HIGHER TECHNICAL INSTITUTE

ELECTRICAL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

DESIGN AND CONSTRUCTION OF A SURROUND, CENTER MATRIX IN ORDER TO BE USED IN HOME THEATER

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SUMMARY

Surround , center matrix by George Vassiliou

This project refers to the design and construction of a simple circuit that will detect, isolate and amplify independently the surround and center signals out of a stereo signal. This is obviously an analogue device that makes simple mathematical operations in order to achieve the required result.
There are two parts that comprise this project; the theoretical part that talks about various surround systems, analogue and also digital that you can find in market, and the practical part that involves the design and construction of the circuit with all the calculations for every component, and also some corrections made after troubleshooting.

INTRODUCTION

The purpose of the project is to provide an easy and inexpensive way of extracting additional signals such as center and surround, from a stereo signal coming either from a CD Player or from a stereo TV broadcast or even from any other stereo source that has been recorded with these signals encoded to the two channels forming the stereo signal.

How to combine four channels into two.

Dolby surround system allows a four channel sound to be delivered by a tow channel format. In a Dolby Surround recording, the left and right channels carry the center channel information as SUM (mono) signal. The surround information is also added into the left and right channels, but as a difference signal in the opposite phase.

The Dolby Surround Pro Logic decoder is constantly searching for sum and difference signals. Sum signals are steered into the center channel and difference into the surround channel. In order to increase the separation between the output channels, the surround decoder also reduces the sum (center channel) signal component from the left and right channels.

This circuit is of course not using a Dolby Surround decoder but it can detect and separately amplify center and surround signals out of the two channels of stereo. This is done in exactly the same way as mentioned before in the Dolby Surround decoder. This circuit is designed to Add and Subtract Left and Right channels producing a Sum which is called Center channel, and a Difference which is called Surround channel.

This project is also providing information about sources of digital surround and many other ways of encoding Left, Center, Right, and Surround channels during a recording. It also provides information about speaker placement and several factors to be taken into consideration when installing a Home Cinema System.