DMA
Direct Memory Access
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Highlights

› The DMA moves data from source locations to destination locations without the intervention of the CPU or other on chip devices.

› Up to 128 individually programmable DMA channels

Key Features

Flexible DMA channels requests

DMA double buffering

DMA linked list

Customer Benefits

› Possible configuration of the request type (SW, HW, Auto, ..) per DMA channel

› Transfer continuous data stream to two destination buffers

› Perform multi DMA transactions from non contiguous Memory regions
The DMA Channel supports the following types of requests:

- **DMA Software Request**: initiated by CPU
- **DMA Hardware Request**: Any peripheral that can trigger an interrupt can initiate a DMA transaction through the Interrupt Router
- **DMA Daisy Chain Request**: DMA transaction initiated by the next higher priority DMA channel
- **DMA Auto Start Request**: initiated by the loading of the next Transaction Control Set (TCS) during a DMA Linked List operation
DMA

DMA double buffering

- Double buffer could be selected for source or destination buffering
- The application is able to freeze one of the destination buffers for cyclic software tasks while the other buffer continues to be filled
DMA
DMA linked list

- A linked list operation consists of a series of DMA transactions executed by the same DMA channel. Each DMA transaction has an unique configuration set.

- If the Auto start request is selected, a DMA transaction will be triggered after the end of the previous one in the list ➔ no HW or SW trigger is needed.

- DMA linked are useful when user wants to transfer data from/to non contiguous memory locations using one DMA channel and/or one service request.

DMA Transaction 1
- Source @1
- Destination @1
- Data Length 1

DMA Transaction 2
- Source @2
- Destination @2
- Data Length 2

DMA Transaction N
- Source @N
- Destination @N
- Data Length 1

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The DMA is connected to both SRI and SPB with master interfaces.

This enables the DMA to read and write data from/to any module.
Application example
DMA hardware requests

In this example, data is transferred from the ADC output registers to internal memory without any CPU intervention.

1. End of ADC conversion interrupt
2. Trigger a DMA channel transfer
3. Read ADC result register
4. Write data to RAM
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