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**CHAPTER 9**  
**M68HC12 MEMORIES**

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**OBJECTIVES**

This chapter describes the types of memories in the M68HC12. The amount and the memory maps differ for different versions of the processor, and memory map examples are given for the MC68HC812A4 and the MC68HC912B32. Examples showing how to program the EEPROM are given. We also discuss the memory expansion capability of the MC68HC812A4.

- 9.1 Introduction
- 9.2 M68HC12 Memory Map
  - MC68HC812A
  - MC68HC912B32
- 9.3 M68HC12 RAM
- 9.4 M68HC12 EEPROM
  - EEPROM Reading
  - EEPROM Control
  - EEPROM Erasing
  - EEPROM Programming
  - Programming EEPROM from EEPROM
  - EEPROM Warnings and Cautions
  - EEPROM Test Register
  - EEPROM Programming Characteristics
- 9.5 MC68HC912B32 Flash EEPROM
  - Flash EEPROM Hardware Interlocks
  - Flash EEPROM Programming Voltage
  - Flash EEPROM Programming
  - Flash EEPROM Erasing
  - Flash EEPROM Programming Characteristics
- 9.6 MC68HC812A4 Expansion Memory
  - Expansion Address Mapping
  - Memory Expansion Control Registers
  - Data Memory Expansion Window
  - Program Memory Expansion Window
  - Extra Memory Expansion Window
  - Register Following Memory Space
  - Programming for Expansion Memory

### Hints for Using Expansion Memory

- 9.7 Expanded-narrow and Expanded-wide Memory Designs
- 9.8 Clock Stretch Bits
- 9.9 Conclusion and Chapter Summary Points

The M68HC12 contains on-chip RAM and EEPROM. The amount of each depends on the version of the chip. The MC68HC912B32 has 32 Kbytes of Flash EEPROM. New versions of the M68HC12 are being released by Motorola regularly so contact a chip supplier for the latest information on available devices.