



Connectors

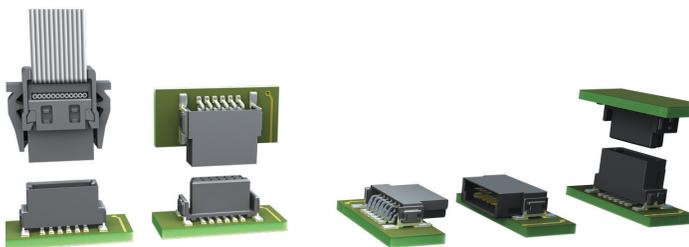
Component innovations helping spur circuit board trends

By Phill Shaw, senior product manager, electronic connectors, HARTING Inc. of North America

Developments in devices and machines are getting inexorably better – fast, smaller, more capable or efficient than their predecessors. That’s thanks in part to trends in printed circuit board (pcb) design like miniaturization and flexibility that are in-turn being facilitated by a steady stream of innovations in what goes on the board.

This interdependence of device maker, pcb manufacturer, chip provider and component supplier has become a virtuous circle supporting continuous improvement. Pcb’s no longer have to be flat but can be flexible, angled, multi-layered, stacked or interfaced with extension or secondary pcb cards or flex boards using new, off-the-shelf connector concepts. Designers of the end products have more leeway in how to incorporate power, signal and data.

These connector innovations cater to both form and function. While some enable higher speed transmission rates and reduced pitch on the board, others are delivering design flexibility and greater robustness needed for outdoor or challenging indoor environments. Still others offer the possibility of extending product life cycles or lowering pcb manufacturing costs.



The har-flex line comes in many options: Straight, angled and cable IDC connectors.

Consider how mezzanine connectivity is helping pcb makers break free from two dimensional constraints. Mezzanine card architecture offers design flexibility and cost effective upgrading of current systems, critical in modular machine and system design and where allowance is made for future expansion or upgrading. As noted in a 2010 Bishop and Associated report on system expansion: “(The) mezzanine card stacks directly above the host board and is electrically connected — and often mechanically supported — by the mezzanine connector. The mezzanine card becomes an optional extension of the daughtercard. The ability to design a system with enough flexibility to customize the product using standard host daughtercards and plug-in modules is highly desirable. Mezzanine cards can also provide a low-cost strategy to address machine obsolescence or the need to expand capacity.”

Products like HARTING’s har-flex connectors are available in multiple stacking heights to accommodate different combinations of mezzanine and mother to daughtercard applications. har-flex, for example, was developed as a universally compatible board-to-board connector family with straight, angled and cable-mounted versions so designers can optimize utilization of pcb real estate, whatever the board-to-board distances or process specifications.

Already, the choice in mezzanine connectivity is wide enough to suit specific applications on the device pcb that call for the latest transfer protocols such as Gigabit Ethernet and PCI Express – and data transfer speeds up to 2.125Gbit. That gives designers an alternative to the more rigid and unforgiving format of connecting pcbs to one another using a backplane, which is difficult to adapt to unconventional device layouts. From a cost perspective, mezzanine connectors are standard, economical products suitable even for the small production runs typical of industrial devices.

Many innovations in connector technology lack a ‘wow’ quality about them, but address application challenges raised by customers. For example, power electronics applications in such fields as renewable energy, transportation, and factory automation require connectors that have high protection classes.

And manufacturers are looking for solutions that bring more power to pcbs – as much as 60A – in ways simple and cost-effective to incorporate and don’t require intermediary parts to join board and power connector. At this year’s Hannover Industry Fair, HARTING unveiled

the Han-Fast Lock pcb connector that allows for plug-in rather than soldered power connections.

An industrial power connector like the Han Q 4/2 with pre-connected litz wires and circuit board contact can be supplied as a pre-tested system and plugged into the board (or unplugged for servicing) for fast solder-free pcb termination that is also automatic crimping process-compatible. The board and connector can be independent of each other.

Press fit termination has been around since the mid-80s but continues to be improved. Thermal stress isn’t applied to the board and the resulting connection is at least as good if not better than a soldered connection. Press in connections are easy to remove and re-insert for servicing which has benefits for the end-user as well as the pcb manufacturer. Press-fit termination is more flexible and service friendly than soldered connections. The trend in recent years has been to RoHS lead free plating, and now palladium nickel with gold flashing is replacing gold, which creates a harder surface that is not susceptible to gold price increases.

The low margin nature of most pcb manufacturing places a premium on minimizing process time, waste and breakage while maximizing space utilization on the board. That’s driving many new product developments.

- Hybrid or mixed connectors now are widely available for DIN Power and Signal, D-Sub and TCA where connectors with different contact types are utilized. In the case of D-Subs this can allow for mixtures of signal, power, coax, high voltage and pneumatic within one connector. Benefits to the customer include design flexibility, fewer individual connectors and space saving.

- New Surface Mount Compatible connectors allow DIN 41 612, D-Sub, IDC and SCSI through-hole connectors to be terminated using existing SMD manufacturing lines, cutting out one stage of production.

- Surface Mount Technology has helped the pursuit of further miniaturization, reducing packaging density while dispensing with hole drilling, another space saver. SMT connectors should be rugged as they have to provide reliability in industrial environment. HARTING developed D-Sub surface mounted connectors with die cast brackets which provide > 500 N retention for per bracket, compatible with current SMT board designs.

- Today’s DIN 41 612 connectors can be supplied with kinked pins or snap in clips. These provide mechanical fixing during the soldering process and dispense with the need for rivets or bolts.

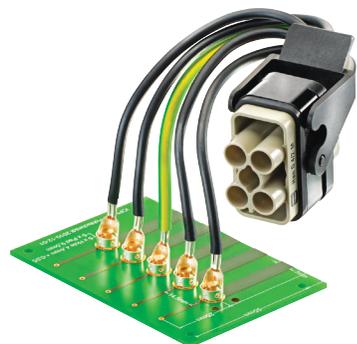
- Connector manufacturers are able to provide the market specific product variants users require, such as low smoke and fire resistant materials used in DIN connectors modified specifically for the rail transportation industry, and non-magnetic D-Subs required for applications such as MRI machines.

As upstream parts suppliers, the connector industry is highly sensitive to the increasingly specialized needs of our customers, and end users. We tell our salespeople: Don’t sell parts, sell solutions. That’s why many component innovations begin as standard catalogue items but can be part of cost-effective, customized solutions to suit today’s growing array of specialized customer applications.

For more information on the har-flex connector line from HARTING Inc. of North America, go to <http://ept.hotims.com/40523-122>



Harting’s har-flex connector line.



Harting’s han-fast lock connector.

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