

2. **Remove the cover.**

Refer to the instructions provided in your Franklin's User's Reference Manual.

3. **Remove the RamFactor from its anti-static bag.**

Do not touch the gold edge connectors.

4. **Install into slot S4/S7.**

Refer again to the User's Reference Manual for instructions on installing an expansion card in expansion slot S4/S7. Configure the jumper-clip to emulate either slot 4 or 7.

5. **Replace the computer's top cover.**

Installing RamFactor in a Laser 128 Computer:

1. **TURN OFF THE COMPUTER'S POWER SWITCH.**

Never install or remove a card while the computer is on. However, you need to leave the computer plugged in throughout the installation to allow the power supply to discharge static electricity from your body.

2. **Remove the RamFactor from its anti-static bag.**

Do not touch the gold edge connectors.

3. **Insert the gold edge connector into the desired slot.**

Refer to the instructions provided in your Laser's User's Reference Manual.

We recommend that you use the Laser 128 two-slot expansion box. If you wish to install RamFactor directly into the Laser 128, position the RamFactor card component side up and insert the gold edge connector into the expansion slot on the left side of the Laser 128 computer. Be very careful not to touch the exposed RamFactor card when the computer's power is on!

Hardware installation is complete! Congratulations!

What Next?

You don't have to test your RamFactor card, but if you'd like to, Appendix B tells you how.

When you read or write the data byte, the address automatically increments. Some 6502 address modes cause two accesses at the same location, which in this case can cause double incrementing. To avoid double incrementing, use either absolute addressing, or an indexed form with the base in a different page. For example, with the RamFactor in slot 4, you could use:

```
LDA  $C0C3      absolute addressing
      or
LDY  #$C8       slot * 16 + $88
STA  $BFFB,Y    $C083-$88,Y
```

Whenever the lower or middle address byte changes from a value with bit 7 = 1 to one with bit 7 = 0, the next higher byte increments automatically. This means that you should always load the bytes in the order low-middle-high, and always load all three of them. (Unless, of course, you are sure of the previous contents and can be sure you will get predictably correct results.)

Finding the RamFactor Card

A program can search the slots for a RamFactor card by looking for a unique pattern in various firmware locations. The bytes at \$Cs00-\$C07 are standard for both the Apple Memory Expansion Card and the RamFactor card. They are:

```
$Cs00:C9 20 C9 00 C9 03 C9 00
```

In addition, the byte at \$CsFB on a card of this type has bit 0 = 1. For RamFactor, the whole byte = \$01. The byte at \$CsFA distinguishes between the various brands of memory expansion cards. RamFactor has \$AE at this location.

Finding RamFactor's Size

There are several ways a program can find out the size of the RamFactor card, or the size of the current partition.

Finding Size via ProDOS Status Call

If you are using ProDOS, the ProDOS status call can be used. The methods for finding the ProDOS firmware entry point, and for making a status call, are explained on pages 112-115 of Apple's "ProDOS Technical Reference Manual" and on pages 6-6 through 6-11 of Quality Software's "Beneath Apple ProDOS". Briefly, the firmware entry point will be \$Csxx, where s is the slot number and xx is the contents of \$CsFF in the firmware.