DMA

* Relation to drivers of other peripherals:

Some MCUs have static mapping between peripherals' DMA request lines and the DMA channel itself and some others have dynamic mapping.

For portability, each peripheral is going to be given a new function that is responsible for connecting peripheral's DMA line with a given DMA channel. Of course, this function would be empty for targets which have static mapping.

In peripherals drivers, when it comes to the need of using DMA, a preprocessor condition is made, such that:

- if target has dynamic DMA channel mapping, acquire any available channel, and connect peripherals request line with it.

- Otherwise, if target has static DMA channel mapping, acquire a certain, previously configured channel.

* DMA channel access synchronization:

- Initially, the DMA driver should have a list of channels.

- If target has dynamic DMA channel mapping, DMA channels are managed as follows:
  - Driver initially has a queue of pointers to these channels, initialized with pointers to all channels.

  - When a task needs to use DMA, it blocks on the DMA queue until it becomes of size larger than 0.

  - Once the queue has channels in it, task should dequeue first channel pointer and operate on it.

  - Once done operating, task must enqueue the channel pointer back.

  - (Notice that queue operations must be thread-safe. For example using freeRTOS's queue API).

- If target has static DMA channel mapping, DMA channels are managed as follows:
  - Each channel in the channel list is given a dependent mutex.

  - A queue set is initialized with mutexes of all channels.

  - When a task needs to use any DMA channel (not a specific one), it performs the following procedure:
    - Task blocks on the queue set (i.e.: until one mutex at least is available).
    - Task locks this mutex, operates on the DMA channel, and then releases the mutex.

  - When a task needs to use a specific DMA channel, it performs the following procedure:
    - Acquire locking mutex of the specific required channel.
    - operates on the DMA channel, and then releases the mutex.