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# User Instruction Manual

## **IQGPI03**

General Purpose Control Interface

# Information and Notices

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## Contact Details

### Customer Support

<b>United Kingdom (HQ)</b> +44 (0) 118 921 4214 (tel) +44 (0) 118 921 4268 (fax) customersupport@snellgroup.com	
<b>Regional Support Contacts</b>	
<b>Snell USA</b> +1 818 556 2616 (tel) +1 818 556 2626 (fax) support.us@snellgroup.com	<b>Snell Germany</b> +49 (0) 6122 98 43 0 (tel) +49 (0) 6122 98 43 44 (fax) support.germany@snellgroup.com
<b>Snell Spain</b> +34 91 446 23 07 (tel) +34 91 446 17 74 (fax) support.spain@snellgroup.com	<b>Snell France</b> +33 1 41 95 30 50 (tel) +33 1 41 95 30 51 (fax) support.france@snellgroup.com
<b>Snell Asia Pacific</b> +852 2356 1660 (tel) +852 2575 1690 (fax) support.hk@snellgroup.com	<b>Snell India</b> +91 124 462 6000 (tel) +91 124 437 5888 (fax) support.india@snellgroup.com
<b>Snell Russia</b> +7 499 248 3443 (tel) +7 499 248 1104 (fax) support.russia@snellgroup.com	<b>Snell China</b> +86 10 6515 6158 (tel) +86 10 6515 5659 (fax) support.china@snellgroup.com

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# 1. Introduction

## 1.1 Description

The IQGPI03 is fitted with optocoupler switches which provide isolated or GND reference signal routing for external devices. The module uses the latest Snell intelligent control software developed from the RollPod technology. The switches (outputs) can be configured individually using the RollPod Designer application, and driven by either the RollCall Control Panel or direct RollCall commands. The unit connects to the RollCall Network via its RollNet (coax) interface.

## 1.2 Features

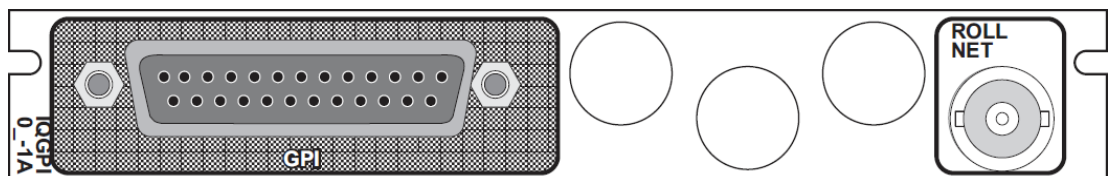
- RollCall commands individually switch isolated signal and return connections between open and closed circuit.
- Onboard dip switches provide GND reference for signal switching.
- Onboard dip switches provide a weak pull-up to +5 V to bias low current signals.
- Signal connections can operate to +/- 48 V and carry 1 A.
- 12 optocoupled output switches: 11 Isolated and one GND referenced.
- Each output may control load current up +/- 1 A.
- Outputs remain open circuit during power-down and power-up (14 s approx).
- Direct connection to the RollCall network.
- Control external events via products on the RollCall Network.
- Customizable solution allows programming of multiple events from a single trigger.
- Outputs may drive relays or LEDs.
- 200 mA +5 V power supply available on connector.

## 1.3 Order Codes

The following product order codes are covered by this manual:

<b>IQGPI0315-1A</b>	Configurable General Purpose Interface. 1 x D25, 12 x GPI high-power output ports (11 isolated, 1 GND referenced), 1 x RollNet BNC.
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## 1.4 Rear Panel View



### 1.4.1 IQGPI03 and IQGPI04 Differences

The IQGPI03 offers a resistive pull-up option for each output signal, to an internal +5 V supply. The IQGPI04 provides lower contact resistance and the option of closed contacts while the card is powered down.

## 1.5 Enclosures

The module can be fitted into the enclosure types shown.

**Important:**

Although IQ modules are interchangeable between enclosures, their rear panels are enclosure specific. An IQH3B enclosure accepts modules with either “A” or “B” order codes. An IQH3A or IQH1A enclosure accepts modules with “A” order codes only. See page 4.

### 1.5.1 B-style Enclosure



Enclosure order codes: IQH3B-S-0, IQH3B-S-P

### 1.5.2 A-style Enclosures



Enclosure order code: IQH1A-S-P



Enclosure order codes: IQH3A-S-0, IQH3A-S-P



Enclosure order codes: IQH3A-E-0, IQH3A-E-P, IQH3A-0-0, IQH3A-0-P



Enclosure order code: IQH1A-S-P

## 2. Technical Specification

<b>Outputs</b>	
SIGNAL 0–10	11 individually controlled optocoupler outputs which are open circuit during power-down. During operation, a toggle switch sets an individual output to be either isolated or GND referenced. A second toggle switch provides the option of a resistive pull-up to +5 V.
SIGNAL 11	A GND referenced optocoupler output which is open during power-down. A toggle switch provides the option of a resistive pull-up to +5 V.
User power supply	Via 25-way D-type 200 mA, 5 V foldback protected  <i>Note: This supply is not protected against applied voltages &gt;+6 V. Applying over voltage to the power supply will damage it.</i>
<b>Communication</b>	
RollNet	Via BNC connector
<b>Indicators</b>	
Power rails	Green +3 V 3, +5 V, -5 V
PSU error	Red, overload
GPI output	Yellow output indicator
RollCall TX	Green activity LED
RollCall RX	Yellow activity LED
RollCall error	Red warning LED
<b>Outputs</b>	
Voltage isolation	2000 VAC isolated GPIs only
Sink current	Up to +/-1 A
SIG/RET port resistance	<900 mΩ
Output Voltage (max)	-50 V to +50 V across signal and return connections
Toggle switch signal pull supply	+5 V typ
Toggle switch signal pull resistor	4K7 Ω
Total GND pin current	Up to +/-1 A
<b>Power Source</b>	
Voltage	5 V ± 0.5 V
Maximum current	200 mA foldback protected
Maximum load	Short-circuit to GND
<b>Power Consumption</b>	
Module power consumption	5 W typ
<b>EMC Performance Information</b>	
Environment	Commercial and light industrial E2
Peak mains inrush current following a five-second mains interruption	Not applicable to GPI card

### 3. Connections

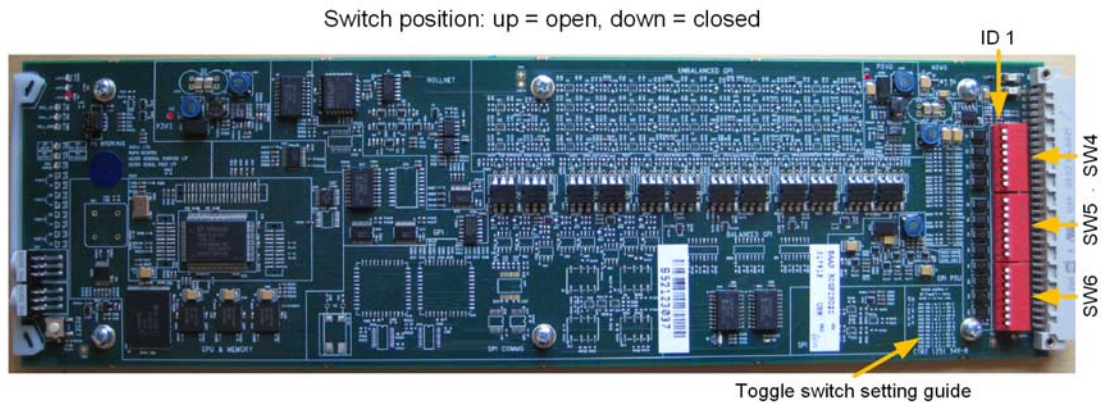
This section details the connections used by the IQGPI03.

#### 3.1 RollNet Interface

The IQGPI03 connects to PC Control Panel software with RollCall protocol packets through a RollNet interface. The RollNet interface connects via a BNC connector which enables the unit to be connected to the RollCall network communications system. The RollCall system should be connected using a 75 Ω “T-piece” or “Y-piece”, in a similar manner to an Ethernet system. Both extremities of the system must be terminated in 75 Ω.

#### 3.2 Onboard Toggle Switch Control

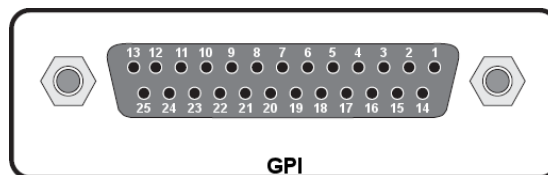
Each SIG (0–11) has an option, under switch control, to pull up to +5 V via a 4K7 Ω resistor. Each RET (0–10) can be connected to GND by a switch. The switch bank locations are to the rear of the board as shown in the diagram below. For information about each toggle switch, see page 8.



### 3.3 GPI Connection

Switch outputs (11 isolated and one GND referenced) connect via the 25-way D-type connector.

+5 V supply connects via the 25-way D-type connector referenced to chassis GND.



Pin	Pin	Name	Description	Toggle switch and ID	Toggle switch closed
1		VPP	+5 V power supply		
	14	RET0	Return 0	SW4, ID 2	GND
2		SIG0	Signal 0	SW4, ID 1	Pull up
	15	RET1	Return 1	SW4, ID 4	GND
3		SIG1	Signal 1	SW4, ID 3	Pull up
	16	RET2	Return 2	SW4, ID 6	GND
4		SIG2	Signal 2	SW4, ID 5	Pull up
	17	RET3	Return 3	SW4, ID 8	GND
5		SIG3	Signal 3	SW4, ID 7	Pull up
	18	RET4	Return 4	SW5, ID 2	GND
6		SIG4	Signal 4	SW5, ID 1	Pull up
	19	RET5	Return 5	SW5, ID 4	GND
7		SIG5	Signal 5	SW5, ID 3	Pull up
	20	RET6	Return 6	SW5, ID 6	GND
8		SIG6	Signal 6	SW5, ID 5	Pull up
	21	RET7	Return 7	SW5, ID 8	GND
9		SIG7	Signal 7	SW5, ID 7	Pull up
	22	RET8	Return 8	SW6, ID 2	GND
10		SIG8	Signal 8	SW6, ID 1	Pull up
	23	RET9	Return 9	SW6, ID 4	GND
11		SIG9	Signal 9	SW6, ID 3	Pull up
	24	RET10	Return 10	SW6, ID 6	GND
12		SIG10	Signal 10	SW6, ID 5	Pull up
	25	SIG11	Signal 11	SW6, ID 7	GND
13		GND	Ground (Ref for SIG11)		

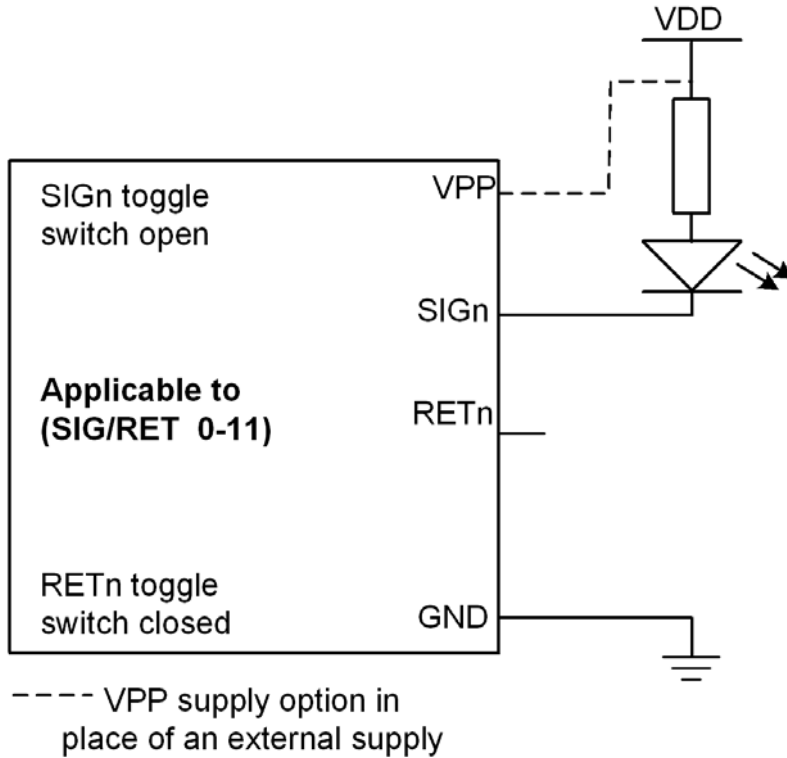


### 3.4 External Circuit Connections

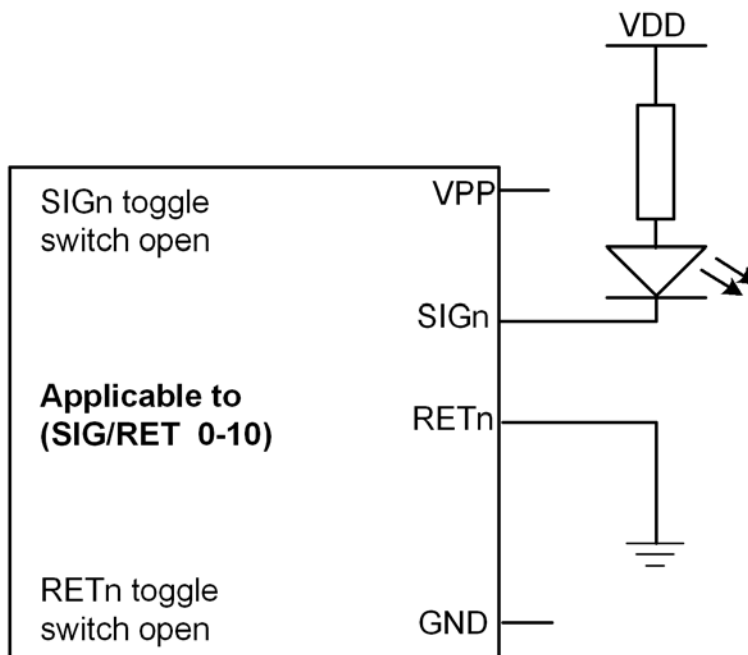
The diagrams in this section are some examples of external circuit connections in combination with onboard toggle switch positions.

The SIG/RET switches can also operate in circuits with a negative external supply voltage.

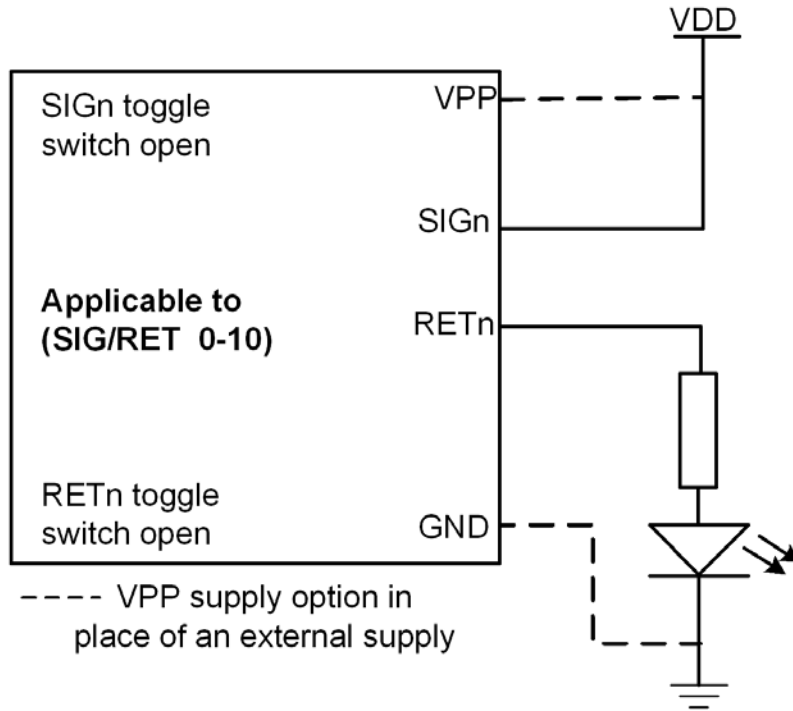
#### 3.4.1 Example 1: Load Connected Between a Supply and Signal Port



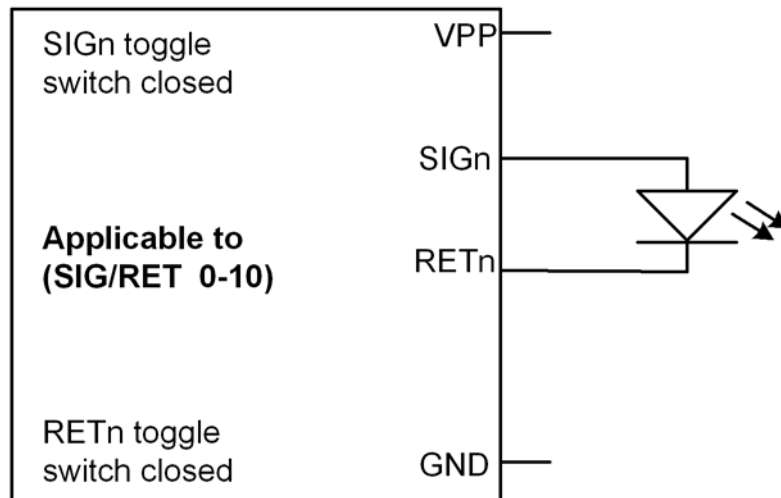
#### 3.4.2 Example 2: Isolated Load Application



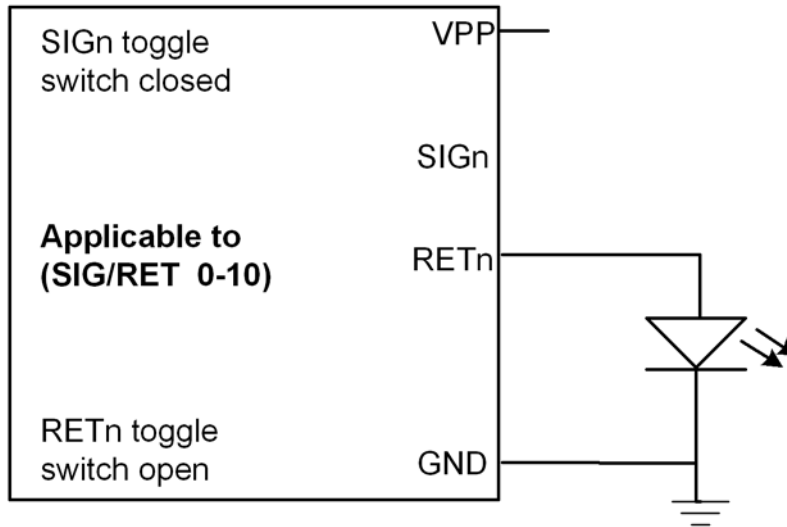
### 3.4.3 Example 3: Load Connected Between Return and an External GND



### 3.4.4 Example 4: Internal Pull-up – Load without External GND



### 3.4.5 Example 5: Internal Pull-up – Load to GND



## 4. Authoring GUIs Using the RollPod Designer

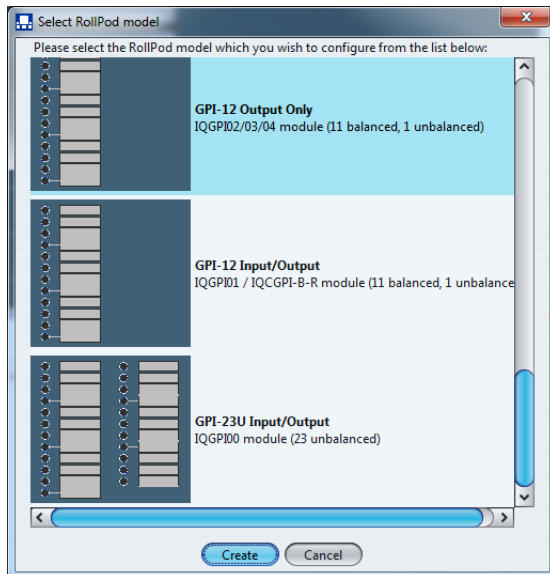
RollPod Designer is an authoring tool that can generate Graphical User Interfaces (GUIs) with custom configurations for control and monitoring of the IQGPI03. The resulting menus can then be used to operate the IQGPI03, from the RollCall Control Panel.

Output state (port closed or port open) can be linked to the behavior of other RollCall controls offered by RollCall-enabled or third-party products, and affects the control and operation of those products.

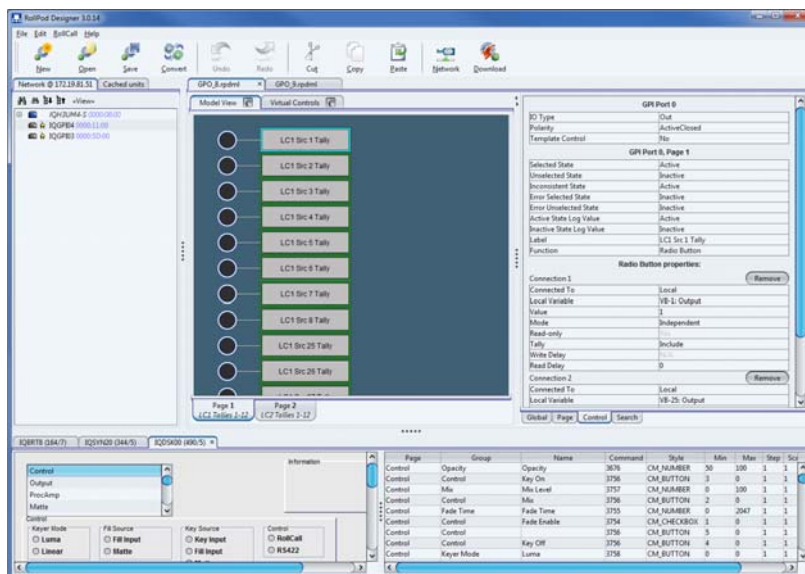
See the *RollPod Designer User Manual* for information about installation and setup of the RollPod Designer.

### Application Example

RollPod Designer has several default templates, from which application-specific menus can be created for all IQGPI and other products.



- Port closed: switches to the redundant input of dual input card and drives a tally LED ON.
- Port open: switches to primary and drives a tally LED OFF.

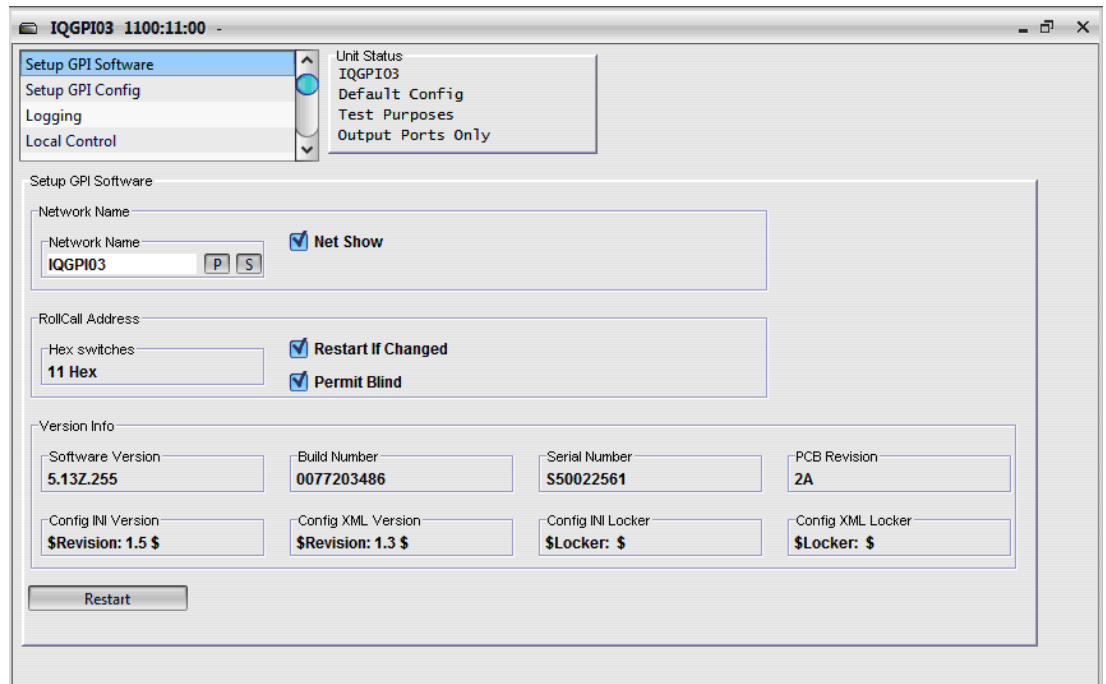


RollPod Designer and RollCall Control Panel are available to download from the Snell website:

<http://www.snellgroup.com/support/software-updates>

## 5. Operation Using the RollCall Control Panel

### 5.1 Setup GPI Software



#### 5.1.1 Network Name

The edit string sets the name of the IQGPI as seen from a RollCall network browser, such as shoebox or RollCall PC Control Panel.

- To change the name, type the new name in the text field and click **S**. To return the name to its factory default, click **P**.

#### 5.1.2 Net Show

When selected, the module will appear in the Module List of other control panels.

If the **Net Show** check box is cleared, the IQGPI will continue to operate normally, but will be hidden in network browsers. From a RollCall PC a connection may be made to a hidden device by entering the address manually, as opposed to browsing.

#### 5.1.3 RollCall Address

A display shows the current position of the hex switches that define the RollCall address of the IQGPI. By default, the **Restart if Changed** check box is selected. This means that the module will automatically restart and use the new address when the hex switches are moved.

#### 5.1.4 Permit Blind

Blind Control is the ability to control a unit without a connection. Active front panels and RollCall PC programs use a RollCall connection to control a module. RollTrack (used for setting audio delay times to track video delays, for example) does not use a connection, it just sets the delay.

If a chassis fitted with modules which will be controlled by Blind Control (RollTrack and some third-party remote control systems), then **Permit Blind** must be enabled.

If Blind Control is not be used, the **Permit Blind** control may be disabled to give protection against incorrectly set-up RollTrack source modules.

### **5.1.5 Restart**

Selecting this function will reboot the module with any changes incorporated. This provides an easier alternative to a power-down/power-up operation.

### **5.1.6 Version Info**

The serial number, software version, and software build number of the unit is shown here. Also shown is version information about the configuration.

### **5.1.7 Software Version**

This item shows the version of the software fitted in the module.

### **5.1.8 Serial Number**

This item shows the serial number of the module.

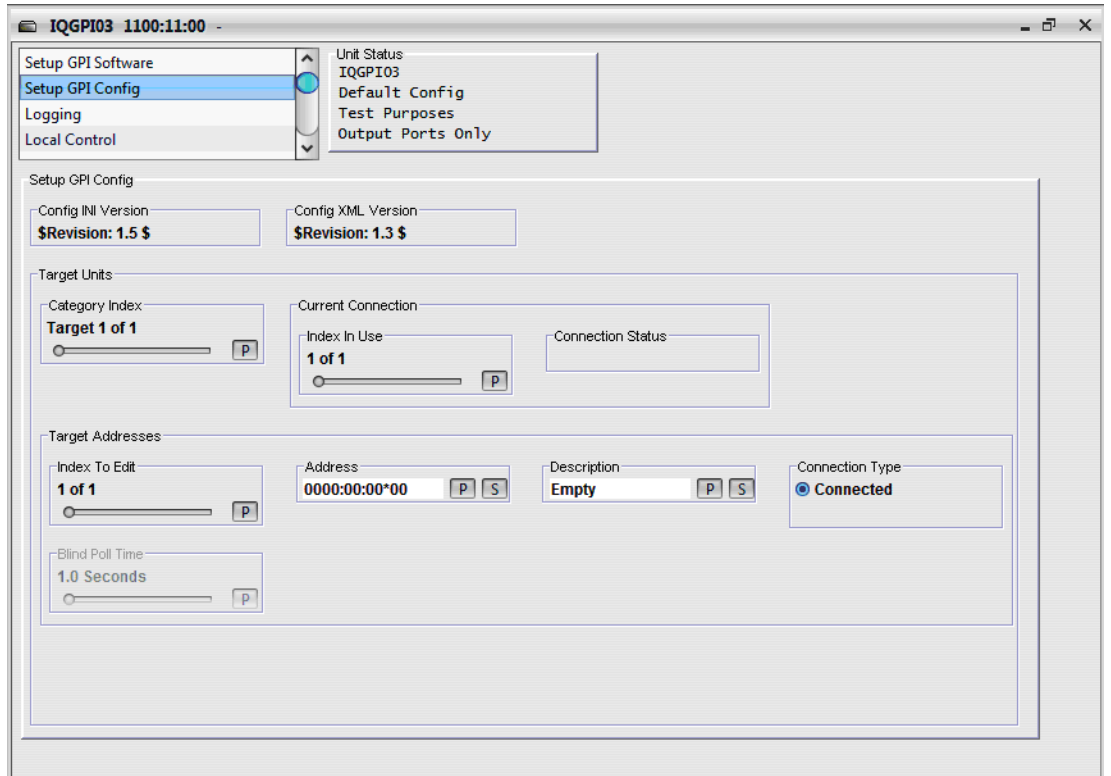
### **5.1.9 Build Number**

This will indicate the factory build number. This number defines all parameters of the unit (software versions, build level etc.) for identification purposes.

### **5.1.10 Config INI Version / Config XML Version / Config INI Locker / Config XML Locker**

These show the version of the user configurations.

## 5.2 Setup GPI Config



A number of controls and displays all apply to one of the IQGPI's "targets" (the units being controlled or monitored by the IQGPI). Depending the method used to develop the configuration, and on the task to be accomplished, the GPI cards RollCall template will show different controls and menus available.

In this example of a customized configuration, a target index slider enables the selection of one target at a time. All the other controls and displays then apply to the selected target.



For example, the configuration shown above has 11 targets, numbered 0 to 11. The target index has Target 7 selected. Therefore the target controls (Address, Connection Status etc.) currently apply only to this target.

In this case, a description has been assigned to the target, Ch2 BSFR Shuffler 1, and the current status is Connection OK to address 0000:12:07. As the target index slider is dragged to the other values, the entry fields and status are seen for each target.

## Controls that apply to the currently selected target

### 5.2.1 Address

This edit string sets the RollCall address of the target unit, in the form “nnnn:uu:pp” where nnnn is the network route, or “0000” in a simple non-bridged network; uu is the unit address, normally set by hex switches; pp is the port address, which corresponds to the slot number in modular systems, or “00” for non-modular products.

- To change the address, type the new address into the text field and click **S**. To return the name to its factory default, click **P**.

### 5.2.2 Description

This edit string has no effect on the communications, but allows the user to differentiate the targets.

### 5.2.3 Connection Type

There are 2 methods of connecting to a target: true connected or blind polled. True connected is preferred because it provides immediate updates to the IQGPI when a control is changed from a different panel, from the card edge controls, or in response to other events.

In current IQGPI versions, connected control is the only mode supported. The only benefit of the blind control mode (currently not supported in the IQGPI), is that this does not take a true control session, which allows other control panels to access single-session units such as IQ modules at the same time as the IQGPI is connected. This mode will be enabled in a future IQGPI software release.

### 5.2.4 Blind Poll Time

This control is ignored when in connected control mode. In blind control mode, Blind Poll Time affects the rate at which the IQGPI polls the target to check for changed values. This affects the speed of updates appearing on the IQGPI when changed externally, e.g. on the unit card-edge controls.

**Note:** This has no effect on the speed of control selection on the IQGPI. Any change occurs immediately in either connected or blind control mode.

### 5.2.5 Connection Status

This display shows a short text message describing the current (live) status of the IQGPI connection to this target.

- **Connection OK:** The IQGPI has a live true connection to the target unit, with no errors detected. In this state the IQGPI should action changes made immediately, and also respond immediately to any changes made on the target unit.
- **Blind Poll OK:** The IQGPI has a live blind-polled connection to the target unit, with no errors detected. In this state the IQGPI should action changes made immediately, and respond to any changes made on the target unit within the configured blind poll time.
- **Bad Address:** The IQGPI is not attempting to connect to this target because the address entered is invalid, e.g. all zeros. The IQGPI will not try communication until a valid address is entered.
- **Conn. Fail: Timeout:** The IQGPI is not connected to the target unit, and connection attempts time out. This indicates either a wrong address entered, or that the target unit is not connected to the network. The IQGPI will retry to connect indefinitely.



- **Conn. Fail: Busy:** The IQGPI is not connected to the target unit because the target returned busy, indicating that it had reached the maximum allowed number of controllers, e.g. one controller on a single session IQ modular system. The IQGPI will retry to connect indefinitely: as soon as the existing control panel is disconnected from the target, the IQGPI will connect.
- **Connection Failed:** The IQGPI is not connected to the target unit, for an unknown reason, i.e. neither time out nor busy. The IQGPI will retry to connect indefinitely.
- **Blind Poll Failed:** The IQGPI's attempt at a blind-poll connection to this target has not been successful. The IQGPI will retry indefinitely.
- **Bad Config:** The currently loaded user configuration is invalid. No communication will be attempted until a valid config is downloaded.
- **Trying...:** The IQGPI is making a first attempt to establish communications with the target. If the most recent attempt fails, an error will be reported, e.g. "Conn. Fail: Busy", replacing the "Trying..." message.

**Note:**

The IQGPI will continue to try, even if the message "Trying..." is no longer displayed. Therefore the "Trying..." message should only occur transiently.

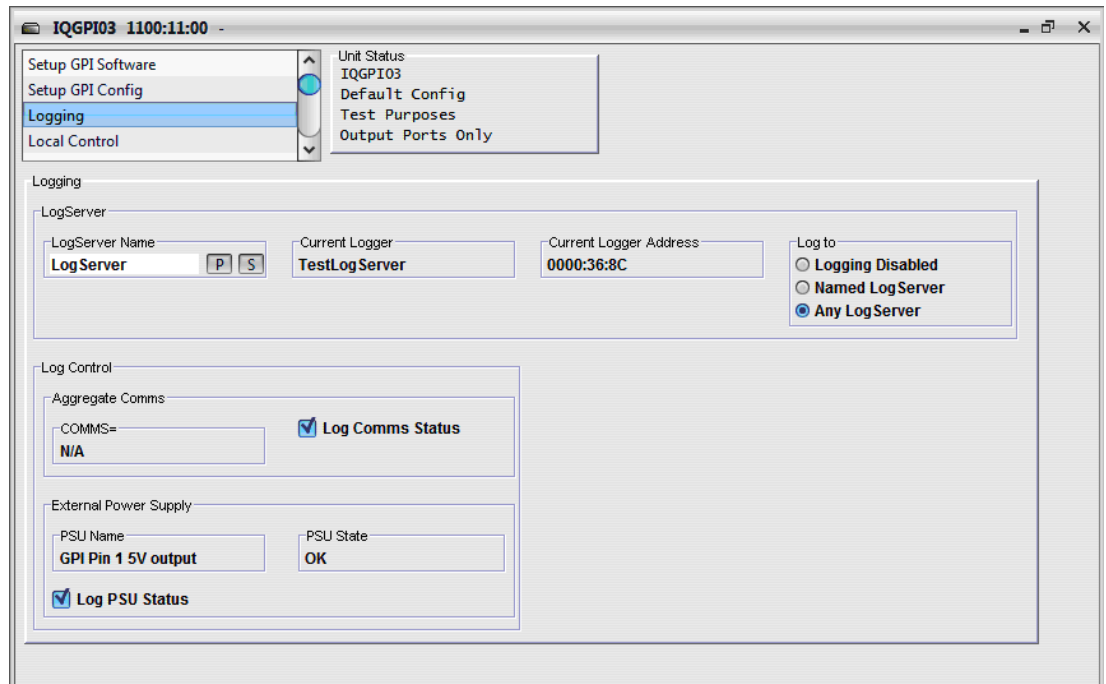
- **Initializing:** The IQGPI has established successful communication with the target and is retrieving the current values of all controls required for the configuration. This message should only occur transiently, being replaced with the appropriate OK or failure message.
- **Remote Disconnected:** The IQGPI had a valid true connection to the target, but this was terminated by the target unit. This can occur, for example, when a Supervisor-level RollCall PC Control Panel remotely disconnects the current controller to allow itself to control a single-session unit. This message should only occur transiently, being replaced with the appropriate OK or failure message as the IQGPI would retry the connection indefinitely.

**Setup Config - Config-specific controls**

Some configurations require additional setup controls that are global, i.e. not affected by the target index selection.

## 5.3 Logging

Logging makes information about various parameters available to a logging device connected to the RollCall network.



### 5.3.1 LogServer Name

The Logging Server to be used may be named by editing the text string in the text window.

- To change the name, type the new name in the text field and click **S**. To return the name to its factory default, click **P**.

### 5.3.2 Current Logger / Current Logger Address

Displays the name and address of the current logger.

### 5.3.3 Log to

Use the radio buttons to specify one of the following options:

- Logging Disabled:** Disables the logging functions.
- Named LogServer:** When selected, logging information will only be sent to the server named in the name window.

*Note: Matching of the name is case sensitive.*

- Any LogServer:** When selected, logging information will be sent to any Logger on the system. This option should be chosen if there is only one server on the system.

### 5.3.4 Log Comms Status

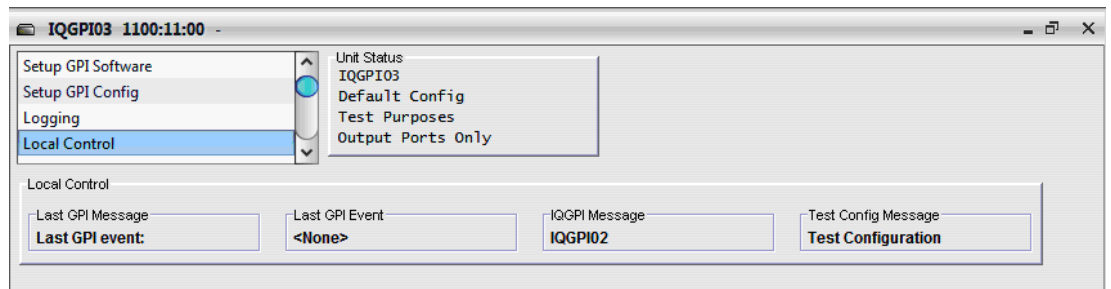
Select this option to log communication status.

### 5.3.5 Log PSU Status

Select this option to log the status of the external power supply.

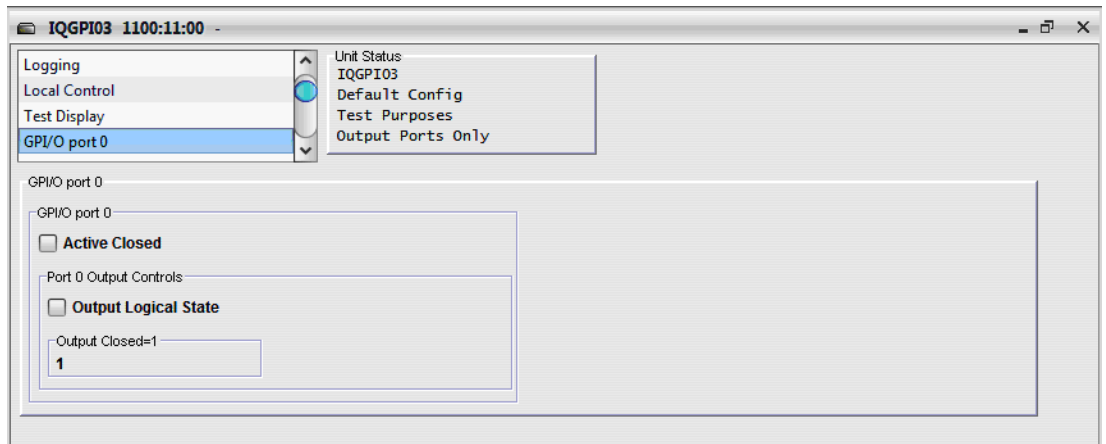
## 5.4 Local Control

The Local Control screen is defined by the user configuration. It typically includes all the controls and pages which may appear on the IQCGPI. The remote user may therefore action any control with the same effect as if the control was made locally on the IQCGPI.



## 5.5 GPIO Port

The following screen is an example of a port setup.



### 5.5.1 Active Closed

This item toggles the sense of the GPI port input or output.

### 5.5.2 Output Logical State

When **Active Closed** enabled, the output is closed when port control is enabled, and open when port control is disabled.

When **Active Closed** is disabled, the sense is reversed: the output is open when port control is enabled, and closed when port control is disabled.

The control is summarized in the following table:

Port Config	Active Closed	Port Control Enabled	Port Control Disabled
Output	Enabled	Closed (1)	Open (0)
	Disabled	Open (0)	Closed (1)

In the external circuit connection examples (see page 9), the LED is illuminated when both active output and port control are set the same.