NAME

hpet - High Precision Event Timer driver

SYNOPSIS

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

device acpi

The following tunables are settable from the loader(8):

hint.hpet.X.allowed_irqs
is a 32bit mask. Each set bit allows driver to use respective IRQ, if BIOS also set respective capability bit in comparator's configuration register. Default value is 0xffff0000, except some known broken hardware.

hint.hpet.X.clock
controls event timers functionality support. Setting to 0, disables it. Default value is 1.

hint.hpet.X.legacy_route
controls "LegacyReplacement Route" mode. If enabled, HPET will steal IRQ0 of i8254 timer and IRQ8 of RTC. Before using it, make sure that respective drivers are not using interrupts, by setting also:

hint.attimer.0.clock=0
hint.atrtc.0.clock=0
Default value is 0.

hint.hpet.X.per_cpu
controls how much per-CPU event timers should driver attempt to register. This functionality requires every comparator in a group to have own unshared IRQ, so it depends on hardware capabilities and interrupts configuration. Default value is 1.

DESCRIPTION

This driver uses High Precision Event Timer hardware (part of the chipset, usually enumerated via ACPI) to supply kernel with one time counter and several (usually from 3 to 8) event timers. This hardware includes single main counter with known increment frequency (10MHz or more), and several programmable comparators (optionally with automatic reload feature). When value of the main counter matches current value of any comparator, interrupt can be generated. Depending on hardware capabilities and configuration, interrupt can be delivered as regular I/O APIC interrupt (ISA or PCI) in range from 0 to 31, or as Front Side Bus interrupt, alike to PCI MSI interrupts, or in so called "LegacyReplacement Route" HPET can steal IRQ0 of i8254 and IRQ8 of the RTC. Interrupt can be

either edge- or level-triggered. In last case they could be safely shared with PCI IRQs. Driver prefers to use FSB interrupts, if supported, to avoid sharing. If it is not possible, it uses single sharable IRQ from PCI range. Other modes (LegacyReplacement and ISA IRQs) require special care to setup, but could be configured manually via device hints.

Event timers provided by the driver support both one-shot an periodic modes and irrelevant to CPU power states.

Depending on hardware capabilities and configuration, driver can expose each comparator as separate event timer or group them into one or several per-CPU event timers. In last case interrupt of every of those comparators within group is bound to specific CPU core. This is possible only when each of these comparators has own unsharable IRQ.

SEE ALSO

acpi(4), apic(4), atrtc(4), attimer(4), eventtimers(4), timecounters(4)

HISTORY

The **hpet** driver first appeared in FreeBSD 6.3. Support for event timers was added in FreeBSD 9.0.