

# ADAPT11

## MODULAR SYSTEM FOR 68HC11 PROTYPING & DESIGN

### THE ADAPT11 SYSTEM

Adapt11 is a compact, carefully designed board containing all the elements common to practically every 68HC11 design. Clock circuitry, reset circuitry (including a pushbutton), a mode select switch, a 5-Volt regulator, and an RS-232 interface are all provided on-board. In addition, provision is made to program 68HC711 EPROM with the addition of an external programming voltage. All of the microcontroller I/O and control lines are brought out to a versatile 50-pin header pattern on the printed circuit board. This allows for several different connector options, to support a wide variety of applications.

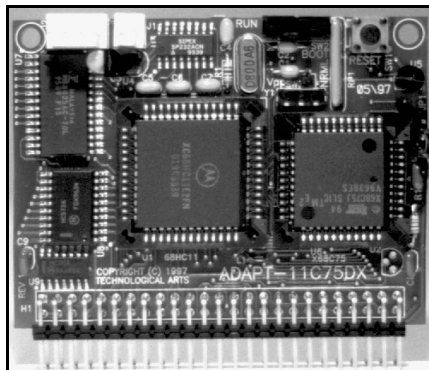
One of the most popular options is the solderless breadboard connector, which allows the module to be plugged vertically into a solderless breadboard, and treated like a 50-pin DIP in the user's application. With the 68HC11's unique BOOT mode, in-circuit re-programming is easily accomplished, making this configuration ideal for application development, prototyping, and educational use. When the application development stage is finished, the module may be removed from the breadboard and embedded into the end-product. This may be a user-designed printed circuit board, wire-wrap board, or perfboard; or it could be a Backplane or prototyping card especially designed for use with Adapt11.

These accessories and a memory expansion card are available to give the designer a high degree of flexibility without spending a lot of time and money.

Six Adapt11 configurations are currently available:

- **Adapt11** (base model, single-chip mode operation)
- **Adapt11C24DX** (operates in expanded mode, with 68HC24 Port Replacement and 32K EEPROM)
- **Adapt11C75** (operates in expanded mode, with X68C75 Micro-peripheral chip providing 8K EEPROM and two I/O ports)
- **Adapt11C75DX** (same as Adapt11C75, with added 32K SRAM)
- **Adapt11C75DXR** (substitutes SnapHat™ RAM/clock/calendar)
- **Adapt11C75DXE** (substitutes 32K EEPROM)

The module you choose will depend upon your application's requirements for memory and I/O port lines. All modules are pin-for-pin compatible and interchangeable (some minor limitations apply; see next page for details).



**UNIQUE FEATURES.** Adapt11 modules are great for schools and product development, because they are inexpensive and can be re-programmed thousands of times. Not only are they perfect for students learning electronics, computer fundamentals, and how to design hardware & software for microcontrollers, but they can be incorporated as the core of a custom or new product design. The 68HC11 is a powerful, popular, and easy-to-use microcontroller. When used with a solderless breadboard, changes are easy, and parts can be used over and over, if you like. For permanent designs, just use Adapt11 Modular Prototyping accessories, such as Backplanes, Memory Expansion, & prototyping cards. Or build your circuit on perfboard, printed circuit, or wire-wrap board, and plug Adapt11 into it. Many combinations are possible.

**EXPANDED CHIP MODE.** By default, the 68HC11 runs in single-chip mode on the base model of Adapt11. Removal of a jumper allows the it to run in expanded mode, in which some of the I/O lines become address, control, and data lines. In this mode, a full 64K address space is accessible. By adding decoding circuitry, and a latch to de-multiplex the address and data lines, external EPROM, EEPROM, SRAM, Flash, and I/O chips can be used via an external board (a memory expansion board is available).

*Note: Adapt11C24DX, Adapt11C75, and Adapt11C75DX/E/R run in expanded mode, since they already incorporate on-board memory expansion, therefore the address and data buses are not brought out.*

**POWER REQUIREMENTS.** Adapt11 can run on regulated 5VDC that you provide via your breadboard or application board. Or, you can supply unregulated 9 to 15 VDC via the external power connector (a 9VDC adapter will work fine; a 9V battery can be used for hand-held applications, if the 68HC11's low-power mode is used; gelcells or NiCd batteries, common in robotics, can also be used).

**'711 PROGRAMMER.** You can use any Adapt11 module to program the EPROM in a 68HC711E9 or 68HC711E20. Just provide 12VDC programming voltage to the External Power connector. Run PCBUG11 on your PC, specify the target chip's EPROM address range, and slide the switch from NORMAL to VPP just before loading the file to be programmed.

### USING ADAPT11 FOR RAPID PROTYPING:

- *Plug any Adapt11-series module into a solderless breadboard or application board.*
- *Wire up desired peripheral circuits (switches, motor drivers, LEDs, sensor circuits, etc.)*
- *Write software for your application in C, BASIC, assembler (freeware versions of each included with Starter Packages)*
- *Compile/assemble your program to produce an s-record file*
- *Attach a serial cable from your PC to Adapt11*
- *Switch to 'BOOT' mode, apply power, & use our downloader or PCBUG11 (both in Starter Packages) on your PC*
- *In approximately 30 to 90 seconds (depending on the size of your code), your software will be ready to run*
- *Switch to 'RUN' mode, & press 'RESET' to run your code*
- *Make changes to hardware/software, as required, and repeat the last 3 steps. No special programming boards or EPROM erasers are required.*

### FEATURES COMMON TO ALL ADAPT11 MODULES:

- *26 input/output lines, many with multiple functions*
- *pulse accumulator, 16-bit timer, real-time interrupt, watchdog, 2 hardware interrupts, 3 input captures, & 5 output comparers*
- *8 channel, 8-bit analog-to-digital converter*
- *serial peripheral interface (SPI) port*
- *RS-232 serial port utilizing on-chip SCI*
- *5-Volt regulator, reset circuit, and RS232 interface*
- *use with C, BASIC, or assembler*
- *all modules can be used to program 68HC711E9/E20 EPROM*
- *full range of accessories available, including memory expansion (Adapt11 base model only), backplanes, and prototyping cards*
- *versatile 50-pin I/O connector pattern, with several connector options available*

### Adapt11

- small size (1.7" x 2.8")
- up to 20K EPROM or 2K EEPROM on-board, in single-chip mode
- up to 64K memory, in expanded mode (external card required)

Available in the following configurations:

(replace □ in Order Code with desired connector code option)

#### Module (Order Code: AD11M-□)

Fully assembled & tested board with PLCC socket for user-supplied 68HC11 chip (available separately). Includes data sheet & schematic.

#### Starter Package (Order Code: AD11SP)

Includes AD11M-SB module with 68HC811E2 chip, serial cable, freeware disk, downloading software, Motorola Programming Reference Guide, user manual, data sheet, & schematic. (For a different connector, append the connector code.)

### Adapt11C24DX

- small size (2.1" x 2.8"), surface mount/through-hole construction
- uses 68HC24 port replacement unit (PRU)
- 32K EEPROM and de-multiplexing circuitry on-board
- can use with 68HC711E20 for up to 20K EPROM on-board
- operates in expanded mode with no loss of I/O port lines

Available in the following configurations:

(replace □ in Order Code with desired connector code option)

#### Module (Order Code: AD11C24DXM-□)

Fully assembled and tested board with 32K EEPROM and PLCC sockets for user-supplied 68HC11 and 68HC24 chips (available separately); includes data sheet and schematic.

#### Starter Package (Order Code: AD11C24DXSP)

AD11C24DXM-SB module with 68HC11E0 & 68HC24, serial cable, freeware disk, configuration/downloading software, Programming Reference Guide, manual, data sheet, & schematic.

### Adapt11C75

- Same size as ADAPT-11 (1.7" x 2.8")
- Adds X68C75 Microperipheral (port replacement/8K EEPROM)
- Up to 20K EPROM & 8K EEPROM on-board, or 10K EPROM
- Operates in expanded mode with no loss of I/O port lines

Available in the following configurations:

(replace □ in Order Code with desired connector option code)

#### Module (Order Code: AD11C75M-□)

Fully assembled & tested board with sockets for 68HC11 & X68C75 chips (available separately); includes data sheet & schematic.

#### Starter Package (Order Code: AD11C75SP)

Includes AD11C75-M-SB module with 68HC11E0 & X68C75 (total of 8K EEPROM and 512 bytes RAM), serial cable, freeware disk, configuration/downloading software, Programming Reference Guide, user manual, datasheet, & schematic.

### Adapt11C75DX

- small size (2.1" x 2.8"), surface mount/through-hole construction
- uses X68C75 Microperipheral (port replacement + 8K EEPROM)
- 32K SRAM and decoding/de-multiplexing circuitry on-board
- up to 20K EPROM & 8K EEPROM possible on-board
- operates in expanded mode with no loss of I/O port lines

Available in the following configurations:

(replace □ in Order Code with desired connector code option)

#### Module (Order Code: AD11C75DXM-□)

Fully assembled and tested board with 32K SRAM and PLCC sockets for user-supplied 68HC11 and X68C75 chips (available separately); includes data sheet and schematic.

#### Starter Package (Order Code: AD11C75DXSP)

Includes AD11C75DXM-SB module with 68HC11E0 & X68C75 (for a total of 8K EEPROM and 32K SRAM), serial cable, freeware disk, configuration/downloading software, Programming Reference Guide, manual, data sheet, & schematic.

### Adapt11C75DXR

- same as Adapt11C75DX, with SnapHat™ 32K battery-backed RAM/clock/calendar chip in place of SRAM

Available in the following configurations:

(replace □ in Order Code with desired connector code option)

#### Module (Order Code: AD11C75DXRM-□)

Fully assembled and tested board with SnapHat™, and PLCC sockets for user-supplied 68HC11 and X68C75 chips (available separately); includes data sheet and schematic.

#### Starter Package (Order Code: AD11C75DXRSP)

Includes AD11C75DXM-SB module with 68HC11E0 & X68C75 (total of 8K EEPROM and 32K battery-backed SRAM), serial cable, freeware disk, configuration/downloading software, Programming Reference Guide, manual, data sheet, & schematic.

### Adapt11C75DXE

- same as Adapt11C75DX, with 32K EEPROM in place of SRAM

Available in the following configurations:

(replace □ in Order Code with desired connector code option)

#### Module (Order Code: AD11C75DXEM-□)

Fully assembled and tested board with 32K SRAM and PLCC sockets for user-supplied 68HC11 and X68C75 chips (available separately); includes data sheet and schematic.

#### Starter Package (Order Code: AD11C75DXESP)

Includes AD11C75DXM-SB module with 68HC11E0 & X68C75 (total of 40K EEPROM), serial cable, freeware disk, configuration/downloading software, Programming Reference Guide, manual, data sheet, & schematic.

### Standard Connector Options

