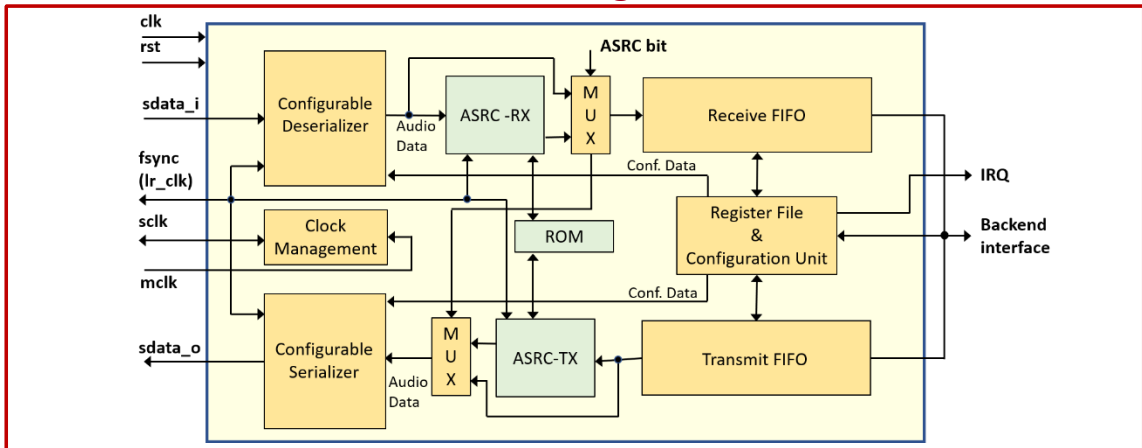## Overview

The IPB-I2S-TDM-ASRC combines an I²S/TDM configurable serial audio interface with two embedded stereo Asynchronous Sample Rate Converters (ASRCs). The ASRCs can provide very high quality in terms of harmonic distortion and noise, tolerance and rejection of input jitter. When sample rate conversion is not necessary, the ASRCs can be bypassed.

The I²S/TDM supports the well-known stereo formats: I²S, Left-Justified or Right-Justified and many configurable TDM formats up to 256 channels. The backend interface is supplied with a choice of AMBA-AHB, AMBA-APB or a parallel interface.

Block Diagram

Features of the ASRCs

- 2-channel audio sample rate converter
- Sample size: up to 24 bits
- Lower than -130 dB THD+N for common conversion ratios
- Fast synchronization time: 128 input samples
- Latency: $64/FS_{in} + 2/FS_{out}$
- Automatically adjusts to changes in both input and output sample rates
- High input jitter tolerance
- Input/output sample rate range: 8 kHz to 192 kHz
- Sampling rate conversion ratios: 3.9 : 1 : 7
- Features customized upon request

Deliverables

- FPGA netlist or Verilog source code
- Verilog testbench for RTL simulation
- Synthesis constraints
- Datasheet

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Features of the I²S/TDM

- Runtime configurable serial audio formats: I²S, left-justified, right-justified or TDM
- Supports all commonly used sample rates including (but not limited) 8, 11.025, 16, 22.05, 32, 44.1, 48, 96, and 192 kHz
- Audio sample sizes: 8, 16, 24 or 32 bits
- Supports slave or master modes
- Supports up to 256 audio channels

Technology	Cell count	ROM	RAMs
TSMC 45nm	33300	8192x28	256x20 64x20 64x33 64x32

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