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EMBEDDED DIGITAL IC TESTER FOR STRUCTURALTESTING USING ARDUINO MICRO CONTROLLER

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Abstract—**Various ICs come with a different range of configurations.There are plenty of techniques available in the markets for the IC testing which are totally expensive uisng microcontroller based integrated circuits(IC's). So we produced simple design, accurate and low budget embedded IC tester with the user-friendly effectiveness. Here its comprises of both the hardware and software architectures for this design to implement. In this we are interfacing hardware with the Arduino programming inorder to know the working condition of an IC. The result is low-cost automatic test equipment, able to execute a preliminary digital test, using just a laptop and an Arduino interfacing. It can handle different I/O combinations and can detect delay with the precision. It can both visually show the resultant voltage/current-time graphs and store them as text files. The ATE is tested on different Design Under Test (DUT) devices like 8-bit and 12-bit adders and a square root circuit implemented on using Arduino Microcontroller. Several structural testing strategies are compared in terms of their relative coverage of the program's structure and in terms of the number of test cases needed to satisfy each strategy. Here we implemented the continuity and leakage test with built tester. Programming in the Arduino IDE to display the output based on the measured voltage in LCD. Interfacing with the Arduino MEGA controller with the program in Arduino IDE. Selecting the pin to check and forcing the current of 100 micro amperes to the pin, after grounding the Vss, Vdd pins. Measuring the voltage across the diode will be determining the status of the device that can be known from the Display.**

Keywords: Interfacing, Arduino, IC, testing.

I. INTRODUCTION

To build a cheap-effective IC structural tester by the Arduino micro controller at the moderate cost effective.Enhance the performance to implement the continuity and escape tests with the designed tester.For enactment, the Programming within the Arduino IDE to execute the output by the measured voltage in LCD.Define and validate specific analysis methodologies, Assess the impact of automatic equipment, assess the legal framework regarding existing implementation barriers.Interfacing the Arduino MEGA micro controller with the program in Arduino IDE.In our project we tend to square measure building up a style for economically low price, high reliability on IC tester.We develop an Arduino program with totally different completely different functions for checking different Integrated circuits . Here We does the various testing methods with IC's by giving all the input connections w.r.t pins fed one by one.This does help in doing useful work..The motivation behind picture pressure is Developments in IC testing are expected to deliver the following benefits[1]Reducing the cost of an IC tester for the low budget clients.[2]Reducing the complexity in stages of testing; and[3]For more usability in college laboratories and budget IC testing companies.[4]Effective usage of the product for the clients with economically as well as highly reliability.

II. PROPOSED SYSTEM

In our project we are building up a dedicated Economic IC tester. So, performing the linkage and continuity test. This test equipment will be performing both functionality with tested design maintaining without performing any of the reconfigurations, such a sequential operation gives the desired flow by detecting the error in the code. Here we mainly focus on the technical hardware implementation and then interfacing with the software coding and it can be performed different arithmetic circuits like different digital IC testing equipment. Enhance the performance to implement the continuity and leakage tests with the built tester. For enactment, the Programming in the Arduino IDE to execute the output by the measured voltage in LCD.

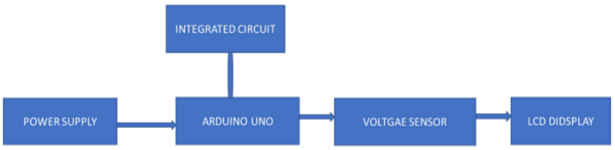


Fig.1.Block Diagram of Proposed work

While manually checking or testing, the IC number should be entered first as 74CH86/00. Based on the number entered the details of the entered IC number can be seen at the LCD. Mostly when the testing would be done it helps the user by conforming it by provided truthtable.For the effectiveness these truthtables are prior conformative at the time of the design. After the initial stage of the process the microcontroller runit could process for the generation of signal. Let consider NAND gate with 8v supply to pin 14 and 0V(ground). to pin 7. As this IC has NAND gates, each of them is to be checked one after another. MU should provide the required combination of inputs vectors to every gate according to the reality table.

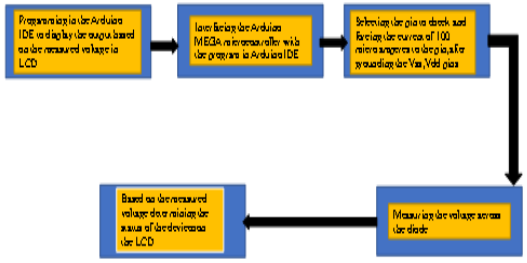


Fig.2.Flow chart of the proposed work

The below flow chart is about the operations of an IC tester. Firstly, do the programming in the Arduino taking the conditions of voltage across the diodes. Then interface Arduino with Micro controller. Choose one pin among all the pins to which testing is going to perform. These give supply of 100 micro amps to the signal pins based on forward and reverse biased diodes, which means +100 micro amps to forward biased diode and -100 micro amps to reverse biased diode. When measuring voltage, keep remaining pins, VDD and VSS connected to ground just to avoid consuming power supply by other pins. Measure voltage across the forward biased diode then figure out the voltage values, if voltage across it is 0.2V then it considers under short circuit and 1.5V across the diode can be detected as open circuit When negative current supply is passed through a reverse biased diode, the voltage measured across them is greater than -0.2V, then it would be short circuit and less than -1.5V will be considered as open circuit Measured voltage will be displayed on the LCD.

2.1: Implementation of Hardware:

From the Fig 2, we can observe the schematic flow of this system process and integrated with the software simulation with the arduino .Programming in the Arduino IDE to display the output based on the measured voltage in LCD.And, by Interfacing the Arduino Mega microcontroller with the program in Arduino IDE. By Selecting the pin to check and forcing the current of 100 micro amps to the pin after grounding the Vss and Vdd pins. It measures the voltage across the diode. Based on the measured voltage determining the status of the device.

The LCD Display gets started. The look at system permits you to look to check the IC for common pin opens and for a short-circuit between any pins with one continuity test step. though the network of association information may be manually entered, this information is sometimes self-learned by the System from a known-good part. See the extra data labelled “Continuity Testing for Opens & Short IC.

2.2: Implementation of software

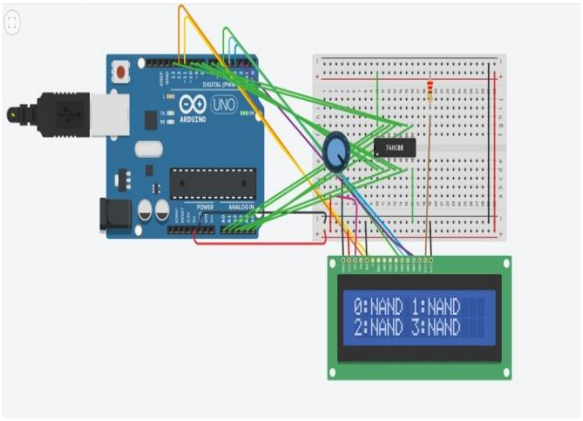
Arduino IDE software used for the interference of the Implementation of the various designcs of IC testing, Also necessary to have the basic idea of the testing functional and also manually.Hence, we should go throw the flow chart and should develop a source code for the functionalilty testing..And this project is comprises the part with programing, Hence by that the Ic tester should be controlles through the programming. If any error condition attained at the time of testing so that we can have the alternate solutions by testing with various methods . In this Implementation Arduino operates a major role in execution

And here we used the C programming concepts as it was the basic to write code on arduino platform.After completion of both Hardware and Software part. we have to integrate the whole system with the USB cable so we have to connect the IC tester with PC. Hence can upload the program with the Arduino.

III. RESULTS AND DISCUSSION

From the above proposed system, the circuits are interfaced and connected. We have taken samples of various IC's for the implementation and tested with the leakagetest and continuity test. Then the IC testers of both i.e one is in perfect condition IC, secondone defective tester IC could be taken for our analysis of checking which is good working IC and which is not perhaps bad. So from the below interface through the design of logic with various types of IC's it can be checked and verified. The LCD display as shown in Fig.5 could show the output according to the instructions given. Then the process of the whole system could be shown below. Here we create a different sets of data tables with various IC's like OR, X-OR, NAND, AND. The program we implemented through the Arduino relatively differs the executable values of the output with respectively comparatively with in that 4 gates. If suppose the 1-Gate value if its suits with any of the outcome Gates like AND it executes and displays the gate name in the LCD. If suppose it doesnot matches with any of the outcome values then it shows some error in the Display. In this Scenario entire process could be done similarly. Here we totally taken 3 input tables and 4 output tables with the same IC series. we can also check the process analysis by giving data input table to the Ic, and by that we could read the outputs of that particular IC .Through that flow we will compare the input data that should match up with the any of outcomes and then displays . If not a error will be displayes on the LCD.

Fig.3.Simulation results of NAND Gate with 74OO IC



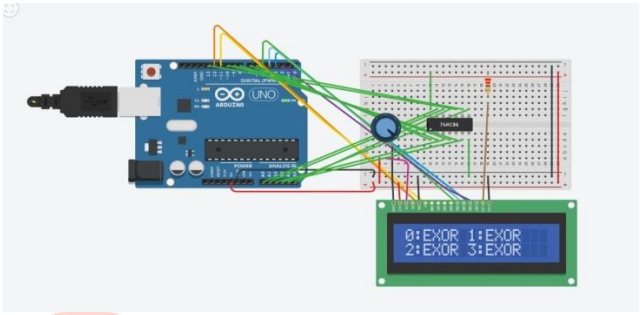


Fig.4.Simulation results of X-OR with 7486 IC

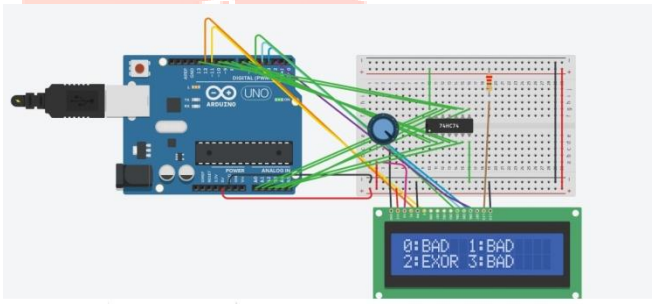


Fig.5.Simulation results of X-OR with 7486 IC(bad gate)

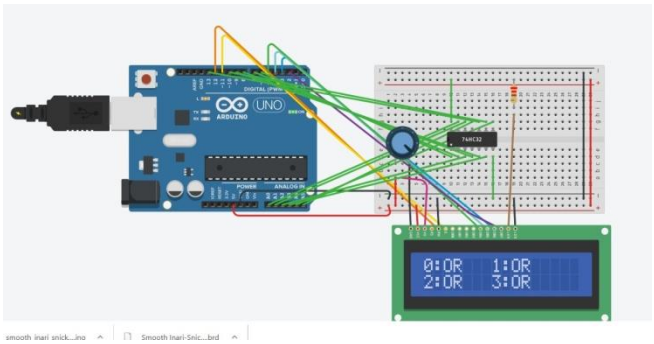


Fig.6.Simulation results of OR with 7432 IC

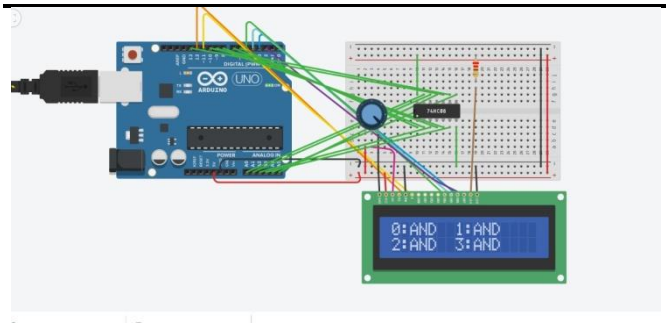


Fig.7.Simulation results of AND with 7408 IC

IV. CONCLUSION

Thus,the implementation Programming in Arduino IDE software to display the output based on the measured voltage in LCD. Define and validate specific evaluation methodologies, Access the impact of automatic Test equipment , to evaluate the legal framework regarding the existing implementation barriers. Interfacing the Arduino MEGA microcontroller with the program (hex file) in Arduino IDE. In our project we are building up a design for economically low cost, high reliable IC tester. To develop an Arduino program consisting various functionalities for testing various Integrated circuits. Here We does the various testing methods with IC's by giving all the input connections w.r.t pins fed one by one.This does help in doing useful work.The system will report failures depending on the Various test point module vectors. the performance to implement the continuity and escape tests with the designed tester.For enactment, the Programming within the Arduino IDE to execute the output by the measured voltage in LCD.Define and validate specific analysis methodologies, assess barriers.Interfacing the Arduino MEGA micro controller with the program in Arduino IDE. In our project we are building up an economical IC tester where it can be used in Laboratories, medium scale companies for budget friendly IC testing. So by this After that user will get acquire results from the tester about IC. There are

actually often used micro controller based IC Testers but Arduino based are infrequent.Arduino based IC testers are at high cost,so for the budget friendly and effectiveness of the system we have Implemented this project with very few components and this could be further having a large scope to implement or Extend it a wide.Finally, by the integration it will gather all the information from database and it will check internal gates of that IC. Then result will be displayed on the LCD.