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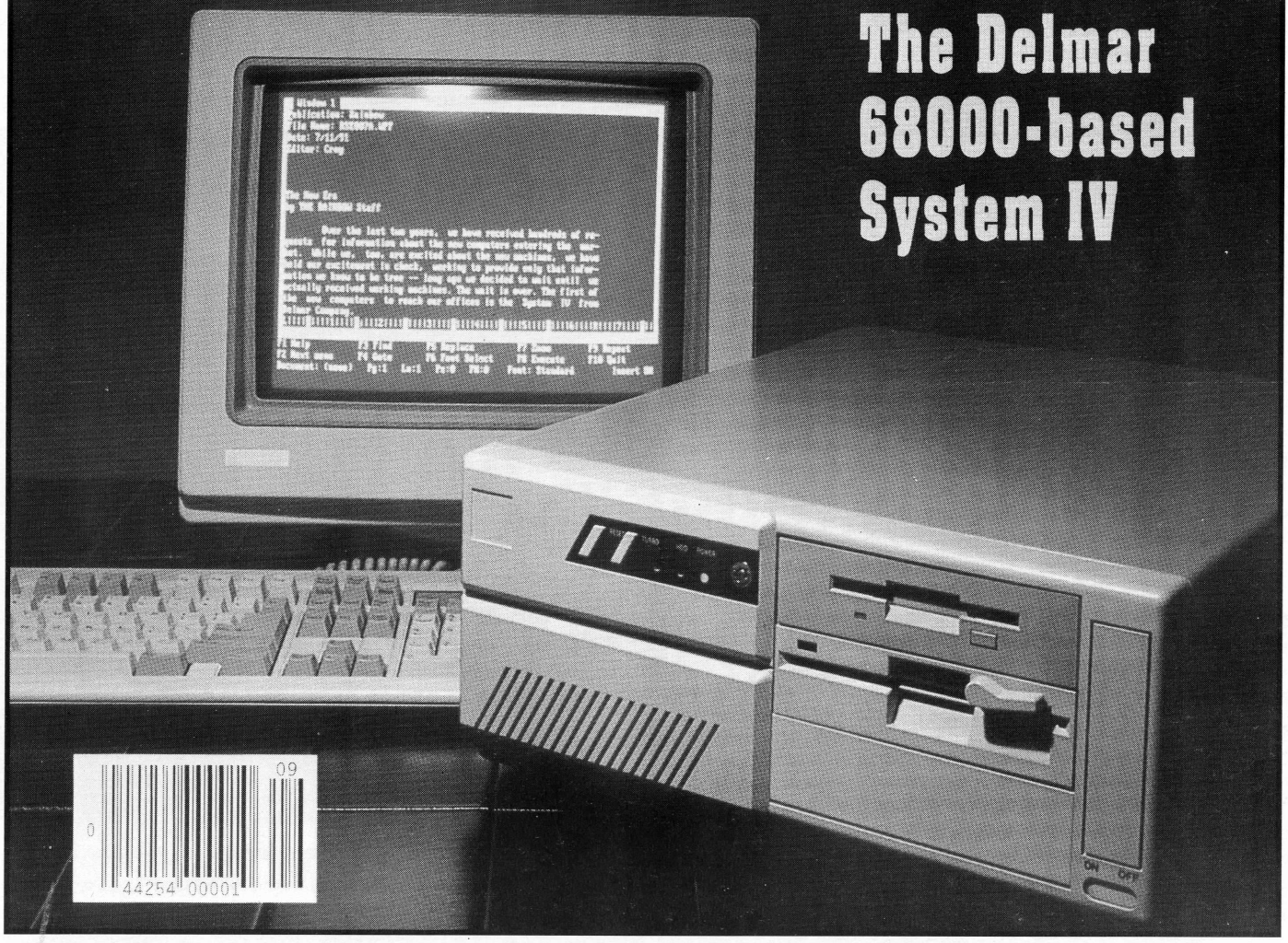
The RAINBOW®

THE COLOR COMPUTER MONTHLY MAGAZINE

September 1991 Vol. XI No. 2 Canada $4.95 U.S. $3.95

A New Era

The Delmar 68000-based System IV



Over the last two years, we have received hundreds of requests for information about the new computers entering the market. While we, too, are excited about the new machines, we have held our excitement in check, working to provide only that information we know to be true — long ago we decided to wait until we actually received working machines. The wait is over. The first of the new computers to reach our offices is the System IV from Delmar Company.

It is important to note right up front that the System IV is not a CoCo, nor was it ever intended to be. It does not support Disk BASIC, and for the most part, it won't even directly run software written for the CoCo.

The System IV is a computer built around the Motorola MC68000 microprocessor (a big sister to the 6809 in the CoCo) and is delivered with Microware's Professional OS-9/68000 operating system. The 16-MHz speed and wider data bus of the 68000 mean the programs you use on it will run quite a bit faster. Of course some of the software we have used on the System IV is a bit more complex, too. The multiuser, multitasking capabilities of OS-9 make the system ideally suited for the professional market where small businesses can take advantage of centralizing data for databases and spreadsheets. With the stock System IV, you can quickly connect up to four external terminals (the CoCo 3 works well for this), allowing up to five people to run different programs on the same computer at the same time. Still, single users can benefit from the increased speed and the ability to run multiple programs simultaneously.

Equally as important, the System IV is designed to be easily and inexpensively expanded. In a somewhat unique approach, the PT68K4 motherboard (developed by Peripheral Technology) sports seven PC/XT-compatible expansion slots. This means you can go to your local computer stores and purchase standard 8-bit expansion cards intended for MS-DOS machines and plug them into the System IV. Video, drive-controller and I/O cards are readily available at low cost in most areas. For example, the system we received for evaluation uses a PC-compatible WDXT-GEN hard drive controller and a standard VGA video card. At the RAINBOWfest in Chicago this past April, we watched (heard) the System IV as it played sound through a Soundblaster PC card. In addition to providing a relatively inexpensive expansion path for System IV users, the flexibility of this approach is a boon for those who already have an MS-DOS machine or who plan to purchase one in the future.

A disadvantage, though not particular to this machine or its approach, is that you may have to write your own OS-9 driver software to support any cards you add. OS-9 requires a driver/descriptor pair for each device in the system, and there are a lot of devices out there. However, Ed Gresick, owner of Delmar Company, informs us that drivers for standard PC-compatible serial cards and the Colorado QIC-40 tape drive are currently being developed. The System IV is delivered with OS-9 drivers and descriptors for a printer port, four serial ports, Hercules and VGA video and a 20-Meg hard drive with the WDXT-GEN controller. However, Delmar provides a preconfigured device descriptor for the hard drive included with the system. You can use utilities provided with OS-9/68000 to alter these descriptors to fit other requirements.

How It's Packaged

The System IV motherboard comes in an attractive mini-PC case, complete with a 200-watt power supply. There is room in the case for up to five drives — three 5¼-inch, half-height and two 3½-inch drives. One of the 3½-inch drive bays is designed for an internal hard drive. Included on the motherboard are one megabyte of memory (DRAM), two parallel ports, four serial ports, a high-density floppy-drive controller and an XT-compatible keyboard interface.

Delmar Company is currently offering the System IV in two basic forms: The Terminal system ($999) and the Console system ($1149). The Terminal system includes one high-density floppy drive (your choice of 5¼-inch or 3½-inch) and Professional OS-9/68000 (which includes the Microware C Compiler). This setup is very attractive to users wanting or needing the power of the 68000 at the lowest possible cost. While it doesn't have a video board, a monitor and a keyboard, it is fairly easy to connect another computer (a CoCo or per-

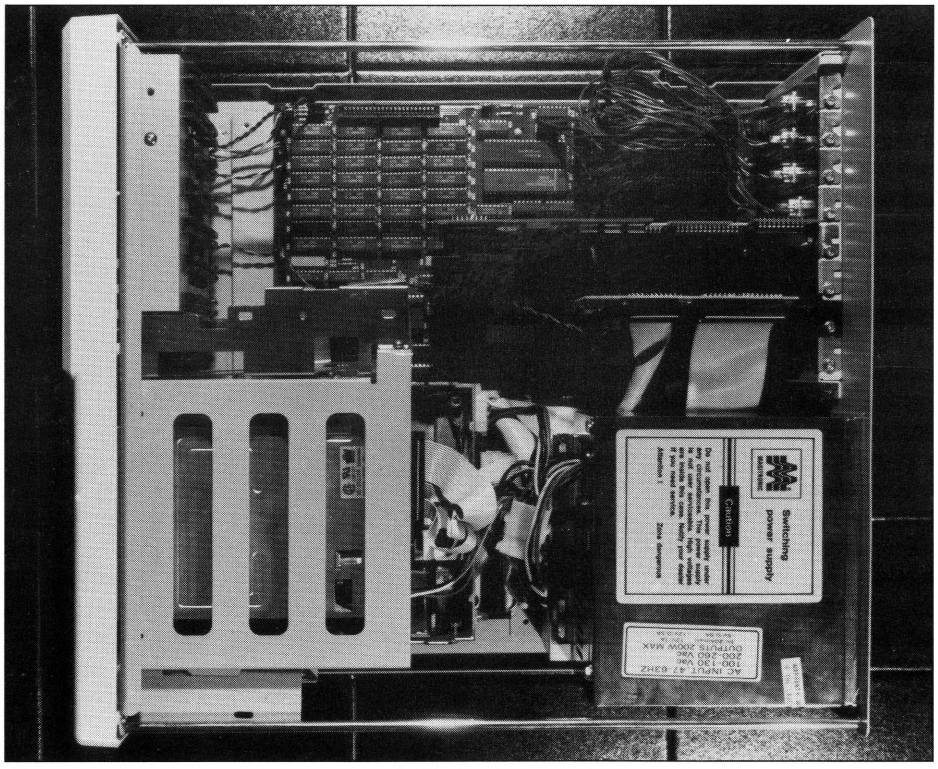


Photo 1: System IV Motherboard

haps an MS-DOS machine) as a terminal and get the same use from the System IV. This offers users in the CoCo Community a less expensive way to ease into the 68000. We'll take a closer look at connecting terminals in a moment. The Console system is the same as the Terminal system except that it includes a VGA graphics card (without a monitor) and an Enhanced 101-key keyboard. Any 83-key or Enhanced 101-key keyboards that can be switched to XT-mode works with the System IV.

The system we received for evaluation is an expanded Console system with four megabytes of memory, a Western Digital WDXT-GEN hard-drive controller and Seagate ST251-1 hard drive, and a Sunshine VGA color monitor. Several graphics images and a slide-show program to view them were included on the hard drive we received. Our first plug-and-run session with the System IV was very exciting.

A Closer Look ▲ ▲ ▲

For individual users, the included one megabyte of memory should be enough for most purposes. None of the software we tried required more than this. However, serious users and programmers will want more to allow for the disk cache and RAM disk features of OS-9/68000. And systems intended for multiple users will need more memory to support the various programs those users might want to run. The motherboard has sockets for an additional three megabytes (available from Delmar Company for $160), bringing the total to four megabytes of onboard DRAM.

Connection to the first parallel port on the motherboard is made through a female DB-25 connector mounted on the rear of the System IV just below the power cord. The port is designed to accept an IBM-compatible printer cable — standard fare at computer stores. The second parallel port is not currently supported, but an updated driver is now in development. We connected a Hewlett-Packard LaserJet printer to the first port, and had no problems using it. With an IBM-type cable, most any parallel printer should work.

The four serial ports are available as female DB-25 connectors mounted on expansion-slot covers on the rear of the machine. For serial ports, the IBM standard uses either male DB-25 or DB-9 connectors to prevent the possibility of a user mixing parallel and serial connections. We suspect the decision to use female connectors on the System IV is to make connection to external terminals (for multiple users) as easy as possible. Fortunately the serial and parallel connectors are located on opposite sides of the case and are clearly labeled. This helps minimize confusion.

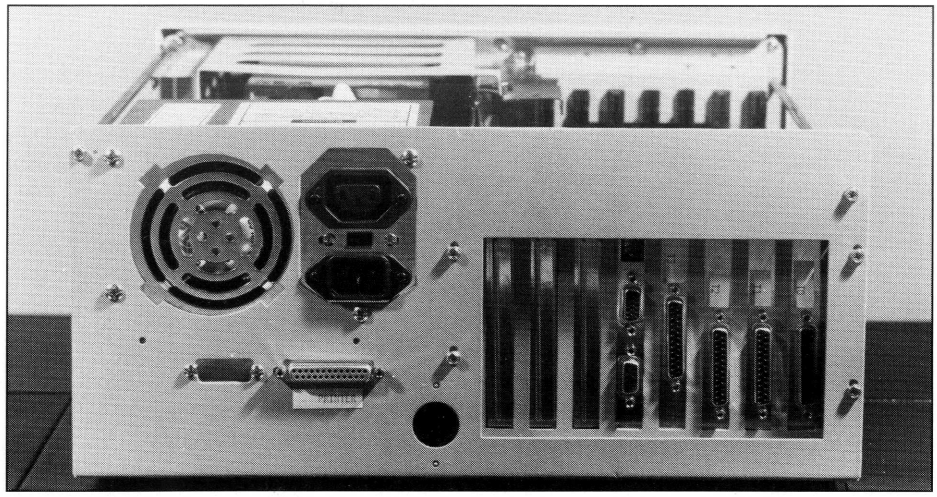


Photo 2: System IV I/O Port Layout

Because the serial ports are designed for direct connection to terminals, connection to DCE (Data Communications Equipment) devices, such as a modem, require the use of a null-modem adapter. Alternatively the pins in either the DB-25 connector or the IDC connector on the motherboard can be rearranged.

The floppy controller (a WD37C65 chip) on the motherboard is designed for two single-, double- or high-density drives. Also, there is a socket on the motherboard for a WD1772 controller chip to maintain compatibility with Peripheral Technology's earlier PT68K2 motherboard. The WD1772 supports up to four single- or double-density floppy drives, and the inclusion of this socket can be very beneficial if you want to add three or more floppy drives to the system. While Western Digital has discontinued the WD1772 floppy controller, it is still being manufactured by VLSI.

The XT-compatible keyboard interface is in keeping with the inexpensive expansion approach. Any XT-compatible keyboard can be used with the System IV, and these keyboards are available at low prices from most computer retail outlets.

All Aboard ▲ ▲ ▲

For our evaluation of the System IV, we connected a Wyse 50 terminal, a 1200-bps modem, a CoCo 3 and a PC-compatible to the four serial ports. Hooking up the Wyse 50 was a simple matter of running a serial cable between the System IV and the terminal and setting the correct speed on both ends. Within a matter of minutes the Wyse 50 was up and running at 19,200 bps.

Connecting the modem involved rewiring the second serial port because the ports come wired for DCE. We could have used a simple null-modem adapter, but decided to make the change more permanent. (Besides, we are always running out of null-modem adapters.) Rewiring the connector was a lot easier than we had at first anticipated.

We expected connecting the PC-compatible would involve only running a cable and firing up *Procomm Plus* on the PC. The hardware hookup went fine, but *Procomm Plus*' implementation of VT-100 emulation leaves something to be desired. The standard VT-100 terminal sends three codes for the function and arrow keys, but `umacs` (the full-screen editor supplied with OS-9/68000) accepts only two-character key sequences. We could have remapped *Procomm Plus*' keyboard, but then we would have to manually remap the keyboard each time we called Delphi. This was too much hassle so we switched to *Crosstalk Communicator* on the PC. This allowed us to remap the keyboard while retaining the original VT-100 mapping — the keyboard layout is automatically selected in the dialing directory.

Connecting the CoCo 3 to the System IV presented a few unusual problems. We couldn't use the serial port on the rear of the CoCo because of its speed limitations. We used an RS-232 Pak and Multi-Pak Interface instead. The 6551 ACIA chip in the RS-232 Pak requires DSR and a few other signals be asserted (High) or the 6551 ignores the incoming data. To solve this, we rewired the serial port on the System IV and used a null-modem adapter from Radio Shack that asserts those signals (Cat. #26-1373).

We initially experimented with *JTerm* and *KBCom* under OS-9 Level II on the CoCo 3. However, we could not get reliable operation when communicating above 2400 bps. Take our word for it, you don't want to use a word processor at 2400 bps unless you have a lot of spare time. You need to be operating at 9600 bps or better to get reasonable response from the setup. We then switched to *VTerm* under Disk BASIC. *VTerm* works reliably at up to 19,200 through the RS-232 Pak and provides exceptional VT-100 emulation.

Using the CoCo 3 as a terminal to the System IV is an excellent way to enter the 68000 world. With this setup, you can run 68000-based software on the System IV and still have your CoCo available for running the software you already own. You won't gain the power of the 68000 for your CoCo software, but you can aquire 68000 software much as many of us have built our CoCo systems — a bit at a time. Ideally, someone will devise a way to get reliable operation of the CoCo 3 as an OS-9 terminal at 9600 or 19,200 bps. Level II's windows would then give you access to the System IV, OS-9 Level II and Disk BASIC (via Burke & Burke's RSB), all with just a press of the CoCo 3's CLEAR key.

It is important to note the problems we encountered connecting the PC-compatible and the CoCo 3 are not problems with the System IV. Rather, they are inherent to the way OS-9/68000 handles terminals and requirements of the 6551 ACIA in the RS-232 Pak. We explain our experiences here only to help you should you decide the System IV is right for you.

Software ▲ ▲ ▲

Software availability is an important consideration any time you are thinking about buying a computer. We contacted Microware and received *Microware Basic* (see the review on Page 54 of this issue) and *SMART*, an integrated business package featuring a word processor, a spreadsheet and a database. *Microware Basic* was way out of line with a price tag of $500, but *SMART* was a little more reasonable at $895. Yes, we know both these figures sound high. However, these products were developed for the professional/industrial markets where prices tend to run a little higher. As demand from the personal market increases, we could see the prices drop.

All portions of *SMART* ran well on the System IV console. We also had few problems running it from the PC and the CoCo 3 (acting as terminals). Using VT-100 emulation cleared up these problems rather quickly, which is why we mentioned VT-100 so heavily earlier. It is really beautiful to see such a program running in three places, from one computer, all at the same time. While we could run *SMART* from the Wyse 50, the display was not correct because of limitations in the Wyse 50 itself. Any other problems we had using *SMART* were products of the program and not the System IV. We were able to print hard copies of spreadsheets and typed documents using special features of the LaserJet printer.

We also received the OS-9/68000 version of the *DynaStar* and *DynaForm* text-editing package from Frank Hogg Laboratories ($99.95). Since *DynaStar* was designed for use with different terminals, we encountered no problems running it on the System IV, from the Wyse 50, the PC and the CoCo 3. We very recently received several of Frank Hogg's other software products (mostly utilities) and haven't yet gotten them transferred to the System IV. As soon as we do, we'll pass the word along to you.

Windsor Systems, which is located down the street from our offices, sent us *Quick Ed*. This text editor and formatter also runs on the System IV with no problems.

We are planning separate reviews of these products, and any others we receive. In addition, we are working on an in-depth preview of Professional OS-9/68000, drawing comparisons with OS-9 Levels I and II where applicable.

A good source for OS-9/68000-based programs is *The OS-9 Source Book* from Microware. Listed on its pages are software packages ranging from business applications to system utilities. As the new 68000 portion of this market warrants, we'll publish reviews of the products available.

Another possible source of software is already in place. While OS-9/68000 doesn't support some of the fancier graphics available through OS-9 Level II on the CoCo 3, there is no reason much of the C software available for the CoCo cannot be ported to OS-9/68000. And Delmar Company is working on a C graphics library for the System IV.

Delmar Company offers an optional OS-9/6809 emulator program. This emulator will run most OS-9/6809 software that is not hardcoded to use CoCo cursor control codes or graphics. Because it emulates the 6809, operation is really slow. However, it may fit a need for some users.

In short, while there is not an abundance of applications available for the 68000, the basic tools are there. What will happen in this personal-computing market remains to be seen.

Support ▲ ▲ ▲

The System IV is sturdily built and runs well, and Delmar Company stands behind its product. On several occasions we called Ed Gresick with questions about the System IV and about OS-9/68000. He was more than responsive in attending our requests, even if it meant calling us back. When we reported some bugs in the driver software, he immediately addressed the problem and sent us new drivers. For special setups, a call to Delmar Company was all it took to solve the problem. While the CoCo Community is a new market for Delmar Company, Delmar is not new to the computer industry. It started selling 68xx-based controllers in 1975 and has been going strong ever since.

Similarly, the PT68K4 motherboard is well-supported. We ran into a problem with the motherboard and shipped it directly to Peripheral Technology. The people there quickly traced the problem to a malfunctioning clock-generator chip, which Peripheral Technology quickly repaired.

The impression we get is that these two companies are serious and conscientious about their business. They understand that problems sometimes occur, and they work quickly to rectify them without a lot of runaround.

In the Future ▲ ▲ ▲

As mentioned earlier, a new driver supporting the second parallel port is in development, as are drivers for standard PC-compatible serial I/O cards and the QIC-40 tape drive. A C graphics library, supporting the System IV, is also on the way. Other products currently being developed include the ALT86 (a PC on a card that lets you run MS-DOS software), a SCSI interface with four additional serial ports, and an IDE interface with sockets for up to six megabytes of additional memory.

We have seen a prototype of the ALT86. This two-card set fits right in the slots on the System IV motherboard and features a V30 (8086-compatible) microprocessor running at 10 MHz, one megabyte of memory and a socket for an 8087 math coprocessor. The second board includes two serial ports, one parallel port, a real-time clock, a mouse port and a high-density floppy controller. This is not an emulator — you don't run MS-DOS software from OS-9/68000. However, it does add seriously to your options about the different software you can run with the System IV. At the RAINBOWfest, attendees were treated to *King's Quest V*, complete with VGA graphics and sound produced by a Sound Blaster card.

The Bottom Line ▲ ▲ ▲

Again, the System IV is not a CoCo. Rather it is a natural extension, for some, of the power of the 6809 in the CoCo. It is intended as a multiuser system, yet works extremely well for single users needing a lot of power. The System IV is reliable and is the product of two companies that offer a high level of service to their customers. Several expansion opportunities either exist or are near completion. In a nutshell, the System IV offers a lot at a relatively low cost.

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