Mapping

1) Functional Description

The mapping operation consists in modulating the inputs bits into symbols (complex signals). In our system, the used mapping is a QPSK (Quadrature Phase-Shift Keying) modulation. This means each symbol is coded by two bits. The architecture of the mapping component is presented in the figure 1. It is composed of a mapping core and a MWMR wrapper. The wrapper is used to interface the core and the MWMR controller avalaible here VciMwmrController.

2) CABA Implementation

a) Component definition & usage

Component definition

- source:trunk/soclib/soclib/module/ofdm_chain_components/mapping/caba/metadata/mapping.sd?

Usage

Mapping has a *fifo_depth* parameter, which defines the fifo depth for the input. For example with a FIFO depth equal to 16 :

```
Uses('Mapping', fifo_depth = 16);
```

b) CABA sources

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

CABA Constructor parameters

```
Mapping(
     sc_module_name name,                    // Instance name
     int ncycles)  // Number of computation cycles
```

CABA Ports

- sc_in<bool> **p_resetn** : hardware reset
- sc_in<bool> **p_clk** : clock
- soclib::caba::FifoOutput<uint32_t> **p_to_ctrl** : interface from the mapping to the MWMR controller
- soclib::caba::FifoInput<uint32_t> **p_from_ctrl** : interface from the MWMR controller to the mapping

3) TLM-DT Implementation

a) Component definition & usage

Component definition

- source:trunk/soclib/soclib/module/ofdm_chain_components/mapping/tlmdt/metadata/mapping.sd?

b) TLM-DT sources

- interface : source:trunk/soclib/soclib/module/ofdm_chain_components/mapping/tlmdt/source/include/mapping.h?
- implementation : source:trunk/soclib/soclib/module/ofdm_chain_components/mapping/tlmdt/source/src/mapping.cpp?

TLM-DT Constructor parameters

```
Mapping(sc_core::sc_module_name name, // Instance name
              uint32_t id,
              uint32_t read_fifo_depth, // Depth of input buffer
              uint32_t write_fifo_depth, // Depth of output buffer
              uint32_t n_read_channels, // Number of read channels
              uint32_t n_write_channels, // Number of write channels
              uint32_t n_config, // Number of configurations
              uint32_t n_status); // Number of status
```

TLM-DT Ports

- std::vector<tlm_utils::simple_target_socket_tagged<Mapping,32,tlm::tlm_base_protocol_types> *> **p_config**: configuration port
- std::vector<tlm_utils::simple_target_socket_tagged<Mapping,32,tlm::tlm_base_protocol_types> *> **p_status**: status port
- std::vector<tlm_utils::simple_initiator_socket_tagged<Mapping,32,tlm::tlm_base_protocol_types> *> **p_read_fifo**: port from the MWMR controller to the mapping
- std::vector<tlm_utils::simple_initiator_socket_tagged<Mapping,32,tlm::tlm_base_protocol_types> *> **p_write_fifo**: port from the mapping to the MWMR controller