

Using the 332 Boot Monitor

The Boot Monitor is a simple program launcher that initializes the board and validates and launches an autostart application in flash. It provides a few commands that allow flash to be erased, files to be downloaded into flash, and memory to be examined and modified. It resides in the EPROM on the SBC2000-332 and MC2000-332 boards.

Upon powerup, the monitor initializes the board, then looks for a valid autostart application in flash. A valid autostart application starts in sector 0 of the flash, and is an exact multiple of 64KB in size. The only requirements for the application image are that the first four bytes of the image contain the address to be used as the top-of-stack, the second four bytes of the image contain the address of the application entry point, and the last four bytes of the image contain the 32-bit additive checksum of the image.

If no valid autostart application is found, or if an autostart application is present but a 'v' or 'V' key is received at the DEV port during the validation of the application image (which takes about ¼ second), then the boot monitor will not launch the application, and will instead enter its command loop. The prompt for the command loop is "SBC2000:"

The following commands are available (commands can be upper- or lower-case):

Command	Argument(s)	Abbreviation	Description
BASIC		B	Erase sectors 0 and 1 (where the VMTB runtime engine would reside).
CLEAN	<sector>	C	Erase a single sector of flash. An error message is issued if the sector number is omitted or is not valid for the flash device.
DB	<address> <length>	DB	Display memory as a sequence of 8-bit bytes.
DW	<address> <length>	DW	Display memory as a sequence of 16-bit words.
DUMP	<address> <length>	D	Display memory. Defaults to byte display.
EB	<address>	EB	Edit memory as a sequence of 8-bit bytes.
EW	<address>	EW	Edit memory as a sequence of 16-bit words.
EDIT	<address>	E	Edit memory. ²
HELP		?	Display the list of commands.
REBOOT		R	Reboot the SBC.
TASKS		T	Erase all of flash except sectors 0 and 1.
XLOAD	<sector>	X	Download a file using XMODEM and save it to flash starting with the specified sector. If no sector number is given, 0 will be presumed.

The dump commands (DUMP, DB, and DW) do not require all, or even any, arguments. If the length argument is omitted, the value specified most recently will be used. If the first dump command does not include a length argument, it will default to 128 (or 0x80, since the dump commands print hexadecimal values). If the first dump command does not specify an address, a default address will be used.

Subsequent dump commands will use the address starting just past the end of the memory displayed by the previous dump command, and the same length, unless other commands have been used in between.

DUMP will display memory in bytes or words, depending on which of DB or DW was used most recently.

The EDIT command will default to byte editing, but will edit words if EW was used more recently than EB.

Recovering from VMTB problems

When you are using VMTB, the VMTB runtime engine is the autostart application that is launched by the Boot Monitor. In turn, the VMTB engine launches any tasks in flash that it can validate. In order to erase or update such a task, you must use the “stop autostart” capability of the IDE. Also, in order to upgrade the VMTB runtime engine, the IDE must communicate with the boot monitor. The IDE does not always successfully stop VMTB from running. For such cases, here are the steps to work around the problem.

1. Turn power to the board off.
2. Launch HyperTerminal or a similar program and configure it for the serial port that is connected to the DEV port on the SBC, with communications parameters set to 9600 baud, 8 data bits, 1 stop bit, no parity, and no flow control.
3. Hold down the ‘v’ key on your PC’s keyboard.
4. Apply power to the SBC. You should see uppercase ‘V’ characters echoed back within a second. If not, try releasing the ‘v’ key – sometimes Windows won’t update the HyperTerminal window until it has less to do. You may see a string of ‘V’ characters once you release the key.
5. Press the “Enter” key. You should see the “SBC2000:” prompt. If not, you are not in the monitor’s command loop, and should repeat the previous steps. Another way to check is to look at the attached LCD, if there is one. The Boot Monitor does not initialize the LCD, but the VMTB runtime engine does.
6. Once you are in the monitor’s command loop, press the “T” and “Enter” keys if your problem is a VMTB task that is preventing the SBC from communicating with the IDE. If you are upgrading the runtime engine, press the “B” and “Enter” keys to erase the runtime from the flash.
7. At this point, you should be able to exit HyperTerminal, launch the VMTB IDE, and cycle power on the board to continue working.