

LOWEST POWER USB AUDIO DEVICE

PNX0161 single-chip solution for USB audio

The PNX0161 is a small, low-power, USB audio device, and is a single-chip solution for digital, USB audio-based headset accessories. It moves the core digital headset functions to the USB connector of a mobile/portable device, so the connector performs battery charging, PC synchronization, and headset operations. In this way, manufacturers can deliver systems with just a USB connector, and thereby simplify their designs, shrink footprint, and reduce cost.

The PNX0161 is fully compliant with USB specifications, so it provides plug-and-play operation with any USB host or On-The-Go (OTG) device. It supports USB audio and human interface device (HID) classes, and requires very little power (10 mA at V_{BUS}) for playback mode.



KEY FEATURES

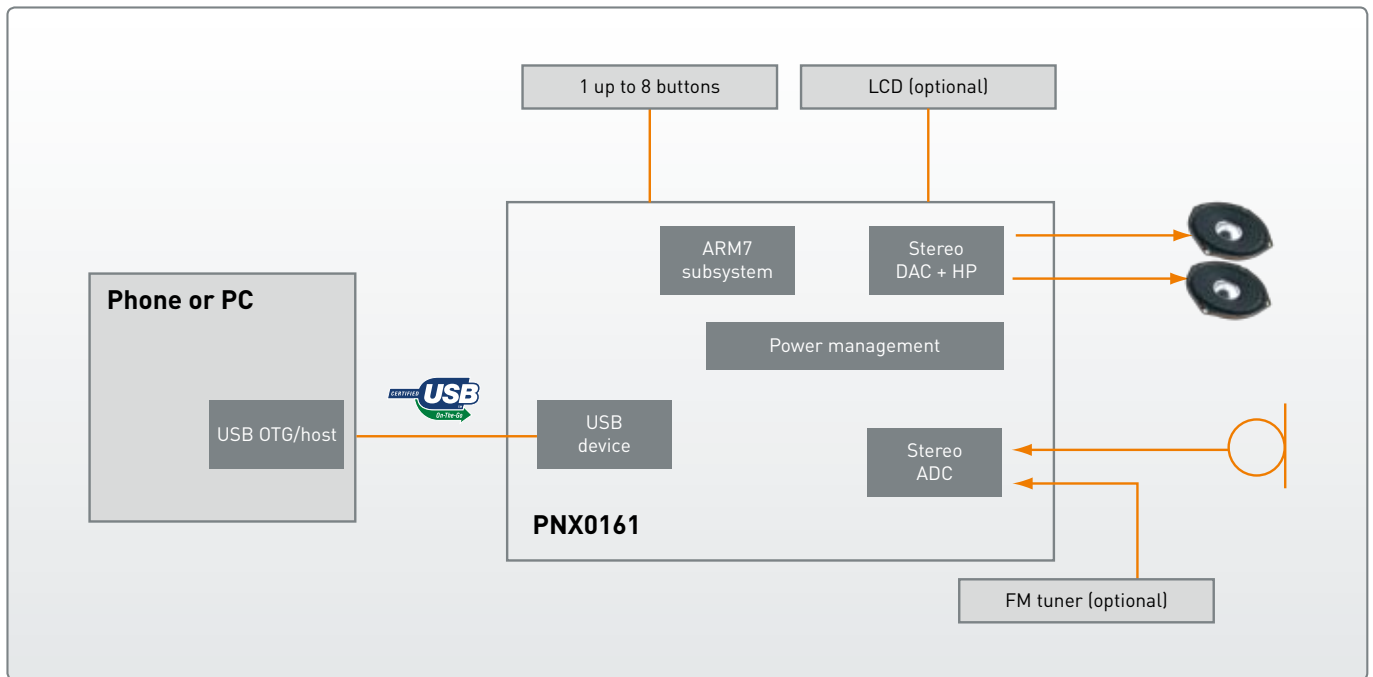
- Full-speed (12 Mbit/s) USB device fully compliant with USB host or USB OTG
- Single-chip solution for USB headset
- USB bus powered (V_{BUS} at 5 V)
- Low power consumption (10 mA at V_{BUS})
- High suppression of phone noise
- Stereo record and playback at sample rate of 44.1 kHz/48 kHz
- Microsoft Windows XP and Vista Logo compliant
- FM-RDS radio support via embedded software, I²C, and low-power analog bypass mode
- ARM7TDMI core with on-chip SRAM, ROM, and optional NOR Flash
- Wide range of connectivity and audio interfaces
- Intelligent power management
- Available in two versions: programmable Flash or cost-effective ROM
- 88-pin TFBGA package (7 x 7 mm with 0.6-mm pitch)

KEY BENEFITS

- Excellent audio quality, due to 48 kHz digital audio paths and high-quality 24-bit stereo ADC and stereo DACs
- Lowest power USB audio solution in the market, preserving phone or notebook battery life
- No need anymore for music DAC/ADCs, FM-RDS radio and 3.5 mm connector, so reducing space, thickness, cost and analog design complexity of phone or PC/notebook
- Software developers kit (SDK) available on request for ARM7 to further differentiate the end product
- Enhanced audio quality by performing voice and music enhancement processing on ARM7 (optional) using the SDK

TARGETED APPLICATIONS

- Headsets for mobile and portable devices
- PC USB audio, such as USB music/VoIP/gaming headsets, USB speakers
- USB docking station for mobile and portable devices



PNX0161 application block diagram

The PNX0161 is available in a small TFBGA88 package (7 x 7 mm), and builds on the USB standard to provide audio playback and recording functionality that is directly powered by the USB bus.

When connected to a USB host or OTG device, a headset based on the PNX0161 is powered by the USB physical bus. The host streams digital audio to the PNX0161-based headset accessory, which synchronizes it to the local clock to prevent audio artifacts, and converts the resulting signal to analog. The headset accessory can capture audio from a microphone, line input, or tuner, and can convert it to a digital USB audio stream that is subsequently streamed to the host.

HIGHLY INTEGRATED HARDWARE AND SOFTWARE

The PNX0161 is a fully programmable solution that uses an ARM7TDMI core with an embedded DC-DC converter that is powered through the USB bus. There are 256 Kbytes of on-chip NOR Flash, 32 Kbytes of SRAM and 32 Kbytes of boot ROM.

For added power savings, there is an embedded power-management functionality, plus intelligent power and DMA control. The PNX0161 is specifically designed to suppress noise coming from the host (GSM noise, for instance).

The IC includes I²S input and output interfaces, a fast UART with DMA support, a master/slave I²C bus interface, a 24-bit stereo ADC with programmable amplifier (for microphone, line input, and tuner input), a microphone bias block and a 24-bit stereo DAC with a class AB headphone amplifier for high-quality audio.

Stereo recording and playback operate at a sample rate of 44.1 kHz/48 kHz. There is USB audio streaming, full support for HID class, USB device firmware upgrade, and audio postprocessing features such as volume control and optionally other sound features.

The PNX0161 is available in two versions – programmable Flash or cost-effective ROM – that can be switched seamlessly during product ramp-ups.

LET'S CREATE IT

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