

# VciMultiDma

## 1) Functional Description

As the VciDma component, this component moves data from a source memory buffer to a destination memory buffer. It 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.

The VciMultiDma component supports up to 8 simultaneous DMA transfers, corresponding to 8 independant DMA channels. As there is only one VCI initiator port, the general arbitration policy between the active channels is round-robin.

The number of channels and the max burst length are constructor parameters. The burst length parameter must be multiple of 4 bytes.

This component makes the assumption that the VCI RDATA & WDATA fiels have 32 bits. The source buffer base address, the destination buffer base address and the buffer length mus be multiple of 4 bytes. The buffer length is not constrained to be a multiple of the burst length.

Each channel has its own set of memory mapped registers, and for each channel a specific IRQ can be is optionally asserted when transfer is completed.

Each channel k has 5 memory-mapped registers :

- **DMA\_SRC[k]** (Read / Write)

It defines the physical address of the source buffer.

- **DMA\_DST[k]** (Read / Write)

It defines the physical address of the destination buffer.

- **DMA\_LEN[k]** (Read / Write)

It defines the length of transfer, in bytes. This register must be written after writing into registers DMA\_SRC & DMA\_DST, as the writing into the DMA\_LEN register starts the transfer. This register gets back to 0 when transfer is finished. This register can be used to test the DMA coprocessor status.

- **DMA\_RESET[k]** (Write-only)

Writing any value into this pseudo-register makes a clean re-initialisation of the DMA coprocessor: The on-going VCI transaction is completed before the coprocessor returns the IDLE state. This write access must be used by the software ISR to aknowledge the DMA IRQ.

- **DMA\_IRQ\_DISABLED[k]** (Read / Write)

A non zero value disables the IRQ line. The RESET value is zero.

The aligned segment size associated to this VCI target is 256 bytes, as only 8 address bits are decoded : the 5 MSB bits define the target register, and the next 3 bits define the channel index.

For extensibility issues, you should access the DMA using globally-defined offsets, and you should include file `soclib/dma.h` in your software, it defines `DMA_SRC`, `DMA_DST`, `DMA_LEN`, `DMA_RESET`, `DMA_IRQ_DISABLED`.

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

## 2) Component definition & usage

[source:trunk/soclib/soclib/module/infrastructure\\_component/dma\\_infrastructure/vci\\_multi\\_dma/caba/metadata/vci\\_multi\\_dm](#)

See [SoclibCc/VciParameters](#)

```
Uses( 'vci_multi_dma' )
```

## 3) CABA Implementation

### CABA sources

- interface :  
[source:trunk/soclib/soclib/module/infrastructure\\_component/dma\\_infrastructure/vci\\_multi\\_dma/caba/source/include/](#)
- implementation :  
[source:trunk/soclib/soclib/module/infrastructure\\_component/dma\\_infrastructure/vci\\_multi\\_dma/caba/source/src/vci\\_](#)

### CABA Constructor parameters

```
VciDma(  
    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 size_t burst_size,    // Max number of bytes transfered in a burst  
    const size_t channels );    // Number of channels
```

### CABA Ports

- **p\_resetrn** : Global system reset
- **p\_clk** : Global system clock
- **p\_vci\_target** : The VCI target port
- **p\_vci\_initiator** : The VCI initiator port
- **p\_irq[k]** : As many output IRQ ports as the number of channels

## 4) TLM-DT implementation

The TLM-DT implementation is not available yet.