User Guide

Revision 0.963 – October 2020

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ROM X Overview

Thank you for purchasing ROM X! We hope that you enjoy experimenting with various different ROM's for your Apple][system.

We will be sharing tools, ROM images, and related documentation at www.theromexchange.com – be sure to check the site regularly for updates.

This user guide documents the features available with firmware version 0.963. If you have an earlier version of the firmware installed, we recommend updating your ROM X firmware to the current release.

So, what is ROM X? ROM X is an in-system programmable device that replaces the system ROM's in your Apple][or][+ computer. It will store up to 15 ROM images and present them for selection via an on-screen menu system. In addition, the menu system itself (the ROM X firmware) is updateable in-system.

What do we mean by In-System Programmable? This simply means that you can re-program ROM X with your own ROM images without removing the device from your computer, and without need for any external programmer. Uploading of new ROM images is done through either the ROM X boot menu, or by running the ROMX.DISK utility from the ROM X System and Utilities Disk image.

If you purchase the optional ROM X text ROM bundle, one of 16 text ROMs (fonts) can be selected from the ROM X menu also, or associated with a specific system ROM. See the Text ROM section for the list of available fonts.

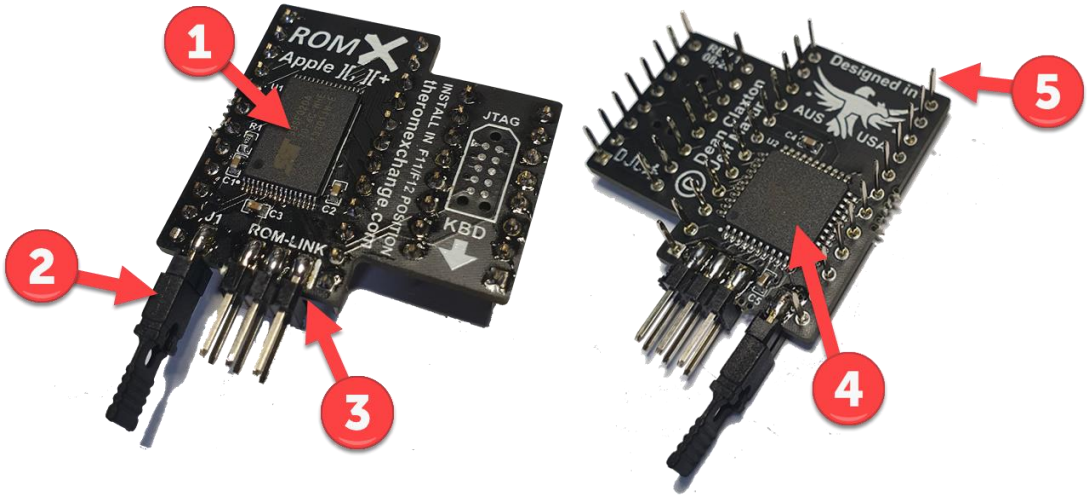
ROM X firmware v0.963 supports linking of a ROM image with a DOS image loaded into a ROM slot. When a ROM image is linked to a DOS image, DOS will be loaded the instant the ROM is selected!

ROM X ships with a default set of system ROM images pre-installed. The following menu selection represents the out-of-box ROM X configuration:

ROM X Hardware

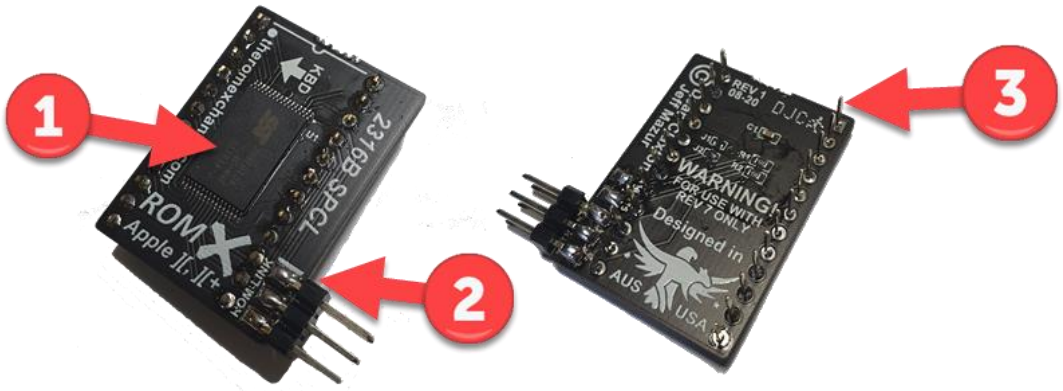
There are currently 2 ROM X modules available – ROM X, and the optional ROM X 2316B Text ROM. A ROM X 2513 compatible Text ROM is also in the works, but not yet available.

ROM X



1. 2Mbit Flash Memory
2. Recovery Jumper (normally installed). Remove to enable recovery mode. See the Recovery Mode section for further details).
3. ROM-Link header linking the optional ROM X Text ROM – Pin 1 end (white bar on PCB)
4. CPLD (Complex Programmable Logic Device)
5. Pin headers (legs)

ROM X 2316B SPCL Text ROM



1. 1Mbit Flash Memory
2. ROM-Link Header – Pin 1 end (white bar on PCB)
3. Pin headers (legs)

ROM X Menu System

Overview

The ROM X menu system is structured as below:

1. Asterisk to the left of the ROM image menu shows the current default ROM image.
2. ROM image selection menu - pressing a key 1 through F will immediately boot the computer using the selected ROM image.
3. ROM X command menu.
4. Example Text ROM associations (active with optional ROM X text ROM module).
5. Example DOS Image association (links ROM with DOS 3.3 Image loaded in slot F).
6. Default Boot ROM image
7. Default character generator (text) ROM image.
8. Menu delay countdown timer.

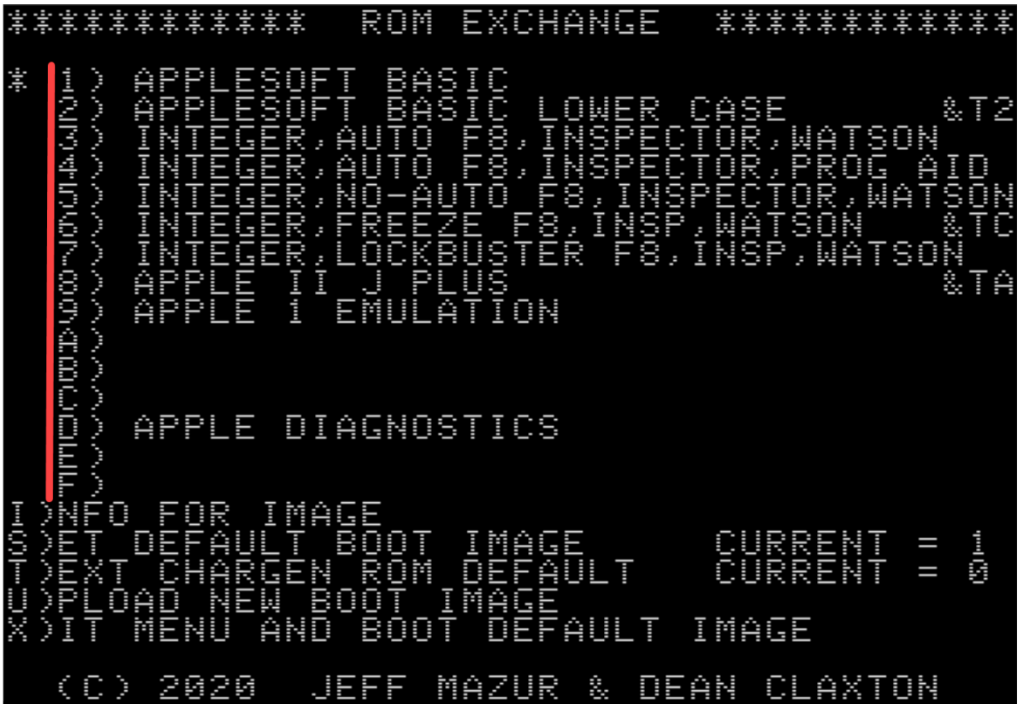
On initial power-up, the ROM X menu will be displayed for a period determined by the delay timer. By default, this is approximately 3.5 seconds. If no menu selection has been made during this time, then the system will automatically boot using the default system ROM (see items 1 and 5 above).

The delay timer has a user adjustable range from 0 to approximately 5.2 seconds. Selecting a delay of 0 will bypass the menu completely on power up. You will then have to use the disk version ROMX.DISK to make further changes.

Pressing a bank key at any time will boot the corresponding image. Any other key will stop the countdown.

Image Selection Menu

The image selection menu displays the list of ROM images 1 through F that are stored on the ROM X module.



ROM Images are selected using keys 1 though F on the keyboard. On keypress, the selected image will immediately be used to boot the system.

After an image has been booted, ROM X becomes invisible to the system. Subsequent RESETs will be handled according to the reset handler in the selected ROM image.

Images with a Text ROM association are displayed above with &T*n* at the end of the description line, where n represents a font number 0 to F. If you have the optional ROM X text ROM installed, selecting one of these images will automatically switch the font via the ROM-Link interface. Text ROM associations override the default text ROM setting.

All 15 image slots are in-system programmable – you can overwrite them or customize them as desired.

As shipped, the blank entries are populated with Applesoft Basic ROMs that display custom boot text. Rather than APPLE][, they will display IMAGE 0*n* where *n* represents the selected image number. These blank entries are great spots to add your first custom images.

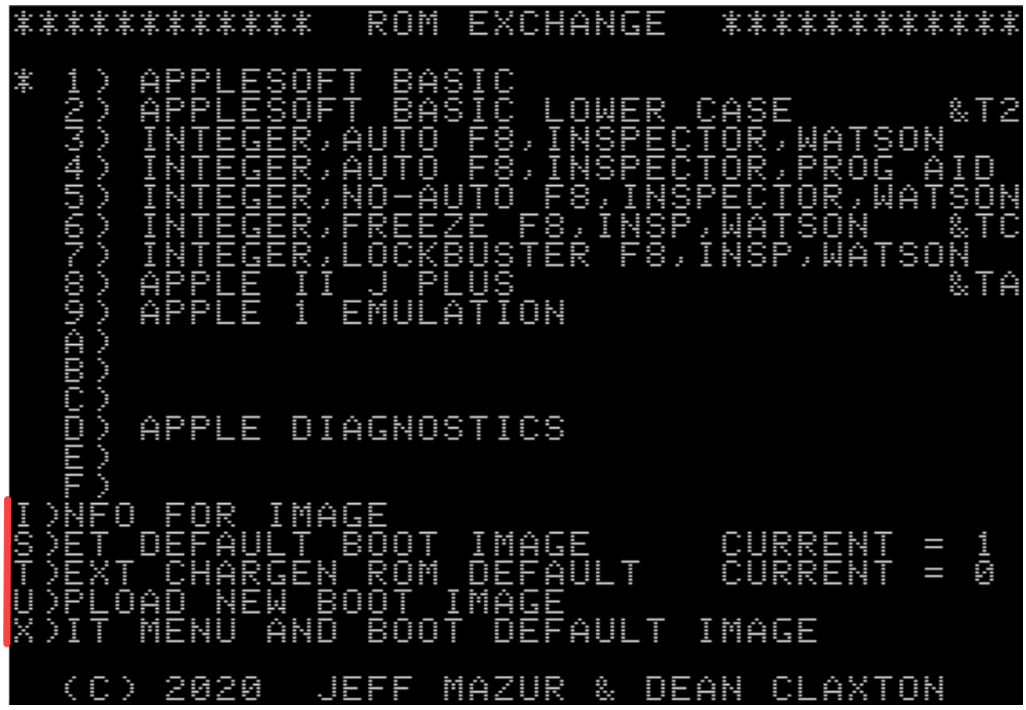
Details on uploading a custom ROM image are covered in the Adding a ROM Image section.

NOTE: It is possible to programmatically switch between system ROM images and Text ROM images. See the ROM X API Reference in the Documentation section at https://theromexchange.com

Command Menu

Keys I, S, T, U and X are used to access the following items from the command menu:

- I)NFO FOR IMAGE
- S)ET DEFAULT BOOT IMAGE
- T)EXT CHARGEN ROM DEFAULT
- U)PLOAD NEW BOOT IMAGE
- X)IT MENU AND BOOT DEFAULT IMAGE

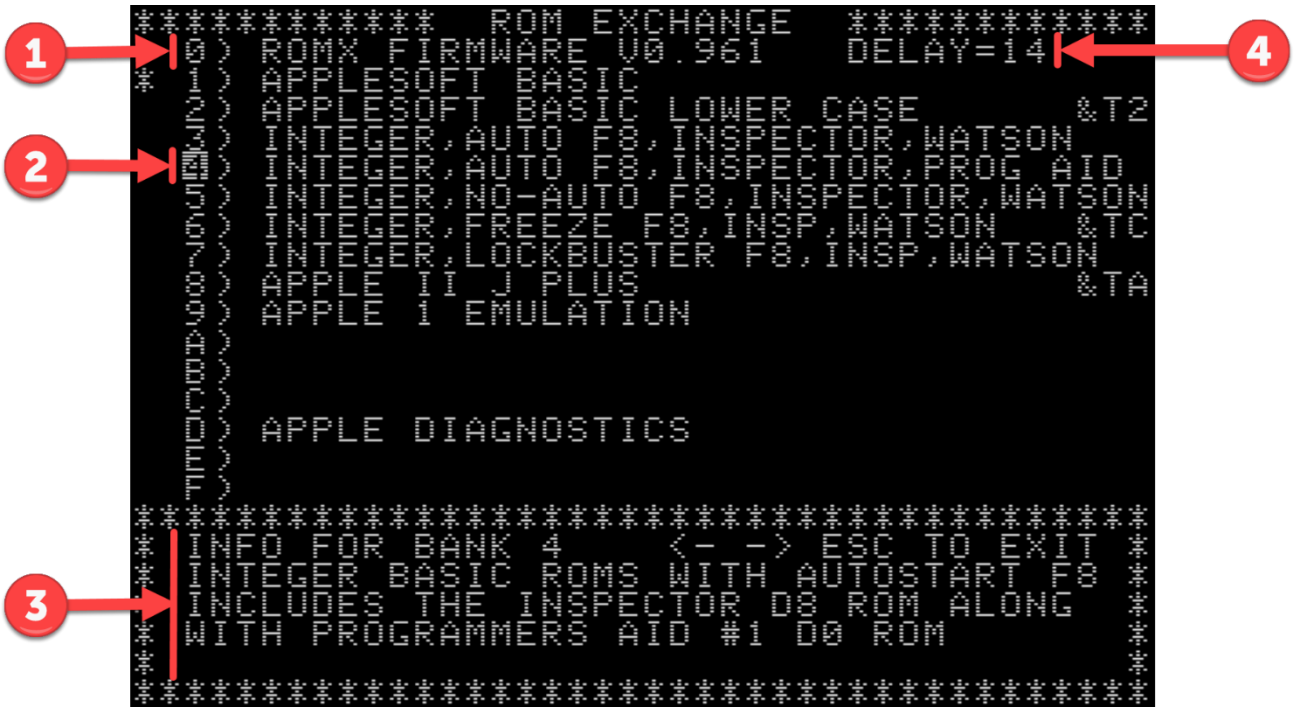


These command options are detailed in the following sections.

I)NFO FOR IMAGE

From the main menu, pressing the I key will invoke the I)NFO FOR IMAGE command. This displays an information page allowing you to:

- View the ROM X firmware revision,
- View and Edit the delay timer setting,
- View the stored information for each ROM image.
- Erase the stored information for all ROM images.



1. ROM X firmware revision.
2. Currently selected image.
3. Information for selected image.
4. Delay timer setting.

Use the right and left arrow keys to change the highlighted image number – the information for the selected image will be displayed in the lower section of the display.

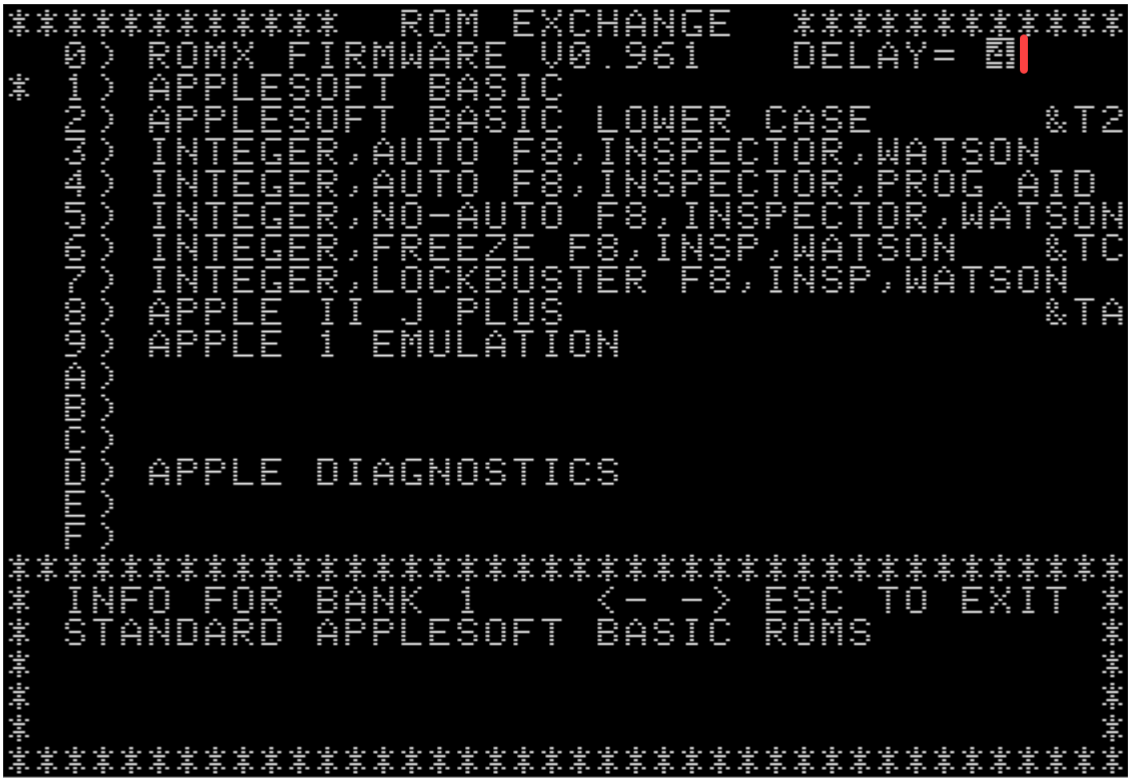
Press the ESC key to return to the main menu.

The image descriptions and information cannot be edited from this screen – these are entered when uploading an image. See *Creating and Uploading a Custom ROM* for further details.

Editing the Delay Timer

The delay timer has a default setting of approximately 3.5 seconds, with a user adjustable range from 0 to approximately 5.2 seconds in 0.346 second increments.

Using the key combination CTRL-D from the Information page, the timer delay setting may be edited:



Valid delay timer entries are 0 to F, resulting in the following delay times:

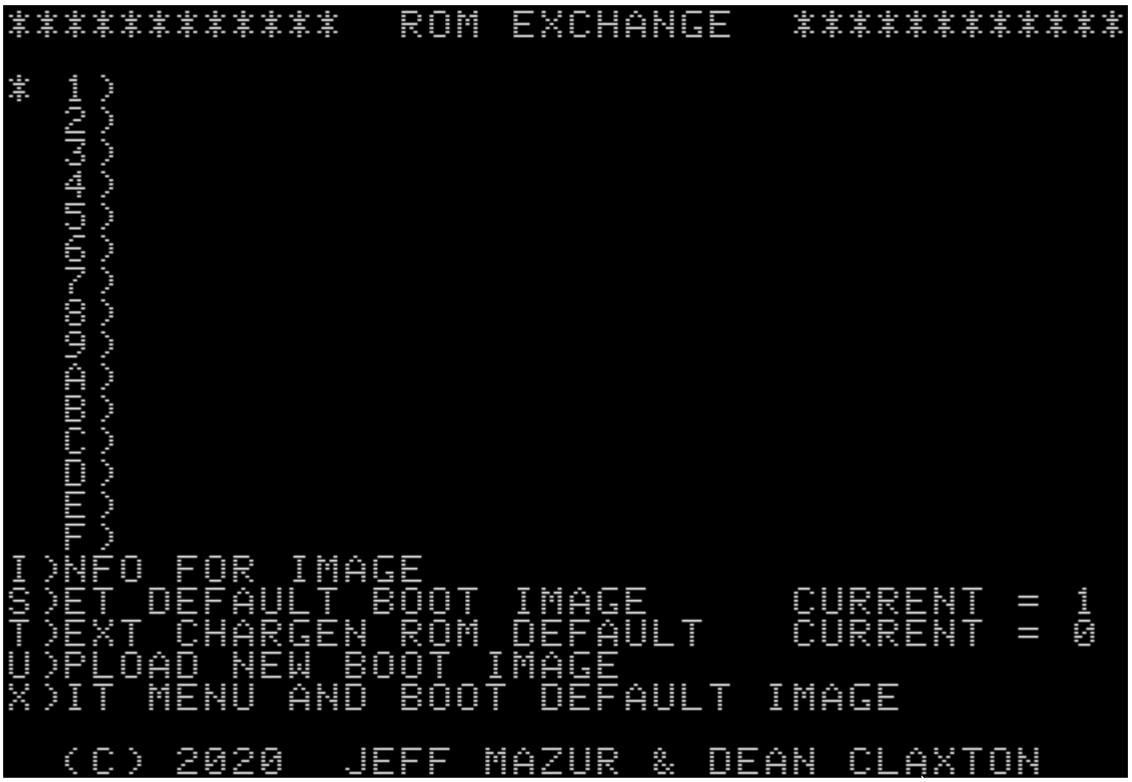
Delay Entry	Delay Displayed	Delay Time (seconds)	Delay Entry	Delay Displayed	Delay Time (seconds)
0	00	0 (menu not displayed)	8	10	2.769
1	02	0.346	9	12	3.114
2	04	0.692	A	14 (default)	3.46
3	06	1.038	B	16	3.806
4	08	1.384	C	18	4.152
5	0A	1.730	D	1A	4.498
6	0C	2.076	E	1C	4.844
7	0E	2.422	F	1E	5.190

If you set the delay time to zero, then the menu will not be displayed at power-up and the default system ROM image will be used. You must then use the disk version of the ROM X firmware (ROMX.DISK) to make any changes to the ROM X configuration or revert the delay timer setting. See the ROM X System and Utilities Disk section.

Erasing the Stored Information

From the information page it is possible to completely erase the image descriptions and stored information for ALL images.

Note that this is NOT on an individual basis – it is for ALL images in one pass. The actual ROM images themselves are not erased, just the descriptions and information.



WARNING! THIS IS IRREVERSIBLE!

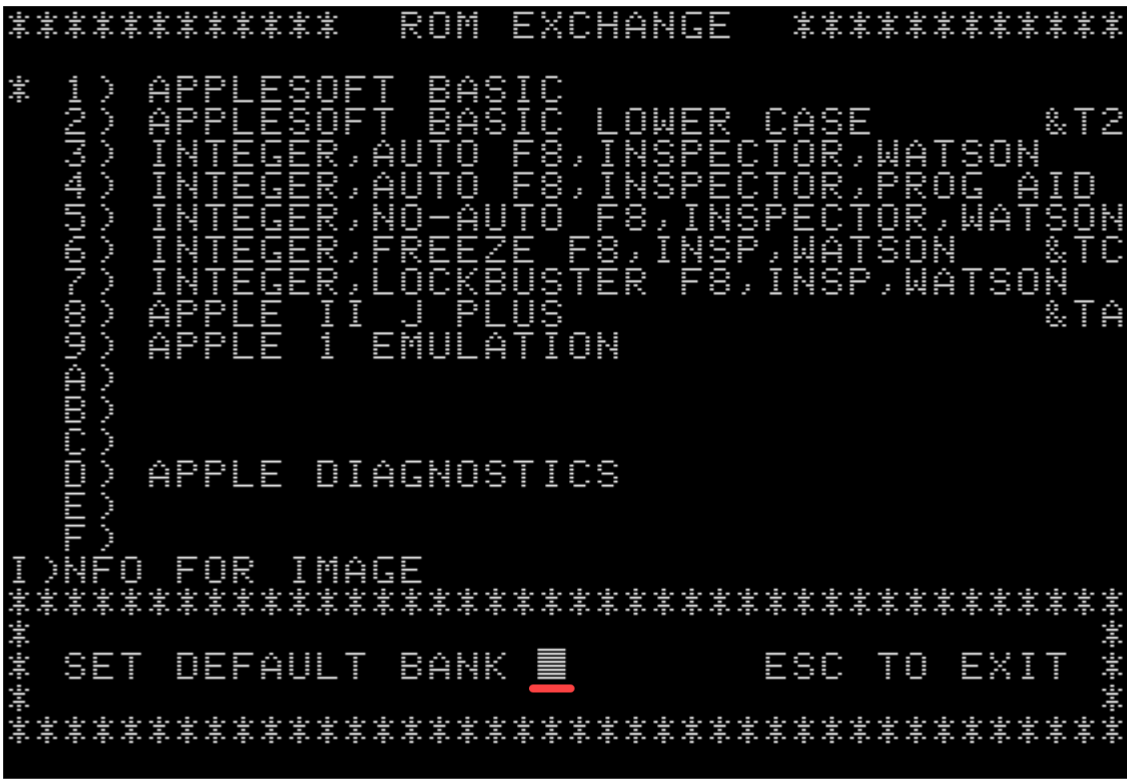
The only way to restore the descriptions and information is to re-upload the images one by one, using the tools to regenerate the description and information fields.

WARNING! THERE IS NO OPTION TO CANCEL!

As soon as the command is invoked, it is executed. If you still want to proceed, then the key combination to erase all descriptions and information for EVERY image in one fell swoop is CTRL-O. Don't say you haven't been warned!

S)ET DEFAULT BOOT IMAGE

From the main menu, pressing the S key will invoke the S)ET DEFAULT BOOT IMAGE command:

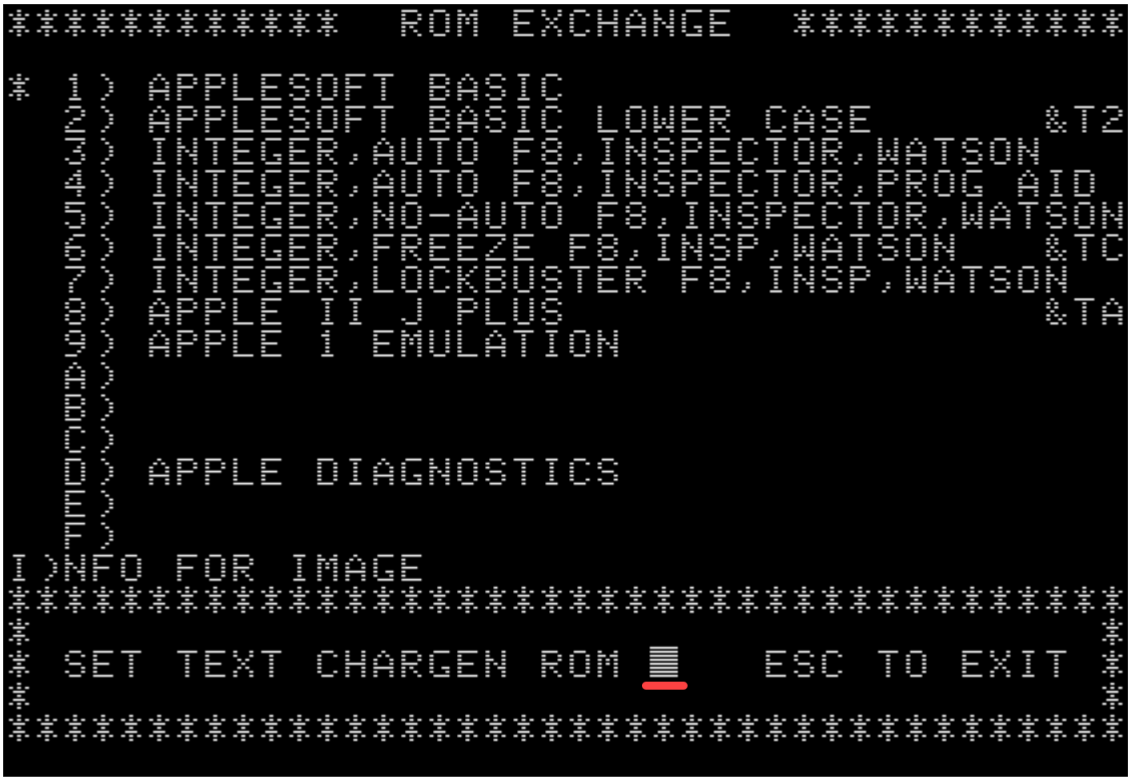


From this page you can select the default boot image 1 to F. The default boot image is used when the delay timer expires, or when the X)IT MENU AND BOOT DEFAULT IMAGE command is invoked from the main menu.

The current default image is highlighted with an asterisk to the left of the ROM image number, and also listed to the right of the command (CURRENT = *n*).

T)EXT CHARGEN ROM DEFAULT

From the main menu, pressing the T key will invoke the T)EXT CHARGEN ROM DEFAULT command:



From this page you can select the default Text ROM image 0 to F. If you have the optional ROM X text ROM module installed, then the selected default text ROM will be used unless there is an overriding text ROM association in the system ROM image description.

If you do not have the optional ROM X Text ROM installed, then this setting will have no effect.

Note that the Text ROM selection will not take effect until the menu system is exited, and that font 0 (Apple stock ROM) will be used when entering the menu.

The current default ROM image is displayed to the right of the command (CURRENT = *n*).

See the *Text ROM* section for a list of the available text ROMs (fonts).

U)PLOAD NEW BOOT IMAGE

From the main menu, pressing the U key will invoke the U)PLOAD NEW BOOT IMAGE command.

This command allows you to upload a ROM image to the ROM X flash memory. Currently, you must firstly boot into DOS and load a 12KB firmware image into RAM at address $2000 before using this function. The upload can then be completed by running the disk based version of the firmware (ROMX.DISK) from the ROM X System and Utilities Disk.

Using the Apple][monitor commands it is also possible to copy the contents of the currently selected ROM image to RAM, where it can be modified and re-uploaded. E.g. 2000<D000.FFFFM

A future firmware revision will eliminate the requirement to load the image from DOS – the U)PLOAD function will allow you to access ROM images from floppy disk directly from the boot menu (a special version of DOS will be embedded in the firmware).

See Adding a ROM Image for the current method of uploading a ROM image onto your ROM X module.

X)IT MENU AND BOOT DEFAULT IMAGE

Pressing the X key from the main menu will immediately boot the computer using your default system ROM. If you have installed the optional ROM X Text ROM module, then your default Text ROM image will also be applied.

Text ROM

The optional ROM X Text ROM contains a total of 16 different fonts. Use the image numbers below when selecting a font. Note that for all except Katakana the inverse and flashing character sets are not shown as they are the same as the main characters, but obviously inverse or flashing - Katakana is a special case.

0 = Apple 7341-0036 (stock ROM):

1 = Apple with lower case (Videx):

2 = Apple with lower case (Z-ROM - Bob Brown):

3 = Apple with lower case (Dan Paymar):

4 = Blippo Black (adapted from The DOS Toolkit):

5 = Byte (adapted from The DOS Toolkit):

6 = Colossal (adapted from The DOS Toolkit):

7 = Count (adapted from The DOS Toolkit):

8 = Flow (adapted from The DOS Toolkit):

9 = Gothic (adapted from The DOS Toolkit):

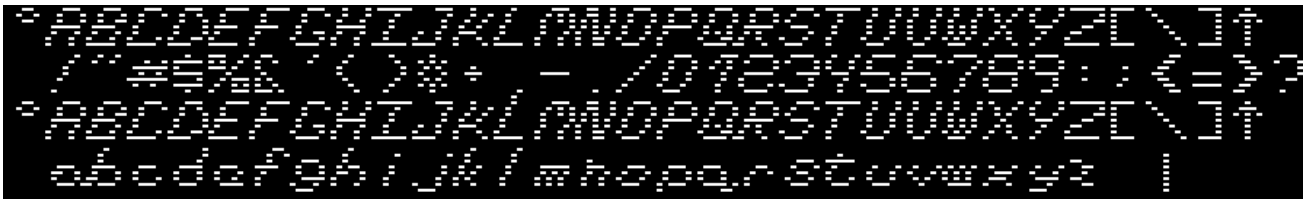
A = Katakana - custom Apple J Plus ROM that Nick Westgate put together (if you load up the J Plus ROM X System ROM, CTRL-T toggles Katakana and Roman text as per standard J Plus behavior). Rather than an inverse character set it has normal Katakana, but does also have flashing Katakana in addition to the roman character set (the second "band" of characters shown below in inverse is actually flashing). Ultimately this means that you can experience the J Plus without having to modify your motherboard. Lowercase added as well :

B = Outline (adapted from The DOS Toolkit):

C = Pig Font (Keith Comer):

D = Pinocchio (adapted from The DOS Toolkit):

E = Slant (adapted from The DOS Toolkit):



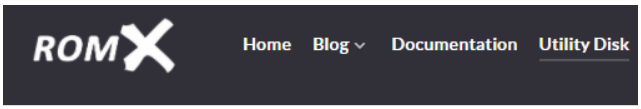
F = Stop (adapted from The DOS Toolkit):

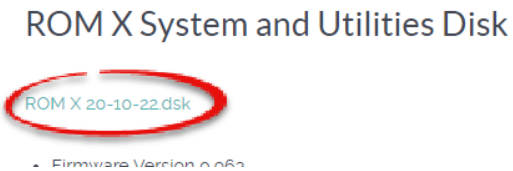
ROM X System and Utilities Disk

Overview

The ROM X System and Utilities Disk contains several software utilities for ROM X, including the current ROM X firmware release.

You may download the current disk image from https://theromexchange.com under the Utility Disk section :

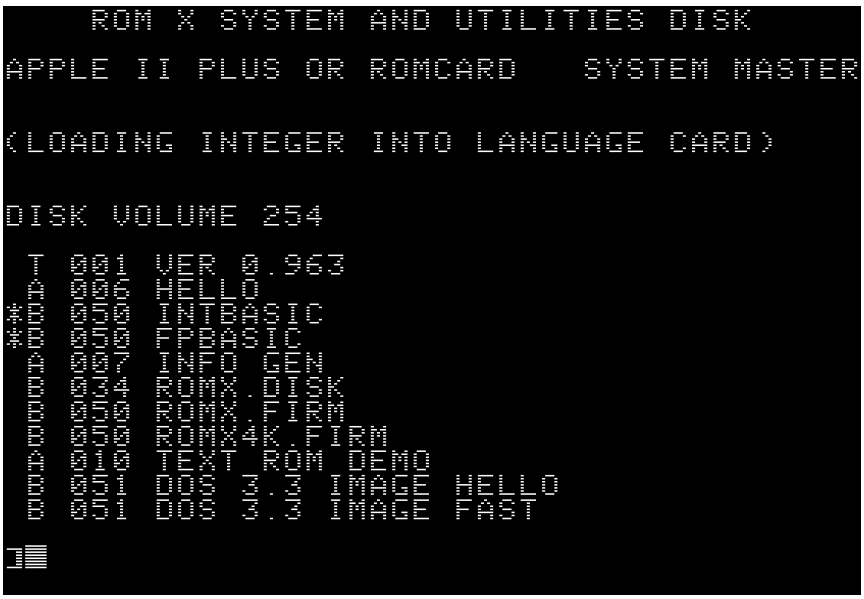




If you have a floppy emulator such as a Floppy Emu or wDrive, you can copy this disk image straight onto the SD card and use it to boot the system.

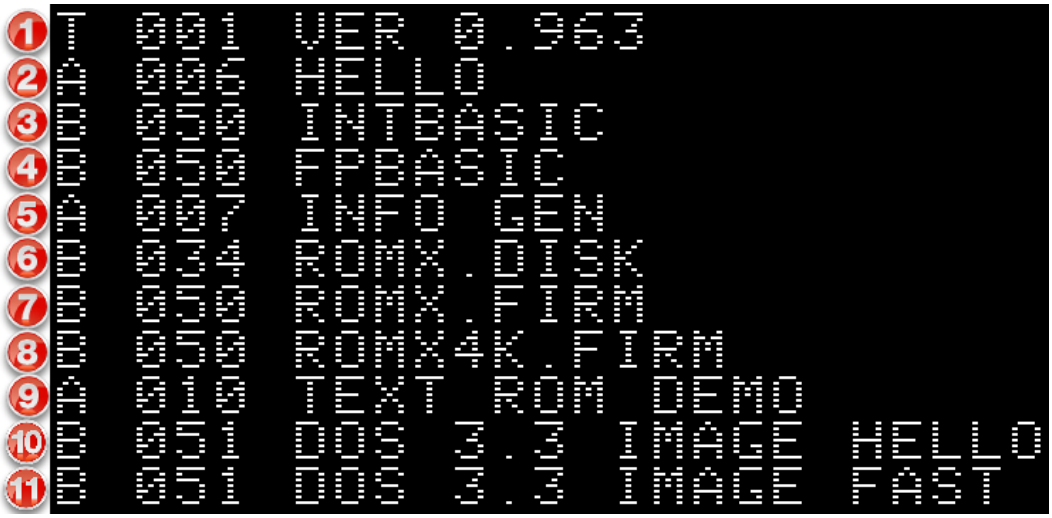
If you are using physical media, you can transfer the disk image to the Apple II using ADTpro (see https://www.adtpro.com/).

The disk contents for the 20-10-22 release of the ROM X System and Utilities Disk are shown below:



Note that some of these utilities are written in Applesoft Basic, and therefore you will need to firstly select an Applesoft Basic ROM from the ROM X menu before booting this disk.

A brief description of each file is shown below :



1. VER 0.963 – ROMX.DISK and ROMX.FIRM release version (0.963).
2. HELLO – boot utility – loads INTBASIC into slot 0 RAM card if present and CATALOGs the disk.
3. INTBASIC – Integer Basic ROM Image.
4. FPBASIC – Applesoft Basic ROM Image.
5. INFO GEN – utility to generate the description and info contents before uploading a ROM.
6. ROMX.DISK – disk based version of the ROM X firmware.
7. ROMX.FIRM – current ROM X firmware release image.
8. ROMX4K.FIRM – cut down version of the ROM X firmware that will run with only 4K RAM.
9. TEXT ROM DEMO – demonstration Applesoft Basic utility that displays the various fonts if you have the optional ROM X Text ROM installed.
10. DOS 3.3 IMAGE HELLO – DOS 3.3 image that can be loaded into a ROM slot. This HELLO version boots instantly and runs HELLO off the disk if present.
11. DOS 3.3 IMAGE FAST – DOS 3.3 image that can be loaded into a ROM slot. This FAST version boots instantly to a prompt without running HELLO.

System ROMs can be associated with DOS images, leading to a near instant boot into DOS. See Adding a DOS Image.

Adding a ROM Image

ROM X supports up to 15 user ROM images. Essentially the upload process involves 5 major steps :

1. Preparing the ROM image
2. Transferring the ROM image to disk
3. Loading the ROM image into RAM
4. Generating description and information (optional)
5. Uploading the ROM image

The following section details the steps to store a ROM in your ROM X flash memory.

Preparing the ROM Image

The Apple][ROM address space is a 12KB (12288 bytes) block from address $D000 through $FFFF. On a stock machine this is made up by the contents of 6 individual 2KB (2048 bytes) ROM chips:

ROM Chip	Address Start	Address End
D0	$D000	$D7FF
D8	$D800	$DFFF
E0	$E000	$E7FF
E8	$E800	$EFFF
F0	$F000	$F7FF
F8	$F800	$FFFF

Complete ROM images downloaded from www.theromexchange.com may be distributed as 12544 byte RMX files. This file format includes the complete ROM in addition to prefilled description and information text generated using the INFO GEN utility. The first 12288 bytes of this file is the ROM image, and the remaining 256 bytes is the metadata. This file can be directly copied onto a disk and used. Refer to the following section.

Some ROMs downloaded from the internet have also been accumulated into a single 12288 byte file. That's perfect for ROM X and you can transfer them directly to disk and use them. Refer to the following section.

Some ROMs though will be distributed as individual 2KB files for each of the F8, F0, E8, E0, D8 and D0 ROMs. The ROM X U)PLOAD function expects a 12KB ROM image starting at memory address $2000 and ending at $4FFF, plus it will pull in the metadata (description and information text generated by the INFO GEN utility) from $5000 to $50FF if it exists.

Whilst you *could* manually load the individual 2KB files into the $2000 - $4FFF address space, its easiest to work with a single 12KB image file that you have pre-built on PC or Mac using a hex editor such as HexEd.It (https://hexed.it/).

Using a hex editor, create a new ROM file that is $3000 (12288) bytes in size, then copy the individual 2KB files into your new ROM file using the following offsets:

ROM Chip	File Offset Start	File Offset End
D0	$0000	$07FF
D8	$0800	$0FFF
E0	$1000	$17FF
E8	$1800	$1FFF
F0	$2000	$27FF
F8	$2800	$2FFF

Using the above table for reference, it is quite easy to manipulate ROM images. You may wish to extract the F8 ROM from one image to use in another, for example. From the table, the F8 ROM resides at file offset $2800 through $2FFF - you can simply copy that block of bytes out into a new F8 ROM file.

Ensure that your new ROM file ends at offset $2FFF – it should be exactly 12288 bytes in length.

If you would like to build an RMX file with Image metadata such as description and information added, see RMX Files in the Generating Description and Information section.

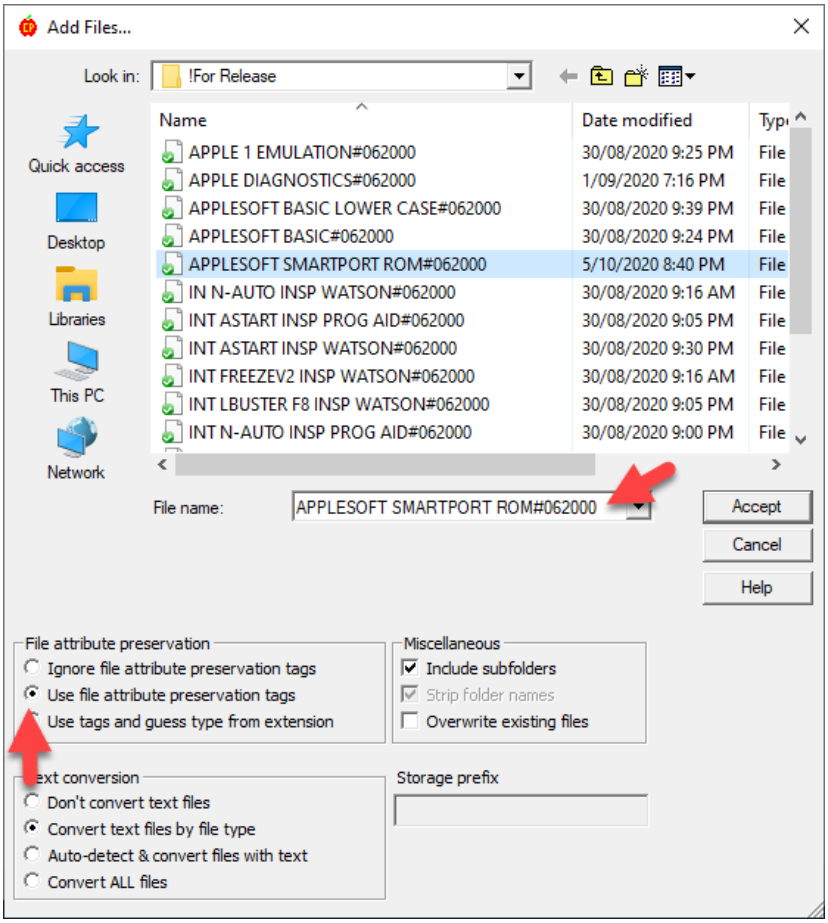
Transferring the ROM Image to Disk

Once you have a 12KB ROM image ready, the file needs to be transferred onto an Apple][disk. It is recommended that you copy the file onto the ROM X System and Utilities Disk as this disk contains the tools required to complete the upload process.

If you are a Windows user, we recommend you install CiderPress (https://a2ciderpress.com/) to complete this task. In addition to many other features, CiderPress will allow you to open the disk image file and insert the ROM image that you have created.

An alternative utility, and one that also supports Mac OS and Linux, is AppleCommander (http://applecommander.sourceforge.net/).

If you choose to use CiderPress, rename your ROM file to include the attribute tag **#062000** at the end of the filename, then select the option *Use file attribute preservation tags* when adding your ROM file:



The #062000 tag will ensure that CiderPress sets the file attribute to Binary (type 06) with a default load address of $2000.

Whichever utility you elect to use, ensure that:

1. The file type on disk is Binary
2. The file size on disk is exactly 12288 bytes, or 12544 bytes for an RMX file.

Pathname	Type	Aux	Mod Date	Format	Size	Ratio	Packed	Access
HELLO	BAS	$0801	[No Date]	DOS	1156	100%	1156	dnwr
INFO GEN	BAS	$0801	[No Date]	DOS	1291	100%	1291	dnwr
TEXT ROM DEMO	BAS	$0801	[No Date]	DOS	2241	100%	2241	dnwr
INTBASIC	BIN	$1000	[No Date]	DOS	12288	100%	12288	r
ROMX.FIRM	BIN	$2000	[No Date]	DOS	12288	100%	12288	dnwr
ROMX4K.FIRM	BIN	$2000	[No Date]	DOS	12288	100%	12288	dnwr
APPLESOFT SMARTPORT ROM	BIN	$2000	[No Date]	DOS	12288	100%	12288	dnwr
ROMX.DISK	BIN	$5FF0	[No Date]	DOS	4112	100%	4112	dnwr
FPBASIC	BIN	$D000	[No Date]	DOS	12288	100%	12288	r
VER 0.961	TXT	$0000	[No Date]	DOS	0	100%	0	dnwr

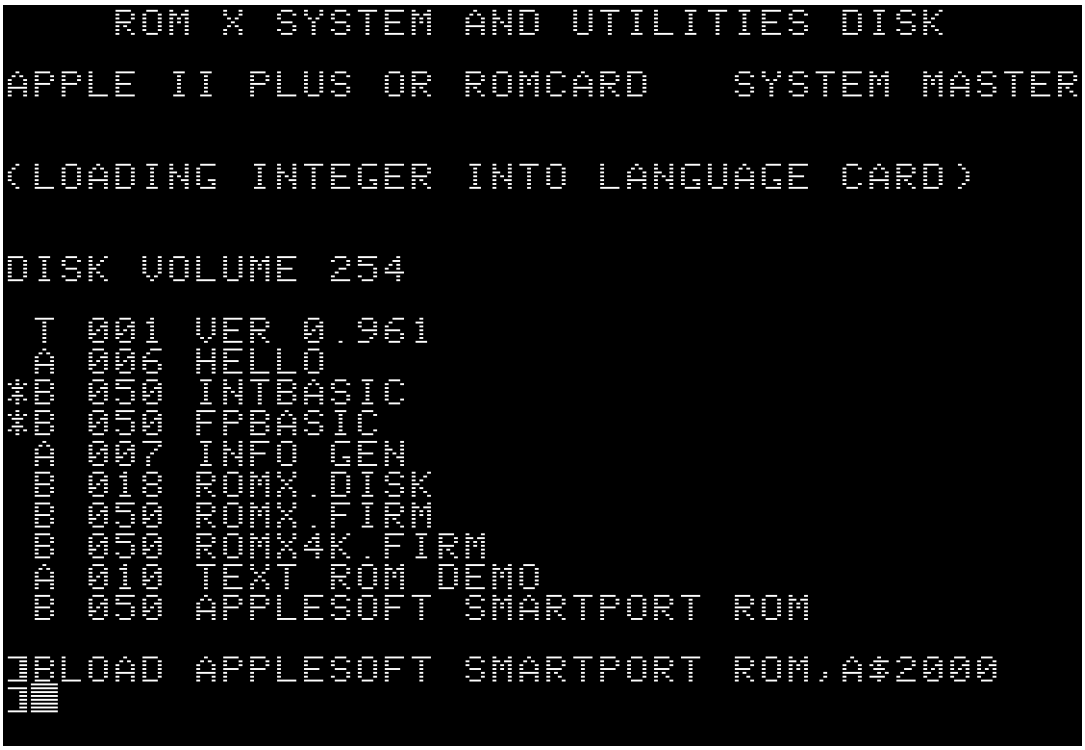
If you are using a floppy emulator such as Floppy Emu or wDrive, you may now copy the disk image to SD card and use it to boot the computer.

If you are using physical media, you can transfer the disk image to the Apple II using ADTpro (see https://www.adtpro.com/).

Loading the ROM Image Into RAM

After booting the computer with your updated disk image, go ahead and load the new ROM at address $2000 using the command

BLOAD *ROM filename*,A$2000



You may now use the ROMX.DISK utility to U)PLOAD the new ROM, however it is recommended that you firsly use the INFO GEN utility to pre-fill the ROM description, and create the information page for the ROM.

Generating Description and Information

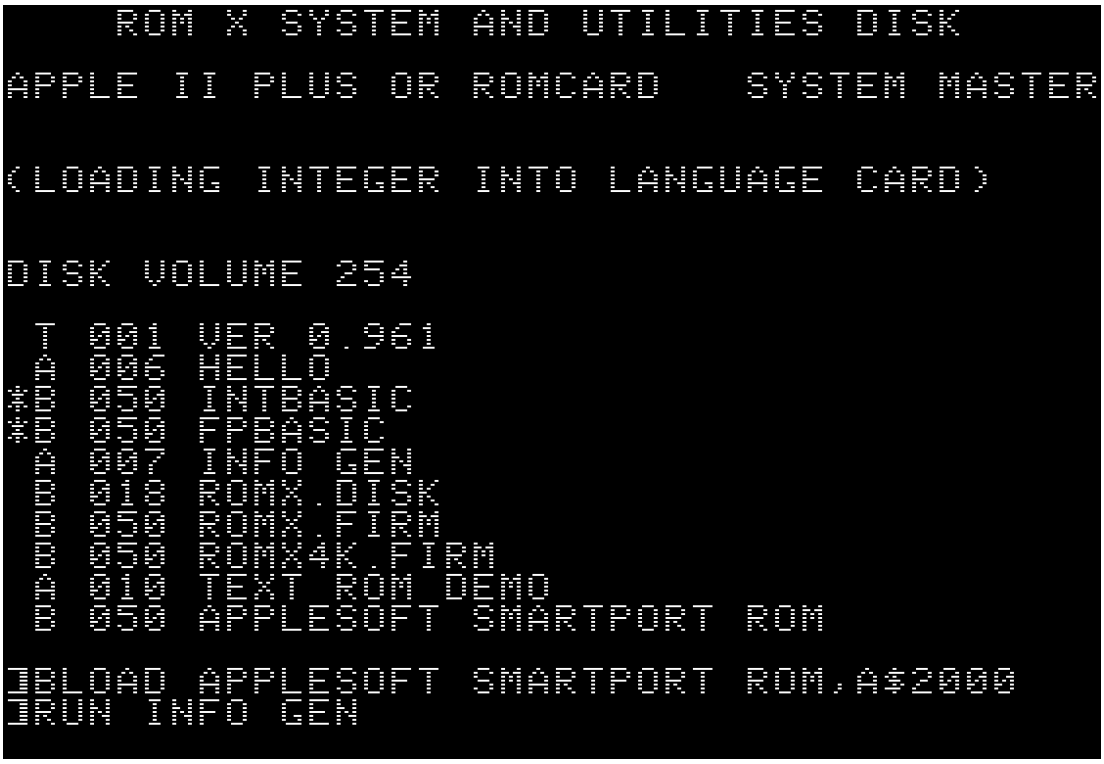
ROM X supports a ROM description of up to 35 characters, which will be displayed alongside the image number on the main menu.

In addition to the image description, 144 characters of additional information or notes for the image can be stored and displayed on the information page.

While the ROM X firmware and ROMX.DISK utility will allow you to enter the description when you select the U)PLOAD command, you must use the INFO GEN utility to generate the information page.

Run the INFO GEN utility using the command:

RUN INFO GEN



The ROM Exchange Image Info Generator should load and prompt you to enter an image description. If you have loaded an RMX file into RAM then the description and information text will be prefilled.

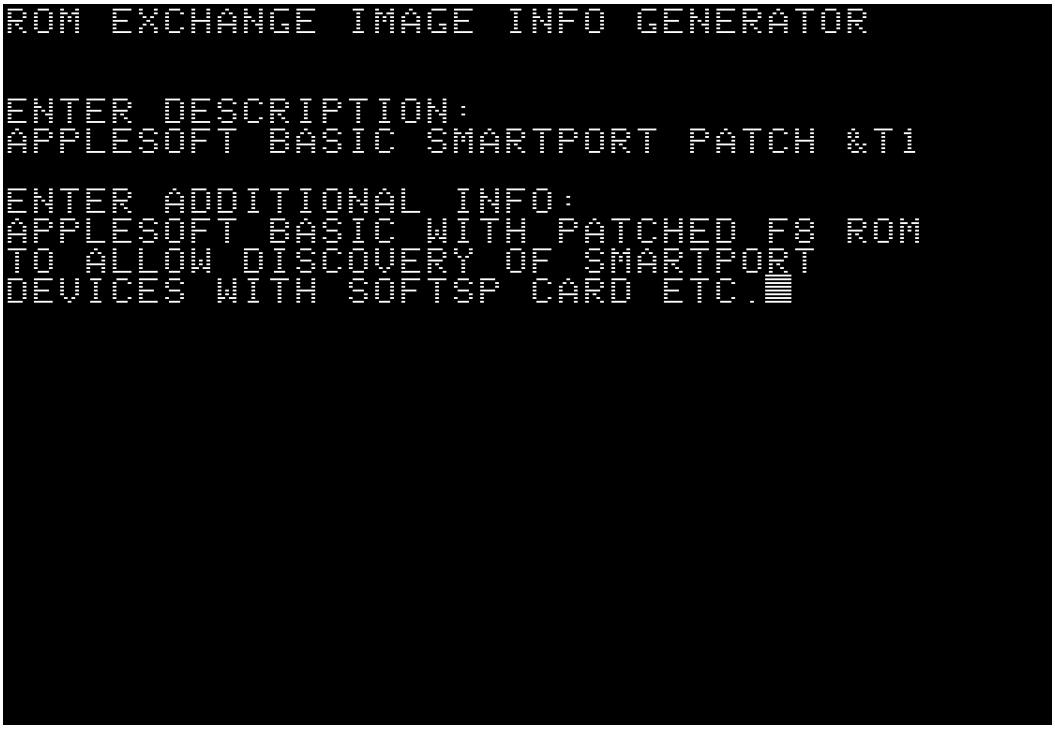
A maximum of 35 characters is allowed, including an optional DOS image association, and optional Text ROM association.

You can link a system ROM image with a DOS image for instant DOS boot by including &Dn at character position 30-32 of the description line, where *n* represents the slot number of a DOS image (1-F).

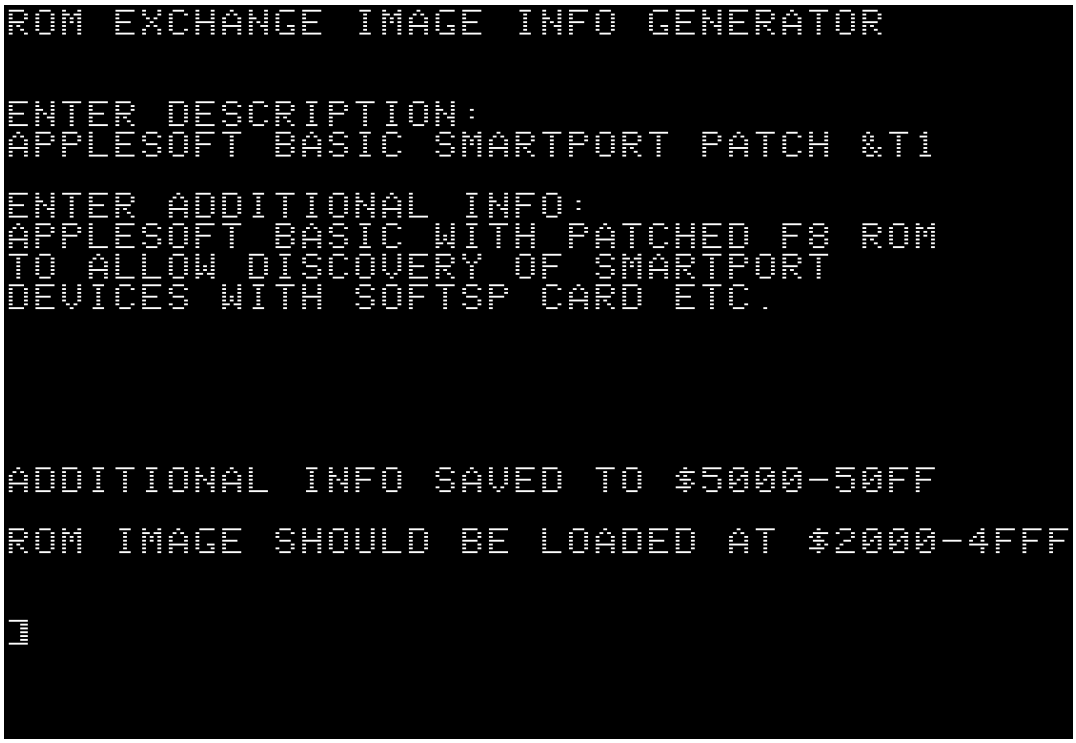
You can associate a specific character generator (text) ROM to be used with a system ROM by including &T*n* at the end of the description line (in positions 33-35), where *n* represents the text ROM image 0-F. With this

association in place (and with the optional ROM X text ROM module installed), the font will change when the ROM image is selected.

After accepting the description by pressing the Enter key, you will be prompted to enter the image information that will be displayed on the I)NFO page. You can use the left and right arrows to move from line to line. What you see here is exactly as it will be displayed in the I)NFO page:


ROM EXCHANGE IMAGE INFO GENERATOR
ENTER DESCRIPTION:
APPLESOFT BASIC SMARTPORT PATCH &T1
ENTER ADDITIONAL INFO:
APPLESOFT BASIC WITH PATCHED F8 ROM
TO ALLOW DISCOVERY OF SMARTPORT
DEVICES WITH SOFTSP CARD ETC.

Pressing the Enter key will write the data to memory (from $5000 to $50FF), ready to be uploaded along with the image that is stored at $2000 to $4FFF.



Double check the information you entered - If you made an error, re-run the INFO GEN and edit the information. The description text can be edited during the upload process – it's actually easiest to add the DOS and/or Text ROM associations at that time to ensure that they are positioned correctly on the description line.

RMX Files

If you would like to potentially distribute the ROM image as an RMX file (an RMX file includes the description and information text) then you should now create an RMX file from the image and text data currently loaded in RAM.

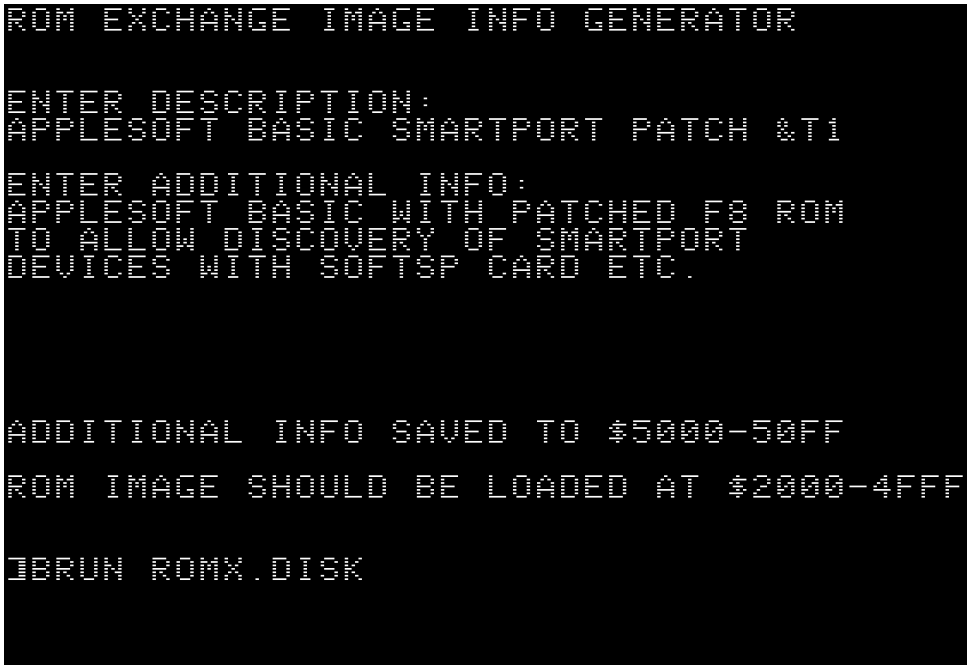
This is a simple matter of using the BSAVE command to save the memory contents to disk:

BSAVE *filename*.RMX,A$2000,L$3100

Uploading the ROM Image

We are now ready to upload the ROM to ROM X. To do this, run the ROMX.DISK utility using the command:

BRUN ROMX.DISK



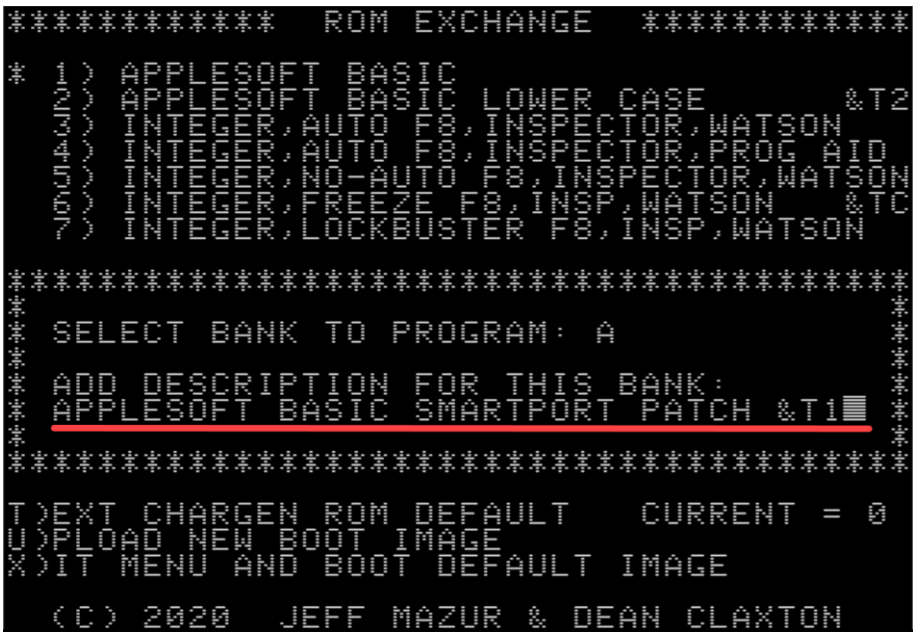
From the menu press the U key to select the U)PLOAD function, then select the number of the ROM bank into where this image will be stored (1 to F for user images):

You may now enter or edit the description for the ROM – if you used the INFO GEN utility to enter this information, then it will be pre-filled, but may be edited.

This is the optimal time to ensure that the position of any DOS image association (&D*n*) and/or Text ROM association (&T*n*) is correct.

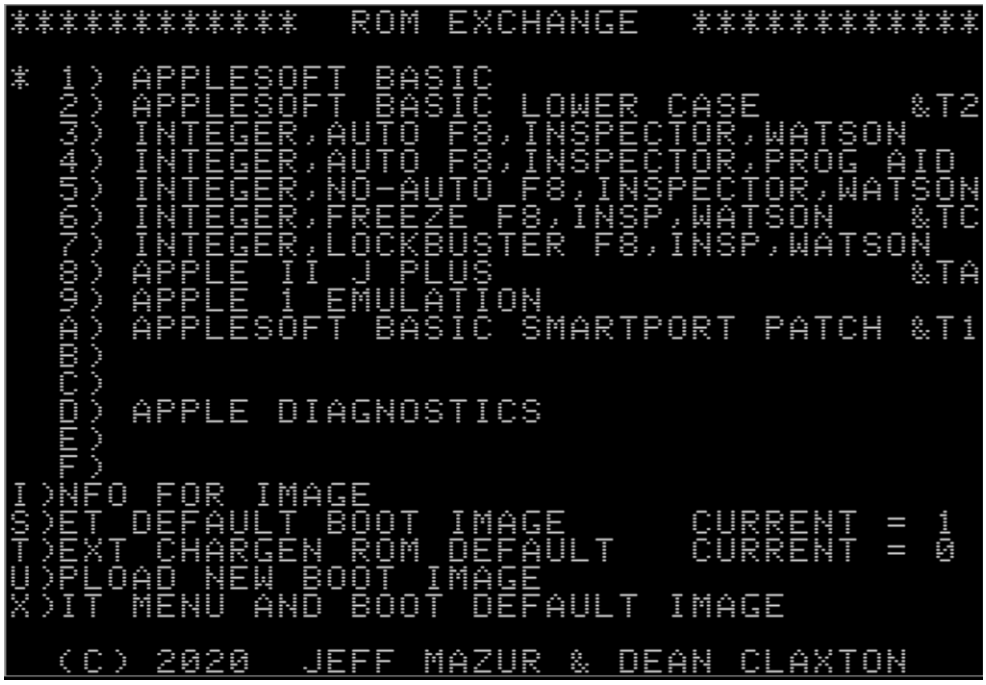
The easiest way to enter the DOS image association is to press the right arrow until you reach the end of the line (computer will beep), then press the left arrow 6 times and type &D*n* where *n* is the image number representing the DOS image (1-F). You may optionally then type the text ROM association &T*n* immediately after &D*n*.

If you are entering just a text ROM association, press the right arrow until you reach the end of the line (computer will beep), then press the left arrow 3 times and type &T*n* where *n* represents the text ROM image 0-F.



Press the Enter key to accept the description – at the bottom of the screen you are then prompted to press U to upload or any other key to exit.

Press U to commit the image to flash:



Adding a DOS Image

ROM X firmware v0.963 supports uploading of DOS images into ROM slots. A system ROM image may then be linked to a DOS image – when the system ROM is selected the computer will instantly boot DOS! This can be quite a time saver – DOS commands can be executed immediately after selecting the ROM.

In the example below a DOS 3.3 image has been uploaded into slot F (item 1). An Applesoft Basic image (FPBASIC from the ROM X System and Utilities Disk) has then been loaded into slot A and associated with the DOS image by placing &DF in the description (item 2) where F refers to the DOS image slot number. The &D*n* has to be in positions 30-32 of the description line – see Adding a ROM Image for further detail.

The v0.963 disk image includes a DOS 3.3 Image that you can use. Its currently set up for a drive connected to a controller in Slot 6, but can be modified as follows.

To change the Default slot number, BLOAD the image at address $2000, and then modify location $3AE9 before running ROMX.DISK. Use Slot*16, e.g. $60=Slot 6.

To change the Default drive number, BLOAD the image at address $2000, and then modify location $3AEA before running ROMX.DISK. Use $01=Drive 1, $02 = Drive 2.

The DOS ROM is then uploaded following the regular upload process. One or more system ROM images may then be associated to it (see Adding a ROM Image).

Please note that this feature currently requires 48KB RAM in your Apple II.

Creating a DOS Image

You may create your own ROMX DOS images as below.

1. Load your favorite DOS replacement (DubbleDOS or DoubleDOS, DiversiDos, etc)
2. Insert the ROMX system and Utility Disk and BLOAD DOS 3.3 IMAGE HELLO, A$2000 (you can optionally BLOAD DOS 3.3 IMAGE FAST, A$2000 if you don't want it to run HELLO at boot).
3. Enter the monitor (CALL -151)
4. Copy data at address $9D00 through $BFFF to address $2000 using the command

   2000<9D00.BFFFM

5. Optionally, use the INFO GEN utility to add the description and information metadata
6. Save a copy of your new ROMX DOS image using the command

   BSAVE *filename*, A$2000,L$3100

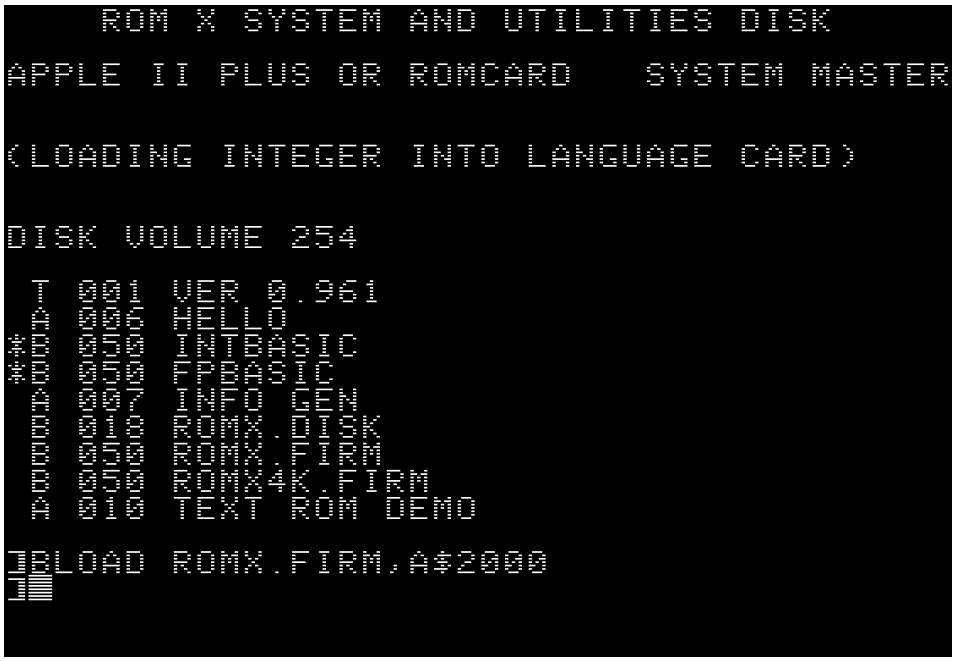
7. BRUN ROMX.DISK and upload your new ROMX DOS image to a ROM bank of your choice.
8. Share the new DOS image! We can put it up on The ROM Exchange for others to enjoy (https://theromexchange.com)

Updating the ROM X Firmware

The ROM X firmware update process is almost identical to the regular ROM upload process.

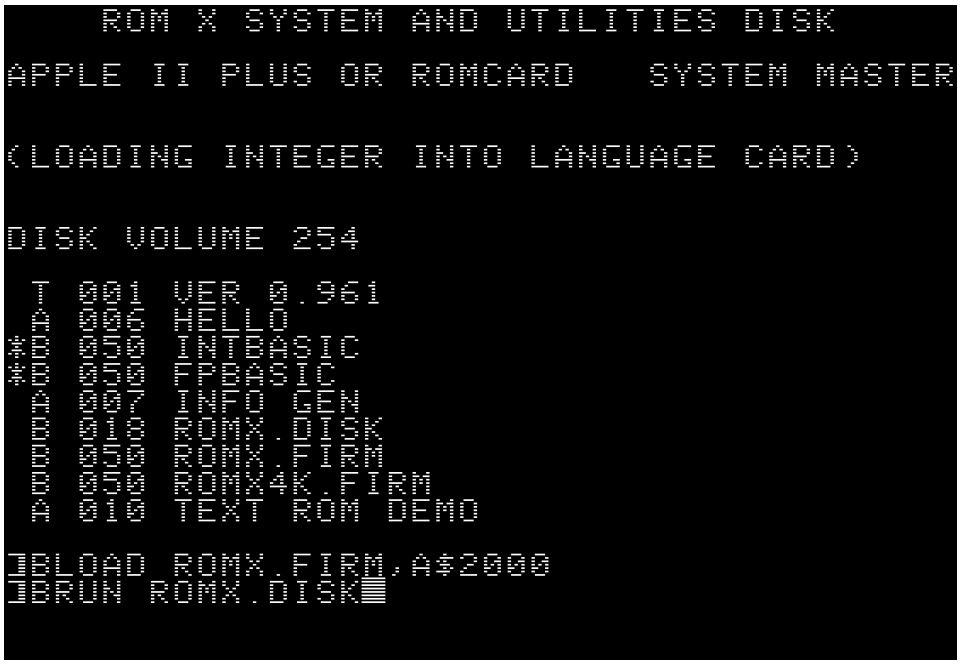
Boot the system from the latest release of the ROMX System and Utilities Disk and load the ROMX.FIRM file at address $2000 using the command:

BLOAD ROMX.FIRM,A$2000



Next, run the ROMX.DISK utility using the command

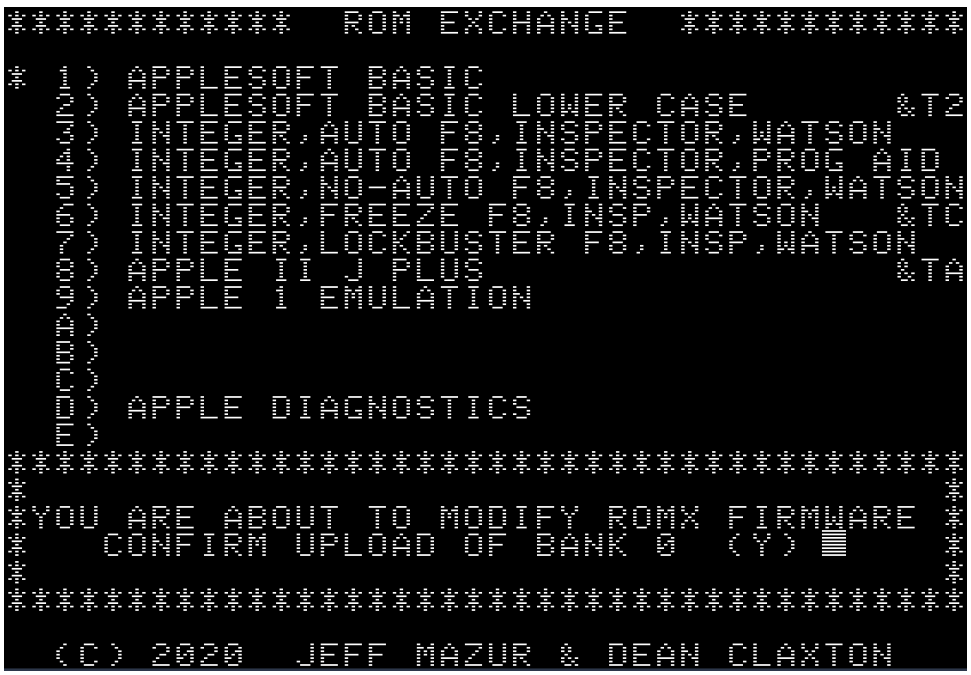
BRUN ROMX.DISK



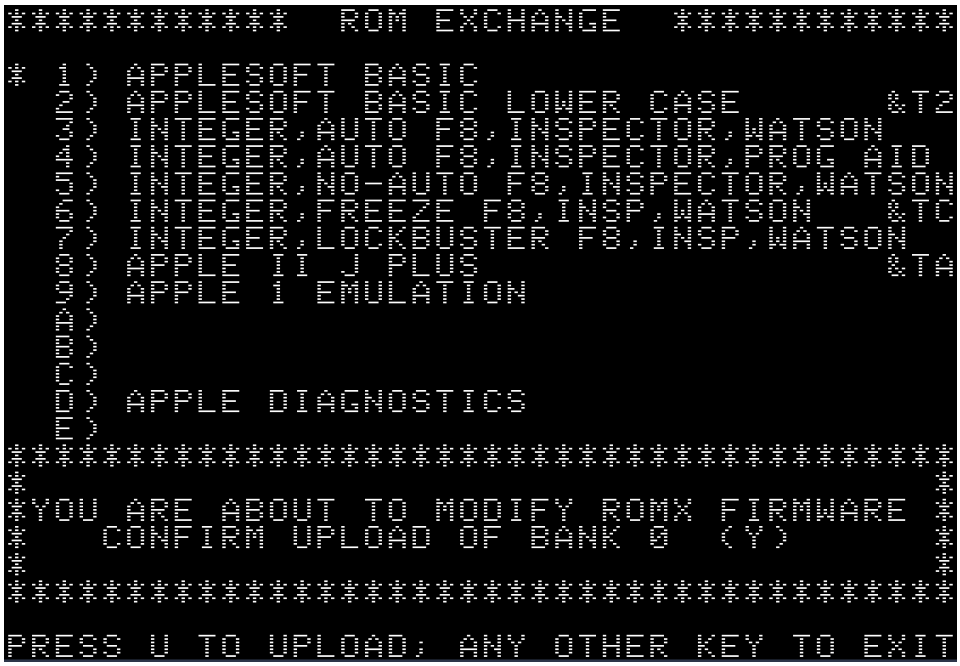
Press the U key to U)PLOAD the firmware image – when prompted for the Bank to Program, select Bank 0:

The software will check that a valid firmware image is stored in memory – an error will be displayed if a valid image is not found:

If a valid firmware image is found, then you will be prompted to confirm the update – press the Y key to continue:



At the bottom of the screen you are then prompted to press U to upload or any other key to exit.



Press U to commit the firmware update to flash.

Once updated, power the computer off and back on again to ensure that the new firmware has been installed successfully. The firmware version will be displayed on the I)NFO page.

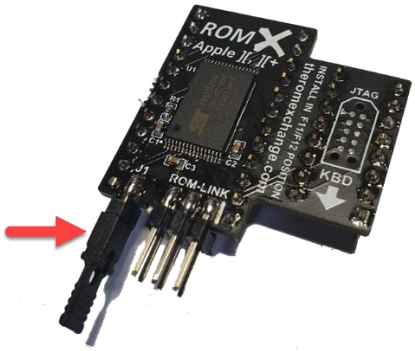
If for some reason you experience an issue when updating the firmware (such as power outage mid cycle!), then you may be left with a machine that will no longer boot.

In this scenario, follow the instructions in the Recovery Mode section to recover your ROM X module from such an event.

Recovery Mode

If you should experience an issue when updating the firmware such as a power outage mid programming cycle, then you may be left with a machine that will no longer boot.

To recover from such an event, turn off the computer, open the lid of the case and touch the power supply to discharge any static electricity that may have accumulated on your body. Then remove the J1 jumper from the ROM X module to enable Recovery Mode. The J1 jumper is next to the ROM-Link header.



After removing the J1 jumper, turn the computer back on. Rather than running the regular ROM X firmware and displaying the menu, a special recovery firmware will be executed. The computer will initially perform a memory test on the lower 2KB of RAM during which the screen will cycle through pages of inverse characters.

If you should have any RAM issues in the lower memory bank, the recovery firmware will beep out the number of the chip that is faulty from left to right (e.g. 3 beeps indicates an issue with the 3rd chip from the left, on the row closest to the keyboard).

If the RAM test passes, the following screen will be displayed:

Set up your system to boot using the ROM X System and Utilities disk image, then select a ROM image to boot by pressing a key in the range 1-9, A-F.

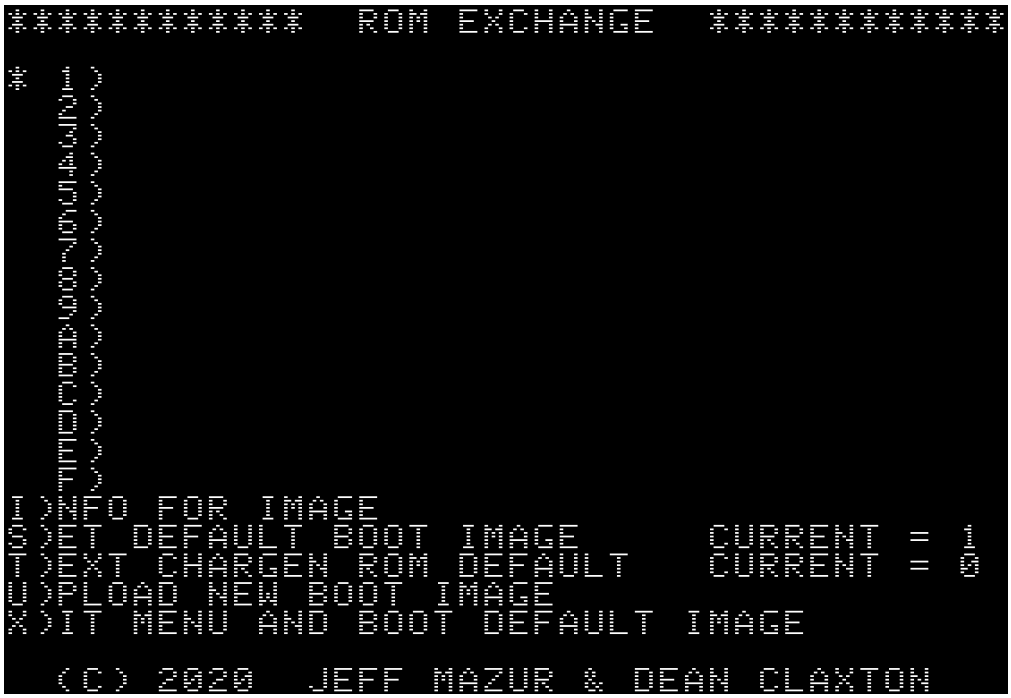
The ROM X module is supplied with all ROM slots filled – even the blank images slots A,B,C,E and F contain valid ROM images so the chances of you having a ROM image installed that you can boot from should be very good.

If for some reason you do not have any valid ROM images installed on your ROM X module, then please make contact via email so as we can try get you up and running again.

Once you have successfully booted the system using the ROM X System and Utilities disk, while leaving the computer on, reinstall the recovery jumper on the ROM X module.

You can now follow the section Updating the ROM X Firmware to re-install the firmware image module (*BLOAD ROMX.FIRM,A$2000* then *BRUN ROMX.DISK* and upload the firmware image to bank 0).

Note that if you are recovering from a corrupted firmware image, then you will find that whilst the ROM images you had previously installed on the module will still be present (and can be booted by pressing keys 1-9,A-F), the text description and information for the installed images may have been lost:



You will have to re-upload the images one by one to repair the menu, using the INFO GEN utility to populate the description and information fields.

Testing

The recovery mode is quite safe to test provided you follow the instructions below.

Pull the jumper and turn on the computer - it will do the memory test then display the recovery menu. Press a key 1-9, A-F to boot using the selected ROM image.

As long as you now reinstall the jumper BEFORE running ROMX.DISK then everything is back to normal, and the existing menu will remain intact if you were to the use a feature within ROMX.DISK that writes settings or data to flash.

If you were to reinstall the jumper AFTER running ROMX.DISK then the current version of ROMX.DISK would warn you that it cannot find the ROMX board and thus will show no current descriptions. It would erase the descriptions if you tried to update any settings.

This is because all the descriptions are stored in the firmware image – with the recovery jumper removed, the firmware image is not visible to ROM X as it has been swapped out for the recovery image. When running ROMX.DISK, if existing descriptions from the firmware image are not visible it sets them to blanks. A setting change to the system when in this state, will commit all the blank fields to flash.