NXP Cortex™-M3 LPC1837 dual-USB Host/Device Solution

MCU solution for HS USB Host and simultaneous dual-USB operation

This comprehensive solution, supplied with a Cortex-M3 LPC1837 demo board and full source files, uses HS USB Host operation for quick file transfers, and simultaneous dual-USB operation for MP3 playback.

KEY FEATURES

▶ 180 MHz Cortex-M3 LPC1837
- 1 MB dual-bank Flash
- 2x HS USB with on-chip PHY
- SD/MMC interface
- BGA100
- Pin-compatible with dual-core LPC4300
▶ Peripheral interfaces
- Audio codec plus audio in/out
- SD card slot
- RJ45 connector
▶ Flexible power supply
- PC power supply via USB (500 mA)
- Regulated supply via 5 V pin on header
▶ Source code
- Dual-USB application for MP3 audio playback
- HS USB application for fast file transfers
▶ IDE compatibility
- Keil µVision
- NXP LPCXpresso v6

TARGET APPLICATIONS

▶ USB peripherals (audio players, storage devices, etc.)

The NXP dual-USB Host/Device solution brings together everything a designer needs to build a fully functional, application-level design. The solution, supplied with all the hardware and software needed to demonstrate real-world operation, supports two demos and is compatible with the KEIL µVision IDE and the LPCXpresso v6 IDE.

ABOUT THE LPC1837

Operating at up to CPU frequencies up to 180 MHz, the LPC1837 is one of the fastest Cortex-M3 MCUs on the market today. The LPC1837 USB Host controller complies with the Enhanced Host Controller (EHCI) specification and supports EHCI/OHCI registers. The controller includes an integrated DMA block, supports power management and the audio PLL, and, to correlate SOF with the external clock, offers adjustable frame lengths.

EXAMPLE 1: MP3 PLAYBACK
SIMULTANEOUS DUAL-USB OPERATION

This example demonstrates a fully-functional controller for dual-USB communications, using USB ports for HS input to and FS output from a PC.

The board is connected to a Windows PC, a Micro SD card loaded with an MP3 file, and a set of earbuds. The PC streams the MP3 file stored on the Micro SD card over a High Speed USB connection (USB0), decodes it with Media Player on the PC, and then streams it back to the Full Speed USB connection (USB1), where it is played through the ear buds. The USB0 block enumerates as a High Speed Mass Storage Class device, while the USB1 block enumerates as a Full Speed Audio Class Device (UAC 1.0).

EXAMPLE 2: FILE TRANSFER
HS USB HOST OPERATION

This example demonstrates dual role (host/device) operation over a single USB port.
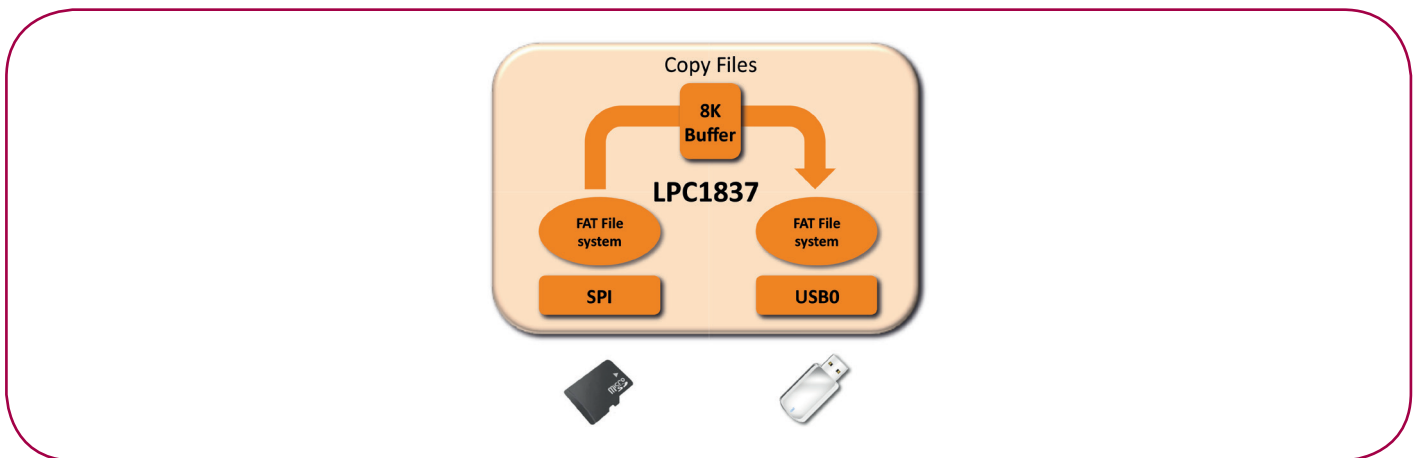
The LPC1837 uses HS USB Host operation to copy files from a Micro SD card to a USB Flash drive. The LPC1837 reads the root directory on the Micro SD card to get a file list, then copies each file on the list, one at a time, to the USB Flash drive. Files are transferred in 8K chunks using the microcontroller's internal memory.

Figure 1
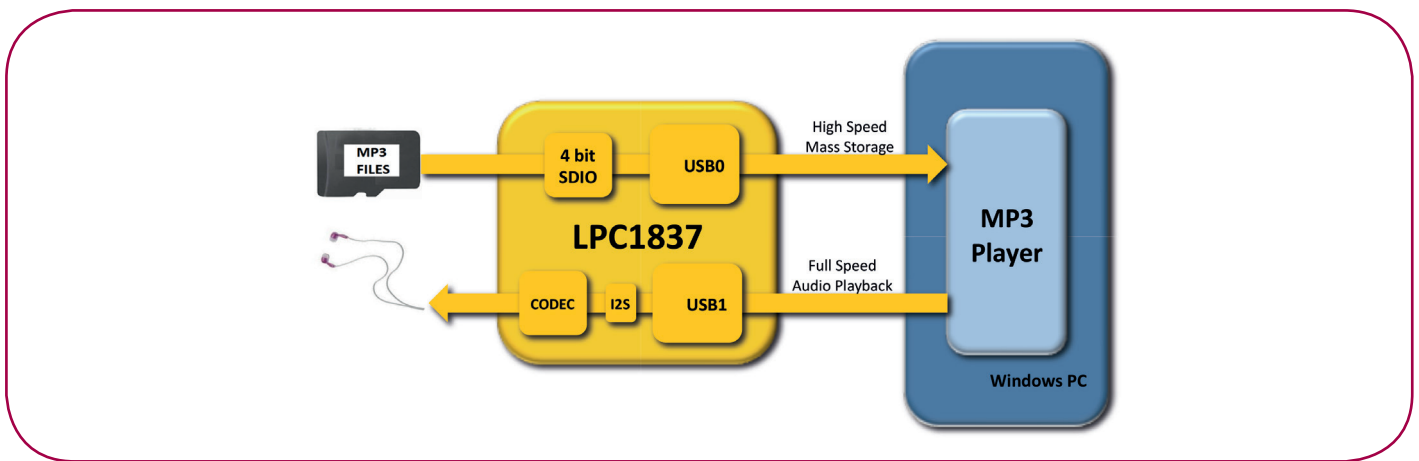
Audio playback: Simultaneous dual-USB operation

Figure 2

File transfer: HS USB Host operation