

# lamaPLC: DS18B20 1-Wire Digital Thermometer

The DS18B20 digital thermometer offers 9-bit to 12-bit Celsius temperature readings and features an alarm function with nonvolatile, user-programmable upper and lower trigger points. It communicates via a [1-Wire](#) bus that requires only one data line (and ground) to connect with a central microprocessor. Additionally, the DS18B20 can draw power directly from the data line, known as "[parasite power](#)", eliminating the need for an external power supply.



Each DS18B20 has a unique 64-bit serial code, enabling multiple units to operate on the same 1-Wire bus. This makes it easy to control multiple DS18B20s from a single microcontroller over a large area.

This feature benefits applications such as HVAC environmental controls, temperature monitoring systems inside buildings, equipment or machinery, and process monitoring and control systems.

## Features

- Unique [1-Wire](#) interface requires only one port pin for communication.
- Multidrop capability simplifies distributed temperature sensing applications.
- It requires no external components and can be powered from a data line.
- The power supply range is **3.0V to 5.5V** DC.
- Zero standby power is required.
- It measures temperatures from **-55°C to +125°C**. The Fahrenheit equivalent is **-67°F to +257°F**.
- It offers  $\pm 0.5^{\circ}\text{C}$  accuracy from  $-10^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ .
- Thermometer resolution is programmable from 9 to 12 bits.
- Converts 12-bit temperature to a digital word in 750 ms (max.).
- User-definable, nonvolatile temperature alarm settings are available.
- The alarm search command identifies and addresses devices whose temperature is outside the programmed limits (temperature alarm condition).
- Applications include thermostatic controls, industrial systems, consumer products, thermometers, or any thermally sensitive system.

The BME/BMP sensors can be integrated with the [Tasmota](#) system. For more details, see here: <https://tasmota.github.io/docs/DS18x20/>


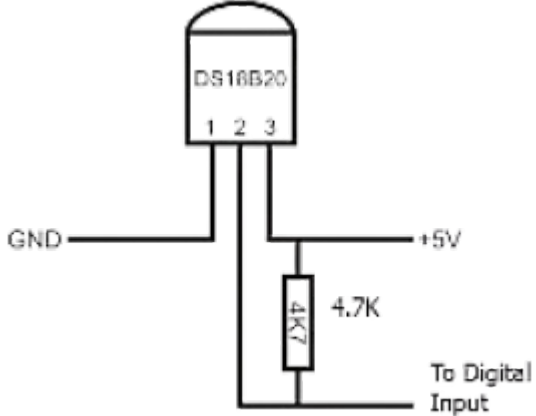


If you'd like to support the development of the site with the price of a coffee — or a few — [please do so here](#).

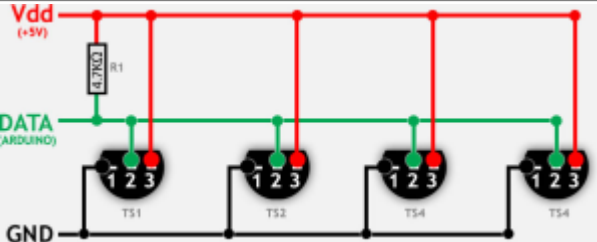
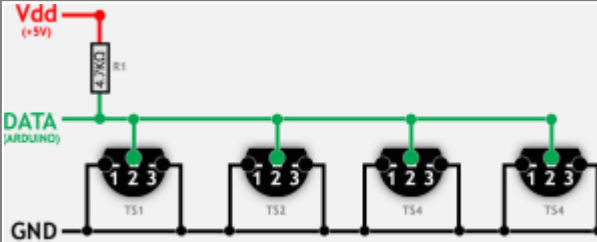
Here's a handy tip: you can quickly save this page as a PDF by clicking "[export to PDF](#)" in the menu on the right side of the screen.

2026/02/14 23:38

## Wiring

<p><b>Red wire:</b> Power supply (3.0V - 5.5V DC)</p> <p><b>Black wire:</b> GND</p> <p><b>Yellow wire:</b> Signal (1-wire bus)</p>		
--	---	--

## Parasitic/normal mode DS18B20 / 1-wire bus

Normal mode	Parasitic mode
	
<p>With an external supply, three wires are needed: the bus wire, ground, and power. The <b>4.7k pull-up resistor</b> remains necessary on the bus wire. Since the bus is available for data transfer, the microcontroller can continually check the device's status during conversion. This allows a conversion to complete as soon as the device reports it is done, without waiting for the conversion time (which depends on device function and resolution) in "parasite" power mode.</p>	<p>When operating in parasite power mode, it requires only two wires: one data wire and one ground wire. The power line must be connected to ground in this mode, as specified in the datasheet. A 4.7k pull-up resistor should be connected to the 1-wire bus at the controller. When the line is in a "high" state, the device pulls current to charge an internal component capacitor.</p>

## Addressing a 1-Wire device

Each 1-Wire device has a unique 64-bit 'ROM' address, which includes an 8-bit family code, a 48-bit serial number, and an 8-bit CRC. The CRC helps verify data integrity.

For example, the sample code below checks if the device being addressed is a DS18S20 temperature sensor by looking for its family code, 0x10. To use the sample code with the newer DS18B20 sensor, you would look for a family code of 0x28. For the DS1822, you would check for 0x22.

## Arduino

The DS18B20 is a popular 1-Wire digital temperature sensor known for its simplicity and the ability to

connect multiple sensors to a single Arduino pin.

## Wiring & Pull-up Resistor

The most critical component of the setup is the 4.7 kΩ pull-up resistor. Without it, the 1-Wire bus cannot return to a “high” state, and you will not get any readings.

- **VCC:** 3.3V or 5V
- **GND:** Ground
- **Data (DQ):** Any digital pin (e.g., Pin 2)
- **Resistor:** Place the 4.7kΩ resistor between VCC and Data.

## Required Libraries

To run the code below, install these two libraries via the Arduino Library Manager (Sketch > Include Library > Manage Libraries):

- **OneWire** by Paul Stoffregen
- **DallasTemperature** by Miles Burton

## Arduino Sketch

This script initializes the sensor and prints the temperature in both Celsius and Fahrenheit every second.

```
#include <OneWire.h>
#include <DallasTemperature.h>

// Data wire is plugged into port 2 on the Arduino
#define ONE_WIRE_BUS 2

// Setup a oneWire instance to communicate with any OneWire devices
OneWire oneWire(ONE_WIRE_BUS);

// Pass our oneWire reference to Dallas Temperature.
DallasTemperature sensors(&oneWire);

void setup(void) {
  Serial.begin(9600);
  Serial.println("DS18B20 Single Sensor Read");

  // Start up the library
  sensors.begin();
}

void loop(void) {
  // Send the command to get temperatures
  Serial.print("Requesting temperatures...");
  sensors.requestTemperatures();
  Serial.println("DONE");
}
```

```
// Use index 0 to refer to the first (and only) sensor on the wire
float tempC = sensors.getTempCByIndex(0);

// Check if reading was successful
if(tempC != DEVICE_DISCONNECTED_C) {
  Serial.print("Temperature: ");
  Serial.print(tempC);
  Serial.print("°C | ");
  Serial.print(DallasTemperature::toFahrenheit(tempC));
  Serial.println("°F");
} else {
  Serial.println("Error: Could not read temperature data");
}

delay(1000);
}
```

### 1-wire topics on lamaPLC

Page	Date	Tags
• <a href="#">lamaPLC Communication: 1-Wire</a>	2026/04/23 21:51	<a href="#">1-wire</a> , <a href="#">communication</a> , <a href="#">bus</a> , <a href="#">microlan</a> , <a href="#">i2c</a> , <a href="#">uart</a> , <a href="#">usart</a> , <a href="#">ds18b20</a>
• <a href="#">lamaPLC Communication: IEC 61850 basic</a>	2026/04/23 21:51	<a href="#">1-wire</a> , <a href="#">communication</a> , <a href="#">bus</a> , <a href="#">xml</a> , <a href="#">iec 61850</a> , <a href="#">iec</a> , <a href="#">ethernet</a> , <a href="#">scl</a> , <a href="#">goose</a> , <a href="#">ied</a>
• <a href="#">LamaPLC: DHT Temperature /Humidity sensors with 1-wire / I²C communication</a>	2026/04/23 21:52	<a href="#">dht11</a> , <a href="#">dht20</a> , <a href="#">dht22</a> , <a href="#">temperature</a> , <a href="#">humidity</a> , <a href="#">pressure</a> , <a href="#">sensor</a> , <a href="#">1-wire</a> , <a href="#">arduino</a> , <a href="#">code</a>
• <a href="#">lamaPLC: DS18B20 1-Wire Digital Thermometer</a>	2026/04/23 21:52	<a href="#">ds18b20</a> , <a href="#">sensor</a> , <a href="#">1-wire</a> , <a href="#">communication</a> , <a href="#">arduino</a> , <a href="#">thermometer</a> , <a href="#">parasitic mode</a>

[DS18B20](#), [sensor](#), [1-wire](#), [communication](#), [Arduino](#), [Thermometer](#), [Parasitic mode](#)

This page has been accessed for: Today: 2, Until now: 294

From: <https://www.lamaplc.com/> - **lamaPLC**

Permanent link: <https://www.lamaplc.com/doku.php?id=sensor:ds18b20>

Last update: **2026/04/21 20:47**

