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Si24HyBdMC1-50V-20A-AP1, Open-Loop, 50V 20A, Hybrid, Bidirectional Motor Controller with Active-Low Soft-Start and Soft-Stop Control, AP1 Aluminum Plate Heat Sink, LCD Port and with 5kHz or 20kHz PWM, Y-Chip

The **Si24HyBdMC1-50V-20A-AP1** is a 50V 20A, microprocessor based, high-power, Hybrid, Bidirectional, Motor Controller with user selectable Soft-Start and Soft-Stop features. This controller uses a single (9V to 50V at 0 to 20A) DC power supply to control the speed of a DC motor in forward or reverse direction. An onboard microprocessor generates a 5kHz or 20kHz **PWM** carrier signal, controls the load-power (or motor speed), controls the load-current rate (or motor acceleration and deceleration), updates the Liquid Crystal Display (LCD) and monitors the user inputs. The **PWM** carrier frequency is user selectable by the jumper **J2**, 20kHz when **J2** is open and 5kHz when short. This high frequency PWM rate insures a quiet motor environment. The user can choose between slow or fast motor acceleration/deceleration modes by short-circuiting or open-circuiting the pins labeled **J1**. The slow mode, with rise-time/fall-time of 1.25Sec, is selected by short-circuit (**J1** jumper installed); while the fast buildup mode, with rise-time/fall-time of 0.05s, is selected by leaving these pins open (no Jumper installed). As the name hybrid (**Hy**) implies the required motor speed (or PWM pulse-duration) is variable from 0 to 100% in 0.83% steps using the analog voltage ($V_{H,G}=0V=0\%PWM$, $V_{H,G}=+5V=100\%PWM$), while the motor direction is selected using two active low digital (0 to +5V) control signals ($V_{F,N}$ and $V_{R,N}$) or switches. All inputs are optically isolated or zener-diode protected. A bicolor LED is used to monitor the motor (or load) voltage (Red = Forward, Green = Reverse). A serial LCD port (with 5V, RS232 Interface Standard and with back-light) is provided for optional display of motor RPM data with a 2 line by 16 character format. A small (4.0"x3.3"x0.062") **AP1** Aluminum Plate heat-sink is used to operate at 20A current levels. Higher current-levels (25A or 1200W) can be achieved with more efficient heat-sinks. Please click on this link and read the [Board Mounting Instructions and Heat Sink Selection Guide](#). This board operates in a wide voltage-range (9V to 50V) at max. continuous load current of 20A. Typical applications are: Bi-directional DC Motor-Speed Controller, Peltier Effect TE Coolers, Heat Pumps, DPDT Solid State Relay, etc. This board can be configured and programmed to perform efficiently in many customized applications.



Motor Control-Action Truth Table, (Pins on Connector CN4)

$(V_{F,G})$ Voltage at Pin F relative to pin G	$(V_{R,G})$ Voltage at Pin R relative to pin G	Operation Mode of Motor or Load
$V_{F,G} = 5V$ or pin Open	$V_{R,G} = 5V$ or pin Open	Stop Rotation (Motor Open)
$V_{F,G} = 0V$ @ 1.2mA sink	$V_{R,G} = 5V$ or pin Open	Forward Rotation with V_{PWM} Control
$V_{F,G} = 5V$ or pin Open	$V_{R,G} = 0V$ @ 1.2mA sink	Reverse Rotation with V_{PWM} Control
$V_{F,G} = 0V$ @ 1.2mA sink	$V_{R,G} = 0V$ @ 1.2mA sink	Stop Rotation (Motor Open)

The motor action or load-current direction is controlled by active low control inputs, (0 to +5V) applied to Pin **F** (Forward) and/or pin **R** (Reverse) relative to Pin **G** (Ground) on the Connector **CN4**. These pins are optically isolated from the H-Bridge, providing good noise immunity for these inputs. The control actions and the required voltage levels are defined by the Truth-Table listed above. All control lines

