

Science & Motion Sports

SAM PuttLab

Operating Manual

Version 2010



Reference

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SAM – PuttLab Version 2010 Operating Manual [03/26/2010]

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1 Introduction and Set-Up

1.1 Welcome

Welcome to the Operating Manual of "SAM PuttLab"!

First, we want to thank you for purchasing our product.

Motion researchers and golf professionals joined forces to develop the first computer-aided analysis of the short game. With the "SAM PuttLab" you have the chance to measure no fewer than 28 parameters of the putting stroke, a number most golfers probably were not aware of. It marks a new dimension for the analysis and the practice of the short game. Use this innovative and revolutionary system and gain the decisive advantage in golf practice.

You can't wait to improve your short game and want to start immediately?

If you want to start immediately, follow our Quick-Start-Guide (you will find it as printout in the case) and then go straight to these chapters in the order listed below.

- [1.7](#) Safety warnings
- [4.4](#) Settings
- [4.5](#) Calibration
- [4.6](#) Measurement
- [4.7](#) Training

1.2 A Word from the Inventor

Dear customer,

Thank you for purchasing the SAM PuttLab.

Following is a brief introduction into the history of the system that will revolutionize the Putt training - the SAM PuttLab.



I have been conducting interdisciplinary research in motor behaviour for more than 15 years. The main goal of our research was to basically understand the process of motor learning and the organisation of skilled human movements. During this time we developed various innovative systems to precisely measure and analyse movements. One system turned out to be very suitable for the measurement of three dimensional movements in space – the ultrasound measurement system.

In the course of our research, my team and I also gained extensive experience in a range of different sports. We discovered that the most important factor for efficient learning in sports is adequate feedback. Lack of feedback is the reason why putting, in terms of movement complexity, is considered to be the easiest part of the golf game, but the most difficult part to learn. To close this gap, we developed the SAM PuttLab, a system to precisely measure all aspects of your putting stroke, and to give you an instant feedback of your individual movement performance.

The SAM PuttLab is the most comprehensive putt training tool ever developed, extremely accurate and easy to use. The software is customized to exactly fit these needs. Training with the PuttLab will substantially improve your short game after only a few lessons. We have been testing the system extensively on all different levels of players, from amateurs up to the very best PGA Tour players, and they all loved the system. At this point I would like to emphasize that the feedback of these PGA Pros has been greatly appreciated and helped us optimize this tool even further.

I am confident, that the SAM PuttLab will meet your expectations and assist you in optimizing your short game in the most efficient way.

Best regards,

Dr. Christian Marquardt

1.3 General operation conditions

1.3.1 Environment requirements

The system can be operated indoors and outdoors without problems. Some conditions have to be fulfilled for optimum quality of the recorded stroke data:

1. General

Check if the area around the Basic Unit in a range of 2 meters (6.5 feet) is not occupied by other objects (like chairs, boxes, etc.). This can lead to interferences of the ultrasonic signals and may reduce the quality of the recordings.

2. Indoors

Choose a place for the recordings with a maximum distance to walls or other objects placed on the ground. Generally it could be a problem to do measurements in very small rooms with wall distances of less than 2 or 3 meters (6.5 to 10 feet).

3. Outdoors

Protect the system against direct rain, both the Triplet and the Basic Unit are not water resistant. If there is a strong or stormy wind during the recordings this will have impact to the signal quality (noise). Try to find a place where the system is protected from the wind (maybe use a windshield).

1.3.2 Optimum length of putts

The automatic stroke recognition, the result data display and the rating of the strokes is optimized for a putt length of 3 to 5 meters (10 to 16 feet) on a stimp of 10. It should be no problem to analyse also putt strokes up to 8 meters (25 feet), but due to the higher velocity and acceleration the data curves may go out of the range of the graphs and the benchmark rating may not be very useful to characterize those putts.

1.4 Functionality of SAM PuttLab

The SAM PuttLab comprises a computer-supported system designed for three-dimensional motion analysis. The function of this system is based on the timing of the interval between emission and reception of ultrasonic signals.

General

Recent technical developments allow the recording of human movements with a high spatial and temporal resolution under low experimental demands. Some very expensive recording systems are based on recording the trace of infrared markers with video cameras. A more refined method is using miniature ultrasonic transmitters, which are attached to the moving object. These transmitters send ultrasonic pulses to the microphones (at least three) of the measuring system in short sequences (typically some milliseconds). The positions of the transmitters are then calculated from time delays of the pulses and stored on the computer.

SAM PuttLab can record the positional data, stores it on a computer, reconstructs the movements from the data, and provides an in-depth kinematical analysis. Graphic reports show even smallest details of the individual movement execution. In the feedback training mode, online analysis of the executed movement is performed. The results are displayed as instant feedback on the computer screen.

Data registration

The positional data of the movements is recorded using the SAM MotionAnalyzer movement registration system. In this measuring system the positions of miniature ultrasonic transmitters are sampled at a maximum frequency of 210 Hz (total for all markers used) at a spatial resolution of about 0.1 mm. Before data analysis the raw positional data is filtered using specially designed filter procedures.

Automatic segmentation

During data recording a data tracer is automatically identifies single strokes from the data flow. For each identified valid stroke an automatic segmentation is calculated to divide the movement into relevant movement segments. The movement data and the segmentation information are then stored on the computer. Based on the data segmentation up to 28 different movement parameters and their distribution in movement repetition can be analyzed.

Analysis

SAM PuttLab software includes extensive graphical and statistical tools to analyze the movement data. Single strokes can be easily selected from the recorded data. The movement characteristics can be inspected in different plots. All data values and differences are displayed on the screen and can be saved to a file.

Graphic Reports

SAM PuttLab provides powerful graphic reports with multiple graphs, texts, and boxes. The high resolution graphical reports allow clear illustration and documentation of the individual movement performance. Graphic reports can be created for screen display or for print out and are available for different performance levels. The reports can also be converted to PDF-format and saved to file.

Competence profiles

A special software module allows displaying the data in bar charts on uniform scales. The transformation of the parameters to z-values allows a direct comparison of movement performance for different tasks with a group performance, i.e. with a certain handicap group or with PGA professionals. The higher the z-value of a movement parameter is indicated the higher is the deviation of the performance from the mean of the group.

Training

The SAM feedback module is an extremely powerful training tool. In the training mode each single stroke is analyzed in real time and the results are displayed on the computer screen or projected to the wall using a beamer. This way, you know immediately what was the difference to the last stroke(s) or how close the movement came to the ideal. The progress of the training session is displayed in a bar chart graph. Training reports are available for each relevant movement parameter to be trained separately.

Therapy of Yips

The SAM MotionAnalyzer allows to separate and to analyze single movement components although the complete movement is rather complex. Thus, preserved movement capabilities might be identified also inside of disturbed movements and can then be explored for tailoring an adequate and effective treatment strategy. In addition, the detailed information given by SAM PuttLab can be used to explain and illustrate specific and inadequate compensation strategies to the golfer.

1.5 Package Components

| | | |
|-------------------|---------------------------|----------------|
| | | |
| Triplet w clips* | PuttLab Basic Unit | Tripod |
| | | |
| USB Cable (3m) | 3 x CR2 Batteries | Software-CD |
| | | |
| Quick-Start-Guide | Triplet Calibration Sheet | Transport Case |

* Basic Edition: 1 clip, Standard and Fitting Edition: 2 clips, Pro Edition: 5 clips
 Pro edition includes additional parts for head and hand measurement

1.6 Soft- and Hardware Requirements

Minimum hardware requirements


- Pentium IV with at least 1.5 GHz (or comparable)
- 1 GB RAM
- CD drive (for installation)
- 250 MB free space on your hard drive
- Free USB port

Optimum hardware requirements (PC)

- Pentium IV with 2 GHz (or comparable)
- 2 GB RAM
- DVD drive (for installation)
- 500 MB free space on your hard drive
- Free USB port

Software requirements

Windows XP, Windows Vista and Windows 7 (32 and 64 Bit) are supported by SAM PuttLab 2010.

 If your system does not match the minimum hardware requirements you could get slowdowns which negatively affect the quality of the product. Science & Motion Sports takes no responsibility if the system does not work properly under lower hardware and software specifications than listed above.

1.7 Safety Warnings



About locations for usage of SAM PuttLab

- Do not place the equipment near flammable liquids such as alcohol or thinners. If the internal electrical parts come in contact with flammable liquids, fire or electrical shock may result.
- Do not place the following objects on top of the equipment. If the internal electrical parts come in contact with these objects, fire or electrical shock may result:
 - metallic objects, such as necklaces
 - containers with liquid, such as cups, vases, and flower pots

If any of these objects or liquids enter the equipment, immediately unplug the USB cable and contact your retailer.

- Do not place the equipment in the following areas. Fire or electrical shock may result:
 - Areas with high temperatures (higher than 60°)
 - Areas near flame sources
- Do not place the equipment on shaky stands, unstable surfaces or surfaces subject to frequent vibrations. If the equipment falls, it may cause injuries.
- Do not place heavy objects on the equipment. Objects may fall and cause injuries.



About the Power Supply

- Do not damage, mutilate or modify the USB cable. Do not place heavy objects on, pull or excessively bend the USB cable. Damaged wires may cause fire or electrical shock.
- Do not twist or tie the USB cable together. Fire or electrical shock may result.
- Always plug the USB cable in all the way. If it is not plugged in completely, fire or electrical shock may result.



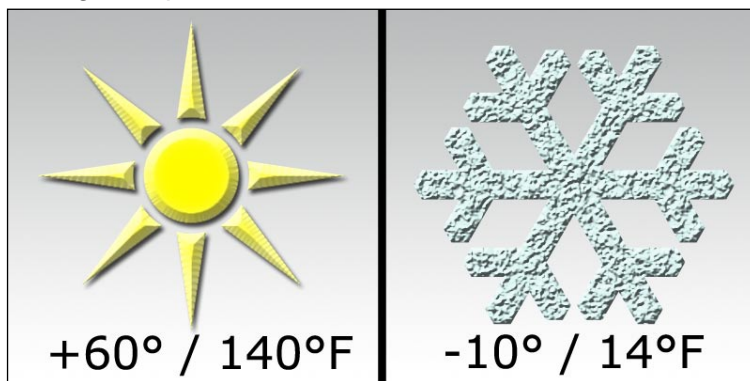
General Handling Precautions

- Do not take apart or modify the equipment. Fire or electrical shock may result from improper handling of its components.
- If you hear unusual noises, see smoke, feel excessive heat or smell anything unusual, immediately unplug the USB cable and contact your retailer. Continued use may result in fires or electrical shock.
- Do not use flammable sprays near this equipment. Also do not spill water, liquids, or flammable liquids on the equipment. If these fluids enter this equipment and contact the electrical parts, fire or electrical shock may result.
- When cleaning the equipment, use a well-wrung, water-moistened cloth. Do not use flammable liquids, such as alcohol, benzene or thinners. If a flammable liquid enters the inner electrical parts, fire or electrical shock may result.
- Do not use the supplied CD-ROM in regular CD audio players. It may produce excessively loud sound that may cause hearing damage.
- Do not attempt to service the system yourself in any manner other than described in the manual. If the cover is removed you could be exposed to lethal voltages or other hazards.
- Most of the package components are shipped inside plastic bags. These bags can be dangerous. To avoid danger of suffocation, keep the plastic bags away from babies and children.
- The batteries included in this package are not rechargeable. Do not try to recharge them.

1.8 Transport and Storage

- You can easily take the SAM PuttLab wherever you want within the original case.
- Please insert the parts into the case as they were shipped.
- Clean the system components of dust, dirt, and water sprinkles with a dry cloth before storing.
- When not in use for extended periods of time, remove the batteries from the battery clip.
- Don't store the case in a damp or wet place.
- When not in use for periods over 1 day, such as long weekends unplug the USB cable for safety.

Storage temperatures



1.9 Hardware and Software Installation

For setup and installation of hardware and software please use the "Quick Start Guide" document and follow the steps described there.

This document covers the following topics:

- a) hardware setup
- b) software and USB driver installation
- c) software start
- d) doing first measurement
- e) system calibration
- f) usage of FlexTriplet (sensor mounting on the putter)

The "Quick Start Guide" is available as printed brochure for every PuttLab system. If you don't have the "Quick Start Guide" as a printout the document is available as PDF on every installation CD and you also can download the latest version under:
www.scienceandmotion.com/downloads

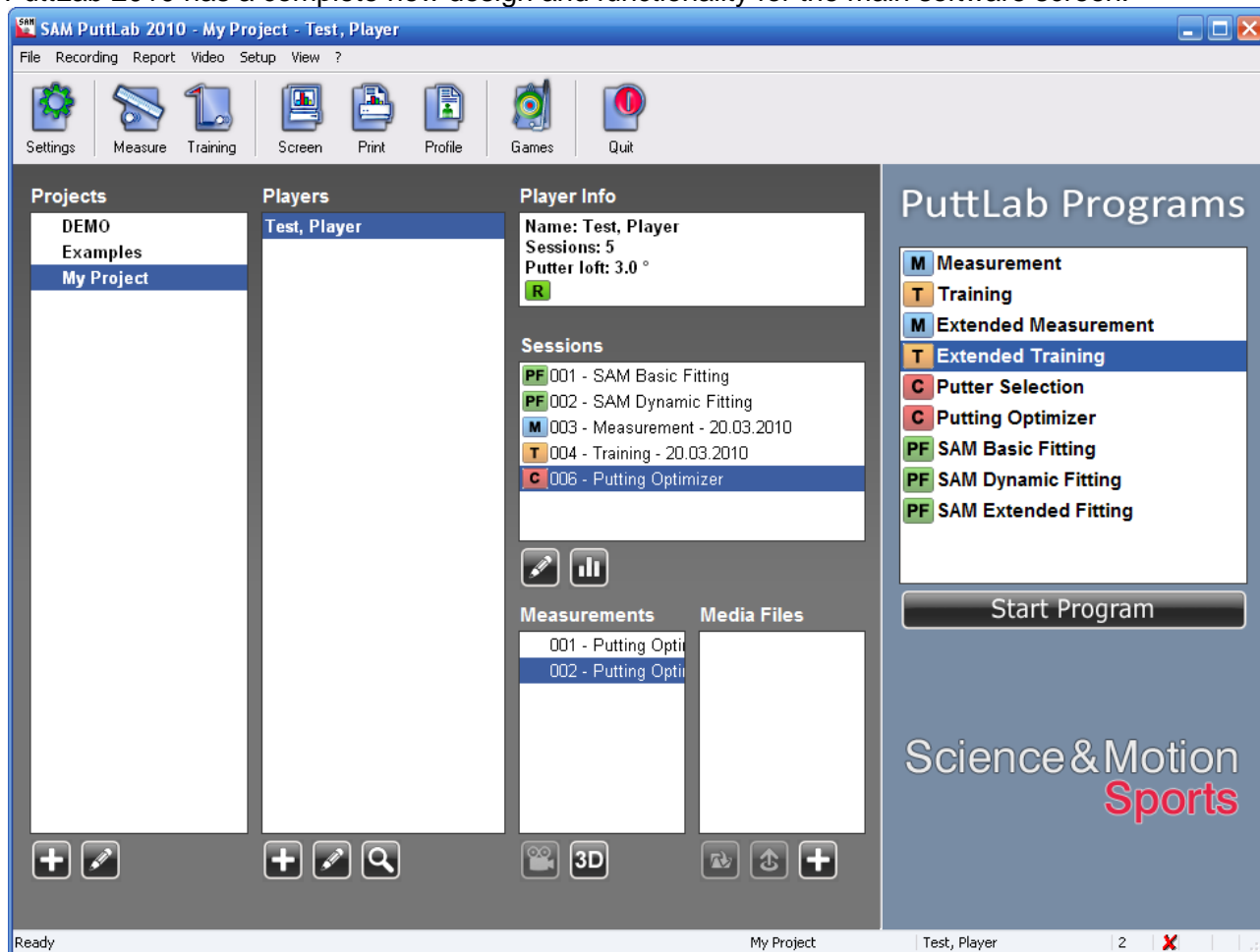
2 What's new in PuttLab 2010

PuttLab version 2010 includes a lot of new features. The main differences to the previous version 2008 are listed in this chapter to give a quick overview.

All the new features are described in detail in this manual. Just follow the links in this overview to jump to the detailed descriptions.

2.1 New software main screen design

PuttLab 2010 has a complete new design and functionality for the main software screen:



Main improvements:

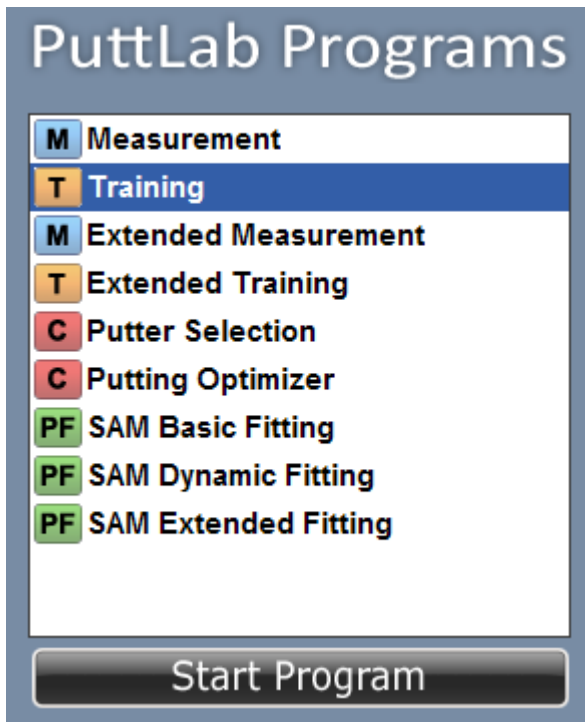
- Projects, Players and Sessions lists are bigger and always expanded to give a better overview
- Quick launch buttons allow direct access to most important functions
- Colored symbols show type of sessions (Measurement, Training, Comparison or Putter Fitting)
- Player info box shows basic information about selected player
- Move one or multiple players to different projects by drag and drop with mouse
- Double click on Session or Measurement will directly open the assigned report

Please read chapter [Using the SAM PuttLab software](#) for further information how to operate the PuttLab 2010 software.

2.2 New PuttLab "Programs" for different tasks

In PuttLab 2008 we introduced the PuttLab "Programs" as predefined putting training or analysis routines. These programs are now very much improved and completed for PuttLab 2010.

Completely new are the interactive Fitting programs (available in the Standard, Fitting and Pro Edition) and the "Putting Optimizer" Program.



New Fitting Programs:

SAM Basic Fitting:

Basic fitting program for fitting of:

- Head type (Blade, Mallet)
- Offset (single shaft, double shaft, center shaft)
- Shaft length
- Putter loft
- Putter lie angle
- Grip type (normal, medium, thick)

SAM Dynamic Fitting:

Fitting program for additional fitting of dynamic loft and lie and optimization of Basic Fitting results.

SAM Extended Fitting:

Additional fitting program for extended shaft and head weighting.

Putting Optimizer:

New comparison program to compare different putting conditions and to directly track and optimize your performance.

You can find more detailed information on the PuttLab programs here: [PuttLab Programs](#)

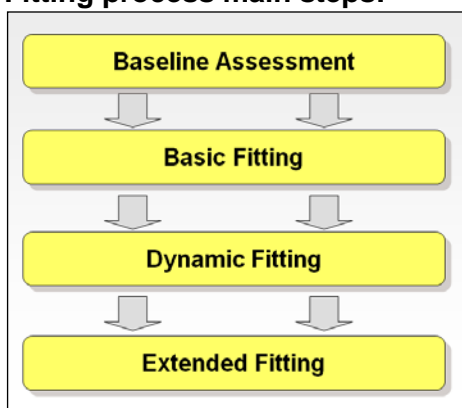
2.3 Putter Fitting module (all Editions except Basic Edition)

The Putter Fitting module provides a complete software aided process to determine all parameters to find or build the perfect putter for any individual player.

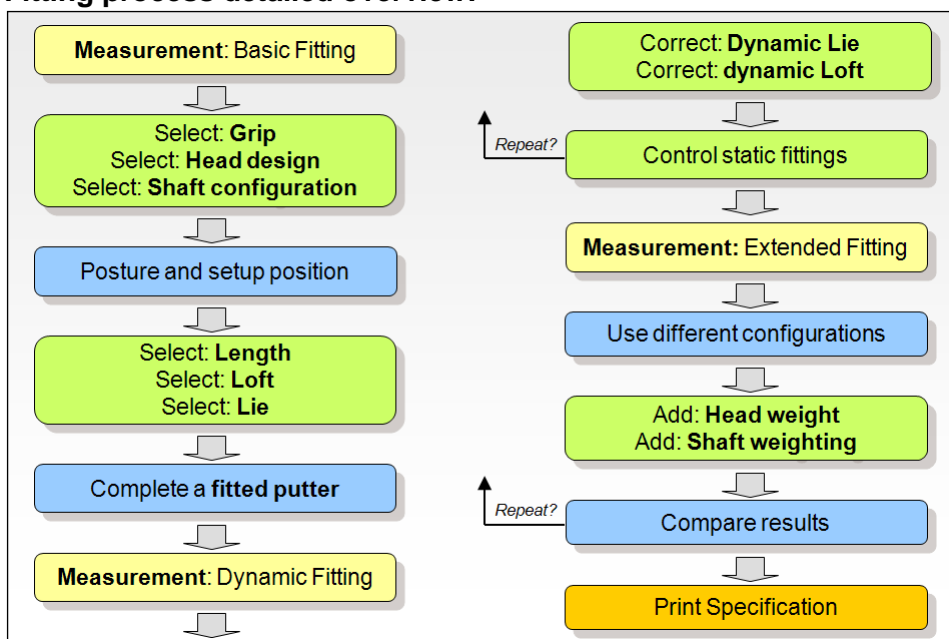
Main Features:

- The SAM PuttLab Fitting Wizard will guide you step by step through the complete fitting process
- The software will explain all necessary steps in detail
- The different aspects are decided interactively
- The software will provide automatic data analysis with recommendations for each aspect (based on PuttLab measurements)
- After the fitting a complete fitting specification can be printed
- The Fitting result will be stored in the PuttLab data and can be reviewed or even optimized at any time later in the future

Fitting process main steps:



Fitting process detailed overview:

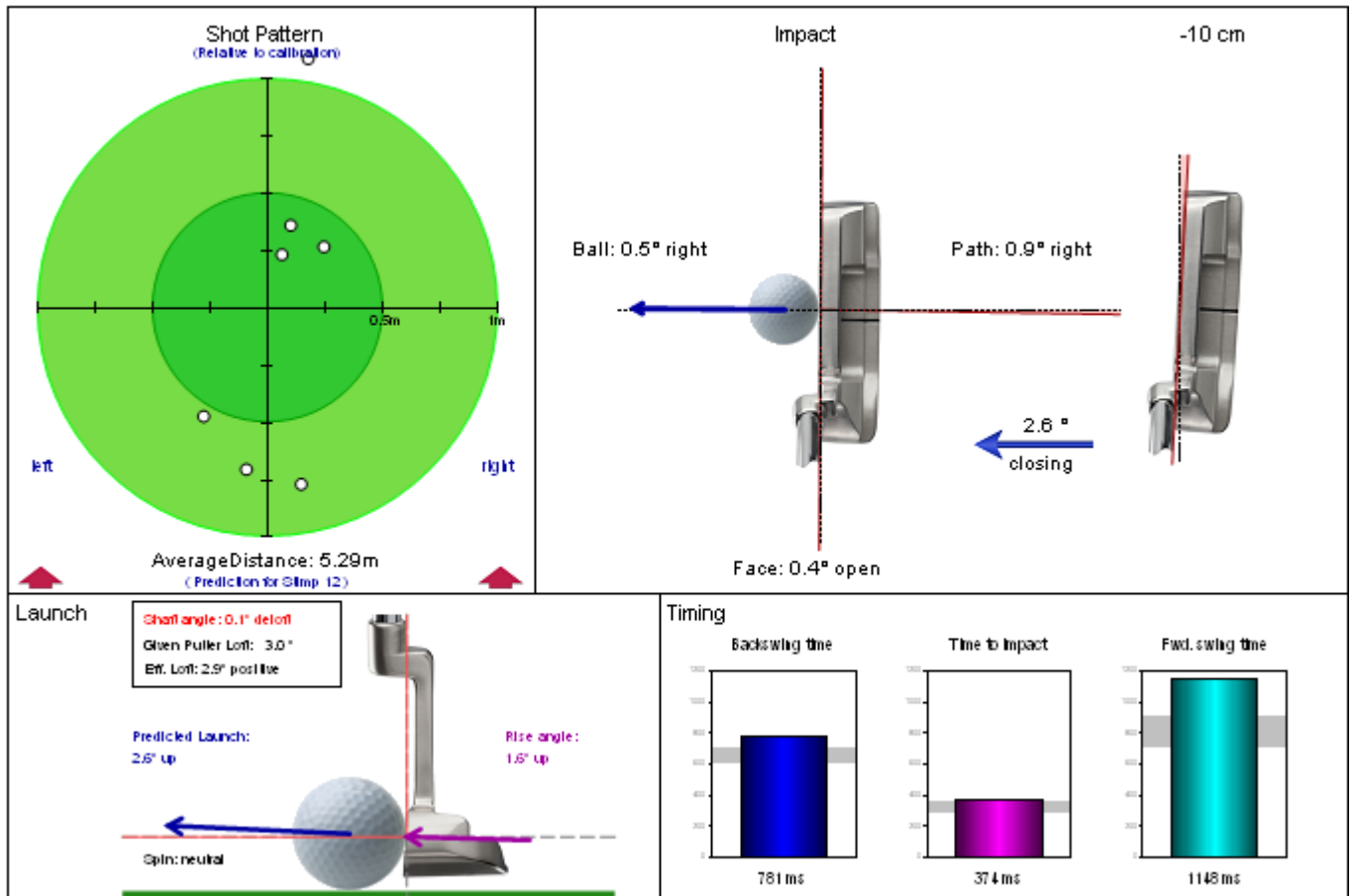


i A complete description of the fitting process is provided in the document "Fitting Manual.pdf" which can be opened from "?" section in the software main menu.

2.4 New and optimized reports

One page screen report

The new one page screen report introduces the new "shot pattern" result and gives a lot of important information on a single page.



The new report shows the following information:

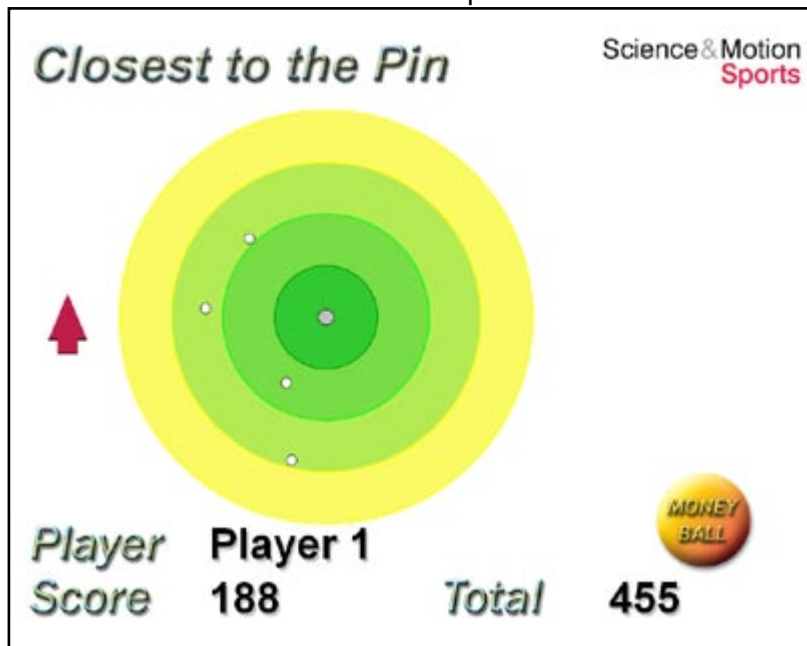
- Shot pattern – shows the spread of the ball positions based on assumption of ideal straight green and Stimp 12. Ideal ball position based on calibration direction.
- Face alignment for address and impact
- Amount of face change in backswing
- Path direction through impact
- Average ball direction
- Ball launch conditions including dynamic loft, rise angle and ball spin prediction
- Timing

All other reports are revised and several optimizations are done.

One example is the new overview start page of the Extended Screen report showing the average rating values as bar charts. This gives a good overview about technical, timing and consistency performance of the player without showing any details.

2.5 New putting game: Closest to the Pin

Based on the new "Shot Pattern" report PuttLab 2010 features also a new putting game:



How the "Closest to the pin" game works:

- the first putt is taken as a reference for direction and length
- all further putts should be played to the same position
- based on distance to the reference putt a score is calculated for each putt
- the goal is to play all putts as close as possible to the position of the first one

The player with the smallest average distance of all balls to the first ball played is the winner and will get the highest score.

This game is very good for training distance control and ball direction - and it is more fun to do this in competition to others or against the existing high score.

2.6 Improved Video and still images feature

If you have a video camera attached it is now possible to save still shots of the putting strokes putting data. The shots will be attached to the Media Files as JPG image files.

The following still shots will be saved:

1. Start of putt movement
2. End of backswing
3. Impact
4. End of putt movement

This feature is also a good documentation of your putting data as you see the player, how the setup was and also which putter he used etc.


How to set up video and the still images feature is described in detail in the [Video](#) section of this manual.

2.7 Online update check

As there will be released updates or fixpacks for the PuttLab software from time to time an automated update check function is build into PuttLab 2010 software.

The update check will be performed every 30 days after program startup. In case an update or fixpack is available the software will display a window with further information and a button that opens a website related to this fixpack. On this website you can download the fixpack and get further information on how to install it.

If a major update is available (e.g. 2012 when you are running 2010) you will also get a notification and the option to visit a website with further information.

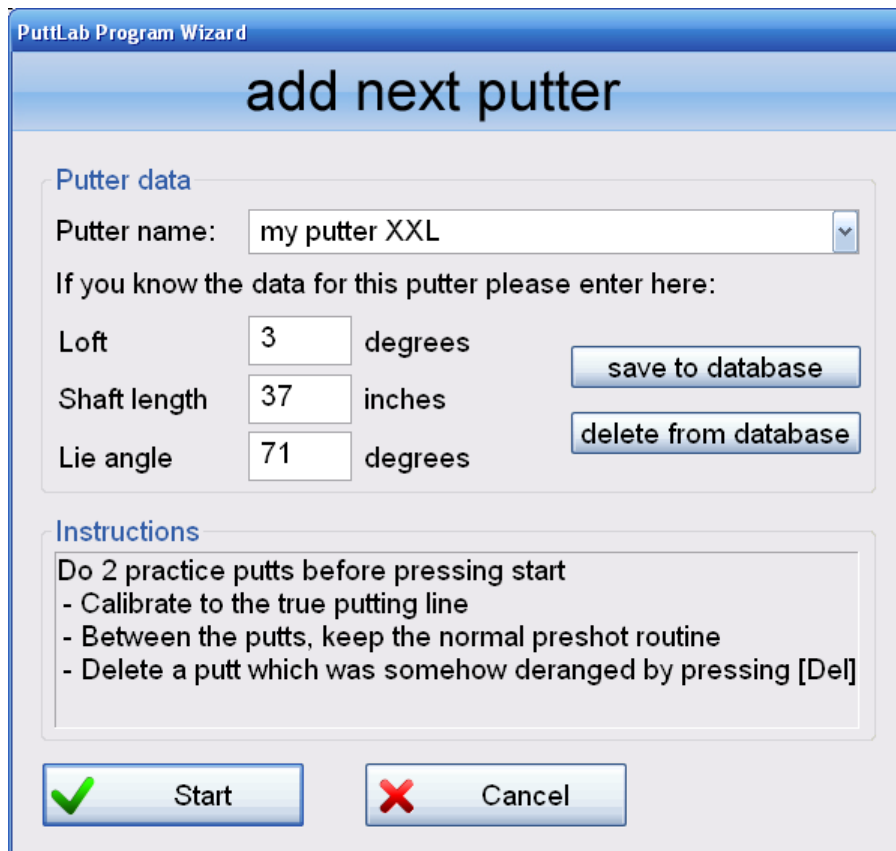
 The update check can also be performed at any time from the "?" section in the main menu. You have to be connected to the internet for a successful update check.

2.8 Putter database for Putter Selection mode

The "Putter Selection" program is a great feature to test different putters for a player and to find the best one very quickly.

Customers told us they use this regularly but have to enter the putter data all the time when they start a putter selection.

With PuttLab 2010 we now added a small putter database so that it is even more easy to use this feature for putter testing and also as a standard putter sales tool.



The screenshot shows a dialog box titled "PuttLab Program Wizard" with the main heading "add next putter". It contains a section for "Putter data" with a text input field for "Putter name" containing "my putter XXL". Below this is a section for "If you know the data for this putter please enter here:" with three input fields: "Loft" (3 degrees), "Shaft length" (37 inches), and "Lie angle" (71 degrees). To the right of these fields are two buttons: "save to database" and "delete from database". Below the input fields is an "Instructions" section with a list of instructions: "Do 2 practice putts before pressing start", "- Calibrate to the true putting line", "- Between the putts, keep the normal preshot routine", and "- Delete a putt which was somehow deranged by pressing [Del]". At the bottom of the dialog are two buttons: "Start" (with a green checkmark icon) and "Cancel" (with a red X icon).

Just enter your putter data and then press "save to database". For the next run you just have to select the putter from the list and you are ready to go.

2.9 Integration of SAM PuttStation into the software

The SAM PuttStation is a very useful extension for the PuttLab system. Especially for fixed indoor installations it makes the work with SAM Puttlab even more convenient.



The main advantage of the PuttStation is the simplified and very accurate calibration using the extendable ruler of the station (see picture). Just hold the putter against the ruler and press the calibration key and the system is perfectly calibrated.

The PuttStation is equipped with different sets of adjustable feet to ensure perfect adaption to the environment.

If the PuttStation is activated for usage in the software there are two other advantages:

- The Triplet does not have to be at the exact height on the putter shaft – so you don't need to measure the position when mounting the Triplet to the shaft
- Also the Triplet does not have to be perfectly aligned to the putting direction when the station is used for calibration.

This all makes the usage of PuttLab much more reliable and easy – especially for locations where quick change of putters or players happens (putter testing, putter fitting, multiple player evaluation in short time,...).

For details on how to operate the SAM PuttStation please refer to the manual which comes with the station. More information on how to activate the PuttStation in the software you can find in the [Program Settings](#) section of this manual.

3 First steps with SAM PuttLab

3.1 Start the SAM PuttLab software

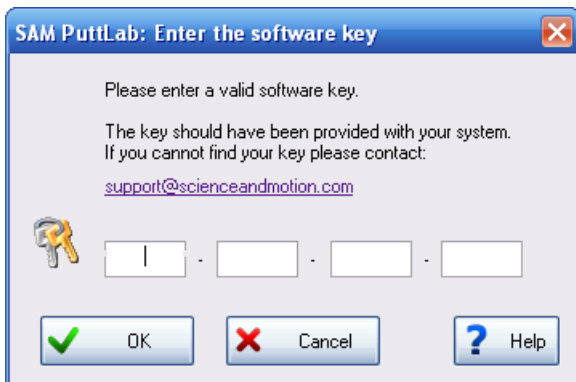
First start the software via the desktop icon. You can also start it via the Windows start menu under "Programs" > "SAM PuttLab 2010".



3.1.1 Enter the Serial Key

i Be sure to have the Basic Unit connected to your USB port before first start of the software!

When you start SAM PuttLab via the desktop-icon or the Windows Start menu you will be asked to enter the software key that comes with your copy of the software:



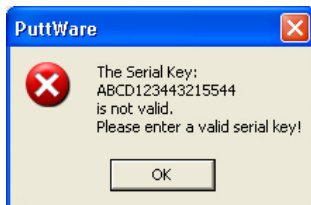
The serial key is either provided as a printout you find in the PuttLab package or provided by email.

i The key which is provided to you is a unique number for your product. Please keep it in a secure place.

After input of the software key the software will check if the right Hardware is connected to your PC (by checking the serial number of the basic Unit).

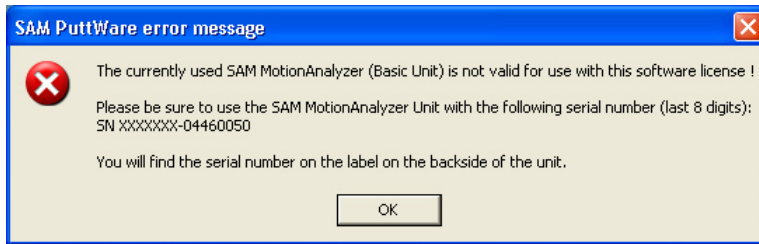
If you get an error message after the serial key input this can have several reasons:

- 1) Input of wrong serial key



Please re-check the input with the number on your serial label (on the backside of the CD sleeve).

- 2) The connected Basic Unit is not the right one

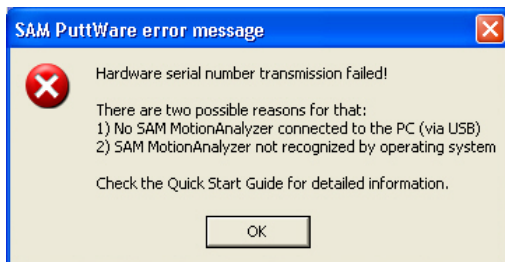


The software is registered to a dedicated Basic Unit (by serial number assignment of the hardware). After input of the serial key the software will check if the right unit is connected to the PC.

If the numbers doesn't match, the software will generate the error message shown above. This can only happen if you have more than one hardware devices and have interchanged them or if a mistake happened in the delivery of the system components.

So please check if the basic Unit with the requested serial number is available to you and connect it to the PC that you are working with. If you do not have the requested Basic Unit please contact the Science&Motion support (support@scienceandmotion.com).

- 3) No Basic Unit connected to the PC **or** connection between PC and Basic Unit does not work



Be sure the Basic Unit is connected to your PC via USB port.

If this is the case please check if the green lamp on the Basic Unit is lighting. You find the little lamp inside the grey pad on the downside of the system (see image):



If the lamp does not light, either a hardware defect occurred or the driver installation was not finished successfully.

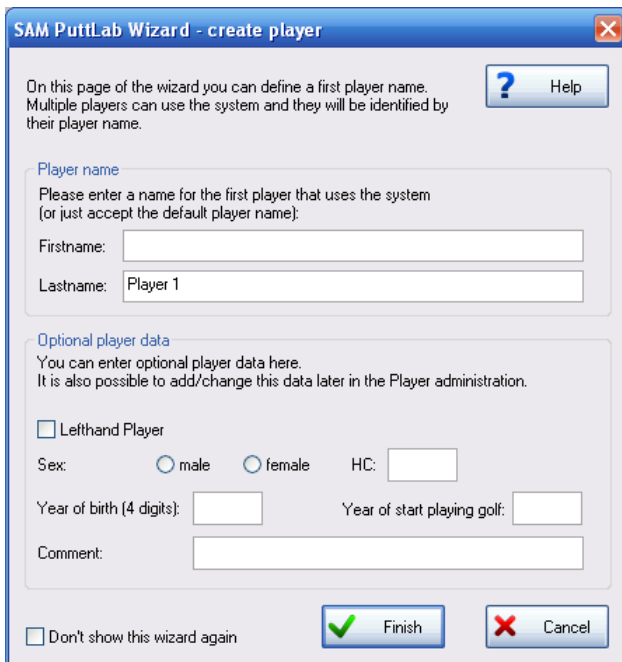
3.1.2 SAM PuttLab Wizard

1. The first time you start the software the "SAM PuttLab Wizard" pops up. In the first window he helps you creating your first *Project*. For detailed information on *Projects* click the "Help" button.



SAM PuttLab Wizard – Create a project

2. On the second window the wizard helps you to create your first *Player*. Follow the information given by the wizard page. By clicking the "Help" button you get more information on *Players*.



SAM Wizard – Create Player

i You can manage *Projects*, *Players* and measurement data with the data management tools within SAM PuttLab. The chapter [Data management](#) explains how. If you don't want to view the wizard on next start up just check the box at the lower left of the wizard window. Once you successfully created a *Project* and a *Player* the wizard will not show up again.

3.2 Quick Overview of Project and Player Management

The PuttLab data is organized in a hierarchical structure with different levels.

Data Management is very important if multiple people are using one SAM PuttLab, for example for training purposes.

A practical usage of the Data Management will allow to find, compare and export measurement and training data in a comfortable way.

The Data Management consists of four main levels.

1. Projects

This is the top level layer of the Data Management. A *Project* can hold multiple *Players*. You need to create *Projects* to separate different sets of *Players*.

2. Players

Players will contain all the data recorded during measure- and training sessions. So each measurement or a training session will be assigned to the currently selected *Player*. A *Player* also can be assigned a lot of additional data like loft of putter, handicap, age, etc.

3. Sessions

Sessions will contain your measurement data and also attached media files and videos (if available). A new *Measurement* or *Training* will automatically start a new *Session*, so you do not have to do this manually.

One *Player* can hold up to 999 *Sessions*. A double-click on a *Session* will open the assigned Report.

4. Measurements

One *Session* can hold up to 999 data sets of measurement or training. These data sets can be viewed or printed out (via reports) and exported (to a PDF document).

So it's easy to keep an overview of all the data you achieved during months or years of training if you manage your data in a practical way.

The "SAM Wizard" helped you to create your first *Project* and *Player* when you started SAM PuttLab for the first time.

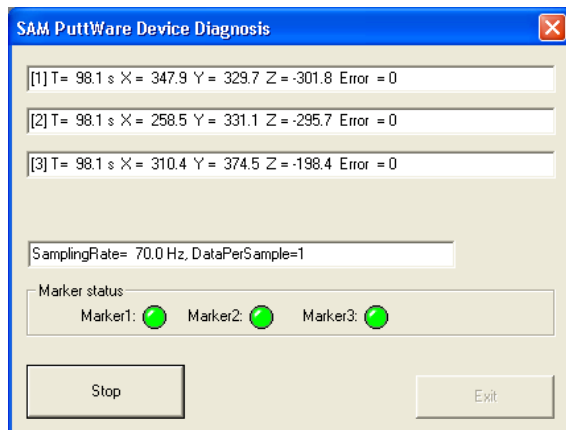


You cannot record measurements or view data without having a *Player* selected.

3.3 Check System Functionality

The PuttLab software includes a test dialog for checking the hardware functionality.

- a) Attach the triplet to your putter and connect it to the battery clip
- b) Attach the battery clip to the right side of your trousers and turn it on by pressing the button.
- c) In the Main Screen of the software open the menu entry "Setup" and select "Device diagnosis". The following screen appears:



- d) Move the club with triplet (or triplet alone) in front of the basic unit.
- e) The front side of the triplet has to point into the direction of the basic unit.
- f) Move the triplet around at a distance of 50 to 100 cm to the basic unit and check if all three signal lights (Marker1 to Marker3) turn green. If this is the case the system is OK. The signals should stay green while moving around in the normal operational area. If one of the signal lights shows in red, one of the sensors (ultrasonic markers) of the triplet is probably defective.



i It is normal that the lights turn red or gray in the display if the system is not switched ON (check lamp on the battery clip, it must be green) or if one of the sensors is out of the measuring range (distance > 100cm or angle > 80 degrees to one side)

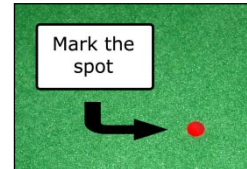
Afterwards close the "Device diagnosis" screen by clicking the "Exit" button.

3.4 First Measurement

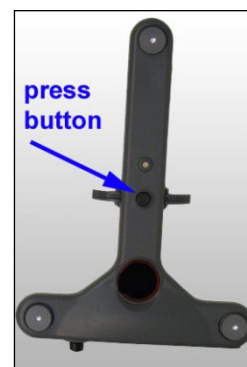
- a) Select the 'Measure' icon from the toolbar to start your first measurement (or just press the F5 key). The "Start measurement" screen opens. Give your measurement a description (optional) and click the "Start" button. The measure screen opens.



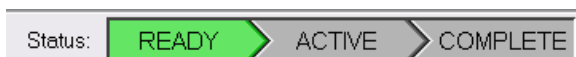
- b) Mark the spot from where you make all your putts (use chalk or a sticker). Then place a golf ball exactly on the spot.



- c) Now move with your golf club in front of the Basic Unit and press the button on the Triplet to switch it on (The LED on the Triplet should turn green.). The "No Data Signal" text box disappears and you can see the motion of your golf club as animation on the display.



- d) Now you need to calibrate your system. Please read the complete chapter [Calibration](#) or the "Quick Start Guide" for details.
- e) After you successfully calibrated the system you can start putting in front of the basic unit. Hold the club head still for 2 seconds before each putt in the calibrated address position until the "Ready"-signal on the screen turns green. Then do your putt!



- f) Verify on the mid-section of the measure screen if your stroke was successfully recorded.



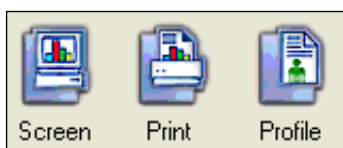
- g) Repeat steps "e" to "f" until all trials are recorded (default = 5 trials). The measure screen closes and your result report is displayed automatically.

3.5 Open a Result Report

After finishing your measurement a report is displayed. There are different reports to choose from as pre-selection, depending on whether you are conducting a measurement or a training session.

- In measurement mode the report will be displayed directly after you accomplished your last stroke.
- In training mode you get instant feedback on your last stroke and can change aspects of your stroke analysis during your training strokes.

You also have the option of selecting a specific measurement via the "Data Selection" bar on the main screen (read chapter [The Main Screen](#) for more details on the main screen) and then choose a report through the "main menu" or click one of the following icons in the toolbar:



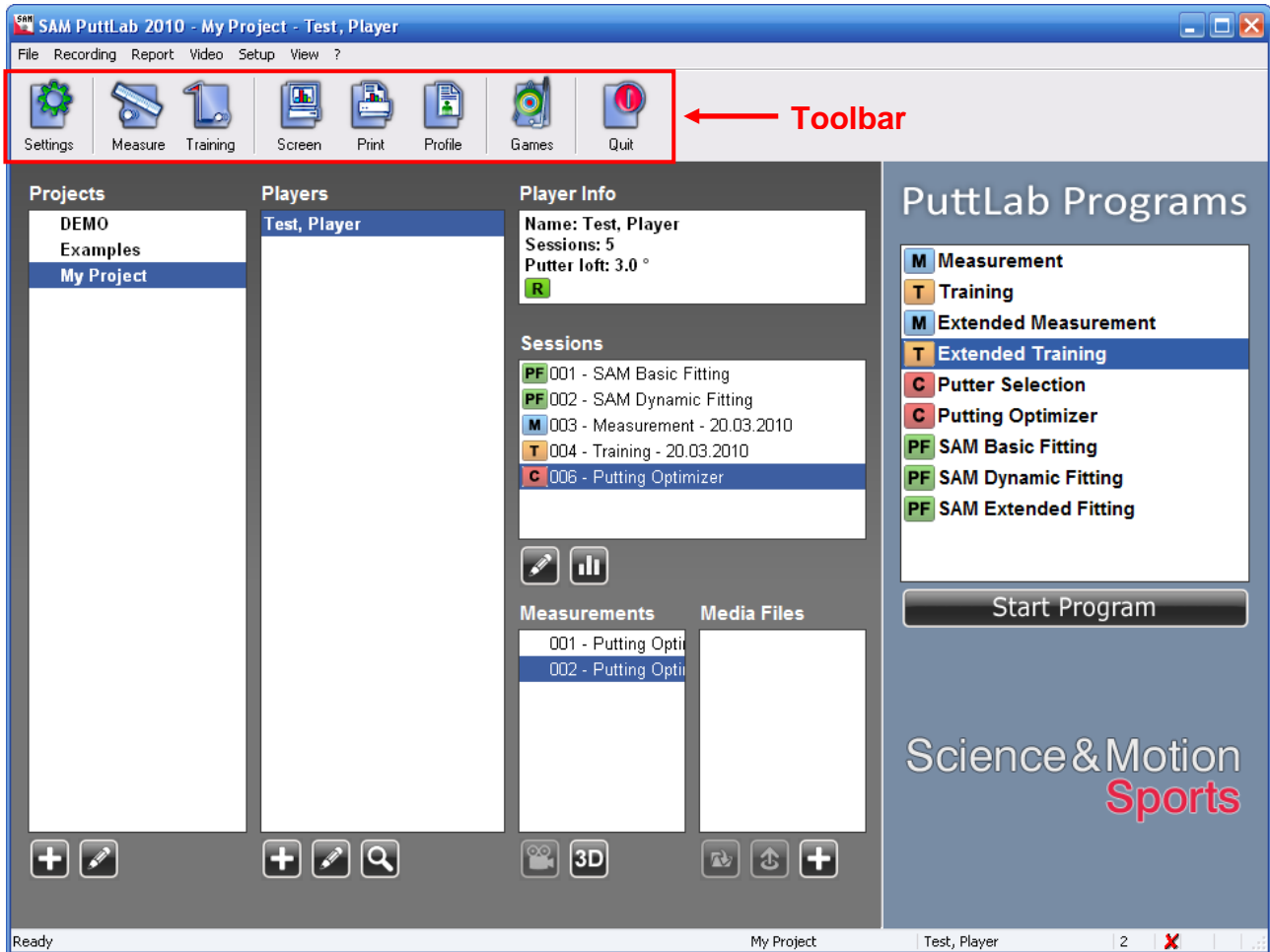
- "Screen" reports are optimized to be displayed on your computer display (printout is not possible).
- "Print" reports are optimized to be printed out and can be exported as a PDF document.
- "Profile" reports create a competence profile or to compare data sets against others (e.g. yourself to data of PGA Pros or a players' performance with different putters)

i The chapter [Viewing the Results](#) provides more detailed information on the report view windows and their functionality.

4 Using the SAM PuttLab software

4.1 The Main Screen

4.1.1 Organization of the Main Screen



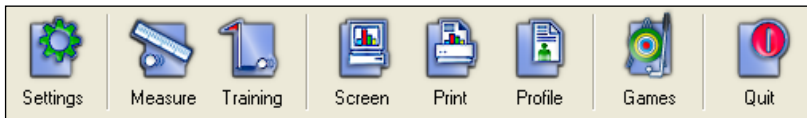
SAM PuttLab 2010 Main Screen*

*Depending on your product edition of SAM PuttLab the Screen may look slightly different.

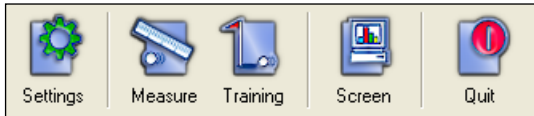
SAM PuttLab can mainly be operated using the main screen controls:

- The most important functions can be executed using the **toolbar** which is positioned directly below the menu.
- On the left side you can see the **Data Selection** area (gray background) where *Projects*, *Players*, *Sessions* and measurement data can be selected.
- The **Puttlab Programs** bar is positioned at the right of the program window (blue background). It displays all the available predefined PuttLab recording programs.
- All other functions can be accessed from the menu.

4.1.2 Toolbar



Toolbar SAM PuttLab Standard / Pro



Toolbar SAM PuttLab Basic

Settings – The main settings for your measurement and training sessions. Read chapter [4.4](#) and [4.5](#) for further details on settings and calibration.



Here you can change the way SAM PuttLab is calibrated before each session.

Measure – Starts a new measurement session. In "Settings" you can predefine the number of strokes to be recorded (trials). Read chapter [Measurement](#) for further details on "Measure."

Training – Starts a new training session. In a training session you get an instant graphical feedback of your last stroke. Up to 99 putts in a row can be recorded in one training session. Read chapter [Training](#) for further details on "Training".

Screen – Different reports based on the measurement data. These single page reports are optimized to be viewed directly on your computer display.



Read the document "SAM PuttLab Reports" for further information on Reports. You can open the document directly from the "?" menu

Print, Profile – Different result reports with different topics to choose from. Optimized to be printed out as multiple-page documents. These reports can also be exported to PDF format. Read the document "SAM PuttLab Reports.pdf" for further details on "Reports". You can open this document via the Windows Start menu in the Program Files / SAM PuttLab section or directly out of the software in the Help menu.

Not available in SAM PuttLab Basic!

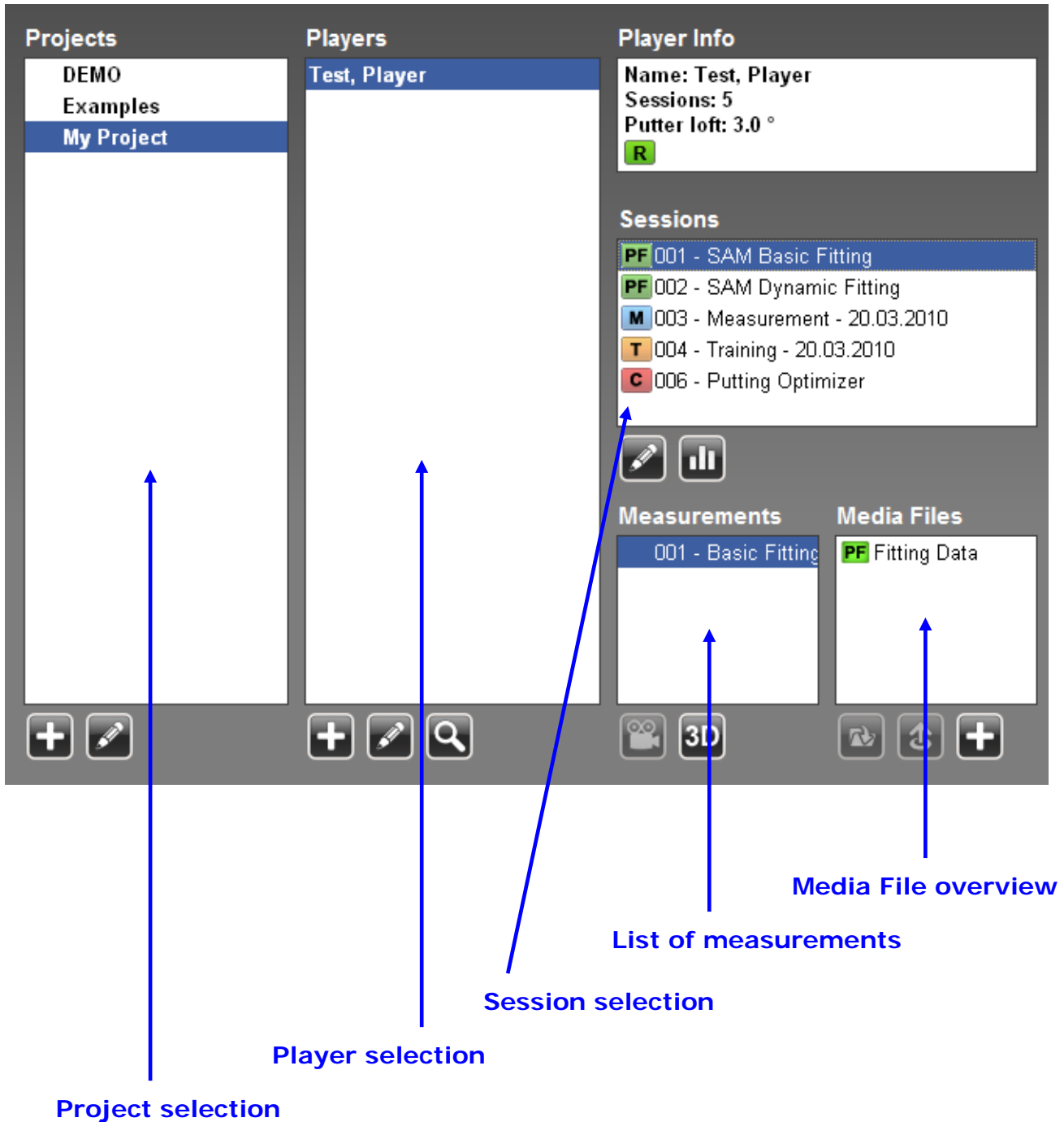
Games – Start the Games Module. Read chapter [Putting Games](#) for further information about the available games.

Not available in SAM PuttLab Basic!

Quit – Exit "SAM PuttLab."

4.1.3 "Data Selection" area

The data selection area in allows a quick selection of *Projects*, *Players*, *Sessions* and measurement data.



In the PuttLab software the recorded measurement or training data is assigned to *projects*, *players*, *sessions* and *measurements*. This allows to organize the data in a structured way.

Measurements contain up to 99 putts

Sessions can contain one or multiple *measurements* depending on the type of recording that was done. Additionally it is possible to add *media file* attachments to sessions manually or automatically.

Players contain sessions and player data. The player data includes name, email, handicap and other data assigned to the payer.

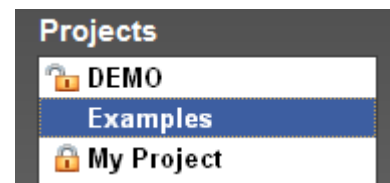
Projects are structures to group multiple players.

i Please read the next chapter [Data management](#) to get a detailed description of all aspects of setting up the data management in a proper way.

In the selection lists for Projects, Sessions and Media Files you may see symbols left to the items – they show additional information about the specific item:

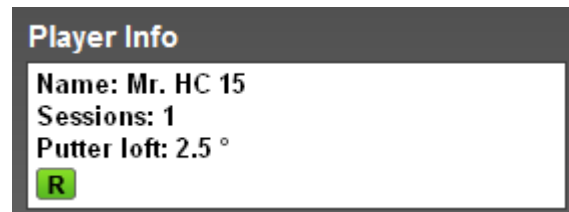
Project selection listbox:

Password protected *Projects* will show a lock symbol, if the password is already entered, the lock will be open, otherwise it is closed.



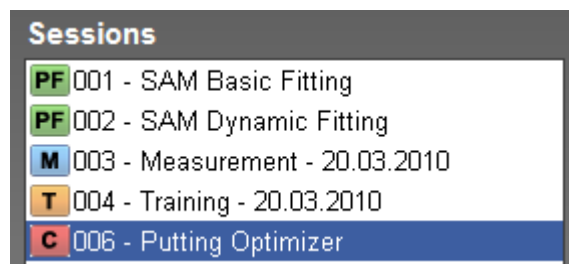
Player Info:

The Player Info box shows basic information from the selected player:
Displayed will be the player name, the number of available sessions and if it is a lefthand (L) or righthand player (R).



Sessions listbox:

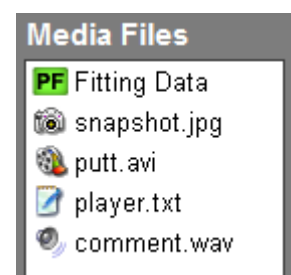
In the Session Listbox the symbols show the type of the recording:
M = Measurement
T = Training
C = Comparison (e.g. Putter Selection)
PF = Putter Fitting



Media Files listbox:

The medial listbox contains all the media files attached to a recording session. The type of the file is shown by the symbol. There are symbols available for four different file types:


- Video files (avi, wmv, mpeg)
- Audio files (wav, mp3)
- Documents (doc, pdf, txt)
- Image files (bmp, jpg)
- Putter Fitting data (PF)




Basic operations in the *data selection* area:


Projects listbox:

Two buttons placed below the **Projects** selection listbox allow you to create new projects or to edit projects.


 opens the dialog to create a new project


 opens the dialog to edit existing projects

Players listbox:


 create a new player


 edit existing players


 search for players by last name

 delete players


Sessions listbox:


 opens the dialog to edit the currently selected session

 open result report assigned to the currently selected session


 A double click on a Session will directly open the Report associated to this Session.


Measurements listbox:


 this button is only active if the videos are assigned to the selected measurement. A click on the button will start the video replay.


 the 3D button will open the 3D replay window for the selected measurement.

Media Files listbox:

 open the currently selected media file. Video files will be opened in the PuttLab video player, all other files will be opened with the program associated to the file type.

 export a media file to any folder or drive. An explorer window will open to select the target drive and folder.

 add media files manually.

 A double click on a media file will open the file in the associated windows program. So you just need to double click on a file to see the picture, play the video or read the document.


4.1.4 PuttLab Programs

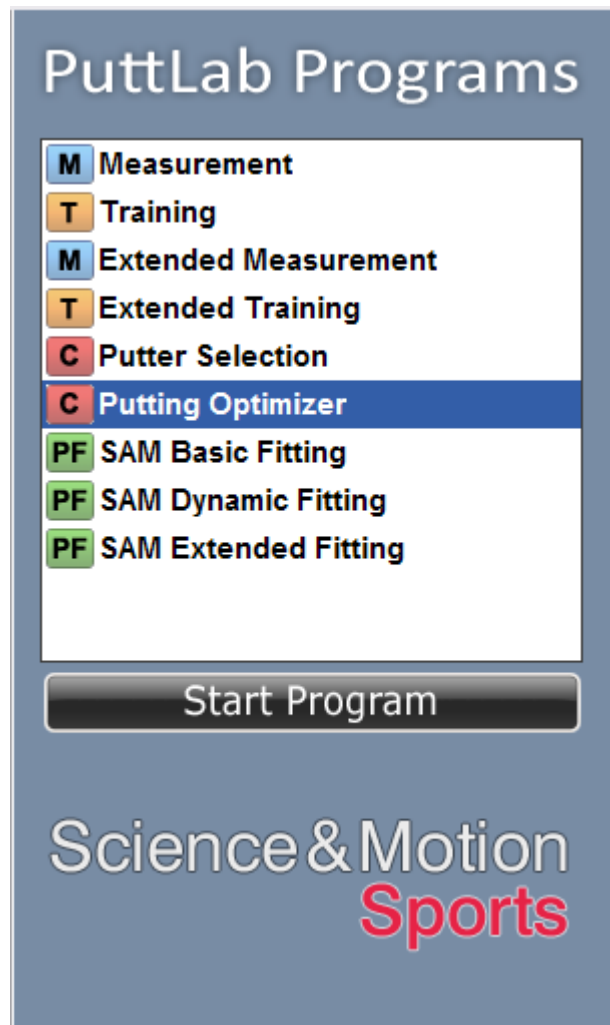
On the right side of the screen you find the **PuttLab Programs** selection bar.

PuttLab Programs are predefined putting sessions for different tasks:

Measurement/analysis
Training
Putter Selection
Comparison (Putting Optimizer)
Putter Fitting

A double click on the program will start the process.

 In chapter [Predefined Putting Programs](#) you can find a detailed description of the programs and how to operate them.



4.1.5 Main Menu Items

Menu FILE

Manage Projects, Manage Players, Manage Sessions

Management of your *Projects*, *Players*, and *Sessions*:

- Add, delete or edit *Projects*.
- Add, delete or edit *Players*.
- Edit or delete *Sessions* or data sets.

Read chapter [Project management](#) for further details.



| File | Recording | Report | V |
|-----------------|-----------|--------|---|
| Manage Projects | | F2 | |
| Manage Players | | F3 | |
| Manage Sessions | | F4 | |
| | | | |
| Export data | | | |
| Import data | | | |
| | | | |
| Exit | | | |

Export data

This option extracts measurement result data into compressed data files (.CAB format). These files can be used to import the data to another PC with SAM PuttLab installed or to a different *Project* on the same PC.

It is also possible to send the files via email for remote analysis of the data (e.g. to your coach or to Science&Motion).

The data export can be done for:

- complete *Projects* (all *Players* and data of a *Project*)
- complete *Players* (all data and file attachments for one specific *Player*)
- or single *Sessions* (single recording sessions of one *Player*)

The export/import functions can also be used for data backup.

A detailed description of the data export process is described in Chapter [Export result records](#).

Import data

Imports data files which are generated with the "Export data" function. The data can be added to an existing *Project* or to a new one.

A detailed description of the data import process you can find in Chapter [Import result records](#).

Exit

Closes SAM PuttLab.

Menu RECORDING

Here you can start measurement or training sessions.

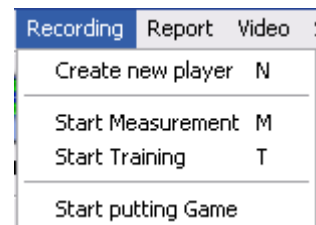
Start Measurement or **Start Training** will start a session.

Further details about Measurement and Training can be found in chapters [Measurement](#) and [Training](#).

Start Putting Game will start the Games Module of PuttLab.

The games combine serious training and fun. We have three great games implemented into the SAM PuttLab yet.

Further information on the available games you find in chapter [Putting Games](#).



| Recording | Report | Video | : |
|--------------------|--------|-------|---|
| Create new player | | N | |
| | | | |
| Start Measurement | | M | |
| Start Training | | T | |
| | | | |
| Start putting Game | | | |

i Games are not available in SAM PuttLab Basic edition!

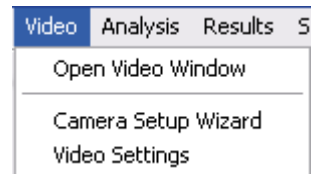
Menu REPORT

This menu will present all result reports that are available on your system. Clicking on one of the entries will open the result report for the currently selected *Project*, *Player*, and *Session*. Read the document "SAM PuttLab Reports.pdf" for further details on "Reports". You can open this document via the Windows Start menu in the Program Files / SAM PuttLab section or directly out of the software in the Help menu.

Menu VIDEO

Since version 2008 PuttLab contains a video recording and replay module.

The menu for video offers the functions for setup and operation of your video camera and recording. The PuttLab software provides video recording, playback, saving snapshots as image files and overlay drawing functions.



Open Video Window

Opens the main video window for recording and playback. See chapter [The video main screen](#) for detailed description of all the features.

Camera Setup Wizard

The "Camera Setup Wizard" will allow easy step by step configuration of your camera. See [Setup your video camera](#) for details.

Video Settings

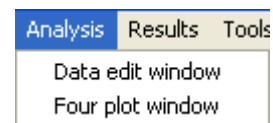
Opens a dialog for specific settings, see [Video recording settings](#) for details.

Menu ANALYSIS

 *Only available in SAM PuttLab Pro edition!*

Data edit window and Four plot window

These options allow to display and edit the recorded data sets in a very detailed mode. See chapter [5.2](#) for detailed description.

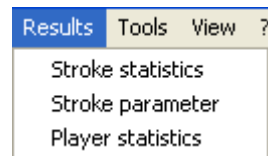


Menu RESULTS

i Only available in SAM PuttLab Pro edition!

Stroke statistics

Creates and shows a database table of all available Measurements of the current selected *Player*. For every single measurement the mean values and the standard deviation values for all trials will be calculated and displayed. See chapter [Stroke statistics](#) for detailed description.



Stroke parameter

Creates and shows a database table of all available strokes in the current selected measurement record. All raw data values for the single stroke will be displayed. See chapter [Stroke parameter](#) for detailed description.

Player statistics

This function creates and shows a database table with all the numerical mean and standard deviation data of multiple pre-selected *Players*. See chapter [Player statistics](#) for detailed description.

Menu SETUP

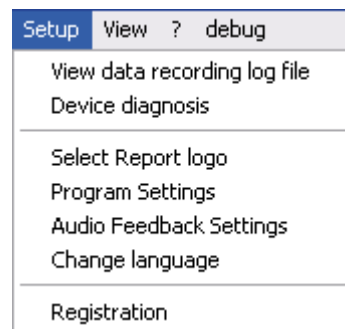
The Setup menu provides different functions to control the behaviour of the SAM PuttLab software and diagnosis of the hardware:

View data recording log file

The system creates log files during each Measurement or Training session. This log files include detailed information about the single steps of the recording process and the putt stroke detection. The file can be used for analyzing purposes in case of problems.

Device diagnosis

Opens the "device diagnosis" window. Here you can check if the system hardware is working properly:



See chapter [Check System Functionality](#) for details.

Select Report logo

SAM PuttLab now provides the option to place individual logos on the print reports instead of the standard PuttLab logo. This dialog will allow to set different logos and also to import user generated logos into the software. See chapter [Individual report logos](#) for details.

Program Settings

Opens the program settings dialog. See chapter [Program Settings](#) for details.

Audio Feedback Settings

The 2008 version of PuttLab includes a new *Audio Feedback* module for the Training mode. This would allow to get acoustical feedback instead or in parallel to the feedback in the report (visually).

- allows training without having to look on a computer screen

- allows training of two parameters in parallel, one with acoustic and one with visual feedback
More details on functionality and configuration can be found in chapter [Audio Feedback](#).

Change language:

If there are different languages installed on your PC you will see all available languages in a listbox. You can select one of the languages and the program will startup again in the new language.

Registration

This will open the Registration Dialog. See Chapter [Registration](#) for more information on how to register your software for one or multiple PuttLab units, or how to upgrade to another program edition.

MENU "?"

Here you can access this operation manual as online PDF document, the "Quick Start Guide" document, and the "Troubleshooting" guide.

SAM PuttLab operation manual

This will open the online operation manual of the SAM PuttLab. This document provides a full description of the functionality of the system and the software.

Show Quick Start Guide

This will open the "Quick Start Guide" document in the PDF Viewer. This is the same document that is delivered as printout with your SAM PuttLab.

Show Report Manual

This will open the "SAM PuttLab Reports" document in the PDF Viewer. In this document you can find brief descriptions of all available report views of SAM PuttLab.

Show Fitting Manual

This will open the "Fitting Manual" document in the PDF Viewer. In this document you can find information how to use and run the Fitting Programs of SAM PuttLab.

Show tip of the day

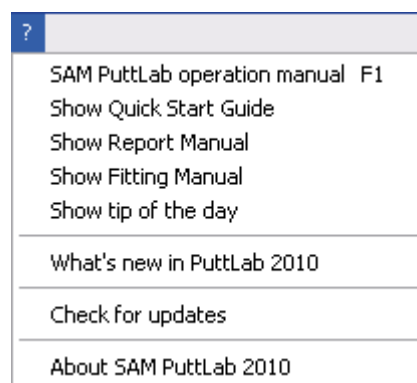
The "tip of the day" dialog displays useful information for special features of the software. You can open and activate this window here.

Check for updates

After clicking on this option the software will gather update information via internet and will display if a fixpack or major update is available. The window showing the update information will also feature buttons with links to Science&Motion website with further information regarding download and install of fixpacks or updates.

About SAM PuttLab

This will open the "About SAM PuttLab" dialog. You can find information about the software version and your software license (program edition) in this dialog.



4.2 Data management

Data management is very important if multiple people are using one SAM PuttLab, for example for long term training purposes. With a proper data management setup it will be easy to analyze, compare or printout data taken from several *Players* over the time.

The data management in SAM PuttLab consists of four main data levels:

1. **Projects:**
This is the top level layer of the Data Management. A *Project* can hold multiple *Players*. You need to create *Projects* to separate different sets of *Players*.
2. **Players:**
Players will contain all the data recorded during measurement- and training sessions. So every measurement or a training session will be assigned to the currently selected *Player* (and *Project*).
3. **Sessions:**
A *Session* is a container for putting data and attachments. So it is possible to bundle together putting data with files and information. The attached files can be videos, audio files, PDF files, pictures or just text documents.
Sessions will be started automatically on start of a measurement or training – so the user does not have to deal with creating sessions.
4. **Measurements:**
One *Player* can hold up to 999 data sets of measurement or training sessions. Every data set can hold up to 99 strokes, so it is possible to store over 98000 putt strokes for one *Player*. The content of the data sets can be viewed on the screen or printed out (via reports) and exported (to a PDF document or database).

So it's easy to keep an overview of all the data you recorded during weeks or months of training if you know how to set up your data management in an effective way.

The "SAM Wizard" helped you to create your first *Project* and *Player* when you started SAM PuttLab for the first time.

Now it's time to manage everything by yourself...

4.2.1 How to set up the data management in a practical way

The main rule is to create a *Player* for every person that should be working with SAM PuttLab. All the data from the recordings of this person are stored into this *Player* (if it is selected before).

It is possible to create all players in one *Project*, but there are some good reasons why it may be better to distribute the data to multiple *Projects*:

- **Special events** – If you use the SAM PuttLab for a special event, like a presentation or a tournament it might be good to have the data of this event inside one separated *Project*.
- **Big amount of *Players*** – If you plan to record data from over 100 *Players* it would make sense to split these *Players* to multiple *Projects* because otherwise the data handling will be very complex (e.g. very long listbox for *Player* selection).
- **Multiple instructors** – If multiple instructors use the system for their training it will make sense to have at least one *Project* for every instructor to avoid mixing up of the data. In this case the *Project* name can be the name of the instructor, so it will be a clear structure.

So the setup of the data management depends also on how the system is used. It is possible to have the same *Player* names in different *Projects*, but these *Players* are then completely independent from each other.

4.2.2 Media file attachments

The "Media File Attachment" feature allows to add and archive any media or document files to your putt sessions easily. The different types of files will be detected automatically and can be opened just by clicking with the mouse.

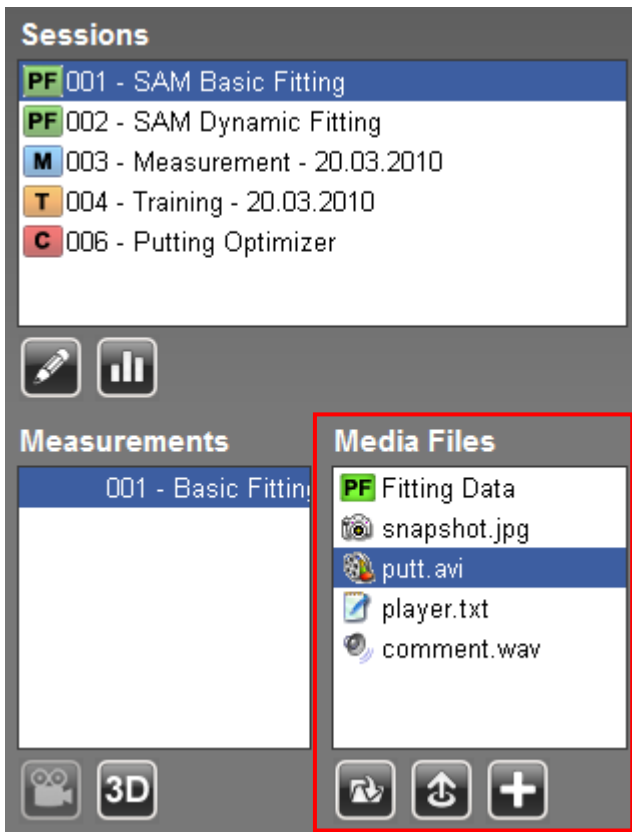
The files can be:

- Video files (avi, wmv, mpeg etc.)
- Audio files (wav, mp3)
- Pictures (jpg, bmp, etc.)
- Documents (pdf, doc, txt)
- Any other files you like to archive with your putting sessions


Examples how to use this feature:

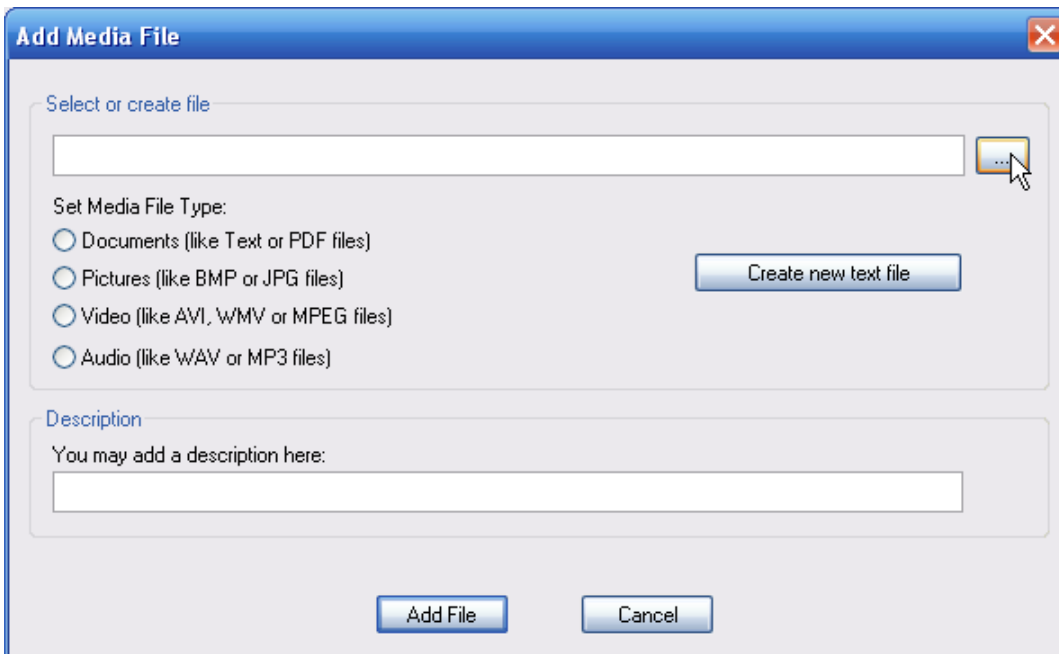
- Easily add text comments or pictures to your training sessions. This will be a great help remembering players and situations when you look up the data later in the future.
- Add videos for each putt and also get information on body movement together with the PuttLab recorded data.


Screenshot of "Media Files" section:




Add a media file:

Press the  button. The "Add Media File" dialog will open up and let you select a file



The Add Media File dialog let you browse your file system by clicking the  button. Select the desired file and the software will automatically try to detect and select the file type. If this does not work you can specify the file type manually by clicking one of the radio buttons.



By clicking the button  you can start a new text document. A text editor window will open and let you write your text comment. Text attributes like font type, font size and color can be set in the editor.

On "Save" the document will be saved in RTF format. This format can also be opened by Microsoft Word or other programs.

It is possible to add a optional description to the media attachment file. This is just to have additional information in the listing of the files in the "Manage Sessions" dialog.


Open / review a media file:

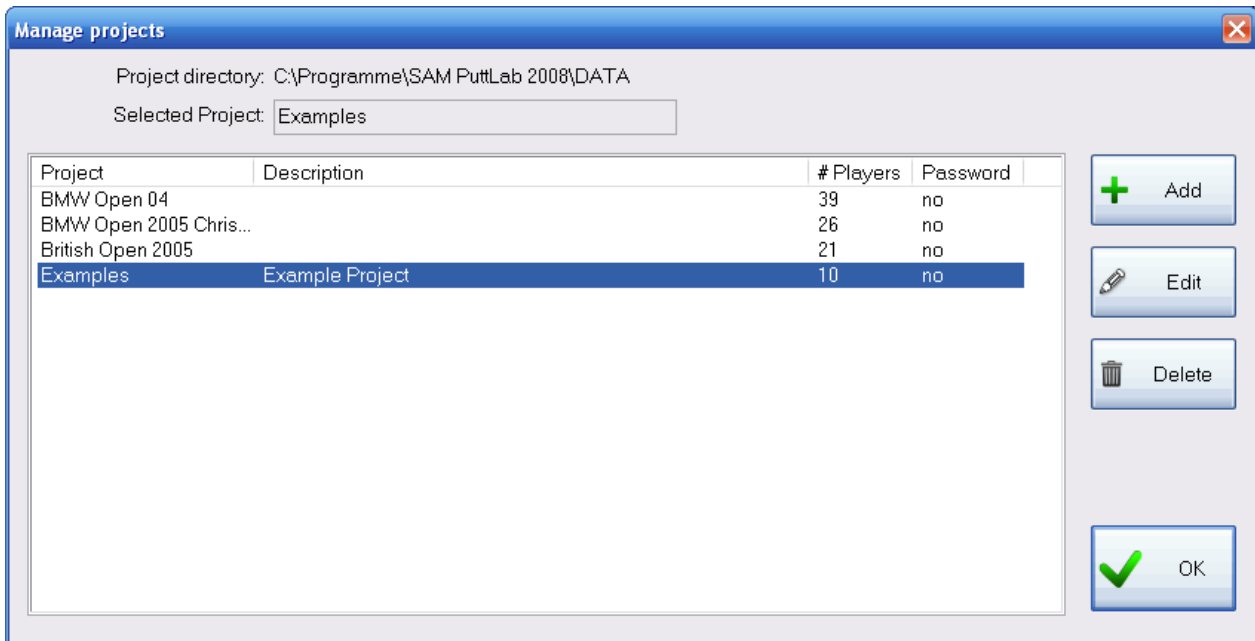
To open or view a media file just double click it in the list or use the "Open" button. The file will be opened with the associated program, for example a video file might be opened with the Windows Media Player, a picture with the installed picture viewer and so on.

Delete media files:

To delete the media files go to the "Manage Sessions" in the "File" section of the main menu. Go to [Session management](#) for details.

4.2.3 Project management

To enter the "Manage projects"-windows just press [F2] or press the  button below the project selection list. Also a double click on any Project in the list will open the Project Management:



Manage Projects window

Explanation of the Manage Project window:

In the table view you will see a list of all your available *Projects*.

Project Name of the *Project*

Description Description of the *Project*

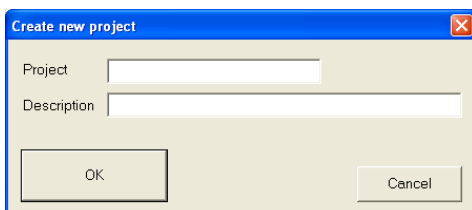
Players Number of *Players* within this *Project*

Password no: the project is not password protected, yes: the *Project* is password protected



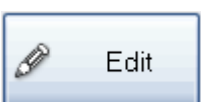
Add / Create a new Project

By clicking on the "Add" button you can create a new *Project*. The following window appears:



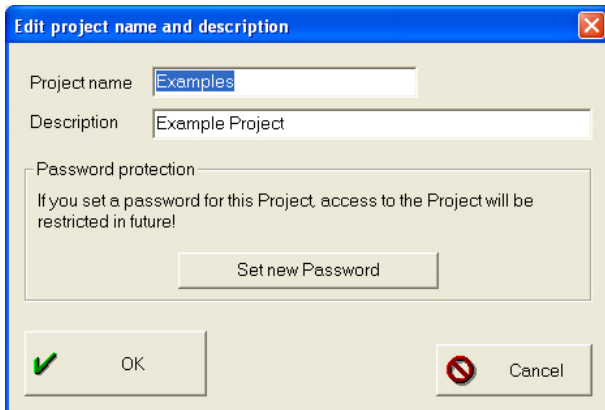
Create new project

Give your *Projects* a meaningful name in order to easily find players or data sets later. Good *Project* management is essential, especially in training schools. Additionally, you can give your new *Project* a short description (optional).



Edit Project description

By clicking on the "Edit" button you can edit the name and the description of a *Project*. The following window appears:

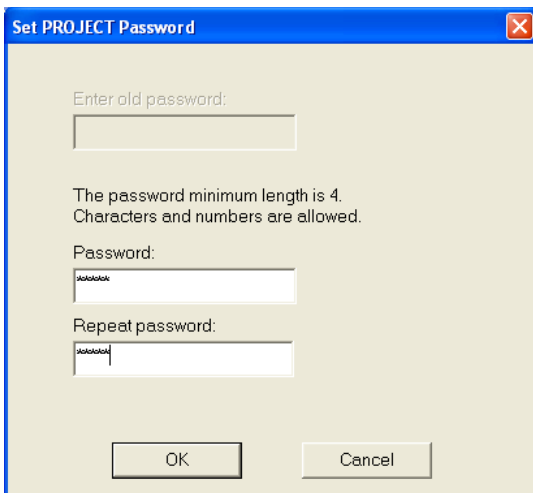


Edit project dialog

In the field "Project name" you can change the name of a *Project*. Also the "Description" can be changed.

Additionally the password settings for this Project can be managed. If the Project currently has no password a password can be set with the "Set new Password" button. If the Project is already password protected the password can be changed or removed.

Set a new password



The password has to be entered twice. Minimum length is 4 digits, allowed are characters and numbers.



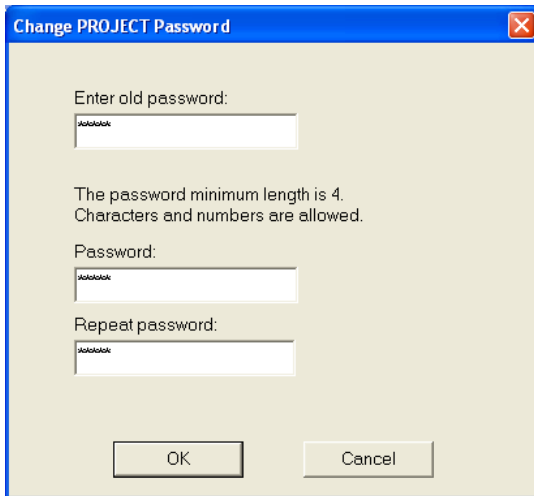
Tip: If you use the same password for multiple Projects all these Projects will be unlocked at the same time. So you don't have to enter a password each time you switch between the Projects.



Please note: If you set a password for a Project this Project is permanently locked. You will need the password to access any data included in this Project. So keep your passwords at a safe place! If you forget a password, contact Science&Motion for a master password (info@scienceandmotion.com).

Change or remove a Project password

To change or remove a password go to the Project Management, select the Project and choose "Edit". The following dialog will open:



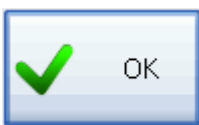
To **change** the password first enter the old password and then two times the new password. Minimum length is 4 digits, allowed are characters and numbers.

To **remove** a password enter the old password and leave the fields for the new password empty. Then press OK and the password is removed.



Delete a Project

With this button you can delete *Projects*. *Projects* must be empty before you can delete them. In the "Manage projects" window you can see how many *Players* are in a *Project* by means of the value below the "<#>"-symbol.



Close window

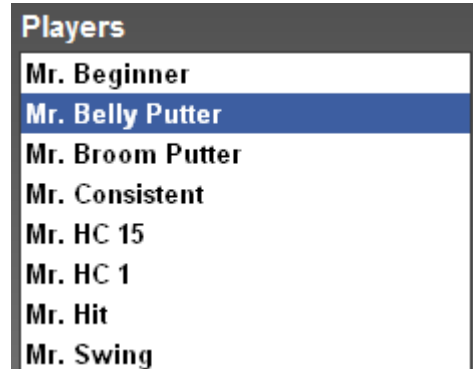
By clicking this button you will select the highlighted *Project* and return to the main menu.

4.2.4 Player management

The players are listed in the "Players" listbox on the main screen.

To select a player click on a Player with the mouse.

The buttons below the listbox provide functions related to the player management:



i To see the details of a player or edit the player information just double-click on a player in the list. The "Edit player" window will open and show all the details.

Add / Create a new Player

By clicking on the "Add" button you can create a new *Player*. The following window appears:

"Create a new player" window

In this window you can specify the name of the *player*, gender, handicap, birth year, years playing and an additional comment. New fields specify some attributes of the putter: Shaft length, putter loft and putter lie.



The value for the putter loft is important because it is used in the calculation of the "ball spin" and launch conditions. If you do no input in this value on creating a new player the default value of 3 degrees putter loft will be used!



While creating a *player* you also define if the *player* is left-handed by checking the box "Lefthanded *player*". In training and measurement the stroke recognition will be automatically flipped when you select a left-handed *Player*.

After you fill out the form, click "OK" to create the *player* or to take over the changes.



Edit player data

Select a *player* in the list and click the "Edit" button to view or change the data of the *player*. The edit window can also be opened by a double-click on a player. See the previous section for Add player for details on the player data input.



Delete a player

With this button you can delete a *player*.

Please note:

If you delete a player also all available data will be deleted!
For this reason there will be a warning and you need to confirm the action.
Once a player is deleted the data cannot be recovered!




Search for a player

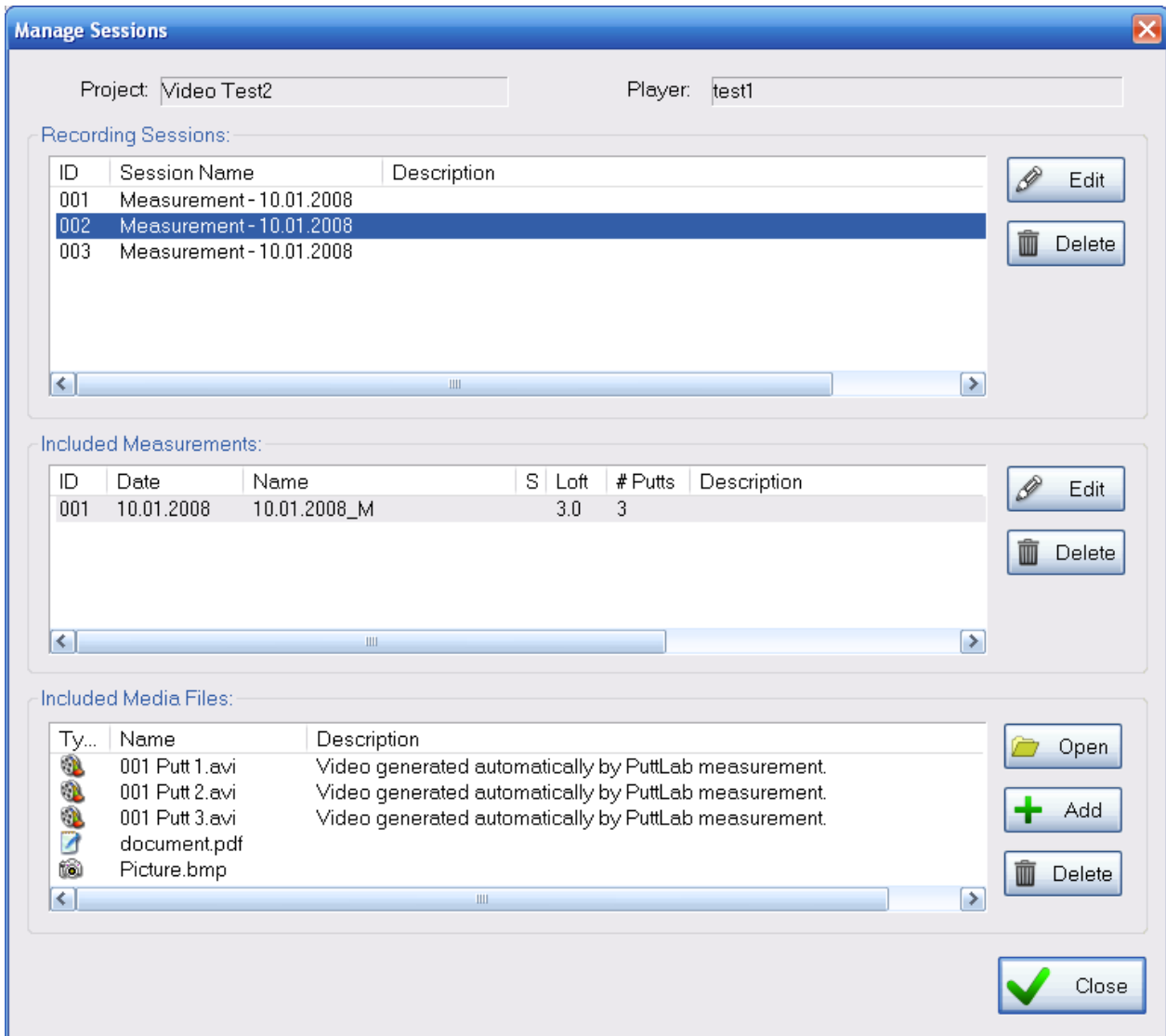
The player search allows you to find a player by entering the lastname into the search field. All player that match the entry will be listed – so if you start with entering the letter "b" all players with lastname starting with "b" will be listed. If you enter further characters the search result will just show players who match the entered characters.

This search will be done over all projects – so you will be able to find players in all projects. This is important to avoid having players spread over multiple projects or to find players if you don't remember in which project they have been created.

4.2.5 Session management

i Sessions are containers to hold the putting data (measurements) and additional information like file media file attachments. Measurements are the result data records that are generated in the Measurement and Training sessions. One Measurement can include result data from multiple strokes (up to 99).

To enter the "Manage Sessions" window just press [F4] or the button  below the session selection list:



"Manage Sessions" window

The "Manage Sessions" dialog is splitted into 3 areas:

a) Recording Sessions

Recording Sessions itself can be edited or deleted.



Edit

Edit Session name or description



Delete

Delete selected Session including all measurement data and attachments.

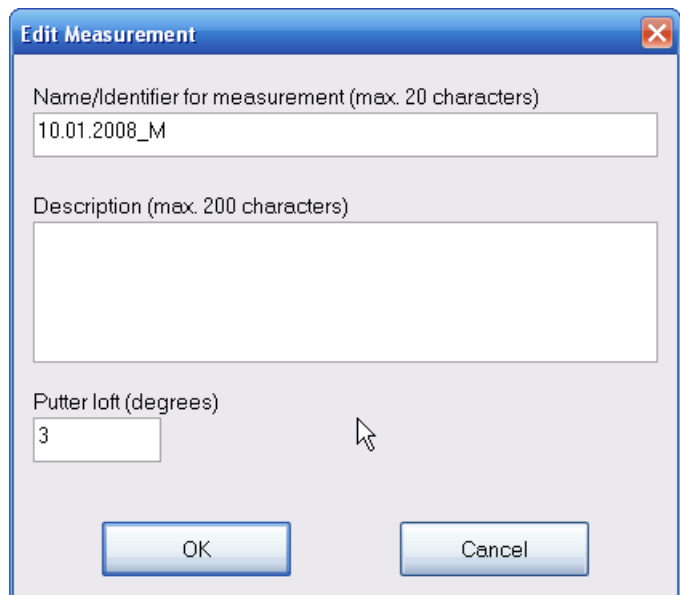
b) Included Measurements

Lists all Measurements included in the currently selected Session. Measurements can be edited or be deleted



Edit

Edit Measurement name and description. Also allows to change the value of the putter loft for this measurement subsequently:



The value for the putter loft is originally taken from the player data for each measurement and will then be stored into the measurement data. The value attached to the measurement data will be used for the calculation of the ball spin and launch in the side view report.

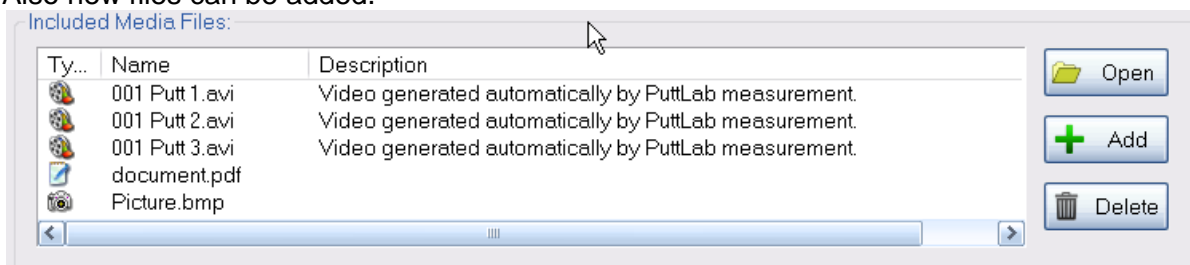


Delete

Delete selected measurement record.

c) Included Media Files

Lists all Media Files attached to the currently selected Session. Files can be reviewed or deleted. Also new files can be added.



4.2.6 Export result records

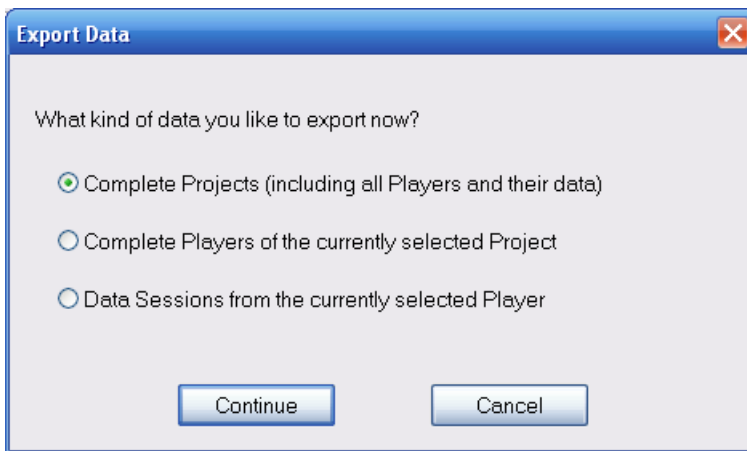
The data export module of SAM PuttLab allows to export selected data sets into compressed ZIP files. This functionality can be used to either transfer data to different PuttLab installations or to backup data for later usage or recovery.

There are 3 levels of data export available:

- Complete projects (including all data and attachments)
- Complete players (including all data and attachments)
- Single data sessions

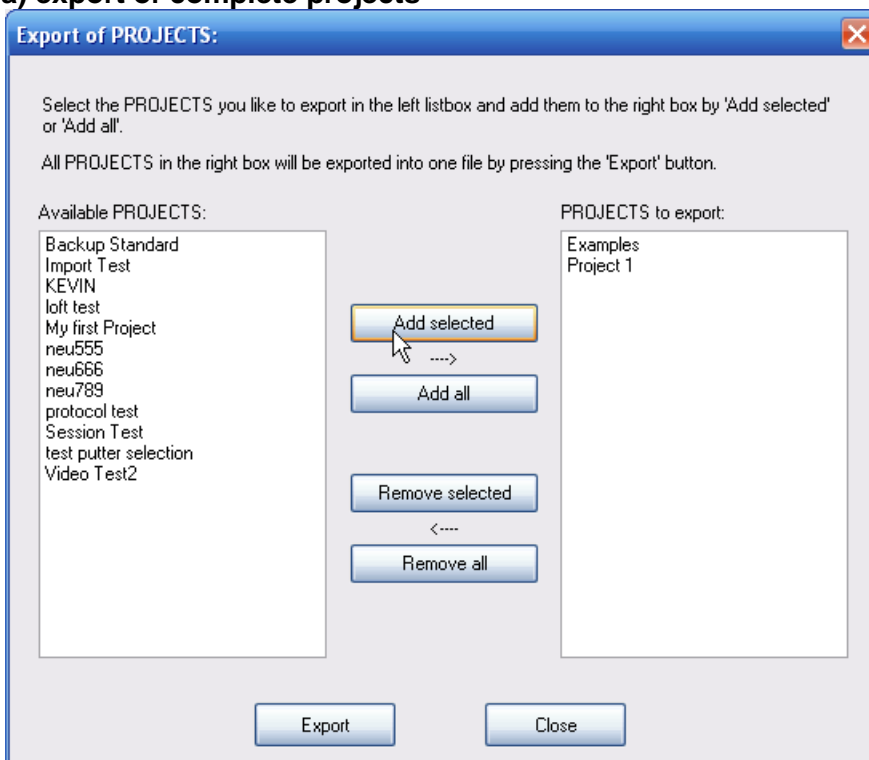
How to export result records:

Go to the section "Export data" in the main menu section "File". A dialog window will open up:



You have to choose what kind of data export you like to perform.

a) export of complete projects



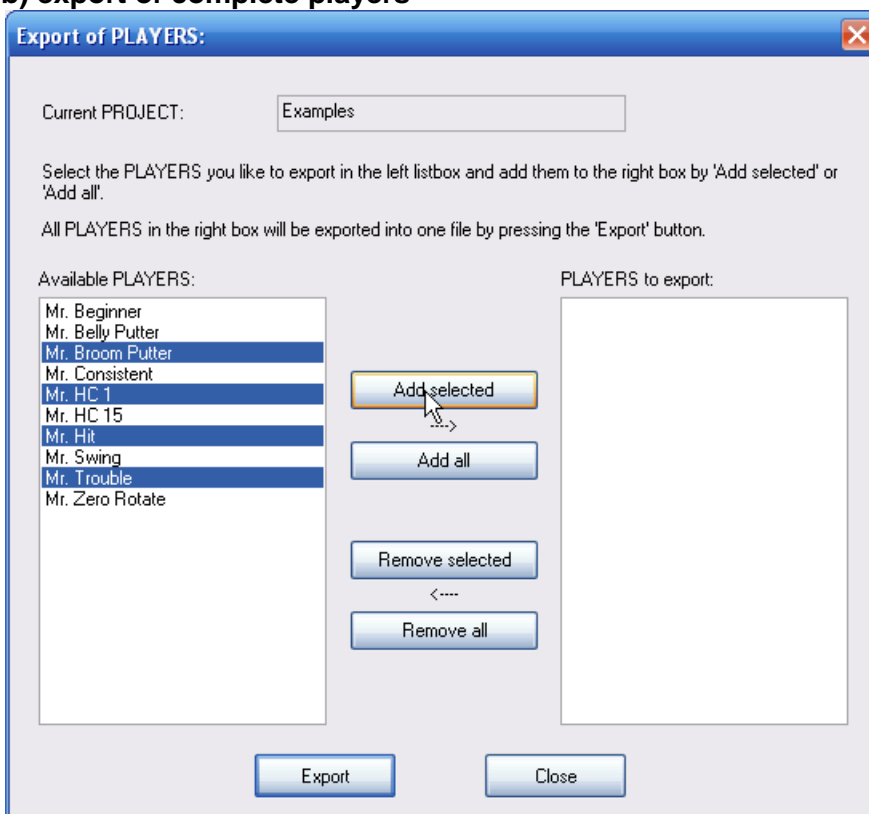
In the left list you see all available projects. You can select projects and add one by one or you can select multiple projects in the left list and add all selected projects by "Add all".

When you now press "Export" a "Save as" dialog will open up to let you define a file name and location for the resulting ZIP archive file.

All player data included in the exported projects will be copied to this compressed file and can be restored later on the same or a different PuttLab installation (SAM Puttlab 2008 or newer).

i Depending on the amount of measurements and also the number and size of attached media files the total size of all files to export may be very big. In this case you will see a warning that the export process may take a while to finish. The export process cannot be cancelled once it has started. So please be patient and wait until the process is finished!

b) export of complete players



In the left list you see all available players of the currently selected project. You can select players and add them one by one or you can select multiple players in the left list and add them all together by "Add all".

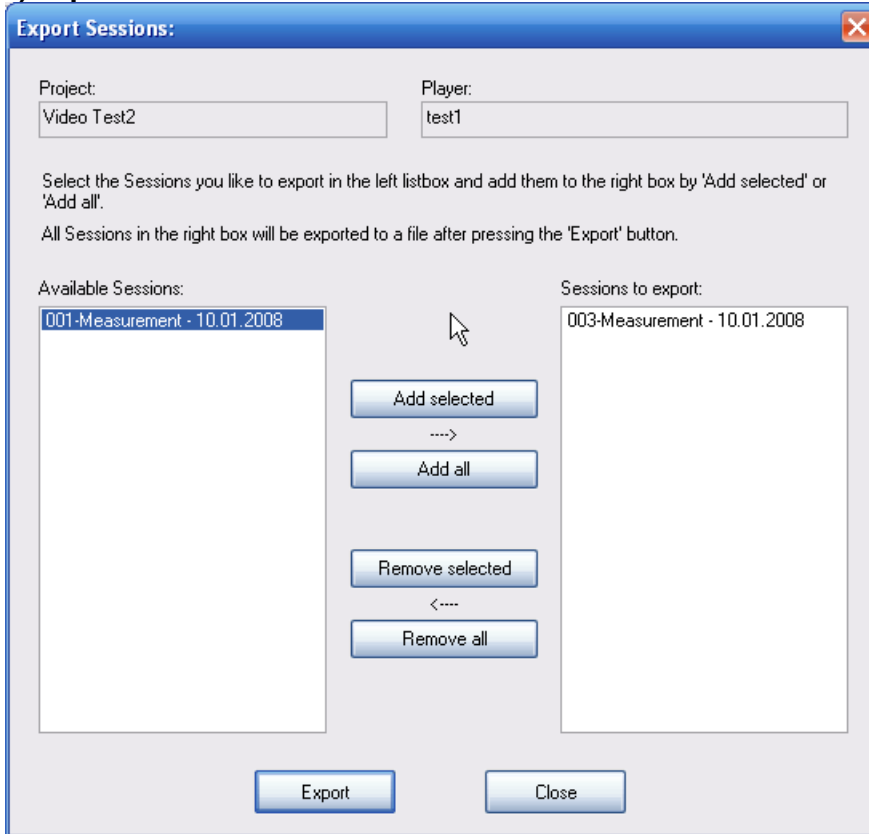
When you now press "Export" a "Save as" dialog will open up to let you define a file name and location for the resulting ZIP archive file.

All data of all players listed on the right side will be exported to this compressed file and can be restored later on the same or a different PuttLab installation (SAM Puttlab 2008 or newer).

i Depending on the amount of measurements and also the number and size of attached media files the total size of all files to export may be very big. In this case you will see a warning that the export process may take a while to finish. The export process cannot be cancelled once it has started. So please be patient and wait until the process is finished!

i Exporting complete projects is the best way to backup your data. It is easy to even export all available projects into one export archive for easy full backup. It may be good to split into one file per project if there is a big amount of data available over time. So one file would be too big to hold all the data.

b) export selected data sessions



In the left list you see all available sessions of the currently selected project and player. You can select sessions and add them one by one or you can select multiple sessions in the left list and add them all together by "Add all".

When you now press "Export" a "Save as" dialog will open up to let you define a file name and location for the resulting ZIP archive file.

All data of all players listed on the right side will be exported to this compressed file and can be restored later on the same or a different PuttLab installation (SAM Puttlab 2008 or newer).

The information to which project and player these sessions belong is also saved in the export file and can be recovered during the import process.

i Depending on the amount of measurements and also the number and size of attached media files the total size of all files to export may be very big. In this case you will see a warning that the export process may take a while to finish. The export process cannot be cancelled once it has started. So please be patient and wait until the process is finished!

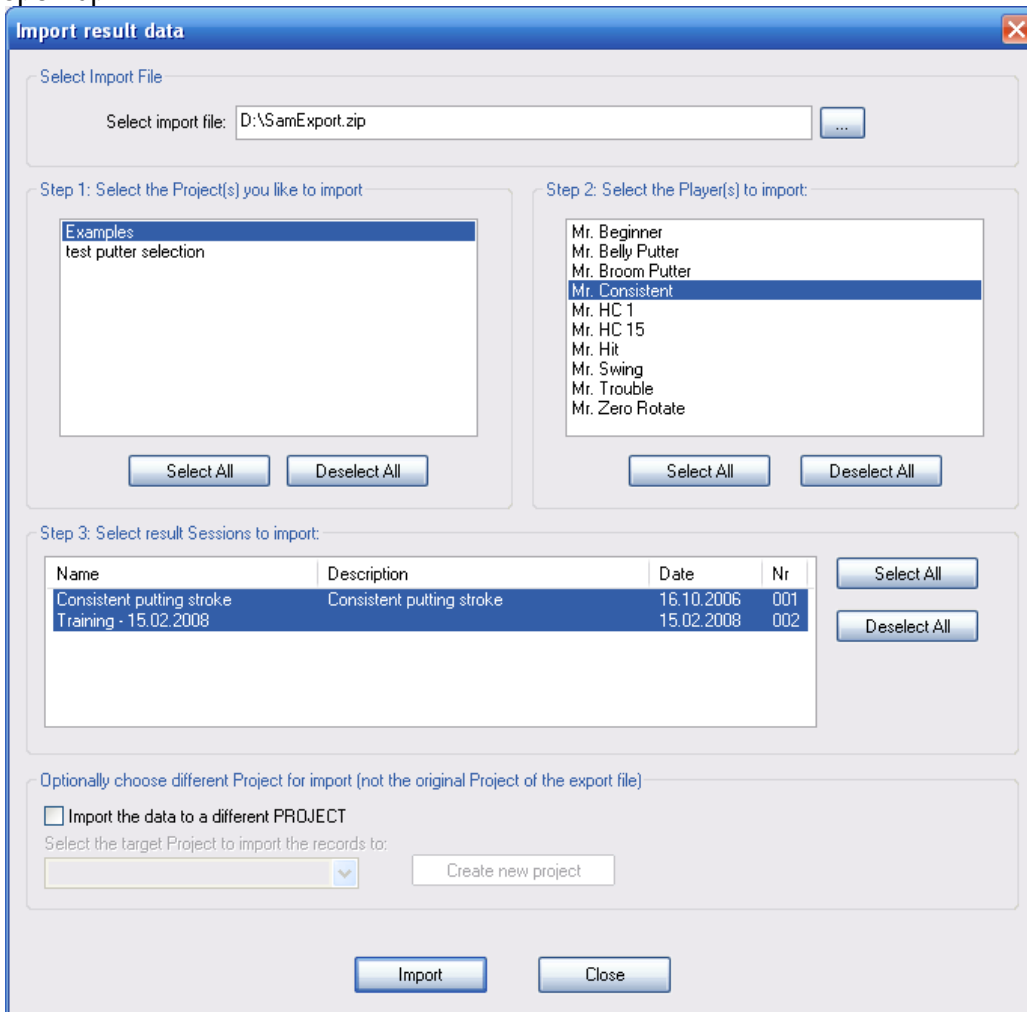
Please refer to [Import result records](#) for information how to import data out of existing data export files.

4.2.7 Import result records

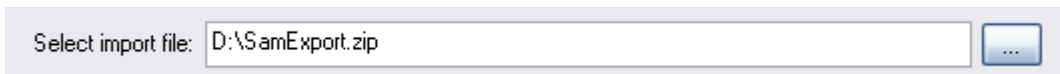
The result records import function allows to import result records out of previously created export files in the "cabinet" format. The import process will import the results contained in the file and also the original *Player*. The result records can be imported to an existing *Project* or to a new *Project*.


How to import results:

Go to the option "Import result records" in the main menu section "Tools". A dialog window will open up:



At the top of the dialog you can select the file to import:



Press the button  and select a SAM Puttlab data export file (ZIP).

Once a valid file is selected the software will analyse the content of the import file. This may take a while depending on the number of data files included in the archive.

After this is finished you will see the content of the import archive in the fields for projects, players and sessions.

Select projects to be imported:

If there are projects available in the archive then they are listed in the left upper list field. If you click on one project you will see the included players in the players field on the right.

If you select multiple projects on the left side you will not see any players, because in this case all the selected projects and the included players will be imported completely.

So you always have the option to select portions of the data like single players or sessions for the import process. But you can also just select everything (all projects) that are included in the archive.

Press "Import" to finally import the selected projects into your current SAM PuttLab installation.

i Recovering all projects contained in a PuttLab data archive is very easy: Just click on "Select All" below the projects box on the top left and then press the "Import" button. This will exactly recover the complete content of the archive to your current PuttLab data.

Select players to be imported:

If you click on one project in the left upper box you will see the included players in the players box on the right. You can choose to import all the available players including their data (Select All) or you can just select one or any number of players by clicking with the mouse.

Press "Import" to finally import the selected players into your current SAM PuttLab installation.

Select sessions to be imported:

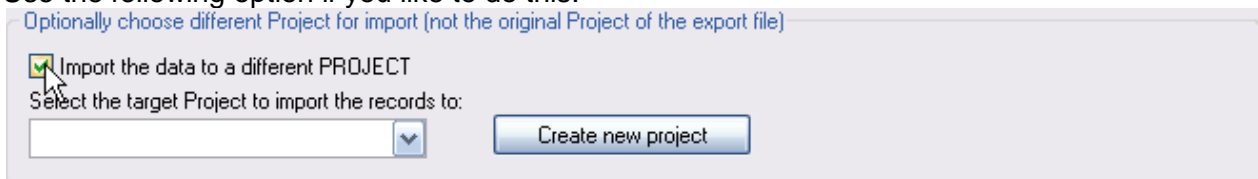
It is also possible to import one or multiple sessions. To do this select the project and the player containing the session. You should then see the available sessions listed in the session box. Select the desired session for import there.

Then press the "Import" button and only the selected session will be imported.

Import data to different projects

By default the imported data will be added to the same project as the data was originally associated with. But it is possible to add imported data to a different or newly created project also.

Use the following option if you like to do this:



Check the box "Import the data to a different PROJECT" and select one project from the list or create a new project with the "Create new project" button.

All the selected data will then be added to this project instead of the originally associated project.

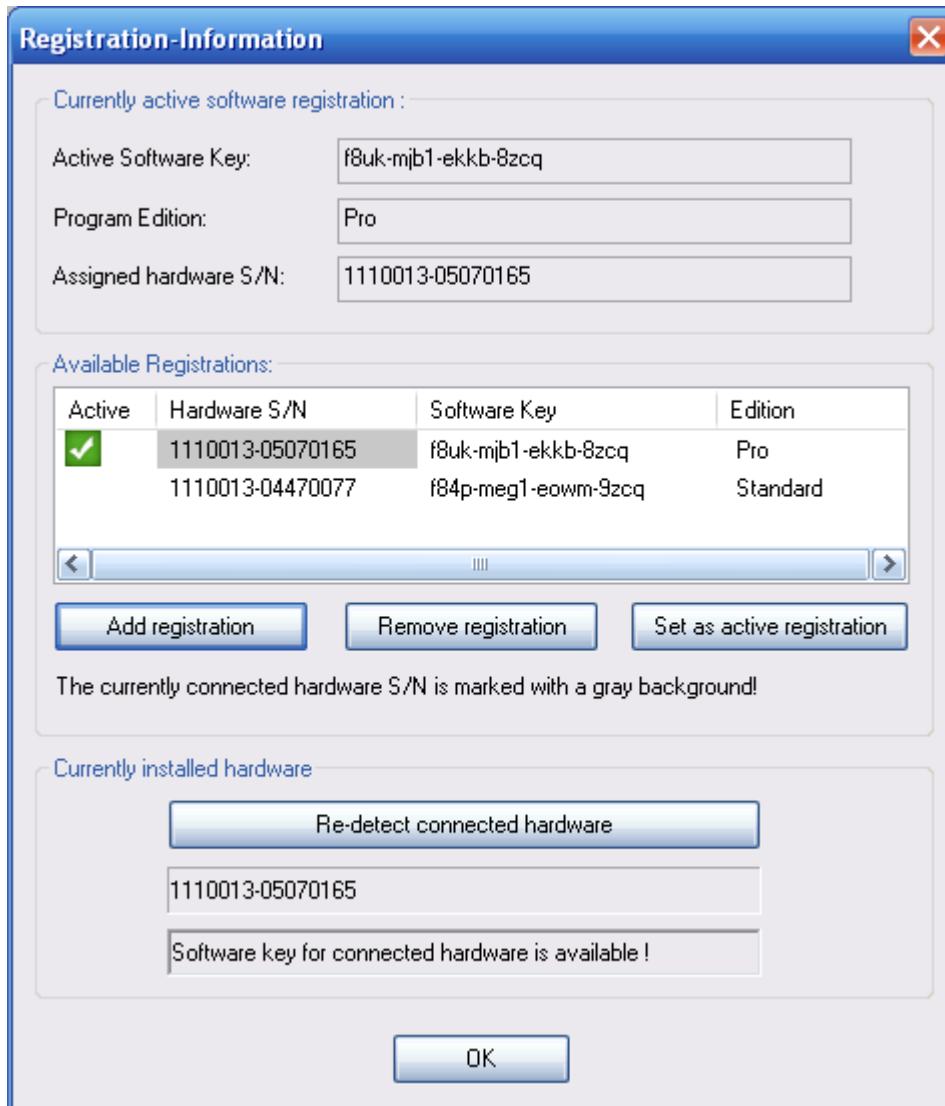
i If you selected an existing *Project* as target and the *Player* is already existing in this *Project* you will get a warning message. You can add the data records to this *Player* anyhow if you like to do this.

After the import process has finished, you can access the new imported result records in the "Data selection" bar.

4.3 Registration

4.3.1 Overview

In the Registration dialog you can see the current registration information, you can add registrations for additional PuttLab units or upgrade the software to a different edition. The dialog can be opened from the main menu in the "Setup" section.



In the upper section *Currently active software registration* you find the current registration data: Active software key, Program edition (Basic, Standard or Pro) and the hardware serial number of the Basic Unit.

In the section *Available registrations* all available registrations are listed in a table. The currently active registration is marked with a green check mark. The currently connected hardware serial number is marked by a gray background.

It is possible to register up to 4 PuttLab systems in for on software installation. So multiple systems can be operated without having to enter the serial key each time when a different unit is connected.

4.3.2 Manage your registrations

i The PuttLab software licenses are bound to the PuttLab units (hardware). For each unit you will need a valid software key to operate the unit with your installed software. Up to 4 units can be registered in one software installation to make it possible to use different units with one computer easily.

At first start of the software you will be forced to enter a software key matching to your PuttLab unit. If you only want to operate this original unit with your software then you will not have to register a key again.

You will only have to add or change registration if you:

- Want to use multiple PuttLab units with one software installation
- Upgrade your PuttLab to another product edition

Activate a registration for a different PuttLab unit

If you already have registrations for multiple PuttLab units and you want to activate a registration for a specific unit just do the following:

If you don't have registered the unit please first do the registration (next section).

Connect the unit to be used to your computer via the USB cable.

Go to the "Setup" section in the main menu and choose the entry "Registration".

The registration dialog will open up and show you the current registration data.

The connected unit should be highlighted with gray background in the registrations list:



Click on the line with the gray highlighted "Hardware S/N" and then click on the button **Set as active registration**. Now this unit is ready to use with your software.

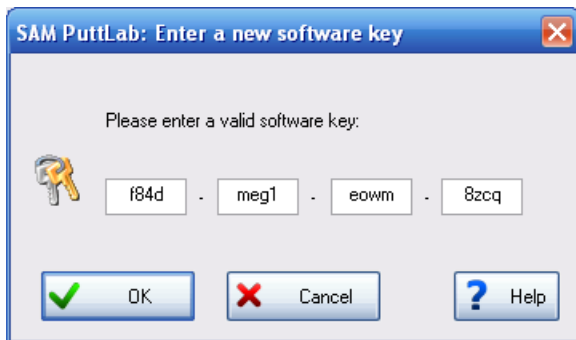
Add a further PuttLab unit to your registration

i Be sure to have a valid software key for your software version available before starting the registration process!

Go to the "Setup" section in the main menu and choose the entry "Registration".

The registration dialog will open up and show you the current registration data.

Press on the button **Add registration** and enter the new software key into the input dialog:



Press **OK** to finalize the input. The software will check your key and if the key is valid you will see it in the registration list. If the key is not valid or maybe the PuttLab unit associated to this key already has been registered you will see an error message.

Delete a PuttLab key from your registration

Go to the "Setup" section in the main menu and choose the entry "Registration". The registration dialog will open up and show you the current registration data.

Select the registration from the list you want to delete and press the button **Remove registration**.

i Please note: You cannot remove the only registration, as it would leave your software without valid license!

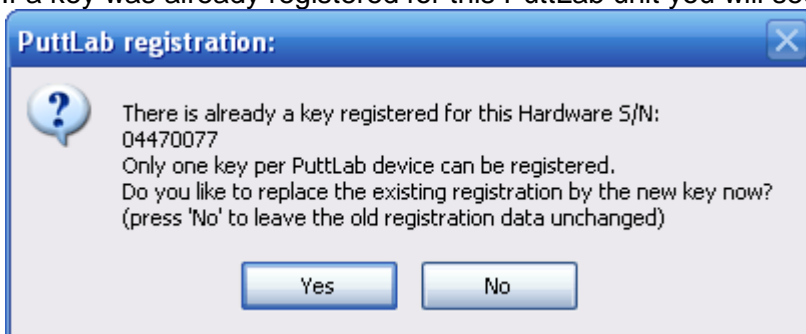
Upgrade a PuttLab registration to a different product edition

In case you want to upgrade one or multiple PuttLab registrations to a higher product edition (e.g. from Standard to Pro edition), you will need to enter the new software key(s).

Go to the "Setup" section in the main menu and choose the entry "Registration". The registration dialog will open up and show you the current registration data.

Click on the button **Add registration** and enter the software key in the following dialog. Press **OK** to finalize the input.

If a key was already registered for this PuttLab unit you will see this message:



Press **Yes** and the new product edition will be set for this unit.

i Please note: The old registration data will be overwritten if you enter a new software key for an existing unit!

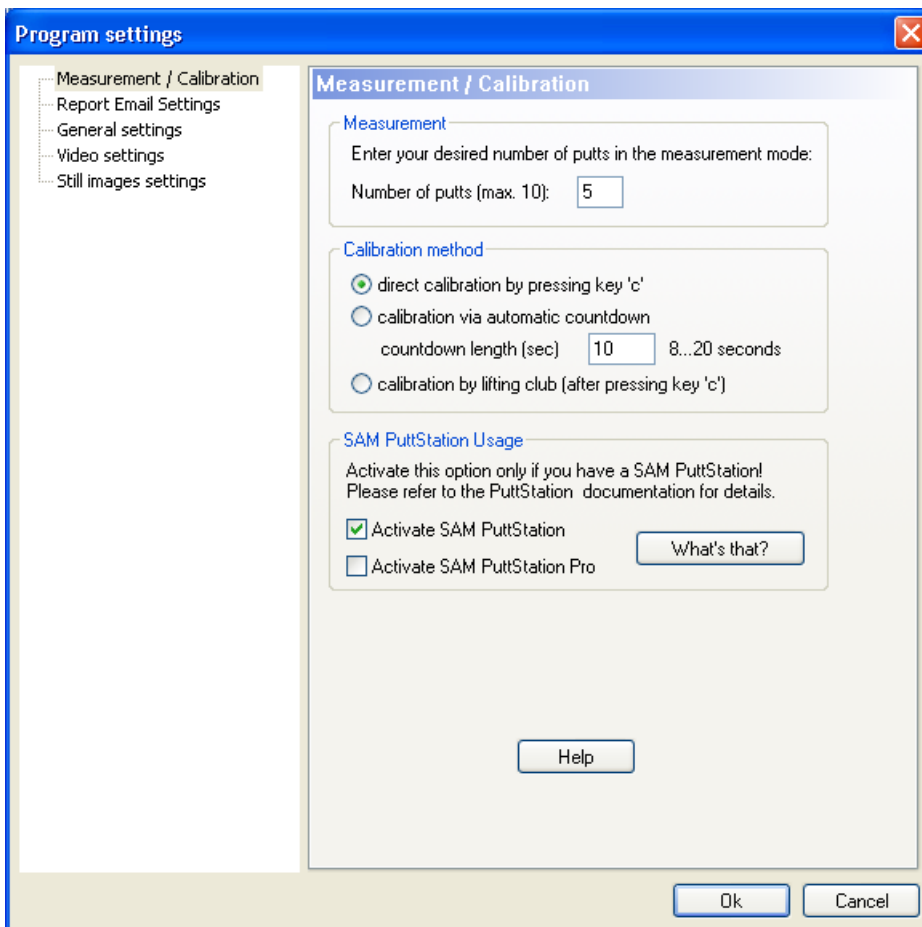
4.4 Program Settings

The "Program settings dialog" for the recording configuration can be opened from the menu in section **Setup – Program Settings** or from the Toolbar (leftmost icon).



The settings dialog provides three pages:

- Page 1: Measurement / Calibration settings
- Page 2: Report Email settings
- Page 3: General settings
- Page 4: Video settings
- Page 5: Still images settings

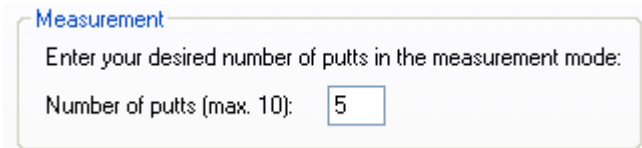


"Program settings" dialog

4.4.1 Page 1: Measurement / Calibration settings

This page of the settings dialog provides the following settings:

Number of putts – Number of putt strokes to be recorded during one measurement session. When the given number of strokes is reached, the measurement session will end automatically, save the data and open the pre-defined result report. The maximum number here is 10 strokes (default value is 5).



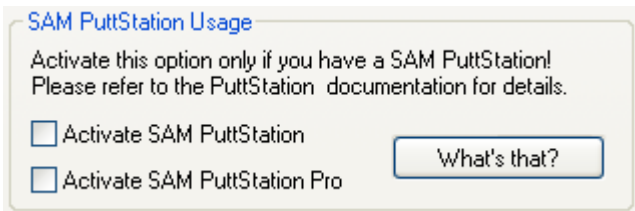
Calibration -



This value is the duration of the countdown time in case you execute the "Countdown calibration". At the end of the countdown the putter has to be in the calibration position (default value is 10). Read Chapter [Calibration](#) for further details on the calibration methods.

SAM PuttStation Usage

The SAM PuttStation is an extension to the PuttLab system for indoor use and replaces the tripod which is normally used as a stand for the system.



When the PuttStation is used it has also to be activated in the software, otherwise the advantage of easy and perfect calibration will not be available!

If you have a PuttStation please be sure to select the right model here. Selecting the wrong model would lead to wrong height calibration!

To see the difference between the model press the "What's that" button and you will see a picture showing both available models (PuttStation Pro is a discontinued product and only shown here for backwards compatibility).

Please refer to the section to [Integration of SAM PuttStation into the software](#) for more details on the PuttStation in general.

4.4.2 Page 2: Report Email Settings

PuttLab 2008 provides direct emailing of reports (as PDF attachment). All you need is a properly installed email client software (Outlook, Mozilla Thunderbird or other).

The reports will be send to the email address given in the Player data – if there is no address available the email client program will open with an empty address field.

The settings page provides standard text you can add to your emails for *subject* and *text*. In the text you can include the Players' name by using placeholders:

- %f will insert the Players' fist name
- %l will insert the Players' last name
- %n will insert the players' full name

Report Email Settings

Set the default settings for your Report Emails here:

Email default subject
SAM PuttLab report

Email default text (email body)
Hi %f,
please find attached your SAM PuttLab reports.
Have fun!

Regards,
your SAM team.

You can include the player names with placeholders in the text:
%f will add the firstname
%l will add the lastname
%n will add the full name

Example:

The name of a player is John Putt. The name is entered in the player data like follows:

Player name

Firstname: John

Lastname: Putt

The text: "Your first name is %f, MR. %l, so your full name is %n" will show up as:
"Your first name is **John**, Mr. **Putt**, so your full name is **John Putt**

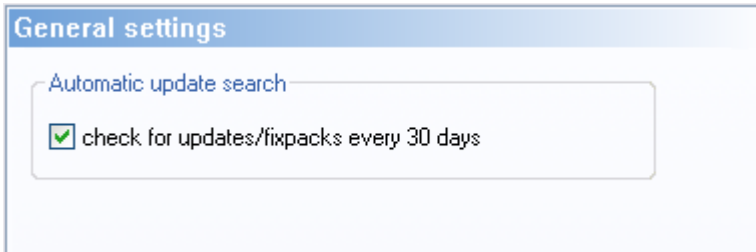
This will allow to send personal emails with your individual texts.

More details on how to send the emails you can find in chapter [Direct Report emailing](#).

4.4.3 Page 3: General settings

The section *General settings* includes only one parameter: A flag to control the automated update check over internet connection.

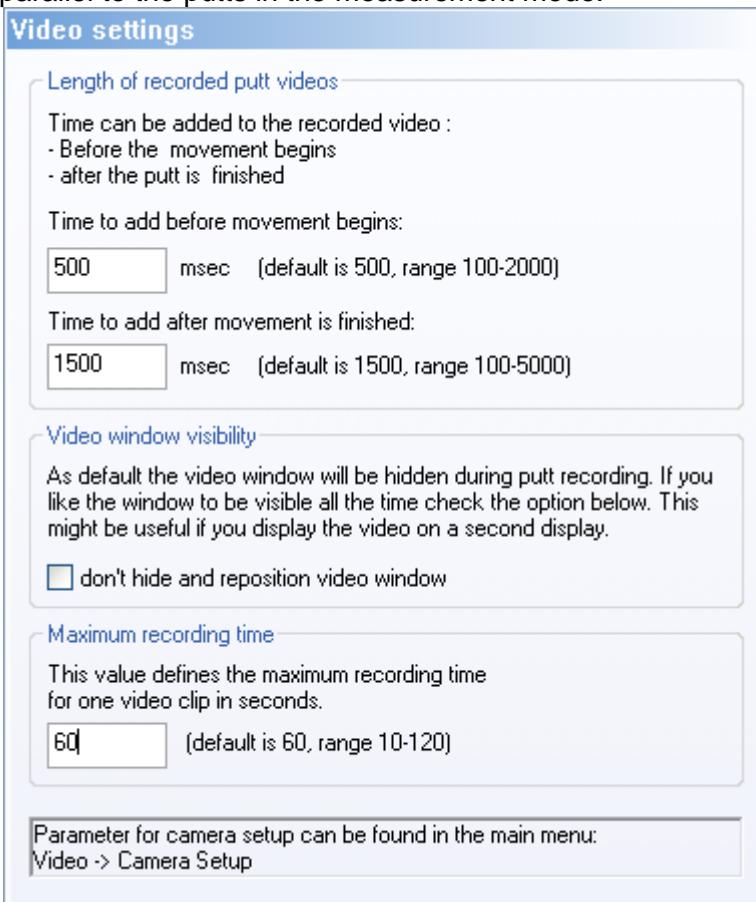
If you don't want the software to look for updates automatically every 30 days then you can lock this feature here by disabling the checkbox.



4.4.4 Page 4: Video Settings

i The setup of your video device will be done in the "Camera setup wizard". Further information on this you can find in chapter [Setup your video camera](#).

In the Video Settings dialog you can define parameters to control the automatic video recording parallel to the putts in the measurement mode:



Length of recorded putt videos

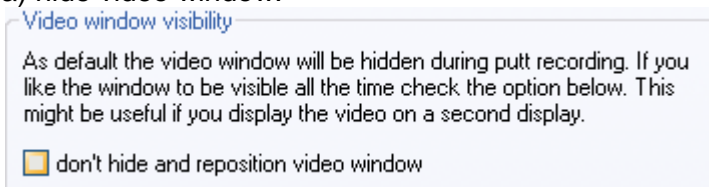
In the PuttLab measurement mode video can be automatically be recorded parallel to the putting. In the end you will have a single video clip for each putt attached to your data. The PuttLab records only the "active" movement of your putting stroke, for the video recording it is useful to have some time before and after the putt movement on in the video clip (e.g. to see the addressing).

Here you can specify the time to be added to the video before the putt movement (backswing) starts and the time to be added after the movement ends. All values have to be entered in milliseconds.

Video window visibility

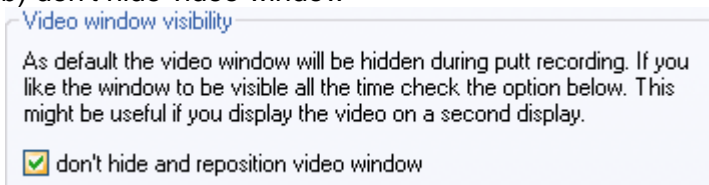
During recording of putts in the measurement mode the video window would cover a part of the screen, so it is good to hide the window when putting strokes are recorded. This is the default setting.

a) hide video window:



In this case you will see the video window at beginning of the measurement to check if the camera works and the captured area is ok. On beginning of the measurement the video window will disappear, and can be reopened after the measurement is done.

b) don't hide video window



In this case the video window will always be visible (if you don't hide it manually). This is useful if you have two displays for your PuttLab system. Then you can have the video window always active and visible on the second display.

Maximum recording time

Depending on the video compression you use (Video Codec) the recorded videos will consume a lot of space on your harddisk.

Uncompressed video of size 640x480 pixel will need the following disk space:

- 10 seconds: 250 MB
- 30 seconds: 750 MB
- 1 minute: 1.5 GB

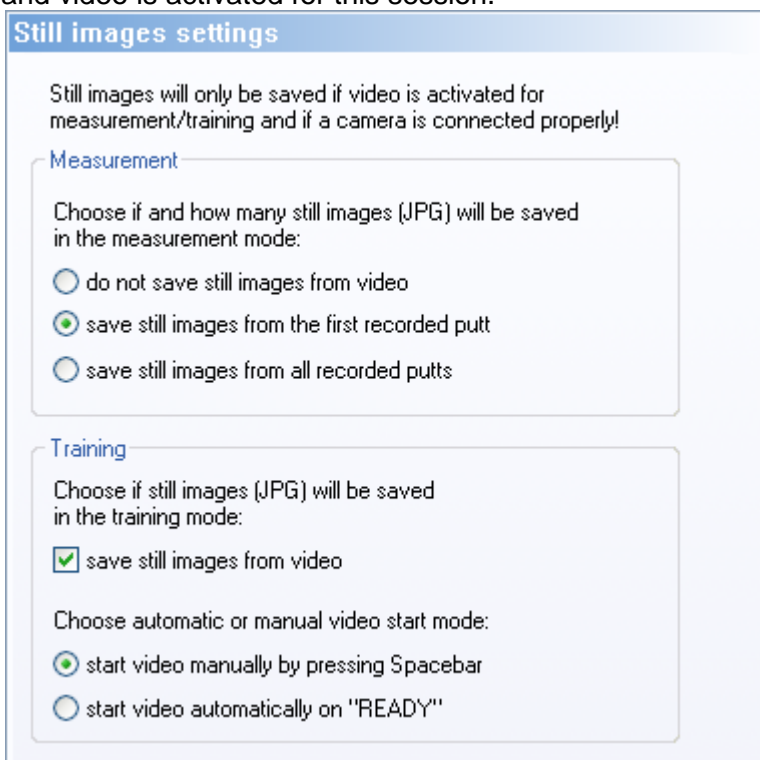
So it is very important to limit the maximum recording time to prevent your disk from running full! 60 seconds is the default value and this should be enough for most occasions. Maximum allowed value is 120 seconds.

4.4.5 Page 5: Still images settings



Recording still images is a new feature for PuttLab 2010 version.

Still images can be recorded for Training or Measurement sessions if a video camera is attached and video is activated for this session.



The settings dialog allows different settings for Measurement and Training:

Measurement:

Options are to record no still images, only record still images from the first putt or record still images for all putts.

Training:

There is a checkbox to enable or disable still images recording.



Still images will only be recorded if video recording is activated for measurement or training!

For Training also the video recording start mode can be set in this settings dialog. There are two different modes available:

- start video manually by pressing spacebar:
If you choose this option (default) you can record videos together with your putt strokes if you press the spacebar before you do a putt. This allows to control for which putts you want to have a video. If you do not press the spacebar before the putt no video will be recorded.
- start video automatically on "READY":
In this case videos will be recorded for all putts and video recording will start automatically when the putter is in the "READY" position. This can cause recording of very long videos if the putt is not started quickly after being in setup position. Advantage is that a video recording without keyboard interaction is possible.

To learn more about video and still images recording please read the chapter [Video](#)

4.5 Calibration

4.5.1 General Information

i A system calibration has to be performed after every software startup and also after every change of either the ball position or the target alignment during a measurement or training session. Also after changing the putter for a new measurement. Without proper calibration the result data might be inconsistent.

The calibration process will calibrate the following parameters:

- 4) Ball position (impact) in x and y direction
- 5) Zero angle of the clubhead alignment (target direction)
- 6) Zero angle of the shaft alignment (shaft loft)
- 7) Height of the ground

So try to be very accurate in executing the calibration to ensure best data reliability.

After startup of a Measurement or Training you are requested to calibrate the system by messages on the screen. Please follow the instructions given on the screen. If you want to calibrate again during a measurement or training session press the [C] key or click on the the following button in the toolbar:

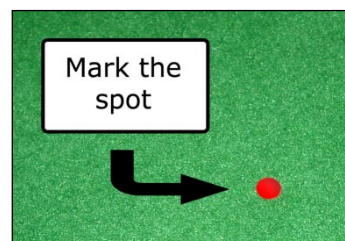


SAM PuttLab provides two different types of calibration methods which can be selected from the system calibration screen in Measurement or Training. These two methods of calibration will be explained in the following sections.

4.5.2 Steps before every calibration

1. Mark the ball position from where you like to make all your putts (use chalk or a sticker).
2. Place the golf ball precisely onto the marked position.
3. Start a measurement or training session in the software.
4. Attach the battery clip to the right side of your trousers. Move with your golf club in front of the basic unit and push the button on the battery clip shortly. After a few seconds you should see the motion of your golf club in the lower portion of the software display.

Then adjust your club head to the ball like shown in the graphics on the next page.



The graphics show you the right calibration position:

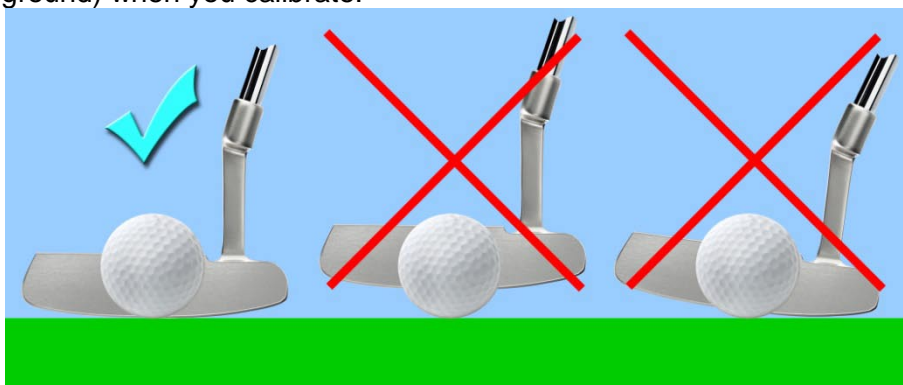
a) Calibration position top view:

Be sure to have your club head close to the ball and in horizontal sweet spot position when you calibrate:



b) Calibration position side view:

Be sure to have your club head set on the ground in proper lie angle (club head bottom flat to the ground) when you calibrate:



The next pages will give an overview of the different calibration methods.

4.5.3 Countdown Calibration

The "Countdown Calibration" method is based on a countdown timer that runs for a pre-defined time. At the end of the timer the calibration will be done automatically by using the club head position at this time. This is a good way to calibrate the system without having to press a key on the keyboard (e.g. if no second person is around).

The timer runs through two phases:

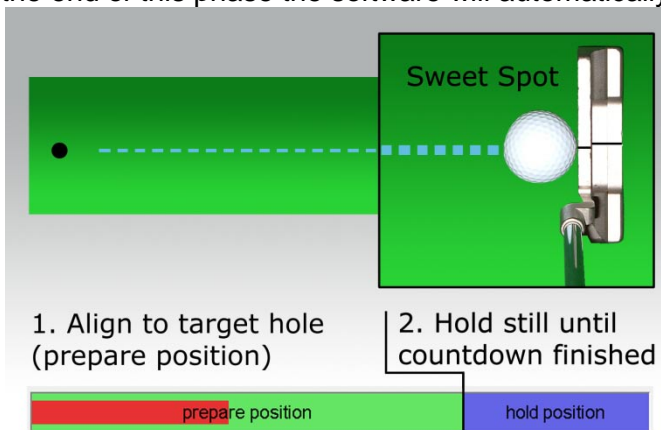
1) Phase one (progress bar is running over green area)

During this phase you have time to prepare your address position, i.e.:

- move to address position
- set club head on the ground
- align club head to target
- adjust club head to sweet spot position (relative to the ball)

2) Phase two (progress bar is running in blue area)

During this phase of the calibration try to hold your club head stable in your address position. At the end of this phase the software will automatically detect your calibration position.



To start the calibration press the [C] key on the keyboard (when you are on the measurement or training screen).

The countdown will start immediately; execute the steps described above.

The duration of the complete countdown can be adjusted from 8 to 20 seconds in the "Measurement / Calibration settings" dialog (see chapter [Program Settings](#)).

4.5.4 Direct Calibration

The calibration method "Direct calibration" is the easiest and quickest way to calibrate the system when a second person is present or when it is no problem for you to press a key while you hold the club in calibration position.

After pressing the [C] key on the keyboard the current club head position and alignment will be taken immediately as calibration position.

Before pressing [C] be sure to properly address your club head as shown in the picture on the right:

- set club head on the ground
- align club head to target
- adjust club head to sweet spot position (relative to the ball)



4.6 Measurement

There are two modes in the program to record the data of your putting strokes, Measurement and Training.

The Measurement provides a recording without direct feedback of results. A pre-defined number of strokes will be recorded by the system. After all strokes are finished, a result report will open up automatically for the analysis of the strokes.

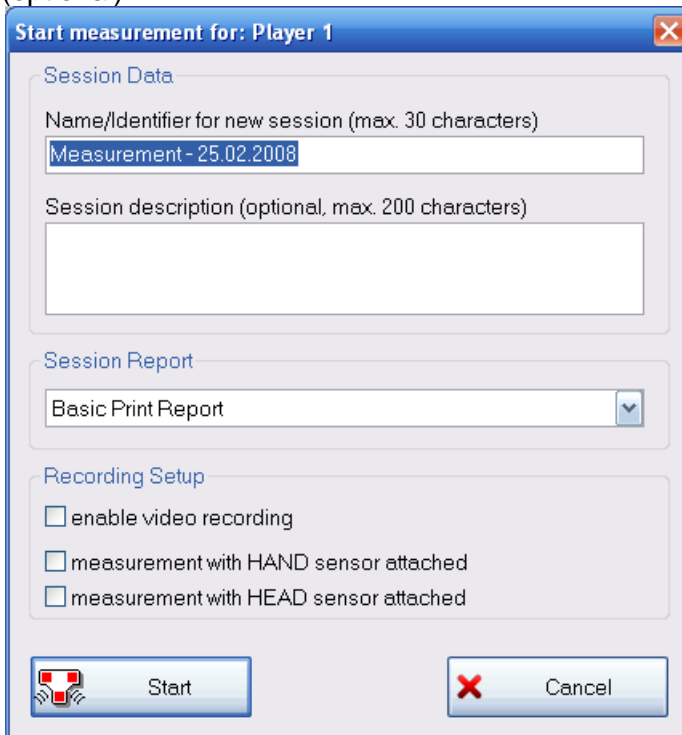
i Please read carefully chapter [Calibration](#). If you don't calibrate your system properly the data analysis may become less precise.

4.6.1 Start of a Measurement session

The easiest way to start a Measurement is to click on the Toolbar icon. Another way is to use the menu or the keyboard shortcut [M].



In the startup dialog you will be asked to give your Measurement Session a name and description (optional):

A screenshot of a Windows-style dialog box titled "Start measurement for: Player 1". The dialog has a blue title bar with a close button (X) in the top right corner. It is divided into three sections: "Session Data", "Session Report", and "Recording Setup".
- "Session Data": Contains two text input fields. The first is labeled "Name/Identifier for new session (max. 30 characters)" and contains the text "Measurement - 25.02.2008". The second is labeled "Session description (optional, max. 200 characters)" and is empty.
- "Session Report": Contains a dropdown menu with "Basic Print Report" selected.
- "Recording Setup": Contains three checkboxes, all of which are unchecked: "enable video recording", "measurement with HAND sensor attached", and "measurement with HEAD sensor attached".
At the bottom of the dialog, there are two buttons: "Start" (with a red and white sensor icon) and "Cancel" (with a red X icon).

In the section **Session Report** you can define the result report which will be displayed automatically after all strokes of the Measurement are finished.

Optional settings can be made in the section **Recording Setup**:

enable video recording

Activates the automatic video recording for the measurement mode. Videos will be recorded together with the putts automatically.

i Be sure to have a camera connected and successfully finished the camera setup ([Setup your video camera](#)) when you activate this option.

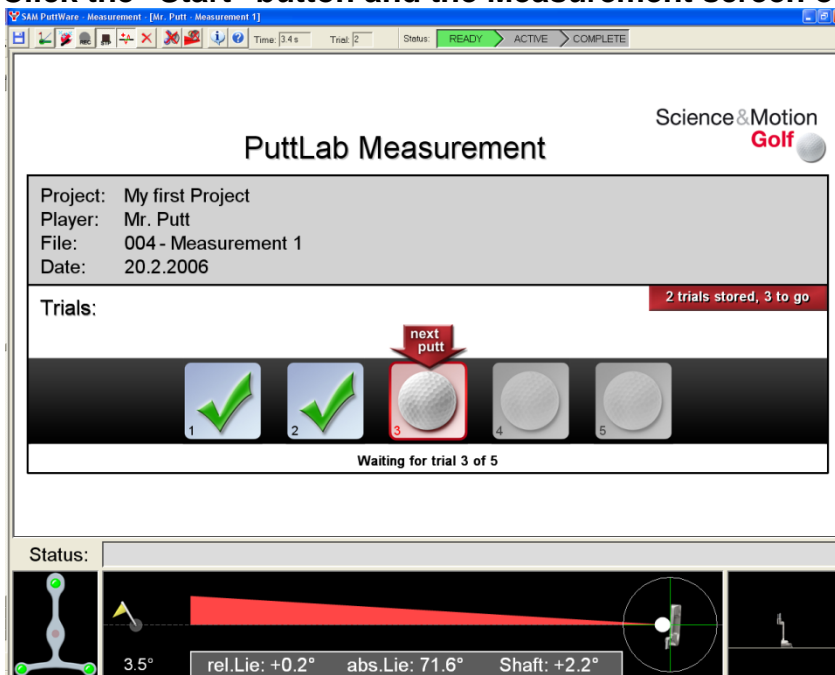
Measurement with HAND sensor attached and Measurement with HEAD sensor attached

These options are only available in the Pro edition of the software.

If you want to use the additional head or wrist sensor you have to activate one of these options.

- i** Be sure to have the additional head/wrist sensor connected to your battery clip when you activate this option – otherwise the system will not be able to record putts!
See chapter [Head and Wrist Measurement](#) for details on working with the additional sensors.

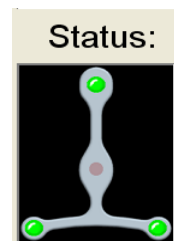
Click the "Start" button and the Measurement screen opens:



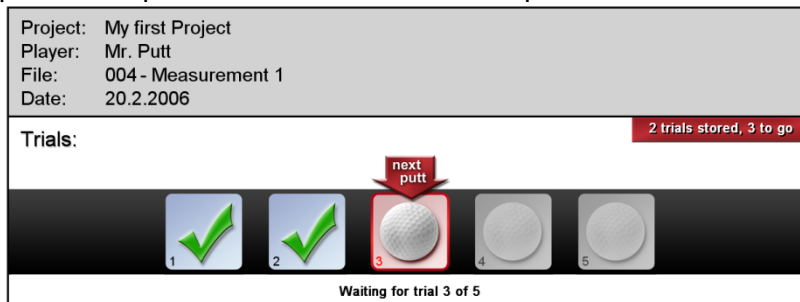
Measurement screen

Once you are in the Measurement screen follow the next steps to execute your stroke recording.

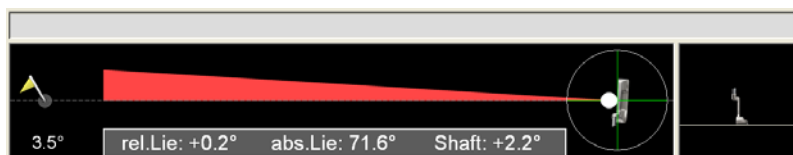
1. Press the button on the battery clip. When you move with your golf club in front of the Basic Unit the "No Data Signal" field should disappear and you can see the motion of your club in the graphics display.
2. Depending on the calibration method you have chosen in the settings (default = calibration by countdown) you need to calibrate the system like described in chapter [Calibration](#).
3. At the bottom left of the window you can see the Triplet symbol below "Status". It indicates whether the 3 sensors are having connection to the Basic Unit. If you are in the measuring range the color of the sensors should be green. A red color indicates interrupted connection (e.g. in case club is out of measuring range).



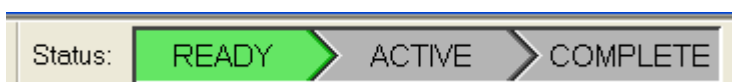
- The box shown below provides you with information on the current measurement. You can see the currently selected *Project* and *Player* name, the date, the number of already processed putts and the number of total putts to be recorded.



- On the lower edge you can see a real-time display of the club head alignment to the target. You will see your current misalignment in the graphics and also displayed as a number in degrees (bottom left corner). If you have calibrated the system correctly in step 2, the alignment of your club should be in the green range and the height should be around 0 mm when you aim to the target (height display on the bottom right corner). If not, press [C] to re-calibrate. This display will additionally show the current live values for relative lie angle, absolute lie angle and shaft angle.



- Now just keep the club head still in the address position until the "READY"-display in the status bar at the top turns green. Then do your putting stroke.



- After your stroke is recorded successfully, a green check mark will be displayed in "Trials". If a stroke hasn't been recorded you can see a message with the reason in the "Status" line above the live display field. You can press [backspace] on your keyboard at every time to delete the last stroke.



- Repeat steps 6 and 7 until all strokes are recorded and the result report is displayed automatically.



You can stop the measurement at any time by pressing the [ESC] key. You then will be asked if you like to save or reject the putts recorded so far.
It is also possible to directly save and exit by pressing [s] key.

4.6.2 Measurement screen toolbar



Save data and exit – Saves the data within the current recording session and exits to the main screen. Keyboard shortcut: [S]



Direct Calibration – starts system calibration in direct mode. Keyboard shortcut: [C] or [F4]



Countdown Calibration – starts system calibration in countdown mode. Keyboard shortcut: [V] or [F3]



Automatic recording - switch on/off automatic recording (stroke detection). If switched OFF, the manual recording will be enabled (see chapter [Manual Recording](#)).



REC start - start manual recording, if enabled. Keyboard shortcut: [Spacebar].
(see chapter [Manual Recording](#))



REC stop - stops manual recording and saves the recorded timespan as trial. Keyboard shortcut: [Enter].
(see chapter [Manual Recording](#))



Delete last trial – Keyboard shortcut: [backspace]



Sound – Turns event sounds on/off



Alignment sound – Turns alignment feedback sound on/off



Help for Measurement screen – Opens the online documentation about the Measurement mode – Keyboard shortcut [F1]

4.7 Training

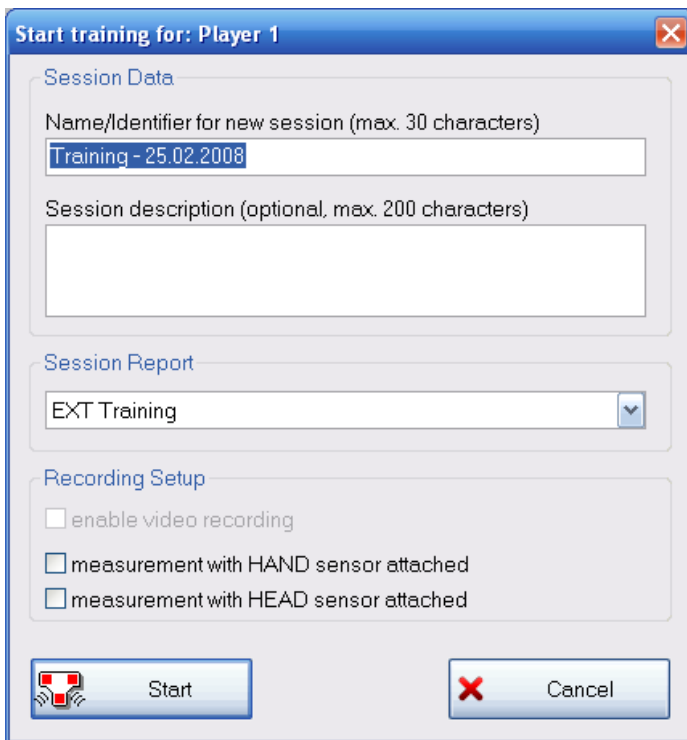
The Training mode is the second possibility to record your putt strokes with SAM PuttLab. In the Training you will get an instant feedback display for your last stroke and can make up to 99 putts in a row. This allows you to work on your strokes continuously with real-time feedback of the desired result output. You can change the result views during a Training session depending on the aspects of your putting you currently want to improve.

4.7.1 Start of a Training session

The easiest way to start a Training is to click on the Toolbar icon. Another possibility is over the menu or the keyboard shortcut [T].



In the startup dialog you will be asked to give your Training session a name and description (optional) and to choose the type of training report which will be displayed during the Training session. Depending on which Training report you select you can choose between different result views for the real-time feedback.



In the section **Session Report** you can define the report to be displayed for the training session. Depending on which Training report you select you can choose between different result views for the real-time feedback.

Optional settings can be made in the section **Recording Setup**:

enable video recording

In the current software version video recording is only possible for Measurement mode, not for Training. So this option is blocked out.

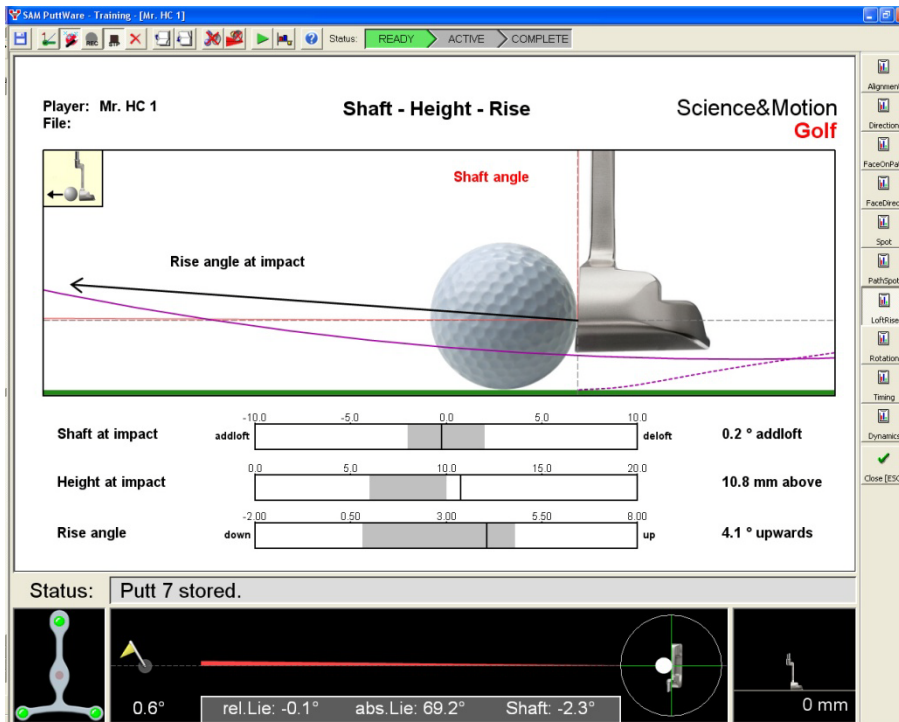
Measurement with HAND sensor attached and Measurement with HEAD sensor attached

These options are only available in the Pro edition of the software.

If you want to use the additional head or wrist sensor in your Training session you have to activate one of these options.

- i** Be sure to have the additional head/wrist sensor connected to your battery clip when you activate this option – otherwise the system will not be able to record putts!
See chapter [Head and Wrist Measurement](#) for details on working with the additional sensors.

Click the "Start" button and the training screen will open:



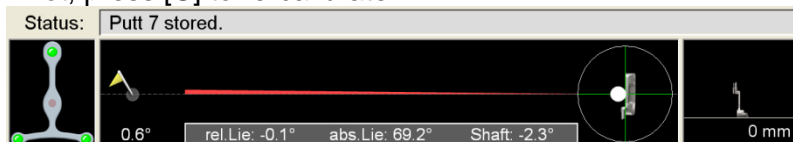
Training screen

Once you are in the Training screen follow the next steps to execute your stroke recording.

1. Press the button on the battery clip. When you move with your golf club in front of the basic unit the "No Data Signal" field should disappear and you can see the motion of your club in the graphics display.
2. Depending on the calibration method you have chosen in the settings (default = calibration by countdown timer) you need to calibrate the system like described in chapter [Calibration](#).

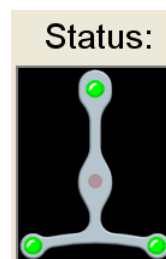
3. On the lower edge you can see a real-time display of the club head alignment to the target. You will see your current misalignment in the graphics and also displayed as a number in degrees. If you have calibrated the system correctly in step 2, the alignment of your club should be in the green range and the height display should be around 0 mm when you aim to the target.

If not, press [C] to re-calibrate.



This display will additionally show the current values for relative lie angle, absolute lie angle and shaft angle.

4. At the bottom left of the window you can see the Triplet symbol below "Status". It indicates whether the 3 sensors are having connection to the Basic Unit. If you are in the measuring range the color of the sensors should be green. A red color indicates interrupted connection (e.g. in case club is out of measuring range).



5. Now just keep the club head still in the perfect address position until the "READY"-display turns green. Then do your putting stroke.



6. After your putt is recorded successfully, you will get an instant result display of your last stroke in the center area of the screen. The displayed parameters depend on the selected Training report type and the selected view.
7. With the button-bar on the right side of the screen you can switch between the different views of the Training report. You can also browse through the views by using the page up and down keys or the numeric keys (1-9) on your keyboard. So you can quickly change the training aspects for your current session. A change of the view can be done at any time during the Training session.

i In a Training session you can record up to 99 strokes in a row. Although only the result for the last stroke will be displayed, the data of all strokes will be saved and can be viewed later in the Print or Screen reports. To end a training session press either the "Save" icon in the toolbar (exit training and save stroke data) or press the [ESC] key (you have then the option to discard all recorded strokes).

4.7.2 Training screen toolbar commands



Save data and exit – Saves the data within the current recording session and exits to the main screen. Keyboard shortcut: [S]



Direct Calibration – starts system calibration in direct mode. Keyboard shortcut: [C] or [F4]



Countdown Calibration – starts system calibration in countdown mode. Keyboard shortcut: [V] or [F3]



Automatic recording - switch on/off automatic recording (stroke detection). If switched on, the manual recording will be enabled (see chapter [Manual Recording](#)).



REC start - start manual recording, if enabled. Keyboard shortcut: [Spacebar]. (see chapter [Manual Recording](#))



REC stop - stops manual recording and saves the recorded timespan as trial. Keyboard shortcut: [Enter]. (see chapter [Manual Recording](#))



Delete last recorded putt – Keyboard shortcut: [backspace]



Previous report page – Keyboard shortcut [page-up]



Next report page – Keyboard shortcut [page-down]



Activate / deactivate training sounds – turns on/off sound output for events (e.g. the beep sound when recording a putt)



Open the settings for "Audio Feedback" – opens the settings dialog where you can define the audio feedback parameters and activate/deactivate the audio feedback



Open 3D Putt replay – the current putt will be displayed in the 3D replay window. Keyboard shortcut: [D]



Display training history – displays the history of values for the current training parameter as a bar chart. This allows a comparison of the values over a certain time of training. Keyboard shortcut: [Ctrl + C]

4.7.3 Audio Feedback



PuttLab 2010 introduces a refined version of the audio feedback module. It is now possible to let the software play the results including the numerical value. Example: For the parameter "Face at impact" a putt with the face open 2.6 degrees open in impact would lead to the following audio output:
open 2.6 degrees

Overview

The audio feedback provides results for your putting stroke as direct feedback in form of specific sound files that are played.

Example:

Training parameter is: "Face at Impact".

- If your putt stroke is in the good range for this you will hear: "perfect"
- If the clubface is closed 2.4 degrees you will hear: "closed 2.4" or "closed 2.4 degrees"
- If the clubface is open 3.2 degrees you will hear: "open 3.2" or "open 3.2 degrees".

Advantage:

- get immediate feedback in training without having to look on the screen
- get feedback on two different parameters at the same time, one by visually results on the screen and one other by audio feedback

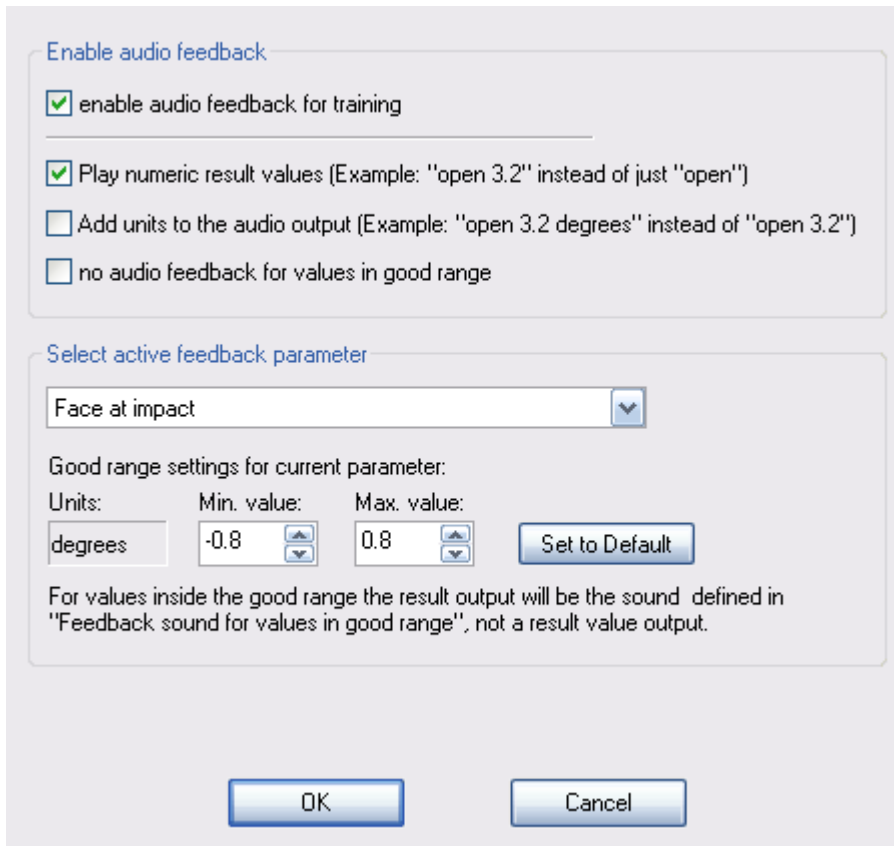
The limits for good or bad results can be set individually for each of the parameters.

Audio Feedback is available for the following parameters:

- Face at address
- Face at Impact
- Face change (difference between face at address and Face at Impact)
- Impact Spot (ball hitting point on the club face)
- Direction at Impact
- Rise at Impact
- Loft at Impact (dynamic loft = shaft angle)
- Alignment feedback (permanent feedback to check alignment)

Configuration of the audio feedback module

The audio feedback settings dialog can be opened from the main menu under **Setup** and then select **Audio Feedback Settings**, or directly from the Training screen with the toolbar button:



The screenshot shows the 'Audio Feedback Settings' dialog box. It has two main sections. The first section, 'Enable audio feedback', contains three checkboxes: 'enable audio feedback for training' (checked), 'Play numeric result values (Example: "open 3.2" instead of just "open")' (checked), 'Add units to the audio output (Example: "open 3.2 degrees" instead of "open 3.2")' (unchecked), and 'no audio feedback for values in good range' (unchecked). The second section, 'Select active feedback parameter', features a dropdown menu set to 'Face at impact'. Below this, it shows 'Good range settings for current parameter:' with fields for 'Units:' (degrees), 'Min. value:' (-0.8), and 'Max. value:' (0.8), along with a 'Set to Default' button. A note at the bottom states: 'For values inside the good range the result output will be the sound defined in "Feedback sound for values in good range", not a result value output.' At the bottom of the dialog are 'OK' and 'Cancel' buttons.

Enable audio feedback:

The option **Enable audio feedback for training** the audio feedback can be globally enabled or disabled.

If the option **Play numeric result values** is set the numeric result values will be added to the sound output.

Example: "open 3.6" instead of just "open"

If the option **Add units to the audio output** is set the unit name will be added after the numeric result.

Example: "open 3.6 degrees" instead of just "open 3.6"

It is possible to enable/disable only the sounds for results in the good range with the option **no audio feedback for values in good range**.

If this option is set you will only hear audio for results out of the good range.

These settings are valid independent which parameter is selected for audio feedback.

Select active feedback parameter:

In this section the currently active training parameter can be selected out of the 8 parameters listed above.

In this section also the limits for good/bad results can be defined per parameter (Min. value and Max. value).

To set the configuration:

a) Select a parameter from the list

b) check / set the values for the high/low limits



It is always possible to set the original default limits by clicking the button "Set to Default". The default limits are derived from the four players measured with PuttLab and correspond to the score ratings in the reports.

Alignment Feedback

The last parameter in the list "Alignment Feedback" is a special type of the audio feedback. It is a permanent feedback to indicate if your putter currently is in the right alignment position or not. This is helpful for alignment training e.g. if you step away from address position, return to the position and align – you will directly hear the feedback if you are in the good range or not.

Settings for current parameter

| | | | |
|---------|------------|--------|----------------|
| Units: | Tolerance: | Range: | |
| degrees | 1 | 10 | Set to Default |

"Tolerance" defines the good range for the alignment. If you hold the putter aligned in this range no sound will be played. If you go out of this range you will hear a periodic sound.

The default value is 1 degree, that means the good range is defined as 1 degree open to 1 degree closed compared to the zero line calibration.

"Range" will define the range for of your club head alignment to be monitored by the audio feedback. If you are out of this range the sound will be suppressed. This is to prevent the sound from being played all the time even when you are not in the address position at all. Default value is 20°.



The value for Tolerance will also effect the graphical live display for putter alignment in the Measurement and Training screen. Inside the good range the drawing color will be green, outside it will be red. So the display will always be conform to the audio feedback.

4.8 Manual Recording

In the Measurement and Training sessions you normally rely on the "automatic stroke recognition" function. Within this mode the system tries to recognize the putt strokes automatically from the club head movement. This will work in most of the cases without problems.

In some cases the automatic stroke detection might not work properly, for example:

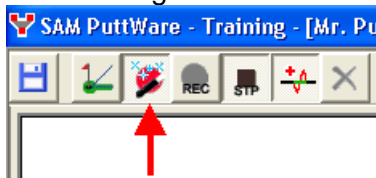
- the backswing is extremely slow
- the putt stroke movement is interrupted

To make sure that strokes can be recorded also in this cases SAM PuttLab has implemented a manual recording feature.

To use this feature it would be good to have a second person around for pressing the "start" and "stop" keys.

How to enable the manual recording:

In the Measurement and Training screen toolbar there is a button for switching on/off the automatic stroke recognition:



In the default mode after start of Measurement or Training the automatic stroke recognition is activated.

When you switch it off by pressing the following button:



the "REC" and "Stop" buttons will get activated:



and the status will show the manual recording symbol:



Recording a putt stroke using manual recording:

- 1) Be sure the system is calibrated and ready
- 2) Prepare your address position and start a manual recording by pressing the "REC" button or the [Spacebar].

The "Status" display will change from:



to

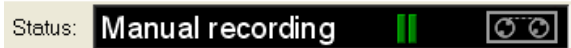


This indicates that a "recording" is currently running.

- 3) Do your putting stroke (directly after recording start if possible)

- 4) Directly after finishing the stroke stop the recording by pressing the "STP" button in the toolbar or hit the [Spacebar] once again.

The "Status" display will change to:



and one trial will be added to the recorded strokes. In the Training mode the results for the stroke will be displayed immediately.

- 5) Repeat this sequence for each further stroke you want to record.

i It is not possible to record multiple strokes into one trial. So you have to Start and Stop the recording for every single stroke! Make sure to have as less as possible clubhead movements inside a recording before and after the stroke, because this may disturb the stroke analysis.


4.9 Predefined Putting Programs

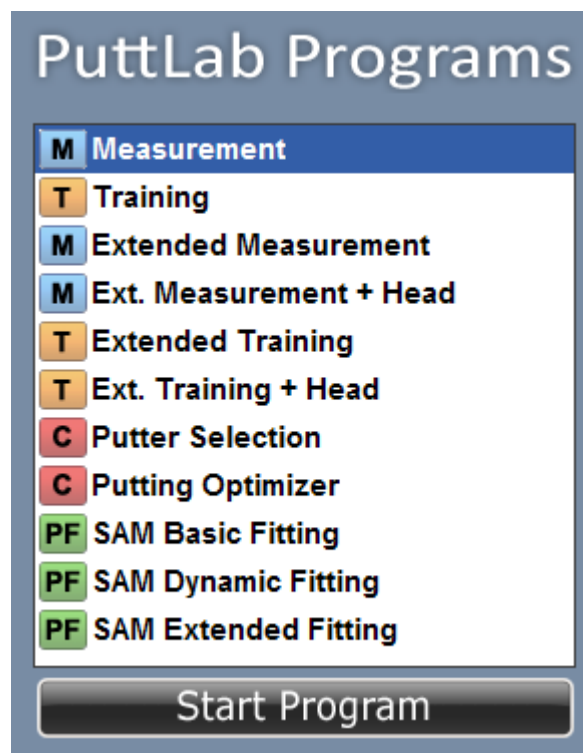
PuttLab 2008 includes up to 11 predefined putting sessions (Pro version). These sessions cover different usage cases of SAM PuttLab, for example training, analysis, putter selection, comparison or putter fitting.

The advantage of the sessions is that they guide the user through the process, from data input to the measurement and finally to the result presentation in the reports.

It is also possible to add user specific sessions later to the program, for example a special training with report screens that are not available in the standard program.

To start a session just double click the desired line in the selection box or press the "Start Program" button.

 When you move the mouse over the selection box entries a short description for the programs will pop up.



4.9.1 PuttLab Programs overview:

Measurement

- ✓ Starts a standard Measurement – the same as if you start a Measurement via the toolbar button
- ✓ Details like number of strokes and result report can be selected before start



Training

- ✓ Starts a standard Training – the same as if you start a Training via the toolbar button
- ✓ Details like result report or dataset name can be selected before start



Extended Measurement

- ✓ Measurement with 10 putts
- ✓ At the end the "Extended Report" will be shown as print report or screen report

Extended Measurement + Head (only available in the Pro Edition)

- ✓ Identical to "Extended Measurement" but automatically activates Head sensor and will present the "Extended Head" result report as default result. Be sure to have the Head sensor attached!

Extended Training

- ✓ Training with maximum stroke number 99
- ✓ Training report is the "Extended Training Report"
- ✓ At the end the "Extended Report" will be shown as print report or screen report

Extended Training + Head (only available in the Pro Edition)

- ✓ Identical to "Extended Training" but automatically activates Head sensor and will present the "Extended Head" result report as default result. Be sure to have the Head sensor attached!

Putter Selection

Special Program for putter comparison and selection – easily finds the best putter out of up to 8 models. The "Putter Selection" report will show a performance overview and details for the different putters.

- ✓ Measurement of 5 putts for up to 8 putters in a row
- ✓ Wizard driven process for all measurements, no measurement restart needed
- ✓ Results of all putters will be stored into one session
- ✓ At the end the "Putter Selection Report" will be shown as print report or screen report

See chapter [Putter Selection](#) for a detailed description of this Program.

Putting Optimizer

Special Program for test and comparison of different putting aspects or strategies.

Example: Testing of different grips or grip techniques.

Do 5 putts with grip one and the next 5 with grip two and so on.

In the result report you can easily compare the strengths and weaknesses of each test.

- ✓ Measurement of 5 putts for up to 8 different tests in a row
- ✓ Wizard driven process for all measurements, no measurement restart needed
- ✓ Results of all putters will be stored into one session
- ✓ At the end the "Comparison Report" will be shown as print report or screen report



This Program can be also used to compare different players.

See chapter [Putting Optimizer](#) for a detailed description of this Program.

SAM Basic Fitting

This fitting Program is designed to determine the basic fitting parameters:

- grip type
- head type
- shaft offset
- putter loft
- putter lie angle
- shaft length



Please refer for the "Fitting Manual.pdf" for details on the fitting process. You can find this document either on the installation CD or you can open it directly from the software in the "?" section of the main menu.

SAM Dynamic Fitting

This fitting Program is designed for dynamic fitting of putter loft and lie angles. Also to control and confirm the findings from the SAM Basic Fitting Program.



Please refer for the "Fitting Manual.pdf" for details on the fitting process. You can find this document either on the installation CD or you can open it directly from the software in the "?" section of the main menu.

SAM Extended Fitting

This Program will allow additional fitting of head weight and shaft weight.



Please refer for the "Fitting Manual.pdf" for details on the fitting process. You can find this document either on the installation CD or you can open it directly from the software in the "?" section of the main menu.

4.9.2 How to run a predefined PuttLab Program

a) Start a Program:

To start a Program double click a line in the Programs box on the right side of the screen or use the "Start Program" button.

In the next step the Program start dialog will open:



This dialog will let you select Project and Player, a name for this data session and a text comment. There is also a checkbox to activate the automatic video recording. After pressing the start button the measurement or training program will start.

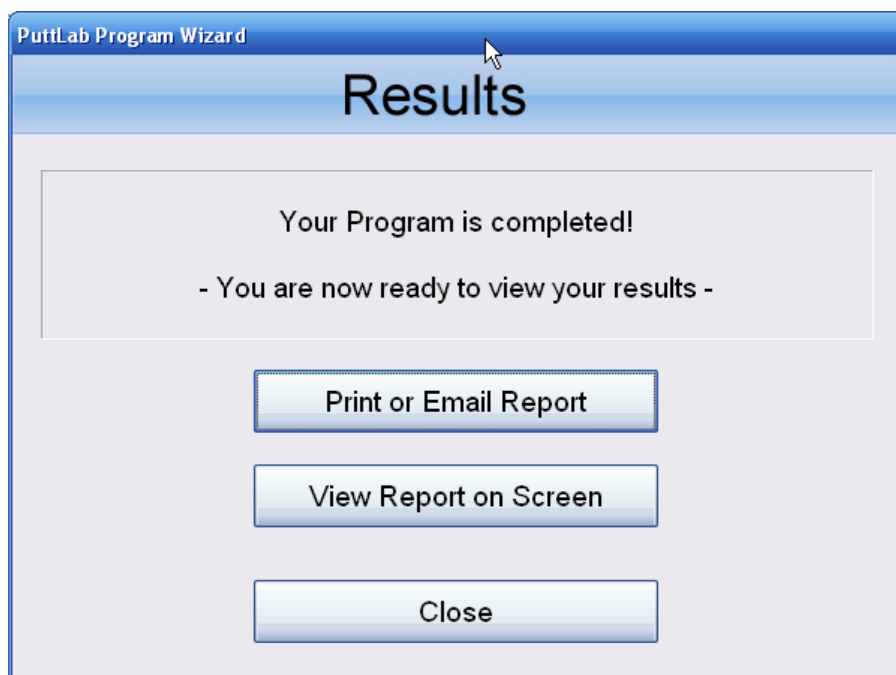
b) Run the putt recording

The measurements or trainings itself runs 100% similar to the normal operation like described in chapters [4.6](#) and [4.7](#).

Depending on the Program there might be multiple measurements to be executed after each other and dialogs might be asking for additional input.

c) View the result reports

After the Program is finished the results dialog will open:



The dialog provides the following options:

Print or Email Report

This option will open the Print Report associated with this session. The Print Report window allows also to print the reports, save them to PDF files and to send a PDF of the report directly by email.

View Report on Screen

Press this button to open the Screen Report associated with this session.

4.9.3 Putter Selection

The *Putter Selection Module* is one of the predefined putting sessions. The ideal tool for testing and selling putters!

The putter selection process will automatically ask for all the data needed including data of the putter like loft, shaft angle and lie angle.

After start of the Program for each putter to be added you have to enter a name and the main parameters for this putter (if known). At least you should enter a meaningful name for identification (putter name or any name which describes the putter clearly).

i If you want to use a putter repeatedly you can save the putter data to the putter database by pressing the "save to database" button. Then you will be able to reload the putter and its data just by selecting from the list in future sessions.

Putter data

Putter name:

If you know the data for this putter please enter here:

Loft degrees




Shaft length inches

Lie angle degrees




putter selection "add putter" window with putter database functions

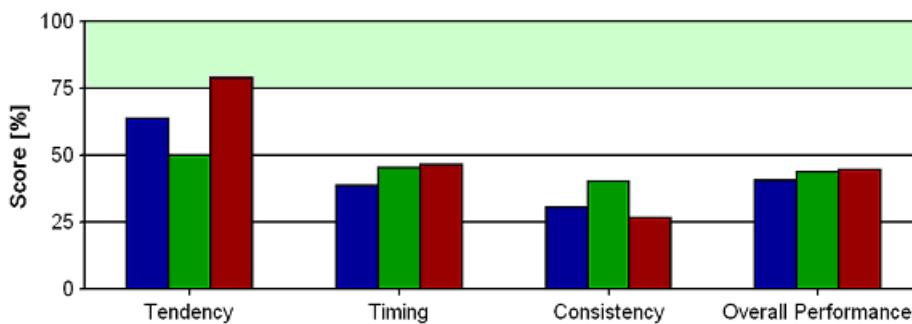
In the process up to 8 putters can directly be compared and the results will be shown in the new designed "Putter Selection Report":

Putter Selection Report

| Project: Project 1 | | Player: Putter Selection | | |
|---|---------------|--------------------------|---------|----------------|
| Color | File / Putter | Loft (°) | Lie (°) | Shaft (inches) |
|  | Putter 1 | 3.0 | 71 | 34 |
|  | Putter 2 | 3.0 | 71 | 34 |
|  | Putter 3 | 3.0 | 71 | 34 |


Summary:

| Record | Tendency | Timing | Consistency | Overall Rating |
|---|----------|--------|-------------|----------------|
|  | 63.5% | 38.4% | 30.4% | 40.7% |
|  | 49.9% | 45.1% | 39.9% | 43.7% |
|  | 78.7% | 46.2% | 26.6% | 44.5% |



The report shows all the overview data on the first page and the details on the following pages. So the putter selection process will be very much simplified and the customer gets a high quality printout with all the relevant and easy to understand information.

The "Overall Rating" number will directly show the putter with the best overall performance for the actual player!

 To re-open the "Putter Selection" report any time in the future just double click the recording in the "Sessions" window or press the "Session report" button:



4.9.4 Putting Optimizer

The *Putting Optimizer* Program is designed to compare different sets of 5 putts.

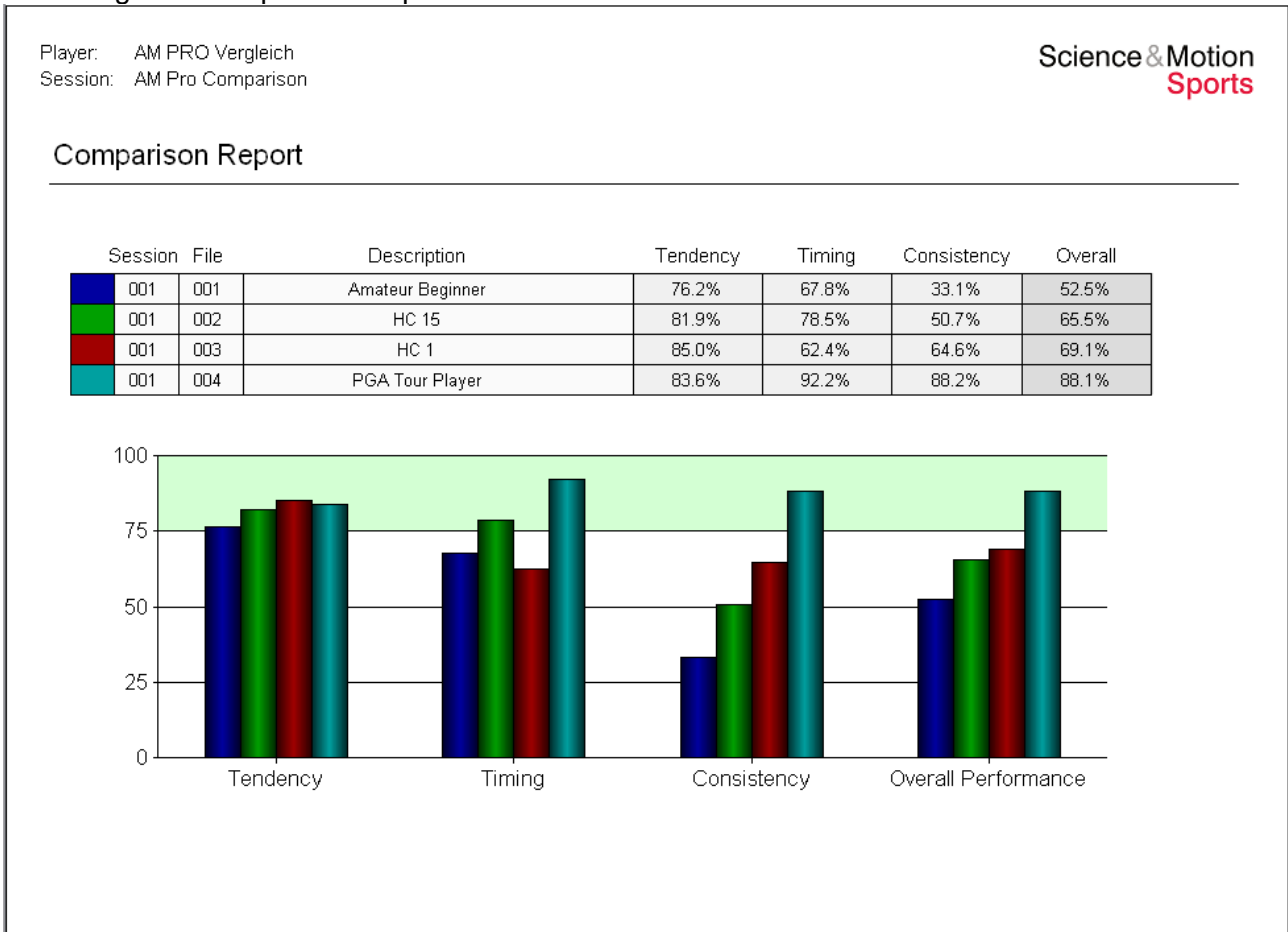
This Program can be used for:

- Testing different setup positions
- Testing different gripping styles
- Comparison of different players
- In general for testing any different putting techniques or putting strategies

It is important to give the single recordings a meaningful name for identification. This can be done in the start window for each new set of putts:

Name for next recording:

In the process up to 8 recordings can directly be compared and the results will be shown in the new designed "Comparison Report":



The result reports show performance values for Tendency (which are mainly technical parameters), Timing, Consistency and the overall rating.

The highest overall rating will indicate the best putting performance.



To re-open the comparison result report any time in the future just double click the recording in the "Sessions" window or press the "Session report" button:



4.10 Video

v. 2008
new

The video recording and replay module mode is a completely new feature of PuttLab 2008.

4.10.1 Overview

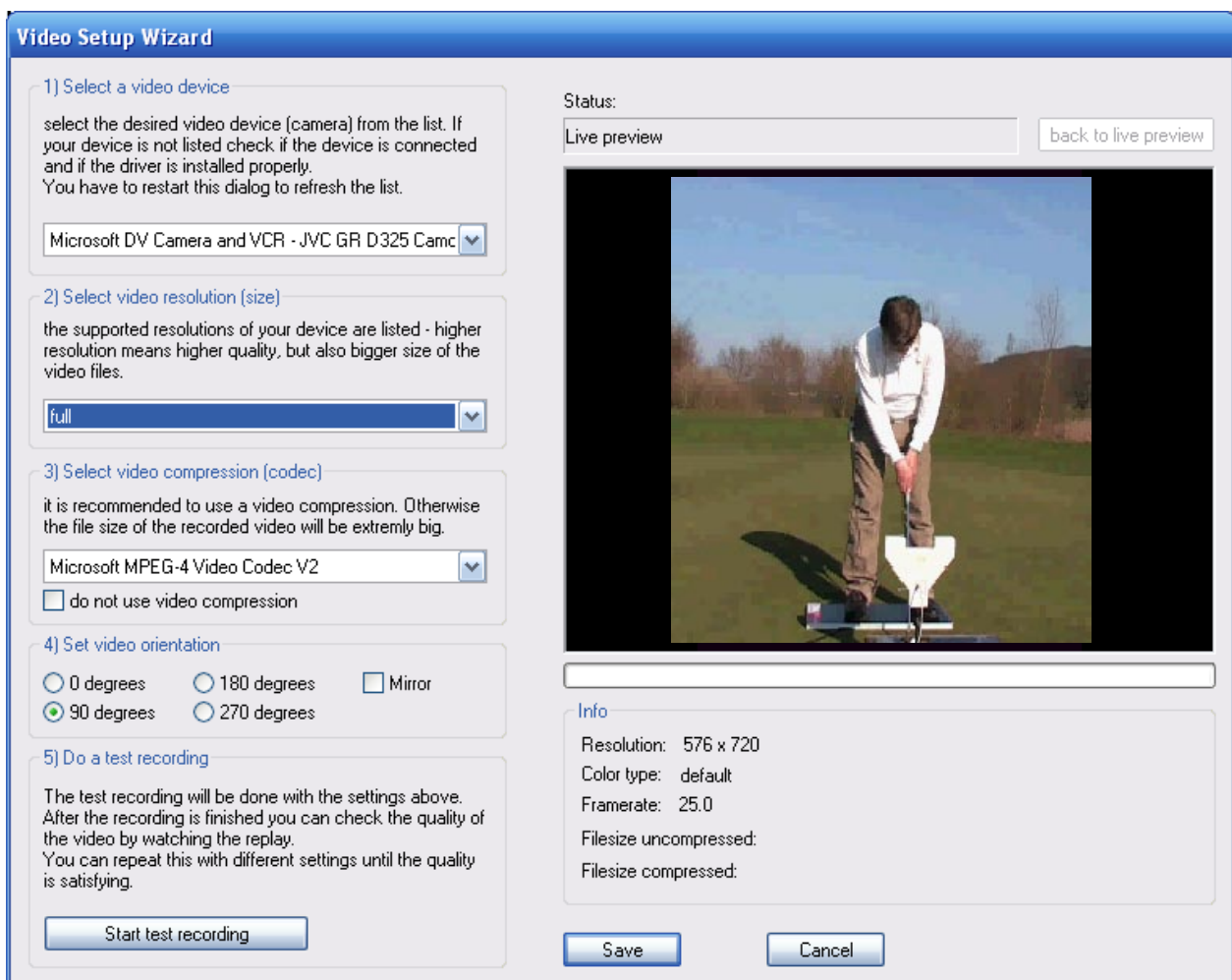
The video recording module of SAM PuttLab includes the following features:

- video capturing from any windows compatible camera (WDM driver). These are nearly all DV cameras and a lot of USB camera models.
- recording video clips in parallel to PuttLab data recording. This means that for each recorded putt there is also a video clip available as attachment to the session data.
- replay of videos with different viewing options (still image, slow motion)
- saving still images out of video stream to Bitmap or Jpeg files
- overlay drawing functions in live view and replay, capturing overlay into recorded videos

The next chapters describe the setup of your video camera and the features of the video module.

4.10.2 Setup your video camera

To setup the video camera the PuttLab software provides a Camera Setup Wizard. To start the wizard go to the "Video" section in the main menu and select "Camera Setup Wizard":



Step 1: Select your video device (camera)

- Be sure your camera is powered and connected to the PC
- Set the camera to recording mode so that the camera provides a live image stream to the PC

In the section **Select a video device** all available / usable video devices are listed. Be sure to have your camera connected to the PC before opening the "Camera Setup Wizard". If your camera is not listed, check if it is installed properly in the Windows environment. Some cameras do not need special drivers, others will do. Please refer to the documentation of your camera to find out how to install and test the camera.

If the camera is listed select it and you should see a live image from the camera show up in the image window on the right (camera has to be in recording mode). If you see a live image please go to step 2. Otherwise close the wizard, check your camera and try again.

Step 2: Select video resolution

Different cameras provide different resolutions. A camera has a native resolution, this is the maximum resolution in most cases and provides the highest video quality. But the videos will also consume maximum space on the harddisk of your system. So a reduced resolution might be good enough and will save disk space.

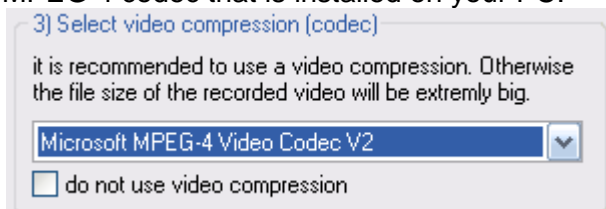
The resolutions provided by the camera are listed in the selection box, so just click on one and you will see the result in the live video window. The window will always be formatted to the same size, so you may not see much of a difference for very high resolutions. It is no problem to change this setting later when you have experience with your recorded videos.

Step 3: Select video compression (codec)

i The video compression is very important to save space on your harddisk. A good codec can reduce the file size of the videos by more than 95% and still provide a good video quality. So having installed a good video compression is very important if you use the video module of SAM PuttLab.

Windows XP:

For Windows XP we recommend to use the "Microsoft MPEG-4 Video Codec V2" or any other MPEG 4 codec that is installed on your PC.



If this codec is not available in the list you can install it from the SAM PuttLab installation CD. Insert the CD into your drive and browse to the content. Open the folder "Video Codecs" and execute the file "WM9Codecs.exe".

After installation and restart of the "Video Setup Wizard" the codec should be listed in the selection box.

Windows Vista:

The codec "Microsoft MPEG-4 Video Codec V2" will not run under Windows Vista, so you need to install a different codec here. We recommend to install the free codec "ffdshow video encoder". To install this codec execute the following steps:

- 1) Locate the installation program.
 - a) you have a PuttLab 2008 installation CD:
 - Insert your PuttLab CD and browse to the folder "Video Codecs"
 - in the folder you should find the file "ffdshow-20051124.exe"
 - go on with step 2
 - b) you don't have a PuttLab 2008 installation CD
 - go to the website www.scienceandmotion.com
 - go to the section "Service" and "Downloads"
 - go to the category "Video codecs"
 - download the "ffdshow" codec installer and go on with step 2
- 2) Execute the installation program from CD or the folder you downloaded it to
- 3) Follow the instructions of the installation program, do not change the default settings.

After installation of the codec restart the PuttLab software and re-enter the "Video Setup Wizard". Your new installed codec should now be listed in the list for the video compression. Select the codec and uncheck the option "do not use video compression".

Step 4: Set video orientation

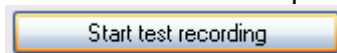
The software provides several options to manipulate the orientation of the video. Normally you would use this for portrait or landscape setting. If you want to record a video in portrait mode you might use the 90° or 270° setting:



If you are in the live mode you will see the result of the settings immediately in the video preview.

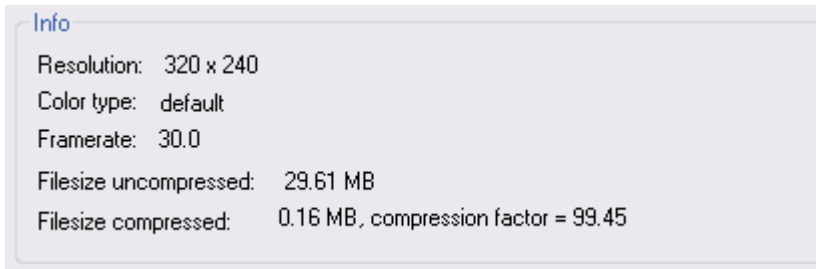
Step 5: Do a test recording

To test the settings it is recommended to do a test recording now. If steps 1 to 4 are set and you see a live video in the preview window press the button:



The software will record a video of 8 seconds length and then compress it automatically (if the compression is not set to OFF, see step 3). Then the video clip is being shown in the preview window. So you will not see live video any more now, you will see the replay of the recorded video with exactly the settings you have set in steps 1 to 4.

After successful recording you will also see some information on the recorded video in the info box on the right:



Very important here is to check the function of the video compression:

Filesize uncompressed will show you the size of the video file in uncompressed mode. The size will be very big also for this very short video clip.

Filesize compressed will show you the file size after compression with the selected video codec. The file size should be very much smaller here – the compression factor should be greater than 90. Also the quality should be acceptable, please check the preview.



To go back to live mode and change settings again press the button

back to live preview

This sequence should be repeated until you are satisfied with the recording quality.



If the compression factor is less than 50 or even negative the selected codec does not work for the combination of this software and camera. Try a different codec in this case:

a) press the button:

back to live preview

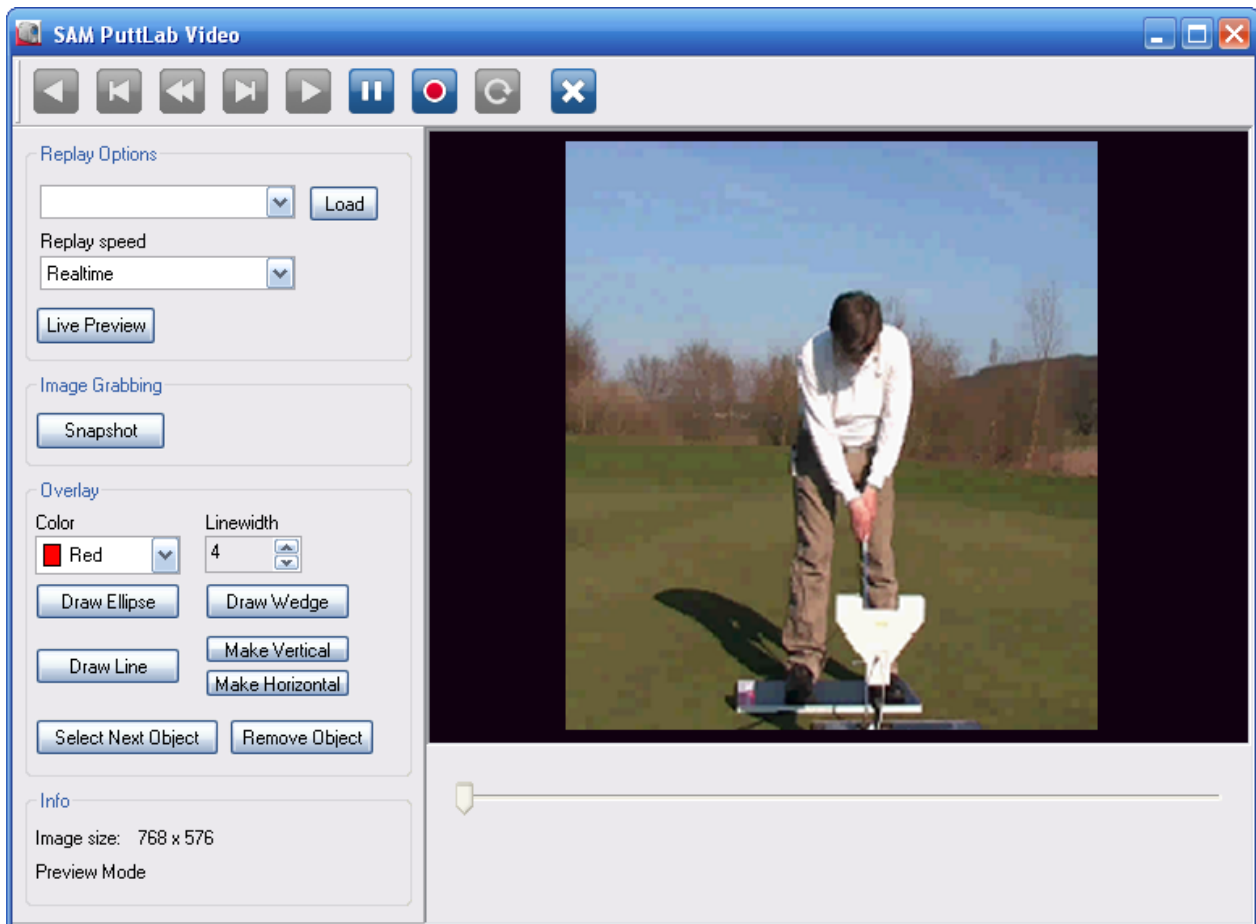
b) select a different codec from the list (step 3)

c) repeat the test recording (step 5).

4.10.3 The video main screen

The video main screen is the control center for all the available video functions:

- video live preview
- video replay
- video recording
- overlay drawing tools
- snapshot image grabbing



To open the video window go to the main menu section "Video" and select "Open Video Window". During putt recording with automatic video recording activated the window will be automatically be displayed or hidden.

If videos are attached to your recordings in the "Media Files" box then you just need to double-click on one video to open this video in the PuttLab video window.

Live preview mode

The initial mode when the video window opens is the **Live preview mode**.

If your video device is connected and configured in the **Video Setup Wizard** (see chapter [4.10.2](#)), then you should see a live preview in the video window.

In the live preview you have the following options:

- a) Start a recording
see section [Video recording](#)
- b) Grab snapshot images
see section [Grab a snapshot image](#)
- c) Use overlay drawing functions
see section [Use overlay drawing functions](#)
- d) Open a video file for replay
see section [Replay Videos](#)



To go back to the live preview mode use the button:



in the "Replay Options" section.

Grab a snapshot image

In the live preview or replay mode a snapshot image can be grabbed from the video stream at any time. These images can be saved as Bitmap (BMP) files to disk.

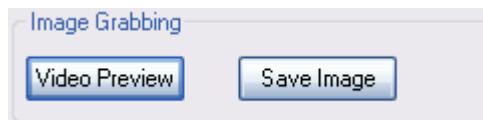
Doing a snapshot is very easy:
Just press the button "Snapshot" in the "Image Grabbing" section.



The preview or replay will stop and you will see a "freezed" image in the window.

To save the image to disk press  the button. A file dialog will ask you for the location where save the file.

To go back to live preview or replay mode just press the "Video Preview" button in the "Image Grabbing" section.



You can use the overlay drawing functions on your grabbed image to draw lines, circles or to measure angles. The overlay drawings will be part of the saved image file.

Details on using the overlay functions you find in: [Use overlay drawing functions](#)

Video recording

When the Recording start button is activated you can start a recording at any time.



The current video device settings will be used (be sure to have configured and connected your video device, see chapter [4.10.2](#)).

After starting the recording the "Recording status bar" should be visible:



The bar shows the current recording status, the length of the video already recorded and the available disk space for the drive where the video is temporarily saved to.

To stop the recording



press again or the pause



button:

After the recording is stopped a file dialog will open and ask where to save the final video file. When you press "Save" the video will be compressed and saved to the final location. Depending on the compression settings and the length of the video this may take a while to finish.

If the video recording time exceeds the time limit given in the video settings, the recording will be stopped automatically to prevent your disk from running full. The recording will also be stopped if your disk space is low.



You can use the overlay drawing functions in your recorded videos to draw lines, circles or to measure angles. The overlay drawings will be part of the saved video clip.

Details on using the overlay functions you find in: [Use overlay drawing functions](#)

Replay Videos

There are two ways to replay videos with PuttLab:

- a) replay videos attached to the putting sessions

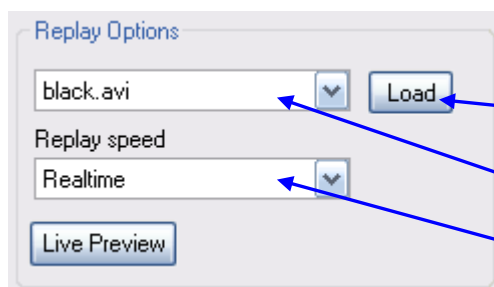
To replay videos that are attached to the putting sessions just double-click the video file in the "Media Files" box on the PuttLab main screen. One or multiple videos will be loaded automatically and the video window will open in replay mode.

The available videos will be listed in the list left of the button "Load" (see picture below).

- b) Replay any video from disk in AVI or WMV format:

To replay a video from disk press the "Load" button in the "Replay Options" section. In the following file dialog browse to your video file and press "Open".

The video will be added to the list and the replay should start in the video window.



"Replay Options" section

load video file from disk

pull-down list of available videos for direct replay

replay seep options (slow motion)

Use overlay drawing functions

The PuttLab video module provides some overlay drawing functions. The overlay can be used in all modes:

- Live preview
- Video recording
- Snapshot images
- Video replay

The following overlay objects are available:

- lines
- ellipses
- wedges with angle displayed



overlay objects example

How to set overlay objects:

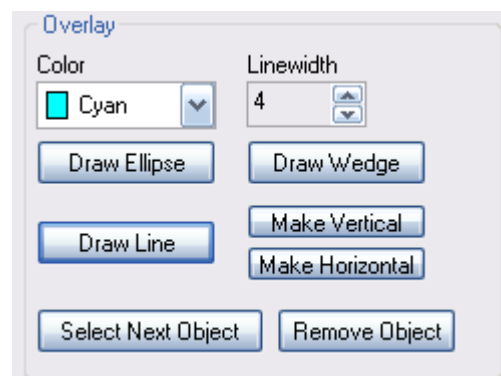
The section "Overlay" provides the controls to add, configure and remove the overlay objects.

For all objects the color and line width can be set.

The **Draw Ellipse**, **Draw Line** and **Draw Wedge** buttons will add an object of the selected type.

The last added or edited object will be the active one, this object can be removed by **Remove Object**.

Select Next Object will set the next object active for changing attributes or removing.



Example:

Press **Draw Line** and a line should appear in the video window with the selected color and line width:



The blue squares on the line are the mouse dragging points to change position or size of the object. In case of the line object the center point will let you change the position of the line, the points at the ends of the line let you move the end points of the line to any position in the window.



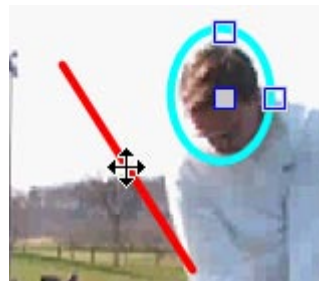
Change the color to "Cyan" and press the button "Draw Ellipse". Move the mouse to the center of the ellipse until the cursor changes to the cross, then press the left mouse button and move the ellipse to the head of the player.



Enlarge the ellipse by moving the mouse to the top square of the ellipse, press left mouse button and move the mouse up/down to enlarge or shrink the ellipse in vertical direction. You can do the same for the horizontal direction on the right dragging point of the ellipse.



To select another object just move the mouse to the center of the object until the cursor changes to the cross and then click the left mouse button. OR: Press the button **Select Next Object** to toggle the selection.



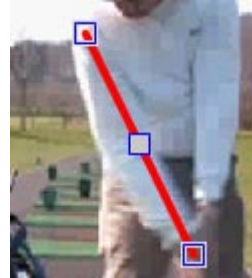
Ellipses:

- Center dragging point will move complete ellipse
- Upper dragging point will stretch/shrink ellipse vertically
- Right dragging point will stretch/shrink ellipse horizontally



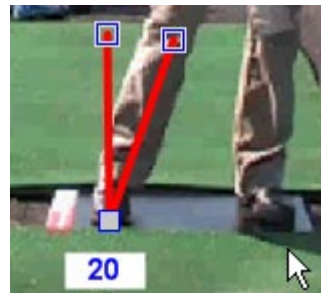
Lines:

- Center dragging point will move complete line
- Dragging points on line ends will move the line end points and stretch or shrink the line
- Button "Make Vertical" will force the line to be 100% vertical
- Button "Make Horizontal" will force the line to be 100% horizontal



Wedges for angle measurement:

- Dragging point above the number display will move the whole wedge object
- Dragging points on the line ends will move the line end points to new positions
- In the text field the angle between the two lines of the wedge will be displayed (0 to 180 degrees)



i If there are overlay objects visible in recording mode the overlay will be saved to the recorded video clip. This is also true when you save a snapshot image, the overlay will be saved together with the image.
If you want to be sure to save images or video without overlay you have to delete the overlay objects before saving an image or recording a video.

4.10.4 Video recording settings

The configuration of the video recording in conjunction with the putt recording is described in chapter [4.4.4](#).

4.11 Viewing the Results

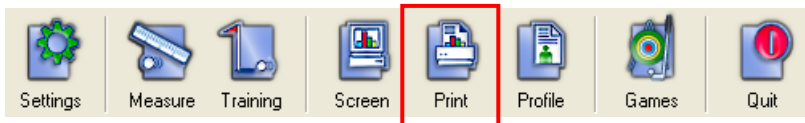
The results are presented in graphic Reports, there are two main options to present the Reports:

4.11.1 Print Report view

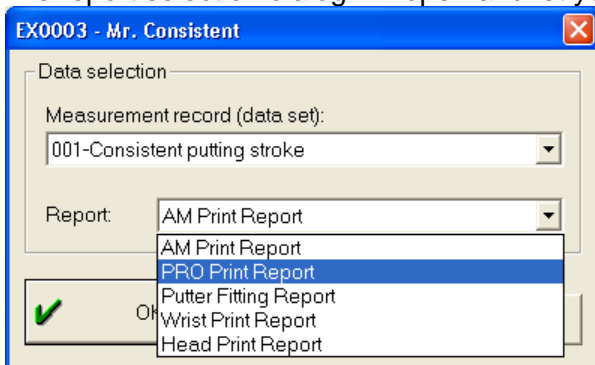
Print reports are not available in the SAM PuttLab Basic edition!

The Print report view shows the Report as multi page document in portrait format. It is good for direct printout or to save a Report as a PDF file.

To open a Print Report click on the "Print" symbol in the toolbar of the main program window:



The report selection dialog will open and let you select one of the available Reports:



After selection of the desired Report and pressing the "OK" button the report will open in the print report view.

In the print report view window you can browse between the pages by using the scrollbar or the page up / page down keys.

Also it is possible to zoom into the Report.

Toolbar function description:



Prints the current Report



Shows a print preview page



Let you open a second dataset in the same report view. This allows a direct result comparison.



Saves the current report to a PDF document



Creates a "on the fly" PDF document and allows to send this directly by email



Switches the mouse to the zoom in cursor – each mouse click on the Report will zoom in then



Switches the mouse to the zoom out cursor – each mouse click on the Report will zoom out then



Zooms to full page display



Zooms to full width display



Zoom factor 33%



Zoom factor 50%



Zoom factor 100%



Closes the Report view window

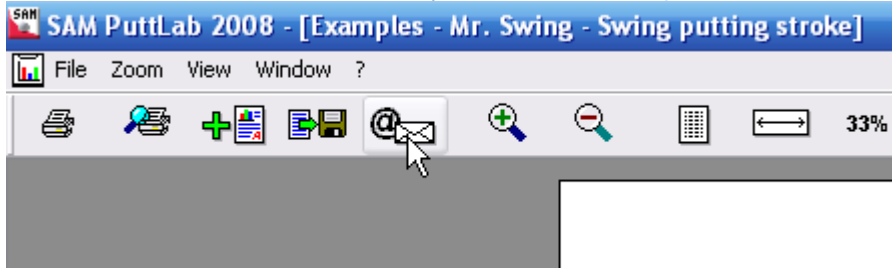


For further details about the content of the report pages and explanations of the graphics please read the document " Reports Manual" or look up the chapter "Reports" in the online help (F1 key).

4.11.2 Direct Report emailing

In the print report window the currently open report can be directly send by email as a PDF attachment.

Press the button with the email symbol to start the process:



If there is already a email address available for the player used in this report this address will be automatically used for the email. If not, a dialog will prompt you for input of a valid email address.

A complete email with the report PDF attached should now open up in your email client program. You can add further addresses, change the subject or body text and send the email.

Configuring default subject and body text:

There are specific settings available to change the default subject and body text of the report email module. So you can use your own texts and even the player's names in your emails.

Please go to 4.4.2 to read how to define individual text for the emails.



The report email module will use your installed email client program to send the email. Be sure to have a email client software installed and set up a user account properly. Email Client programs that work with SAM PuttLab are for example: Outlook, Outlook Express, Mozilla Thunderbird and the Windows Email program of Windows Vista.

To test if it is possible for SAM PuttLab to send emails via the email client program there is a test function available:

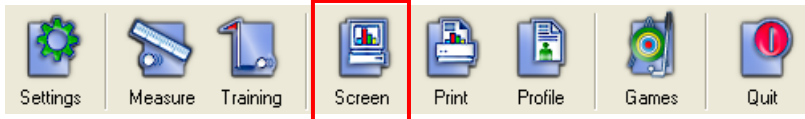
Go to the "Setup" section in the main menu and then to the option "Test email client".

A dialog opens with a given email address "info@scienceandmotion.com" . You can also use any other valid email address for the test. Press "Test Sendmail via Email Client" and your installed standard email program should open up showing you a pre-configured email. If this does not happen the SAM PuttLab is not able to open your email program and you will not be able to send reports emails. It is recommended to check the functionality of your email client program in this case.

4.11.3 Screen Report view

The Screen report view shows the Reports as single pages in landscape format. The presentation of the results is pretty much the same as in the training screen. This Report view does not have a print function, but the layout is optimized for screen display.

To open a Screen Report click on the "Screen" symbol in the toolbar of the main program window:



In the screen report window you can browse between the single report pages by using the buttons on the right screen border. You can also step to the next or previous page by using the arrow up / down keys.

The currently visible page can be saved as a bitmap image to the disk drive or copied into the windows clipboard (Ctrl + c).

It is also possible to browse through the single putt strokes and even to delete strokes from the current dataset. See the following descriptions for details on how to delete strokes.

Toolbar function description:



Saves the current page as bitmap graphics file



Copies the current page graphics to the windows clipboard



Browse one page up in the report page list



Browse one page down in the report page list



Shows all available putts from the current dataset



Switches the display to only one putt from the current dataset. In this case the following buttons will be enabled and it is possible to browse through the single putts by using the forward / backward buttons or the slider.



Step one putt backwards - only active for single putt display



Step one putt forwards - only active for single putt display



Delete the current visible putt stroke - only active for single putt display. After closing the screen report window you will be asked to confirm the deletion of the putts



Opens the 3D putt replay window for the current dataset.

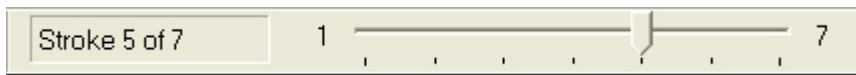


Opens video clips attached to this dataset. If there are no videos available the button will be disabled.



Closes the screen report window

When the single putt mode is activated, the info bar shows information about the current displayed stroke:



↑
currently displayed
putt

↑
slider bar for easy
putt selection



For further details about the content of the report pages and explanations of the graphics please read the document "Reports Manual" or look up the chapter "Reports" in the online help (F1 key).

4.11.4 Competence Profile Reports

Profile reports are not available in the SAM PuttLab Basic edition!

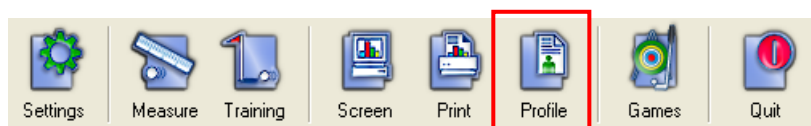
The program also provides two so called "Competence profile reports".

These reports show a rating for the average performance and the consistency for the 8 main parameters.

All ratings are in percent and based on the performance of the Science&Motion database of over 100 tour professionals, mainly from the European PGA Tour.

At the end of the reports an "over-all rating" will be printed out for the categories Technique, Timing, Consistency and Over-All. This gives a quick overview about the performance.

To open a "Competence profile report" click on the "Profile" symbol in the toolbar of the main program window:



There are two competence reports available:

- Personal Competence Profile
Shows the profile for the currently selected dataset on one page.
- Multi Competence Profile
This allows the direct comparison of up to 8 datasets in one report. This is a great feature to compare players or to use this for putter evaluation and selection.

The profile reports will open in the print report view, see chapter 3.8.1 to learn which features this window offers.

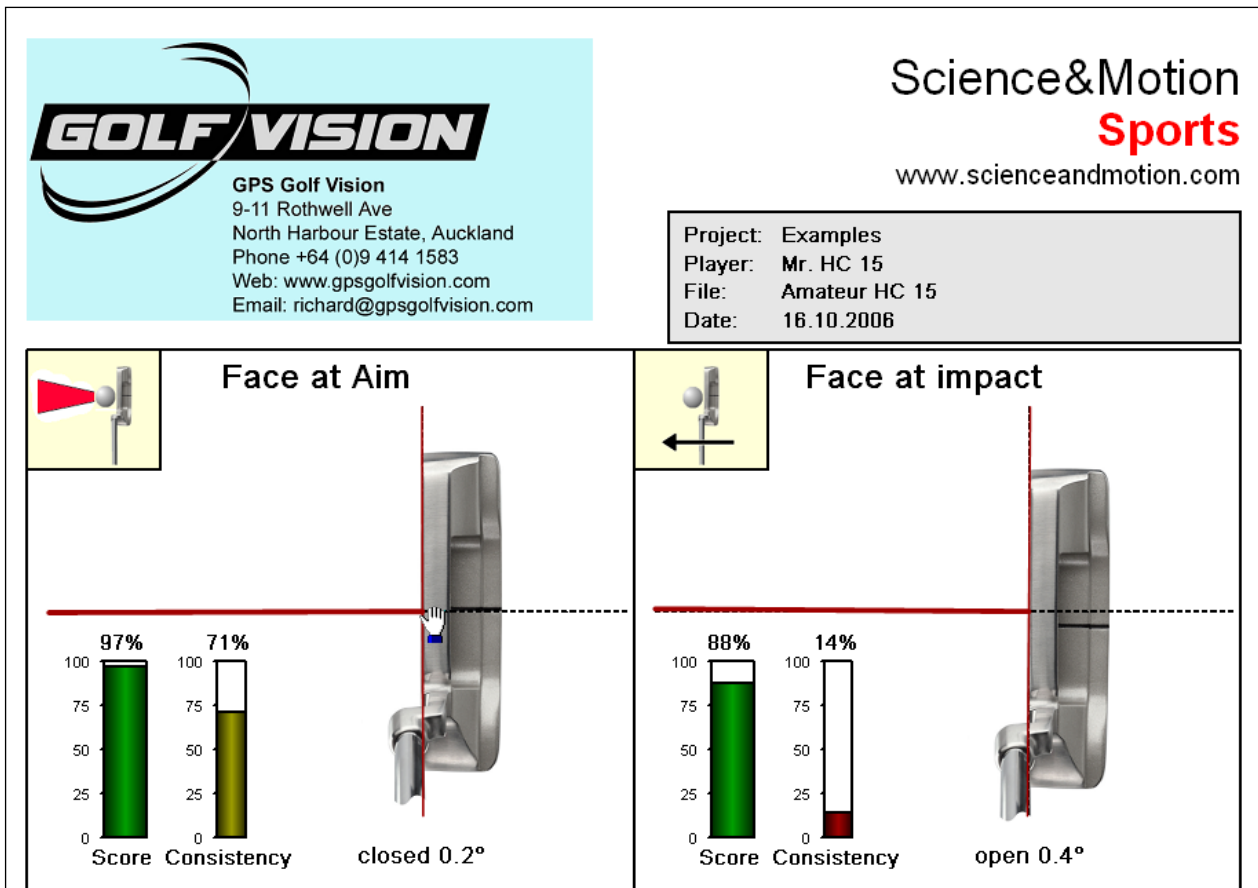
i For further details about the content of the report pages and explanations of the graphics please read the document "Reports Manual" or look up the chapter "Reports" in the online help (F1 key).

4.11.5 Individual report logos

v. 2008 new Individual report logos are new in PuttLab 2008

This feature allows to define different logo graphics in bitmap format (BMP) and easily load them to the print reports header area.

The logos will automatically be placed in the upper left corner of each report page:



The size of the logo will be 8 cm width and 4 cm height (on the printed page).

Features of the SAM PuttLab 2008 report logo module:

- Storage of unlimited number of different logos in the software for later usage
- Logo import function with preview and quality check
- Easily selection of currently active logo with preview

How to create report logos:

The logos have to be in the Windows bitmap format (BMP). Any graphics program like Windows Paint, Corel PhotoPaint many others can save graphics in this format.

To get a good printing quality the graphics should be in 300 dpi resolution. For the size of 8 x 4 cm (or 3 x 1.5 inches) this means the ideal size in pixel would be: 945 x 471 (width x height). The ratio of width to height should be 2 to 1 for optimum display size.

Other sizes or resolutions are also possible to use, but the result may not be satisfying. But it is very easy just to test if an existing graphic is good enough, see next section on how to do this.

i To help you create your own logos there is a logo template file included in the installation of SAM PuttLab. Browse to the PuttLab installation folder (normally C:\Program Files\SAM PuttLab 2008) and search for the file logo_template.bmp. You can open and edit this template file in any graphics program and save it to a different location. Then use the logo import function to use the graphic as report logo.

How to import logo graphics:

To import a logo graphic go to the **Setup** and **Select Report logo** section in the main menu.

The "Select Print Report logo" dialog will open.
The initial setting is to use the PuttLab standard logo.

To import a logo to the list press the button **import new logo bitmap**.

The "Report logo import" dialog opens:

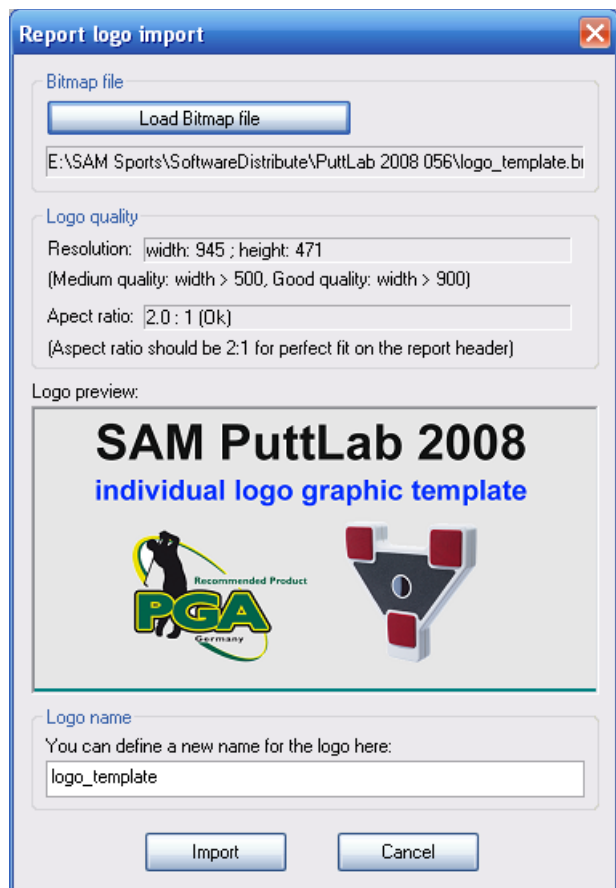
Click on the button **Load Bitmap file**

A file selection dialog will open and let you search and select your bitmap file.

If you already have created a logo then select this file, if not you might use the logo template delivered with Puttlab. Browse to the PuttLab installation folder (normally C:\Program Files\SAM PuttLab 2008) and select the file logo_template.bmp.

You should see the selected logo graphics in the preview like in the sample on the right.
In the preview the logo will be shown in the same size and aspect ratio like on the reports.

In the **Logo quality** section there will be some additional information about the quality of the resolution and the aspect ratio of the original graphics file.

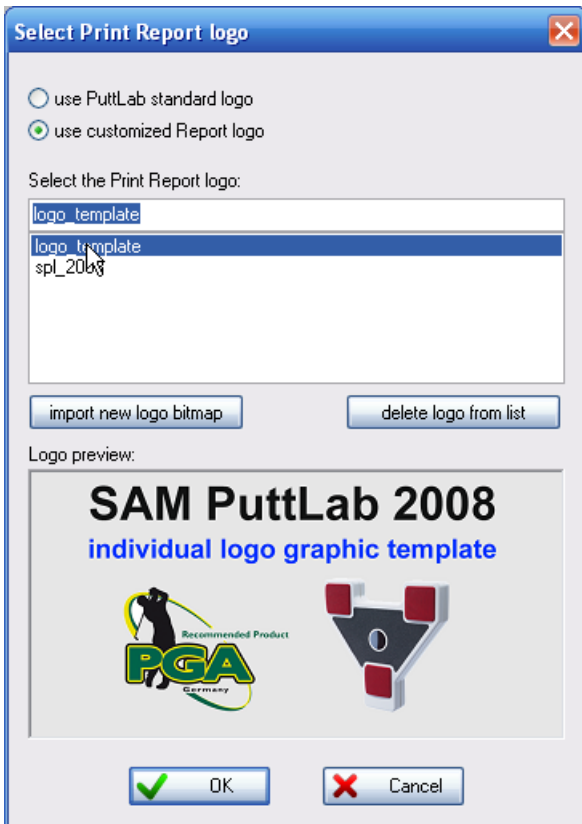


If you are satisfied with the quality of the displayed logo you have the option to give the logo a name in the **Logo name** section.

Then the press the **Import** button and the new logo will be added to the list of available logos in the "Select Print Report logo" dialog..

How to select logo graphics for display in reports:

To select a logo go to the **Setup** and **Select Report logo** section in the main menu. The "Select Print Report logo" dialog will open:



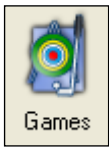
You will see a list of all available logos.

- click on the option **use customized Report logo**
- select the desired logo in the list
- check the logo in the preview display
- press OK button to set the logo active for display on the reports

i If you want to display the SAM PuttLab original logo just set the option **use PuttLab standard logo** on the top of the dialog.

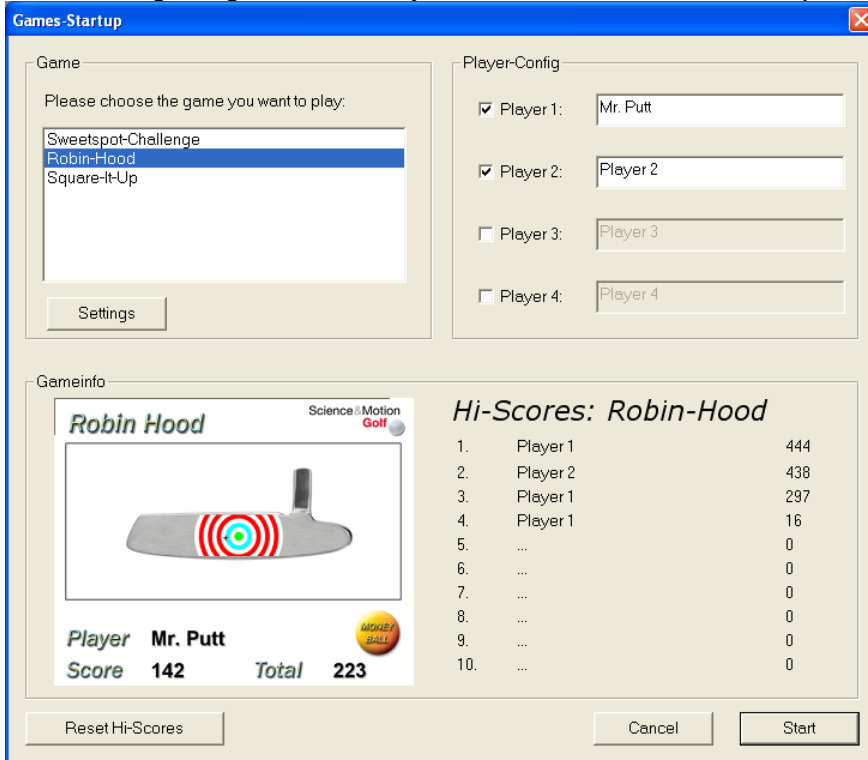
4.12 Putting Games

Games are not available in the SAM PuttLab Basic edition!



Three games come with SAM PuttLab. They can be accessed via the "Games" icon in the toolbar or in the main menu under "Tools".

After starting the game module you will see the Games-Startup dialog:



Games-Startup screen

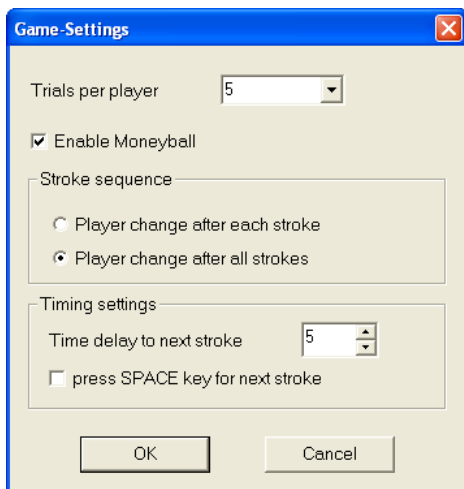
Under "Game" you can choose between the three games "Sweetspot-Challenge", "Robin-Hood" and "Square it up". On the right side you can select how many players take part on the game and set their names.

In the "Gameinfo" box you can see the Hi-Score list for the selected game.

You can reset the Hi-Scores by clicking the "Reset Hi-Scores"-button.

4.12.1 Game Settings

With the "Settings" button in the Game box you can open the "Game-Settings" dialog. Here you can set several options that control the behavior of the games.



Game-Settings

Trials per Player – Choose the number of putts that each player has to do.

Enable Moneyball – If this option is checked, the score of the last putt will count double. This will raise the pressure to do an extra-good stroke.

Stroke sequence

Player change after each stroke – after each stroke the player will change to the next in the sequence.

Player change after all stroke – one player will do all his strokes in a row before the next player is requested.

Timing Settings

If the option "press spacebar for next stroke" is checked, the program will wait until this key press before the current display is erased and the display for the next player will be loaded. This is a good option if you like to have a deep view on your results after each stroke.

If this option is not checked the next players display will be loaded after the time defined in the field "Time delay to next stroke". The default value is 5 seconds here. If you need more time to view the results you may increase the value. This is the time you will see your last stroke's result on the screen before it will be erased to show the next stroke.

4.12.2 Games description

After you selected a game and defined the players click the "Start"-button to start the game.

If you haven't used PuttLab in measure- or training-mode before, you maybe need to calibrate the system (read chapter [4.5](#) for details on calibration).

Sweetspot-Challenge

The goal of this game is to hit the ball as close as possible in the horizontal "sweet spot". On the screen a clubface is displayed, the hit positions will be drawn to the clubface so that you can check your performance during the game. If you hit the ball absolutely in the "sweet spot" you will get a score of 100 points, the farther the hit point is away from the "sweet spot" the more the score will be reduced.



i The "sweet spot" position will be set by the last system calibration. So be sure to have done an accurate calibration for the horizontal "sweet spot" of your putter before playing the "Sweetspot Challenge" game.

After all players completed the trials the final results for every player and high scores are displayed.

Robin-Hood

The goal of this game is to hit the ball as close as possible in the horizontal and vertical "sweet spot". On the screen a bull's eye is displayed, the center marks the "sweet spot" of your putter. Compared to the "Sweetspot-Challenge", "Robin-Hood" also measures and scores the vertical deviation.



During the game the hit positions will be drawn as colored crosses onto the bull's eye, so you get instant feedback on your strokes performance.

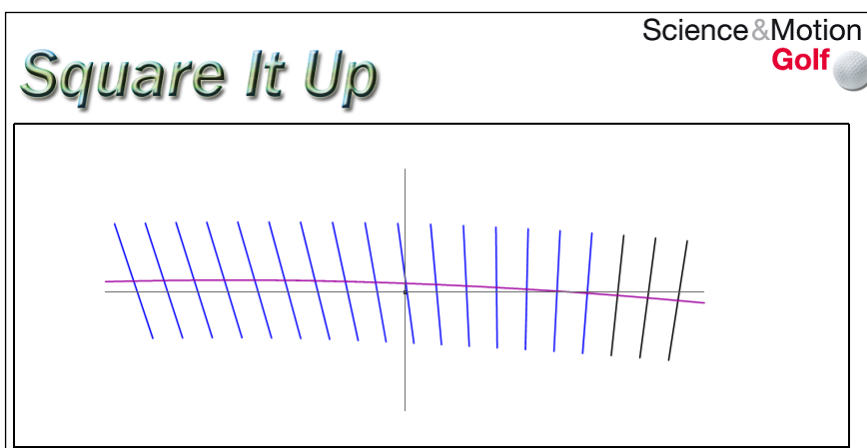
i The "sweet spot" position will be set by the last system calibration. So be sure to have done an accurate calibration for the "sweet spot" position of your putter before playing the "Robin Hood" game.

After all players completed the trials the final results for every player and high scores are displayed.

Square it up

In the "Square it up" game the goal is to be square to the putter path with the clubhead around the impact point. This is a very important parameter for a successful putt stroke.

On the screen you will see a graphic that shows your path over a length of 30 cm / 12 inch around the impact point. Over the path line there are drawn lines that represent the clubface alignment in the particular position. If the angle is in a range of ± 1.5 degrees of the path direction the line color will be black. Opening alignment will be indicated by red color, closing by blue color.



4.13 3D Putt Replay

The *3D putt replay* function visualizes the movement of the club in an animated graphics window. The window offers many options to configure the replay to your personal needs:

- 3D or 2D view
- selectable view direction – front view, top view, side view
- different replay speeds
- different zoom modes to view details
- live display of data values for the current position
- permanent replay mode
- path line display

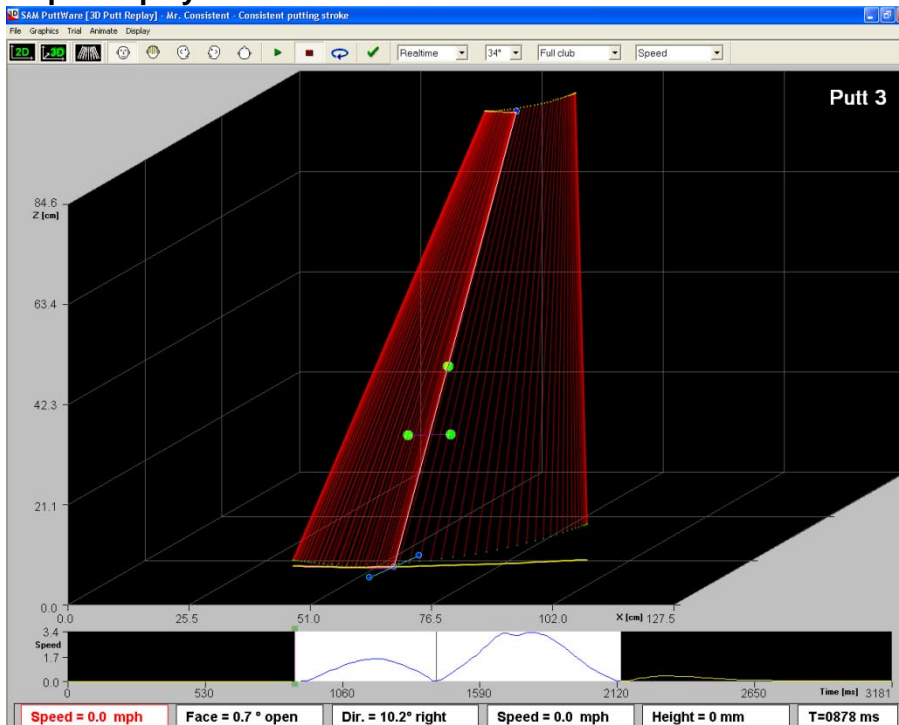
i The full functionality of the 3D putt replay is only available in the Pro Edition. The Standard Edition only features a restricted functionality!

The *3D putt replay* can be started:

- from the main window for the currently selected dataset. Use the "3D Replay" button to start.
- from the screen report window for the currently displayed putt(s). Use the toolbar button with the green "play" symbol to start.
- directly from the training mode for the last stroke. Use the toolbar button with the green "play" symbol to start.

4.13.1 General overview

3D putt replay widow:



The window includes 3 areas for different information:

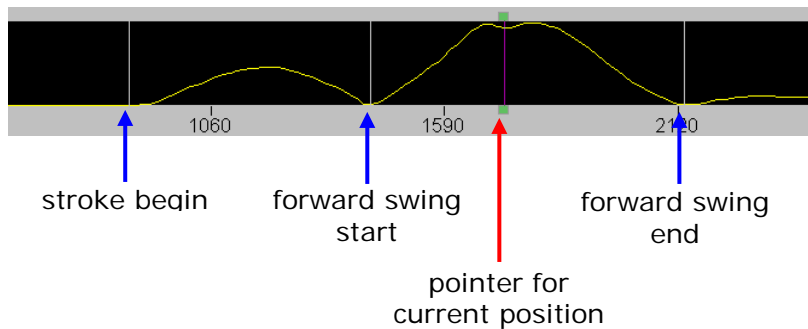
1) The main replay graphics display

Here you will see the putt stroke replay. Depending on the settings it will show a still graphic or an animation. The view can be switched to 3D or 2D display. Details like stick lines, path line, triplet display or ball display can be switched on or off.

If a dataset contains more than one putt you can browse through the putts by using the page up / page down keys. The current displayed putt is always shown in the right upper corner of the window.

2) The time bar display

The time bar display will show a data curve for the currently selected data value. Highlighted in white color you will see the part of the stroke that is selected for the replay. Only the highlighted portion of the stroke will be used for the replay. If nothing is selected the whole movement will be displayed.

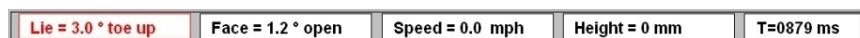


To select a part of the stroke for the replay use the arrow up / arrow down keys. They toggle through the possible pre defined ranges. To select a user defined range click with the right mouse button in the time bar area and move the mouse to the left or right. Release the mouse button for selecting the marked range.

If you click in the time bar with the left mouse button, you can set the position manually and move it around. In the replay graph the putter will move synchronized to the mouse movements.

3) The data value display

At the lower end of the screen the data value bar is displayed. Here you can see live data values for the important parameters. The value represents the current position of the putter that is shown in the graph.



The first value in red shows the currently selected data value for the time bar. You can select this parameter in a listbox in the toolbar at the top of the window.

The last value shows the current time in milliseconds.

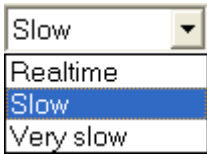
4.13.2 Functional description

Toolbar options:

-  Switch to 2D view
-  Switch to 3D view
-  Activate stick lines – lines for the putter positions will stay visible to show the whole movement pattern.
-  Front view – look from position in front of the player
-  Back view – look from position behind the player
-  Side view right – look from position right of the player
Only available in Pro Edition
-  Side view left – look from position left of the player
Only available in Pro Edition
-  Top view – look from position above the player
Only available in Pro Edition
-  Start replay animation
-  Stop replay animation
-  Activate endless play mode – replay will start again until "Stop" is pressed.
-  Close the 3D replay window.

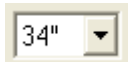
Description of the listbox options

1) Replay speed



Here you can specify the replay speed of the animation. "Realtime" means this is the original speed of the putt – in most cases this would be too fast to see what really is happening during the stroke. The default setting is "Slow".

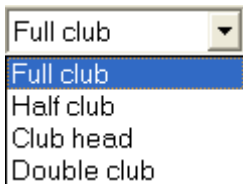
2) Putter length



To ensure a realistic display of the putter you can select the shaft length in this listbox.

3) Zoom mode

Only available in Pro Edition



In this selection you can specify the zoom mode for the replay display.

"Full Club" means that the putter is displayed in full shaft length.

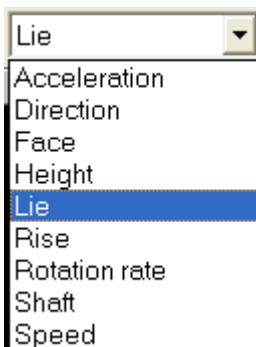
"Half club" will show only the half of the shaft length – you will see a bigger view of the club head in this case.

"Club head" means that the display is reduced to the club head and a very small portion of the shaft – very detailed view of the club head.

"Double club" – this is a special view where the shaft is virtually extended to double length. The crossing of the lines will show if the putt stroke has a pendulum characteristic or if the putter movement is more a "shift" from left to right.

4) data value selection

Only available in Pro Edition



One parameter value out of this list can be selected for additional display in the "data value display".

You will then see the actual value for this parameter in the leftmost field of the data value display line.

Additionally the selected parameter will be printed as data curve to the "time bar display".

4.14 Keyboard-Shortcuts

The Keyboard shortcuts can be used to navigate through SAM PuttLab without having to use a mouse.

Main Menu

| | |
|-----|-----------------------------------|
| N | – create a new player |
| M | – start a Measurement |
| T | – start a Training |
| F1 | – display Online Help |
| F2 | – Project management |
| F3 | – Player management |
| F4 | – Session management |
| F5 | – start a Measurement |
| F6 | – start a Training |
| F7 | – open Screen Report dialog |
| F8 | – open Print Report dialog |
| F9 | – directly opens AM Print Report |
| F10 | – directly opens PRO Print Report |

Measurement / Training screen

| | |
|-----------|--|
| C | – system calibration |
| I | – display Measurement log |
| S | – save data & exit Measurement |
| Ctrl + F | – switch Feedback sound on/off |
| Backspace | – delete last stroke |
| Spacebar | – start manual recording |
| Enter | – stop manual recording |
| ESC | – abort Measurement, discard recorded data |

Within the Training you can switch between the result views directly using the numerals 1 to 9 or browse through the views with the page up / page down or up / down keys.

5 SAM PuttLab Pro Features

Features described in this chapter are **only** available in the SAM PuttLab Pro product edition!

The Pro edition of SAM PuttLab includes the following extra features that will be described in this chapter:

- additional data channel (for **wrist** or **head** movement measurement)
- very detailed data analysis functions
- data export to database file (dBase format)

5.1 Head and Wrist Measurement

The additional sensor delivered with the SAM PuttLab Pro enables an additional data channel for measurements. By default there are 3 channels available on the Triplet to record the movement of the club.

Since version 2.0 of the SAM PuttLab the additional sensor can be used for **wrist/hand** or **head** movement measurements.

The next sections describes how to attach the sensor, how to execute measurement or training and how to open the special result reports for wrist and head measurement.



Attention:

The sensor and the cable are build with extreme light weight materials, so be very careful in handling these parts. Never pull the sensor cable !

5.1.1 Wrist measurement

To execute a measurement or training with additional **wrist** measurement you need:

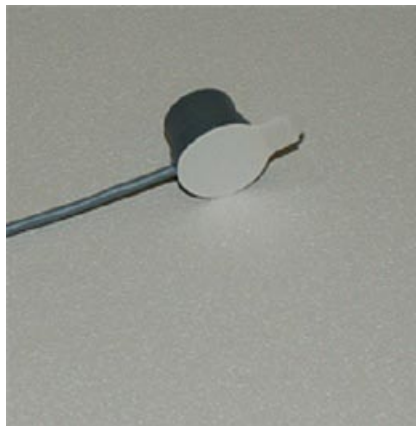
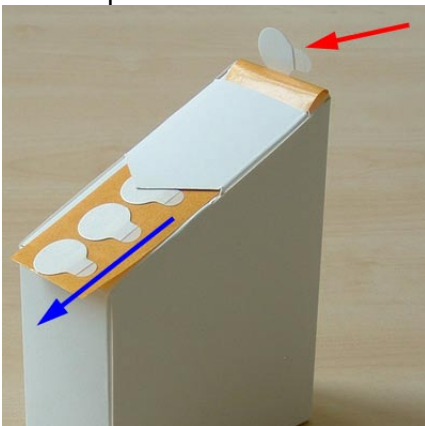
- a) additional sensor
- b) double sided stickers for sensor fixation on hand



a) Prepare the sensor:

The sensor itself can be attached to the target position on the hand by using the double side adhesive stickers which are delivered with your SAM PuttLab Pro.

See the pictures:



Pull the band with the stickers out of the box so that the next sticker will show up (left picture). Take the sticker and stick it to the backside of the sensor (right picture)

b) Attach the sensor to the hand:

Remove the paper from the backside of the sticker and stick the sensor to the hand like shown in the picture below:

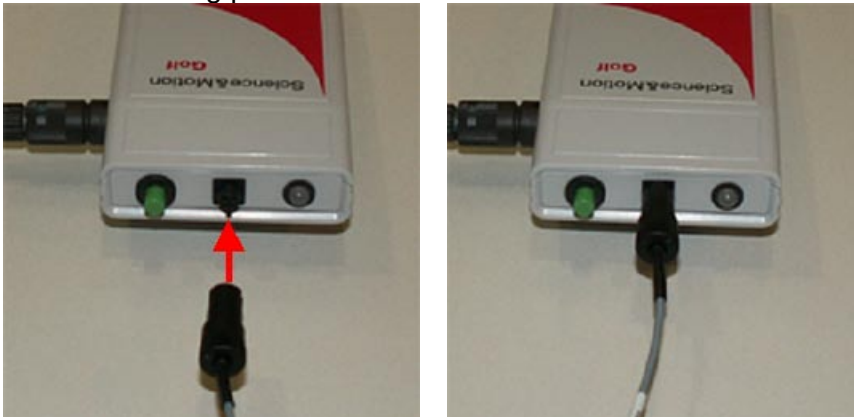
The sensor has to point in direction of the basic unit (front).
The cable should hang down in a loop to be sure to not disturb the movement.



c) Connect sensor to battery clip:

The plug at the other end of the sensor cable has to be plugged into the jack on the topside of the battery clip.

See the following pictures:



Attention:

When you remove the plug from the battery clip do not pull the cable itself. Only pull the plastic plug!

If the cable is too long, you can loop it around the battery clip one or two times like shown in the next picture:



5.1.2 Head measurement

To execute a measurement or training with additional **head** measurement you need:

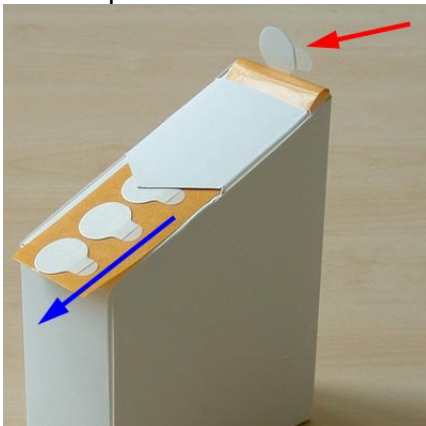
- additional sensor
- SAM head band
- double sided stickers for sensor fixation on head band



a) Prepare the sensor:

The sensor itself should be attached to the target position on the head band by using the double side adhesive stickers which are delivered with your SAM PuttLab Pro.

See the pictures:



Pull the band with the stickers in direction of the blue arrow until the next sticker shows up (left picture).

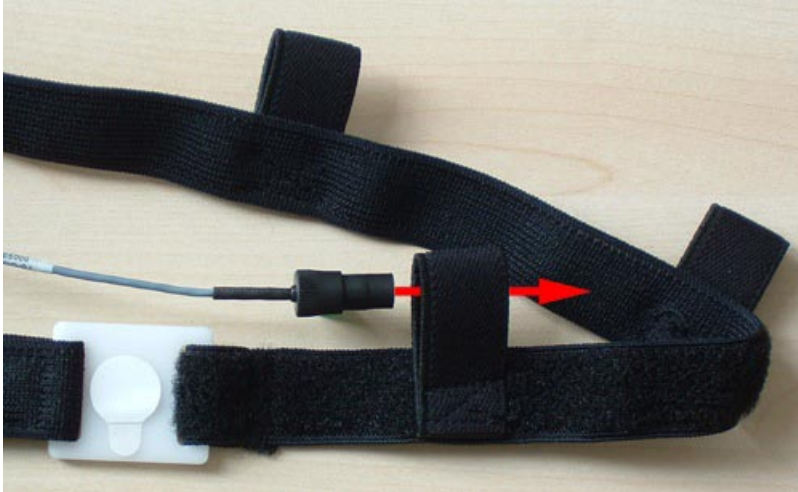
Take the sticker and stick it to the backside of the sensor (right picture)

Do not touch the adhesive area of the sticker to avoid poor sticking.

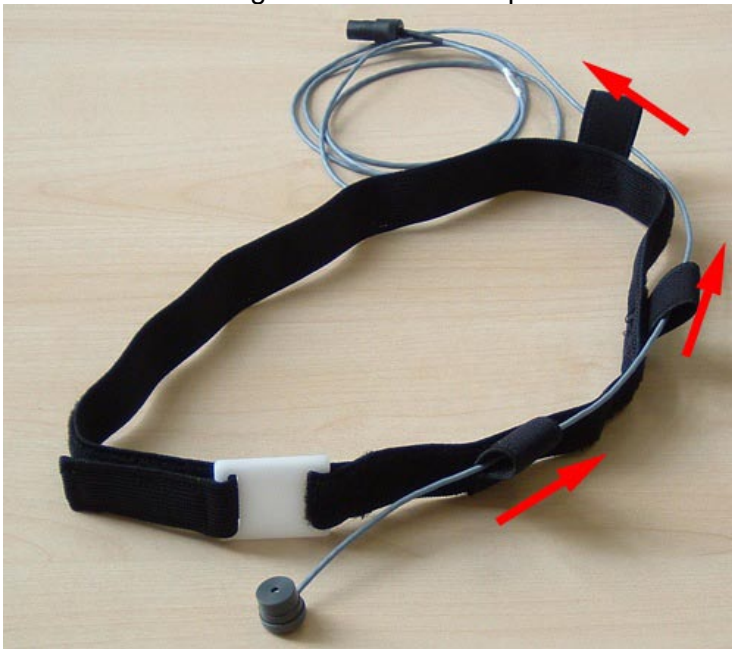
b) Prepare the head band:

The head band has a plastic plate which holds the sensor. On the side the band has three loops that hold the cable and lead it to the back of the head. The first step is to pull the cable through the loops so that the sensor is on the side of the plastic plate at the end.

See the following picture:



Pull the cable through the two other loops as well:



Remove the paper from the backside of the sticker that is already attached to the sensor head and stick the sensor head onto the plastic plate like shown in the next picture:



c) Attach the head band:

The head band is made of elastic material and will fit for most people without adjusting. The best way to attach the band to the head is as follows:
place the plastic plate to the center of the forehead, sensor showing to the front.
Then pull the band over the head to the back so that it fits properly. The cable should be on the left side and going down from the head to the battery clip over the back of the person.

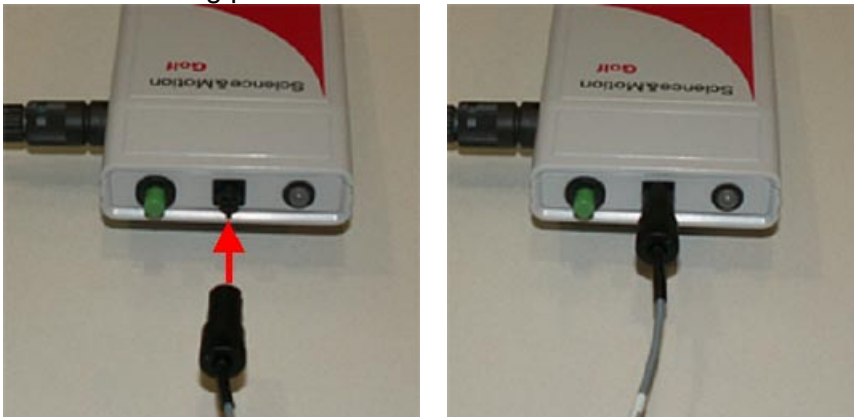
If it is too loose or too tight the band can be adjusted by opening the Velcro fastener at the right side of the plastic plate. Then adjust the band to the right tightness (while holding the plastic plate at the same position) and reattach the Velcro.

i Be sure there is no hair in front of the sensor during the recording of the putts. This will affect the recording and may cause putts not to be recorded!

d) Connect the sensor to the battery clip:

The plug at the other end of the sensor cable has to be plugged into the jack on the top side of the battery clip.

See the following pictures:



Attention:

When you remove the plug from the battery clip do not pull the cable itself. Only pull the plastic plug!

5.1.3 Measurement and Training with HEAD or WRIST sensor

The following steps will show you how to do execute a measurement or training with hand or head sensor:

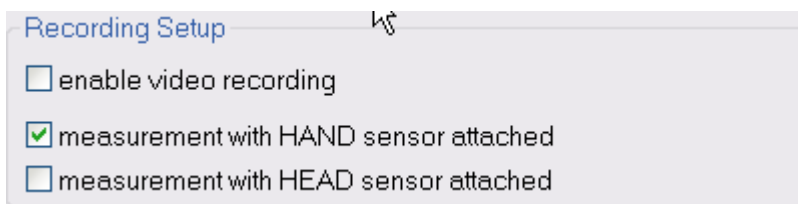
1) Prepare and connect the sensor

See chapter [Wrist measurement](#) or [Head measurement](#) on how to prepare the hardware.

2) Switch on the external sensor in the software

For a measurement or training with WRIST or HEAD measurement you have to enable the external sensor in the software.

Since version 2008 you can switch on or off the external sensor directly in the startup dialog for a measurement or training:



To enable the sensor the box 'additional **Hand** sensor' or 'additional **Head** sensor' has to be activated.

3) Start Measurement or Training session

Start your Measurement or Training the same way you do without using the external sensor.

Note: If you start a Training, be sure to select the "Wrist Training" or "PRO Training Head" reports to see the special report pages.

4) Check the functionality of the external sensor

If the 'Hand sensor' or 'Head sensor' option is activated and the external sensor is plugged to the system the movement data for the additional channel will be recorded by the system automatically. There is nothing different in the execution of Training or Measurement compared to the normal mode.

Just be sure that the status signal for the additional channel lights green when recording data. You find the signal in the toolbar at the top of Measurement and Training window:



Check the status of the symbol in the toolbar:

Not visible: external sensor is not activated; the system will only work correctly if additional marker is not plugged to the system.

Red: external sensor is activated; the system will only work correctly if additional marker is plugged to the system. The red color indicates that currently no signal is received from the sensor.

Green: external sensor is activated and data signal is currently received from the sensor.



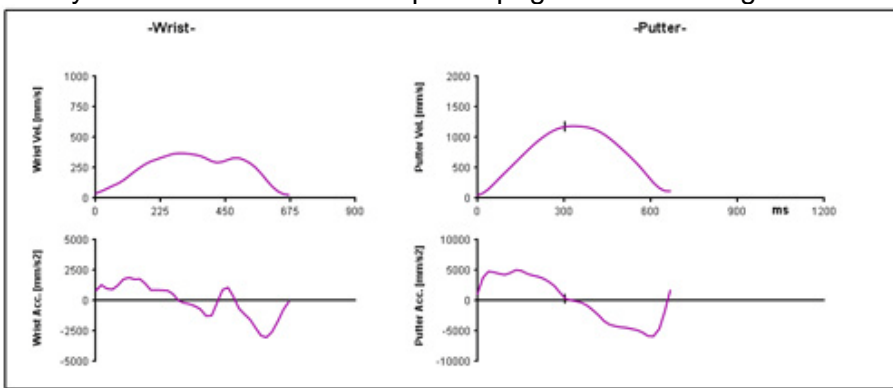
Please note: If the option 'Hand sensor' or 'Head sensor' is selected in the software and the sensor hardware is NOT connected to the system the software will deliver incorrect data signals. This will also happen if the additional sensor switch is off but the sensor hardware is connected to the system. As a result of this the software will show data errors or 'No data signal' error message when you enter the measurement or training mode.

5.1.4 WRIST measurement reports

Training:

When you start a Training session you can select the "Wrist Training" report in the list of the start up dialog.

Then you are able to view one special page in the Training screen:



It shows the speed (velocity) and acceleration of the wrist versus the putter.

Print report:

When you start a Print report you can select "Wrist Print Report" from the list and you get a two pages report showing the wrist measurement results.

This Report provides information on the following parameters:

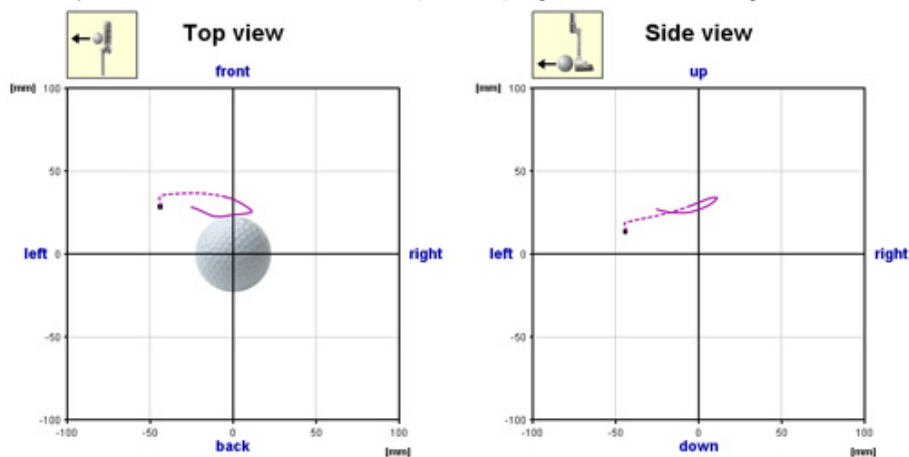
- Path curves (top view)
- Rotation
- Change of Rotation
- Wrist speed and acceleration
- Putter speed and acceleration

5.1.5 HEAD measurement reports

Training:

When you start a Training session you can select the "PRO TrainingHead" report in the list of the start up dialog.

Then you are able to view one special page in the Training screen:



This report page provides the following information:

- head address position (relative to moment of calibration)
- head move during back swing (dotted line)
- head move during forward swing (solid line)

Print Report:

When you start a Print report you can select "Head Print Report" from the list and you get the 5 pages Pro Report and an additional page with the head measurement results.

This page will provide the same information as shown above in the Training section.

5.2 Extended data analysis functions

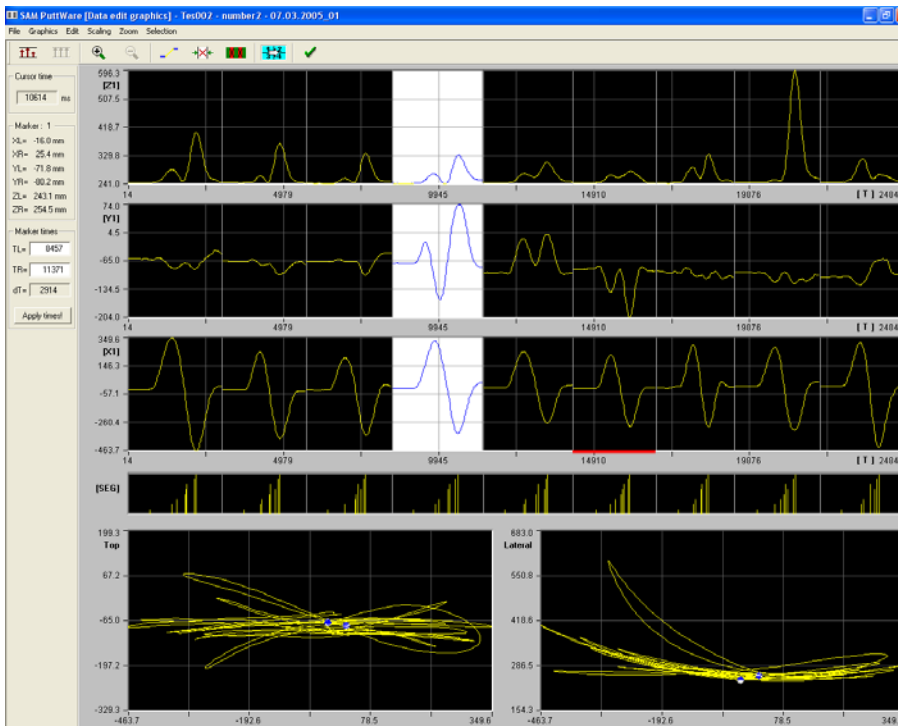
Only available in the SAM PuttLab Pro product edition!

The Pro edition of SAM PuttLab features some extended data analysis functions. These functions allow to view, edit and export the data in a very detailed way.

5.2.1 The data edit window

In the analysis of longer data registrations it may be useful to open the data edit window for further analysis. The data edit window will show the raw data of all Trials of the currently selected data set. In the graphical data window selection the raw data is displayed on the screen in all 3 dimensions and two projection planes for one marker at a time. A selected data range remains valid until a new window is defined or a new data file is loaded.

To open data edit window execute the "Data edit window" command in the main menu under "Analysis".



The positional raw data of one marker is displayed in 5 graphs. The upper three graphs display the time courses of [Z/T], [Y/T], [X/T] and the lower two graphs display the planes [Z/Y] (sagittal) and [Z/X] (frontal). The graphical selection of a data range is supported by menu commands, by a toolbar which is positioned under the menu bar, and by a dialog bar at the left side of the screen. In the dialog bar informations on the selected data range, on the corresponding data values, and on the position of the cursor are displayed. One data file may contain several trials of data registrations. The trials are separated in the time graphics by vertical lines. Errors in the data are indicated by small red arrows at the lower side of the time graphs. The errors are displayed in the data curves by red color, errors corrected by the software are displayed in magenta color.

Setting time marks

A data range is selected by marking a data area with the mouse cursor. Therefore the mouse cursor has to be positioned in one of the upper time courses Z/T, Y/T or X/T. The selection mode can be switched between *cursor selection* and *trial selection*.

Cursor selection

A data window is marked by pressing the left mouse button at the start of the data range and then moving the mouse cursor with pressed mouse button to the end of the data range. The selected data range is displayed in an inverted color. In the two lower curves the position of the time marks are displayed by small circles. If the mouse cursor is moved over a selected data range, the selection can be adjusted by moving the mouse cursor with the left mouse button pressed. If the mouse cursor is displayed as a cross, the whole data range is moved, if the mouse cursor is displayed as a horizontal arrow, only the corresponding time mark is moved.

Trial selection

A complete trial is selected if the right mouse is clicked into the trial.

Cancel selection

A selected data window can be canceled by pressing the right mouse button or by clicking in an area besides of the selected data window.



If the data file contains only one trial, at start of the data window selection the complete data is selected. To cancel the selection the right mouse cursor has to be clicked into the lower plots.

Scaling

Normally all three time curves are scaled to their maxima. The setting "ScaleEqual" sets all three time curves to an equal scaling. The equal scaling allows to easily to identify the main movement direction.

Interpolation

A linear interpolation can be applied to the data to exclude data errors from the analysis. Before interpolating the data the errors have to be selected as data window. For few data points the zoom function may be used. Then the interpolation button is pressed. The interpolated data is marked as data errors.



A linear interpolation is not a good error correction, as the behavior in the velocity and in the acceleration signals is not controlled. However, the linear interpolation can limit the errors and keeps the automatic scaling in the range of the movement.

Zoom

If a valid data window is selected, the data window can be zoomed in the time graphs. In the zoomed display mode all window functions are accessible, like interpolation, further zooming, or the selection of a data window. The zoomed display can be reset with the "UnZoom" button.

Time values

The time values of the data window selection are displayed in the left dialog bar in ms. In the upper part of the dialog bar the time value that corresponds to the actual cursor position is displayed independently of the data window selection.


Numerical time selection


The position of the time marks can also be set numerically. First the times have to be entered into the two time value fields in the dialog bar. If the button [Apply times] is pressed, the time marks will jump to the positions that correspond to the defined time values.


The data edit window toolbar:





The toolbar provides direct access to the following functions:


- 


Scale equal
All three time curves are displayed with an equal scaling.
- 


Scale max
All three time curves are displayed with dynamical maximum scaling.
- 


Zoom in
If a valid data window is selected, the data window can be zoomed in the three time curves.
- 

Zoom out
The zoom-mode is terminated. All data of the data file is displayed unzoomed again.
- 

Interpolation
If a valid data window is selected, a linear interpolation can be applied to the data, to exclude errors from the analysis. The interpolated data is marked as errors.
- 

Delete trial
Deletes the actual (selected) trial from the current data set.
- 

Delete errors
Deletes all trials which contain errors from the current data set.
- 

Step to four plot window
The program steps directly to the four plot window. The currently selected data range will be displayed in the four plot view!
- 

Select data range and exit
If a valid data range is selected, further data analysis in SAM PuttLab is restricted to this data range. The data edit window will be closed.

The data edit window dialog bar (left side):



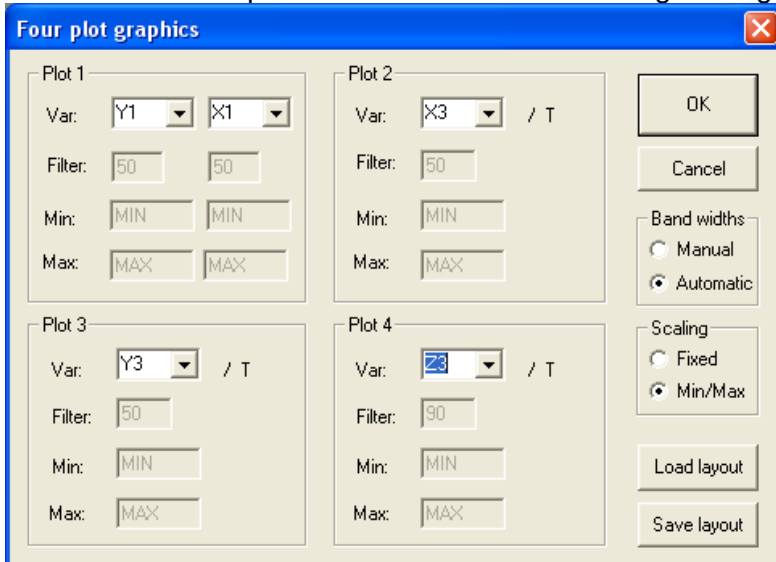
- Cursor time:**
current cursor position in [ms]
- Marker:**
The data values of both time marks are displayed for the three time curves.
- Marker times:**
T1 - Time of the left time mark in ms
T2 - Time of the right time mark in ms
- Apply times:**
The position of the time marks can also be set numerically. First the times have to be entered into the two time value fields in the dialog bar. If the button [Apply times] is pressed, the time marks will jump to the positions that correspond to the defined time values.

5.2.2 The four plot window

In the four plot window up to 4 data curves are displayed at a time. In the upper left plot two variables (no time courses) can be plotted against each other (movement traces or phase plots, i.e. acceleration Y1 / velocity Y1). The other three plots display time courses of a variable. Time marks can be set in the graphs and can be simultaneously moved. All corresponding data values are displayed and can be stored in a result file. For detail analysis a data window can be selected and be zoomed. Especially the display of four plots at the same time allows exact analysis of the relations between the movement properties and the corresponding velocity and acceleration signals. To inspect the place with the highest velocity, the maximum in the velocity curve is clicked with the left mouse cursor. In all time curves a synchronous time mark is now inserted. In the movement trace or in a phase plot the corresponding position can be identified by a small colored circle. The systematic search for places with a zero velocity is also very useful, because here the movement direction is inverted (not in the absolute velocity). If the acceleration is "0", the velocity is inverted. To identify the zero crossings better zero lines are inserted into the plots.

To open the four plot view execute the "Four plot window" command in the main menu under "Analysis".

Each time the four plot window is started the settings dialog will open up:



This is a quite complex dialog which controls the behaviour of the four plot window:

Plot 1

Selection of two variables for a X/Y graph. This can be the projection of the movement trace of a marker (i.e. sagittal projection Z1/Y1) or a phase plot (i.e. V1/A1). If the scaling mode is set to "fix" or the bandwidth selection is set to "manual" the corresponding data fields are activated.

Plot 2-4

Selection of the three variables for the time graphs. At the X-axis always the time is displayed.

Bandwidths

- Manual - The bandwidths of the selected variables are defined manually. The corresponding data fields are activated.
- Auto - The bandwidths of the selected variables are defined automatically.

Scaling

- Fix - The graphs are scaled with fix scaling. The corresponding data fields are activated. "MIN" or "MAX" identify the minimum or the maximum of a variable.
- Min/Max - All axes are scaled to their maximum.

Layout

- Load layout - A complete four plot graphics configuration can be loaded from file.
- Save layout - The actual four plot graphics configuration can be stored in a layout file. All informations on variables, bandwidth, and scaling will be set.

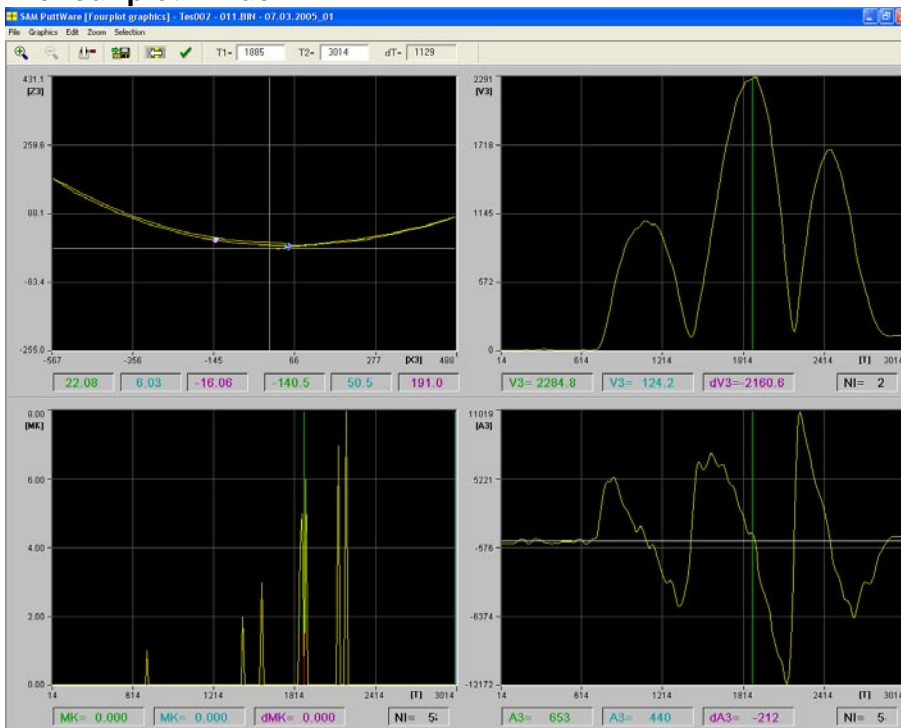
OK

The four plot graphics are displayed.

Cancel

The setting changes will be discarded, no four plot window will be opened.

The four plot window:



In this four plot graphics 4 different data curves are displayed for putting stroke. In the upper left plot the sagittal projection [Z/X] is displayed. To the right you see the backswing, to the left you see the forward swing. In the lower left plot the data segmentation signals are displayed. In the upper right plot the velocity of marker 3 (club head) and in the lower right plot the acceleration of marker 3 are displayed. In the upper left sagittal projection the positions of the time marks are indicated by small circles. Corresponding data values for additional time marks set with the mouse cursor are displayed.

Setting time marks

Two vertical time mark lines can be set and moved in the graphs using the left and right mouse button. The mouse cursor has to be positioned inside one of the three time graphs. At the position clicked synchronous vertical time marks are inserted. In the upper left plot the corresponding position in the movement trace is indicated by small circles. The data values of each variable at the marked times are displayed below each graph. If both mouse buttons are used data differences can be determined directly.

Data values

The data values of the marked data points and the data differences are displayed below each graph. The units are [mm] for trace, [mm/s] for velocity and [mm/s²] for acceleration. For angles the units are [°], [°/s] and [°/s²].

Step functions

If the cursor line mode is selected the cursor jump functions help to find significant data points. Functions are step to the next minimum, maximum, zero crossing, or to the next event. The jump is always applied to the time mark which has been last moved in the graph which has been last clicked on.

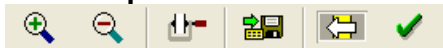
Zoom

The time axis of all displayed data is zoomed to the data window defined by the two time marks. In the three time graphs the time axis is zoomed directly, the upper left plot is not zoomed but displays only the data for the zoomed time. In the zoomed display the complete four plot window functionality is available. The scaling of the graphs remains unchanged. If no time marks are set, the zoom command zooms the time axis to half size.

Select data window

If two valid time marks are set (or if a valid data window is marked) this data window can be selected for further analysis. This can be sensible if information revealed from the derivatives is necessary to select a data window (i.e. if creating a standard graphic report with centered movements). The four plot graphics are closed.

The four plot window toolbar:



The toolbar provides direct access to the following functions:



Zoom in

The time axis of all displayed data is zoomed to the data window defined by the two time marks. In the three time graphs the time axis is zoomed directly. The upper left graph is not zoomed but displays only the data for the zoomed time window.



Zoom out

The time axes are zoomed out. The complete data is displayed again.



Cut to selection

The data window is set to the actual time marks. The data is recalculated. The new data window is displayed in the graphs. In contrast to the zoom function the data window is kept after the fourplot function is closed.



Save

All displayed data values displayed inclusive the variable names can be stored into a dBase file for further statistical analysis. The name of the result file is "FPDAT.DBF" and is always created on the current data path.



Step to data edit window

The program steps directly to the data edit window function.



Select

If two valid time marks are set (or if a valid data window is marked) this data window can be selected for further analysis. The four plot graphics will be closed.

5.2.3 Stroke statistics

With this result data export function it is possible to export the average values and standard deviation values of all relevant data values of the strokes from one measurement into a database table. This table will be displayed on the screen and can be saved to disk in different file formats. One line in the data table will represent one Measurement/Training session.

The data values that are shown belong to the current selected Project and Player.

The function can be executed from the main menu:
Results – Stroke statistics

The data viewer window will open and will show the data values of the strokes line by line in a table view. You can find more information about the data viewer window in chapter [5.2.7](#).

A description of the data values can be found in chapter [5.2.6](#).

5.2.4 Stroke parameter

With this result data export function it is possible to export all relevant raw data values of the single strokes from one measurement into a database table. This table will be displayed on the screen and can be saved to disk in different file formats. One line in the data table will represent one single stroke.

The data values that are shown belong to the current selected Project, Player and Measurement.

The function can be executed from the main menu:
Results – Stroke parameter

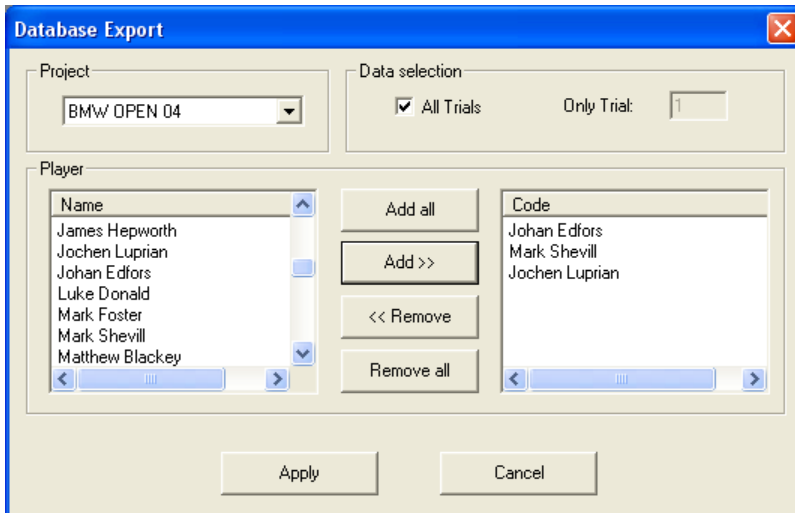
The data viewer window will open and will show the data values of the strokes line by line in a table view. You can find more information about the data viewer window in chapter [5.2.7](#).

A description of the data values can be found in chapter [5.2.6](#).

5.2.5 Player statistics

With this result data export function it is possible to export the key data values of the putt strokes of a selected Players to a database file in dBase format. This file can be viewed or edited by many software programs like any database or spreadsheet programs (e.g. Microsoft Excel).

The data export function can be executed from the main menu:
Results – Player statistics



In the configuration dialog you can add *Players* to the listbox on the right side. Data from the *Players* listed in this box will be added to the export file.

Project

here you can select the *Project* from which data should be exported. It is possible to add *Players* from *Project A* first, then switch to *Project B* and add also *Players* from this *Project*.

Data selection

Here you can define if only one trial number will be added to the export file or if all available trials of the selected *Players* should be used.

Player

This listbox will show all *Players* from the current selected *Project*. By selecting *Players* and executing "Add" the *Players* can be added to the right list for export.

Apply

Start the data export process. The data viewer window will open and will show the data values of the *Players* line by line in a table view. You can find more information about the data viewer window in chapter [5.2.7](#).

A description of all the listed data values can be found in chapter [5.2.6](#).

5.2.6 List of data values

The following list shows all data values that are exported by the functions in the menu "Results". The column "Variable" will represent the entry in the header line of the data table. In the column "Description" you will find a brief description of the parameter.

i If the exported data shows average values of multiple strokes in one line, for each variable there is a second entry with the prefix "SD". This will show the standard deviation value for this parameter. Example: BSTIME = average Backswing time of strokes in Measurement; SDBSTIME = standard deviation of Backswing time.

| Header information | | |
|--------------------|----------|------------------------------|
| No. | Variable | Description |
| 1 | PROJECT | Project code |
| 2 | P_ID | Player code (internal use) |
| 3 | PLAYER | Player name |
| 4 | MEAS | Measurement number |
| 5 | TRIAL(S) | Number of / Index of putt(s) |

| Data values | | |
|-------------|-----------|------------------------------------|
| No. | Variable | Description |
| 1 | BSTIME | BackSwing (BS) time |
| 2 | FSTIME | ForwardSwing (FS) time |
| 3 | BSRATIO | Relation of BS / FS time |
| 4 | TAMAX | Time of maximum Acceleration in FS |
| 5 | TVMAX | Time of maximum Velocity in FS |
| 6 | TIMP | Time of impact in FS |
| 7 | TAMIN | Time of minimum acceleration in FS |
| 8 | TEND | Time for impact to end of FS |
| 9 | RHYTHM | Relation of BS time / Impact time |
| 10 | TIMING | Relation of Impact time / FS time |
| 11 | VSYM | Relation of time to VMAX |
| 12 | XADR | Position [X] at address |
| 13 | YADR | Position [Y] at address |
| 14 | ZADR | Position [Z] at address (height) |
| 15 | XSTART | Position [X] at beginning of FS |
| 16 | XIMP | Position [X] at impact |
| 17 | XEND | Position [X] at end of FS |
| 18 | BSPATH | Length of BS |
| 19 | FSPATH | Length of FS |
| 20 | PATHSYM | Relation of BS path / FS path |
| 21 | SPOTADR | Horizontal address Spot |
| 22 | SPOTIMP | Horizontal impact Spot |
| 23 | HEIGHTADR | Height of ground at address |
| 24 | HEIGHTIMP | Height of ground at impact |
| 25 | VMAX | Maximum velocity |
| 26 | VIMP | Impact velocity |
| 27 | AMAX | Maximum acceleration in FS |
| 28 | AIMP | Acceleration at impact |
| 29 | AREL | Acceleration after impact |
| 30 | AMIN | Minimum acceleration in FS |
| 31 | FACEADR | Club face angle at address |
| 32 | FACESTART | Club face angle at begin of FS |
| 33 | FACEIMP | Club face angle at impact |

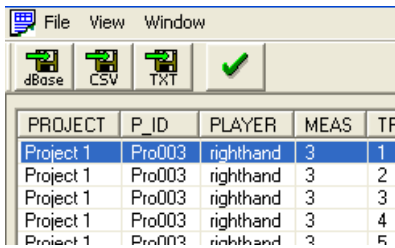
| | | |
|----|------------|--|
| 34 | FACECHANGE | Face change from address to impact |
| 35 | FACEEND | Club face angle at end of FS |
| 36 | ROTIMP | Face rotation from begin of FS to impact |
| 37 | ROTEND | Face rotation from impact to end of FS |
| 38 | ROTTOT | Total rotation in FS |
| 39 | ROTRATE | Dynamic change of rotation at impact |
| 40 | WBEFORE | Face angle 10cm before impact |
| 41 | WAFTER | Face angle 10cm after impact |
| 42 | WTOBEFORE | Impact zone rotation before impact |
| 43 | WTOAFTER | Impact zone rotation after impact |
| 44 | FACEBREAK | Ratio of WTOAFTER / WTOBEFORE |
| 45 | SHAFTADR | Vertical shaft angle at address |
| 46 | SHAFTIMP | Vertical shaft angle at impact |
| 47 | LIEADR | Lie angle at address |
| 48 | LIEIMP | Lie angle at impact |
| 49 | DIRECT | Swing path direction at impact |
| 50 | RISE | Rise angle of path at impact |
| 51 | FACEPATH | Face angle relative to path direction at impact |
| 52 | DYNLOFT | Dynamic Loft at impact (static loft + shaft at impact) |
| 53 | LAUNCH | Predicted launch angle (83% Loft + 17% Rise angle) |
| 54 | BALLDIR | Predicted ball direction (83% Face and 17% Path angle) |
| 55 | RATING1 | Score rating for TECHNIQUE |
| 56 | RATING2 | Score rating for TIMING |
| 57 | RATING3 | Score rating for CONSISTENCY |
| 58 | RATINGALL | Overall Score rating |

5.2.7 The data viewer window

The data viewer window will open up after one of the result export functions in the "Results" menu are executed.

The window will show the data in a table view. To see all data it is possible to scroll the view horizontal and vertical.

There are export functions available to export the data into different file formats. These functions can be executed by the toolbar icons or from the menu "File":



a) data export into dBase format file

This option will generate a dBase format database file from the currently displayed data. This file can be opened by any database or spreadsheet program to do further analysis later on.

b) data export into CSV format file

This option will generate a CSV-formatted text file from the currently displayed data. This file can be opened by any editor, the data columns are separated by colons. Many software programs are able to import files in CSV format (e.g. Microsoft Excel).

c) data export into formatted text file

This option will generate a formatted text file from the currently displayed data. This file can be opened by any editor and is optimized for viewing the data in a normal text editor like Notepad or Wordpad. This format is not suitable for later import of the data to another program.

a. Technical Troubleshooting

1. I've calibrated the system correctly, but why are my strokes not recorded during training- or measure-mode?

SAM PuttLab uses motion detection to determine if you made a stroke. Try to make a complete putt motion including back- and forward-swing. Don't forget to keep the club head quiet before each stroke until the "Ready" LED on the screen turns green.

2. My strokes are not recorded because of "Data Spikes." What's the reason for that?

Because the system uses ultra-sonic signals to determine the position of your golf club, these signals can be reflected on flat surfaces and walls nearby. Position your SAM PuttLab away from flat surfaces and walls.

3. I hit the golf ball exactly in the sweet spot, but PuttLab shows me it's beneath it.

The system wasn't calibrated accurately enough. Hold the club head exactly in the "sweet spot" directly and align exactly with the target hole during the calibration.

Appendix

b. Technical Data

Basic Unit

| | |
|-------------------------------------|--------------------------------|
| Dimensions: | 260 x 250 x 50 mm (W x H x D) |
| Weight: | approx. 0.56 kg |
| Max. number of marker channels: | 4 |
| Buffer memory: | 60 KB |
| Digital entrances: | 1 |
| Interface to PC: | USB |
| Measurement rate: | max. 210 Hz / 70 Hz per sensor |
| Measurement distance: | up to 1.5 m |
| Marker entrances: | 4 singles, 1x 4 complete |
| Power supply: | supplied via USB cable |
| Power consumption: | < 2 W |
| Range of temperature for operation: | 10 - 35°C |
| Storage temperature: | -10 - +60°C |
| Operating conditions: | Lab |
| PC port: | USB port |
| Display: | green status-LED |
| Control elements: | None, on/off control via USB |

The calculation of the measuring coordinates and further measuring parameters as well as the disturbance-variable compensation is effected in the evaluation programs. The maximum measuring error of relative paths is 2.5 per thousand of the absolute paths.

Triplet

| | |
|-------------------------|-------------------------------|
| Dimensions: | 160 x 109 x 12 mm (W x H x D) |
| Weight: | approx. 55 g with cable |
| Standard cable lengths: | 900 mm |
| Power supply: | ONLY via Battery Clip |
| Frequency: | approx. 40 kHz |

This triplet is designed for measurement of general movements as well as in the field of movement disorders.

Battery Clip

| | |
|-------------------|----------------------------------|
| Dimensions: | 105 x 61 x 28 mm (W x H x D) |
| Weight: | approx. 75 g (without batteries) |
| Power supply: | 2x AA-LR6, 1.5 V batteries |
| Battery duration: | 4 – 6 hours |
| Control elements: | Trigger for "on" control |

c. FAQ

Which possibilities does SAM PuttLab provide to improve my golf game?

With SAM PuttLab you have THE opportunity to improve your short game. Compared to other PC-based golf training products SAM PuttLab provides you with unprecedented analytical precision and interpretation of your putting performance.

Which operating system do I need on my PC?

You need Windows XP or Windows Vista installed on your PC/laptop to run SAM PuttLab 2008.

Can I use my own putter(s)?

You can use any kind of putter, because the triplet easily fits on most commercial club shafts. Via state-of-the-art wireless technology your stroke-movement data will be transmitted to the basic unit.

How accurate is the measurement of PuttLab?

More than 210 data points per second are recorded to determine the position of your club with a precision of 1/10 millimeter for position and 1/10 degree for alignment.

Do I need batteries?

Yes. The triplet uses 2 AA-size batteries. They last about 8 hours. Rechargeable batteries can be used instead.

How easily can I transport the SAM PuttLab-system?

SAM PuttLab comes in an easy-to-transport and shock resistant case. The system is ready for daily mobile indoor and outdoor use.

How do I recognize that the batteries are low or empty?

If the battery power is low the LED on the top of the battery clip will blink in red color. If the batteries are empty the LED will not light up and you will get no data signal from your club movement. If you press the start button on the clip it will not activate or only be active for a short time. One pair of batteries will last 5 to 8 hours depending on use of the system. High capacity rechargeable batteries can be used as well.

Does SAM PuttLab provide support for left-handed Players?

Yes, for version 1.1 or higher of the software there is a full featured lefthand mode available. In the Player settings you can set a checkbox for left handed players and the stroke recognition and result display will be adapted.

Where can I use SAM PuttLab?

You can use SAM indoors, for example for training purposes, without any limitations. Through the integrated power supply through the USB-cable you also can take your exercises outdoors and use a notebook to analyze your data.

Can SAM PuttLab be used under every weather conditions?

No. Due to the employment of modern technology SAM Motion Analyzer hardware components have to be protected from direct rain and sprinkling water. Stormy winds may impact the measurement accuracy.

Is it possible to place more than one SAM PuttLab system in the same area, for example for training purposes?

Yes, it is possible. But multiple systems should be placed about 5 meters apart from each other in order to avoid interferences between adjacent systems.