Digital to IF Converter

KR-DIF-300-01 Preliminary Data Sheet

"A Digital to IF Converter that Enables a Reconfigurable Transmitter"

Features

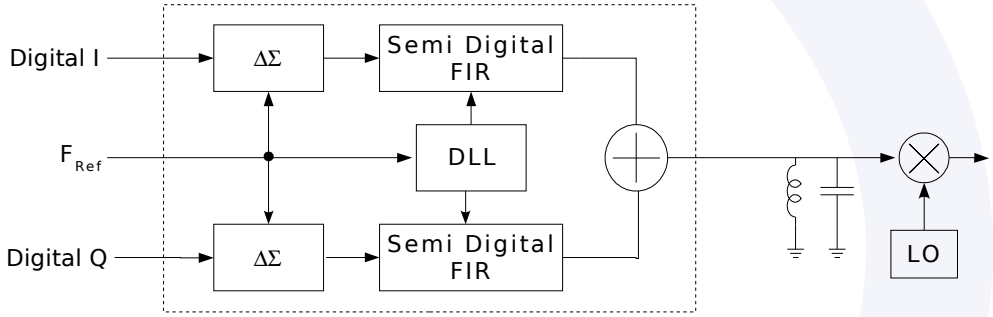
- Digital Baseband Input
- IF Frequency output up to 300 MHz
- 4 MHz Bandwidth
- Zero Phase Dispersion
- High Linearity 12 bits
- Spurious Free Dynamic Range 70 dB
- Image Rejection 60 dB
- Center Frequency independent of F_{Ref}
- 1.2 V operation
- Low current consumption 3 mA at 1.2 V
- Power down mode 1 µA at 1.2 V

Programmable Parameters

- IF Output Frequency
- 5 Digital-to-IF Converters are stackable (in parallel) for an effective bandwidth of 20 MHz

Applications

- Multi-Mode Radios
- WLAN 802.11a, 802.11b, 802.11g
- WiMAX
- Bluetooth
- 2.4 and 5 GHz Radios
- Cable Modems



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Description

The Kaben Wireless Silicon Digital-to-IF Converter provides wide bandwidth, excellent linearity at low power consumption, and can be easily integrated into your current design. This converter cell is a key building block in the design of high-performance wireless transmitters, that require high data rates and low power.

The Converter accepts a digital baseband input and upconverts the signal to an IF frequency, up to 300 MHz. The in-phase and quadrature digital input can have up to 2 MHz bandwidth each, for a combined 4 MHz bandwidth.

Five of the 4 MHz cells can be stacked (in parallel) to provide 20 MHz total bandwidth. When stacked, the digital baseband inputs are fed directly into the cells, each of which is tuned to an individual 4 MHz band. Each cell in turn provides 50 dB of rejection of all adjacent bands.

The high IF frequency reduces the requirement for off-chip RF output filtering, thereby reducing cost and size. The high linearity of 12 bits and spurious free dynamic range of 60 dB makes this product an ideal selection for transmitters employing complex modulation formats such as OFDM and high data-rate multi-level QAM.

The Digital-to-IF Converter inherently provides band-pass and anti-aliasing filtering with zero phase dispersion, thereby delivering undistorted up-conversion of the digital baseband complex signal. For advanced signal structures supporting high data rates such as OFDM, generating the up-converted transmit signal with zero dispersion is crucial in maintaining acceptable bit error rate performance.

High performance is delivered without sacrificing power consumption. The cell operates using 3 mA from a 1.2 V supply and powers down to 1 µA.

Support

For system's design, we provide a kit that includes high-level models in Matlab/Simulink, Verilog, and Verilog-A. System-level models offer various modes of abstraction for flexibility in simulation speed vs. accuracy.

At the circuit design level, we deliver GDS II files and a Cadence library containing schematics, symbols, and cell layouts. We also provide production test procedures for the cell.

For supported semiconductor processes the design can be rapidly customized to your application. Support includes tools for all phases of the life cycle of your SoC.

Electrical Characteristics

Parameter	Conditions	Min	Typ	Max	Units
Input Frequency Bandwidth				4	MHz
IF Output Frequency				300	MHz
IF Output Bandwidth				4	MHz
Maximum IF Output Bandwidth	Stacked in 5 Channels			20	MHz
Linearity				12	bits
Image Rejection		60			dB
Spurious Free Dynamic Range				60	dB
Supply Current	Vcc = 3V Temp = 22°C		2	3	mA
Supply Voltage		1.0		1.2	Volts
Powerdown current				1	µA
Operating Temperature		-40		85	°C