

## Booting a RAM disk version of the Flex9 operating system on System09

Digilent Spartan 3 Starter board XC3S200 version.

Terasic Cyclone 2 DE1 starter board.

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This procedure describes how to boot a RAM disk version of the Flex9 disk operating with System09 running on the Digilent Xilinx Spartan 3 Starter Board (XC3S200), or the Terasic Altera Cyclone 2 DE1 board.

The Digilent Spartan 3 starter board has 1MByte of Static RAM on the board. The Terasic Cyclone 2 DE1 board has 512KByte of Static RAM. Flex9 requires the first 64Kbytes for system memory. 192Kbytes are reserved for the system drive RAM disk, and 256Kbytes are reserved for the working drive ram disk. Note that the Spartan 3 starter board is capable of operating with more RAM, however the RAM is limited to the capacity of the DE1 board.

To boot Flex9 you will need Hyperterm or some equivalent terminal emulation program for the PC that implements Xmodem protocol with checksum over a RS232 COM port.

1. Connect the FPGA board serial board to the PC COM Port.
2. Select the COM port with Hyperterm
3. Set the data word format to 8 data bits, 2 stop bits and no parity.
4. Set the Baud rate to 57.6KBaud
5. Synthesize the System09 design for the Spartan 3 starter board using Xilinx ISE or for the Cyclone 2 DE1 board using Quartus and download it to the FPGA board.
6. If the system is working correctly, System09 will print out a message on the screen and prompt with a ">" character.
7. Use the "L" key to load the RAM Disk version of Flex9
8. On Hyperterm click on Transfer->Sent text file and send the file  
...\\System09\\src\\flex9\\FLEX9RAM.s19
9. After a short period of time downloading the S19 file the monitor program should prompt for the next command.
10. Enter "UX" to transfer the RAM Disk image using Xmodem protocol.
11. On Hyperterm select Transfer->Send File
12. In the Protocol drop down menu, select Xmodem

13. Click on the Browse button for the File name and navigate to  
... \System09\src\dsk\DISK\_RAM.dsk
14. A window should pop up indicating the progress of the download and the number of packets sent
15. When the transfer is complete, you will have to click on the cancel button to manually terminate the download.
16. You will then have to return to the monitor program and enter "UB" to patch the drivers and boot Flex.
17. Flex should then prompt for the date.
18. Enter the date as "MM,DD,YY <enter>" (note that Flex9 is not year 2000 compliant).
19. Flex should then prompt with "+++" indicating it is ready to accept commands.
20. Set the scroll escape character to a space by typing "TTYSET ES=1B<enter>" or "TTYSET ES=20<enter>"
21. The Escape character is the key you press to allow the screen to keep scrolling.
22. TTYSET Escape character is entered as a two hexadecimal digit number that corresponds to the ASCII code.
23. If for any reason System09 returns to the monitor program, try using the "UB" command to reboot back into Flex9.
24. Entering the "DIR 0<enter>" command should list the files on the System RAM disk.
25. To format a working RAM disk drive, return to the monitor program by entering "MON<enter>"
26. Format a Working RAM disk by typing the monitor command "UF".
27. Return to FLEX by setting the PC to the FLEX9 Warm start entry point at \$CD03, and running Flex i.e.:

<ctrl>P CD03

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28. Flex should prompt with "+++"
29. Entering the Flex Command "DIR" or "DIR 1" should list the files on the working drive.
30. Since the working drive has just been formatted there will be no files.

There is a modem program on the system disk for uploading and downloading programs, but as of writing this document, I'm not sure that the program has been patched to operate correctly.

You can reset System09 by pressing the BTN3 button on the Digilent board, or BTN0 on the Terasic board and that should return you to the Sys09bug monitor program.

Manuals for the Flex operating system may be found at the Flex user Group web site.

<http://www.evenson-consulting.com/flexusergroup/default.htm>