HIGHER TECHNICAL INSTITUTE
ELECTRICAL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

DEVELOPMENT OF A COMPUTER CONTROLLED AMPLIFIER

By

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Development of a Computer Controlled Amplifier

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SUMMARY

Development of a computer control amplifier

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The objectives of this project were to design and construct an amplifier , a pre-amplifier and an interface card and using an IBM pc to control the variable functions of the pre-amplifier through a software , in other words to turn a personal computer into a hi-fi system .

The pre-amplifier should be capable of working with low and high levels of inputs without overloading the pre-amplifier . That also goes for the power amplifier . The functions (Volume , Balance , Treble and Bass) are controlled by digital or manual potentiometers .

The amplifier is giving sufficient power output end during operation of the amplifier there is no possibility of damaging the computer .

INTRODUCTION

Up to now all the stereo Hi-fi and music systems in the market were being controlled manually by the user or by the use of remote control . The control of the functions of those systems can also be done with the use of a personal computer . So the control can be more pleasurable and more fun . At the end your personal computer can be turned into a good quality hi-fi stereo system .

The project is being separated into three different parts: the pre-amplifier , the power amplifier and the interface card. The pre-amplifier and the power amplifier were built separately so they can be used separately . There are external (not in a form of a computer card) as a stereo hi-fi system with the possibility to be used and without the computer .

When we are talking about a computer controlled amplifier in simple words we mean that the computer is communicating through an interface card , or through an LPT or COM port with the pre-amplifier . And through the use of digital controlled potentiometers the functions of the pre-amplifier as volume , balance , treble , and bass can be controlled . So the pre amplifier is controlling the input signal and then is amplifying it so it can deliver sufficient input signal to the power amplifier . Then the power amplifier is giving us the corresponding output music level throughout the speakers after it has amplified the signal that has received from the pre amplifier.

Now if we take the three parts separately , first of all the pre amplifier is being constructed with the use of the LM381 dual preamplifier that is specially designed to meet the requirements of amplifying low level signals in low noise applications . Filters also were used (RC networks) for controlling the bass and treble functions and the use of manual and digital potentiometers for the controlled of all the functions .But to make the pre-amplifier more simple and reliable , manual switches were placed on the pre-amplifier that transfer the operation of the functions to manual potentiometers or digital potentiometers .So the pre amplifier can be used and without the use of the computer , and as a simple pre-amplifier . Also at the input of the pre-amplifier a linear stereo potentiometer was placed so that the input voltage for linear swing can be excited and so the linear operation can always be obtained . The pre-amplifier needs +15Volts DC with total current supply of 10mA . The pre-amplifier can be connected to the computer through a 9-core cable using the interface card.

The power amplifier has been built with two TDA2004 class B dual audio power amplifiers which each of them have been connected as a bridge amplifier so it can deliver 20 watt RMS to each channel . If the power amplifier is connected directly to a music player equipment , like cd-players that can deliver sufficient power to drive the power amplifier , then it can be used without it being driven by a pre-amplifier . At the input of the power amplifier as and of the pre-amplifier two potentiometers were being used so the input signal can be controlled .

The interface card is very simple and is based on gates . It is being placed on the system bus of an IBM PC (or compatible) motherboard. The interface card provides protective buffering , to limit the chances of damage to the computer by something connected throughout the card . The address gate for decimal address is 703(2BFH).You can use another address for the design of the interface card as long as it has not been taken . The interface card is being connected with the pre-amplifier and through the use of a software the digital potentiometers can be controlled . Now , the constructing of the interface card is not necessary .If someone was not using the LPT or COM port on his computer then he would be able to control the pre-amplifier through those ports.