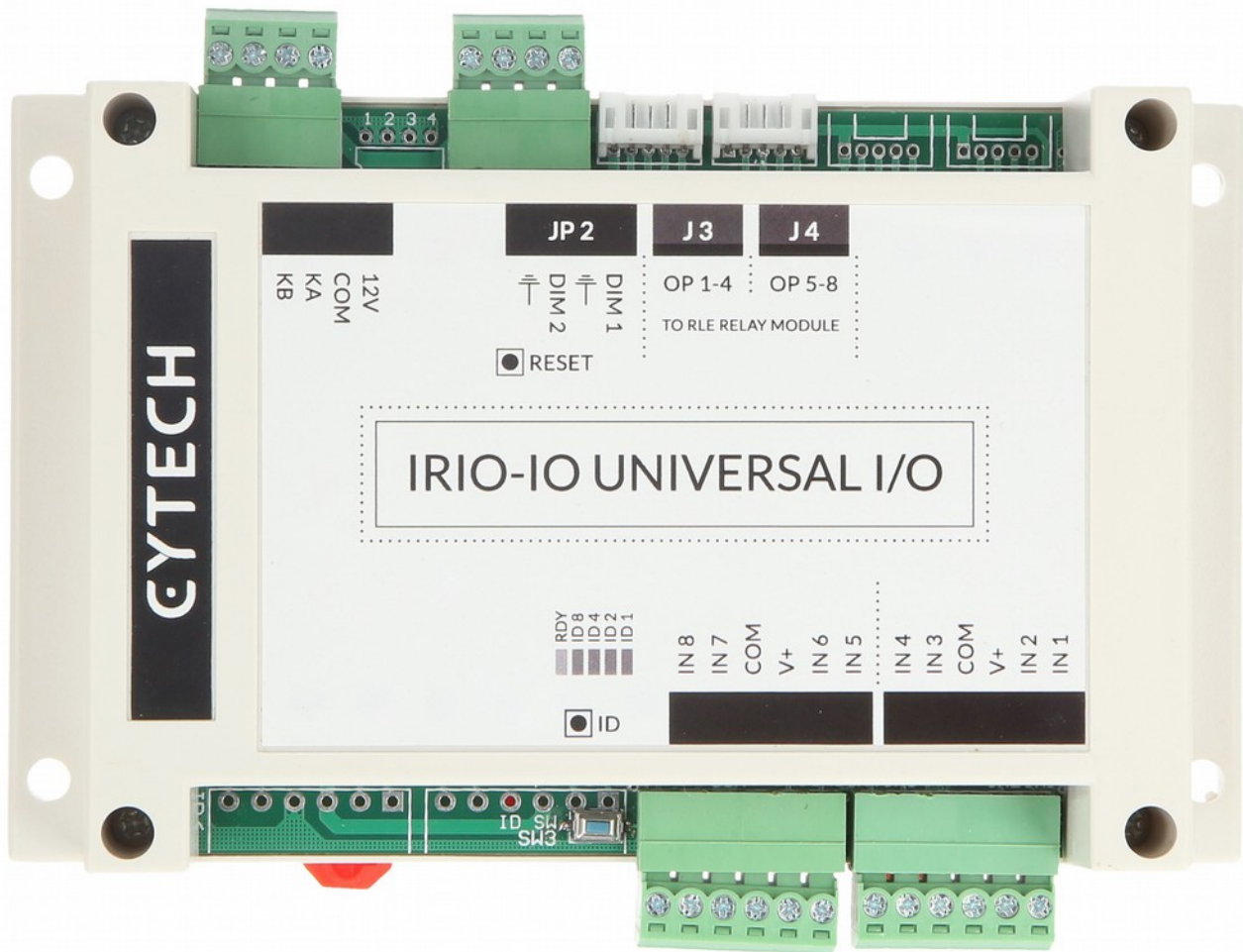


Introduction

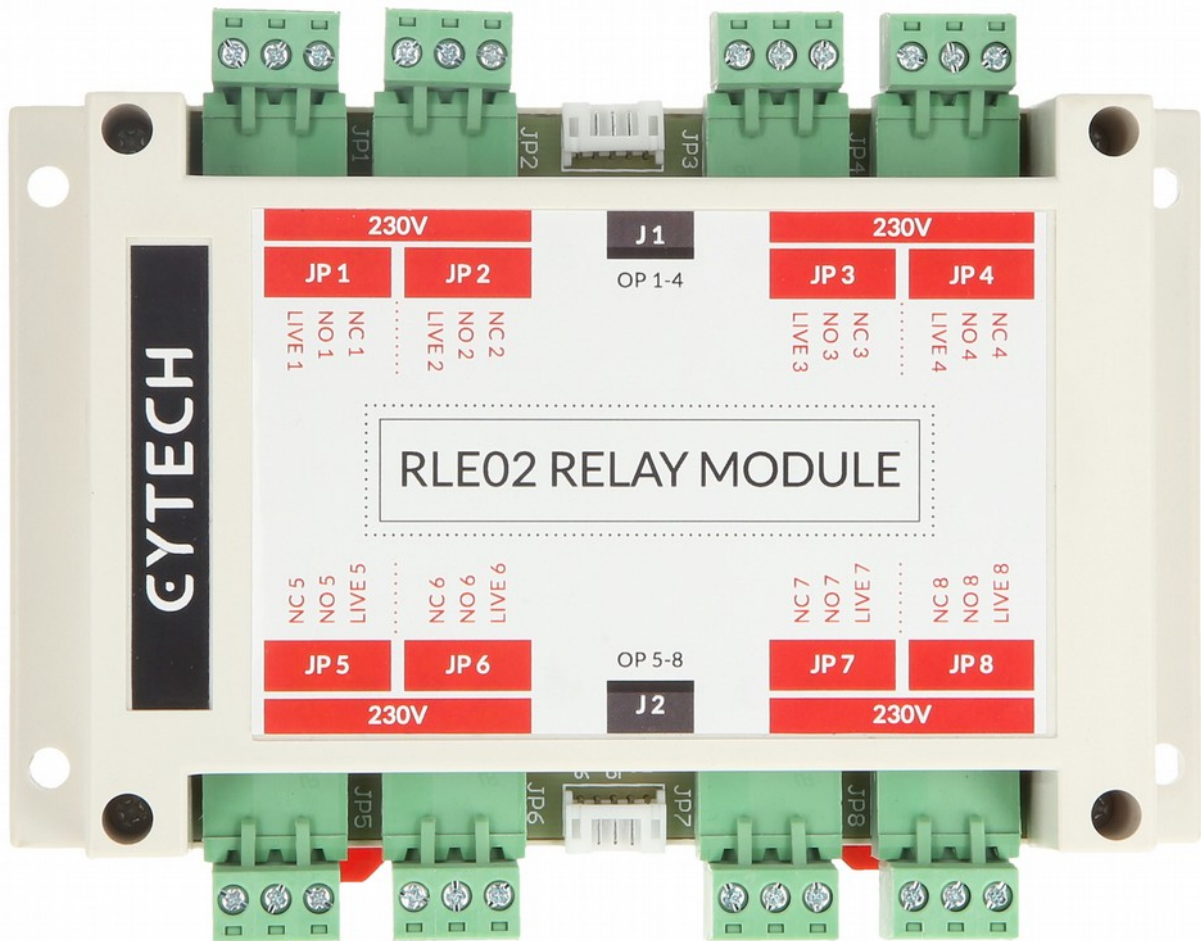


IRIO-IO Universal I/O Module

The IRIO-IO Universal I/O Module is a general purpose automation module with 8 Inputs and 8 Outputs capable of digital I/O, Analog I/O (0-10V), control of HVAC with different fan speeds, Blinds. The IRIO-IO is a special IRIO module with ISM08 submodules in a DIN rail enclosure.

The IRIOs handles automation functions in way that is easy to program and reduces wiring. Up to 15 IRIOs can be installed in a system which can be controlled by Comfort, Logic Engine or the UCM/Logic Controller. The IRIO can be used in stand-alone mode when no control from other systems or other IRIOs is required.

The IRIO-IO can be used in conjunction with RLE02 with 8 Relays. Cable Assemblies from J3, J4 can be plugged in to RLE02 J1 and J2 for easy connection.



RLE02 Relay Module with 8 Relays

Input/Output Functions

The IRIO-IO has 8 Analog/Digital Inputs, 8 Open-collector Outputs, and 2 Analog 0-10V outputs

Each of the 8 Open-collector Outputs can be assigned to the following functions;

- On/Off
- Heating/Cooling
- 2 speed/3 speed fan
- Air-conditioner Relay Interface
- Blinds DC

Note that IRIO-IO outputs are Open-Collector, not relay outputs. The RLE02 Relay Module has 8 relays that can be used with IRIO-IO.

2 x Analog Output 0-10V – Two 0-10V analog outputs are available

Each of the 8 Inputs can be assigned to the following functions;

- Digital Input
- Pulse count Input
- Dimmer Switch for 0-10V Outputs
- Analog Input 0-10V

The table below shows the Output and Input functions available. Note that in Configurator, the IRIO appears as 2 ISM08 submodules each with 4 Outputs and 4

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Inputs.

SubModule (Type)	Available OP Functions	O/ Ps *	Used I/Ps *	Available Input Functions	I/P *
ISM08 General I/O (8) 8 Outputs, 8 Inputs	Aircon Relay I/F	1	1	Not Available, used for Aircon feedback	0
	On/Off	1	0	Digital, Pulse count, Dimmer switch 0-10V, 0-10V Analog Input	1
	Heating	1	0		1
	Cooling	1	0		1
	Heat/Cooling	2	0		2
	2 speed Fan	2	0		2
	3 speed fan	3	0		3
	Blinds DC	2	2	Inputs are used by Blinds DC function as pushbutton	0

O/Ps * column is the number of outputs required by the function, eg 2 speed fan requires 2 outputs, On/Off requires 1 output.

Used I/Ps* column is the number of Inputs used by the function. If the input(s) is used by the function, it means that the input(s) is not available to be assigned to an independent Input function.

I/Ps * column is the number of Inputs available for Input Functions when the Output function on the same line is chosen. These Inputs can only be assigned to the Available Input Functions.

Available Inputs Function Column is the applicable Input functions for that module.

Specifications

- Enclosure Dimensions 145 x 90 x 40 mm
- Enclosure Material: ABS V0 Fire-rated Plastic.
- Weight: 260 g
- No of Inputs: 8
- No of Open-Collector Outputs: 8
- Max Output Current 100 mA each Output
- 2 Analog Outputs 0-10 Volts on baseboard. This is suitable for driving loads with minimum 5K input impedance.
- Power Supply: 12 Volts from CM9001 or external 12V power supply.
- Max current 50 ma.

Contents

The package includes

- IRIO-IO

System Requirements

- Comfort II, LGX01 or UCM/Logic firmware 7.090 and above
- Configurator Version 3.11.15 and above
- IRIO Firmware 7.005 and above

ID Settings

The ID of the IRIO can be seen via the state of LEDs ID1, ID2, ID4, ID8 according to the table below. For Default ID=1, ID1 is on, others are off.

To change the ID, press and Hold the ID button for 4 seconds. Press and release to

IRIO-IO Manual

increment the ID to the next value 1 to 15. Release the button to end.

The ID LEDs shows the ID according to the table below. The factory default is ID=1. If there are more than 1 **IRIO or SCS** in the system, the IDs must be unique and consecutive, eg 1,2,3, etc. Otherwise the Keypad will report "Communications Failure" and the RDY green led will flash.

ID #	ID8	ID4	ID2	ID1	ID#	ID8	ID4	ID2	ID1
1	Off	Off	Off	On	9	On	Off	Off	On
2	Off	Off	On	Off	10	On	Off	On	Off
3	Off	Off	On	On	11	On	Off	On	On
4	Off	On	Off	Off	12	On	On	Off	Off
5	Off	On	Off	On	13	On	On	Off	On
6	Off	On	On	Off	14	On	On	On	Off
7	Off	On	On	On	15	On	On	On	On
8	On	Off	Off	Off					

Buttons

- RESET. This button resets the IRIO. It does not change any other setting in IRIO.

Connections

- JP1 (12V/COM/KA/KB) – Green removable 4-way terminal block.
- J3 – 5 way header for "Module 1 Output 1 to 4"
- J4 – 5 way header for "Module 2 Output 5 to 8"
- JP3 – Input 1-4, V+, COM
- JP4 – Input 5-8, V+, COM
- JP2 – DIM1/ DIM2/COM Outputs for 0-10V

V+ in JP3 and JP4 is 3.3V Voltage. Do Not Connect.

LED Indicators

- ID1, ID2, ID4, ID8: ID of IRIO (See ID Setting table)
- PWR (D31, Green) – Power LED indicates that 12V is supplied to IRIO
- "RDY" (D38, Green) should be on at all times, flashes when IRIO is not polled.
- "Tx" (Red) RS485 send message to Comfort
- "Rx" (Green) RS485 Receive message from Comfort

Note that the LEDs may not be visible outside the enclosure. These are for troubleshooting purposes.

Connection Procedure

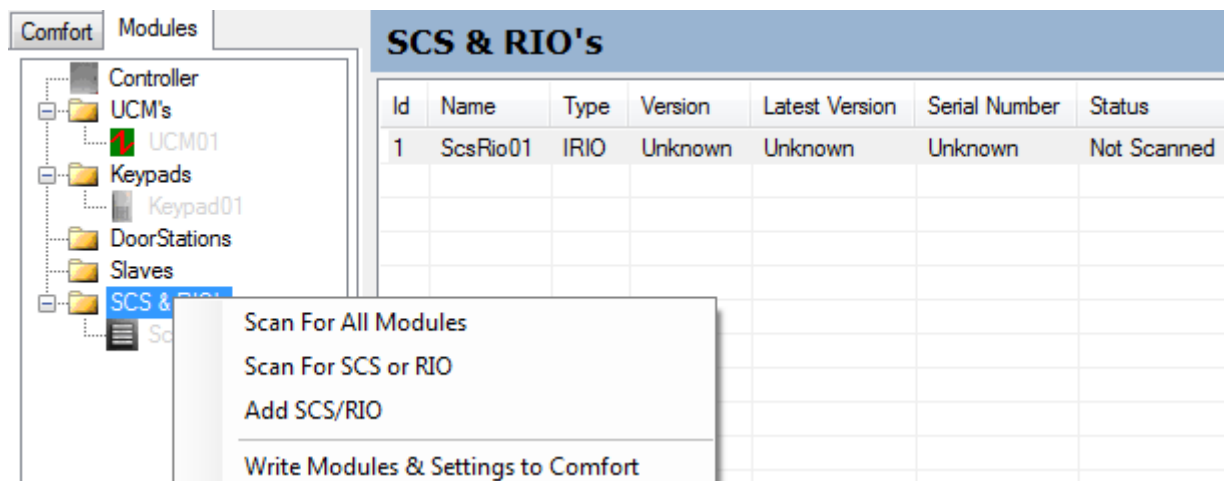
- The IRIO-IO is connected to Comfort via JP1 4 way Green Terminal Block) This supplies power and RS485 communications to the IRIO. Use CAT 5 data cable between Comfort (12V, COM, KA, KB) and the green terminal block. It is not necessary to switch off the power to Comfort before plugging in this connection.
- When connected by JP1, the Green RDY led on the IRIO should light up and remain on.
- Check the ID on ID1, ID2, ID4, ID8 LEDs (default ID=1), and if necessary change the ID according to ID Settings above so it does not conflict with another IRIO ID.
- The LEDs TX (red) and RX (green) should blink rapidly showing that RS485 communications has been established between Comfort and the IRIO. RX (green) flashing shows that it is receiving communications from Comfort (poll). TX (red) blinks when the UCM responds to a poll from Comfort. If TX does not blink it means that Comfort is not polling the IRIO. Do a

IRIO-IO Manual

Scan for IRIO Modules and write the Modules to Comfort. Configuration

- If required, connect to RLE02 Relay module using cable assemblies J3 and J4 to RLE02 J1 and J2.

Using Configurator



If there are more than 1 IRIO or SCS in the system, set the ID of the IRIO so that it is unique and consecutive among IRIO, RIO and SCS modules. Go to the Modules Tab, Right click and “Scan for All Modules” or “Scan for SCS or RIO”. This will automatically detect all IRIO if the IDs are set correctly without any conflict with other IRIOs, RIOs and SCS.

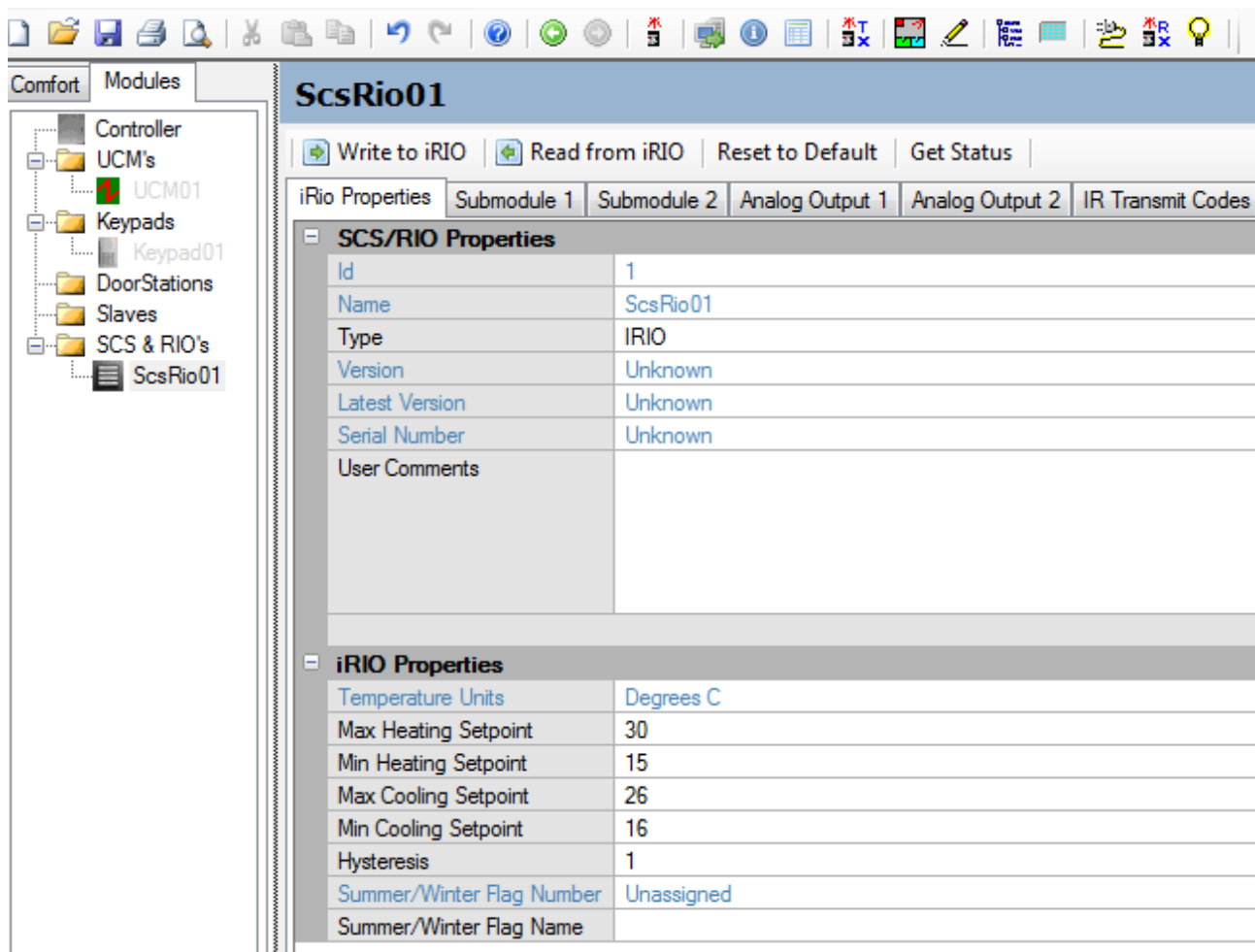
“Add SCS/IRIO” allows you to manually add an IRIO if not currently connected to Comfort, i.e. when doing programming off-line.

If the IRIO ID is detected during the module scan its properties should be displayed.

Type, Version, Latest Version , Serial Number are described below.

“Status” shows the status of IRIO on the bus. It is ‘Polled’ when the IRIO is detected and matches the number of IRIOs programmed. ‘Not Polled’ will be displayed when the IRIO is detected by scanning but the number of IRIOs programmed is less than the IRIO ID. ‘Not Found’ is shown when the IRIO is not connected to Comfort when scanning is done.

Click on the IRIO on the left pane. This brings up the Configurator screen as shown below;



IRIO Properties

SCS/RIO Properties

ID	1 to 15 *
Name	as in Modules> IRIO
Type	IRIO *
Version	Firmware version eg 7.001 *
Latest Version	Released version available when internet connection is present.
Serial Number	Electronic serial number of IRIO (if implemented.)
User Comments	Enter comments

If the IRIO was manually added instead of being scanned, the firmware information will not appear.
 * means Read Only

IRIO Properties

Max Heating Setpoint	Maximum Heating Setpoint for Heating/Cooling Function
Min Heating Setpoint	Minimum Heating Setpoint for Heating/Cooling Function
Max Cooling Setpoint	Maximum Cooling Setpoint for Heating/Cooling Function
Min Cooling Setpoint	Minimum Cooling Setpoint for Heating/Cooling Function
Hysteresis	Hysteresis in degrees for Heating/Cooling function
Summer/Winter Flag Name	Flag for Summer/ Winter Fan Mode 1= Winter, 0 = summer

Menu Bar

The menu items are; Write to IRIO, Read from IRIO, Read Properties, Reset to Default, Get Status.

Write to IRIO

This writes the IRIO configuration in IRIO

Read from IRIO

This reads the data from IRIO and displays the data on screen.

Reset to Default

This clears all the data in the IRIO to default settings, but does not write any data to IRIO (after clearing, prompt "Write to IRIO? " should be seen")

Get Status

The Get status button causes the IRIO Module status to be shown on the status bar on bottom left

"Normal/No error"

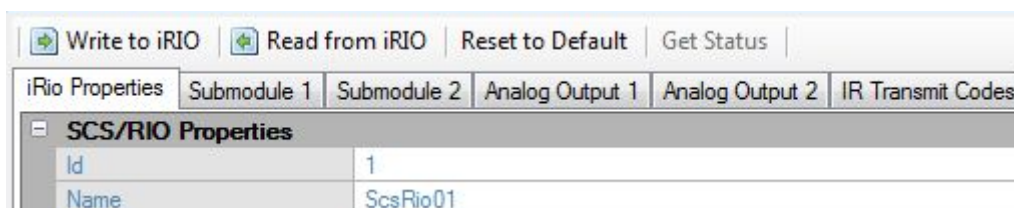
"Data Invalid"

"Communication error between baseboard and sub-module 1"

"Communication error between baseboard and sub-module 2"

When the cursor is moved away from the IRIO screen, Get status is automatically turned off, and when the cursor is on the IRIO screen the get status function is turned on if Comfigurator is logged in.

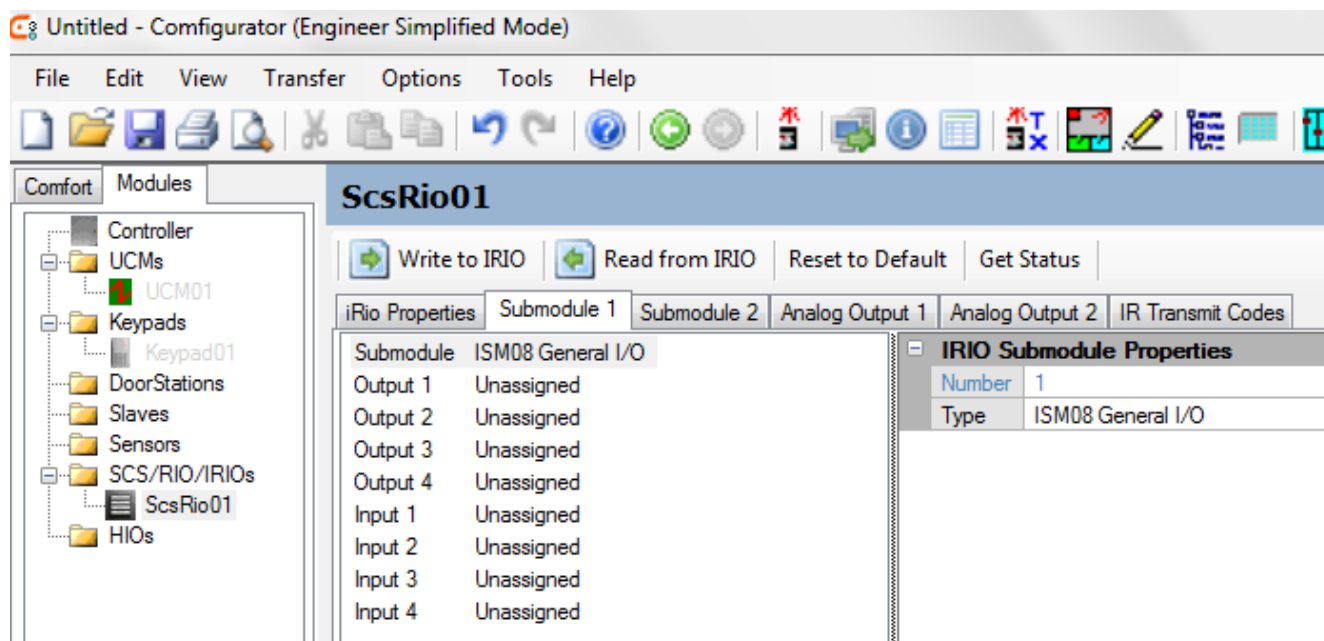
IRIO Tabs



- IRIO Properties – described above
- Submodule 1 – properties of 1st submodule
- Submodule 2 – properties of 2nd submodule
- Analog Output 1 – properties of 1st Analog Output
- Analog Output 2– properties of 2nd Analog Output
- IR Transmit Codes – Assign IR transmit codes to ISM03 IR Submodule

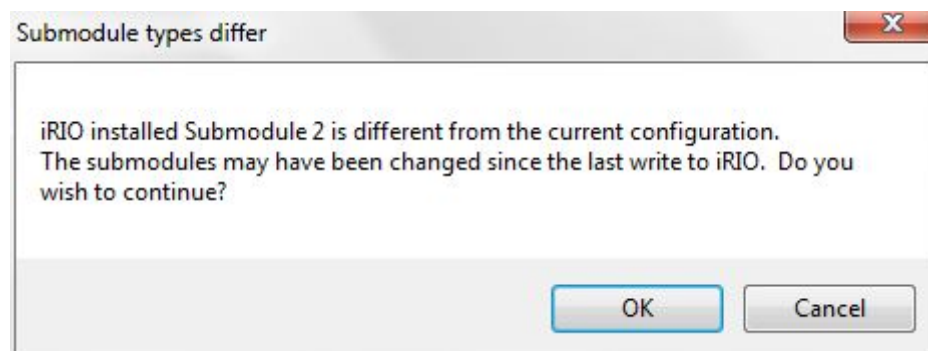
Submodules for IRIO-IO

Unlike other IRIOs, the IRIO-IO is an IRIO with 2 ISM08 Submodules. Select ISM08 for both Submodules 1 and 2. Alternately, do a Read from IRIO to discover the ISM08 submodules.



Each of Submodule 1 and 2 will show 4 Outputs and 4 Inputs. Submodule 1 contains Outputs 1 - 4 and Input 1 - 4 and Submodule 2 contains Outputs 5 - 8 and Inputs 5 - 8.

The error message below appears after Read from IRIO if other submodules other than ISM08 have been manually selected.



Press Yes to go ahead to read from IRIO.

After reading from IRIO, the Submodule 1 and Submodule 2 tabs will show the information relating to the ISM08. After changing the parameters and register mappings, do not forget to WRITE to IRIO.

Analog Outputs

The IRIO-IO has 2 built-in Analog Outputs. Click on Analog Output 1 or Analog Output 2 to configure.

The screenshot shows the ScsRio01 software interface. At the top, there are buttons for 'Write to IRIO', 'Read from IRIO', 'Reset to Default', and 'Get Status'. Below these are tabs for 'iRio Properties', 'Submodule 1', 'Submodule 2', 'Analog Output 1', 'Analog Output 2', and 'IR Transmi'. The 'Analog Output 1' tab is selected, displaying the 'Analog Output Properties' table.

Analog Output Properties	
Number	1
Name	dimmer
Register Type	Counter
Control Counter Number	5
Control Counter Name	Counter005
Full Scale Value	255
Travel Time	20
On Level	Full Bright
Minimum Dim Level	0

The analog Output is mapped to a Comfort Counter which can be selected from a pulldown list. Setting a value in the mapped counter will set the analog output to the assigned value. "Full Scale Value" is either 255 or 99. Setting the counter to the full scale value will set the output to 10 V. The analog output is limited to 10V, even if the counter value is higher than the full scale value.

"Travel Time" is the time taken to dim or brighten from minimum to maximum level or vice versa when using the Dimmer Switch 0-10V Input function to preess and hold. This does not apply for control by Counter value, which will be immediate.

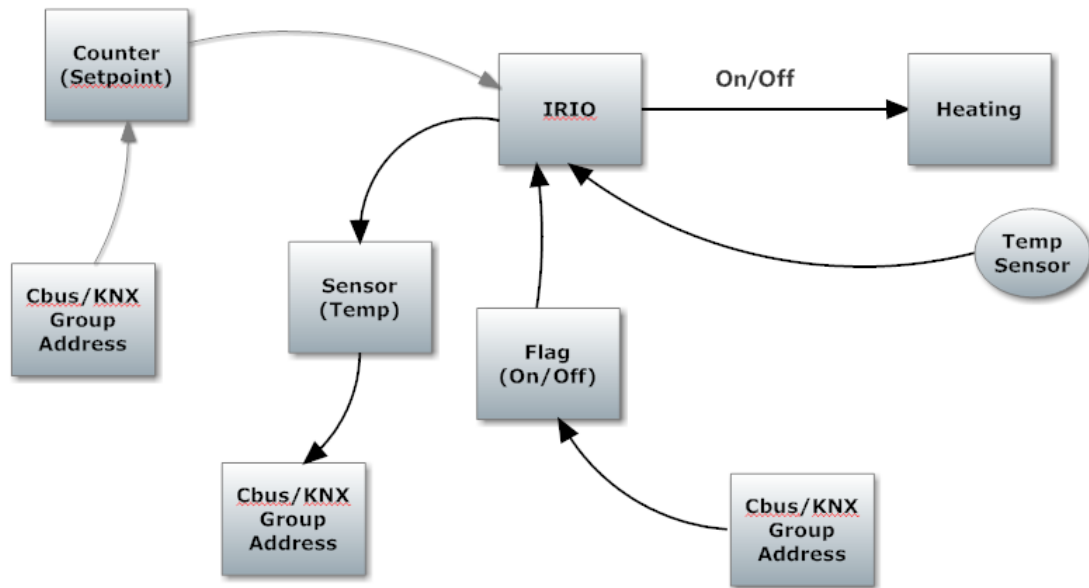
"On Level" is selected between "Full Bright" and "Last Value". This refers to the brightness level when the Dimmer Switch 0-10V Input function is used to switch on the light. Either the light turns on to full brightness or to the last level before switching off.

"Minimum Dim Level" is the lowest dimming level (0-255) below which the light is switched off to prevent the light having low dim levels which cannot be seen.

Mapping to Counters, Flags and Sensors

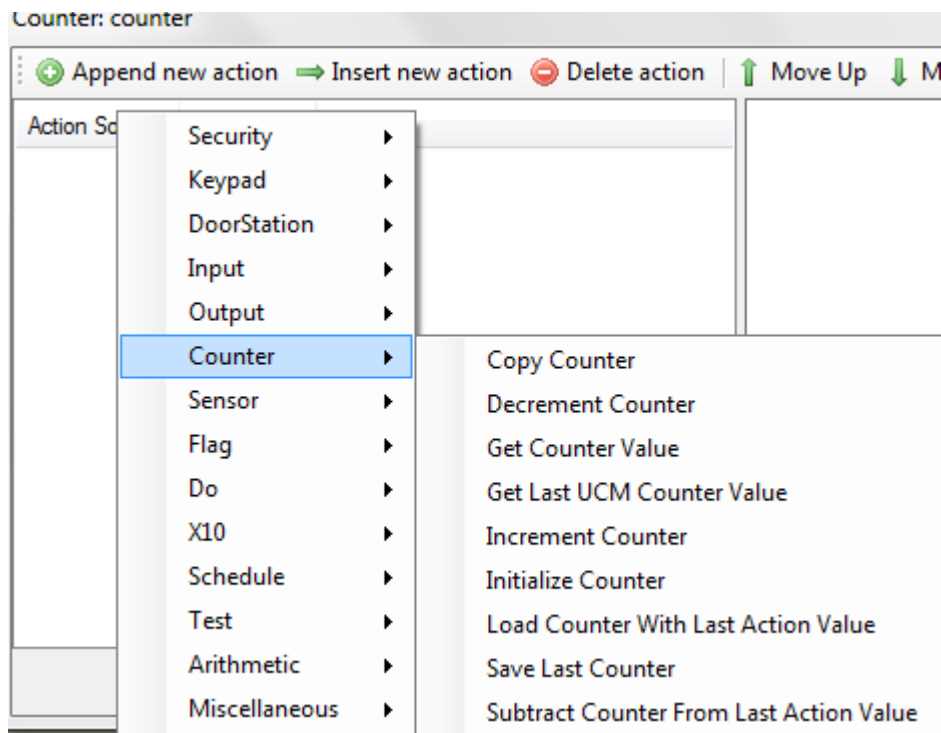
Instead of programming Responses and Actions, Functions are selected, and mapped to Comfort registers like Flags, Counters and Sensors. For example, the Heating or Cooling function works by assigning the setpoint to a Counter and temperature to a Sensor Register. Setting a value into a Counter changes the setpoint, and comparing the temperature in the sensor register allows the IRIO to decide whether to turn on the heating/cooling relay.

The function is mapped to a Comfort Flag, so that setting the flag will start the function and clearing the flag disables it. The temperature is obtained from the thermistor in the Temp Sensor Input function, the TSM (Temperature Sensor Module) or other means, e.g. via KNX, Cbus.



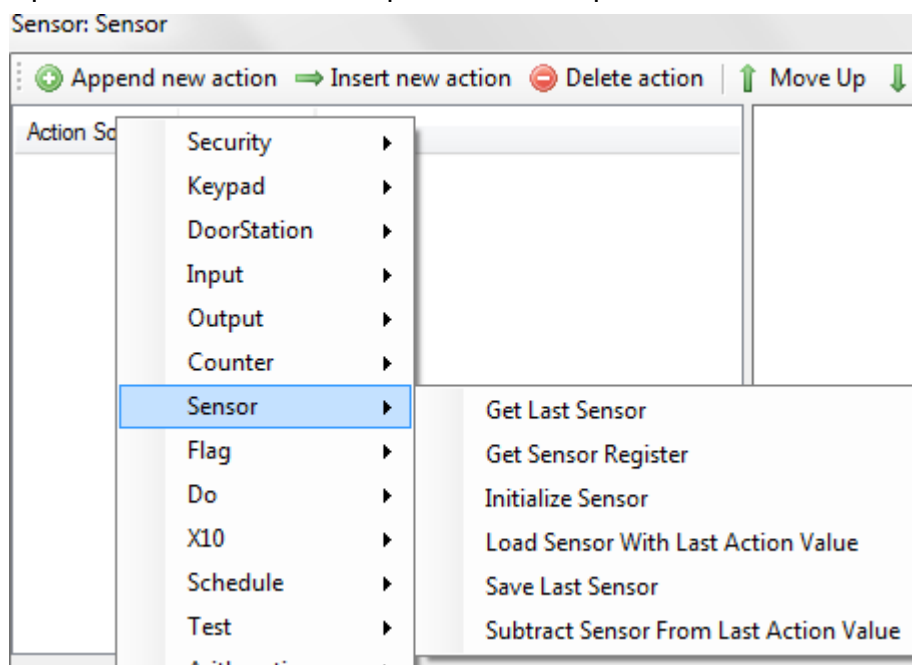
Mapping to Counters

Counters are used for level control and status. Loading a counter with a value from 0 to 255 puts the same value into the IRIO function, eg Analog Output, Heating/Cooling Setpoint, Blinds position, Infrared command. Counters can be added or subtracted from other values (using Actions within Responses) to implement arithmetic operations. IRIO Input functions like Digital Inputs (0 or 255 value) can be mapped to Counters to trigger Counter Responses to handle the input. Counters can be a way to link or synchronise the state of external devices. For example a Counter that is mapped to a Cbus or KNX group address can be controlled by an IRIO function mapped to the same Counter, where a 8 bit value is used eg for dimming.



Mapping to Sensors

Input functions like Temperature, Analog Input, Current sensor and Pulse Counter can be mapped to Sensors. The value in the sensors is 0 to 255 will trigger a Sensor Response which is used to process the input.

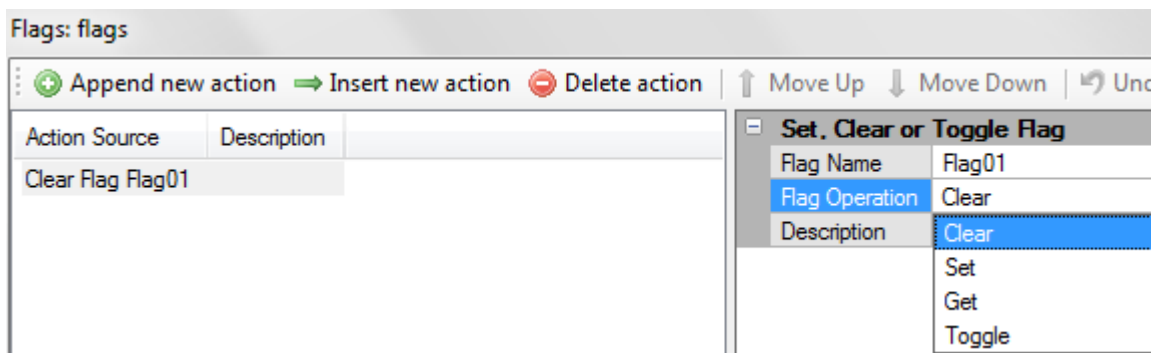
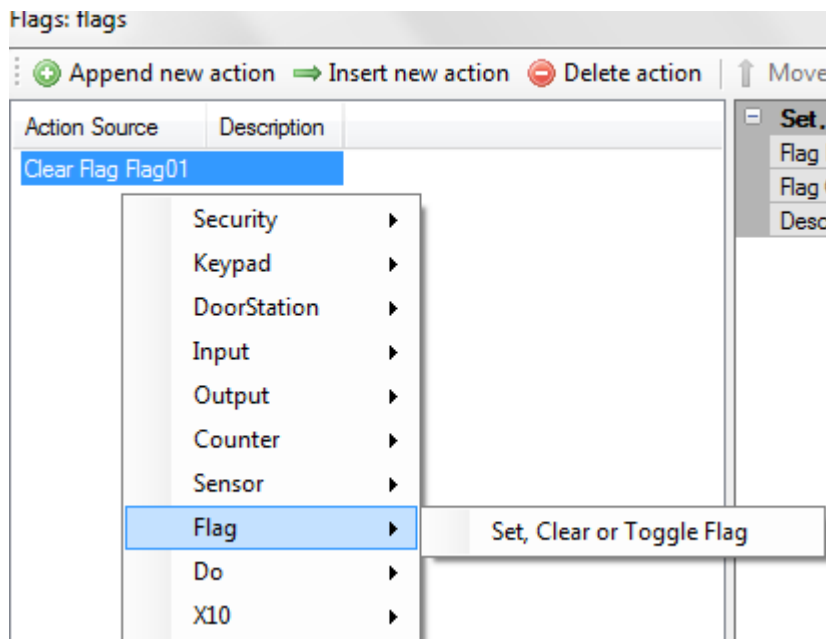


Mapping to Flags

Flags are used for On/Off control and status. Output functions like Output On/Off, Two Way Switch, Blinds Up/down can be mapped to Flags (which have 2 states – On and Off). Setting or clearing the flag will cause the function to turn on or off respectively.

IRIO-IO Manual

Feedback Input or Output functions can also be mapped to Flags so the Flag is synchronised to the function state. Flags can be a way to link or synchronise the state of external devices. For example a Flag that is mapped to a Cbus or KNX group address can be controlled by an IRIO function mapped to the same flag.



Control and Feedback Registers

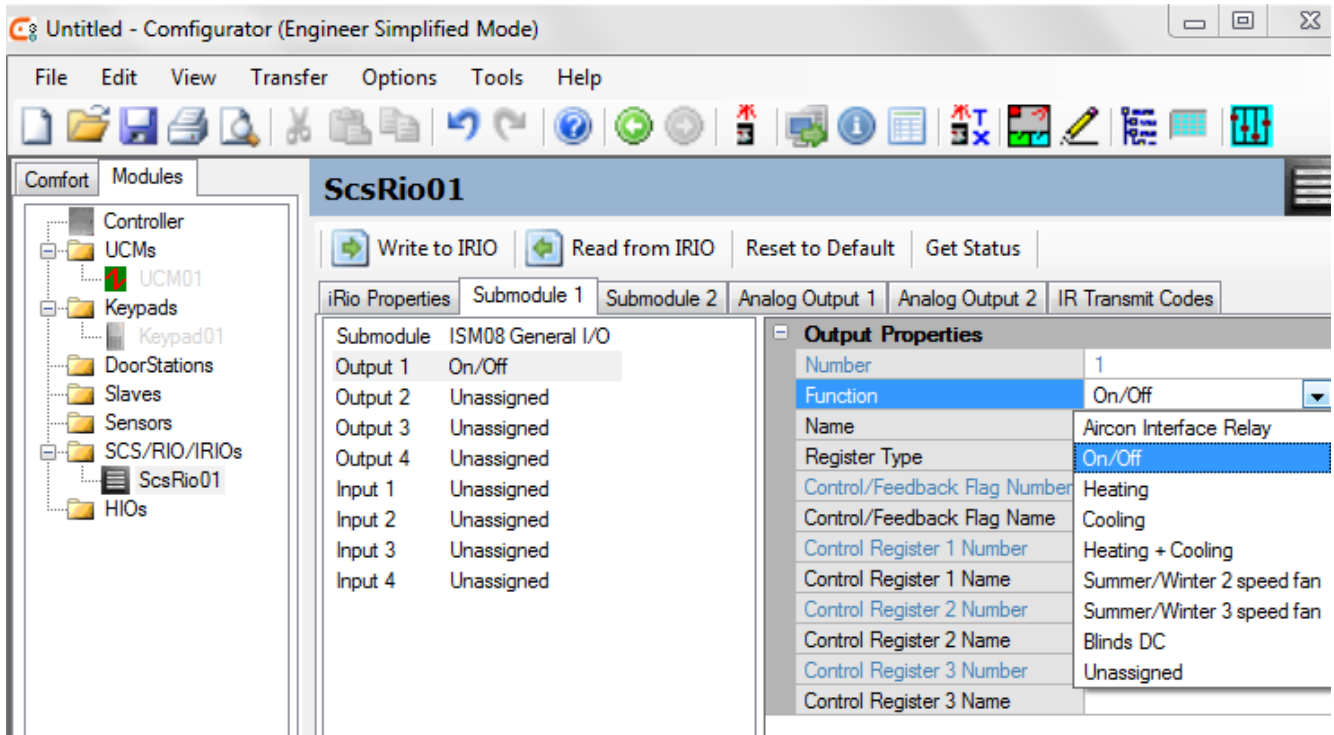
IRiO Output functions can be assigned to one **Control/Feedback Flag** and 3 additional optional **Control Registers**.

For example the On/Off Function can be mapped to Flag 1 as Control/Feedback register. Setting and clearing Flag 1 will switch the output on or off respectively. The function can be mapped to flags 2, 3, 4 as additional Control Registers. This means that changing the state of any of these flags will also affect the state of the output as well as update the state of Flag 1 (the main control/feedback register). The 3 Control Flags allow the different flags to be used to implement Scenes; for example Flag 1 can be for Kitchen Lights, Flag 2 can be used for Downstairs lights including Kitchen Lights, Flag 3 can be for Cooking Scene. The Control/feedback flag can be used to provide status to other systems eg KNX, Cbus, Zwave etc. If a flag is mapped to an IRIO function as well as to a KNX 1-bit object, then the KNX object can control the IRIO function.

Duplication of Comfort Registers

The Control/Feedback Register must not be the same as a Control/feedback register in another function (so that only 1 device is giving the feedback to the register). However, the 3 Control Registers need not be unique ie the same Control Register can be used for different functions.

Output Functions



Each of the Outputs in IRIO-IO can be assigned the functions below;

- Aircon Interface Relay
- On/Off
- Heating
- Cooling
- Heating + Cooling
- Summer/winter 2 speed fan
- Summer/winter 3 speed fan
- Blinds DC
- Unassigned (No Functon)

On/Off Function

This function is used for switching Outputs or Relays on and off. RLE02 can be connected to IRIO01 to provide relay outputs.

ScsRio01
☰

➡ Write to IRIO
⬅ Read from IRIO
Reset to Default
Get Status

iRio Properties
Submodule 1
Submodule 2
Analog Output 1
Analog Output 2
IR Transmit Codes

Submodule	ISM08 General I/O
Output 1	On/Off
Output 2	Unassigned
Output 3	Unassigned
Output 4	Unassigned
Input 1	Unassigned
Input 2	Unassigned
Input 3	Unassigned
Input 4	Unassigned

Output Properties

Number	1
Function	On/Off
Name	Kitchen Light
Register Type	Flag
Control/Feedback Flag Number	1
Control/Feedback Flag Name	Flag001
Control Register 1 Number	2
Control Register 1 Name	Flag002
Control Register 2 Number	3
Control Register 2 Name	Flag003
Control Register 3 Number	Unassigned
Control Register 3 Name	

Control/Feedback Flag

Map to a Flag for Control and Feedback Status of the output. This flag cannot be the same as any other function's Control/feedback flag. Setting or clearing the flag turns on and off the Output.

Control Flags

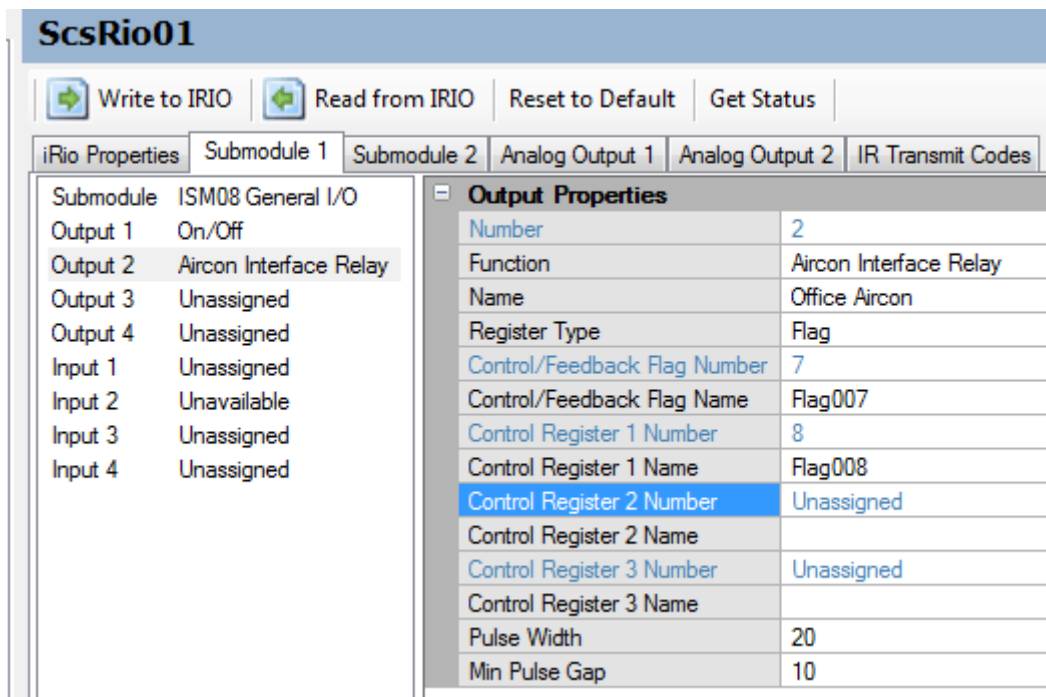
3 additional control flags can be mapped for on/off control of the output. Setting or clearing any of the control flags turns on and off the Output and updates the Control/Feedback flag. The additional control flags can be used to implement scenes.

Inputs

The On/Off Output function does not require any Inputs so the Inputs on the submodule can be assigned to any applicable Input function for the submodule.

Aircon Interface Relay Function

The Aircon Interface Relay Function is used to control airconditioner interface cards of various manufacturers. These interface cards have a dry-contact input which toggles the aircon state when a pulse is applied, and has a relay output which gives the status of the aircon (ie closed contact for On, open for off). A short pulse on the IRIO output toggles the aircon on and off. An Input from the aircon card gives the state of the aircon, ie Open for Off and Closed for On.



Control/Feedback Flag

Map to a Flag for Control and feedback Status of the air-con. This flag cannot be the same as any other function's Control/feedback flag. Setting or clearing the control flag changes the state of the aircon by sending a pulse on the relay if the state is different from the desired state. There is no action if the air-con is already in the desired state.

Control Flags

Map to 3 additional flags for control of the Aircon. This can be used to implement scenes. The Control/Feedback flag is updated with the current state of the aircon

Pulse Width

Pulse width in 50 ms units for the control pulse to change the state of the aircon. Typically 20 = 1 second.

Min Gap between Pulses

Minimum gap in 50 ms units between consecutive pulses to toggle the state of the aircon, to prevent pulses from being too close together which may appear as a continuous pulse. Typically 10 = 500 ms

Input

The corresponding input is "Unavailable" ie it is used by the Aircon Interface Function (see screenshot above)

Heating, Cooling Functions

The Heating function and Cooling function is for water based systems using valves which allow Hot (or cold) water to flow. The IRIO-IO does not have any built-in relays. The RLE02 Relay module can be connected to the IRIO-IO, or another IRIO with ISM07 mapped to the same flag can be used. The valve is controlled by switching the

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submodules Output on or off.

The screenshot below is applicable for both Heating and Cooling functions.

The screenshot shows the ScsRio01 configuration window. At the top, there are buttons for 'Write to IRIO', 'Read from IRIO', 'Reset to Default', and 'Get Status'. Below these are tabs for 'iRio Properties', 'Submodule 1', 'Submodule 2', 'Analog Output 1', 'Analog Output 2', and 'IR Transmit Codes'. The 'Submodule 1' tab is selected, showing a list of submodules and their properties. The 'Output Properties' section is expanded, showing a table of properties for Output 3.

Output Properties	
Number	3
Function	Heating
Name	Heater 1
Register Type	Flag
Control/Feedback Flag Number	11
Control/Feedback Flag Name	Flag011
Control Register 1 Number	12
Control Register 1 Name	Flag012
Control Register 2 Number	Unassigned
Control Register 2 Name	
Control Register 3 Number	Unassigned
Control Register 3 Name	
Sensor Number	1
Sensor Name	Sensor01
Heating Setpoint Counter Number	1
Heating Setpoint Counter Name	Counter001

Control/ Feedback Flag

Map to a Flag for Control and feedback Status of the Heating or Cooling. This flag cannot be the same as any other function's Control/feedback flag. Setting or clearing the control flag enables or disables the heating or cooling function.

Control Flags

Map to 3 additional flags for control of the Heating or cooling function. The Control/Feedback flag is updated with the current state of the heating or cooling.

Sensor

The Temperature of the system is mapped to a Sensor number. The sensor obtains the system temperature from another external device like the MSM01 or KP04AET Temperature sensor, or from a KNX or Cbus temperature sensor, or using a TH1 Thermistor connected to an input programmed as Temp Sensor Input Function (for ISM07 Relay I/O or ISM01 Digital I/O). The sensor value is sent to the Heating/cooling function so that the IRIO can determine whether to switch on or off the heating/cooling relay.

Setpoint Counter

The Heating or Cooling setpoint can be mapped to a Counter. The value that is put into the mapped counter will be the setpoint for the function.

For the Heating function, the heating relay switches off if the temperature (sensor value) exceeds the setpoint by the value of the hysteresis (in IRIO Properties). The heating relay switches on if the temperature (sensor value) is lower than the setpoint.

For the Cooling function, the cooling relay switches off if the temperature (sensor value) is lower than the setpoint by the value of the hysteresis (in IRIO Properties). The cooling

relay switches on if the temperature (sensor value) is higher than the setpoint.

Inputs

The Heating or Cooling Output function do not require any Inputs so the Inputs on the submodule can be assigned to any applicable Input function for the submodule.

Heating+Cooling Function

This function is for water based systems using valves which allow for both heating and cooling by turning on hot and cold water valves.

The IRIO-IO does not have any built-in relays. The RLE02 Relay module can be connected to the IRIO-IO, or another IRIO with ISM07 mapped to the same flag can be used. The heating and cooling valve is controlled by switching the Outputs on and off. Heating and Cooling outputs are in adjacent outputs on the IRIO-IO. For a combined heating/cooling system, 2 adjacent outputs are used, with the 1st output being the heating output, followed by the 2nd output for Cooling. For example, Output 2 is heating, output 3 is cooling.

ScsRio01

Write to IRIO

Read from IRIO

Reset to Default

Get Status

iRio Properties

Submodule 1

Submodule 2

Analog Output 1

Analog Output 2

IR Transmit Codes

Submodule	ISM08 General I/O
Output 1	On/Off
Output 2	Aircon Interface Relay
Output 3	Heating + Cooling
Input 1	Unassigned
Input 2	Unavailable
Input 3	Unassigned
Input 4	Unavailable

Output Properties

Number	3
Function	Heating + Cooling
Name	Heater 1
Register Type	Flag
Control/Feedback Flag Number	11
Control/Feedback Flag Name	Flag011
Control Register 1 Number	12
Control Register 1 Name	Flag012
Control Register 2 Number	Unassigned
Control Register 2 Name	
Control Register 3 Number	Unassigned
Control Register 3 Name	
Sensor Number	1
Sensor Name	Sensor01
Heating Setpoint Counter Number	1
Heating Setpoint Counter Name	Counter001
Cooling Setpoint Counter Number	Unassigned
Cooling Setpoint Counter Name	

Control/ Feedback Flag

Map to a Flag for Control and feedback Status of the Heating/Cooling. This flag should not be the same as any other function's Control/feedback flag. Setting or clearing the control flag enables or disables the heating/cooling function.

Control Flags

Map to 3 additional flags for control of the heating/cooling function. Setting or clearing any of the control flags enables or disables the function. The Control/Feedback flag is

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updated with the current state of the heating or cooling.

Sensor

The Temperature of the system is mapped to a Sensor number. The sensor obtains the system temperature from another external device like the TSM01 Temperature sensor module, or from a KNX or Cbus temperature sensor, or using a TSM Thermistor connected to an input programmed as Temp Sensor Input Function (for ISM07 Relay I/O or ISM01 Digital I/O). The sensor value is sent to the Heating/cooling function so that the IRIO can determine whether to switch on or off the heating/cooling relay.

Setpoint Counter

There are separate setpoints for Heating and Cooling. The setpoints are mapped to Counters. The value that is put into the mapped counter will be the heating or cooling setpoints.

For the Heating function, the heating relay switches off if the temperature (sensor value) exceeds the setpoint by the value of the hysteresis (in IRIO Properties). The heating relay switches on if the temperature (sensor value) is lower than the setpoint.

For the Cooling function, the cooling relay switches off if the temperature (sensor value) is lower than the setpoint by the value of the hysteresis (in IRIO Properties). The cooling relay switches on if the temperature (sensor value) is higher than the setpoint.

The Heating and Cooling outputs are interlocked, ie both outputs will never be on at the same time. This is the advantage of using this function compared to individual Heating and Cooling functions.

Inputs

The Heating/Cooling Output function do not require any Inputs so the Inputs on the submodule can be assigned to any applicable Input function for the submodule.

Summer/Winter 2 Speed Fan

This function is used in HVAC systems where hot or cold air is blown through the fan. In Summer Mode, cool air is generated, and in Winter Mode, hot air is generated. A Flag is assigned to Summer/Winter mode in IRIO Properties which is set to 1 for Winter and is 0 for Summer. The summer/winter Flag can be determined by Time programs in Comfort. The IRIO-IO does not have any built-in relays. The RLE02 Relay module can be connected to the IRIO-IO, or another IRIO with ISM07 mapped to the same flag can be used.

IRIO Properties	
Temperature Units	Degrees C
Max Heating Setpoint	30
Min Heating Setpoint	15
Max Cooling Setpoint	26
Min Cooling Setpoint	16
Hysteresis	1
Summer/Winter Flag Number	71
Summer/Winter Flag Name	Flag071

ScsRio01
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Write to IRIO Read from IRIO Reset to Default Get Status

iRio Properties Submodule 1 Submodule 2 Analog Output 1 Analog Output 2 IR Transmit Codes

Submodule	ISM08 General I/O
Output 1	Summer/Winter 2 spee
Output 3	Unassigned
Output 4	Unassigned
Input 1	Unassigned
Input 2	Unavailable
Input 3	Unassigned
Input 4	Unassigned

Output Properties

Number	1
Function	Summer/Winter 2 speed fan
Name	
Register Type	Flag
Control/Feedback Flag Number	5
Control/Feedback Flag Name	Flag005
Control Register 1 Number	6
Control Register 1 Name	Flag006
Control Register 2 Number	Unassigned
Control Register 2 Name	
Control Register 3 Number	Unassigned
Control Register 3 Name	
Sensor Number	2
Sensor Name	Sensor02
Setpoint Counter No	2
Setpoint Counter Name	Counter002
High/Low Speed Flag Number	2
High/Low Speed Flag Name	Flag002

There are 2 possible speeds; Low and High Speed controlled by individual Outputs. Low speed fan is fixed to the 1st Output 1 High Speed Fan to the 2nd Output on the submodule. Thus each submodule can support 2 such 2-speed fan functions.

Control/ Feedback Flag

Map to a Flag for Control and feedback Status of the function. This flag should not be the same as any other function's Control/feedback flag. Setting a control flags starts the function. Clearing a control flag turns off the high and low speed fan.

Control Flags

Map to 3 additional flags for control of the function for scene control. Setting or clearing any of the control flags enables or disables (switch off) the function. The Control/Feedback flag is updated with the current state.

Sensor

The Temperature of the system is mapped to a Sensor number. The sensor obtains the system temperature from another external device like the TSM01 Temperature sensor module, or from a KNX or Cbus temperature sensor, or using a TH1 Thermistor connected to an input programmed as Temp Sensor Input Function (for ISM07 Relay I/O or ISM01 Digital I/O). The sensor value is sent to the Heating/cooling function so that the IRIO can determine whether to switch on or off the heating/cooling relay.

Setpoint Counter

The setpoint mapped to a Comfort Counter. The fans stop if the temperature exceeds this value in Winter or is lower than this value in Summer. If the counter number is undefined ie 255, it means the function is inactive.

High/Low Speed Flag

The flag state determines the Fan speed. If the flag state=0, low speed fan is on. If Flag state =1, the high speed fan is on. Both fans cannot be on at the same time

In IRIO Properties, Max Heating setpoint Min Heating Setpoint, Max Cooling setpoint, min cooling setpoint, Hystereris are global settings applicable to all IRIO submodules. As the setpoint is common for heating and cooling, the max setpoint is the maximum cooling setpoint and the minimum setpoint is the minimum heating setpoint

Inputs

This Output function do not require any Inputs so the Inputs on the submodule can be assigned to any applicable Input function for the submodule.

Summer/Winter 3 Speed Fan

This function is used in HVAC systems where hot or cold air is blown through the fan. In Summer Mode, cool air is generated, and in Winter Mode, hot air is generated.

A Flag is assigned to Summer/Winter mode in IRIO Properties which is set to 1 for Winter and is 0 for Summer. The summer/winter Flag can be determined by Time programs in Comfort.

The IRIO-IO does not have any built-in relays. The RLE02 Relay module can be connected to the IRIO-IO, or another IRIO with ISM07 mapped to the same flag can be used.

The screenshot shows the SCSRio01 configuration window. The 'Submodule 2' tab is selected, showing 'Output Properties' for 'Summer/Winter 3 speed'. The properties are as follows:

Output Properties	
Number	1
Function	Summer/Winter 3 speed fan
Name	
Register Type	Flag
Control/Feedback Flag Number	5
Control/Feedback Flag Name	Flag005
Control Register 1 Number	6
Control Register 1 Name	Flag006
Control Register 2 Number	Unassigned
Control Register 2 Name	
Control Register 3 Number	Unassigned
Control Register 3 Name	
Sensor Number	2
Sensor Name	Sensor02
Setpoint Counter No	2
Setpoint Counter Name	Counter002
Fan Speed Counter Number	Unassigned
Fan Speed Counter Name	

There are 3 possible speeds; Low, Medium and High Speed controlled by individual relays. Low speed fan is fixed to the 1st Output, medium speed to the 2nd output and

IRIO-IO Manual

High Speed Fan to the 3rd Output on the module. Thus each submodule can support only one 3-speed fan function.

Control/ Feedback Flag

Map to a Flag for Control and feedback Status of the function. This flag cannot be the same as any other function's Control/feedback flag. Setting a control flags starts the function. Clearing a control flag turns off the fans.

Control Flags

Map to 3 additional flags for control of the function. Setting a control flags starts the function. Clearing a control flag turns off the fans. The Control/Feedback flag is updated with the current state.

Sensor

The Temperature of the system is mapped to a Sensor number. The sensor obtains the system temperature from another external device like the TSM01 Temperature sensor module, or from a KNX or Cbus temperature sensor, or using a TH1 Thermistor connected to an input programmed as Temp Sensor Input Function (for ISM07 Relay I/O or ISM01 Digital I/O). The sensor value is sent to the Heating/cooling function so that

Setpoint Counter

The setpoint mapped to a Comfort Counter. The fans stop if the temperature exceeds this value in Winter or is lower than this value in Summer. If the counter number is undefined ie 255, it means the function is inactive.

Fan Speed Counter

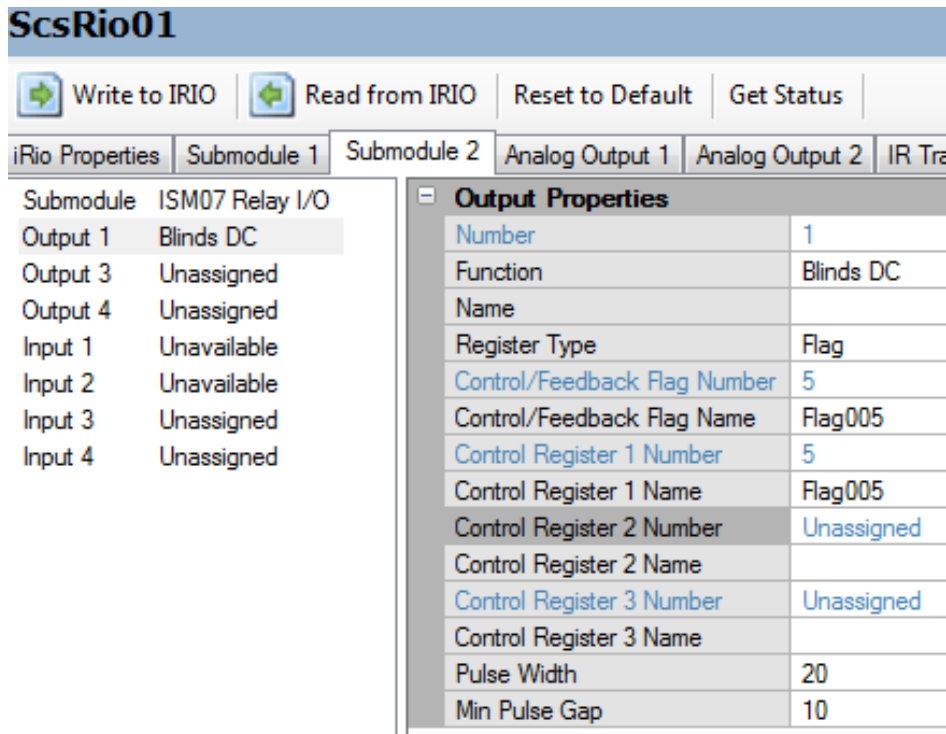
The counter value determines the Fan speed. Counter value =0 means low speed fan. Counter value =1 means medium speed fan, Counter value = 2 or more means high speed.

Inputs

This Output function do not require any Inputs so the Inputs on the submodule can be assigned to any applicable Input function for the submodule.

Blinds DC Function

The Blinds DC Function requires 2 outputs and 2 inputs for Up and Down control and Buttons.. Note that external relays are needed for this function, e.g. RLE02



The Blinds DC Function 2 Output and 2 Inputs. This is for control of blinds/curtains with a Blinds controller. The blinds controller has 2 dry contact inputs for up and down. Each submodule can control 1 sets of blinds (up and down).

Output 1 = UP control. Output 2 = Down control

Input 1 = Input 1 = Up button, Input 2 = Down button

The Up and Down Inputs should be connected to pushbuttons for manual control of the blinds.

The iRIO can be used standalone for blinds control when CM9001 is disconnected

Setting the flag sends a pulse on Output 2 to move down the blinds. Clearing the flag sends a pulse to Output 1 to move up the blinds.

There is no control over the position of the blinds and no STOP function. Some blinds controllers accept another press on the Up or down buttons as Stop command and some require a simultaneous press on the Up and Down buttons to stop the blinds. Some controllers have Short and Long press for Nudge and Full travel. This can be done manually using the pushbutton inputs. There is no STOP command which is sent by IRIO. The Up and down Inputs when pressed just pass on the state to the Up and Down Outputs, ie when the button is pressed, the output is turned on, and when the button is released the output is turned off.

Control/Feedback Flag

Map to a Flag for Control and Feedback Status of the output. This flag cannot be the same as any other function's Control/feedback flag. Setting the flag sends a pulse on Output 2 to move down the blinds. Clearing the flag sends a pulse to Output 1 to move up the blinds. The feedback Flag state gives the current position of the Blinds, ie Flag On = Down, Flag Off = Up

Control Flags

3 additional control flags can be mapped for Blinds Control. Setting the flag sends a pulse on Output 2 to move down the blinds. Clearing the flag sends a pulse to Output 1

to move up the blinds. The current state is copied to the Control/Feedback Flag. The additional control flags can be used to implement scenes. Note that the state of one of the Control Flags may not be the current state of the flags due to control by other Control Flags.

Inputs

The Inputs are used for the Blinds DC Function and cannot be used for any other function.

IRIO-IO Input Functions

IRIO inputs may be

1. Used by the Output function on the Function eg Blinds and Aircon configured in the Output function. These are not independent inputs, ie they are required by the Output function.
2. Independent - these inputs are not part of the output functions eg Digital, Current sensor, Pulse count, Analog Input, Temp Sensor.

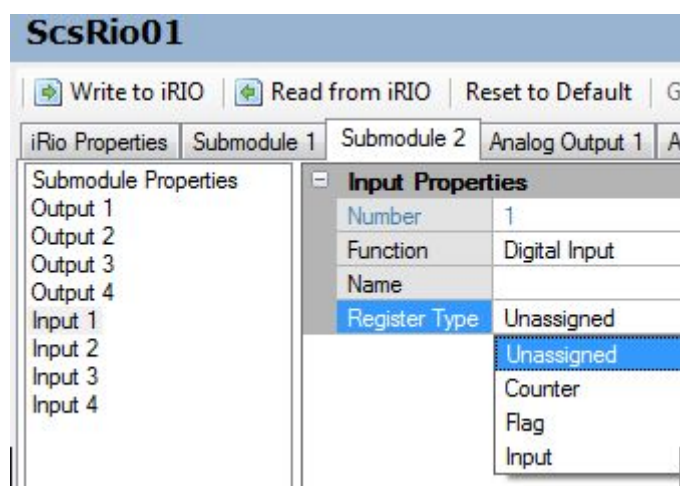
The following Independent Input functions are available

- Digital Inputs Function
- Analog Input Function (0-10V)
- Dimmer Switch (0-10V)
- Pulse Count Function

Digital Input Function

Each of the applicable submodules have 4 digital inputs which can accept Open and Close contacts (voltage-free).

A digital Input can be mapped to Counter, Flag or Input



Map to Counter

If mapped to a Counter, when the Input is On, it will put value 255 into the mapped Counter. When the Input is Off, it will put value 0 into the mapped Counter. The Counter Response for the mapped Counter will be activated which can cause different things to be performed by Comfort depending on the change of Input state.

Eg

If Counter NNN = 0 then
Do Response XXX

```
Else
    Do Response YYY
EndIf
```

Map to Flag

If mapped to a Flag, the flag will be set or cleared based on the Input state. Flags do not activate Responses as in the case of Counters. Instead Flags can be used for Conditional programming or they can be used to send commands to other systems. For example a KNX or Cbus Group address can be mapped to the same Flag as the Input. This allows the Input to control the external Group address. Also another IRIO function like Heating or Blinds can be mapped to the same Flag to allow the Input to control the mapped Heating or Blinds

Map to Input

If mapped to an Input, this triggers the Response for the IRIO Input in the same way as the old RIO Input Response. The Input numbers are as follows;

IRIO ID	Input No	IRIO ID	Input No	IRIO ID	Input No	IRIO ID	Input No
1	129-136	5	161 - 168	9	193 - 200	13	225 - 232
2	137-144	6	169 - 176	10	201 - 208	14	233 - 240
3	145-152	7	177 - 184	11	209 - 216	15	241 - 248
4	153-160	8	185 - 192	12	217 - 224		

Pulse Counter Input Function

Each Input on the above modules can be assigned as a Pulse Counter function. The Pulse Counter Function is able to count pulses from one of 4 digital Inputs on the applicable modules. The digital Input accepts a voltage-free contact (Open or close).

ScsRio01

Write to iRIO
Read from iRIO
Reset to Default
Get Status

iRio Properties | Submodule 1 | Submodule 2 | Analog Output 1 | Analog Output 2

Submodule Properties

Input Properties

Number	1
Function	Pulse Counter
Name	
Register Type	Sensor
Register Number	Unassigned
Register Name	
Counting Interval	60
Min Limit	0
Max Limit	65535
Alarm	FamilyCare

Alarm
 Alarm to be activated when count is outside limits.

The Pulse Counter Input can be mapped to a Comfort Sensor.

Map to Sensor

If mapped to a Sensor, the number of pulses counted during the Counting Interval (see below) is saved to the mapped sensor. The sensor value can be read by Responses or it can be sent to external devices for further processing. A Sensor Response is activated whenever a new value is saved in the sensor.

Eg

If Sensor NNN $\geq$ 100 then

Do Response XXX

Else

Do Response YYY

EndIf

Counting Interval

This is the interval for counting pulses. Eg if set to 60 seconds, that means that the pulses are counted every minute and the results for counter or sensor reported every minute to comfort. If set to 0, it means every change in count is reported.

Min Limit

The minimum pulse count for the Counting Interval. Currently there is no action when the counter is below this limit. This is for future use.

Max Limit

The maximum pulse count for the Counting Interval. Currently there is no action when the counter is below this limit. This is for future use.

Alarm

This is for future use and currently has no function.

Analog Input Function (0-10V)

 Write to IRIO		 Read from IRIO		Reset to Default	Get Status
iRio Properties	Submodule 1	Submodule 2	Analog Output 1	Analog Output 2	IR Tran
Submodule	ISM08 General I/O				
Output 1	On/Off				
Output 2	Aircon Interface Relay				
Output 3	Heating + Cooling				
Input 1	Analog Input (0-10V)				
Input 2	Unavailable				
Input 3	Unassigned				
Input 4	Unavailable				

Input Properties	
Number	1
Function	Analog Input (0-10V)
Name	
Register Type	Unassigned
Sensor Number	Unassigned
Sensor Name	
Input Threshold	16
Sensor Reporting Offset	1

Analog Input

Select an Register Type; Flag, Virtual Input, or Unassigned (default)

Flag

Map to a Flag for On/Off Status of the Input. The flag can be the same as one of the control flags, or may be different, but cannot be the same as any other function's feedback flag. The feedback flag provides the actual status of the appliance monitored on the analog input.

Virtual Input

Map to a Virtual Input Flag for Status of the Input. The Virtual Input should be unique, i.e. cannot be assigned to other analog Inputs or Input parameters. The feedback flag provides the actual status of the appliance monitored on the analog input.

Sensor Name

A sensor can be assigned to the analogue input while the Input is mapped to Flag or Virtual Input. The measured voltage is converted to a value from 0 to 255 and saved in the sensor. This can be used for testing purposes or monitoring the voltage so as to be able to set the threshold value.

Input Threshold

This is the Sensor value 0-255 above which the mapped Flag or Virtual Input is in the ON state, and vice versa.

Sensor Reporting Offset

This is used in conjunction with the Sensor mapping. The hysteresis value determines the change in sensor value before the change is saved to the sensor, to prevent excessive reporting to CM9001

Stand-alone IRIO-IO Operation

Some configurations allow the IRIO-IO to operate in stand-alone mode, ie without CM9001. This is possible when the functions share Comfort registers for Input and Output functions, and do not require any Logic by the CM9001 or other controller

Document History

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