## NAME

**vmd** - Intel Volume Management Device driver

## SYNOPSIS

To compile this driver into the kernel, place the following lines in your kernel configuration file:

**device vmd**

Alternatively, to load the driver as a module at boot time, place the following line in loader.conf(5):

vmd_load="YES"

## DESCRIPTION

This driver attaches to Intel VMD devices, representing them as PCI-to-PCI bridges and providing access to children PCI devices via new PCI domains.  Intel VMD is used by Intel's VROC (Virtual RAID on chip) to manage NVMe drives.

## LOADER TUNABLES

The following tunables are settable via loader(8) or sysctl(8):

*hw.vmd.bypass_msi*

By default all VMD devices remap children MSI/MSI-X interrupts into their own.  It creates additional isolation, but also complicates things due to sharing, etc.  Fortunately some VMD devices can bypass the remapping.  Defaults to 1.

*hw.vmd.max_msi*

Limits number of Message Signaled Interrupt (MSI) vectors allowed to each child device.  VMD can't distinguish MSI vectors of the same device, so there are no benefits to have more than one, unless it is required by specific device driver.  Defaults to 1.

*hw.vmd.max_msix*

Limits number of Extended Message Signaled Interrupt (MSI-X) vectors allowed to each child device.  VMD has limited number of interrupt vectors to map children interrupts into, so to avoid/reduce sharing children devices/drivers need to be constrained.  Defaults to 3.

## SEE ALSO

graid(8)

## HISTORY

The **vmd** driver first appeared in FreeBSD 13.0.