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TC74 Serial Temperature Sensor Demo Board User's Guide

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Table of Contents

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Chapter 1. General Information

1.1 INTRODUCTION

Thank you for purchasing the TC74 Serial Temperature Sensor Demo Board from Microchip Technology Inc. The TC74 Demo Board is an evaluation and demonstration board specifically designed to support Microchip's TC74, a 2-wire serial temperature sensor. Communication with the TC74 is accomplished with a PC running the communication software.

The evaluation board and software for the TC74 have been designed specifically for use with a PC running Windows® 95 and an available parallel port.

The TC74 Demo Board has the following features:

1. A TC74A5-5.0VCT device.
2. Parallel port for power and communication.
3. 3/4" x 2 1/2" circuit board allows "real-world" evaluation and design.
4. Footprint for temperature-to-voltage IC.
5. Printer port connector (female).
6. Unpopulated holes for pull-up resistors.
7. Unpopulated holes for thermistor (comparative evaluation).

1.2 THE TC74 DEMO BOARD

The TC74 Demo (Figure 1-1) is built on a 3/4 inch by 2 1/2 inch PC board featuring easy setup for bench top evaluation and testing. The board is powered directly from the PC printer port.

The TC74 Demo Kit comes with the following:

1. TC74 Demo Board
2. TC74A5-5.0VCT (sample on PCB)
3. TC74 Serial Temperature Sensor Demo Board User's Guide (DS51303)
4. TC74 Data Sheet (DS21462)
5. TC74 Communication Software

The following must be provided by the user to implement a TC74 system.

1. Centronics Port Printer Cable.

If any item is damaged or missing, please contact your nearest Microchip sales office listed on the back of this publication.

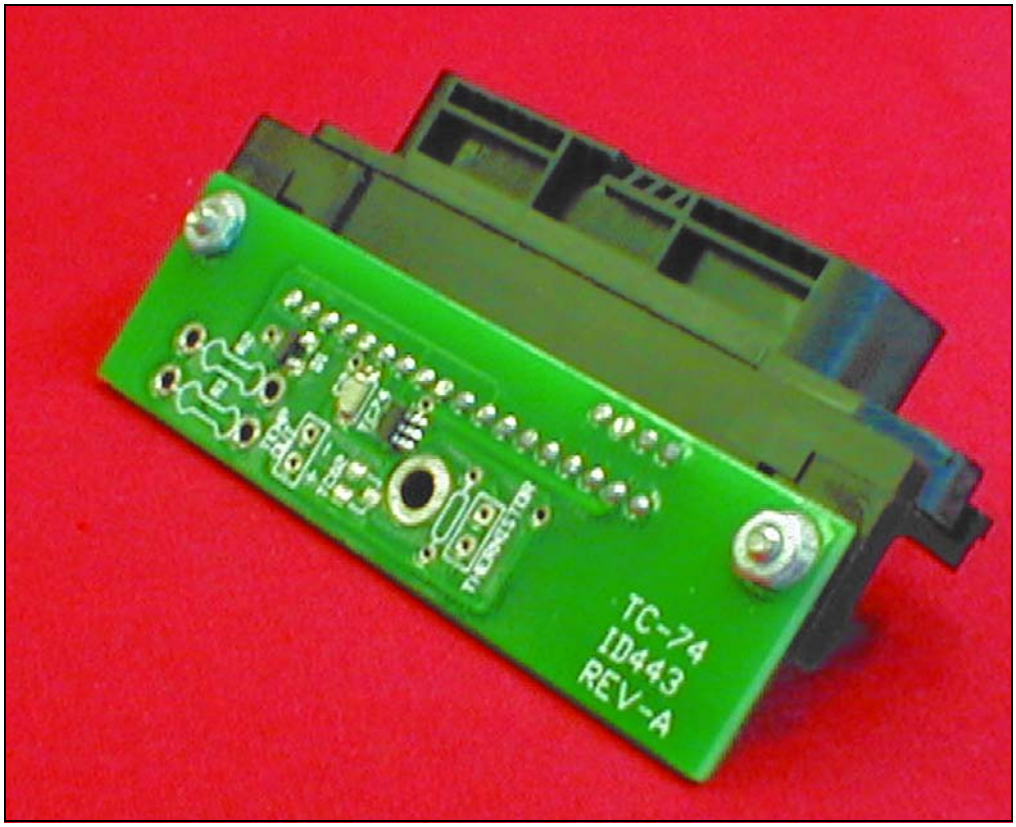

FIGURE 1-1: *TC74 Serial Temperature Sensor Demo Board*

1.3 TC74 DEMO BOARD APPLICATIONS

The TC74 Demo Board is the ideal solution for identifying the temperature profile of applications, such as, datacom, telecom and PC equipment. Simply let your equipment run under normal operating conditions, record temperature data in wide time intervals and save the resulting data in a file.

The following are appropriate applications for the TC74 Demo Board:

1. Thermal protection for hard disk drives and other PC peripherals.
2. PC card devices for notebook computers.
3. Real-time temperature measurement for datacom and telecom equipment.
4. Low cost thermostat controls.
5. Thermistor replacement.

1.4 REFERENCE DOCUMENTS

Other Reference Documents may be obtained by contacting your nearest Microchip sales office (listed on the back of this document) or by visiting the Microchip website at (www.microchip.com).

- *Technical Library CD-ROM,* (DS00161), or the individual data sheet:
  - *TC74 Data Sheet,* (DS21462)
- *Analog & Interface Families Data Book 2002,* (DS00207)
- *2002 Technical Documentation Analog & Interface Product Families* CD-ROM, (DS51205)
- *Serial Output Temperature Sensor Family* Sell Sheet, (DS21651)
- *TC74 Demo Board Kit* Sell Sheet, (DS51253)

NOTES:

Chapter 2. Getting Started

This chapter discusses the necessary steps for installing the software, understanding the various menu options and installing the hardware components. Additionally, it explains how to implement the TC74 Demo Board. Before getting started, please check the contents you received against the TC74 Demo Board Packing List. Also, please read section 1.2, "The TC74 Demo Board", in Chapter 1 for a list of what is included in the TC74 kit and what you must provide. Assemble the necessary items.

2.1 TC74 SOFTWARE INSTALLATION AND MENU OPTIONS

You can either download the TC74 software via the Internet or download it from the TC74 installation disk.

1. First create a directory for the evaluation software to reside in, such as, \Program Files\Microchip.
2. Next, use pkunzip (or any other readily available decompressing software) to extract the software from TC74EV.ZIP to the directory that was created.
3. Finally, the software can be launched by double clicking on the TC74.EXE file from the Microsoft® Windows® Explorer Start Menu or File Manager.

2.1.1 Software Screen Menus

This section gives a brief description of the various menu commands and features associated with the TC74 software. See Figure 2-1.

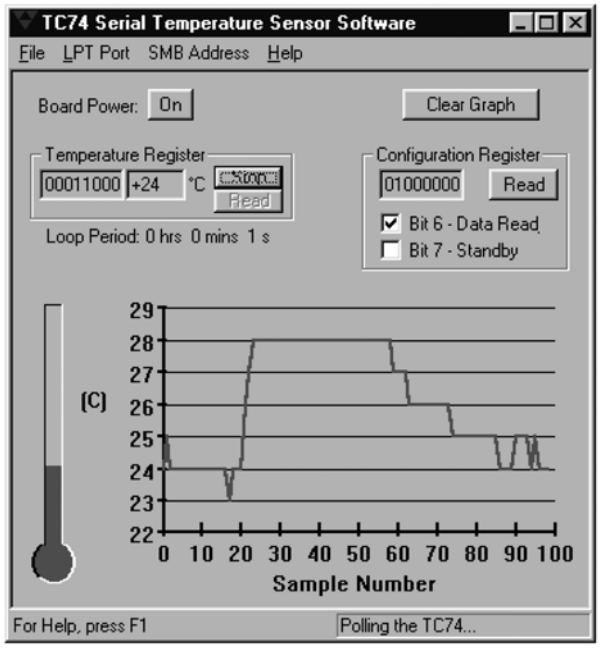

FIGURE 2-1: *TC74 Serial Temperature Sensor Software, Sample Screen*

2.1.1.1 FILE MENU COMMANDS

The file menu offers the following commands:

1. **Save**
   Saves the current group of temperature samples to a file.
2. **Save As**
   Saves the current group of temperature samples to a user supplied file name.
3. **Exit**
   Exits the TC74 software.
4. **File Save / File Save As**
   Use this command to save the current group of temperature readings to a file.
5. **Exit Command**
   Use this command to end your TC74 session. You can also use the Close command on the application's control menu.

Shortcuts:

Mouse: Double-click the application's control menu button.

Keys: ALT+ F4

2.1.1.2 LPT PORT MENU COMMANDS

The LPT Port menu is used to specify the address of the parallel port to which the TC74 board is connected. The three most common addresses are shown as menu selections. The currently selected port is also stored in the system registry and automatically resets when the software is restarted.

0X378 Set the LPT port address to 0X378.

0X278 Set the LPT port address to 0X278.

0X278 Set the LPT port address to 0X278.

2.1.1.2.1 Custom Command

If the parallel printer port address is not displayed in the menu, use the Custom option to set the address. Enter three hexadecimal characters. Do not preface the number with any extra formatting characters. Use extreme caution. If the address is set incorrectly, it may be necessary to reboot the computer. It is not recommended that this address be set arbitrarily.

2.1.1.2.2 How to find the LPT Port Address

1. Double click the My Computer icon on your desktop.
2. Open the Control Panel and then double click the System icon.
3. Click on the Device Manager tab.
4. Expand the Ports (COM & LPT) entry by double clicking it.
5. Highlight the correct LPT port and then click the Properties button.
6. Click on the Resources tab.
7. Make a note of the Setting for the Input/Output Range. The first number in that range is the address of the port.

2.1.1.3 SMBus™ BUS ADDRESS

The SMBus™ address of the TC74 chip must be set by selecting the appropriate address from the menu options. The SMBus address is also stored in the system registry and reset whenever the software is restarted. The SMBus address is not configurable on the evaluation board but is a factory programmable option. The software defaults to the standard SMBus address used by the TC74 silicon.

2.1.1.4 HELP MENU COMMANDS

The Help menu offers the following commands which provide assistance with this application:

1. **Help Topics**
   Provides an index to topics on which to get assistance.
2. **About**
   Displays the version number of this application.
3. **Index Card**
   Use this command to display the opening screen of Help. From the opening screen you can go to step-by-step instructions for using the TC74 software and to access various types of reference information. Once you open Help, you can click the Contents button whenever you want to return to the opening screen.
4. **About Command**
   Use this command to display the copyright notice and version number of your copy of the TC74 software.

2.1.1.5 ON/OFF BUTTON

The TC74 Demo Board is powered directly from the computer's parallel port, therefore, the software power button must be clicked on in order to power and establish communication with the board. If clicking on the power button results in an error message, make sure that the serial bus address and parallel port address have been set properly.

2.1.1.6 CONFIGURATION REGISTER

The contents of the Temperature register are non-programmable. This is a read-only register.

The Configuration Register has only one writable bit. Bit 7 (standby mode) can be toggled by clicking the corresponding check box. Bit 6 indicates that a sample is ready and is read-only. All other bits read back as zero.

2.1.1.7 THE TEMPERATURE GAUGE

The temperature gauge is to the left of the temperature graph and uses the same vertical scale as the graph. It displays the current value of the temperature register.

2.1.1.8 THE TEMPERATURE GRAPH

The temperature graph plots the last 100 readings of the temperature register. The graph is reset whenever the On/Off power switch is clicked On or the Clear Graph button is clicked.

A new point is graphed when the temperature register Read button is clicked or when the software makes a timed read of the Temperature register during looped read mode. The current set of graphed readings can be saved at any time from the File Menu.

2.1.1.9 LOOP BUTTON

To automatically read the temperature on an ongoing basis, click the Loop button. This displays a dialog box that asks how often the software should read the temperature register. Positive values up to 18 hours are allowed. A value of 0 hrs, 0 min and 0s will be converted to 1 second. The temperature graph will be updated each time the temperature register is read. To stop the automatic loop read, click the Stop button (displayed only during looping mode).

2.2 HARDWARE INSTALLATION

Connect the Centronics connector on the evaluation board to an available parallel port on your computer, using a standard printer cable (cable not included with the TC74 kit). The evaluation board is powered directly from the parallel port and therefore no external power connection is required.

2.3 IMPLEMENTING THE TC74

To get started with the TC74, launch the software from the Windows® 95 start menu.

The LPT Port menu allows the user to specify the address of the parallel port to which the TC74 board is connected. The three most common addresses are shown as menu selections:

0X378 Set the LPT port address to 0X378.

0X278 Set the LPT port address to 0X278.

0X3BC Set the LPT port address to 0X3BC.

Custom Advanced feature that allows you to enter a different address.

To power-up the board and to start reading temperature data, simply click the "Board Power" button. The temperature will be displayed in the temperature register and on the thermometer and temperature graph.

To automatically read the temperature on an ongoing basis, click the Loop button. This displays a dialog box that asks how often the software should read the temperature register. Non-negative values up to 18 hours are allowed. A value of 0 hours, 0 minutes and 0 seconds will be converted to 1 second.

The temperature graph will be updated each time the temperature register is read. To stop the automatic loop read, click on the Stop button.

The contents of the temperature register are non-programmable. This is a read-only register. The configuration register has only one writable bit. Bit 7 (Standby Mode) can be toggled by clicking the corresponding check box.

Appendix A. Board Layout

A.1 INTRODUCTION

This appendix contains general information concerning the layout, schematic and components for the TC74 Demo Board.

A.2 BOARD LAYOUT AND SCHEMATIC

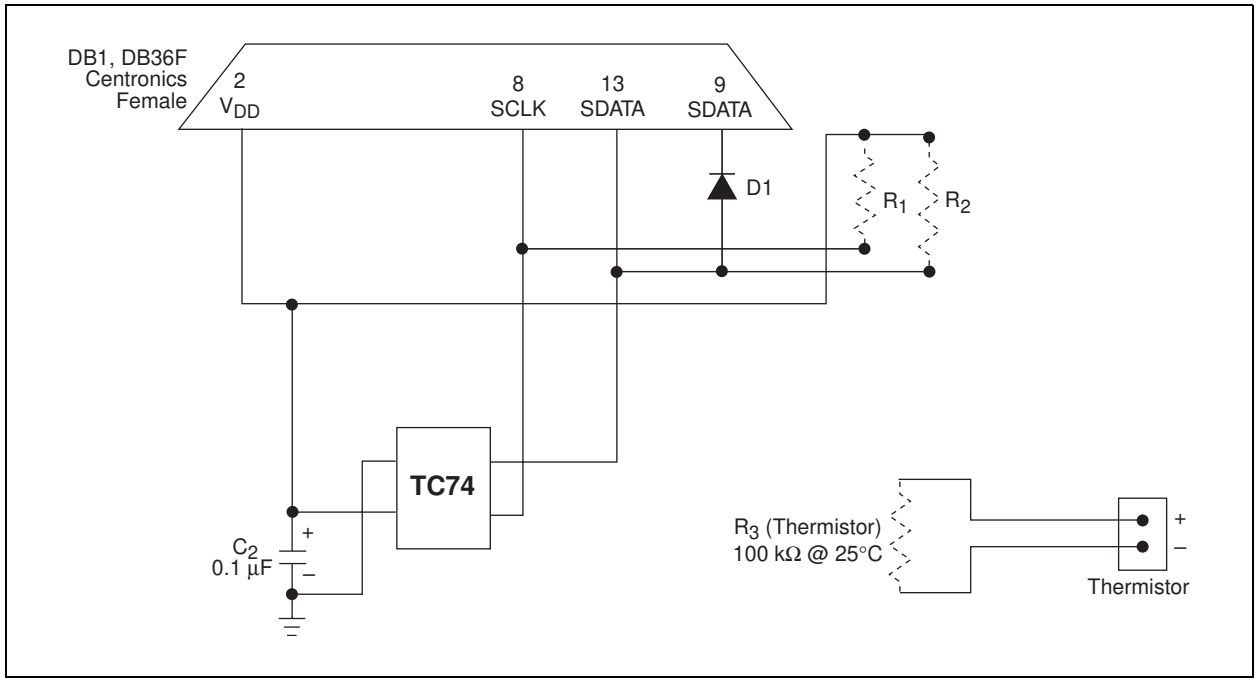

FIGURE A-1: *TC74 Demo Board Layout and Schematic*

A.3 DEMO BOARD COMPONENTS

Table A-1 lists the components that the TC74 board consists of and their associated values assigned.

TABLE A-1: TC74 BOARD COMPONENTS AND VALUES

Component	Component Values
R_1	Pull-up Resistor - Not populated
R_2	Pull-up Resistor - Not populated
C_2	.1 µF Capacitor
U_1	TC74A5-5.0VCT Device
D_1	IN4148 diode or 1N914
U_3	Thermistor - Not populated
DB_1	Printer Port Connector - Female

A.4 TC74 FUNCTIONAL BLOCK DIAGRAM

The diagram pictured in Figure A-2 shows the TC74 powered directly to a PC running the communication software.

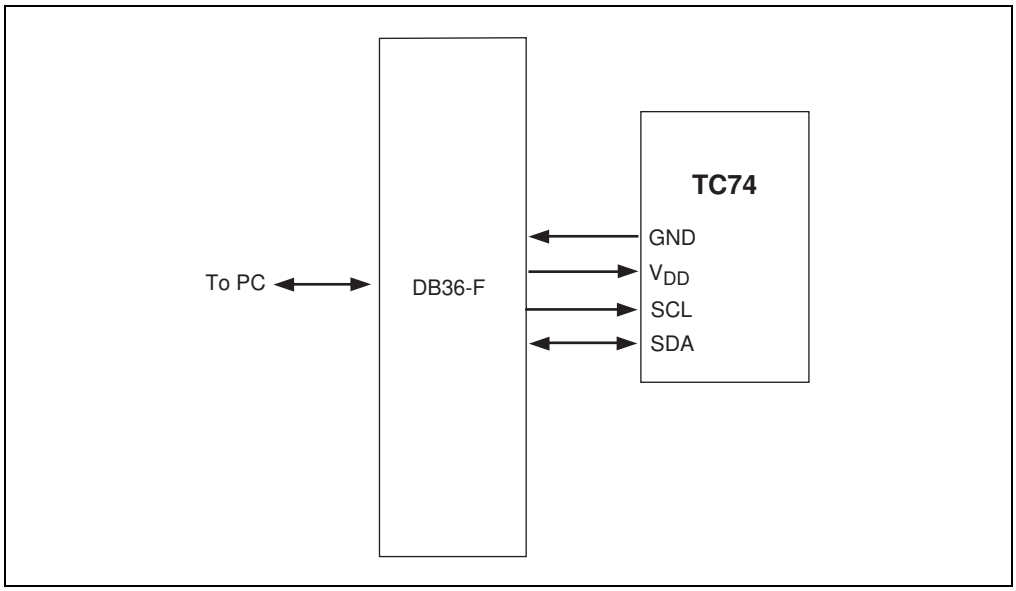

FIGURE A-2: *TC74 Functional Block Diagram*

NOTES:

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