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DESIGNING A NETWORK CABLE TESTER

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ABSTRACT

The aim of this project was to design and construct a low cost Network Cable Tester with LCD (Liquid Crystal Display) and more features. Network cable tester is a device which has the ability to test the connections of a network cable. In this work, it was designed at a low cost and as a convenience network tool. It can be used to check whether the eight wires of the network cable are open, short circuited or mismatched. The status of those cables can be displayed using the LCD display. This project required basic designing using about PIC (Peripheral Interface Controller) microcontroller, LCD circuit and electronics simulations. This project also need network installation knowledge and techniques especially on the status and problems of network cables such as continuity, opens, shorts, and mismatches. This project used coding in mikroC language to provide a very efficient algorithm for carrying out the required task. The designed LCD network cable tester is hand-held, can be easily operated and cheap. Also, it does not require pulling the cables out of the place to check the connection because one end of the network cable can be connected to the transmitter part and the other end can be connected to the receiver part. Further, this tester can be developed to check the connectivity of the optical fiber cables.

Keywords: *Network Cable Tester, Liquid Crystal Display, Peripheral Interface Controller*

1.0 INTRODUCTION

Although there exist different types of cable testers, they have some issues[1]. They are very expensive and have some limitations. They can only check whether the network cable is good or bad. It cannot check the cross connectivity of that cable. Also they show the connections using LEDs. The top RJ45 connector sends signals to each of its eight legs. The lower RJ45 connector receives signals from the top RJ45 connector created by the wire. It needs minimum two people to check a network cable using those LED based cable testers. It cannot check a network cable which is wired in a lab without pulling the cable out of that place. By considering these drawbacks, an improved network cable tester was introduced.

2.0 EXPERIMENTAL

The block diagram of the proposed system for the Network Cable Tester is shown in Figure 1.

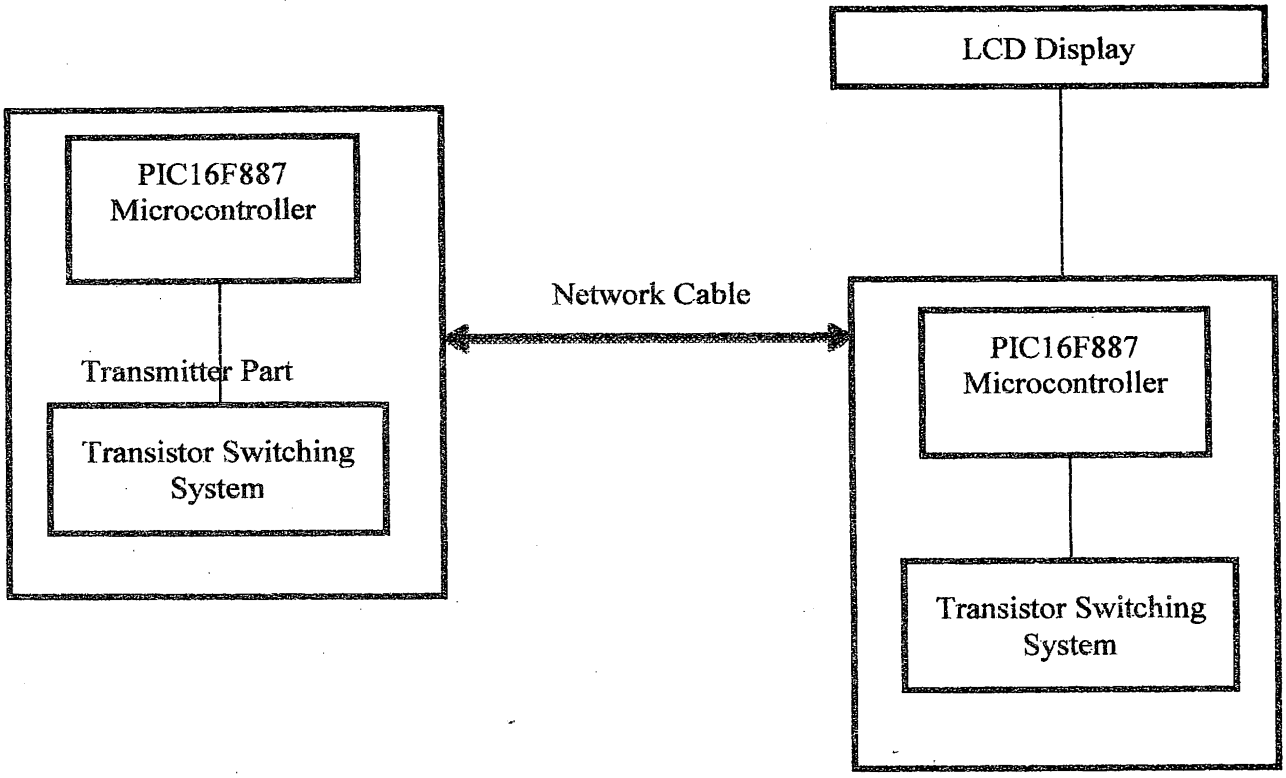

Figure 1: Block diagram of the proposed Network Cable Tester

There should be transmitter and receiver parts to implement this device. The PIC16F887 microcontroller was used as the main control unit of the transmitter side[2]. Also, eight transistors were used as the switching system for this device implementation[3].There should be two RJ-45 connecters at the transmitter and the receiver parts. One end of the network cable which needs to be checked for continuity should be connected to transmitter part and the other end to the receiver part. The two PIC microcontrollers were programmed using mikroC software. The programming language is also called mikroC[4].

To program the PIC 16F887 there need an external hardware part. For this a Multi PIC programmer unit which can programme PIN 18 Microcontrollers and PIN 40 Microcontrollers was used. After connecting PIC to this unit, it should be connected with computer using serial DATA cable.

3.0 RESULTS AND DISCUSSION

The designed Network Cable Tester was checked for properly connected, open circuited and cross connected network cables.

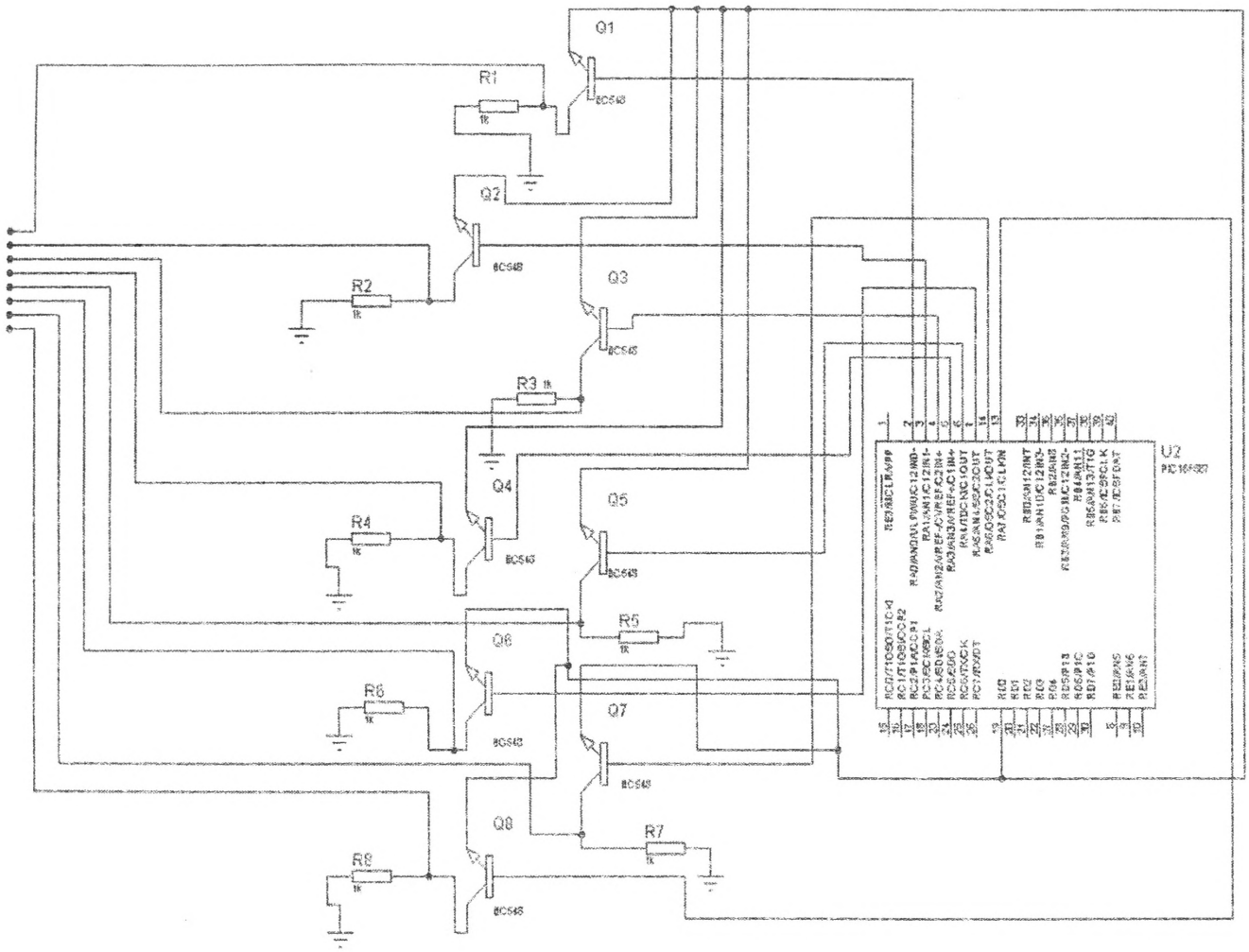

Figure 2: The circuit diagram of the transmitter part of the system

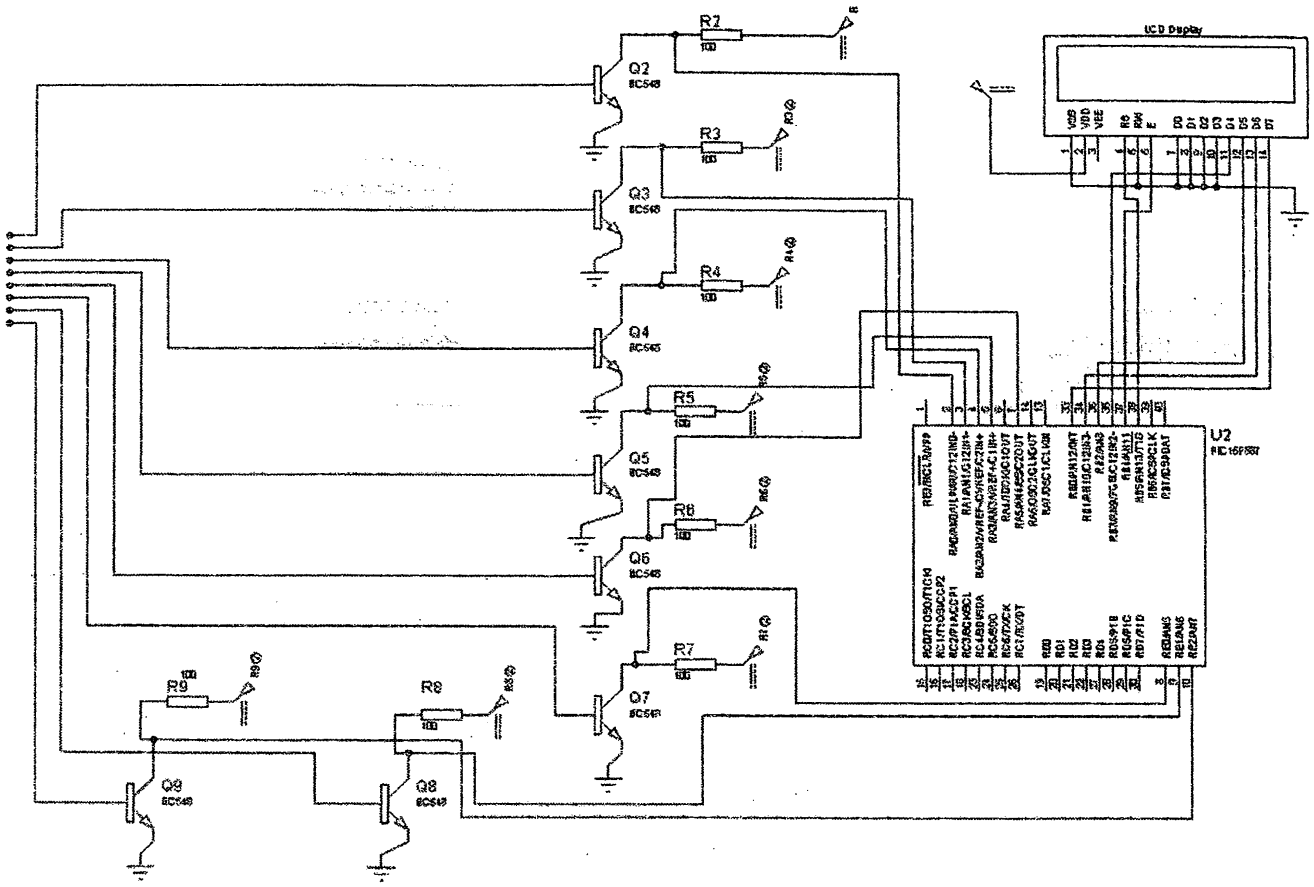

Figure 3: The circuit diagram of the receiver part of the system

When the properly connected network cable was used, LCD Display displayed wires of the network cable are OK one by one. When the open circuited (broken) network cable was used, LCD Display displayed status of the wires of network cable one by one. If the first wire was properly connected, it displayed LINE 1 OK and if the second wire was broken, it displayed LINE 2 BAD. When the cross connected network cable was used, LCD Display displayed status of the wires of the network cable one by one. If first wire was connected to the second pin of the other side, it displayed LINE 1 CROSS 2.

Although there exist various types of cable testers, they have some limitations. Some of them are;

- Very expensive.
- If some of the wires of network cable are broken, it cannot be used to check the status of the other wires because those testers use one wire as the common line.
- No proper display unit.

- Cannot check individually a network cable which ends are far away from each other.

The implemented system was designed to solve the above limitations.

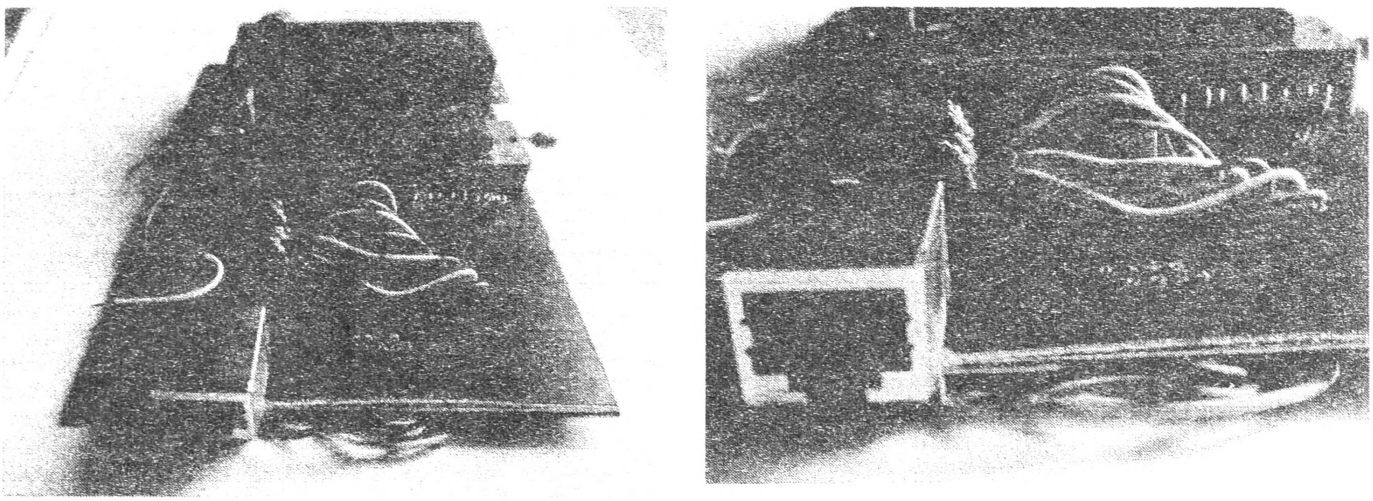

Figure 4: The designed network cable tester

4.0 CONCLUSION

The purpose of this project was to design a simple, low cost but reliable Network Cable Tester. It is intended for use as a troubleshooting tool for basic connectivity testing.By the use of Network Cable Tester we can find all the problems associated with the network cable and the actual fault in our network to make it appropriate. Also it can be used to check whether the wires in a network cable are properly connected, open circuited or wrongly connected.

At this stage, this cable tester was implemented only to test network cables. As further development, this can be improved for testing coaxial cables and optical fiber cables.

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