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The Zune HD: more than an iPod touch wanna-be?

A few weeks ago, Microsoft began shipping the latest iteration of its portable-multimedia-player series. Notably more competitive with Apple's products than earlier Zune generations, the Zune HD even one-ups the iPod touch in several areas. How did Microsoft implement these accomplishments?

The Zune HD marks the first notable design win for Nvidia's Tegra CPU, an APX2600 running at a clock speed that Microsoft had not made public by press time.

This unit contains a 1-Gbit, 32-bit Samsung K4X1G323PE-8GC6 mobile DDR SDRAM that runs at a 166-MHz memory clock rate. Do-it-yourself-repair company iFixit recently published a teardown that reveals a Hynix DDR SDRAM, however, thereby suggesting that Microsoft is buying memory at open-market rates instead of securing a single-supplier deal.

Nonvolatile storage in this particular 16-Gbyte Zune HD comprises a single Hynix NAND-flash memory; the unpopulated PCB site next to it is for a sibling IC in the 32-Gbyte product variant. Again, iFixit's analysis reveals Toshiba-fabricated NAND devices, suggesting that Microsoft decided that day-by-day best-price bargain shopping is preferable to a single-vendor lock-in. Also notable on this side of the PCB is Kionix's KXSD9 accelerometer.

An Atheros AR6002 IEEE 802.11g transceiver provides wireless connectivity. Unlike Apple's iPod touch, the Zune HD offers no Bluetooth capabilities.

Other notable ICs on this side of the PCB include a Wolfson WM8352 power-management device with an integrated two-channel audio codec, an Atmel AT88SC0808CA 8-kbit CryptoMemory EEPROM, and a Phison PS8006 NAND-flash-memory controller. The need for the PS8006 is unclear because the Nvidia Tegra CPU's specifications claim that it already offers "enhanced NAND-flash support."

Integrated hardware-acceleration blocks handle video decoding, graphics processing, and other tasks that would otherwise notably burden the ARM 11 core, consequently leading to both poor performance and degraded battery life. The Tegra CPU also contains dedicated still- and video-image processing logic, but Microsoft did not include a camera in the Zune HD design.

The Zune HD also includes a 3.7V, 2.45-Whr, 660-mAhr battery and a 3.5-in.-diagonal, 480×272-pixel, wide-screen Samsung AMS326FA05 OLED display. While the OLED's image quality is excellent in dim ambient-lighting conditions, bright sunlight washes it out. Its operating lifetime versus that of a traditional LED-backlit-LCD alternative may also be suboptimal.

The "HD" portion of the product moniker refers to the fact that the Zune HD can output 720p high-definition video to a tethered display through the device's dock connector and that it is the first multifunction mobile player to support hybrid digital radio, including the ability to gracefully degrade from digital to traditional analog radio reception in "fringe" environments with low SNR (signal-to-noise ratio). SiPort's SP1010 terrestrial digital-broadcast-receiver IC implements the hybrid digital function. Users can even tag tracks they're listening to on the radio for later acquisition from Zune's purchase and subscription-rental content options.

