# xKITS

ETHERNET AVB NETWORKING SOLUTIONS

Media distribution has progressed a long way from point-to-point analog AV implementations with masses of bulky, expensive copper wiring, which required extensive knowledge to design and implement. Today's digital media networks are based on mass market items such as Cat 5 cables, switches and standard hardware components. They need to be easy to configure, capture inputs from many different sources and output to a variety of listening hardware, all in real-time and with better quality.
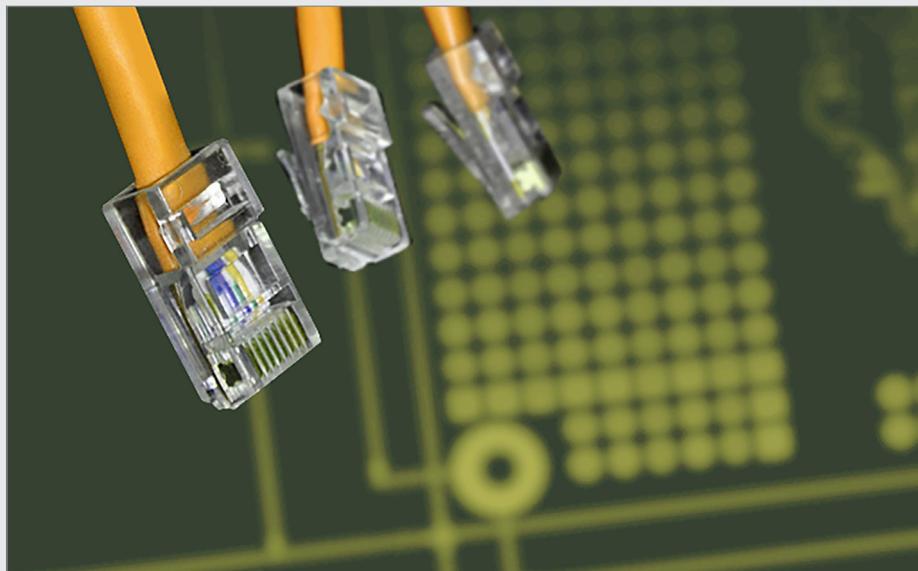
XMOS ETHERNET AVB AUDIO ENDPOINTS

Developers building an AV product to attach to an AVB network generally want to concentrate on the product. They require a solution that is flexible and easy to implement, rather than a device that requires them to engage with the details of AVB standards. To meet these requirements, XMOS has developed AVB audio endpoint solutions that designers can rapidly and easily incorporate into their products, while retaining the flexibility to change the firmware to adapt to changes in the hardware or software specification.

XMOS multicore microcontrollers are ideally suited to real-time audio networks due to the ability to break down each of the inputs/outputs into separate tasks that behave in a completely predictable way. Individual logical cores are used to manage talker inputs and listener outputs; all managed by a global clock. Input data is timestamped and output on request by the deterministic architecture that is driven by events instead of interrupted tasks, providing jitter-free data transport between switches.

The configurability of XMOS devices means that the endpoint solutions are not necessarily audio specific; the multicore microcontrollers can be reconfigured to support different interfaces such as CAN and MPEG-TS making the network extremely flexible.

Lowest cost AVB solutions
– Royalty-free Ethernet AVB
– No O/S or external RAM required
– Zero development tools cost

Unmatched flexibility
– Up to 8 channels; scalable up to 32 channels
– Talker/Listener or both
– Star or daisy-chain network topology
– IEEE 1722.1 control
– Easy to integrate DSP and house-keeping functions

Fastest time-to market solution
– Field and AVnu plugfest proven
– Easy to use endpoint solutions
– Simple customization using configurable xSOFTip blocks
– Field upgradable

MULTI-CHANNEL ETHERNET AVB ENDPOINT
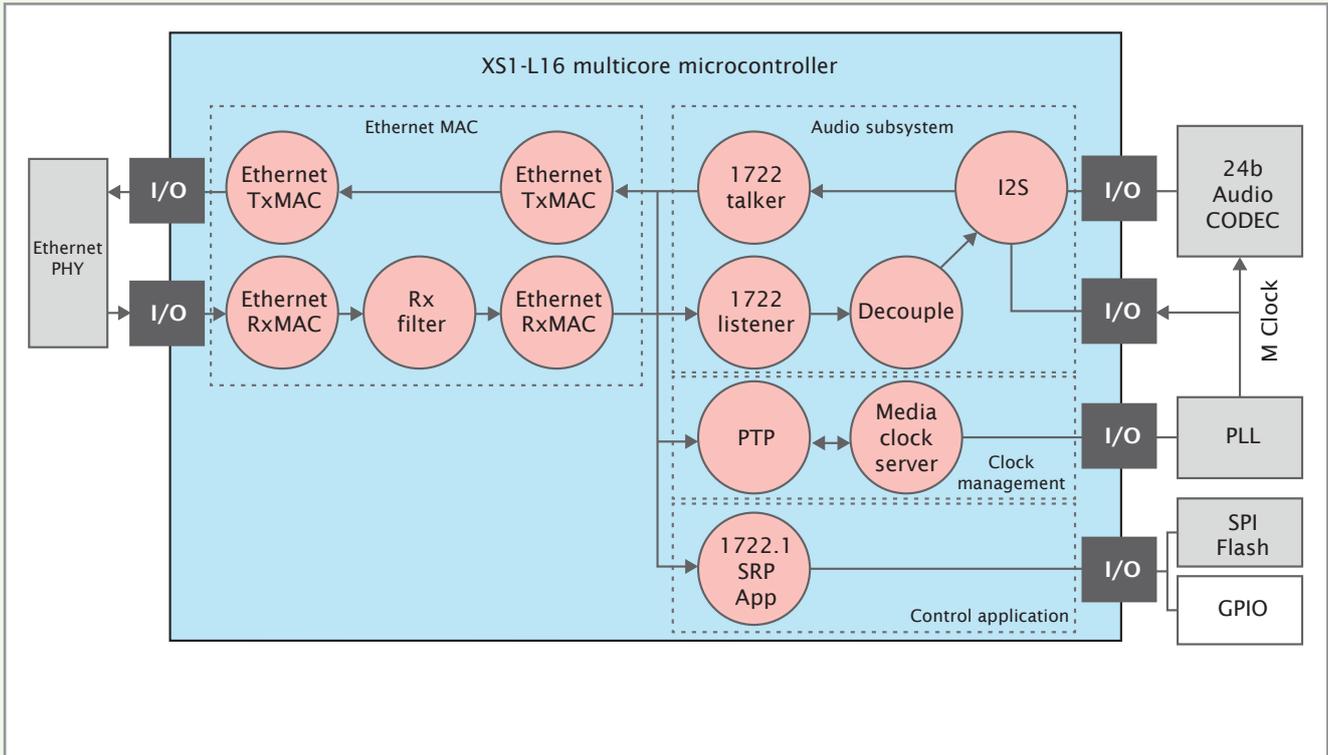
Software subsystems

- 100Mbps Ethernet MAC
- Precise Timing Protocol
- Media clock recovery
- Audio streaming components
- Control application
- Optional DSP

Capability

- Multichannel audio (8 Channels)
- Simultaneous talker / listener
- Control via 1722.1

Typical application

- Multichannel recording interfaces
- Digital audio interfaces
- Mixing desks
- Audio digital signal processing systems

# MULTI-CHANNEL ETHERNET AVB ENDPOINT DEVELOPMENT BOARD

The **XMOS AVB Audio Endpoint Kit** consists of two development boards based on the xCORE XS1-L16 device, Ethernet cables, power supplies and an xTAG-2 debug adapter. Each board includes:

- Stereo analog audio in/out via 3.5mm jack or RCA sockets

- Up to 8 channels via I2S headers

- High quality clock recovery with PLL

- GPIO for buttons and LEDs

- Expansion header with 12 spare I/O available

Part #: **XK-AVB-LC-SYS**
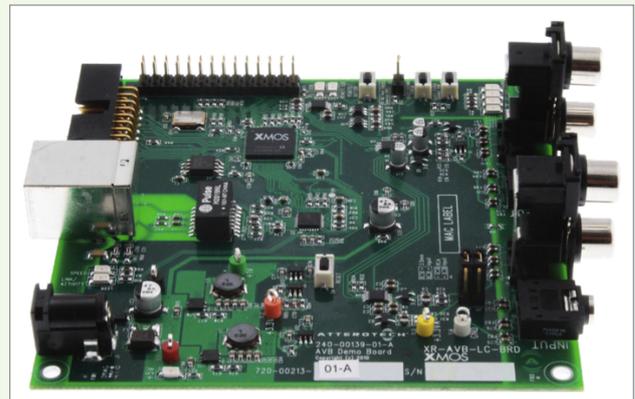
DAISY-CHAINED ETHERNET AVB
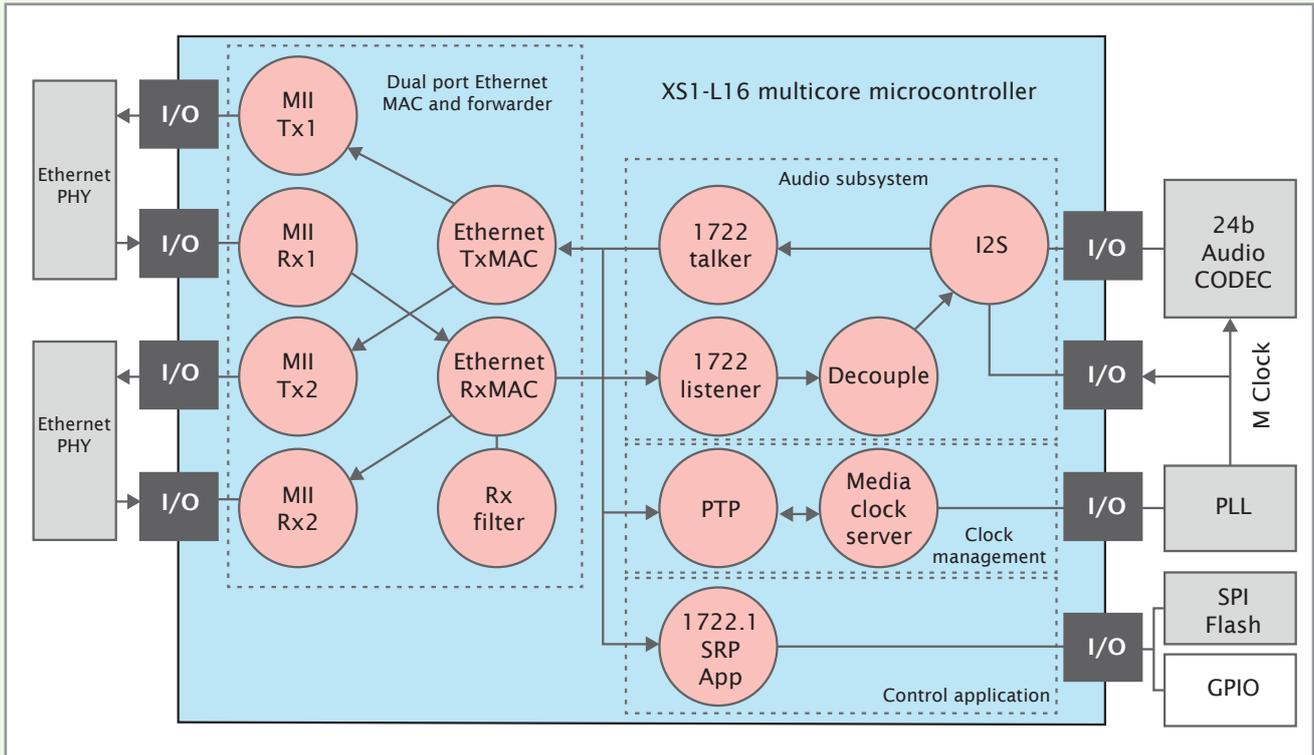
Software subsystems

- Dual 100Mbps Ethernet MAC
- Precise Timing Protocol
- Media clock recovery
- Audio streaming components

Capability

- Simultaneous 4-Channel talker/4-Channel listener
- Up to 6 levels of daisy chaining

Typical application

- Intercom systems
- Public address systems
- Paging systems
- Line array speakers
- Studio monitors

DAISY-CHAINED ETHERNET AVB DEVELOPMENT BOARD

The **XMOS AVB-DC kit** includes: two sliceKIT General Purpose core boards, two audio sliceCARDs, four Ethernet sliceCARDs, two xTAG-2 debug adapters, power supplies and USB/Ethernet cables. Each platform supports:

- Up to 4 audio channels simultaneous talker/listener

- Up to 4 streams @ 48kHz or
  2 streams @ 96kHz sample rate

- Dual 100Mb Ethernet ports supporting daisy-chain topologies of up to 6 devices in a line

Part #: **XK-SK-AVB-DC**
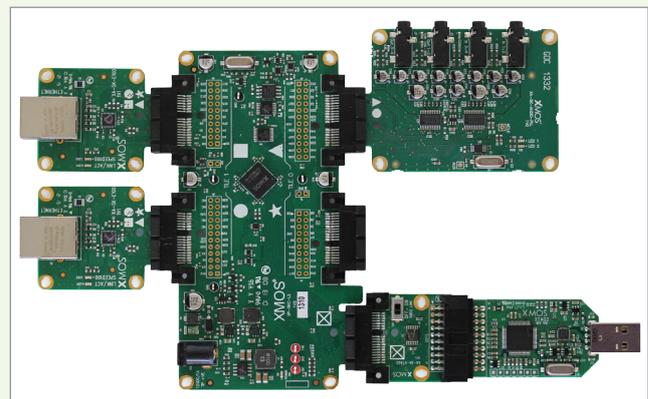
XMOS AVB SOFTWARE REFERENCE DESIGN

The XMOS AVB software reference design implements the different standards used by AVB.

STANDARD	FUNCTION IN AVB AUDIO SYSTEMS
IEEE1722.1	Discovery, connection management and control
IEEE 1722	Media transport
IEC 61883-6	Audio format encapsulation
802.1 Qat	Stream reservation
802.1 Qav	Flow control
802.1 Qas	Timing synchronization
IEEE1722.MAAP	MAC address acquisition protocol
802.1	Ethernet MAC (100Mbit)

SOFTWARE DEVELOPMENT ENVIRONMENT

XMOS development kits and software reference designs are complimented by a software development environment, which makes it easy to define real-time tasks as a scalable parallel system. The xTIMEcomposer tools include fully standards compliant C and C++ compilers plus the standard language libraries, an IDE, simulator, symbolic debugger, runtime instrumentation and trace libraries and a static code timing analyzer (XTA).

All of the tools are aware of the real-time multicore software extensions supported by xCORE devices, giving a fully integrated approach. As a result the xCORE tools are able to support parallel code descriptions, report on memory and resource usage, let you debug multicore programs and determine the exact timing of your software code.

For more details, visit **www.xmos.com/avb,** or email **info@xmos.com**