

PMB Electronics (Net-Tech Developments)

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PRODUCT NOTE

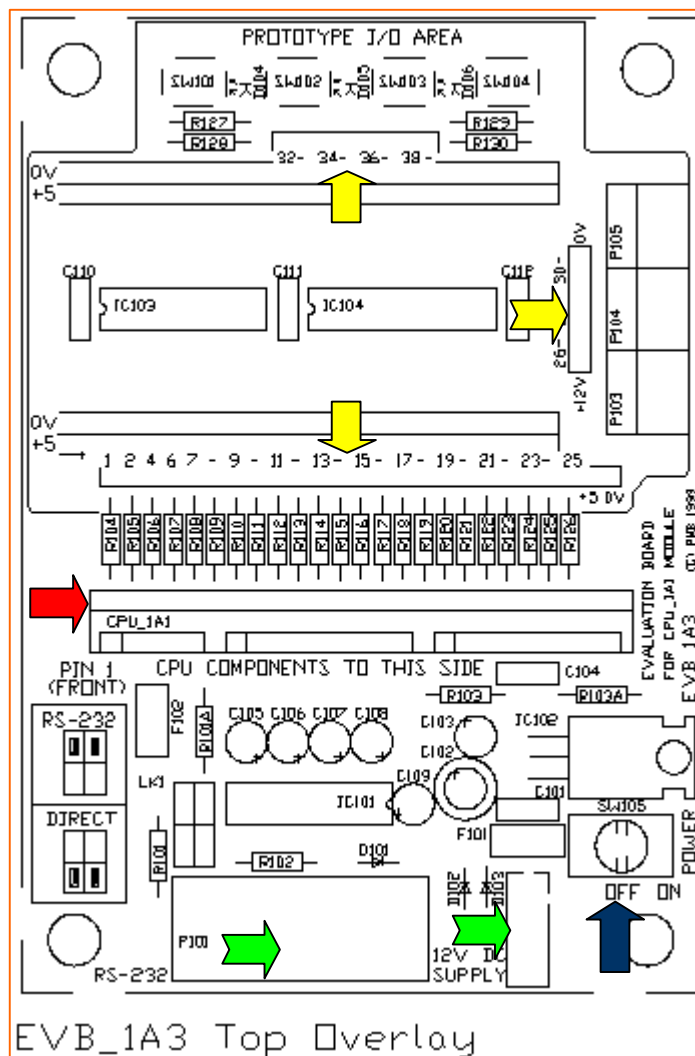
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CPU_1** DEVELOPMENT BOARD

INTRODUCTION

This is a simple development platform for the CPU_1* 68HC11F1 modules. It allows you to be up and running usually within half an hour. It is supplied in circuit board form with rubber feet to prevent it sliding around the desk.

The board provides a socket for the CPU module, on/off switch, voltage regulator, RS-232 interface and a prototype area with LED's, buttons and screw terminals.



CONNECTIONS

- At the bottom of the board are the 9-pin female D connector and 1.5mm DC power socket (green).
- A straight serial cable is required to connect the board to Com1 or Com2 of a PC.
- A 9V DC to 16V DC 200mA (min) power supply is also required. A plug-pack works well. There is a 150mA PTC fuse on the board.

POWER

- The on/off switch (blue) switches all power to the board.
- The power switch is also used to reset the CPU module.

INSERTING THE CPU

- Always switch the power off when working on the circuit and when inserting or removing the CPU module.
- The CPU module is plugged into the socket (red) with the component side facing the RS-232 and power connectors.
- Take care when handling the CPU module.

SOFTWARE

The CPU module (supplied separately) is supplied with some example HC11 code. There are two loaders available from PMB, a basic language version that requires Qbasic and runs under DOS, and a Win95/98 HC11boot program.

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The Qbasic program is quicker and will handle larger files, but it can be tricky to get it working on a modern PC. It can be made to operate out of Win95/98.

The HC11boot program is much easier to install and use when you are getting started. It is a little slower when downloading and large files may need to be broken into smaller sections.

- We recommend using the Win95/98 loader program “HC11boot”. This can be downloaded from the web site.

USING THE BOARD

The board is ideal for testing code segments as well as the complete embedded application. There are two basic ways to do this:

1. Download from the PC to the board into RAM. The code runs automatically following verify.
2. Download from the PC to the board into Flash memory and run the code by restarting the CPU in expanded mode.

The board is supplied with an LED in the prototype area linked to the CPU module. This allows easy verification of correct program loading.

- Insert the CPU module (ensure the links are inserted unless running Buffalo).
- Connect the serial cable between the board and the PC.
- Run the software on the PC (HyperTerminal for Buffalo, or the HC11Boot loader).
- Connect the power supply and switch on.

If running Buffalo:

- Buffalo must already be installed in the CPU module. If it is not, see the notes associated with Buffalo for the installation procedure.
- When power is first applied, Buffalo sends a sign-on message to the terminal (HyperTerminal) via the RS-232.
- Buffalo is now ready for use. Type “help” and press “enter” to see a list of commands and syntax.

If loading your own Code:

- This is done with the HC11 in bootstrap mode (both links inserted).
- Using the loader program on the PC, you can initialise the HC11. This installs a small program that allows Motorola S19 files to be loaded.
- The S19 file contains data and the addresses at which the data is to be stored. The data can be written to RAM, Flash or EEPROM.
- The S19 file is “loaded” then “Verified”. At the end of the verify, the program automatically runs from the first address in the first line of the S19 file.

NOTES:

- The LED linked to Port-A0 comes on when the CPU is initialised and ready to receive an S19 file. The LED flickers slightly while the S19 file is downloading.
- The S19 files can have the “.hex” extension. It depends on the assembler or compiler used.

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- For the downloaded code to run automatically after verify, the S19 data line must contain the data at the location from which execution starts. The loader that is initialised into the HC11, takes the first S19 address and runs from there on completion of verify.
- Multiple S19 files can be downloaded. Verify only the last file downloaded.
- The utilities “erase” and “dump” are a good place to start when first trying to understand the download procedures.

As you become more familiar with the HC11F1 and the CPU module, you will come across other ways of downloading and running your programs. One way is to modify the source assembly file of the initialisation code to make the HC11boot program better suit your application.

PROTOTYPE AREA

This can be used to test input/output circuit ideas or if you do not want to modify the board, to link to an adjacent breadboard.

The rows of pins (yellow) can be interconnected using fine teflon covered wire-wrap wire and a small hand operated wire-wrap tool. This allows the LED's, buttons and terminals to be connected without soldering on the board.

On three sides of the prototype area are pins. Using fine wire-wrap wire these can be cross-linked or used to connect to your own circuitry.

Pins 1 to 25 are the same as the pins of the CPU module.

Pins 26 to 31 connect to the screw terminals (26 = +12V, 31 = 0V)

Pins 32 to 39 connect to the LED's and push buttons (36 = 0V)

NOTES:

- There are 1.2K resistors between the pins and the CPU module. These provide a reasonable level of protection to the CPU module. They also allow direct wire links to the LED's
- The LED's are connected cathode to 0V. Apply +V (via a resistor) to make the LED glow.
- The push buttons are connected common to 0V with a pull-up to +5V. The push button pins can be directly linked to the CPU module pins.

Additional files and information are available at www.pmb.co.nz

For more information or assistance, contact paul@pmb.co.nz