Optimized system-on-chip processor, DACs and ADCs for defense digitizer systems

This **TI Design** is for developers currently leveraging an FPGA or ASIC in their product solution with high-speed ADCs and DACs. Significant time savings are achieved by pre-integrating hardware and software for both the processor and ADC/DAC. Additionally, this solution saves cost, power and size versus a traditional FPGA-based solution. The design includes the first widely available processor integrating a JESD204B interface and Digital Front End (DFE), the **66AK2L06** SoC. Connecting the **ADC12J4000** and **DAC38J84** to the 66AK2L06 processor provides an efficient solution for test and measurement and defense applications.
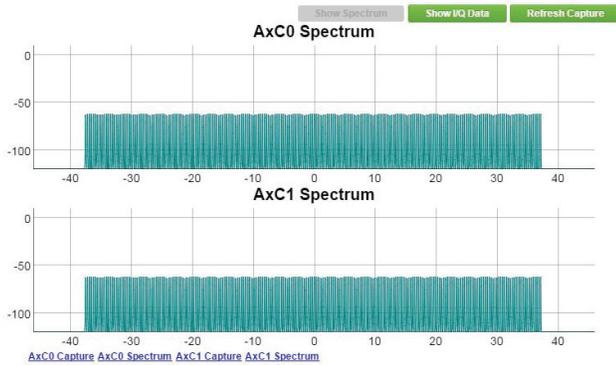
Features

- Easy integration of signal processor to data converters over JESD204B

- Multichannel sampling rates up to 368Msps with 150MHz of processing bandwidth

- DFE processing for filtering, down-sampling or up-sampling

- Wideband sampling with JESD204B attached signal processing solution including DSP, ADC and DAC boards, demo software, configuration GUIs and getting started guide

- A robust demonstration and development platform including three EVMs, a deterministic latency card, schematic, BOM, user guide, benchmarks, software and demos

- New TI Design for synthetic aperture radar (SAR) applications coming soon (shown to the right)
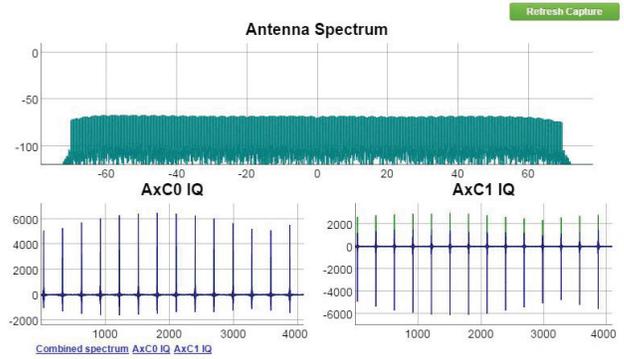
Visit: **www.ti.com/tidesign0034**

Deterministic Latency Card

ADC12J4000

66AK2L06

DAC38J84
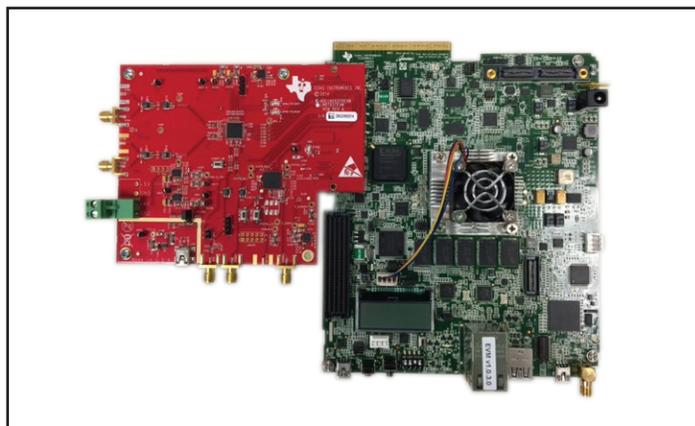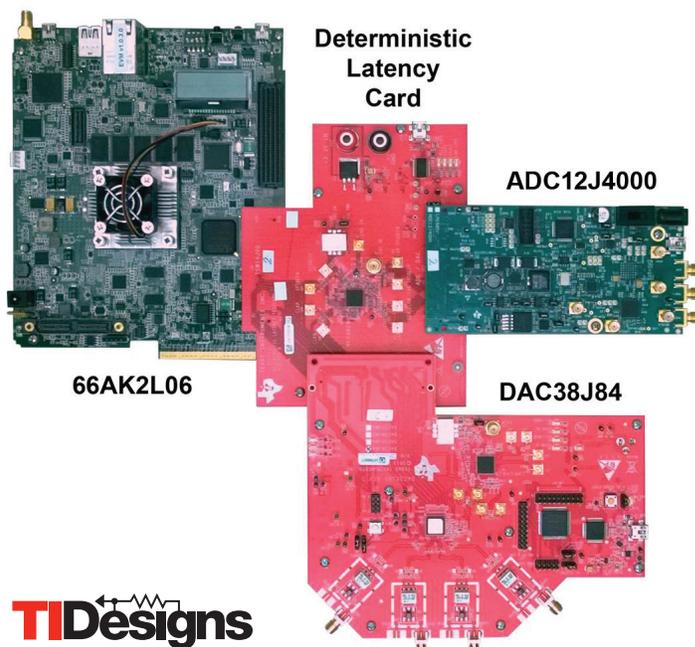
TI Designs

Coming soon: TI Design demonstrating an optimized SAR application using an on-chip FFT coprocessor
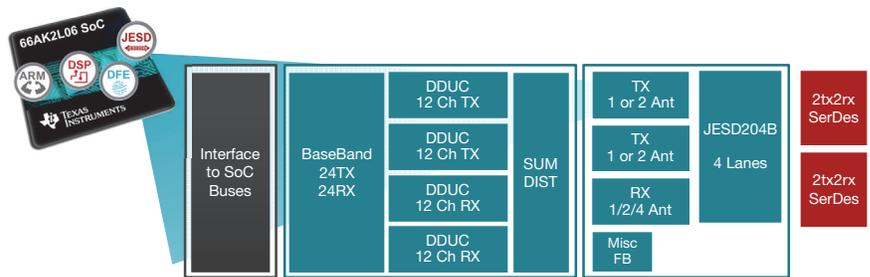
TX Signal Capture @ DSP (4k FFT, Hanning)

AxC0 Spectrum

AxC1 Spectrum

AxC0 Capture AxC0 Spectrum AxC1 Capture AxC1 Spectrum

Web interface for control and visualization

Combined RX Signal Capture @DSP

Antenna Spectrum

AxC0 IQ

AxC1 IQ

Combined spectrum AxC0 IQ AxC1 IQ

TI products in the TI Design

66AK2L06 system-on-chip

- Integrated DFE technology with programmable up/down sampling and filtering
- Latency optimization using 2× FFT co-processors up to 8K-points and >80dB SNR, 35 GFLOPS @ 8K
- Four TMS320C66x DSP cores with fixed- and floating-point processing providing 153.6GMACS and 76.8GFLOPS
- Two ARM® Cortex®-A15 RISC cores providing 8400 DMIPS
- Floating-point FFT with TMS320C66x DSP – any size FFT, >300dB SNR, 4GFLOPS @8K

Software Programmable Digital Front End (DFE)

66AK2L06 SoC

Interface to SoC Buses | BaseBand 24TX 24RX | DDUC 12 Ch TX / DDUC 12 Ch TX / DDUC 12 Ch RX / DDUC 12 Ch RX | SUM DIST | TX 1 or 2 Ant / TX 1 or 2 Ant / RX 1/2/4 Ant / Misc FB | JESD204B 4 Lanes | 2tx2rx SerDes / 2tx2rx SerDes

Frequency Plan

- Max sample rate: 368Msps TX and 368Msps RX complex
- 330MHz instantaneous and 150MHz occupied signal bandwidth

Input / Output

- 4× JESD204B lanes, 7.4Gbps each
- 4RX and 4TX streams
- 4 streams and 4/8/12 DDUC channels on each stream
- 18-bit data path resolution

Performance

- > 90dB stopband performance
- Programmable FIR with 399 taps maximum tap length
- 1–16 integer decimation rates
- Fractional decimation using resampling

TI 66AK2L06

4× C66x DSP | 2× ARM A15 | 2× FFTC | NetCP

Programmable FIR Filter | Re-samplers, Mixers
Digital Up Conversion

Digital Front-End

Digital Down Conversion
Programmable FIR Filter | Re-samplers, Mixers

JESD204B

Clock and SYSREF

Loopback

DAC38J84
JESD TX
JESD TX
DAC

ADC12J4000
JESD RX
JESD RX
ADC
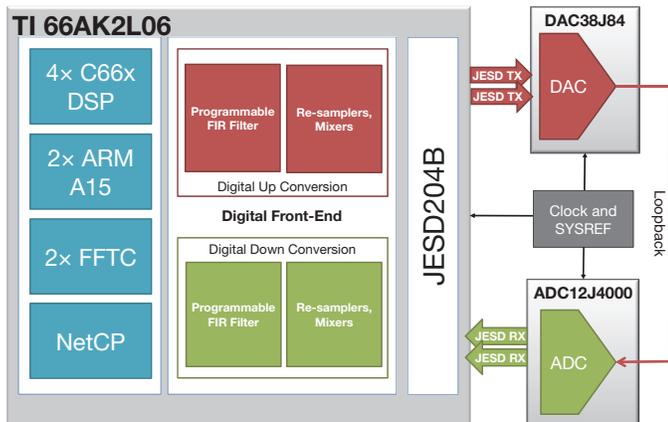
DAC38J84: Quad 16-bit 2.5-GSPS DAC

- Low power: 450 mW/ch @ 2.5GSPS
- JESD204B, 8 lanes 12.5-Gbps interface
- 10×10mm, 0.8-mm pitch BGA

ADC12J4000: 12-bit 4-GSPS ADC

- RF sampling to > 3GHz
- JESD204B, 8 lanes 10-Gbps interface

TEXAS INSTRUMENTS

IMPORTANT NOTICE

Products		Applications	
Audio	www.ti.com/audio	Automotive and Transportation	www.ti.com/automotive
Amplifiers	amplifier.ti.com	Communications and Telecom	www.ti.com/communications
Data Converters	dataconverter.ti.com	Computers and Peripherals	www.ti.com/computers
DLP® Products	www.dlp.com	Consumer Electronics	www.ti.com/consumer-apps
DSP	dsp.ti.com	Energy and Lighting	www.ti.com/energy
Clocks and Timers	www.ti.com/clocks	Industrial	www.ti.com/industrial
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Logic	logic.ti.com	Security	www.ti.com/security
Power Mgmt	power.ti.com	Space, Avionics and Defense	www.ti.com/space-avionics-defense
Microcontrollers	microcontroller.ti.com	Video and Imaging	www.ti.com/video
RFID	www.ti-rfid.com		
OMAP Applications Processors	www.ti.com/omap	**TI E2E Community**	e2e.ti.com
Wireless Connectivity	www.ti.com/wirelessconnectivity		