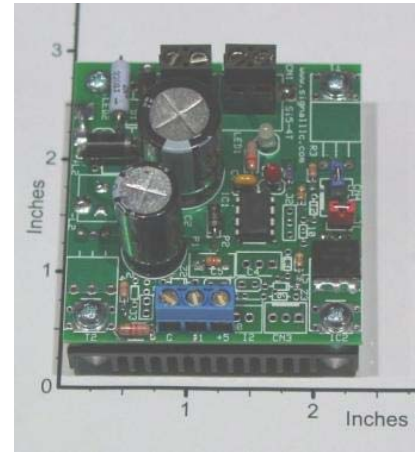




Si5HyUdMC1-50V-20A, Single, Open-Loop, Hybrid, Unidirectional 50V-20A Motor Controller with Integrated Heat Sink and with 5kHz or 20kHz PWM, T-Chip

The **Si5HyUdMC1-50V-20A** is a 50V 20A, microprocessor based, Single, Open-Loop, Hybrid, Unidirectional Motor-Controller board that uses pulse-width modulation (**PWM**) to efficiently control the speed of a brush type DC motor (or load current) in the 0 to 1000W power range, with 8.33W steps. An onboard microprocessor generates a 5kHz or 20kHz **PWM** carrier signal, controls the load-power (or motor speed) and controls the load-current rate (or motor acceleration and deceleration). The **PWM** carrier frequency is user selectable by the jumper **CN4**, 20kHz when **CN4** is open and 5kHz when short. The high frequency PWM rate provides a smooth speed control and insures a quiet motor environment. As the name hybrid (**Hy**) implies, the desired motor speed (or PWM pulse-duration) is set by a variable (0 to +5V) analog input-voltage $V_{I1,G}$, providing a smooth motor-speed control from 0 to 100% in 0.833% steps; while the other control-signals are digital. This analog input ($V_{I1,G}$) is zener-diode protected. The user can choose between slow or fast motor acceleration/deceleration modes by short-circuiting or open-circuiting the pins labeled **J1M**. The slow mode, with rise-time/fall-time of 0.5s, is selected by short-circuit (**J1M** jumper installed); while the fast buildup mode, with rise-time/fall-time of 0.025s, is selected by leaving these pins open (no Jumper installed). All control lines (analog and digital) are sampled approximately at 700Hz rate in the fast mode, and at 20Hz rate in the slow mode. An onboard LED (red) is used to monitor the load-voltage. A small (2.3"x2.4"x0.45") finned integrated heat sink is included with mounting hardware (as shown on the photograph) to operate at 20A or 1000W power levels. Higher power-levels (50V, 30A or 1500W) 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 requires a single 9V to 50V DC power source (unregulated) at a 0A to 20A current range to operate normally. Typical applications are: DC Motor-Speed Controller, Light-Dimmer with variable delay, Power Amplifier, SPST Solid State Relay, etc. This board can be configured and programmed to perform efficiently in many customized applications.



Specification and Application for **Si5HyUdMC1-50V-20A**

- **Typical Operating Temperature at 20A:** 45°C with the Metal Heat-Ring Bolted to a small (2.3"x2.4"x0.45") finned Aluminum Heat-Sink, while exposed to air at 25°C (as shown on photograph).
- **Source-Voltage Requirement (V_P from pin +P to pin -P):** Any DC voltage from 9V to 50V, unregulated DC.
- **Average Load-Voltage:** Linearly variable from 0 to V_P in 0.83% steps, using $V_{I1,G}$ as control input.
- **Max. Continuous Average Load-Current:** 20A at 100% duty-cycle, with heat-sink (as shown).
- **Max. Load-Current for 5sec:** 40A at 100% duty-cycle, with heat-sink (as shown).
- **Load Isolation:** The Load or Motor must be isolated from the source voltage (V_P).
- **Power-Conversion Efficiency:** Approximately 97.5% at full-load (50V and 20A).
- **PWM Switching Frequency:** 5kHz when **CN4** short and 20kHz when **CN4** open.
- **PWM Duty-Cycle:** varies linearly from 0% to 100% in 0.833% steps, using $V_{I1,G}$ as control voltage (voltage at pin **I1** relative to pin **G** on connector **CN4**): where $V_{I1,G} = 0V$ yields 0%, and $V_{I1,G} = +5V$, yields 100%. This input is zener-diode protected. Note that the Duty-Cycle is defined as the ratio of

