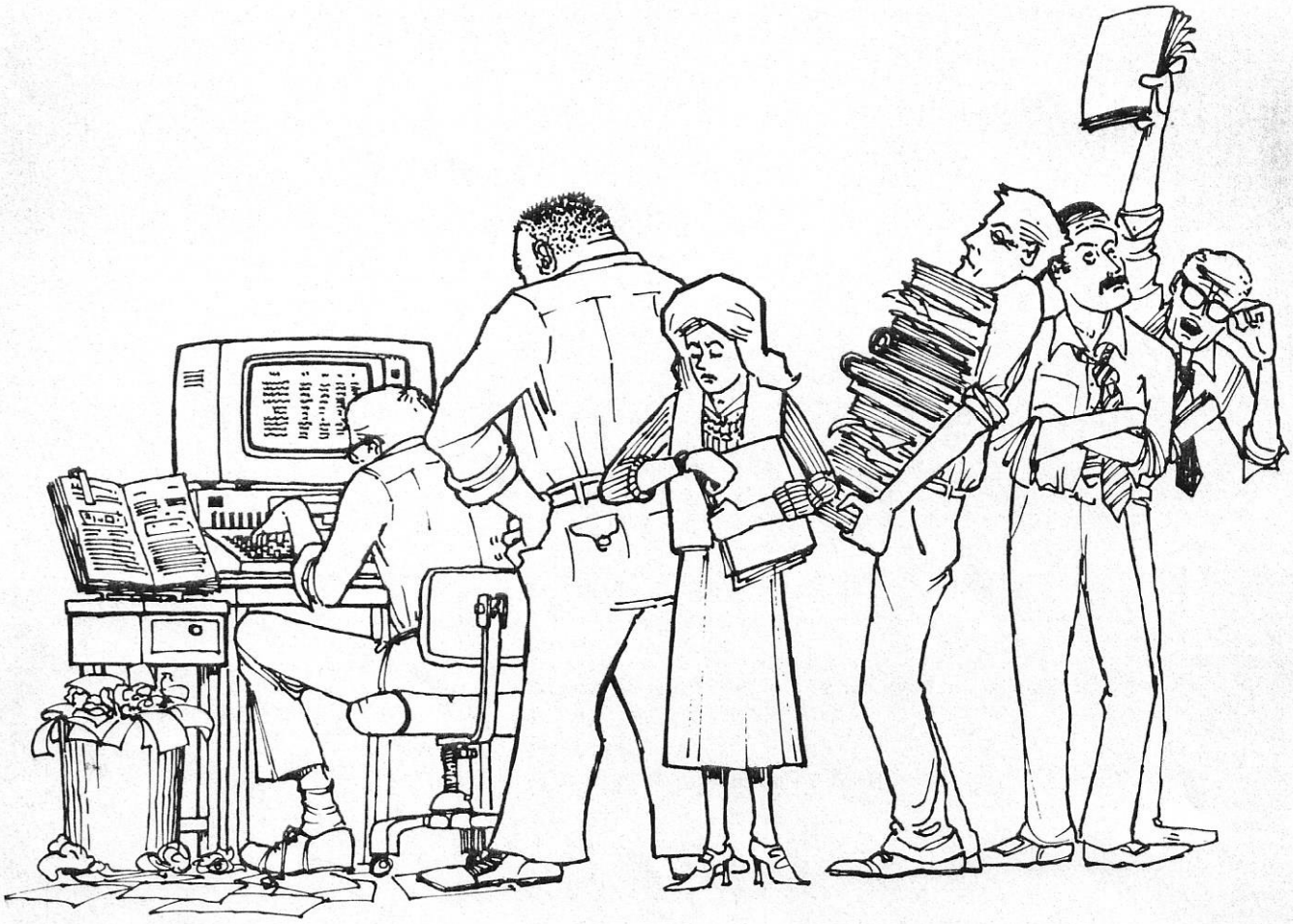
IBC IS THE ONE COMPUTER YOU NEED WHEN YOU NEED MORE THAN ONE.



If you want a computer to help you run your business, then you need a multiuser computer. Not a PC. It's that simple.

A PC is a personal computer, not a business computer. That's because PCs are single user computers with single user software. They're good for one person — but not good enough for a whole company. Even if the company is only two people.

Every computerized business has someone entering information someplace while someone else is looking up information somewhere else. That's two users. And every business has more than two users who need access to the computer. That's a multiuser computer environment.

The idea of multiuser computers is not new. They've been around longer than PCs. Companies like IBM, DEC, and HP have been selling multiuser business computers for years. So has IBC.

Recently the PC has gotten all the attention. It has a low price and can do a lot of new things for your business. But as soon as you buy the first one, you'll realize that you really need more. But don't buy more than one. Buy one multiuser business computer from IBC. It costs as little as a PC and can do more — a lot more.

If you want a good business computer, look at what IBM, DEC, HP or anyone else has to offer. But if you want that business computer at a great price, then look at what IBC has to offer. We've been building low cost multiuser business computers since 1979. And that's longer than anybody else.

IBC is the one computer you need when you need more than one. And you do.

IBC INTEGRATED BUSINESS COMPUTERS "When Performance Is Everything"

21621 Nordhoff Street
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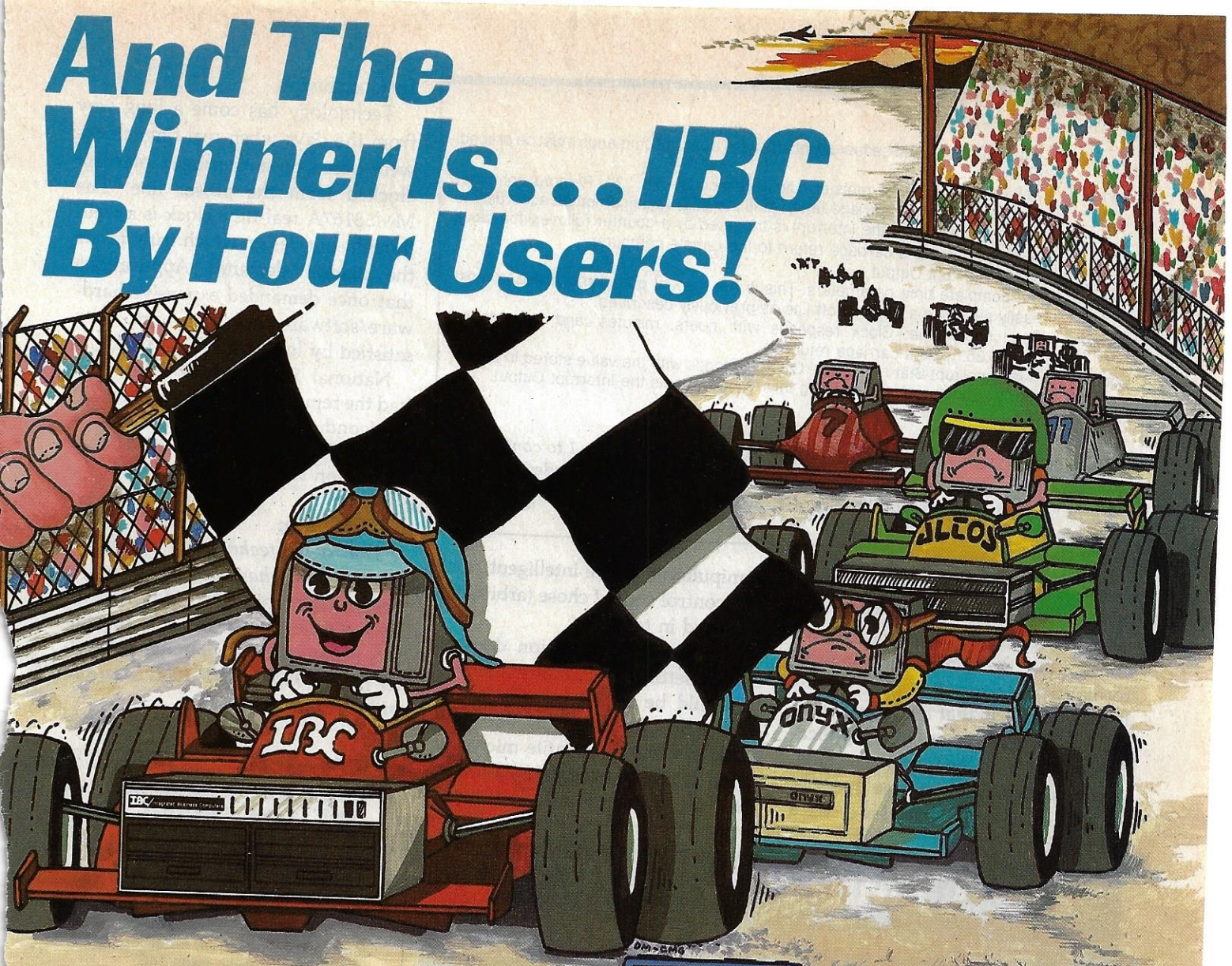
And The Winner Is... IBC By Four Users!



When you are racing toward that finish line, beating the competition is everything. IBC is the choice of OEM's, system integrators and dealers throughout the world, because in benchmark after benchmark our small business computer systems finish first.

We finish first because we are faster, offer higher quality peripherals and can expand our system significantly beyond our nearest competitors. In fact, looking at the chart below, you can quickly see why knowledgeable resellers are choosing IBC.

	IBC	onyx	ALTOS
Oasis Operating System (Max. Users)	9	5	4
CPU Speed (MHz)	6	4	4
Disk Speed I/O (MB/Sec.)	.81	.65	.54
Seek (Milli Sec.)	35	50	65
Cache Disk Memory	Yes	No	No

Circle 198 on inquiry card.

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!	Indicates command-sequence initiation (all control commands must be preceded by "!").
Control-I	Set Interrupt Control register. Clock responds with "?". Remote computer sends "%X" and a carriage return (X is the BCD value computed according to figure 7). Each time the interrupt is triggered by a counter rollover, the clock will send "I" and a carriage return to the remote computer.
Control-R	Reset Interrupt Output.
Control-S	Set complete time parameters. This is the manual preset mode and is most easily set using a terminal off line as previously described.
Control-T	Send short time. Clock responds with hours, minutes, and seconds as "10:25:35" plus a carriage return.
Control-U	Read Interrupt Status register. Clock responds with the value stored in the Interrupt Status register. Reading this register resets the Interrupt Output.

Table 3: *Command codes used by the BASIC/Debug code in listing 1 to control the real-time-clock circuit of figure 6 from a remote computer. These codes were arbitrarily chosen and do not provide for activating all the capabilities of the MM58167A.*

The serial communication of time information to the remote computer is commanded by various control codes. Only the minimal required information is transmitted from the intelligent clock so that the information can be more easily used in an application program on the remote machine. A simple response to a time query of "06:34" reduces processor data manipulation in the intelligent clock. The control codes I chose (arbitrarily) are listed in table 3.

My brief demonstration does not include setting the Standby Interrupt. It should be added for any serious use. Also, because this intelligent clock contains a versatile microcomputer, it can be programmed for any data rate or custom data format.

In Conclusion

Technology has come a long way from the days when real-time clocks were based on a heartbeat interrupt clocked from the power line. The MM58167A real-time clock is a well-thought-out design which truly meets the market demand. Applications that once demanded expensive hardware/software solutions are now satisfied by low-cost LSI hardware.

National Semiconductor has long had the reputation of being a leader in semiconductor innovation, and I believe the company has justified that reputation with the MM58167A.

Next Month:

The high technology of video-image storage has been promising to benefit the computer industry. In June, I'll let you in on how to reap this benefit with a computer controller for the Pioneer VP-1000 Laserdisc video player. ■

References

1. Ciarcia, Steve. "Anyone Know the Real Time?", August 1979 BYTE, page 50. Reprinted in *Ciarcia's Circuit Cellar, Volume II.* Peterborough, NH: BYTE Books, 1981, page 96.
2. Ciarcia, Steve. "Build a Z8-Based Control Computer with BASIC, Part 1," July 1981 BYTE, page 38. Reprinted in *Ciarcia's Circuit Cellar, Volume III.* Peterborough, NH: BYTE Books, 1982, page 146.
3. Ciarcia, Steve. "Build a Z8-Based Control Computer with BASIC, Part 2," August 1981 BYTE, page 50. Reprinted in *Ciarcia's Circuit Cellar, Volume III,* page 156.

Editor's Note: *Steve often refers to previous Circuit Cellar articles as reference material for each month's current article. Most of these past articles are available in reprint books from BYTE Books, 70 Main St., Peterborough, NH 03458.* Ciarcia Circuit Cellar, Volume I, *covers articles that appeared in BYTE from September 1977 through November 1978.* Ciarcia's Circuit Cellar, Volume II, *contains articles from December 1978 through June 1980.* Ciarcia's Circuit Cellar, Volume III, *contains the articles that were published from July 1980 through December 1981.*

To receive a complete list of Ciarcia's Circuit Cellar project kits available from the Micromint, circle 100 on the reader-service inquiry card at the back of the magazine.