

# 68HC11 TRAINING



Technological Arts and Tardis Publishing have joined forces to put together a complete low-cost Learning System for the Freescale 68HC11. Courseware is based on Adapt11EVBU and Adapt11 Memory-mapped Interface Board (MIB) to provide complete training in microcontroller interfacing and programming concepts for one of the most prevalent 8-bit microcontrollers in the world. This courseware is currently used in programs offered by Seneca College, Toronto, Canada and Eastern Michigan University.

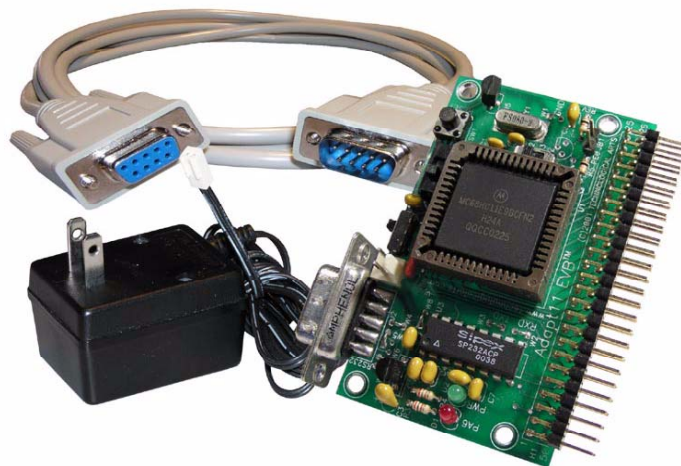
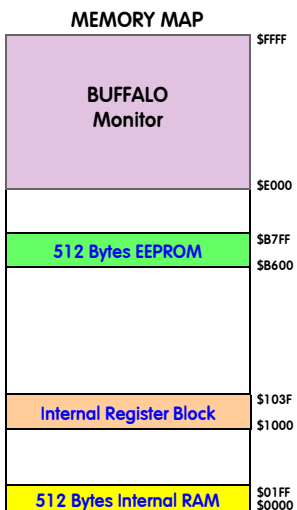
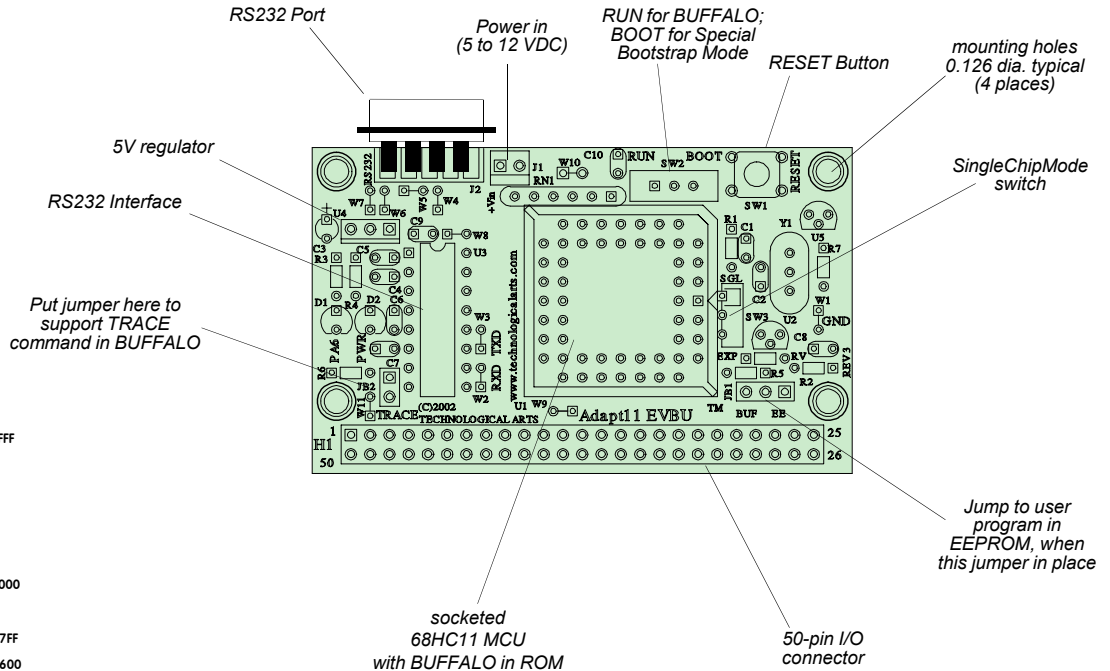
## HARDWARE FEATURES:

- **68HC11E9B MCU running BUFFALO**
- **8 MHz crystal for precision timing**
- **32K SRAM**
- **on-board 5V regulator**
- **on-board RS232 interface circuit**
- **four 7-segment LED displays**
- **eight 8-bit analog-to-digital converter channels**
- **10-segment bargraph LED**
- **user pushbuttons**
- **16 character 4-line LCD**
- **temperature sensor**
- **light sensor**
- **IR emitter and receiver**
- **audio transducer**
- **clock/calendar chip**
- **matrix keypad and interface chip**

# 68HC11 Training Course Details

## Volume 1: Using Adapt11

- Covers the various aspects of Microcontroller Programming, including:
  - Number Systems
  - Computer Concepts
  - DOS Basics
  - Assembly Language Programming (up to and including the use of Indexed Addressing/Pointers)
- Includes floppy disk/CD with supporting data and utilities.
- Includes Microcontroller Hardware:
  - Adapt11EVBU module with BUFFALO monitor in ROM
  - Serial cable
  - Schematic diagram
  - North American-style power supply



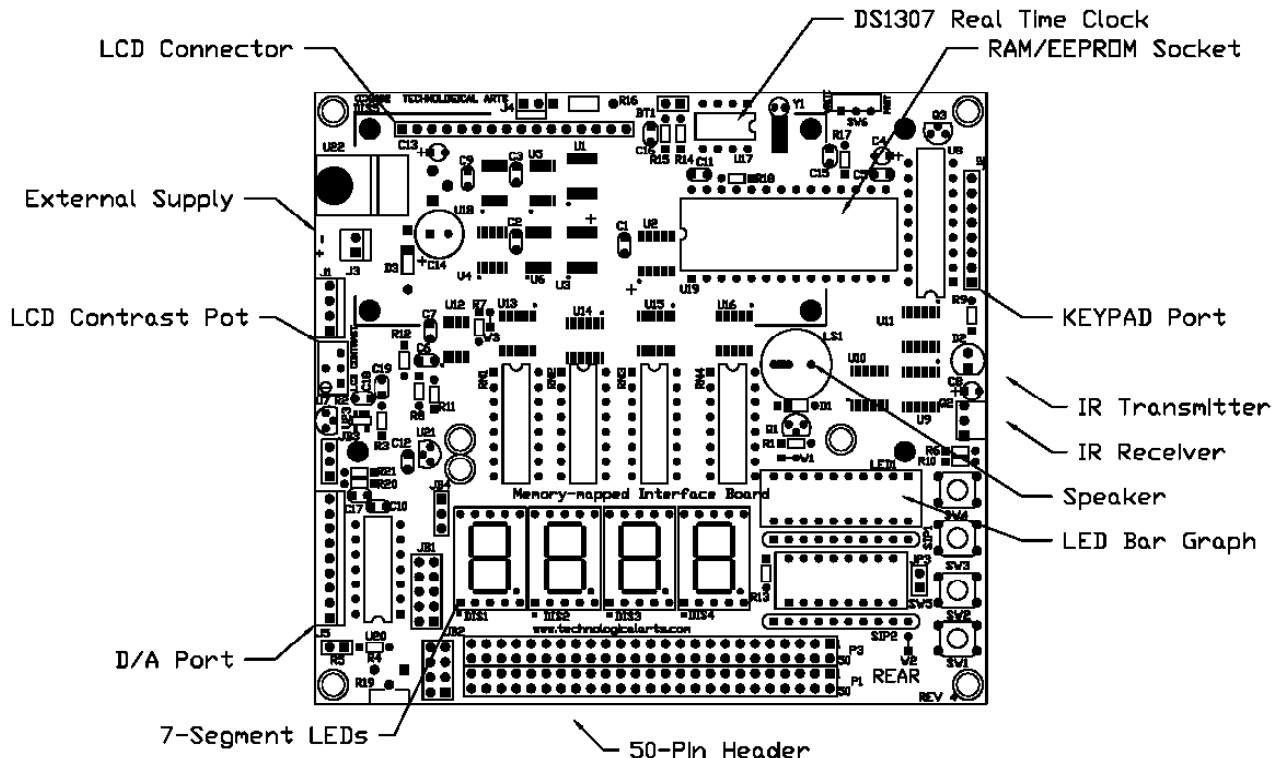
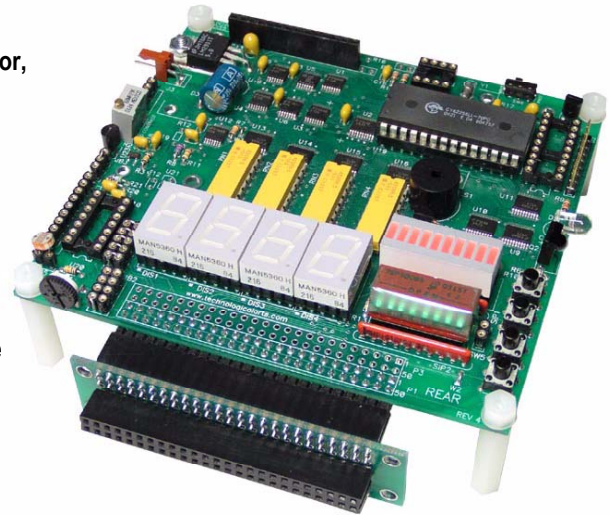
## Volume 2: Interfacing

Assumes a minimally populated MIB, with 7-segment displays, Bargraph Leds, Switches, a Temperature Sensor, Light Sensor, Speaker, and Infrared Transceiver system. Since the devices on the MIB are Memory-mapped, most can be manipulated directly by using just the BUFFALO monitor, without the need for any programming. Having this type of access, lets the student explore these devices first, without the need to program them.

Topics include:

1. Formatting the PC Screen so that it can display selected MIB device information (using built-in BUFFALO Subroutines), and ANSI Escape Sequences.
2. Asynchronous Serial concepts using the Serial Communications Interface
3. Software Time Delays
4. Led and Switch Interfacing
5. 7-Segment Display interfacing including the use of look up tables to send various patterns to the displays
6. Sending sounds and tunes to the speaker
7. Using Interrupts and Interrupt Service Routines
8. Using the A/D Converter Subsystem to acquire Temperature Sensor, Light Sensor, and other external Analog values.
9. Using the Infrared Transmitter and Receiver to:
  - Communicate Temperature between MIBs
  - Take Input from TV, VCR, and other remotes, then map it to PC Keys and control these devices with a PC Keyboard

Hardware included: Memory-mapped Interface Board (MIB)



## Volume 3: Advanced Topics

Focuses on: a Character LCD, a Matrix Keypad (and keypad encoder chip), and a Real Time Clock/Calendar chip. These devices are simply connected to the existing MIB.

Topics Include:

1. Address Decoding of Devices
2. Interfacing Keypads
3. LCD Interface
4. Making Stand Alone Systems

Hardware Add-on kit includes: LCD, keypad, keypad encoder, clock/calendar chip, more



### ORDER CODES:

- HC11COURSESET: complete set of all 3 volumes plus hardware

Items may be ordered separately:

- HC11COURSE1: printed text + CD (no hardware)
- AD11EVBUSC1: hardware for Volume 1
- HC11COURSE2: printed text + CD (no hardware)
- AD11MIB-MIN: hardware for Volume 2
- HC11COURSE3: printed text + CD (no hardware)
- MIBKIT1: add-on kit of parts for MIB, to be used with Volume 3

Each Volume covers one semester of material at community college level



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