

DESIGN CONSTRUCTION AND TESTING  
OF AN INFRA-RED REMOTE CONTROLLER

=====

Project report and construction submitted by:

ANDREAS ZANTIS

in part satisfaction of the award of

Diploma of Technical Engineer

in ELECTRICAL ENGINEERING

of the HIGHER TECHNICAL INSTITUTE

CYPRUS

June 1990



=====

## Infra-red Remode Controller

Written and constructed by: ANDREAS ZANTIS

Supervised by: SOTIRIS HADJIOANNOU

---

Infra-red remode controllers are widely used in every day life (eg. Television).

The perpose of this project is to design, construct and test such a remode controller which will probably used in controlling the gate of a garage.

The main advantages of this construction against other infra-red remode controllers are:

1] The encoding of the signal (production of a burst) in the transmitter and decoding of the signal in the receiver, leads to high reliability of the system, and interference is impossible. Even somebody with the same transmitting device cannot interfere due to the dip-switches combination (somebody with the same transmitter has only 1 out of  $4096=2^{12}$  possibility to interfere) .

2] The diodes of the transmitter are not working constantly (drived by DC) but they are driven by a burst (AC). As a result of this, the mean value of the power that

diodes can handle, increases making the the distance of transmission to increse as well.

This system could also be achived by using LASER, ULTRAVIOLET, ULTRASONIC or MICROWAVE ratiations. Laser, ultaviolet and microwave are not used due to the difficulties in constraction, and the damage that these ratiations can cause on human if these are used in every day life. Ultrasonic is not used because:

- a) It is very difficult to encode ultrasonic signals
- b) Ultrasonic can be interfere by bats or special dog wistles which radiate ultrasonic.

The report is devited into 6 main parts:

PART 1 (introduction) : Under this heading, all the information about the infra-red transmitting and receiving diodes, as well as for the nature of light and optoelectronics can be found.

PART 2 (transmitter) : This part has all the information and theory as well as the theoretical wireing diagram of the transmitter.

PART 3 (receiver) : This part has all the information and theory as well as the theoretical wireing diagram of the receiver.

PART 4 (performance) : This part consist of all the

experiments taken place either for the calculation of the values of the components, or the final performance of the system (waveforms)

PART 5 ( construction and applications) : This part consist of all the information about the construction of the system and the applications of the system in industry and every day life.

PART 6 (appendices) : this part consist of all the data found from the manufacturers of the components that helped during the design and testing of the system.

\*\*\*\*\*  
\*\* GENERAL CONTENTS \*\*  
\*\*\*\*\*

ACKNOWLEDGEMENTS. . . . . Page I  
REFERENCES. . . . . Page II  
SUMMARY. . . . . Pages III-V.  
PHOTOGRAPH OF THE CONSTRUCTION. . . . . Page VI  
GENERAL CONTENTS. . . . . Page VII

PART 1 INTRODUCTION. . . . . Pages 1 to 9

PART 2 TRANSMITER. . . . . Pages 10 to 19

PART 3 RECEIVER. . . . . Pages 20 to 37

PART 4 PERFORMANCE. . . . . Pages 38 to 47

PART 5 CONSTRUCTION & APPLICATIONS. . . . . Pages 48 to 78

PART 6 APPENDICES. . . . . Pages 79 to 100