tions for the S-100 (P696) and Multibus (P796) buses had made clear the need to consider future systems bus requirements before the emergence of yet another generation of de facto but incompletely specified and incompatible buses.

The working group set up to consider this need [This was the Future Bus (not Futurebus) subgroup chaired by Cash Olsen.] concluded that the buses then being specified by the Microprocessor Standards Committee could not be extended to satisfy the requirements anticipated for future microprocessor-based systems. Three major categories of bus—backplane, local network, and residential—were identified. A backplane bus subcommittee was set up (by the present writer) in June 1979, and Project Authorization Request Number 896 was approved by the IEEE Standards Board in September of the same year. EDSIG—the European Distributed Intelligence Study Group—set up a subgroup in May 1980 to interact with the IEEE work. EDSIG is one of the working groups supported by the Commission of European Communities for promoting standardization in the field of data processing."

This makes it clear where the P896 and 802 activities originated. The fact that Maris Graube quickly took the local network effort out from under the MSC's purview is no doubt the reason that it is now an IEEE standard.

The status report was based on the working document for the Boulder P896 workshop and included specification of the serial link feature allegedly introduced by me at the workshop. The position attributed to me in the August issue is, quite simply, false. Credit for the development of this feature, part of P896 from its early days and since incorporated into several other buses, and probably the most useful outcome of the P896 effort, belongs (as I informed Stewart when he was researching his paper) to Rollie Linser.

The reference to Versabus in the August article is incorrect. Both Versabus and Nubus (then still in the hands of M.I.T.) were among the preexisting specifications presented to the P896 working group as candidates for standardization, but neither were felt to meet the processor-, manufacture-, and technology-independence objectives set for P896.

Similarly, the decision to present a proposed draft to the MSC for approval to distribute for public comment was the result of a vote of the working group. It is ironic that the MSC's January decision to deny that request on the basis of a minority viewpoint has resulted in Versabus's successor, the VMEbus, becoming the de facto standard 32-bit bus. The characterization of that vote in the article in question is, incidentally, not factual—among other things, Nicoud was not even present!

The fundamental reasons for the failure of the MSC to produce useful standards, in my opinion, were (and remain) lack of understanding of the difference between controlled and uncontrolled specifications, and of the needs of the user communities, and the insistence by certain members of the MSC that the proposed standards incorporate their opinions. Perhaps the most ludicrous example of the latter was the holding up of the Multibus draft for months until the working group chairman acceded to Stewart's nomenclature demands.

As noted above, in 1977 the S-100 bus specification was both popular and out of control, with as many implementations as suppliers and serious incompatibilities between them. All of the other preexisting buses taken up by the MSC since that time have been controlled by their proprietors. The failure to recognize this fundamental difference was the cause of the so-called "bus wars," which were (and are) primarily fought over efforts by the MSC to impose, frequently over the objections of the working groups actually drafting the standards, changes to proprietary, de facto standards. The outcome has been that the need which led to formation of the MSC, namely the interoperability of subsystems from different suppliers, has been met by the use of de facto rather than IEEE standards.

I submit that the MSC will continue to fail in its obligation to provide useful, timely standards until it recognizes that: (a) microprocessor and computer manufacturers have a (perfectly legitimate) commercial interest in establishing proprietary buses as de facto standards; (b) the MSC has no business ratifying such standards, with or without the cosmetic changes that are the only kind possible for this type of standard; (c) the plethora of overlapping bus specifications being "standardized" defeats the objective of standards development; and (d) the marketplace will continue to establish de facto standards if adequate (as opposed to wonderful) alternatives are not offered in timely fashion.

The foregoing is, unfortunately, probably irrelevant to microcomputer system bus standards development. The IBM PC and PC AT buses will clearly remain the de facto standards for 8- and 16-bit subsystems development for the foreseeable future. Absent something dramatic from IBM very soon, VMEbus's present domination of the 32-bit arena will also be secure. In other words, the war is over!

Andrew Allison

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