General Info** screen **(10)**, and then use the **[+] / [–]** keys to position cursor on the line which says **Your Weight**. Press **F3** and then use the **[+] / [–]** keys again to set the desired weight (you plus your bike). Press **F3** again. If no further menu selection is required, press **F1**.

Setting Heart Rate Limits

For information on determining heart rate limits, please refer to page 12.

The **Heart Rate Monitor** of the CompuTrainer uses "state of the art" filtering in its design in order to eliminate any unwanted signals while amplifying your actual heart rate signal. While training, the **Handlebar Controller** will alert you with a slow, low pitched tone if you are below your pre-set LO limit and with fast, high pitched tone when you are exceeding your pre-set HI limit. You should change gears, speed up or slow down to maintain your heart rate within your pre-set limits.

For heart rate limit alarms to function, the **Earclip Sensor** must be installed into the **Pulse Jack** on the **Handlebar Controller**.

To set the **Heart Rate Limits**, go to **General Info screen (10)**, use the **[+] / [–]** keys and position cursor on the line that says **"Target Heart Rate"**. The minimum heart rate allowable is **40 beats per minute**, and the maximum is **199 beats per minute**. Press **F3** to move cursor alongside either the **MIN** or **MAX** then use the **[+] / [–]** keys to set the desired limits. Once the limits are set, press **F3.** If no further menu selection is required, press **F1.**

If an **"E"** appears alongside the heart symbol on the **Main Screen**, this indicates a weak signal and you should readjust the Earclip sensor or rub your ear lobe to increase capillary blood flow. (See page 12 for more information)

When racing a **"Second CompuTrainer"**, the heart rates for the two trainers are displayed beside each other on the **Main Screen**. Alarms for the "Second CompuTrainer" are taken from its **Handlebar Controller** using "Stand-Alone" Alarm setting procedures.

Select Drafting Option

When one rider approaches the other from the rear, that rider will at a distance of 16 feet move into drafting position. Resistance will decrease proportionate to real life conditions. Within 6 feet of the lead opponent, the drafting rider will move out of the drafting position and full load will resume. The software will disregard **Drafting** if the approach speed is *faster* than a rider would normally approach an opponent intending to drop into a draft.

To turn **Drafting ON** or **OFF**, go to **General Info screen 10**, use the **[+] / [–]** keys to position cursor on the line that says **Drafting**. Press **F3** and use the **[+] / [–]** keys to change to either **ON** or **OFF**. Press **F3** again. If no further menu selection is required, press **F1**.

Saving your Last Race

One of the most useful features of the CompuTrainer is its ability to save into memory the speed and finish time of the **Last Race**. The Pacer (WHITE) can perform just as you did when this saved race is recalled on the **"Race Against"** screen. When used correctly, a **Saved Race** will motivate you to improve upon your own best performance.

The Last Race

At the end of each race the (BLUE) rider's speed and finish time are temporarily retained in memory until replaced by the next race (or the White Rider's data if a race took place against a live rider on a "Second CompuTrainer). This race can be permanently saved into memory using the **"Save Last Race"** feature.

To **Save a Race**, go to the **General Info screen (10)**. Using the **[+] / [–]** keys, position the cursor alongside the line that says **Save Last Race**. Press **F3** and then use the **[+] / [–]** keys to select the number you would like to save that race under. Press **F3** to save and exit. If no further menu selection is required, press **F1**.

Notes:

1) If you decide not to save a race, but have already moved into the save position, you may select **0** and then exit. No new information will be stored in memory.

2) The information stored in memory will be erased when new information is inserted into that position. It would be advisable to keep a log of Saved Race parameters which would include: Rider Name, Course Name / Number, Finish Time for future reference.

3) If **F1** is pressed to start a race before **F3** saves the "Last Race" into memory, that race will be lost.

4) When saving a race, it is normal for the screen to disappear while the race saves.

5) The last race will always be saved into memory and updated automatically with each consecutive race.

6) It is important to remember when selecting to race against a **"Saved Race"**, that you also select the course that the saved race menu indicates (it appears alongside the saved race). The Pacer's speed is based upon that course.

7) When racing against a **"Second CompuTrainer"** the rider who won that race will have his race data saved into the last race memory.

Course Creation

To create a **Custom Course**, go to **General Info screen (10)** and using the **[+] / [–]** keys, move the cursor to the **Program** selection line. Press **(F3)**. Using the **[+] / [–]** keys move the cursor to the line that says **Custom Courses**. Press **(F3)** and you will be taken to **Custom Course Select Screen 80**. Choose the course you would like to edit and select it using the **(F3)** key. Now press **(F2)** to enter the **Custom Course Edit Screen** and then using the **(F2)** and **(F3)** keys position cursor for the values you would like to change. Use the **[+] or [–]** keys to raise or lower the values that the cursor points to.

If **F2, F3** or **[+] / [–]** keys are held down momentarily, the value changes will accelerate.

Parameters:

- The **COURSE LEG** values can be set from 0.0 to 9.9 miles.
- The **GRADE** values can be set from -4.9% to +15.0%.
- The **WIND** values can be set from - 99 mph to +99 mph.
- The **Total Length** of a course is limited to 99.9 miles.
- The race program will ignore any legs with zero length.
- It is not necessary to have all the legs full in order to finish the creation.

When satisfied with a course, press **(F1)** to save it in memory and return to **screen (10)**.

Please Note: Shutting off the power to the NES Deck while in edit mode will cause the current, unsaved Custom Course information to be lost.

Course Creation Limitations and Issues

1) While the wind and grade values can be set to these wide ranges, the load generator can't drive the bike downhill, so a -4.9% grade or a 50 mph tailwind will just turn off the electrical load, leaving the actual tire friction. Unless you pedal, you will not go down hill. The Pacer has no such limitations and will go very fast if given a big tailwind and downgrade.

2) Some Custom Course profiles have more than 20 legs. If you are trying to input a race with more than 20 legs, you will need to create more than one Custom Course for that race. In this case keep a log of the finish times for each section. The race finish time will be the multiplied total of all sections.

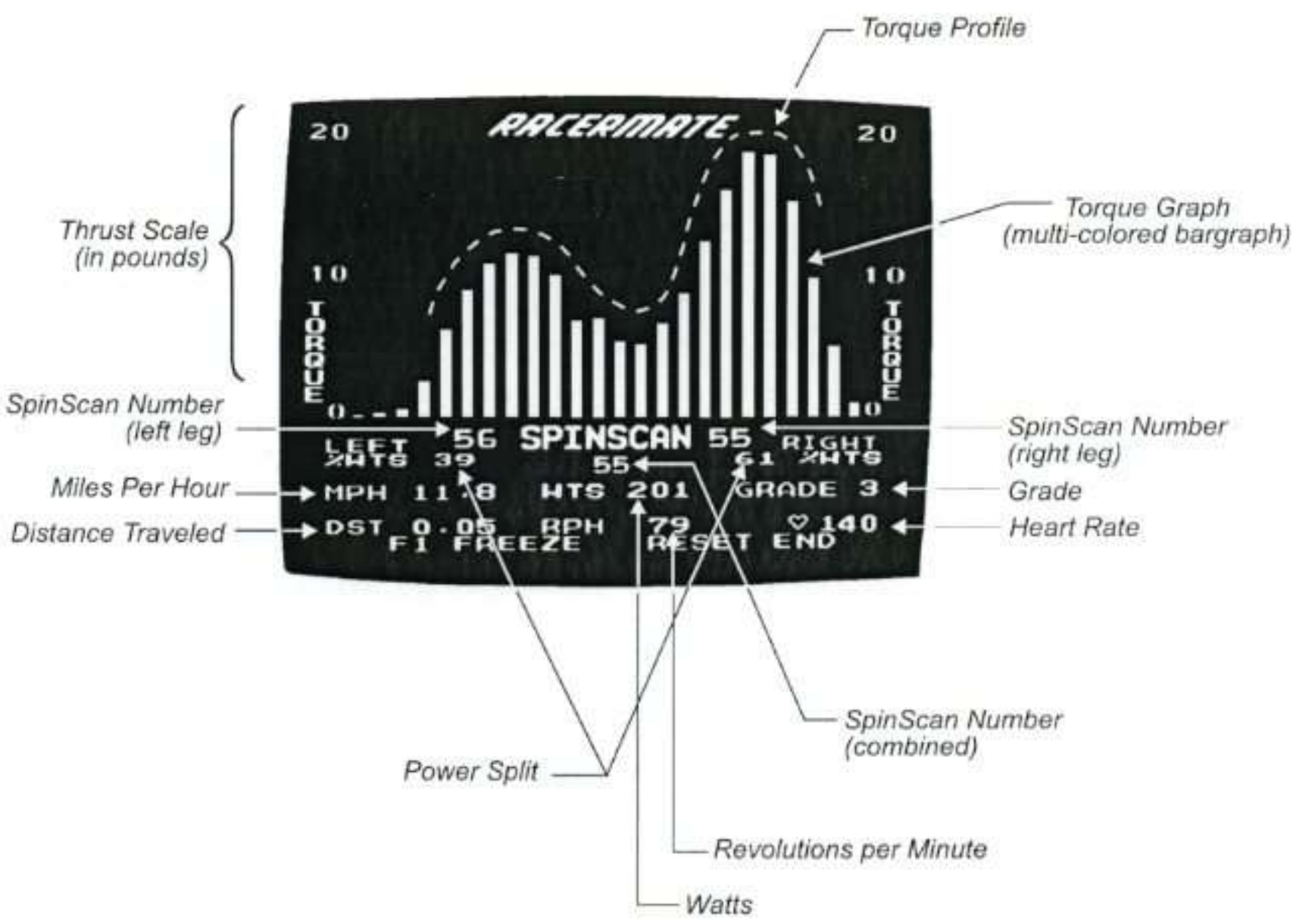
3) Some Custom Course Profiles have a down grade which exceeds the -4.9% limit. This is the lowest value you can set for a Custom Course. The same is true for courses with grades greater than +15.0%.

4) Though you can create courses with fairly high uphill climbs, the Load Generator can not adequately cool itself off if you climb a +15.0% grade at 5 mph for any extended length of time. It is advisable to provide some interval cooling period (above 12 mph) if long hill climbs are being used. A cooling fan placed next to the Load Generator to replace ambient air can improve cooling tremendously.

SpinScan Pedal Stroke Analyzer

Understanding the Display

SpinScan Screen



SpinScan Pedal Stroke Analyzer

The **SpinScan Screen** displays the following information:

1) A **Torque Graph** displaying power output to the road for one full crank revolution.
2) A **Torque Profile** displaying a graphic representation of how power is being transferred to the road in 15 degree incremental changes.
3) A **Thrust Scale** showing foot pounds thrust.
4) The **SpinScan Numbers:** combined and also separate for left and right leg.
5) A **Power Split** displays power output differences between left and right leg in %.
6) A **Grade** display which can be changed to increase and decrease load.
7) **Heart Rate** displayed to verify pedaling and equipment effects on heart rate.
8) **Watts** displayed to compare cadence, heart rate relation to power output.
9) **MPH, RPM** and **Distance** to use as comparison variables.

> **Definition**: The **SpinScan Number** is defined as Average Torque divided by Maximum Torque multiplied by 100.

In order to understand how to use SpinScan, you must first understand what it displays and what it doesn't. The **Torque Graph** represents power output - to the road - of *both the right and left leg at the same point in time* - not separately. Because power output is measured where the tire meets the road (the Load Generator Friction Roller in this case) and not at the crank, each bar of the graph represents both the push of one leg and the pull of the other. It is commonly known that the "push" muscle groups are stronger than the "pull" muscle groups. Taking this into consideration, the **Power Split** defines the power of both legs, due to the fact that the weakest muscle groups will always be "shadowed" by the strongest muscle groups.

The interaction between muscle memory and equipment variables determine what the **Torque Graph** looks like and changing these variables will likewise have an affect on the graph. For instance, consciously modifying muscle coordination by pulling up before or pushing forward at TDC (Top Dead Center), or pulling back at BDC (Bottom Dead Center), will show dramatic changes in the **Torque Profile**. Likewise, equipment variables such as oval chain rings, clipless pedals, crank arm lengths, etc., will each have their own distinct effect on the **Torque Profile**. It has been demonstrated that an uneven **Power Split** can be compensated for by using different length crank arms while having a positive effect on the **Torque Profile**.

The **Torque Graph,** a multicolor bar graph, represents one full 360 degree pedal stroke divided into 15 degree segments, 24 in all. The graph starts with white bars for the *left leg* at Top Dead Center and Top Dead Center for the *right leg* starts 180 degrees later (in the center of the graph), again with white bars. The height of the bars are proportional to torque, showing road thrust in foot pounds. Remember, each bar represents *both legs at opposite positions*; therefore, finding the weaker (lower) areas of the **Torque Graph** and determining which muscle group can best improve this weak area and then training that specific muscle group to "fill in" the weak area, an overall "flat" SpinScan will result. The flatness of the SpinScan **Torque Profile** along with higher **SpinScan Numbers** should equate to less fatigue for any single muscle group and improved overall endurance. For specific advice on what is best for you, please consult an Exercise Physiologist, Coach or Sports Physician.

SpinScan Pedal Stroke Analyzer

Necessary Connections and Settings

SpinScan will not work without a Cadence Sensor (RPM) reading, therefore, before using SpinScan, be sure you have correctly mounted the Cadence Sensor to the bike. For instructions on installing this sensor, see Page 7 of this operating manual. Though not seen on the SpinScan Screen, *you must enter your correct weight into memory*. See Page 19, "Entering Your Weight", General Info Screen (10).

To use the **SpinScan Screen,** press the **F2** key while in either the **Main Screen** or the **General Info Screen**. At this point you can start pedaling just as you would normally. Above **30 rpm** the **Torque Graph** will begin displaying.

Load Levels

You can change **"Grade"** while using SpinScan by pressing the **[+)] / [–]** keys until the desired grade is displayed or the desired resistance is felt.

Analyzing the SpinScan Results

After using your SpinScan Pedal Stroke Analyzer, you may immediately notice a **Power Split** which shows one leg differs from the other. The **Power Split**, as shown, is the actual output for each leg and the relative "smoothness" for each leg is shown by a visual correlation between the **Torque Profile** and pedal position (in 15 degree increments).

By utilizing the SpinScan information, you can make the necessary changes in order to obtain your desired goals. It would be wise to keep a record of these changes so that accurate comparisons can be made. You can save **SpinScan Snapshots** to allow a comparison of various changes you have made in technique or equipment. There are 50 **Saved SpinScan Snapshots** available.

Procedure for Saving SpinScan Snapshots

At anytime while using SpinScan, you may **freeze** the display by pressing **F1** and analyze the information. While the screen is frozen, you may save that screen into memory by pressing **F3**. This will bring you into the first of 50 "saved" screens. Press the **[+] / [–]** keys to advance the display to any desired "saved" screen. When you have selected a screen to save the "current" **SpinScan Snapshot** in, press **F2.** The screen will then warn you that you may be erasing a previously saved screen. You can then save it by pressing the **F3** key or abort the save by pressing **F1.**

Comparing SpinScan Screens

To compare **SpinScan Snapshots**, freeze the current screen by pressing **F1**. While this screen is frozen, it can be compared to any saved **SpinScan Snapshot** by pressing **F3** and then the **[+] / [–]** keys until the desired saved screen is displayed. Then pressing **F3** toggles back and forth between the **Saved Snapshot** and the **Current Snapshot**.

HANDLEBAR KEYPAD

Quick Reference Guide

STAND ALONE OPERATION

Rolling Resistance

(Ride for 5 - 10 minutes to warm up the tire to equilibrium operating temperature)

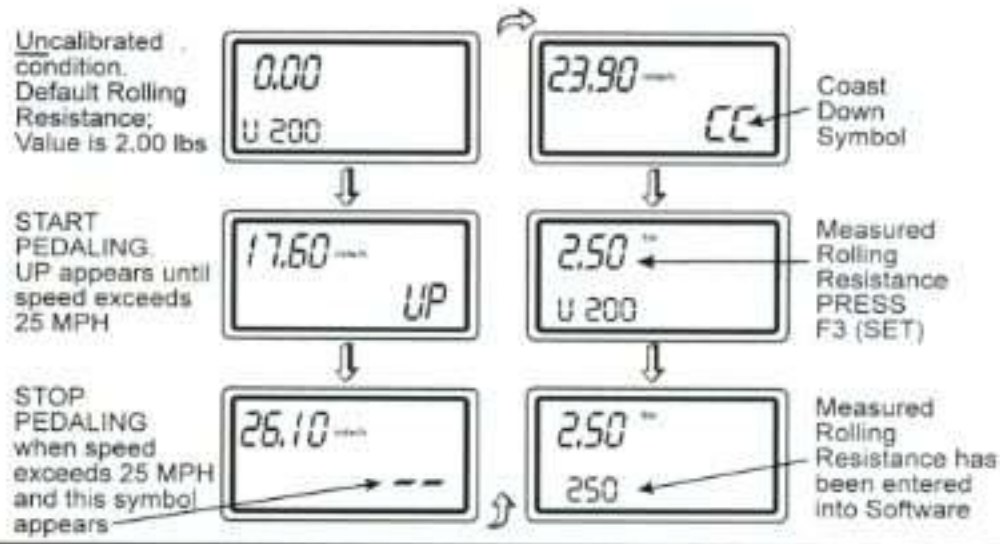
Calibration Program

[+] .....Press both keys
[-] simultaneously to enter Calibration Mode

SET [F3].....Enters measured Rolling Resistance into software

DISPLAY [F2]....Shifts to Ergometer Program

STOP [RESET]..Shifts to General Exercise Program



Ergometer Program

Before selecting Ergometer Program you must first select the Rolling Resistance Calibration Program above.

[+] Raises load in 10 Watt steps
[-] Lowers load in 10 Watt steps

To enter the General Exercise Program from the Ergometer Program press STOP [RESET

General Exercise Program

STOP [RESET] ...Stops & resets a running program
Courses #0-59

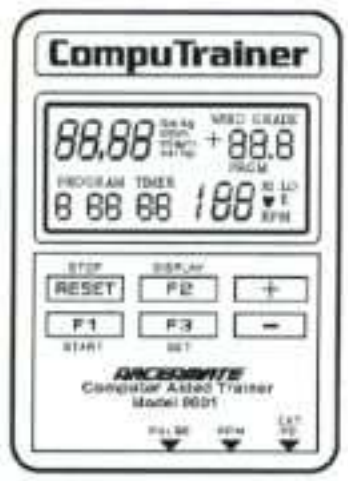
START [F1].....Starts & pauses a running program
Courses #20-59
Starts and stops timer on all courses

DISPLAY [F2].....Scrolls through MPH, Miles, Watts, and Calories
Starts Scan when pressed and held
Stops Scan when pressed and held

SET [F3] .....Scroll through Heart Rate HI/LO Alarms, HR, and RPM
Starts Scan when pressed and held
Stops Scan when pressed and held

[+] .....Raises program numbers and heart rate values

[-] .....Lowers program numbers and heart rate values



SOFTWARE OPERATION (with Challenge PC1 software)

STOP [RESET]...Stops a race before it is finished
Exits Race Screen

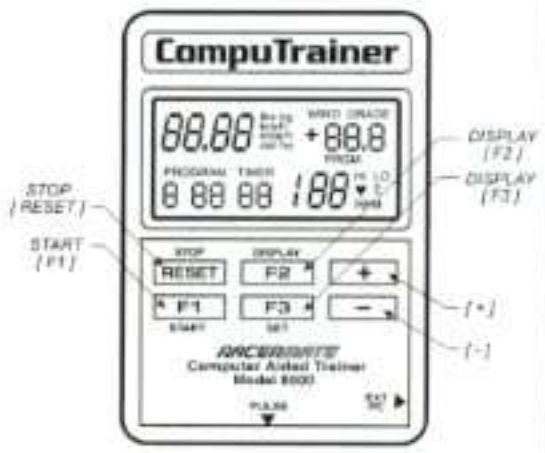
START [F1].....Starts or pauses a started race

DISPLAY [F2].....Scrolls through Anticipator / Course Zoom Window

SET [F3].....Enters Rolling Resistance Calibration

[+] .....Raises Pacer Power
Raises Grade in SpinScan display

[-] .....Lowers Pacer Power
Lowers Grade in SpinScan display



Specifications

Stand Alone Operation

Display Functions

- Current Speed
- Distance
- Watts
- Calories
- Timer
- Heart Rate and Cadence

Precision Ergometer

General Exercise Programs

- 10 fixed load levels
- 1, 3 and 10 mile fixed courses
- 10 random courses

Rolling Resistance Calibration

CompuTrainer

Power Source
Standard 110 VAC

Resistance Device
Electronically controlled eddy current brake

Load Capacity
Maximum peak: 1500W
Continuous 400W

Load Control Update Rate
10 milliseconds

Microprocessor
8 Bit 80C51FA, 32K ROM, 8K Byte RAM

Rear Mount Stand
1 1/2" Diameter heavy duty steel tubing. Cast steel hinges with internal lock design. Take-ups mounted on 5/8" Diameter precision ground threaded rod.

Handlebar LCD Display Module
Stand Alone operation or interactive with Challenge II Software with menu selection, data entry and operating commands.

Challenge II Video Software

Nintendo Interface

- Software Cartridge
- Electronic Interface Module (allows one or two riders)
- Stereo Cable

Display Functions
Performance Feedback
(2 Riders)

- Selected Course Profile
- Grade & Wind Parameters
- Rider position in road & profile images
- Instantaneous & Average Speed
- Distance Traveled
- Lead Distance
- Instantaneous, Peak & Average Watts
- Cadence
- Timer
- Heart Rate (earlobe)

Programs

Fixed Resistance

- Ten levels corresponding to varying road grades from 0% to 9%

Distance Controlled Programs

- 1, 3, 5 or 10 mile workouts at either beginner, intermediate or advanced level of difficulty

Road Races/Courses

- Level road from .1 to 25.5 miles
- Coors Morgul-Bismarck
- Orange County Triathlon
- Lowenbrau Classic
- Columbia Maryland Triathlon
- Union Bay Roller Coaster
- Progressive Intervals
- Course Creation: gives you the ability to create any course or training regimen up to 99.9 miles @ 15% road grade

SpinScan™ Pedal Stroke Analyzer

- Plots torque versus crank angle
- Numerical % Watts split between left & right leg

One Year Limited Warranty

RacerMate **Electronic Components** are warranted to the original purchaser for a one year period from the original purchase date against defective material or workmanship. Any implied warranties are also limited in duration to one year from the original purchase date. Some states do not allow limitation on how long an implied warranty lasts, so the above limitations may not apply to you.

During the warranty period RacerMate will repair, or at its option replace, any part that proves upon inspection to be defective. Products subject to improper installation, misuse, neglect, accident, alteration, or unauthorized repair shall be excluded from this warranty. To obtain warranty service, proof of original purchase date must be furnished.

RacerMate shall not be liable for shipping cost to the factory, consequential costs, expenses or damages incurred by the purchaser. Some states do not allow the exclusion of incidental or consequential damages so the above limitation or exclusion may not apply to you. Its warranty gives you specific legal rights, and you may also have other rights that vary from state to state.

Lifetime Limited Warranty

RacerMate **Trainer Stands** are warranted to the original purchaser for a lifetime of service against defective material or workmanship.

During the warranty period RacerMate will repair, or at its option replace, any part that proves upon inspection to be defective. Products subject to improper installation, misuse, neglect, accident, alteration, or unauthorized repair shall be excluded from this warranty. To obtain warranty service, proof of original purchase date must be furnished.

RacerMate shall not be liable for shipping costs to the factory, consequential costs, expenses or damages incurred by the purchaser. Some states do not allow the exclusion of incidental or consequential damages so the above limitation or exclusion may not apply to you. Its warranty gives you specific legal rights, and you may also have other rights that vary from state to state.

RACERMATE

3016 N.E. Blakeley St.
Seattle, WA 98105
(206) 524-7392
Toll Free (800) 522-3610
FAX (206) 523-4961
e-mail: racermate@aol.com
web site: www.computrainer.com