

Benchmarks, Standards, etc.

I just described what I think is a reasonable version of the state of the art in small systems computing at the low end in price. Now, what can you expect out of the supplier of small systems products so that you can implement the benchmark capability? Well, for one thing, sooner or later every supplier will want to demonstrate this type of system with an editing capability. Note with care that I did not specify one iota of detail about the actual editor programs themselves which implement the capability. I've hardly limited the software people (or lack of same) at the kit companies to a particular implementation. There will be plenty of room for variations on the basic editor concept from supplier to supplier, in terms of meeting the benchmark requirement.

The only supplier of kit computers who comes close to demonstrating the under \$1000 benchmark to my satisfaction is Scelbi Computer Consulting in Milford, Conn. Their 8008 oriented system has reasonably priced software listed in their catalog for a tape editor program, and the peripherals/memory products they list look sufficient for this capability. (MITS: I get

the impression that from your prices and available printed data, your library of programs is oriented to the larger systems which implement your BASIC interpreter. This puts them out of the class of under \$1000 computer systems, although your new 6800 system may be in the small computer benchmark classification of this editorial.)

As manufacturers send me evidence (documentation, systems summaries, program listings, etc.) for the small systems benchmark capability, I'll report on them either in the editorials of BYTE or in review articles commissioned for that purpose. Readers can help prod the software departments (or lack of same) at the various kit manufacturers by writing them to urge demonstration of both the benchmark capability and to urge "bundling" of that valuable systems software — the editor — as part of the package of items which comes with the computer.

Comments on Kit Documentation: An Open Letter to Manufacturers

What should readers expect from a kit manufacturer? BYTE is certainly looking into the various kit products with the reviewers' soldering irons, pens and typewriters in hand, so we can present a critical evaluation of the ease (or lack thereof) of assembly of the products. Just so you won't have it sprung on you without warning, I thought a

few comments on assembly manual standards for reviewing kits might help, and it will give our readers an idea of what to look for when they buy these products. For starters, let's concentrate on the first documents the kit builder has to come across — the system's assembly and hardware checkout documentation.

Manufacturers, be on your guard here! Microcomputers are complicated pieces of equipment which cannot tolerate mistakes in assembly if the result is to be a functional unit. Further, since there is a finite possibility of bad integrated circuits getting through your quality control procedures (if any), you had best make sure you can count upon your customers to diagnose any problems which might arise. While you can assume an above average intelligence on the part of your customers — the readers of BYTE — you cannot assume a complete familiarity with all the details of your system. The burden of clear and understandable presentation lies upon your shoulders. The days of the two page description of some digital logic circuit being passed off as an assembly manual are over when it comes to microcomputers. Kit computer builders do not need the Heathkit overkill approach to assembly procedures, but they do need more than a skeleton of a manual. There is a balanced middle ground between the extreme of minute detail on one hand, and a bare circuit diagram with parts list on the other. Here are some of my

thoughts on what a good assembly and checkout document might contain.

System Summary: A description of the overall design of your product, and where the particular unit being assembled fits into that design.

Complete Schematics: The need for these goes without saying.

Parts Lists: Specify what you think you ship, and stick to it as closely as possible. The user can check it off and pick up errors.

Recommended Assembly Sequences: Give a fairly detailed sequence of assembly, more than "stuff PC boards," "solder" then "checkout." As a manufacturer you should assemble the kit at least once yourself while taking notes on paper or magnetic tape. In any given mechanical and electrical assembly design, there is bound to be an optimal sequence of steps — being close to it you should be able to give a good approximation of the optimum. The assembly sequence should be specified with sufficient detail — pictures where necessary — so that an intelligent reader can reproduce it.

Checkout Sequences And Self-Test: Thought should be given to the sequence of procedures needed to verify the operation of the kit once it is assembled. Do not under any circumstances leave your checkout procedures to a strictly "nominal" course. I can predict that sooner or later some of your customers will find common glitches in assembly. Give a few side branches in the checkout procedures for commonly occurring problems. "Ah," you protest, "but I don't

Standardization is a must for the growth of this industry — both for the users of the equipment and the manufacturers.

know what the problems are!" Well, why not institute an in-house contest among your engineers called BUGDEBUG: Have one fellow go to a prototype and intentionally introduce a bug, then have his compatriot — without advance knowledge — get that machine and figure out what is wrong while taking notes on his methods of deducing the error.

Use of the Computer as a Debugging Tool: Above all, concentrate on getting the CPU up first in your procedures, so that it can be used as a debugging tool by the fellow who has no oscilloscope. Think about the computer as a debugger, and burn some hardware debugging routines into your ROMs.

I present these thoughts as a constructive input to all manufacturers — and as information for readers to use in the evaluation of your products. I predict that the manufacturers who do the best job documenting their kits will be the ones who prosper the most in the long run.

Standardization

As I mentioned in describing the small systems benchmark, the idea of a home computer system is best implemented with modularity. This brings up the question of standardization of interfaces, since one of the most obvious areas of modularity is in the choice of peripheral devices for a system. What are standards, and whom do they serve?

BYTE will editorially support any equipment that meets industry standards, however those standards are defined.

A standard is an agreement — de facto or by explicit choice of participants — upon a common set of parameters for some aspect of technology. In the home computer field, the de facto standard of character data is adopted without question from the computer industry at large — ASCII (Baudot Teletype interfaces use obsolete equipment and are viewed as an exception to be specially programmed). There is, however, a strong need for additional standardization in two areas, one of which I'll talk about in some detail now. These are the areas of peripheral interconnection to processors and the audio cassette data interchange standard. Work upon the interface standardization problem has already begun under the leadership of Bill Godbout in Oakland, Calif. Bill has been in and around the computer industry for a long time (he worked for IBM when IBM was anything but a giant in the field) and appreciates well the shot in the arm competition can give the development of a new area. By having plug standards, we can avoid arbitrary restrictions on entry into the field, thereby expanding the choices users have and giving incentives to the innovative and creative producers of personal computing products. With a peripheral standard for the industry, the inventor of "El Neato Peripheral #367" only has to worry about one interface, and can enhance the value of Bill Godbout's computer systems, as well as Sphere, MITS, SWTPC, RGS, Scelbi and yet unheard of products.

In California, there already have been several informal

standards meetings among industry representatives, according to Bill in a phone conversation recently ... a trend which we at BYTE want to see continuing.

As a step in a second direction — audio cassette standards — BYTE is sponsoring an audio cassette standardization conference on November 7 and 8 in Kansas City, Kansas (see the announcement in this issue). The purpose of this conference is to act as an information exchange among the various manufacturers and users, and to hear arguments on the relative merits of various systems for audio recording of digital data. The main argument in favor of the audio standard concept — whatever technically competent system or systems are chosen — is so that the various users of small computers can freely communicate with one another by passing data tapes back and forth. We need a universal audio standard so that Joe Smyly in Podunk Hollow, Kentucky, can record his thoughts on tape and send them to his friend Fred Oberheimer in San Francisco, where Fred can display the message on his own computer's data screens or hard copy outputs.

Once a standard has been agreed upon you may be sure that BYTE will do all it can to encourage manufacturers to adhere to this standard and to publish articles explaining the systems involved, the hardware which will work with it, and software involved. Should some alternatives be proposed which seem of value, BYTE will encourage their investigation and evaluation. But once a standard has been set, it will take some powerful improvements to warrant basic changes.

Carl Helmers
Editor, BYTE

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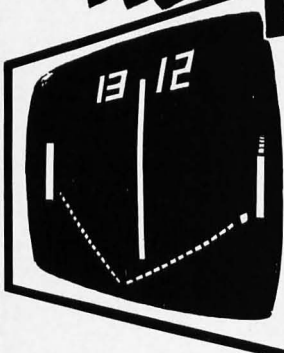
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