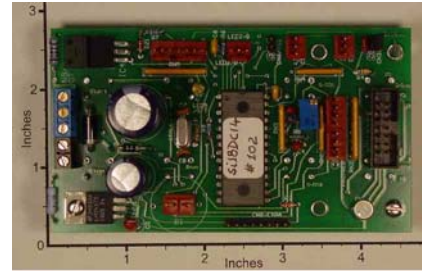


Si18DiUdMTC1-50V-20A, Digital, Unidirectional Motor Controller and Proportional Temperature Controller with LCD Port and with 20kHz PWM L-Chip

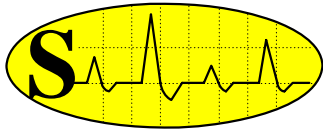
Si18DiUdMTC1-50V-20A Features:

- Fully-Programmed, Proportional (PWM) Controller
- Controlling Temperature and DC Motor Speed Simultaneously in Open or Closed-Loop Modes
- Eight Board-Mounted Push-Buttons or a Key-Pad
- 2-line by 20-character long LCD Output for Display
- Alarm-Sensor Inputs and LED Outputs are Provided
- The Controller is Immune to Power Interruptions
- Proportional Temperature Control in $1/2^{\circ}\text{C}$ Steps, -25°C to $+102^{\circ}\text{C}$ Range
- A Factory Calibrated, 9-Bit Digital Temperature Sensor is Immune to Noise
- Smooth and Silent (20KHz PWM) Unidirectional or Bi-directional Speed Control for a Wide-Range of DC Motors (12V to 50V and 0 to 20A at unregulated power)
- Open or Closed-Loop Speed Control and Display in 1 RPM Steps (in -250 RPM to +250 RPM Scale) or in 10 RPM Steps (in -2500 RPM to +2500 RPM Scale)
- A Precise Digital Clock is used to measure/display the elapsed-time (in C-Run mode) or the preset-time (in T-Run mode) of the DC Motor
- Slow Start/Stop Control Features Assure Long Motor Life



Si18DiUdMTC1-50V-20A Description:

The **Si18DiUdMTC1-50V** is a versatile, fully-programmed, microprocessor-based, proportional, Digital, Unidirectional, Motor and Temperature Controller board; capable of controlling two processes (temperature and DC motor-speed) simultaneously in a closed-loop or open-loop control mode. 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 values. A precise digital clock is used to measure/display the elapsed-time (in C-Run mode) or the preset-time (in T-Run mode) of the DC Motor. This controller is immune to power interruptions. Set-values and system modes are saved in non-volatile memory as the AC power is interrupted and the system returns to the same working state when the AC power is restored. The **Si18DiUdMTC1-50V** can be configured by the user to control a single process (Temperature only or RPM only) or to control two processes simultaneously. In addition, control-modes (open or closed-loop; unidirectional or bi-directional speed), control-limits and correction-biases can be defined in the configuration phase. Eight board-mounted push-buttons (Start, Stop, Up, Down, S-Temp, S-RPM, C-Run, T-Run) or an optional external key-pad (connected to CN2/ExK port) can be used for control inputs. The board is front-panel mountable with protruding push-buttons or can be used as an embedded controller with the external Key-Pad. The set-temperature and motor-speed are adjusted with the Up and Dow keys, while the motor run-time is controlled by the C-Run, T-Run, Start and Stop keys. An optional 2-line by 20-character long LCD Module (with Hitachi HD44780 Interface, connected to CN1/LCD port) is used to display: Set-



Signal Consulting, LLC

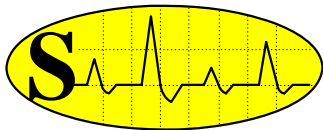
16 Wilelinor Drive, Edgewater, MD 21037-1003 USA

Phone: 410-224-8429, Fax: 410-510-1821, E-mail: info@signalllc.com

Temperature, Set-RPM, Set-Time, Run-Time, Measured-Temperature, Measured-RPM, Status and Alarm information. The motor can run Continuous-Run mode (using C-Run, Start and Stop keys) or in a Timed-Run mode (using T-Run and Start keys). The motor Set-Speed and Set-Temperature values can be adjustable (while the motor is running) from 0 to 100% in 0.66% steps, using the S-Temp, S-RPM, Up and Down keys. Pulse-width modulation, at 20KHz rate is used to achieve a smooth and noise-free DC motor-speed control in closed-loop or open-loop mode and in 9V to 50V; 0 to 20A range. All power electronics and filter components (IC2, C1) are included on the board to provide unidirectional speed control. Bi-directional speed control (with an external power-bridge, [Si20HPB4-50V](#)) and unidirectional speed control are supported by an optical-wheel/RPM-sensor (2"-OD, 45-holes, in closed-loop mode), and by a board-mounted 25T RPM calibration Pot (P2) in open-loop mode. Slow-start, slow-stop control features assure long motor life and prevent power overloads. TTL level (0 to +5V) Pulse-Width-Modulated outputs (PWM @20KHz) are provided (pins1,6 for +RPM; pins1,7 for -RPM on port CN7/HCR) to support bi-directional motor-speed control. Similarly, pulse-width modulation (PWM) at 1Hz rate is used to achieve closed-loop, proportional-temperature control. Several KW of heating and cooling power can be controlled in this manner. A small-size, 9-bit, digital-thermometer sensor, is used to measure and control the temperature with $\frac{1}{2}^{\circ}$ C accuracy in the -25° C to $+102^{\circ}$ C range. The sensor is manufactured by Dallas Semi. www.dalsemi.com with part number DS18S20 and it is connected to CN4/TS1 port. Because this sensor outputs zeros and ones, it is virtually immune to noise and loading; ideally suited for remote sensing. In addition, this sensor is calibrated by Dallas Semi., guaranteeing $\pm \frac{1}{2}^{\circ}$ C, accuracy. Heat and cool TTL level (0 to +5V) relay outputs are provided (Heat on pins 3, 2; Cool on pins 1, 2; at port CN7/HCR) to drive two solid-state relays, or the [Si20HPB4-50V](#) (High Power H-Bridge) board. In addition, heat and cold TTL level LED outputs are provided (Heat on pins 5, 4; Cold on pins 2,3; at port LED2/R-G) to drive indicator lights. A low-power, variable-resistance-type alarm-sensor (connected to CN3/LWS port) is used to enable/disable the heating or cooling action. Sensor resistance less than 250K Ω will enable (while greater than 250K Ω will disable) the heating or cooling action.

A Typical Si18DiUdMTC1-50V-20A Application:

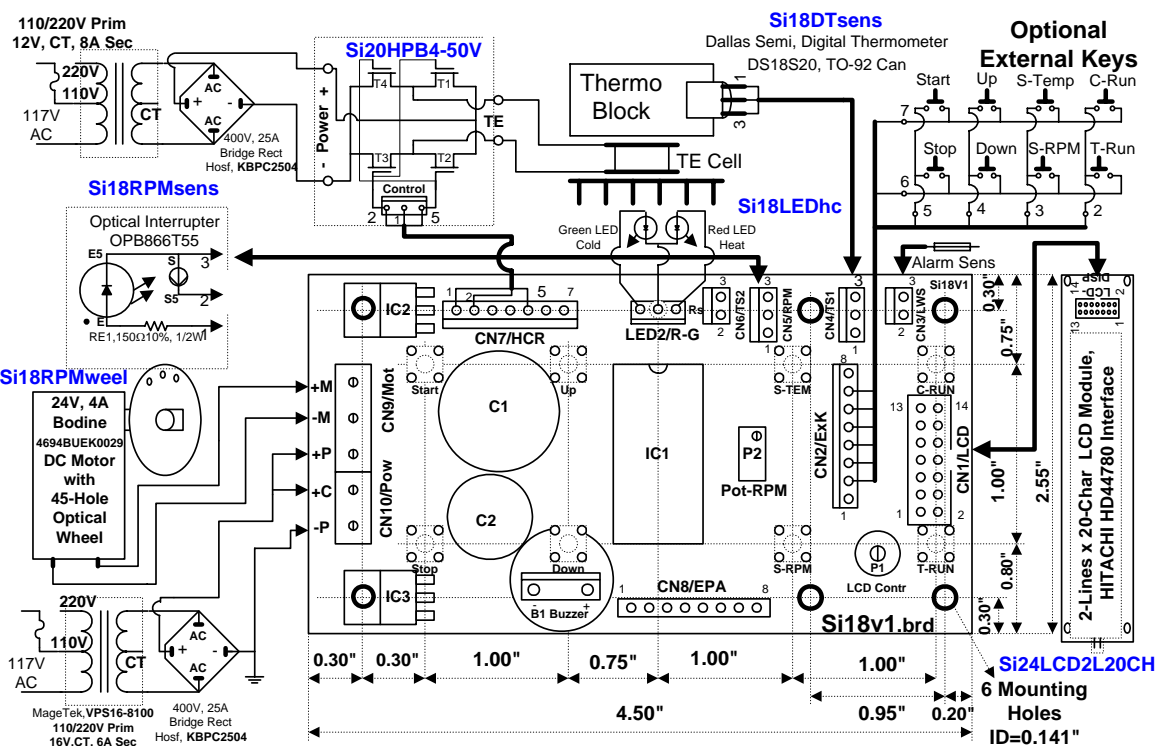
The [Si18DiUdMTC1-50V](#) can be used in many applications including: Shaking Platforms, Heated/Cooled Shaking Platforms, Heated Waterbaths, Shaking Waterbaths, etc. A typical digital application, depicting a shaking, thermo-electric (TE) platform (heated or cooled) is shown below. The TE cells are powered by the [Si20HPB4-50V](#) (High Power H-Bridge Board) and the platform temperature is controlled with $\frac{1}{2}^{\circ}$ C accuracy in the -25° C to $+102^{\circ}$ C range. Temperature is measured with the [Si18DTsens](#) 9-bit, digital-thermometer sensor, while the [Si18LEDhc](#) accessory indicates that the heater or cooler is turned on. This circuit uses a 24V, 4A, brush-type DC Motor, and the accessories [Si18RPMsens](#) and [Si18RPMwheel](#), provides the optical feedback, achieving 2% speed regulation. The motor Set-Speed and Set-Temperature values are adjustable from 0 to 100% in 0.66% steps, using the S-Temp, S-RPM, Up and Down keys. Eight board-mounted push-buttons (Start, Stop, Up, Down, S-Temp, S-RPM, C-Run, T-Run) or an optional external key-pad (connected to CN2/ExK port) are used for control inputs. A 2 line by 20 characters long LCD (with HITACHI HD44780 Interface Standard) is used for Set-Temperature, Measured-Temperature, Set-RPM and Measured-RPM data display. The LCD with back-light (with 8" cable, and with two 14-pin connectors) can be ordered from Signal with part number of [Si24LCD2L20CH](#) ; OEM pricing is available from Sunlike Display Tech Corp. in Taiwan, www.lcd-modules.com.tw. The TE Cells can be purchased from Melcor Corp. Trenton, NJ 08648 USA, www.melcor.com. The DC Motor can be purchased from Bodine, www.bodine-electric.com ; or from other vendors, www.e-motorsonline.com/emotors/dcmproduct_list.php.



Signal Consulting, LLC

16 Wilelinor Drive, Edgewater, MD 21037-1003 USA

Phone: 410-224-8429, Fax: 410-510-1821, E-mail: info@signalllc.com



Si18-Application Notes and Drawings:

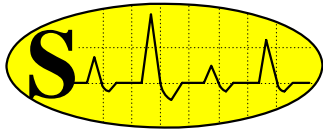
The Si18 Controller board can be used in numerous applications. Some of these are given in the application notes listed below.

- [Si18DC-BDSh-NTCL12V-AppNote](#)
- [Si18DC-HCSh-TEcCL12V-AppNote](#)
- [Si18DC-HCTEHP-TEc12V-AppNote](#)
- [Si18DC-HSh-RHCL12V-AppNote](#)
- [Si18DC-Sh-NTCL12V-AppNote](#)
- [Si18DC-Sh-NTOL12V-AppNote](#)
- [Si18DC-ShWB-RHCL24V-AppNote](#)
- [Si18DC-WBMS-RHOL12V-AppNote](#)

Please click on the blue titles to link to these application notes and drawings:

[Si18DiUdMTC1-50V-AppNotes.](#)

Si18-Accessories:



Signal Consulting, LLC

16 Wilelinor Drive, Edgewater, MD 21037-1003 USA

Phone: 410-224-8429, Fax: 410-510-1821, E-mail: info@signalllc.com

Several accessories can be used with the **Si18** controller board depending on the required control mode.

To achieve closed-loop motor speed control mode (RPM control only), choose the following accessories:

- [Si18RPMsens](#)
- [Si18RPMwheel](#)

To achieve closed-loop proportional temperature control mode (temperature control only), choose the following accessories:

- [Si18DTsens](#)
- [Si18LEDhc](#)

To achieve simultaneously closed-loop motor speed control and closed-loop proportional temperature control mode, choose the following accessories:

- [Si18RPMsens](#)
- [Si18RPMwheel](#)
- [Si18DTsens](#)
- [Si18LEDhc](#)

To achieve simultaneously open-loop motor speed control and closed-loop proportional temperature control mode, choose the following accessories:

- [Si18DTsens](#)
- [Si18LEDhc](#)