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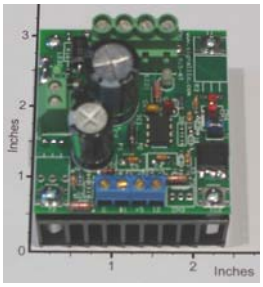
Si16HyPC2-S13kHz-30V-2x6A, Dual, Hybrid, 30V-2x6A DC Power Controller with Common Ground, Integrated Heat Sink and with Four User Selectable PWM, Y-Chip



The **Si16HyPC2-S13kHz-30V-2x6A** is a 30V, 2x6A, microprocessor based, Dual, Hybrid, Power Controller with common ground and with an integrated heat sink. **By common ground we mean that the negative load terminals (-L1, -L2) are internally connected to the negative terminal of the power source (-P) and can be tied to the chassis ground.** This board uses two independent pulse-width modulators (**PWM**) to efficiently control the power flow (or DC currents) in two inductive loads each in the 0 to 180W power range, and in 1.5W steps. An onboard microprocessor generates the **PWM** carrier signals, controls the load-power to each load and controls the load-current buildup and decay rates. The **PWM** carrier frequency is user selectable by the jumperJ1 and J2 as shown below. The high frequency **PWM** rate provides a smooth DC current control to each load and insures a quiet load environment. As the name hybrid (**Hy**) implies, the desired load currents (or PWM pulse-durations) are set by two variable (0 to +5V) analog input-voltages $\mathbf{V_{I1,G}}$ and $\mathbf{V_{I2,G}}$ each providing control from 0 to 100% in 0.83% steps; while the other control-signals are digital. These analog inputs ($\mathbf{V_{I1,G}}$ and $\mathbf{V_{I2,G}}$) are zener-diode protected. The user can choose between both slow or both fast load-current buildup/decay modes by short-circuiting or open-circuiting the pins labeled **CN3**. The slow mode, with rise-time/fall-time of 0.5s, is selected when **CN3** jumper is installed (**CN3** is short); while the fast mode, with rise-time/fall-time of 0.025s, is selected by leaving **CN3** open (no Jumper installed). Two onboard LEDs (red for channel 1, green for channel 2) are used to monitor the load-voltages. Snubbing circuits and filter capacitors are included to suppress inductive switching transients. A small (2.3"x2.4"x0.95") finned integrated heat sink is included with mounting hardware (as shown on the photograph) to operate at 2x6A or 360W power levels. Higher power-levels (30V, 2x10A or 600W) can be achieved with more efficient heat-sinks. This board requires a single 9V to 30V DC power source (unregulated and unfiltered) at a 0A to 12A current range to operate normally. Typical applications are: Dual Power Controller, Dual Light-Dimmer with variable delay, Dual Power Amplifier, Dual SPST Solid State Relay, etc.

PWM Carrier-Frequency Selection Table of the Si16HyPC2-S13kHz-30V-2x6A

J1	J2	PWM Freq	Max. Load Current
Open or High	Open or High	13.5kHz	2x5A
Open or High	Short or Low	11.5kHz	2x7A
Short or Low	Open or High	6.75kHz	2x9A
Short or Low	Short or Low	5.75kHz	2x12A

Specification and Application for Si16HyPC2-S13kHz-30V-2x6A

- **Typical Operating Temperature at 2x6A:** 45^0C with the Metal Heat-Ring Bolted to a small (2.3"x2.4"x0.95") finned Aluminum Heat-Sink, while it is exposed to ambient air at 25^0C (as shown on photograph).
- **Max. Continuous Average Load-Current:** is PWM-frequency dependent (as shown in the table above), with heat-sink.

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- **Max. Load-Current for 5sec:** 20A for each load at 100% duty-cycle, with heat-sink (as shown).
- **One common source voltage V_P (from pin +P to pin -P) for the two loads:** V_P can have any value between 9V to 30V (unregulated DC).
- **Load Connection: The negative load terminals and the negative power terminal (-L1, -L2 and –P) are internally interconnected and can be tied to the Chassis Ground.**
- **Power-Conversion Efficiency:** Approximately 97% at full-load (30V and 6A).
- **Analog Control Inputs, I1, I2:** These independent analog inputs $V_{I1,G}$ and $V_{I2,G}$ (voltage at pin **I1** or **I2** relative to pin **G** on connector **CN5)** vary the duty-cycle of each DC current (or load-current) from 0% to 100% in 0.83% steps. Each duty-cycle vary linearly with $V_{I1,G}$ or $V_{I2,G}$; where $V_{In,G}$ = 0V yields 0%, and $V_{In,G}$ = 5V yields 100% duty-cycle. These inputs are zener-diode protected.
- **Load-Current Buildup/Decay Time:** The user can choose between both slow or both fast load-current buildup and decay modes by short-circuiting or open-circuiting the pins labeled **CN3**. The slow mode, with rise-time/fall-time of 0.5s, is selected by short-circuit (**CN3** 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).
- **Load-Voltage Indicators:** Two onboard LEDs (red for channel 1, green for channel 2) are used to monitor each load voltage.
- **About the Voltage Requirement:** The Si16 will work with any load or DC motor in the 9 V to 30 V voltage range.

A Typical Application of the Si16HyPC2-S13kHz-30V-2x6A

In this application, two DC load-currents (or PWM pulse-durations) are independently and linearly adjusted by the analog inputs $V_{I1,G}$ and $V_{I2,G}$ (via, two 5KOhm Linear tapered pots **SiPot2-2x5K**); efficiently controlling the power to each load (or DC motor) in the 0 to 180W range in 1.5W steps. The DC Motor can be purchased from Bodine, **www.bodine-electric.com** ; or from other vendors, **http://www.e-motorsonline.com/emotors/dcmproduct_list.php**. An inexpensive, unregulated DC power supply is shown below. A wide variety of linear and switching power supplies can also be used with this board. Consult the most recent catalog on www.mpja.com to purchase these power supplies.

Warning: The connecting wires to the Motor and the Power Supply must be heavy gauge copper wire (#12 AWG or heavier) to handle the rated current level. In addition, these heavy gauge wires act as a heat sink, protecting the board from overheating.