

# PMB Electronics (Net-Tech Developments)

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## PRODUCT NOTE

DATE: 17-June-2000      FILE: basic11 for cpu\_1a1\_1.doc  
Class "C"      No charge      S# n.a.

## BASIC11 for CPU\_1A1 & CPU\_1B

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### INTRODUCTION

This is Gordon Doughman's Basic11 modified to operate on the CPU\_1A1 and CPU\_1B 68HC11 boards. The major changes are to do with the Flash memory of the CPU\_1\*. The current configuration handles Basic programs of up to about 16K bytes in size.

HyperTerminal or similar terminal, set to 9600 baud must be connected to the CPU board to make use of Basic11.

### INSTALLATION

To install to the CPU\_1A1 or CPU\_1B module:

- Power down
- Connect serial link to PC
- Insert links for bootstrap mode
- Power up
- Initialise HC11
- Load and verify (run) the erase1.hex file
- Wait for erase to complete led starts flashing
- Reset the HC11
- Initialise HC11
- Load the buff\_p1.hex file verify/run not essential
- Power down
- Remove links for expanded mode
- Power up to run buffalo message appears (HyperTerminal)

### HOW IT WORKS & CHANGES TO ORIGINAL

Basic11 runs in expanded mode. The reset and interrupt vectors are located in EEPROM at the top of the memory map. Basic11 itself is located in Flash memory, starting at \$C000. The CPU registers are located at \$1000. Zero page RAM is entirely taken up by Basic11 variables and an interrupt jump table.

When power is applied, the HC11 is reset. **There is a 2 second delay before the Basic11 greeting and prompt appear on the terminal.** It gets the reset vector from EEPROM at address \$FFFE-\$FFFF and starts executing code at \$FF80. This code, also located in EEPROM, configures the external Flash and RAM memory then jumps to Basic11 in Flash.

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The Basic program is stored by Basic11 in RAM. The “esave” command saves the program to Flash memory at \$8000-\$BFFF. The “eload” command loads the Basic program from Flash back into RAM.

Changes to the original include:

- Memory map adjustments
- Esave & Eload changes to operate with Flash memory
- Inclusion of a Help command
- Inclusion of the Ferase command to erase program storage Flash memory
- Modification to Auto-start:
  - If the auto-start is enabled and the basic program does not exist or runs to completion, the auto-start is disabled and Basic11 restarted.

## MEMORY MAP

\$0000-\$00FF RAM, zero page mostly used by Buffalo  
\$0100-\$03FF RAM, inside cpu  
\$0400-\$0FFF RAM, external  
\$1000-\$105F RAM, cpu registers  
\$2000-\$7FFF RAM, external, used by Basic11  
\$8000-\$CFFF Flash, used to save your basic program  
\$D000-\$FDFF Flash, the Basic11 interpreter  
\$FE00-\$FF7E EEPROM, available  
\$FF7F-\$FFFF EEPROM, boot code do not erase or change

## Notes:

Erasing all Flash memory will also erase Basic11. This cannot be done with a simple command while running a Basic program.

## FILES

basic11c_cpu_1a1.asm	source file for AS11 or MiniIDE
basic11c_cpu_1a1.hex	S19 file for HC11
erase1.hex	use to erase before installing Basic11 to Flash
basic11.doc	the main manual
notes155.txt	additional release notes
readme.txt	a message from the creator
basic11 for cpu_1a1_1.doc	this document

For more information or assistance, contact [paul@pmb.co.nz](mailto:paul@pmb.co.nz)