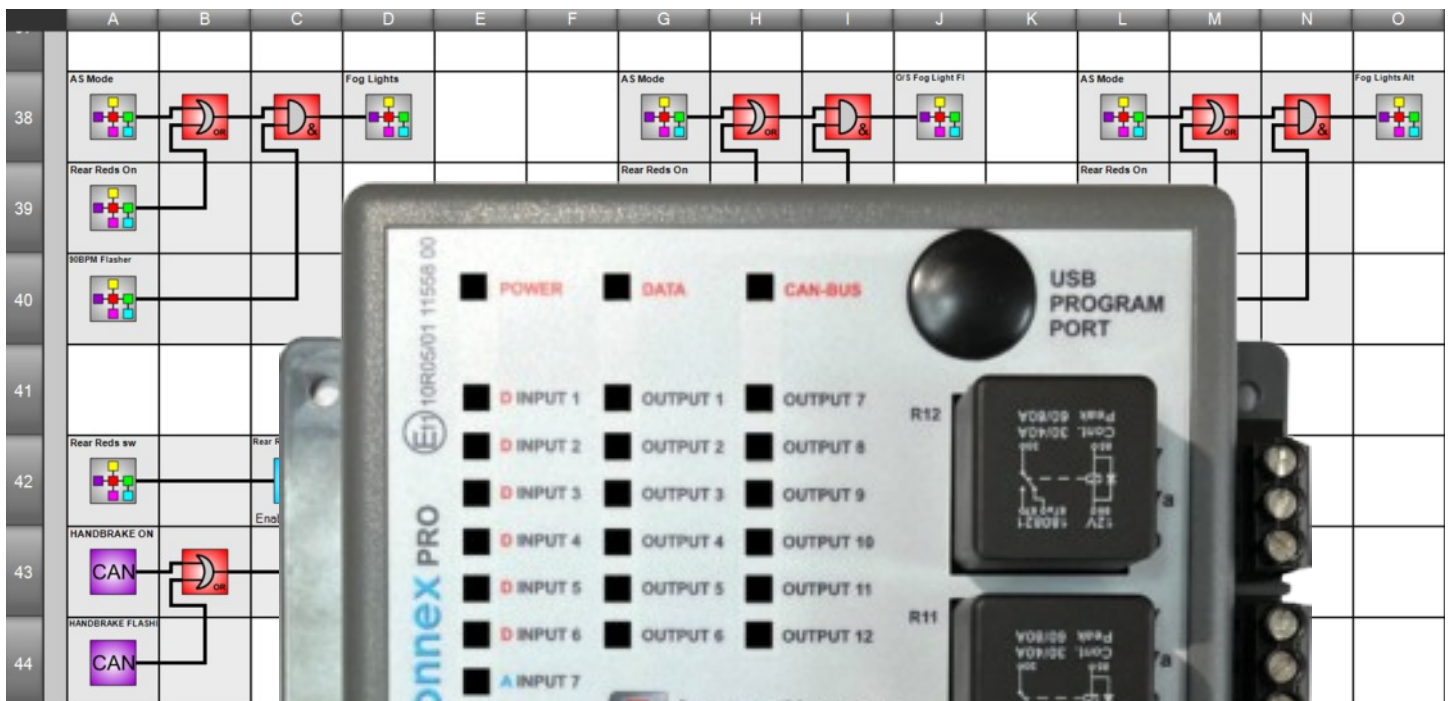




iConnex

GUI User Manual

V1.00 03/03/23



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The instructions within this booklet (User's Manual) must be read thoroughly before any installation work, testing or general use.
We recommend this booklet is kept in a safe place that can be easily retrieved for any future referral.

Installation must be carried out by competent personnel with adequate knowledge of electrical installations.

All necessary precautions must be taken to ensure this product is fitted correctly, securely and safely into the desired application.

This product must not interfere with road safety or OEM safety systems fitted to the vehicle
All necessary checks must be carried out by installer to ensure this device is used only in the intended application and also does not conflict with any road laws in all countries the vehicle may be driven within.

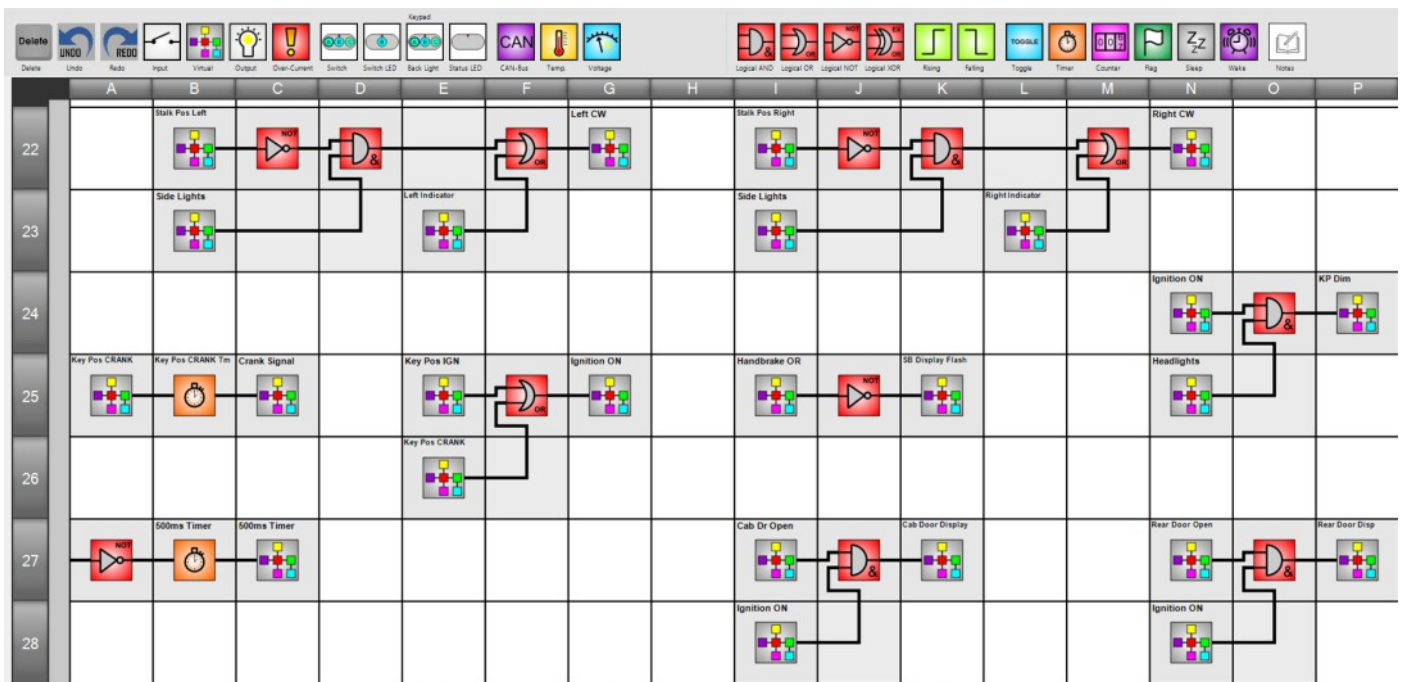
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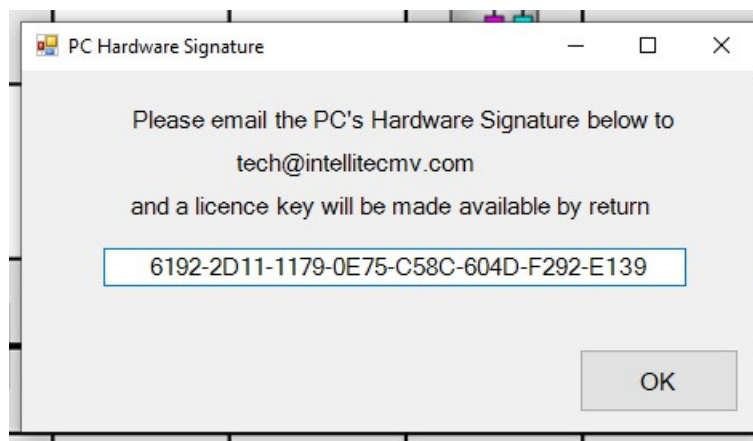
iConnex GUI Introduction



The iConnex GUI (Graphical User Interface) software is a user friendly tool which can be used to programme an iConnex module. The software is free to download from the downloads tab of the intellitec website, offering complete control in writing a PLC programme for the iConnex. Consisting of IO Functionality, keypad functionality, CAN-BUS and much more, the iConnex GUI is versatile and robust, ideal for any control requirements.



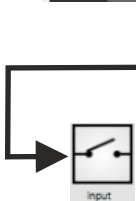
When using the iConnex GUI for the first time, the license will need to be activated. This can be done by opening the hardware signature in the help tab, and forwarding on that hardware signature to tech@intellitecmv.com. The programme will still be usable without an active license, but will need to be activated to allow for saving a programme or programming an iConnex module.



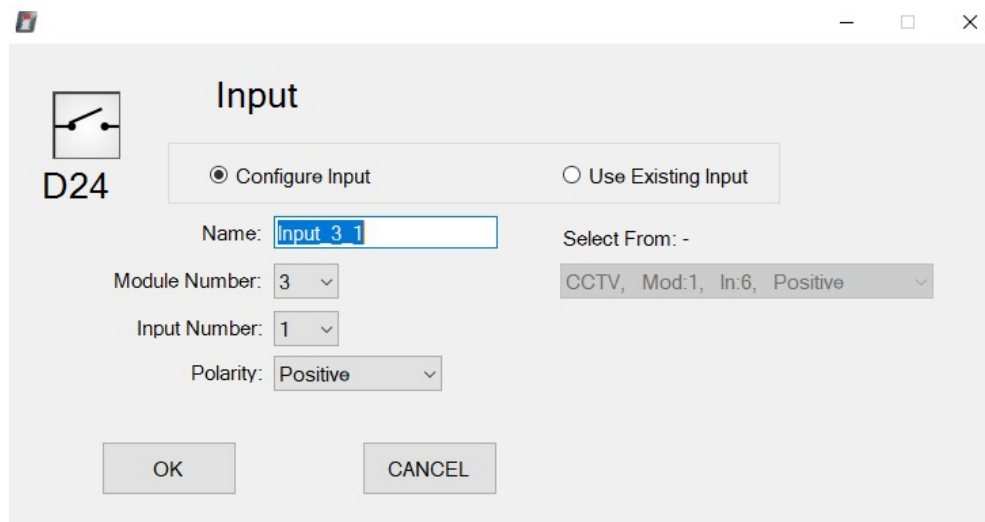
Inputs / Outputs



All the functionality for the iConnex GUI runs across the top of the page, as seen below.

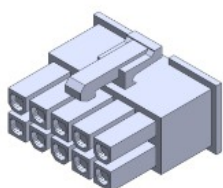


Inputs- The input icon is used to configure the hardwired inputs on the iConnex module. Dragging this icon on to the grid and then double clicking the icon will bring up the below screen to allow configuration.

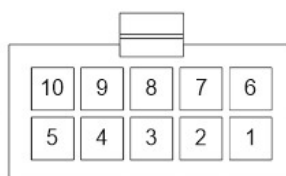


From here the input can be named and addressed to a module/input number within that module. The polarity of the input must also be set to either positive/negative to ensure that that the input is read when active. There are 6 digital hi/lo configurable inputs on each module, with up to 15 modules in a system. The inputs for each iConnex are on the 10-way connector as shown in the image below.

Input Connector	Molex 10-Way Female Housing	0469921010
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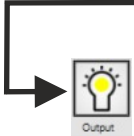


Cable Entry View

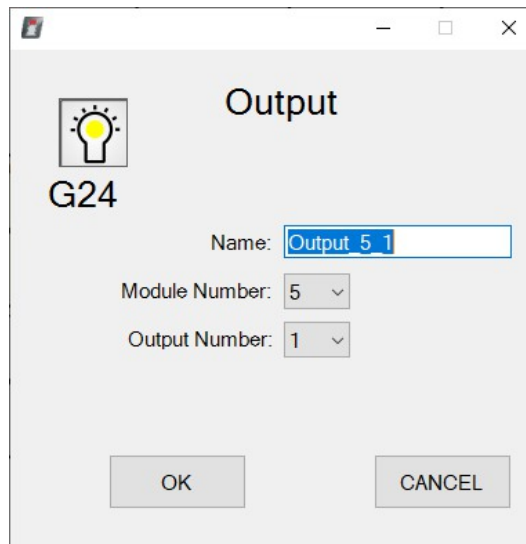


1. Input 6 (Hi/Lo configurable).
2. 0V (Ground) to chassis negative.
3. 0V (Ground) to chassis negative.
4. 0V (Ground) to chassis negative.
5. 0V (Ground) to chassis negative.
6. Input 5 (Hi/Lo configurable).
7. Input 4 (Hi/Lo configurable).
8. Input 3 (Hi/Lo configurable).
9. Input 2 (Hi/Lo configurable).
10. Input 1 (Hi/Lo configurable).

Inputs / Outputs

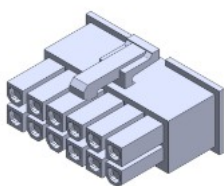


Outputs- The output icon is used to configure the hardwired outputs on the iConnex module. Dragging this icon on to the grid and then double clicking the icon will bring up the below screen to allow configuration.

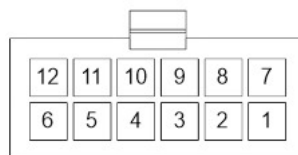


From here the output can be named and addressed to a module/output number within that module. The polarity and load that can be put through that output are dictated by the iConnex. There are 12 outputs on each iConnex module, with up to 15 modules in the system. 10 of the 12 outputs are on the 12-way connector as shown in the image below, with the loads for each of these outputs included. The two remaining outputs are the relay outputs on the side of the module, each capable of carrying a 30A load.

Output Connector	Molex 12-Way Female Housing	0469921210
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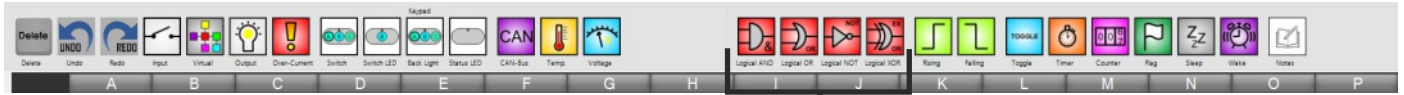
Cable Entry View



1. Output 10 Negative (1A max).
2. Output 9 Positive (8A max).
3. Speaker + Output (smart model only).
4. Output 8 Positive (8A max).
5. Speaker - Output (smart model only).
6. Output 7 Positive (8A max).
7. Output 1 Positive (8A max).
8. Output 2 Positive (8A max).
9. Output 3 Positive (8A max).
10. Output 4 Positive (8A max).
11. Output 5 Positive (8A max).
12. Output 6 Positive (8A max).

Logic Gates

Logic gates and boolean algebra are used to build up the programmes, using one or more digital inputs to produce a single output.



AND gate- An AND gate has two digital inputs going into the gate. The output will only be activated if both digital inputs are active. This means that if either inputs is off, or if both inputs are off, the output will be off. The truth table below shows all alternatives from an AND gate

Digital Input 1	Digital Input 2	Output
0	0	0
1	0	0
0	1	0
1	1	1



OR gate- An OR gate has two digital inputs going into the gate. The output will be active if either inputs are on or if both the inputs are on. This means that the output will only go off if both inputs are off. The truth table below shows all alternatives from an OR gate

Digital Input 1	Digital Input 2	Output
0	0	0
1	0	1
0	1	1
1	1	1



NOT gate- A NOT gate has one digital inputs going into the gate. The not gate inverts the signal going into it. Therefore, if there input is active, the output is not active and vice versa. The truth table below shows all the alternatives from a NOT gate.

Digital Input 1	Output
0	1
1	0



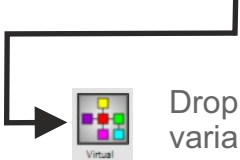
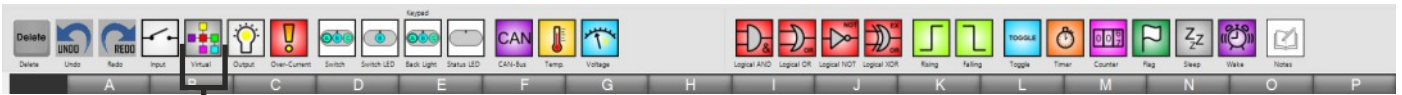
EXOR gate- An EXOR gate has two digital inputs going into the gate. The EXOR gate is a special logic gate that stands for exclusive OR gate. This means that it operates like an OR gate, except for when both digital inputs are active, then the output is off. The truth table below shows all the alternatives from an EXOR gate

Digital Input 1	Digital Input 2	Output
0	0	0
1	0	1
0	1	1
1	1	0

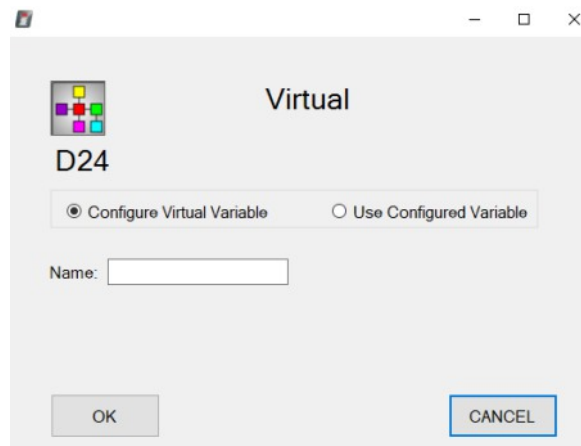
Virtuals



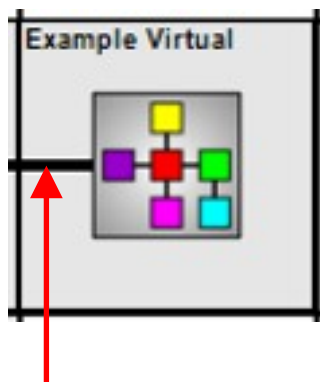
A virtual can be configured as either an input or as a block of logic, and can then be referenced several times in the GUI. This means that if there is repeated logic, it only has to be written once and then attributed to a virtual, saving time and keeping the programme clean.



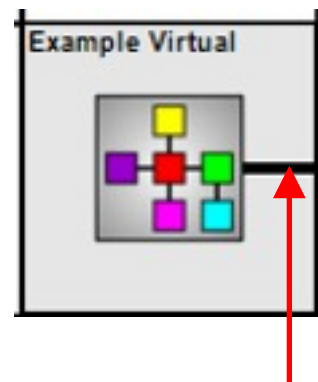
Dropping the virtual icon onto the grid will give you two options, to either 'configure virtual variable' or 'use configured variable'.



When the 'configure virtual variable' option is selected, the virtual icon has a connection point to the left of the virtual, allowing inputs to run into them. When the 'use configured variable' option is selected, the virtual icon has a connection point to the right of the virtual, allowing them to run into outputs to drive them.



Connection point to the left of the virtual for configuring it.



Connection point to the right of the virtual for referencing it and using it to trigger outputs.

Virtualls

Configuring Virtualls

As stated earlier, a virtual may be used to reference one input or a set of logic that may be required repeatedly. Below are two images, the image on the left shows a virtual configured for one input. The ignition input runs into the virtual, and is then referenced several times to trigger different outputs. The image on the right shows a virtual configured for some basic logic, in this case, the virtual is active when the ignition **and** handbrake signals are active. These activating conditions can then be referenced several times to trigger various outputs. When the 'configure virtual variable' option is selected, the virtual icon has a connection point to the left of the virtual, allowing inputs to run into them. When the 'use configured variable' option is selected, the virtual icon has a connection point to the right of the virtual, allowing them to run into outputs to drive them.



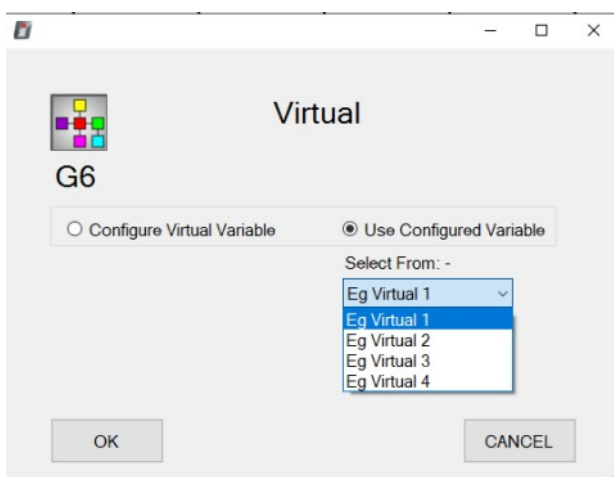
Input configured Virtual



Logic configured Virtual

Using configured Virtualls

To use a configured variable, select the 'use configured variable' option and select the drop-down menu. This will bring up any configured virtualls, which can then be selected and will appear on the grid. This will have a connection point to the right of the virtual, which can then run directly into an output.



Configured Virtual triggering output

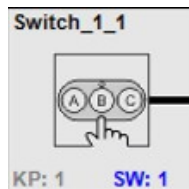
Keypad Functionality



The iConnex Keypad family consist of a 3-way, a 4-way and a 6-way keypad, but the iConnex system is also compatible with the OLED DIN and OLED X12 keypads. The iConnex keypads are configurable on the button press, the back light and the status LED.



Switch - The switch icon configures the button press itself. When dropped on to the grid it functions like an input, with a connection coming out to the right of the icon. Double clicking the icon when on the grid will bring up a pop up box to configure the switch press. This will include naming the switch, and addressing the keypad number (1-15) and the switch number (1-6).

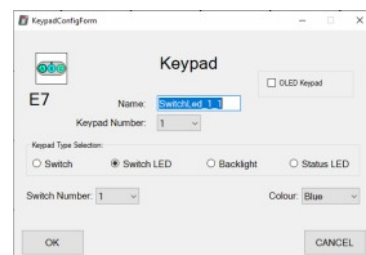
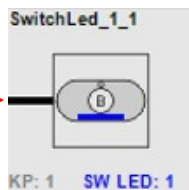


Keypad
Switch
Input



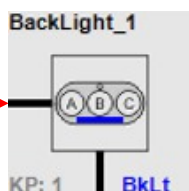
Switch LED - The switch LED icon configures the LED of an individual switch on a keypad. When dropped on to the grid it functions like an output, with a connection coming out to the left of the icon. Double clicking the icon when on the grid will bring up a pop up box to configure the switch LED. This will include naming the switch LED, addressing the keypad number (1-15) and the switch number (1-6), and choosing the LED colour for when it is activated.

Activates
Switch
LED

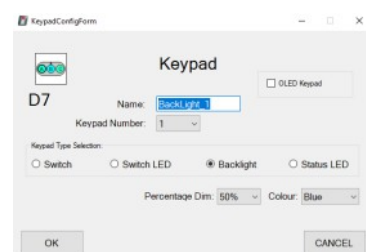


Back Light - The back light icon configures the back light of a whole keypad. When dropped on to the grid the back light icon has connections coming out to the left and the bottom of the icon. Double clicking the icon when on the grid will bring up a pop up box to configure the back light. This will include naming the back light, addressing the keypad number (1-15), choosing the back light colour and the percentage dim. The connection to the left of the icon will activate the back light, the connection at the bottom of the icon will trigger the dim function on the keypad.

Activates
backlight



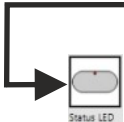
Dims backlight



Keypad Functionality

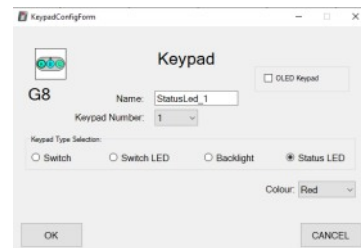
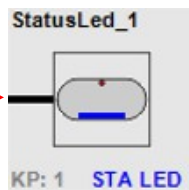


The iConnex Keypad family consist of a 3-way, a 4-way and a 6-way keypad, but the iConnex system is also compatible with the OLED DIN and OLED X12 keypads. The iConnex keypads are configurable on the button press, the back light and the status LED.



Status LED - The status LED icon configures the status LED at the top of the iConnex keypads. The status LED is most commonly used for the battery voltage levels, with the LED changing between green, amber and red light depending on the battery voltage level. When dropped on to the grid it functions like an output, with a connection coming out to the left of the icon. Double clicking the icon when on the grid will bring up a pop up box to configure the status LED. This will include naming the switch, addressing the keypad number (1-15) and status LED colour.

Activates
Status
LED



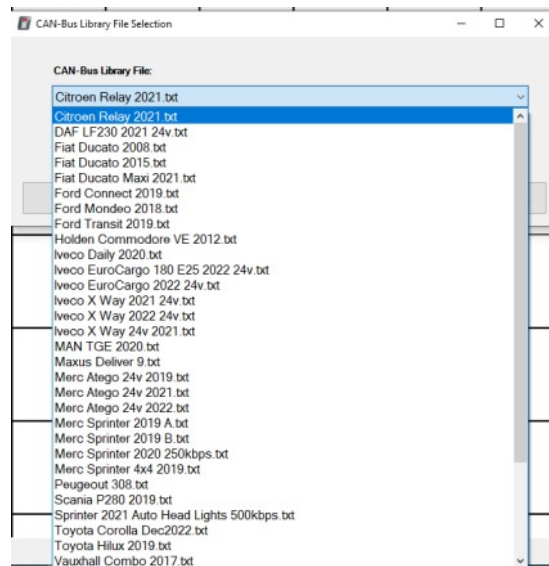
CAN-BUS Functionality



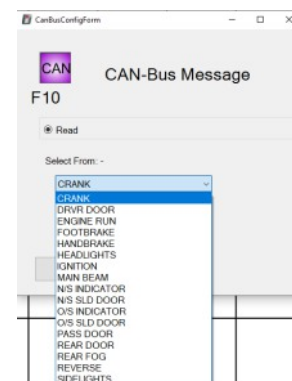
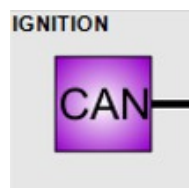
The iConnex can integrate with a vehicle's CAN network, with logic being built around CAN messages for ignition, handbrake ETC. This means that the limited hardwired inputs can be reserved for other inputs if the input can be picked up from the vehicle CAN.



CAN-BUS - In order to utilise the CAN-BUS icon, a CAN file must first be loaded in to the programme. In the CAN-bus tab at the top of the page, there is an option to select a file from the CAN-BUS library. These are all the vehicles that have previously been CANscraped, and have since been logged for any other users to utilise.



With the CAN-BUS file loaded, the icon can now be dragged and dropped on to the grid. When released on to the grid, there will be a pop up with a drop down menu to select the CAN-BUS message that that CAN icon will represent. The drop down will consist of all the messages that are available for that vehicle, with the available CAN messages changing between vehicle. When the desired CAN message is selected, it will appear on the grid as an input, with the CAN message label in the icon.



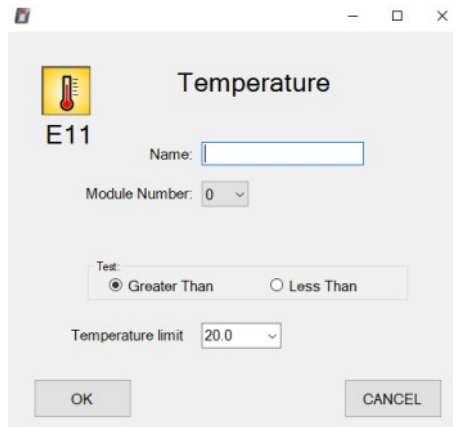
Temp./Voltage Readings



The iConnex has temperature and voltage sensing capabilities. The voltage sense is in-built in to the module, and is displayed and configured through the analogue inputs 7 & 8. the temperature sense is an additional extra component, that can be used to enhance the iConnex capability.

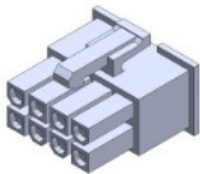


Temperature - Dragging and dropping the temperature icon on to the grid will bring a pop-up on to the screen. This is to configure the sensor, naming it and selecting if the input from the sensor should be greater than/ less than the chosen temperature.

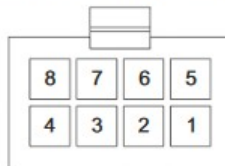


The temperature sense is wired into the iConnex 8-way connector, as shown in the image below.

Auxiliary Connector	Molex 8-Way Female Housing	0469920810
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Cable Entry View

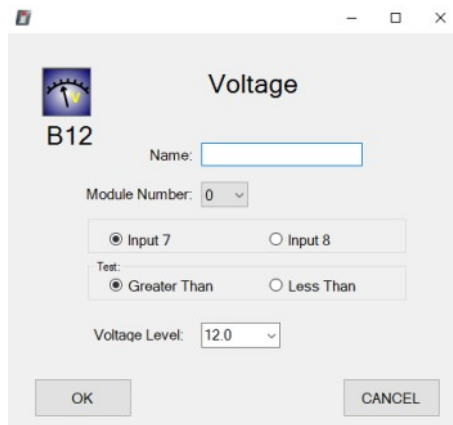


1. Temperature sensor ground.
2. Battery voltage sense 1.
3. Temperature sensor data 2.
4. Battery voltage sense 2.
5. Temperature sensor only 3V3.
6. Temperature sensor data 1.
7. External CAN-Hi (Vehicle Body).
8. External CAN-Lo (Vehicle Body).

Temp./Voltage Readings

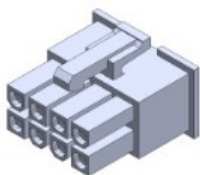


Voltage - Dragging and dropping the voltage icon on to the grid will bring a pop-up on to the screen. This is to configure the sensor, naming it and selecting if the input from the sensor should be greater than/ less than the chosen voltage

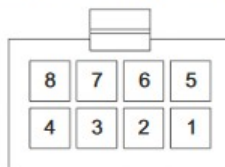


The voltage sense is wired into the iConnex 8-way connector, as shown in the image below.

Auxiliary Connector	Molex 8-Way Female Housing	0469920810
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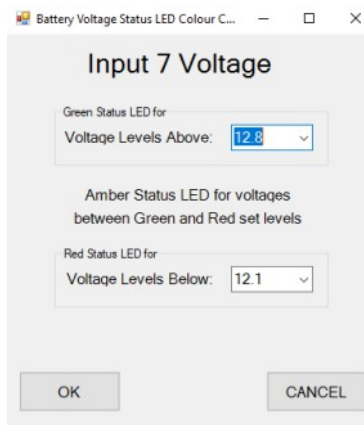


Cable Entry View



1. Temperature sensor ground.
2. Battery voltage sense 1.
3. Temperature sensor data 2.
4. Battery voltage sense 2.
5. Temperature sensor only 3V3.
6. Temperature sensor data 1.
7. External CAN-Hi (Vehicle Body).
8. External CAN-Lo (Vehicle Body).

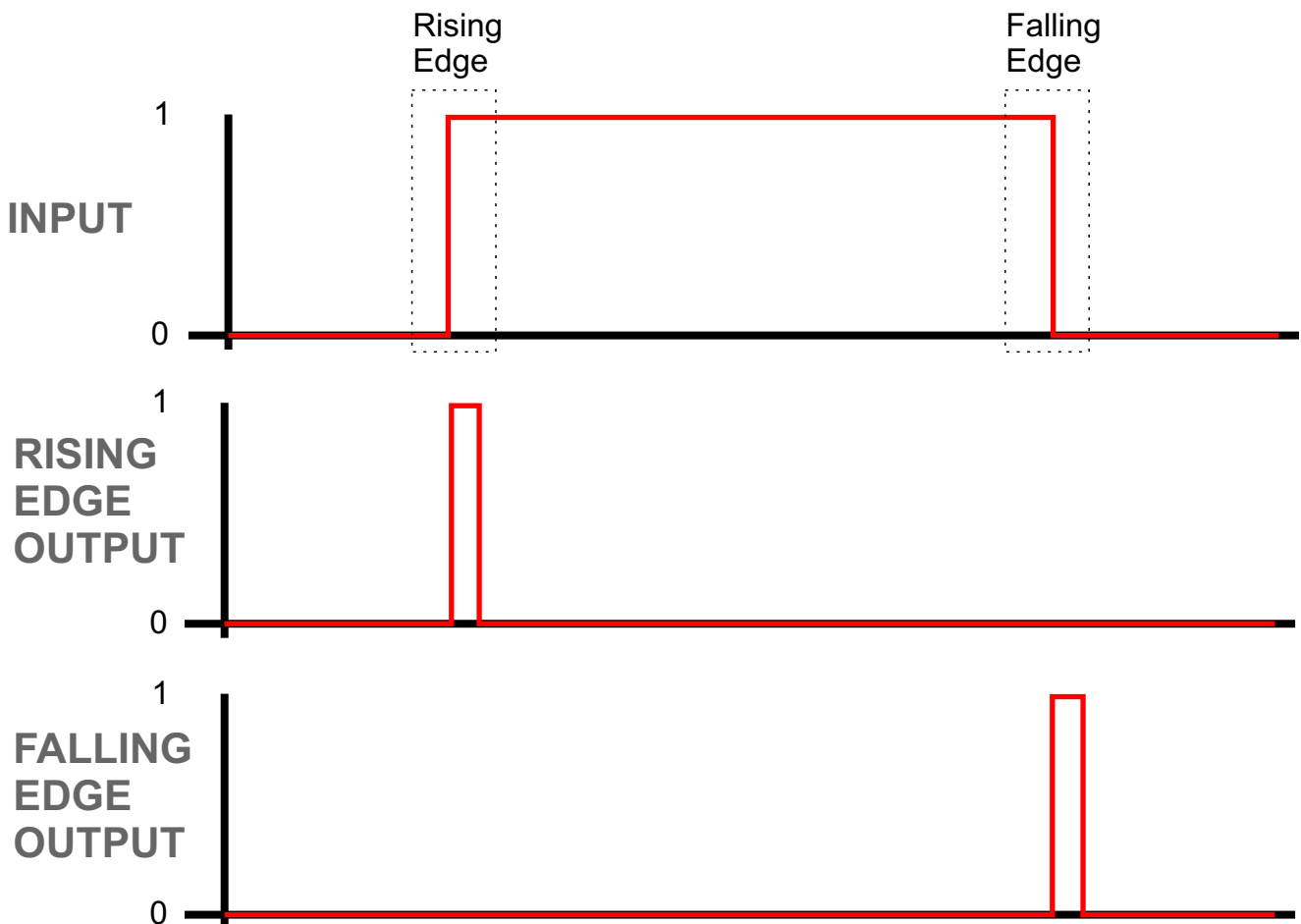
Diagnostic feedback for battery voltage is also provided on the iConnex module through inputs 7 and 8. Selecting the module tab at the top of the GUI page will offer options for both auxiliary input 7 and auxiliary input 8. From here, diagnostic red, amber and green warning lights can be configured for low battery levels at specified voltages.



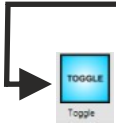
Rising/Falling Edges



Rising/Falling Edge - The rising/falling edge of a signal will give a momentary pulse when the input changes state. The rising edge of the input will trigger a pulse at the moment the input becomes active, whereas the falling edge of the input will trigger a pulse at the moment the input drops out. The graphic below shows the constant input, and the corresponding rising edge and falling edge.



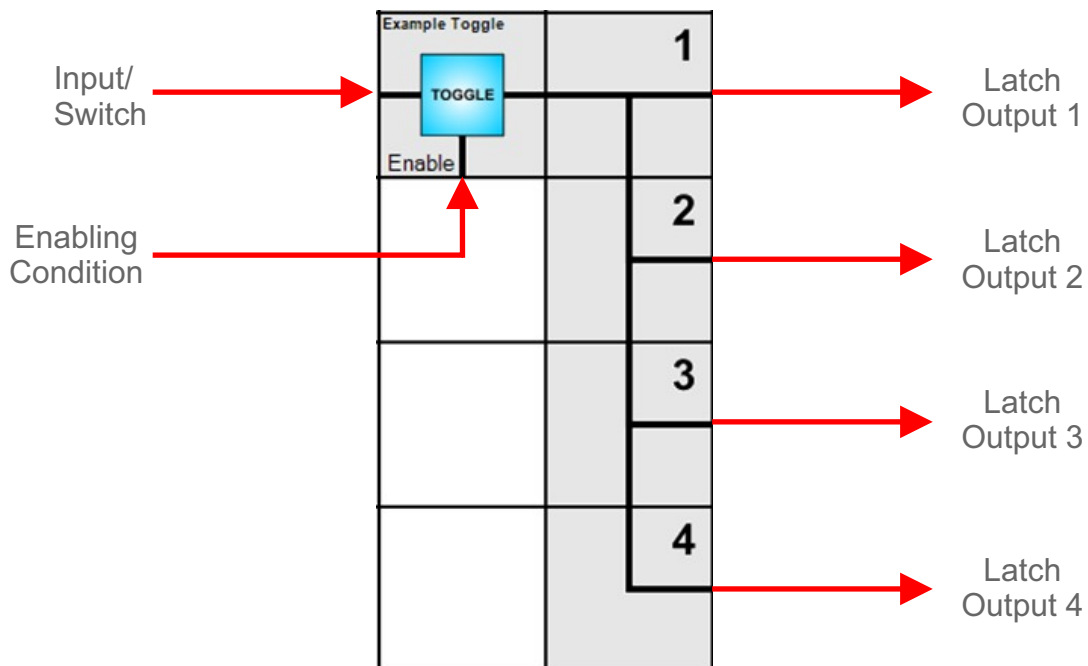
Toggles



Toggle - A toggle can be used to latch on outputs when a momentary input or switch is detected. The toggle requires an enabling condition to function, which would shut down the output if the enabling condition is not met. The toggle can have up to 4 latches, and can be triggered on either the rising or the falling edge of the input. Dropping the toggle icon on to the grid will bring up the pop up box shown below to configure the toggle name, the number of latches, and the rising/falling edge criteria.



When configured, the toggle will appear on the grid, with the specified number of latches present.

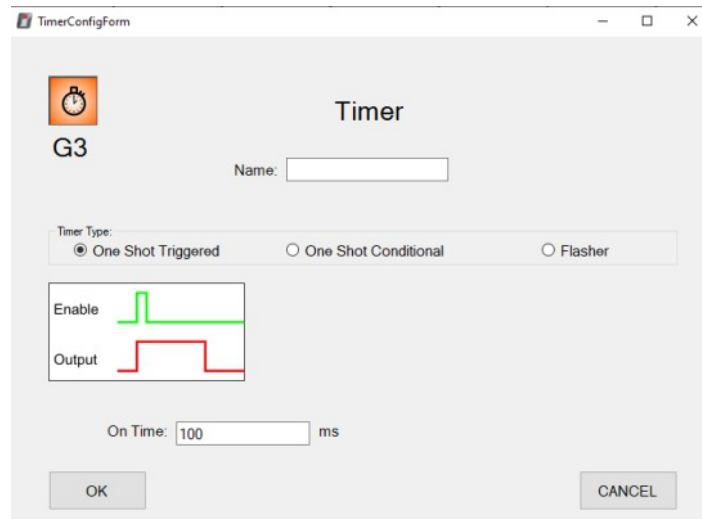


Timers

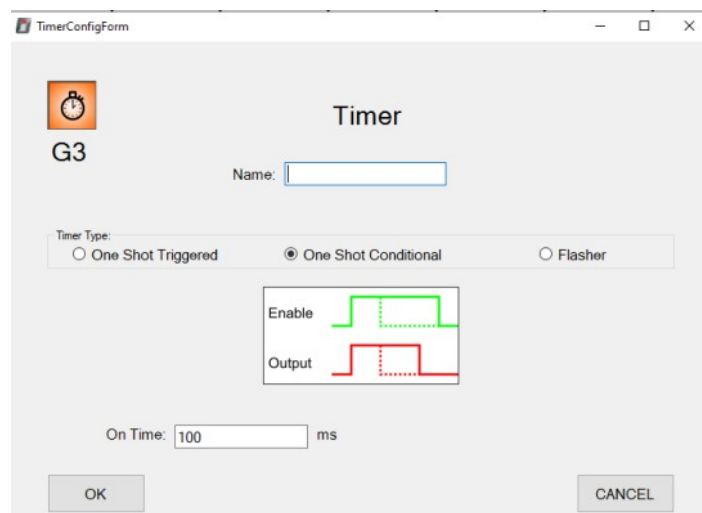


Timers- The timer function is a versatile function that can be used to trigger outputs based on an input and a selected timer function. When the timer function is dropped on to the grid, there is a pop up box where the desired function can be selected.

The one shot triggered becomes active when an input is detected. Regardless of the length of time the input is active, the output will stay on for the time specified in this pop up. This means that whether the input is momentary or if the input is permanent, the output will only be active for the given amount of time.



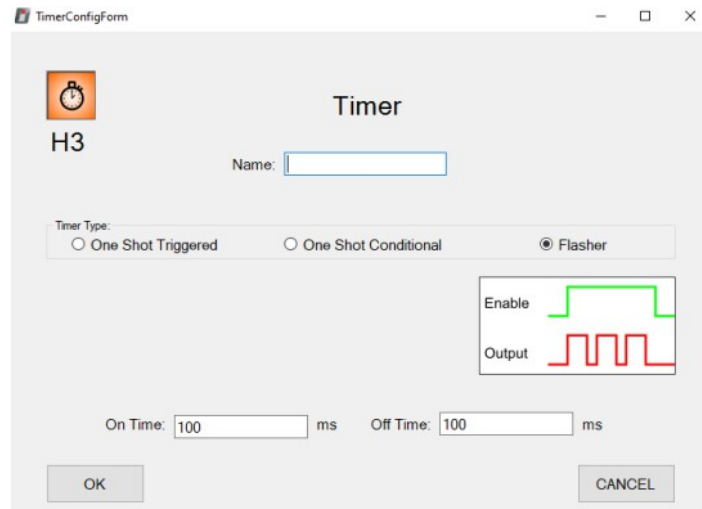
The one shot conditional timer function will be enabled when the input is active. The output will stay on for the length of time the timer specifies, as long as the input remains active. If the input drops out before the timer is finished, the output will also be turned off. This is shown in the graph above, with the solid line showing the output turning off because the time has finished, and the dotted line showing the output turning off because the input has dropped out.



Timers



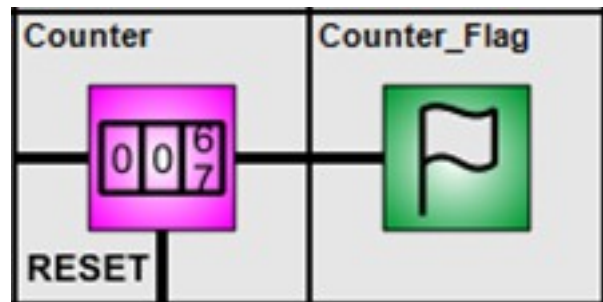
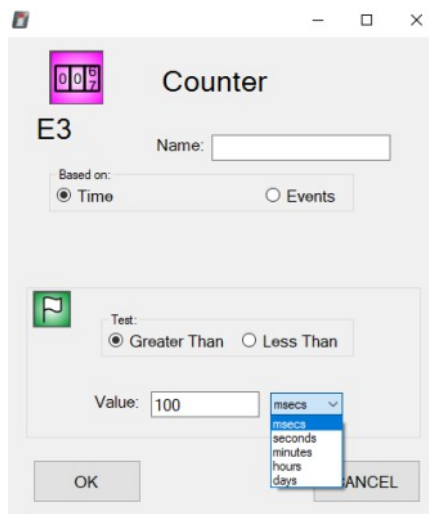
The flasher timer function will be enabled when the input is active. The output will flash at the specified time intervals for as long as the input is present.



Counters & Flags

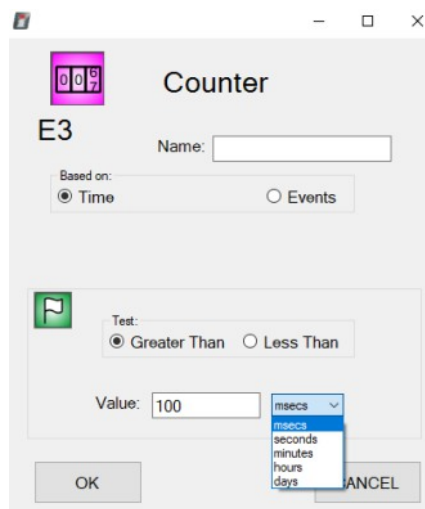


Counters- The counter function uses an input to trigger either a time based counter or an event based counter, which in turn can trigger an output when the count is greater than or less than a specified value.

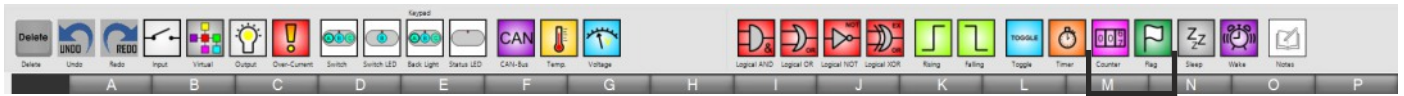


When dropped on to the grid, a pop up box will appear to configure the counter. This will request a name, whether it is a time or events based counter, whether the output to is active when greater or lower than the threshold value, and the threshold value itself. When configured, a counter icon will appear, with a counter flag next to the counter. The flag operates much like a virtual, and can be referenced to trigger outputs.. There will be a connection point to the left of the icon, which is for the input, and a connection point below the icon, which is used to reset the counter when certain conditions are met.

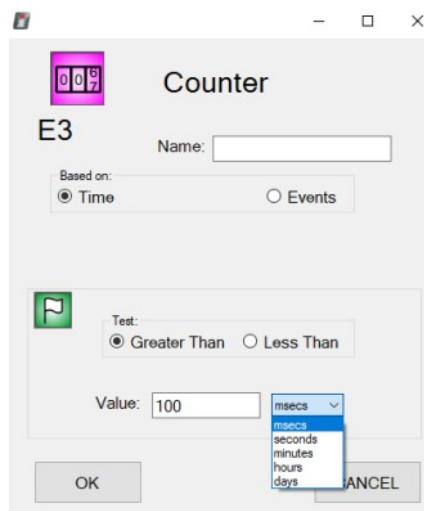
If the counter is being configured for a time based output, the time period has to be specified. For example, when the ignition has been off for ten minutes or over, any internal lights in the cab of the vehicle may switch off.



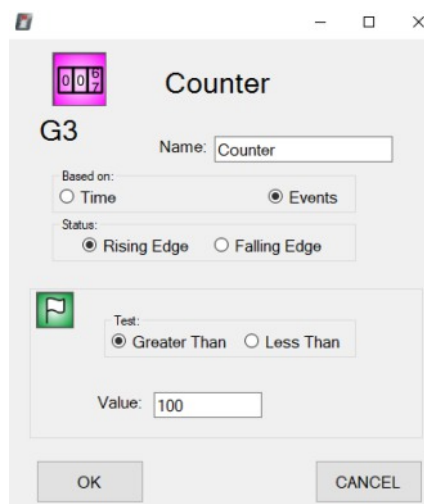
Counters & Flags



If the counter is being configured for a time based output, the time period has to be specified. For example, when the ignition has been off for ten minutes or over, any internal lights in the cab of the vehicle may switch off.



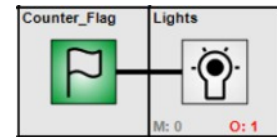
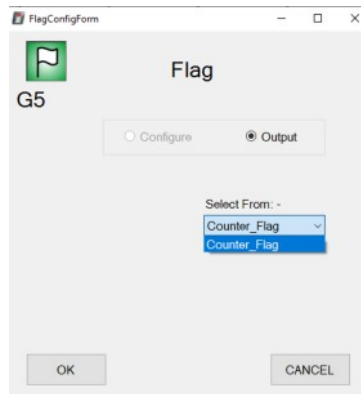
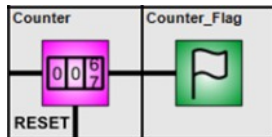
If the counter is configured for an events based output, the count can either be picked up from the rising or falling edge of the input. Again, it must be specified whether in the output is active when the counter is above or below the specified value.



Counters & Flags



Flags- Flags are automatically generated when a counter is configured. This means that when the counter is activated by the input hitting the threshold value, the flag becomes active. Dragging and dropping the flag icon on to the grid will offer a drop down, which will be a list of all the configured flags in the programme. When selected, the flag will drop on to the grid, with a connection point to the right of the icon, which can be used to activate outputs.

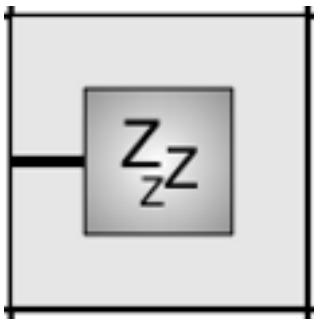


A flag functions like a virtual, and can be referenced as many times as is required in the programme.

Sleep Function & Notes



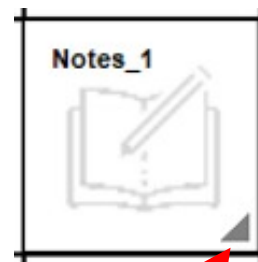
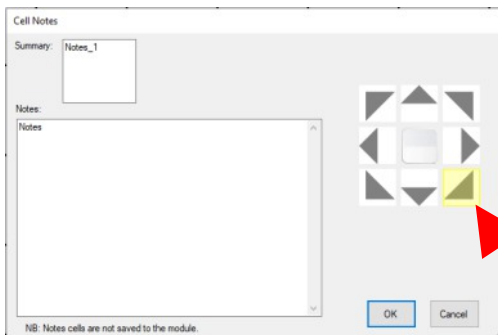
Sleep Functionality- The sleep function can be used to put the iConnex module into a low power consumption sleep mode. This can be configured so that logic triggers the module into the sleep mode. When dropped on to the grid, the connection point is on the left of the icon, so it can be triggered as an output. Once in sleep mode, the iConnex can currently only be woken up by pressing the left-most button on an iConnex keypad. This wakes up the system by giving a negative feed through pin 2 on the 6-way molex connector on the iConnex.



Keypad Connector	Molex 6-Way Female Housing	0469920610
Cable Entry View		
<ol style="list-style-type: none"> 1. 0V (Ground) to keypad only. 2. Switch 1 negative return (System wake-up). 3. N/C 4. 5V (Supply) to keypad only. 5. Keypad CAN Hi. 6. Keypad CAN Lo. 		



Notes- The notes function can be used to leave any notes that are required within the programme. When dropped on to the grid, the pop up requests a notes summary, the note itself, and the grid to which the note is referring to (using the arrow box).

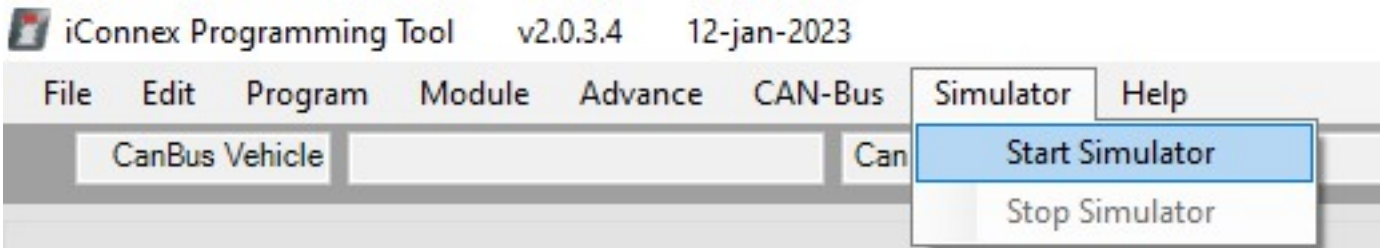


The grid reference that is selected in the configuration appear on the icon on the grid.

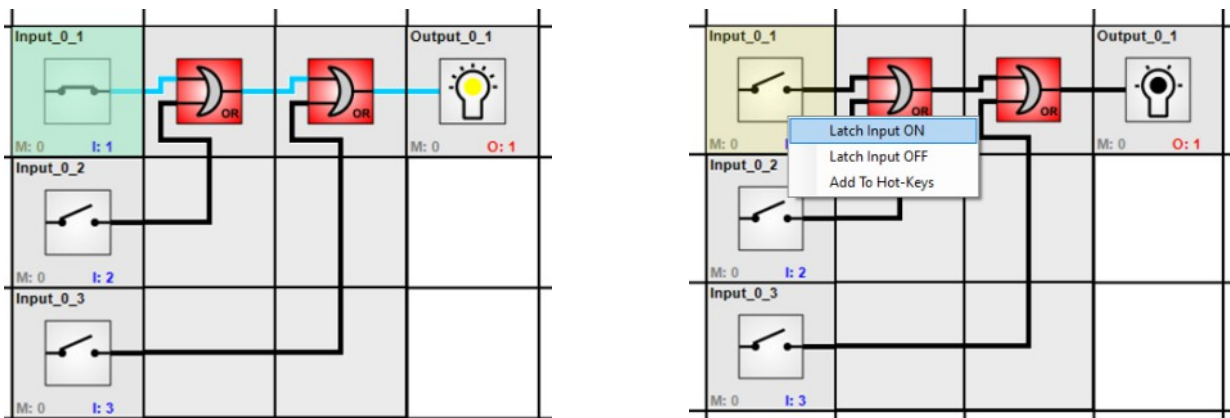
Simulation Mode



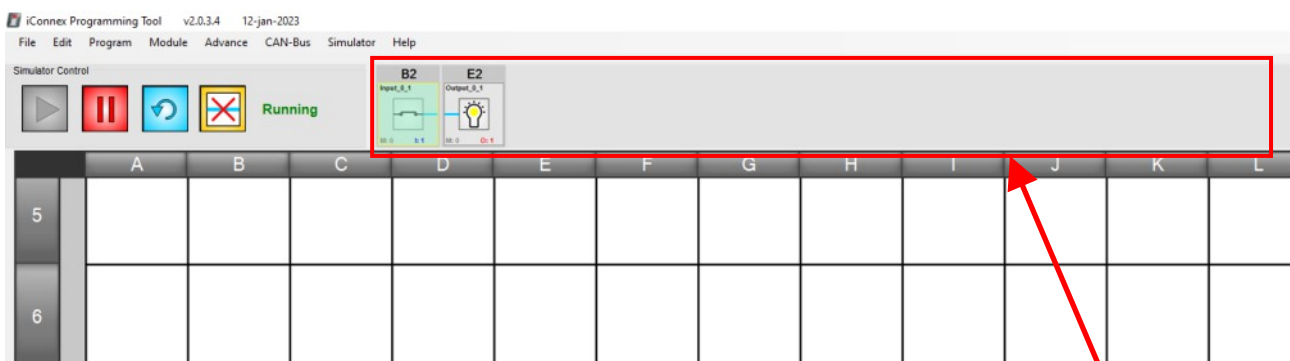
Simulation Mode- The simulation mode in the software allows testing of any programmes to check the logic within the system. To go into the simulator mode, the start simulator option has to be selected from the simulator drop down.



Once in simulator mode inputs, keypad switch inputs CAN message inputs can be triggered by left clicking on the icon. These inputs can also be latched on/off by right clicking the icon and selecting the latching option. Latching inputs allows for several inputs to be activated at once, which may be required to activate AND gates, or conditional toggles ETC.



The 'add to hot-keys' option on the right click of an icon is a useful tool for larger projects. Adding icons to the hot-key suite allows a viewing window that will permanently display the added icons, regardless of what the grid view is displaying. This allows users to trigger inputs that aren't on the current screen, and see if the logic works in a different place on the grid.

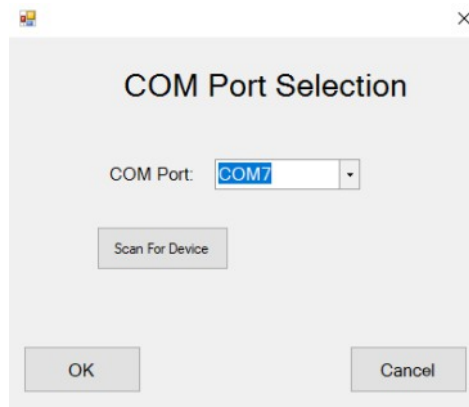


Hot-key Suite

Programming



To programme the iConnex module, the programme must first be saved. Once saved, pressing the COM port option in the program tab will bring up the below pop up.



At this point, plug a USB-B cable into the port on the front of the iConnex module and connect it to the PC via a USB-A cable. This will bring up the COM port for that iConnex module, select it and press ok. Then press 'write' in the programme tab, and the module will go into programming mode.