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Buttons overview

Configuring buttons within Toolset is one of the best ways to expand functionality and allow flexibility when you create a setup. The following shows how you can configure buttons (with an emphasis on CCW & CSB), how buttons within Toolset are structured, and some examples of how to use them.

Configure button inputs

Add buttons

By default, on the **Buttons** node there are no entries on the **Inputs** page. Unlike a Maths channel or Logic channel, which are software defined, buttons are hardware defined. On devices such as the CCW and the CSB which communicate via CAN, the button properties are imported from the associated device CAN.

Buttons	Ø
Inputs Combinations	
Configure input names and debounce timings	



When you configure a CAN device such as the CCW or CSB, it comes with an associated CAN stream to transmit data between the primary device and the CAN device. Once the device stream has been imported to Toolset (see **Streams**), it automatically updates the **Buttons** node to show the available buttons.

You can also generate your own virtual buttons via CAN streams and define any received channels as a 'Button Group'.

When the device stream is imported (a CCW stream in the example below), button inputs are shown on the **Buttons** node in the format of 'Name (Source)'.

Buttons Inputs Combinations Configure input names and debounce timings	Ø
CCW Switch1 (Stat_Switches_CCW)	CCW Switch2 (Stat_Switches_CCW)
debounced at source	debounced at source
CCW Switch3 (Stat_Switches_CCW)	CCW Switch4 (Stat_Switches_CCW)
debounced at source	debounced at source
CCW Switch5 (Stat_Switches_CCW)	CCW Switch6 (Stat_Switches_CCW)
debounced at source	debounced at source
CCW Switch7 (Stat_Switches_CCW)	CCW Switch8 (Stat_Switches_CCW)
debounced at source	debounced at source
CCW Switch9 (Stat_Switches_CCW)	CCW Switch10 (Stat_Switches_CCW)
debounced at source	debounced at source
CCW Switch11 Shift L (Stat_Switches_CCW)	CCW Switch12 Shift R (Stat_Switches_CCW)
debounced at source	debounced at source
CCW Switch13 AD L (Stat_Switches_CCW)	CCW Switch14 AD R (Stat_Switches_CCW)
debounced at source	debounced at source

Name buttons

The name of the button is configured in the **CAN Streams** node. To edit the name of the button, select the 'Button Group' packet content (1), and then click **Edit Buttons** (2).

CCW_MK2_Decode_1.2 (CAN Stream De	ecode)								All streams
Packets	General								
+	Configure the basic properties	that define this packet.							
Analogue 1-3 0xC1	Name / CAN ID	Board Status	0xC0	Standard 👋					
Analogue 10-12	Length Bit Numbering / Endianness	64 Follows Endianness	Big (Motorola)	0					
Analogue 4-6	Rate	200 ×	Hz						
Analogue 7-9 DiC3	Timeout Status Channel		Ø						
Board Status 0xC0	Enabled	Always							
	Content	kes up this packet.							
	\oplus						٢	Configure the button	s of the selected button
1	Name Stat_Switches_CCW	Ту	pe Button Group	Start Bit 0	Length 22			Timeout Behavior	Hold v
	Name Stat_CAN Term_CCW	Туг	pe Channel	Start Bit 23	Length 1		2	CEdit Buttons	
	Name Temp_Box_CCW	Ту	pe Channel	Start Bit 24	Length 8			Comment	
	Name V_Battery_CCW	Ту	pe Channel	Start Bit 32	Length 8				
	Name Stat_Device ID_CCW	Ту	pe Channel	Start Bit 40	Length 4				
	Name Stat_Software Ver_CCW	Ту	pe Channel	Start Bit 44	Length 4				
	Name Stat_CVW Switches_CCW	Туг	pe Channel	Start Bit 48	Length 16				
	Preview Packet Layout								

StatSwitches_CCW Buttons	\otimes
Edit the buttons within this group. Buttons are allocated one bit each, starting at the first bit configured for the content.	
$ \oplus $ $ \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc $	Ŵ
CCW Switch1	
CCW Switch2	
CCW Switch3	
CCW Switch4	
CCW Switch5	
CCW Switch6	
CCW Switch7	
CCW Switch8	
CCW Switch9	
CCW Switch10	
CCW Switch11 Shift L	
CCW Switch12 Shift R	
CCW Switch13 AD L	
CCW Switch14 AD R	

If a pre-compiled CAN stream for a device (that has been locked) is imported, you cannot edit the default button name, and it is greyed-out.

If a new CAN stream is compiled, you can add buttons by clicking the + icon (1), and then enter the button name (2).

StatSwitches_CCW Buttons	\otimes
Edit the buttons within this group. Buttons are allocated one bit each, starting at the first bit configured for the content.	
	١
2 Example Button 1	
Example Button 2	
Example Button 3	
Example Button 4	
Example Button 5	
Example Button 6	



Configure button properties

From the **Buttons** node, the **Button Configuration** option is displayed. Here the name of the button is displayed, and you can define the **Timing configuration**. Select or unselect the **Use default timings** option (1).

General con	iguration	
Name	CCW Switch1	
Timing conf	guration	
Hold time		0.75 s
Long hold tim		1.50 s

Click the 'Wrench' icon on the **Buttons** node to configure default timings.

Click the 'wrench' icon to display a dialog box where you can configure the default timing configuration.

Buttons Inputs Combinations Configure input names and debounce timings	$\textcircled{\textcircled{0}}$
CCW Switch1 (Stat_Switches_CCW)	CCW Switch2 (Stat_Switches_CCW)
debounced at source	debounced at source
CCW Switch3 (Stat_Switches_CCW)	CCW Switch4 (Stat_Switches_CCW)
debounced at source	debounced at source
CCW Switch5 (Stat_Switches_CCW)	CCW Switch6 (Stat_Switches_CCW)
debounced at source	debounced at source
CCW Switch7 (Stat_Switches_CCW)	CCW Switch8 (Stat_Switches_CCW)
debounced at source	debounced at source
CCW Switch9 (Stat_Switches_CCW)	CCW Switch10 (Stat_Switches_CCW)
debounced at source	debounced at source
CCW Switch11 Shift L (Stat_Switches_CCW)	CCW Switch12 Shift R (Stat_Switches_CCW)
debounced at source	debounced at source
CCW Switch13 AD L (Stat_Switches_CCW)	CCW Switch14 AD R (Stat_Switches_CCW)
debounced at source	debounced at source

You can configure timing configuration settings such as 'On', 'On Hold', 'Off, and 'Ignore' times under **Debounce**. 'Click', 'Hold', and 'Long Hold' timings are configurable under the **Timings** section.

Note that: An individual item may override the default configuration In addition, some items may not support some or all of th	n. he settings pr	ovided here, in which case the settings provided here will not apply.
Debouncing		Timings
On Time The time for which the input signal must be active and stable before a press is registered.	0.02 s	Click A click is triggered if the debounced input is pressed for less than the Hold time.
On Hold Time The minimum length of time for which a press will be generated regardless of the input signal.	0.02 s	Hold The minimum time for which the debounced input must 0.75 remain pressed before a 'hold' condition is detected.
Off Time The time for which the input signal must be inactive and stable before the signal is considered to be released.	0.02 s	Long Hold The minimum time for which the debounced input must remain pressed before a 'long hold' condition is
Ignore Time The minimum length of time which must elapse	0.05 s	detected.

For most functions, the default values should work well.

Note: These settings are for all buttons on the **Inputs** tab. If you need to edit button settings, unselect the 'use default settings option.

Configure button combinations

On the **Combinations** tab, you can configure channels that react from combinations of button inputs. For example, you can configure a channel to be triggered when two buttons are pressed simultaneously. This channel can be used to drive miscellaneous functionality within the setup.

To create a new button combination channel, click the **Combinations** tab (1), and then click the **+** button (2). Combinations can be deleted with the 'bin' icon (3).

	Buttons		Ø	
	Inputs	Combinations	1	
	Configure o	combination inputs		
2	Add	combination	3 Remove combination	h

You can configure the new button combination. Name the combination (1), and then provide an optional description (2). You can select if the combination is enabled in the setup (3). You can then use the **Choose a Strategy** option to select the strategy condition (4/5.).

	General		🚱 Choose a Strategy	- C	x נ	
1	Name Example Combination		Car			5
2	Description Example button combination for User Guide		Engine			
- 1			Logging			
	Enable	5	Moving			V
2	Enabled V		start typing to filter the selection		(3
5	Dynamically enable when	4	This channel indicates the state of the engine.			
		([©])• ~			0.	
		_	Show Diagnostic Items	Юок	Canc	el

You can then define the button combination with options for the **Ordered** or **Unordered** button inputs:

• **Ordered**: the button needs to be pressed first, and then the second button to trigger the output channel.

Combinati	ion	
Mode	 Ordered Unordered 	
Input	CCW Switch1	
then input	CCW Switch2	

• **Unordered** – Two buttons must be pressed to trigger the output channel but a time threshold 'pressed within' must be defined to trigger the channel.

Combination			
Mode	○ Ordered ● Unordered		
Input	CCW Switch1		
and input	CCW Switch2		
pressed within	0.400 s		

Configure a digital button

A button can also be configured from a digital input rather than from a CAN device. This is useful if you need an additional button in the setup which is separate to any CAN devices.

To configure a digital button, go to the **Sensors** node, and navigate to the available digital inputs. Click a digital input (1), click the import tool (2), select 'Digital Push Button Sensor' (3), and then click **Import** (4).

Input Sensor Pairs						
	Ŵ					
Analog Inputs (40)	۲					
Digital Inputs (10)		🌀 Attach Sensor			-	
Digital 01		The selected directory and all subdi	rectories are searched for suitable items.			
C2.17 Digital Level Input		4 Libraries	Name	Туре		
		Read-Only Library	DF11i Rotational Sensor	Digital Pulse Sensors		
Digital 02		2024 AC INPUTS	Digital Push Button Sensor	Digital Level Sensors	3	
C2.18 Digital Level Input		2024 Bat Limitation Math	Rotational Sensor	Digital Pulse Sensors	Ŭ	
		2024 CAN		-		
Digital 03		2024 Firefly 2024 Led Configuration				
C2.36 Digital Level Input		2024 Logic Channels				
		2024 SC3				
Digital 04		AliveDrive PDR 2.0				
C2.30 Digital Level Input		AMR GT3				
		Auto Backup				
Digital 05		Display Sim Channels				
C2.35 Digital Level Input		Ethan				
		MUX Examples				
Digital 06		Ronge				
C3.9 Digital Level Input		Slider				
		▲ Update Files 2024 SC2				
Digital 07		<	Filter: start typing to filter the selection			
C3.8 Digital Level Input			7. 5 (\bigcirc
				2	+ Umport	(Can
Digital 08						
Digital Level Input						
Digital 09						
C3.7						
Digital Level Input						
Digital 10						
G3.2						
Digital Level Input						



You can now configure the digital button. Enter a **Sensor Name** (1) and an optional comment about the digital button in the **Details** section (2). The actual button **Name** is configurable (3), as is the 'mode' (4), in the **Button** section. The 'mode' allows the user to configure if the button triggers on the rising or falling edge of the digital input channel.

	Details					
1	Digital Push Button					
2	Comment	Example digital push button for User Guide				
	Manufacturer Status					
3.	Name	Example Digital Push Button				
	Trigger button press	on the Rising v edge of the input channel. 4 Falling Rising				

Return to the **Buttons** node and acknowledge the creation of the digital button. The default button settings apply to this button, but default timings can be deselected. You can use the digital button in button combinations and in conjunction with CAN buttons.

Buttons	General config	guration	
Inputs Combinations	Name	Example Digital Push Button	
Configure input names and debounce timings	Debourse con	- A starting	
Example Digital Push Button (Digital Push Button on Digital 01) default debouncing	Use default ti	nguatori ining	
	On time	0.02	
	Hold time	0.02	
	Off time	0.02	
	Ignore time	0.05	
	Timing configuration		
	🖌 Use default ti	imings	
	Hold time	0.75	
	Long hold time	1.50	

Button structure and examples

The CSB or CCW buttons consist of an 8-bit output to determine what type of button press is commanded. These are configured as bit-fields by default with bit 0 to the left, and bit 7 to the right. You might need to acknowledge specific buttons press types and ignore others. The table below shows the press type and the output bit number and decimal value:

Press Type	Bit Number	Decimal Value	
Raw	0	1	
Debounced	1	2	
Clicked	2	4	
Held	3	8	
Long Held	4	16	
Click Latched	5	32	
Latched Held	6	64	

Latched Long Held	7	128

For example, to command a Maths channel to enable on a 'Latched Long Hold', the channel syntax is configured as shown below:

Equat	ion				
Edit th	e equation t	nat determin	nes the valu	ue of this math	channel.
1	[Button	1] & 12	28 == 12	8	

For this channel, when the button value is both equal to 128 (the '& 128' portion of the equation) **and** equal to 128 (the '== 128' portion), then the button output is acknowledged. Therefore, there is no chance that an intermediary button state triggers the channel output. The computed Maths Channel generates a value of 1 or 0.