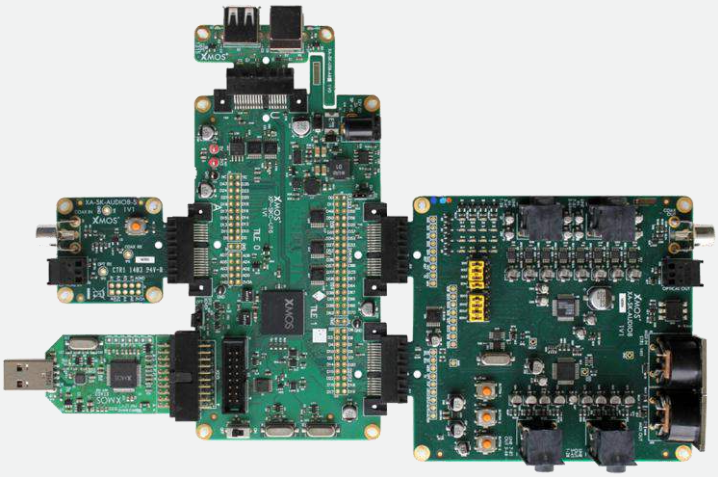
U16 MULTI-CHANNEL AUDIO REFERENCE DESIGN

Multi-channel analog and digital USB Audio Class 2 reference design



FEATURES

- **Complete hardware and software USB audio reference design**
  - 8 channel analog input and output
  - S/PDIF or ADAT input and output
  - MIDI input and output
  - 18in/8out digital audio mixer
- **USB compliant device**
  - High-Speed USB device
    Optional Full-Speed fall-back
  - USB Audio Class 2.0 device
    Optional Audio Class 1.0 fall-back
  - Self- or bus-powered
- **Bit perfect USB audio transfer**
  - Asynchronous Isochronous from host
  - Adaptive Isochronous to host
  - PCM ≤192kHz at 16, 24 or 32bits
  - Local crystal audio clocking
  - PLL recovery of digital audio clock
- **Multiple OS support**
  - Windows
  - Mac OS X
  - Android
  - Apple iOS
- **Royalty free software stack**
  - Provided as source code

The Multi-Channel Audio Reference Design is a complete USB audio device reference design for multi-channel audio applications.

The reference design uses the XS1-U16 multicore microcontroller; an XMOS xCORE-USB™ device with an integrated High Speed USB 2.0 PHY and 16 logical cores delivering 1000MIPS of deterministic and responsive processing power.

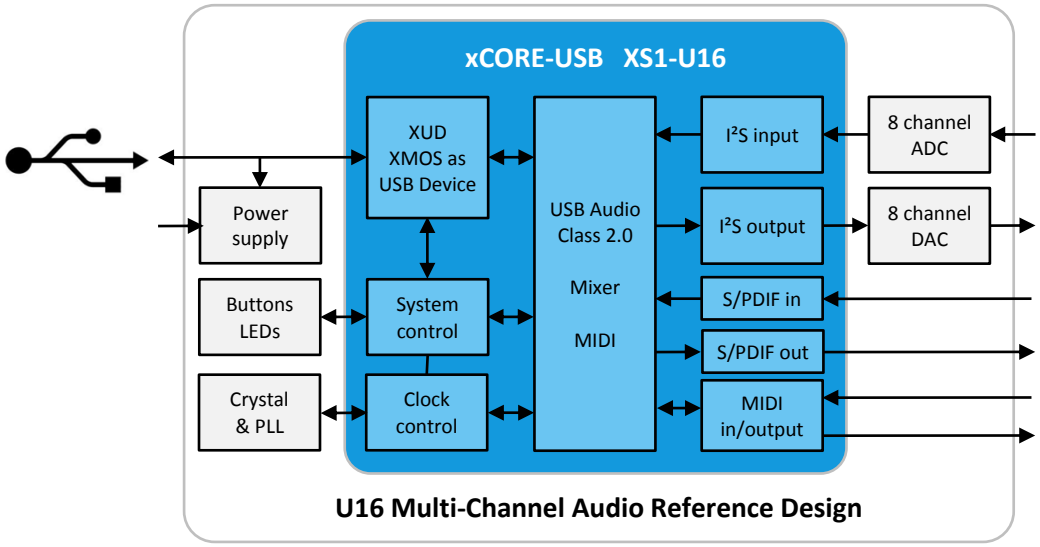
Exploiting the flexible programmability of the xCORE™ architecture, the reference design supports USB audio streaming of up to 20 channels at 192kHz, and includes 18in/8out audio mixing functionality.

The guaranteed Hardware-Response™ times of xCORE technology always ensure low latency (round trip as low as 3ms), bit perfect audio streaming to and from the USB host.

Delivered as source code, the reference software provides a fully featured production ready solution, including support for: Full- and High-Speed USB operation, USB Audio Class 2.0 & 1.0, MIDI, HID and DFU classes.

The XMOS xTIMEcomposer™ Studio development suite and tools then allow for quick and easy software development and customization to add additional application specific features.

U16 MULTI-CHANNEL AUDIO REFERENCE DESIGN BLOCK DIAGRAM



U16 Multi-Channel Audio Reference Design

	Feature	Benefit
	High-speed USB 2.0 device	Plug-and-play operation Bus- or self-powered
	USB Audio Class 2.0 compliant	Driverless operation with Mac OS X[1] and Apple iOS[2] Multiple driver vendors for Windows[3] Android[4]
	Multi-channel audio input and output Digital and analogue audio formats Multi-channel audio mixing[5]	Functionality ideally suited for Mac/PC/Apple/Android based audio recording and playback interfaces
	Local clocking Asynchronous USB audio transfer	Low jitter, high quality audio capture and playback
	Powered by xCORE-USB multicore microcontroller	Flexible, deterministic and responsive processing power Low audio USB round trip latency (<3ms achievable)
	Flexible hardware & software platform	Predefined feature set reference design Easily customisable to meet specific product requirements
xTIMEcomposer	Source code reference software Integrated development tools suite	Rapid development and code reuse Royalty-free deployment Fast time to market

1: Mac OS X v10.6 and later provides native USB Audio Class 2.0 support.
2: Apple iOS support only available to Apple MFi licensees.
3: USB Audio Class 2.0 support under Windows requires a 3rd party driver.
4: Android device is USB host with USB Audio Class 2.0 support.
5: Mixer configurable with up to 18 input channels and 8 output channels at 96kHz, or 2 output channels at 192kHz.

ORDERING INFORMATION

For a list of XMOS distributors, please visit www.xmos.com/support/distributors.

Part number	Contents
XK-USB-AUDIO-U16-MC-AB	XP-SKC-U16 U16 sliceKIT core-board XA-SK-USB-AB USB-AB slice card XA-SK-AUDIO8 Analog 8in/8out, S/PDIF out, MIDI in/out multi-channel audio slice card XA-SK-AUDIO8-S S/PDIF in audio slice card XA-XTAG2 xTAG2 debugger 12V PSU, USB cable