

White Paper - Host Signal Processing

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The power and affordability of the PC, the increasing role of communications in business and everyday life, and telecom deregulation have led to the evolution of products that support the economic development of telecommunications systems. Hardware and software value-adding components allow the system developer to skip the years and millions required to develop the bedrock telecommunications technologies needed in telephony systems and move directly to application development. This industry's structure, although much less mature, is traveling the same evolutionary path blazed by the PC industry, the most efficient value-creation industry of all time.

These system-foundation products are improving along many dimensions, including the support of additional media and switching capabilities. When the industry began in the mid-'80s, it only supported voice play-record. Fax send-receive was added in the late '80s. PCM switching came along in the early '90s. And the late '90s saw the addition of IP telephony. Video is next. This increase in media diversity led to the serial development of media-specific PC add-in boards and software.

However, dedicated-function resources led to high costs for systems that require multiple media. Since MIPS pooling is not statistically effective in low-density systems, there is an economic incentive for manufacturers to lower product costs by sizing the DSP to meet the MIPS requirements of the particular media.

For example, an analog network interface and DSP-resource board that supports both voice and fax will require the resources to simultaneously support four ports of fax, but since fax requires roughly three times the MIPS of a voice-only resource. So the integrated-media resource is only cost-effective for applications that require both media, but over resourced for applications that only require voice.

However, the MIPS required to process specific media have remained constant, while the MIPS available on host PCs, following Moore's Law, have soared. Where the required media-stream compute resource was once large compared with that available on the PC, it's trivial today. You can simultaneously receive 48 V.17 faxes on a typical PC, and still have plenty of headroom. It's now time to put those MIPS to work in lowering the costs and increasing the system flexibility of low-density digital-media telephony systems.

So, what if host MIPS, a very large resource pool, are used to process the media stream? The hardware designer no longer has to be concerned about whether a stream requires five MIPS for voice or 15 MIPS for a modem. As long as we're not talking about hundreds of simultaneous calls, the MIPS are there and they are essentially free. Specialized hardware is then only required to provide the PCM interface, which is necessary regardless of the media requirements if the network being supported is the PSTN. Commetrex is now shipping its MSP-H8, a one-to-eight-line PCM interface. Since all it has to do is get the media stream to and from the host, there's little component cost. The basic board is only \$295. But much more than a PCM interface is required to rival the functionality of legacy systems.

The Supporting Software Architecture

The supporting software architecture, Open Telecommunications Framework®, is radically different from the classical PC-based telephony platform. In the last-generation architecture, buffers of fax-image or voice-file data are transferred to and from an add-in board, which has a complex embedded software framework to support the DSPs and their algorithms. But with the MSP-H8, the stream-processing environment is moved to the host PC. This stream environment, a separate licensed product, is called OpenMedia™. The results of the stream processing (for outbound data) are PCM buffers, which are transferred to the board. The board feeds OpenMedia PCM buffers for inbound data. And since the stream processing is performed on the PC, it's easy to validate new stream-processing software, even if it is destined for an embedded application.

Commetrex sells its MSP-H8 as a hardware-only product for those developing their own stream-processing software. An MSP-H8 Board-Level SDK is available for the embedded developer. For the host-application developer, Commetrex offers developer's kits for its S.100-conforming OTF Kernel™ middleware. This a la carte licensing means the developer pays for only what is required, and no more.



MSP-H8 Embedded SDK