

HIGHER TECHNICAL INSTITUTE  
ELECTRICAL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

INVESTIGATION/APPLICATION OF PROGRAMMABLE  
LOGIC DEVIDES IN DIGITAL CCTS

*By*

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INVESTIGATION AND APPLICATION OF PROGRAMMABLE  
LOGIC DEVICES IN DIGITAL COUNTERS

COLLECTION, UTILIZATION AND APPLICATION  
OF SOLAR ENERGY

**TO MY PARENTS**

BY

E. 1019

In partial fulfillment of the requirements for the diploma award  
of the technician engineer in  
electrical engineering department of the

HIGHER TECHNICAL INSTITUTE

1981

# DIPLOMA PROJECT

## INVESTIGATION / APPLICATION OF PROGRAMMABLE LOGIC DEVICES IN DIGITAL CCTS:

### COLLECTION , UTILIZATION AND APPLICATION OF SOLAR ENERGY

**SUBMITTED BY:**

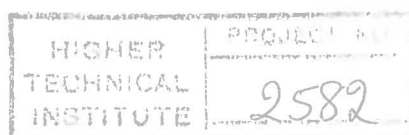
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### SUMMARY

This project deals with the techniques and basic principles associated with the collection and utilization of solar energy.

Influenced by the fact that in Cyprus, the sun shines at least ten months of the year for long and short periods every day, I intend to present a study of how the sun can be used as an energy source which will help to provide a solution to a future energy crisis.

This project is divided into two parts, theoretical and practical:

The theory recalls historical problems of energy and describes the anticipated needs of the future as present resources diminish. The sun as an alternative potential energy source is examined i.e. collection problems arising and possible solutions are discussed. A number of applications are listed. The idea of tracking is introduced and its advantages are described.

In part II a tracking system was designed, constructed and tested as outlined in part I.

An alternative design using a microprocessor is presented in Appendix 2. Both designs result in successful practical ccts which can be applied anywhere irrespective of illumination levels.

Until now, in Cyprus, little serious consideration has been given to solar energy collection. I hope that in the future more emphasis will be placed on this study and that we will see this design giving results.

## INTRODUCTION

The prospect of converting solar energy on a large scale may seem an ecologist's dream, incompatible with the needs of the modern economy. Yet, until comparatively recent times, man relied entirely on the sun for his energy needs.

Only in the nineteenth century, as a result of the prolific growth of industry in Western Europe and in the USA, did the extraction of fossil fuels become important.

The problem of energy was not considered very serious at the beginning of the century because petroleum deposits were enough to serve the needs of the society at that time.

Now as the cost of fuel continues to skyrocket, more people are looking towards the sun to meet their energy needs. The potential use of solar energy for both heating /cooling and electric power generation is tremendous. By some estimates, energy from the sun could account for more than 30% of the nation's total energy needs by the year 2000.

Today, man has become fully aware of the increasing dangers of pollution and the limited supplies of his present energy resources.

However, the development of solar electricity - in other words, direct conversion of solar energy into electricity - offers an inexhaustible and non-pollution energy supply. Solar electricity cannot be found ready for use in nature.

To obtain this new form of energy, devices must be invented which can collect the solar radiation and convert it into electricity.

"If now solar energy can be harvested" in outer space by a station in geosynchronous orbit, it can be beamed down to earth's surface as low power microwaves. In such a scenario, as much as 80% of our energy might come from the sun.

During 1973-74 there was an energy crisis which indicated a problem as far as energy was concerned. Therefore new methods have to be developed by which solar electric can supply of domestic needs.

Finally the development of solar energy applications does not mean the beginning of a new economic world: they have to win their place in the overall energy market.

The reader will find it interesting and very educational as he progresses through these pages. Unique and modern ideas about energy collection and its use are part of this project. Of course basic electrical and electronic engineering knowledge is required in order to understand the circuits and the programs.

In concluding the introduction I hope that more effective use of solar energy will be made in the future.

