Lab 1 Basic Logic Gates

1. Objectives

- Introduce the CMOS family of integrated circuits (75HC series)
- Introduce basic logic gates: AND, OR, INVERT, NAND, and NOR
- Represent logic functions by truth tables, logic diagrams, and Boolean equations

2. Material

- Digital Logic Trainer
- > Wires
- 74HC08 (Quad 2-input AND)
- 74HC32 (Quad 2 Input OR)
- 74HC00 (Quad 2-input NAND)
- 74HC02 (Quad 2 Input NOR)
- Logisim tool

3. Introduction

a. CMOS Integrated Circuits

CMOS integrated circuits (IC), also called chips, are used to build the logic circuits in this experiment. As shown in Figure 1, the chip is packaged in a plastic holder (Dual Inline Package or DIP) with pins spaced on a 0.1° (2.54mm) grid that will fit the holes on breadboards. The pins are numbered anti-clockwise around the IC (chip) starting near the notch or dot. The half-moon notch is used to indicate the chip orientation.

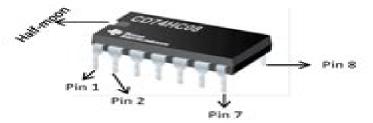


Figure 1. An integrated Circuit

Four different kinds of chips, from the CMOS (Complementary Metal Oxide Semiconductor) family, will be used in this experiment. The chips are labeled 74HCxx, where the xx is a number that indicates the specific kind of gate or function. Figure 2 shows the pin description and pin numbers of these IC's.

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Morris Tischler

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Digital Technology Lab Manual Webb R J Staff,1988-12

ELECTRONICS LAB MANUAL Volume I, FIFTH EDITION NAVAS, K. A.,2015-09-11 This lab manual is intended to support the students of undergraduate engineering in the related fields of electronics engineering for practicing laboratory experiments It will also be useful to the undergraduate students of electrical science branches of engineering and applied science This book begins with an introduction to the electronic components and equipment and the experiments for electronics workshop Further it covers experiments for basic electronics lab electronic circuits lab and digital electronics lab A separate chapter is devoted to the simulation of electronics experiments using PSpice Each experiment has aim components and equipment required theory circuit diagram tables graphs alternate circuits answered questions and troubleshooting techniques Answered viva voce questions and solved examination questions given at the end of each experiment will be very helpful for the students The purpose of the experiments described here is to acquaint the students with Analog and digital devices Design of circuits Instruments and procedures for electronic test and measurement

Digital Circuits Laboratory Manual Farzin

Asadi,2023-08-30 Digital systems are an important part of modern life This book introduces the basic building blocks of digital systems and how these blocks can be used to design a digital system It can be used as a laboratory manual for courses such as Digital Logic and Digital Electronics All of the experiments in this book can be done in a simulation environment like Proteus or NI MultiSim or on the breadboard in a real laboratory environment Digital Circuit Design Laboratory Manual, 4th edition (Global) Akhan Almagambetov, J. Matt Pavlina, Yelena Mukhortova, Lab. Manual for CSE/CSE-DS/ AIML/AIDS students-A Practical Manual Dr. Rajiv Chopra, 2025-02-21 Lab Manual for CSE CSE DS AIML AIDS Students By Dr Rajiv Chopra This book serves as a comprehensive lab manual for B Tech students specializing in Computer Science Data Science Artificial Intelligence and Machine Learning Designed with a practical and experiment based approach it bridges the gap between theory and real world application Covering essential programming concepts AI ML techniques and hands on exercises this manual equips students with the skills needed for modern computing challenges Ideal for CSE IT ECE and related disciplines this book encourages students to explore experiment and apply their knowledge effectively in labs and AN INTRODUCTION TO VLSI DESIGN AND TESTING P. Brundavani ,B. Abdul Raheem ,Rachapudi projects Prabahakar ,2025-05-20 VLSI Design and Testing provides a concise yet comprehensive guide to the design analysis and testing of integrated circuits Covering key topics such as IC types Moore's Law MOSFET and CMOS fabrication and SOI technology the book builds a strong foundation in VLSI principles It explores the design flow CMOS logic gates layout techniques and both static and dynamic logic circuits Readers will also learn about circuit performance parameters scaling theory and subsystem design including adders shifters and comparators The book concludes with essential concepts in VLSI design styles FPGA gate array full custom and CMOS testing including fault models ATPG and BIST Ideal for students and

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This book is about using electronics without fear This book includes both digital and analog integrated circuit instrumentation Many microcomputer interfacing examples are given Preface page xi xii Lab Manual Troubleshooting and Design to Accompany Digital Systems Frank J. Ambrosio, 1997 Logic-timing Simulation and the Degradation Delay Model Manuel J. Bellido, Jorge Juan Chico, Manuel Valencia, 2006 This book provides the reader with an extensive

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