

PCI Telecom Mezzanine Card (PTMC) Extending PMC to Support Standard Telecom and Telephony Interfaces

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INTRO

In the embedded telecommunications world, there is an ongoing need to provide designers, manufacturers and integrators with common, industry-standard platforms on which they can implement the emerging era's telecommunications hardware or specialized voice and data applications. Thanks to the dedication of open-systems standards bodies and the innovative minds of countless engineers, standards have been developed and will keep evolving to meet emerging new requirement challenges.

For example, the popular PCI Mezzanine Card (PMC) specification up until recently had lacked telecommunications extensions. The standards bodies and engineers now have addressed this need by developing the PCI Telecom Mezzanine Card. PTMC will not replace PMC, but will enhance it as an extension of the PMC specification. PTMC blends and leverages the success, form factor and functionality of the PMC series of peripheral mezzanine cards to support three popular industry-standard interconnectivity bus interfaces. This makes PTMC ideally suited to provide telecom and telephony functionality - which was unavailable under the existing PMC spec.

For hosts and carriers alike, PTMC represents a giant step in standardization. It can deliver modular, multi-function resources through universal mezzanine cards that offer telephony-oriented features such as T/E connectivity, Protocol Processors, ATM, Ethernet, DSP and voice/speech. That means adapter vendors and developers no longer need to choose between competing hardware architectures to support standard telecom and telephony interfaces. They can just pick the right PTMC module with the appropriate options based on the specific applications and functionality they wish to implement. Simple.

PTMC has three distinct optional implementations. Each supports subset variations of the UTOPIA II Asynchronous Transfer Mode (ATM) bus, the ECTF Time Division Multiplexed (TDM) computer telephony bus and standard Ethernet MII (IP) bus. PTMC is based on the four-connector standard PMC and brings new

flexibility and definition to the realm of slim, modular mezzanine cards for CompactPCI. All traditional PMC 32-bit PCI signals are handled by PTMC on the Pn1 and Pn2 connectors, while it supports specialized telecom interfaces on Pn3 and Pn4.

SPEC SOURCE

As is often the case, PTMC flowed from a specialized vendor recognizing a gap in capabilities. Performance Technologies, Inc. since 1983 has provided wide-area telecommunications and data-communications products to leading telecom equipment manufacturers. PTI's products have been high-end baseboards for telecom network access - T1/E1, T3, V.35, etc. - all aimed at accommodating the telecommunications demands of the market. In the ongoing process of tracking customer requirements, however, it became clear to PTI that processor baseboards with this type of functionality were reaching their limits. There also remained the pressing need to be able to optimize system performance by combining multiple functions on any given board.

The PMC spec specifically lacked something the telecommunications world needed -- a standard for taking TDM signals in a specified format down from mezzanine to the baseboard and vice versa. The more it delved into the need for high-density time slot exchanges and IP packet processing, (using standards such as H.100/H.110 in the TDM world, UTOPIA in the ATM world, and Ethernet MII in the IP world), the more PTI discovered how significant the void in the current spec was.

So PTI joined with Motorola to deal with this developmental gap by writing extensions based on the demand for such PMC highways traversing to and from the baseboard. This was the birth of PTMC, which Performance Technologies (as a telecom network access vendor), CPU vendor Motorola and Blue Wave Systems (a DSP company) presented to the PICMG organization standards committee for its consideration as a next-gen PMC spec.

PTMC grew from a classic case of technical capabilities intersecting with market appetites. With the

swelling market demand to integrate telecom-related functions (i.e., telecom network access and DSPs, or telecom network access and network processors) to run more protocol or application software directly on these subsystems, the value of being able to plug on telecom-related mezzanines became obvious. The spec's advent was driven by (a) applications converging onto single subsystems, (b) the convergence of functions and (c) the convergence in general of voice and data in networking.

FLEXING THE SPEC

The PTMC standard is a typical outgrowth of a competitive marketplace. Many companies focus on a "core competency" (in PTI's case, for instance, telecom network access) to keep from being spread so thin that development of cutting-edge products is thwarted. This reinforces the obligation to provide interoperability of best-of-breed products so that savvy developers can create higher-end solutions for the converged, next-generation telecom networks. As the standards committee closes in on completing approval of the PTMC spec, expect vendors to unveil mezzanine boards that add significant functionality to a variety of products for telecom and telephony applications.

At a granular level, for example, this will mean easier integration of functions desired by various companies. Significantly, compatibility will be ensured and customization obviated because there will be standard TDM and telephony pin-outs between the mezzanine and baseboard. Previously, a mezzanine obliged the assignment of identical user-I/O pins on both the baseboard and mezzanine. The chances of that happening without a spec are extremely slim.

Formats now are being standardized for three distinct telecom/telephony requirements: the TDM telecom signals, the UTOPIA II interface and the Mill Ethernet interface for IP. This will give integrators the ability to take a PTMC-compliant baseboard and PTMC-compliant mezzanine and integrate them with a high level of confidence of compatibility. The PTMC spec also facilitates voice/data convergence because the interfaces are standardized into a single specification.

PTMC APPLICATIONS

PTMC's value add can be shown in the applications for which it was developed. Those in the media gateway realm, in increasing market demand, are a significant example. Digital signal processing functions in such applications can be combined with telecom network interfaces (such as T1, T3 or OC-3) to provide a scalable and cost-effective network interface to the PSTN.

Leveraging PTMC, mezzanines can allow a scalable and extensible combination of functions, thus greatly easing the headaches of developing new converged voice/data applications. For example, putting an ATM PTMC on a baseboard can not only process ATM cells, but provide a quality of service (QoS) measure that would have been inordinately cumbersome without the standard (or call for an expensive baseboard custom designed to handle a specific ATM module).

By taking advantage of PTMC, high-volume protocol processing (likewise in increasing demand) also becomes immediately more efficient and easier to integrate. Most telecom network-access interfaces have a protocol (i.e., SS7, frame relay, GR.303, countless others) that must be processed to take in data off the trunk interface and make intelligent decisions as to what happens next. With TDM signals defined, protocol processors can be added on the mezzanine, which adds horsepower on the board. This becomes critical when advancing from T1 (24 voice circuits) to T3 (672 voice circuits) - as call capacity grows, host computer performance will be unable to process these calls unless they are processed at the point (i.e., the subsystem) at which the trunk is terminated.

Looking forward, the PTMC specification will facilitate the market's insistent push for standard, off-the-shelf and therefore more cost-effective development products (as CompactPCI has become). With the telecom (or "T") aspect of this new spec, developers and integrators can avoid having to custom develop hardware to create next-gen systems. That means eliminating any need to customize base platforms or mezzanines. And that translates into saving precious, expensive development time that could easily add months to the life of any project - which is the true, bottom-line value of PTMC ■

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