

# **iBIOS Mobile Pentium®II Processor Micro Code Update Implementation Guide**

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## **Introduction**

The mobile Pentium ® II processor has the capability to correct specific errata through the loading of an Intel-supplied data block -CPU Micro code update. A Micro Code update loader integrated within the BIOS uses data from the update to correct specific errata to complete the processor functionality. The BIOS is responsible for loading the update on all processors during system initialization. Please see Pentium® Pro processor BIOS Writers Guide Version 2.01, February, 1996 (Order Number: 649773-001) ,Chapter 8 for detail.

## **CPU Micro Code update File**

A Micro Code Update file consists of an Intel-supplied binary file that contains a descriptive header and data. No executable code resides within the update. This section describes the update and the structure of its data format.

Each Micro Code Update is tailored for a particular stepping of the Pentium® II processor. The data within the update is encrypted by Intel and is designed such that it is rejected by any stepping of the processor other than its intended recipient. Thus, a given Micro Code update is associated with a particular family, model, and stepping of the processor as returned by the CPUID instruction. The encryption scheme also guards against tampering of the update data and provides a means for determining the authenticity of any given Micro Code update.

## **Micro Code Update Loading Procedure**

The update loader contains the minimal instructions needed to load an update. The specific instruction sequence required to load an update is associated with the loader revision field contained within the update header. The revision of the update loader is expected to change very infrequently, potentially only when new processor models are introduced. CPU Micro Code update can be loaded during BIOS POST and after BIOS boot.

The BIOS at boot loads Micro Code update data into the processor after locating it in the BIOS NV RAM (BIOS flash device) slot. The Micro Code update data is an Intel supplied binary data block that is designed to correct specific errata on the Pentium® II processor. First, the BIOS checks the global enable bit. The Micro Code update spec. needs that the loader check for the global update status bit before loading the Update data. In this way, user can disable the loading of the update data.

The BIOS uses the INT 15 function to read the update data. At this point in the BIOS the OS is not loaded and this means that the BIOS owns all the system memory.

## **Micro Code Update Loading During POST**

Step 1: Check if the data is palatable to loader by checking the BIOS loader version against the data block.

Step 2: Check if the data block is for the present CPU on which the code is running.

Step 3: Check if the data block checksums.

If all conditions are met with then load it.

## Micro Code Update After Boot

Both the real mode INT 15h call and the alternate protected mode call specifications described here are Intel extensions to an OEM BIOS. These extensions allow an application to read and modify the contents of the Micro Code update data in NVRAM. The Micro Code update loader, which is part of the system BIOS, cannot be updated by either of the two interfaces. All of the functions defined in either of the two specifications must be implemented for a system to be considered compliant with the specification. The INT15 functions are accessible only from real mode. The protected mode is not recommended by Intel. The following IP should be provided in INT15:

AX - 0D042h, indicates Micro Code update interrupt  
BL - 00h, test for function supported  
    01h, write Micro Code update data to NVRAM  
    02h, set the status of Micro Code update loading  
    03h, read Micro Code update data from NVRAM

## Current iBIOS Source

Current iBIOS Micro Code update source release is based on Intel MSO reference platform MPDK1 version D1 (Trajan) iBIOS for 280 MPPII/440BX PIIX4E built on 01/22/98 with Micro Code update files for Slot 1 Pentium® II processor A-0 Stepping. Here are the files listed:

1. iBIOS.ROM - reference platform MPDK1 version D1 (Trajan) D1 iBIOS image for 280 MPPII/440BX PIIX4E built on 01/22/98

2. UPDATE.ZIP - Zipped iBIOS source code files related to CPU Micro Code update, unzip the UPDATE.ZIP you will see the following 12 files, among them, UPDATA.ASM and P6INT15.ASM contain main routines:

UPDATE.ASM  
P6INT15.ASM  
CNTRL.INC  
FLSHRDWT.ASM  
ORION.INC  
ORION.MAC  
ORIONEQU.INC  
P6\_EQU.INC  
PTFORM.INC  
PTFORM.MAC  
SYSTEM.MAC  
SYS\_EQU.INC

3. MU165015.TXT- the assembly code version of the Micro Code update to be included in system BIOS that do not support the Micro Code update loader API. It only contains the Micro Code update for Pentium® II processor A-0 stepping.

4. S1\_6.PDB - Micro Code update file is for use with the CHECKUP1.EXE Micro Code update loader utility. The S1\_6.pdb file contains Micro Code update for Pentium® II processor A-0 stepping.

5. CHECKUP1.EXE - Micro Code update API from Intel.

6. CHECKUP.HLP- help message file for CHECKUP1.EXE