



# 68K 307-Module

The 68000 Micro-controller with Analogue, Digital, Serial I/O plus Keypad input and text or graphics LCD output

The picture shows a photograph of the 307-Module

## Features

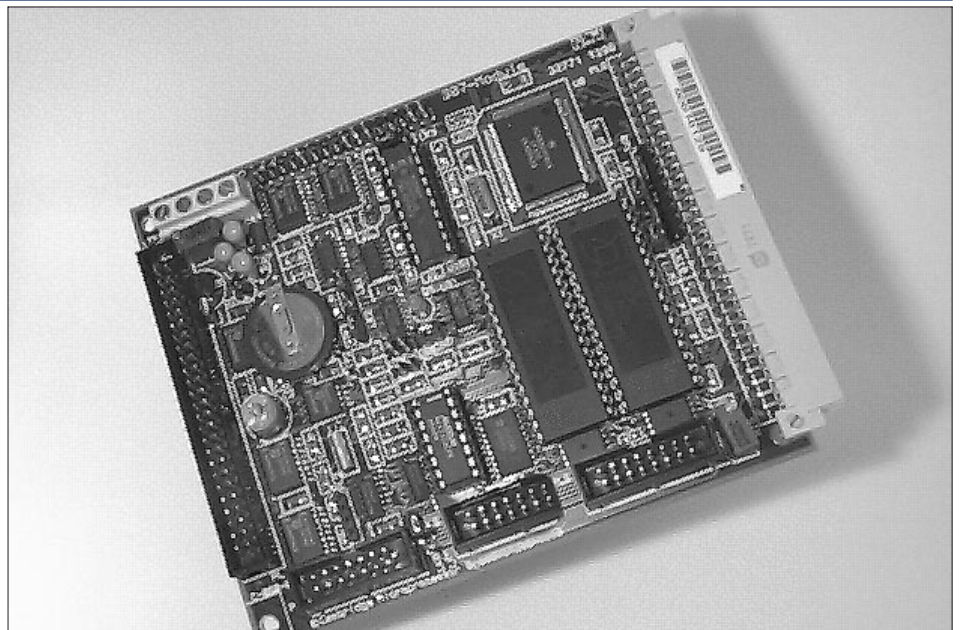
- ❑ 8/16/32 bit Microprocessor
- ❑ 68307 with 68000 instruction set
- ❑ Language choice C or Modula-2
- ❑ Real Time Operating System
- ❑ Low power CMOS construction
- ❑ Single 5 Volt operation
- ❑ Up to 2 M-byte EPROM space
- ❑ Up to 512 k-byte Static RAM
- ❑ Real Time calendar clock
- ❑ 8 x 8 matrix keypad port
- ❑ RS232 or RS485 Serial port
- ❑ LCD port for Text or Graphics
- ❑ I<sup>2</sup>C Serial Bus or M-Bus
- ❑ 36 digital I/O lines
- ❑ Two 16-bit counter/timers
- ❑ Four 8-bit analogue inputs
- ❑ One 8-bit analogue output
- ❑ Watch dog and power fail
- ❑ Numerous Low Power Modes

## Description

The 307-Module is a small 100 x 118 mm micro-controller packed with I/O features. The 32-bit microcontroller is powerful enough to be used as a central CPU in stand alone target designs. The card, on its own, or in combination with our extensive range of I/O and peripheral cards is capable of outstanding performance for its small size.

The 68307 micro controller uses the standard 68EC000 core processor. This is 100% code compatible with the standard 68000 instruction set. Around the CPU core are several peripheral devices including a 68681 type serial port, two 16 bit timer/counters, digital I/O lines and bus interface logic. The serial port can be operated over the standard baud rates between 200 and 38400. For non-standard baud rates one of the timer counters can be used for the baud rate generator. Buffers are provided on the board for RS232 or RS485/RS422 communications. The four fast digital I/O lines are driven directly by the micro controller

Two standard 32 pin JEDEC sockets are provided that can take EPROMs from 16 k-bytes (27C128) up to 1 M-bytes (27C080).



The on board 128 k-byte of static ram is battery backed for up to 1 month at 25degC, using a vanadium lithium cell which is trickle charged while power is supplied to the 307-Module. The battery backed real time calendar clock can be used to keep day of the week, date, month and year, hours, minutes and seconds. It also has alarm facilities.

The I<sup>2</sup>C bus is utilised for the analogue I/O and the remaining 32 digital I/O lines. The maximum operating speed of this bus is 100 kHz. The analogue I/O uses a single PCF8591 device with a 2.56V reference. It can be used as 4 single ended unipolar inputs, or two differential unipolar inputs. The analogue output is single ended unipolar. The keypad port uses up to 16 of the I<sup>2</sup>C digital I/O lines. It can easily be configured to work with different keypad matrixes.

The address mapped LCD port will connect directly to many of the two or four line alpha-numeric LCDs. An adapter will allow it to interface to the Hitachi range of graphics LCDs allowing upto 128 x 256 pixel displays to be used as well as 1/4 VGA displays. For the alphanumeric displays a contrast adjustment is provided, for the graphics LCDs the contrast adjustment is on the adapter board.

Three status LEDs are provided on the 307-Module along with a power fail detector and watchdog. The watchdog, when enabled, must be periodically triggered to prevent the Module being reset. This is a very useful feature allowing the Module to restart following a error condition without having to manually reset it.

The best way to develop code for the 307-Module is to purchase a development pack. The Development Pack includes everything that is required to write your applications code and test it as quickly as possible. The development pack comes with a 307-Module, a plug in mains power adapter, P.C. development software and utilities, documentation and an royalty free real time multitasking operating system.

An optional evaluation board is available and is the ideal development tool. It has two extra serial ports, allowing you to develop all the code from the P.C. and leave the on board serial port free for the target code. The evaluation board provides LEDs and switches to demonstrate the digital I/O lines, manual trimmer pots for the analogue inputs and test points to clip scope probes on for the analogue output. Screw terminals are provided to access the timer counter I/O signals and the I<sup>2</sup>C bus. Switches are also provided to reset the board, and to operate the interrupt lines.

The Module Bus expansion allows a wide range of peripheral boards to be added to the 307-Module including 12 bit or 16 bit analogue, extra digital I/O, serial ports, printer ports, video displays etc..

The P.C. development software comes in two versions. The Modula-2 pack comes with demo programs and a terminal program. The code is written using a text editor on the P.C. and the EPROMs in the 307-Module include a Modula-2 interpreter to convert the code from text to a p-code which is interpreted as the program is running. The C pack comes with an integrated editor, compiler, assembler and linker package.

When using the C Development Pack, code is typed into the built in editor, compiled and linked on the P.C. and down loaded to the 307-Module as machine code. Since the C code is compiled and not interpreted the C code runs approximately 5 times faster than the Modula-2 equivalent. Both packages contain all the P.C. utilities to generate EPROMs to run from power up from your application code. All that is required is an EPROM programmer to program the EPROMs. Code can also be run from battery backed RAM if required which is a very useful feature during development.

The Minos Real Time Operating system is provided as standard with all Development Packs. This is a powerful multi-tasking operating system that makes writing applications code very simple indeed. All hardware specific code is resolved by using drivers and descriptors, enabling the programmer to write code without having to know anything about a particular I/O device. The run time environment is fully multi-tasking allowing several programs to run concurrently. Minos is licensed on a royalty FREE basis providing the user with unlimited target software free of all charges.

## Specification

### Processor

MC68307 8/16/32 bit Micro-controller  
14.7456 MHz operating frequency

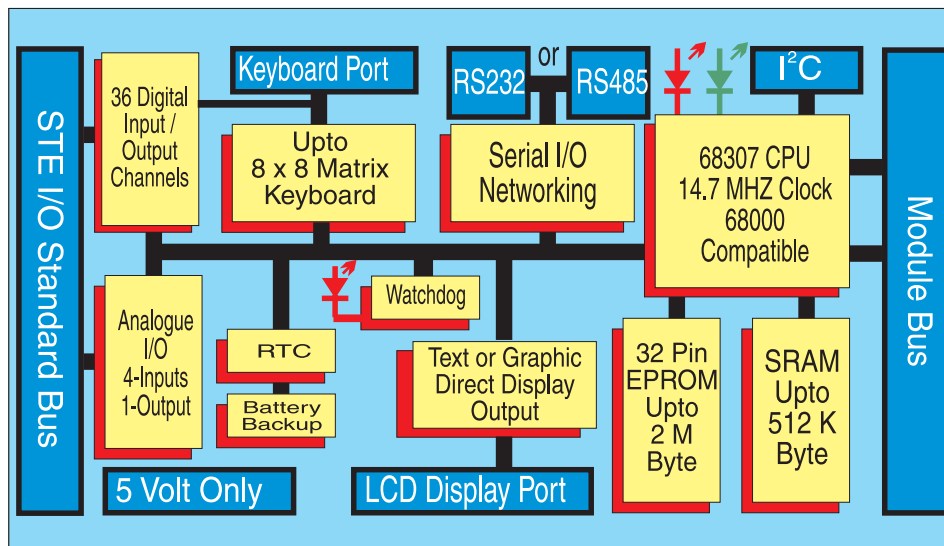
### Memory

2 M-byte EPROM space  
Up to 512 k-byte battery backed SRAM  
128 k-byte SRAM fitted as standard

### Serial Port

RS232 or RS485/422 buffered  
200 to 38400 baud  
Data size, stop bit and parity control  
Hardware handshaking

### Digital I/O



Four 8-bit parallel ports (32 channels)  
16 I/O lines used on keypad connector  
4 fast digital I/O lines  
Full edge detection and interrupt control

### Analogue I/O

Four 8-bit single ended inputs or  
Two 8-bit differential inputs  
One 8-bit output  
0 to 2.56 Volt input range  
On board reference

### Timer/counters

Two independent 16-bit timers  
Two match/counter/capture registers

### Real Time Calendar Clock

Seconds, Minutes, Hours  
Week day, Date, Month, Year  
Timer and Alarm function  
Full interrupt control

### Battery backup

Full battery backup for SRAM and RTC  
3V vanadium lithium cell  
20mAh operation

### Power Fail Detector

Independent power fail detection  
Allows recovery from power fail

### Watchdog Timer

Selectable watch dog enable

### LCD Port

Direct drive for a range of 2 and 4 line LCDs  
Adapter required for up to 128 x 256 pixel  
Graphics LCDs and 1/4 VGA LCDs.

### I<sup>2</sup>C Bus

Up to 128 external addresses  
Full software support

### Local Expansion bus

Full 68000 bus interface

### Size

100 x 118 x 20 mm 2/3 Eurocard

### Power Supply

5 Volt only operation  
150 mA @ 5 Volts

### Environmental

0 to 50 degC  
0 to 90 % RH (non condensing)

## Order Information

K-307M	307-Module Controller 128 k-byte
K-307G	307-Module Controller Graphics LCD
K-275	Graphics LCD Adapter Board
K-605	307-Module Evaluation Board

### Development Packs

H-307M	307-Module C Development Pack
J-307M	307-Module Modula-2 Development Pack

Module 970221



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