

# Why Turbo 1394?

**Q: What is Turbo 1394?**

**A:** Turbo 1394™ is Photometrics' unique implementation of data transfer through a standard FireWire® (IEEE 1394) computer connection.

**Q: Why did Photometrics® decide to use an implementation of FireWire over our previous low-voltage differential signaling (LVDS) connectivity?**

**A:** The LVDS connectivity lacked the bandwidth required for newer cameras. The theoretical maximum on our implementation of LVDS at 16 bits is 16.5 MHz. In testing, however, we found that actual speeds of 12-13 MHz required the use of very short cables. Also, the LVDS PCI cards would not function in PCIe-based computers or with other future bus architectures. By designing Turbo 1394, we were able to overcome these issues.

**Q: What makes Turbo 1394 different from regular FireWire?**

**A:** There are two main differences, each of which offers distinct advantages for users. These differences are listed below.

**(1) Turbo 1394 allows higher data throughput than standard FireWire in an equivalent timeframe.**

**Q: How do we achieve higher throughput?**

**A:** We have found a way to increase the bandwidth beyond the published specifications. By pushing the capacity of FireWire, we're able to achieve bandwidth that supports the same (or better) data rates than our LVDS cameras are able to provide — even at 16 bits per pixel. With our special implementation of FireWire, we can guarantee that all frames are delivered. We do not have to drop frames or insert dark frames (as other camera manufacturers do).

**(2) Turbo 1394 saves your computer from having to perform the extra clock cycles that would need to be done under a standard FireWire implementation, thus allowing the computer to perform faster.**



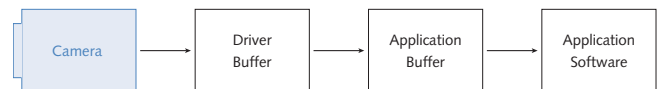
**Q: How does Turbo 1394 eliminate these extra clock cycles?**

**A:** Turbo 1394 allows the camera direct memory access (DMA) into the application's frame buffer rather than into a driver buffer (unlike other camera manufacturers). Our streamlined approach avoids forcing the user to double buffer the data, which saves the host computer clock cycles and affords it a greater ability to perform other tasks, such as processing (see **Figure 1**).

*Photometrics continually strives to optimize the electronic design of our cameras in order to further enhance their performance capabilities. Turbo 1394 is another example of this ongoing effort.*

FireWire is a trademark of Apple Computer, Inc., registered in the U.S. and other countries.

**Standard Implementation**



**Photometrics Implementation**



**Figure 1.**