

# A digital picture frame is worth 1000 words

The explosive growth of digital cameras has created a problem: What do you do with all those photos? To deal with this problem, many camera owners are adopting a DPF (digital picture frame) to sequentially display a large number of images and as a replacement for the traditional photo album. *EDN* took a look at the inner workings of the Westinghouse DPF-0561. With a 5.6-in. LCD, 8 Mbytes of internal storage, and sockets for multiple plug-in memory formats, the DPF-0561 can display both JPEG still-image files and AVI (Audio/Video Interleave) full-motion files. The current price for the DPF-0561 is \$80 to \$120.

Unlike many of the simpler frame designs, the DPF-0561 includes several user controls with onscreen-display feedback. A rotary potentiometer controls display brightness, and a set of four push-buttons controls various functions depending on onscreen-menu modes. The user can select multiple transition effects, slide-show-display speed, memory location, photo orientation, and menu language. The menu options allow the user to select any JPEG image for continuous display or AVI motion file for repeated playback.

The device displays digital pictures and videos on a 5.6-in. AT056TN03 LCD from Innolux Display Corp. The display's size and 320×234-pixel resolution are barely adequate for a low-end DPF. Like most small LCD units, the display is transmissive; it illuminates pixels from behind with an LED backlight. Other display specifications include a 65° viewing angle, a 300-to-1 contrast ratio, 350-cd/m<sup>2</sup> brightness, and a 20-msec response time.

The heart of the DPF is the Magic Pixel MP612 multimedia playback controller with decoders for both JPEG and MPEG formats. The circuitry decodes JPEG images at 48M pixels/sec and 640×480-pixel MPEG-1/MPEG-4 video at 30 frames/sec. The MP612 includes extensive audio-processing features. For downloading data to internal memory, the MP612 includes a USB 2.0 interface controller. An Infineon HYB25D256 DDR 256-Mbit SDRAM delivers local processing storage for high-speed image decoding, and a 29LV320 flash memory provides processor program storage.

The DPF-0561 boasts a range of picture-storage options. Users can download as much as 8 Mbytes of JPEG or AVI images directly over the USB connection to the internal Hynix Semiconductor NAND-flash memory. If you reduce the resolution to 640×480 pixels, the internal memory holds more than 80 images. The playback controller also includes interfaces for multiple external storage devices, such as smart media, memory sticks, multimedia, and xD-picture cards as well as micro drive and Ultra-DMA66 hard-disk drives. A CompactFlash connector is hidden on the back of the board.

The MX88V44 TFT-LCD driver provides a single-chip drive for the 240×320-pixel-resolution quarter-VGA display. The driver accepts analog composite video in a 4:3 standard format as its input. Composite video, also known as CVBS (color, video, blanking, and sync), combines the brightness information (luma), the color information (chroma), and the synchronizing signals on one input pin. Portable televisions and DVD players widely use the MX88V44, supporting programmable brightness, contrast, and saturation.

