

**NAME**

**genet** - Raspberry Pi 4 / BCM2711 Gigabit Ethernet controller driver

**SYNOPSIS**

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

```
device miibus
device genet
```

**DESCRIPTION**

The **genet** driver supports the BCM2711 Ethernet controller as found on the Raspberry Pi 4.

The following features are supported in the **genet** driver in FreeBSD:

- IP/TCP/UDP checksum offload for IPv4 and IPv6
- 10/100/1000Mbps operation in full-duplex mode
- 10/100Mbps operation in half-duplex mode

Note that the operation of transmit checksum offload is coupled for IPv4 and IPv6; to disable it, both must be disabled even if both address families are not in use.

The **genet** 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 rc.conf(5).

**10baseT/UTP** Set 10Mbps operation. The ifconfig(8) **mediaopt** option can also be used to select either **full-duplex** or **half-duplex** modes.

**100baseTX** Set 100Mbps (Fast Ethernet) operation. The ifconfig(8) **mediaopt** option can also be used to select either **full-duplex** or **half-duplex** modes.

**1000baseT** Set 1000baseT operation over twisted pair. Only **full-duplex** mode is supported.

The **genet** driver supports the following media options set with the **mediaopt** option to the ifconfig(8) command:

**full-duplex** Force full duplex operation.

**half-duplex**

Force half duplex operation.

For more information on configuring this device, see `ifconfig(8)`.

## HARDWARE

The **genet** driver supports the Ethernet controller portion of the Broadcom BCM2711 on the Raspberry Pi 4 Model B and related systems. It utilizes the BCM54213PE PHY.

## LOADER TUNABLES

Tunables can be set at the `loader(8)` prompt before booting the kernel or stored in `loader.conf(5)`. The following loader tunable variable is available, and is also available as a read-only `sysctl(8)` variable:

*hw.genet.rx\_batch*

The maximum number of packets to pass to the link-layer input routine at one time. The default is 16.

## SYSCTL VARIABLES

The following variable is available as a `sysctl(8)` variable:

*hw.genet.tx\_hdr\_min*

When the driver is given an output packet in a buffer chain in which the first buffer contains only the Ethernet header, the number of bytes of the packet to add to the Ethernet header in the first buffer. Certain packets may be lost if this value is too small. The default value is 56, and is sufficient for the observed cases to date.

## DIAGNOSTICS

The **genet** driver has no diagnostics that are likely in normal operation. However, when the **debug** option is set with `ifconfig(8)`, most failures that cause packet loss in the transmit and receive paths cause a cryptic diagnostic message naming the failure. These messages generally make sense only when looking at the driver source.

## SEE ALSO

`altq(4)`, `arp(4)`, `miibus(4)`, `netintro(4)`, `ng_ether(4)`, `vlan(4)`, `ifconfig(8)`

## HISTORY

The **genet** device driver first appeared in FreeBSD 13.0.

## AUTHORS

The **genet** driver was written by Mike Karels <[karels@freebsd.org](mailto:karels@freebsd.org)>. Portions are derived from the `bcmgenet` driver in NetBSD by Jared McNeill, and parts of the structure and common code are from the

awg driver for the Allwinner EMAC by Jared McNeill.