SG31

OWNER'S MANUAL

Introduction

The SG31 was first introduced in 1993. With hindsight, one can say that it made fencing history as the first hit detection and signalling unit of its kind with integrated score, stopwatch, remote control and direct computer communications. Fencing bouts became much easier to follow in top tournaments as spectators were able to visualize results in real time. Additionally, this same information was now displayed on giant repeaters or sent directly to television.

The versatility and many unique features of this machine have since made it a standard for all major fencing tournaments around the world. This has led the F.I.E. to make this type of equipment compulsory in all world cup events. The notoriety of the SG31 has culminated twice after use in the last two Games: the 1996 Atlanta Olympics and the 2000 Sydney Olympics.

After 10 years of intense use and much experience gained in many top international events: Olympics, World Championships, World Cups etc.. the designers of the SG31 decided to completely redesign the machine in order to incorporate the latest technologies and introduce new features that would be very useful in the organization of major fencing events. What's more, the machine has been designed to adapt easily to any change that may effect the sport of fencing in the coming decade. This "anticipation" is accomplished by providing openness and flexibility in order to facilitate reprogramming of the machine to account for any of these changes.

This is why, we are proud to introduce the new SG31, " a machine for the 21st century", the most advanced fencing scoring device of its kind currently available.

The SG31 has many possibilities. None of these are just fun to have gadgets. They have all proven useful over the course of time in international tournaments. Their implementation is the result of a decade of experience gained in major events across the word. We strongly recommend that you learn about them before staging an event yourself.

The new version of the SG31 will be used at the Athens 2004 Olympics.

DATA SHEET

Fencing functions

- Officially approved F.I.E. three-weapon scoring machine.
- Can be directly reprogrammed on board to latest F.I.E. regulations.
- Antifraud yellow lights.
- Automatic regulation of reset time from 1 to 9 seconds.
- Instantaneous reset at 0 when a fencing master gives a lesson.
- Whip-over blockage in the sabre.

Integrated stopwatch and round

- Presetting of count-down time from 0 to 99 minutes (count-down time is memorized even when machine is turned off).
- Round can be set from 0 to 99.
- Blocking of hit detection when stopwatch time has reached: 00 :00.
- The SG31 can be set so that the stopwatch is halted automatically as soon as a hit has been recorded. This automatic stopwatch option can be turned on or off (for more information consult the section devoted to SG31 stopwatch options).
- As another option, possibility of introducing a one-minute pause between two rounds (for more information consult the section devoted to SG31 stopwatch options).

Integrated scoring

- Scoring of up to 99 hits can be displayed on both sides.
- The SG31 can be set so that the score is updated automatically every time a hit is recorded. This automatic scoring option can be turned on or off (for more information consult the section devoted to SG31 options).
- When the automatic scoring mode is set along with the automatic stopwatch mode, a halted stopwatch prevents the machine from updating the score automatically. Automatic updating of the score can only be performed when the stopwatch is running. This allows fencers to try their weapon after a hit has been detected without disrupting the score (useful for the epee in particular).

Remote control

- Mixed transmissions : wire and infrared
- Driven by rechargeable Lithium Ion accumulator
- Remote control is rechargeable directly on one of two specially provided slots.
- Control of stopwatch, score, cards and priority.
- Control of general functions (choice of weapon, manual reset).
- Each remote has a unique address that is sent to the SG31 when it is recharging on the machine. Thereafter, the SG31 will only operate with this unique remote.

Communications

- 6 RS422 connectors for general purpose computer communications.
- 2 special connectors for charging and communicating with either remote control or wireless portable.
- Setting of machine in slave mode for the repetition of scoring, stopwatch, round, cards, names and lamps from the master machine.
- 2 pairs of LAN connectors for "LonWorks" communications to central PC with Fencing Technologies special Windows program.
- Optional radio communications.

Other features

- LCD screen for ease of option setting or selection as well as utter flexibility when programming new options.
- 2 side jack connectors for integrated external LED repeaters (for more information, consult section on peripherals).
- Internal management of text for output of names, countries to external panels.
- Internal management of cards and priority for output to external panels.
- Lamps are implemented with LEDs on a rounded flexible circuit for 180° vision thus preventing any need of maintenance connected to light bulbs while solving the problem related to LED directivity.
- Diagnostics capabilities for easy maintenance.
- Duplication of connectors on top and bottom for added ease of use in all configurations.

Family of peripherals

- Table repeaters that connect directly on the sides of the machine.
- Horizontal repeater for display of names, cards and lights.
- Finals panels for repetition of results, names and lights in major events.
- Windows programs for control of a single machine and its peripherals or a host of machines connected to LAN.

GENERAL PRESENTATION

The SG31 is a multipurpose fencing panel for hit detection and signalling, results management and display and a LAN node in case of a full fledged computerized competition setup.

DESCRIPTION

Connectors:

Connectors are located on top of the machine and are duplicated at the bottom. This allows for use of the machine in all possible configurations whether on a table or on the wall.

Top Connectors (from right to left):

- Power XLR connector next to the ON/OFF switch.
- 2 DB9 LAN (Local Area Network) Connectors for connection to the Fencing Technologies LAN (for more information, consult the section devoted to the LAN).
- 2 DIN plugs for connection to external lamp repeaters.
- Coaxial antenna connector for use in case of optional radio link.
- Fencing connectors.
- Male DB9 charging plug: used for charging remote control or wireless fencing portable (for more information, consult the section devoted to the remote control).
- 2 Female DB9 RS422 connectors for general purpose computer communications.
- Male DB9 charging plug: used for charging remote control or wireless fencing portable.

Bottom Connectors (from left to right):

- Power XLR connector.
- 2 DB9 LAN(Local Area Network) Connectors for connection to the Fencing Technologies LAN (for more information, consult the section devoted to the LAN).

- 2 DIN plugs for connection to external lamp repeaters.
- Fencing connectors.
- 4 Female DB9 RS422 connectors for general purpose computer communications.

Connectors on the sides:

- One stereo female jack connector on each side to plug in vertical external lamp repeaters that are compulsory in major tournaments (for more information, consult section devoted to peripherals).

The Front Panel:

The purpose of the front panel is to display the stopwatch, the score, the round and hit detection. Additional features include yellow antifraud lights, a stop light for the stopwatch that signals a halted stopwatch, a few push-button switches for direct control of some of the parameters of the stopwatch and score.

Lights are implemented with a rounded flexible circuit of LEDs. One of the major limitations with LEDs is that they are directive. Their luminosity is diminished if you are not facing them. This well known problem is solved by resorting to a rounded circuit which in practice affords 180° visibility.

The SG31 is now endowed with an integrated LCD screen for easy option selection or setting as well as for added flexibility of the machine. The SG31 can be reprogrammed very easily to

account for any new option or feature that may be needed to comply with changes in regulations introduced by the F.I.E. over the course of time.

There are three ways to change a setting or operational parameter of the machine:

- The LCD screen for most options or functions.
- The remote control for a large subset of functions.
- Activation of front panel switches for a few functions.

Some options or parameters may be set through all three methods while other functions may only be reached through the LCD screen and others only with the remote control.

The LCD screen : principles of operation

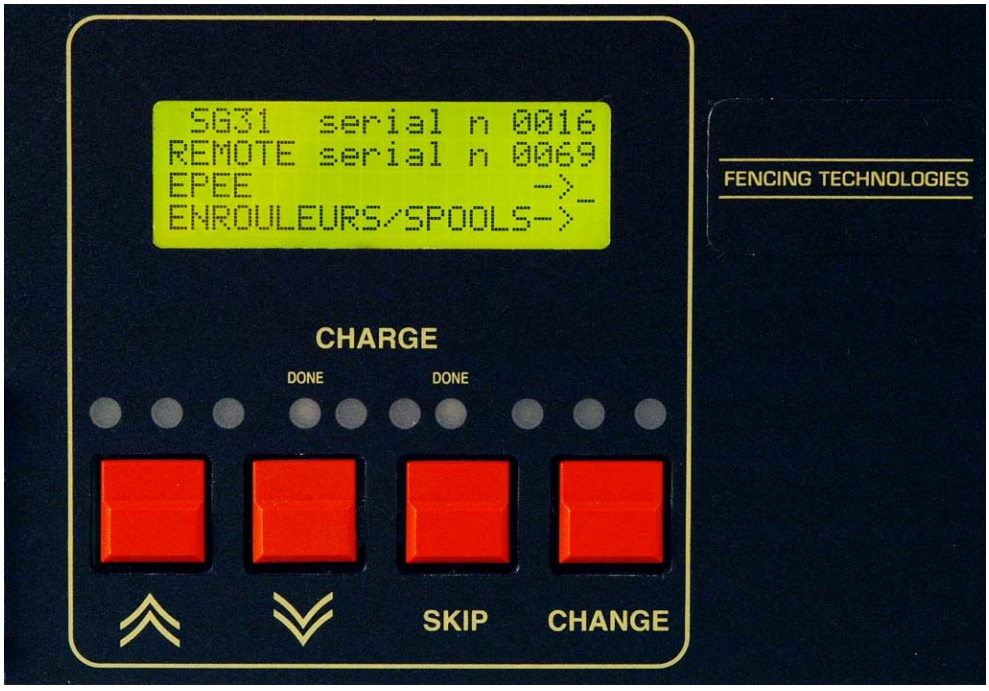
The options and functions available through the LCD screen are reached and modified with the help of 4 pushbutton switches located just below it.

A given LCD screen usually groups related functions and parameters.

- The two left most buttons « and » allow you to go from one screen to the next.

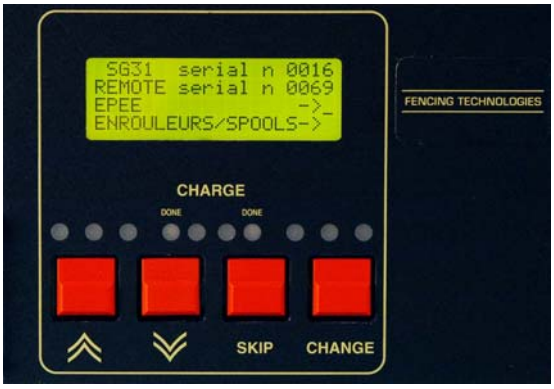
- Inside a given screen, the **SKIP** button will go from one line to the next.

- On a given line the, the **CHANGE** button will change a parameter, function or option of the machine.



DESCRIPTION OF LCD SCREENS

SCREEN 1:



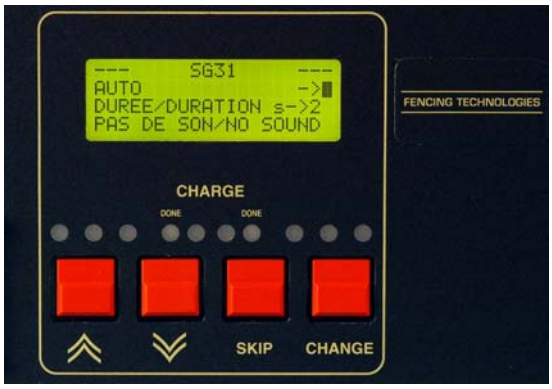
The first line can't be modified. It just gives the unique address of the machine. This unique address will identify the machine unequivocally when the machine is connected to the integrated LAN.

The second line gives the address of the remote control currently accepted by the machine. Each remote has a unique address itself. Whenever the remote is charging on one of the 2 devoted slots of the SG31 or communicating through the cable delivered with the machine, it will synchronize this address with its own. Once this is done, the machine will only operate with this particular remote control.

The third line allows for selection of weapon: EPEE/FOIL or SABER through use of the CHANGE button. The change of weapon may also be performed through the remote control (for more information, consult section devoted to the remote control).

The fourth line allows for selection of fencing with reels or wireless fencing.

SCREEN2:



The second line allows for selection of AUTOMATIC or MANUAL mode.

In automatic mode, the third line will display the AUTOMATIC RESET TIME in seconds. This time may be set from 0 to 9. The selection of 0 entails a particular mode whereby the lights are reset almost instantaneously (about 100 ms). This mode is used for lessons where very fast reset is required.

In manual mode, the third line will allow MANUAL RESET of the lights whenever the CHANGE button is activated. The reset function is also available on the remote control (for more information, consult section devoted to the remote control) so that in practice the remote control would be more suited to the implementation of this function.

The fourth line allows for selection of SOUND or NO SOUND.

SCREEN3:

This screen is devoted to the stopwatch. The second line displays the current state of the stopwatch. It is not updated in real time during a bout in order not to slow the machine down. What's more, this is not necessary as the stopwatch is also displayed directly on the machine.

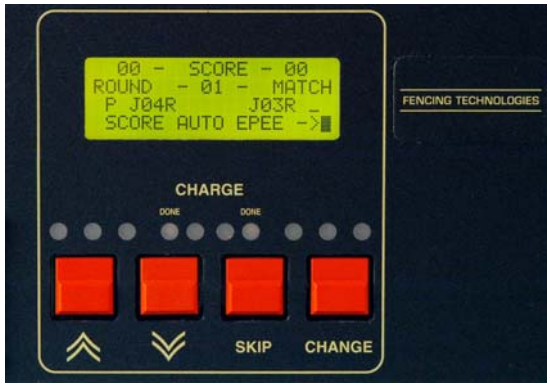
The use of the CHANGE button when the cursor is placed on this line will cause the stopwatch to increment or decrement continuously one second at a time. This function, also available on the remote control (for more information, consult section devoted to the remote control) is useful whenever the stopwatch time needs to be adjusted at a precise intermediate value. Whenever you activate the CHANGE button and the button remains pressed, the stopwatch will increment or decrement continuously. If the button is depressed and pressed once more, the stopwatch will change but in the opposite direction.

The third line is used to select the INITIAL COUNT DOWN TIME of the stopwatch in minutes. Pressing the CHANGE button will increment or decrement this time in a continuous fashion. Depressing the button and pressing it anew will, just like in the previous line, reverse the direction of change (up or down). This function is also available on the remote control (for more information, consult section devoted to the remote control).

The other functions related to the stopwatch: STOP/GO and RESET are available on the remote and on dedicated front panel switches. The one minute PAUSE option is only available through the remote control. An additional ON/OFF function is exclusively available on one of the dedicated front panel switches.

The last line allows for setting of the AUTOMATIC of MANUAL STOPWATCH options. Whenever the AUTOMATIC STOPWATCH option is selected, the stopwatch will halt automatically whenever a hit has been detected.

SCREEN4:



This first line displays the current SCORE and is updated in real time. The score itself is controlled through the remote control (for more information, consult the section devoted to the remote control) or directly on the front panel. Turning the score ON or OFF can only be accomplished through this last method.

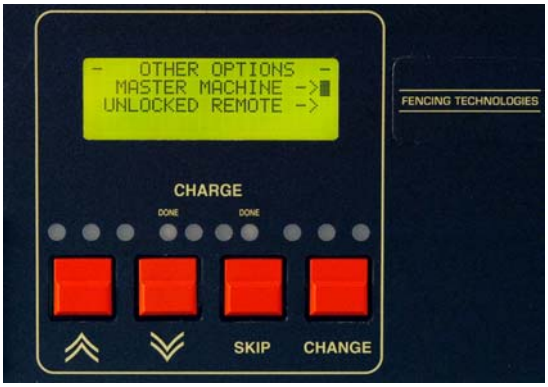
The second line displays the current ROUND and is also updated in real time. The ROUND itself is controlled exclusively through the remote control (for more information, consult section devoted to the remote control).

The third line displays the current state of YELLOW and RED CARDS as well as PRIORITY. The yellow and red cards are activated exclusively through the remote control (for more information, consult the section devoted to the remote control). Whenever a yellow card is given on one side, the letter J appears (for JAUNE). Whenever a red card is set on one side, the line will increment and display the current number of red cards (for example: 03R). This number may be increment up to 99. When the priority function has been activated, the side that was awarded priority will be bestowed on this same line with the letter P.

The SG31 manages cards and priority for internal use and for exclusive display on the LCD screen. In order to make this information truly available to the spectator, use of external peripherals that display this information is required (for more information, consult section devoted to peripherals).

The last line is used to set the appropriate score option. If the SCORE AUTOMATIC option is selected, the score will be increment automatically anytime a hit has been detected. If the AUTOMATIC STOPWATCH option has been selected simultaneously, the score will only be updated automatically if the stopwatch is running. If the stopwatch is halted, the score will not increment automatically. This is very useful to try your weapon in this configuration without affecting the score. The SCORE AUTOMATIC EPEE option will do the same thing but only when in epee. In the other weapons, automatic scoring is disabled.

SCREEN 5:



This screen is devoted to two important options.

The second line is used to set the operational mode of the machine. In order to function normally, the machine must be in MASTER mode. In this mode, the machine operates as a full-fledged fencing scoring device. Through its communication ports, a continuous stream of computer formatted data is sent for display on external panels or peripherals. This data delivers, in real time, the current state of the machine.

The other operational state of the machine is the SLAVE mode. In this mode, the machine becomes dumb and lifeless. Its only function is the repetition of signals that come from another connected machine in MASTER mode. The hit detection signals, stopwatch, score, round, cards and names managed by the master machine are repeated on the slave machine. In slave mode, the only pushbutton switches available are the LCD screen switches. The remote is deactivated (for more information, consult the section devoted to communications).

Whenever a machine seems not to be working, the first thing to check is its operational mode. Would the machine happen to be in SLAVE mode?

In slave mode, 3 different modes are available. In the INVERTED SCORE SLAVE mode, the score is repeated but inverted. The left side score appears on the right side and vice versa. In the last mode, the INVERTED SLAVE mode, the score is inverted as well as the lights. This is useful whenever the slave and master machine are back to back.

The third line, is devoted to locking or unlocking the remote control. Locking the remote is a requirement of the Olympics. When the remote is LOCKED, the buttons on the remote are not active unless a special mode button on the remote is pressed simultaneously. This is to ensure that a button may not be pressed unintentionally during the course of an important event. When the remote is UNLOCKED, it recovers its normal mode of operation. In order to set this parameter in the remote, the remote has to be connected to the machine either on its charging slot or through the communications cable (for more information, consult section devoted to the remote control).

Whenever a remote seems not to be working, the first item on the check list should be to test is operational mode. Is the remote LOCKED?

SCREENS 6 and 7

The SG31 manages 3 lines of text for each fencer on either side. This text would typically contain information like the name or country of the fencer. This information appears on these screens. In order to make this information truly available to the spectator, use of external peripherals that display this information is required (for more information, consult section devoted to peripherals).

SCREEN 8

This screen is reserved exclusively for maintenance purposes. Diagnostics routines are used to help identify faults with the machine.

THE REMOTE CONTROL

The SG31 comes with a sophisticated rechargeable mixed remote control with infrared and cable capabilities. There are instances, as in top tournaments, where infrared transmission is not enough and the use of a secure cable connection indispensable.

Charging the remote:

For wireless communications, the remote needs to be charged. There are 2 ways of charging the remote. You may use one of the 2 slots devoted to this purpose or connect the remote to the machine through the communications cable. When turned on, the CHARGE LED will indicate that the remote is fully charged. Complete charge time takes about 2 to 3 hours. In order to get optimal performance, we recommend that the remote be fully charged before use.

Infrared communications:

Each remote control is endowed with a unique address. Infrared communications are only possible if the address of the remote is the same as the address displayed on the first LCD screen of the SG31. Whenever the remote is connected to the SG31 either through the charge slot or through the communications cable, it will exchange its address with the central machine.

Whenever the remote is disconnected or reconnected to the machine, it automatically switches from infrared communications to cable communications or vice versa.

General principles:

Each button on the remote control may have up to three different functions. The main function is indicated by a white text or drawing, the second function is in yellow while the third (if there is one) is in red.

At the top of the remote are 3 MODE buttons: a green rectangle, a yellow rectangle and a red rectangle. In order to activate to the yellow function of a button, the yellow mode button must be pressed simultaneously. In order to activate the red function of a button, the red mode button must be pressed simultaneously.

The green mode button is used only when the remote is in LOCKED mode. In this mode, the white functions are not activate unless the green mode button is pressed simultaneously. It is worth while locking your remote in very important tournaments where accidental activation of a switch is undesired. In order to lock or unlock the remote, go to LCD screen 5 and select the appropriate option. Locked remotes were compulsory in major events such as the Olympics.

The remote control buttons:

General purpose buttons:

Priority button:

- When activated, the lights on the SG31 are toggled for about 5 seconds before selecting a side. The side that has been selected is marked with a P on LCD screen 4. This result may be visualized on one of the peripherals (for more information, consult section devoted to peripherals).
- The yellow function of this button simply resets priority.

Weapon selection button:
Used to change weapons: epee->foil->sabre.

Reset button:
Only used when the machine is in manual reset mode to reset the SG31.

<u>Stopwatch and round buttons:</u>

Stop/go:

- Activating this button will start or halt the stopwatch depending on the current state of the stopwatch. This is the only button that can never be locked.
- The yellow function of this button selects the sabre as the current weapon.

Reset:

- Activating this button will reset the stopwatch to its initial value.
- The yellow function of this button selects the foil as the current weapon.

Pause:

- Activating this button will cause the stopwatch to reset to 1 minute and count down from there. During the one minute pause (typically used between rounds), the weapon may be tested without affecting score even if the automatic score option has been selected.
- The yellow function of this button selects the epee as the current weapon.

Round increment:

- Activating this button will cause the round to be increment.
- The yellow function of this button: CLOCK∧ is used to halt the stopwatch and increment its value by one second. This function is used to set the stopwatch at a precise intermediate value. This could typically be used in a time sensitive event like Modern Pentathlon if the stopwatch has been running unduly for example.
- The red function RESET∧ is used to reset the stopwatch and increment the reset value by one minute.

Round decrement:
This button does the same thing as the previous button but in the opposite direction.

<u>Score buttons:</u>

Left score∧ :

- This button increments the left score by one unit.
- The yellow function of this button sets a yellow card on the left side. On LCD screen 4, a J (for Jaune) will appear. In order for spectators to truly visualize cards and priority, you need one of the Fencing Technologies peripherals connected to the machine (for more information, consult section devoted to peripherals).

- The red function of this button will increment the number of red cards on the left side. On LCD screen 4, a xxR will appear where xx stands for the current number of red cards.

Left score∨ :
This button will do the same thing as the previous one but in the opposite direction.

Right score∧ and Right score∨ :
These buttons are akin to the previous one but for the right side this time.

↔:
This is the general swap button. When activated the following information is swapped sides: Score, cards, priority, fencer Ids and text. This is typically used if fencers decide to change sides or used in the team event where the two teams may have to change sides depending on whether the fencers are right or left handed.

0:0:
- This button is used to reset the score.
- The yellow function of this button is used to reset all cards: yellow and red.
- The red function is used whenever the machine is LAN connected to send results back to the central computer when a bout is over (for more information, consult section devoted to LAN).

COMMUNICATIONS

The SG31 is an "open"machine designed to communicate with other machines and peripherals.

RS422 connectors:

In order to perform these duties, the machine is equipped with 6 DB9 RS422 connectors (2 on top and 4 at the bottom).

In MASTER mode, selectable in LCD screen 5, the machine operates as a regular fencing scoring panel. Computer data is sent continuously in parallel to all RS422 connectors to whatever peripheral or device is connected.

The most obvious example of communication is between a master SG31 and a slave SG31. In SLAVE mode, the SG31 becomes a dumb machine that no longer operates as a fencing machine. The remote is no longer operational on a slave machine and the front panel switches are disabled save the 4 LCD buttons. A slave SG31 only does one thing: read computer data coming from the master SG31 in order to display this information.

The information read in slave mode comprises: score, stopwatch, round, lights, cards, priority and text.

Another interesting feature of the slave mode is that the information read is echoed back on the RS422 connectors. This allows for daisy chaining. This means that a slave SG31 can be chained to another SG31 slave and continue repetition of information from the one master machine. **To perform this type of communications, you will need a special communications cable available at Fencing Technologies. The remote control cable will not be suited to this application**.

The RS422 connector is also used to send data to one of the several Fencing Technologies peripherals(for more information, consult the section devoted to peripherals).

Fencing Technologies can also provide a simple Windows program to send names via the SG31 to some of these peripherals. In this case, one of the RS422 plugs would be used to communicate with the PC.

Another typical application of the RS422 connector is to communicate with television. This feature is used very often in major tournaments to allow for the display of results on the TV screen in real time (stopwatch, lights, score, names etc…).

LAN connectors:

A pair of LAN connectors is located on top and on bottom. In order to connect the machine in a meaningful way to the LAN, you need:

- A LAN adapter plugged on board inside the machine.
- A central PC with our dedicated Windows program to control the machines.

- The remote control with its special VALIDATE button will be used to send results back to the central PC when a bout has finished.

In order to be meaningful, a typical LAN application would require the use of a peripheral on each strip to display text and names in particular.

PERIPHERALS

External Lamp Repeaters:

Fencing Technologies provides 2 types of such repeaters:

- A vertical repeater that plugs directly to the side of the SG31 in one of the jacks provided for this purpose.
- A horizontal repeater that connects to the SG31 through a cable and one of the 2 DIN plugs.

As with the SG31 lamps, the repeaters are made of LED matrices. Fencing Technologies provides several models of these repeaters. They are distinguished according to the number of LEDS or their density. For more information, consult us.

External Name Repeater:

This repeater is also made of an LED matrix. Its purpose is to display cards, priority and text managed by the SG31 but not displayed. It can also act as a lamp repeater. This type of peripheral would typically be used in case of a LAN application.

Finals panels:

These panels are long (3m) and typically used in major events for spectator convenience. They repeat most of the information displayed or managed by the SG31: lights, score, stopwatch, cards, priority and text.

Fencing Technologies also produces a “name tree” in the form of large panel.

GUARANTEE

The SG31 is guaranteed, parts and labour, for one year, from date of purchase, attested by invoice. Transport costs are always charged to the customer even if the machine is under warranty.

"Long term" guarantee

At the expiration of the guarantee period, the user may subscribe, if he so wishes, to an annual maintenance contract for a period of two years and for a modest price.

After sales service: change in F.I.E. norms

This scoring apparatus may be reprogrammed by the manufacturer to meet any modifications in F.I.E. rules. The machine comes with a 2 year reprogramming guarantee.

N.B. The guarantee does not cover the following incidents due to faulty use of the machine:

- repair work performed by anyone non-accredited by the manufacturer
- dropping and breaking of case
- malfunction caused by plugging the apparatus into a power supply other than the one provided by the manufacturer
- plugging the apparatus into a defective electric network.
- guarantee doesn't cover the power supply that we do not manufacture. If this power supply should becomes faulty, purchase a new power supply will become mandatory.

In all cases, please call us first before shipping machine back to:

Precautions in use

The machine must be used exclusively with the power supply delivered by the manufacturer.

Two very common sources of problem:

The machine doesn't respond as a fencing machine anymore. Check to see if it is in MASTER mode. Go to the LCD screen and inspect screen 5. If the machine is in SLAVE mode, it will no longer respond as a normal signalling unit.

The remote doesn't seem to work anymore. Check to see if the remote is LOCKED or UNLOCKED. To unlock the remote, go to LCD screen 5 and set the appropriate option.

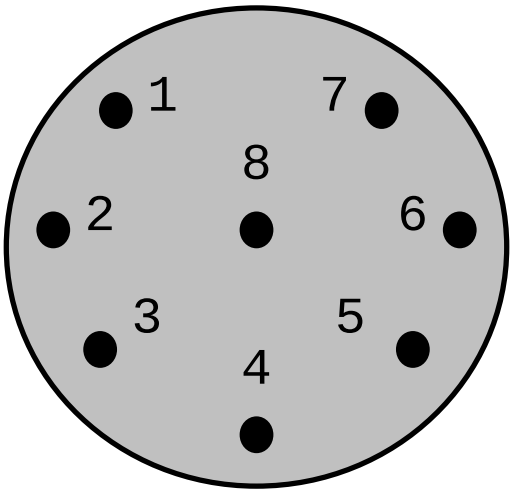
Annex 1

D.I.N. CONNECTOR TO EXTERNAL LAMPS

Although the D.I.N. pins are **protected against short circuits**, it is not advised to prolong connections with faulty cables or with inappropriate external lamps as this may damage the machine.

We can supply proper cables, external lamps or adaptors for connection to the equipment of other manufacturers.

Back view of the D.I.N. plug



1. **Yellow lamp on red side (left)**
2. **White lamp on red side (left)**
3. **Red lamp (left)**
4. **12V**
5. **Green (right)**
6. **White lamp on green side (right)**
7. **Yellow lamp on green side (right)**
8. **Sound**