

EE 3444-003 Electronics II Lab

Fall 2011
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Lab Manual:

H.T. Russell, Jr., *EE 3444 Electronics II Lab Manual, VI.1*, OPAL_{TX}, Fort Worth, TX, 2011.

Times and Location:

Lab Section 003 – Thursday, 9:30 am to 12:20 pm, NH148A.

GTAs:

Lab – TBD.

EE 3444-003 Lab Schedule			
Week/Dates		Lab	Lab Topic
1	8-25		Introduction to EE labs and lab orientation.
2	9-1	Lab 1	Bipolar Device Characterization.
3	9-8		
4	9-15	Lab 2	MOSFET Characterization.
5	9-22		
6	9-29	Lab 3	Biased Current Sinks and Sources.
7	10-6		
8	10-13	Lab 4	Self-Biased Current Sinks and Sources.
9	10-20	Lab 5	Current Mirrors.
10	10-27		
11	11-3	Lab 6	Single-Stage Amplifiers.
12	11-10	Lab 8	Amplifier Networks.
13	11-17	Lab 11	Linear Voltage Regulator.
14	11-24		Thanksgiving Holiday
15	12-1	Lab 12	Switch-Mode Voltage Regulator.

16	12-8		
17	12-15		All lab reports due

References:

1. P.R. Gray, P.J. Hurst, S.H. Lewis, and R.G. Meyer, *Analysis and Design of Analog Integrated Circuits, Fourth Edition*, John Wiley & Sons, Inc., New York, NY, 2001.
2. S. Franco, *Design with Operational Amplifiers and Analog Integrated Circuits, 3rd Ed.*, The McGraw-Hill Companies, Inc., New York, NY, 2001.
3. A.B. Grebene, *Bipolar and MOS Analog Integrated Circuit Design*, John Wiley and Sons, Inc., New York, NY, 1984.
4. P. Antognetti and G. Massobrio, *Semiconductor Device Modeling With SPICE, Second Edition*, McGraw-Hill Book Co., Inc., New York, NY, 1993.
5. *SPICE 2 User's Guide*, University of California Berkeley, Electronics Research Labs, Berkeley, CA.

Lab Rules:

1. Regardless of the lab section, student attendance in all EE 3444 labs is mandatory and not an option. You must attend each and every lab meeting for the entire time the lab is scheduled to be in session.
2. As indication of your attendance, you must sign and write the time of day on the lab sign-in sheet which is provided at the beginning of each lab. If your signature and time stamp are not on the sign-in sheet, you are considered to be absent and not in attendance for that lab meeting.
3. Do not sign for your lab partner(s) if they are not in attendance.
4. Lab attendance is counted in the lab grade.
5. You are responsible for obtaining and applying data sheets for any and all components used in the lab experiments.
6. It is mandatory that the circuits you build and layout for the lab experiments work and perform as designed. This is not an option. You are responsible for trouble shooting your circuits and correcting any problems that cause them not to work.
7. You must include photos of all breadboards, protoboards, and/or printed circuits boards constructed for the lab experiment in your formal lab report. This is mandatory and not an option.
8. Formal lab reports are due on the date indicated. Reports submitted after the due date are considered late. Any late lab reports will not be counted in your lab grade.
9. If necessary, exceptions, additions, modifications, inclusions, and details to these and all other lab rules will be provided prior to or during the lab.

Tools:

1. Scientific calculator.
2. Breadboard (mandatory).
3. Toolbox (mandatory) – containing an assortment of electronics tools consisting of needle nose pliers, diagonal cutters, tweezers, precision knife set, pocket screwdrivers.

Tool Box Components			
Component	Example Brand	Example Source	Price (\$)
Suitable container (all-purpose plastic tool box; fishing tackle box)	Keter (13" all-purpose box)	Wal-Mart	3.64
Needle nose pliers (4" to 5")	Stanley (mini plier set)	Wal-Mart	12.88 (set of 6)
Diagonal cutters (4" to 5")	Stanley (mini plier set)	Wal-Mart	

Wire strippers (5")	H-Tools (cutter and stripper, 34-899C)	Fry's	3.49
Prototype breadboard (6.5" x 2" to 6.5" x 4" with 3 to 5 binding posts)	Elenco (Model 9425, 6.5" x 2", 830 test points)	Fry's	9.99
Precision screwdriver set (6 to 11 piece set with slotted and Phillips screwdrivers)	Stanley (6 piece; 4 slot- ted, 2 Phillips)	Wal-Mart	4.88
22 gauge solid hook-up wire	Fry's product number: PLU#1615281	Fry's	2.99
		Tax:	3.09
		Total:	40.96

Component Photos:

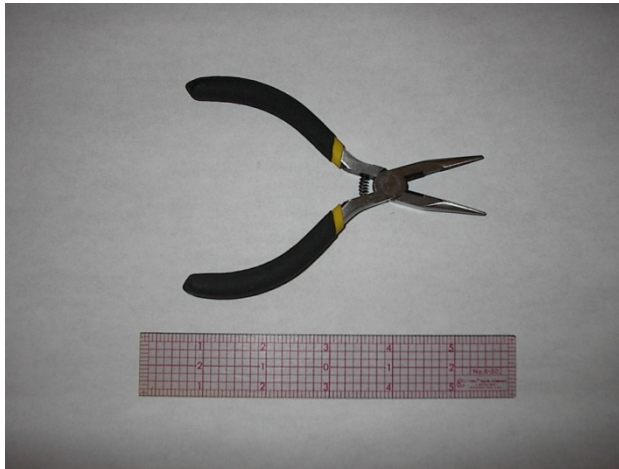


Figure 1
5" needle-nose pliers



Figure 2
Wire strippers



Figure 3
5" diagonal cutters

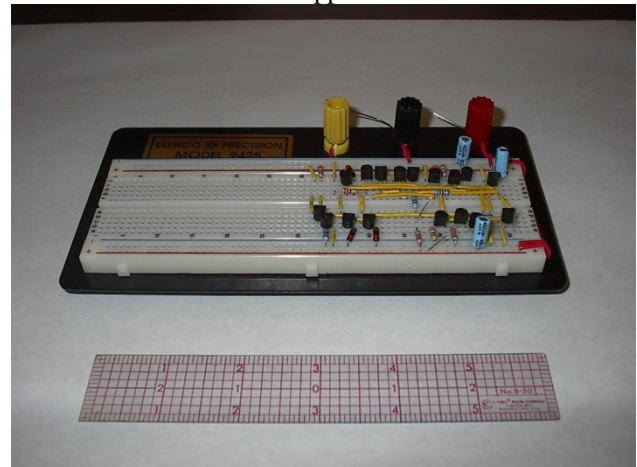


Figure 4
Three binding post breadboard

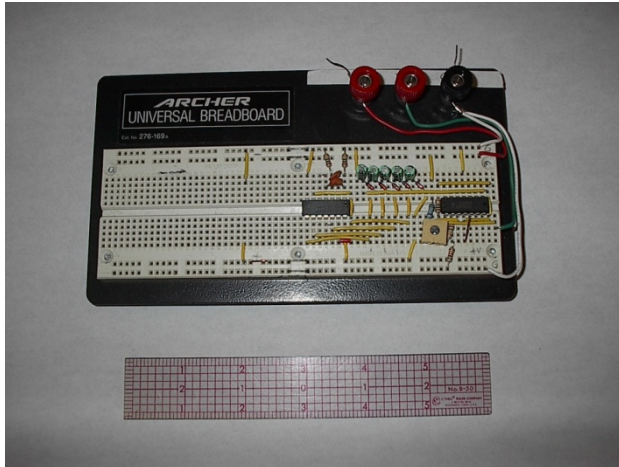


Figure 5
Three binding post breadboard

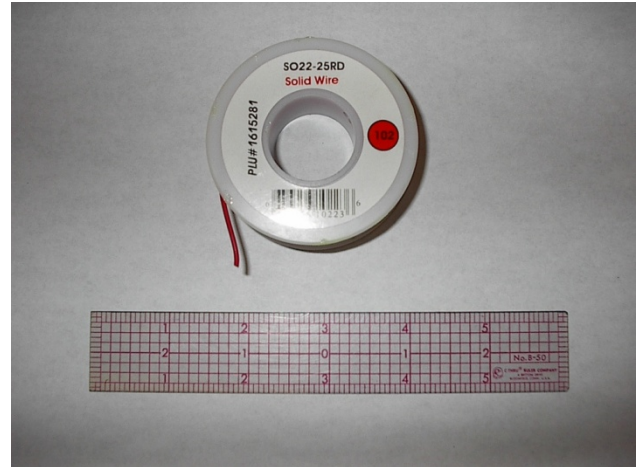


Figure 6
22 gauge wire

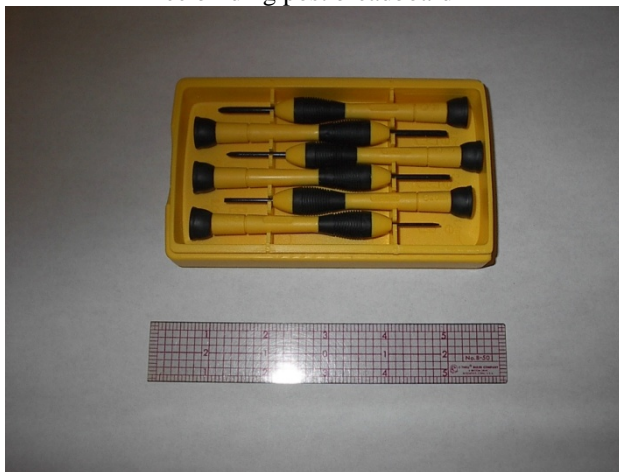


Figure 7
Screwdriver set

Breadboard Layout Examples:

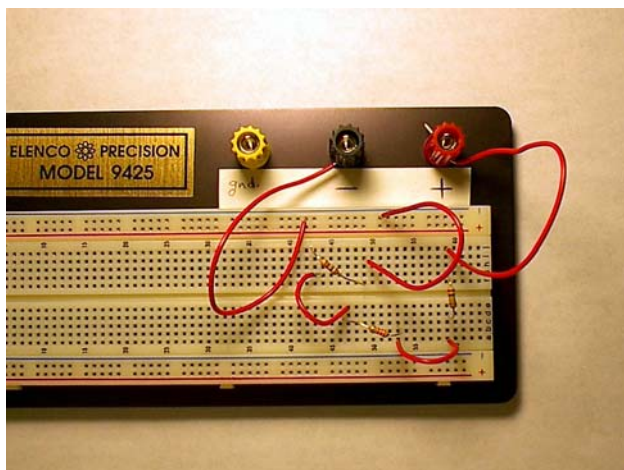


Figure 8
Wrong way – off the board with loops

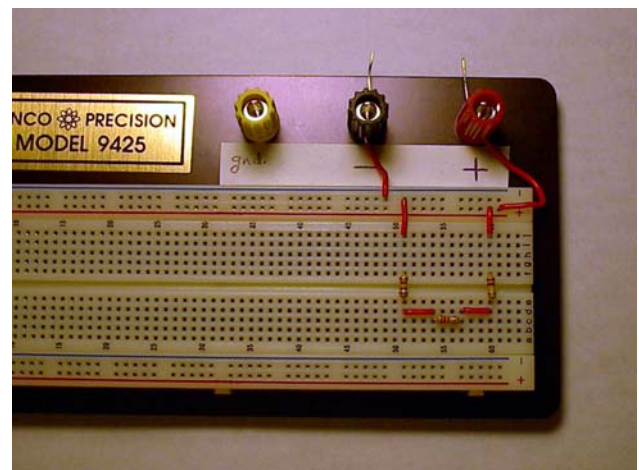


Figure 9
Right way - low to the board and tight

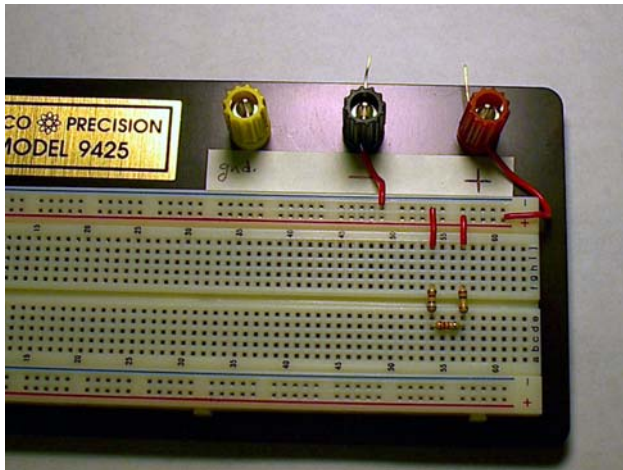


Figure 10

Right way – low to the board and even tighter

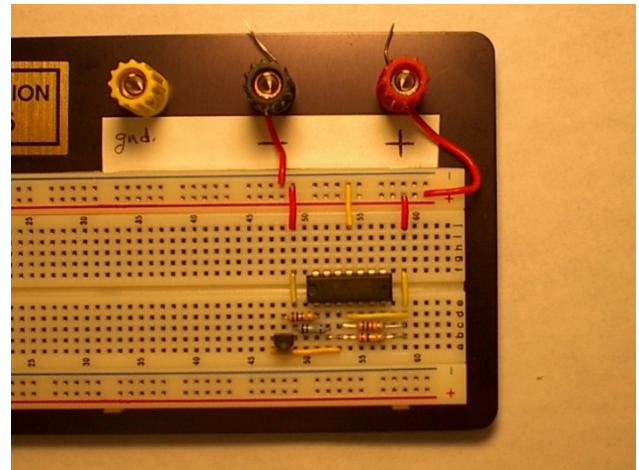


Figure 11

Correct way

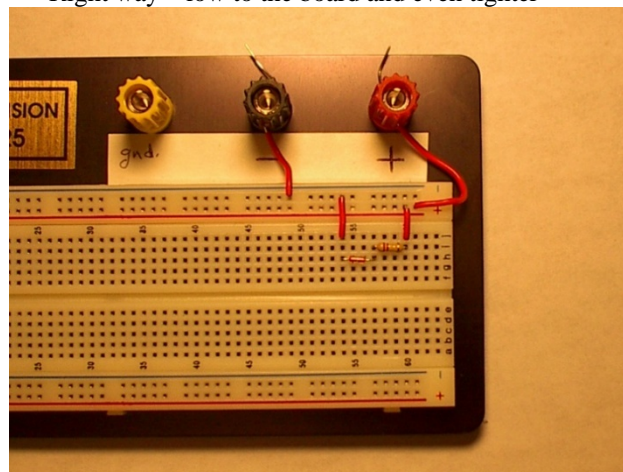


Figure 12

Correct way

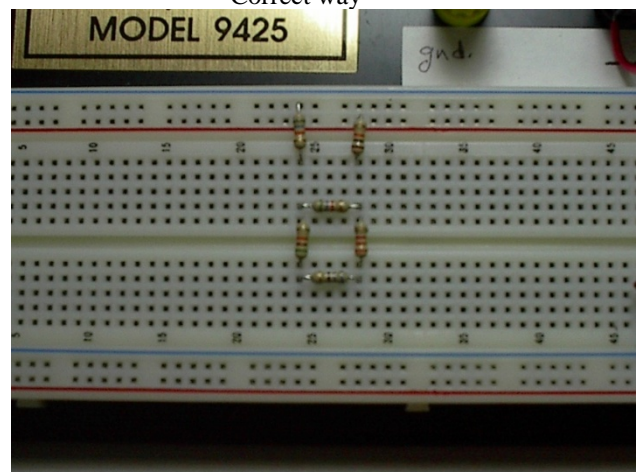


Figure 13

Correct way

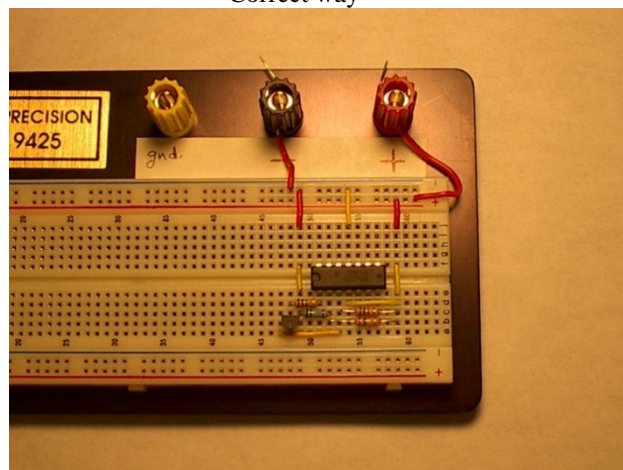


Figure 14

Correct way

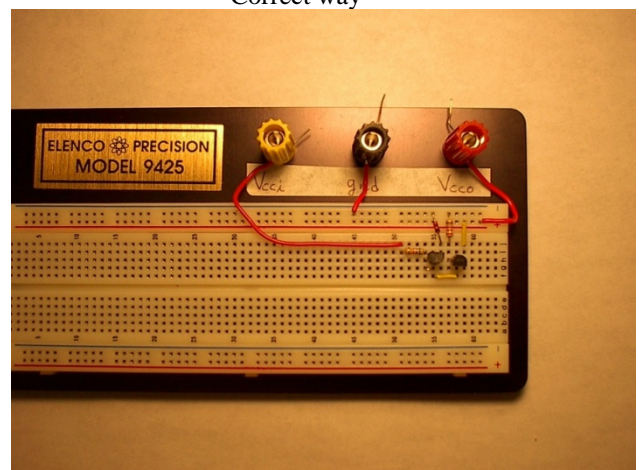


Figure 15

Correct way

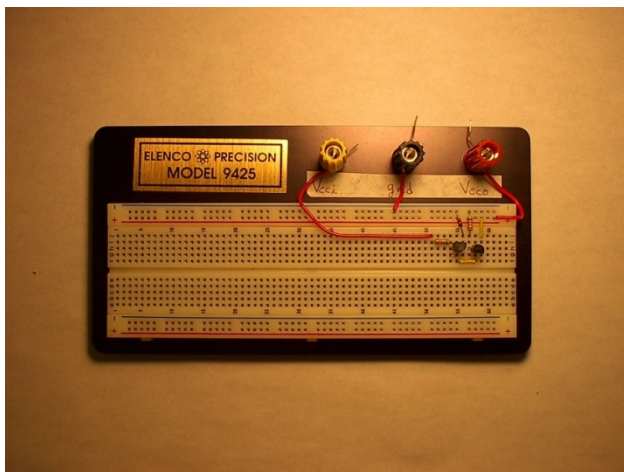


Figure 16
Correct way

Important dates:

1. Census date – **Monday, September 12, 2011.**
2. Spring 2012 registration starts – **Monday, October 24, 2011.**
3. Last day to drop classes – **Friday, November 4, 2011.**
4. Last day of classes – **Friday, December 9, 2011.**

Drop Policy:

Please refer to the University policy for dropping courses.

Americans With Disabilities Act:

The University of Texas at Arlington is on record as being committed to both the spirit and letter of federal equal opportunity legislation; reference Public Law 92-112 - The Rehabilitation Act of 1973 as amended. With the passage of federal legislation entitled *Americans with Disabilities Act (ADA)*, pursuant to section 504 of the Rehabilitation Act, there is renewed focus on providing this population with the same opportunities enjoyed by all citizens. As a faculty member, I am required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Student responsibility primarily rests with informing faculty of their need for accommodation and in providing authorized documentation through designated administrative channels. Information regarding specific diagnostic criteria and policies for obtaining academic accommodations can be found at www.uta.edu/disability. Also, you may visit the Office for Students with Disabilities in room 102 of University Hall or call them at (817) 272-3364.

Student Support Services Available:

The University of Texas at Arlington supports a variety of student success programs to help you connect with the University and achieve academic success. These programs include learning assistance, developmental education, advising and mentoring, admission and transition, and federally funded programs. Students requiring assistance academically, personally, or socially should contact the Office of Student Success Programs at (817) 272-6107 for more information and appropriate referrals.

Final Review Week:

A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week unless specified in the class syllabi. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. Classes are held as scheduled during this week and lectures and presentations may be given.

E-Culture Policy:

The University of Texas at Arlington has adopted the University email address as an official means of communication with students. Through the use of email, UT-Arlington is able to provide students with relevant and timely information, designed to facilitate student success. In particular, important information concerning registration, financial aid, payment of bills, and graduation may be sent to students through email. All students are assigned an email account and information about activating and using it is available at www.uta.edu/email. New students (first semester at UTA) are able to activate their email account 24 hours after registering for courses. There is no additional charge to students for using this account, and it remains active as long as a student is enrolled at UT-Arlington. Students are responsible for checking their email regularly.

Ethics:**Student Responsibility**

Undergraduate and graduate students assume full responsibility for knowledge of all University rules, regulations and deadlines published in the Undergraduate and Graduate Catalogs and of all departmental and program requirements concerning their degree programs.

Academic Dishonesty

All students are expected to pursue their academic careers with honesty and integrity. Academic dishonesty includes, but is not limited to, cheating on a test or other coursework, plagiarism (offering the work of another as one's own) and unauthorized collaboration with another person. Students found responsible for dishonesty in their academic pursuits are subject to penalties that may range from disciplinary probation, suspension or expulsion from the University. In accordance with the Rules and Regulations of the Board of Regents of The University of Texas System (Part One, Chapter VI), institutional procedures regarding allegations of academic dishonesty are outlined in Part Two, Chapter 2, of the U.T. Arlington Handbook of Operating Procedures. This information may be obtained by accessing the Dean of Students' Web site at www.uta.edu/studentaffairs/dos or the Student Judicial Affairs' Web site at www.uta.edu/studentaffairs/judicialaffairs. Copies of each regulation can be obtained in the Dean of Students' Office on the lower level of the University Center.

Definitions (UTA Handbook of Operating Procedures)

F. scholastic dishonesty, including, but not limited to, cheating on an examination or an assignment, plagiarism, and collusion;

1. *cheating on an examination or an assignment* includes:
 - a. copying the work of another, engaging in written, oral or any other means of communication with another, or giving aid to or seeking aid from another when not permitted by the instructor;
 - b. using material during an examination or when completing an assignment that is not authorized by the person giving the examination or making the work assignment;
 - c. taking or attempting to take an examination for another, or allowing another to take or attempt to take an examination for a student;
 - d. using, obtaining, or attempting to obtain by any means, the whole or any part of an un-administered examination or work assignment;
 - e. any act designed to give unfair advantage to a student or the attempt to commit such an act;
2. *plagiarism* means the unacknowledged incorporation of the work of another in work that is offered for credit;
3. *collusion* means the unauthorized collaboration with another in preparing work that is offered for credit.

The following is an excerpt from the College of Engineering's statement on Ethics, Professionalism, and Conduct of Engineering Students. Read the statement carefully, sign it, and return it to your instructor. You may make a copy for your records. Additional copies of this statement can be obtained from your instructor or the Office of the Dean of Engineering.

**STATEMENT ON ETHICS, PROFESSIONALISM, AND CONDUCT
FOR ENGINEERING STUDENTS
COLLEGE OF ENGINEERING
THE UNIVERSITY OF TEXAS AT ARLINGTON**

The College cannot and will not tolerate any form of academic dishonesty by its students. This includes, but is not limited to cheating on examination, plagiarism, or collusion.

Cheating on an examination includes:

1. Copying from another's paper, any means of communication with another during examination, giving aid to or receiving aid from another during examination;
2. Using any material during examination that is unauthorized by the proctor;
3. Taking or attempting to take an examination for another student or allowing another student to take or attempt to take an examination for oneself.
4. Using, obtaining, or attempting to obtain by any means the whole or any part of an un-administered examination.

Plagiarism is the unacknowledged incorporation of another's work into work which the student offers for credit.

Collusion is the unauthorized collaboration of another in preparing work that a student offers for credit.

I have read and I understand the above statement.

In addition, I understand that, in order to ensure fairness to all students, exams will be proctored and possibly video-taped.

Course and section number: _____EE 3444-003_____

Date: _____

Student's signature: _____

Student's name, printed: _____

Student's ID number: _____

Student's e-mail address: _____
(please print clearly)