NAME

vr - VIA Technologies Rhine I/II/III Ethernet device driver

SYNOPSIS

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

> **device miibus**
> **device vr**

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

> if_vr_load="YES"

DESCRIPTION

The **vr** driver provides support for PCI Ethernet adapters and embedded controllers based on the VIA Technologies VT3043 Rhine I, VT86C100A Rhine II, and VT6105/VT6105M Rhine III Fast Ethernet controller chips.

The VIA Rhine chips use bus master DMA and have a descriptor layout designed to resemble that of the DEC 21x4x "tulip" chips. The register layout is different however and the receive filter in the Rhine chips is much simpler and is programmed through registers rather than by downloading a special setup frame through the transmit DMA engine. Transmit and receive DMA buffers must be longword aligned. The Rhine chips are meant to be interfaced with external physical layer devices via an MII bus. They support both 10 and 100Mbps speeds in either full or half duplex.

The **vr** driver supports the following media types:

autoselect   Enable autoselection of the media type and options. The user can manually override the autoselected mode by adding media options to the */etc/rc.conf* file.

10baseT/UTP   Set 10Mbps operation. The *mediaopt* option can also be used to select either *full-duplex* or *half-duplex* modes.

100baseTX   Set 100Mbps (Fast Ethernet) operation. The *mediaopt* option can also be used to select either *full-duplex* or *half-duplex* modes.

The **vr** driver supports the following media options:

full-duplex   Force full duplex operation.

half-duplex   Force half duplex operation.

Note that the 100baseTX media type is only available if supported by the adapter. For more information on configuring this device, see ifconfig(8).

HARDWARE

The **vr** driver supports VIA Technologies Rhine I, Rhine II, and Rhine III based Fast Ethernet adapters including:

- AOpen/Acer ALN-320
- D-Link DFE520-TX
- D-Link DFE530-TX
- Hawking Technologies PN102TX
- Soekris Engineering net5501

SYSCTL VARIABLES

The following variables are available as sysctl(8) variables:

dev.vr.%d.stats
        Display lots of useful MAC counters maintained in the driver.

DIAGNOSTICS

vr%d: couldn't map memory A fatal initialization error has occurred.

vr%d: couldn't map interrupt A fatal initialization error has occurred.

vr%d: watchdog timeout The device has stopped responding to the network, or there is a problem with the network connection (cable).

vr%d: no memory for rx list The driver failed to allocate an mbuf for the receiver ring.

vr%d: no memory for tx list The driver failed to allocate an mbuf for the transmitter ring when allocating a pad buffer or collapsing an mbuf chain into a cluster.

vr%d: chip is in D3 power state -- setting to D0 This message applies only to adapters which support power management. Some operating systems place the controller in low power mode when shutting down, and some PCI BIOSes fail to bring the chip out of this state before configuring it. The controller loses all of its PCI configuration in the D3 state, so if the BIOS does not set it back to full power mode in time, it will not be able to configure it correctly. The driver tries to detect this condition and bring the adapter back to the D0 (full power) state, but this may not be enough to return the driver to a fully

operational condition. If you see this message at boot time and the driver fails to attach the device as a network interface, you will have to perform second warm boot to have the device properly configured.

Note that this condition only occurs when warm booting from another operating system. If you power down your system prior to booting FreeBSD, the card should be configured correctly.

SEE ALSO

altq(4), arp(4), miibus(4), netintro(4), ng_ether(4), polling(4), ifconfig(8)

The VIA Technologies VT86C100A data sheet, http://www.via.com.tw.

HISTORY

The **vr** device driver first appeared in FreeBSD 3.0.

AUTHORS

The **vr** driver was written by Bill Paul *<wpaul@ctr.columbia.edu>*.

BUGS

The **vr** driver always copies transmit mbuf chains into longword-aligned buffers prior to transmission in order to pacify the Rhine chips. If buffers are not aligned correctly, the chip will round the supplied buffer address and begin DMAing from the wrong location. This buffer copying impairs transmit performance on slower systems but cannot be avoided. On faster machines (e.g. a Pentium II), the performance impact is much less noticeable.