VciBlockDevice

1) Functional Description

This VCI component is both a target and an initiator.

- It is addressed as a target to be configured for a transfer.
- It is acting as an initiator to do the transfer

There is only one block device handled by this component. It can be seen as one single *file*, that has a storage capacity limited to 2^{41} bytes. An IRQ is optionally asserted when transfer is finished.

This hardware component checks for segmentation violation, and can be used as a default target.

It contains 8 memory-mapped registers:

- **BLOCK_DEVICE_BUFFER** (read/write)

Physical address of the source (or destination) buffer in SoC memory.

- **BLOCK_DEVICE_COUNT** (read/write)

Number of blocks to be transfered.

- **BLOCK_DEVICE_LBA** (read/write)

Logical Base Address (index of the first block in the block device)

- **BLOCK_DEVICE_OP** (write only)

Type of operation, writing here initiates the operation.This register goes back to BLOCK_DEVICE_NOOP when operation is finished. The following operations codes are defined:

1. `BLOCK_DEVICE_NOOP` : No operation
2. `BLOCK_DEVICE_READ` : Transfer from flock device to memory
3. `BLOCK_DEVICE_WRITE` : Transfer from memory to block device

- **BLOCK_DEVICE_STATUS** (read only)

State of the transfer. Reading this register while not busy resets its value to IDLE, and acknowledge the IRQ. Value may be one of :

1. `BLOCK_DEVICE_IDLE`
2. `BLOCK_DEVICE_BUSY`
3. `BLOCK_DEVICE_READ_SUCCESS`
4. `BLOCK_DEVICE_WRITE_SUCCESS`
5. `BLOCK_DEVICE_READ_ERROR`
6. `BLOCK_DEVICE_WRITE_ERROR`
7. `BLOCK_DEVICE_ERROR`

- **BLOCK_DEVICE_IRQ_ENABLE** (read/write)

Boolean enabling the IRQ line

- **BLOCK_DEVICE_SIZE** (read only)

Number of blocks addressable in the block device

- **BLOCK_DEVICE_BLOCK_SIZE** (read only)

Block size (in bytes)

For extensibility issues, you should access this component using globally-defined offsets. You should include file `soclib/block_device.h` from your software, it defines `BLOCK_DEVICE_COUNT`, `BLOCK_DEVICE_READ`, ...

Sample code: Please see reference implementation in source:trunk/soclib/soclib/platform/topcells/caba-vgmn-block_device-mips32el

(add -I/path/to/soclib/include to your compilation command-line)

2) Component definition & usage

source:trunk/soclib/soclib/module/connectivity_component/vci_block_device/caba/metadata/vci_block_device.sd?

See SoclibCc/VciParameters

```
Uses( 'vci_block_device', **vci_parameters )
```

3) CABA Implementation

CABA sources

- interface : source:trunk/soclib/soclib/module/connectivity_component/vci_block_device/caba/source/include/vci_block_device.h
- implementation : source:trunk/soclib/soclib/module/connectivity_component/vci_block_device/caba/source/src/vci_block_device.cpp?

CABA Constructor parameters

```
VciBlockDevice(
     sc_module_name name,   //  Component Name
     const soclib::common::MappingTable &mt, // MappingTable
     const soclib::common::IntTab &srcid,    // Initiator index
     const soclib::common::IntTab &tgtid,    // Target index
     const std::string &filename, // mapped file, may be a host block device
     const uint32_t block_size = 512 ); // one-block size
```

CABA Ports

- sc_in<bool> **p_resetn** : Global system reset
- sc_in<bool> **p_clk** : Global system clock
- soclib::caba::VciTarget<vci_param> **p_vci_target** : The VCI target port

- soclib::caba::VciInitiator<vci_param> **p_vci_initiator** : The VCI initiator port
- sc_out<bool> **p_irq** : Interrupt port

4) TLM-DT Implementation

The TLM-DT implementation is not yet available.