

# WSG31

## OWNER'S MANUAL



# Introduction

The WSG31 is new top of the line fencing scoring machine designed by Fencing Technologies.

With respect to the previous version of the SG31, the scoring machine is now able to connect directly to an Ethernet LAN and implements the CYRANO protocol. The WSG31 is meant to operate with our new REPNAME name repeater. This repeater is an RGB matrix that can be used to display lights or names and countries.

Once the machine is connected to the network, names can be displayed either through Competition software such as the Engarde program or directly by using the integrated web server in the WSG31.

The machine is delivered in either of 2 versions. The standard version and the Cyrano version for tournament service. **The present document describes the standard version of the machine.**



# 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 WSG31 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 WSG31 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 WSG31 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 WSG31 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 the central top DB9 connector or through a special cable connected to any of the 8 bottom DB9 connectors.
- 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 WSG31 when it is recharging on the machine. Thereafter, the WSG31 will only operate with this unique remote.
- Can be used to work with the Cyrano Ethernet protocol with its PC switches.

### **Communications**

- 8 RS422 connectors for general purpose computer communications.
- 1 USB connector
- 1 optional Ethernet connector with a built in Web server
- Setting of machine in slave mode for the repetition of scoring, stopwatch, round, cards, names and lamps from the master machine.
- Optional radio communications for direct communications to wireless portables.

### **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 and cards 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.

### **Family of peripherals**

- Table repeaters that connect directly on the sides of the machine.
- Horizontal repeater for display of names, cards and lights.
- RGB panels for display of names and countries.
- Direct connection of a PC on Ethernet through a web browser.



# GENERAL PRESENTATION

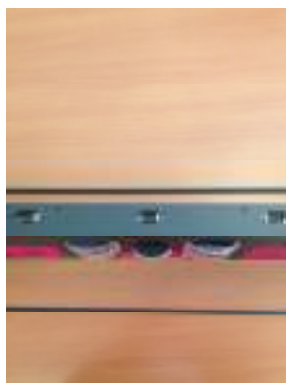
The WSG31 is a multipurpose fencing panel for hit detection and signalling, results management and display and a Ethernet node in case of a full fledged computerized competition setup.

## DESCRIPTION

### Connectors:

#### Top Connectors:

- Left male DB9 connector for charging of wireless unit
- Central DB9 male connector for charging of rechargeable remote control
- Right male DB9 connector for charging of wireless unit



#### Bottom Connectors (from left to right):

- USB connector
- Optional Ethernet connector with built in Web server for direct connection via any Web browser
- 4 female DB9 connectors for general purpose RS422 connections
- 1 RJ45 connector for external repeater
- Fencing connectors
- 1 RJ45 connector for external repeater
- 4 female DB9 connectors for general purpose RS422 connections
- Power supply connector





### 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, cards and hit detection. Additional features include yellow antifraud lights, a stop light for the stopwatch that signals a halted stopwatch. The machine is also equipped with 2 LEDs to monitor connection to a distant LAN results software system.

Lights and cards 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 WSG31 is now endowed with an integrated LCD screen for easy option selection or setting as well as for added flexibility of the machine. The WSG31 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.



Most of the current functions of the WSG31 are activated through the remote control. Complementary options and settings are programmed via the LCD screen.

## 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.

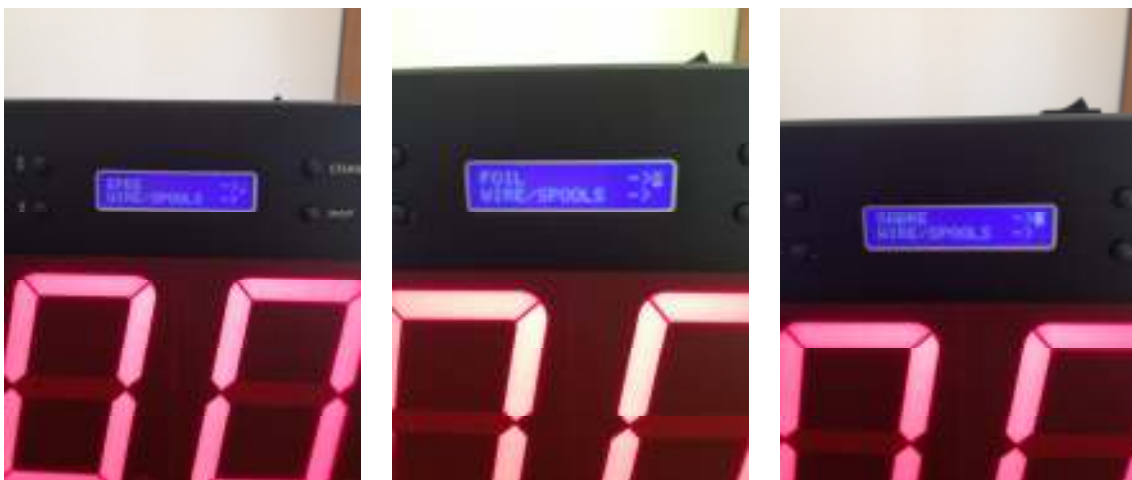
A given LCD screen usually groups related functions and parameters.

- 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 allows for selection of weapon: **EPEE/FOIL** or **SABRE** 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).



## SCREEN2:

The first line allows for selection of **AUTOMATIC** or **MANUAL** mode.

In automatic mode, the second 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 in particular for epee lessons where very fast reset is required.

In manual mode, the second 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.



## SCREEN3:

The first line offers information about the version of code inside the machine.

The second line is devoted to the selection of the sound level. There are 4 sound levels:  
0 : sound is turned off and sound is turned on from 1 to 3.







#### SCREEN4:

The first 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.



The second line is devoted to the appropriate score option. If the **SCORE AUTOMATIC** option is selected, the score will be incremented 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:

The first 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.

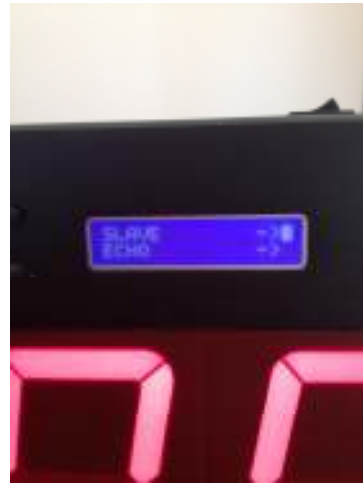
The other operational state of the machine is the **SLAVE** mode. In this mode, the machine becomes dumb and lifeless. Its only function is the repetition of signals that come from another connected machine in **MASTER** mode. The hit detection signals, stopwatch, score, round, cards and names managed 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.

When a machine is connected as a slave machine it can echo the information received from the master machine. This allows for daisy chaining of machines. In some instances, this feature is not desirable so it can be switched off.





### SCREENS 6:

This screen displays the current address of the infrared remote paired to the machine. All you need to do to pair any IR remote is to activate a switch on the remote and the code will appear on this screen. As long as this screen is visible an infrared remote can't function normally.



## SCREEN 7:

This screen allows selection of the serial baud rate used on the RS422 connections. **The mixed remote is programmed to operate at 38400 bauds** so this baud rate should be chosen at all times but is possible to select 9600 bauds to insure backward compatibility with previous Fencing Technologies machines. In order for a change in baud rate to be taken into account, the machine must be turned off and on again.



The second line allows selection of any of 3 families of protocols:

- Fencing Technologies protocols
- Swiss Timing Beijing Olympic protocols
- Swiss Timing London Olympic protocols



## SCREEN 8:

By activating the CHANGE button in this screen, the original factory settings of the machine are reprogrammed into the WSG31.



# THE REMOTE CONTROL



The WSG31 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 the central slot devoted to this purpose or connect the remote to the machine through the communications cable. When turned on, the CHARGE LED is charging and turn off when 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.

The remote will save power by going into sleep mode as soon as it is not used so the remote can keep its charge for long periods of time without any need to be recharged. When it is connected to the machine through a cable or on the central slot, you must first press a button to awaken it.

**Care must be taken when plugging the remote into the top connector to drive it vertically.**



### **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 6th LCD screen of the WSG31.

Whenever the remote is connected to the WSG31 either through the charge slot or through the communications cable, it will exchange its address with the central machine once it has been awakened by pressing a button.



The address can also be set by pressing any button on the remote when the IR remote control screen is active.

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 4 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. The button may also have a fourth green function.

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 same applies to the green function of any button.

## **The remote control buttons:**

### **General purpose buttons:**

#### **Priority button:**

- When activated, the lights on the WSG31 are toggled for about 4 seconds before selecting a side.
- 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.

### **Stopwatch and round buttons:**

#### **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 $\wedge$  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 $\wedge$  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.

#### **Score buttons:**

##### **Left score $\wedge$ :**

- This button increments the left score by one unit.
- The yellow function of this button sets a yellow card on the left side
- The red function of this button will increment the number of red cards on the left side.

##### **Left score $\vee$ :**

This button will do the same thing as the previous one but in the opposite direction.

##### **Right score $\wedge$ and Right score $\vee$ :**

These buttons are akin to the previous one but for the right side this time.

##### **$\leftrightarrow$ :**

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.

#### **PC network functions:**

These functions are used when the machine is directly connected to the main competition Ethernet LAN and the competition software. In order for these switches to be active, you need the CYRANO version of the WSG31 used for tournament service.



# COMMUNICATIONS

The WSG31 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 8 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 WSG31 and a slave WSG31. In SLAVE mode, the WSG31 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 WSG31 only does one thing: read computer data coming from the master WSG31 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 can be echoed back on the RS422 connectors. This allows for daisy chaining. This means that a slave WSG31 can be chained to another WSG31 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).

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 connector:**

An optional Ethernet connector is located at the bottom. The WSG31 has a built in Web server.

- A LAN adapter plugged on board inside the machine.
- A central PC
- The remote control is equipped with a special set of buttons for communications to this central PC



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 WSG31 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 WSG31 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.



# WARRANTY

The WSG31 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" WARRANTY**

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 become 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.**

## **A 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.**



# APPENDIX 1

## RJ45 CONNECTOR TO EXTERNAL LAMPS

Although the RJ45 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.

### Definition of the RJ45 plug

1. Green
2. Red
3. White lamp on green side
4. White lamp on red side
5. Yellow antiblocking light on green side
6. Yellow antiblocking light on red side
7. 12V
8. 12V



# APPENDIX 2

## SERIAL COMMUNICATIONS

The definition of these plugs are the following:

### RS422 female connector :

Row 1

Pin	Function
1	Input-
2	Input+
3	Output-
4	Output+
5	12V

Row 2

Pin	Function
6	GND
7	GND
8	NC
9	12V

### RS422 male connector (used for charging):

Row 1

Pin	Function
5	Output-
4	Output+
3	Input-
2	Input+
1	12

Row 2

Pin	Function
9	GND
8	GND
7	NC
6	12V



Contrary to the previous family of machines, only 12V is used to charge devices. The 5V pin has been suppressed. Two pins are also tied to ground affording greater distance when master and slave are connected though the same ground.

This change leads to the following changes in remote control cable:  
The remote control cable:

This cable delivered with the SG31 allows bi-directional communications as well as remote charging. This cable is designed for the RS422 female plugs and thus has 2 male plugs on each side.

The inputs one each side are connected to the outputs on the other side. GND, 12V are connected directly (NC means not connected).

Side a

1	2	3	4	5	6	7	8 NC	9
3	4	1	2	5	6	7	NC	9

Side b

The communication cables:

These cables have not changed.

**The cable is asymmetric.**

**Side a**

1 NC	2 NC	3	4	5 NC	6 GND	7 GND	8 NC	9 NC
3 NC	4 NC	1	2	5 NC	6 GND	7 GND	8 NC	9 NC

**Side b**

**With the cables delivered by fencing technologies, the Master side is always marked with a black tape.**

If you use the SG12 or SG21 as slave, the black tape should always be on the other side.

FEMALE-MALE plugs:

These should only be used with the SG12 and SG21 and only if you want to “daisy chain” many machines. You need to connect the female plug on one side to the male plug on the other (on this later plug, the cable can’t be fastened).

Connection of ground is always optional.



**Side a to female connector on machine**

1 NC	2 NC	3	4	5 NC	6 GND	7 GND	8 NC	9 NC
		3	2		8 GND	9 GND		

**Side b to top male connector on machine**

