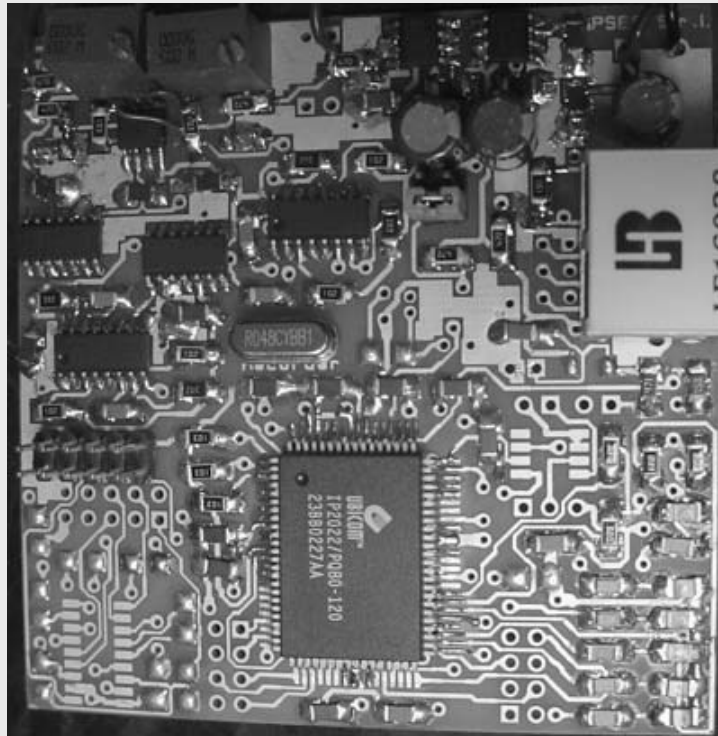
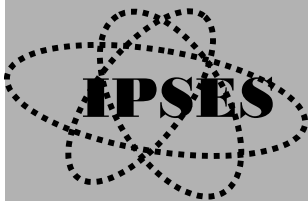


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## Pulse Recorder : USER MANUAL





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**WARNING!**  
**ELECTRICAL DEVICES COULD DAMAGE EQUIPMENT OR PROPERTY**  
**OR CAUSE PERSONAL INJURY**

This guide contains instructions and technical features of  
**Pulse Recorder** made by *IPSES S.r.l.*

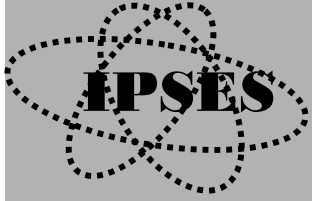
Read with attention before attempting to install.

It is the responsibility of the technician to undertake all the safety rules provided by the law during the installation and the use of this device.

For any information which is not contained in this guide, please contact:



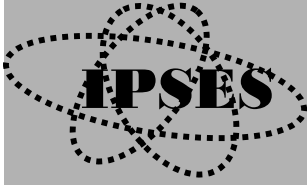
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Tel. (+39) 02/99068453 Fax (+39) 02/700403170  
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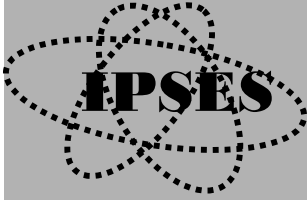
## GENERAL FEATURES

*Pulse Recorder* is a miniature low-consumption, *stand-alone data logger* which can count and memorize pulse inputs from two channels. The reading and the configuration of the device take place through an *ethernet* interface, using a normal *TCP/IP telnet* connection. To avoid no allowed connections, the access is protected by *password* which can be set out by the user.

The counting takes place during a "*gate time*", programmable as needed: in fact, it is possible to select a *gate time* from 1 ms and up to 14 hours, with a setting precision of 1 ms. A LED will light when the pulse counting is activated.

The in progress pulse counting is recorded in an 64 bit integer variable which can always maintain a precision of one unit, even in the case of very high values. The vector containing the previous counting is memorized using an exponential notation. Beside, the device can calculate the input signal mean frequency present in its first channel.

It is also possible to set out an alarm counting threshold for the first channel: a LED will light showing that value is reached, then an appropriate system state bit will be raised.

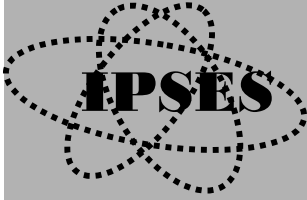


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## CONNECTION AND LOGIN

The communication of the *Pulse Recorder* system takes place through an *ethernet* interface, using a *TCP/IP telnet* connection. It is not necessary to connect the device directly to an acquisition server: it is sufficient an *ethernet* connection reachable by the used *PC*. It is also possible to connect the system directly to internet through a router.

The default *TCP/IP* address is **192.168.0.15**, the **telnet port** used is the number **23** (the most part of the servers employs this port for telnet connection). These values can be changed through a specific command. When a connection is established, then the system will ask for a **login password**: the default password is “**ipses**”, but it can be set out by the user. Using the correct *jumper* it is possible to restore all the default values (*TCP/IP* address, *telnet* port and login password), since the removal of that jumper (afterwards the memorized values will be considered effective).



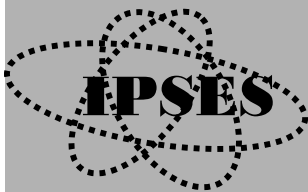
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## REMOTE CONTROL COMMUNICATION PROTOCOL

The exchanged strings are in ASCII code ended with the <CR> character; others control characters (<LF>, <VT>, etc) are ignored. To make the commands effective, it is necessary to utilise always lower-case letters (the command interpreter is *case-sensitive*).

### The following commands are implemented:

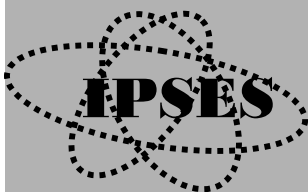
<b>?</b>	Shows the available commands
<b><i>ax.x.x.x</i></b>	Changes the <i>TCP/IP</i> address [0<x<255] of the device. To make the change effective, the configuration parameters must be memorized (" <i>m</i> " command), then power down and power up the system.
<b><i>bx</i></b>	Changes the telnet port of the device. To make the change effective, the configuration parameters must be memorized (" <i>m</i> " command), then power down and power up the system.
<b><i>cxxxxxxx</i></b>	Sets out a new <i>password</i> . The password can be anyone in alphanumeric characters on condition that it is shorter than nineteen characters. This command will be immediately effective (the new password will be request at the next connection), but it will be no kept if the system will be power down without having saved the configuration parameters by the " <i>m</i> " command.
<b><i>dx</i></b>	Sets out the alarm threshold. `x` is the critical counting value: when the reached value is higher than it, the alarm is activated (this value can be from 1 up to 18.446.744.073.709.551.615). The default one is 10.000.
<b><i>d?</i></b>	Shows the value, as a hexadecimal, of the alarm threshold.
<b><i>fs</i></b>	Enables the input signal frequency counting on the first channel (It works only when the counting is activated).
<b><i>fk</i></b>	Interrupts the input signal frequency counting on the first channel.
<b><i>fp</i></b>	Shows the computed frequency.



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## REMOTE CONTROL COMMUNICATION PROTOCOL

<i>ir</i>	Resets the input <i>interrupt</i> counting.
<i>i?</i>	Shows the input <i>interrupt</i> counting.
<i>k</i>	Stops immediately the counting started with the “ <i>s</i> ” or “ <i>t</i> ” commands.
<i>m</i>	Saves the configuration parameters in the internal non volatile memory (the saved data are the following: <i>TCP/IP</i> address, <i>telnet</i> port, <i>password</i> and <i>checksum</i> ).
<i>p</i>	Shows the memorized counting, as a hexadecimal, on both channels.
<i>q</i>	Disconnects the device.
<i>r</i>	Shows the last 100 countings memorized on both channels in exponential notation. The execution of this command requests the use of a lot of system resources: for this reason, during its execution, the pulses eventually present at the inputs could be no counted.
<i>sx</i>	Starts the counting. `x` is the time in ms (it can be set out from 0 up to 51.200.000, that is from 0 and up to more than 14 hours).
<i>tx</i>	Starts the repetitive counting. `x` is the time in ms (it can be set out from 0 up to 51.200.000, that is from 0 and up to more than 14 hours).
<i>u</i>	State request. (This command resets also any memorized error state)
<i>v</i>	Shows the <i>firmware</i> version and the set out configuration parameters ( <i>TCP/IP</i> address, <i>telnet</i> port, <i>password</i> and <i>checksum</i> )



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## REMOTE CONTROL COMMUNICATION PROTOCOL

**The status request message** (“*U*”) forces the device to return a byte (2 hex characters) representing the actual status of the unit.

Return message interpretation table:

bit 7: error;

bit 6: not in use (its value is always 0);

bit 5: repetitive counting state (1 = activated);

bit 4: auxiliary exit state (1 = activated);

bit 3: alarm activated (the counting has reached the set out alarm threshold value);

bit 2: alarm switched on;

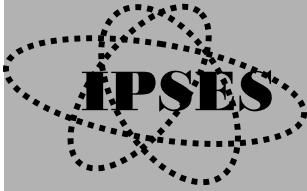
bit 1: counting state (1 = active);

bit 0: frequency counting algorithm activated.

If the error *bit* is high (i. e. if it answers with a code as the 81), then another error code is added after a comma. More than one error code can be active. **The possible codes are:**

- 01 Syntax error
- 02 Illegal command ( i. e. an “*s*” command when another counting is already active, or an “*k*” command during no counting)
- 04 Out of range parameter
- 08 Connection attempt when the device is already connected.
- 10 Invalid data on the flash
- 20 Invalid data checksum on the flash
- 40 Buffer overflow
- 80 Internal error





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## LAYOUT AND CONNECTIONS

**LEDs:**

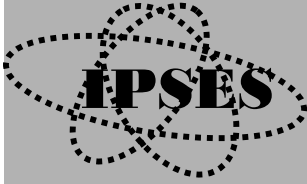
- **D15 (green):** Activity on the *ethernet* port.
- **D16 (yellow):** established *link* on the *ethernet* port.
- **D17 (red):** Collision on the *ethernet* port.
- **D18 (red):** Error
- **D19 (yellow):** Counting activated
- **D20 (red):** Alarm threshold reached

**Connectors:**

- **I1:** first channel input
- **I2:** second channel input
- **P1:** power supply
- **J1:** RJ45 *ethernet* connector
- **J2:** expansion connector
- **J3:** expansion connector
- **J18:** *RS232* serial connector (optional)
- **J19:** reserved

**Jumper:**

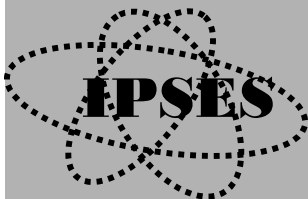
- **J9 o J15:** reset
- **J16:** use the default configuration
- **J17:** reserved



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## TECHNICAL FEATURES

- **Power supply:** 5Vdc stabilized.
- **Maximum Consumption:** 150mA
- **Inputs:** two. They accept signals from 0 up to 5V. Programmable threshold.
- **Max Rate:** 1,6 MHz
- **Maximum counting:** 18.446.744.073.709.551.615 (about 18 billions of billions)
- **Gate timer:** variable continuatively from 1ms up to 51.200 s (more than 14 hours).
- **Memory:** the device can memorize the last 100 countings for each channel.
- **Alarm threshold:** continuatively settable from 0 up to 18.446.744.073.709.551.615 (about 18 billions of billions)
- **Interface:** 10base-T ethernet (RJ45 connector).
- **Dimension:** about 70 x 70 x 20 mm.



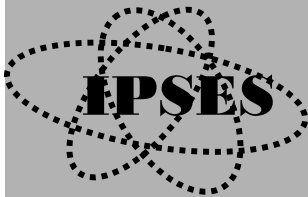
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## OTHER AVAILABLE MODELS

**IPSES** can realize customized versions of this device to answer any clients' demand.

Particularly, it is possible to have this instrument with a bigger memory, working with any power supply voltage and with any kind of input signal.

Thanks its customized design, **Pulse Recorder** is a device which can answer very well our clients' specific needs with a reasonable cost.



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IPSES s.r.l. conceives, projects and markets electronic and scientific instruments. The customized planning of our devices allows us to answer specific necessities for customers needing embedded systems. IPSES clients enjoy access to a dedicated project engineering team, available as needed.

Our pool consists of highly competent professionals whose experience in this field is extremely strong. Thanks to constant updating and technical development, IPSES is a leading company, combining the dynamism of a young group into the competence and reliability of a qualified staff.