Sim-8800 is based on APPLE-80 ©1979 by Dann McCreary.
Additional operating instructions can be found in the APPLE-80 manual.

Release 2.0

Requires an Apple IIe with 64K auxiliary memory, 80 column card, or appropriate emulator.
Startup:

At startup, Sim-8800 will ask you to choose a program to load. See below for a summary of the programs, and for links to more information. It will then display a condensed set of instructions. Press the space bar to continue to the main Altair interface mode. Press I any time the virtual Altair is paused to view the instruction screen again. Note: All commands are upper case.

Keyboard commands:

0-9, A-F TOGGLES SWITCHES 0-15
Number keys 0-9 and letters A-F will toggle the corresponding switch on the Altair, numbered 15-0 from left to right. Switches will operate when the Altair is stopped, or during Trace (see below).

X TO EXAMINE MEMORY
The byte in memory at the address indicated by the address switches is displayed in the data LEDs. e.g, when the program starts, the address is set to $0000, so pressing X will display the byte at $0000.

N FOR NEXT ADDRESS, ^ FOR PREVIOUS
Pressing N will advance the program counter address by one, and display the byte at that address. The caret (^) will decrement the address and display the corresponding byte.

P TO DEPOSIT BYTE INTO MEMORY
To write a byte to memory, set switches 15 through 0 to the corresponding address, and eXamine that byte. Then set switches 7 through 0 to the byte value you want to write, and press P to deposit it into memory.

O TO DEPOSIT NEXT BYTE INTO MEMORY
Once a byte is set into memory, another can be deposited at the next address in memory with the O key. This increments the program counter and writes the byte value set with switches 7 through 0 into memory.

SPACE OR S TO EXECUTE 1 8080 PROGRAM STEP
This will execute the opcode at the currently displayed program counter address, then pause the machine. The results of the operation are displayed in the status line and the LEDs will update with the new address and data bytes.
T TO START INTERACTIVE TRACE MODE
This will execute a program, one opcode at a time, while updating the
LED display and the status line. While tracing a program, you can toggle
the switches (emulated input 00). The trace will continue until
interrupted with Control-C or the program reaches a breakpoint.

G TO RUN PROGRAM IN NON-INTERACTIVE MODE
In this mode, the program will run, full speed, until interrupted by control-
C or a breakpoint is reached. Switches and LEDs will not be active during
this “non-interactive” mode.

CONTROL-F TO RUN FULL SCREEN MODE
The virtual Altair is connected to an emulated teletype for input and
output. In normal operation, you can see only the last 4 lines of text at
the bottom of the screen. Press Control-F to expand the text to the full
screen, and optionally view in 80-column text. Use Control-C to pause the
machine and return to normal view.

CONTROL-C TO STOP RUN/TRACE MODE
While in Run or Trace mode, the virtual machine can be paused with
Control-C, and the current program counter and register status will be
displayed in the status line and LEDs.

K TO SET BREAKPOINTS
Pressing K while the Altair is paused will display the word “Breakpoints”
below the status line. You may then enter or edit several memory
addresses to be breakpoints for your program separated by spaces. Type in
the addresses, or use the arrow keys to move the cursor over an existing
breakpoint. Press Return when finished. When the program reaches a
breakpoint address while tracing or running, it will pause the Altair and
display the registers and program counter status.

R TO EDIT REGISTERS
While the Altair is paused, the contents of the registers and accumulator
can be edited. Use the arrow keys to move the cursor over the register,
and type the new value. Press Return to accept the new register values.

I FOR INSTRUCTIONS
When the virtual Altair is paused and not running a program, pressing I
will display the instructions screen. Pressing Space will hide the
instructions and return to the virtual Altair display.
Programs
A number of pre-loaded programs are available in this release of Sim-8800. They are each loaded into memory at $0000 by choosing the appropriate response from the menu when Sim-8800 starts up. You may also start with a blank program, containing only the random bytes that remain in memory from when your Apple II started up.

Kill the Bit
Classic front panel lights “game” by Dean McDaniel, May 15, 1975.

; classic "kill the bit"

; 0000 org 0000 ;initialize counter
; 0000 21 00 00 lxi h,0 ;initialize counter
; 0003 16 80 mvi d,080h ;set up initial display bit
; 0005 01 0E 00 lxi b,0eh ;higher value = faster
; 0008 1A beg: ldax d ;display bit pattern on
; 0009 1A ldax d ;...upper 8 address lights
; 000A 1A ldax d
; 000B 1A ldax d
; 000C 09 dad b ;increment display counter
; 100D D2 08 00 jnc beg
; 1010 DB FF in ffh ;input data from sense switches
; 1012 AA xra d ;exclusive or with A
; 1013 0F rrc ;rotate display right one bit
; 1014 57 mov d,a ;move data to display reg
; 1015 C3 08 00 jmp beg ;repeat sequence
; 1018 end

21 00 10 16 80 00 0E 80 1A 1A 1A 1A 09 D2 08 00 DB FF AA 0F 57 C3 08 00

Before tracing the program, set switches 15-8 (F-8) off. As the program traces, you will see one LED in the Address High Byte bank of LEDs light up and move across. The goal is to “kill” the bit by flipping up the switch under the lit LED while it is still lit, then flip it down again once the LED turns off. If you miss, another bit is added to the pattern for you to kill.

Additional Altair 8800 programs can be found online that take advantage of the switches and LEDs, or a teletype connected to SIO card for input and output. To get them to run on the virtual Altair, a few considerations must be made. The emulator simulates a teletype connected via a simplified 88-SIO serial interface card. Serial status is on input 00, serial data on input/output port 01.
Altair 4K BASIC

MITS 8K BASIC
Altair 8K BASIC Version 4.0 from 1976.

When BASIC starts up, it will display

MEMORY SIZE?

Any number (in bytes) can be entered, from 4096 (4K version) or 8192 (8K version) up to 65536 (64K max memory).

It will then ask for the terminal width. The default is 72, so you should enter 40, unless you are running in full-screen mode (press Control-F) at 80 columns, in which case you can choose any width up to 80.

To access more memory, some features of BASIC can be disabled by answering N to the questions “WANT SIN?”, “WANT SQR?” and “WANT RND?”. Those functions will not be available, and a program using them will cause an error.

More information, and a complete manual for Altair BASIC, can be found here: https://www.autometer.de/unix4fun/z80pack/ftp/altair/AltairBasic_1975.pdf

Microchess
Microchess: A Chess playing program for the 8080 Microcomputer, written by Peter Jennings in 1977.

More information and a complete manual can be found here: https://www.computerhistory.org/chess/doc-434fe976ea550/

DBL Bootloader
The Disk Boot Loader has been modified to run at address $00 instead of the default ROM location of $FF00. This first relocates its own code to $2C00, then loads data from an emulated 8-inch Altair floppy. The virtual floppy is emulated on the Sim8800 disk image as a file called “VIRTUAL.DSK”. Additional DSK files are also available on the Sim8800 2MG. In order to use one, use a utility like Ciderpress to rename it to VIRTUAL.DSK, and reboot your emulator or Apple II.