Pre-validated platforms: The route to fast adoption of MicroTCA

By Herbert Erd

Herbert explains why pre-validated MicroTCA platforms free customers to begin porting their preferred operating systems, integrating any middleware, and developing applications far earlier in the cycle than would be possible without pre-validation.

It is a characteristic of the majority of customers that rely on mission-critical computing – in telecommunications, for example, or medicine – to wait for a standard to establish itself before evaluating new technologies. This has certainly proven to be the case with MicroTCA. Nominally, MicroTCA was expected to bring the performance, manageability, and reliability of AdvancedTCA but in smaller packages and at lower cost. However, the market needed to be assured that the specification was solid before dipping its toe in the MicroTCA water. With formal ratification of MicroTCA in mid 2006, real customer evaluation activity began.

Customer careabouts

Evaluations have revealed a number of customer *careabouts* – the majority tied to reducing time to market and minimizing the delay between evaluation and deployment.

Pre-validated platforms

The careabouts led to the idea of a pre-validated platform. Rather than experience the delay of validating hardware, developers can take advantage of a hardware vehicle that is fully configured, pre-tested, and guaranteed to deliver the required reliability and interoperability. Porting the preferred OS, bringing middleware into play, and application development can begin more quickly, the hardware validation step having been eliminated.

The keys to these platforms are interoperability, compatibility, reliability, and responsive support. Time and again, customers express the strong view that their priority is application integration and verification, rather than hardware integration and verification. The challenge for the TCA industry, if high volume take-up of MicroTCA is to be maximized as early in its life cycle as possible, is to provide customers with products, tools, and infrastructure to enable easy migration.

While significant flexibility can be designed into such a platform, there are inevitably limits to that flexibility, requiring more than one such platform to be available. This is the approach GE Fanuc Embedded Systems has elected to take with two pre-validated platforms.

Pre-validated platform #1

This MicroTCA platform reflects the telco requirement for standard -48 VDC Power Modules (PMs). The chassis supports two PMs, which can be used for load sharing and for handover (failover) during field operation. The current power modules deliver 355 W of output power. To meet special requirements, it is also possible to use a PM with a height of 9U and/or 12U. This chassis comes with two intelligent fan trays that have six fans each (push and pull), guaranteeing optimal cooling regardless of whether double AdvancedMC modules are present or the amount of power drawn by the AdvancedMCs. The platform mounts as a double cube in a 19" cabinet or attaches directly to a wall in a *pizza box* configuration with only six AdvancedMC slots for small applications. It will supply PMs that support input voltages not used in the telecommunications world and platforms with backplanes that support two MCHs. Only two screws are needed to reconfigure any AdvancedMC slot to handle double AdvancedMC modules.

Pre-validated platform #2

The second platform (Figure 1) reflects a different approach. Designed to meet the needs of the industrial, server, and telecommunications markets, it offers a flexible power supply design while meeting the need for a low-height 19" chassis. An AC 86-264 V power supply, which performs all of the functions of a

Customer requirements for adoption of MicroTCA

- The flexibility and implied assurance of interoperability that derives from a broad portfolio of single source AdvancedMCs
- The inherent reliability that accrues from MicroTCA chassis that are fully compliant with the necessary electrical, mechanical, and thermal requirements
- The ability for chassis to accommodate customer-specific form factor requirements
- The availability of MicroTCA backplanes that can accommodate a range of communications requirements between individual components, as well as the ability to rapidly adapt to special needs such as multiple fabric types
- Provision of compatible power supplies (AC/DC) and power modules (DC/DC)
- Availability of a guaranteed-compatible, fully proven MicroTCA Carrier Hub (MCH) for high-volume applications
- In addition to carrier management functions, provision of a shelf manager (including a GUI), which is embedded in the MCH and can communicate with the next higher management level using Hardware Protocol Interface (HPI)
- Availability of vendor-developed IPMI code to maximize responsiveness in the event of failure and to ease integration of third-party or customer-developed AdvancedMCs

MicroTCA PM, is included as standard equipment on this platform. The 2U chassis fits into a closed 300 mm ETSI cabinet and supports up to 12 AdvancedMCs (depending on the form factor) as well as telco alarm functions and a JTAG connector.

Both platforms are designed for high-volume production, with modular design providing the flexibility to accommodate project-specific customer requirements quickly and at minimum cost – including mechanical modifications and varying requirements for the backplane and power supply. The backplane and the MCH functions that are provided give users the choice of Gigabit Ethernet, SATA/SAS, and PCI Express for communication between the cards and with external systems.

Two main groups of users

An analysis of the customer base in the MicroTCA market reveals that there are two main groups of users. Telecommunications users are committed to the Gigabit Ethernet/XAUI backplane protocols and Serial RapidIO in some niche markets. Customers that have their roots in the server or industrial markets will continue to choose PCI Express. Since there is only one root complex with PCI Express, the issue of redundant systems with two MCHs is not relevant. Backplane designs with a star network, an MCH, a set of AdvancedMC slots, one to two fan units, and PM/power supplies are sufficient and will provide a basis for development and production of MicroTCA-based modular server systems.

Both platforms are already suitable for these applications, and depending on the power requirements, customers can decide which basic system they want to use during the development phase. Installing AdvancedMCs with telecom I/O ports on MicroTCA-based servers facilitates the use of an increasing number of servers for telecommunications applications. Middleware with backup and standby server functionality offers a fast and efficient way of providing the necessary redundancy.

Fully redundant systems

Until the MicroTCA specification is revised, it will be more difficult for this new technology to provide fully redundant systems, which are needed for standard telecommunications applications. Users have already submitted some thought-provoking suggestions that have not yet been implemented. However, intensive discussions with telecommunications customers have revealed that fast delivery of pre-validated platforms is currently more important than the need for redundancy during field verification.

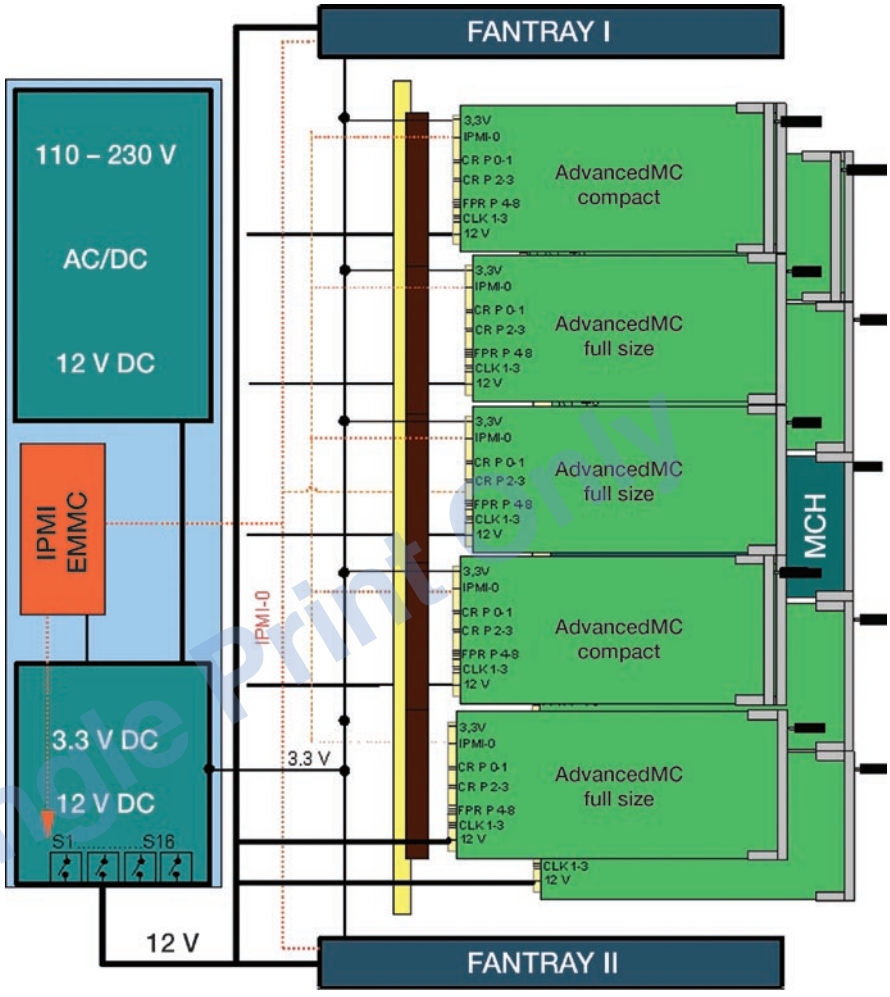

Figure 1

Summary

Mechanical engineers, backplane designers, applications engineers, cooling experts, software engineers, and customers from a number of industries have worked closely together to create two basic pre-validated platforms designed to satisfy a broad range of customer needs. Created to deliver to customers an efficient, fast, and reliable route to invest in MicroTCA technology, these pre-validated platforms will help ensure rapid deployment of a unique and exciting computing architecture.

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