

**Higher Technical Institute  
ELECTRICAL ENGINEERING DEPARTMENT**

**DIPLOMA PROJECT**

**DEVELOPMENT OF A MICROPROCESSOR  
CONTROLLED SET OF CHRISTMAS' LIGHTS**

*BY*  
**ARMEFTI MYRIA**  
*E/1165*

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**DEVELOPMENT OF A**  
**MICROPROCESSOR CONTROLLED SET**  
**OF CHRISTMAS' LIGHTS**

BY  
ARMEFTI MYRIA

PROJECT REPORT SUBMITTED  
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***Myria G. Arnefti***

SUMMARY

Project Title : Development Of a Microprocessor  
Controlled Set Of Christmas'Lights

By  
Arnefti Myria

This project work deals with the Intel 8031 microcontroller. More specifically it has to do with the design, construction and testing of the 8031 microcontroller. Also it includes the design, construction and testing of a Christmas' lights set with sixty-two coloured LEDs in the form of a sphere and the design, construction and testing of an interface circuit with power-transistors for connection to the above construction and to the microcontroller. Subsequently, the relevant software compatible with 8031 micro-controllers was developed to control the whole construction.

### INTRODUCTION

Single-chip microcomputers, also known as microcontrollers, are used primarily to perform functions such as controlling appliances and traffic lights. They are used as independent controllers in machines or as slaves in distributed processing. Nowadays almost all forms of consumer, industrial, and military electronics equipment use microcontrollers.

Generally microcontrollers, include all the essential elements of a computer **on a single chip**: MPU, R/W memory, ROM, and I/O lines. Typical examples of the single chip microcomputers are the Intel MCS-48, 51, and 96 families, the Motorola MC68H11 family and the Zilog Z8. Most of these microcomputers have an 8-bit word size, at least 64 bytes of R/W memory and 1K byte of ROM. The range of I/O lines varies considerably, from 16 to 40 lines.

The power, size and complexity of microcontrollers advanced an order of magnitude in 1980 with Intel's announcement of the 8051, the first device in the MCS-51 single chip microcontroller family. This device contains over 60,000 transistors and includes the following features:

- 4K bytes of ROM or EPROM
- 128 bytes of RAM plus 21 special functions registers (SFR)
- Four programmable I/O ports (32 I/O lines)
- Two 16-bit timer/event counters
- A serial I/O port with an UART
- Five interrupt lines: two for external signals and three for internal operations

Also it can operate with a 12 MHz clock and has a very powerful instruction set and it is designed for use in sophisticated real-time instrumentation and industrial control.

The 8051 is known as a "bit and byte processor". Its instruction set includes binary and BCD arithmetic operations, bit set/reset functions, and all logical functions. However its real power comes from its ability to handle Boolean Function. On any addressable

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