PC SERIAL TEMPERATURE DATA LOGGER (Order Code 3145)

This is an 8-pin microcontroller based circuit for temperature data logging via the serial port of any computer from between 1 and 4 remote digital temperature sensors, DS18S20 made by Dallas. The DS18S20 replaced the DS1820 during late 2000. Both data sheets are on our website at:

http://www.quasarelectronics.com/ds.htm

Features.

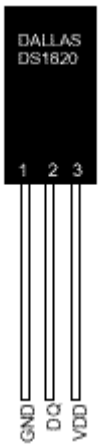
- provides realtime data via the serial port
- interfaces up to 4 x DS18S20 sensors
- accuracy to 0.5 degrees centigrade
- fahrenheit scale selected by a jumper
- no external power required
- data stream easily logged & processed
- over 200m distance for each sensor

We have only provided one DS18S20 in this kit due to the cost of this component. This allows you to test the kit. Then if it is what you want you may buy the 3 additional sensors either direct from us (£3.95 each plus standard postage).

We also have not provide cables to connect between the board and each remote sensor. Any 2 core screened cable is suitable. The board has four 3-pin screw terminal blocks. We have not tested the maximum distance which the sensors can be located from the PCB but believe it be much more than 200 metres.

Assembly.

First check the components supplied against the Component Listing. Follow the overlay on the PCB to assemble the kit. If you want to measure degrees Fahrenheit then add the Link 'F' to the board where shown. The default measurement is in degrees Centigrade, or you can add the Link at the 'C' position. The pinout of the DS18S20 is shown here. You can easily determine how to connect the sensor to the 3-wire harness by looking at the back of the PCB to see which is the ground connection. The pin-out is shown looking down on the component. The board requires no external power supply as it takes power directly from the serial port of the computer. The board has four M3 fixing holes.



Reading Data. There are several ways to read the temperature data. You have to use a terminal program set to 2400 baud, 8 bits, no parity, 1 or 2 stop bits. The easiest way is to download **term.exe** from our website, run 'term 2400' and maybe hit the Esc key to get things started. You will see the data stream on your monitor. Use Alt-L to log the data. This log file may be dumped into an Excel spreadsheet for further processing.

A number of software programs are available for this board which you may also download from our website address below. Some also provide the C sourcecode. You may also wish to write your own program in BASIC using the INPUT command to capture the data as it comes in.

If you do write a good program for this board and wish to share it please send to us and we will put on our website for others to use.

Distance. We believe the sensors may be located more than 200 metres from the PCB. Just check that the remote VDD is above 4.4Volts.You may find it necessary to have 10uF tantalum capacitors placed across the power supply pins of the sensor (not supplied) to minimise random errors and possibly get increased range.

If power supply from your serial port is a problem you could use a lower current drawing 5 voltage regulator.

For more information about the technical details go to our detailed data webpage on the 3145 at

www.quasarelectronics.com/3145data.htm

COMPONENT LISTING		
2K2 resistor 5%	R1 R2 R3 R4	4
100uF mini	C1	1
Mono 104	C2	1
1N4004	D1	1
10uF mini	C3	1
78L05	IC1	1
Programmed 12C509 /P04	IC2	1
8 pin IC socket		1
DS1820 or DS18S20		1
DB9 Right angle Female connector		1
3.5mm 3-pin screw terminal blocks (DS1-DS4)		4
3145 PCB		1

As mentioned, only one DS18S20 sensor has been supplied in this kit. The kit has room for 4 sensors. You may purchase additional sensors from us at £3.95 each plus our normal postage charge. **Call Sales on 01279 467799**

See our website at:

http://www.quasarelectronics.com/3145.htm

Email us at:

support@quasarelectronics.com

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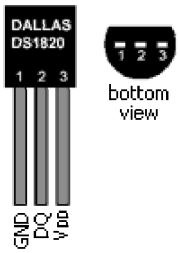
QUASAR PROJECT KIT # 3145v2.3 - TEMPERATURE DATA LOGGER

CONNECTING SENSORS



The diagram at left shows the pinout of the DS1820 sensor. The sensor pins connect to the kit's screw terminals as follows:

Sensor Pinout	
1	GND
2	DQ
3	VDD

CABLE LENGTHS

Cables have inherent capacitance between conductors which tend to degrade digital signals. The longer the length of cable the greater the capacitance and the more the signal is degraded.

Some types of cable have lower capacitance than others. It **is recommended to use CAT5 cable** when connecting sensors over long cable lengths. Flat telephone type cable is not quite as good as CAT5 but is better than twin-shielded audio cable.

For cable lengths up to 7.5 metres (25 feet), sensors can be simply connected at the end of the cable, as described. However for longer cables we need to add an extra resistor and capacitor **at the sensor end of the cabl**e.

The resistor provides a 'harder' pullup which helps overcome the cable capacitance and 'squares up' the digital signal enough to allow the sensor to operate. The capacitor provides power supply filtering and removes voltage fluctuations as the sensor outputs data.

These extra resistors and capacitors are provided in the parts list to be used for this purpose.

The 1K resistors are soldered across the DQ (pin 2) and VDD (pin 3) pins of the sensor. The 10uF tantalum capacitors are soldered across the VDD (pin 3) and GND (pin 1) pins of the sensor

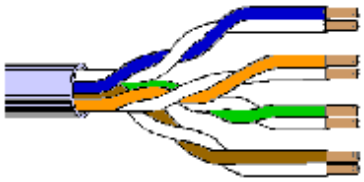
With the resistors and capacitors added the following cable lengths were used successfully:

Twin-shielded audio cable - 15 metres (~50 feet)
Flat telephone type cable - 75 metres (~245 feet)
CAT5 cable - 100 metres (~325 feet)

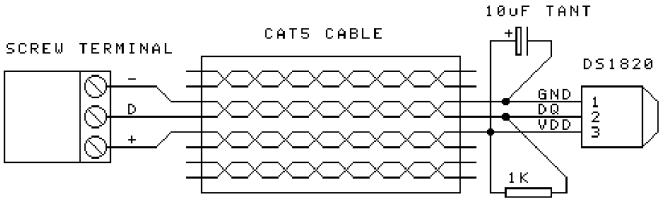
CABLE WIRING

NOTE:
All unused wires should be connected to ground (-) at the screw terminal end to prevent them acting like antennas and picking up noise.

CAT 5 CABLE



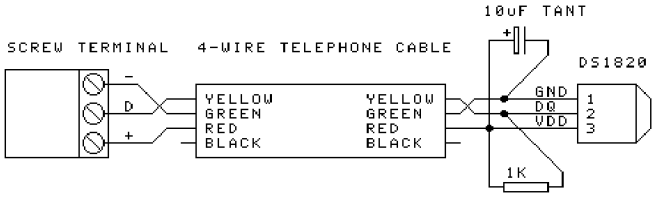
CAT5 cable has eight (8) wires consisting of four (4) twisted pairs. Only three (3) wires are used as per the following diagram:



4-WIRE TELEPHONE CABLE

As the name suggests this cable has only four (4) wires coloured black, red, green and yellow. Only three (3) wires are used as per the following diagram:

Note: The GND wire runs between the VDD and DQ wires. This reduces the potential of noise being induced into the data line from the power supply.



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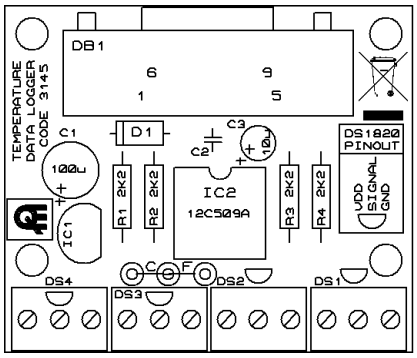
Board Layout Overview



DS18S20 pinout as view from above.

Schematic Diagram