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

Question

- 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)?

Answer

- 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:

- ES910
- ES930
- 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"

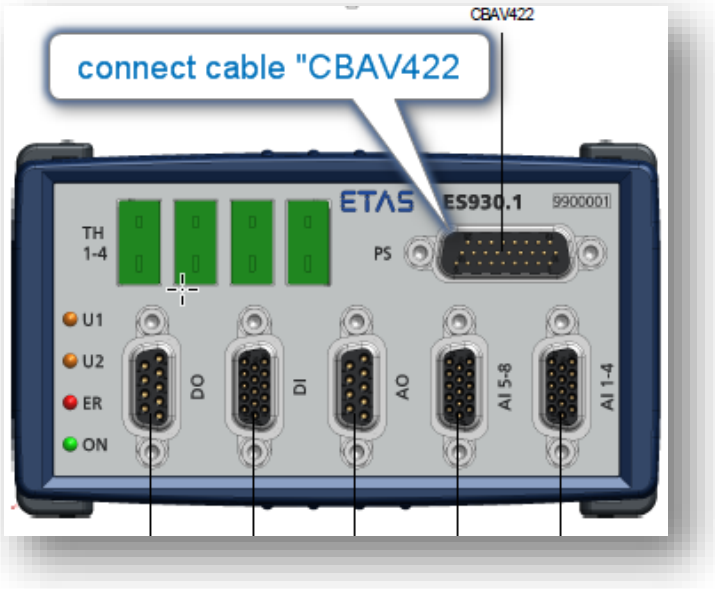


Figure: "ES930, used Ports"

- **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"

Assignment of the CBAV422.1 cable when used at the "PS" connection

HD-SUBD Pin	Signal	Open cable end Color	
1, 10	PS_CH1	white	Page C
2, 11	PS_CH2	brown	
3, 12	PS_CH3	green	
4, 13	PS_CH4	yellow	
5, 14	PS_CH5	gray	
6, 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	
7, 8, 9, 16, 17, 18, 26	PS_GND	red/blue	Page D
	PS_GND	white/green	
	PS_GND	brown/green	
	PS_GND	white/yellow	
	PS_GND	yellow/brown	
Housing		Shield	

Figure: "CBAV422.1; used cables"

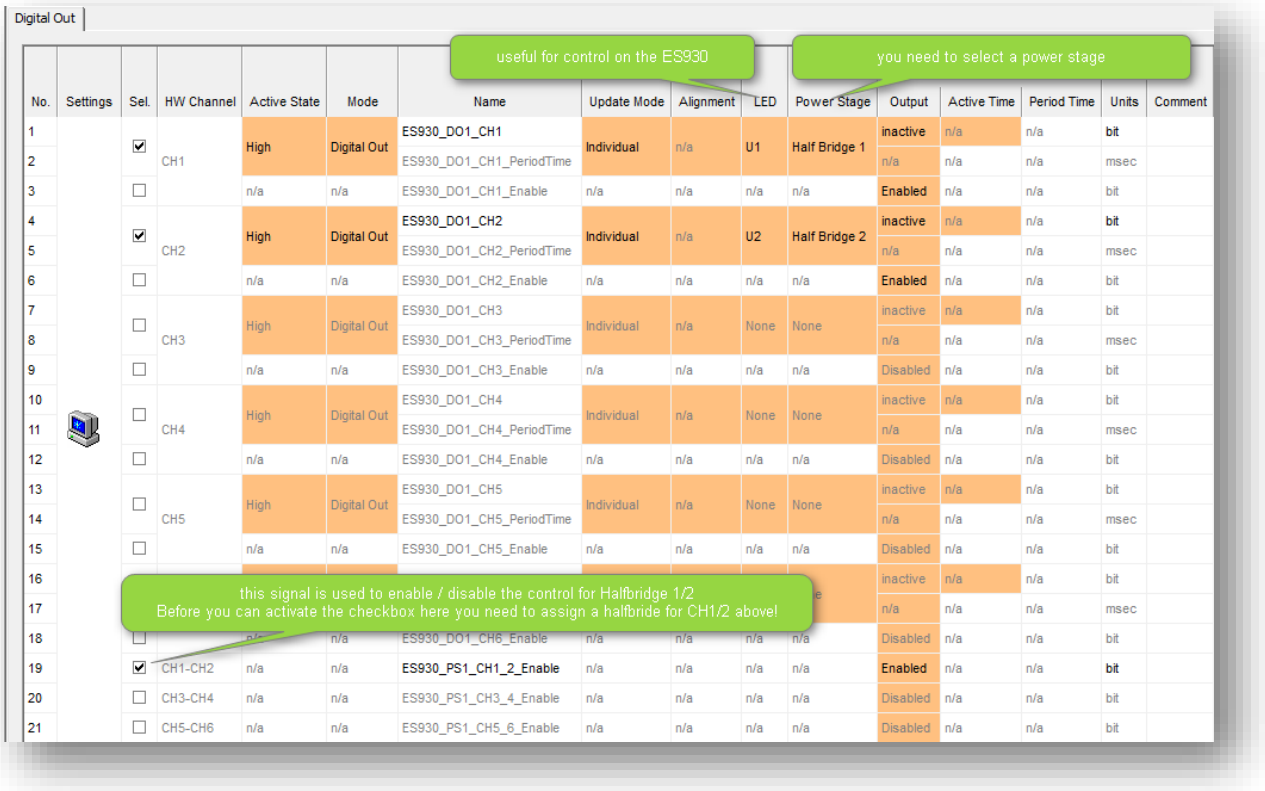
We use Power Stage "Half Bridge 1 / 2". To get control of the Power Stage (PS) for the ES930 you need to make the Daisychain Configuration for the Digital Out "DO" for in the following way:

- 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)"

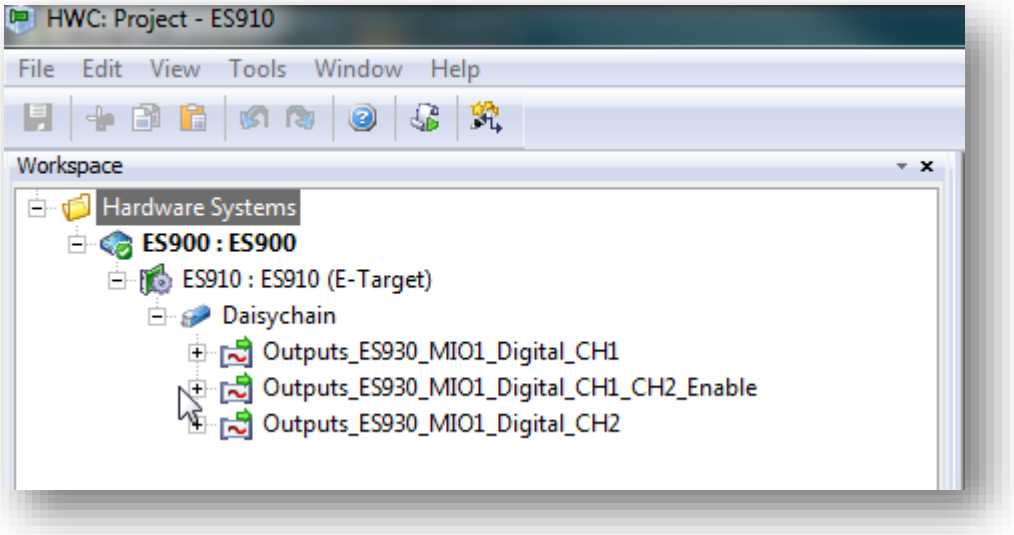


No.	Settings	Sel.	HW Channel	Active State	Mode	Name	Update Mode	Alignment	LED	Power Stage	Output	Active Time	Period Time	Units	Comment
1		☑	CH1	High	Digital Out	ES930_DO1_CH1	Individual	n/a	U1	Half Bridge 1	inactive	n/a	n/a	bit	
2						ES930_DO1_CH1_PeriodTime					n/a	n/a	n/a	msec	
3		☐		n/a	n/a	ES930_DO1_CH1_Enable	n/a	n/a	n/a	n/a	Enabled	n/a	n/a	bit	
4		☑	CH2	High	Digital Out	ES930_DO1_CH2	Individual	n/a	U2	Half Bridge 2	inactive	n/a	n/a	bit	
5						ES930_DO1_CH2_PeriodTime					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		☐	CH3	High	Digital Out	ES930_DO1_CH3	Individual	n/a	None	None	inactive	n/a	n/a	bit	
8						ES930_DO1_CH3_PeriodTime					n/a	n/a	n/a	msec	
9		☐		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						ES930_DO1_CH4_PeriodTime					n/a	n/a	n/a	msec	
12		☐		n/a	n/a	ES930_DO1_CH4_Enable	n/a	n/a	n/a	n/a	Disabled	n/a	n/a	bit	
13		☐	CH5	High	Digital Out	ES930_DO1_CH5	Individual	n/a	None	None	inactive	n/a	n/a	bit	
14						ES930_DO1_CH5_PeriodTime					n/a	n/a	n/a	msec	
15		☐		n/a	n/a	ES930_DO1_CH5_Enable	n/a	n/a	n/a	n/a	Disabled	n/a	n/a	bit	
16											inactive	n/a	n/a	bit	
17											n/a	n/a	n/a	msec	
18		☐		n/a	n/a	ES930_DO1_CH6_Enable	n/a	n/a	n/a	n/a	Disabled	n/a	n/a	bit	
19		☑	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:



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.

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"

Do you still have questions?

- You will find **further FAQ articles** on the ETAS homepage: www.etas.com/en/faq
- **Movies** corresponding to FAQ articles can be found on the ETAS YouTube channel
- Please feel free to contact our Support Center, if you have further questions.
- Here you can find all information: http://www.etas.com/en/hotlines.php