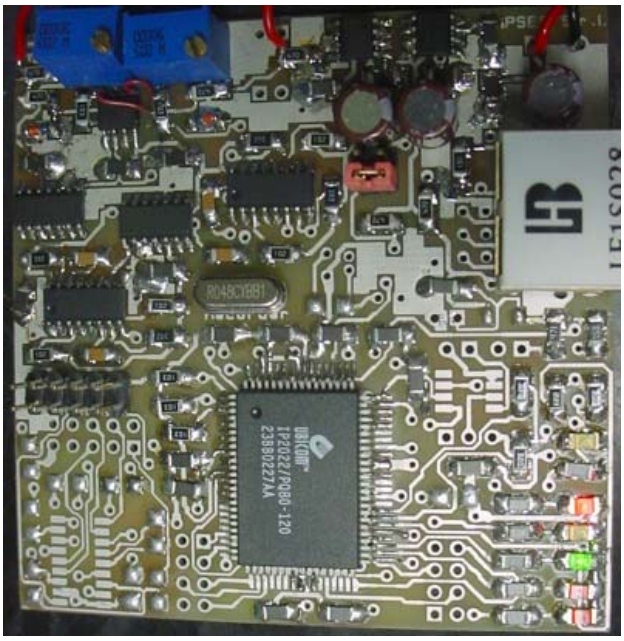
# Pulse Recorder
# USER MANUAL

Rel. 01.00.0003
(Hardware code: PulseRecorder)



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

This guide contains instructions and technical features of the Pulse Recorder.
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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# REVISION HISTORY

## *Manual revision history*

| Revision/ Date | Change description | Author |
|---|---|---|
| 01.00.0000 December 2003 | First version Released | Pizzocolo G. |
| 01.00.0001 March 2008 | Update template engagement | Barbera D. |
| 01.00.0002 June, 2015 | Update document template | Bottaccioli M. |
| 01.00.0003 August, 2016 | Added ISO 9001:20015 logo | Bottaccioli M. |



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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 configuration of the device is achieved trough an *ethernet* interface, using a normal *TCP/IP telnet* connection. A customizable *password* protects the access from not allowed connections.

The counting takes place during a "*gate time*", programmable as needed: it is possible to select a *gate time* from 1 ms up to 14 hours, with a setting precision of 1 ms. A LED will light when the pulse counting is activated.
Pulse counting is recorded in a 64 bit integer variable which maintains a precision of one unit, even in 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 average frequency present in its first channel.
It is possible to set an alarm counting threshold for the first channel too: a LED will light when value is reached, then an appropriate system state bit will be set to 1.

## CONNECTION AND LOGIN

The default *TCP/IP* address is 192.168.0.15, the ***telnet*** port used is number 23 (employed by most servers for telnet connection). These values can be changed through a specific command.

When a connection is established, system asks for a ***login password***: the default password is "ipses", but it can be set by the user.

Using the correct *jumper* it is possible to restore all default values (*TCP/IP* address, *telnet* port and login password), until it will be removed (afterwards the stored values will be effective).

The communication with *Pulse Recorder* system takes place trough an ***Ethernet*** interface, using a *TCP/IP telnet* connection. It is not necessary to connect the device directly to an acquisition server: any personal computer capable of connection to an *Ethernet-based network* will suffice. It is also possible to connect the system directly to internet through a *router*.

## REMOTE CONTROL COMMUNICATION PROTOCOL

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

### The following commands are implemented:

| | |
|---|---|
| *?* | Shows the available commands |
| *ax.x.x.x* | Changes the device TCP/IP address [0<x<255]. To make the change effective, the configuration parameters must be memorized ("*m*" command), then the system has to be switched off and back on. |
| *bx* | Changes the device ***telnet*** port. To make the change effective, the configuration parameters must be memorized ("*m*" command), then the system has to be switched off and back on. |
| *cxxxxxxx* | Sets a new ***password***. The password can be any combination of alphanumeric characters, with a maximum of nineteen characters. This command will be immediately effective (the new password will be requested at the next connection), but it will be no kept if the system is power down without saving the configuration parameters using the "*m*" command. |
| *dx* | Sets the alarm threshold. '*x*' is the critical counting value: when the reached value is higher, the alarm is activated (this value can be from 1 up to 18.446.744.073.709.551.615). The default is 10.000. |



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| | |
|---|---|
| *d?* | Shows the value, in hexadecimal form, of the alarm threshold. |
| *fs* | Enables the input signal frequency counting on the first channel (it works only when the counting is activated). |
| *fk* | Interrupts the input signal frequency counting on the first channel. |
| *fp* | Shows the computed frequency. |
| *ir* | Resets input interrupt counting. |
| *i?* | Shows input interrupt counting. |
| *k* | Stops immediately the counting started with "*s*" or "*t*" commands. |
| *m* | Saves configuration parameters in the internal non volatile memory (saved data are: *TCP/IP* address, *telnet* port, *password* and *checksum*). |
| *p* | Shows memorized counting, in hexadecimal form, on both channels. |
| *q* | Disconnects the device. |
| *r* | Shows the last 100 countings memorized on both channels in exponential notation. The execution of this command requests the use of many system resources: for this, during its execution, the pulses eventually present at the inputs could be no counted. |
| *sx* | 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). |
| *tx* | Starts the repetitive counting. '*x*' is the time in ms (it can be set from 0 up to 51.200.000, that is from 0 and up to more than 14 hours). |
| *u* | State request (this command resets also any memorized error state) |
| *v* | Shows the firmware version and the configuration parameters (*TCP/IP* address, *telnet* port, *password* and *checksum*) |

The status request message ("*u<CR>*") gets by the device a byte (2 hex characters) representing the actual status of the unit. Status code is reported here below:

bit 7: error;
bit 6: not used (always 0);
bit 5: repetitive counting state (1 = enabled);
bit 4: auxiliary output (1 = enabled);
bit 3: alarm activated (the counting has reached the set out alarm threshold value);
bit 2: alarm switched on;
bit 1: counting state (1 = enabled);
bit 0: frequency counting algorithm activated.

If the error *bit* is high (i. e. if device answers with a code as 81), then another code is added after a comma (more than one error code can be active). 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 Attempted connection 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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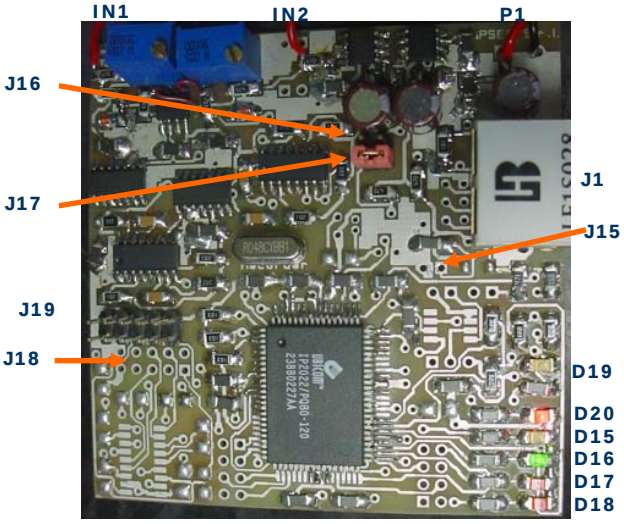
## LAYOUT AND CONNECTIONS




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:
- IN1: first channel input
- IN2: second channel input
- P1: power supply
- J1: RJ45 ethernet connector
- J18: RS232 serial connector (optional)
- J19: reserved

Jumper:
- 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 51.200s (more than 14 hours).

Memory: the device can store the last 100 counting 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 mm (2.76 x 2.76 inches).

## OTHER VERSIONS

IPSES can realize customized versions of this device, in order to match any customer need.
For example, is possible to ask for versions with a bigger memory or working with any other Power Supply value or with any kind of input signals.
Thanks to customized design, Pulse Recorder is a cheap device which perfectly gets all your requests.



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## CONTACTS

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 asking for 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.

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## SUPPORT INFORMATION

The customer is at liberty to contact the relevant engineer at IPSES S.r.l. directly.


| | | |
|---|---|---|
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## PROBLEM REPORT

The next page is a standard template used for reporting system problems. It can be copied and send as a fax. Alternative bugs may be reported by emails, in this case please insure that the mail contains similar information listed in the *Engineering Problem Report* form.



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# ENGINEERING PROBLEM REPORT

## Problem describer

| | | | |
|---|---|---|---|
| Name | | | **IPSES s.r.l.**<br>**Via Suor Lazzarotto, 10**<br>**Cesate (MI)**<br>**Italy**<br>**Fax (+39) 02 700403170**<br>**e-mail *support@ipses.com*** |
| Company | | | |
| Date | Tel. | Fax | |

## Product

| Name | Version | Serial No. |
|---|---|---|
| | | |

## Report Type (bug, change request or technical problem)

| | | | |
|---|---|---|---|
| Major bug | ☐ | Urgency: | |
| Minor bug | ☐ | High | ☐ |
| Change request | ☐ | Medium | ☐ |
| Technical problem | ☐ | Low | ☐ |

## Problem Description

| |
|---|
| |

## Reproduction of Problem

| |
|---|
| |

## IPSES s.r.l. Action notes

| Received by | Date | Report No. | Action |
|---|---|---|---|
| | | | |



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(Product code PulseRecorder Rel. 01.00.0003)

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