HIGHER TECHNICAL INSTITUTE ELECTRICAL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

DEVELOPMENT OF A DEMONSTRATION MEASURING INSTRUMENT (E/1037)

SHIAMMA PANAYIOTA

JUNE 1996

DEVELOPMENT OF A DEMONSTRATION

MEASURING INSTRUMENT

SUBMITTED BY: PANAYIOTA SHIAMMA

In partial fulfillment of the requirements of the award of the Diploma of the Technician Engineer in Electrical Engineering of the Higher Technical Institute in Cyprus.

Project Supervisor: Mr. S. Spyrou Senior Lecturer in HTI

June 1996



ACKNOWLEDGEMENTS

I would like to express my sincere thanks to my project supervisor Mr. Spyros Spyrou for his continuous guidance and assistance throughout the project period.

CONTENTS

INTRODUCTION

CHAPTER 1	
DIFFERENT TYPES OF CIRCUITS FOR MULTIMETERS	1
CHAPTER 2	
SELECTION, DESIGN AND OPERATION OF THE CIRCUITS	12
CHAPTER 3	
DEVELOPMENT AND CONSTRUCTION OF PCB CIRCUIT	29
CHAPTER 4	
CALIBRATION OF THE INSTRUMENTS	31
APPENDIX A	
OPERATIONAL AMPLIFIERS	34
APPENDIX B	
PART LISTS FOR CIRCUITS	38
APPENDIX C	
PRINTED CIRCUIT BOARDS	44

INTRODUCTION

The objectives of this project is to *select*, *design*, *develop*, *construct*, *test* and *calibrate* a measuring instrument to be suitable for demonstrating the principles and fundamentals of electrical measurement.

The system is suitable for measuring electrical quantities of voltage, current, resistance and capacitance.

It is also compact and portable and it contains its own power conversion source, making it suitable for connection to the 240V, 50Hz supply.

The circuits are designed to be connected to either analog or digital meters.