

#5

American Megatrends Inc.  
Award Software International Inc.  
Dell Computer Corporation  
Intel Corporation  
Phoenix Technologies Ltd.  
SystemSoft Corporation

## Desktop Management BIOS Specification

Version 2.0

March 6, 1996

This specification has been made available to the public. You are hereby granted the right to use, implement, reproduce and distribute this specification with the forgoing rights, at no charge. This specification is, and shall remain, the property of American Megatrends Inc. ("AMI"), Award Software International Inc. ("Award"), Dell Computer Corporation ("Dell"), Intel Corporation ("Intel"), Phoenix Technologies LTD ("Phoenix") and SystemSoft Corporation ("SystemSoft"). No license under any patents of other intellectual property rights are granted either expressly or impliedly by the publication of this document by AMI, Award, Dell, Intel, Phoenix, and SystemSoft.

**NEITHER AMI, AWARD, DELL, INTEL, PHOENIX, NOR SYSTEMSOFT MAKE ANY REPRESENTATION OR WARRANTY REGARDING THIS SPECIFICATION OR ANY PRODUCT OR ITEM DEVELOPED BASED ON THIS SPECIFICATION. USE OF THIS SPECIFICATION FOR ANY PURPOSE IS AT THE RISK OF THE PERSON OR ENTITY USING IT. AMI, AWARD, DELL, INTEL, PHOENIX, AND SYSTEMSOFT DISCLAIM ALL EXPRESS AND IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND FREEDOM FROM INFRINGEMENT. NEITHER AMI, AWARD, DELL, INTEL, PHOENIX, NOR SYSTEMSOFT WILL BE RESPONSIBLE FOR ANY DIRECT, INDIRECT, CONSEQUENTIAL OR OTHER DAMAGES RELATING TO THE USE OF THIS SPECIFICATION. WITHOUT LIMITING THE GENERALITY OF THE FOREGOING, NEITHER AMI, AWARD, DELL, INTEL, PHOENIX, NOR SYSTEMSOFT MAKE ANY WARRANTY OF ANY KIND THAT ANY ITEM DEVELOPED BASED ON THIS SPECIFICATION, OR ANY PORTION OF IT, WILL NOT INFRINGE ANY COPYRIGHT, PATENT, TRADE SECRET OR OTHER INTELLECTUAL PROPERTY RIGHT OF ANY PERSON OR ENTITY IN ANY COUNTRY.**

\\document\ind\_std\dmi\dmb2spc.doc

## Document Information

The softcopy version of this specification, in Microsoft Word-for-Windows 6.0 format, is available as DMIB20.DOC via [ftp://ftp.ptltd.com/pub/phoenix\\_docs/dmib20.doc](ftp://ftp.ptltd.com/pub/phoenix_docs/dmib20.doc) or from the Phoenix Technologies World Wide Web site at <http://www.ptltd.com/techs/specs.html>.

## Document Revision History

|              |          |  |
|--------------|----------|--|
| Version 2.0D | 09/14/95 | Initial Release of DRAFT COPY  |
| Version 2.0M | 12/12/95 | Final draft released, with the following changes: <ul style="list-style-type: none"><li>- Specified that dmiStorageBase (Function 50h) and NVStorageBase (Function 55h) must be paragraph-aligned.</li><li>- Added Command value to change a string to function 52h; Command enumeration values modified.</li><li>- Removed redundant enumerations from Processor Family list</li><li>- Corrected Memory Subsystem Example</li><li>- Corrected/clarified Indexed I/O access-methods for event-log; Access Method enumeration values and Access Method Address union modified</li><li>- Added clarifications to some of the event log types</li></ul> |
| Version 2.00 | 03/06/96 | Final release, with the following changes: <ul style="list-style-type: none"><li>- Specified that all structures end with a terminating NULL, even if the formatted portion of the structure contains string-reference fields and all the string fields are set to 0.</li><li>- Corrected the Memory Subsystem Example, handles are now correctly created with a 'dw'.</li><li>- Fixed formatting of some bit definition fields and function examples.</li></ul>   |

## Table Of Contents

---

|   |          |
|---|----------|
| <b>1. OVERVIEW</b>                                    | <b>4</b> |
| 1.1 REFERENCES  | 4        |
| 1.2 ENHANCEMENTS TO THE CURRENT BIOS ARCHITECTURE     | 4        |
| <b>2. ACCESSING DMI INFORMATION</b>                   | <b>5</b> |
| 2.1 CALLING CONVENTION                                | 5        |
| 2.2 DMI BIOS FUNCTIONS                                | 5        |
| 2.3 ERROR RETURN CODES                                | 6        |
| 2.4 DMI BIOS STRUCTURE ACCESS INTERFACE               | 7        |
| 2.4.1 FUNCTION 50H – GET DMI INFORMATION              | 7        |
| 2.4.2 FUNCTION 51H – GET DMI STRUCTURE                | 8        |
| 2.4.3 FUNCTION 52H – SET DMI STRUCTURE                | 9        |
| 2.5 STRUCTURE CHANGE NOTIFICATION INTERFACE           | 12       |
| 2.5.1 FUNCTION 53H – GET STRUCTURE CHANGE INFORMATION | 13       |
| 2.6 CONTROL INTERFACE                                 | 15       |
| 2.6.1 FUNCTION 54H – DMI CONTROL                      | 15       |
| 2.6.2 DMI_CONTROL_LOGGING CONTROL WORD                | 16       |

|  |           |
|--|-----------|
| <b>2.7 GENERAL PURPOSE NONVOLATILE STORAGE INTERFACE</b>         | <b>17</b> |
| 2.7.1 FUNCTION 55H – GET GENERAL-PURPOSE NONVOLATILE INFORMATION | 18        |
| 2.7.2 FUNCTION 56H – READ GENERAL-PURPOSE NONVOLATILE DATA       | 19        |
| 2.7.3 FUNCTION 57H – WRITE GENERAL-PURPOSE NONVOLATILE DATA      | 20        |
| <br>   |           |
| <b>3. DMI BIOS STRUCTURES</b>                                    | <b>22</b> |
| <br>   |           |
| <b>3.1 STRUCTURE STANDARDS</b>                                   | <b>22</b> |
| 3.1.1 STRUCTURE HEADER FORMAT                                    | 22        |
| 3.1.2 TEXT STRINGS   | 23        |
| <b>3.2 STRUCTURE DEFINITIONS</b>                                 | <b>24</b> |
| 3.2.1 BIOS INFORMATION (TYPE 0)                                  | 24        |
| 3.2.2 SYSTEM INFORMATION (TYPE 1)                                | 26        |
| 3.2.3 BASE BOARD INFORMATION (TYPE 2)                            | 26        |
| 3.2.4 SYSTEM ENCLOSURE OR CHASSIS (TYPE 3)                       | 26        |
| 3.2.5 PROCESSOR INFORMATION (TYPE 4)                             | 28        |
| 3.2.6 MEMORY CONTROLLER INFORMATION (TYPE 5)                     | 31        |
| 3.2.7 MEMORY MODULE INFORMATION (TYPE 6)                         | 33        |
| 3.2.8 CACHE INFORMATION (TYPE 7)                                 | 36        |
| 3.2.9 PORT CONNECTOR INFORMATION (TYPE 8)                        | 37        |
| 3.2.10 SYSTEM SLOTS (TYPE 9)                                     | 40        |
| 3.2.11 ON BOARD DEVICES INFORMATION (TYPE 10)                    | 42        |
| 3.2.12 OEM STRINGS (TYPE 11)                                     | 43        |
| 3.2.13 SYSTEM CONFIGURATION OPTIONS (TYPE 12)                    | 43        |
| 3.2.14 BIOS LANGUAGE INFORMATION (TYPE 13)                       | 43        |
| 3.2.15 GROUP ASSOCIATIONS (TYPE 14)                              | 44        |
| 3.2.16 SYSTEM EVENT LOG (TYPE 15)                                | 45        |

# 1. Overview

---

Desktop Management Interface (DMI) is a new method of managing computers in an enterprise. The main component of DMI is the Management Information Format Database, or MIF. This database contains all the information about the computing system and its components. Using DMI, a system administrator can obtain the types, capabilities, operational status, installation date, and other information about the system components.

The Desktop Management BIOS Specification documents a standard embedded tool-set to assist in the generation of a system MIF database.

## 1.1 References

Desktop Management Interface Specification, Version 1.0, April 29, 1994.

DMTF PC Systems Standard MIF Definition, Version 1.3, March 1, 1995.

DMTF Server Standard MIF Definition, Draft Version 0.3, March 1, 1995

Plug and Play BIOS Specification, Version 1.0A, May 5, 1994

PCI BIOS Specification, Version 2.1, August 26, 1994

## 1.2 Enhancements to the current BIOS architecture

The DMI specification requires that certain information about the System Board be made available to an applications program. For systems implementing DMI BIOS Extensions, user-defined information will be located in a series of data structures. These data structures are accessed by the method described in Section 2.

Vendors may decide to include all or any part of this information in their designs. For a complete solution that is compatible with the Service Layer distributed by the DMTF, vendors must also implement component instrumentation. This instrumentation allows the Service Layer to gain access to the information stored in the BIOS. In addition, a MIF file must be provided that describes that data that is provided by the BIOS and the method of accessing that data. As a minimum, the PC Standard System MIF provided by the DMTF can be used for this purpose.

## 2. Accessing DMI Information

### 2.1 Calling Convention

To prevent the proliferation of interfaces for accessing information embedded in the System BIOS, the Desktop Management BIOS Specification will follow the System Device Node model used by Plug and Play, and use Plug and Play BIOS functions to access DMI information. Plug and Play functions 50h-5Fh have been assigned to the DMI BIOS Interface.

Each of the DMI BIOS Plug-and-Play functions is available both in real-mode and 16-bit protected-mode. A function called in 16-bit protected-mode supports both 16-bit and 32-bit stack segments.

### 2.2 DMI BIOS Functions

This table defines the current DMI BIOS Functions.

| DMI BIOS Function             | Function Number | Description  | Required/Optional  |
|-------------------------------|-----------------|--|--|
| GET_DMI_INFORMATION           | 50h             | Returns the Number of Structures, the Size of the Largest Structure, and the DMI BIOS Revision.                              | Required   |
| GET_DMI_STRUCTURE             | 51h             | Copies the information for the specified DMI Structure into the buffer specified by the caller.                              | Required   |
| SET_DMI_STRUCTURE             | 52h             | Copies the information for the specified DMI structure from the buffer specified by the caller.                              | Optional   |
| GET_DMI_STRUCTURE_CHANGE_INFO | 53h             | Returns the DMI Structure Change Information into a 16-byte buffer specified by the caller.                                  | Required for Dynamic Structure-change Notification Support |
| DMI_CONTROL                   | 54h             | Controls a system action   | Optional   |
| GET_GPNV_INFORMATION          | 55h             | Returns information about the General Purpose Non-Volatile Storage Area  | Required for GPNV Support                                  |
| READ_GPNV_DATA                | 56h             | Reads the entire specified GPNV contents into a buffer specified by the caller.  | Required for GPNV Support                                  |
| WRITE_GPNV_DATA               | 57h             | Copies the contents of the user specified buffer into the GPNV. The function causes the entire specified GPNV to be updated. | Required for GPNV Support                                  |
| Reserved for Future Use       | 58h-5Fh         | Reserved, will return DMI_FUNCTION_NOT_SUPPORTED.  | Reserved   |

# Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

## Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

## Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

## Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

## API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

## LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

## FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

## E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.