# High-Speed Interconnects

## Innovative I/O connector enables high speeds in tight spots.

By Molex, Inc.
The challenge of finding components that can keep up with the ever-increasing speeds of chip sets can be daunting. Designers are always on the lookout for components that can meet both the speed and space requirements of the advanced systems they design.

One product that resolves their design dilemma is the Triad Differential Pair input-output connector system from Molex. This new, innovative TDP I/O connector enables speeds of five Gb/s and beyond.

This innovative product features a Triad design of differential pair signaling to achieve optimal bandwidths for cable-to-board interconnections. Offset terminal spacing of 1.27 &#215 0.64 mm (0.050 &#215 0.025 inches) and surface mount tails facilitate the high speeds of this connector. The shielded, dual-row interface offers high-speed and 100-ohm controlled impedance. The connector's high-pin density and low profile of 7.00 mm (0.276 inches) offers advantages in space-constrained applications. Five circuit sizes are available (18, 28, 38, 48 and 72) with up to 24 differential pairs possible between the various circuit sizes.

The TDP connector features Molex's patented low force helix (LFH) contact design, which produces a mechanically reliable device with a cycle-life of 5,000 mating cycles. It has recessed contacts that protect signal lines from ESD, support-mating alignment and provide added contact protection during operator use. Two points of contact on each pin offer both optimal signal integrity and mechanical integrity, making the LFH contact a superior I/O interface.

The TDP I/O connector system is designed to work in a broad range of telecom, datacom and storage applications. These include LVDS servers, displays, hubs, routers, switches, storage devices, and network products. The connector is well suited for transition minimized differential signaling (TMDS)* digital displays supporting one, two or four channels with side channels to support USB, Serial ATA, digital audio, IEEE 1394 or other multimedia applications. It can also be used in HDTVs and other entertainment displays, as well as set-top boxes, personal video recorders and satellite receivers. The TDP connector system meets first generation Infiniband signaling requirements for impedance and crosstalk, it can be used in Infiniband applications that do not necessarily require the physical packaging of the Infiniband interface.

While the connector has a number of diverse applications, one of note is a rather unique solution using the TDP cable assembly. The project consists of multiple RJ-45 plugs into a single TDP plug and receptacle. This type of application is taking multiple RJ-45 patch cables that are traditionally used in networking applications, and making a single multi-strand RJ-45 cable assembly. This allows for more density in the hub, router or switch versus using a stacked multi-port modjack. It also allows the speeds of the equipment to go beyond the Category 5 and 6 specifications used today. It will allow expendability without changing the I/O on the board.

The TDP system is also available as custom solutions. This offers the user to specify customization, enabling them to select the signal assignment in the connectors and cable assemblies per their configuration.

Included in the TDP family of products are a board-mount receptacle; cable plug connector; and cable plug kit and standard length cable assemblies. The receptacle and plug are fully shielded and the receptacle has inline SMT leads on a 0.64 mm (0.025") pitch that provide direct PCB routing. On the cable plug connector, the LFH contact design provides a shallow mating angle that reduces insertion force. The cable plug connector is available with or without a terminal carrier strip for flexibility in various termination processes.

The cable plug kit contains a two-piece die cast shell in either a black or dull nickel finish with two threaded jackscrews for use with the cable plug connector. The die cast shell reduces overall labor costs by eliminating internal shielding and overmolding processes traditionally used with I/O cable assemblies. A user-friendly strain relief eliminates secondary operations and an ergonomic thumb grip and thumb rest located on the shell eases mating and unmating.