

Four modes of SAI module

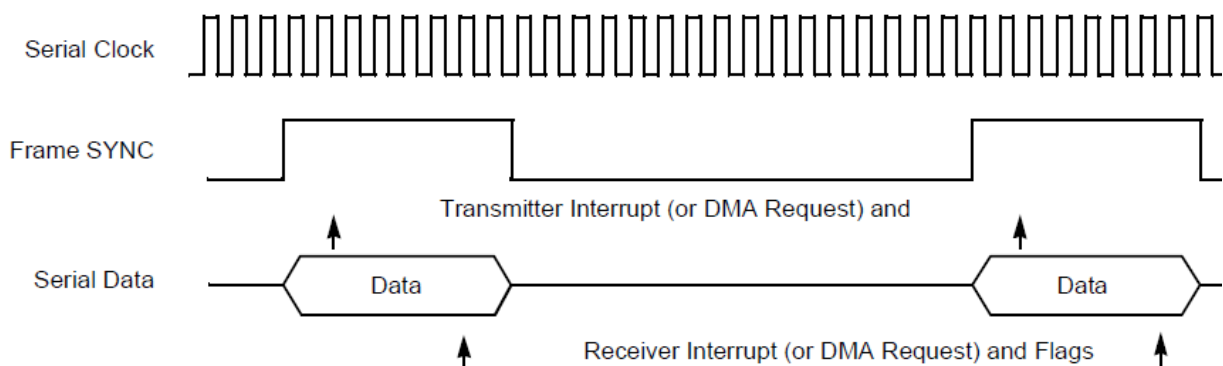
Introduction:

Most of kinetis K family have SAI module, the “SAI” is acronym of Synchronous Audio Interface, generally, the module is connected to Codec, ADC, DAC, it is an important serial port for Kinetis family. For Kinetis family, there are two IP to implement the synchronous serial interface, one is “SAI” module which is integrated in K6x, K2x,...., another is I2S module implemented in K4x..., but they have similar function, but they are implemented in totally different methods. Here, I only talk about the SAI module.

As the user manual of Kinetis family says that the SAI module supports 4 modes, they are Normal mode, I2S mode, Network mode and AC97 mode with full-duplex and programmable word length. Here, I explain the four modes, give the waveform, I will give the snippet later.

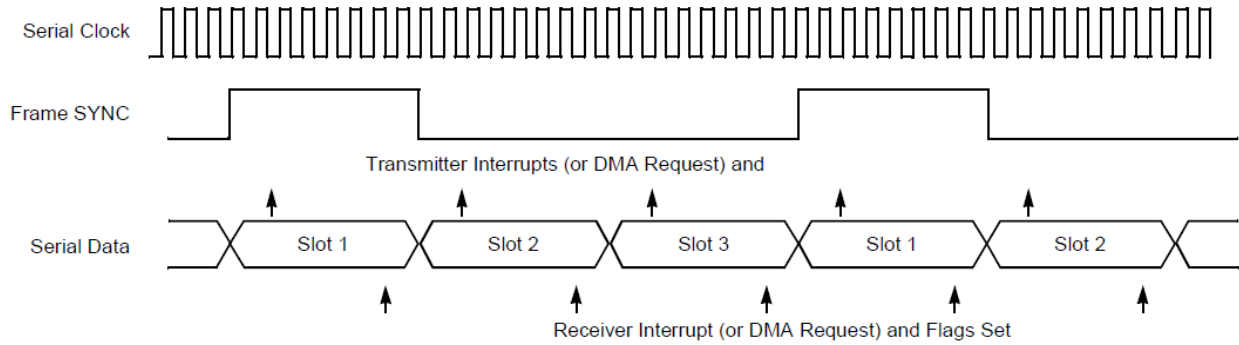
Normal mode:

The normal mode is used to interface with ADC, DAC..., the normal mode means that one frame contains multiple slots, but only first slot is valid, the other slots is dummy slots, the dummy slots can only control the sampling rate, but do not transfer any data.



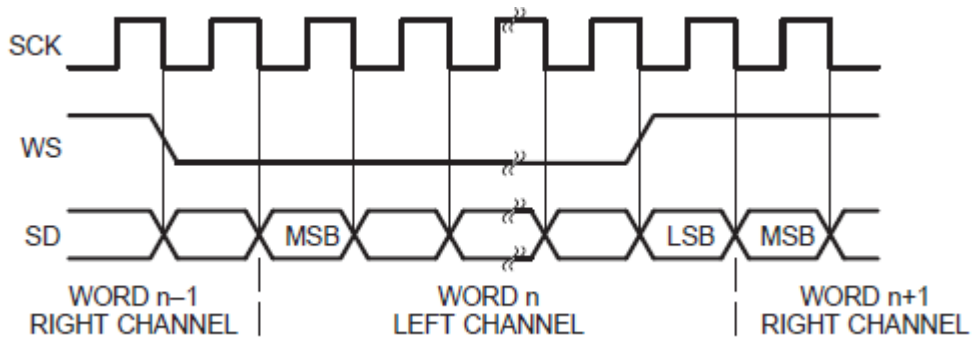
Network mode:

Network mode is also used to interface with ADC, DAC, codec..., one frame of data includes multiple slots, but all slots are valid. The following figure is the waveform of network mode, which includes 3 slots in each frame, all three slots transfer data.



I2S mode:

I2S mode is a subset of Network mode and used in audio application, one frame only includes 2 slots, one slot is left audio channel, another slot is right audio channel. Generally, the I2S' Frame sync asserts one bit before the first bit of the frame as the following figure. But the I2S also supports right/left justified mode, which means that the MSB or LSB of data aligns with the frame signal.



AC97 mode:

AC97 mode is PC audio protocol, one frame includes 13 slots, the slot0 is control or tag slot which covers 16 bit clock. The slot1~12 are data slots, each slot covers 20 bit clocks.

