



PIO-1 User Manual

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The Promixis PIO-1 is a network multifunction input output device capable of sending and receiving IR codes, network to serial conversion, digital input output and relay control. It supports DHCP and static IP configuration.

If you are having trouble with your PIO-1 please contact support@promixis.com or 805.504.9740 x 1 for help.

1. Functionality

The PIO is packed with features:

1. 2 Serial outputs
2. 4 IR Outputs
3. 1 IR Input
4. 3 Relays
5. 2 bi-directional digital ports
6. 8 (up to 13 in custom builds) internal lines with 3 available PWM outputs (expansion boards available)
7. Web configuration interface (default password: cookie, leave user name empty)

1.1. Ethernet to Serial Bridge

The device outputs the raw data from the serial port onto the network without any conversion. With the addition of this [free software](#) you can use the PIO-1 as a virtual comport on your computer with any software that supports serial communications.

The serial ports can be access through the network by connecting to ports 6001 (serial 1) and 6002 (serial 2) on the device. The serial port baud rates can be configured through the web interface. Some serial devices require power on pins 4 and 7 to operate properly (for example the UPB interface modules). The PIO-1 provides internal jumpers (p6 and p7) to provide that.

Note that due to the inherent network behavior timing of data arrival is slightly different when using any Ethernet to Serial bridge and some time sensitive serial protocols might not work.

1.2. IR (infra red)

The PIO-1 supports the industry standard RAW-CCF format and can output a wide range of modulation frequencies. The PIO-1 also has a IR input that allows you to detect remote controls. This is good for controlling a computer or similar. Note that to actually learn a RAW-CCF signal you must use a PIR-1 (available from Promixis). Sending IR signals is done through the telnet interface.

1.3. Relays

The PIO-1 has three internal relays suitable for signal level switching. The relays can be controlled from the telnet interface.

1.4. Digital Input Output

The PIO-1 has 8 digital input output lines. Two of those lines are brought out to the back of the PIO-1 on the green connector block. The external lines are protected with an ESD protection circuit. Refer to the electrical characteristics sections for the maximum draw allowed on these lines. You'll also find a 3.3V dc output on the green connector block. Please do not use more than 50mA from this.

1.5. PWM

Internally the PIO-1 has support for fixed frequency PWM modulation outputs. These can be useful to dim LED light chains. Promixis sells expansion boards that plug into the internal headers for this. Note that you must have a power supply that supplies sufficient power.

1.6. Web Configuration

Configuration of the PIO-1 can be done through a web browser. Simply type the IP address of the PIO-1 into your browser. For example <http://192.168.1.102>. By default the web interface is protected by a password. The default password is “cookie” leave the username empty. To remove the password simply enter a blank password in the password section.

2. The API

The PIO-1 also has a telnet interface that allows you to control the various features of the device. The telnet interface can be reached on port 6000. The API is plain text and \r\n terminated. This allows you to control the PIO-1 manually as well as using an automation application like [Girder](#).

The telnet interface is also protected with the same password as the Web Configuration Pages.

Most commands require you to have entered the password and will answer “not_authorized” if you forgot to do so. If an error occurs the unit will answer “error 0,0”

2.1. Password

By default the unit is password protected. To unlock the API type

request	password <PASSWORD>
answer success	ok

Replace <PASSWORD> with the password that is currently set. The default password "cookie"

2.2. Version

This commands allows you to retrieve the firmware version and the device layout.

Request	getversion
Answer	getversion Promixis PIO-1 Firmware 1.0.0,IR:4,RELAY:3,IO:2,SERIAL:2

2.3. Relays

These commands give you full control over the relays. <relay> is the index of the relay either 1, 2 or 3. <state> is 0 for open and 1 for closed.

Change relay status

Request	setrelay <relay>,<state>
Answer	ok

Relay Status request.

Request	getrelay <relay>
Answer	getrelay <relay>,<state>

2.4. Digital IO

Digital IO ports (<pin>=1-8) have three registers. A direction register, an output register and an input register. Pin's 1 and 2 are the external pins. <direction> can be 0 for input and 1 for output. <state> can be 0 for off and 1 for on. These are manipulated through the following requests.

Set Direction:

Request	setddr <pin>,<direction>
Answer	ok

Get Direction:

Request	getddr <pin>
Answer	getddr <pin>,<direction>

Set Port (output value / pull ups)

Request	setport <pin>, <state>
Answer	ok

Get Port (output value / pull ups)

Request	getport <pin>
Answer	getport <pin>,<state>

Get Pin (input) value

Request	getpin <pin>
Answer	getpin <pin>,<state>

Whenever the value of an input changes the unit automatically sends the following notification

Noti	pinchange <pin>,<state>
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2.5. PWM Pulse Width Modulation

Internally the unit has three fixed frequency PWM outputs. PD4, PD5 and PD7. The duty cycle can be controlled with the following API. Note that once PWM is active IR send and receive is disabled and should not be used.

Turn PWM mode on

Request	pwmon
Answer	ok

Turn PWM mode off

Request	pwmoff
Answer	ok

Set individual duty cycle

Request	pwmset <pwmpin>,<duty>
Answer	ok

- <pwmpin> = 1,2 or 3 (PD4, PD5 or PD6) and <duty> = 0..255 0 = 0% duty cycle (all off), 255 = 100% duty cycle. (all on)

Set all channels' duty cycle:

Request	pwmsetall <H1><H2><H3>
Answer	ok

- <H1> is hex value of duty cycle of channel one 00-FF
- <H2> is hex value of duty cycle of channel two 00-FF
- <H3> is hex value of duty cycle of channel three 00-FF

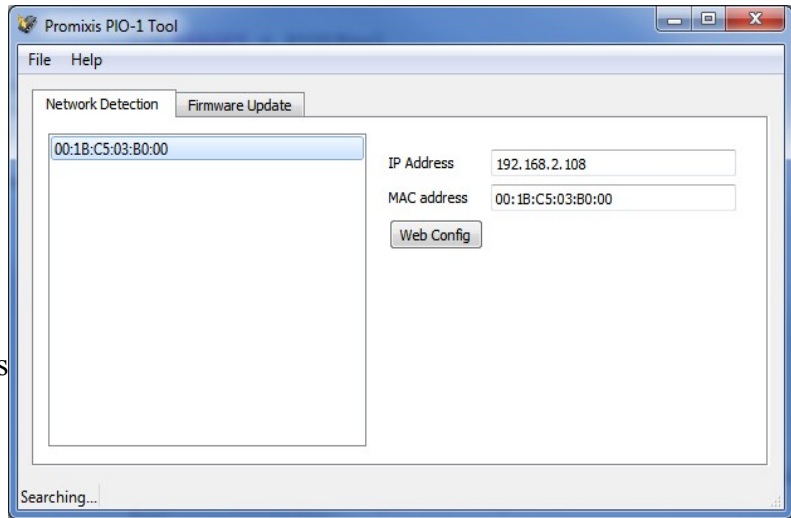
3. Firmware updating / Factory Reset

You can update or factory reset the PIO-1 using the PIO-1 tool available from the Promixis website.

4. Unit Detection

The PIO-1 will periodically transmit a UDP broadcast packet containing its current IP address. This allows you to find PIO-1 on your network's subnet and determine which IP address the PIO-1 has taken on the network.

The destination port for this broadcast is: 5998 IP address 255.255.255.255



The packet contains the string: PIO-1,192.168.2.108,00:1B:C5:03:B0:00 which is the name the hardware, the ip address and its hardware address. The hardware address is fixed and will remain the same for each device.

The Promixis PIO-1 Tool allows you to find the PIO-1's easily on the network.

5. UDP Communications

The PIO-1 also responds to UDP communications on port 5999. It currently support 3 functions there.

5.1. IR Send

SHA = sha-1 of the password + the packet bytes 20 to end

Salt = 16 bit random number

Bitmask = bitmask of ports to send from

Repeat = Repeat count for IR

Data = binary encoded CCF (big endian)

5.2. IR Stop

SHA = sha-1 of the password + the packet bytes 20 to end

Salt = 16 bit random number

Bitmask = 0

Repeat = 0

Data = 0xFFFF

5.3. Broadcast Presence

SHA = sha-1 of the packet bytes 20 to end

Salt = 16 bit random number

Bitmask = 0

Repeat = 0

Data = 0xFFFE (big endian)

5.4. Packet Format

Bytes	Contents
0,19	SHA-1 hash of password + add data following
20,21	Salt, must be different for each call. Otherwise unit will ignore request
22	Bitmask for sending
23	Repeat count for sending
24-	Data

6. Characteristics

Power input	12v dc capable of at least 500mA. The center pin must be positive.
Relay output	Maximum power of 10Watts and can switch a maximum current of 0.5A and a maximum voltage of 200Vdc. Note these relays are not intended to switch AC power.
Digital IO	The digital inputs handle a maximum of 3.3V as input and put out 3.3V (max 10mA) in output mode. Do not put voltages larger than 3.3V on these ports.
Internal Digital Lines	These have the same characteristics as the external digital minus the ESD protection circuit.
Power output	The PIO-1 has a VCC (3.3V) + GND output on the green connector block please do not use more than 50mA on this output.
Operating Temperature	-40 to 60 Celsius
Operating Environment	Indoor or water shielded operation only
Ethernet	10Base-T
Dimensions	5.63 x 3.75 x 1.38 in. (excluding connectors) (flanged cases available upon special request)
Material	Flame Retardant ABS - UL94-5VA

Exceeding these specifications will damage the unit and void your warranty.

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