

DC MOTOR EXPERIMENTAL STATION

**This is presented in partial fulfilment for the award of the
Bachelor in Electrical Engineering of
INSTITUT TEKNOLOGI MARA**



ZAHARAN @ ABDULLAH BIN AWANG
Department of Electrical Engineering
INSTITUT TEKNOLOGI MARA
40450 Shah Alam
DECEMBER 1996

ACKNOWLEDGEMENT

All a praised to be ALLAH, The Beneficient, The Merciful . My ever-lasting thank to ALLAH for granting me patience in completing this project.

I would like to express my deepest gratitude to my Project Supervisor, Encik Mohamad Aris Bin Ramlan for his guidance, ideals and patientness in advising and assisting my project.

My gratitude also goes to Encik Ahmad Ismail, Encik Ngah Ramzi, Encik Kamal, Encik Zaini and Encik Maliki for their guidance and willingness in sharing knowledge and the opportunity to use the laboratory.

Also thanks to my friends for their suggestions and contributions towards the accomplishment of this project

Abdullah Bin Awang

MARA Institute of Technology

Shah Alam

Selangor

MALAYSIA

ABSTRACT

This project describe the development of the control system and measurement experimental station for conducting various experiments on D.C machine. The control system is capable of driving the D.C machine over wide range of speed by controlling the biasing voltage of a transistor. By varing this biasing voltage causes the input voltage into the machine to vary accordingly. Beside of driving the machine, the system is also capable of taking the measurement of current, voltage and speed. These parameters are acquired from the various signal sensing and conditioning subsystem which are designed to process into its digital equivalent before being transmitted into the computer through I/O interfacing card. All the data signals are then transmitted in sequence into the computer for computation . The software and hardware developed provide suitable tools for research or teaching in the electrical machine for various laboratory test and measurements. It also provide improvement in reliability and accuraccy of measurement and provide such features as speed copntrol , over load identification , protection and graphic display of measured variables.

TABLE OF CONTENTS

Topic

Page

Submission letter	i
Acknowledgement	ii
Abstract	iii
Table of content	iv-v

1.0 INTRODUCTION

1.1: An Introduction	1-2
----------------------	-----

2.0: DC MOTOR FUNDAMENTALS

2.1: Variable Speed Drive	3
2.2: Separately Excited DC Motor	3-6

3.0: PROPOSED SYSTEM AND HARDWARE

3.1: System Measurement And Control	7
3.2: Parameters Sensing Sub-System	7-10
3.2.1: Speed Module	8
3.2.2: Current Module	9
3.2.3: Voltage Module	9
3.2.4: Motor Control Module	9
3.3: Analog To Digital Converter	11-12
3.4: Digital To Analog Converter	13-14
3.5: Buffer Circuit	15
3.6: The I/ O Interface Card	
3.6.1: Card Specification	16-17
3.6.2: Card Features	18
3.6.3: Connector Pin Assignment	19
3.6.4: Base Address Selection	20
3.6.5: Inertial works before Using The Card	21
3.6.6: A/D Calibration Test	21

4.0: SOFTWARE DEVELOPMENT

4.1: Software Development	22-23
4.2: Programming And Test	24
4.3: List of A/D Parameter And Function	24-25
4.4: Flow Chart For Main Program	26
4.5: Software Listing	27

5.0: EXPERIMENTAL RESULTS

5.1: Load Test I	28
5.2: Load Test II	29
5.3: No Load Test I	30
5.4: No Load Test II	31

6.0: DISCUSSION AND FUTURE WORKS

6.1: The Discussion	32
6.2: Future Works	33
6.2.1: Selection Components	33
6.2.3: Software Development	33-34

7.0: CONCLUSION

35

REFERENCES

APPENDIXES

APPENDIX A: Graph Results

APPENDIX B: Software Programming