SAM Wireless Trainer

(SAM – Funktrainer)

The training analysis system for ambitious shooters

For rifle and pistol

Enhances performance – inexpensive - universal

Perfect measurement technology for the target shooting sports

Installation and Usage

User Manual, 4th Edition published 07.01.2004

These instructions assume some prior knowledge on the part of the shooter.
They have been written and proof-read with great care.
In spite of this, we can not exclude the possibility of mistakes.

Many thanks to Dipl. Ing. (FH) Mr. Volker Walter for the creation of this Manual.

Many thanks to Bill Murray for the engllish translation.

SAM Funktrainer
07.01.2004 /E4

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SAM Funktrainer

A. Introduction and description of functions

The SAM Wireless Trainer is the latest development in training systems for the target shooting sports. The system is designed to provide realistic training and thorough analysis for a wide range of differing short- and long-barrelled target guns and the relevant competition targets.

This offers ambitious shooters the possibility of training, of identifying and correcting systematic errors and of improving their performances away from the shooting range, or in other words, at home. The system allows for shooting training over shorter distances which the user is free to determine, for example 4 or 6 metres, with suitably proportioned aiming marks; the software enables you to print out the desired aiming mark according to your choice.

The equipment is also ideally suited for use in training centres.

Training and evaluation of individual shots and whole strings, the widest range of different shooting disciplines, and also comparisons between several shooters are all possible, without the need to fire even one single 'live' shot.

How does the system work?

The hardware package measures the position, movement and steadiness of the gun during aiming, together with the exact moment in time when the trigger is released to fire the (training) shot; and it calculates whereabouts on the target the point of impact of a real shot would have been. In addition, the movements of the gun before, during and after the execution of the shot are displayed. When replayed, mistakes such as failure to follow-through or variable canting of the gun can be observed and subsequently eliminated.

With the use of optional additional components, the take-up of pressure on the trigger and also the heartbeat of the shooter can be simultaneously displayed and evaluated.

A specially-modulated infra-red light is emitted from a source in the target-holder (the aiming unit) and received and evaluated by an IR sensor (the sensor unit) which must be attached to the gun.

The release of the trigger causes vibrations in the gun which are measured by an accelerometer, also integrated in the sensor unit. The raw data is then wirelessly transmitted to a computer, for example a notebook. The computer analyses, displays, saves and outputs the data.

The SAM wireless trainer offers the shooter a comfortable, safe, and quiet means of practising his or her sport at home, in the club or in a training centre. Performance can be analysed, mistakes can be identified and rectified, and therefore competition results can be improved. A particularly significant advantage is that you can now train at home over shorter distances than are usual for the particular discipline, using suitably scaled-down target aiming marks.

It is also possible to use several wireless training systems together in one practice space, for example in a training centre, because different transmission channels can be selected.

B. Components of the System

The system consists of the following components :

1. Receiver with USB connection
2. USB connector cable
3. Sensor unit (to be mounted on the gun)
4. Target unit with carrier
5. Power supply adaptor
6. Trigger pressure sensor (optional)
7. Installation CD-ROM with drivers and software
8. Instructions
9. Plastic carrying case

1. Receiver with USB connection

Empfängereinheit

The receiver should be connected to a PC (for example a laptop) via the USB connector cable (Pos. 2). Data is transmitted remotely via the receiver between the PC, the sensor on the gun, and optionally also an additional (but not included in the system hardware package described here) pulse sensor/receiver. The computer automatically acts as the power supply for the receiver.

Once the receiver is connected, the green LED (LED = Light Emitting Diode) blinks 5 times. The receiver is then ready for operation. The first time the unit is connected to a PC, Windows automatically recognises a new USB hardware device and asks for the USB driver to be installed. See section F: Driver Installation for instructions on how to proceed.

The green light blinks for a short time whenever a successful transmission of data from the sensor to the receiver has taken place.

Note: In order to save power, the sensor only transmits data when the PC when told do do so by the computer, in other words when a menu option in the software which calls for data from the sensor, has been selected (for example, Calibration or Training).

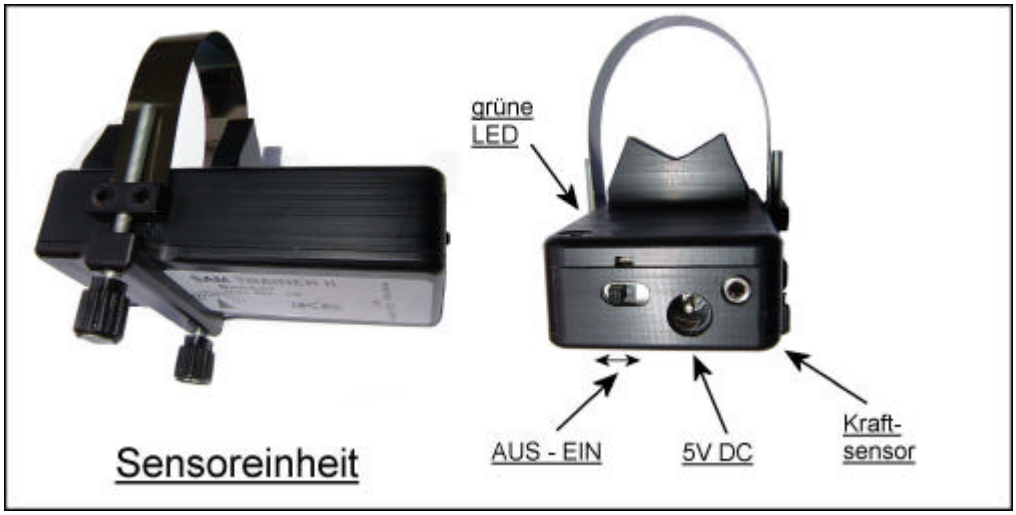
In these cases, data is also only transmitted when the sensor is oriented towards the target. This means that the green LED on the receiver remains lit for as long as the gun is pointing at the target.

If the sensor does not receive any IR-emissions from the target unit, then no data will be transmitted (in order to save power) and the green LED will not light up.

2. USB connector cable

The USB connector cable has two identical USB plugs. It connects the receiver unit with the PC.

3. Sensor unit



The sensor features an On/Off switch, a green LED and the ports for the power supply (5v DC) and the optional trigger pressure sensor.

The sensor unit should be mounted on the gun by means of the metal band, and can be fixed by tightening the two knurled screws. These two screws should only be tightened to the point where the sensor is firmly in place, not more.

Attention: No great strength is needed in order to fix the sensor unit in place! If the knurled screws are tightened with too much force, damage to the metal band may result.

The weight of the sensor unit is not substantial and has an insignificant effect on the centre of gravity of the gun.

The sensor receives the infrared emissions from the target unit. The evaluation of the IR signals in the sensor unit itself, provides the information as to how far and in which direction the position of the sensor deviates from the two IR LEDs in the target unit. The software calibrates the position of the sensor in relation to the position of the gun, in actual fact the sights on the gun, and the target centre (computerised alignment).

The release of a shot is picked up by an integrated accelerometer. As far as is possible with your own gun, you are recommended to use the dry firing trigger setting. It is not necessary to fire a live shot.

Sensor and receiver units communicate with each other over a bi-directional remote channel. Data travels over this channel in both directions.

The green LED on the sensor functions as follows:

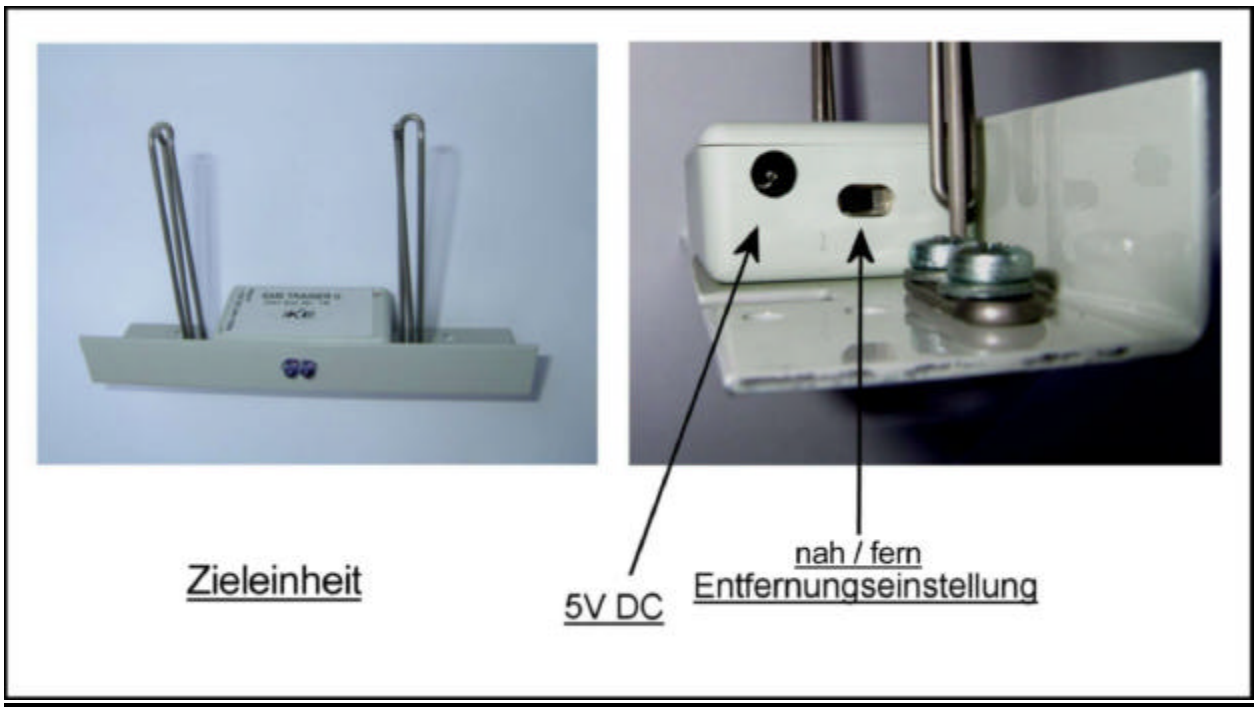
- after power-up the LED blinks for a moment 5 times. After this the sensor is ready for operation.
- the LED blinks briefly every time when data has been successfully transmitted between sensor and receiver.

The power source for the sensor is an inbuilt rechargeable battery, which can be recharged by connecting the power supply adaptor unit supplied with the system.

Attention: It is essential to ensure that the battery is recharged after each training session and that the On/Off switch is returned to the Off position. If the power level in the battery reaches a low level, the sensor automatically switches itself off. The LED lights up as a warning shortly before this takes place. If for example the LED blinks only once at power-up, then the sensor has shut down straight away because the power level in the battery is too low.

It is possible to continue with training during recharging (sensor unit must be switched to the 'On' position again!). However, in this case the target unit must be supplied with power by means of a second adaptor unit, which can be purchased as an optional extra.

4. Target unit with carrier



The target unit can be mounted on a normal camera tripod. For this purpose, a suitably threaded hole is located on the underside of the unit.

On the front side, that is the side facing the shooter, there are two IR-emitting diodes. These diodes emit a specially modulated, invisible IR light, which is received and evaluated by the sensor on the gun.

On the lefthand side of the unit is the port for the power supply (5vDC) and a switch for adjusting the distance (near/far). In the 'near' position, this switch reduces the strength of the emitted IR light for training at shorter distances to the target; this is necessary in order to avoid overloading the sensor at shorter distances.

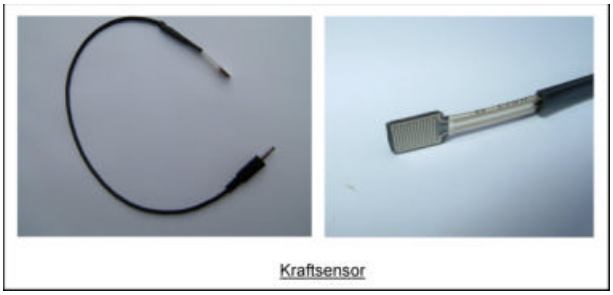
Attention: The target unit does not have an integrated battery and must therefore remain continually connected to the mains via the power supply adaptor.

5. Power supply adaptor

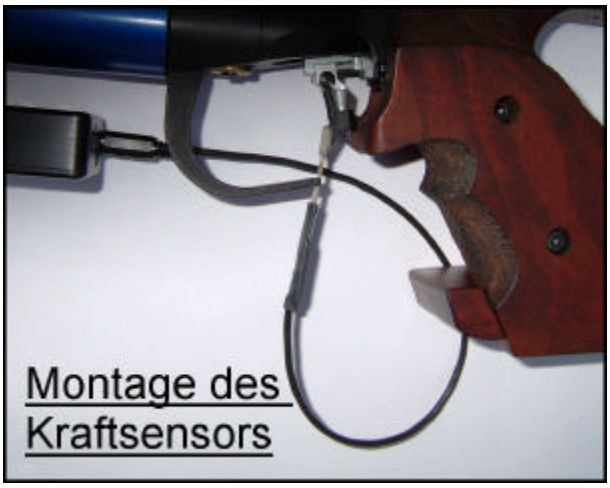
The power adaptor which is supplied with the system delivers a stabilised 5V DC power source.

It should be used
- in order to load the battery in the sensor unit
- in order to deliver power to the target unit

6. Trigger pressure sensor



The optional pressure sensor measures the amount of pressure which is being applied to the trigger before and during the release of a shot. The data is transmitted to the sensor unit via a cable and from there it is relayed over the remote channel to the PC. The software maps and displays the progress of



Double-sided sticky tape on the pressure sensor enables it to be fastened to the trigger.

C. Assembling the system and training

1. Target unit

The aiming unit should be mounted on a typical camera tripod. The middle of the target aiming mark should be approximately 1.4 metres above floor level (the target height for airgun shooting which is laid down in the rules).

Connect the power supply adaptor to the aiming unit and plug into the mains.

Move the switch on the target unit to the intended distance (options are near or far).

Orientate the target unit in such a way as to allow the shooter to see the full face of the target. This is important, because the IR diodes only have a narrow dispersion. The system only functions correctly when the sensor unit on the gun can 'see' the related target unit.

2. Sensor unit

Fasten the sensor to your gun. If you have not already done so, install the drivers and software according to the instructions in sections F and G in your PC. Now run through the steps for the basic set-up and calibration as described in sections H and I. Before beginning, switch on the sensor unit. Be sure to charge up the battery beforehand.

3. Receiver

Connect the receiver to the PC by means of the USB connector cable.

4. PC / Laptop

Start the SAM-Trainer programme. Select the desired training mode. The individual menus are in principle self-evident. Use the F1 key to obtain, as needed, context-dependent Help for the current menu item and the possible selections.

5. After finishing training

At the end of a training session, do not forget to switch off the sensor unit, disconnect the power supply from the target unit, and connect it to the sensor unit in order to recharge the battery. It takes about 1 hour to fully load the battery.

D. Wireless and infra-red transmission

The SAM Wireless Trainer uses the 433 MHz frequency band (LPD-Band) for the remote transmission of data. The maximum power emitted in this respect is 10 milliwatts. Depending on the broadcasting conditions, equipment operating at these levels can transmit over a span of several hundred metres, naturally significantly less in buildings. The emissions are insignificant, for example they are only about 1/100 of the radiation of a mobile phone.

The IR-emission from the target unit is eye-safe; there is **no laser** involved. The light which is emitted from the target unit is largely invisible to the human eye. A tiny portion of visible residual light can however be noticed in dark conditions or from very close up, in the form of a red glow.

E. Minimum System Requirements

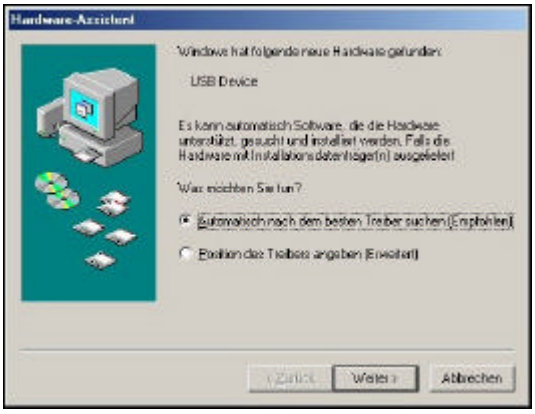
The PC or laptop which is to be used, must fulfil the following minimum requirements:

- IBM compatible PC, processor minimum Pentium 400 MHz oder equivalent
- RAM dependent on operating system
- SVGA graphics card 800*600 Pixel Hi Color (16 Bit, 32768 colours) or better
- A free USB port
- CD-ROM drive
- Operating system Windows 98SE, ME, 2000, XP oder neuer (not NT 4 or older)
- 10MB free hard disc space

F. Driver installation

The receiver of the SAM Wireless Trainer requires special drivers in order to communicate with your PC.
These drivers should be installed as follows :

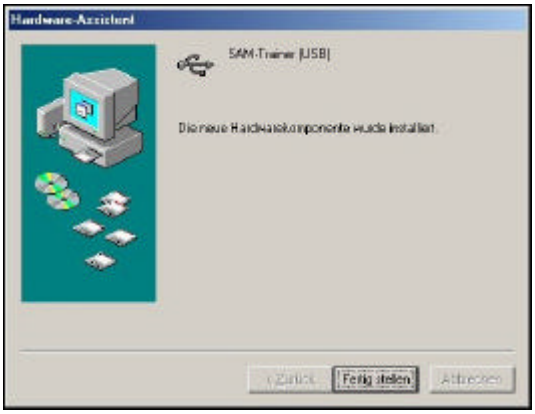
Connect the receiver unit to one of the USB ports on your PC, using the USB cable supplied with the system. In so doing, take account of the instructions contained in the handbook for your PC.



Once the receiver has been connected, the PC recognises automatically that the new hardware is a USB device.

Insert the CD containing the system software into the CD drive.

The driver you require will now be installed. Follow the instructions on your computer screen.



This picture is displayed when the driver has been successfully installed. Confirm by clicking on the ‘Finish’ button.

It can happen that you will be asked to restart your computer at this point. In this case, please confirm any error messages that may appeaar with OK, and ignore them.

G. Installing the software program SAM-TRAINER

When the CD-ROM is inserted an automatic installation programme is started, in which you are invited to choose which version (German or English) of the software you wish to install.

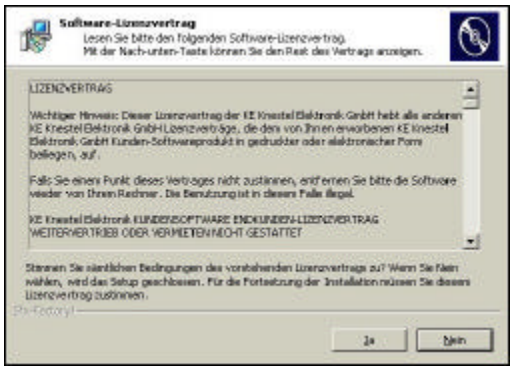
If this does not happen, start Windows Explorer and change to your CD drive (in our example drive letter E:). Install the desired version by double clicking on the .EXE file in the folder \install on the CD-ROM in Windows Explorer.

For the english language version
E:\SAM_PRODUCTS\install\SAM-Trainer32e.exe

For the german language version
E:\SAM_PRODUCTS\install\SAM-Trainer32d.exe

Sequence of installation:

1. Start the installation program as described above and accept the license agreement, once you have read it. Then follow the directions on the screens.

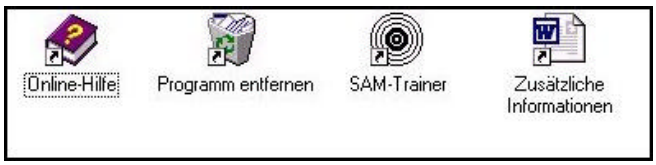


2. Choose the drive and folder to which you want the program data to be copied. The program will suggest a default folder.

Confirm your choice by clicking on the button „Next“.

The program will now be installed on your computer. When finished, the following window apperas :

3. At the same time, the following links are installed, which you can reach via Start> Programmes > SAM-Trainer



4. Copy the link „SAM-Trainer“ to your desktop. This simplifies starting the program in future.

After the SAM-Trainer programme has been successfully installed, a few basic steps are needed in order to enable all the system components to work together.

Note: Once you have installed the programme, please read the additional information and the online-help which is now located on your computer. To do this, you need to click on the relevant buttons located in the Start Menu under Start>Programmes>SAM-Trainer. Access to the online-help is available at any time during the operation of the programme via the F-1 key.

H. Basic settings

Preliminary Note

In the individual menus in the programme, next to the rectangular buttons which differ according to the menu, you will find additional square buttons. With the help of these buttons you can control important aspects of the programme.

Some examples:

This button calls up the help-file for the present menu. So that while you are working with the programme, you can call up those instructions which are relevant to the current menu.

This button jumps you back to the previous menu.

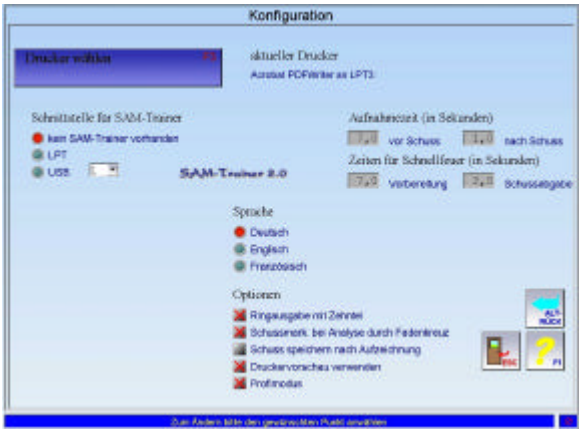
By clicking on this button when you are in the main menu, you close down the programme.

Basic setup

1. Connect the receiver to the PC. Switch on the sensor unit. The battery inside the sensor should have been previously charged for at least one hour.
2. Connect the power supply for the target unit; and switch to the near setting for distances up to 6 metres, and to far for distances greater than 6 metres.
3. Start the SAM-Trainer program

First of all the SAM-startup logo will appear:

4. Then the programme moves automatically to the configuration menu.



At this point a window will inform you that the sensor has not been recognised. This is because you first need to complete the basic set-up of the programme.

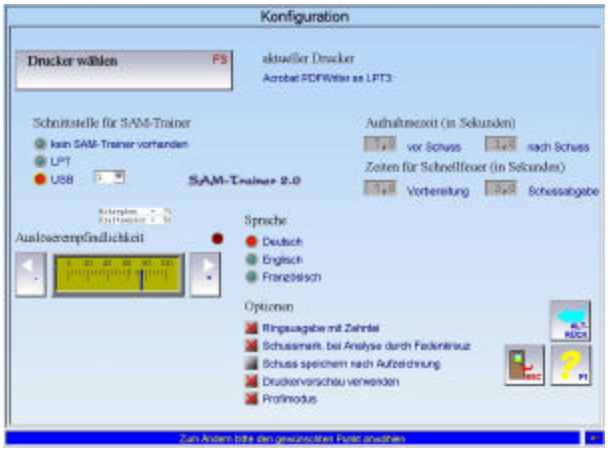
5. Now select the desired options:

   - the desired printer (default is the standard printer in the Windows settings)
   - the desired language (e.g. English)
   - the USB-Port
   - the desired wireless channel (default: cahannel 1)

Note: In cases of extreme disturbance from other external wireless systems, please choose another channel

Attention: If you are using more than one wireless trainer in the same space, you will need to select a different channel for each system.

6. Now the window changes, because the USB connection between the receiver unit and the PC has been established. On the lefthand side, the scale for setting the trigger release sensitivity appears.

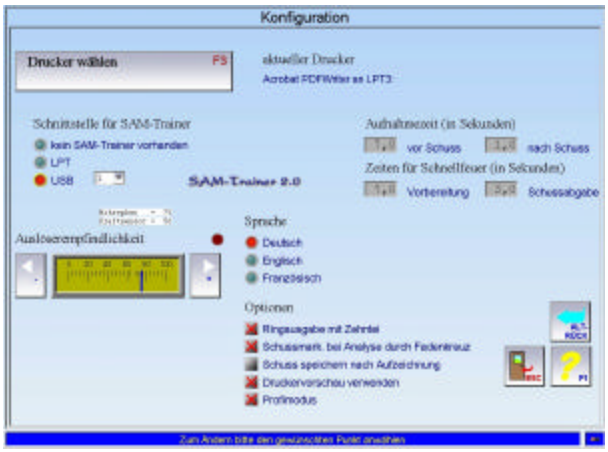


7. Leave this menu by using the righthand 'Esc' button. Now you will be asked whether you want to confirm or discard the new settings. After making this choice, you are brought back to the main menu:

Now you will see at bottom left, the serial numbers of the receiver and the sensor units. If the sensor is switched off or the battery is empty, a warning will be displayed..

8. Click on the lowest button 'Other'. You will come to the following menu:

9. Click again on the 'Configuration' button, and you come to the configuration menu:



10. Configuring the sensitivity of the trigger release sensor

In this part of the programme you are able to adjust the sensor unit to suit the gun. Configuration of the sensor unit in this respect will always be necessary whenever you want to use a different gun to train with. The following procedure allows you to set the sensitivity with which the unit picks up the vibrations which are caused by the release of the (training) shot.
On the lefthand side of the configuration menu you will find a scale from 0 to 100% which displays the trigger sensitivity setting. The default setting is 85%. Positive or negative changes in steps of 5% can be made by clicking on the arrows on either side.
Set your gun to the training trigger, in so far as this is possible. Fire a sighting shot in the direction of the target unit. The sensor picks up the vibrations caused by the trigger release; the light spot above the righthand arrow (a symbolised LED) lights up for about a second and then disappears.
Now reduce the sensitivity setting by one step and test whether a further shot is still registered by the system. Make a note of the lowest value where the system still registered the shot (for example, 60%).
Now increase the value stepwise until the red light spot which appears after the shot, no longer disappears or the shot is no longer registered at all (e.g., 90%). Also make a note of this value.
Switch the sensor on the gun off and then on again. This must cause the LED to go out.
Now set the trigger release sensitivity to the middle of the two values you noted (in this example, 75%). Go back to the main menu and again back to the calibration menu. Check that the shot is correctly displayed by firing once more at the target. Now you have successfully established the trigger sensitivity for this particular gun, and set up the system correctly.

11. Printer-selection

At the top of the configuration window, your standard printer will be displayed as the current printer. Using the 'Select Printer' button you are able if you wish, to choose a different installed printer. Once you have done so, leave the menu by clicking on the 'Esc' button.

I. Calibrating/harmonising with the gun

Sensor and gun now need to be adjusted to suit one another, so that over the desired distance from the target, the point of impact of the shot matches up with the setting of the sights on the gun. It is important to note the following points:

- It is necessary to check the calibration every time you mount the sensor unit on the gun, because of the possibility of minimal mechanical differences each time the unit is fixed.
- If the distance to the target unit changes, for example if you change from 4 metres to a bigger distance, you need to re-check the calibration even if you haven't demounted the sensor unit from the gun, because of the parallax between sensor and the sights on the gun.
- In accordance with the desired distance and type of gun, you can print out the correct target corrected to the right size of aiming mark to suit the distance. In this way you can ensure that the relationships between gun, discipline, target type and sight-picture are correct. You can also print out a special calibration target or user-defined targets with the programme.

Switch on the power supply for the sensor and target units.

In the main menu, click on the button 'Gun Calibration - F6' to reach the following menu:

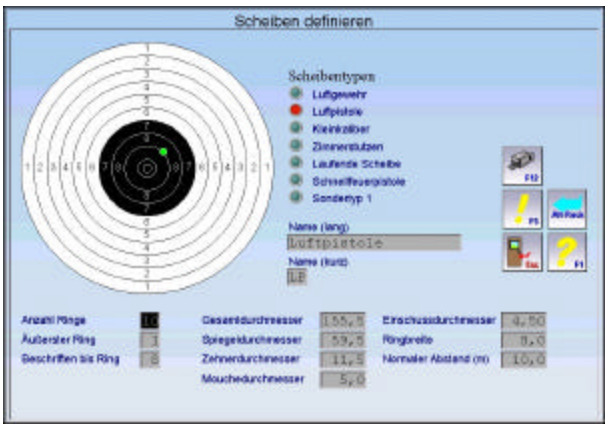
In this menu you can select the target type, for example air pistol.
Now print out the desired target. To do this refer to Section K and/or the Help menu (F1).
The form of calibration can be selected with the buttons F5 to F7. Please read the contents of the Help (F1) for this menu and the visible sub-menus.

K. Printing out targets

The SAM-Trainer programme offers you the possibility of printing out on your own printer, a target of the correct dimensions and type according to your choice of gun and distance. You can also print calibration targets.

You can use this function as follows: Beginning from the main menu.
In this menu, choose 'Other'.

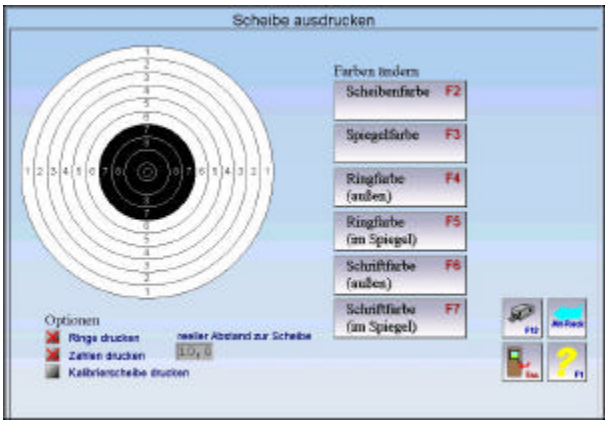
Iin the next menu, click on the button ‘Define target type F5“.



You reach the following menu ‚Define Target’.

Choose the desired target type.

Then click on the ‚F12 Print’ button on the righthand side of the screen.



Now you come to the menu 'Printout Target'.
Now enter the actual distance to the target.
You also have further options to make choices about the colour.
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By clicking on the button 'F12 Print' the target will print out.

L. Trouble-shooting and support

If you are uncertain or experience a problem, use the Help-functions within the SAM-Trainer programme software. The button 'F1' brings you to the matching help topics in every menu.

We can also be contacted and offer further support for our products:
In Internet under www.disag.de and www.knestel.de

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