



VBE/PM Standard

Video Electronics Standards Association

2150 North First Street, Suite 440
San Jose, California 95131-2029

Phone: (408)435-0333
FAX: (408)435-8225

VESA BIOS Extensions / Power Management, (VBE/PM) Standard

Version: 1.0
Approved: February 4, 1994

Purpose

To establish a standard set of hardware independent system services for controlling the power management features of Flat Panel and VESA DPMS compliant display devices in the PC environment.

Summary

The VBE/PM standard defines a set of functions that application software can use to control the power saving features of VESA DPMS compliant displays. These functions supplement the VESA Video BIOS extensions (VBE) normally provided in ROM with the display controller and accessed through interrupt 10h.

The hardware mechanism for controlling the power states of display devices is defined by the VESA Display Power Management Signaling (DPMS) standard.

Intellectual Property

© Copyright 1993 - Video Electronics Standards Association. Duplication of this document within VESA member companies for review purposes is permitted. All other rights reserved.

Trademarks

All trademarks used in this document are property of their respective owners.
VESA, DPMS are trademarks owned by the Video Electronics Standards Association

Patents

VESA proposals and standards documents are adopted by the Video Electronics Standards Association without regard to whether their adoption may involve patents on articles, materials, or processes. Such adoption does not assume any liability to any patent owner, nor does it assume any obligation whatever to parties adopting the proposals or standards document.

Support for this Specification

If you have a product which incorporates VBE/PM, you should ask the company that manufactured your product for assistance. If you are a manufacturer of the product, VESA can assist you with any clarification you may require. All questions must be in writing to VESA, in order of preference by:

America On-line: KEYWORD: VESA. Post your question on the VESA Message Board

FAX: (408)435 8225

Mail to:

VESA
2150 N. First Street, Suite 440
San Jose, CA 95131-2029
U.S.A.

Acknowledgments

This document was made possible by the joint efforts of the members of the VESA Monitor Committee and the VESA Software Standards Committee 1993.

In particular the following individuals and their companies contributed with time and knowledge.

Anders Frisk, ICL Personal Systems

Rod Dewell, Formerly, Weitek Corp.

Kevin Gillett, S-MOS Systems, Inc

Tom Ryan, Formerly, VESA

Document revision history

Standard v 1.0, February 4, 1994

Document converted from proposal ver. 1.0p rev. 0.5p

Contents

1. Introduction	Page 1
2. Goals and Objectives	2
3. VBE/PM BIOS Functions	3
3.1 Status information	3
3.2. VBE Function 10h - Display Power State Services	4
3.2.1 00 - Report VBE/PM Capabilities	4
3.2.2 01 - Set Display Power state	5
3.2.3 02 - Get Display Power state	6

1. Introduction

This document contains a specification for an application interface, VBE/PM, that extends the VESA Video BIOS with functions that control the power consumption of an attached Flat Panel or VESA DPMS compliant Display device. The VBE/PM interface will allow application software to set the power state of the display device without specific hardware knowledge or direct hardware access. The hardware protocol for power management of DPMS compliant devices and Flat Panel displays is defined by the VESA DPMS 1.0 power signaling specification and the VESA VFP 1.0 Flat Panel Specification respectively.

Readers of this document should already be familiar with the VESA Video BIOS extensions and programming video hardware at BIOS level. The VESA Video BIOS extensions are defined by the VESA VBE Specification available from the VESA office.

2. Goals and Objectives

The VESA Display BIOS Extensions / Power Management, VBE/PM, provides a power management program to send any of the signals defined in VESA DPMS 1.0, to an attached DPMS compliant display, without detailed knowledge about the display controller hardware. It will also allow Flat Panel controllers to set the power consumption state on the controller and display. The VBE/PM standard should include services that return the current revision level VBE/PM implementation, and the power management functions that are supported in the display controller hardware.

The VBE/PM services can be provided as part of the Video BIOS ROM or it can be loaded as a TSR and chained to the *int 10h BIOS vector*. However, if VBE/PM is not implemented in ROM the VBE/PM services will not be available for registration with the operating system during system initialization. The VESA VBE 2.0 definition will require that VBE/PM services be provided in ROM for compliance.

The VBE/PM services can be implemented with a standard VGA BIOS, and do not require the support of other VESA VBE Video BIOS services.

3. Display Power Management BIOS Extensions, VBE/PM

The new BIOS calls have been defined to map in to both a standard VGA BIOS as well as all implementations of a VESA VBE BIOS. For compatibility with these environments the VBE/PM function calls are grouped under the VBE function number **4Fh**, sub-function **10h**. The number **4F10h** is passed in the AX register to the int 10h interrupt handler.

3.1 Status information

Every function returns status information in the AX register. The format of the status word is as follows:

AL == 4Fh: Function is supported
AL != 4Fh: Function is not supported
AH == 00h: Function call successful
AH == 01h: Function call failed

Software should treat a non-zero value in the AH register as a general failure condition. In later versions of VBE or VBE/PM new error codes might be defined. Refer to the VBE Standard documentation.

3.2 VBE Sub-function 10h - Display Power Management Extensions

The VESA VBE sub-function 10h is used to implement the VBE/PM services. The VBE/PM services are defined below and are not included in the VBE Standard documentation.

3.2.1 00 - Report VBE/PM Capabilities

Input: AH = 4fh VESA Extension
AL = 10h VBE/PM Services
BL = 00h Report VBE/PM Capabilities
CX = 00h Controller unit number (00 = primary controller)
ES:DI Null pointer, must be 0000:0000h in version 1.0
Reserved for future use.

Output: AX = Status
BH = Power saving state signals supported by the controller (*).
1 = supported, 0 = not supported
bit 0 STAND BY
bit 1 SUSPEND
bit 2 OFF
bit 3 REDUCED ON (**)
bits 4 - 7 reserved for future power control of the display
controller
or other related circuits.

BL = VBE/PM Version number (0001 0000b for this version)
bits 0-3 Minor Version number
bits 4-7 Major Version number

CX = Unchanged
ES:DI Unchanged
All other registers may be destroyed

(*) The attached display may not support all the power states that can be signaled by the controller. It is the responsibility of the power management program to determine the power saving states that are offered by the controller. If the controller has a means of determining which power saving state that is implemented in the attached display device, this function reports the power saving states that are supported by both the controller and the display.

(**) REDUCED ON is not supported by DPMS 1.0 displays and is intended for use by Flat Panel Displays.

3.2.2 01 - Set Display Power State

Input: AH = 4fh VESA Extension
AL = 10h VBE/PM Services
BL = 01h Set Display Power State

BH = Requested Power state
00h ON
01h STAND BY
02h SUSPEND
04h OFF
08h REDUCED ON (**)

All other BH values are currently undefined and are reserved for future power control of the display controller.

CX = 00h Controller unit number (00 = primary controller)

Output: AX = Status (*)
BH = Unchanged
CX = Unchanged

All other registers may be destroyed

(*) If the requested state is not available, this function will return AX=014Fh to indicate that the function is supported but the call failed. The BH register and Display Power State shall be left unchanged in this case.

(**) REDUCED ON is not supported by DPMS 1.0 displays and is intended for use by Flat Panel Displays.

3.2.3 02 - Get Display Power State

Input:	AH	= 4fh	VESA Extension
	AL	= 10h	VBE/PM Services
	BL	= 02h	Get Display Power State
	CX	= 00h	Controller unit number (00 = primary controller)
Output:	AX	=	Status (*)
	BH	=	Power state currently requested by the controller
		00h	ON
		01h	STAND BY
		02h	SUSPEND
		04h	OFF
		08h	REDUCED ON (**)
			All other BH values are reserved and may be used to signal other power saving states in future revisions of VBE/PM. To ensure future compatibility, applications written for VBE/PM 1.0 should ignore the value of bits 4 -7.
	CX	=	Unchanged

All other registers may be destroyed

(*) If this function is not supported by the controller hardware, AL=01 should be returned in the status register. This function should always read the controller HW to determine the current power state. This function shouldn't rely on any form of information stored in memory about what power state was last initiated through a VBE/PM call. The power state signaling can be initiated through many different HW and SW interfaces making any stored information potentially invalid.

(**) REDUCED ON is not supported by DPMS 1.0 displays and is intended for use by Flat Panel Displays.