

80-U.S. Interviews **Bill Gates** of **Microsoft**

Bellevue, Washington

It's nearly impossible to work with the TRS-80 without coming into contact with software written by Microsoft of Bellevue, Washington. They have supplied the TRS-80's Basic interpreter for the Model I, II and III as well as a host of supporting software of consistently high quality. Though there are a few gripes about how Microsoft does business, most people who work with their products have praise for the high quality of the software and responsiveness of the organization.

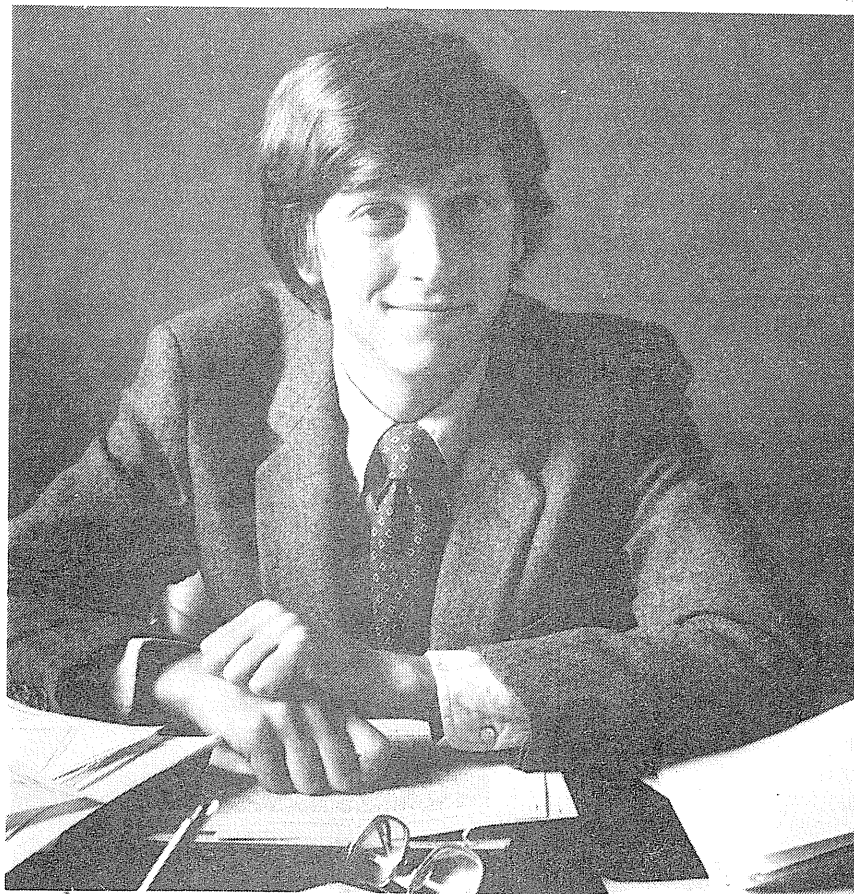
Microsoft was founded in 1974 to supply software for the newly developed Microcomputer marketplace. Since that time they have grown into a major force in software development. Among their products are the Basic Interpreter, Basic compiler, FORTRAN, COBOL, PASCAL, Data Base Manager, Word Processor and a new line of consumer products.

Since the beginning, Bill Gates has led this organization of software superstars. He is responsible for many of their best products and continues a program of software research and development which refines and improves the products which have made Microsoft the leader in their field.

Bill attended Harvard University, where he was in an accelerated graduate program. He worked at the TRW Corporation where he feels that the open atmosphere helped him learn much of what he knows about software.

When the Altair computer was first introduced, Bill moved to Albuquerque New Mexico. This period saw the introduction of Microsoft Basic and the development of the TRS-80 Model I, Level II ROM packages.

In 1978 it was decided to move Microsoft to a major metropolitan



area. After looking around, they made their move to Bellevue, Washington in early 1979.

Like most of the other people we have met at Microsoft, Bill Gates turned out to be knowledgeable and easy to talk to. At Microsoft, Bill is the last resort for the final, authoritative answer to any technical question. Bill remains apparently unaffected by the fantastic success of the company. He loves to talk about computers and computer software.

Most recently he completed the work on the Radio Shack color computer. He is most excited about the Extended Color Basic package he wrote.

We met with Bill in his office, where we talked about the past, present and future of Microsoft.

80-U.S.: What do you think about the various people who have adapted your

Basic, changed things about it, and are now marketing it?

Bill: One of the things we are trying to promote is a standard where people can interchange programs from one system to the next. So obviously, it takes away from that a great deal when there are specific things that are in one system implementation and not in others. A good example of that would be graphics. There is no standard for how you implement graphics in hardware and there are so many different characteristics, different resolution, and just different ways of doing the stuff that it's tough to be compatible today. Likewise, people's programs are often dependent on the size of the display. Radio Shack considered going to an 80 character display when they designed the Model III. But they felt that would create too much incompatibility, so they didn't. And obviously that same

incompatibility would exist when someone is taking the Basic ROM up to an 80 column system. The degree of incompatibility is less than people would expect. It's really isolated to the I/O and graphics areas. When we did the Basic, we decided that there would be several levels. As you moved from one level to the next, it would always be a superset of the previous level. We had 4K, 8K, Extended and Disk: four levels. When I had to do the Radio Shack ROM, I had 12K, more than enough for 8K but not enough for extended. It's a hybrid, in between extended and 8K. For example, there are no user defined functions or short error messages; two features typically in extended. But there are PRINT USING and Double Precision variables, which aren't found in 8K Basic. The additional data types were one of the key things we wanted to get. So we took that as given and pared it down to cram it into the 12K. We try to get people not to make changes and we have been very successful as far as the language itself goes. We have even participated in doing specific graphics stuff. But it's going to be a long time before there are any real standards there.

80-U.S.: I can see that. How about some of these inside Microsoft Basic books? Have you looked at any of them?

Bill: One or two of them. It's illegal for anyone to take material out of the ROM and publish it based on our software. I think what one of them did was publish comments and say that if you owned a ROM, somehow then you could fill in. That's legitimate. Anybody who actually gives the disassembled listing, ... when I hear about that I might take action. In a way, it's a legitimate thing that people want to know how the stuff works.

One of the most popular cassettes of all time for the TRS-80 is the EditorAssembler. I never expected it would be. I thought that it would be compared with Basic, where you don't have to bang bits. Well, an impressively high percentage want to understand what is going on in the ROM and in assembly language after they have used it for a while. So a natural place to look is to say how does Basic work? Or, the thing that people often say is they want to call routines in the ROM. People have a little overblown view of how easy that is to do. The ROM wasn't designed as a

bunch of subroutines, with the exception of the first 2K, which we did as the I/O stuff. It's extremely messy to use anything but those I/O things because on any error condition there are branches off to other places. In the case of the color computer we expect to come out with something that won't be a complete dump of the ROM. But we will have portions of it listed which is legitimate for us. We will talk about its overall structure and about advanced techniques using the thing. This should sort of head off all the decoding and insider-type books. We will see if this helps, and possibly distribute that through Radio Shack.

Actually, in a way I'm impressed that people have done as well as they have. The code is reasonably tricky and very compact. We didn't have a chance to totally rework the thing for the Z-80 because we only had about four weeks from start to finish on that entire project. The ROM was really difficult. Also, it was the first time anyone had ever done a 'hook' scheme where we allowed additional disk code to come in as a RAM load. And we were never able to test that. There were no disks working at the time. So we put the hooks in and used our judgement that those things would work out properly. As it turns out, we and a few other people have used those hooks for other types of extensions. And we have gone beyond that. We have much better hook schemes that we have used in other Z80 products in some of the other microprocessors. And they even add reserved words and don't just work within the fixed set that was there.

80-U.S.: Are you considering publishing any more inside information other than about the color computer?

Bill: Well, as far as the Model I goes, there are four or five books which go into the stuff. There is so much crazy terminology. Disk Basic was originally going to be called Level III Basic. That's why it says L3 ERROR. And then we went and called our product Level III Basic. And Radio Shack, on the Model III, call that Level III Basic. But I don't think that for Model I or Model III Basic we will do anything. I don't endorse any of the ones that are out there nor do I damn them unless they have used our material.

80-U.S.: How about the Model II Basic?

Bill: Well, the idea there was that the Model II people were probably more

businessmen. The spare time to be curious and really learn about it didn't come into it as much. That's why we didn't put PEEK and POKE in; Radio Shack told us not to. The next thing we knew, some guy comes out with patches for PEEK and POKE. I doubt the audience there is large enough to justify that type of book on the Model II Basic in RAM.

As far as the Model I and III go, we did come out with the advanced Editor-Assembler. People can use that to probe into the ROM and play around because it has a very nice symbolic decoder as part of ZBUG and that's probably enough. As far as the color computer goes, we will probably come out with the same package, but we'll also have a text that talks about the inside.

With the color computer there's more to talk about. You can talk about high-res graphics and how you do 3D graphics and color mixing and PAINT and what the PAINT algorithm is and how you do sound modulation and how to use joy sticks to do really interesting things. There's a lot of complexity that goes beyond that. The things the people talk about on the Model I are why the cassette routines aren't reliable, or how to add keyboard debounce, such things aren't nearly as interesting.

80-U.S.: Are there any plans for the TRS-80 in the future that you can talk about?

Bill: Of course, we have our Consumer Products division that sells products directly for the TRS-80. And we have a lot of stuff that will be coming out there. We have a modeling program, some forms handling stuff, the disk version of the Editor-Assembler, the disk version of Level III Basic, and then we have a totally new release of the Basic compiler that is a significant improvement over the previous version.

80-U.S.: Is it one with a run-time package?

Bill: Yes, so you don't use nearly as much memory or disk space.

You know, it surprises us how few software vendors support the Model I. We are going to continue to do it. The challenge to us is that since we can't get our stuff into the stores that sell the computers, the only people we can sell to independently are the ones who stop by computer stores or who buy mail order. Most of it today is really mail order. Radio Shack's controlled distribution makes it tough for

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someone like us. So we have a choice, we can either OEM everything to them or we can try to build an independent image and marketing channel. We have so many things we want to do, so many products, that we need to have the independent image as well as the OEM market. We OEM'd the FORTRAN and we are OEMing some nice new stuff for Model III, but not the Basic compiler and the really key consumer products stuff.

80-U.S.: Do you have any plans for Model III software?

Bill: Not really. Anything we do for the Model III we'll also come up with a Model I version. They are so compatible, you might as well address both markets. There are 200,000 Model I people out there. With the way we market and the recognition factor we have, it's hard for us not to get at least 1% market penetration and that's a couple thousand sales, so we continue to work them both even-handedly. We've moved a little slow to bring that stuff up on the Model III because frankly we haven't seen a market. We are just beginning to see a little demand.

80-U.S.: Why didn't Radio Shack go with Microsoft's Basic compiler for the Model II?

Bill: We have a compiler that is compatible with the interpreter and runs dramatically faster because it is a true compiler. It fits into all the other development tools including common relocatable format so it can call things from FORTRAN. We felt that we were the obvious solution and perhaps in some ways we overplayed that. Our relationship with Radio Shack has had its ups and downs, but they dealt with us very honestly and continue to work with us on many things. In that one case, we think they made a bad mistake.

The thing that's great is to have this synergy of being able to debug under the interpreter and then go to compiling. The problem with compilers is that it's not at all interactive. In our compiler and Radio Shack's compiler, the amount of time it takes to compile something and get it ready is minutes. For some small typing mistake that's outrageous. And so that's why we have the combined approach. In the case of the Model II, we'll be coming out with an enhanced interpreter that has all the features of the compiler. In the Model I and III the compiler has gotten a little ahead of

the interpreter since that was burned into ROM a little over three years ago and so you have to be careful to stay within the interpretive set. There are a few things such as dynamic dimensioning which are not supported in the compiler which will be out in future versions of it.

80-U.S.: Have you upgraded or tested any of your software on Radio Shack's new DOS release for the Model II?

Bill: On the DOS 2.0? We had to go and convert all of our files as part of our OEM contract with Radio Shack and we had to run FORTRAN under it. It seems OK.

The DOS's have had an interesting history. The first was written by the guy who sells VTOS and that was a stormy relationship. The in-house group did the Model II TRSDOS, and of course the size of the Model II TRSDOS is different, but they put in some improvements and I guess Model III TRSDOS is a merger of that. I really haven't looked at it at all.

80-U.S.: From the standpoint of the average TRS-80 user, your manuals have improved considerably, particularly on the Model I.

Bill: We're trying to improve the manuals. The company started out with pretty much an OEM orientation. What we were addressing was a low end of the data processing market where people were using micros at low cost to do what they had done previously on mini's and large machines. And in some ways our software and our documentation was adapted to that mode.

Now what we are addressing is a whole new class of users who aren't perhaps as sophisticated. So we have had to really beef up our tech writing. We have four times as many tech writers as we did. Some people like Apple have set pretty reasonable precedents for good documentation and so that is really our focus. We have a couple of products where our investment in documentation is as great as in the software itself, which is a new thing.

80-U.S.: Occasionally, I've seen complaints about Microsoft's user support or their software. An example which comes to mind is the M80 assembler, where one gentleman complained about the lack of real Macro capability as he called it, because it could handle Macros but it couldn't handle a Macro library. How

do you feel about those kinds of comments?

Bill: Software, if it did all things for all people would be arbitrarily big and arbitrarily slow. Obviously you make tradeoffs. That's what we're known for doing real well. Various users will complain about how we have made those tradeoffs, which is to be expected. There is nothing wrong with healthy criticism. We've used that feedback many times and factored it into our new product plans. Like our loader or some of the new compiler features, which are very much based on feedback. You know, if someone comes down on us real hard, I can get upset because I think we have made an excellent tradeoff as to what should be in a macro assembler. It's extremely powerful. I doubt that there are many people out there who get near to its full capability. And it's the same thing with the loader. The loader is confusing to some people because it was designed to support a pretty sophisticated operation where you can locate things at arbitrary locations in memory. It's just a tradeoff we made. Maybe in that case we went too far towards sophistication. But if you put out as much software as we do you are not going to escape criticism. We have one or two things which I'm surprised there hasn't been more comment on.

80-U.S.: How much business do you do with Radio Shack? How much of a percentage of your operation is it?

Bill: Well, it's a classic tradeoff for an OEM software house like us. Are you willing to involve yourself in royalty arrangements with manufacturers or do you work on a fixed fee? On the initial Level II Basic we worked on a fixed fee. We have an on-going yearly fee relative to Model III Basic, it's strictly bounded. Some of the work we have done on the color computer is more royalty oriented and so we are super enthusiastic about it. We think the color computer is going to be incredibly successful so that, if I'm right about that, Radio Shack could be as much as 10 or 15 percent of our income.

One thing for most people to realize is that Microsoft does most of its work at a higher end of the computer spectrum. Although we are best known for our work with Apple and Radio Shack, Texas Instruments and people like that, most of our business is with NCR, ICL, XEROX and companies which are not down at the

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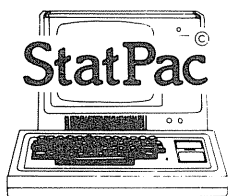
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low end. The thing about those companies is that they need more software for their products. You know when Zenith comes in, they want Basic, FORTRAN, COBOL, Basic Compiler, PASCAL and SORT - the whole bit. So that's a lot bigger piece of business and there are many of those manufacturers around. The low end tends to be dominated by a few manufacturers. Because of our Consumer Products Division, the low end is super important to us though. We have really done quite well selling to a user base of 100 to 200 thousand systems. When you think of what that is going to be like when there is a base of 500,000 systems, it's really neat. The key thing is to build a reputation in that market and as it grows we can capture more and more volume.

80-U.S.: It makes a lot of sense.

Bill: So, even from an internal point of view, Radio Shack is a very good customer. But if you also weigh in the consumer products things, you might say that they are our best customer.

80-U.S.: How about these TRS-80 imports like the PMC80 which advertises Microsoft Basic? Is that

basically the same ROM that Radio Shack uses?

Bill: It is virtually the same ROM, and they have a license to Microsoft Basic.

I don't know if they are selling a lot of these. The hardware looks reasonable. The thing Radio Shack really proved about the computer business is that distribution is critical. So what if someone has an equivalent machine at an equivalent price. They are not going to hurt Radio Shack that badly. No one has 7000 stores, or whatever the number is, to place the product. As long as Radio Shack has a reasonable product, they are going to be a leader in this business.

80-U.S.: So as long as you can put out good software for the system, you're going to go right along.

Bill: Yes. We are certainly available to someone who has that kind of distribution. There are two ways we work, we like to make a good economic return, but we also like to be involved in bringing computers to more and more people. We get a lot of enjoyment out of the success of the

Model I with Level II Basic. The initial prediction was that 10 to 20 percent of the people would upgrade (from Level I to Level II) and it makes me feel good that the number is almost the inverse of that. It's 80 to 90 percent. I hope to see the same thing on the color computer. Our participation is heavily tied to the success of the extension ROM.

80-U.S.: Did you do the actual Basic in the color computer?

Bill: We did the 8K ROM. But that is not actually subject to a royalty. It's the extension ROM. They are married. They fit together in a very strong way. It's another classic situation. There was limited memory, limited time, a lot of new features that needed to go in and so we had to work really hard to get that done. We are super pleased about it.

80-U.S.: From everything I've heard about it, it sounds like it is going to be a tremendous machine.

Bill: The only real threat to it is if Commodore can get their act together. It is possible that they could be a serious competitor. I'm interested to see if Commodore follows through. ●