

Apple II Technical Notes



Developer Technical Support

GS/OS

#2: GS/OS and the 80-Column Firmware

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This Technical Note discusses the changes in handling the 80-column firmware between GS/OS and ProDOS 16.

For compatibility with the Apple IIe, the Apple IIgs does not treat slot 3 like it treats other slots. Instead of using a bit in the Slot Register (\$C02D) to control the mapping of ROM in slot 3 between the built-in 80-column firmware and any peripheral card physically in slot 3, the soft switches SETINTC3ROM (\$C00A) and SETSLOT3ROM (\$C00B) are used instead. On the Apple IIe, these soft switches (referred to by the single label SLOT3ROM) respectively map the ROM at \$C300 to the internal 80-column firmware (which works with the auxiliary-slot 80-column card in most IIe computers) or to a peripheral card in slot 3. Note that writing to SETSLOT3ROM on a IIe or IIgs with no card in slot 3 results in floating bus addresses in the \$C300 space.

ProDOS 8 will not allow an Apple IIe or later model computer to have a card other than an 80-column card in slot 3. ProDOS 8 needs the 80-column firmware on a 128K machine for use in the /RAM driver, and the enhanced Apple IIe has some of the interrupt firmware in the \$C300 space. When ProDOS 8 is loaded in an Apple IIe or later, it writes to SETSLOT3ROM and looks at five identification bytes. If all five of these

bytes do not match, ProDOS 8 will write to SETINTC3ROM to use the internal firmware. If all five bytes match, the external slot 3 ROM is left mapped in.

ProDOS 16 fell victim to a bug in ProDOS 8 versions 1.2 through 1.6 which always switched in the internal 80-column firmware, regardless of the user's Control Panel setting. GS/OS does not have this bug; a card in slot 3 of a IIGS other than an 80-column card will not be mapped out by GS/OS.

Application programmers who require the 80-column firmware should be familiar of the following points:

- If your program contains a routine to insure that the 80-column firmware is indeed available, it could be buggy. Since ProDOS 16 always made the 80-column firmware available, your routine to check that condition may never have been executed.
- If your program requires the 80-column firmware and it is not available, your program should display a message on the screen informing the user that he must set Slot 3 in the Control Panel to Built-in Text Display for your program to execute, then gracefully exit. Switching the \$C300 ROM space, even with the user's permission, is not recommended. Slot 3 could contain an operating GS/OS device, perhaps even the one your program was launched from. Remember, it is possible to boot GS/OS from slot 3.

Do not try to be clever in a situation like this. For example, do not go looking at ID bytes in slot 3 to try to determine the type of device present so that you can switch it out if you identify it as a non-disk device. Slot 3 could contain an active device being operated by a loaded GS/OS driver.

Your program should not ask the user's permission to switch ROM space between ports and slots (or in this case, the internal firmware versus the external card). That is why there is a Control Panel. Simply display a message informing the user that he must set Slot 3 in the Control Panel to Built-in Text Display for your program to execute. You may offer to change the battery RAM parameter for the user and restart the system (using the `OSShutdown` call), but under **no** circumstances should you hit the soft switch yourself, even with the user's permission.

Further Reference

- *GS/OS Reference*, Volume 1
- ProDOS 8 Technical Note #15, How ProDOS 8 Treats Slot 3