

Apple II Technical Notes



Developer Technical Support

Apple IIc

#6: Buffering Blues

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This Technical Note describes changes on the memory-expandable IIc which affect the procedures for enabling keyboard and serial input buffering.

When the IIc firmware was reorganized to accommodate the memory expansion card in slot 4, the mouse moved to slot 7, thus causing some screen holes to be reassigned. This change may software which uses keyboard or serial input buffering to crash.

The following list shows the changes in the locations which are used for enabling keyboard and serial input buffering:

Name	Original & 3.5 ROM	Expandable IIc	Comment
typhed	\$5FA	\$5FA	;buffer the keyboard? NO CHANGE
twkey	\$5FF	\$5FC	;storage pointer for type-ahead buffer
trkey buffer	\$6FF	\$6FC [†]	;retrieve pointer for type-ahead
aciabuf	\$4FF	\$4FC	;Owner of serial buffer, if any
twser	\$57F	\$57C	;storage pointer for serial buffer
trser	\$67F	\$67C	;retrieve pointer for serial buffer

[†] In the version 3 ROM (original “memory-expandable” IIc) this pointer is still \$6FF which causes, among other things, the Terminal Mode to be inoperative. Revision 4 of the IIc firmware fixes this bug.

We can not emphasize enough the need for carefully checking the version of the machine on which a program is running. It is also important to pay attention to the now obvious fact that even in the Apple IIc things can (and most probably will) move around, making any hard-coded slot assignment a sure source of incompatibility. To ensure compatibility, **scan the slots**.

The *Apple IIc Technical Reference Manual, Second Edition* describes how to enable buffering. Using serial buffering as an example, the pertinent instructions in the manual should now be understood as meaning:

Using Serial Buffering Transparently

```
If (machineID = "Memory Expandable IIc") then
  begin
    aciabuf = $04FC;    {Newest IIc with Expanded Memory Capabilities,}
    twser = $057C;      {ROM versions 3 and 4.}
    trser = $067C
  end
else
  begin
    aciabuf = $04FF;    {Original IIc and 3.5 ROM IIc}
    twser = $057F;
    trser = $067F
  end;

Set_Location aciabuf to $C1 or $C2.
Set_Locations twser and trser to $0.
```

Using Serial Interrupts Through Firmware

```
Set_Location aciabuf to a value other than $C1 or $C2
```

Further Reference

- *Apple IIc Technical Reference Manual, Second Edition*
- Apple IIc Technical Note #7, Existing Versions
- Apple II Miscellaneous Technical Note #7, Apple II Family Identification