

Introduction to the Mechatronic Engineering Laboratory Equipment

Learning Objectives: By the end of the lab, you should be able to:

- Properly use a triple-output power supply, digital multimeter, function generator, and oscilloscope.
- Measure voltage and current using the digital multimeter and oscilloscope.
- Use a solderless breadboard to build an electronic circuit.
- Use Intuilink to capture a waveform from the oscilloscope

Pre-Lab Preparation: Watch the following YouTube videos:

[Breadboard](#)

[Digital Multimeter](#)

[Function Generator](#)

[Oscilloscope](#)

Components:

- Resistors: one each of: 100 Ω , 2 k Ω , 5.1 k Ω , 10 k Ω , 100 k Ω , 1 M Ω , and two 1 k Ω resistors.

Introduction: Each workstation in the lab consists of the equipment shown in Figure 1.

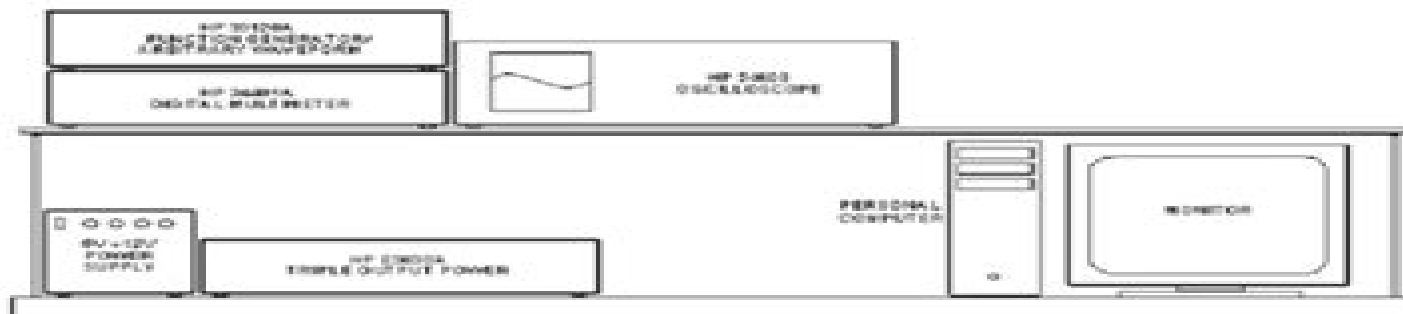


Figure 1. Laboratory equipment in the Mechatronic Engineering Laboratory. The multimeter, arbitrary waveform generator and oscilloscope are connected to the computer via GP-IB.

The purpose of each of these devices, briefly, is:

- The **HP E3630A TRIPLE OUTPUT POWER SUPPLY** will be used to supply the DC power needed to operate your circuits.
- The **HP 34401A DIGITAL MULTIMETER** (often referred to as the DMM) will be used to measure resistance, voltage, and current.
- The **HP 33120A FUNCTION GENERATOR** will be used to provide various types of time-varying signals to your circuits.
- The **HP 54603 OSCILLOSCOPE** (often referred to as the 'scope) will be used mainly to display how circuit voltages vary with time.
- The **PERSONAL COMPUTER** will be used in conjunction with Agilent IntuiLink[®] software to communicate with the 'scope (but can also be used to communicate with the function generator and DMM) and will also be used to program the microcontrollers that you will learn about in later labs.

You will get to use each of these devices in this laboratory session. This guideline contains the basic operating instructions for the test and measurement equipment described above. It also includes a number of exercises identified by a framed border on the page. The exercises will help you learn

Mechatronic Engineering Lab Manual

Wego Wang



Mechatronic Engineering Lab Manual:

Innovations in Mechatronics Engineering IV Jose Machado, 2025 This book reports on innovations and engineering achievements of industrial relevance with a special emphasis on developments in mechatronics control engineering and signal processing It gathers peer reviewed papers presented at the 4th International Conference Innovation in Engineering ICIE 2025 held on June 18 20 2025 in Prague Czech Republic It covers advances in automated detection and monitoring systems industrial applications of machine learning and artificial neural networks and industrial robots and medical devices among other topics This second volume of a three volume set provides engineering researchers and professionals with a timely snapshot of technologies and strategies that should help improve production efficiency industrial sustainability and human well being

The Mechatronics Handbook - 2 Volume Set Robert H. Bishop, 2018-10-08 The first comprehensive reference on mechatronics The Mechatronics Handbook was quickly embraced as the gold standard in the field From washing machines to coffeemakers to cell phones to the ubiquitous PC in almost every household what these days doesn't take advantage of mechatronics in its design and function In the scant five years since the initial publication of the handbook the latest generation of smart products has made this even more obvious Too much material to cover in a single volume Originally a single volume reference the handbook has grown along with the field The need for easy access to new material on rapid changes in technology especially in computers and software has made the single volume format unwieldy The second edition is offered as two easily digestible books making the material not only more accessible but also more focused Completely revised and updated Robert Bishop's seminal work is still the most exhaustive state of the art treatment of the field available

Optomechatronics Hyungsuck Cho, 2005-11-29 Optomechatronics Fusion of Optical and Mechatronic Engineering takes an integrated approach to combine the fields of optical and mechatronics engineering The author provides a multidisciplinary view from the design stage of engineering systems that result from the fusion of optical elements with mechatronic elements He explores how the integration of optomechatronic components can create new value and functions for the engineering systems under consideration In the final section practical optomechatronic systems are richly illustrated to aid readers in understanding how effectively optomechatronic technology can be utilized to produce new functionalities and enhance performance

Mechatronics and Automatic Control Systems Wego Wang, 2013-11-18 This book examines mechatronics and automatic control systems The book covers important emerging topics in signal processing control theory sensors mechanic manufacturing systems and automation The book presents papers from the 2013 International Conference on Mechatronics and Automatic Control Systems in Hangzhou held in China during August 10 11 2013

Mechanical Engineering Laboratory Manual Earl Baldwin Smith, 1912

Paper, 1995

IEEE/ASME International Conference on Advanced Intelligent Mechatronics Proceedings, 2005

Materials, Mechatronics and Automation Dehuai Zeng, 2011-02-21 Selected peer reviewed papers from the 2011 International Conference on Materials Mechatronics and Automation ICMMA

2011 On 15 16 January 2011 Australia Melbourne **Winter Annual Meeting** American Society of Mechanical Engineers, 1995 Mechatronics Dan S. Neculescu, 2002 1 Computer Integration of Electro Mechanical Systems Mixed Systems Integration Mechanical Structure Sensors and Actuators Computer Monitoring and Control 2 Sensor Modeling Sensors and Transducers Temperature Sensing Thermocouples Strain Stress and Force Measurement Using Strain Gauges Piezoelectric Strain Sensors and Accelerometers Analog Position Measurement Potentiometers Digital Position Measurement Optical Encoders Velocity Measurement Tachometers Problems 3 Actuators Modeling Direct Current Motors Stepper Motors Hydraulic Motors Piezoelectric Actuators Problems 4 Interfacing Computer Interface Requirements Operational Amplifiers Signal Conditioning Digital to Analog Conversion Analog to Digital Conversion Power Amplifiers and Actuator Drives Problems 5 Mixed Dynamic Systems Modeling and Simulation Overview of System Modeling Block Diagrams and State Space Modeling Object Oriented Modeling Signal and Power Transmission Virtual Prototyping and Hardware in the Loop Experimentation Neural Network Models Problems 6 Data Acquisition and Virtual Instrumentation Computer Based Monitoring and Control LabVIEW Programming for Virtual Instrumentation MATLAB Data Acquisition Toolbox Data Analysis Tools Signal Generation Digital Signal Processing for the Fourier Transform Signal Spectrum Smoothing Windows Digital Filters Problems 7 Real Time Monitoring and Control PC Based and Embedded Microcontrollers Solutions for Real Time Applications Digital Signal Processors for Real Time Applications LabVIEW Real Time Data Acquisition and Control MATHWORKS Tools for Real Time Data Acquisition and Control Embedded Single Chip Computers for System Integration Problems 8 Laboratory Experiments For Mechatronics Overview Interfacing Sensors and Actuators using LabVIEW MATLAB Sound Acquisition and FFT Advanced Monitoring and Control Experiments Problems References Index **Proceedings of Frontiers in Education 1996** IEEE, Education Society Staff, Ieee Education Society, 1996-11 **Advances in Mechatronics and Machinery** Dong Ming Guo, Liding Wang, Zhenyuan Jia, Junsheng Liang, Dazhi Wang, 2017-07-24 20th ICMT 2016 Selected peer reviewed papers from the 20th International Conference on Mechatronics Technology ICMT2016 October 28 31 2016 Dalian P R China Summary Progress Report Synthesis Coalition, 1995 Mechatronics, 1990

Advances in Robotics, Mechatronics and Haptic Interfaces, 1993 American Society of Mechanical Engineers. Winter Annual Meeting, 1993 **Mechatronics-- the Basis for New Industrial Development** Memiş Acar, Judit Makra, Eva Penney, 1994 *Applied Mechatronics* Ahmad Smaili, Fouad Mrad, 2008 Applied Mechatronics synthesizes the disciplines of Mechanical and Electrical Engineering to provide a comprehensive overview of the various technologies and tools used to develop mechatronic devices Co written by Mechanical Engineering and Electrical Engineering professors who co teach this interdisciplinary course this text highlights the information each discipline might have considered prerequisite so students can focus on material new to them Designed for a first course in mechatronics it contains numerous practical classroom tested examples experiments and simulations using SIMULINK MATLAB and LabVIEW and presents material in a

format that lends itself to collaborative project based learning **Lego Mindstorms Mechatronics** Don Wilcher,2003
Focuses on hot technology topics electronics embedded systems object oriented technology software development and
robotics This book also includes projects for each concept including a LEGO camera for the remote control vision chapter an
interface for a robotic warning system and a tele operated robot **IEEE/IFAC Joint Symposium on Computer-Aided
Control System Design** Sven Erik Mattsson,J. O. Gray,François E. Cellier,1994 **Mechanical Engineering News** ,1987

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Table of Contents Mechatronic Engineering Lab Manual

1. Understanding the eBook Mechatronic Engineering Lab Manual
 - The Rise of Digital Reading Mechatronic Engineering Lab Manual
 - Advantages of eBooks Over Traditional Books
2. Identifying Mechatronic Engineering Lab Manual
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in a Mechatronic Engineering Lab Manual
 - User-Friendly Interface
4. Exploring eBook Recommendations from Mechatronic Engineering Lab Manual
 - Personalized Recommendations
 - Mechatronic Engineering Lab Manual User Reviews and Ratings
 - Mechatronic Engineering Lab Manual and Bestseller Lists
5. Accessing Mechatronic Engineering Lab Manual Free and Paid eBooks
 - Mechatronic Engineering Lab Manual Public Domain eBooks
 - Mechatronic Engineering Lab Manual eBook Subscription Services
 - Mechatronic Engineering Lab Manual Budget-Friendly Options
6. Navigating Mechatronic Engineering Lab Manual eBook Formats
 - ePub, PDF, MOBI, and More
 - Mechatronic Engineering Lab Manual Compatibility with Devices
 - Mechatronic Engineering Lab Manual Enhanced eBook Features
7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Mechatronic Engineering Lab Manual
 - Highlighting and Note-Taking Mechatronic Engineering Lab Manual
 - Interactive Elements Mechatronic Engineering Lab Manual
8. Staying Engaged with Mechatronic Engineering Lab Manual

- Joining Online Reading Communities
- Participating in Virtual Book Clubs
- Following Authors and Publishers Mechatronic Engineering Lab Manual
- 9. Balancing eBooks and Physical Books Mechatronic Engineering Lab Manual
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Mechatronic Engineering Lab Manual
- 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
- 11. Cultivating a Reading Routine Mechatronic Engineering Lab Manual
 - Setting Reading Goals Mechatronic Engineering Lab Manual
 - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Mechatronic Engineering Lab Manual
 - Fact-Checking eBook Content of Mechatronic Engineering Lab Manual
 - Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
- 14. Embracing eBook Trends
 - Integration of Multimedia Elements
 - Interactive and Gamified eBooks

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