PHYTIUM 飞腾

飞腾系统
SMBIOS 描述规范

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目录

1 范畴

此文档适用于基于飞腾处理器的系统平台，为支持 SMBIOS 的固件设计提供参考。

2 定义与缩写

2.1 定义

2.2 缩写

SMBIOS	System Management BIOS

3 参考文献

[1] UEFI, Advanced Configuration and Power Interface Specification, Version 6.3.

[2] System Management BIOS（BMBIOS）Reference Specification，3.2.0

[3] PCI-SIG, PCI Firmware Specification

[4] Server Base Boot Requirements SBSR Version 1.2

[5]腾云 S2500 高性能通用微处理器数据手册

[6]腾云 S2500 高性能通用微处理器软件编程手册

4 飞腾系统 SMBIOS 表

飞腾处理器系统平台采用的 SMBIOS 表要求遵循《System Management BIOS（SMBIOS）Reference Specification》规范 3.2.0 及以后的版本，传统的 SMBIOS 表以及格式不再支持。

UEFI 使用 SMBIOS3_TABLE_GUID 来识别 SMBIOS 表，使用 EfiRuntimeServicesData 类型内存来存放 SMBIOS 表。

根据 SBSR 文档说明，SMBIOS 表分为如下类型：

- 必需：Type00、Type01、Type03、Type04、Type07、Type09、Type16、Type17、Type19、Type32
- 推荐：Type02、Type08、Type11、Type13、Type15、Type41

飞腾平台要求实现上述必需的表。

5 必须实现的 SMBIOS 表

5.1 Type00: BIOS Information (REQUIRED)

- Vendor.
- BIOS Version.
- BIOS Release Date.
- BIOS ROM Size.
- System BIOS Major Release.
- System BIOS Minor Release.
- Embedded Controller Firmware Major Release.
- Embedded Controller Firmware Minor Release.

Tyep00 表描述了 BIOS 信息，包括 BIOS 厂商、BIOS 版本、BIOS 发行日期、BIOS ROM 大小（以 64k 为粒度）、系统 BIOS 的主版本号、系统 BIOS 的次版本号、EC 固件主主版本号、EC 固件次版本号等。关于该表的每个字段详细描述见 SMBIOS 规范的 7.1 节。

5.2 Type01: System Information (REQUIRED)

- Manufacturer
- Product Name
- Version
- Serial Number
- UUID
- SKU Number

Type01 描述了系统信息，包括系统制造商、产品名、系统版本、系统序列号、UUID、SKU 码等。关于该表的每个字段详细描述见 SMBIOS 规范的 7.2 节。

5.3 Type03: System Enclosure or Chassis (REQUIRED)

- Manufacturer
- Type

- Version
- Serial Number
- Asset Tag Number
- Height
- SKU Number

Type03 描述了系统机箱（底座）的信息，包括机箱制造商、类型（台式机 3、笔记本 10、服务器 17）、版本、序列号、资产标签号、高度（单位 U）、SKU 码等。关于该表的每个字段详细描述见 SMBIOS 规范的 7.4 节。

5.4 Type04: Processor Information (REQUIRED)

- Socket Designation
- Processor Type
- Processor Family
- Processor Manufacturer
- Processor ID
- Processor Version
- Max Speed
- Status
- Core Count
- Core Enabled
- Thread Count
- Processor Family 2
- Core Count 2
- Core Enabled 2
- Thread Count 2

Type04 表描述了处理器信息，包括 socket 类型、处理器类型（通用、DSP 等）、处理器家族（ARM、intel 等）、处理器制造商（phytium）、处理器 ID（MIDR_EL1 寄存器的值）、处理器版本（字符串）、最大速率（还有当前速率字段）、状态（使能、关闭等）、core 的数目、core 使能、线程数目、处理器家族 2、core 数目 2（大于 255）、core 使能 2（大于 255）、

线程数目 2（大于 255）。关于该表的每个字段详细描述见 SMBIOS 规范的 7.5 节。

5.5 Type07: Cache Information (REQUIRED)

- Socket Designation
- Cache Configuration
- Maximum Cache Size
- Installed Size
- Cache Speed

Type07 表描述了 Cache 信息，包括 Socket 类型、Cache 配置（打开、关闭、cache 级别等）、最大 Cache 大小、安装的大小、Cache 速度（未知设为 0）。关于该表的每个字段详细描述见 SMBIOS 规范的 7.8 节。

5.6 Type09: System Slots (REQUIRED for platforms with expansion slots)

- Slot Designation
- Slot Type
- Slot Data Bus Width
- Current Usage
- Slot ID
- Slot Characteristics 1
- Slot Characteristics 2
- Segment Group Number
- Bus Number
- Device Function Number

Type09 表描述系统插槽信息，例如 PCIE 信息。该表描述主要包括插槽名称、插槽类型、插槽数据总线宽度（X4、X8、X16 等）、当前使用情况（可用、不可用、正在使用等）、插槽 ID（支持 ACPI 时，从_SUN 对象获得）、插槽特征 1（提供的电压）、插槽特征 2（支持 PCIE 拆分等）、段（组）号、总线号、设备功能号。关于该表的每个字段详细描述见 SMBIOS

规范的 7.10 节。

5.7 Type16: Physical Memory Array (REQUIRED)

- Location
- Use
- Maximum Capacity
- Number of Memory Devices
- Extended Maximum Capacity

Type16 表描述物理内存数组信息，包括内存位置（主板、PCI 卡等）、使用内存类型（系统内存、显存、flash 等）、最大内存容量（单位 KB）、内存设备个数、扩展最大内存容量（单位 B）。关于该表的每个字段详细描述见 SMBIOS 规范的 7.17 节。

5.8 Type17: Memory Device (REQUIRED)

- Total Width
- Data Width
- Size
- Device Locator
- Memory Type
- Type Detail
- Speed
- Manufacturer
- Serial Number
- Asset Tag
- Part Number
- Extended Size

Type17 表描述了内存设备（Type16 内存设备数组的一部分）信息，包括总的宽度（有 ECC 72bits，无 ECC 64bits）、数据宽度（64bits）、内存设备大小、设备位置（字符串表示，如 DIMM 3）、内存类型、额外的内存设备类型信息、设备支持最大速率（MT/s）、制造商、序列号、资产标签号、部件（零件）号、扩展内存设备大小（大于 32GB，单位 MB）。关于

该表的每个字段详细描述见 SMBIOS 规范的 7.18 节。

5.9 Type19: Memory Array Mapped Address (REQUIRED)

- Starting Address
- Ending Address
- Extended Starting Address
- Extended Ending Address

Type19 表描述了内存数组映射地址，包括物理起始地址、物理结束地址、扩展物理起始地址、扩展物理结束地址等。关于该表的每个字段详细描述见 SMBIOS 规范的 7.20 节。

5.10 Type32: System Boot Information (REQUIRED)

- Boot Status

Type32 表描述了系统启动信息，主要描述了启动状态，包括正常和错误的。关于该表的每个字段详细描述见 SMBIOS 规范的 7.33 节。

6 推荐实现的 SMBIOS 表

6.1 Type02:Baseboard(orModule)Information(RECOMMENDED)

- Manufacturer
- Product
- Version
- Serial Number
- Asset Tag
- Location in Chassis
- Board Type

Type02 描述了主板信息，包括主板的制造商、产品名称、版本号、序列号、资产标签、板子的位置、板子类型（母板、互联板等）。关于该表的每个字段详细描述见 SMBIOS 规范的 7.3 节。

6.2 Type08: Port Connector Information (RECOMMENDED for platforms with physical ports)

- Internal Reference Designator
- Internal Connector Type
- External Reference Designator
- External Connector Type
- Port Type

Type08 表描述了 Port 连接器信息，包括内部参考指示器、内部连接器类型（DB-9、DB-15 等）、外部参考指示器、外部连接器类型、端口类型（SATA、USB 等）。关于该表的每个字段详细描述见 SMBIOS 规范的 7.9 节。

6.3 Type11: OEM Strings (RECOMMENDED)

- Count

Type11 表描述 OEM 字符串信息，主要包括字符串个数。关于该表的每个字段详细描述见 SMBIOS 规范的 7.12 节。

6.4 Type13: BIOS Language Information (RECOMMENDED)

- Installable Languages
- Flags
- Current Language

Type13 表描述了 BIOS 语言信息，包括可安装语言的数目、标志位（语言表现是缩略形式还是长格式）、当前使用的语言。关于该表的每个字段详细描述见 SMBIOS 规范的 7.14 节。

6.5 Type15: System Event Log (RECOMMENDED)

关于该表的每个字段详细描述见 SMBIOS 规范的 7.16 节。

6.6 Type41: Onboard Devices Extended Information (RECOMMENDED)

- Reference Designation
- Device Type
- Device Type Instance
- Segment Group Number
- Bus Number
- Device Function Number

Type41 表描述了主板上的设备扩展信息，例如板载显卡、SATA 卡等。该表主要描述参考设计、设备类型（包括设备状态）、设备类型实例（用于表明设备顺序）、段（组）号、总线号、设备功能号。关于该表的每个字段详细描述见 SMBIOS 规范的 7.42 节。

7 附录 S2500 SMBIOS 信息参考示例

7.1 Type00 BIOS Information

Structure Type: BIOS Information

Format part Len : 26

Structure Handle: 0

Vendor: PHYTIUM LTD

BiosVersion: V2.2

BiosSegment: 0x8800

BiosReleaseDate: Dec 16 2020

BiosSize: 16384 KB

BIOS Characteristics:

PCI is supported

BIOS is Upgradeable(FLASH)

BIOS shadowing is not allowed

Selectable Boot is supported

EDD (Enhanced Disk Driver) Specification is not supported

Int 13h - Japanese Floppy for NEC 9800 1.2mb (3.5",1k Bytes/Sector, 360 RPM) is not supported

Int 13h - Japanese Floppy for Toshiba 1.2mn (3.5", 360 RPM) is not supported

Int 9h, 8042 Keyboard services are not supported

Bits 32:47 are reserved for BIOS Vendor

Bits 48:64 are reserved for System Vendor

BIOS Characteristics Extension Byte1:

ACPI supported

USB Legacy is supported

BIOS Characteristics Extension Byte2:

BIOS Boot Specification supported

Enable Targeted Content Distribution

UEFI Specification is supported

Bits 5:7 are reserved for future assignment

SystemBiosMajorRelease: FF

SystemBiosMinorRelease: FF

EmbeddedControllerFirmwareMajorRelease: FF

EmbeddedControllerFirmwareMinorRelease: FF

ExtendedBiosSize: 0 MB

7.2 Type01 System information

Structure Type: System Information

Format part Len : 27

Structure Handle: 1

Manufacturer: PHYTIUM LTD

ProductName: Phytium S2500/64

Version: none

SerialNumber: Serial Not Set

Uuid：78 56 34 12 34 12 78 56-90 AB CD DE EF AA BB CC

System Wakeup Type: Power Switch

SKUNumber: SKUNumber Not Set

Family: S2500

7.3 Type02 Baseboard(orModule)Information

Structure Type: Base Board Information

Format part Len : 17

Structure Handle: 4100

Manufacturer: PHYTIUM LTD

ProductName: Phytium S2500/64

Version: none

SerialNumber: Serial Not Set

AssetTag: AssetTag Not Set

Base Board Feature Flags: Hosting board | Replaceable

LocationInChassis: Base of Chassis

ChassisHandle: 0x0

Base Board Board Type: Motherboard

7.4 Type03 System Enclosure or Chassis

Structure Type: System Enclosure

Format part Len : 24

Structure Handle: 4101

Manufacturer: PHYTIUM LTD

Type: 17

System Enclosure or Chassis Types: Expansion Chassis

Version: none

SerialNumber: Serial Not Set

AssetTag: AssetTag Not Set

Bootup state System Enclosure or Chassis Status: Safe

Power Supply State System Enclosure or Chassis Status: Safe

Thermal state System Enclosure or Chassis Status: Safe

Security Status System Enclosure or Chassis Security Status: None

OemDefined ： 00 00 00 00

Height: 2

NumberofPowerCords: 0

SKUNumber:

7.5 Type04 Processor Information

7.5.1 Type04 1（CPU1）

Structure Type: Processor Information

Format part Len : 48

Structure Handle: 4102

SocketDesignation: S2500

Processor Type: Central Processor

Processor Family: ARMv8

ProcessorManufacture: PHYTIUM LTD

ProcessorId :33 66 1F 70 00 00 00 00

ProcessorVersion: S2500/64

Processor Information - Voltage:

Processor current voltage = (8/10)V

ExternalClock: 50

MaxSpeed: 2100

CurrentSpeed: 2100

Processor Status:

CPU Socket Populated

CPU Enabled

Processor Upgrade: Unknown

L1CacheHandle: 0x1001

L2CacheHandle: 0x1002

L3CacheHandle: 0x1003

SerialNumber: Serial Not Set

AssetTag: None

PartNumber: AssetTag Not Set

CoreCount: 64

EnabledCoreCount: 64

ThreadCount: 1

Processor Characteristics: 64-bit Capable | Multi-Core | Execute Protection |

Enhanced Virtualization | Power/Performance Control

CoreCount2: 0

EnabledCoreCount2: 0

ThreadCount2: 0

7.5.2 Type04 2（CPU2）

Structure Type: Processor Information

Format part Len : 48

Structure Handle: 4103

SocketDesignation: S2500

Processor Type: Central Processor

Processor Family: ARMv8

ProcessorManufacture: PHYTIUM LTD

ProcessorId :33 66 1F 70 00 00 00 00

ProcessorVersion: S2500/64

Processor Information - Voltage:

Processor current voltage = (8/10)V

ExternalClock: 50

MaxSpeed: 2100

CurrentSpeed: 2100

Processor Status:

CPU Socket Populated

CPU Enabled

Processor Upgrade: Unknown

L1CacheHandle: 0x1001

L2CacheHandle: 0x1002

L3CacheHandle: 0x1003

SerialNumber: Serial Not Set

AssetTag: None

PartNumber: AssetTag Not Set

CoreCount: 64

EnabledCoreCount: 64

ThreadCount: 1

Processor Characteristics: 64-bit Capable | Multi-Core | Execute Protection |

 Enhanced Virtualization | Power/Performance Control

CoreCount2: 0

EnabledCoreCount2: 0

ThreadCount2: 0

7.6 Type07 Cache Information

7.6.1 L1 Data Cache

Structure Type: Cache Information

Format part Len : 27

Structure Handle: 4097

SocketDesignation: L1 Data Cache

Cache Configuration:

Write Back

Enabled Internal

Not Socketed

Level 1

MaximumCacheSize: 0x0

InstalledSize: 0x0

SupportedSRAMType: 0x2

CurrentSRAMType: 0x2

Cache SRAM Type: unknown

CacheSpeed: 0x0

Cache Error Correcting Type: Single-bit ECC

Cache System Cache Type:Data

Cache Associativity: 2-way Set-Associative

MaximumCacheSize2: 0x1000

InstalledSize2: 0x1000

7.6.2 L1 Instruction Cache

Structure Type: Cache Information

Format part Len : 27

Structure Handle: 4096

SocketDesignation: L1 Instruction Cache

Cache Configuration:

Write Back

Enabled Internal

Not Socketed

Level 1

MaximumCacheSize: 0x0

InstalledSize: 0x0

SupportedSRAMType: 0x2

CurrentSRAMType: 0x2

Cache SRAM Type: unkown

CacheSpeed: 0x0

Cache Error Correcting Type: Single-bit ECC

Cache System Cache Type:Instruction

Cache Associativity: 2-way Set-Associative

MaximumCacheSize2: 0x1000

InstalledSize2: 0x1000

7.6.3 L2 Cache

Structure Type: Cache Information

Format part Len : 27

Structure Handle: 4098

SocketDesignation: L2 Cache

Cache Configuration:

Varies with Memory Address

Enabled Internal

Not Socketed

Level 2

MaximumCacheSize: 0x0

InstalledSize: 0x0

SupportedSRAMType: 0x2

CurrentSRAMType: 0x2

Cache SRAM Type: unknown

CacheSpeed: 0x0

Cache Error Correcting Type: Single-bit ECC

Cache System Cache Type:Unified

Cache Associativity:16-way Set-Associative

MaximumCacheSize2: 0x10000

InstalledSize2: 0x10000

7.6.4 L3 cache

Structure Type: Cache Information

Format part Len : 27

Structure Handle: 4099

SocketDesignation: L3 Cache

Cache Configuration:

Varies with Memory Address

Enabled Internal

Not Socketed

Level 3

MaximumCacheSize: 0x0

InstalledSize: 0x0

SupportedSRAMType: 0x2

CurrentSRAMType: 0x2

Cache SRAM Type: unknown

CacheSpeed: 0x0

Cache Error Correcting Type: Single-bit ECC

Cache System Cache Type:Unified

Cache Associativity:8-way Set-Associative

MaximumCacheSize2: 0x20000

InstalledSize2: 0x20000

7.7 Type09 System Slots(与板子相关)

Structure Type: System Slots

Format part Len : 24

Structure Handle: 5

SlotDesignation: PCIE0_X16

System Slot Type: PCI Express Gen 3 X16

System Slot Data Bus Width: 16x or x16

System Slot Current Usage: In use

System Slot Length: Long Length

System Slot Type: PCI Express Gen 3 X16

Slot Id: the value present in the Slot Number field of the PCI Interrupt Routin

g table entry that is associated with this slot is: 0

Slot characteristics 1: Provides 3.3 Volts | Slot's opening is shared with ano

ther slot, e.g. PCI/EISA shared slot.

Slot characteristics 2: PCI slot supports Power Management Enable (PME#) signal

SegmentGroupNum: 0x0

BusNum: 0x0

DevFuncNum: 0x0

DataBusWidth: 0

PeerGroupingCount: 0

7.8 Type13 BIOS Language Information

Structure Type: BIOS Language Information

Format part Len : 22

Structure Handle: 3

InstallableLanguages: 2

Flags: 0

Reserved

CurrentLanguages: zh|CN|unicode

7.9 Type16 Physical Memory Array

Structure Type: Physical Memory Array

Format part Len : 23

Structure Handle: 9

Physical Memory Array Location: System board or motherboard

Physical Memory Array Use: System memory

Physical Memory Array Error Correction Types: Single-bit ECC

MaximumCapacity: 0x20000000

MemoryErrorInformationHandle: 0xFFFE

NumberOfMemoryDevices: 0x10

ExtendedMaximumCapacity: 0x0

7.10 Type17 Memory Device

Structure Type: Memory Device

Format part Len : 84

Structure Handle: 11

MemoryArrayHandle: 0x9

MemoryErrorInformationHandle: 0xFFFE

TotalWidth: 72

DataWidth: 64

Size: 32767

Memory Device - Form Factor: DIMM

DeviceSet: 0x0

DeviceLocator: SOCKET 0 CHANNEL 0

BankLocator: BANK0

Memory Device - Type: DDR4

Memory Device - Type Detail: Synchronous

Speed: 0xA6A

Manufacturer: Hynix

SerialNumber: 82A68419

AssetTag: AssetTag Not Set

PartNumber: Part Number Not Set

Attributes: 0x0

ExtendedSize: 32768

ConfiguredMemoryClockSpeed: 2666

MinimumVoltage: 1200

MaximumVoltage: 1200

ConfiguredVoltage: 1200

Memory Device - Memory Technology: Undefined Value

Memory Device - Memory Operating Mode Capability: No Info

FirwareVersion:

ModuleManufacturerID: 0x0

ModuleProductID: 0x0

MemorySubsystemControllerManufacturerID: 0x0

MemorySubsystemControllerProductID: 0x0

NonVolatileSize: 0x0

VolatileSize: 0x0

CacheSize: 0x0

LogicalSize: 0x0

7.11 Type19 Memory Array Mapped Address

Structure Type: Memory Array Mapped Address

Format part Len : 31

Structure Handle: 10

StartingAddress: 0x0

EndingAddress: 0x1FFFFFFF

MemoryArrayHandle: 0x9

PartitionWidth: 0x10

ExtendedStartingAddress: 0x0

ExtendedEndingAddress: 0x0

7.12 Type32 System Boot Information

Structure Type: System Boot Information

Format part Len : 11

Structure Handle: 2

Reserved

System Boot Status: No errors detected