



## PCI-SIG ENGINEERING CHANGE NOTICE

<b>TITLE:</b>	Vendor-Specific Extended Capability (VSEC)
<b>DATE:</b>	January 7, 2004
<b>AFFECTED DOCUMENT:</b>	PCI Express Base Specification 1.0a
<b>SPONSOR:</b>	Joe Cowan; Hewlett-Packard Company

### **Part I**

#### **1. Summary of the Functional Changes**

Define a PCI Express Vendor-Specific *Extended* Capability (VSEC), analogous to the existing Vendor-Specific Capability defined for PCI-compatible Configuration Space.

#### **2. Benefits as a Result of the Changes**

By defining a PCI Express Vendor-Specific Extended Capability (VSEC):

1. Component vendors can expose vendor-specific registers using an architected mechanism, eliminating the possibility of conflicts that might occur if non-architected mechanisms are used in PCI Express Extended Configuration Space or Root Complex Register Blocks (RCRBs).
2. Vendor-specific registers for PCI Express Functions can be exposed using an architected mechanism in PCI Express Extended Configuration Space (3840 bytes) as opposed to PCI-compatible Configuration Space (256 bytes), which is less likely to have adequate room.
3. Vendor-specific registers can be exposed using an architected mechanism in RCRBs, which reside in Memory Space and do not support PCI-compatible Capability structures.

#### **3. Assessment of the Impact**

There is no impact on existing hardware or software.

#### **4. Analysis of the Hardware Implications**

New hardware implementations are permitted to include the new VSEC structure.

#### **5. Analysis of the Software Implications**

Old software will not recognize the new VSEC structure, and thus will ignore it. New (vendor-specific) software can recognize the new VSEC structure and take advantage of it.

## Part II

### Detailed Description of the change

Add the following new section to the end of Chapter 7:

## **7.x Vendor-Specific Capability**

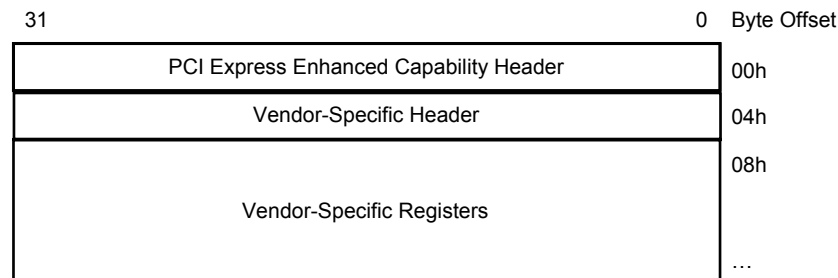
The PCI Express Vendor-Specific Extended Capability (VSEC) is an optional extended capability that may be implemented by any PCI Express Function or RCRB. This allows PCI Express component vendors to use the extended capability mechanism to expose vendor-specific registers.

A single PCI Express Function or RCRB is permitted to contain multiple VSEC structures.

An example usage is a set of vendor-specific features that are intended to go into an on-going series of components from that vendor. A VSEC structure can tell vendor-specific software which features a particular component supports, including components developed after the software was released.

Figure 7-y1 details allocation of register fields in the VSEC structure. The structure of the PCI Express Enhanced Capability Header and the Vendor-Specific Header is architected by this specification.

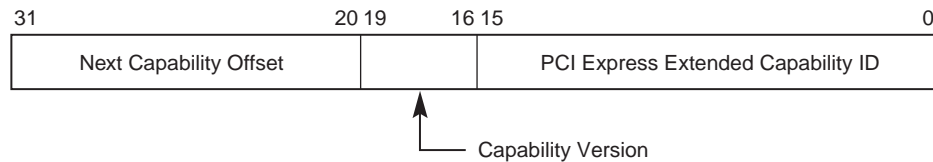
With a PCI Express Function, the structure and definition of the Vendor-Specific Registers area is determined by the vendor indicated by the Vendor ID register located at byte offset 00h in PCI-compatible Configuration Space. With an RCRB, a VSEC is permitted only if the RCRB also contains an RCRB Header Capability structure, which contains a Vendor ID register indicating the vendor.



**Figure 7-y1: PCI Express VSEC Structure**

## 7.x.1 Vendor-Specific Enhanced Capability Header (Offset 00h)

Figure 7-y2 details allocation of register fields in the Vendor-Specific Enhanced Capability header; Table 7-z1 provides the respective bit definitions. See Section 7.9.3 for a description of the PCI Express Enhanced Capability header. The Extended Capability ID for the Vendor-Specific Capability is 000Bh.



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**Figure 7-y2: Vendor-Specific Enhanced Capability Header**

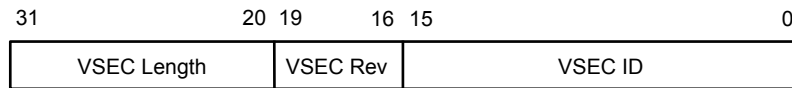
**Table 7-z1: Vendor-Specific Enhanced Capability Header**

<b>Bit Location</b>	<b>Register Description</b>	<b>Attributes</b>
<u>15:0</u>	<p><b>PCI Express Extended Capability ID</b> – This field is a PCI-SIG defined ID number that indicates the nature and format of the extended capability.</p> <p>Extended Capability ID for the Vendor-Specific Capability is 000Bh.</p>	<u>RO</u>
<u>19:16</u>	<p><b>Capability Version</b> – This field is a PCI-SIG defined version number that indicates the version of the capability structure present.</p> <p>Must be 1h for this version of the specification.</p>	<u>RO</u>
<u>31:20</u>	<p><b>Next Capability Offset</b> – This field contains the offset to the next PCI Express capability structure or 000h if no other items exist in the linked list of capabilities.</p> <p>For Extended Capabilities implemented in device Configuration Space, this offset is relative to the beginning of PCI-compatible Configuration Space and thus must always be either 000h (for terminating list of capabilities) or greater than 0FFh.</p>	<u>RO</u>

## 7.x.2 Vendor-Specific Header (Offset 04h)

Figure 7-y3 details allocation of register fields in the Vendor-Specific header; Table 7-z2 provides the respective bit definitions.

Vendor-specific software must qualify the associated Vendor ID of the PCI Express Function or RCRB before attempting to interpret the values in the VSEC ID or VSEC Rev fields.



**Figure 7-y3: Vendor-Specific Header**

**Table 7-z2: Vendor-Specific Header**

<u>Bit Location</u>	<u>Register Description</u>	<u>Attributes</u>
<u>15:0</u>	<p><b>VSEC ID</b> – This field is a vendor-defined ID number that indicates the nature and format of the VSEC structure.</p> <p><u>Software must qualify the Vendor ID before interpreting this field.</u></p>	<u>RO</u>
<u>19:16</u>	<p><b>VSEC Rev</b> – This field is a vendor-defined version number that indicates the version of the VSEC structure.</p> <p><u>Software must qualify the Vendor ID and VSEC ID before interpreting this field.</u></p>	<u>RO</u>
<u>31:20</u>	<p><b>VSEC Length</b> – This field indicates the number of bytes in the entire VSEC structure, including the PCI Express Enhanced Capability Header, the Vendor-Specific Header, and the Vendor-Specific Registers.</p>	<u>RO</u>