the world of

68' micros

Support for Motorola Processors

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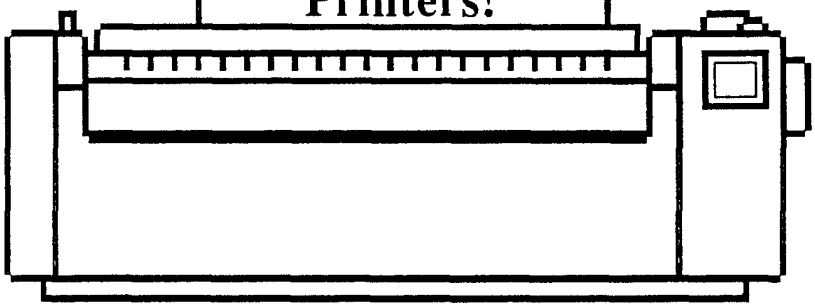
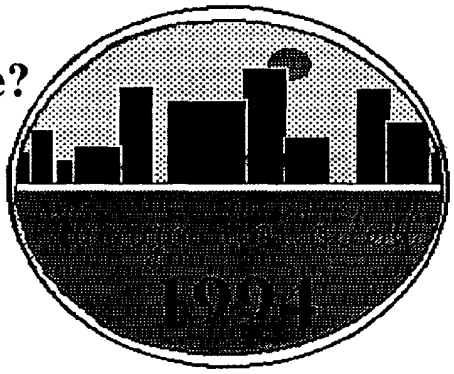
The Printed Word...
The Issue of Printers!



Were you there? We were! Read all about it in this issue!



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The editor speaks...

F.G. Swygert

As I write this, it is only 10 days from the "Third Annual 'Last' CoCoFest" in Chicago Illinois. We've come a long way since "The Rainbow" left us! I hope we can go much further. I'll be rushed getting this issue out, as I have a lot to do getting ready for the 'fest myself, and most of our writers are doing the same. So if this issue is missing a regular article or two, or was a few days late, I apologize in advance. We're all trying to support the CoCo and OSK machines in our spare time (most of us, anyway) and only have so much to give.

One thing that many of you don't realize is that even the two biggest names in the OS-9 hobby market, Delmar Co. and Frank Hogg Labs, are really in this market "part time". They both have other business ventures that are their main source of income. Both have ties with the hobby ist that go back a long time- that's their main reason for supporting us and staying in a market where they make very little profit. Thank these fellows for their support, and buy their products. And don't forget about us "little guys" either. It takes a lot of all our time to keep this hobby alive.

Printing is something all of us do, regardless of the type of computer used. I did some research and came up with some good advice on purchasing a printer. I'll be taking my own advice soon also. I did good enough at the fest that I'll be purchasing a printer soon. The primary purpose of this printer will be printing the masters for this magazine, so it has to be very good quality. I have been hesitant to get an ink-jet because I was uncertain if I'd be happy with the quality of the printouts. Well, after going to CompUSA in Atlanta and actually looking at the text from some, and doing the research for the feature article in this issue, I've decided that an ink-jet should be at least as good as my printer's Apple Laser is now. In fact, there may be an increase in quality. Right now I'm leaning toward the Canon BJ-200e (reviewed in this issue) or a Canon BJ-230. Both are three page per minute 360x360 dot per inch printers, the only difference is that the 230 prints up to 11x17 inches, the 200 only 8.5x11 inches. The extra may come in handy for other jobs. The HP DeskJet 520 also looks interesting with it's 600x300 dot per inch resolution, but it is larger than even the BJ-230. Decisions, decisions...

The surveys have been steadily coming in. In fact, almost a third of the subscriber base responded within days of receiving the last issue. If you haven't sent yours in yet, please do! I'll let everyone know the results as soon as I get the data compiled (it takes a while to go through these things!).

I did sort of screw things up though. The memory question is almost useless, as I overlapped the choices! Do you have 512K if you checked 128-512K box, or do you have 512K when you checked the box marked 512K-1MB? My mistake... will correct it on the next survey. I also forgot to mention hard drives, but some CoCo people with hard drives have been writing that fact in. The main thing I hope to glean from this survey is system types and usage, and that is coming through pretty clear.

< 268'm >

~~PROGRAMMING CONTEST!!!~~

FARNA Systems has set aside some cash and prizes ($150 total!) for a programming contest!

ALL COMPUTER TYPES SUPPORTED BY 268'm ARE ELIGIBLE!

Send a disk with a running copy of the program as well as an ASCII listing of the source code or BASIC listing, running/installing instructions, and a description to FARNA Systems PC, Box 321, WR, GA 31099 by September 1st, 1994. Programs may be of any type.

First place gets $50 cash, Second place gets $25!

Letters to the Editor

The thing that interested me [about 68' micros] was getting some insight into the different users of OS-9. Just knowing who is using the OS and for what is useful information to me. I am hoping that your magazine might lead to contacts with people who may have goods and services that I might find helpful. I am particularly on the lookout for development tools above and beyond the normal suite of C compiler, make and the Bourne like shell that we are using (I don't know where we got it as it was acquired before I arrived on this scene). As I believe I said in my original letter to you I would love to get the source code to fix some of the bugs and incompatibilities with the real Bourne shell that drive me up a wall.

Our use [at Polaroid] of OS-9 is to provide the intelligence in a medical imaging laser printer. We are using the real time aspects of OS-9 as well as the fact that it supports Ethernet, SCSI (both for local disks and for external images) and supports our target Tadpole 68030 based VME CPU card.

We have been doing our development on the OS-9 system but are moving more and more toward our Sun based cross development environment. I'm afraid that the OS-9 development system is a poor second to the highly robust and feature full Unix environment provided by Sun.

A CoCo was my 2nd computer. My first was a 6809 system bought from someone who's name escapes me at the moment. It ran the FLEX operating system which I had to port and write my own disk driver for. We later bought a CoCo for games for our two sons and by reading the 68 Micro Journal that I subscribed to at the time found out that OS-9 could be had for the CoCo. The machine was the original 64K grey case with a single drive that I expanded to two drives for the bargain price of $200.00. I bought OS-9 as a cheap way to run a UNIX like OS. I played with it for a spell but tended to stick with the FLEX system as I was developing a machine controller for a customer using a 6809 CPU on a board of our design and FLEX had an assembler that allowed me to write relocatable modular code which OS-9 didn't. The FLEX system still stands although I rarely use it. I find it rather amusing to have this old, floppy based 6809 system where my console terminal is a Sun SPARCstation with 16MB of memory and 2GB of disk running Kermit over a serial port. I still use it because I am still supporting this same customer. Actually, I still have the original CoCo, OS-9 disks and one each of the Radio Shack an Microware OS-9 manuals. I hate throwing things out that still work.

I got involved with real UNIX later on in my work and bought some 68000 boards from my employer. They were originally targeted as the main CPU for a circuit board tester running NIX but the project was killed and I bought several boards because they would run UNIX. These boards have a 68000 CPU (8MHz I believe) with 512K of ram, two serial ports, parallel I/O and a SASI port (SASI is the same as SCSI but doesn't support the full command set). The CPU can be upgraded to a 68010 and the memory can be upgraded to 2MB using 256K d-rams. I have complete schematics for the boards which by the way are VME compatible although not the actual VME form factor (the boards are larger). They also have a prom monitor embedded in the 27128 (4) EPROMs on board. The boards were intended to be run in a card cage but I have run them as single board computers using an external power supply. If you think that these boards could be of any use to any of your readers I would be willing to let them go at say $100.00 apiece if you think that is reasonable. I have about six of them. Let me know if it is worth advertising them.

Another thought about a platform for OS-9 is a bit off the wall but I'll mention it anyhow. The Sun 3 line uses the Motorola 68020 or 68030 chip as its engine depending upon which model 3 you are talking about. All have an FPU and all have memory management although I believe that in the case of the 020's the memory management is Sun designed. My point is that complete Sun-3's can be had for several hundred dollars on the used equipment market. I know of several vendors who would sell such systems. A typical Sun-3 has 4MB ram minimum with some expandable to 24MB using 1MB SIMMs, a built in SCSI port, a built in Ethernet port, two serial ports, video (1152x900 typically to a 19" monitor which can be either mono or color), keyboard and optical mouse. That's not a bad deal if someone would port OS-9 to it.

Charlie Jack
jack@temerity.polaroid.com
(617)-386-4479:voice
(617)-386-4360:fax
(508)-655-1471:home

Charlie, OS-9 would indeed be great on a used Sun, but gosh those things are big! Really, the only problem is Microware's licencsing policies and the cost. The port would have to sell in the $300-$400 range unless there was definitely a large market for it, and there isn't a large market for anything in the OS-9 works at this time, mainly because of it's industrial nature... most applications are custom jobs that never leave the factories and are often considered trade secrets. But porting to the Sun is a thought...

How are you doing? Good I hope. I'm... well, in Korea. I've finally got an address and I'm anxiously awaiting my missed copies of "68' micros".

Again, I want to thank you for the piles of good info, the software, and disk drives. I'm looking forward to sending in software, so that the last of the great CoCo mags, or better stated the last of the valuable computer magazines, might be a little thicker.

I've met a couple people who have computers here ("Eye Bee Ehms"). All seem to hate the CoCo with a vengeance that's almost sacrilegious, and insist on calling it a "Trash 80". It's a good thing it doesn't have ears (yet).

Also, if you can, could you make an inquiry as to anyone who's been here and knows if there's any CoCo stuff around to be had, and where, if any? Only a CoCo owner would know. I'll keep my eyes open and let your readers know if I find anything.

Dan Concepcion
80 FS
PSC #2, Box 171
APO AP 96264

Dan, I don't think you'll find anything in Korea specifically for the CoCo, nor much hardware at all. There were a couple computer stores at Osan when I was there six years ago, but they dealt mainly in illegal IBM, Apple, and a little Commodore software. They may have been shut down by now. They only had a little hardware, an occasional modem, maybe some memory chips or a disk drive, but that's about all. The BX at Osan may be your best bet at finding anything at all. Other than that, most of the vendors here will be happy to send to an APO address. It is basically a stateside address, the USAF transports it overseas for no additional charge. It will take a couple extra days to get there though.

When you mentioned the term "sacrilegious" with the computer reference, I don't think you realized just how correct you are! If you want to see something, get the IBMers talking about different word processors. If one prefers a WP the other doesn't care for (but prefers a rival company's), they'll get the same way! We CoCo people are loyal to our machines, they are to theirs (IBMers) also. Only they tend to think they have "divine rights", being blessed by Big Blue, so to speak. IBM didn't get to be the biggest name in computers (I'm including clones here also) because they are the best, but because IBM was big in business, and business adopted the PC because of this endorsement. With the PC entrenched in business, it was only a matter of time before businessmen brought it home.

The term "Trash 80" did NOT originate with the CoCo, but the TRS-80 Model I. These early machines were cantankerous at times (1979... two years BEFORE IBM!).

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Letters are printed on a space available and popular subject matter basis. If you don't want your letter printed, or wish to withhold your address and/or name, please state so when writing. In some cases, letters are edited for space and/or clarity. If a personal reply is desired, please enclose an SASE.

The Printed Word:

F.G. Swygert

Which printer is right for you? Here are the options...

Personal computers came along and people heralded the "paperless" office. Now people had access to all sorts of information right on the screen. Little did they realize at that time that computers would generate more paperwork than ever before! Information on the screen is fine, but it is difficult to handle and can't always be taken home, to conferences, worked on during flights, etc. In fact, a computer is pretty much useless without a printer.

Before the personal computer, it was difficult, time consuming, and costly to get reports. Now, all one has to do is send the report to a printer and there it is! Here at Robins AFB, it happens on our network all the time. Someone needs some information? Send it the 2000 line per minute band printer and a 1500 line report is generated in a minute or so (a line in this case is 136 characters... that's 4,533 cps, and yes, it IS that fast!). Instead of creating less paper, the computer generated much more.

So that brings us to this issues topic- computer printers. In the early days one really had to have a printer of some sort because there were no video terminals. Everything was routed through the printer, as it served as a "display" as well as an output device. This could be simulated with an OS-9 system easily by routing standard output to the printer instead of the screen. Try it a while and you'll really appreciate your monitor. Many computer hobbyist worked with rebuilt (and expensive, usually $1,200-$1,500, in 1977 dollars) Teletype machines. These served three purposes: input, output, and mass storage. Most Teletypes have a paper tape punch that could store messages in five bit code. So programs consisted of rolls of 3/4" wide paper tape. These could then be stored and read back into the computer through the same device that punched the tape. A paper tape could be used about 10-12 times before it started to show wear and produce errors. Luckily, my experience with this type storage was with an actual teletype machine used to send messages, not computer storage! Teletypes are basically 80 column dot-matrix printers.

Some long time computer users will remember things such as the TRS-80 TP-10 and Sinclair 40 column thermal printers. These were essentially cash register mechanisms converted for computer use. The first such printer was made by South West Technical Products Co. It cost an amazing $250.00. Amazing was the low price... the least expensive printer until that time was the used teletypes, which were big and noisy also. The next company to break the $1000 barrier in computer printers was Centronics with their model 779 in 1977. This was a large dot-matrix printer that printed 80 columns at a speed of around 80 CPS. Centronics printers soon became so popular that every printer maker adopted their interface connection as the standard. I'll bet some of you didn't even know there was a "Centronics" company that once made printers. That's where the name of the connector came from though. Soon after in 1978 Epson, a Japanese company, introduced their first printer in the US for under $600.

A lot has changed since then. A reasonable quality printer can be purchased new for around $150. The $1,500 that at one time bought a used teletype can now purchase a very well equipped laser printer.

Which Printer Is Right For Me?

There are basically three types of printers sold today: dot-matrix, ink-jet, and laser. Daisy wheel printers are still occasionally found, but have been far outdated by inexpensive lasers and are generally not a good purchase. Daisies have the disadvantages of being slow and inflexible. They can only type text and the size and type of the wheel installed. Unless you are really hurting for a printer and find one at a really low price, stay away from them! Of course, there are still some companies with the need to fill in forms and don't want dot-matrix, so there is still a small demand for the occasional daisy wheel printer. This demand is generally filled by companies who specialize in rebuilding the old, very reliable Diablo models (Diablo is a Xerox company).

Dot-Matrix

Most low-cost ($100-$200) printers today are dot-matrix types. They are so called because they print tiny dots in a matrix to make each letter. Look closely at a printed page from a dot-matrix printer and you can easily see the dots, especially if it is a nine pin. The number of pins (either nine or twenty four) determines the print quality. This number represents the number of pins, or dots, tall each character is. The more dots, the better the print quality. Nine pin printers usually print two rows of dots slightly overlapping to produce near letter quality (NLQ) print. That's one reason they are slow in NLQ mode. Twenty four pin printers don't have to make two passes (though some do) for NLQ print, so are much faster.

For general purpose use, a twenty four pin printer will please most people. Graphics and text are clear and sharp, and the average cost is under $250. For the frugal, or as a second draft printer, the nine pin can't be beat. Average prices are around $150, and many can be found for less. There are price exceptions- very high speed business dot-matrix printers run from $300 (300 cps) to $1350 (500 cps) for nine pin models. These are usually used for high speed listings and long reports or forms.

There are many high quality dot-matrix printers in the $200-$250 range that have many features found in more expensive ink-jet and laser printers. They have sheet feed paper trays built in as well as tractor feeds for continuous paper. Print speeds are around 180 cps in NLQ mode (about 2 ppm). And they are quieter than many older dot-matrix types (noise has to be the boon of dot-matrix printers!). The best of the lot are the Citizen GSX-220 and Epson AP-3250 (both 24 pin and just under $200). Epson also makes a nine pin model, the AP-2250, priced at around $150. Citizen offers a color kit for the GSX-220 for $60-$65 more.

Ink Jets

Many ink-jets approach the cost of a high quality dot-matrix printer, beginning in the $225-$300 range and working up to as much as $2500+ for some high quality color models (we'll concentrate on the lower cost ones in this article). They also give laser-like output at a fraction of the initial cost. In fact, a few ink-jets are print at higher resolutions than low cost lasers, making them more attractive for low volume graphics work. The Epson Stylus 800 is one, printing 360x360 dpi (dots per inch). Hewlett-Packard's DeskJet 520 prints at 600x300 dpi. Ink-jets are also very quiet, even quieter than many lasers.

Ink-jets lack the speed of lasers though, usually printing at 2-3 ppm (pages per minute). The cost of printing is also higher when using manufacturer recommended supplies. If you don't need a high volume of high quality printed material, then an ink-jet is a definite consideration. If you print more than 100 or so pages a week, a laser might be more cost effective in the long run.

One big field enjoyed by the ink-jet today is in color printing. Color lasers are available, but they run $5,000 and up. Good laser-like quality color ink-jets start as low as $400. One of the best, the Canon BJC-600, is under $600.

Laser Printers

If you need letter quality correspondence or high resolution graphics printed, you probably need a laser (provided you need more than 100 pages a week). Good laser printers now start around $500, making them affordable for more people than ever before. The typical low cost laser will print 4 ppm, 300x300 dpi, and come with only 512K of RAM. 1MB is needed in most cases to print full page graphics. Move up to a slightly faster model ($600+), around 6 ppm, and you will usually have 1MB initially. Since 1MB upgrades cost anywhere from $50-$150, it might be a good idea to get the faster printer. An exception is the Okidata 400e. This printer incorporates special memory enhancement techniques that make 512K work like 1MB. Moving up to the $1,000-$1,500 range will buy one 2MB or more of RAM and 600x600 dpi, and in many cases Postscript capability.

There are generally two types of laser printers — true lasers and LED types. The true laser has a single laser gun that scans back and forth (much like a TV tube gun) and a rotating mirror that aims the laser beam. An LED printer has a print head made up of many tiny laser LEDs. The LED type has fewer moving parts and should last longer before any major service is needed and is more rugged than a true laser. The rotating mirror can become misaligned after a time or during moving, causing unfocused printing. If you need to move the printer often, consider an LED model. All Okidata and many Sharp and Texas Instruments models are LED types.

Overall Costs

The initial cost of a printer is only a small part of the overall cost. How much will it cost to use the printer? The cost of consumables often exceeds the cost of the printer in the first year of printing. Of course, if you do little printing (such as the typical home user) consumable cost is of less importance.

You should also keep your dot-matrix printer even if you get an ink-jet or laser. Although your first reaction may be to use the more expensive printer all the time to "get your money's worth" out of it, you will save in the long run by using the dot-matrix for long listings and draft work and save the in-jet/laser for final copy and proofs. Another cost saving tip is to only print what really needs to be printed. Maximize your screen editing and reviewing first, then print a draft copy on the dot-matrix. If you do this you will minimize printing and maximize savings. If you must use your ink-jet/laser for drafts, make sure you set it for draft mode or turn the darkness level down to minimize ink/toner usage.

Recycle!

Another way to reduce costs is to reuse ink products. Ribbons can be re-inked several times with aftermarket devices or through special services (see ******* ad in this issue). Remanufactured and recharged toner cartridges are available, and refill kits are marketed for the popular HP5x0 and Canon ink-jets (there isn't a refill kit for the Epson Stylus yet).

There are a few things to be aware of when using remanufactured products. Ribbons are pretty easy- if they are cloth type and aren't frayed, they can be reused about five to six times. Ink jet cartridges are the same, but there is an added problem: all manufacturers recommend that refilled cartridges NOT be used. Any damage caused by a refilled cartridge will void the warranty. Most users will consider this a ploy to get them to spend more on OEM cartridges, but the truth of the matter is that the cartridges were really designed for one time use. They all have very tiny holes and some circuitry made into them. It is possible (but not likely) that damage to the circuit or leaking ink could damage the printer. The manufacturer is just looking out for himself, since he has no quality control over refilled cartridges. Do be careful and follow refill instructions to the letter, as the cartridges are easily damaged.

Laser cartridges are a different story altogether. No manufacturer is known to void the warranty if a remanufactured cartridge is used, but manufacturers do exclude damage caused by a cartridge not of their own manufacture from warranty service. There are really three different ways of reusing laser cartridges. They can be recharged (simply refilled with new toner, old imaging drums retained), remanufactured (refilled and worn parts replaced, but not the drum), or reconditioned (remanufactured with recoated imaging drums... in some cases the drums are "hard coated"). One can get recharging materials and instructions from several sources. The best source for instructions and material sources is Synergetics, run by Don Lancaster (anyone who has been in the electronics hobby for long has probably read one or more of his books). If you buy reused laser cartridges, make sure they have at least a replacement guarantee, as occasionally a drum will go bad after a few pages.

Paper

Paper is a big consideration for ink-jet and laser printers. There are premium 24 pound "laser" papers available for around $12-$14 per ream (500 sheets; Hammermill Laser Plus). If quality of output is the number one priority, get it. If good quality output is needed but economy is still an issue, 20 pound copier paper will give very good results. In my Air Force office, that's all we use in all our lasers- the same paper used in our copiers. The master for this magazine, however, is printed on 24 pound laser paper. But then it will be used to reproduce nearly 300 others, so the quality of the original has to be very good.

Ink-jet printers need paper with a high cotton content, according to most ink-jet vendors. Paper that absorbs ink to fast will bleed and produce "fuzzy" output. It is best to try a sample sheet before buying a large quantity of paper.

Average Consumable Costs:

Laser Paper : Hammermill Laser Plus	
$14.00/ream	$0.028/sheet
20 pound bond :	(fanfeed about the same)
$03.00/ream	$0.006/sheet
HP Laser Cartridge: (average new)	
$80.00	$0.020/sheet
HP Laser Cartridge: (average reman.)	
$40.00	$0.010/sheet
Ink-Jet Cartridge: (average new)	
$25.00	$0.050/sheet
Ink-Jet Cartridge: (average refill kit)	
$12.00	$0.012/sheet
Ribbons: (average - vary widely)	
$04.00	$0.008/sheet
Reinked-Ribbons (average)	
$02.00	$0.004/sheet

Average Total Consumable Costs (rounded to nearest penny):

Laser w/ new HP cartridge, 24 # paper : avg. $0.05/sheet

Laser w/recharged cartridge, 20 # paper: avg. $0.02/sheet

Ink-Jet w/new cartridge, 24 # paper: avg. $0.08/sheet

Ink-Jet w/refill cartridge, 20 # paper: avg. $0.02/sheet

Dot-Matrix w/new ribbon, 20 # paper: avg. $0.02/sheet

Dot-Matrix w/reinked ribbon, 20 # paper: avg. $0.01/sheet

Only when using the highest quality materials is there much difference between a laser and an ink-jet in cost. When using remanufactured/filled cartridges and medium quality paper, consumable prices are nearly the same. The prices for ribbons are nearly impossible to estimate due to the wide variety and capacity available. An average of 500 sheets per ribbon was used (considering maximum quality output), with the ribbon price being an average for most Epson compatible 80 column styles. One will have to use the price of their particular printer's ribbons to come up with a reasonable estimate, and the manufacturers recommended ribbon life.

< 268'm >

The Third Annual "Last" CoCoFest

F.G. Swygert

One hell of a time in Elgin! (one hell of a time getting there too!)

Three weeks before the 'fest...

Last year I rented a car to go to Chicago. That cost me $184.00, but I still came home with about $300.00 after all expenses were paid. Not bad, but $184 more would have been nicer!

Why did I rent a car last year? Well, the same reason I was about run ragged for the three weeks before the 'fest this year! You see, my other big hobby is antique cars, especially AMC products. I have a 1963 Rambler American sedan which I have had for the past nine years. In fact, I've had a '61-'63 American since 1978 (these three years are virtually identical), except for about 18 months. Got rid of the one I had (a '62) when I decided I wanted to get married (sometimes I think I should have kept the car and not got married, but then everyone who has ever been married knows that there are always times like that, and others when you're glad you have the wife!). I joined the Air Force and then as soon as we were settled down had to find another Rambler! So I bought the one I have now.

Eventually, the engine needed a full rebuild. I'd rebuilt or repaired everything to this point except the short block (bearings, pistons, and rings for those who don't know what a short block is), so that came out and was rebuilt before the fest last year. Delays at the machine shop doing some of the work meant I didn't get it together in time to drive to Chicago.

I had a minor engine problem recently and had to remove the oil pan. I then discovered the rod bearings were nearly worn out after only 2,000 miles. Must have got some bad bearings or the machinist didn't grind the crank right, but I figured I'd just replace the bearings. An easy weekend job, no problem! Well, that's when the problems started. First, the bearings weren't the right size. The old bearings I had originally were mis-boxed and marked with the wrong size. So the crank had to come out and be ground (bearings are extremely hard to find for this thing!). Still didn't turn over right! Had to pull the pistons and rods. Now I noticed something wrong... the rods should be positioned a certain way inside the engine. The machine shop had put the rods on the pistons backwards and I didn't notice when the engine was first assembled. The engine was a little hard to turn then, but after running like that a while the rods were mis-shapen and had to be "re-sized" by a machine shop. And more parts had to be ordered, again, hard to find parts! This got to be quite a headache and worry. Luckily, I had enough time while waiting for parts to get my materials together, and to start with this issue of "68' micros" so it wouldn't be to late.

Now for the 'fest!

I headed out for Chicago on Thursday morning, 19 May, at 5:15AM. The plan was to go through Atlanta GA, Chattanooga TN, Nashville TN, Louisville KY, and Indianapolis, IN, before stopping just shy of the Illinois border for the night. Well, the Interstates were clearer than expected, so I made my goal for the day in fourteen hours. I even got off the Interstate in Indiana and took some country roads.

At 7:00PM, I decided I wasn't tired and would just be bored for three or four hours before being able to sleep, so I drove on, figuring to stop just before getting into Chicago. Well, I missed the exit for Motel 6 on the east side of Chicago! Since traffic was moving right along, I continued through the city. Traffic coming out of the city was moving too -- about 20-25 MPH. I got into that exiting the west side also, but only for about 30-45 minutes. I skipped the toll road this time but had no problems. It was a little late and I was starting to get tired around 9:00PM, but since I had just got out of Chicago and was only an hour away from Elgin, I drove on. I arrived in Elgin about 9:45PM and checked into the "Super 8" just across I-90 from the Holiday Inn. I had pulled into the HI parking lot, but since it looked full I decided not to stop. Note that all times above are in Eastern Standard Time; it was actually only 8:45 in Elgin.

The first people I saw the next morning (about 10:00AM) was the Texas crew, who had arrived about an hour or so earlier. This was Allen Huffman and Terry Todd of Sub-Etha Software, Tim Johns of JOTA Productions, David Graham of BlackHawk Enterprises, and Tim's fiance, Katie (they'll make a nice couple... Tim needs someone to keep him in touch with reality and get him away from his computer every now and then-- Katie is just the one to do it!). They *thought* they were the first arrivals, and were a little disappointed when I told them of my arrival time the night before-- seems *I* was there first (as far as vendors go anyway)!

These guys rented a vehicle to come north also, a full size passenger van. Smart move, didn't cost them as much and no one had to do all the driving (though Terry Todd did most). They swung through Enid, Oklahoma, on their way to pick up David Graham. For those who are curious, Lufkin, Texas, is sort of between Houston and Shreveport, Louisiana.

We all finally got rooms between 12:01 and 2:00PM. We lounged around in the hot tub and talked around the pool until then. The Texans got pool-side rooms. I remembered to ask for a first floor room, but got stuck in the far end of the tower. Will remember where to make the reservations next year! A second floor pool-side room would have been much closer to the other vendors and the showroom.

Rick Ulland (CoNect... also my roommate for the fest) and Brother Jeremy arrived later that same evening, as did most of the other vendors. A group of us got together and headed out to the Ponderosa steak house in Elgin. It took us at least an hour to make the ten minute trip. Took us that long to get back also. Hey, it's just around about five corners and only around a mile and a half, maybe two from the Holiday Inn. It's the five corners that's the problem! In riding around later, I discovered that by heading directly north on highway 31 (the road the Holiday Inn is off of!) almost everything one could want is right on either side of the road after crossing under I-90, including a Ponderosa about three or four miles down the road! It may be further, but it's a straight shot and only a total idiot (which we felt like after getting lost both to and from the Elgin Ponderosa) could possibly get lost! Something else to remember for next year.

The showroom wasn't available the night before for vendors to set up. We all met outside rooms and reacquainted ourselves and talked shop. The inn was ours!

About 7:00AM the Glenside members got the showroom doors open so vendors could set up their wares. It was about this time that I discovered I had

left the remote keyboard for my main CoCo (the "T2000c", from Vol. 1 #3) at home. No problem, I had the portable ("CoCo3Go!", from Vol. 1 #2) and the keyboard for it was wired the same... supposedly! It seems that while I had intended to wire the keyboards identically just in case I had a problem with one or the other, I actually had them wired directly opposite of each other! I should have tested this a long time ago, but to late now! So I made do without the hard drive (which I had intended to get up and going with some help from Rick) and the 3.5" drive. Luckily, Chris Dekker, who I had allowed some booth space to show his wares (that's why he isn't in the program, for those who attended), had brought a 512K CoCo3 but no monitor, just in case something like this happened! So we set his machine up with my monitor and set my machine off to the side.

The fest itself was great! There were a few familiar faces in the crowds, people who never seem to miss a fest. Luckily, these loyal people continue to buy and support the CoCo and/or OS-9, so it is nice to see them in the crowd. The seminars were pretty well attended, and all the vendors I talked to afterwards were pleased with the results.

There were several new and interesting items that stood out at this years 'fest. The most important was a point of sale (cash register/inventory system) running on an MM/1. The system was all text based, allowing support for inexpensive RS-232 terminals and not special networking support other than OS-9/68K's built-in multi-user capabilities, though I seem to remember that plans were to support the network capabilities of the MM/1 for larger systems. Drivers were in place to support a cash drawer, barcode scanner, and credit card reader. The system was demonstrated to me and would readily read credit cards and scan codes correctly-- it is nearly market ready, at least ready for some more extensive field testing. The author has been using the system in his personal business for some time now, the reason for it's relatively mature state of development.

The author's goal is to aim for the middle ground of the retail business--those businesses with requirements for between 10 and 30 or so checkout stations (more or fewer can be easily supported though). This system is expected to be priced along with existing MS-DOS PC based systems with similar capabilities, though it as yet to be determined (my best guess is in the $1,500 -$2,500 range). The author had started some negotiations with William Wittman, an MM/1 dealer.

I started out attempting to sell complete POS systems for MS-DOS machines several years ago-- actually have two installed and running to this day. The main problem I had was the expense in hardware that was required to have as few as two checkout stations. Complete PCs with hard drives were required for each station, along with a network card, cabling, and the network operating system itself. This made an expensive setup, and another $2500+ was required to add a third unit. With the multi-user and dumb terminal capabilities of OS-9/68K, much of this expense can be abandoned. Even if the system is priced so that it is no cheaper to install with two checkout stations than a PC based system would be, it would cost only around $1000 to add additional stations using high quality Wyse 60 terminals. Contrast that to the $2500+ for each PC based station-- and there is a limit (usually 10) to how many can be used with a low-cost network system. The OS-9/68K based system is limited only by the speed of the system, which limits more the number of users who can be on at the same time rather than the physical number of stations. A text based system shouldn't tax the processor as much as the heavily graphics based MS-DOS systems. This should be a winning application.

Since I'm on the POS subject, I'll mention that FARNA Systems has also developed such a system. OS-9 Point of Sale, currently for the CoCo3 and Level II only, is not as extensive as the MM/1 based system. There is no barcode or credit card reader support, and probably won't be in the near future (if ever). But this was designed for the small business that requires no more than ten stations, with one to five being the more likely numbers. Other than the above, all necessary POS functions and a few bells and whistles are present (there will be cash drawer support). The price for this system is also CoCo level-- $60. The Alpha version was all that was at the fest unfortunately, a full working version will be available in the next few weeks. We are planning an OS-9/68K version at a later date.

Other notable items included:

• Neil Brookins' bible search software. He now has at least five different translations available for OS-9 machines (including the CoCo3).

• CoNect demoed a *FAST* RS-232 port for the CoCo. They make a standard 65c51 based port that goes up to 9600 baud, but the fast version uses a different chip that supports up to 56,700 baud! Now that's fast! Only the demo was ready for the 'fest, he should have a few ready to send out by the time this reaches readers. Price will be $80 plus Rick's standard $4.00 S&H charge.

• CoNect also had the prototype of a new case for the CoCo, dubbed "the cube". This is a tower type case custom designed specifically to hold a CoCo, MPI, and just about any available accessory (Puppo keyboard adapter, RS-232 ports, hard drive adapters, etc.). It has four drive bays for 5.25" devices. The lower bays are oversize, allowing two 3.5" drives sideways in each, for a possible total of six drives. This thing was designed to be easily accessible-- each side swings totally open. Rick will mount your system in one, or will sell a complete setup with a CoCo 3 ready to go ($274.95 with 512K). These systems are slightly modified with a 6309, remote keyboard and RGB connectors, and an external 85 watt power supply (enough for two floppy and two hard drives). The prototype was a little rough, but the production units will be finished a little better. They'll be ready for delivery by the time this is out also. Ask for price of empty case so you can mount your own CoCo or if you send your complete system in for mounting by Rick.

• A surprise vendor this year was BlackHawk Enterprises. David Graham (owner) was selling some RS-232 paddle boards and such, and also some updated telecommunications software, as well as taking orders for MM/1s and answering questions. I spoke with David after the 'fest, and he was pleased with the response he got. Don't know if he'll make Atlanta, but he hopes to return to Chicago next year.

• Color Systems had a couple new items for the MM/1-- K-Windows Chess (which looked really good on screen) and X-10 Master Control software. There will be two versions of the X-10 stuff, one for K-Windows (graphical!) and one for generic OSK (terminal/text based). See "MicroNews" for more on this one!

• Nelson Howard, SYSOP of the "Crystal Palace" BBS, had his latest OS-9 Level II BBS software running. This system has many new features currently unavailable to the CoCo. More info in "MicroNews" on this one also.

• Sub-Etha had a couple new items also. There was a new word processor for the MM/1 by Joel Hegberg and TOWEL, a point and click file utility for the CoCo 3.

• Chris Dekker , though not mentioned in the 'fest flyer, attended. He wasn't listed because I gave him some room in the FARNA Systems booth in exchange for some help running things. He had an OS-9 version of Terry Simon's "Home Pac" software. This neat package has a checkbook register, telephone and address database, prints mailing labels, and more... just about everything a home business (or just home!) needs except a word processor. The DECB version is available through Mid Iowa and Country CoCo Club, Chris is the source for the OS-9 package.

I know I missed some things, it is difficult to man your own booth and see all the new things. I didn't even get to attend any of the seminars this time, though I did have Chris Dekker helping me out. If I left something out, let me know and I'll get an update in the next issue. See the sidebar for attending vendors and addresses.

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This Year's Chicago CoCoFest Vendors

A.R. Smith / R.C. Dages
(NO ADDRESS)
Adventure Survivors
24 Perthshire Dr.Peachtree City, GA 30269
BarSoft
Box 281, Lake Villa, IL 60046
BlackHawk Enterprises
Box 10552, Enid, OK 73706-0552
BudgetWare
Box 3422, Omaha, NE 68103
C. Dekker
RR#4 Centreville, NB E0J 1H0, Canada
Chicago Area OS-9 USers Group
10 McCarthy, Park Forest, IL 60466
Color Systems
Box 540, Castle Hayne, NC 28429
CoNect
449 South 90th, Milwaukee, WI 53214
Crystal Palace BBS
2193D Drive South, East Leroy, MI 49051
DALTRUG
8809 Linda Vista, Rowlett, TX 75088
DELMAR Co.
Box 78, Middletown, DE 19709
Digigrade Productions
1325 West Lincoln Hwy Apt. #412A, DeKalb, IL 60115
FARNA Systems
Box 321, Warner Robins, GA 31099
Fat Cat Publications
4650 Cahuenga Blvd. Ste#7, Toluca Lake, CA 91602
Frank Hogg Labs
204 Windemere Road, Syracuse, NY 13205
Glenside CoCo Club of Illinois
208 Glen Ellyn Road #306, Bloomingdale, IL 60108
HawkSoft
244 South Randall Road Suite #172, Elgin, IL 60123
JOTA Productions
Box 4657, Nagodoches, TX 75962
JWT Enterprises
5755 Lockwood Blvd., Youngstown, OH 44512
Ken-Ton Electronics
(FARNA Systems is exclusive dealer!)
Nell G. Brookins & Co.
491 Bethlehem Pike Apt.G-4, Ft. Washington, PA 19034
Northern Xposure
7 Greenboro Cres, Ottawa, ON K1T 1W6, Canada
The OS-9 Users Group, Inc.
6158 West 63rd St. Suite 109, Chicago, IL 60638
South Bay Users Group (SBUG)
1251 W Sepulveda Blvd. Suite 400, Torrance, CA 90502
Strongware
Box 361, Matthews, IN 46957
Sub-Etha Software
Box 152442, Lufkin, TX 75915

Remember to mention that you got the address from "the world of 68' micros" when you write for catalogs!

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CoCo Hard Drives

Rick Ulland

The most popular CoCo hard drive system- the Burke & Burke CoCoXT

The following article was written primarily by Rick Ulland. The editor added information from articles uploaded to Delphi by Chris Burke in 1987.

The Burke & Burke CoCo XT system was at one time the ultimate in cheap CoCo hard drives. It takes advantage of the bazillions of PC/XT (eight bit) hard drive controller cards made over the years by providing a 'close enough' version of an IBM XT buss and software to run one (hence the name!). The CoCo XT is just a host adapter (interface)- you must supply the PC type controller and drive. It is still a fast system, with good hooks to both OS-9 and DECB, but now has a problem familiar to many CoCo users- the parts are getting harder to find new...

With PC/XT's all but vanished, these cards are harder to come by. Buying a new 'controller' is expensive- these puppies are still advertised in magazines like Computer Shopper, but at vastly inflated prices (around $50), considering that they are pretty much obsolete. The MFM or RLL drives required are also relatively costly new. Typically, 20 Meg hard drives are available mail-order for an average of about $65 refurbished (90 day warranty) and $150 for the same in 40 Meg size. There are always specials on many of the older MFM drives. I've found them as low as $34.95 for brand new Seagate ST-225 drives (half-height, 5.25", 30 day exchange warranty only).

Hard disk cases with built-in power supplies are available for around $80 new. One of the old Tandy full height floppy controller cases will also power a single half-height hard drive and one floppy with no problem, provided it is the case with the transformer hanging off the back. Newer floppy cases with internal transformers just aren't up to the job. A typical 5.25" hard disks needs at least 3 amps at 12 volts and 1 amp at 5 volts to operate correctly. Some older hard disks need as much as 5 amps at 12 volts when they first start up. Power supply capabilities are often expressed in Watts. Your hard disk power supply should be rated for at least 40 Watts in order to provide the voltages and currents listed above. If you have 2 hard disks, you could need twice this power. If you know the voltage and amperage of a power supply, you figure Watts by multiplying the two: 5 volts at 1 amp = 5 Watts, 12 volts at 3 amps = 36 watts, for a total of 41 Watts output.

Not all PC-compatible hard disk controllers are alike, and some older ones will not work with the CoCo XT (nearly all newer half length "generic" 8 bit controllers will work). The hard disk support software, and the mounting screws in the interface housing, are optimized for use with particular hard disk controllers. Some controllers that work well with the CoCo XT hard disk interface are:

Western Digital WD1002A-WX1 (MFM)
Western Digital WD1002S-27X (RLL)
Western Digital WDXTGEN (MFM)
All are "half length" cards.

All PC/XT compatible hard disk controllers include a 2K disk buffer. The hard disk controller reads from or writes to this buffer independent of what the CoCo is doing. Your CoCo does not need to slow down or "HALT" during hard disk I/O, because the hard disk controller takes care of all critical timing. This is one reason the B&B is so fast. Since interrupts aren't used, the CoCo XT can be used in conjunction with interrupt driven devices, such as an RS-232 PAK, without having to make hardware modifications.

A brand new B&B might run around $650 for a 40 meg system. Forget new. Look for old XT computers at the rummage sales and flea markets! Some of these $100 machines contain both the needed controller AND a drive- and the cables and a power supply, plus a neat box for that re-pack project you've been thinking about. Even if you have to buy two to get parts for one CoCo, the price is right- so shop for the drive/controller first. When you find one, $70 more fits all to your CoCo.

The best place to look for mail-order equipment deals used to be COMPUTER SHOPPER ($4 on news stands). There are fewer dealers of used and surplus equipment in CS nowadays, though some still advertise there (it's still a decent source). A better place to look is in an electronics hobby magazine called "Nuts & Volts". There are often free copies available at HAM Fests, so do check if there are any held in your area. While you're there, scout around for a used drive and controller. A lot of the HAMs use computers with their radio set-ups! Plus a case/ps.

Once the parts are in hand (that's the Queen's English, Frank) OS-9 installation goes swiftly. While a Multi-Pak is recommended, a Y cable will do (provided you supply 12V from an external source- the drive power supply is a good one!). The 62 position edge connector of the PC/XT hard disk controller plugs directly into the 62 position socket on the CoCo XT interface card; the combined interface card and controller then plug directly into the Multi-Pak's (Slot-Pak, Y-cable) 40 position socket (MPI slot 3- following the Tandy standard for hard drives). The height of the combined interface card and hard disk controller is almost exactly the same as the height of the original (full length- about 6") Tandy floppy disk controller. The CoCo XT is addressed in the range of $FF50-$FF5F when used in conjunction with a Multi-Pak Interface.

Drivers cover any machine from a jumpered C board on and 'crippled' non-formatting versions are supplied for publicly accessed systems. The driver of choice is simply added to OS9Boot, while the supplied ddmaker utility builds custom device descriptors to fit anything, and a free copy of EZGen allows one to fix up OS-9 in a painless fashion. This is as far as the base system goes- 2 drives, OS-9. More drives can be added, at the expense of an additional copy of the driver in RAM per each two drives (and another XT in the Multi-Pak). Burke & Burke drivers are recognized by both PowerBoost (natch) and NitrOS9- Nitro even includes a patch to avoid the 2 drives per driver limit.

Also supplied is the worlds slowest backup utility pair. Hdb can, over an evening, stuff a 20 meg drive onto a few dozen 720K floppies. Actually, it will give 35 track single siders a go- a scary thought! Hdr reverses the damage. Of course, any extra cost backup utility is faster and prettier, but these free ones work fine. A few odds-n-ends utilities like 'park' round out the package.

Disk Basic users haven't been left out- extra cost options include a B&B version of RGB-DOS or their own Hyper-I/O. Hyper-I/O forms what Chris Burke calls a 'Dynamic Disk Interface'- DECB has no idea what sort of hardware it's using- it sees 35 track, single sided drives. Lots of them. You might be using 80 track, ds floppies or 40 meg, six head hard drives- DECB doesn't know them from a 501. If you use both OpSys, OS-9 simply sees lots of (floppy sized) files it can't read or write- the mix of OS-9/DECB can change constantly, since there are no partitions to worry about. It's EPROMable, so one can build weird drive assignments and burn them in- most programs will be fooled into thinking DRIVE 231 is a normal thing to do. This means that you can add either HYPER-I/O or OS-9, or change the amount of hard disk storage allocated to either, at any time, without reformatting your hard disk. HYPER-I/O also allows you to use two hard disks of the same or different sizes if you so desire.

HYPER-I/O stores information on the hard disk in regions called "MSA's" (Mass Storage Areas). To OS-9, each MSA looks like a large data file; to HYPER-I/O, an MSA looks like an image of a floppy disk. Many different sizes of MSA are allowed, including standard 35 track floppy disk emulation and emulation of double-sided, 160 track super-floppies (up to 1.1 MB each!). Several different sizes can be mixed on the same hard disk. You can create up to 200 MSA's distributed across one or two hard disks.

RGB-DOS is a bit different from Hyper-I/O. For starters, it was designed for DECB use only. RGB-DOS must be burned into a ROM which takes the place of the original DECB ROM in the disk controller. Several new commands are added for hard drive use while others are enhanced. The main addition is that up to 255 floppy drives can be addressed. Drives 0-3 are the standard floppy drives while drives 4-254 are actually floppy size (35 track single sided, 156K) hard drive partitions. These are handled just like floppy drives. For those programs which will only run from one of the four drive numbers (0-3), a special command (DRIVE ON) transfers control from the floppy drives to the first four hard drive partitions (4-7). To use RGB-DOS with OS-9, the hard drive must first be formatted and partitioned using OS-9. The first partition can then be set up with RGB-DOS.

Incidentally, other drive systems (SCSI types) now have patches to use 512 byte sectors, rather than the CoCo's normal 256 byte ones. The XT has been doing this for years- the controller is reading/writing 512 bytes to the drive, but the CoCo is doing 256 bytes on it's side of the cache. No problem.

In use, the first thing you note is this thing is fast. Given the same drive, an XT outruns almost anything available for the CoCo. The drive also formats to it's full size, thanks to the imaginary 512 byte sectors used. There's not much more to add- just like a big floppy (or a thousand little DECB floppies), you don't think about it to much.

Besides the normal options- defragmenters and backup utils- there is XTROM. This is an EPROM that fits in the PC controller BIOS ROM socket (some aren't socketed) and boots directly into OS-9, or alternate OS-9 (two boots), if Multi-Pak is pointed to hard disk. The PC type controller's BIOS ROM socket is selected by a low on the CTS* pin. This allows the CoCo to access XT-ROM or other custom ROM's in the address range $C000-$FFFF. Note, however, that several of the address lines driving this EPROM are inverted by the CoCo XT interface board. Special equipment is needed to create a ROM that is compatible with the CoCo XT, and most "off-the-shelf" DOS EPROMs are incompatible. Wes Gale ran with this, and Nitro'd XTROM systems also have two startups and two autoexes. Running basic is as simple as moving the MPI slot switch back to 4 before powerup.

A real-time clock (and OS-9 drivers) is also an option- order the CoCoXT-RTC if you want the clock. Nice, and the battery is replaceable.

Provided one can find the drives and controllers used, the B&B is still the cheapest CoCo hard drive, and one of the fastest. I'm quite pleased with mine!

The CoCoXT is still available from Burke & Burke, Box 733, Maple Valley, WA 98038; phone 206-432-1814. CoCoXT - $69.95; CoCoXT-RTC - $99.95 (Hyper I/O and OS-9 drivers included with both); XT-ROM - $19.95; Hyper I/O alone - $24.95. There has been some difficulty in recent months contacting B&B, but recent customers do verify that these items are still shipping. Visa and Mastercard are accepted. Include $4 US, $5 Canada for shipping. COD accepted for US customers (add $3.75).

Editor's Note: *It seems that Burke & Burke has all but disappeared from the CoCo market. Several people have placed orders and not received anything after four to five weeks. I hate to get these reports, but feel I should pass them on. A couple vendors have been able to get CoCoXT units (check with CoNect), so be careful ordering!*

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A Typical User's Installation

Rix Seacord

Some time ago, I purchased a Burke & Burke CoCoXT/RTC interface. I finally got up the money to buy a controller and used hard drive with case and power supply. The controller was ordered from USA Electronics in Texas for 69.75+S&H including the cables. It took me about 10 minutes to install the controller and hook up the cables to the hard drive.

Installing the device descriptor and driver was easy with a program supplied by Burke called 'bootmod'. It allows you to pull out unused modules in your boot file and add new ones at the end. Following Chris's instructions, I used ddmaker to gen the descriptors and bootmod to create a new os9boot file. I also followed his suggestion of changing floppy D0 to F0 and naming the hard drive D0 and DD. 20 minutes for this one.

After formatting the drive with the standard OS-9 format util, I copied all of my files over from the system disk, re-booted and WOW it worked.

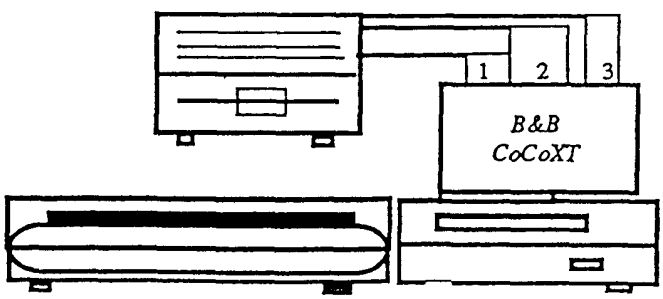
One of two problems was installing the clock battery upside down. The other was caused by not using the current disk Burke had sent. Other than that the installation was one of the easiest I have had in a long time.

Chris supplies all of the utils (except format) and drivers needed to support a hard drive on a level 1 or 2 CoCo 1,2 or 3. A util call clkget can be included in your startup routine to set the system clock. Another util called rtc can be used to display it.

Next, we installed Hyper-IO (HIO). This is a DECB enhancer. It sets up your drives, (4 ss/dd or 3 ds/dd) to run in a os9 like manner. After a few false starts, HIO finally allocated enough tracks on the HD to DECB. The 40 tracks appear to OS-9 as a large file.

I downloaded Bruce Isted's Megaread to run against the drive. With an interleave value of 4 it took 53 seconds to read a one meg file. Changing the interleave to 17 added 3 seconds to the time.

Burke & Burke CoCoXT System with hard and floppy drives in same case. Note that an MPI is ussually recommended, but some people have successfully used Y-cables modified to supply 12V to the controller. Cable 1 is the for the floppy controller in slot four, cable 2 and 3 are the hard drive data and control cables, respectively.



The HD6309E CPU

Robert Gault

PART 3: The advantages and disadvantages of using 6309 native mode with DECB.

Last time we looked at code to speed up the CoCo3 hi-res text scrolling routines. This will be the most obvious speed improvement that a 6309 can bring to the ROM code.

The second most noticeable effect will be caused by going from 6809 emulation mode to pure 6309 native mode. In this mode most instructions have at least one cycle shaved off their operation times. While this will produce a speed increase, the actual gain is unpredictable; depending on the specific code in question. Typical gains should be about a 20 to 30% increase in speed.

You may decide that the gain is not worth the trouble because you will also alter the accuracy of any timing loops. If I just lost you, consider that when your Coco makes a sound (SOUND, PLAY), the ROM code must time the intervals which make up the "sine" wave forming the tone. If the timing is shortened, the frequency of the sound wave will increase and the pitch will rise. Your Coco just went slightly out of tune and I don't mean "Desafinado".

Even worse, the bit banger serial port routines will also get "out of tune" which means that your printer won't work correctly. In this case, it is possible to change the baud rate printer constant at $96 and get the printer working again.

You may be able to live with the above but application software you have purchased may not. For example, my own program, CC3FAX, will not be able to correctly decode weather fax charts with a 6309 CPU running in native mode, unless I rewrite the code.

There is a second factor that may decide you not to use 6309 native mode. The 6809 and 6309 exhibit differences in response to interrupts. Your software won't know of these differences and could malfunction. A perfect case in point is the NMI routine in DOS 1.0 and 1.1. The OS-9 kernal will have considerably more problems with 6309 native mode.

Let's look at the DOS 1.1 NMI (non-maskable interrupt) routine.

```
org  $d8a1
lda  nmiflag
beq  $d8ae      return if not a floppy disk
                operation
ldx  dnmivect   get the disk nmi vector
                address
stx  $0a,s      store new return address on
                sys. stack
clr  nmiflag    clear the nmi flag
$d8ae  rti      return from nmi interrupt
```

The important point in the above routine is the STX $0A,S instruction. The nmi code was written before the existence of the 6309. The code expects that any interrupt - which automatically saves the registers on the system stack reg.S - will always have the PC image at $0A,S. The programmers had no reason to believe this would ever change.

The 6309 has several extra registers and interrupts, in native mode, save one of the extra registers on the system stack, reg.W. The chart below compares the 6809 vs. the 6309 stacking order.

6809	6309
0 CC	0 CC
1 A *D	1 A *
2 B *	2 B *Q
3 DP	3 E *W *
4 X	4 F * *
6 Y	5 DP
8 S/U 6 X	
$0A PC	8 Y
	$0A S/U
	$0C PC

You can see that in native mode, the NMI routine would not place the return address in the correct slot on the stack. You might ask what happened to backwards compatibility. The Hitachi designers had little choice but to place the E & F registers on the stack as shown. Just as the combined A & B registers make the D register, the E & F make up the W register; moreover A+B+E+F make up the Q register. True compatibility required that registers W or Q could be loaded directly from the stack with a single instruction, thus A,B,E, and F must be contiguous.

Before the Coco can run under Disk Basic in 6309 native mode, the NMI routine must be altered. You may have read in other sources that "... the system will crash with any attempt to execute sound functions, send or receive data through the rear serial port or perform disk I/O." The statement is only true for disk I/O for the above stated reasons. Sound and serial port functions don't depend on the NMI routine or special stack altering techniques.

The following code will alter the NMI routine and, when run, will place the 6309 in native mode.

```
00100    org   $7000
00110 start ldmd  #1  start native mode;
MD is a new register
00120    rts   return to Basic
00130
00140  org  $d8a9  DOS 1.1
00150  stx  $0c,s  alter code to
accommodate 6309 stacking
00160
00170  end  start
00180 * The above code should be
assembled and executed to place the
6309CPU
00190 * in native mode. This will affect
sound production and printer baud
00200 * rates.
00210 * org  $d7b6  DOS 1.0
00220 * stx  $0c,s
```

For Basic users:

```
10 POKE&H7000,&H11:POKE
&H7001,&H3D:POKE&H7002,1:
POKE&H7003,&H39
20 POKE&HD8AA,&H6C
30 EXEC&H7000
```

When all is said and done, what have we gained? That's hard to say, particularly as some programs may choke on 6309 native mode, EDTASM+ and EDTASM6309 are examples. ZBUG won't return register info correctly at breakpoints in native mode. In fact, EDTASM6309 forces 6809 emulation mode.

About all I can say is that in native mode at 2MHz clock speed, I have to change my 9600 baud rate constant from 7 to 9. This means that the printer port driver is running about 1.3 times faster for a 30% gain in speed.

Considering the small gain but significant problems associated with native mode, it should be used with caution. There is little chance of a user knowing whether native mode is safe with any specific program, Basic or OS-9. There is no universally accepted memory data byte in use as a flag for native mode and the MD register cannot be read to check for native mode. It is possible to write routines that test for active native mode but the overhead involved in accommodating both modes is significant.

I feel it unlikely that authors will alter mode sensitive programs to accommodate both modes. It is not even likely that authors will indicate whether programs are mode sensitive. My opinion is that the HD6309 is an interesting device for serious experimenters with hardware and programming, but it will have no effect on the Coco community at large.

I took the trouble to go through all three "Basic Unraveled" books looking for sections of code that could be made faster with 6309 instructions. I did not actually find many and only a very few sections of code

would make a significant difference if changed. I'll conclude this series of articles by listing some of these sections of code and include a patch for the CoCo3 unknown token bug.

The code is scattered throughout RAM making a Basic patching program unsuitable. Readers who want to try the patches will have to make use of an editor/assembler.

The code falls into three types of changes: 1) replace transfer loops with a block transfer instruction; 2) replace multiple register load/stores with a fewer number of shifts using a larger capacity register; 3) using the extended math instructions MULD, DIVD. I have not tried to measure the gain in speed of these changes but the cycle counts have decreased.

We have discussed type one changes previously and the type two change is obvious. Type three requires explanation.

The 6809 was, I believe, the first 8-bit microprocessor to incorporate a hardware multiply. MUL multiplies register A by register B and returns the result in register D. The operation is unsigned. The 6309 introduces a 16 by 16-bit multiply and two division operations 16-bit/8-bit and 32-bit/16-bit. All normal 6809 addressing modes apply to the above new instructions.

Unfortunately, the new instructions are of limited value where they should be of great value; particularly the division. The catch is that the new instructions are not unsigned but twos-complement math. If you are not familiar with this term, it means a signed number; ex. $0=0, $1=1, $2=2, $FF=-1, $FE=-2. An 8-bit register can only represent numbers from -128 to +127 in twos-complement math. Similarly a 16-bit register represents numbers from -32768 to +32767.

Most of the math routines in ROM require unsigned math. The sign can be easily added to the result in the last step if necessary. Attempts to replace the math routines with the new hardware multiplication or division instructions involves so much sign and overflow testing that the result is worse than the original. There are a few exceptions which are shown below in the listing.

The most useful is the 16-bit by 16-bit multiply. There is a relatively simple method of converting the signed result back to unsigned values and the total code just fits into the graphics routines requiring the multiplication. The gain in speed may be minimal as four 9 cycle MUL instructions are replaced with one 31 cycle MULD instruction. I know of no method for converting signed division results back to unsigned.

```
00100 * 6309 ROUTINES TO SPEED UP
BASICROMS.
00110 * BY ROBERT GAULT AUG. 1992
00120 * LAST MOD: NOV.4,1992
00130 * PARTIAL LISTING FOR
68'MICRO
00150
00160 DOS    EQU   1    0=DOS1.0
1=DOS1.1
00170 FPA0   EQU   $50   System
floating point numbers
00180 FPA1   EQU   $5D
00190 FPA2   EQU   $13
00200 FP0EXP EQU   $4F
00210 FP1EXP EQU   $5C
00220
00410
00420        ORG   $9732
00430        LDW   #$600
00440        TFRP  X,U
00450        RTS
00460
00470        ORG   $9FB5
00480 MUL16  PSHS  D,X
00490        MULD  2,S  This would be
great if the result was unsigned
00500        TFR   D,Y
00510        TFR   W,U  Signed product
is now in regs Y & U
00520        BNE   NOTZRO
00530        TSTW
00540        LBNE  MULP2
00550 ZERO   PULS  D,X,PC
00560 * CONVERT SIGNED 16BY16BIT
MULT TO UNSIGNED
00570 * IF ANSWER -; ADD POSITION
MULTIPLIERS
00580 NOTZRO LBPL  MULP2
00590        PULS  D,X  RECOVER
STARTING NUMBERS
00600        TSTA
00610        BMI   A@
00620        ADDR  D,Y  Add
multiplier to LSW
00630 A@     CMPX  #$8000
00640        BHS   B@
00650        ADDR  X,Y  Add second
multiplier to LSW
00660 B@     RTS
00670
00680        ORG   $EBCB
00690        JMP   MUL16
00700 * IF ANSWER +; ADD NEG.
MULTIPLIERS
00710 MULP2  PULS  D,X
00720        TSTA
00730        BPL   A@
00740        ADDR  D,Y  Add neg
multiplier to LSW
00750 A@     CMPX  #$8000
00760        BLO   B@
00770        ADDR  X,Y  Add 2nd neg
multiplier to LSW
00780 B@     RTS
00790
00800        ORG   $A59A
00810        CLRA
00820        TFR   D,W
00830        TFRP  X,U
00840        RTS
00850
00860        ORG   $B4CE
00870        LDD   <$64
00880        MULD  5,X
00890        TSTD
00900        LBNE  $B447
00910        TFR   W,D
00920        RTS
00930
00940        ORG   $B647
00950        CLRE
00960        TFR   B,F
00970        TFRP  X,U
00980        STU   <$25
00990        RTS
01000
01010        ORG   $B7F3  PART OF
TOKEN FIX
01020        JMP   $E2A3
01030
01040        ORG   $B9FD
01050        PSHS  B
01060        LDQ   FPA0
01070        EXG   D,W
01080        ADCD  FPA1+2
01090        EXG   D,W
01100        ADCD  FPA1
01110        STQ   FPA0
01120        PULS  B
01130        BRA   $BA15
01140
01150        ORG   $BA21
01160        LDW   FPA0+1
01170        STW   FPA0
01180        BRA   $BA29
01190
01200        ORG   $BA53
01210        SUBR  B,A
01220        STA   <$4F
01230        BLS   $BA39
01240        BRA   $BA5E
01250
01260        ORG   $BA9E
01270        LDW   2,X
01280        STW   3,X
01290        BRA   $BAA6
01300
01370        ORG   $BB0A
01380        PSHS  B
01390        LDQ   FPA2
01400        ADDW  FPA1+2
01410        ADCD  FPA1
01420        RORD
01430        RORW
01440        STQ   FPA2
01450        PULS  B
01460        BRA   $BB29
01470
01480        ORG   $BBDE
01490        PSHS  B
01500        LDQ   FPA1
01510        SUBW  FPA0+2
```

listing continues on page 15

The Hardware Hacker

Dr. Marty Goodman

Using the CoCo3 or MM/1 monitor with video game consoles.

Recently I had been asked by several Delphi CoCo SIG members about how to hook a RGB monitor to a Super Nintendo Entertainment System (SNES) or to a Sega Genesis. As it happens, both of those home game systems do provide RGB video signals, for a potentially ultra-sharp and crisp display. However, one needs to know the pin out and signal protocol, and in some cases to make some minor conversions, if one wants to use those signals with the RGB monitors one uses with a Color Computer 3 or MM/1

The first problem one encounters is knowing the pin outs for the video connectors of the game systems.

Sega Genesis

```
      V
    7   1
  6   8   2
    5   3
      4
```

Looking at the female 8 pin DIN on the Genesis, with "V" being the NOTCH at the top:

1 - Red
2 - Mono Audio
3 - +5 volts
4 - ground
5 - green
6 - composite NTSC video
7 - Negative combined sync
8 - blue

Super NES

The connector on the Super Nintendo appears to be a card edge type. It is numbered with odd pins on top (1-11) and even pins on the bottom (2-12). I believe this numbering of the pins is right to left, but check it by locating the ground pins and/or using an oscilloscope. What I know of the pinout is as follows:

1 - Red (use 220 mfd coupling capacitor to monitor)
2 - Green (use 220 mfd coupling capacitor to monitor)
3 - sync (Combined negative sync)
4 - Blue (use 220 mfd coupling capacitor to monitor)
5 - GROUND
6 - GROUND
7 - Super VHS "Y" (luminance) 75 ohm load
8 - Super VHS "C" (chroma)
9 - NTSC video
10 - +5 DC, capable of supplying 50 ma maximum (good for sync sep circuit)
11 - L+R sound (mono audio)
12 - L-R sound

This information on the SNES is gleaned from an article in the April 1992 issue of Radio Electronics, by the famous Don Lancaster, as transcribed in a post by the editor on Delphi.

Note that Steve Bjork, who has worked professionally with the Genesis, says that pins 11 and 12 are not quite properly described above. He says that pins 11 and 12 are simply left and right audio, NOT sum and difference audio as is implied above.

Interfacing:

All that you will use from the connectors will be the R,G,B, sync, and ground lines... and perhaps the +5 volt to supply your circuit, and one or both of the audio lines to go to an amplifier in or outside of your speaker.

You may have trouble finding the correct 8 pin DIN connector for the Genesis (there are at least two varieties of 8 pin DIN connector, and they are mutually incompatible) and the edge connector for the SNES. In either case, if worst comes to worst, you can open up the unit, solder a few wires here and there, and install your own connector for RGB video. If you do that, I suggest using a DB 9 or DB 15 connector... something cheap, highly reliable, and widely available. I recommend wiring such a connector so that every OTHER line is ground. For example, if you use a DB 9, wire it so that pins 1,2,3 are R,G,B and pin 4 is sync. Then use pins 6,7,8,9 all for ground. If you do that, and use ribbon cable, you get a cable that has signal transmission properties that approach using separate coaxial cables for each signal line.

If you have a Magnavox 8CM515 or its successor, the 1CM135, hooking your game machine to the monitor is no more difficult than fabricating the correct cable. You just run like-named lines from the game machine to like-named lines on the monitor. The reason the Magnavox is especially easy to work with is that its sync inputs are designed to accept ANY polarity of sync, AND to not care if the sync is separate or combined. The internal circuitry sorts it all out correctly. So, just hook the combined negative sync from the game machine to either the V sync or H sync input on the Magnavox RGB connector, hook everything else up, and you're off and running. The Magnavox 6 pin DIN connector pin out is: 1 - green, 2 - H sync, 3 - ground, 4 - red, 5 - blue, 6 V sync. Again, use either H or V sync for the combined negative sync input from the game machine.

The Sony KV1311CR that was popular among CoCo 3 and Amiga users a while ago is also easy to use, because its RGB input accepts a combined negative sync pulse. For reference, its 34 pin dual row pin strip input pinout is 30 -sync, 16 -ground, 26 - green, 27 - blue, 25 - red, 24 - audio, 6 - ground for R,G, and B. You must also pull high pin 33 and 34 of the Sony to activate the RGB input and activate RGB port sound input.

Using a monitor like the CM-8, that *demands* separate positive sync poses a bit more of a challenge. You may need a circuit that can separate H and V sync pulses to some degree. Actually, Robert Louden found that a simple circuit that really did not quite separate sync worked fine for his CM8 and Genesis game machine. He merely fed the negative, composite sync into a 10K resistor, and from there to the base of a general purpose NPN transistor (2N2222 or 2N4401 or equivalent). Then he sent the collector of the transistor to the H sync input of the CM8. The emitter of that transistor he hooked to the base of another NPN transistor, and hooked the collector of that other transistor to the V sync input of the CM8, and hooked the base of that same transistor to ground. Such a circuit may or may not work with the SNES or with other monitors.

If you send me a stamped, self-addressed letter and $1.00 hassle / copying fees, I can send you a copy of two more sophisticated sync separator circuits. Note that JDR Microdevices (2233 Samaritan Drive, San Jose, CA 95124 1-800-538-5000 for orders) sells a chip from National Semiconductor called the LM 1881 for only $5.00. This is a dedicated sync separator chip, that does high quality sync separation with virtually no external components. It requires a 5 volt DC supply. You can buy it from them with documentation. Or, if you prefer, design or get from me any of a number of simple circuits using under a half dozen transistors that do the same thing. In any case, the important thing to realize is that the only trick to running a CoCo or MM/1 style RGB monitor with a Sega or Nintendo 16 bit game machine is to know the pin out, and apply (if needed) a sync separator to convert the combined negative sync from the game machine into separate positive H and V sync (or, if you happen to have an Atari ST monitor, separate negative H and V sync) for your monitor.

In my next column, I hope to provide a review in some detail of a product I referred to in my last column: A tiny, single board, 6809 - based controller for use in dedicated devices.

Comments and questions may be sent in care of 68'Micros or directly to Dr. Goodman at:
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Operating System -Nine

Rick Ulland

My personal system, pathlists, more Multi-Vue, and boots.

I hope there is a fest report someplace in this issue. It was interesting, to say the least. A few vendors had a less than perfect time of it- I've heard rumors of customs agents and deathly illness... theft and debauchery. The video game should be fun! Can't wait for Atlanta.

What Is It?

A few folks have asked about my personal machine- and what the heck, I like to brag anyway. Pretty much everything runs on a CoCo3 (this column, CoNect, stupid carpentry business) while play is a range of hardware from CoCo2 to KMA depending on what's in stock.

The main box is a 2Meg 6309 Puppo MPak, with Burke&Burke/ST251 (40Meg buffered seek), 720K and 360K halting floppies and a plain jane Mini232 card (shades of the sixties! double pumper 4 bbl, too!).

This box runs a very conservative (nowadays) PatchOS-9+Powerboost flavor of OS-9, usually under MultiVue. Being a terrifically organized individual, there are usually about a half dozen aps open, which is what got me started on OS-9 patches in the first place.

The trials and tribulations of maintaining this box ensure I'll always have something to write about. In fact, a truly ancient widebed Epson has been added to the printer array, so expect a piece on multiple printers one of these days.

App Alert

That fun loving Canadian Bob van der Poel has released a new shareware program. Diskcat creates an index file of all your disks, floppy or hard drive. It can then quickly find all instances of any file or directory name. I'm finding files presumed lost years ago! Did I say it was fast? Skip lunch next week, send Bob the twenty bucks.

Pathlist Shorthand:

The standard OS-9 pathlist begins at a device, for example /p or /d1. Depending on the device, it many extend on to further divide the device. Most commonly, a disk drive is divided by topic into smaller directories, similar to a thesis outline.

Now that I've given you the unique opportunity to remember that English teacher, on to pathlist shorthand. A full pathlist is simply separated with slashes, so:

```
(default drive)
   USR
      WRITE
         TW68M
            art8.doc
```

becomes:

/dd/usr/write/tw68m/art8.doc

Pathlists are not case sensitive. In addition, each shell remembers two locations- one for commands and one for data. The current data position is usually referred to as dot, and in fact can be specified with a dot (period) on the command line. Kind of useless, since dot is a default. (dir and dir . are the same command).

The beginning slash is significant. It means this pathlist extends all the way from a device to the final destination. Leave the initial slash off, and OS-9 adds dot to the beginning- so from /dd/usr you could use /dd/usr/desk/filename or desk/filename or even ./desk/filename (if you're weird).

There is another shorthand, dot dot .. backs up one position. This is a bit more useful. Lets assume we are in /dd/usr/tcom/dearc and want to copy a file to /dd/usr/tcom. Instead of copy file /dd/usr/tcom/file you can use copy file ../file. Easy, huh?

Variations on a theme:

Over the years, Tandy released quite a few OS-9 programs, and every possible variation of OS-9 was used at one time or another. Collecting all of these programs under one boot can be tricky.

The easiest programs to transport are those not written specifically for the Color Computer- they usually were written for the greatest common denominator. Remember, machines like the GIMIX were running level two long before the CoCo. Programs like Dynacalc took care to be compatible with both variants of OS-9 and require little more than copying off the original boot disk to install under level two. Another example is the C compiler- look in time.h. 'ifdef leveltwo....' hmmm.

Graphics programs are more difficult. In an attempt to maximize the CoCo's speed, Tandy used a very machine specific graphics driver- not only is it different than anybody else, it's different than itself! Graphics applications therefore fall into three groups- Level1 vdg, Level2vdg, and Level2 windows. Other than MultiVue, Rogue, and CoCo Artist, I can't think of any Level2 windows apps released by Tandy.

Still, there is hope. With some careful fitting, vdgint can be inserted alongside windint or grfint. The vdgint supplied with level2 contains both CoCo2 and CoCo3 versions, which contributes to it's huge size. (A 'tiny' CoCo3 only vdg is available) Still, this vdgint will coexist, and we can create windows to use it.

To obtain the Very Dumb Green window itself, use TANDY xmode. Type 0 is a traditional (inverted lower case) screen while type 1 gives a TIvdg version, with real letters for letters.

```
xmode /w14 type=0
iniz /w14
shell i=/w14&   or   program<>>>/w14&
```

This bit of code can be placed in a shellscript- replace the shell line with one to run the program itself- this way, it's creation is transparent to the user. Under MultiVue, you'll set the aif to call shell as the program, with the name of the shellscript as a parameter. In this case, don't forget the ampersand! It's needed to allow the intermediate window (which was called when clicking on the AIF) to die. Otherwise it's stuck until the vdg program ends.

Some programs, for instance DeskMate3, *have* to run on the term device as shipped. Luckily, most have been patched so you don't need to go back to the old 32 column TERM, just obtain the pd patches for your programs. Most of these patches also include extensions for MultiVue- for instance the DeskMate patch removes the lame menu window. Each app runs directly from a MultiVue icon.

There are two situations when it's not practical to run a game under the main boot. Under Level 2, you'll probably find King's Quest3, Leisure Suit Larry, and Flight Simulator just don't fit in a single boot. It *is* possible to squash them in using the VRN package, but most users will have to rip altogether to much out. If you've ever seen KQ3 under MultiVue, you'll know it's not worth the effort. Everything stops!

Instead, go ahead and make a new boot for these games. After all, any of these three take hours to play. The time spent rebooting isn't significant. Obviously, the easiest thing to do is simply add your drive descriptors (and HD drivers) to the vdg boot that came with the game, possibly Boosting or Nitroing (is that a word?). Anyone with the patience to enjoy these games might like to attempt an improved version. Use VRN to replace the dedicated drivers- this way you can squeeze at least grfint in there to allow an "emergency" window on the side. And it is kind of fun to fire up multiple iterations. Amaze your friends!

The Tandy video system isn't totally compatible, and some things won't go under

Level2. Since a 3 can't run original Level1, you'll have to find a copy of Level1, v2. This isn't that difficult- Tandy sold quite a few games with Level1v2. Perhaps the best one to rob is Interbank Incident's boot, since it also has the SpeechPak drivers.

Be careful mixing utilities. Level1 v2 *is* still Level1 - added utilities should come from a Level1 package. Incidentally, if you are running Level One on a CoCo2, you might want to check out 1v2 anyway- many system modules were tweaked beyond simply getting it CoCo3 compatible.

More tricks:

Hard drive users will soon run into another problem- directory size. Some games, especially adventures, are composed of dozens of data files. Putting 2 or 3 of these into a single directory results in what is known in more knowledgeable circles as a mess.

The text clutter is bad enough, but under MultiVue things get really painful- it can take minutes for MVue to read in one of these giant directories, and all you can do is stare at that stupid hourglass in the meantime.

So we dig in our bag of tricks again and come up with..... a procedure file! For this example, assume /dd/usr/games is the main games directory, and all games are to be ran from there. The dance goes like this:

First, create a new directory in games for the new program, and copy all it's data files there. Go back to usr/games, and set up an AIF to create the proper window type. Instead of the program itself, this AIF should run a procedure file, similar to the 'create a vdg' AIF above. This procedure file will have to be placed in usr/games if using the stock shell. With shell plus, it can be placed in the cmds directory (provided the execute attribute is set)- a much better location.

All this file has to do is chd to the games subdirectory and run the game. This can be combined with the vdg maker file (if needed). Now, you have no reason to ever go into any games data directory- just click on the pretty submarine (or whatever), and the system will take over from there, chd to the proper data dir, and run the game- the user never sees anything, and quitting the game kills this path, dropping you back into gshell, wherever it is.

Some games aren't properly housebroken, leaving hi-score files in the current data directory and causing another form of directory clutter. The result is the same- MultiVue slows down and text directories become unreadable. I do the same thing to these, changing data to /dd/sys/scores before running the game.

Incidentally, you may want to break with convention somewhat, and start these subdirectory names with a lowercase letter. If aif files are capitalized, gsort will put the icons first, and the cluster of subdirectories will fall to the end of the list. Depending on how many games you've installed, they may drop out of sight completely.

The Wrap:

I'm going to crawl in my hole and die now. Those who care will be happy to know the disk of the month is 'cc3fix'- a collection of stuff to assist in cramming it all under a normal boot.

< 268'm >

Comments and questions may be sent in care of 68'Micros or directly to Rick at:
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DECB 6309 Patches

(continued from page 12)

```
01520        SBCD   FPA0
01530        ANDCC  #$FE
01540        ROLW
01550        ROLD
01560        STQ    FPA1
01570        PULS   B
01580        BRA    $BBD8
01590
01600        ORG    $BC0B
01610        LDQ    FPA2
01620        STQ    FPA0
01630        RTS
01640
01650        ORG    $BC5F
01660        LDQ    FPA0+1
01670        STQ    FPA1+1
01680        LDD    FP0EXP
01690        STD    FP1EXP
01700        TSTA
01710        RTS
01720
01790        ORG    $BDAE
01800        ADDR   B,A
01810        STA    <$47
01820        BRA    $BD55
01830
01840        ORG    $BE50
01850        PSHS   B
01860        LDQ    FPA0
01870        ADDW   2,X
01880        ADCD   ,X
01890        STQ    FPA0
01900        PULS   B
01910        BRA    $BE68
01920
01930        COND   DOS.EQU.1
01940 OFFSET  EQU    $C779-$C749
01950        ENDC
01960        COND   DOS.EQU.0
01970 OFFSET  EQU    0
01980        ENDC
01990
02000        ORG    $C749+OFFSET
02010        LDA    #9
02020        MUL
02030        RTS
02040
02050        ORG    $C754+OFFSET
02060        DIVD   #9
02070        RTS
02080
02090        ORG    $E0F5
02100        LDW    #16
02110        TFRP   X,Y
02120        CLRB
02130        RTS
02140
02190 * TOKEN DECODER FIX FOR
THE COCO3
02200        ORG    $E2A3
02210        CMPU   #$E162
02220        LBLO   $E172
02230        LBRA   $B7E0
02240
02250        ORG    $E2C0
02260 HCLS   STB    ,X
02270        LDW    #$7FFF
02280        TFRS   X,X
02290        RTS
02300
02380        ORG    $E648
02390        LDW    #16
02400        TFRP   X,Y
02410        ANDCC  #$AF
02420        RTS
02430
02440
02450        ORG    $E6E4
02460        LBSR   HCLS
02470        JSR    $E0FF
02480        RTS
02490
03230        END
```

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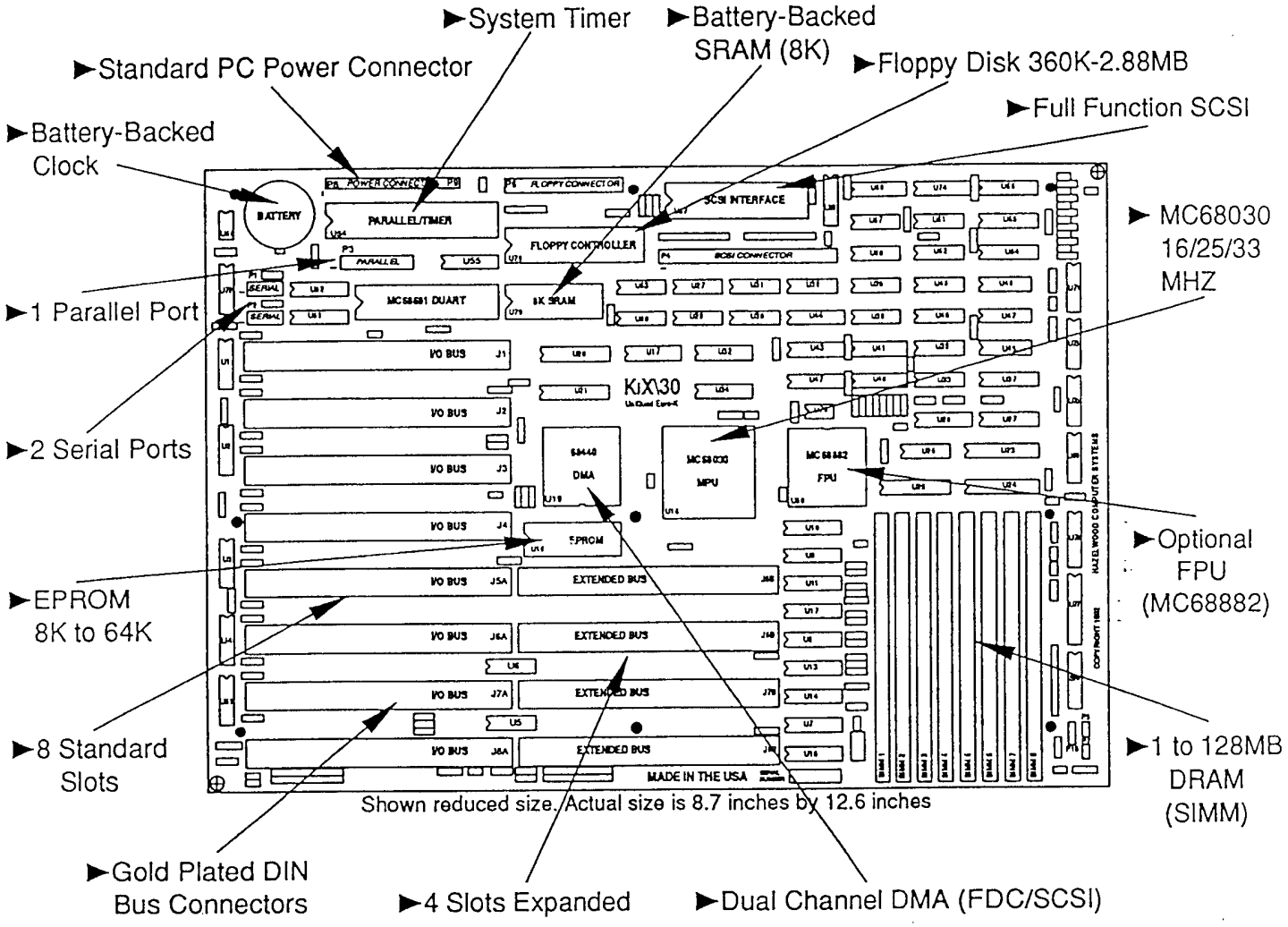

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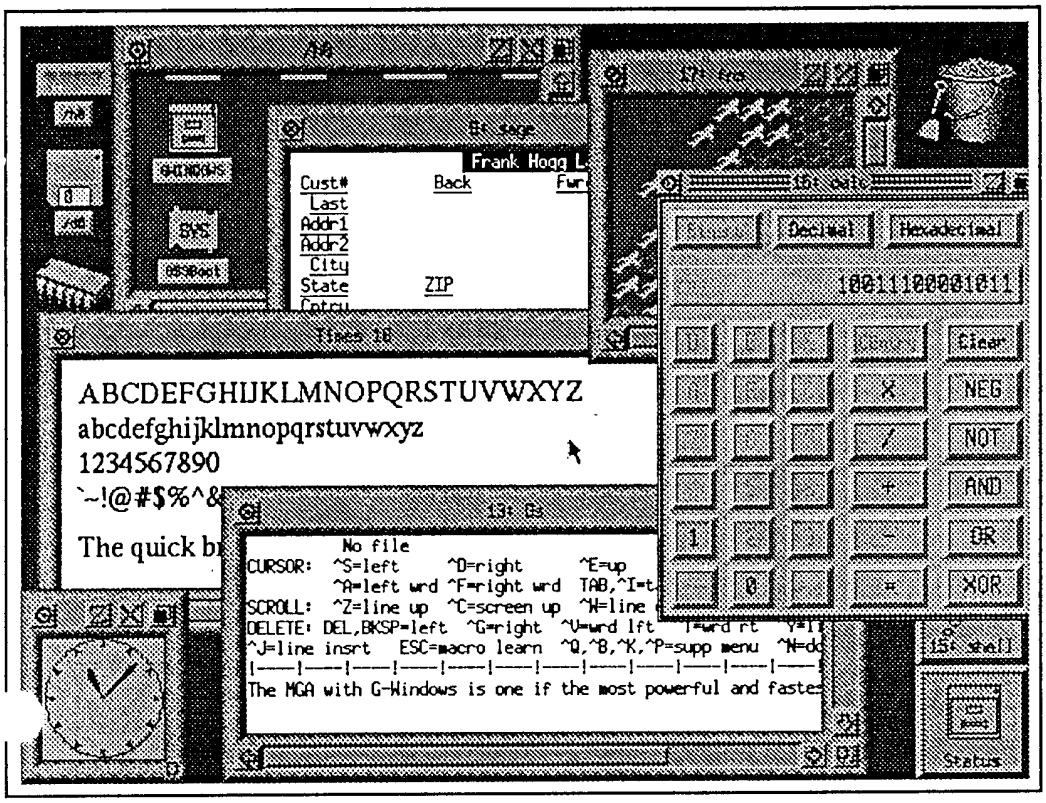

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OS-9/OSK Answers!

Joel Mathew Hegberg

MM/1 keyboard driver discoveries, reading system time, and signal notes.

I just got back from the Chicago CoCo/OS-9 Fest a couple days ago, and it's amazing how energized and excited you can get by attending one of those shows! For those of you who could not make it, a complete report of the fest will soon be available (if it's not already). We have some wonderful OS-9 vendors selling great hardware and software. New, affordable OS-9/68000 systems should be coming out sometime soon and that's really exciting.

In this issue, I would like to first cover new discoveries into the MM/1's keyboard driver by Andrzej Kotanski, investigate how to read the system time under OS-9, and close with some notes about OS-9 signals.

For a long time now, MM/1 programmers have been discussing ways to improve the K-Windows keyboard driver (keydrv) to allow more functionality and full distinction amongst all keys. Certain programs (most notably, KBCom by Eddie Kuns) require such functionality before being released. Andrzej has discovered that when the CONTROL, ALT, SHIFT, NUM LOCK, SCROLL LOCK, or CAPS LOCK are being pressed, certain bits in the K-Windows data memory module, wdata, are set. This opens up many new possibilities for MM/1 programmers. I've already written a screen-saver program which takes advantage of this, and Eddie Kuns is planning on using this functionality in KBCom. Listing #1 contains Andrzej's source code.

Listing #1: kysns.c

```
/* kysns.c - program to check certain
MM/1 keys -
  released to PD by Andrzej Kotanski,
April 24, 1994  */

/* scroll lock is used to disable middle
mouse button copying  */
/* run the test program after typing
'tmode nopause'        */

main()
{
  while (1)
    kysns();
}

char *wdata = 0;
char *keydata;
extern errno;
kysns()
{
  if ( wdata == 0 )
  {
    wdata = (char *)modlink("wdata",
1024);
    if ( wdata == (char *)-1 )
      exit(errno);
    keydata = wdata + 0xb4;
  }

  if ( keydata[2] & 1 )
    printf("left_shift ");
  if ( keydata[2] & 2 )
    printf("right_shift ");
  if ( keydata[3] )
    printf("scroll");
  if ( keydata[4] )
    printf("control ");
  if ( keydata[5] )
    printf("alt ");
  if ( keydata[6] )
    printf("capslock ");
  if ( keydata[7] )
    printf("numlock ");
  if ( keydata[8] )
    printf("capslock2 ");
  if ( keydata[9] )
    printf("numlock2 ");
  if ( keydata[10] )
 printf("if_you_got_this_please_tell_the_author
");
    printf("\n");
}
```

Some people find it difficult to read the system time using C under OS-9. I don't see why this should be a problem... I mean, just use the call to get the current system time, and there you go, right? Hmmm... Let's look in the OS-9 C manual and see which calls deal with time: _sysdate(), _julian(), asctime(), ctime(), localtime(), mktime(), clock(), difftime(), getime(), gmtime(), setime(), and time()... and each call represents time in various formats. Well, ok, maybe I can see where the trouble is coming from! Certainly, since we're running a real-time operating system, we need to get this confusion taken care of!

I usually use the getime() function, because it's so easy to use. This call gives you the system year, month, day, hours, minutes, and seconds. This appears to be the easiest call to use under OS-9. The structure for the time being returned is defined in the header file 'time.h', so be sure to include that in any programs using the getime() function.

Listing #2 gives a simple example of how to use the getime() function to return the current system time to your program. Notice that we pass the address of (i.e. a pointer to) our time structure to the getime() function so it can fill in the require d data, which is why we use the ampersand (&) character in front of the timebuf structure.

Listing #2: showtime.c

```
#include <stdio.h>
#include <time.h>

struct sgtbuf timebuf;

main()
{
  getime(&timebuf);
   printf("Year:  %d\n",timebuf.t_year);
   printf("Month:
%d\n",timebuf.t_month);
   printf("Day:   %d\n",timebuf.t_day);
   printf("%d hours\n",timebuf.t_hour);
   printf("%d
minutes\n",timebuf.t_minute);
   printf("%d
seconds\n",timebuf.t_second);
}
```

Another common problem for beginning OS-9 C programmers is signal handling. Signals and signal handlers (also called 'signal traps') are generally new concepts to novice OS-9 C programmers and they usually don't know how to 'install' a signal handler or what should be put into a signal handler. Luckily, the answers are very simple. In fact, the simplicity is at the root of the confusion. You would think there would be a significant amount of source code to be placed into something called a 'signal handler', but this is not the case at all.

A signal is just a value sent to an OS-9 program, hopefully for a special reason. A signal code of 2 or 3 may mean then user has pressed CTRL-C or CTRL-E to abort the program. If your program does not have a signal trap, it will die immediately. If you install a signal trap, your program will be able to continue processing. So, in this instance, the signal trap is analogous to the ONBREAK GOTO function in BASIC for preventing a user from killing the program. But, this is not the primary reason signal traps are used.

Signal traps are very useful when reading keyboard or mouse information. Perhaps you would like OS-9 to send a signal when the user presses a key or clicks a mouse button. This way your program could go on processing other information while occasionally checking if a signal has been received to read keyboard or mouse data. Optionally, your

program may request OS-9 send keyboard/mouse signals and then simply go to sleep indefinitely (using sleep(0); or tsleep(0);). When a signal is received by a sleeping process, the process is awaken so it may process the signal. This frees up the CPU for other processes and prevents processes who are simply waiting for keyboard input from hogging the system's resources.

So, how do you do all this neat stuff? As complex as the above explanation is, the answer is it's amazingly simple. The important point is the signal handler function MUST NOT do any I/O processing or anything complex. That is where most novice OS-9 programmer's run into problems. As a rule of thumb, the signal handler should only save the signal, allowing all processing to be done by the program itself. Listing #3 gives an example of how one may use a signal trap to read the keyboard.

* Note that user-defined signals (such as ones sent back when a keypress is made, etc.) must be in the range of 256-65535 for OS-9/68000 or 128-255 for OS-9/6809.

Listing #3: keyb_signal.c

```
#include <stdio.h>

#define STDIN 0

#ifdef OSK
#define KEYSIG 400
#else
#define KEYSIG 140
#endif

extern int signal_handler();
int signal;

main()
{
  char keypress;

  /* Install signal trap */
  intercept(signal_handler);

  while(1)
  {
    signal=0;

    /* Request signal to be sent by OS-9 when user presses a key, */
    /* then go to sleep indefinitely. */
    _ss_ssig(STDIN,KEYSIG);
    sleep(0);

    /* Now, we process the signal... not the signal handler. */
    if (signal==KEYSIG)
    {
      read(STDIN,&keypress,1);
      printf("\nUser pressed %c key.\n",keypress);
      fflush(stdout);
      if (toupper(keypress)=='Q')
      {
        printf("Exiting program.\n");
        break;
      }
    }
    else
    {
      printf("\nUnknown signal received: %d\n",signal);
      printf("Exiting program.\n");
      break;
    }
  }
}

/* The parameter to the signal handler is the signal received. */
signal_handler(s)
int s;
{
  signal=s;
}
```

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Any comments, questions, or source code to be included in Joel's column may be sent in care of 68'Micros or directly to Joel at:

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Programming in "C"

P.J. Ponzo

More FUNCTIONS, including main( )

You may recall, in a previous lesson, that we passed *float* arguments x and y to a function (which we called average(x,y)) which returned the average: (x+y)/2. It was something like:

```
1  main() {
2     float x,y,a;
3          printf("\n Enter two numbers (separated by a space) : ");
4       scanf("%f%f",&x,&y);
5     a=average(x,y);
6    printf("\n The average of %f and %f is %f",x,y,a);
7  }
8  float average (a,b);
9  float a, b;
10 {
11    float z;
12    z=(a+b)/2;
13    return(z);
14 }
```

The function average(a,b) was invoked in line 5, where we passed it *copies* of the variables x and y. The function itself starts in line 8 and it makes no difference what name the function gives to its arguments... they are, after all, only private copies of the two variables which main() uses. Whatever average does with its copies, it does NOT effect the original x and y.

We could have simplified the function by replacing lines 11, 12, 13 with:

```
return( (a+b)/2 );
```

Anyway, we mentioned that printf() , scanf() , getchar() and main() were ALL functions. Whereas WE write the functions main() and (in this example) average(), the others are a standard part of the C-library.

Some C-compilers automatically give your main() program access to the standard input/output (stdio) routines such as printf(), etc. BUT, SOME DO NOT.

To be sure that you include these stdio functions in your main() program (assuming you will be using them) you should begin your program...

#include <stdio.h> (*after* main() {) When the C-compiler sees the #include <stdio.h> it will append to your main() program all the i/o functions in the C library.

Now, if printf() and scanf() and average() etc. can be passed arguments, why not main() ??? As a matter of fact, we CAN pass arguments to main() .

Suppose your main() program was expected to add a series of numbers and that you compiled/linked it with the name sum. Now you could run the sum program by typing its name, sum, after which a scanf() function call (in the program) would input the numbers which were to be added. Then your program would printf() the sum.

BUT, wouldn't it be nice to run the sum program by typing:

```
sum 10.5 -15.23 6.7
```

and have the sum program run, and also have the numbers 10.5 -15.23 and 6.7 passed to the program as arguments?

The main() arguments

```
0 #include <stdio.h>
1 main(number,term)
2 int number;  /* first main() argument */
3 char *term[ ];/* second main() argument */
4 {              /* NOW start main()     */
5  .....
6  .....        /* program goes here    */
7 }              /* end of main()        */
```

Here we #include the stdio.h library (we'll need this stuff).

```
0 #include <stdio.h>
1 main(number,term)
```

NOW our main program expects two arguments called number and term.

```
1 main(number,term)
2 int number;  /* first main() argument */
3 char *term[ ];/*second main()argument*/
```

The first argument (here called number) is ALWAYS an integer! The second argument (here called term) is ALWAYS declared as:

```
char *name[ ] ;
```

(in our example, the argument name is term).

BECAUSE it is declared char *term we see that term is a pointer ! BECAUSE we refer to it as term[ ] we see that term is an ARRAY! In fact, the second argument is ALWAYS an ARRAY of POINTERS which point to char acter strings (that's why we said char).

If we called upon our (compiled/linked) program with the command string:

```
sum 10.5 -15.23 6.7
```

then this contains 4 elements, namely:

sum and 10.5 and -15.23 and 6.7 (separated by a space).

It is the number 4 which gets passed to main() as its first argument! (..in our example, number is the integer 4).

The second argument which gets passed to main() is (are?) the strings: sum and 10.5 and -15.23 and 6.7. BUT, main() receives this list of strings as an ARRAY of POINTERS.

```
term[0] points to the string sum
term[1] points to the string 10.5
term[2] points to the string -15.23
term[3] points to the string 6.7
```

NOTE: when we refer to the string -15.23 we mean a collection of 7 characters: '-' and '1' and '5' and '.' and '2' and '3' and '\0'. (remember the '\0' which terminates strings?)

We may pick out the numbers 10.5 and -15.23 etc. by referring to term[1] and term[2] etc.

Of course, they are NOT (really) numbers (?!@#$) but strings of ASCII characters. To add them up, we must convert them to floating point numbers....

Some SUM programming ...

```
0  #include <stdio.h>
1  main(number,term)
2  int number;  /* first main() argument */
3  char *term[ ];/* second main()argument */
4  {              /* NOW start main()     */
5   float next, sum=0; /* couple of floats*/
6    int n; .  /* an int to count terms  */
7    for (n=1; n<number; n++); {
/* loop thru' terms      */
8       next=atof(term[n]);
/* CONVERT next term     */
9    sum=sum+next; /* add it to sum      */
10       printf("\n   %8.3f",next);
/* print each term       */
11   }       /* end of for-loop          */
12    printf("\nSUM=%8.3f,sum);
/* print the sum         */
13 }                    /* end of main()  */
```

```
7    for (n=1; n<number; n++); {
```

Here we begin our loop, which sums the terms. Beginning with term[1] (the first number) we let n cycle thru' the terms (incrementing each time, with n++).

```
7    for (n=1; n<number; n++); {
8      next=atof(term[n]);
```

Here's our conversion of the ASCII string (one for each number) to a float(this ASCII to float function is part of any respectable C-library ...which is one reason why we #included stdio.h). Note that we give to atof() the pointer to the ASCII string, namely term[n] (for each value of n in our for-loop).

```
8       next=atof(term[n]);
9       sum=sum+next;
```

Here we add the float (generated in Line 8 by atof()) to our sum (which was initialized to 0 in Line 5).

```
9       sum=sum+next;
10       printf("\n   %8.3f",next);
```

Just to prove that atof() is doing its job, we'll print each float which it generates... each on a newline.

```
10      printf("\n   %8.3f",next);
11   }
12   printf("\nSUM=%8.3f,sum);
```

We end the for-loop, after which we printf() our sum (using 8 positions on the screen, and printing to 3 decimal places).

```
11   }
12   printf("\nSUM=%8.3f,sum);
13 }
```

Finally, we come to the end of main().

In response to sum 10.5 -15.23 6.7, our program will print: 10.500 SUM= 1.970

Note: Each term is printed after 4 spaces, then -15.230 occupies a field width of 8 and is 6.700 right-justified! Four spaces was just enough for: SUM= .

Although (in our program) term[0] is supposed to point to the name of the program (in our example it was sum) some C-compilers do NOT provide this! In particular, MS-DOS does NOT pass the name to the compiled program, so C-compilers running under MS-DOS do not (CANNOT) implement this feature of the C language. Instead, reference to this zero th string may yield garbage or a blank (NULL) string or some home-made string!

That's all folks! au revoir!

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Review:

Star NX 2480 Rainbow

Terry Simons

The Star 2480 Rainbow is a 24 pin color dot matrix printer. It comes standard with a push and pull pin-feed tractor and a single sheet loader. While you only use one, all are included for your choice. I find no problem with the push feed tractor and leave the pull tractor in the box. Or you may, with the flip of a lever, go to pressure feed for single sheets. Also available as an option is a multi-sheet single sheet feeder which will handle up to 50 single sheets in one loading.

Stars have dip switches to set the defaults. The 2480 is set from the front panel with a relatively simple guide.

While fonts are customarily set within a word processor, the 2480 allows you to set font/pitch/ color/ Zoom and other options from the front panel.

The 2480 comes with draft/ high speed draft and 10 selectable NLQ fonts, from your processor or the printer panel. Script font, while perhaps not the most legible on a nine pin, has a high quality print and legibility, on the 24 pin 2480. Orator font comes in two varieties. As indicated by the name, it is easily legible, at arms length.

ZOOM, a new feature, allows you to do a 67 or 50% reduction in text or graphics. For text it does exactly that, a handy feature for someone preparing a newsletter. For graphics, it's really neat to see a MAX III picture print in a 2"X 1 5/8" full color graphic with no loss of picture quality. In a practical sense, this will save me running to Kinko's on those occasions when I need a color graphic reduction for a card or Christmas letter.

The 2480 took another jump in buffer size. Now at 47K it will handle most any size letter, gosh that would handle many manuals in buffer. No need to wait for your printer to finish before you have your computer back. For graphics and color you not only have the text or graphic dot info, but the color command structure as well. Color graphics take a tremendous amount of print memory. A full MAX III 16 color dump is probably over a Meg. Ergo the 47K buffer is a needed and handy feature.

The NX-2480 is an excellent printer for those who demand the best dot matrix can provide. The price usually runs from $249.00 to $269.00. The price of $249 comes from: Computability, 1-800-558-0003 (IBM & Amiga). They carry a fairly full line of Star and other printers. Call for a free catalogue if you wish. I should add this review is being directed toward CoCo users, and omits mention of an included MS-DOS Disk which greatly furthers the Star's font capabilities.

Using my CoCo for business and serving a large group like MI&CC, I look for several features. Reliability, speed, character clarity and variety capability. I find them all in the latest Star printers.

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Basic09 In Easy Steps

Chris Dekker

Setting up graphics windows.

Today I will discuss the matter of setting up (graphics) windows in Basic09. It is after all a little bit of a disillusion if you have a wonderful program but can't get it's output on the screen.

From Basic09 you have access to 2 text screens (40 and 80 column) and 4 types of graphics screens. If you are familiar with DECB you will see that these choices coincide with the so called high resolution screens made available with the introduction of the CoCo 3. You can also access the (older) low and medium resolution screens from within Basic09 (through the Gfx module) but I doubt many people are interested in using those. So here we will focus on accessing the high resolution screens.

As I stated earlier you can not access the screens directly from within Basic09, but you must use a module called Gfx2 or one of the later replacements (up to Gfx7 now, I believe). Well, that is what we begin with anyway. This module doesn't really deal with the windows but it allows you to use English language commands to tell the computer what to do. It translates those commands, checks any parameters that you may have used and then tries to run the appropriate ML subroutine(s) to execute your idea. The actual subroutines are found in a module called Grfdrv, so make sure you load this module into memory if you want to work with windows.

There is sometimes confusion about screens and windows, not in the least because it is very easy to mix both words in a text (or sentence) in such a way that their real meaning gets changed. Technically speaking though the screen is the physical (monitor) screen you are looking at. A window is that part of the screen the computer uses for it's output. It is analogous to a window being the part of a wall you can look through (unless, of course you are super[wo]man).

This is a very important distinction under OS-9 (and Basic09) and makes for a powerful programming tool. You can, for instance, put 3 or 4 windows on one screen and run a program in each of the windows. This way you can keep an eye on all of them without ever touching a key.

However we will start out doing something easier. The following listing is a program that draws about 1000 circles on the screen arranging their size and place in such a way that it forms a symmetrical structure. Actually this structure is called a Pythagoras tree, named after the Greek mathmetician Pythagoras, who "invented" it, and also discovered the Pythagorean Equation for triangles).

```
  PROCEDURE pyth
  BASE 0
  DIM path,RI,x3,y3,x4,y4,col(11):
INTEGER
  DIM RA(11),XA(11),YA(11),Z(11):
REAL ON ERROR GOTO 200 OPEN
 #path,"/w1":WRITE
  RUN gfx2(path,"dwset",8,0,0,40,24,1,
2,2)
  RUN gfx2(path,"curoff")
  RUN gfx2(path,"select")
 P=10 \C=.5 \E=SQRT(C)
 FOR i=1 TO P \ READ col(i) \NEXT i
 DATA 0,9,1,10,2,12,4,14,9,1,10,2,12,
4,14
 X=0 \Y=1 \M=0 \G=0 \R=C
 REPEAT
 IF G<P THEN
 M=M+1 \G=G+1 \ GOSUB 100
 X=X1 \Y=Y1 \R=E*R
  XA(M)=X2 \YA(M)=Y2 \Z(M)=G
\RA(M)=R
 ELSE
  X=XA(M) \Y=YA(M) \G=Z(M)
\R=RA(M)
  M=M-1
 ENDIF
 UNTIL M<0
 RUN gfx2("select")
 CLOSE #path \ END
 100 X1=C*(X-Y+1)-1 \Y1=C*(X+Y+1)
 X2=C*(X+Y-1)+1 \Y2=C*(-(X)+Y+1)
 x3=320+X1*640/4.8
 y3=116-Y1*192/3.6
 x4=320+X2*640/4.8
 y4=116-Y2*192/3.6
 RI=130*R
  RUN gfx2(path,"color",col(G))
  RUN gfx2(path,"circle",x3,y3,RI)
  RUN gfx2(path,"circle",x4,y4,RI)
 RETURN
 200 ermum=ERR
  RUN gfx2("select")
 CLOSE #path
```

For the time being I won't go into the whys and whats of all the formulas, variables, etc. I first want to concentrate on the screen commands. OS-9 considers a window a device, just like a printer or a disk drive. For this reason you can not directly access the screen but you must open a communications line with the device. This is done with the OPEN statement. As you can see this program uses a device called /w1. If you are not sure which window you can use you can address it as /w. This is a generic descriptor which tells OS-9 to use the first window that is available.

After we open the path we must establish the type of window we want to use. This is done with the first call to gfx2. DWSET tells gfx2 we want to SET up a Device Window. The numbers define the window, while the path variable tells gfx2 where to set up the window.

The numbers are defined as follows:

8 - screen type: 320x192 16 colors

0,0 - coordinates upper left corner of window

40 - width of window in columns (=320 pixels)

24 - height of window in lines (=192 pixels)

1 - register number of foreground color

2 - register number of background color

2 - register number of border color

Note that under DECB you would use the HSCREEN 2 command to achieve the same results. We don't want a blinking cursor in a corner of the screen so we turn it off with the CUROFF command. Then we want to actually see the new window which is accomplished by the SELECT command.

I will tell you right here to be very careful with this command. It not only shows the window but it also sends any key presses to that window and no longer to our program. Under normal circumstances this is no problem but if you are debugging the program and have a PAUSE statement inserted somewhere; the program will execute until it encounters the PAUSE and then it waits for your input. But since you are looking at the image and can not send input to the program, the whole thing is deadlocked. If you have multiple shells running you can kill the program then restart Basic09, reload the program and try again. If you don't have any other shells running it's going to be a trip to the reset button.

The easiest way to prevent these problems is to put the following line just before the pause: run gfx2("select"). This will switch the keyboard back to the program and allow you to proceed. Also make sure you have the same statement in your error trapping routine (for obvious reasons).

To round off the SELECT statement: if you execute it BEFORE you close the path to the window, the screen display will switch back to your program. If you close it AFTER you close the path, OS-9 will link the keyboard back to the program but continue to display the graphics image. You must then

press the CLEAR key to switch the display.

The three lines near the bottom of the subroutine set the color and draw the circles. We must first use the COLOR statement because you can not specify the color with the CIRCLE command as you would under DECB. As far as Gfx2 is concerned a circle is a circle and nothing else. If you want to specify a color you must use a different call and if you want to draw off-beat circles you must use the ELLIPSE function. So in our program we just have to specify the centre point and the radius.

Before we move on one more thing about windows. This program works fine because we have not INIZialized the window (or used an I$attach system call) before opening the path to the window. If you type INIZ w1 at the OS9: prompt before running the program you will get an error 184 message. The reason for this is that you can establish only one device window per device. If you still want the program to run hassle free you must trap that error, execute a run gfx2(path,"dwend") statement and loop to the dwset statement. Alternately if you send the dwend command to a non-existing window you will get error 196 upon which you can loop back to the dwset statement.

Ohh,, and please DO some experimenting before you move on.

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Review: Cannon BJ200e

Michael Rowen

The Cannon BJ-200e bubble jet printer is one of many ink-jet type printers now widely available. The BJ-200e has some slight improvements over the original BJ-200. The BJ-200e was ideal for my needs since I am using it with a Coco 3.

The BJ-200e At a Glance:

Interface: Parallel
Paper Handling: 100 sheets or 10 envelopes in built-in feeder
Paper Capability: plain paper (17-28lb), letter, legal, A4, #10 envelopes, transparencies
Dimensions: 13.7" wide X 6.8" high X 7.6" deep
Weight: 6.6lb/3kg
Warranty: 2 year limited
Cartridge life: Avg 450 Pages
Print Resolution: 360 dots per inch
Print speed: Draft 248cps, High quality 173cps, Super High quality 124cps (about 4ppm in high speed, 2.7ppm in high quality)
Emulations: Cannon Native, Epson LQ, IBM X24E
Fonts: Prestige, Courier, Orator, Roman, San Serif, Script, Orator-S

What you get:

Unpacking the BJ-200e was simple. The printer comes with a user's manual, a quick start guide, registration card, MS-Windows print drivers, MS-Windows true-type font disks, 120VAC power cord, and an ink cartridge.

The quick start guide clearly shows you how to unpack the printer and install the ink cartridge. The only interface for the BJ-200e is a 36 pin centronics parallel (Amphenol) connector. Power is not supplied on pin 18, so you will have to use a powered parallel interface adapter if you use it with a Coco. I use a Blue Streak Ultima adapter that I have connected power to.

Documentation:

The User's Guide does a good job walking you through set-up and maintenance as well as troubleshooting. All DIP switch selectable options and control panel controls are well explained. The section on using the printer with your software is strictly MS-Windows oriented. Because of this, there is no reference in the supplied documentation for the printer control codes or escape sequences needed to control the printer. The manual mentioned that a Programmer's Reference manual is available from Cannon, I assume at extra cost. I called the Cannon help desk number in the manual to ask about this vital information. They told me that the Programmer's Reference manual would probably be overkill. Cannon supplied me with three document codes that could be entered into their toll free FAX back system. These documents contained the escape sequence information I wanted. Since I had access to a FAX machine, I was able to obtain the escape sequences readily. Cannon said that the information could be mailed if I did not have access to a FAX machine.

BJ-200e Physical Layout:

One of the selling points for me was the size of the BJ-200e. It weighs just over six pounds, and takes up an extremely small amount of space. The built-in paper tray is at the rear and is angled so that the paper leans back at about a 25 degree angle. This design means that you do not need to allow for any space behind the printer. The paper tray also has an adjustable paper guide and a retractable paper support. To the right of the paper tray is a paper selection switch which is used when you want to print envelopes. Prints exit at the front of the printer. A retractable support can be used to catch prints as they exit if desired. The front cover flips down for easy access to the ink cartridge. All printer control buttons and DIP switches are on the top operator panel. The DIP switches have a small hinged cover and are well marked. The only need to access the rear of the printer is to connect the parallel port and the AC power cord. The parallel port is situated sideways. This allows easy access to the speed control switch on my parallel adapter. The paper tray also eliminates the worry of cabling interfering with normal feeding of the paper.

Printing to the BJ-200e.

As soon as I powered up the BJ-200e, I sent a text file from OS-9 to the printer. This generated a single line of smeared ink. Automatic line feeds are not enabled on the printer as it is configured from the factory. There are a number of ways to cure this. From OS-9 I simply issued an xmode /p lf to add line feeds. Automatic line feeds can be enabled by powering up the printer while holding down front control panel buttons or by enabling the automatic line feed DIP switch. Most word processors give you the option of including line feeds when printing. This can also be enabled via an escape sequence to the printer. I sent the text file again and received a very clean and crisp document. The speed of the printer is impressive.

Next I wanted to test the Epson compatibility. I configured CocoMAX 3 for an Epson printer and loaded some graphics. I did have to set the printer up for automatic line feeds for it to work. Graphics printed with exceptional quality and speed. It was not necessary to put the printer into Epson emulation mode since the normal mode supports the Epson graphics character set.

I tried three different types of paper and printed envelopes. The quality of the prints were all of high quality. Very thin paper will not absorb the ink as fast and can be smudged if not allowed to dry before handling.

Special features:

The BJ-200e has a 50KB buffer that is allocated for use depending on the emulation mode. In the Native (BJ-10) mode the entire buffer is used as an input buffer. In Epson LQ mode, 11KB are used as an input buffer and 39KB are used as a download buffer for font information. The BJ-200e can also be configured for Automatic emulation mode. This mode allows automatic switching between the Epson LQ mode and the IBM X24E (BJ-10) mode based on the data being sent to the printer. This mode used 9KB as an input buffer and 41KB as a download buffer.

Overall results:

The Cannon BJ-200e has much going for it. Print quality is very near laser quality. Seven different fonts are built in. Both emulation modes support the Epson graphics character set making the BJ-200e compatible with virtually all Coco software. The small size of the printer and it's low weight offer unmatched flexibility in placing and transporting the printer. Access to the ink cartridge, printer controls and the DIP switch settings are readily available from the front of the printer. The printer is very quiet (40-42dB) and fast. Perhaps the only mark against the BJ-200e is that the printer control and escape sequences were not included in the documentation. I would highly recommend this printer to Coco users.

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Hewlett Packard DeskJet 500

John Wainwright

Like many old CoCo users, my first full-sized printer was a Tandy DMP-105 hooked to my old Gray F-Board CoCo. It looked pretty good then, and it still works today, but times have changed. I now have an MM/1 and can run typesetting and graphics programs that are completely independent of the screen display resolution. For those of us who are not accustomed to using the terms "kilo" and "mega" when discussing our computer budgets, there is no monitor available that will accurately show the output of these programs unless you break the page into pieces the size of an address label and display it one section at a time (300 DPI on an 8"x10" page would take a monitor with 2400x3000 resolution—we won't talk about 1200 DPI). For this, you need a printer that will handle all that data in a reasonable time.

The good news is that a 300 DPI printer can now be found for just a little more than I paid for that old DMP-105. I bought the Hewlett Packard Deskjet 500 at a local branch of CompuAdd for about $380.00 some time ago. I saw one for $249.00 at a local OFFICEMAX store this week.

The manual is as good as most. It contains lots of diagrams to help the new user load paper, set the DIP switches, change ink cartridges and so forth. To control the advanced features, there is a table listing all the possible commands, and a few (very few) examples of command lines. Like a lot of today's hardware manuals, this is the "little book"—with information in the back on how to order the "big book". There are several references to using the "included Windows software", which probably explains the salesman's doubtful attitude when I told him I didn't plan to use it on an MS-DOS computer. He was pretty sure that it wouldn't print at all without the windows driver installed in the computer. Rest assured, all the fancy features are OPTIONAL, the thing understands ASCII text. The same methods you use to send control sequences to any other printer will work with this one.

The Hewlett Packard DeskJet 500 is an ink jet printer. The image is produced by spraying ink through 50 nozzles on the printhead. For best print quality, very smooth paper is needed. Copier paper works much better than "fancy" textured bond paper.

When the ink in the cartridge is exhausted, the cartridge, which includes the printhead, is replaced. The recommended replacement cartridge is the HP 51626 "high capacity" cartridge, which is supposed to be good for about 2000 pages. The cost of the cartridge at the time of this writing is about $28.00, which would make the cost for ink just under 1.5 cents per page. The ACTUAL number of pages produced per cartridge will depend on the type of print and the resolution selected (75 -300 DPI). The older HP 51608 cartridge has less capacity, but it has a hole in the top, and can be refilled with kits supplied by third party sources (Refilling is NOT RECOMMENDED by the manufacturer). Other third party cartridges and refill systems are available, as reported by users in the CIS and DELPHI forums.

The "standard" warning applies — the user must take full responsibility for any consequences in deciding to ignore the manufacturers instructions. I have used the refill kits for the 51608 cartridge with good results and I have not heard of anyone damaging his printer by using one, but if a user did manage to cause some damage with a refilled cartridge, he would probably find that he has voided his warranty.

The DJ500 comes with both serial and parallel interfaces built in, with serial baud rates from 1200 to 19,200. The paper tray will hold about 100 sheets of paper in standard letter, legal, or European A4 size. It will also print envelopes (one at a time). There is no tractor feed option.

There is a default 1/2" top margin, 1/4" side margins, and 1/2" bottom margin. The top margin can be changed, but the bottom 1/2" of the paper is described in the manual as the "unprintable area". This must be taken into account when setting up printing software.

There are three internal typefaces which can be printed in several sizes in portrait or landscape mode. Many more fonts are available on plug-in cartridges. Epson and IBM Proprinter emulation is also possible with optional cartridges. Memory cartridges can be installed to allow downloading fonts from other sources.

For OSK users, versions of Ghostscript, TeX, and gnuplot have been written with drivers for the DJ500. These programs completely ignore the printer's fonts, build their own, and send them as graphics images to the printer. The quality of the output ALMOST as good as a laser.

A CoCo -> DeskJet screen dump has been posted on DELPHI, and a screen dump for the MM/1 to HPCL (HP's printer control language) is available on CIS. The latter was posted by Bob Van der Poel, originally written for an HP Laserjet, but it also works with the DeskJet.

I now have both a DeskJet 500 and an Epson Action Printer 5000 (the AP5000 is about the same as the LQ 570). The Epson, with its optional film ribbon, will print text and graphics with excellent quality, and it will take both tractor feed and single sheets (with options available for cut sheet bin feeders). The DeskJet is faster on complicated graphics but needs very smooth paper. The Epson will print quite well on a grocery sack. Since the only thing that 'hits' the paper in a DeskJet is ink, it will NOT do carbons.

If I had to pick just one of them, it would be the DeskJet. This decision is not based on print quality or cost, since they are very close in both areas. My choice is based on the relative noise levels. Compared to the Epson (or any other impact printer), the DeskJet is almost silent. I LIKE that.

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Re-Inking Printer Ribbons

Leonard Winterfeldt

NEW PRODUCTS *from* FARNA Systems!

CoCo Family Recorder/OS-9 1.0

If you are into genealogy, then the CoCo Family Recorder is the *absolute best* program for the CoCo 3. But it runs under DECB, and many OS-9 users simply don't want to leave the multi-tasking environment. Well, we now have a solution for you! CCFR has been ported to OS-9! The program is very easy to use and menu driven. The OS-9 version is nearly identical to the DECB version in appearance, but takes advantage of many OS-9 features such as pop-up windows for entering data. DECB users can send their *original* CCFR disk (it will be returned) to get the OS-9 version for only $22.50. Others must pay the regular price of $32.50. Requires at least one 40 track double sided drive (FD-502) or larger. Can be shipped on 3.5" 720K disk if requested.

FARNA Systems
Box 321
Warner Robins, GA 31099
$2.50 shipping and handling per order.
Canada S&H $4.00; Overseas $7.00

OS-9 Point Of Sale 1.0

If you have a small retail store business, this may be just what you've been waiting for! Designed specifically for the small business that needs more than one check-out station but can't afford the $7,500.00 or more for an MS-DOS based system. This easy to use, menu driven software uses OS-9's inherent multi-user/tasking features, eliminating the high cost of DOS based networks. Has all necessary features to replace your cash register and keep track of your sales and inventory automatically. Supports multiple serial ASCII terminals.Current price is only $62.50.

Re-inking is an economical as well as a save the environment process. It consists of passing the ribbon across an inking element and depositing a continuous layer of new ink on the ribbon. Fresh new ink helps extend printhead and ribbon life by acting as a lubricant for the printhead and a coolant for the ribbon to protect it from the heat of the pins. Dry ribbons tend to fray from the heat of the printer pins. Most ribbons can be re-inked at least 50 times, if not frayed or torn.

Ink and re-inking equipment is available for over 20,000 types and makes of printers. I have acquired equipment to re-ink black ribbons for myself and fellow members of the Phoenix Color Computer Club. For others who may want or need to avail themselves of this service, I will re-ink black cartridge ribbons for $3.00 each ppd. Money back if not satisfied. The ink used is a black, dot matrix, abrasive free, lubricant ink that is darker than most inks found on new ribbons.

At this time I am able to re-ink ribbons for the following printers: RS DMP105/107/130 thru 134; Panasonic KX-P110/115/145/1080/1090/1124/1180/1191/1524/1624/1592/1595/1695; and Roland DG PR 1010/1011/2417/2450. Upon request, I will purchase equipment for re-inking other makes.

Other services can be made available. That includes colored ribbons in Red, Green, Blue, Brown, Yellow, Purple, Orange, Gold, Silver, & White. Price example: RS DMP 130 colored ribbon cartridge $12.00 plus shipping. Minimum order of 2. Gold, Silver & White are $2.00 more each. New black and colored ribbons can be installed in used cartridges. Heat transfer ribbons are also available in black & colors. This requires the ability to produce a mirror image on 20lb bond, which can then be transfered with a hot iron. Special inks are black indelible (laundromat). Sunfast (UV resistant) in black, Green, Red & Blue. Black Optical Character Recognition (infrared). Multicolored & spool ribbons can be re-inked. Jet printer cartridge recharge kits. Laser printer kits.

For further information I can be reached at 4045 E. Crocus Drive, Phoenix, AZ 85032-5417; phone (602)971-5052; COCO national Echo; COCO Fidonet.

Cartridge ribbons to be re-inked may be sent to the same address along with check for $3.00 each. I provide a money back guarantee if you are not satisfied with the quality--just return the ribbon. Please don't send torn or frayed ribbons, they can't be re-inked and could damage my equipment (I inspect ribbons before re-inking).

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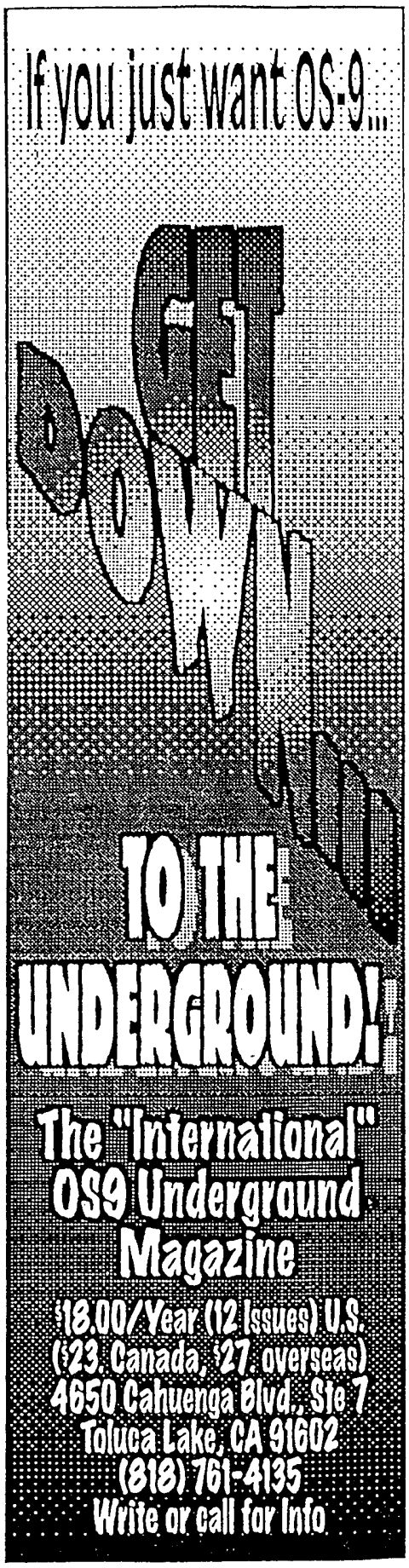

Micro News

New OS-9 LII BBS Software is available with EXTENSIVE features. In fact, it is probably the most feature rich system ever written for the CoCo. If any or ALL of this sounds interesting, call the primary support site at (616) 979-1858, 24 hrs, 7 days, 300-14400 bps. Three test sites are currently running this package, so far so good! Any questions about the software??? I'll answer what I can (some things still under development). Any comments about what you'd like to see? I'll try to put it in here for ya!

Nelson Howard
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X10 Master Control Program for OSK and K-Windows!

Some time ago there was a discussion on Delphi (OS-9 SIG) about how nice it would be to have an OSK system running the house and terminals connected throughout for individuals to use for gaming, word processing, etc. (one in the kids room, kitchen for recipes and such, pop's study to take care of bills, etc.). A similar concept was mentioned by Ed Gresick's letter to the editor in vol.1 number 2. Well, Zack Sessions of Color Systems has taken the first step- X-10 home control software for the MM/1 and standard OSK systems. Features include:

1) Dual user selectable interfaces. One is the "standard" K-Windows menu style interface. It has a menu bar of functions and a "toolbar" of quick action buttons. The other interface is in a "popup" style window which is "on top of" the window it was created on and only contains buttons for quick action. It is movable and resizable.

2) With the single click of your mouse you can now turn a light on or off. With an additional mouse drag of a slide bar you can dim a light to any of 16 discrete levels. With just a few more mouse clicks these actions can be performed on up to 16 remote modules at the same time. With menu bar functions you can access all modules available from your X10 Powerhouse Controller, a total of 256 different remote modules, with direct commands which are executed immediately or with programmed events which occur at the date, day and time you specify.

3) Store pre-programmed commands to turn units on or off or dimmed on any date and time or on repetitive times, like at 4PM every Tuesday. You can even have the X10 vary the time just slightly each repetition to give would be robbers the illusion of non-computer control.

4) You can save your configuration of known modules and current X10 program memory to a disk file for later recovery after a power failure and you were caught without a good battery! Access all other functions on the X10 like, display current base house code, display current date and time and even run an X10 diagnostic on the X10 controller via other menu bar functions, all using full mouse for input. Remote Module Identification is one of the only times you need to touch your keyboard while using the X10 Master Control Program from ColorSystems!

For pricing and ordering information, see the Color Systems ad in this issue or send Internet mail to colorsystems@delphi.com.

~~UUCPbb-UUCP for OS-9~~

UUCPbb is an update of the UUCP (Unix to Unix Communications Protocol) software Rick Adams wrote a few years ago for the Tandy Color Computer 3 running OS-9 Level 2. It gives you a way to hook your CoCo or OSK machine to the world UUCP network for exchanging email, news and files. New features include:

* Calling multiple systems from a single command line
* Ability to process mail after each call, after all calls, or a later time.
* Retrying a call every few minutes if the initial call fails
* Improved logging of call progress and error messages.
* Tested with other UUCPs
* Improved mailer
* Software to let you read and send Usenet news.
* Mini-listserver written and donated by Rick Adams. Now you, too, can be a fileserver!
* Utilities to do UUCP administrative chores.

UUCPbb is released as free software under the GNU General Public License, so it costs nothing! The official site for this and all updates will be chestnut.cs.wisc.edu. It will also be posted to Delphi, Compuserv, and various landline BBS. Official updates will always show up on chestnut first. It will probably be on the OS-9 mirror archive site, wuarchive, after a short while.

You will need a 512K (128K may work but it hasn't been tested) CoCo 3 running OS-9 Level 2, with a hard drive to run UUCPbb. Floppies may work, but it will be painfully slow. UUCPbb is distributed as C source only, so a compiler is required . Any OSK machine with either Microware's Ultra C or C compiler ver3.2 is acceptable. And of course, you need these files:

README.bb -brief summary of UUCPbb
uucpbb20.lzh -the source code
uucpbm20.lzh -docs and other files to make life easier

Not required but a good idea for OS-9/6809:

clib1990.lzh -this is the 1990 edition of Carl Kreider's CLIB
cc250.lzh -latest replacement of Carl Kreider's C compiler executive updated by Vaughn Cato. Definitely worth having!

All the archives were created with LHA211. To burst the archives under OS-9/6809, you will either need LHA211 or UNLZH7. UNLZH7.AR is available on chestnut.cs.wisc.edu. OSK users will need to use LHA v2.0.1 to burst the archives. Later versions of LHA will extract files with junk attached and give CRC errors.

Questions or comments can be sent by email to Bob Billson (bob@kc2wz.bubble.org). Share and enjoy! More is on its way!

~~New OS-9 Internet Mail-List~~

~~Alan Sheltra, editor of "OS-9 Underground",~~ is running a mini-listserv and mail list on his TC70. At present there are three mail lists: 1) FatCat, 2) OS9ers, 3) Sci_Fi. The FatCat list has been for discussion about the Underground, but is also open to discussion of other OS-9 related mags.

The OS9ers list is strictly for OS-9 discussion and not mag related, but you are welcome to subscribe to any or all. These lists are very much like the Cocolist. To subscribe, send email to: listserv@zog.wa.com, and in the body of your msg, type: subscribe (mail list) Real Name

Motorola has added a 50MHz 68060 to the 680x0 line. It is available both with or without a floating point unit built in. The '060 is expected to be used mainly in communications and networking equipment.

~~Recently, a company sent~~ unsolicited e-mail advertising to many Internet UseNet newsgroups. While advertising isn't barred from Internet, it is usually limited to being within the subject area of any group it is posted to. This particular incident involved an Arizona law firm advertising green-card services. Many users were enraged at getting "electronic junk mail" unrelated to the subjects that, in most cases, they were paying access fees to read. The company defended it's position by admitting that they were taking advantage of UseNet and that they got 30,000 responses. They didn't rule out doing it again either. On the good side (for the user), the firms Internet server received 450 megabytes of complaints— enough to overload the server. So if they want to try this again, they'll have to find a server willing to allow it first.

If you have new soft or hardware products, let us know! We will gladly print a free blurb for you here in MicroNews whether you advertise or not (though we will be happy to have your ad also).

~~Another long time computer~~ manufacturer has closed it's doors - Commodore Business Machines of Canada. Commodore officially closed on 29 April, 1994. They were well known during the "home computer" heyday of the 70s for building the popular Commodore 64. The replacement C=128 didn't fair as well, and the Commodore IBM compatible line didn't sell very well either. Commodore was most recently known for buying Amiga several years ago and increasing that computer's market. The Amiga has carved a decent niche for itself in the video field, mainly due to it's use of NTSC (standard TV) level video. In fact, the video market is small, but large enough that several companies are competing to buy manufacturing rights to the Amiga from the remnants of Commodore. The Amiga will surely carry on.

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