Introduction

The scope of this lab is to introduce the student to the characteristics and application of real world active devices. The devices that will be examined include the diode, the operational amplifier, the transistor as well as linear ICs such as 555 timer. The lab will also give the student the opportunity to design active component circuits and to enhance their test and measurement skills. This lab exposes student to the new piece of equipment, NI ELVIS, wherein all the conventional equipment such as, Oscilloscope, Function Generator, Variable Power Supply, Digital Multi meter are integrated into one single unit. All the operations are controlled by the software installed on the computer to which NI ELVIS is connected.

NI ELVIS Overview

NI ELVIS combines hardware and software into one complete laboratory suite. This chapter provides an overview of the hardware and software components of the NI ELVIS.

NI ELVIS Hardware

The following sections briefly describe the hardware components of the NI ELVIS.

NI ELVIS Bench top Workstation

The bench top workstation and the DAQ(Data Acquisition) device together create a complete laboratory system. The workstation provides connectivity and functionality. The control panel on the workstation provides easy-to-operate knobs for the function generator and variable power supplies, and it offers convenient connectivity in the form of BNC and banana-style connectors to the NI ELVIS - Scope SFP(the software panel) and NI ELVIS - DMM SFP. The bench top workstation also contains a protection board that protects the DAQ device from possible damage resulting from laboratory errors.

Figure: Control Panel Diagram of the Bench top Workstation
The bench top workstation has the following controls and indicators:

- **System Power LED**—Indicates whether the NI ELVIS is powered
- **Prototyping Board Power Switch**—Controls the power to prototyping board.
- **Communications Switch**—Requests disabling software control of the NI ELVIS. This setting provides direct access to the DAQ device DIO lines.
- **Variable Power Supplies Controls**

The NI ELVIS hardware provides a Function Generator and Variable Power Supplies from the benchtop workstation. The NI ELVIS provide the functionality of the following instruments:

- Arbitrary Waveform Generator (ARB)
- Bode Analyzer
- Digital Bus Reader
- Digital Bus Writer
- Digital Multimeter (DMM)
- Dynamic Signal Analyzer (DSA)
- Function Generator (FGEN)
- Impedance Analyzer
- Oscilloscope (Scope)
- Two-Wire Current Voltage Analyzer
- Three-Wire Current Voltage Analyzer
- Variable Power Supplies

**NI ELVIS Prototyping Board**

The NI ELVIS Prototyping Board connects to the bench top workstation. The prototyping board provides an area for building electronic circuitry and allows the connections necessary to access signals for common applications. The figure below shows the layout of the interconnections inside the board.

![Layout of the Prototyping Board](image-url)
**Safety Information**

The following section contains important safety information that you *must* follow when using the product.

*Do not* operate the product in a manner not specified in this document.

Misuse of the product can result in a hazard.

You *must* insulate signal connections for the maximum voltage for which the product is rated. *Do not* exceed the maximum ratings for the product.

Do not install wiring while the product is live with electrical signals. Do not remove or add connector blocks when power is connected to the system.

Avoid contact between your body and the connector block signal when hot swapping modules.