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TITLE

'THE DESIGN OF AN ELECTRONIC MUSIC SYNTHESIZER'

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## TABLE OF CONTENTS

Summary	
Design Basis for the Music Synthesizer	Ch 1
General Description of the Synthesizer Design	Ch 2
Sound Sources	Ch 3
Sound Manipulators	Ch 4
Control Units	Ch 5
Frequency Standards	Ch 6
Conclusion	Ch 7
Appendix	
Bibliography	

## The Design Basis of an Electronic Music Synthesizer

### SUMMARY

Initially this thesis examines the basic design considerations of electronic music synthesizers. It is pointed out that, irrespective of how sophisticated the musical instrument, it is necessary for the operator to select sounds by means of physical movements. If one of a large number of sounds is to be selected, then one of that large number of physical operations must be selected by the operator of the musical instrument. The implications of using taperecording techniques is considered. It is concluded that, at the outset, a musical instrument should be designed as either a monitored instrument where the sounds are heard as they are being selected, or as a programmed instrument where the instrument is adjusted at leisure but without the benefit of hearing the corresponding sound at the same time as the instrument is adjusted.

The thesis gives a design of a monitored music synthesizer. The design of each unit is related to the basic design considerations. The question of how to interconnect the units is examined, as is the relative importance of the sound sources and sound manipulators. The designs of the individual units are very different, so that different sounds are available to the musician. The four sound sources use the time domain, frequency domain, digital division and white noise as bases for the design approach. The sound manipulators produce lower frequency components as well as the more usual higher frequency components, and a voltage controlled filter is described.

The control units use a variety of sources of control; a hand operated lever with three degrees of freedom, a keyboard where combinations of notes as well as pressure are used, a foot controller, and even the sound of the voice is used. Two designs are given for reference oscillators which can be used when adjusting the keyboard controllers.

Each of these units is designed so as to make the greatest number of sounds available to the musician.

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## DECLARATION

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university and that, to the best of the candidate's knowledge and belief, the thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.