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Field Calibration:

The SDB-P1 features a user friendly calibration interface that is used to custom configure the operating parameters. The setup menu is accessed using the 4 switches mounted on the top of the board (see page 3 for top cover removal). The switches are used in conjunction with the display to navigate through the menu structure and modify operating parameters as they are selected by the user. A change that is made to a parameter is automatically saved when the user exits from that adjustment location.

The complete set of menu parameters and their definitions are given in **Table 1a**. The calibration menu consists of three levels, the top level menu is used to display the current profile number and is normally selected when not in calibration mode. The top level menu also provides feedback such as error codes when fault conditions are detected and real time output activity. Sub-level menu 1 is used to select a parameter. Sub-level menu 2 is used to make adjustments to a particular parameter value within the appropriate range e.g. PWM duty cycle minimum and maximum levels.

Table 1a: Display Readout Definitions

Top Level Menu		Sub-level Menu 1		Sub-level Menu 2	
Display Readout	Definition	Display Readout	Definition	Display Readout	Definition
P1	Profile 1	*1H*	Output 1 Maximum Duty Cycle	*05 - 99*	Duty Cycle Setting, 1% Increments
*P2**	Profile 2*	*1L*	Output 1 Minimum Duty Cycle	*05 - 99*	Duty Cycle Setting, 1% Increments
*P3**	Profile 3*	*2H*	Output 2 Maximum Duty Cycle	*05 - 99*	Duty Cycle Setting, 1% Increments
		2L	Output 2 Minimum Duty Cycle	*05 - 99*	Duty Cycle Setting, 1% Increments
		1r	Output 1 Ramp Rate	*0.1. - 9.9.*	Ramp Rate Setting, 0.1s Increments
		2r	Output 2 Ramp Rate	*0.1. - 9.9.*	Ramp Rate Setting, 0.1s Increments
		Co	Calibrate Outputs Command	*cF*	Indicates Calibration Finished
		Fr	PWM Frequency	*04 - 40*	PWM Frequency Setting, 10Hz Increments
		cr	Input Mode Select	*01 – 03*	01 Selects Single Input Mode - (0.5V - 4.5V). 02 Selects Dual Input Mode - (0.8V - 4.2V). 03 Selects Switched Input Mode - (0V(off), 5v(on)).

(*) Available through optional Profile Select Switch

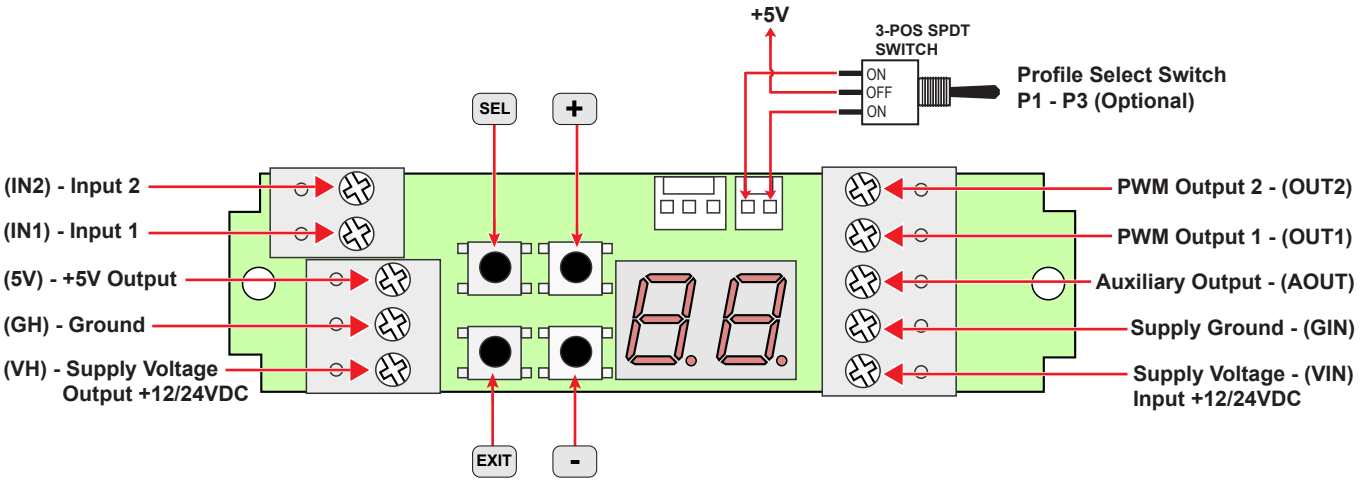

Figure 1: Wiring Connections and Calibration Switch Locations

Table 1b: Switch Functions

Name	Top Level Menu Function	Sub-level Menu 1 Function	Sub-level Menu 2 Function
SEL	Access sub-level menu 1	Scroll through parameter/command list	n/a
EXIT/SAVE	n/a	Revert back to top level menu, saves current settings	Revert back to previous menu, saves current settings
+	n/a	Move to sub-level menu 2 to increase value, or execute command e.g. 'calibrate outputs'	Increase parameter value
-	n/a	Move to sub-level menu 2 to decrease parameter value	Decrease parameter value

Note: While in normal run mode, the display will shut off after a period of 15 seconds. The display can be reactivated by pressing any one of the switches, and will automatically turn on when one of the outputs is activated, or if a fault has occurred.

Calibration Menu:

Figure 2b shows the menu structure for setting up the parameters for a single profile i.e. default configuration: no external switch option. If the external option switch is connected, the procedure for setting up the other two profiles is identical. When not in calibration mode (run mode), the display will show the current profile number: 'P1' without the switch option installed, or 'P1' - 'P3 with the switch installed. While in run mode, if either output 1 or 2 is activated, the PWM duty cycle will be shown on the display. If the board detects a valid fault at any time while in run mode, the corresponding fault code E5 to E6 will be shown on the display (see **table 2** below), and will remain displayed until the problem has been resolved followed by cycling power to the board. The display will shut off after a period of inactivity, and can be reactivated by pressing any of the four switches. The display will also reactivate when one of the outputs is trigged or if a fault has occurred. While in calibration mode, the driver board will time out after a period of inactivity of 15 seconds and automatically return to 'run' mode. Any changes made to operating parameters are not saved when this occurs, and helps to ensure that the board does not remain in calibration mode.

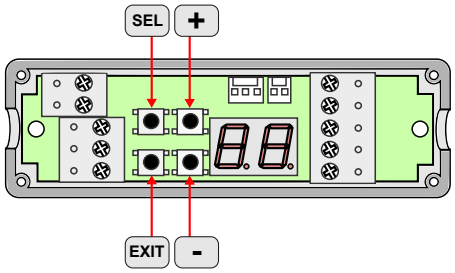

Figure 2a: Calibration Switches

Table 4: Fault Codes

Fault Code	Description
E5	No control device connected to Input 1
E6	No control device connected to Input 2

Note: Once fault conditions have been addressed, the error codes are cleared by cycling the power.

Figure 2b: Calibration Menu Diagram

Disassembly Instructions:

In order to access the calibration interface, the top half of the case assembly must be removed by loosening the 4 corner screws using a No. 1 Phillips screwdriver as shown in **figure 3a**. The parameters summarized in **table 3** can be modified in the field through the use of the on-board calibration menu. Before making any adjustments, it is important to ensure that the board is powered on with the appropriate input control device and the outputs connected.

Remove the 4 housing cover screws (No. 1 Phillips screwdriver required)

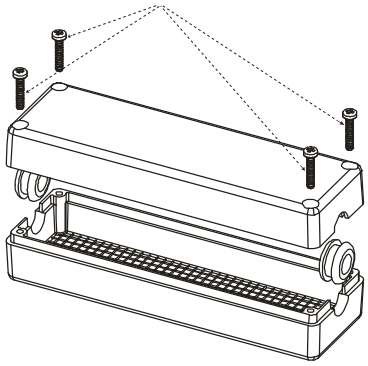

Figure 3a: Cover removal

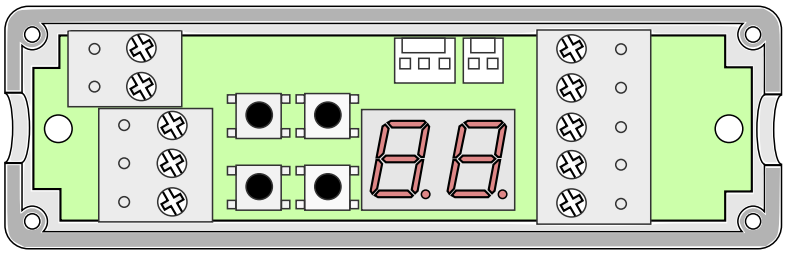

Figure 3b: Driver Board with top cover removed

Overview of Adjustable Parameters:

Table 3: Adjustable Operating Parameters

Parameter	Range of Adjustment and Characteristics	Factory Settings				
		Profile ID	**Output ID**	**Min**	**Max**	**Unit**
PWM Duty Cycle	Duty Cycle adjustable from 5% to 99% on both outputs independently	P1	OUT 1	20	80	%
			OUT 2	20	80	
		P2	OUT 1	30	90	%
			OUT 2	30	90	
		P3	OUT 1	40	99	%
			OUT 2	40	99	
				Setting		
PWM Frequency	PWM Frequency is adjustable from 40Hz to 400Hz, not independent	P1 – P3	OUT1, OUT2	200		Hz
Ramp Rate	Adjustable from 0.1s to 9.9s on both outputs independently	P1 – P3	OUT1, OUT 2	0.2		s
Output Calibration	The calibration command automatically sets the limit on the output current to match the attached loads	P1 – P3	OUT1, OUT 2	open loop		mA
			Input	**Range**		**Out**
Input Mode	Input mode 1 is used for a single control input e.g. one axis from a proportional joystick or a proportional slider module	Single input	IN1	2.5V - 4.5V		OUT1
			IN1	2.5V - 0.5V		OUT2
	Input mode 2 is used for dual control inputs e.g. two proportional modules	Dual input	IN1	0.8V - 4.2V		OUT1
			IN2	0.8V - 4.2V		OUT2
	Input mode 3 is used for switched control inputs	Dual input	IN1	0V (off), 5V (on)		OUT1
			IN2	0V (off), 5V (on)		OUT2