

:TITLE[MPCodes]; *Dolphin Maintenance Panel codes.
 *Last edited by Fiala 16 October 1981

%This file defines Alto.Eb MP codes. The runtime error codes are compatible with Pilot/Cedar microcode releases after 10 September 1981 except that task numbers are different for Pilot/Cedar. Although EPROM and Initial MP codes are mentioned, full documentation for them is elsewhere. In general codes between 0 and 99 are from the EPROM, 700 to 799 from Initial, and 100 to 255 from Alto.Eb.

Booting takes place in four steps: First, the EPROM delivers a tiny diagnostic and boot loader into the microstore--this program is necessarily limited for the reasons discussed in the D0 Hardware Manual. If the processor test fails, it shows an error MP code briefly, waits 30 seconds, and boots again. If all is well, registers are initialized and the first program on the disk boot record (normally Initial) is loaded directly into IM; if the disk won't work, Initial is obtained from the Ethernet. Storage is not used during any part of the EPROM boot.

Next, Initial is started at either its disk or ether boot address. It first initializes storage and the map; on a disk boot, it then reads the rest of the disk boot record into storage; on an ether boot, it places either AltoCSL.Eb or AltoLF.Eb from the Ethernet (These files are now identical) into storage. Finally, it exits with LoadRAM.

Alto.Eb starts the third stage boot at either KGO or EGO. It shows the final MP code from Initial, then StartDeviceInit, StartEtherBoot, and GotBreathOfLife for about 0.3 seconds each; other MP codes normally flash past too quickly to view, unless an error is detected. If the disk is ready (which happens about ~ 2 min. after power on), StartDiskBoot is shown instead of StartEtherBoot, but it normally flashes past too quickly to be seen.

At this point the final microcode overlay is loaded and the number of good pages is shown on the MP. Then the Alto emulator is started at the Breath-of-life program's disk boot or Ether boot starting address.

With the Initial current on 16 October 1981, the viewable MP sequence for a "normal" disk boot is 40, 700, 720, 104, 118, NPages (see below). Other MP codes are not up long enough to see unless something goes wrong. The viewable sequence for a "normal" ether boot is [46, 60], 700, 760, 104, 114, 118, NPages (see below), where "46, 60" may repeat several times before continuing with the rest of the sequence. The 760 will be 758 on an LF Dolphin.

After showing GotBreathOfLife (118) for .3 sec, the final microcode overlay is loaded and MP then shows the number of pages found to be good during storage init. For perfect storage boards, the MP will show 96K/256 pages/board which is 384 x number of storage boards (i.e., 768, 1152, 1536, 1920, 2304, or 2688). Some MPs will show this value plus 1 occasionally for unknown reasons. However, if the number of good pages is less than 256, then the NotEnoughMemory code (101) will be shown instead.

Many machines malfunction briefly when first powered up, then work correctly. If the EPROM diagnostic detects a malfunction it will show an error MP code briefly, then show "46" for a long time (30 sec), then boot again. If you get impatient during such a wait, push the power on button again to retry immediately. If an error is detected after StartDeviceInit (104) or if the NotEnoughMemory error (101) occurs, initialization will loop back to StartDeviceInit after showing the MP code for .3 seconds. It is improbable that retrying will succeed, so push the power on button to reboot.

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