

A SURVEY ON THE PRESENT STATE OF VEHICLE ELECTRONIC SYSTEMS

BY

MARCOS ORPHANIDES

Project Report

Submitted to

*The Department of Mechanical Engineering,
of the Higher Technical Institute*

NICOSIA – CYPRUS

*In partial fulfillment of the requirements
for the diploma of*

TECHNICIAN ENGINEER

in

MECHANICAL ENGINEERING

JUNE 2001

HIGHER TECHNICAL INSTITUTE	PROJECT NO. 3282
----------------------------------	---------------------

CONTENTS

Acknowledgements	1
Summary	2
Introduction	3
<u>CHAPTER I</u>	
Engine management systems	5
(i) Combustion processes in a spark ignition engine	5
(ii) Ignition systems	14
<u>CHAPTER II</u>	
Electronic transmission control	29
(i) Electronically controlled semi-automatic transmission	30
(ii) Electronically controlled automatic transmission	35
<u>CHAPTER III</u>	
Electronic control of chassis systems	59
(i) Anti-lock braking system (ABS)	59
(ii) Traction control system (TCS)	79
(iii) Engine drag torque control (EDTC)	85
(iv) Electronic control of suspension	86

ACKNOWLEDGEMENTS

This project would not have been accomplished without the help of my friends who tolerated me until the completion.

A special thanks to Autoplus LTD for the technical information they provided me.

Also, last but not least a warm thank you to my supervisor Mr. P. Demetriou for his valuable assistance and information during the making of this project.

SUMMARY

Electronics of vehicles is a section on which all the car industries spend time and money in order to be improved. It is one of the most important sections in car industry and one of the most important things in an engineer's knowledge.

This project describes almost all the common and known electronics of an ordinary vehicle. Using special diagrams, tables and graphs, a brief image of the systems is shown and the principle of operation is explained. It describes the engine management, automatic transmission and a number of chassis systems, both history and present state.

This project is a helpful survey, which helps a future engineer to understand something more about electronics of vehicles and how fast this section has grown and improved over the recent years.

INTRODUCTION

Automotive history began in the middle of the eighteenth century when a Frenchman, Nicholas Cugnot, produced the world's first automobile. Using steam power he invented the world's first steam engine. Then Henry Ford came to continue Nicholas's work by developing and improving Nicholas's engine and by producing engines in mass production.

Since then vehicles have been modernized and improved a great deal in the exterior, interior, and in the engine bay. Electronics dominate the construction of a yet simple vehicle and have made life 'easy' for humankind.

From the instant the ignition key is turned on electronic systems start working making driving more comfortable and safe.

The main objective of this project is to describe the present state of vehicle electronic systems and explain the principles of operation of those systems. With the help of diagrams and tables one can easily apprehend the main purpose of electronics, on today's vehicles.

Nowadays almost every vehicle is equipped with all the necessary electronic systems. These systems dominate the car market and play an important role, both to safety and reliability of a vehicle. The competition is fierce between all the car industries and electronics is one of the main reasons why!