LM71 Evaluation Board User's Guide
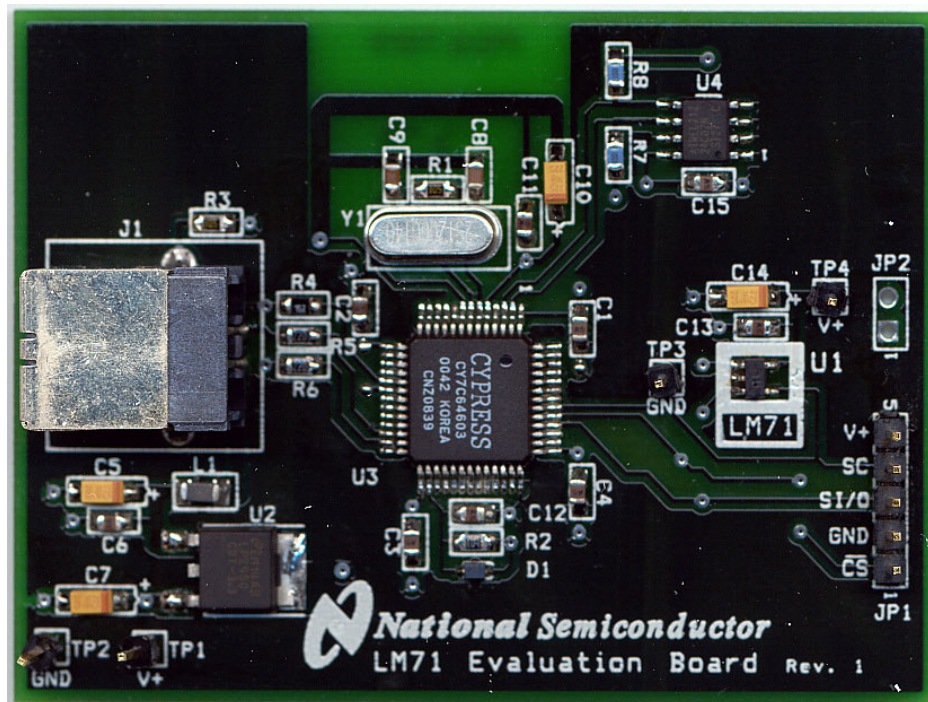
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1.0 Introduction

The LM71EVAL kit includes the following items:
1. The LM71 Evaluation Board
2. The SensorEval Software CD, including…
   a. A readme.txt file (read this first)
   b. An installation setup file
   c. The SensorEval Software manual
   d. This User's Guide
3. Introductory letter

The LM71 Evaluation Board is a complete printed circuit board assembly. The board features an LM71 Digital Temperature Sensor with 14-bit resolution in a small SOT-23 package. The LM71 is also available in a small, low-profile LLP package; see the LM71 datasheet at www.national.com for more information on these two packages. Other parts of the evaluation board circuit are a USB connector, a voltage regulator circuit, a microcontroller, and an EEPROM.

1.1 Operating Temperature

Though the LM71 can measure temperature over the wide temperature range of –40°C to 150°C, the microcontroller on evaluation board limits the operating temperature of the evaluation board to the range of 0°C to 70°C. If it is desired to operate the evaluation system over a wider range, the LM71 can be removed from the PCB and an LM71 signals can be cabled to the pins at JP1. The LM71 device under test (DUT) can then be placed in a –40°C to 150°C ambient temperature while the PCB remains removed from the test environment.
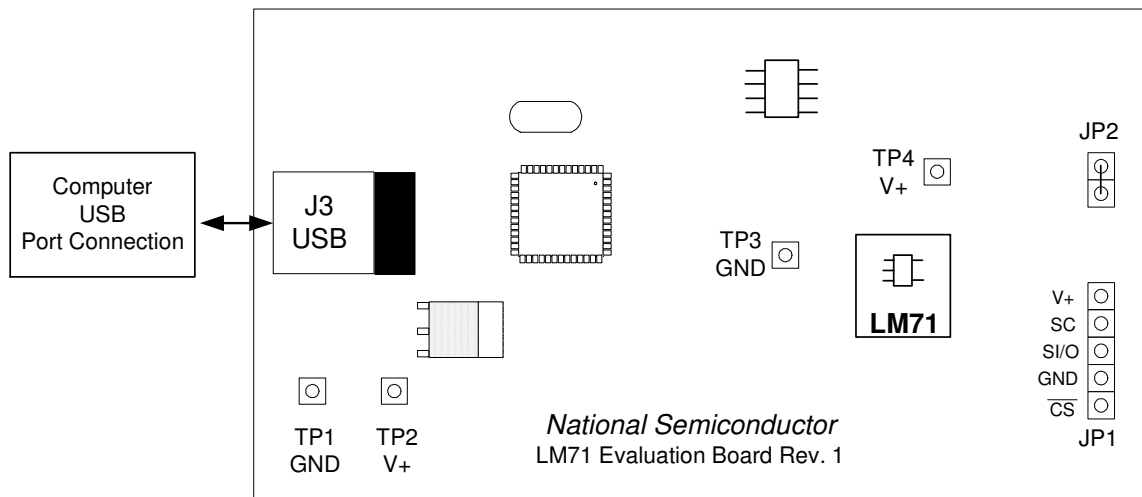

Figure 1: LM71 Evaluation Board Outline

1.2 Board Power

The LM73 evaluation board is completely powered by the USB bus. No external power source is required.
Jumper JP2 is normally shorted by a trace on the PCB. It provides regulated power to the on-board LM71.
This series jumper can be opened in order to, for example, place a current meter in series with the DUT.

1.3 SensorEval Evaluation Software

The SensorEval software is provided by National Semiconductor to communicate with the LM71 Evaluation
Board by way of the USB port and cable (not provided) from the controlling computer. The SensorEval
software is used to control the writing and reading of the digital registers in the LM71, enabling the user to
quickly read temperature from the LM71. SensorEval also features other useful functions, such as displaying
graphical temperature data and logging data to a file.

2.0 Getting Started

2.1 Required Equipment

In order to use the LM71 Evaluation Board you will need the following required pieces of equipment:

1. A computer with at least a Pentium III processor, running Microsoft® Windows® 98/2000/XP[1]
    operating system, with 20 MB of free disk space, and at least one USB port
2. A standard USB cable (3 foot length should be sufficient) for connecting the computer to the LM71
    Evaluation Board

2.2 Evaluation System Set-up

The installation procedure for the SensorEval software is documented in the readme.txt file on the SensorEval
software CD. For detailed use of the SensorEval software used with the LM71 Evaluation Board, please refer
to the SensorEval Software User's Guide on the same CD.

IMPORTANT

Load the SensorEval software onto the host computer **before** connecting the evaluation
board to the computer's USB port. If the board is connected first (before loading the
software) the operating system will not recognize the evaluation board and will add an
erroneous device to its device manager list. If this happens, follow the directions in the
SensorEval *Readme.txt* file to correct the situation.

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[1] Microsoft®, Windows®, and XP® are registered trademarks of Microsoft Corporation.
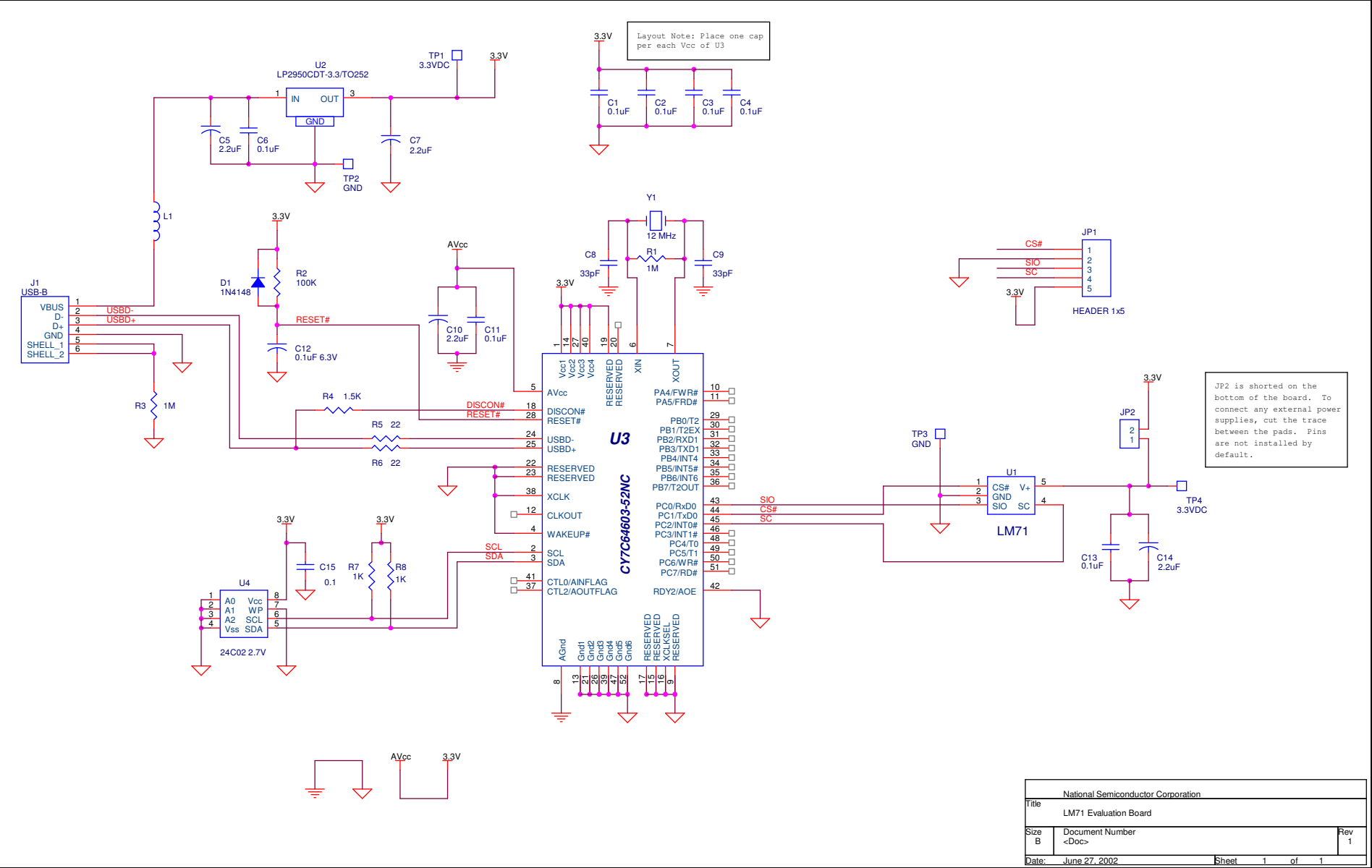
3.0 Connections and Test Points

The connections and test points of the LM71 evaluation board are shown in Figure 1 and their functions are described in Table 1.

Symbol	Description
JP1	Each pin on this header is directly connected to a pin on the LM71. It is useful a contact point for probing the I/O, power, and ground signals on the LM71.
JP2	Series jumper for the LM71 power source. Connects the output of the voltage regulator to the V+ pin of the LM71. *This jumper is shorted on the bottom of the PC board.* The bottom shorting trace can be cut in order to, for example, connect an external power source to the LM71.
TP1	Ground test point near the voltage regulator
TP2	Supply voltage test point near the voltage regulator output
TP3	Ground test point near the LM71
TP4	Supply voltage test point near LM71 V+ pin.

Table 1: LM71 Evaluation Board Connections and Test Points

4.0 Schematic of the LM71 Evaluation Board

5.0 LM71 Evaluation Board Bill of Materials

Item	Quantity	Reference	Part
	1	PCB	Circuit Board, LM71 Evaluation Board, Rev. 1
	1	U1	National Semiconductor LM71 Digital Temperature Sensor
	1	U2	National Semiconductor Voltage Regulator, LP2950CDT-3.3/TO252
	1	U3	Cypress Semiconductor EZ-USB Microcontroller, CY7C64603-52NC
	1	U4	EEPROM, 24C02 2.7V
	1	Y1	Crystal, 12 MHz
	7	C1,C2,C3,C4,C6,C11,C13	0.1uF
	4	C5,C7,C10,C14	2.2uF
	2	C8,C9	33pF
	1	C12	0.1uF 6.3V
	1	C15	0.1
	1	D1	N4148
	1	JP1	HEADER 1x5
	1	JP2	EEPROM CONNECT
	1	J1	USB-B
	1	L1	1uH
	2	R3,R1	1M
	1	R2	100K
	1	R4	1.5K
	2	R5,R6	22
	2	R8,R7	1K
	2	TP4,TP1	3.3VDC
	2	TP3,TP2	GND

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