EI-1050 TEMPERATURE HUMIDITY PROBE

The EI-1050 is a selectable digital relative humidity and temperature probe intended for use with the LabJack U12. This unit combines a single chip sensor module with a selector chip and buffering components on a small PC board. The single chip sensor is manufactured by Sensirion and provides a 14 bit/12 bit (temperature/humidity) serial digital output for each reading. It is housed in a plastic tube (4.5 in by 0.625 in) with a 6 ft cable. The device includes two calibrated microsensors for relative humidity and temperature. Since the output is serial digital data, this results in superior signal quality, a fast response time and insensitivity to external disturbances (EMC). Each sensor is calibrated in a precision humidity chamber and the calibration coefficients are programmed into the OTP memory.
These coefficients are used internally during measurements to calibrate the signals from the sensors. The interface to the EI-1050 is a 5-wire connection consisting of 5 volt, ground, clock, data, and enable. By using the enable line multiple probes can be connected to the LabJack at once.

Specifications:

Relative Humidity Sensor (RH)

Range:	0 to 100 % RH
Accuracy:	±3.5 %
Response time:	=4 s
Reproducibility:	±0.1 % RH
Resolution:	0.03 % RH

Temperature Sensor

Range:	-40°C to 120°C
Accuracy:	0.5°C @ 25°C
	0.9°C from 0 to 40°C
Response time:	= 20 s
Reproducibility:	± 0.1 °C
Resolution:	0.01 °C

Operating temperature:	-40°C to 120°C

Electrical Data

Power consumption:	typ. 30µW(@ 5 V, 12-bit, measure every 2 sec), typ. 1µW(@ 2.4 V, 8-bit, measure every 2 min)

Supply voltage range:	2.4 to 5.5 V
Input current during measurement:	0.5 mA
Input current standby:	0.3 µA
Cable Interface (LabJack U12 Terminal):	
Power	Red (+5V)
Ground	Black (GND)
Data	Green (IO0)
Clock	White (IO1)
Enable	Brown (IO2,IO3,AOx,Dx, or +5V for always enable)

More detailed specifications can be found at Sensirion's web page:
http://www.sensirion.com/en/sensors/humidity/sensors_devices/sensorSHT11.htm

LabJack U12 Interface:

Multiple EI-1050 probes can be connected to a single LabJack U12 (www.labjack.com). When using multiple probes, the data and clock line from every probe connect the same LabJack terminals (IO0 and IO1). An individual connection is needed for the enable line on each probe. The enable line is pulled high inside the probe, so the probe is enabled when this line is disconnected (not recommended), connected to +5V, connected to an analog output set to 5.0 volts, connected to a digital input, or connected to a digital output set high. The probe is disabled when the enable line is connected to GND, connected to an analog output set to 0.0 volts, or connected to a digital output set low. This can be accomplished using IO2, IO3, AOx, or Dx, providing multiple enable line connections. The example programs provided by LabJack Corporation, toggle the digital lines between input and output-low to enable and disable the probe (analog outputs are toggled between 0.0 volts and 5.0 volts). When the probe is disabled, it is powered-up, but there is no communication.

There are two example applications available from LabJack Corporation to experiment with the EI-1050 probe(s): LJSHT.exe and LJSHTmulti.exe. LJSHT acquires temperature and humidity readings from 1 probe and displays the information on a chart. LJSHTmulti acquires readings from multiple probes and displays the current readings in a table.

LabJack U12 drivers V1.10 and later have 3 new functions for communicating with the EI-1050 (and SHT1X sensors in general):

- SHT1X: This is the only function most programmers will use, and retrieves a temperature and/or humidity reading.
- SHTComm: A general function that sends and receives up to 4 bytes to/from a SHT1X sensor. Allows access to advanced features of the sensors.
- SHTCRC: Used with SHTComm. Checks the validity of a returned CRC byte.

For more information on the drivers functions, see the “LabJack U12 User’s Guide”.

LabJack U12 firmware V1.10 (serial numbers 100012000 and higher, 03/2003) and later has new functions to perform the SHT1X communication at a hardware level, such that one call to the LabJack U12 will send/receive up to 4 bytes of data. When using such hardware communication, it takes about 230 ms to get a 14 bit temperature reading and about 75 ms to get a 12 bit humidity reading. The LabJack U12 is busy during this time and unavailable for other operations.

When the LabJack U12 drivers detect a firmware version earlier than V1.10, they revert to software communication mode, and it takes about 2 seconds to get a temperature or humidity reading. The LabJack U12 is busy during this time and unavailable for other operations. Firmware upgrade requires the replacement of a chip (which is socketed, not soldered). Contact LabJack Corporation for more information.