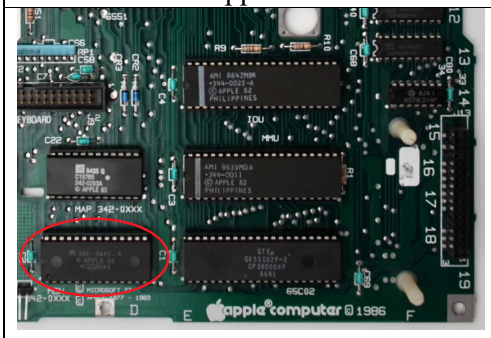
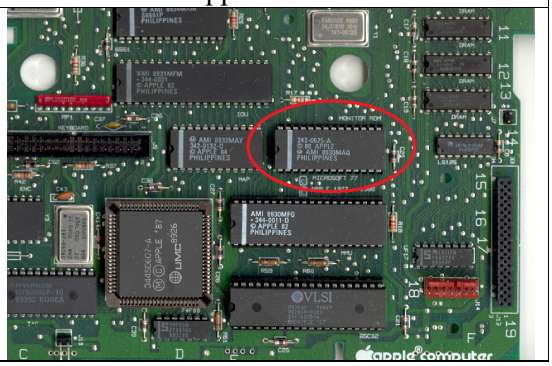
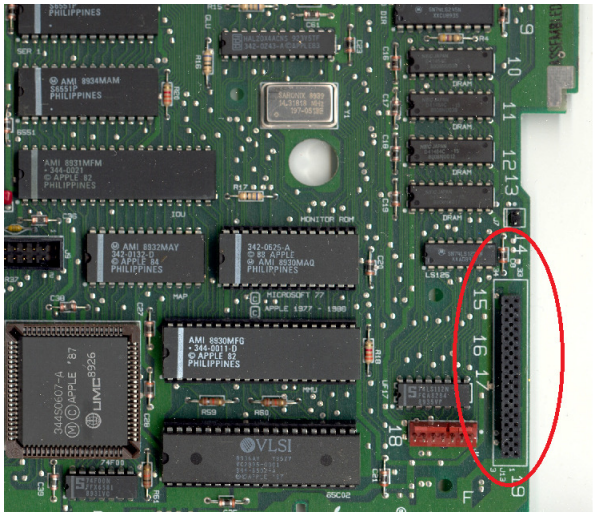
MegaFlash User Guide

Installation

1. Replace the Monitor ROM with the supplied ROM chip.

Apple IIc	Apple IIc Plus
	

2. Install MegaFlash to the Memory Expansion Connector of Apple IIc/IIc plus motherboard. Make sure the header pins are aligned to the connector correctly.



Boot Menu and Control Panel

- Ctrl-Option-Reset to enter the boot menu.
- In the boot menu, there are some shortcut keys:
  C key to enter control panel
  Space bar to toggle CPU speed on IIc+
  Esc key to reboot

Booting from drive 2

IN#4 command to boot from drive 2 of MegaFlash

Control Panel

Drives Enable

Each flash drive and the RAM Disk can be individually enable/disabled. Select **Drives Enable** from the main menu to open the window. Press the number keys to enable/disable the drives.

To save the changes, press Enter to return to main menu. Then, select **Save and Reboot.**

To discard any changes, press Esc key.

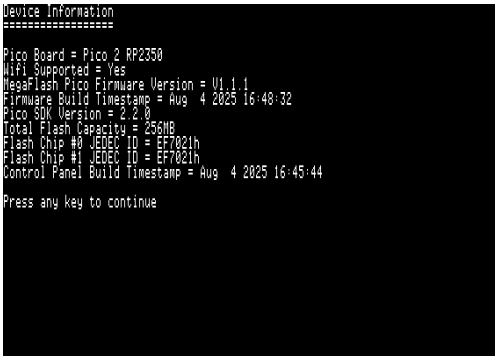
Warning: The slot/drive mappings will be changed after drives are enabled/disabled. Always identify the drives with ProDOS volume name instead of slot/drive number.

Format

It can format the flash drives and RAM drive on MegaFlash. It has two special features. 1) It can format drives to any arbitrary size. 2) It can erase the entire drive before formatting. It may take up to 2 minutes to erase a flash drive. Subsequent write access will be much faster if the drive is already erased.

MegaFlash Hardware/Firmware Information

To show the hardware and firmware information, go to the boot menu. Hold the Open-Apple key while entering Control Panel. i.e. OA-7 or OA-C. Hold Open-Apple key until the device information screen appears.



Apple IIc+ Accelerator

The accelerator code has been modified:

- Pressing Esc key on Power up to switch to normal mode is *removed*.
- To change CPU speed, first go to Boot Menu. Press key 8 or Space bar to toggle the CPU speed. Then, reboot
- Ctrl-OA-Reset *does not* change the current CPU speed.
- The word **Normal** is shown when CPU is running at 1MHz during cold boot.
- The speed when the computer is powered up can be set in Control Panel

ROM Disk

- A ROM Disk is provided for disaster recovery. The ROM disk contains Copy II+ and ADT Pro.
- When enabled from boot menu, it will become the first unit of MegaFlash (slot 4, drive 1). Please note that the slot/drive assignments of all MegaFlash units are changed.
- Ctrl-OA-Reset cold boot to disable the ROM Disk

RAM Disk

- RAM Disk can be enabled from Control Panel. The size of RAM Disk is 400kB. RAM Disk is the last unit of SmartPort. Its volume name is /RAMDISK.
- RAM Disk can be used to transfer floppy disk image with ADT Pro. Users may transfer a floppy disk image and write it to the RAM Disk. Then, copy files from the disk image to Flash storage.

Applesoft BASIC FPU

- High bit of address $5FC is the Enable flag of Applesoft FPU.

Real Time Clock and Network Time Sync

The Raspberry Pi Pico has a real time clock (RTC). But it does not support battery backup. MegaFlash gets the time from NTP server via WIFI.

To enable network time sync,

1) Configure the **WIFI Settings** from Control Panel
2) Run **Test Wifi/NTP** from Control Panel
3) If all tests are passed, enable the **Network Time Sync** option and setup the time zone.

If MegaFlash can fetch the time from NTP server, the time is shown at the bottom right corner in Boot Menu and Control Panel.

If Network Time Sync option is enabled, a ProDOS clock driver will be installed automatically. The clock driver is in the patched system ROM. No software installation is required.

Slinky Emulation

With the stock Apple IIc firmware, MegaFlash can emulate a 256kB Memory Expansion card (aka Slinky) if Pico 2 controller board is used.

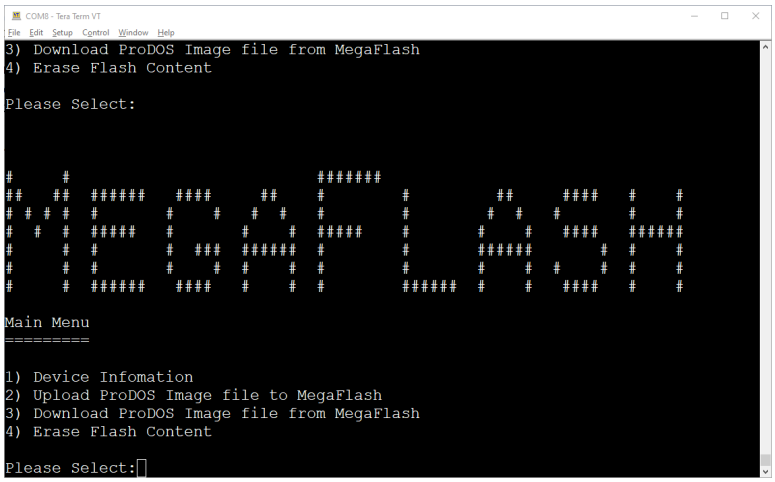
Disk Image Transfer

Disk Image File (.po or .hdv) can be transferred to MegaFlash in 3 ways.

1) ADT Pro and Serial Port
2) MegaFlash Terminal Mode
3) Via WIFI and TFTP Server

Terminal Mode

- To enter terminal mode, TURN OFF Apple IIc. Then, connect a PC to USB port of Pi Pico. Connect to MegaFlash serial port with a Terminal Program like TeraTerm (Windows).
- In the terminal mode, ProDOS-ordered disk image (.po or .hdv) can be uploaded to or downloaded from MegaFlash using XMODE-CRC or XMODEM/1K protocol.



Disk Image Transfer via WIFI

Disk Image can be transferred between MegaFlash and TFTP server via WIFI. Note that TFTP is not FTP. TFTP protocol is much simpler and without user authentication.

To transfer disk image, setup the WIFI network from Control Panel. Then, **select Disk Image Transfer via WIFI** from Control Panel and follow the instruction.

Please note that the TFTP server and MegaFlash must be on the same subnet and TFTP traffic cannot pass through firewall or NAT. In other words, MegaFlash and the server must be connected to the same WIFI router.

The block size of original TFTP protocol is 512 bytes. Later TFTP option extension allows larger block size. A larger block size increase transfer speed dramatically. Make sure blocksize option negotiation is enabled when configuring the TFTP server.

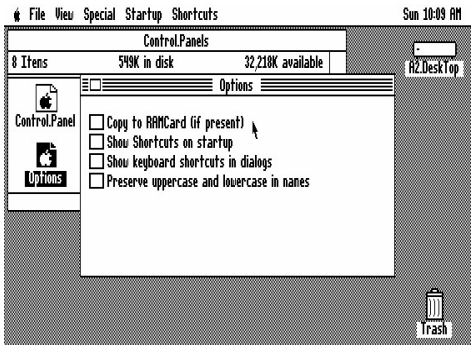
On Windows, Tfpd64 (https://pjo2.github.io/tftpd64/) server program is recommended. It has a GUI. You may need to run the app as administrator to save the setting. When sending a file to server, the file is overwritten without any warning if the file already exists on the server. Make sure **Option negotiation** is enabled.

I don't have a Mac. So, I cannot test any Mac TFTP servers. But this software looks promising.

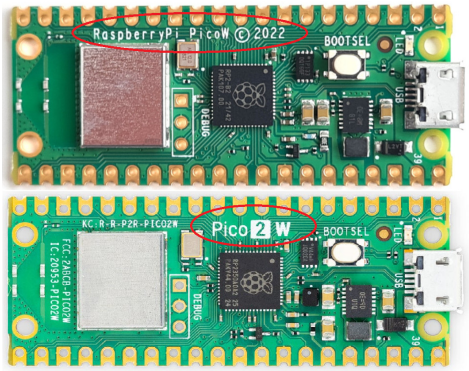
Pumpkin
https://github.com/mterron/pumpkin

Apple II Desktop

By default, Apple II Desktop copies itself to RAM Disk during start-up. This is not necessary for MegaFlash. This behaviour can be disabled from Apple II Desktop Control Panel. Select **Control Panel** from Apple Menu. Open **Options**, then disable **Copy to RAMCard**.



Updating Pi Pico Board Firmware



The first step is to identity the model of Pico Board on your MegaFlash. Currently, Pico W and Pico 2W boards are supported. The firmware of the two boards is different. Please prepare the correct firmware file (`.uf2`) for your Pico board.

To upgrade the firmware,

1) Remove MegaFlash from your Apple IIc computer.
2) Press and **hold** the white button labeled BOOTSEL on the Pico board
3) Connect the Pico board to a USB port of a computer while holding the button. Wait a few seconds, then release the white button
4) A disk drive called `RP2350` or `RPI-RP2` should be mounted.
5) Drag-and-drop the firmware file to the drive. i.e. Copy the `.uf2` file to the root directory of the drive. Wait until the file copy finishes.
6) Reinstall MegaFlash back to your Apple IIc computer carefully.