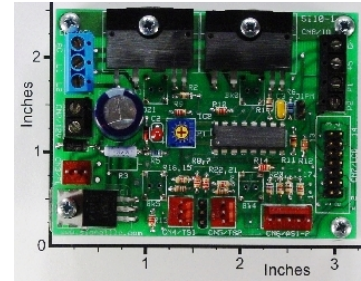


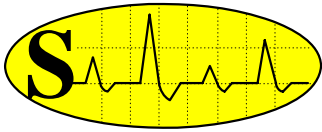
## **Si82Di2ZPTC** Digital Two-Zone Proportional Temperature Controller with one LCD Port, Two AC 120/240V-5A Solid-State Relays, and 4-Keys

The **Si82Di2ZPTC-120/240Vac-5A** is a versatile, closed-loop, microprocessor based, Digital, Two-Zone, Proportional Temperature Controller board that can control two independent thermal-zones. By proportional control, we mean that the amount of correction used in the closed-loop is proportional to the difference between the set and measured temperature values. Five PWM duty-cycle values are used depending on the absolute-value of the difference between the set and measured temperature values ( $|T_d|$ ). The duty-cycle is 0% when  $|T_d|=0^{\circ}\text{C}$ ; 25% when  $0^{\circ}\text{C} < |T_d| < 0.5^{\circ}\text{C}$ ; 50% when  $0.5^{\circ}\text{C} < |T_d| < 1^{\circ}\text{C}$ ; 75% when  $1^{\circ}\text{C} < |T_d| < 1.5^{\circ}\text{C}$ ; 100% when  $|T_d| > 1.5^{\circ}\text{C}$ . Two 120/240Vac, 5A solid-state relays (one for each zone) are used to control the currents in resistive heaters (600W in each zone). A single AC or DC voltage source (9V to 20V range, unregulated and unfiltered) is required for the control electronics. The onboard microprocessor measures and controls the temperatures, and monitors the user inputs. Two small 9-bit digital thermometers (by Dallas Semi., DS18S20 sensor, connected to ports **CN4TS1** and **CN5TS2**) are used to measure temperatures in the  $+5^{\circ}\text{C}$  to  $+102^{\circ}\text{C}$  range, with  $\frac{1}{2}^{\circ}\text{C}$  accuracy. Because each sensor is digital, it is virtually immune to noise and loading; ideally suited for remote sensing. As the name Digital (**Di**) implies the desired set-temperatures are derived from board-mounted push-button type **Up** or **Down** keys while the other control signals are also digital. An LCD port (with HITACHI HD44780 Interface Standard) is provided for optional display of Set and Measured Temperatures data in 2 line x 20 character format. Two red LEDs are used to monitor the Heater currents. A small Aluminum plate (3.3"x4.0"x0.065") is required to operate at 2x600W power level. Typical applications are: Dual Water-Baths, 2-Zone Heat-Pumps, etc. This board can be configured and programmed to perform efficiently in many customized applications.



### Specification and Application for **Si82Di2ZPTC-120/240Vac-5A** Board

- **Efficient Two-Zone Proportional Temperature Controller in the range of  $+5^{\circ}\text{C}$  to  $+102^{\circ}\text{C}$  with  $1/2^{\circ}\text{C}$  Steps**
- **Two 120/240V, 5A AC Solid-State Relays for Heaters**
- **Two LEDs as Heater-On Indicators (one for each zone)**
- **Two Digital Thermometer with  $1/2^{\circ}\text{C}$  Accuracy**
- **Two Sets of Onboard Up and Down Set-Temperature Keys**
- **An LCD port (with HITACHI HD44780 Interface Standard) for Set and Measured Temperature Display.**
- **A single (9V to 20V) AC or DC Voltage (unregulated and Unfiltered) for Board-Control Power**



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- **Operating Temperature:** 45°C with the Metal Heat-Ring Bolted to a small Aluminum plate (3.3"x4.0"x0.065") acting as Heat-Sink, while the plate is exposed to air at 25°C (as shown on photograph)

## A Typical Application of the **Si82Di2ZPTC-120/240Vac-5A**

In this closed-loop proportional temperature control application, the Set-Temperature (in the, +5°C to +102°C Range with 1/2°C steps) is adjusted (for each zone) by the board-mounted **Up** and **Down** keys. The resistive Heaters are operating with 120Vac at 5A max. A small transformer with 12Vac output provides the control-power to this board. The temperature in each zone is measured with the Dallas Semi. [www.dalsemi.com](http://www.dalsemi.com) (DS18S20 in TO-92 casing) Digital Thermometer. This sensor can be purchased from Signal Consulting, LLC as [Si18DTsens](#) (sensor with 12" leads and connector) or you can wire-up your own sensor using parts from [www.digikey.com](http://www.digikey.com). The LCD module can be purchased from Signal as [Si24LCD2L20CH](#), or from several vendors; for OEM pricing, contact: Sunlike Display Tech Corp. in Taiwan, [www.lcd-modules.com.tw](http://www.lcd-modules.com.tw).

