Vector User's Guide
version 3.0.0

November 2004

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GETTING STARTED

Introduction

Congratulations on your AccuSport Vector Launch System purchase. You have chosen to do business with the leader in golf technology. The Vector Launch System is the most advanced ball launch monitor on the market. In a few minutes you will be able to precisely measure the speed, distance, launch angle, spin rates and push/pull of every golf shot.

Please take a moment to complete the Vector Launch System **Warranty / Registration Card** and mail it to AccuSport. The AccuSport Warranty covers the Vector Launch System for two-years on parts and labor, from the date of purchase. During the warranty period, AccuSport will repair, at no charge, any defective component, part or product. Replacement systems are offered at AccuSport's discretion; minimal charges may apply.

To ensure trouble-free, reliable operation, please read this user guide before setting up and using the Vector Launch System. After you install the software, an online help manual will become automatically available on your computer desktop for further assistance.

Please visit the AccuSport web site at www.accusport.com for advanced topics and ideas for using the Vector System.

System Requirements

Vector Launch System is designed to work with an IBM compatible personal computer that meets the following standards:

• Operating System: Windows XP or Windows 2000

• RAM: At least 256 Megabytes of RAM

• Hard Drive: At least 200 Megabytes of available hard disk space

• Video: Video resolution of at least 1024x768 pixels with at least 24 bit color

• Ports: One available IEEE 1394 port (Firewire)

Safety Instructions

• Follow all warnings and instructions marked on the product.

• Do not drop the Vector or subject it to mechanical shocks.

• When taking a swing, do not hit the Vector with the club.

- Always use the protective shield to avoid damage to the Vector from shanked shots.

- Do not open the Vector unit. The Vector contains high voltages and delicate components. Opening the Vector could result in personal injury or harm to the unit, and will void the warranty.

- Do not expose to rain, extreme weather or excessive humidity. Do not allow liquids of any kind to enter the Vector.

- Use only approved accessories. To prevent harm to the Vector or the computer system, use only the supplied cables and power adapters.

AccuSport, Inc. reserves the right to void the Vector Launch System warranty in the event of failure to follow these safety instructions.

Care and Handling

- The Vector unit contains a rechargeable NiMH battery system, which will power the system for approximately 1.5 hours. To recharge the Vector, turn off the unit, connect the supplied AC adapter to it and plug it into an AC outlet. The Vector will completely charge in approximately 12 hours. To protect the life of the battery, do not leave it plugged in when not in use for an extended period of time.

- The outside of the lens and strobes may become dirty from time to time due to divots, handling, etc. Clean the lens using any photographic or eyeglass cleaning kit. Paper towels or tissue are not recommended.

- The outside of the Vector case can be cleaned using a damp cloth. Turn off and disconnect the Vector system before cleaning. Take care to not let any liquid enter the case at the seams, the camera or through the trigger adjustment hole.

Vector Launch System Components

1. Waterproof Carrying Case (optional)
2. Setup Template
3. Vector
4. AC Adapter
5. Leveling Base
6. Vector Software
7. Protective Shield


4 pin   6 pin

Firewire Cables – 4 pin and 6 pin. Check your computer to see which cable it requires. The Vector, itself, requires the 6 pin fitting.

Note: Align plug properly into port. DO NOT FORCE

Software Installation

For Vector Launch System first time set up, you must install and configure the software on your computer. (If a computer was supplied with your Vector Launch System, AccuSport has already installed and configured the software for you. If this is the case, move immediately to Hardware Installation.)

Note: The appearance of some of your screens may vary slightly depending on your specific computer configuration.
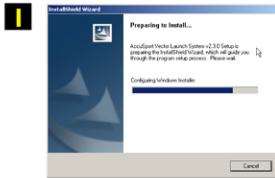
1 Insert the Vector Software Version 3.0 CD into your computer and wait for the installation to start.
If it does not start automatically, navigate to the CD and double-click on the **setup.exe** to start the installation.
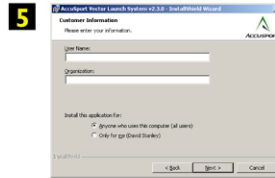
2 The Splash Screen shows the AccuSport logo. Press the **Next** key to go to the next screen.
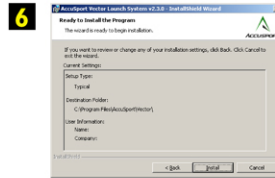
3 The Welcome Screen will display. Press the **Next** key to start the installation.

4 The License Agreement Screen appears. If you agree with the terms, select the "I accept" option and press the **Next** key.

5 Enter your name and organization information. We recommend that you select the "All Users" option. Press the **Next** key to continue the installation.

6 The Ready to Install Screen appears with a summary of the installation actions. Press the **Install** key to start the copying of files to your hard disk.
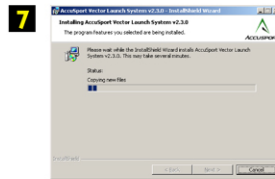
7 The program will install the software on your hard disk. A progress bar displays the status of the installation.
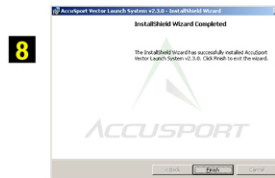
8 When the installation is complete this screen will display. Press the **Finish** key to exit the install program.

Hardware Installation

Never force in the IEEE cable into the port upside down. The Firewire plug is rounded on one side and square on the other. Check the alignment before insertion.

For Windows XP

1. A. Make sure the Vector Software CD is in the CD Drive of your computer before starting this step!
   B. Plug the AC adapter into your Vector unit and turn it on.
   C. Plug the IEEE 1394 (FireWire) cable into your computer and into the Vector.
   Note: If you are using an IEEE 1394 PC Card with your laptop, insert the card into the PC Card Port of your computer first.

   6 pin   4 pin   *Note: Align plug to fit properly into port.* Do not force!

2. The Found New Hardware Wizard will appear. Press the **Next** key to begin the installation of the new hardware.

3. The wizard will find the driver on your CD. Press the **Next** key to install the driver.

4. A warning will be displayed that the driver has not been digitally signed. This is okay. Press the **Continue** key to continue.
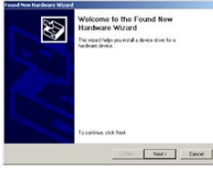
5. The driver is now installed. Press the **Finish** key to complete the process.

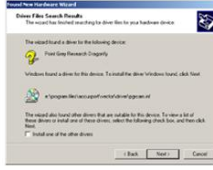You are now ready to use your Vector!

For Windows 2000

1. A. Make sure the Vector Software CD is in the CD Drive of your computer before starting this step!
   B. Plug the AC adapter into your Vector unit and turn it on.
   C. Plug the IEEE 1394 (FireWire) cable into your computer and into the Vector.
   Note: If you are using an IEEE 1394 PC Card with your laptop, insert the card into the PC Card Port of your computer first.
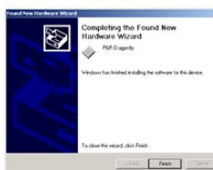
   6 pin   4 pin   *Note: Align plug to fit properly into port.* Do not force!

2. The Found New Hardware Wizard will appear. Press the **Next** key to begin the installation of the new hardware.

3. The wizard continues by letting you select how the new driver will be found. Just press the **Next** key.

4. Now the wizard allows you to specify where it will search for the new driver. Just press the **Next** key to continue.

5. The wizard will find the driver on your CD. Press the **Next** key to install the driver.

6. A warning will be displayed that the driver has not been digitally signed. This is okay. Press the **Yes** key to continue.

7. The driver is now installed. Press the **Finish** key to complete the process.

You are now ready to use your Vector!

Note: Each time you turn it on your Vector, there will be a series of low beeps as it goes through a 30 second self-checking sequence.

HITTING YOUR FIRST SHOT

Vector Software Organization

This section will give you a basic understanding of the Vector Launch System, allow you to hit your first ball and read the Vector launch measurements.
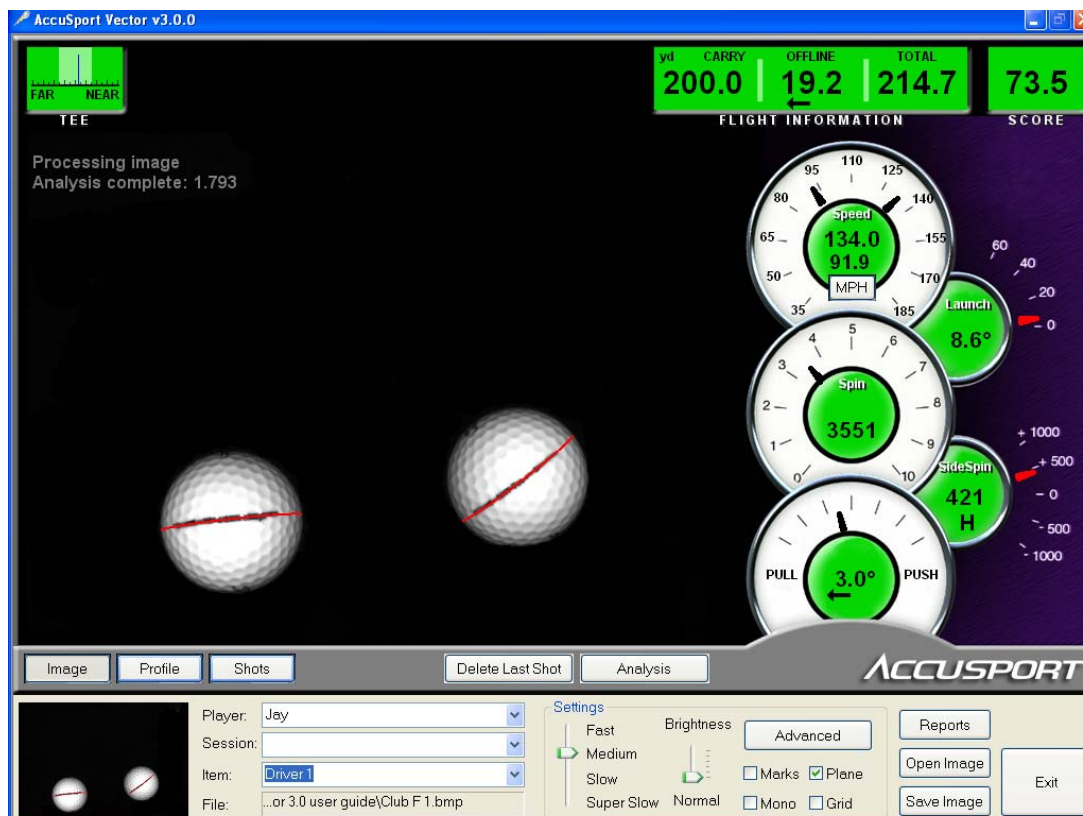
The Image Screen, which comes up automatically on your computer, is the main screen of the Vector Software. The photograph of the two balls shows the most basic information – the image of the shot. The shot dials to the right of the image, reveal shot launch data. (For a detailed explanation of the Image Screen, see page 17).

The lower left area allows the entering of information to document a Vector session. Above this section, are the Image, Profile and Shots buttons, which permit three different ways to view shot data. The Image button brings you back to this main screen, the Profile button goes to a screen showing the flight profile (see page 20), and the Shots button accesses a spreadsheet of all of the shot data collected (see page 21).

The buttons at the lower right section of the screen control the operation of the Vector.

Setting Up

Mark the ball for the most accurate data: Marking the golf ball before use is easy. The mark must be black (other colors don't show up in infrared light) and at least one inch long. It is not necessary for the mark to be completely straight or perfectly aligned. The mark must be clearly visible when it is facing the Vector.

One easy method for marking a ball is to find a blank face on the ball and draw a black stripe on it. Another method is to extend the existing mark. For instance, if the name of the manufacturer is shorter than one inch, add a short stripe to either side of it, or draw the new stripe through it.

There are a number of golf ball marking devices commonly used in the industry. Any of these will work.
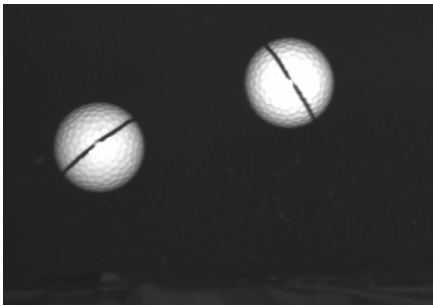
This image, captured by the Vector, illustrates a well-marked ball.

Position the Vector Launch System: Use the supplied Setup Template for assistance in positioning the ball and Vector Launch System. Check the built-in level on top of the unit to be sure the Vector is level. The Leveling Base should be placed beneath the Vector for use outdoors and, if needed, indoors. Screws are supplied if you want to attach it permanently to the Vector.

Vector Leveling Base

Align the Vector parallel to the downrange target. The golfer must swing parallel to the Vector Launch System.

Vector Setup Template

Set the Brightness:

Be sure the Vector is turned on and that the software is running. The Image Screen, the main Vector Software screen, should be on your computer.

1. Set the Brightness Setting to Normal on the computer.

2. Hold a ball directly in front of the Vector about 14 inches away, about 4 inches off the mat.

3. Press the Fire button on the side of the Vector to get a test image.

4. Adjust the aperture ring on the lens. The Aperture ring is the one closest to the body of the Vector. Adjust the ring clockwise for a brighter image, counter-clockwise for darker tone.

5. Repeat brightness steps 3 and 4 until a proper exposure is obtained.

Set the Focus:
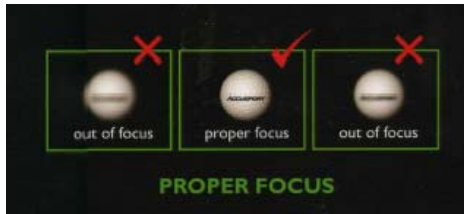
1. Hold a ball directly in front of the Vector about 14 inches away, about 4 inches off the mat.
2. Press the Fire button on the side of the Vector to get a test image.
3. Adjust the focus ring on the lens. The focus ring is the one farthest from the body of the Vector.
4. Repeat focus steps 2 and 3 until proper focus is obtained.
5. Readjust brightness if necessary.

Position the shield:

The Protective Shield is a device that fits over the top of the Vector. In the event of an errant shot, the shield will protect the front of your Vector from damage. Place the short lip of the shield towards the back of the Vector.

Hitting your first shot

Use the supplied Setup Template to tee up the ball for either a right or left-handed golfer. If you are setting up without the template, tee up the ball 14 inches away from the front of the Vector. For a right handed golfer, the ball should be four to six inches to the **right** of center.

For a left handed golfer, tee the ball up 14 inches away from the front of the Vector and four to six inches to the **left** of center downrange from the target. For a left-handed golfer, click the Advanced button to go to the Advanced Screen on your computer. Go to the Golfer heading on the right side and click on left-handed. Click OK to return to the main Vector screen on your computer – the Image Screen.

Check the quality of your image.
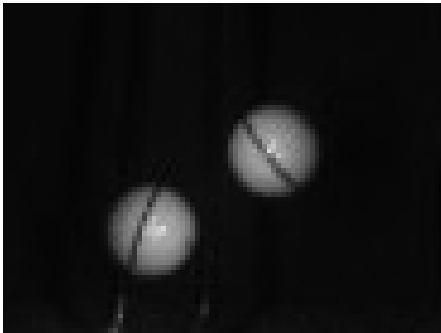
The Vector Launch System must have an accurate image of the shot in order to measure ball flight parameters. When you look at the Vector software Image Screen, you should see two entire balls in the image frame. If not, move the ball slightly downrange or uprange. (See the green cross in the center of the Setup Template.) The marks on each ball should be clear and the ball outlines should be completely visible – not fading into darkness. Ball dimples should be distinguishable.

A Quick Read of the Dials

(For a detailed explanation, see page 18)
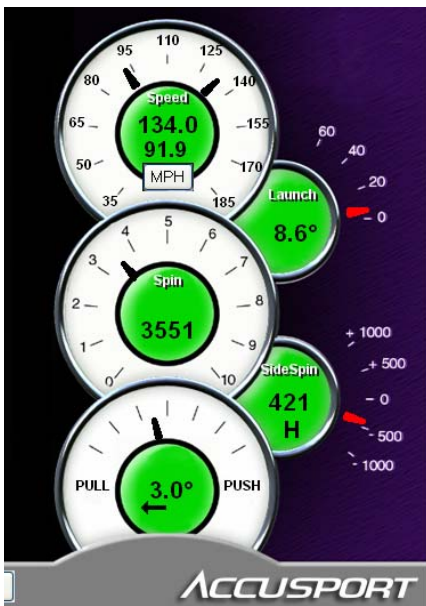
Ball speed shown above club head speed.

Launch Angle in degrees.

Back spin (RPM)

Side spin (RPM) - H indicates hook. S indicates slice.

Push/ pull measured for the shot.

DETAILS OF THE VECTOR LAUNCH SYSTEM SOFTWARE

Vector Buttons

The buttons at the lower right section of the screen control the operation of the Vector.

Delete Last Shot: Deletes most recent shot from the database. This button becomes visible after the shot is analyzed.
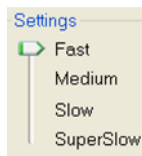
Settings: Fast, Medium, Slow and Super Slow Settings refer to ball speed. In most instances, Medium setting is best. However, if the two images of the ball are too far apart for both to appear in the frame, the F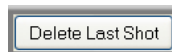ast setting will bring them closer together. Likewise, a wedge or chip shot may produce overlapping images of the ball. In this case, the Slow or Super Slow setting should be used. To adjust the settings, click and drag the arrow to the appropriate setting.
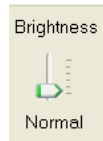
Brightness: Fine tunes software which controls the brightness of the next image taken.

Image Check Boxes: Useful for diagnosing a problem with image capture.

Mono: Used to verify aperture adjustment. Any objects, other than the golf ball, which show up as bright white should be removed from the scene. If removing those objects is not possible, use the aperture ring to dim the exposure level.

Marks: Highlights ball markings. If camera is not reading the markings clearly, remark the ball.

Plane: Marks ball equator with red line for spin measurement. It is necessary to have a good plane in order to measure sidespin and backspin.

Grid: Provides a screen reference grid and places a small, blue cross at the center point of each ball.

Reports: Click this button to select the following reports:

Practice Range Report: Scorecard of key shot parameters for last shot, best shot (using selected performance measure) and longest shot. Includes distance to the pin information for target practice mode.

Shot Analysis Report: Chart shows the effect of increasing or decreasing the launch angle or spin rate of a shot. Each cell of the spreadsheet represents the yardage of a shot. Green cells indicate more distance, red cells less distance and black means no noticeable change.

Shots Report: Detail of shot spreadsheet with a chart showing shot location with standard deviation of shot group.

Shots Summary Report: Summary of shot spreadsheet with a chart showing shot location with standard deviation of shot group.

Shots Profile Report: Chart of one or more shots selected for plotting in the shots screen.

Ball Image Report: Printout of Image screen with ball coordinates and key shot parameters.

Bag Tag Report: Practice range report for small format printer.

Saving Image Data

After hitting the ball, you can save the image by clicking on the Save Image button in the lower right corner of the Vector Launch System screen.
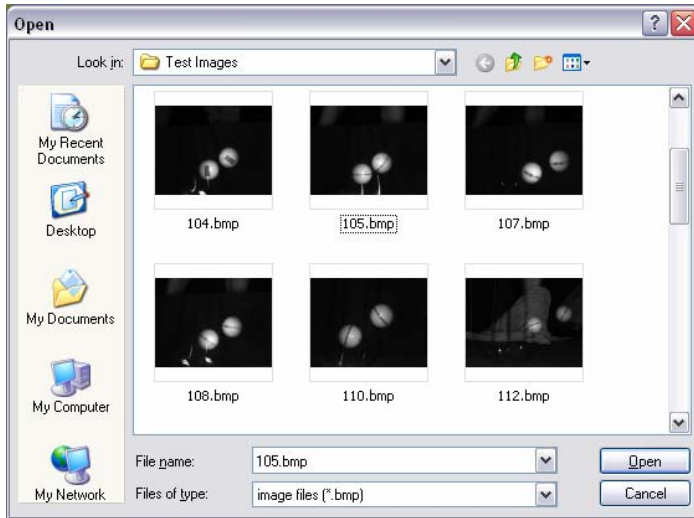
Open Image: Retrieves a saved ball image. Vector will load the image, re-process it and display the results on each of the screens.

Save Image: Saves currently displayed ball image. A dialog box opens to allow you to select where you wish to save the file on your computer.

Exit: Closes the Vector Launch System program.

Use the fields on the lower left section of the screen when you want to document a hitting session. Click on Player and Session to enter player name and information describing the session. Each time a new item (ball, club, swing) is tested, enter the name of the club, ball or a description of the swing technique in the Item field. At the end of a hitting session, if you wish to save the session data, click on the Shots button, above the data fields, to go to the Shots Screen. Then click Save Data.

Click the arrows at the ends of the fields for a drop-down of the last ten items entered. This feature allows you to go back later and append to a saved group or session.

Note: Saved session data can be imported into Microsoft Excel for further analysis. (See Appendix, page 38).
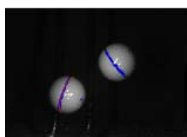
Thumbnail Ball Image: This quick reference of the image is displayed on all Vector screens. Click on it to access the Image Screen.

Analyzing Vector Data

Image Screen: Vector software's main screen. The Image Screen shows the Vector image capture. From other screens, click Image to return to this screen.
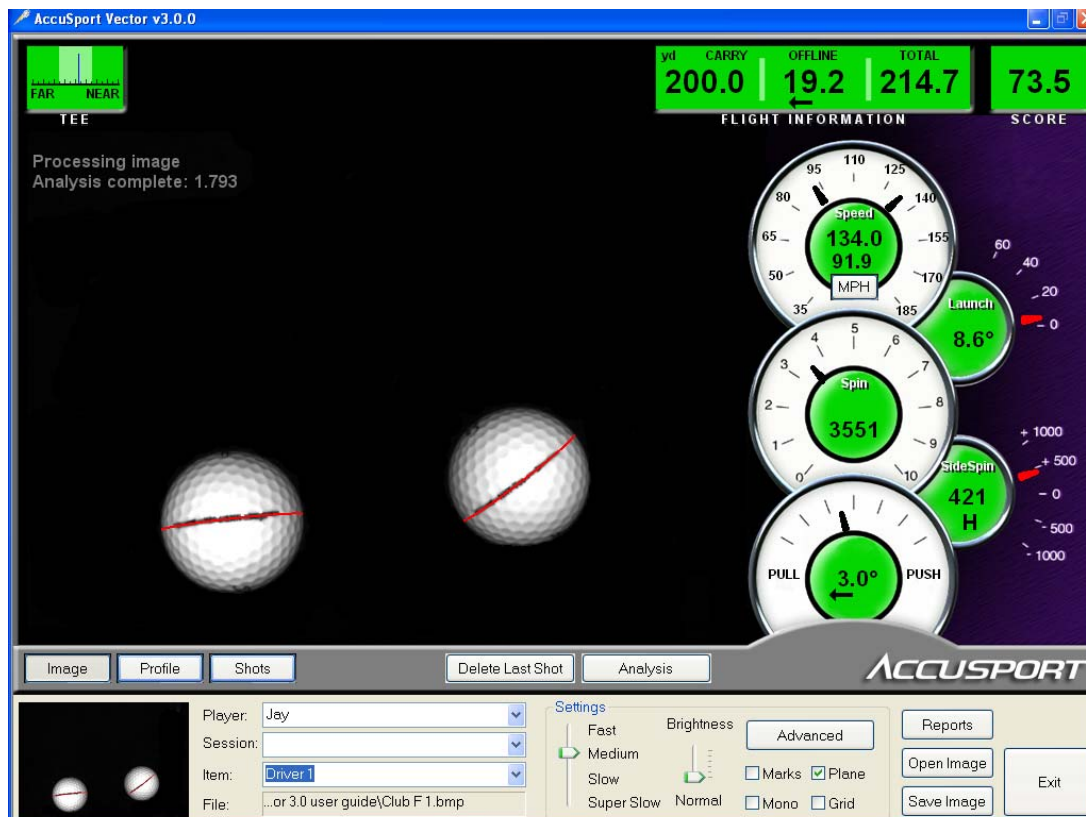
Use the Plane check box to see how the system processed the marking on the ball. The Plane check box displays how the marks were processed by drawing a red stripe on each ball. If the red stripe doesn't line up with the proper mark on the ball then the spin numbers will be inaccurate. The red stripe can be manually redrawn on the ball by two-clicking on the proper mark. The spin numbers will automatically recalculate after the red stripe is redrawn.

Shot Dials

Convey easy to read, measured information about every shot. These dials appear on both the Image and the Profile Screen.
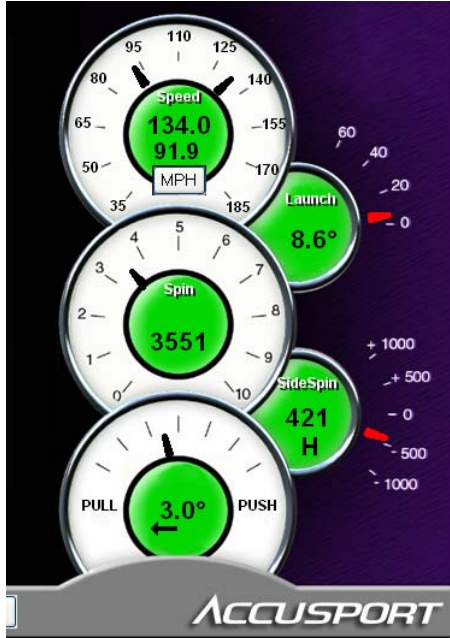
Speed: This dial displays ball speed and club head speed in miles per hour (MPH), feet per second (FPS), kilometers per hour (km/h) or meters per second (m/s). To select the speed units, click the Advanced button to go to the Advanced Settings screen.

Ball speed is the upper number. Club head speed is below it.

Launch Angle: Displayed in degrees.

Spin: Back Spin. To see total spin go to the Advanced Settings screen and click on Total Spin. Total Spin will appear as the top number and is the rotation of the ball (measured in RPM) around the true spin axis. The Vector software breaks the Total Spin down into Back Spin and Side Spin.

Side Spin: A positive or negative number depending on the direction of the spin. A positive number indicates hook spin which is displayed with an "H" preceding the number. A negative number indicates slice spin which is displayed with an "S" preceding the number.

Push/Pull: Indicates how many degrees of push or pull was measured for the shot.

Flight Information: Flight information appears on both the Image and Profile Screens. The Vector Launch System uses AccuSport's flight model – the best in the industry – with precise Vector launch data to accurately display each shot's carry, offline, and total distance (in yards, feet or meters). Note: Total Distance includes the carry and roll of the ball.

Score: A measure of shot efficiency from 0 to 100, with 100 being the best. The score is derived from club head speed and total yardage, in conjunction with Vector's exact measurements

of ball speed, spin, launch angle and push/pull. The specific factors from every shot, which are uniquely used by the Vector Launch System to determine this score, make it the most advanced golf scoring system available.

 Tee: The green distance guide in upper left corner of the screen. This guide indicates, in half inch increments, ball distance from the Vector system when the image was taken. Optimal position is shaded. Move the ball nearer to, or farther from, Vector Camera lens as indicated to get the best position. If you are still having difficulty getting a good shot image, refer to page 34 of the Troubleshooting Section.

Profile Screen
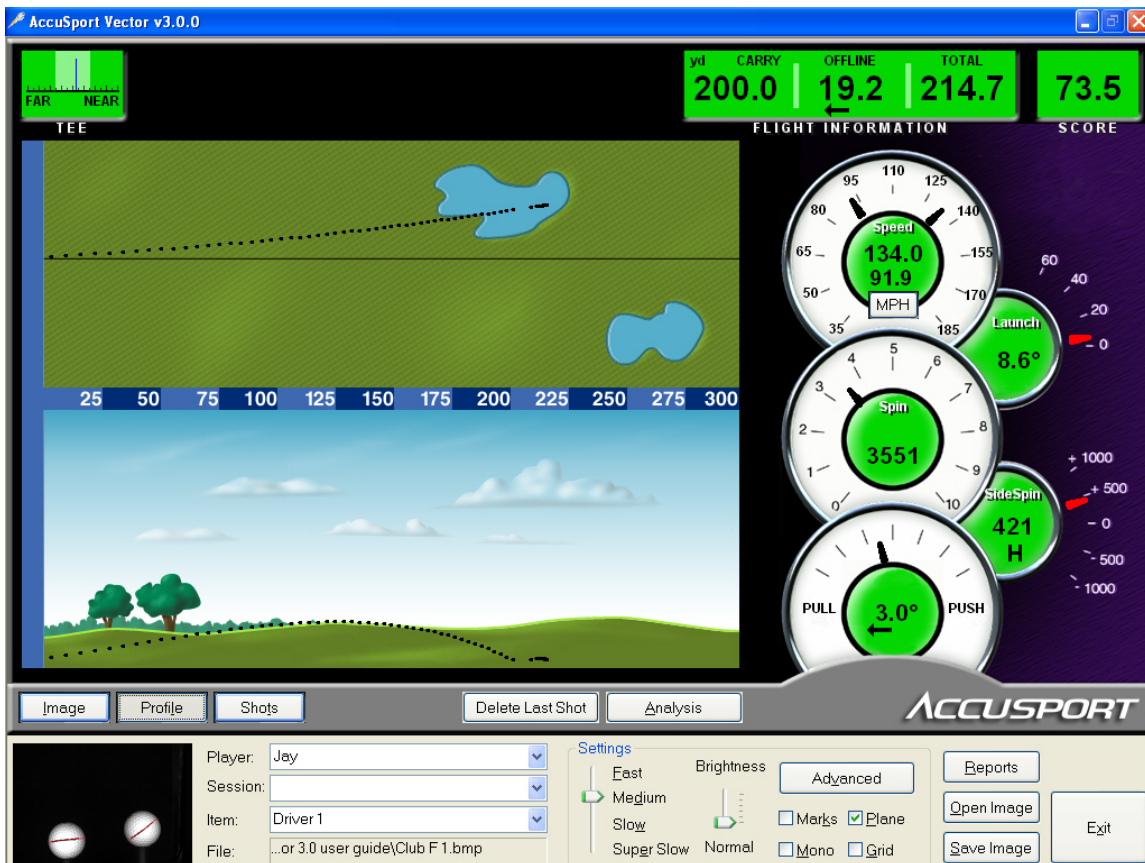
Click the Profile button to access this screen. The Profile Screen displays an overhead and side view of ball flight, based upon the measured ball launch information and AccuSport's best in the industry flight model. Multiple shots can be viewed as individual flight profiles or as a single profile representing the average through the Shots Screen. Click on the Shots button to go to the Shots Screen, and then click the plot cell to select colors for plotting various shots.

Shots Screen

Click the Shots button to access this screen. The Shots Screen displays a spreadsheet of data from each shot. Data is grouped and summarized by item, as shown on the top line of each group. Click on the +/- box in the item field to collapse the data to display averages with standard deviation for each measurement.

If you highlight a row of launch information, then click the Analysis button, that information will appear on the Analysis Screen. (See page 23 for details.)

Individual or item averages may be selected for printing, or for plotting in the Profile Screen. To plot an item, click the box in the plot column of the Shots Screen for a particular shot or average; when the arrow appears, click on it to select a color for plotting that item.

New Session: Creates new session by clearing all records from the prior session.

Save Session: Allows you to name and save a session.

Load Session: Brings up a saved session for adding more shots or for further analysis.

Delete Record: Click this after highlighting one or more records that you wish to delete.

One way to use the Shots Screen is for comparing two clubs entered as two different items. You can collapse to the summary lines of each club, then compare and plot the averages of the shots for each club.

In addition, Golf Instructors can track and manage their student's progress using the shots screen by saving each Session and retrieving it later for comparison.

Tips for managing the grid: Use the horizontal scroll arrow to view additional data. When the screen is full, a vertical scroll bar will appear.

Analysis Screen

AccuSport Vector Shot Analysis

LAUNCH ANGLE

SPIN RATE		5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5
	1750	170.0	175.5	180.8	185.6	190.1	194.4	198.5	202.3	205.9	209.2	212.4	215.5	218.4
	2000	176.2	181.4	186.2	190.8	195.0	199.0	202.8	206.3	209.6	212.7	215.7	218.5	221.1
	2250	181.6	186.4	191.0	195.2	199.1	202.8	206.3	209.5	212.6	215.4	218.2	220.7	223.1
	2500	186.2	190.7	194.9	198.8	202.4	205.8	209.0	212.0	214.8	217.4	220.0	222.3	224.5
	2750	190.1	194.2	198.1	201.6	205.0	208.1	211.1	213.8	216.4	218.8	221.1	223.3	225.3
	3000	193.2	197.0	200.6	203.9	207.0	209.9	212.5	215.1	217.5	219.7	221.8	223.8	225.7
	3250	195.7	199.2	202.5	205.5	208.4	211.0	213.5	215.9	218.1	220.2	222.1	224.0	225.7
	3500	197.6	200.9	203.9	206.7	209.3	211.8	214.1	216.3	218.3	220.3	222.1	223.8	225.4
	3750	199.0	202.0	204.8	207.4	209.9	212.2	214.3	216.4	218.3	220.0	221.7	223.3	224.8
	4000	200.0	202.8	205.4	207.8	210.1	212.3	214.3	216.2	217.9	219.5	220.9	222.2	223.4
	4250	200.7	203.3	205.7	208.0	210.1	212.0	213.7	215.3	216.8	218.1	219.3	220.4	221.4
	4500	201.0	203.4	205.6	207.6	209.4	211.1	212.6	213.9	215.2	216.3	217.4	218.3	219.1
	4750	200.9	203.0	204.9	206.7	208.3	209.7	211.0	212.2	213.3	214.3	215.2	215.9	216.6
	5000	200.3	202.2	203.9	205.4	206.8	208.1	209.2	210.3	211.2	212.0	212.8	213.5	214.0
	5250	199.4	201.0	202.5	203.9	205.1	206.3	207.3	208.2	209.0	209.7	210.3	210.9	211.4

Blue

Plot

Clear Plot

MPH 134.0

Spin: 3551

Launch: 8.6

Side Spin: 421

Side Angle: -3.0

Total

Analyze

Carry: 199.9

Offline: -19.3

Total: 214.6

Reports

Exit

Click the Analysis button to access this screen. In the chart, varying launch angle and back spin conditions are computed and displayed. The yellow box shows the distance gained by the initial launch conditions. The surrounding cells show the distances of the various launch angles and spin rates. If a box is black, there is no appreciable gain or loss in distance. Red indicates a loss of distance and green indicates a gain in distance

A great feature of the Analysis Screen is the "What If" analysis for shot comparison. Launch information may be modified, analyzed and compared to other shots. After filling in hypothetical launch condition values such as speed, launch angle, spin and push/pull, click Analyze to update the chart. Clicking Plot will show the profile of the shot.

Blue ⌄	**Plot Color Selection Box:** Use to select a color for plotting a shot with the launch conditions you choose.
Plot	
Clear Plot	**Plot:** Plots the shot with the selected launch conditions. Select different colors to plot multiple shots.
MPH 134.0	**Clear Plot:** Clears plot screen.
Spin: 3551	
Launch: 8.6	**Ball Speed, Backspin, Launch, Side Spin, Side Angle:** These are launch conditions taken from last or selected shot, or are the variables entered for analysis.
Side Spin: 421	
Side Angle: -3.0	
Carry ⌄	**Distance Selection Box:** Options for showing distance in total, carry or roll.
Analyze	
Carry: 199.9	**Analyze:** Updates chart with latest entered data.
Offline: -19.3	
Total: 214.6	**Carry, Offline, Total:** Flight information for the selected launch conditions.
Reports	**Reports:** Takes you to the reports screen for printing options.
Exit	**Exit:** Returns to previous screen.

Practice Range

The Practice Range Screen uses AccuSport's patent pending spin technology to create the world's most accurate golf simulation. You may select a target by clicking on the flags and hit balls onto the Practice Range to improve your game, compare clubs or compete with friends in a distance driving or closest to the pin contest.

To activate this screen, click the Advanced button. Go to the lower left corner of the Advanced Settings Screen and select the monitor you wish to use to display the Practice Range. (Your computer is monitor 1. None turns the Practice Range Screen off.) The multiple screens feature allows you to display the Practice Range on a secondary monitor or projector while continuing to view the Vector Image Screen on the main monitor. Click OK on the Advanced Setting screen to go to the Practice Range.

At the upper left corner of the Practice Range screen:

Last: Most recent shot. Shows carry, offline, total distance, and distance from the selected target.

Best: Highest scoring shot based on the Vector score.

Long: Shot with the greatest total distance.

At the lower right corner of the Practice Range screen:

Reports: Takes you to the Reports Screen to print reports.

Replay: Replays animation of the last shot.

Show Summary/Show Extended: Shows last shot, best shot and longest shot, or additional information about the last shot.

Clear Field: Eliminates all balls on the field and resets statistics.

Click on a flag and that flag becomes the golfer's target. Distance to flag is shown.

Click on the lower left corner of the Practice Range to see a thumbnail of the ball image.

Advanced Settings Screen

Click the Advanced button to access this screen. The Advanced Setting Screen can be used to configure various aspects of the Vector Launch System. Once all selections are made, save them by clicking on OK. If you wish to exit without saving the changes, click Cancel and the screen settings will return to the default mode.


Weather: Enter conditions under which you are hitting the ball. English units are the only units currently supported.
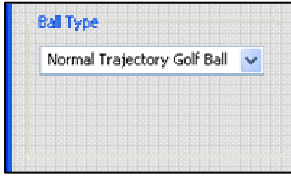
Ball Type: Selects the type of golf ball used. A normal trajectory ball is most often used. There are also options for high trajectory, low trajectory, and range balls.

Practice Range: Select the monitor you wish to use to display the Practice Range Program. (Your computer is monitor 1. None turns the Practice Range Screen off.) The multiple screens feature allows you to display the Practice Range on a secondary monitor or projector while continuing to view the Vector Image Screen on the main monitor.
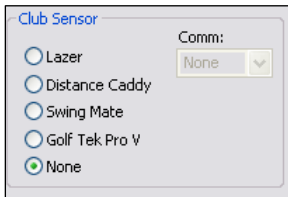
Club Sensor: Enables the Vector Launch System to work with a number of other equipment sensors.
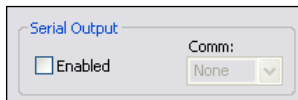
Serial Output: Interfaces Vector Launch System output with other devices via the communications port.
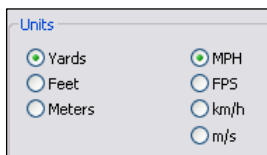
Units: Select units for measuring distance and ball and club head speed.
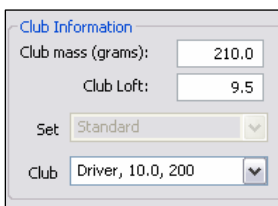
Club Information: Mass and loft of the club head. Enter values directly into boxes or use the list to select pre-set values.
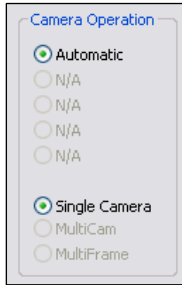
Camera Operation: For advanced use with multiple Vector Cameras. For normal use, the default setting is Automatic and Single Camera.
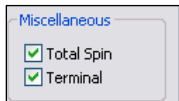
Miscellaneous: Clicking total spin displays total spin as well as back spin on dial. Terminal displays ball processing and image information of the Image Screen.
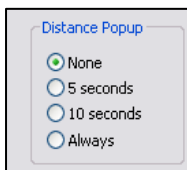
Distance Popup: If selected, a distance popup screen will appear after every shot, on every screen for the selected amount of time, displaying distance, off line and total distance.

Score: Changes performance score index. AccuSport's score is derived from club head speed and total yardage, in conjunction with Vector's exact measurements of ball spin, launch angle and push/pull. The highest possible score is 100. Power Transfer Index (PTI), a quotient of ball speed over club speed, is an older scoring technique, first used when speed was the only information available in ball flight measurement. The PTI number will be somewhere between 1.4 and 1.5.

Golfer: Specify right or left-handed player. For a left-handed player, you must also reposition the Vector. See Setup Template.

TROUBLESHOOTING

Frequently Asked Questions

How do I stripe the ball?

The ball needs to have a straight marking of some sort for the software to read the spin rate. This can be either a stripe or a straight logo on the ball. A long thin line will give you the most accurate and consistent results. The Vector software may incorrectly read the spin plane if there are many other markings in the image. Proper illumination and focus will help in getting the most consistent readings.

I am having trouble getting good data outdoors. What should I do?

Usually, this problem is caused by improper exposure. In general, outdoor shots should be set at a slightly lower brightness level than indoor shots. Look for objects in the background that may be showing up. Another common problem is the grass directly in front of the Vector Launch System can be too bright. The best tool for checking this is the Mono mode. This mode is set by clicking on the Mono check box. This mode will display all bright objects in the image as bright white. Optimally, only the two balls should be highlighted in this mode. However, a few small patches of white are acceptable. If other objects or the grass is highlighted, try reducing the exposure level.

All of these issues can usually be resolved by adjusting the exposure level. After each test hit, either slightly adjust the aperture control on the lens or the Brightness slide control on the screen until a better image is obtained.

Why am I getting the message, "Couldn't open COM…"

This message comes up when a communications port is selected by the user that does not exist on the computer. Simply close the message box and select a different communications port. To do this, go to the Advanced Settings screen and click on the drop down arrow in the Comm: selection box.

What should I do if I receive an image of two balls, but no data.

Usually this problem is caused by improper camera exposure or a poorly framed shot. A poor exposure will cause the image analysis software to overlook the balls or to select the wrong objects. Use the Plane function and Mono function to determine what the Vector is capturing in the image.

The Mono check box causes the system to highlight every object that might be a golf ball. If objects other than the golf ball are highlighted, then they may be interfering with the analysis software. Darkening the image with the camera aperture or the Brightness control usually resolves this problem.

Use the Marks and Plane check boxes to see how the system processed the markings on the ball. The Marks check box displays all of the marks on the ball in dark blue. A dirty ball or an underexposed ball can cause erroneous marks to appear. The Plane check box displays how the marks were processed. The red stripes indicate which marks were used. If a different set of marks are used for each of the two balls, erroneous or zero spin information will be displayed. In this case, make sure you are using a reasonably clean ball and that only one mark is presented to the Vector launch System.

Why do I have a good image, but no spin numbers?

The Vector Launch System does not measure forward spin and will display a zero whenever forward spin is detected Another reason for no spin numbers can be that no markings or invalid markings are found. See the question below regarding extremely high spin value for more information.

Why is Vector showing extremely high spin value?

This can happen if the ball is poorly marked or if the mark is not facing the Vector. If the system processes the marks on the ball improperly or uses a different set of marks from one ball to the next in a shot, a wrong spin value will result.

Use the Marks and Plane check boxes to analyze how the system processed the markings on the ball. The Marks check box displays all of the marks on the ball in dark blue. A dirty ball or an underexposed ball can cause erroneous marks to appear. The Plane check box displays how the marks were processed. The red stripes indicate which marks were used.

Make sure you are using a reasonably clean ball and that only one mark is presented to the Vector Launch System

How should the Settings be adjusted?

Shots should be teed up 14″ from the face of the Vector and in front of the right-side strobes for a right handed golfer or in front of the left-side strobes for a left handed golfer. The tee should be moved to the left as shorter clubs are used. The key is to get two full golf balls in the image without them overlapping. Using the speed setting at the bottom of the software is helpful. Settings guidelines are as follows:

Setting	Ball Speed
Fast	150 + mph
Medium	90 – 150 mph
Slow	50 – 90 mph
Super Slow	below 50 mph (pitch and wedge shots)

Sometimes I hit the ball and get an image, but no ball is in the image. What happened?

If the ground is struck before the ball (a fat shot), the Vector Launch System will trigger early, causing the image to be taken before the ball leaves the tee.

How can I recover shot data if my computer crashes?

Every shot is permanently recorded in the log file located at:

C:\Program Files\AccuSport\Vector\logVector.txt

What should I do if my Vector is emitting a continuous tone?

A low battery causes the Vector Launch System to emit a continuous tone. Turn off the Vector and plug the system into an AC outlet for use and charging. Then turn the Vector back on.

No image of the balls is shown, but data appears on the dials. What is happening?

The display of the computer must be set to 32-bit or 24-bit color for Vector Launch System to operate properly. The procedure to change this is as follows:

1. Right-click on an empty area of the desktop.
2. Select Properties.
3. Click on the Settings tab.
4. In the Color Quality box, select Highest (32 bit) or 24 bit.
5. Click on OK.

This setting should be compatible with most software packages. It is recommended to keep this setting permanently.

What should I do if the Vector triggers continuously?

A low battery can cause the Vector Launch System to fire every three seconds. If this is the case, turn off the Vector and plug the system into an AC outlet to charge the battery.

Another source of continuous firing is an incorrect trigger adjustment. The Vector Launch System is triggered by the sound of the ball being struck by the club face. The sensitivity of the trigger can be adjusted to suit a variety of situations. For instance, on a crowded driving range or when working with a golf robot, it is desirable to make the system less sensitive. On the other hand, when measuring light chip shots it may be desirable to make the system more sensitive. This procedure allows you to adjust this parameter:

On the back of the Vector Launch System, there is a small hole marked Trigger Adjustment. Inside is a control that can be adjusted with a plastic screwdriver:

1. Turn on the Vector Launch System.
2. Wait for the double beep indicating it has initialized.
3. Using the screwdriver, adjust the control screw clockwise for greater sensitivity, counter-clockwise for less sensitivity.

Note: in the most sensitive position (fully clockwise) the system will start firing continuously. In this case, move the control counter-clockwise until the unit stops firing.

Warning: only use a **_plastic_** screwdriver to prevent harm to the system unit.

What should I do if the images of the golf ball are distorted or if I am getting multiple images?

The display of the computer must be set to 32-bit or 24-bit color for Vector to operate properly. The procedure to change this is as follows:

1. Right-click on an empty area of the desktop.
2. Select Properties.
3. Click on the Settings tab.
4. In the Color Quality box, select Highest (32 bit) or 24 bit.
5. Click on OK.

Since this setting is compatible with most software packages, it is recommended that you keep this setting permanently.

## How can I get the best possible image quality?

The Vector Launch System is focused and the aperture is set at the factory. Keeping the system focused and the aperture properly set is important for consistent, accurate readings.

Focus

To obtain the most accurate readings possible, the camera should be focused so that the dimples are distinct and the logo is crystal clear. If your images with the test button are not clear or if you don't always get spin rates, refocus your Vector.

Test Focus Image taken at 14 inches
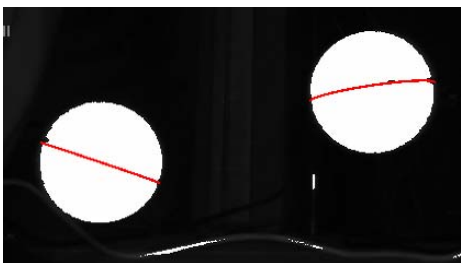
Brightness

Setting the proper camera brightness will resolve many Vector issues. If the image shows two complete golf balls, but you are receiving no data, verify the brightness. Check the "Mono" box on the software. Both balls should turn solid white. Ideally the rest of the image does not have any more white reflection; however, small reflections should not impact the analysis. If the white does not cover the entire ball, the image needs to be brighter. If there are more white marks

than the ball, or something is reflecting and the edge of the ball is not clear, the image needs to be less bright. If the image is too bright or too dim, then the software may be unable to "see" the plane properly.

The above graphic shows a great image when Mono and Plane are clicked in the Image Check boxes.

What should I do if I receive the message, "No Vectors were detected"?

You may receive this message for 3 main reasons.

1) The camera driver has not been loaded for the current camera. If a specific Vector is being used for the first time with a computer, the camera drivers will need to be installed. The following procedure will make sure the proper driver is loaded:

Connect the Vector Launch System to your Firewire (or IEEE 1394) connection and turn it on.

1. Right-click on My Computer.
2. Select Properties (this brings up the System Properties dialog).
3. Select the Hardware tab.
4. Click on the Device Manager.
5. You should see a device named Generic Desktop Camera with a warning sign.
6. Right-click on it and select Update Driver.
7. Select Install from a list or specific location and click on Next.
8. Select Don't Search and select Next.
9. Select the PGR Dragonfly driver and select Next.
10. When the Unsigned Driver dialog comes up, select Continue Anyway.
11. Click on Next, watch it run.
12. Click on Finish.

2) The IEEE 1394 FireWire cable is unplugged. If the Firewire cable is disconnected from either the computer or Vector, you will receive this prompt.

3) The Vector has low power. If the Vector is running on battery and the battery runs low, you may get a series of beeping and flashing along with a "Vector not connected" error message. Applying power may not immediately fix this problem. If the software doesn't work after you plug it in, simply turn the Vector off for a couple of seconds and then turn it back on again. If the battery has run too low, it may need to be charged for up to 30 minutes before use. A full charge is obtained in 12 hours.

In all three cases, the Vector software will need to be restarted after the problem is corrected.

What should I do if I receive the message, "Analysis Terminated: No Error?"

This usually happens when the Golfer setting is set incorrectly – i.e. a left handed golfer is hitting on right-handed mode or a right handed golfer is hitting on left-handed mode. Go to the Advanced Settings screen to correct the problem.

Customer Support

Partnership with customers is a major priority at AccuSport. We want to help you use our products and increase your business. Because of our unsurpassed customer support, you can have additional confidence and peace of mind. We stand behind our products and are here when you need us.

TOLL FREE: 1-866-759-3302

EMAIL: support@accusport.com

HOURS: Monday – Friday   8:00 am to 5:00 pm
Free customer support during regular business hours

Saturday   10:00 am to 5:00 pm

Sunday   1:00 pm to 5:00 pm
There is a $15 charge for each incident during the weekend

All times are Eastern Time Zone.

APPENDIX

Importing Saved Data into Microsoft Excel

Microsoft Excel and Microsoft Access are powerful tools for storing, retrieving and analyzing data. With these tools you can save your data for retrieval at a later date, or use the data for a detailed analysis. For instance, you could track the progress of a golfer by storing their shots over the period of time to see how their game improves. First save your session data by clicking on Save Session on the Shots screen.

Loading data into Microsoft Excel is easy. For Office XP:

1. Select File/Open and specify a text file.

2. Locate the saved session and select the file.

3. The Import Wizard will come up. Select the Delimited option and click on Next.

4. Select the Comma delimiter and click on Next

5. Click on Finish

All of your data will then be brought into the current worksheet. Notice that the exact date and time is included for every shot, as well as, the Golfer and Session values. You can now analyze, sort, chart, etc. the data just like any other spreadsheet.

Note: When you save the new spreadsheet, use the File/Save As command and select the .XLS file type. This will make sure that your data is now saved as a spreadsheet instead of a text file.