

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.

Lab Manual For Logic Gates In Cmos

Morris Tischler



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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 Technology Lab Manual Webb R J Staff,1988-12 **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 projects

AN INTRODUCTION TO VLSI DESIGN AND TESTING P. Brundavani ,B. Abdul Raheem ,Rachapudi 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

professionals it blends theory with practical design strategies in modern VLSI systems Visit garuda publishers com

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background in the field of logic timing simulation and delay modeling It includes detailed information on the challenges of logic timing simulation applications advantages and drawbacks The capabilities of logic timing are explored using the latest research results that are brought together from previously disseminated materials An important part of the book is devoted to the description of the Degradation Delay Model developed by the authors showing how the inclusion of dynamic effects in the modeling of delays greatly improves the application cases and accuracy of logic timing simulation These ideas are supported by simulation results extracted from a wide range of practical applications Sample Chapter s *Microelectronics Education* Ton J. Mouthaan, Cora Salm, 2012-12-06 Dear participant in the second European Workshop on Microelectronics Education It is a pleasure to present you the Proceedings of the Second European Workshop on Microelectronics Education and to welcome you at the Workshop The Organising Committee is very pleased that it has found several key persons with highly appreciated levels of knowledge and expertise willing to present Invited Contributions to this Workshop We have striven for an interesting spread over important areas like the expected demands for educated engineers in the wide field of Microelectronics and Microsystems in European industry and beyond and innovations in method and focus of our educational programmes This is the second European Workshop in this area the first one was held in Grenoble in France in the spring of 1996 It was the initiative of Georges Kamarinos Nadine Guillemot and Bernard Courtois to organise this Workshop because they felt that Microelectronics was at a turning point to become the core of the largest industry in the world and that this warranted a serious re consideration of our educational imperatives It is now two years since and their feeling has become reality nobody doubts that by the year 2000 the microelecnonics industry will be the largest industrial sector It is also obvious that because of that and because of the predicted shortfall of educated engineers we must continuously reconsider the quality of our educational approach Analog Design Issues in Digital VLSI Circuits and Systems Juan J. Becerra, Eby G. Friedman, 2012-12-06 Analog Design Issues in Digital VLSI Circuits and Systems brings together in one place important contributions and up to date research results in this fast moving area Analog Design Issues in Digital VLSI Circuits and Systems serves as an excellent reference providing insight into some of the most challenging research issues in the field

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