Overview

The iPIO-8 is a network attached, IP addressed digital input and output device. The iPIO-8 can be controlled and monitored with a standard web browser. Multiple iPIO-8 devices can communicate amongst themselves to transport I/O information across the network. Each iPIO-8 has eight controllable form C relays, and eight digital inputs.

Each channel of the iPIO-8 is independently configurable, allowing selection of what IP addresses to deliver to and on what channel. Highly flexible telemetry systems can be developed with these simple devices.
Hardware Installation

**Inputs**

Connect the inputs to the iPIO-8 using the screw terminals. Inputs can be either dry relay or switch contacts, or a +VDC voltage (3 to 30 V), referenced to a common ground.

Screw terminals are removable for easy installation. Terminals for each circuit are marked + and G. When connecting dry relay contacts, the polarity is not significant.

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**The iPIO-8 is Factory set for Dry Contact Input Only.**

Prior to Connecting +VDC, Resistor Pack PU2 must be removed. Contact Dataprobe Technical Support for Details

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When connecting +VDC, connect the positive voltage to the terminal marked + and the negative or ground to the terminal marked G.

<table>
<thead>
<tr>
<th>Status</th>
<th>Dry Relay</th>
<th>DC Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open</td>
<td>Open</td>
<td>&gt;3VDC</td>
</tr>
<tr>
<td>Closed</td>
<td>Closed</td>
<td>&lt;=0VDC</td>
</tr>
</tbody>
</table>

Input Specification  
Dry Contact (common ground)  
or Wet ±30VDC Max

**Relays**

Connect to the iPIO-8 relays using the screw terminals, as illustrated. Relays are Form C. Connect to the Common (C), Normally Closed (NC) and Normally Open (NO) as marked. When the iPIO-8 relay is in the Open Condition, the Common is connected to the Normally Open. In the Closed state, the Common and Normally Closed are connected.

**Relay Specifications**

<table>
<thead>
<tr>
<th>Rating (resistive)</th>
<th>0.5 A 120 VAC or 1 A 24 VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Carrying Current</td>
<td>2 A</td>
</tr>
<tr>
<td>Maximum Switching Power</td>
<td>60 AV, 24 W</td>
</tr>
<tr>
<td>Maximum Switching Voltage</td>
<td>120 VAC/60 VDC</td>
</tr>
<tr>
<td>Maximum Switching Current</td>
<td>1A</td>
</tr>
<tr>
<td>Life Expectancy</td>
<td>5 Million Operations Mechanical.</td>
</tr>
<tr>
<td></td>
<td>100K Operations at rated load</td>
</tr>
</tbody>
</table>

Switching Higher Current

The ELK-912-2 is a two relay board to provide higher current switching for several of Dataprobe’s remote control products. Each ELK-912-2 is two independent relays, each with screw terminal connections. The relay boards can be separated in to individual relays as required for mounting.

To use the ELK-912-2 with the iPIO-8, connect the relay board to the Output connections of the iPIO-8 as shown below.
**Power supply**

The iPIO is provided with a wall mounted power supply, item 1930075. This power supply is provided with four plug styles to accommodate most locations. The plug for North America is pre-installed. To remove the plug, slide the tab located under the plug and lift the plug out. For another location, attach the appropriate plug to the power supply body. Insert the top of the plug in first, then slide the tab and insert the bottom of the plug. If a suitable plug style is not provided, use an adaptor power cord (not provided) appropriate for your location.

Connect the power supply to the +5VDC connection on the iPIO. An LED next to the connector indicates power on. The iPIO-8 requires a 1 minute boot-up process.

**Power Supply 1930075**
- **Input**: 100-240 VAC 50-60Hz
- **Output**: 5 VDC 2.6A

**Network**

Connect the network to the iPIO-8 with the Cat 5 cable, provided, or suitable replacement. The Network connector on the iPIO-8 has two LED indicators. The orange LINK LED indicates a successful connection to the network. The Green ACT LED blinks to display network activity.

**LED Indicators**

- **Pwr**: Power On indication
- **Rmt**: Remote Communication Status indication

  - LED OFF: No Remote Units Programmed
  - LED ON: All Remotes Communicating Normally
  - LED Flash: One or More Remotes with Communication Error

**Input**

The iPIO-8 has eight LED indicators, displaying the status of the Inputs.

- LED OFF: Input Open
- LED ON: Input Closed

During power up sequence, LEDs will be off until boot complete, then flash once, then set to their current status.

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**Specifications – ELK-912-2**

- **Operating Voltage**: 12 VDC Nominal
- **Current Draw**: 30 mA
- **Minimum Pull-in Voltage**: 9VDC
- **Diode Protection Across Relay**:
  - **Contact Rating**:
    - 7 Amps @ 30 VDC
    - 10 Amps @ 125 VAC
- **Physical**: 2.2" x 1.55" (56mm x 39mm)
**Output** The iPIO-8 has eight LED indicators, displaying the status of the Relay Outputs.

<table>
<thead>
<tr>
<th>LED OFF</th>
<th>Relay Open</th>
</tr>
</thead>
<tbody>
<tr>
<td>LED ON</td>
<td>Relay Closed</td>
</tr>
</tbody>
</table>

During power up sequence, LEDs will be off until boot complete, then flash once, then set to their current status.

**Link**  Network Connected

**Act**  Network Activity. During power up sequence, Act LED will be solid on until boot process is complete. After boot, LED blinking indicates network activity
WEB Page Access

The web pages provide status information on the inputs and outputs of the iPIO-8, as well as provide configuration for the unit. Open a browser to the default or current IP address of the unit. Enter the default username and password:

**Factory Defaults:**

IP Address   192.168.1.254

**User Credentials**

<table>
<thead>
<tr>
<th>User Type</th>
<th>Default Username / Password</th>
<th>Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator</td>
<td>admin / admin</td>
<td>View, Control and Setup</td>
</tr>
<tr>
<td>General User</td>
<td>user / user</td>
<td>View and Control</td>
</tr>
</tbody>
</table>

**Status and Control**

The Status and Control web page provides real time status of the inputs, outputs and remote iPIO-8 unit connections.

The top of the page indicates the iPIO-8 device the user is connected to. This location ID is settable.

Each input, output and remote device is defined by a user selectable name. Inputs and outputs can also be assigned names for Open and Closed statuses, as well as background and text colors for each. All configurations are accomplished via the Setup button at the left of the screen.

If the iPIO-8 is programmed to communicate with additional units, each remote unit will be displayed at the bottom of the page. Each remote site displays red or green, indicating connection status.

**Operation**

To operate any of the relays, click on the **Change** button associated with that relay. To view the latest status, click on the **Refresh** button. To access the configuration click the **Setup** button (Administrator Only). To logout, click the **Logout** button.
Configuration

Access to the Setup requires administrator rights.

The setup section is divided into seven sections, Device, Network, Email, SNMP, Inputs, Outputs, and Remotes. Click on the buttons on the left to access that section.

Note: Click on Save at the bottom of each screen before moving to another section. Wait for the page to reload prior to moving to another section.

Device Setup

Device setup allows definition of the Location ID, displayed on the top header of each page. The Auto Update feature defines if the status of this device will be automatically transmitted to the remote sites, and if so, how often.

Also set on this page are the Login Names and Passwords for the User and Administrator roles.

There are two roles that can be defined. The user has access only to the status and control page. The Administrator also has access to the setup pages.

Network Setup

The iPIO-8 provides two methods for setting the IP Address
  1) Static
  2) DHCP

Select Static Mode from the drop down list and fill in the IP Address, Subnet Mask and Gateway as provided by your network administrator. Click save to save the changes. You will then be prompted to reboot the iPIO-8. Click on the Reboot Required button. The iPIO-8 will reboot and the new IP address will be ready to be accessed.

Selecting DHCP from the IP Setup page allows a DHCP server to provide IP address, Subnet Mask and Gateway information to the iPIO-8. Click Save and then Reboot when prompted. The iPIO-8 will reboot. After reboot, access the iPIO-8 with the IP address assigned by the DHCP server. Check your DHCP server to identify the IP address assigned to the iPIO-8. If no IP address is assigned by a DHCP server, the original IP address will be retained.
Secure Sockets Layer (SSL)  To restrict web access to secure, encrypted pages, select SSL. Click Save and then Reboot when prompted. With SSL enabled, access the iPIO-8 using https://

To remove SSL, a hardware reset is required. After deselecting SSL, press the recessed Reset pushbutton on the front panel, to the right of Input 8.

Port Settings  The IP Setup page also allows for changing of the port assignment for both HTTP, HTTPS and inter-iPIO protocols. Dataprobe recommends changing the Web port for units that will be connected to the Internet. This will minimize the number of hacker attacks that the iPIO-8 will be subject to. If a port other than the default Port 80 (or port 443 for SSL) is used for web browser access, that port must specifically be used in the URL when accessing the iPIO-8. For example, if the Web Port is changed to 9090 then the URL for the unit would be http://192.168.1.254:9090 or https://192.168.0.254:9090 for SSL.

Default Port Assignments
Web: 80
SSL: 443
iPIO: 9100

AES Encryption  Pairs of iPIOs can use 128 bit AES encryption to secure status and control messages. To use AES, enter a AES Passphrase (up to 16 characters) and enable AES with the checkbox. Any additional iPIO-8 that connects to this device will need to use the same Passphrase as set here. See Remote Setup for entering the Passphrase of a remote iPIO-8.

Use DxP Username and Password.  Older DxP supported devices do not use username and password pairs in the protocol. Uncheck this to provide backward compatibility if the remote site units do not support U/P pairs.

Connection Timeout.  The CLI and web login will automatically log off the user if no activity is detected for the period of time (in minutes) specified here. Set to 0 to allow unlimited timeouts, but be sure to log out manually as unlimited timeout will prevent new users from logging in if the session is not closed manually.

Email Setup

The iPIO-8 sends email notification on a variety of events. Set the email server and destination information on this page.

SMTP Server.  Set the IP address of the email (SMTP) server that will send the email notifications.

Account Name.  Set the user login name for the SMTP server.

Account Password.  Set the password for the SMTP server account.

Return Address.  Set the return address to be used in the email notifications.
Destination 1 & 2. Set up to two email addresses to receive notifications.

**Send Email on Change.** Select which type of events will generate email notifications.

- Input. Email on any input change
- Relay. Email on any relay change
- Communication. Email on any change in communication status to the remotes.
- Configuration. Email on any configuration change.

**SNMP Setup**

iPIO-8 is SNMPv2 manageable. Set the SNMP manager and trap information on this screen.

SNMP Managers 1-4. Set up to four SNMP manager IP addresses. Each manager defined here will receive traps.

Read & Write Community. Set the SNMP Read Community and Write Community strings here.

Send Trap on Change. Set which events will generate SNMP Traps.

- Input. Email on any input change
- Relay. Email on any relay change
- Communication. Email on any change in communication status to the remotes.
- Configuration. Email on any configuration change.

To use the SNMP, download the iPIO MIB at [http://dataprobe.com/support-ipio8/](http://dataprobe.com/support-ipio8/)

**Input Setup**

Each of the eight inputs is represented by a tab with its name. Click on the tab to access the setup parameters for each input.

Each input has a user definable name (20 characters max.).

Both the Open and Closed conditions have a user definable Name (20 characters max.) and a Qualifying time in (0-99) seconds to qualify an reportable event.

The user may also select colors for the background and text. To select the colors, click on the color boxes below the Open and Closed names. Click Save when done, before moving to the next tab.
**Relay Setup**

Each of the eight relays is represented by a tab with its name. Click on the tab to access the setup parameters for each relay.

Each relay has a user definable name (20 characters max.)

Both the Open and Closed conditions have a user definable Name as well as user definable colors for the background and text. To select the colors, click on the color boxes below the Open and Closed names. Click Save when done, before moving to the next tab.

**Remote Setup**

Add remote iPIO-8 units to allow communication between iPIO-8 units and remote transport of contact inputs across the network. Up to 16 remote units can be programmed.

Adding a remote unit allows the local inputs of the iPIO-8 to control the relays of the remote iPIO-8. To achieve bi-directional control between two iPIO-8 units, each must be programmed with the other as a remote.

To add a remote, click on the Add Remote tab.

Remote Name  Enter the name (20 characters max.) to identify the remote unit.

Remote Network  Enter the IP Address and Port (if changed from default 9100 when setting up the remote).

AES Encryption can be used to secure communications with the remote. Enter the Passphrase that matches the remote device, and check the AES checkbox.

Remote Relays  One relay on the local iPIO-8 can be used as an alarm for link failure. When used, the Alarm relay will be energized (Common to Normally Closed connected) when the link is OK and de-energized (Common to Normally Open) when an alarm occurs. Each remote can use a different alarm relay, or multiple remote units can share the same relay and the alarm will occur if any remote link fails.

Each local input on the iPIO-8 can be used to activate one relay on remote iPIO-8 units. Program the Remote Relay section by selecting which remote relay will be controlled by each input. Select the relay number on the remote unit that will be controlled. The On Open and On Close setting allow the user to define the action that the remote relay will take when the input is open or closed. The choices are Open, Close or Pulse – Open and Pulse - Close. If Pulse – Open or Close is selected, the relay will momentarily take the state chosen (open or closed) for the duration specified in the Pulse column.
Multiple inputs on the local iPIO-8 can control the same relay on the remote unit. In this case, the remote relay will switch based on the most recent input state change. It is also possible to have the inputs of the local iPIO-8 control its own relays, by setting up a remote iPIO-8 with the local IP address.

Click Save and the color Link Status will change from red to green to indicate successful communications between iPIO-8 devices.

The Sync button allows information on all local inputs to be transmitted to the remote iPIO-8. When the remote iPIO-8 is set up, use this button to coordinate the local inputs with the remote relays.

iPIO-8 units continually communicate to coordinate inputs and outputs. If one or more remotes are programmed, the RMT LED on the front of the iPIO-8 will be solid on. If any remotes fail to communicate, the LED will flash, and the alarm relay (if programmed) will Open. Click refresh, or refresh your browser window to view the latest remote status.

If the Auto Update feature is enabled on the Device Setup section, the iPIO-8 will periodically transmit its status to the remote unit. If the On Reconnect feature is enabled, the iPIO-8 will transmit its status whenever the connection to the remote is established or re-established.
Using remote setup for your application

Application 1. Bidirectional Relay Transport
In this application, two iPIO-8 units share input status over the network. The relays of each unit reflect the input status of the other.

- Set each iPIO-8 as a remote of the other.
- Set each remote relay to match the input of the local.
- Set an alarm relay to provide link supervision (alarm relay notification if communications fails).

Application 2. Multi-Site Event Consolidation
In this application, many reporting sites communicate to one central site. Any input change from any of the remote sites is reflected in the output at the central site.

- Set each reporting unit with the IP address of the central site as a remote.
- Set each input of the reporting unit to the same relay on the central unit.
- To get consolidated link supervision, add all the reporting sites as remotes in the central unit, and set an alarm relay.

Application 3. Multi-Site Event Distribution
In this application, one central sites broadcasts status information to multiple remote sites.

- Set all remote sites as remotes in the central unit.
- To get link supervision at the remote sites, add the central unit as a remote, and set an alarm relay in each location.

The flexibility of the iPIO-8 allows many other combinations of control and reporting. Contact Dataprobe Technical Support for assistance in getting the most out of your iPIO-8.

Communications Protocol and Developer Support
The protocol for communication between iPIO units can be used by software developers to create custom applications for a wide variety of applications. Dataprobe makes the protocol freely available on its website, as well as sample code in a variety of formats. Visit http://dataprobe.com/support-ipio8/ for more information. Contact Dataprobe Application Engineering for additional assistance.
Firmware Upgrades
The iPIO-8 can be field upgraded. Find the latest version or special purpose versions at http://dataprobe.com/support-ipio8/

⚠️ Upgrading the firmware with a minor upgrade (i.e. 1.01.xx to 1.01.yy) will not alter the user defined settings. Major upgrades may or may not reset the iPIO-8 to factory defaults. Check the release notes for the upgrade before making changes to your iPIO-8.

1) Run the Device Management Utility, available at the link above. If the iPIO-8 you would like to upgrade is not visible in the list box, either

Select Device | Discover from the menu to locate iPIO-8 units on the local network, or
Select Device | Add from the menu to add the IP address of the iPIO-8.

Once the device is displayed in the list, highlight it

2) Select Manage | Upgrade Firmware

Enter User Name root and the Password for the Administrator. (default is admin)

Enter the filename of the firmware, or click Browse and find the file of the firmware file to be used. iPIO-8 firmware uses the extension .ipu If you don’t see any files of that type, make sure the ‘Files of type’ box is set for iPIO-8 or All Files.

Click OK when all the details are entered.

3) The upload will begin, and a progress bar will be displayed.

4) When the firmware upload is completed, WAIT 2 Minutes. The iPIO-8 will automatically reset and be ready for use.
## Specifications

<table>
<thead>
<tr>
<th><strong>Physical</strong></th>
<th>5.25&quot;W x 5.5&quot;D x 1.75&quot;H (13.3 x 14.0 x 4.5 cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Environmental</strong></td>
<td>Temperature 0 - 70 Deg C Operating</td>
</tr>
<tr>
<td></td>
<td>Humidity 90 Pct Non Condensing</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td>Wall Mounted Power Supply, included</td>
</tr>
<tr>
<td></td>
<td>105 - 240 VAC 50/60Hz or +5VDC direct.</td>
</tr>
<tr>
<td><strong>Connections</strong></td>
<td>2 Terminals per Input. (common ground)</td>
</tr>
<tr>
<td></td>
<td>Three Terminal per Relay Output (Form C)</td>
</tr>
<tr>
<td><strong>LED Indicators</strong></td>
<td>8 x Input.</td>
</tr>
<tr>
<td></td>
<td>8 x Output.</td>
</tr>
<tr>
<td></td>
<td>Network Link (Link) and Activity (Act).</td>
</tr>
<tr>
<td></td>
<td>Remote Unit Link Status (Rmt).</td>
</tr>
<tr>
<td></td>
<td>Power (Pwr)</td>
</tr>
<tr>
<td><strong>Switch</strong></td>
<td>Reset. Hardware Reset</td>
</tr>
<tr>
<td><strong>Inputs</strong></td>
<td>8 Digital Inputs</td>
</tr>
<tr>
<td></td>
<td>Dry relay/switch closures or</td>
</tr>
<tr>
<td></td>
<td>+/-3VDC to +/-30 VDC</td>
</tr>
<tr>
<td></td>
<td>Grounds common</td>
</tr>
<tr>
<td><strong>Control Relay</strong></td>
<td>Current Maximums 0.5A @ 120VAC or 1A @ 24VDC</td>
</tr>
<tr>
<td></td>
<td>Switching Power 60VA Max 50uW Min</td>
</tr>
<tr>
<td></td>
<td>Switching Voltage 120VAC or 60VDC Max 1VDC Min</td>
</tr>
<tr>
<td></td>
<td>Switching Current 1A Max 1mA Min</td>
</tr>
<tr>
<td></td>
<td>Resistance 100 milliohms (initial value)</td>
</tr>
<tr>
<td></td>
<td>Operations 5 Million, mechanical. 100K at max</td>
</tr>
<tr>
<td><strong>Network</strong></td>
<td>HTTP Web Server</td>
</tr>
<tr>
<td></td>
<td>SSL Secure Sockets Layer</td>
</tr>
<tr>
<td></td>
<td>DHCP Assigned or Static IP Address</td>
</tr>
<tr>
<td></td>
<td>Email to SMTP Server</td>
</tr>
<tr>
<td></td>
<td>SNMP V2 Manageable. MIB Supplied</td>
</tr>
<tr>
<td></td>
<td>Inter Device Communications via DxP Protocol supplied.</td>
</tr>
<tr>
<td></td>
<td>128 bit AES Encryption optional</td>
</tr>
<tr>
<td></td>
<td>Selectable Port assignments for Web, SSL and DxP Protocol.</td>
</tr>
</tbody>
</table>
TECHNICAL SUPPORT, RETURNS and WARRANTY

Seller warrants this product, if used in accordance with all applicable instructions, to be free from original defects in material and workmanship for a period of Three Years from the date of initial purchase. If the product should prove defective within that period, Seller will repair or replace the product, at its sole discretion. Repairs may be made with new or refurbished components and replacements may be new or refurbished at the Seller’s sole discretion. Repaired or replaced units shall be warranted for the balance of the original warranty, or 90 days, whichever is greater.

If Purchased from Dataprobe Inc.; Service under this Warranty is obtained by shipping the product (with all charges prepaid) to the address below. Seller will pay return shipping charges within the United States. Call Dataprobe Technical Service to receive a Return Materials Authorization (RMA) Number prior to sending any equipment back for repair. Include all cables, power supplies, accessories and proof of purchase with shipment.

If purchased from an Authorized Dataprobe Reseller; Service under this Warranty is obtained by contacting your Authorized Dataprobe Reseller.

THIS WARRANTY DOES NOT APPLY TO NORMAL WEAR OR TO DAMAGE RESULTING FROM ACCIDENT, MISUSE, ABUSE OR NEGLECT. SELLER MAKES NO EXPRESS WARRANTIES OTHER THAN THE WARRANTY EXPRESSLY SET FORTH HEREIN. EXCEPT TO THE EXTENT PROHIBITED BY LAW, ALL IMPLIED WARRANTIES, INCLUDING ALL WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PURPOSE ARE LIMITED TO THE WARRANTY PERIOD SET FORTH ABOVE; AND THIS WARRANTY EXPRESSLY EXCLUDES ALL INCIDENTAL AND CONSEQUENTIAL DAMAGES.

Some states do not allow limitations on how long an implied warranty lasts, and some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may have other rights which vary from jurisdictions to jurisdiction.

WARNING: The individual user should take care to determine prior to use whether this device is suitable, adequate or safe for the use intended. Since individual applications are subject to great variation, the manufacturer makes no representation or warranty as to the suitability of fitness for any specific application.

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