Technical Report

School of Electronic Engineering and Computer Systems

UNDERGRADUATE TEACHING LABORATORY

Part I and Part II Students

Technical Report

Throughout their working lives professional engineers and scientists are required to write technical reports. In industry, these can vary from short monthly progress reports for line managers to detailed reports of a major development which will be used by patent agents to protect an invention or will be lodged in the company library to be used by other engineers. Often, it is necessary to write up a particular piece of work as a paper for publication in conference proceedings or in journals. While the specification of each type of report is different in detail, they all have certain features in common. The most important feature is that they present information in a clear and unambiguous way so that it can be understood and acted upon by the reader. It is important to remember that reports are written for the benefit of the reader. To achieve this aim, technical reports have a clear structure, each section having a particular function as described below.

Structure of a Technical Report

The structure you should adopt for the technical report is outlined below:

Title page
This gives the title of the report, the author's name and address and the date when the report was written.

Summary
This appears on the second page and is a 200 - 250 word summary of the complete report. It should outline for the reader why the work was done, how it was done (mentioning any special features of the experimental apparatus or techniques used), what the main results were and what conclusions were drawn from the work.

Contents
This follows on the next page and lists all the section headings and the numbers of the pages on which the various sections appear.

1. Introduction
This is the first main section of the report. It is generally designated section 1 and starts on page 1. It should state the aims and objectives of the work and provide the reader with enough background material (drawn from reference sources e.g. journal

and conference papers, text books and other reports - so some background reading in the library is necessary here) to appreciate why it was necessary to carry out the work e.g. development of new ideas, new or better apparatus available, need to characterise a new device, etc. (This part will be a little artificial in the context of set laboratory experiments - so you will have to use your imagination!).

The Introduction should end by outlining the approach that was adopted to achieve the aims and objectives of the work.

2. Theoretical

When detailed mathematical proofs are required to establish the principle that is being tested by the experiments, this section is optional and often appears as an appendix. Apart from this special case, a brief synopsis of the theoretical ideas behind the experimental work should be given under this heading, presenting those equations that you will need to use when testing the experimental data.

3. Experimental

This section describes all the equipment and the experimental techniques used in the work. The description should be supplemented with diagrams. The model number and manufacturer of major items of equipment should be provided. Finally and very importantly, you should indicate the accuracy to which the important experimental variables can be measured with the equipment you describe (e.g. the current was measured to an accuracy of 1% using a Keithley electrometer, Model 602). Provide only an outline description of experimental methods if these are of a routine nature. Any special or unusual procedures should be described fully.

4. Results

In this section you present the raw data obtained during the experiments either graphically (the preferred method) or tabulated. As each set of data is presented, it must be described in words and any features of interest pointed out to the reader e.g. whether a plot is linear or curved, continuous or discontinuous, data points scattered etc. Here you should prepare the reader for the discussion that follows in the next section. Generally, the calculation of any required parameter is done in this section. (There is no need to show steps in the calculation - simply tell the reader the number of the equation being used and the values of any parameters that are being substituted). Here you should tell the reader the overall accuracy to which the required parameter has been calculated from the data. (This is based on the accuracy of the instruments described in the Experimental section and any errors arising from curve fitting to the data presented in this section. It is meaningless and pointless to give the error between your reading and the accepted value).

5. Discussion

This is a very important section of the report because it is here that you discuss the results in terms of the ideas and concepts introduced in the Theory section and against the background which you painted in the Introduction. From this section, the reader should learn to what extent the aims and objectives set out in the Introduction have been met.

6. Conclusions

This section should summarise (i) the main results obtained and (ii) the main conclusions arrived at in the Discussion section.

Acknowledgments

Here you should acknowledge any special help that was provided to enable you to complete the work.

References

A numbered list of the references used in the report must be included here.

General points to remember

(a) All diagrams of apparatus, graphs, sketches, flow diagrams etc are called figures and are given consecutive figure numbers as they appear in the text. Below each figure you should have a figure number and a caption describing the figure (e.g. Figure 2 *A schematic diagram of the apparatus used for measuring the characteristics of a Schottky barrier diode).*

(b) Label the axes of graphs, providing the name and the units of the quantities used in the plot (e.g. a current-voltage characteristic would be labelled as follows:

y-axis: Current (mA)
x-axis: Voltage (V)

(c) All equations should be numbered sequentially so that you can refer back to them later when you are presenting or discussing your results. Every time a new parameter is introduced it should be defined in words e.g.

....The capacitance of a parallel plate capacitor is given by

$$C = \frac{\varepsilon\varepsilon_0 A}{d} \qquad (4)$$

where A is the plate area, d the separation of the plates, e the relative permittivity of the material between the plates and e_0 the permittivity of free space. ....

(d) Wherever material from a published source is used or cited in the report, this must be acknowledged by a reference. This involves placing a number in brackets (e.g. [5]) in the sentence which uses the published information. Each reference is numbered sequentially and collected in the reference list at the end of the report, where you must give full details of the cited work, e.g.

For books,:

1. DM Taylor and PE Secker, *"Industrial Electrostatics: Fundamentals and Measurements"*, Research Studies Press: Taunton, 1994.

For journal papers:

2. M Brodsky, *Electronics*, 53, 117-122 (1980).

NOTE
Copying from a published source and passing the work off as your own constitutes the legal offence of PLAGIARISM and can seriously affect your professional career.

(e) Reports should be written in the past tense i.e. tell the reader what you did. The use of "I" and "you" should be avoided at all times. The active voice should be used i.e. "..increasing the voltage increased the device current" rather than "..the device current was increased by increasing the voltage". Occasional use of the first person plural "we" can increase the interest of the report.

D.M.Taylor
18th August 1995