

BOOTI USER MANUAL V0.4

What is the BOOTI card ?

The BOOTI card is a block device emulator allowing the user to « mount » up to 8 devices (stored on a USB stick or provided by ADTPro virtual drive) in any slot equipped Apple II (i.e.: II/II+/original IIe/enhanced IIe/IIgs). Its main purpose is to easily offer mass storage to the Apple II.

Two modes are supported by the BOOTI card :

- The block mode (using zero page location from 42h to 48h) for basic block devices access. This mode is limited to 65535 blocks of 200h bytes each for a total of 32 MB storage and up to eight devices can be used in ProDOS**.
- The smartport mode (using, you guessed it, SmartPort calls). This mode offers up to eight devices in ProDOS and GS/OS. In GS/OS, the size of a device is limited to 8GB provided that you use either an HFS volume or an ISO image.

** Under normal operation, ProDOS can only provide two devices in block mode but the BOOTI firmware bypasses that limitation thanks to a feature called ACTIV8. See the chapter on ACTIV8 to know more about this.

Supported file formats for images are :

.po/.dsk***/.2mg/.iso/.hdv/.do***

*** .dsk and .do are supported ONLY if they are in ProDOS order AND if the operating system on that image can use block devices (i.e. no « RWTS only » operating system).

What the BOOTI card is NOT ?

The BOOTI card is NOT and will never be (in its current hardware form) a floppy emulator. It will NOT boot from a DOS 3.3 .dsk, nor from any kind of custom format .dsk. It will NOT boot from a .woz either. A floppy emulator is a totally different beast and there are many options available as of now (KBOO HK wDrive/ BMOW floppy emu from Richard Chamberlain/CFFA 3K and a few others). The BOOTI card doesn't care about tracks and sectors. It only works at the block level.

Ok, but you just said that you can boot a ProDOS .dsk under certain conditions ?

Yes, that's because ProDOS can handle both RTWS devices AND block devices.

HOW TO USE THE BOOTI card ?

Fairly simple. Plug the provided USB module onto the card. Make sure that the module pins are aligned with the connector on the card. **A misaligned module may result in a fried card, fried module or even worse.** Please note that the USB port must point towards the keyboard. Now prepare a USB stick formatted in either FAT16 or FAT32 (recommended). Once your USB stick is ready, just copy all the images you want into the root directory of the stick and plug it in the BOOTI card. You are almost ready to rock.

Plug the card into your II and turn it on. Please note that as with any other Apple II « bootable » card, it must be inserted into the highest numbered slot (7 is a pretty good choice) in order to automatically boot that card.

If this is the first time you've used the BOOTI card, then you should be presented with the BOOTI CONFIGURATION UTILITY. If you have previously used the BOOTI, you can press the "C" key to bring up the CONFIGURATION UTILITY.

THE BOOTI CONFIGURATION UTILITY

The screen is divided into three parts.

The left part is populated with the list of compatible files that are present on the USB stick.

For each SSC card detected, two virtual files will be automatically added to the file list. Those two files are named *VDSSC X *.VD Y , where X is the slot of the SSC card and Y is the virtual unit number (i.e., in ADTPro, Virtual.po is VD1 and Virtual2.po is VD2).

WARNING : Those files are added to the file list as soon as an SSC card is detected and even if ADTPro is not running. Obviously, you cannot boot from a virtual drive if ADTPro is not configured properly and running on your host computer.

The only supported speed is 115200 baud.

Ilgs embedded serial support is still a work in progress.

The upper right part is the list of devices with the disk images loaded into each one. By default, all units are blank.

The lower right has small help info and also provide status information on the selected mode and the boot delay.

MODE : Can be either BLOCK or SMARTPORT.

When the card is in BLOCK mode, it will only expose unit 1 and 2 to the operating system **. Those units are limited to 32 MB.

In SMARTPORT mode, up to 8 units are available to the operating system. While ProDOS units are still limited to 32 MB, the actual limit for a unit is 8 GB (255 * 255 * 255 * 512 bytes). Units larger than 32 MB can only be used under GS/OS with HFS.FST for HFS volumes or HS.FST for ISO images. This is a limitation of ProDOS 8, not of the card or firmware.

Please note that in smartport mode, the number of available units reported by the firmware is equal to the last non-empty unit number. If there are « holes » in the unit list, the firmware will report « NO DEVICE CONNECTED » for those units.

This allows other mass storage cards to provide their units to ProDOS instead of « locking » unused units to the BOOTI.

BLANK CURRENT UNIT

Use this to blank a unit in the SELECTED list. As previously mentioned, blank units will report a NO DEVICE CONNECTED status unless they are last in the list.

1-8 :ASSIGN TO UNIT

Use number keys from 1 to 8 to assign the currently selected file to the corresponding unit.

TAB/SPC :NEXT UNIT

Moves the selected unit marker down, going back to unit 1 after unit 8

RE-READ USB

You can use this instead of rebooting to read the USB stick directory in case of a USB stick swap.

WRITE PROTECT TOGGLE

Pressing W will toggle WRITE PROTECT for the currently selected unit. And guess what ? Once a unit is write protected, you can't write to that unit.

BOOT DELAY:1

Use D to select the boot delay in the BOOTI card (from 1 to 6). When the boot delay is higher than 1, a countdown is displayed in the upper left corner of the screen during boot. This allows less than speedy users to use one of the boot keys discussed in the BOOT KEYS section of this document. Any non « boot key » press will stop the countdown and start booting normally.

EXIT

Exit the CONFIGURATION UTILITY and reboot the II.

Arrow keys and **RETURN** are used respectively to navigate the FILE LIST and to assign the currently selected file to the current unit.

Any setting change is saved immediately.

BOOT KEYS

You can use various keys during boot.

Of course, this only works if the BOOTI card is the first bootable card in your Apple II.

Valid keys are :

1 to 8 : select a temporary boot device. This allows you to boot from another unit. By default, the card boots on unit 1. The temporary boot unit is not preserved across reboots.

From a technical point of view, the selected unit is swapped with unit 1. So, if you select 3 as a temporary boot device, unit 1 becomes unit 3 and unit 3 becomes unit 1.

N : Boot from next slot in descending order. Please note that if no bootable card is found, you'll jump to Applesoft BASIC.

B : Boot to Applesoft BASIC.

C : Invoke the BOOTI CONFIGURATION UTILITY

Any other key will break the boot delay countdown and boot in the standard way (i.e. first unit).

ACTIV8

During the development of the firmware, we noticed that, by default, ProDOS can't offer more than 2 units per card in block mode, even if the card reports 4 available units. We decided that it was not satisfying for user to be limited by the model of Apple II they are using (while smartport works in a II+/II+, it will autoboot in enhanced IIe and IIgs only). That's why we added ACTIV8 as a « driver » in the first beta release of the firmware.

Later in the development, we found a way to fully remove the once required driver. ACTIV8 is now completely firmware integrated and will allow older II to boot in block mode and have up to 8 units available without any driver required. Neat !

NB : It seems that ProDOS 2.5 (Hi John !) can provide any number of units in any mode. We are still investigating this.

Q&A

Q : I see a delay when cold booting

A : This is the required time for the USB module and port to set up. There's not much that can be done to reduce that delay.

Q : I cannot boot (crash or nothing happens) using image XXXX

A : The image you are using MUST be in ProDOS order (no skew) and the operating system on the image MUST be block device aware (i.e. no custom or standard RWTS)

Q : Can the read/write speed be improved ?

A : It depends on too many factors to answer this one in a simple way. The firmware is under constant improvement. We might achieve better speed but do not expect it to double.

Q : Are you planning on adding new features to the firmware ?

A : Yes we are. As we previously mentioned, the firmware is under active development. Any new feature request is welcome, except for WOZ support which CAN'T be done (along with any floppy emulation feature that would rely on RWTS).

Q : Ok, the firmware is under active development, but how do I upgrade ?

A : The firmware is flashable from the Apple II using our USBFLASH utility. The flash process is pretty straightforward and it takes just a few seconds to complete.

Q : How can I contact you ?

A : We (David and I) are active members of the Facebook Apple II Enthusiasts group. You can PM us using Facebook messenger.

Special thanks

First of all, I'd like to thank David Mutimer for letting me work on such a great project.

My daughter (4 years old) for all the unicorn stuff. That was her idea. No kidding.

Then Chris Torrence for the great video he did about the BOOTI and also for helping me correct this document.