

HIGHER TECHNICAL INSTITUTE
ELECTRICAL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

DEVELOPMENT OF A DUAL AXIS NEEDLE
ELECTRODE POSITIONER

VOLUME 2

HAJICHRISTOU LOUIS

E/1011

JUNE 1996

VOLUME 2

SECTION 1
GENERAL DESCRIPTION

DEVELOPMENT OF A DUAL AXIS NEEDLE

ELECTRODE POSITIONER

Project report submitted by

LOUIS HAJICHRISTOU

to the

Higher Technical Institute

Nicosia, Cyprus

in partial fulfilment of the requirements

for the Diploma of

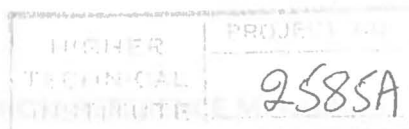
TECHNICAL ENGINEER

in

ELECTRICAL ENGINEERING

VOLUME 2

PROJECT No : E1011



SECTION 1 GENERAL DESCRIPTION

This reference manual will be a valuable aid in the development of M68HC11 applications. Detailed descriptions of all internal subsystems and functions have been developed and carefully checked against internal Motorola design documentation, making this manual the most comprehensive reference available for the M68HC11 Family of microcontroller units (MCUs).

Practical applications are included to demonstrate the operation of each subsystem. These applications are treated as complete systems, including hardware/software interactions and trade-offs. Interfacing techniques to prevent component damage are discussed to aid the hardware designer. For software programmers, **SECTION 6 CENTRAL PROCESSING UNIT (CPU)** and **APPENDIX A INSTRUCTION SET DETAILS** contain examples demonstrating efficient use of the instruction set.

This manual is intended to complement Motorola's official data sheet, not replace it. The information in the data sheet is current and is guaranteed by production testing. Although the information in this manual was checked against parts and design documentation, the accuracy is not guaranteed like the data sheet is guaranteed. This manual assumes the reader has some basic knowledge of MCUs and assembly-language programming; it may not be appropriate as an instruction manual for a first-time MCU user.

The information in this manual is much more detailed than would usually be required for normal use of the MCU, but a user who is familiar with the detailed operation of the part is more likely to find a solution to an unexpected system problem. In many cases, a trick based on software or on-chip resources can be used rather than building expensive external circuitry. Data sheets are geared toward customary, straightforward use of the on-chip peripherals; whereas, an experienced MCU user often uses these on-chip systems in very unexpected ways. The level of detail in this manual will help the normal user to better understand the on-chip systems and will allow the more advanced user to make maximum use of the subtleties of these systems.

In addition to this manual, the data sheet(s) or technical summary is needed for the specific version(s) of the M68HC11 being used. A pocket reference guide is another beneficial source.

1.1 GENERAL DESCRIPTION OF THE MC68HC11A8

The high-density complementary metal-oxide semiconductor (HCMOS) MC68HC11A8 is an advanced 8-bit MCU with highly sophisticated, on-chip peripheral capabilities. New design techniques were used to achieve a nominal bus speed of 2 MHz. In addition, the fully static design allows operation at frequencies down to dc, further reducing power consumption.