



# **T-Sense™**

## **USER MANUAL**

**for all models of the T-Sense family of sensors**



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## **Introduction:**

The XX-Sense family of 1-wire™ sensors represents a major improvement in the price/performance of physical and electrical measurements. This new group of sensors will provide excellent physical and environmental durability, measurement accuracy and range far beyond its predecessor, the MultiSensor™ family.

## **T-Sense**

First, and primary in this group is the T-Sense™. The T-Sense™ uses the DS18B20 as the sensing element for temperature, and intended to be the temperature sensing element in all future developments of the T-Sense family. The advantage in using the DS18B20 is two fold; faster response to temperature variations and predictable accuracy. In addition to the increased electrical performance is its physical durability. The T-Sense is molded in our low pressure molding machine and has the advantages of being quite tolerant of ambient conditions, plus a very small (1 13/16”L x 11/16”W x 11/16”H) footprint.

The 1-Wire™ connections are made via RJ45 connectors on either end. The RJ45 connectors will accept RJ11 and 12 connectors as well as RJ45, thus allowing use of economical cat5 cable or simple phone wire. The RJ45 connectors *do not* provide Ethernet compatibility.

The T-Sense™, like all 1-Wire™ slaves, can operate on parasitic power from the serial port it is connected to. The number of slave devices that can be connected in a particular 1-Wire™ network will vary a great deal, depending on the power available on any particular serial port, the quality of the network interface used, the RFI levels, the quality of cable used, and the total length of the bus. If the “weight” of the bus (combined length and number of slaves) is too great for the power level of the serial port in use, a MS-PWR or LinkHUB can provide a good solution.

## **NOTE: Important information**

There is a *small* chance that the bus could become unstable when using T-Sense units as the only sensor on the bus. This condition comes about as a result of the new design of the T-Sense™, using the DS18B20 sensor. The third lead on the DS18B20, (Vdd) is left floating, (to allow design flexibility for sophisticated networks) which leaves the possibility of unpredictable performance. Our engineering department has not been able to create this condition. Experiments with > 30 T-Sensors on the bus, and a variety of interfaces, have shown all devices working properly.

In the unlikely event of unstable behavior on the bus, resolution can be accomplished by simply connecting pin 2 (+5 volts) to pin 6 (Aux). Alternately, any MS-xx product on the bus will provide the jumper internally, or the use of a LinkHub as the interface.

**NOTE TO LinkTH USERS: The above statement applies to LinkTH interfaces in all cases. The 1-Wire™ bus must have pins 2 and 6 jumpered together somewhere along the bus. Location of the jumper is of no matter, since the entire bus is a parallel circuit.**

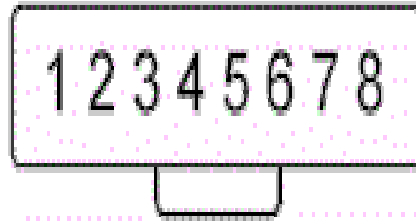
## **Specifications**

What is true for the DS18B20 is also true for the T-Sense™. For complete details on the DS18B20, use this link: <http://datasheets.maxim-ic.com/en/ds/DS18B20.pdf> .

As substantiation for the above statement refer to Appendix 1. Using our environmental test chamber, three T-Sense units were tested against a bare DS18B20. These four devices were monitored by our 0.01 degree C standard (Tweener). Other than a very small amount of lag time, all devices agree within the limits of published specifications for the DS18B20.

The temperature range of the T-Sense is equal to the range of the DS18B20. The temperature range of the connecting cables will likely be far less. Standard cat5 cable sheathing will begin to melt at temperatures >60 degrees C (140F). High temp cables are available by special order if needed.

The pin assignments listed below are viewed as looking into either jack on any XX-Sense product. As a point of reference, the latch is on the bottom side of the female jack.



- Pin 1 = +5 volt return (pass through)
- Pin 2 = +5 volts (Vdd)
- Pin 3 = Aux return (pass through)
- Pin 4 = 1-Wire® data
- Pin 5 = 1-Wire® return
- Pin 6 = Aux (pass through)
- Pin 7 = +12 volts (pass through)
- Pin 8 = +12 volts return (pass through)

# APPENDIX 1

## Chamber test 12/18/2007

