

ES930: How to control the rotation direction of a DC motor using the ES930?



- How can I turn the rotation direction of a DC motor?
- How can I use the Power Stages of the ES930 to reverse external provided power (polarity reversal)?



- You can control the rotation direction of a DC motor within reversing the provided power to it (polarity reversal).
- To achieve this you use the Power Stages of the ES930 which can be controlled within Digital Out of the ES930.

Step-by-step guide

Prerequisites:

- o ES910
- o **ES930**
- o CBAV422 Cable

Hardware Connections:

- **ES910: "PC Sync"-Port** => PC "Ethernet"-Port
- **ES910: "IO (Daisychain)"-Port** => ES930 "In (Daisychain)"-Port
- ES930: "PS"-Port => cable "CBAV422"

Please see figure: "ES930, used Ports"



Figure: "ES930, used Ports"

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- Cable "CBAV422" (PS_GND, PS_UBAT) => to external Power (Remark: PS excepts external Power from 7V to 34V)
- Cable "CBAV422" (PS_CH1 white, PS_CH2 brown) => Voltage measuring device, or motor you like to control

Please see figure: "CBAV422.1; used cables"

D-SUBD	Signal	Open cable end			
Pin		Color			
, 10	PS_CH1	white	Page C		
, 11	PS_CH2	brown			
, 12	PS_CH3	green	-		
, 13	PS_CH4	yellow			
, 14	PS_CH5	gray			
, 15	PS_CH6	pink			
19, 20, 21, 22, 23, 24, 25	PS_UBAT	blue	Page B		
	PS_UBAT	red			
	PS_UBAT	black			
	PS_UBAT	violet			
	PS_UBAT	gray/pink			
8, 9, 16,	PS_GND	red/blue	Page D		
17, 18, 26	PS_GND	white/green			
	PS_GND	brown/green			
	PS_GND	white/yellow			
	PS_GND	yellow/brown			
ousing		Shield			

Figure: "CBAV422.1; used cables"

We use Power Stage "Half Bridge 1 / 2". To get control of the Power Stage (PS) for the ES930 you need to make the Daisychain Configuration for the Digital Out "DO" for in the following way:

- Select ES930_DO1_CH1 and select in the column "Power Stage" "Half Bridge 1". Remark: Optional you can select in the column "LED" the led "U1" for controlling the activity (it's just an visual indicator for the signal)
- Select ES930_DO1_CH2 and select in the column "Power Stage" "Half Bridge 2". Optional you can select in the column "LED" the led "U2" for controlling the activity.
- Select ES930_PS1_CH1_2_Enable.
 Comment: Before you can do so you need to assign the half bridges to CH1 and CH2.

Please see figure: "ES930, Daisychain configuration for Digital Out (DO)"

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						useful for control on the ES93D				you need to select a power stage					
No.	Settings	Sel.	HW Channel	Active State	Mode	Name	Update Mode	Alignment	LED	Power Stage	Output	Active Time	Period Time	Units	Comment
1			CH1	High	Digital Out	ES930_DO1_CH1	Individual	-/-		Half Bridge 1	inactive	n/a	n/a	bit	
2		V				ES930_DO1_CH1_PeriodTime		n/a	01		n/a	n/a	n/a	msec	
3				n/a	n/a	ES930_DO1_CH1_Enable	n/a	n/a	n/a	n/a	Enabled	n/a	n/a	bit	
4			CH2	High	Digital Out	ES930_DO1_CH2	Individual			Half Dates 0	inactive	n/a	n/a	bit	
5		•				ES930_DO1_CH2_PeriodTime		n/a	02	Hait Bridge 2	n/a	n/a	n/a	msec	
6				n/a	n/a	ES930_DO1_CH2_Enable	n/a	n/a	n/a	n/a	Enabled	n/a	n/a	bit	
7		_	СНЗ	High	Digital Out	ES930_DO1_CH3	Individual	n/a None			inactive	n/a	n/a	bit	
3						ES930_DO1_CH3_PeriodTime			None	e None	n/a	n/a	n/a	msec	
)				n/a	n/a	ES930_DO1_CH3_Enable	n/a	n/a	n/a	n/a	Disabled	n/a	n/a	bit	
10	~		CH4	High	Digital Out	ES930_DO1_CH4	Individual	n/a None	None	inactive	n/a	n/a	bit		
11	<u>.</u>					ES930_DO1_CH4_PeriodTime				n/a	n/a	n/a	msec		
2	~			n/a	n/a	ES930_DO1_CH4_Enable	n/a	n/a	n/a	n/a	Disabled	n/a	n/a	bit	
13		_			Digital Out	ES930_DO1_CH5	Individual			None	inactive	n/a	n/a	bit	
14			CH5	High		ES930_DO1_CH5_PeriodTime		n/a	None		n/a	n/a	n/a	msec	
5				n/a	n/a	ES930_DO1_CH5_Enable	n/a	n/a	n/a	n/a	Disabled	n/a	n/a	bit	
6				deter store et te		u alita Zalia alita dia mandrati	en l'halfaniskan	10			inactive	n/a	n/a	bit	
7		Before you can activate the checkbox here you need to assign a halfbride for CH1/2 above!							e	n/a	n/a	n/a	msec		
8				nle	n/a	ES930_DO1_CH6_Enable	n/a	n/a	n/a	n/a	Disabled	n/a	n/a	bit	
9		•	CH1-CH2	n/a	n/a	ES930_PS1_CH1_2_Enable	n/a	n/a	n/a	n/a	Enabled	n/a	n/a	bit	
20			CH3-CH4	n/a	n/a	ES930_PS1_CH3_4_Enable	n/a	n/a	n/a	n/a	Disabled	n/a	n/a	bit	
21			CH5-CH6	n/a	n/a	ES930 PS1 CH5 6 Enable	n/a	n/a	n/a	n/a	Disabled	n/a	n/a	bit	

Figure: "ES930, Daisychain configuration for Digital Out (DO)"

That's it!

This Daisychain Configuration will be used later on in your Hardware Configuration. You will have the following signals appearing there:

HWC: Project - ES910						
File Edit View Tools Window Help						
Workspace 🔻 🗙						
🗄 🧔 Hardware Systems						
😑 🏀 ES900 : ES900						
🗄 🎼 ES910 : ES910 (E-Target)						
🗄 🥔 Daisychain						
🕀 📩 Outputs_ES930_MIO1_Digital_CH1						
🕀 📩 Outputs_ES930_MIO1_Digital_CH1_CH2_Enable						
🖄 📩 Outputs_ES930_MIO1_Digital_CH2						

These signals can used for calibration now (we don't show here how to setup the experiment environment for calibrating signals)

"ES930_PS1_CH1_2_Enable" is used to activate / deactivate the control of the Power Stage, if it is enabled you can use "ES930_DO_CH1" and "ES930_DO_CH1" to control the Power Stage.

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The Table below shows how the output voltage behaves within different calibrations for: ES930_PS1_CH1_2_Enable, ES930_DO_CH1, ES930_DO_CH2

ES930_PS1_CH1_2_Enable	ES930_DO_CH1	ES930_DO_CH2	Output Voltage (measured within white / brown of connected PS cable)
1	0	0	0
1	0	1	- (external provided power)
1	1	0	+ (external provided power)
1	1	1	0
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0

Table: "Combinations for ES930_PS1_CH1_2_Enable, ES930_DO_CH1, ES930_DO_CH2"



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