

**65816**

**16 Bit Card**

Software  
Developer's  
Guide



**APPLIED ENGINEERING**

## Read Me First...

### Special Applied Engineering (Beta )16 Bit Card Software Developer's Package

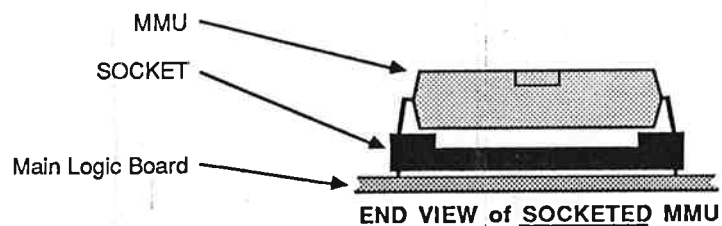
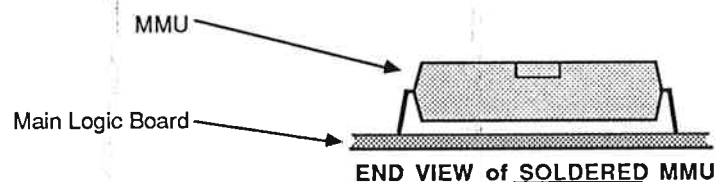
The version of the 16 Bit Card that is being sent to software developers is "only" capable of addressing up to 8 Meg of memory. The version that will be shipped to customers will be capable of addressing up to 16 Meg of memory, the full capability of the 65816 processor. This Beta version of the 16 Bit Card is provided with only one ribbon cable to connect it to a RamWorks II memory expansion card. Ordinarily it would have another shorter ribbon cable to connect the 16 Bit Card (P2) to a 2 Meg. RamWorks memory expander piggy-back card. This "2 Meg." cable is not required when using the 512K version of the RamWorks memory expander piggy-back card.

### Applied Engineering Technical Support

Applied Engineering has a staff of technicians dedicated to answering specific questions about Applied Engineering products and software. If your question cannot be resolved by the technician, he will refer the question to the appropriate engineer. The technical support representatives are available Monday through Friday, between the hours of 9 AM to 5 PM (Central). The technical support telephone number is (214)241-6069. Please have as much information as possible available about your problem if you call.

### Soldered MMU chip on the //e main logic board

**Important!:** Some (very few) Apple //e's were manufactured with the MMU chip soldered in. If your //e does not have a socket for the MMU, the MMU will have to be desoldered and a socket installed. This is very tricky and should only be done by a professional with the proper tools. Apple Computer, Inc has assured us that //e's are now assembled with socketed MMU chips.

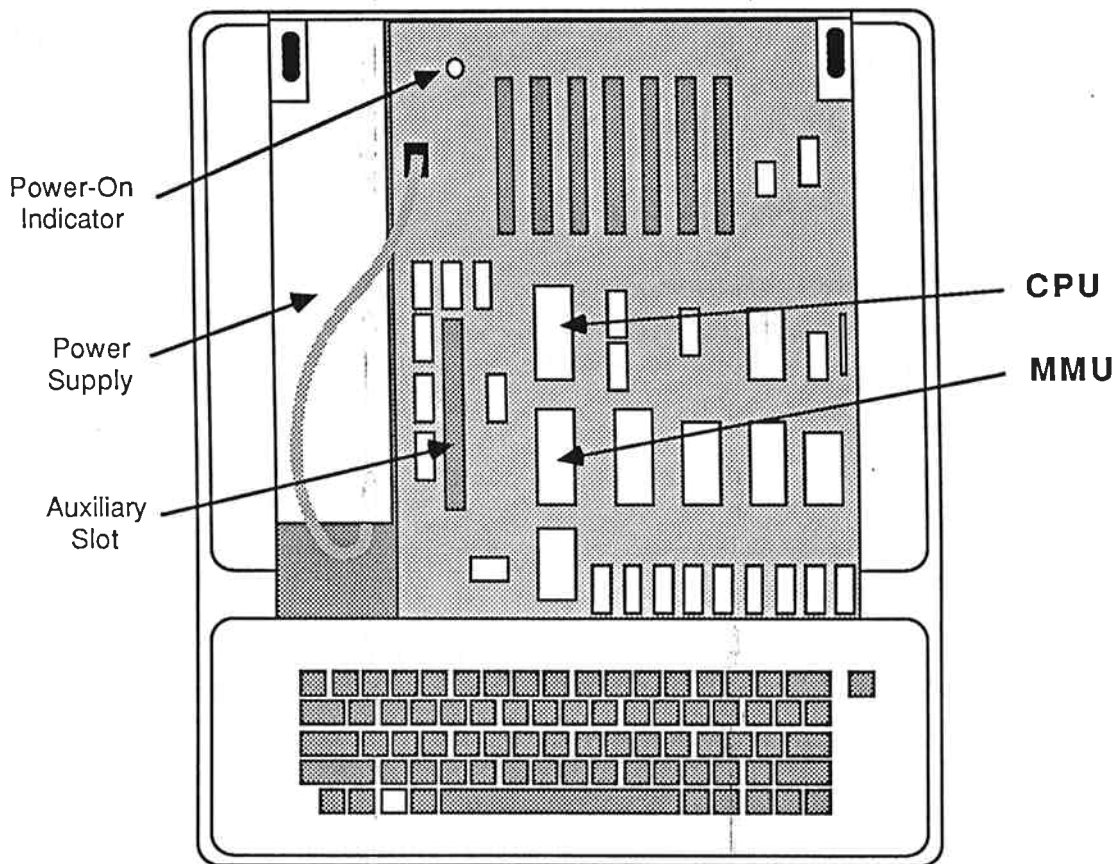


## Installation

### Installing the 16 Bit Card

- Turn the //e power switch to the OFF position, but leave the computer plugged in.
- Remove the //e top lid.
- Make sure the power-on indicator light inside the computer is OFF. (See Illustration 1.)

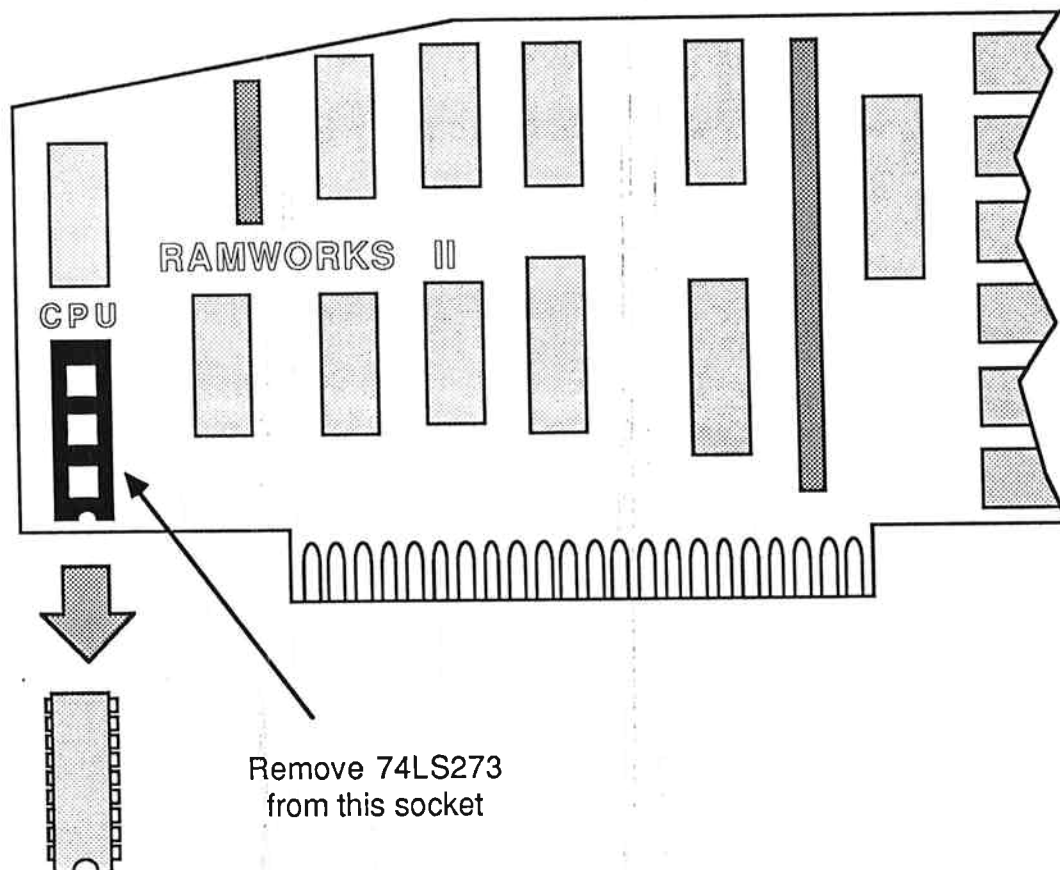
Illustration 1:



- If installed, remove the RamWorks II card from the //e auxiliary slot.
- Remove the 74LS273 chip from the RamWorks II socket marked "CPU." (Refer to Illustration 2.) Carefully set the RamWorks II aside and store the 74LS273 in a safe place.

## Installation

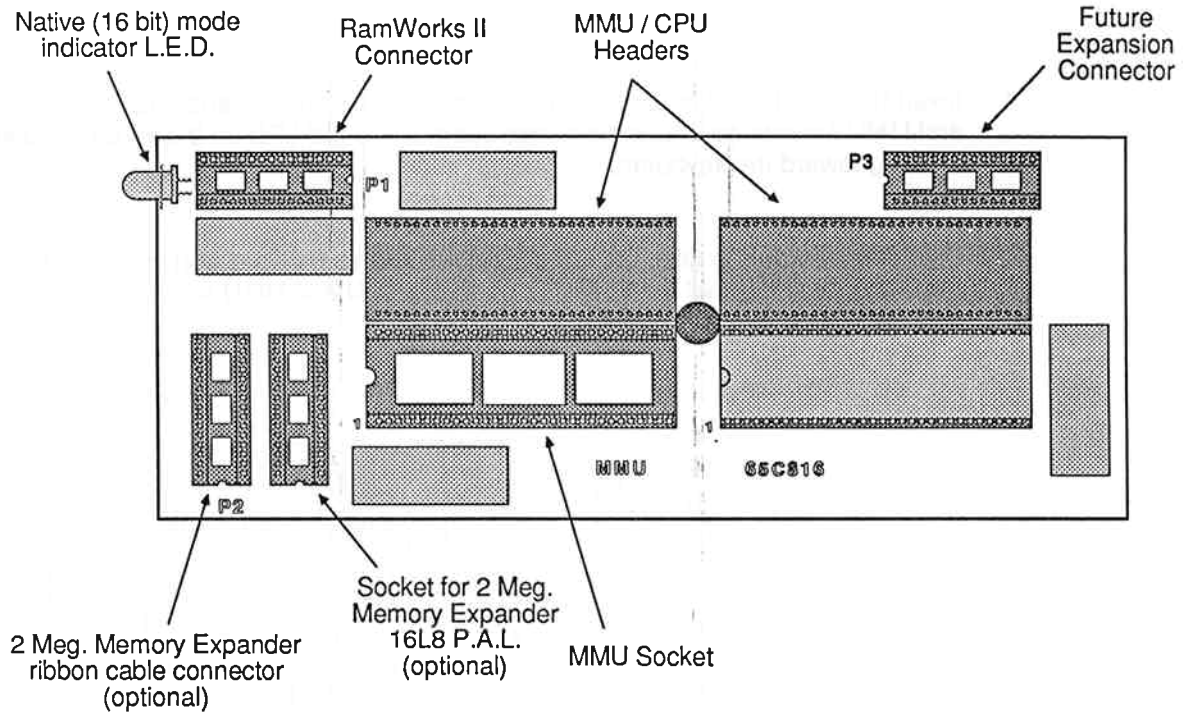
Illustration 2:



- Locate the CPU chip and the MMU chip on the //e main logic board. (Refer to Illustration 1.)
- Remove the MMU chip from the //e main logic board. Use a small flatblade screwdriver to gently lift alternate ends of the chip until it is free from its socket. Carefully set the MMU chip aside.
- Remove the CPU chip in the same manner. The //e's CPU chip is not required with the 16 Bit Card installed. Store it in a safe place.
- Verify that all pins on the 16 Bit Card CPU and MMU header connectors are straight. (Refer to Illustration 3.)

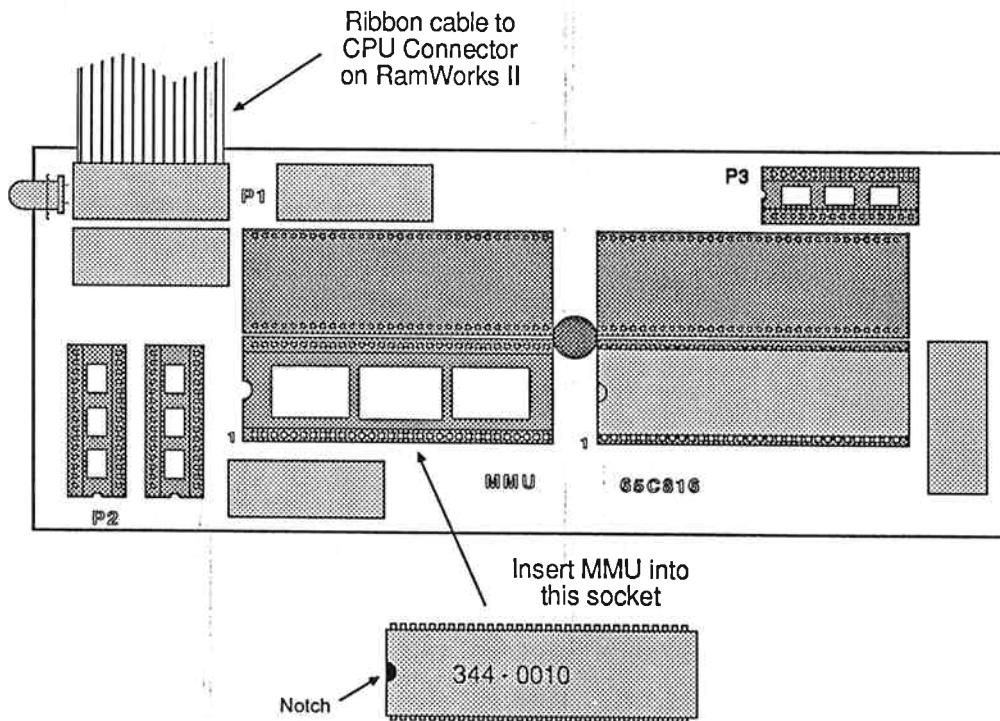
## Installation

**Illustration 3:**



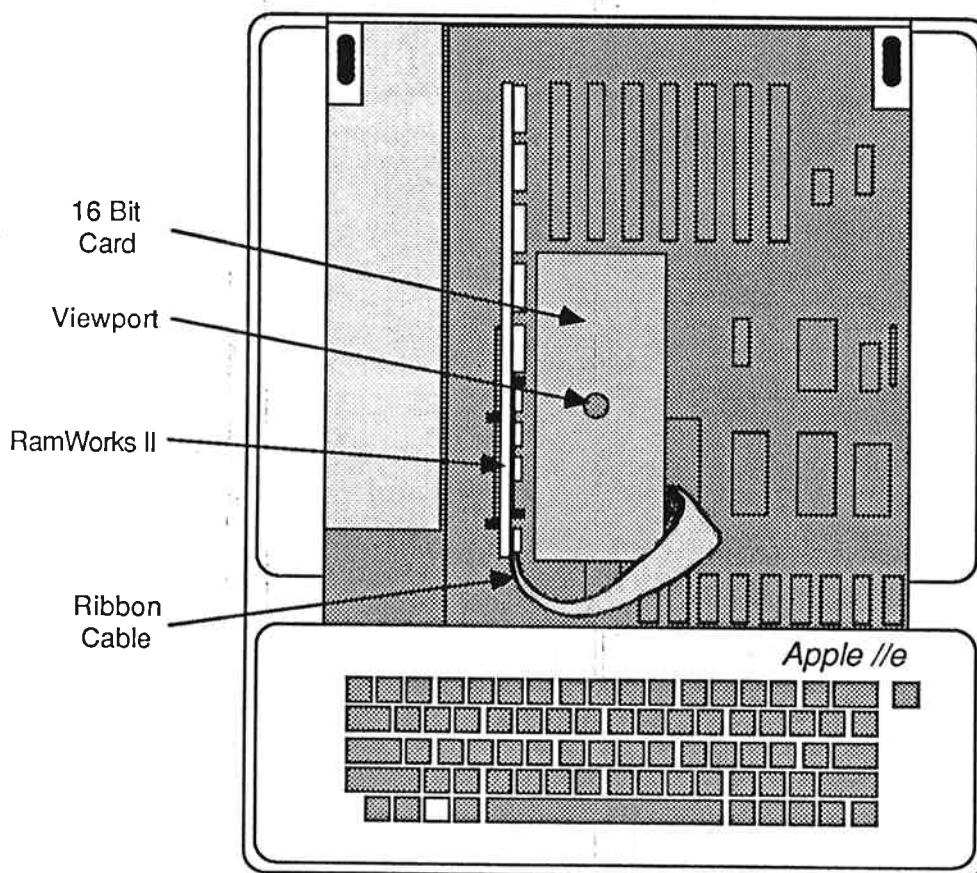
- Install the MMU chip on the 16 Bit Card, as shown in Illustration 4. Be sure the notch is oriented as indicated in the illustration.

**Illustration 4:**



- Plug one of the ribbon cable header connectors (both ends are the same) into the 16 Bit Card socket marked "P1" exactly as shown in Illustration 4.
- Invert the 16 Bit Card (solder side up; component side down) and position it above the CPU and MMU sockets on the //e main logic board. The red LED on the 16 Bit Card should be pointing toward the keyboard.
- Using the viewport to align the header pins on the 16 Bit Card with the socket holes on the //e main logic board, install the 16 Bit Card into the CPU and MMU sockets. Press gently but firmly until the card is securely seated.

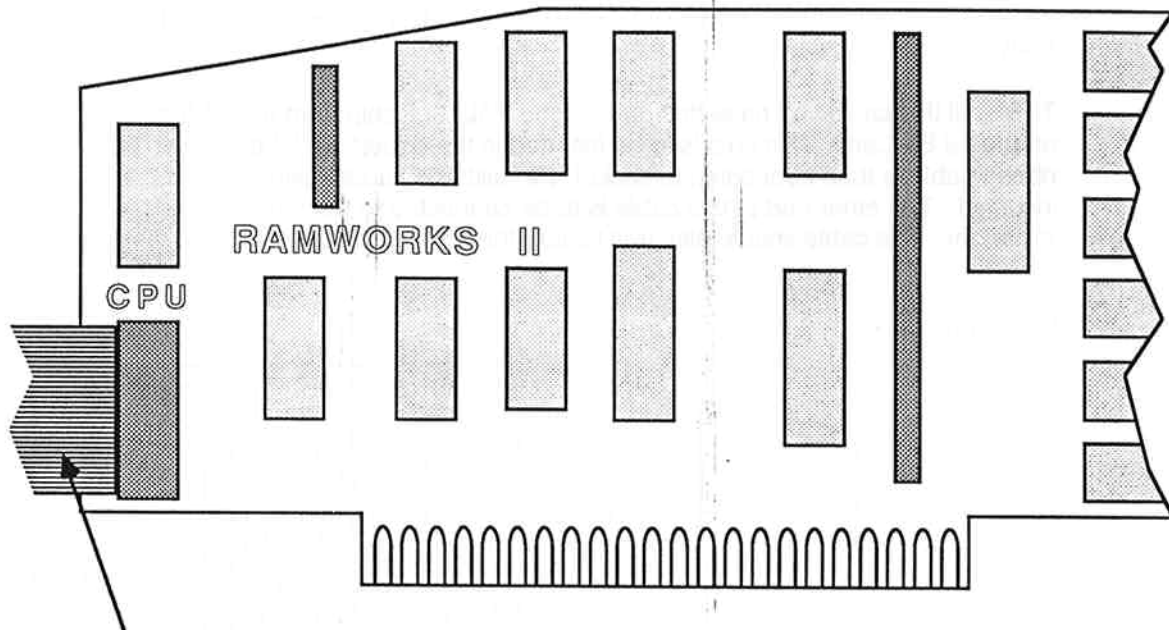
Illustration 5:



- Position the keyboard end of the RamWorks II card near the installed 16 Bit Card. Install the free end of the 16 Bit Card ribbon cable to the RamWorks II socket marked "CPU." Verify that all header connector pins are fully seated in the socket and that the cable is installed as shown in Illustration 6.

## Installation

Illustration 6:



Ribbon cable from  
P1 of 16 Bit Card.

- Install the RamWorks II card into the //e's auxiliary slot.
- Replace the //e's top lid. Installation is complete.
- Boot the disk labeled "Æ 16 Bit Developer's Disk" and run the program "TEST816."

If the computer will not boot or fails the test program, check to see that all chips, cables, and connectors are securely seated in their sockets. Also check for bent pins on the MMU chip and on the ribbon cable and CPU / MMU headers.

## Installation

For developers with the 2 Meg. RamWorks memory expansion piggy-back card, a special ribbon cable is required to connect the 16 Bit Card to the 2 Meg. expander card. This cable is available from Applied Engineering.

To install this cable you must first remove the PAL16L8 chip from the 2 Meg. expander and install it on the 16 Bit Card. This chip is to be inserted in the socket *NEXT* to socket "P2." One end of the ribbon cable is then connected to socket "P2" with the cable trailing toward the keyboard when installed. The other end of this cable is to be connected to the empty 16L8 socket on the 2 Meg. expander. The cable should also trail toward the keyboard end of the card when installed.

Illustration 7:

