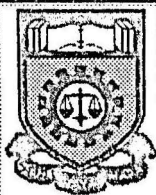


**AN IMPROVEMENT OF A TELEPHONE HAND-SET FOR HIGH
dB-RESPONSE PERSONS**

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



**SITI ZAUYAH ISMAIL
Department Of Electrical Engineering
INSTITUT TEKNOLOGI MARA
40450 Shah Alam, Malaysia
June 1995**

ABSTRACT

The purpose of this project is to improve the audibility of speech during telephone conversation for the hard of hearing. In general, hearing impaired are a group of people with hearing problems. A telephone model S2000A and a 5 octave equaliser is used in the design. The output of the telephone i.e the receiving call are modified to a certain level which gives better clarity to the hearing impaired person.

This telephone can also be utilised by the non-hearing impaired person by switching off the equaliser. Another features of this telephone will be a light indicator to visually help the hearing impaired notice incoming calls. The light will flashes out as the telephone rings. A hearing aid is not required when using this telephone due to sufficient amplification.

ACKNOWLEDGEMENT

In the name of ALLAH the Beneficent, the Merciful. It is with the deepest sense of gratitude of the Almighty Allah who give me the strength and ability to complete this project and thesis as it is today.

I am personally indebted to my project advisor, Puan Rusnani Ariffin who deserves most credit for her patience, inspiration and advice in guiding me towards the completion of this project and thesis. Thank you.

I am also indebted to University Hospital, especially to Professor.Madya Vijay Khanijow, for giving me the permission to borrow books from the medical library and Audiologist Vanaja who have given me great knowledge on the subject matter. Thank you so much for your precious time.

My gratitude also goes to Sistem Telekom Malaysia(STM) of Seksyen 18, Shah Alam Selangor Darul Ehsan especially to En.Hamidon, Mr.Thambu and technicians who have provided me necessary informations on telephone.

I would also like to express my deepest gratitude to lecturers, technicians who were involved directly or indirectly in giving invaluable assistance during this project. Thank you to all and may Allah S.W.T blessed your good deeds.

AN IMPROVEMENT OF A TELEPHONE HAND-SET FOR HIGH-dB RESPONSE PERSONS

<u>CONTENTS</u>	<u>Page No</u>
Abstract	1
Acknowledgement	ii
Contents	iii
1. Introduction	1
1.1 Telephone Systems : Telephone set And Block Diagram	2
1.2 Basic Features Of Telephone Model S2000A	4
2. The Hard Of Hearing Group	5
2.1 Types Of Hearing Loss	5
2.2 Audiometer : Block Diagram And Test Measurements	7
3. Hearing Aid And Its Parameters	11
3.1 Hearing Aid Block Diagram And Operations	13
3.2 Three Modes Of A Hearing Aid	14
4. Improved Telephone For The Hearing Impaired Group	17
4.1 Fundamental Concepts Of The Improved Telephone	17
4.2 Design And Features Of The Improved Telephone	18
4.3 Equaliser Characteristics	20
4.4 Testing Results Of Equaliser Circuit	24
4.5 Hardware construction	30
4.6 Casing	35

CHAPTER 1

1. INTRODUCTION

The use of telephone is not restricted to only normal people. Other groups such as the handicaps also use this facility. Handicaps like the hearing impaired or the hard of hearing people are those who are unable to listen to the ideal condition of sound. Hearing loss can be of many different types but how they perceive sound are the same, that is they experience a different sound pressure level at different frequencies. Therefore, an accurate amplification at each level of frequency is necessary.

In preparing for this project knowledge on how the hard of hearing accept sound is important. What they hear is felt as tickling sensation or as actual pain, also known as threshold of feeling pain. Besides that, understanding the hearing aid operation will give a close idea on what is going to be done.

As a result from the above suggestions, an equaliser is designed to modify the frequency response of the speech signal coming from the telephone. For speech and audio purposes only five frequency bands are selected. This five frequencies covers the high, middle and low range of frequencies where the maximum intelligibility and voice energy of the speech lies. Further, the frequency response plot of the equaliser is obtained to determine the maximum gain. In order to use the