

T-EMU: OpenCores CAN Device Model Manual



Prepared

Mattias Holm
Technical Manager

Approved

Michela Alberti
General Manager

Checked

Dan Søren Nielsen
QA Manager

Record of Changes

Author	Description	Rev	Date
Mattias Holm	Initial Version	1.0	2016-04-05

Table of Contents

1. Introduction	2
2. Configuration	2
3. Attributes	2
3.1. Properties	2
3.2. Interfaces	4
3.3. Ports	4
4. Limitations	4

1. Introduction

The CAN_OC is part of the OpenCores and the GRLIB IP libraries. It is available in libTEMUOpenCores.so.

2. Configuration

There are two configuration parameters in the CAN device, firstly the config.interrupt property can be set to influence the interrupt that is raised with the IRQ controller (setting this property also updates the AHB PnP info).

The second configuration property is config.infiniteSpeed, with this set, messages are sent immediately instead of being scheduled for the future based on the message length. This is the default option.

The device should be connected to an interrupt controller and a CAN bus, to work properly.

3. Attributes

3.1. Properties

Name	Type	Description
basiccan.acceptCode	uint8_t	Accept Code register for BasicCAN mode.
basiccan.acceptMask	uint8_t	Accept Mask register for BasicCAN mode.
basiccan.ctrl	uint8_t	Control register for BasicCAN mode.
basiccan.txID	[2 x uint8_t]	TxID registers for BasicCAN mode.



Name	Type	Description
bus	iref	CAN bus the device is connected to.
busTiming	[2 x uint8_t]	Bus Timing registers.
clockDivider	uint8_t	Clock Divider register.
command	uint8_t	Command register.
config.infiniteSpeed	uint8_t	Enable infinite speed mode (no delays when sending messages).
config.interrupt	uint8_t	External interrupt raised with IRQ controller.
fifo.data	[64 x uint8_t]	RX FIFO data buffer.
fifo.start	uint32_t	RX FIFO buffer start location.
fifo.usage	uint32_t	RX FIFO buffer usage.
interrupt	uint8_t	Interrupt register.
irqCtrl	iref	Interrupt controller.
object.timeSource	object	Time source object (a cpu or machine object)
pelican.acceptCode	[4 x uint8_t]	Accept Code registers for PeliCAN mode.
pelican.acceptMask	[4 x uint8_t]	Accept Mask registers for PeliCAN mode.
pelican.arbLostCaputure	uint8_t	Arbitration Lost Capture register for PeliCAN mode.
pelican.errCodeCapture	uint8_t	Error Code Capture register for PeliCAN mode.
pelican.errWarnLimit	uint8_t	Error Warning Limit register for PeliCAN mode.
pelican.interruptEnable	uint8_t	Interrupt Enable register for PeliCAN mode.
pelican.mode	uint8_t	Mode register for PeliCAN mode.
pelican.rxErrCounter	uint8_t	RX Error Counter register for PeliCAN mode.
pelican.rxMsgCounter	uint8_t	RX Message Counter register for PeliCAN mode.
pelican.txErrCounter	uint8_t	TX Error Counter register for PeliCAN mode.
pelican.txFI	uint8_t	TX Frame Info register for PeliCAN mode.

Name	Type	Description
pelican.txID	[4 x uint8_t]	TxID registers for PeliCAN mode.
status	uint8_t	Status register.
txData	[8 x uint8_t]	TX data buffer (excluding TX FI and TX ID registers).

3.2. Interfaces

Name	Type	Description
AhbIface	AhbIface	AHB interface
CanDevIface	CanDevIface	CAN device interface.
DeviceIface	DeviceIface	Device interface.
MemAccessIface	MemAccessIface	Memory access interface for memory mapped registers.
ResetIface	ResetIface	

3.3. Ports

Prop	Iface	Description
-	-	-

4. Limitations

The following deviations from real hardware are known to exist with this model:

- The controller clears the RX and TX buffers on reset. This is not the proper behaviour and may have an impact on FDIR. Let us know if this is an issue.
- With all CAN models, there is no arbitration of messages in the simulated world and busses are not synchronised.
- The model does at present not register filters with the CAN bus model.
- The model currently ignores the error field in the CAN frame objects.
- The model currently assumes the CAN bus is running at 1 Mb/s (in non-infinite speed mode). This is arguably incorrect and the timing should be picked from the bus timing register, this has however not yet been done. Contact Terma if this is this is critical for your needs.