

TEMU
GRETH Model

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1. Introduction

The GRETH model is available in the GrEth plugin. The model needs to be combined with a MDIOBus, PHY and Ethernet model.

The GRETH model implements the behaviour of both **GRETH** and **GRETH_GBITH**.

2. Loading the Plugin

```
import BusModels
import GrEth
object-create class=GRETH name=greth0
object-create class=GenericPHY name=phy0
object-create class=EthernetLink name=eth0
connect a=greth0.phy b=phy0:PHYIface
connect a=greth0.mdioBus b=phy0:MDIOIface
connect a=apbctrl0.slaves b=greth0:ApbIface
object-prop-write prop=greth0.mac value="00:00:00:00:00:01"
connect a=phy0.macDevice b=greth0:MACIface
ethernet-connect link=eth0 device=phy0:PHYIface
```

3. Configuration

The `config.gbitVariant` property can be set to enable **GRETH_GBITH** extensions. The extensions includes:

- Gigabit speed.
- IP header checksum offloading
- TCP checksum offloading
- UDP checksum offloading
- Scatter / gather send lists.

4. Attributes

4.1. Properties

Name	Type	Description
ETHCTR	uint32_t	Ethernet Control Register
ETHMDC	uint32_t	Ethernet MDIO Control and Status Register

Name	Type	Description
ETHRDP	uint32_t	Ethernet Receiver Descriptor Pointer Register
ETHSIS	uint32_t	Ethernet Status and Interrupt Source Register
ETHTDP	uint32_t	Ethernet Transmitter Descriptor Pointer Register
MACLSB	uint32_t	Ethernet MAC Address LSB
MACMSB	uint32_t	Ethernet MAC Address MSB
config.checkCrc	uint8_t	Enable ethernet frame CRC checking.
config.checkIpCrc	uint8_t	Enable IP header CRC checking.
config.checkTcpCrc	uint8_t	Enable TCP header CRC checking.
config.checkUdpCrc	uint8_t	Enable UDP header CRC checking.
config.gbitVariant	uint8_t	Enable GRETH_GBIT behaviour.
config.generateCrc	uint8_t	Enable ethernet frame CRC generation.
config.irq	uint8_t	IRQ
config.logTraffic	uint8_t	Enable traffic logging
irqCtrl	iref / IrqCtrlIface	IRQ controller
mac	cstring	Set MAC by string
mdioBus	iref / temu::MDIOIface	MDIO bus
memory	iref / MemoryIface	Memory
object.timeSource	object	Time source object (a cpu or machine object)
phy	iref / temu::PHYIface	PHY device

4.2. Interfaces

Name	Type	Description
ApbIface	ApbIface	APB P&P interface
DeviceIface	DeviceIface	
MACIface	temu::MACIface	MAC interface
MemAccessIface	MemAccessIface	Mem access interface

Name	Type	Description
ResetIface	ResetIface	

4.3. Ports

Prop	Iface	Description
-	-	-

5. Registers



Register support is currently experimental!

5.1. Register Bank registers

5.1.1. Register ETHCTR

Ethernet Control Register

Cold reset value: 0x0

Warm reset value: 0x0

Field	Mask	Cold	Warm	Description
EA	0x80000000	0x0	0x0	EDCL available
BS	0x70000000	0x0	0x0	EDCL buffer size
GA	0x8000000	0x0	0x0	Gigabit MAC
MA	0x4000000	0x0	0x0	MDIO interrupts supported
MC	0x2000000	0x0	0x0	Multicast supported
SP	0x80	0x0	0x0	Speed
RS	0x40	0x0	0x0	Reset
PM	0x20	0x0	0x0	Open Packet Mode
FD	0x10	0x0	0x0	Full Duplex
RI	0x8	0x0	0x0	Enable Receiver Interrupts
TI	0x4	0x0	0x0	Enable Transmitter Interrupts

Field	Mask	Cold	Warm	Description
RE	0x2	0x0	0x0	Receive Enable
TE	0x1	0x0	0x0	Transmit Enable

5.1.2. Register ETHSIS

Ethernet Status and Interrupt Source Register

Cold reset value: 0x0

Warm reset value: 0x0

Field	Mask	Cold	Warm	Description
IA	0x80	0x0	0x0	Invalid Address
TS	0x40	0x0	0x0	Too Small
TA	0x20	0x0	0x0	Transmitter AHB Error
RA	0x10	0x0	0x0	Receiver AHB Error
TI	0x8	0x0	0x0	Transmitter Interrupt
RI	0x4	0x0	0x0	Receiver Interrupt
TE	0x2	0x0	0x0	Transmitter Error
RE	0x1	0x0	0x0	Receiver Error

5.1.3. Register MACMSB

Ethernet MAC Address MSB

Cold reset value: 0x0

Warm reset value: 0x0

Field	Mask	Cold	Warm	Description
MSB	0xffff	0x0	0x0	Two MSB of MAC

5.1.4. Register MACLSB

Ethernet MAC Address LSB

Cold reset value: 0x0

Warm reset value: 0x0

Field	Mask	Cold	Warm	Description
LSB	0xffffffff	0x0	0x0	Four LSB of MAC

5.1.5. Register ETHMDC

Ethernet MDIO Control and Status Register

Cold reset value: 0x0

Warm reset value: 0x0

Field	Mask	Cold	Warm	Description
Data	0xffff0000	0x0	0x0	Data for MMI read / write
PHY_ADDR	0xf800	0x0	0x0	PHY address
REG_ADDR	0x7c0	0x0	0x0	MII reg addr
NV	0x10	0x0	0x0	Not valid
BU	0x8	0x0	0x0	Busy
LF	0x4	0x0	0x0	Link fail
RD	0x2	0x0	0x0	Read
WR	0x1	0x0	0x0	Write

5.1.6. Register ETHTDP

Ethernet Transmitter Descriptor Pointer Register

Cold reset value: 0x0

Warm reset value: 0x0

Field	Mask	Cold	Warm	Description
TXDTRA	0xffff800	0x0	0x0	Tx desc base address
TX_DESCRIPTOR_P TR	0x3f8	0x0	0x0	Tx desc offset

5.1.7. Register ETHRDP

Ethernet Receiver Descriptor Pointer Register

Cold reset value: 0x0

Warm reset value: 0x0

Field	Mask	Cold	Warm	Description
RXDTRA	0xffff800	0x0	0x0	Rx desc base address
RX_DESCRIPTOR_P TR	0x3f8	0x0	0x0	Rx desc offset

6. Limitations

- Multicast groups are not yet supported.
- ECDL mode is not supported.